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Heart Sounds and Murmurs

1. A 66-year-old male presents with complaints of increasing dyspnea on exertion. On examination, heaving apex beat and carotid thrill were present. Auscultatory findings showed ejection systolic murmur with single S2. Which of the following is an incorrect transthoracic echocardiographic finding in this condition?

(or)

Which of the following is an incorrect transthoracic echocardiographic finding in aortic stenosis?

A. Calcification of valves

B. Ejection velocity > 4m/sec

C. Transvalvular gradient (LV -AO) > 40mmHg

D. Candle flame jet

---

2. A 2-month-old infant is brought to the pediatrician with symptoms of poor feeding, increased sweating on the forehead, and irritability. On examination, a continuous heart murmur is heard upon auscultation. Which of the following is not correct about this condition?

(or)

Which of the following clinical presentations regarding patent ductus arteriosus is incorrect?

A. Left to right shunt

B. Presents as isolated right ventricular failure

C. Increased risk of NEC

D. Narrow-split second heart sound

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3. A 50-year-old female presents to the clinic with complaints of exertional dyspnea and fatigue. Upon auscultation, the physician notes a narrow split second heart sound. Further evaluation is warranted to determine the underlying cause of this auscultatory finding. Which of the following conditions is not typically associated with a narrow split second heart sound?

(or)

Which of the following conditions is not typically associated with a narrow split second heart sound (S2)?

A. Aortic Stenosis

B. Hypertrophic Obstructive Cardiomyopathy

C. Wet Beriberi

D. Mitral regurgitation

---

4. A 6-month-old infant is brought to the pediatric cardiology clinic for evaluation due to a heart murmur noted by the parents. Upon examination, the physician identifies a ventricular septal defect (VSD). Further assessment is required to determine the specific type of VSD present in the infant. Which of the following types of VSD is the most common?

(or)

Which of the following types of VSD is the most common?

A. Perimembranous

B. Muscular

C. Supracristal

D. Sinus venosus

---

5. A 25-year-old female presents to the cardiology clinic for evaluation of a heart murmur. She reports experiencing occasional shortness of breath and fatigue but denies any chest pain or palpitations. On physical examination, a fixed split-second heart sound is noted, along with a prominent systolic ejection murmur along the left sternal border. Which of the following statements is incorrect about this condition?

(or)

Which of the following statements about atrial septal defect (ASD) is incorrect?

A. Low-pressure shunt

B. Right ventricle will have volume overloading

C. P2 will be delayed

D. Ostium Primum is the most common type of ASD

---

6. A 28-year-old female presents to the emergency department with palpitations and dizziness. On examination, she is found to have a regular rapid heart rate, and an electrocardiogram shows delta waves. Which of the following statements is not true regarding this condition?

(or)

Which of the following statements is not true regarding Wolf Parkinson White (WPW) Syndrome?

A. Pre-exciattion syndrome

B. Low cardiac output

C. Sudden cardiac death

D. Implantable cardioverter-defibrillator

---

7. During a routine physical examination, a physician auscultates the heart of a 25-year-old female patient. While listening at Erb's point, the physician hears a splitting of the heart sounds that varies with respiration. Where is Erb's point located?

(or)

Where is Erb's point located?

A. Erb's point is located at the third intercostal space on the left side along the parasternal line

B. Erb's point is located at the third intercostal space on the right side along the parasternal line

C. Erb's point is located at the fifth intercostal space on the left side along the midclavicular line

D. Erb's point is located at the fourth intercostal space on the right side along the midclavicular line

---

8. Which of the following statements regarding heart sounds is incorrect?

A. S1 & S2 are heard as lub & dub respectively

B. The duration of systole is less than diastole

C. Systole is the period between S1 & S2

D. The ejection click comes just after S2.

---

9. Which of the following is not a low-pitched heart sound?

A. S3

B. S4

C. S1

D. Murmur of mitral stenosis

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10. A 30-year-old male was brought to the clinic with breathlessness that increases while sitting and resolves on lying down. On auscultation, tumor plop sound and mid diastolic murmur are heard. Which of the following is the investigation of choice in this condition?

(or)

Which of the following is the investigation of choice for atrial myxoma?

A. Transthoracic echocardiography

B. Ultrasonography

C. ECG

D. Troponin

---

11. A 45-year-old male presents to the emergency department with complaints of chest pain at rest, night sweats, low-grade fever, involuntary weight loss, and pain radiating to the left shoulder. An ECG shows widespread ST elevation with concavity upwards. Which of the following auscultatory sound will be heard in this condition?

(or)

Which of the following is the auscultatory sound heard in tubercular pericarditis?

A. Pericardial friction rub

B. Mid to late diastolic murmur

C. S3

D. S4

---

12. A 50-year-old male presents to the emergency department with complaints of chest pain and shortness of breath. He is a known case of long-standing hypertension. Upon auscultation of the heart, the physician hears an additional heart sound just before the first heart sound. Which of the following is heard?

(or)

The additional heart sound heard just before the first heart sound (S1) in patients with long-standing hypertension is known as:

A. S2

B. S3

C. S4

D. S5

---

13. Which of the following conditions is most likely to cause a loud first heart sound (S1)?

A. Congestive Heart Failure

B. Hypothyroidism

C. Inferior Wall MI

D. Sick Sinus Syndrome

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14. A 55-year-old male presents to the cardiology clinic with complaints of palpitations and shortness of breath. On examination, an elevated jugular venous pressure (JVP) is noted, along with a cannon "A" wave. This is seen in which of the following condition?

(or)

Which of the following is the condition where a cannon 'A' wave is seen in JVP?

A. Tricuspid regurgitation

B. Pulmonic Stenosis

C. Mitral Stenosis

D. Ventricular tachycardia

---

15. A 25-year-old male was brought to the emergency department due to fainting. On examination, he has low blood pressure, S1, and S2 are muffled, and absent Y descent was seen in JVP. Which of the following is the treatment option in this condition?

(or)

Which of the following is the treatment option in the condition characterized by fainting, low blood pressure, muffled S1 and S2, and absent Y descent in JVP?

A. Echocardiographic guided pericardiocentesis

B. Transesophageal echocardiography

C. Balloon valvuloplasty

D. IV Digoxin

---

16. A 45-year-old female presents to the cardiology clinic with complaints of dyspnea on exertion, orthopnea, and paroxysmal nocturnal dyspnea. On examination, the physician notes a tapping apex beat and auscultates a loud S1 with a mid-diastolic murmur that accentuates with pre-systolic accentuation. Additionally, a narrow split S1 is heard on auscultation. Which conditions are most likely responsible for the patient's symptoms and examination findings?

(or)

Examination findings such as a tapping apex beat, loud S1, and a mid-diastolic murmur accentuated with pre-systolic accentuation are seen in?

A. Mitral regurgitation

B. Mitral stenosis

C. Aortic regurgitation

D. Aortic stenosis

---

17. A 45-year-old woman presents to the cardiology clinic with complaints of shortness of breath and fatigue on exertion. On examination, she is found to have a Mid-diastolic murmur heard best at the apex, along with signs of right-sided heart failure. A chest X-ray shows a straightening of the left heart border and a double atrial shadow. Which of the following is not typically associated with the workup of this condition?

(or)

Which of the following findings is not typically associated with the workup of Mitral Stenosis?

A. Increased duration of P wave on ECG

B. Narrowing of carinal angle on chest X-ray

C. Hockey stick sign on TTE

D. P-pulmonale

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18. A 55-year-old male presents to the cardiology clinic with complaints of exertional dyspnea and fatigue. On auscultation, a diastolic murmur is heard at the apex of the heart. An echocardiogram confirms severe aortic regurgitation. Which of the following is the murmur typically associated with this condition?

(or)

Which of the following is the murmur typically associated with severe aortic regurgitation?

A. Graham Steele murmur

B. Austin Flint Murmur

C. Seagull murmur

D. Carey Coombs murmur

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19. A 32-year-old male presents to the cardiology clinic with complaints of chest pain and shortness of breath. On auscultation, a continuous murmur is heard during both systole and diastole. Which of the following conditions is least likely to present with a continuous murmur?

(or)

Which of the following conditions is least likely to present with a continuous murmur?

A. Coarctation of aorta

B. Patent ductus arteriosus

C. Peripheral pulmonary stenosis

D. Rheumatic heart disease

---

20. A 50-year-old male presents to the cardiology clinic with complaints of chest pain and dyspnea on exertion. On examination, a systolic murmur is auscultated along the left sternal border, which increases in intensity with maneuvers that decrease left ventricular volume. Which of the following is the echocardiography finding that will be seen in this case?

(or)

Which of the following is the echocardiography finding seen in hypertrophic obstructive cardiomyopathy?

A. Systolic anterior movement of the mitral valve

B. Systolic posterior movement of the mitral valve

C. Systolic medial movement of the mitral valve

D. Systolic lateral movement of the mitral valve

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21. A 22-year-old female presents to the clinic with complaints of intermittent chest pain and exertional dyspnea. On examination, a brachio-femoral pulse delay is noted. This patient is a known case of 45 XO syndrome and also exhibits signs of cyanosis in her toes but has pink fingers. Which of the following statements is true regarding the auscultatory findings in this patient?

(or)

Which of the following statements is true regarding the auscultatory findings in the coarctation of the aorta?

A. The murmur peaks at S1

B. The murmur is heard predominantly in diastole

C. The murmur is continuous and peaks at S2

D. The murmur is loudest at the apex of the heart

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	2
Question 3	4
Question 4	1
Question 5	4
Question 6	4
Question 7	1
Question 8	4
Question 9	3

Question 10	1
Question 11	1
Question 12	3
Question 13	1
Question 14	4
Question 15	1
Question 16	2
Question 17	2
Question 18	2
Question 19	4
Question 20	1
Question 21	3

Solution for Question 1:

Correct Option D - Candle flame jet:

• Transthoracic echocardiography (TTE) is an essential tool for diagnosing Aortic stenosis.

• It provides valuable information such as the size of the reduced orifice, ejection velocity >4m/sec, and transvalvular gradient (LV -AO) >40mmHg.

• Candle flame jet is seen in mitral stenosis.

Incorrect Options:

Options A, B, C:

• These are the correct echocardiographic findings seen in aortic stenosis.

Solution for Question 2:

Correct Option B - Presents as isolated right ventricular failure:

• Patent ductus arteriosus is characterized by a left-to-right shunt, where blood flows from the higher-pressure systemic circulation to the lower-pressure pulmonary circulation due to the persistence of the ductus arteriosus after birth.

• This leads to increased pulmonary blood flow and left ventricular overload and presents as left-sided heart failure.

• However, biventricular failure will later ensue.

Incorrect Options:

Option A - Left to right shunt: This is a characteristic feature of PDA, as described above.

Option C—Increased risk of NEC: In PDA, the shunting of blood to the pulmonary artery reduces the s planchnic circulation, leading to an increased risk of necrotizing enterocolitis.

Option D - Narrow-split second heart sound: It occurs due to left ventricular failure.

Solution for Question 3:

Correct Option D - Mitral regurgitation:

• Mitral regurgitation causes early A2 and wide split S2.

• A narrow split second heart sound (S2) refers to a decreased interval between the closure of the aortic and pulmonic valves during expiration.

• This phenomenon occurs due to conditions that prolong the ejection time of the left ventricle relative to the right ventricle, leading to a closer timing of closure of the aortic and pulmonic valves.

• Conditions associated with a narrow split S2 include Aortic Stenosis, Hypertrophic Obstructive Cardiomyopathy, and Wet Beriberi.

Incorrect Options:

Option A - Aortic Stenosis: Aortic stenosis is associated with a narrow split S2 due to the prolongation of left ventricular ejection time.

Option B
- Hypertrophic Obstructive Cardiomyopathy: Hypertrophic obstructive cardiomyopathy can lead to a narrow split S2, especially when subvalvular obstruction is present.

Option C - Wet Beriberi: Wet Beriberi, a manifestation of thiamine deficiency, can result in a narrow split S2 due to impaired cardiac function and prolonged left ventricular ejection time.

Solution for Question 4:

Correct Option A - Perimembranous:

• The most common type of VSD is the perimembranous type, which is found in 80% of cases.

• This type of VSD is located in the membranous portion of the ventricular septum.

Incorrect Options:

Option B - Muscular: Muscular VSDs, also known as trabecular or mid-muscular VSDs, are located wit hin the muscular portion of the ventricular septum. It may undergo spontaneous closure.

Option C - Supracristal: Supracristal VSDs, also known as conal or outlet VSDs, are situated above the level of the aortic valve. They are less common than perimembranous VSDs.

Option D - Sinus venosus: Sinus venosus defects are a type of atrial septal defect (ASD), not VSDs. T hey involve the atrial septum, specifically the area where the superior or inferior vena cava enters the ri ght atrium.

Solution for Question 5:

Correct Option D - Ostium Primum is the most common type of ASD:

• Wide fixed split S2 is a key finding seen in atrial septal defect.

• The statement that "Ostium Primum is the most common type of ASD" is incorrect. The most common type of ASD is Ostium Secundum, accounting for approximately 70-80% of all ASD cases. Ostium Primum defects are less common and account for a smaller proportion of cases.

Incorrect Options:

Option A - Low-pressure shunt: ASD is a low-pressure left-to-right shunt with a gradient of 4 mm Hg. This leads to overloading of the right atrium.

Option B - Right ventricle will have volume overloading: Due to the left-to-right shunt, the right ventricle experiences volume overload as it receives excess blood from the left atrium. Over time, this can lead t o right ventricular enlargement and dysfunction.

Option C
- P2 will be delayed: This delay is primarily due to delayed closure of the pulmonic valve (P2) as a resu lt of increased blood flow to the right heart. Since the normal split of S2 that occurs with respiration is c anceled due to shunt, it is called wide fixed split S2.

Solution for Question 6:

Correct Option D - Implantable cardioverter-defibrillator:

• In Wolf Parkinson White (WPW) Syndrome, radiofrequency ablation is done to destroy the accessory pathway.

• An implantable cardioverter-defibrillator is used to terminate tachyarrhythmias.

Incorrect Options:

Option A
- Pre-excitation syndrome: This is correct, as the bundle of Kent does not have decremental property.

Option B - Low cardiac output: This is correct as the ventricles do not get enough time to get filled with blood and contract prematurely.

Option C - Sudden cardiac death: True. A fast beating heart can cause crashing of blood pressure.

Solution for Question 7:

Correct Option A
- Erb's point is located at the third intercostal space on the left side along the parasternal line:

• Erb's point is located at the third intercostal space on the left side along the parasternal line.

• It is the area where the physiological splitting of heart sounds is best heard. Physiological splitting varies with respiration and is approximately less than 30 milliseconds. This is typically heard during

inspiration.

Incorrect Options:

Option B, C, and D: These options do not represent the location of Erb's point.

Solution for Question 8:

Correct Option D - The ejection click comes just after S2:

• The ejection click typically occurs just after S1.

• It is associated with the opening of the semilunar valves (aortic and pulmonary) during the initial phase of ventricular systole.

• After S2, opening snap is present.

Incorrect Options:

Option A - S1 & S2 are heard as lub & dub respectively: This statement is correct. S1 represents the cl osure of the mitral and tricuspid valves (lub), while S2 represents the closure of the aortic and pulmona ry valves (dub).

Option B - The duration of systole is less than diastole: This statement is correct.

Option C - Systole is the period between S1 & S2: This statement is correct. Systole begins with the cl osure of the mitral and tricuspid valves (S1) and ends with the closure of the aortic and pulmonary valv es (S2).

Solution for Question 9:

Correct Option C - S1:

• S1 is a high-pitched sound caused by the closure of the mitral and tricuspid valves during ventricular systole.

• It is best heard using the diaphragm of the stethoscope.

Incorrect Options:

Option A - S3: S3 is a low-pitched heart sound that occurs due to rapid early diastolic filling of the ventr icles. It is often heard in conditions such as heart failure and volume overload.

Option B - S4: S4 is another low-pitched heart sound caused by atrial contraction against a stiffened ve ntricle during late diastole. It is commonly associated with conditions like hypertension and ischemic he art disease.

Option D - Murmur of mitral stenosis: The murmur of mitral stenosis is typically a low-pitched rumbling sound heard during mid-diastole. It is best appreciated using the bell of the stethoscope due to its low f requency.

Solution for Question 10:

Correct Option A - Transthoracic Echocardiography:

• The condition described in the question is atrial myxoma.

• It is characterized by breathlessness while sitting that resolves when lying down (platypnea), dyspnea when exerting effort, effort intolerance, and a transient ischemic attack.

• Auscultation reveals a tumor plop sound with a mid or late diastolic murmur.

Incorrect Options:

Options B, C & D:

• These are not the investigation of choices in Atrial myxoma

Solution for Question 11:

Correct Option A - Pericardial friction rub:

• A pericardial friction rub is a characteristic auscultatory finding in tubercular pericarditis.

• This sound is produced by the rubbing of inflamed pericardial surfaces against each other during cardiac contraction and relaxation.

• It can be differentiated from pleural rub as a sound that persists on breath holding.

• It is typically heard as a scratching or grating sound and is best appreciated when the patient is sitting up and leaning forward.

Incorrect Options:

Option B
- Mid to late diastolic murmur: Mid diastolic murmur is heard in mitral stenosis and tricuspid stenosis.

Option C - S3: S3 is associated with conditions such as heart failure.

Option D - S4: S4 is heard in hypertrophic cardiomyopathy, hypertension, or conditions causing left ven tricular hypertrophy.

Solution for Question 12:

Correct Option C - S4:

• The additional heart sound heard just before the first heart sound (S1) in patients with long-standing hypertension is known as S4. This sound is caused by the atria generating more power due to left atrial hypertrophy secondary to left ventricular hypertrophy.

• The turbulence produced by the increased atrial power creates the S4 sound.

Incorrect Options:

Option A - S2: The second heart sound (S2) is typically heard at the beginning of the diastole, marking the closure of the aortic and pulmonic valves.

Option B - S3: The third heart sound (S3) is heard during the rapid ventricular filling phase and is norm al in children, pregnant women, and adults up to 35 years of age. It is not specifically associated with lo ng-standing hypertension.

Option D - S5: There is no fifth heart sound (S5) described in standard cardiac auscultation.

Solution for Question 13:

Correct Option A - Congestive Heart Failure:

• Congestive heart failure is a condition characterized by impaired cardiac function leading to abnormal filling of the ventricles and tachycardia.

• In this condition, the mitral valve apparatus is subjected to increased tension during ventricular systole, resulting in a louder closure of the mitral valve and, thus, a louder S1.

Incorrect Options:

Options B, C & D:

• Hypothyroidism, inferior wall MI, and sick sinus syndrome produce a soft S1.

• These conditions have a common finding of bradycardia.

Solution for Question 14:

Correct option D - Ventricular tachycardia:

• Ventricular tachycardia is a condition where a cannon A wave is seen in JVP

• Other conditions where a cannon A wave is seen in JVP are:

Incorrect Options:

Options A, B & C:

Solution for Question 15:

Correct Option A - Echocardiographic guided pericardiocentesis:

• Echocardiographic-guided pericardiocentesis is the primary treatment for cardiac tamponade leading to compression of the heart chambers and diastolic collapse of ventricles.

• This compression results in symptoms such as fainting (syncope), low blood pressure (hypotension), muffled heart sounds (S1 and S2), and an absent Y descent in the jugular venous pulse (JVP).

• Pericardiocentesis, guided by echocardiography, allows for the drainage of the pericardial fluid, relieving the pressure on the heart and improving hemodynamic stability.

Incorrect Options:

Option B
- Transesophageal echocardiography: It may aid in the diagnosis of cardiac tamponade but is not a treatment modality.

Option C - Balloon valvuloplasty: Balloon valvuloplasty is a procedure used to treat certain types of val vular heart disease, such as mitral stenosis or aortic stenosis, and is not indicated for cardiac tampona de.

Option D - IV Digoxin: Digoxin is a medication used to manage certain heart conditions, such as heart f ailure and atrial fibrillation, but it is not indicated for treating cardiac tamponade.

Solution for Question 16:

Correct Option B - Mitral stenosis:

• The patient's clinical presentation, including dyspnea on exertion, orthopnea, and paroxysmal nocturnal dyspnea, along with examination findings such as a tapping apex beat, loud S1, and a mid-diastolic murmur accentuated with pre-systolic accentuation, suggest mitral stenosis.

• Additionally, the presence of a narrow split S1 further supports the diagnosis of mitral stenosis.

• In mitral stenosis, the narrowing of the mitral valve orifice leads to increased left atrial pressure, resulting in symptoms of pulmonary congestion and the characteristic auscultatory findings described.

Incorrect Options:

Option A - Mitral regurgitation: Mitral regurgitation typically presents with a holosystolic murmur and is not associated with a narrow split S1 or mid-diastolic murmur.

Option C - Aortic regurgitation: Aortic regurgitation is characterized by a diastolic murmur heard best at the left sternal border and is not typically associated with a narrow split S1 or mid-diastolic murmur.

Option D - Aortic stenosis: Aortic stenosis presents with a systolic murmur heard best at the right upper sternal border and is not associated with a narrow split S1 or mid-diastolic murmur.

Solution for Question 17:

Correct Option B - Narrowing of carinal angle on chest X-ray:

Workup Findings in mitral stenosis

• Chest X-Ray: Straightening of left heart border: Suggests left atrial enlargement. Double atrial shadow/ Double atrial contour: Indicative of double contour of the atria, commonly seen in cases of left atrial enlargement. Widening of carinal angle (Tracheal bifurcation) is seen, and not narrowing.

• Straightening of left heart border: Suggests left atrial enlargement.

• Double atrial shadow/ Double atrial contour: Indicative of double contour of the atria, commonly seen in cases of left atrial enlargement.

• Widening of carinal angle (Tracheal bifurcation) is seen, and not narrowing.

• Straightening of left heart border: Suggests left atrial enlargement.

• Double atrial shadow/ Double atrial contour: Indicative of double contour of the atria, commonly seen in cases of left atrial enlargement.

• Widening of carinal angle (Tracheal bifurcation) is seen, and not narrowing.

Incorrect Options:

Option A, C, D:

ECG:

• Increased duration of P wave

• Increased height of P wave

• P-pulmonale: Height of P wave >2.5 mm due to pulmonary artery hypertension

• Transthoracic Echocardiography (TTE): IOC (Indications of Cardiac Structure): Candle flame jet: A characteristic finding in mitral regurgitation, where the regurgitant flow appears like a candle flame on echocardiography. Hockey stick sign: Typically seen in aortic dissection, where there is a disruption of the intima leading to a false lumen formation, resembling the shape of a hockey stick.

• Candle flame jet: A characteristic finding in mitral regurgitation, where the regurgitant flow appears like a candle flame on echocardiography.

• Hockey stick sign: Typically seen in aortic dissection, where there is a disruption of the intima leading to a false lumen formation, resembling the shape of a hockey stick.

• Candle flame jet: A characteristic finding in mitral regurgitation, where the regurgitant flow appears like a candle flame on echocardiography.

• Hockey stick sign: Typically seen in aortic dissection, where there is a disruption of the intima leading to a false lumen formation, resembling the shape of a hockey stick.

Solution for Question 18:

Correct Option B - Austin Flint Murmur:

• Austin Flint murmur is a mid-diastolic murmur heard at the apex of the heart and is due to severe aortic regurgitation.

• This murmur results from the regurgitant flow from the aorta impinging on the anterior leaflet of the mitral valve, leading to vibration and turbulence in the left ventricular inflow.

Incorrect Options:

Option A - Graham Steele murmur: Associated with pulmonary artery hypertension leading to mild pul monic regurgitation.

Option C - Seagull murmur: Associated with mild aortic regurgitation.

Option D
- Carey Coombs murmur: Associated with rheumatic heart disease and acute rheumatic fever.

Solution for Question 19:

Correct Option D - Rheumatic heart disease:

• Rheumatic heart disease typically presents with murmurs characteristic of valvular involvement, such as Carey Coombs murmur, which is a late diastolic murmur.

Incorrect Options:

• Options A, B & C are present with a continuous murmur due to a high pressure gradient.

Solution for Question 20:

Correct Option A - Systolic anterior movement of the mitral valve (SAM):

• A key finding in hypertrophic cardiomyopathy is a murmur that increases with decrease of LV volume. This murmur behaves opposite of what is seen with other left-sided murmurs.

• In hypertrophic obstructive cardiomyopathy (HOCM), systolic anterior movement of the mitral valve (SAM) is a characteristic echocardiography finding.

• SAM occurs when the hypertrophied septum obstructs the outflow tract, causing the mitral valve leaflet to be anteriorly displaced during systole.

• This movement contributes to left ventricular outflow tract obstruction and is commonly associated with a harsh systolic murmur heard along the left sternal border.

Incorrect Options:

Options B, C, D:

• These are not the appropriate echocardiography findings seen in HCM.

Solution for Question 21:

Correct Option C - The murmur is continuous and peaks at S2:

• In coarctation of the aorta, a continuous murmur is often heard due to the development of collateral vessels.

• This murmur is best heard in systole but may extend into diastole, and it typically peaks at S2.

• The continuous nature of the murmur is a result of blood flow across the coarctation site throughout the cardiac cycle.

• Prior to extensive development of the collaterals, a systolic ejection murmur is heard.

Incorrect Options:

Option A - The murmur peaks at S1: In coarctation of the aorta, the murmur typically peaks at S2.

Option B - The murmur is heard predominantly in diastole: While the murmur may extend into diastole, it is typically heard throughout the cardiac cycle and peaks at S2.

Option D - The murmur is loudest at the apex of the heart: In coarctation of the aorta, the murmur is typ ically heard over the left sternal border, not at the apex.

Valvular Disease

1. A 63-year-old male presents to the clinic complaining of fatigue, shortness of breath, and occasional palpitations. He has a medical history of hypertension and hyperlipidemia, for which he takes medications regularly. He appears tired, and his blood pressure is 140/90 mmHg. Auscultation reveals a pansystolic murmur best heard at the apex, radiating to the axilla. What is the most likely diagnosis?

(or)

What is the most likely diagnosis for a patient with fatigue, shortness of breath, occasional palpitations, pallor, and a pansystolic murmur best heard at the apex radiating to the axilla?

A. Aortic stenosis

B. Mitral regurgitation

C. Ventricular septal defect

D. Tricuspid regurgitation

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2. A 42-year-old female presents to the clinic due to occasional palpitations, mild exertional shortness of breath, and chest discomfort. Her blood pressure is 120/80 mmHg, heart rate is 82 beats per minute, and regular. There is a mid-systolic click heard best at the apex, followed by a late systolic murmur. The murmur increases in intensity with the Valsalva maneuver and decreases with squatting.Which of the following additional finding can not be found in this patient?

(or)

What additional finding is less likely to be present in an otherwise healthy patient with a mid-systolic click followed by a late systolic murmur that intensifies with the Valsalva maneuver and decreases with squatting?

A. Fibrillin-1 protein defect

B. Hyperextended joints

C. Sacroiliitis

D. Blue sclera

---

3. A 45-year-old male, presents to the clinic with fatigue, exertional dyspnea, and swelling in his legs for the past few months. There is bilateral pitting edema in his lower limbs and an elevated jugular venous pressure. Auscultation reveals a soft, low-pitched, rumbling sound following S2. Which of the following conditions will match the given clinical profile?

(or)

Which of the following will have auscultatory finding of a soft, low-pitched, rumbling sound following S2?

A. Aortic Stenosis

B. Hypertrophic Cardiomyopathy

C. Atrial Fibrillation

D. Chronic Mitral regurgitation

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4. A 25-year-old female with a webbed neck presents to the clinic complaining of mild exercise intolerance and occasional palpitations. A fourth heart sound and a systolic ejection murmur over the left upper sternal border are heard on auscultation. Which of the following chromosomal defects is most likely to be associated with her condition?

(or)

What chromosome defect is most commonly associated with the presence of a fourth heart sound and systolic ejection murmur over the left upper sternal border in a young woman with a congenital heart disease?

A. Chromosome 21

B. Chromosome 12

C. Chromosome 13

D. Chromosome 18

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5. A 32-year-old male presents to the clinic due to palpitations, fatigue, and right upper quadrant discomfort due to hepatomegaly. Auscultation reveals a pansystolic murmur that is louder on inspiration. ECG shows right axis deviation. Echocardiography reveals defective coaptation of leaflets, and there is leakage of blood from the right ventricle to the right atrium with reverse systolic flow in the liver on a Doppler. Which of the following JVP findings would be found in this patient?

(or)

What JVP findings are likely to be observed in a patient with defective coaptation of leaflets, and blood leakage from the right ventricle to right atrium with reverse systolic flow in the liver?

A. Large a wave

B. Giant CV wave

C. Blunted y descent

D. Steep x descent

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6. A 60-year-old male presents to the clinic due to fatigue and leg swelling for the past few weeks. On examination, jugular venous distention, hepatomegaly, and peripheral edema are noted. A mid-diastolic murmur is heard over the lower left sternal border. The patient's history is significant for balloon dilatation done for rheumatic heart disease. What is the most likely underlying cause?

(or)

What is the most likely cause of right heart failure in a patient with a history of rheumatic heart disease?

A. Tricuspid stenosis

B. Pulmonic stenosis

C. Aortic regurgitation

D. Mitral regurgitation

---

7. A 65-year-old male presents to the clinic due to shortness of breath on exertion, chest pain, and occasional fainting episodes. His blood pressure is elevated. Cardiac auscultation reveals a narrowly split S2 and a murmur over the right upper sternal border. Which of the following murmurs would be found in this patient?

(or)

Which murmur is present in an elderly patient with a triad of exertional dyspnea, angina, and syncope?

A.

B.

C.

D.

---

8. A 60-year-old male with long-standing hypertension visits a clinic for a routine check-up. He mentions occasional episodes of exertional dyspnea and fatigue. His blood pressure is elevated, and an irregularly irregular heart rhythm is noted. A low-pitched sound is heard immediately preceding the first heart sound on auscultation. No other abnormalities are present. Which of the following is the possible explanation of the low-pitched sound?

(or)

What is the likely explanation for a low-pitched sound heard immediately preceding the first heart sound in a patient with long-standing hypertension?

A. Rapid passive ventricular filling

B. Increased stiffness of left ventricular wall

C. Closure of pulmonic valve

D. Restricted motion of aortic cusps

---

9. A 60-year-old female presents to the clinic with complaints of exertional dyspnea and occasional chest discomfort. She has had well-controlled hypertension for the past five years. A systolic murmur is heard over the right upper sternal border on cardiac auscultation. Her family history is remarkable for cardiovascular diseases. Which of the following is not related to this presentation?

(or)

Which of the following is unrelated to a woman's exertional dyspnea, chest discomfort, well-controlled hypertension, and a systolic murmur heard over the right upper sternal border?

A. Turner syndrome

B. Rheumatic heart disease

C. NOTCH 3 gene

D. Shone complex

---

10. A 40-year-old female presents to a clinic complaining of breathlessness and chest pain on exertion. She feels uncomfortable in the supine position. Examination reveals capillary pulsations in the nail bed, single S2 with an early diastolic murmur. Echocardiography shows LVEF = 42 %. What is the most likely diagnosis?

(or)

What is the likely diagnosis of a condition that causes capillary pulsations in the nail bed, a single S2, an early diastolic murmur, and LVEF of 42% on echocardiography?

A. VSD

B. ASD

C. Aortic Regurgitation

D. Severe pulmonary regurgitation

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11. A 45-year-old male presents to a clinic with progressively worsening fatigue, shortness of breath, and palpitations over the past few months. He has history of rheumatic fever during childhood. On examination, you note a wide pulse pressure, a diastolic murmur best heard at the left sternal border, and bounding peripheral pulses. An echocardiogram reveals a dilated left ventricle. On auscultation, a pistol shot sound is heard over the femoral artery. What is this sign known as?

(or)

What is the term used for the 'pistol shot sound' over the femoral artery on auscultation in a patient with a history of rheumatic fever, a diastolic murmur, and a dilated left ventricle?

A. Traube’ sign

B. De Musset’s sign

C. Hill’s sign

D. Duroziez’ sign

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	3
Question 3	4
Question 4	2
Question 5	2
Question 6	1
Question 7	1
Question 8	2
Question 9	3
Question 10	3
Question 11	1

Solution for Question 1:

Correct Option B - Mitral regurgitation:

• The patient's clinical presentation, including fatigue, shortness of breath, and a pansystolic murmur at the apex radiating to the axilla, is highly suggestive of mitral regurgitation.

• Tricuspid regurgitation also has pansystolic murmur but it does not radiate to the axilla.

Incorrect Options:

Option A - Aortic stenosis:

• Exertional dyspnea, angina pectoris, and syncope are three cardinal symptoms.

• The classic murmur is a systolic ejection murmur, which is heard best at the right upper sternal border and radiates to the carotid arteries.

Option C - Ventricular septal defect:

• The murmur of a VSD is typically a holosystolic murmur heard best at the left lower sternal border.

• This condition has a pediatric onset.

Option D - Tricuspid regurgitation:

• The murmur of tricuspid regurgitation is typically pansystolic and best heard at the lower left sternal border.

Solution for Question 2:

Correct Option C – Sacroiliitis:

• In this patient, the presence of a mid-systolic click followed by a late systolic murmur suggests mitral valve prolapse. Mitral valve prolapse is a condition characterized by the displacement of the mitral valve leaflets into the left atrium during systole. Patients are often asymptomatic but can cause symptoms such as palpitations, chest discomfort, and shortness of breath, especially with exertion.

• Causes of MVP: Myxomatous degeneration of Mitral Valve apparatus Marfan syndrome Ehlers-Danlos Syndrome Osteogenesis imperfecta Antero-posterior diameter decrease Rheumatic fever Subacute bacterial endocarditis Dilated cardiomyopathy Ostium secundum ASD

• Myxomatous degeneration of Mitral Valve apparatus

• Marfan syndrome

• Ehlers-Danlos Syndrome

• Osteogenesis imperfecta

• Antero-posterior diameter decrease

• Rheumatic fever

• Subacute bacterial endocarditis

• Dilated cardiomyopathy

• Ostium secundum ASD

• Among the options given, the finding that is not associated with this patient is sacroiliitis.

• Sacroiliitis refers to inflammation of the sacroiliac joints, typically seen in conditions such as ankylosing spondylitis or other forms of spondyloarthropathy. It is not directly related to mitral valve prolapse.

Incorrect Options:

Option A - Fibrillin-1 protein defect: Defect in fibrillin-1 is associated with Marfan syndrome and can hav e mitral valve prolapse, along with other features such as aortic root dilatation, hyperextensible joints, a nd a tall and slender body habitus.

Option B - Hyperextended joints: Hyperextended joints are often seen in patients with connective tissue disorders, such as Ehlers-Danlos syndrome or Marfan syndrome. Joint hypermobility can be a feature of these conditions and can coexist with mitral valve prolapse.

Option D - Blue sclera: It is seen in conditions such as osteogenesis imperfecta, a genetic disorder characterized by brittle bones. While blue sclera is not specific to mitral valve prolapse, it can occur in some connective tissue disorders that may also be associated with MVP.

Solution for Question 3:

Correct Option D – Chronic Mitral Regurgitation (MR):

• The auscultatory sound, described as a soft, low-pitched, rumbling sound following S2 is a flow murmur due to increased flow across the mitral valve.

• The blood that leaks from LV to LA has to flow back to LV during diastole.

Incorrect Options:

Option A - Aortic Stenosis: Aortic stenosis produces a systolic ejection murmur.

Option B - Hypertrophic Cardiomyopathy: Hypertrophic Cardiomyopathy produces an ejection systolic murmur heard at the left sternal border, which increases with Valsalva maneuver and decreases with squatting.

Option C - Atrial Fibrillation: Atrial Fibrillation is an irregular heart rhythm characterized by rapid and chaotic atrial contractions.

Solution for Question 4:

Correct Option B - Chromosome 12:

• The murmur and other clinical findings in this young patient are consistent with the diagnosis of pulmonic stenosis.

• Auscultatory findings in pulmonic stenosis: Ejection systolic murmur Presence of S4, soft, single S2, normal A2, and soft P2

• Ejection systolic murmur

• Presence of S4, soft, single S2, normal A2, and soft P2

• Pulmonic stenosis is one of the common cardiac abnormalities observed in individuals with Noonan syndrome.

• Noonan syndrome is caused by mutations in several genes, including the PTPN11 gene located on chromosome 12.

Incorrect Options:

Option A Chromosome 21: Defects in chromosome 21 result in Down syndrome. It is associated with the atrial septal defect, ventricular septal, and patent ductus arteriosus.

Option C Chromosome 13: Defects in chromosome 13 lead to Patau syndrome. Cardiac abnormalities associated with this syndrome include ASD, VSD, PDA, and Tetralogy of Fallot.

Option D Chromosome 18: Edward syndrome results from trisomy 18. Associated cardiac abnormalitie s are ASD, VSD, and PDA.

Solution for Question 5:

Correct Option B - CV wave:

• The constellation of findings suggests the diagnosis of tricuspid regurgitation in this patient.

• A pansystolic murmur can be heard which increases on inspiration. This is known as the Caravallo Sign.

• Dilation of the right chambers will cause right axis deviation.

• The clinician would observe a giant CV wave in the jugular venous pressure findings in this patient with TR.

Incorrect Options:

Option A - Large a wave: The a wave in the JVP represents atrial contraction and is typically elevated i n conditions such as tricuspid stenosis.

Option C - Blunted y descent: The "y" descent in the JVP represents the rapid emptying of blood from t he right atrium into the right ventricle during diastole. In tricuspid regurgitation, the y descent will be exaggerated.

Option D - Steep x descent: Tricuspid regurgitation shows absent "x" descent.

Solution for Question 6:

Correct Option A - Tricuspid stenosis:

• Based on the patient's symptoms and examination findings, the most likely cause is tricuspid stenosis.

• It usually unmasks after percutaneous mitral balloon valvuloplasty done for mitral stenosis.

• This results in increased pressure in the right atrium, leading to jugular venous distention, hepatomegaly (enlarged liver), and peripheral edema (swelling in the legs). The diastolic murmur heard over the lower left sternal border is a characteristic finding in tricuspid stenosis.

Incorrect Options:

Option B - Pulmonic stenosis: Pulmonic stenosis primarily affects the flow of blood from the right ventri cle to the pulmonary artery and is associated with a systolic murmur heard over the left upper sternal border.

Option C - Aortic regurgitation: It produces early or mid-diastolic murmur.

Option D - Mitral regurgitation: It produces pansystolic murmur.

Solution for Question 7:

Correct Option A -

• The clinical presentation of exertional dyspnea, angina, and syncope, along with a murmur auscultated over the right upper sternal border, is highly suggestive of Aortic Stenosis (AS). Aortic stenosis is characterized by a narrowing of the aortic valve, leading to obstruction of blood flow from the left ventricle to the aorta.

• The murmur is typically a systolic ejection murmur, also known as a crescendo-decrescendo murmur. It starts after the first heart sound (S1) and peaks in intensity in mid-systole. Then, it gradually decreases in intensity as blood is ejected from the left ventricle.

Incorrect Options:

Option B - Holosystolic murmur at apex: Characteristic of mitral regurgitation (MR), where blood flows back from the left ventricle to the left atrium during systole due to a dysfunctional mitral valve.

Option C - Midsystolic click followed by systolic murmur: Characteristic of mitral valve prolapse (MVP), where the mitral valve leaflets prolapse into the left atrium during systole.

Option D - Opening snap followed by mid-diastolic murmur: Characteristic of mitral stenosis (MS), wher e the mitral valve is narrowed, causing obstruction of blood flow from the left atrium to the left ventricle during diastole.

Solution for Question 8:

Correct Option B - Increased stiffness of left ventricular wall:

• The additional low-pitched sound heard immediately preceding the first heart sound (S1) in this patient is likely the fourth heart sound (S4). The S4 sound is an extra heart sound that occurs during late diastole, just before the first heart sound (S1).

• It is caused by the rapid active ventricular filling of blood into the stiffened left ventricle.

• In patients with long-standing hypertension and left ventricular hypertrophy, the left ventricle can become stiff and less compliant, making it harder for the ventricle to relax and fill with blood during diastole. T

• his increased stiffness of the left ventricular wall is responsible for producing the S4 sound.

Incorrect Options:

Option A - Rapid passive ventricular filling: Rapid passive ventricular filling is associated with the third heart sound (S3), which occurs in early diastole. The S3 sound is often heard in conditions such as con gestive heart failure.

Option C
- Closure of the pulmonic valve: The pulmonic valve closure produces the P2 sound, which is a component of the second heart sound (S2) and is heard over the left upper sternal border.

Option D - Restricted motion of aortic cusps:

• Restricted motion of aortic cusps is observed in aortic stenosis.

• The typical murmur is a high-pitched, "diamond-shaped" crescendo-decrescendo, midsystolic ejection murmur heard best at the right upper sternal border radiating to the neck and carotid arteries.

• AS can also cause LV hypertrophy and production of S4. However, there is no evidence of AS in this patient with hypertension.

Solution for Question 9:

Correct Option C - NOTCH 3 gene:

• The patient's clinical presentation and a systolic murmur over the right upper sternal border are suggestive of aortic stenosis.

• Aortic stenosis is characterized by narrowing of the aortic valve opening, which can lead to obstruction of blood flow from the left ventricle to the aorta.

• The NOTCH 3 gene is associated with cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL), a hereditary small vessel disease that affects the brain's blood vessels. It is unrelated to AS.

• Mutations in the NOTCH 1 gene are associated with bicuspid aortic valve disease predisposing to AS.

Incorrect Options:

Option A - Turner Syndrome: Turner Syndrome is associated with a high incidence of aortic valve abno rmalities, especially bicuspid aortic valve, which is one of the causes of aortic stenosis.

Option B - Rheumatic Heart Disease: Rheumatic fever, caused by an untreated streptococcal infection, can lead to inflammation and damage to heart valves, including the aortic valve. Rheumatic heart dise ase is one of the causes of aortic stenosis.

Option D - Shone Complex: Shone complex is a combination of cardiac defects that can lead to left-sid ed heart obstruction, including aortic stenosis. It is associated with pediatric aortic stenosis. Componen t of this complex:

Solution for Question 10:

Correct Option C - Aortic Regurgitation:

• Clinical findings of capillary pulsations in the nail bed, called Quincke’s Sign, a single S2, and an early diastolic murmur in the setting of chest pain on exertion and breathlessness reflect a diagnosis of aortic regurgitation, which occurs due to inadequate closure of the aortic valve.

• Key–Hodgkin murmur is the diastolic murmur of AR with a raspy quality, likened to the sound of a 'saw cutting through wood.'

• A single S2 is due to inadequate closure of aortic valves, which eliminates the A2 component.

• Hence, only the P2 component is heard due to the closure of pulmonary valves.

Incorrect Options:

Option A – VSD: Pansystolic murmur is seen in the Ventricular septal defect.

Option B – ASD: No shunt murmur due to extremely low-pressure gradient, instead only flow murmur is present in the left upper sternal border due to increased blood flow across pulmonary valves.

Option D - Severe pulmonary regurgitation: Severe PR $\rightarrow$
RV dilation due to chronic volume overload causing eccentric hypertrophy $\rightarrow$ Tricuspid regurgitation $\rightarrow$ Pansystolic murmur.

Solution for Question 11:

Correct Option A - Traube' sign:

• Traube's sign, also known as "pistol-shot sound," is a clinical finding associated with aortic regurgitation.

• It is characterized by a loud, high-pitched, and tapping sound heard over the femoral artery when auscultated with a stethoscope.

• This sound occurs due to the rapid rise and fall of the arterial pressure during systole and diastole in the presence of aortic regurgitation.

Incorrect Options:

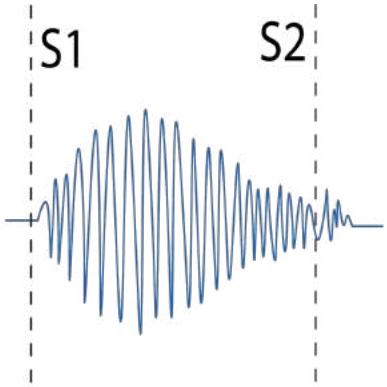
Option B - De Musset's sign: De Musset's sign is a clinical finding characterized by a rhythmic nodding or bobbing of the head with each heartbeat. It is also typically associated with aortic regurgitation.

Option C - Hill's sign: Hill's sign refers to a clinical finding in patients with aortic regurgitation. In this, a systolic and diastolic murmur heard over the femoral artery when auscultated with a stethoscope and compressed with a sphygmomanometer cuff.

Option D - Duroziez's sign: Duroziez's sign is a clinical finding in aortic regurgitation. It occurs when a c ontinuous murmur is heard over the femoral artery when auscultated with a stethoscope and compressed with a sphygmomanometer cuff. This phenomenon is due to the turbulen t blood flow through the narrowed femoral artery.

ECG and Arrythmias

1. What does the image below represent in terms of murmurs?



A. End diastolic

B. Pan systolic

C. Ejection systolic

D. Mid diastolic

---

2. A 42-year-old male presents to the cardiology clinic with complaints of intermittent palpitations and lightheadedness. His electrocardiogram reveals a pattern consistent with Lown-Ganong Levine Syndrome.Which of the following ECG findings is not characteristic of this condition?

(or)

Which of the following ECG findings is not characteristic of Lown-Ganong Levine Syndrome?

A. PR interval is short

B. QRS is normal

C. PJ interval is short

D. PJ interval is long

---

3. A 65-year-old male presents to the clinic for a routine check-up. During the examination, his resting heart rate is noted to be 70 beats per minute, and his blood pressure is within normal limits. The physician notices that the duration between the P wave and the QRS complex on the electrocardiogram is consistently prolonged, measuring at 0.24 seconds. Which of the following is the best recommendation for this patient?

(or)

Which of the following is the treatment of choice in first-degree heart block?

A. No specific treatment

B. Digoxin

C. Amiodarone

D. Labetalol

---

4. A 60-year-old male presents to the emergency department with complaints of palpitations and shortness of breath. An electrocardiogram is performed, revealing an irregularly irregular rhythm. Which of the following ECG waves is absent in the patient?

(or)

Which of the following waves is absent in the ECG of a patient with atrial fibrillation?

A. P wave

B. T wave

C. Q wave

D. U wave

---

5. A 60-year-old male patient presents to the clinic with complaints of occasional dizziness and lightheadedness. An electrocardiogram reveals a pattern consistent with Mobitz Type 1 (Wenckebach) phenomenon. Which of the following statements best describes this condition?

(or)

Which of the following statements best describes Wenckebach phenomenon on ECG?

A. Accelerated AV nodal conduction

B. Progressive decrease in PR interval with each beat and a missed beat

C. Progressive increase in PR interval with each beat and a missed beat

D. The PR interval before and after the missed beat are equal

---

6. A 65-year-old male patient with a history of hypertension and previous myocardial infarction presents to the emergency department with complaints of dizziness and near-fainting episodes. An electrocardiogram is performed, revealing a pattern consistent with Mobitz II. Which of the following is not seen in this pattern?

(or)

Which of the following features is not seen in Mobitz II?

A. Infranodal block

B. PR interval is normal before a missed beat

C. PR interval is increased before a missed beat

D. PR intervals before and after the missed beat are equal

---

7. A 60-year-old male patient presents to the emergency department with palpitations and shortness of breath. His ECG reveals atrial flutter with a rapid ventricular response. The patient's blood pressure is stable, and he is hemodynamically well. Which of the following interventions would be most appropriate as a first-line treatment for rate control of this patient?

(or)

Which of the following interventions is the first-line treatment for rate control of atrial flutter?

A. Intravenous Esmolol

B. Chemical cardioversion with intravenous Amiodarone

C. Electrical cardioversion with biphasic DC shock

D. Anticoagulation with unfractionated heparin

---

8. A 45-year-old male patient undergoes an electrocardiogram (ECG) as part of a routine health check-up. The ECG report indicates a prolonged QT interval.

(or)

What does the QT interval signify in an electrocardiogram (ECG)?

A. Ventricular depolarization

B. Ventricular depolarization and ventricular repolarization

C. Ventricular repolarization

D. Septal activation

---

9. A 25-year-old patient presents with recurrent episodes of palpitations and recurrent syncopal attacks. An electrocardiogram performed in the clinic shows normal findings. The physician advises the patient to undergo Holter monitoring which reveals paroxysmal supraventricular tachycardia. What is not correct about this condition?

(or)

Which of the following is not an ECG finding seen in paroxysmal supraventricular tachycardia?

A. Wide QRS complex

B. ST segment depression

C. R-R interval decrease

D. Hidden P waves

---

10. A 30-year-old patient with a history of panic attacks presents to the emergency department with palpitations and chest discomfort. Blood pressure is 110/70mmHg and pulse rate is 150 bpm. An electrocardiogram shows findings of paroxysmal supraventricular tachycardia. Which of the following is the best treatment for this patient?

(or)

Which of the following is the most appropriate intervention for symptom control in a patient with PSVT, blood pressure on admission 110/70 mmHg, and heart rate 150 bpm?

A. Oral verapamil

B. Carotid sinus massage

C. Intravenous adenosine

D. Electrical cardioversion

---

11. A 60-year-old patient with a history of CAD presents to the emergency department with palpitations and chest discomfort. An electrocardiogram shows wide QRS complex tachycardia. Which of the following is not an ECG finding seen in this patient?

(or)

Which of the following is not an ECG finding seen in Ventricular tachycardia?

A. Rabbit ear appearance

B. Josephson's sign

C. Capture beats

D. QTc prolongation

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	4
Question 3	1
Question 4	1
Question 5	3
Question 6	3
Question 7	1
Question 8	2
Question 9	1
Question 10	2
Question 11	4

Solution for Question 1:

Correct Option C: Ejection systolic

• An ejection systolic murmur occurs during the ejection phase of the cardiac cycle when blood is being pumped out of the heart. It is characterized by a continuous or crescendo-decrescendo sound that starts after the first heart sound (S1) and ends before the second heart sound (S2).

• The ejection systolic murmur is typically heard best over specific areas of the heart, such as the aortic or pulmonary valve areas, depending on the underlying cause of the murmur. It is caused by turbulent blood flow through a narrowed or abnormal valve or aorta during systole.

Incorrect Options

Option A: End diastolic: An end diastolic murmur occurs during late diastole, just before the next systol e begins. It is commonly associated with conditions such as mitral stenosis or tricuspid regurgitation. T he image does not show features or timing consistent with an end diastolic murmur.

Option B: Pan systolic: A pan systolic (or holosystolic) murmur is heard throughout systole, starting wit h or immediately after S1 and continuing until S2. It is typically associated with conditions such as mitra l regurgitation or ventricular septal defects. The image does not show features or timing consistent with a pan systolic murmur.

Option D: Mid diastolic: A mid diastolic murmur occurs during mid-diastole, after S2 and before S1. It is commonly associated with conditions such as mitral stenosis or tricuspid stenosis. The image does no

t show features or timing consistent with a mid-diastolic murmur.

Solution for Question 2:

Correct Option D - PJ interval is long:

• In Lown-Ganong Levine Syndrome, the characteristic ECG findings include a short PR interval, normal QRS duration, and a short PJ interval.

• Therefore, option d is incorrect as a long PJ interval is not a typical ECG finding in Lown-Ganong Levine Syndrome.

Incorrect Options:

Option A - PR interval is short: True. Shortening of the PR interval is a hallmark ECG finding in Lown-Ganong Levine Syndrome.

Option B
- QRS is normal: True. The QRS complex typically appears normal in Lown-Ganong Levine Syndrome.

Option C - PJ interval is short: True. Shortening of the PJ interval is a characteristic ECG feature of Lown-Ganong Levine Syndrome.

Solution for Question 3:

Correct Option A - No specific treatment:

• First-degree heart block is characterized by a prolongation of the PR interval on the ECG, indicating delayed conduction through the atrioventricular node.

• In most cases of first-degree heart block, especially if asymptomatic, no specific treatment is required.

• It is typically considered a benign condition that does not necessitate intervention.

Incorrect Options:

Options B, C, D:

• These are not the treatment options for first degree heart block.

Solution for Question 4:

Correct Option A - P wave:

• In atrial fibrillation (AF), the atria exhibit chaotic electrical activity, resulting in the absence of organized atrial depolarization.

• This causes absent P waves.

Incorrect Options:

Option B - T wave: The T wave represents ventricular repolarization.

Option C - Q wave: The Q wave represents septal activation.

Option D - U wave: If present, the U wave follows the T wave and represents repolarization of the Purkinje fibers or papillary muscles.

Solution for Question 5:

Correct Option C - Progressive increase in PR interval with each beat and a missed beat:

• Mobitz Type 1 (Wenckebach) phenomenon is an intranodal conduction defect that leads to progressive increase in the PR interval with each beat until a beat is dropped (a missed beat) followed by a reset of the conduction sequence.

Incorrect Options:

Option A - Accelerated AV nodal conduction: Instead, there is a progressive slowing of AV nodal conduction.

Option B - Progressive decrease in PR interval with each beat and a missed beat: PR interval typically lengthens rather than decreases.

Option D - The PR interval before and after the missed beat are equal: This is incorrect as the PR interval before and after the missed beat are unequal in Mobitz Type 1 (Wenckebach) phenomenon due to the progressive lengthening of the PR interval.

Solution for Question 6:

Correct Option C - PR interval is increased before a missed beat:

• Typically, there is a sudden skipped beat without a change in the PR interval in Mobitz type II heart block.

• This results in intermittent failure of conduction from the atria to the ventricles. Therefore, option a is the correct choice, as it describes the anatomical location of the block in Mobitz II/Infranodal heart block.

Incorrect Options:

Option A - Infranodal block: In Mobitz II/Infranodal heart block, the conduction block occurs below the AV node, specifically within the Bundle of His.

Option B - PR interval is normal before a missed beat: Mobitz II/Infranodal heart block is characterized by sudden skipped beats without a change in the PR interval.

Option D - PR interval before and after the missed beat are equal: In Mobitz II/Infranodal heart block, the PR interval after the missed beat is usually longer than the PR interval before the missed beat.

Solution for Question 7:

Correct Option A - Intravenous Esmolol:

• In the acute management of atrial flutter with a rapid ventricular response, the priority is rate control to reduce symptoms and prevent hemodynamic compromise.

• Intravenous beta-blockers like Esmolol or calcium channel blockers like Verapamil are commonly used for rate control in this setting.

• Esmolol acts rapidly and can effectively control heart rate in patients with atrial flutter without compromising cardiac output.

Incorrect Options:

Option B - Chemical cardioversion with intravenous Amiodarone: While Amiodarone may be used for c hemical cardioversion in certain cases of atrial fibrillation, it is not typically the first-line treatment for ac ute atrial flutter.

Option C - Electrical cardioversion with biphasic DC shock: Electrical cardioversion may be considered if the patient is hemodynamically unstable or if rate control measures fail, but it is not usually the initial t reatment in stable patients with atrial flutter.

Option D - Anticoagulation with unfractionated heparin: Anticoagulation is important in atrial flutter, esp ecially before cardioversion to prevent thromboembolic events, but it is not the first-line treatment for ac ute management of atrial flutter with a rapid ventricular response.

Solution for Question 8:

Correct Options B - Ventricular depolarization and ventricular repolarization:

• The QT interval on an electrocardiogram (ECG) represents the time from the start of ventricular depolarization to the end of ventricular repolarization.

• It encompasses both the electrical events of ventricular contraction (depolarization) and relaxation (repolarization).

• Prolongation of the QT interval can predispose individuals to ventricular arrhythmias, including Torsades de Pointes, and is associated with an increased risk of sudden cardiac death.

Incorrect Options:

Option A - Ventricular depolarization: The QRS complex on an ECG represents ventricular depolarizati on, not the QT interval.

Option C - Ventricular repolarization: While the QT interval includes ventricular repolarization, it also in cludes ventricular depolarization.

Correct Option D - Septal activation: The Q
wave on an ECG represents septal activation, not the QT interval.

Solution for Question 9:

Correct option A - Wide QRS complex:

• Paroxysmal supraventricular tachycardia presents with a narrow QRS complex on the ECG, as the arrhythmia originates above the bundle of His.

• Therefore, a wide QRS complex is not an ECG finding observed in PSVT.

• The other options, including ST segment depression, decreased R-R interval, and hidden P waves, are commonly seen in PSVT due to rapid atrial activation and aberrant atrioventricular conduction.

Incorrect Options:

Options B, C & D:

• These are the ECG findings seen in paroxysmal supraventricular tachycardia.

Solution for Question 10:

Correct Option B
- Carotid sinus massage: Carotid sinus massage is first-line treatment in patients with PSVT.

Incorrect Options:

Option A - Oral verapamil: Oral verapamil is used to prevent PSVT rather than for acute management. It may not provide immediate relief during an acute episode.

Option C - Intravenous adenosine:

• In the acute management of PSVT, intravenous adenosine is the preferred initial intervention, especially when the systolic blood pressure is ≥ 90 mmHg.

• Adenosine helps terminate the tachyarrhythmia by transiently blocking conduction through the atrioventricular node.

• but first-line of management without any contraindications (carotid bruit) is carotid sinus massage.

Option D - Electrical cardioversion: Electrical cardioversion is reserved for patients with hemodynamic i nstability or failed pharmacological interventions.

Solution for Question 11:

Correct Option D - QTc Prolongation:

• Ventricular tachycardia (VT) is characterized by broad QRS complexes on the ECG due to aberrant conduction through the ventricles.

• QTc prolongation is seen in Polymorphic Ventricular Tachycardia, also known as Torsades de Pointes, is a specific type of ventricular tachycardia characterized by its distinctive twisting pattern on electrocardiogram (ECG).

Incorrect Options:

Options A, B & C:

• These are the ECG findings seen in ventricular tachycardia.

Ischemic Heart Disease

1. A 55-year-old male with a medical history of hypertension and hyperlipidemia presents to the clinic due to intermittent chest pain for the past six months. He describes a squeezing chest pain and shortness of breath that are brought on by exertion and relieved with rest. His blood pressure is 140/90 mmHg. No other abnormal findings were noted during the examination. Which of the following parameters is not used to assess the risk of atherosclerosis?

(or)

Which of the following parameters is not used to assess risk of atherosclerosis?

A. Increased LDL and decreased HDL

B. Homocysteinemia

C. Positive high sensitivity CRP values

D. Low Lipoprotein B /Apolipoprotein A ratio

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2. A 60-year-old man with a 25-year history of smoking presents to a clinic due to recurrent chest pain whenever he walks fast. It is a squeezing sensation in the center of his chest and radiates to his left arm. His blood pressure is 160/100 mmHg and heart rate is 110 beats per minute. Stress test shows downsloping ST segment depression in leads II, III, and aVF. What is the diagnostic test of choice?

(or)

Which of the following is the investigation of choice for a patient who presents with exertional chest pain and downsloping ST segment depression on the stress test?

A. Coronary CT Angiography

B. Multiple Uptake Gated Acquisition (MUGA) scan

C. Holter monitoring

D. Myocardial Perfusion Imaging

---

3. A 55-year-old male with a medical history of hypertension and hyperlipidemia, presents to the emergency department due to episodes of tight, squeezing sensation in the center of his chest occurring at rest. His blood pressure is 140/90 mmHg, heart rate is 80 beats per minute, and respiratory rate is 18 breaths per minute. Auscultation is normal. ECG reveals deeply inverted symmetric T waves in leads V2 and V3. What is the most likely diagnosis?

(or)

What is the most likely diagnosis for a patient with recurrent central, squeezing, chest pain and deeply inverted T-waves in leads V2-V3 on ECG?

A. Stable Angina

B. Prinzmetal Angina

C. Pulmonary Embolism

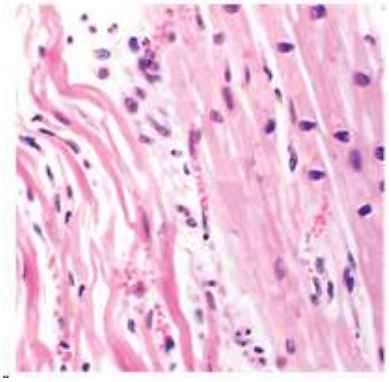
D. Wellens Syndrome

---

4. A 60-year-old male with a history of smoking, hypertension, and diabetes presents to the emergency department with severe, crunching, central chest pain radiating to the left arm and jaw that started approximately 2 hours ago. Despite percutaneous coronary intervention, he succumbed to sudden cardiac arrest. The pathologist examines the patient's heart tissue from an autopsy and identifies the following changes: Based on the histological cues of vacuolation and waviness of cardiac fibers, what is the approximate time since the myocardial infarction (MI) has occurred?

(or)

What is the approximate time since the myocardial infarction (MI) has occurred based on the following histopathological tissue findings?



A. 30 minutes to 4 hours

B. 4 hours to 12 hours

C. 12 hours to 24 hours

D. 24 hours to 48 hours

---

5. 56-year-old male presents with severe chest pain and shortness of breath. His blood pressure is 150/90 mmHg, heart rate is 110 bpm, respiratory rate is 22 breaths per minute, and oxygen saturation is 93% on room air. Significant ST-segment elevation in leads II, III, and aVF are noted on ECG. The drug given to treat him results in tachycardia and constipation. Which of the following statements is true about this drug?

(or)

Which of the following statements is true about the drug used to treat STEMI, which causes constipation and an increased heart rate?

A. It is metabolized by an enzyme called aldehyde dehydrogenase

B. The patient will never develop tolerance to this drug

C. It can be given to a patient taking sildenafil for erectile dysfunction

D. It is a drug of choice for cyanide poisoning

---

6. A 60-year-old male with a past medical history of hypertension, dyslipidemia, and type 2 diabetes presented to the emergency department with crushing chest pain radiating to his arm and jaw. Low blood pressure and tachycardia are present. There is ST-segment elevation in leads II, III, and AVF. Which of the following statements is true about the management of this disease?

(or)

What is true regarding the recommended management for STEMI?

A. Treatment of choice is Fibrinolytic therapy

B. Door-to-balloon time should be less than 30 minutes

C. Sublingual nitroglycerine should not be given to a patient with inferior wall MI

D. Morphine is given to prevent reinfarction

---

7. A 55-year-old male presents to the emergency department with severe, crushing chest pain radiating to the left jaw that started 2 hours ago. ECG reveals ST-segment elevation in leads I, aVL, and V2-V6. He undergoes percutaneous coronary intervention and is started on antiplatelet and antithrombotic medications. Three weeks later, he returned with chest pain and a friction rub on auscultation. What is the pathogenesis of the problem that has arisen in this patient?

(or)

What is the pathogenesis behind the development of chest pain and a friction rub 3 weeks after a myocardial infarction?

A. Infection

B. Autoimmunity

C. Infarction

D. Adverse Drug reaction

---

8. A 65-year-old male with a past medical history of hypertension and dyslipidemia presents to the emergency department with complaints of sudden-onset severe chest pain. The patient was diagnosed with myocardial infarction based on his clinical history and investigations. Which of the following is not true about the cardiac biomarkers of this disease?

(or)

Which of the following is not true regarding the cardiac biomarkers in myocardial infarction?

A. Myoglobin is the last cardiac enzyme to rise

B. Heart fatty acid binding protein is the first one to rise

C. Troponin I is the best test for reinfarction

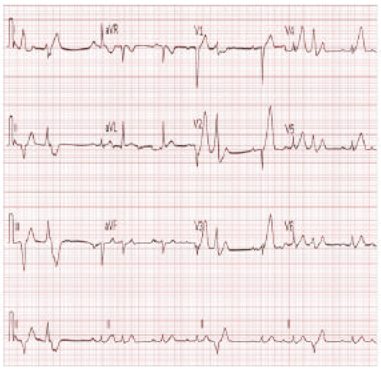
D. CK-MB rises before the rise of AST

---

9. A 58-year-old male with a past medical history of hypertension and dyslipidemia presents to the emergency department with sudden-onset severe chest pain that started approximately 2 hours ago. He describes the pain as crushing and radiating to his left arm and jaw. The ECG of the patient is given below: Which of the following vessels is most likely to be blocked in this patient's condition?

(or)

Which coronary vessel is most likely blocked in a patient with the given ECG?



A. Left Anterior Descending (LAD) artery

B. Right Coronary Artery (RCA)

C. Left Circumflex (LCX) artery

D. Posterior Descending Artery

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10. A 35-year-old male with a history of recreational drug use is rushed to the emergency department after collapsing at a party. He appears agitated and diaphoretic and complains of severe chest pain. His blood pressure is 160/100 mmHg, heart rate is 110 beats per minute, and respiratory rate is 24 breaths per minute. An ECG reveals ST-segment elevation in leads II, III, and aVF. What type of myocardial infarction is most likely in this patient?

(or)

What type of myocardial infarction is most likely in a young patient with recreational drug use?

A. Type I

B. Type II

C. Type III

D. Type IV

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11. A 45 yr old male presents to the Medicine OPD with complaints of chest pain. He describes his pain as stabbing and has put his fist on his chest while localizing the pain. After further investigations , a diagnosis of STEMI is made and the patient is started on thrombolytic therapy. Which of the following statements is not true about this treatment modality?

(or)

Which of the following statements is not true regarding thrombolytic therapy in a patient with a diagnosis of STEMI?

A. Alteplase has rapid onset of action than streptokinase

B. Streptokinase and urokinase might lead to allergy

C. It is contraindicated in NSTEMI

D. Use of Tenecteplase will lead to increased dosing error

Correct Answers

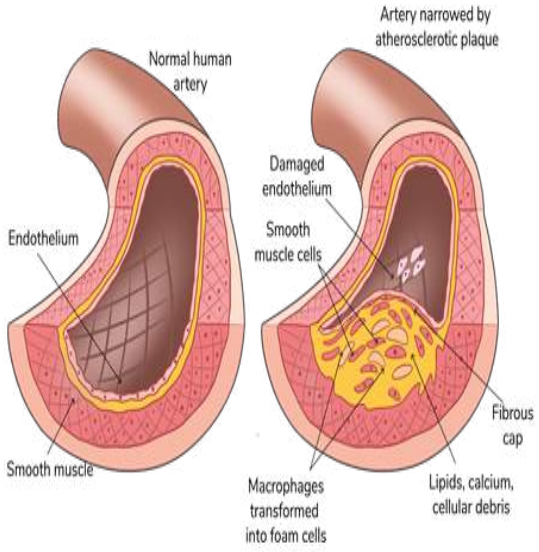
Question	Correct Answer
Question 1	4
Question 2	1
Question 3	4
Question 4	1
Question 5	1
Question 6	3
Question 7	2
Question 8	1
Question 9	1
Question 10	2
Question 11	4

Solution for Question 1:

Correct Option D - Low Lipoprotein B /Apolipoprotein A ratio:

• The clinical scenario suggests stable angina, which is commonly associated with atherosclerosis. Atherosclerosis is characterized by the deposition of fatty plaques in the arterial walls, leading to narrowing and reduced coronary blood flow.

• The high lipoprotein A / Apolipoprotein B ratio increases the risk of atherogenicity.



Incorrect Options:

Option A: Increased LDL and decreased HDL: Increased LDL cholesterol is associated with plaque for mation, while decreased HDL cholesterol is associated with impaired reverse cholesterol transport and

increased risk of atherosclerosis.

Option B - Homocysteinemia: Homocysteine, is an amino acid that, when present at high levels in the b lood (homocysteinemia), has been associated with an increased risk of premature cardiovascular disea se. Elevated homocysteine levels can contribute to endothelial dysfunction, oxidative stress, and inflam mation, which are involved in the pathogenesis of atherosclerosis.

Option C - Positive high sensitivity CRP values: High-sensitivity C-reactive protein (hsCRP) is a marker of systemic inflammation and is an important predictor of future coronary events.

Solution for Question 2:

Correct Options A - Coronary CT Angiography:

• The clinical scenario and stress test findings of downsloping ST segment depression in leads II, III, and aVF are diagnostic of reversible ischemia, which is seen in patients with Chronic Stable Angina.

• The best investigation (noninvasive) is coronary CT angiography to determine the site, location, and percentage of blockages.

Incorrect Options:

Option B - Multiple Uptake Gated Acquisition (MUGA) scan: MUGA scan is used to calculate the ejecti on fraction.

Option C - Holter monitoring: It is used to detect rhythm disorders of the heart.

Option D - Myocardial Perfusion Imaging: Myocardial Perfusion Imaging uses radioactive tracers inject ed into the bloodstream to assess blood flow to the heart muscle. It is a non-invasive imaging test that can identify areas of reduced blood flow, indicating myocardial ischemia. While it is a useful test, it is le ss accurate than coronary CT angiography. Gold standard test in conventional coronary angiography.

Solution for Question 3:

Correct Option D - Wellens Syndrome:

• In this clinical scenario, the most likely diagnosis based on the clinical presentation of chest pain occurring mainly during rest and the ECG findings of deeply inverted, symmetric T-waves in leads V2-V3 is Wellens syndrome.

• Wellens syndrome, also known as "LAD coronary T-wave syndrome," refers to characteristic ECG findings that are highly suggestive of critical proximal left anterior descending (LAD) artery stenosis.

• Hypertension, diabetes, and dyslipidemia are common risk factors for the development of coronary artery disease, including LAD artery stenosis.

• Immediate coronary angiography and intervention are necessary when Wellens syndrome is identified on the ECG.

• This condition is considered a "pre-infarction" state, and urgent revascularization is crucial.

Incorrect Options:

Option A - Stable Angina: Stable angina is characterized by chest pain that occurs predictably with exe rtion and is relieved by rest or nitroglycerin. While Mr. Thompson's chest pain occurs mainly during rest

, the ECG findings of deeply inverted, symmetric T-waves in leads V2-V3 are not typical for stable angi na.

Option B - Prinzmetal Angina: Prinzmetal angina is characterized by chest pain that occurs at rest or wi th minimal exertion and is unpredictable in its pattern. It is due to the spasm of epicardial coronary arter ies causing ST elevation.

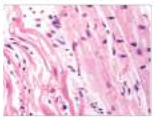
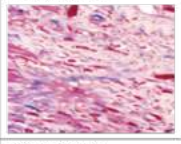
Option C - Pulmonary Embolism: Pulmonary embolism (PE) is a condition caused by a blood clot that t ravels to the lungs, obstructing blood flow in the pulmonary arteries. While PE can cause chest pain an d shortness of breath, the ECG findings of deeply inverted T-waves in leads V2-V3 are not characteristi c of this condition

Solution for Question 4:

Correct Option A - 30 minutes to 4 hours:

• The presence of vacuolation of cardiac cells and waviness of cardiac fibres in the histological examination is characteristic of the early stages of myocardial infarction. These changes are typically observed within 30 minutes to 4 hours after the onset of the MI.

• The vacuolation represents the cellular response to ischemia, and the waviness of cardiac fibers indicates early structural changes in the heart muscle.

Timings of death	Gross	Light microscopy	Electron microscopy
Reversible cell injury (20–40 minutes)	–	–	• Myofibrils relaxation • Mitochondrial swelling
Irreversible cell injury 30 mins to 4 hrs	–	• Vasculation of cell • Waviness of cardiac fibers 	• Amorphous densities (Calcium in mitochondria)
4 hrs to 12 hrs	Occasional dark mottling	Coagulative necrosis	
12 hrs to 24 hrs	Dark mottling	• Coagulative necrosis • Neutrophil • Contraction band necrosis	
1 day to 3 days		Neutrophils (acute inflammation)	
3 days to 7 days		Macrophages (Chronic inflammation)	
7 days to 10 days		Early Granulation tissue 	
10 days to 14 days		• Granulation Tissue • Early collagen	
2 weeks to 2 months		High collagen	
>2 months		Scar formation	

Solution for Question 5:

Correct Option A - It is metabolized by an enzyme called aldehyde dehydrogenase:

• When nitrate is given, it is metabolized and turned into nitric oxide.

• Mitochondrial aldehyde dehydrogenase is an enzyme used to metabolize nitrate. These enzymes are present more in the veins than in the arteries. Soluble guanylate cyclase converts GTP into cGMP. This cGMP inhibits Myosin light-chain kinase, resulting in smooth muscle relaxation.

• Indications of nitrates: Stable angina Prinzmetal angina Acute coronary syndrome (Unstable angina, NSTEMI, STEMI) Esophageal spasm Acute CHF Hypertensive emergency

• Stable angina

• Prinzmetal angina

• Acute coronary syndrome (Unstable angina, NSTEMI, STEMI)

• Esophageal spasm

• Acute CHF

• Hypertensive emergency

Incorrect Options:

Option B - The patient will never develop tolerance to this drug: With prolonged use of nitroglycerin, tol erance can develop, leading to a diminished therapeutic effect. To prevent tolerance, it is necessary to provide drug-free periods to avoid desensitization of the vasodilatory response.

Option C - It can be given to a patient taking sildenafil for erectile dysfunction: Nitroglycerin and sildena fil (Viagra) are both vasodilators and their concurrent use can cause a dangerous drop in blood pressur e, thus, Nitroglycerin and other nitrates are contraindicated in patients taking sildenafil or other phosph odiesterase-5 (PDE-5) inhibitors.

Option D - It is a drug of choice for cyanide poisoning: Nitroglycerin is not a drug of choice for cyanide poisoning. In cases of cyanide poisoning, the primary treatment is usually with antidotes like hydroxoco balamin or sodium thiosulfate, which help neutralize cyanide.

Solution for Question 6:

Correct Option C - Sublingual nitroglycerine should not be given to a patient with inferior wall MI:

• In the given clinical scenario, the patient presents symptoms suggestive of an inferior wall STEMI because his ECG shows ST-segment elevation in leads II, III, and AVF.

• Inferior wall MI causes hypotension.

• Giving nitrates will worsen the hypotensive state.

Incorrect Options:

Option A - Treatment of choice is Fibrinolytic therapy: Treatment of choice for MI especially STEMI, is Primary Percutaneous Intervention (PCI), and not fibrinolytic therapy.

Option B - Door-to-balloon time should be less than 30 minutes: The guideline-recommended door-to-b alloon time for primary PCI is less than 90 minutes, not 30 minutes.

Option D - Morphine is given to prevent reinfarction: Morphine is used in the acute setting to manage p ain and reduce pulmonary edema. Long-term management to prevent reinfarction involves medications like dual antiplatelet therapy, beta-blockers, and ACE inhibitors/ARBs, along with lifestyle modification s, to prevent future cardiac events.

Solution for Question 7:

Correct Option B - Autoimmunity:

• The constellation of symptoms in this patient is consistent with Dressler syndrome (post-MI pericarditis)

• Dressler syndrome is a delayed autoimmune-mediated inflammatory response that occurs several weeks after an acute myocardial infarction (MI). It is characterized by inflammation of the pericardium, which can lead to chest pain and a friction rub heard on auscultation.

• The immune system mistakenly targets healthy cardiac tissue, causing inflammation and the characteristic symptoms associated with Dressler syndrome.

Post-MI Complication

Time Frame

Arrhythmias

Hours to days

Heart Failure

Cardiogenic Shock

Hours

Ventricular Septal Rupture

Days

Papillary Muscle Rupture

Free Wall Rupture

Dressler Syndrome

Weeks

Thromboembolism

Days to weeks

Ventricular Aneurysm

Incorrect Options:

Option A - Infection: While infections can lead to inflammation of the pericardium (pericarditis), the timi ng and clinical presentation described in the case scenario are more indicative of Dressler syndrome

Option C - Infarction: The patient's initial presentation was of infarction event. However, the problem th at has arisen during the follow-up visit, characterized by chest pain and a friction rub, is not due to a new infarction. It is more consistent with Dressler syndrome

Option D - Adverse Drug Reaction: While adverse drug reactions are always possible, there is no evide nce or indication in the case scenario to suggest that the patient's current symptoms of chest pain and a friction rub are due to an adverse drug reaction. The patient's symptoms are more in line with Dressle r syndrome

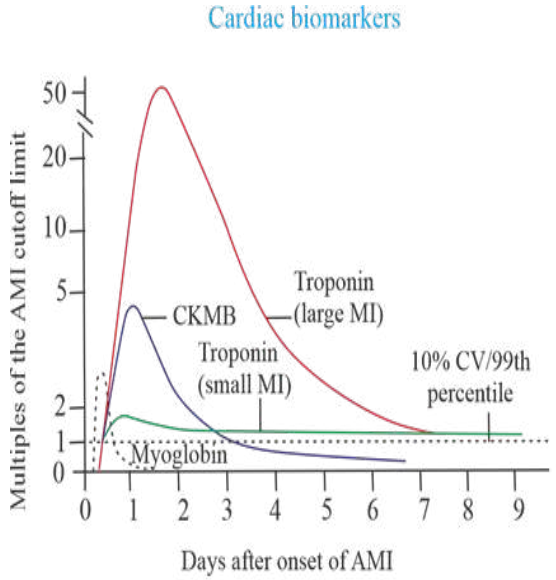
Solution for Question 8:

Correct Option A - Myoglobin is the last cardiac enzyme to rise:

• Last to rise is LDH and not myoglobin.

• Myoglobin is one of the earliest enzymes to rise in MI patients, though it can also be released from skeletal muscles after DC shock. Hence, it is difficult to know the source.

• The first to rise in the case of an MI is HFABP (Heart Fatty Acid Binding Protein), which rises in about 1 hour.



Other Options:

Option B
- Heart fatty acid binding protein is the first one to rise: This is correct. HFABP rises by one hour.

Option C - Troponin I is the best test for reinfarction: Troponin I is a highly sensitive and specific biomar ker for myocardial injury. 20% rise over admission values indicates reinfarction. If reinfarction occurs af ter 72 hours, CK-MB is used.

Option D - CK-MB rises before the rise of AST: This statement is also true.

Solution for Question 9:

Correct Option A - Left Anterior Descending (LAD) artery:

• The ECG shows ST-segment elevation in the anterior leads, specifically leads V2-V4. The LAD artery is the culprit vessel responsible for an anterior wall MI. The LAD artery supplies the anterior and apical regions of the left ventricle, and its occlusion leads to ischemia and infarction in these areas.

Incorrect Options:

Option B - Right Coronary Artery (RCA): In RCA occlusion, ECG displays ST-segment elevation in infe rior wall leads (II, III, and aVF) with reciprocal ST-segment depression in V1–V3.

Option C - Left Circumflex (LCX) artery: The LCX artery supplies the lateral wall of the left ventricle. An occlusion of the LCX artery usually results in lateral wall MI, which may present with ST-segment elev ations in leads I, AVL, V5, and V6.

Option D - Posterior Descending Artery: Posterior descending artery occlusion is best picked up by lea ds V7, V8, and V9.

Solution for Question 10:

Correct Option B - Type II:

• Type II MI is characterized by an imbalance between myocardial oxygen supply and demand, often caused by conditions like severe anemia, cocaine overdose, or carbon monoxide poisoning.

• In this patient's case, the history of recreational drug use and the presence of severe chest pain, agitated state, and ST-segment elevation in leads II, III, and aVF on the ECG are suggestive of a type II MI.

Incorrect Options:

Option A - Type I MI: Type I
MI is caused by atherosclerosis and coronary artery thrombosis, leading to the sudden occlusion of a c oronary artery. While this type of MI is common in patients with atherosclerosis or coronary artery dise ase, it is less likely in this patient with a
known history of recreational drug use and an acute presentation at a party.

Option C - Type III MI: Type III MI causes sudden cardiac death due to life-threatening arrhythmias, su ch as ventricular fibrillation or Mobitz II heart block.

Option D - Type IV MI: Type IV MI is related to complications during percutaneous coronary interventio n (PCI) or coronary stent placement. While it is possible for this patient to have had a previous stent pl acement or PCI, the acute presentation with severe chest pain and ST-segment elevation on the ECG suggests a more acute and ongoing event, which is more consistent with Type II MI due to oxygen sup ply-demand imbalance.

Solution for Question 11:

Correct Option D - Use of Tenecteplase will lead to increased dosing error:

• Tenecteplase is a newer thrombolytic drug that was developed to simplify dosing compared to older agents like alteplase, streptokinase, and urokinase.

• Unlike alteplase, which requires weight-based dosing, tenecteplase has a fixed-dose regimen and it is given as a single bolus, making it less likely to result in dosing errors.

Incorrect Options:

Option A - Alteplase has a rapid onset of action than streptokinase:

• Alteplase is a tissue plasminogen activator (tPA) that works by converting plasminogen to plasmin, which helps break down blood clots.

• Alteplase has a relatively short half-life in the body but a more rapid onset than streptokinase, and hence, the reperfusion of occluded vessels is faster.

Option B - Streptokinase and urokinase might lead to allergy:

• Streptokinase is derived from group c streptococcal bacteria and can induce an immune response, leading to hypersensitivity reactions in some patients.

• Urokinase, while less immunogenic than streptokinase, can also lead to allergic responses.

Option C - Thrombolytic therapy is contraindicated in NSTEMI:

• STEMI has a fibrin-rich clot that responds to fibrinolysis.

• NSTEMI has a platelet-rich clot that will not respond to fibrinolysis.

Congenital Heart Disease

1. Which of the following is a Major NADAS criterion?

A. Abnormal S2

B. Abnormal ECG

C. Diastolic murmur

D. Systolic murmur grade I

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2. A 2-year-old boy is brought to the clinic by his mother who noticed his lips turning blue whenever he cries or gets sick. She says that the squatting position relieves the bluish discoloration. Examination revealed a harsh holosystolic murmur at the left parasternal area. His complete blood count shows a hemoglobin 18 g%. What is the underlying defect?

(or)

Which condition has squatting episodes and polycythemia in a boy with repeated episodes of dusky discoloartion of lips when he cries?

A. Acyanotic heart disease

B. Cyanotic heart disease

C. Eisenmenger syndrome

D. Lutembacher syndrome

---

3. Which of the following does not cause central cyanosis?

A. Methemoglobinemia

B. Pulmonary arteriovenous fistula

C. High altitude

D. Hypothermia

---

4. A 25-year-old pregnant woman presents to the obstetrics clinic for a prenatal checkup. She has a history of bipolar disorder. On prenatal ultrasound, the fetus exhibits cardiac abnormalities, including an inferiorly displaced tricuspid valve, tricuspid regurgitation, a small right ventricle, and Wolff-Parkinson-White syndrome. Which of the following drugs is most likely responsible for the following finding?

(or)

If taken during pregnancy, which drug used to treat bipolar disorder is most likely responsible for causing fetal cardiac abnormalities such as tricuspid valve displacement, tricuspid regurgitation, a small right ventricle, and WPW syndrome?

A. Lithium

B. Valproate

C. Captopril

D. Carbamazepine

---

5. A one-week-old infant is brought to the clinic due to extreme bluish discoloration of the lips, skin, and nail beds. The baby tires quickly during feeds and often appears fatigued. On examination, the infant is visibly cyanotic. Cardiac auscultation reveals a single loud S1, single S2. There is cardiomegaly on the chest X-ray. What is the diagnosis?

(or)

What is the most likely congenital heart defect in a one-week-old infant with cyanosis, cardiomegaly, single loud S1 and single S2?

A. Tetralogy of Fallot

B. Patent Ductus Arteriosus

C. Tricuspid Atresia

D. Coarctation of the Aorta

---

6. A 10-year-old boy is admitted to the hospital for pneumonia. Further evaluations reveal an atrial septal defect. There is no family history of heart disease except for ischemic heart disease in the grandfather. Which of the following is incorrect regarding atrial septal defect?

(or)

Which of the following is incorrect regarding atrial septal defect?

A. Pulmonary plethora leads to pulmonary artery hypertension

B. Harsh murmur presents early in the course of the disease

C. Flow murmur is mid-diastolic murmur

D. Shunt murmur is absent

---

7. A 4-month-old infant with a history of Tetralogy of Fallot presents with fever and loose stools. The patient is stabilized with IV fluids and antibiotics. Which of the following is compatible with the diagnosis of hypercyanotic spells?

(or)

Which of the following is diagnostic of hypercyanotic spells in a child with ToF?

A. O2 saturation < 70% in room air

B. Inability to hear a murmur

C. Hepatomegaly

D. S3 gallop rhythm

---

8. A 40-year-old female patient presents with palpitations and difficulty in breathing. Auscultation reveals a mid-diastolic murmur and JVP shows a prominent 'a' wave. What is the most likely diagnosis?

(or)

Prominent 'a' wave on JVP is seen in?

A. Mitral stenosis

B. Tricuspid stenosis

C. Mitral regurgitation

D. Tricuspid regurgitation

---

9. A 6-week-old baby is having failure to thrive and poor activity. On auscultation, you hear a harsh systolic ejection murmur and a single second heart sound. Select the most appropriate chest X-ray for the given clinical situation.

(or)

Which of the following chest X-rays corresponds to a 6-week-old baby with failure to thrive and cyanosis worsening during crying and feeding?

A.

B.

C.

D.

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	2
Question 3	4
Question 4	1
Question 5	3
Question 6	2
Question 7	2
Question 8	2
Question 9	1

Solution for Question 1:

Correct Option C - Diastolic murmur:

NADAS criteria are used for evaluating heart murmurs in pediatric patients:

Major criteria include:

Incorrect Options:

Option A - Abnormal S2: Abnormal S2, or the second heart sound, is a minor NADAS criterion.

Option B - Abnormal ECG: Abnormal ECG findings are also a minor criterion in the NADAS criteria, not a major one.

Option D - Systolic murmur grade I: A systolic murmur grade I is categorized as a minor criterion in the NADAS criteria, not a major one. Major criteria typically involve more severe findi ngs, such as congestive heart failure, cyanosis, diastolic murmur, or high-grade systolic murmur.

Solution for Question 2:

Correct Option B - Cyanotic heart disease:

• This patient with cyanosis and a harsh holosystolic murmur of sub-pulmonic stenosis is most likely suffering from Tetralogy of Fallot.

• TOF is a group of four defects affecting the heart and its blood vessels.

• These children characteristically obtain relief by squatting after exertion (this increases the afterload to the left heart and decreases the right-to-left shunting).

Incorrect Options:

Option A - Acyanotic heart disease:

• Acyanotic heart disease involves left to right shunting, causing CHF and pneumonia.

Option C - Eisenmenger syndrome:

• Eisenmenger syndrome is caused by the reversal of shunt i.e. (right to left shunt) in a child with left to right shunt.

• Over the years, the vascular remodeling in the pulmonary artery replaces elastic tissue with fibrous tissue, ultimately leading to pulmonary arterial hypertension and RVH.

• Increased pressure in the RV leads to the reversal of shunt-right to left

• Clinical features include clubbing and cyanosis.

Option D - Lutembacher syndrome:

• Congenital atrial septal defect (ASD) exacerbated with acquired mitral stenosis is known as Lutembacher's syndrome.

Solution for Question 3:

Correct Option D - Hypothermia:

• Hypothermia refers to a decrease in core body temperature below the normal range. It occurs when the body temperature drops below 95 degrees Fahrenheit (35 degrees Celsius).

• Hypothermia causes peripheral cyanosis.

• Central cyanosis is seen due to decreased oxygen saturation or oxygen-carrying capacity of the blood.

Incorrect Options:

Option A
- Methemoglobinemia: Methemoglobin is oxidized hemoglobin due to nitrate exposure. This leads to a reduced oxygen-carrying capacity of the blood and can result in central cyanosis.

Option B - Pulmonary arteriovenous fistula: A
pulmonary arteriovenous fistula is an abnormal connection between an artery and a vein in the lung. T
his can result in the bypassing of oxygenated blood from the lungs to the systemic circulation, leading t
o a decrease in arterial oxygen saturation and central cyanosis.

Option C - High altitude: At high altitudes, the partial pressure of oxygen in the atmosphere is lower, re
sulting in hypobaric hypoxia. This can cause central cyanosis due to reduced oxygen availability.

Solution for Question 4:

Correct Option A - Lithium:

• Lithium used in bipolar disorder is known to be associated with congenital heart defects especially when taken during the first trimester of pregnancy.

• Ebstein anomaly involves the apical displacement of the tricuspid valve, the adherence of the septal and posterior leaflets to the myocardium, and the atrialization of the inlet portion of the right ventricle.

• It includes conduction defects like Wolff-Parkinson-White syndrome.

Incorrect Options:

Option B - Valproate: Valproate is an antiepileptic drug that has been associated with an increased risk of neural tube defects when taken during pregnancy.

Option C - Captopril: Captopril is an angiotensin-converting enzyme (ACE) inhibitor used to treat hypert
ension. It causes renal agenesis.

Option D - Carbamazepine: Associated with neural tube defects in the fetus when used during first trim
ester of pregnancy.

Solution for Question 5:

Correct Option C - Tricuspid Atresia:

• Tricuspid Atresia is a congenital heart defect in which the tricuspid valve is absent or poorly developed. This results in the absence of the right atrioventricular connection. In Tricuspid Atresia, a single functional ventricle (usually the left ventricle) pumps blood to systemic circulation resulting in neonatal cyanosis.

The clinical findings in this case align with Tricuspid Atresia:

Incorrect Options:

Option A - Tetralogy of Fallot: Tetralogy of Fallot has boot shaped heart with a
normal S1 and single S2. It also has ejection systolic murmur due to sub-pulmonic stenosis.

Option B - Patent Ductus Arteriosus (PDA): It usually presents with a
continuous machine-like murmur and causes CHF.

Option D - Coarctation of the Aorta: It can present with high blood pressure in the upper extremities an
d weak pulses in the lower extremities, but it does not explain the central cyanosis or heart sounds des
cribed.

Solution for Question 6:

Correct Option B - Harsh murmur presents early in the course of the disease:

• An atrial septal defect is a low-pressure shunt and, hence, does not have a harsh murmur.

• Symptoms most commonly include exercise intolerance, arrhythmia, and dyspnea.

• The classic physical examination finding is a wide, fixed splitting of the second heart sound due to prolonged RV ejection and increased PA capacitance, which, in turn, delay pulmonary valve closure.

Incorrect Options:

Option A - Pulmonary plethora leads to pulmonary artery hypertension: Pulmonary plethora will lead to pulmonary artery hypertension and the development of loud P2.

Option C - Flow murmur is mid-diastolic murmur: In ASD, the shunt murmur is absent, but the flow mur mur is heard in the middle of the diastole.

Option D - Shunt murmur is absent: In ASD, the Shunt murmur is absent, but the flow murmur is prese ntly leading to a mid-diastolic murmur.

Solution for Question 7:

Correct Option B - Inability to hear a murmur:

• Hypercyanotic episodes most frequently occur in children with Tetralogy of Fallot due to increased right to left shunting.

• This decreases blood flow across the sub-pulmonic stenosis/ RV outflow tract even further.

• Hence, the intensity of the ejection systolic murmur becomes less and the murmur will become softer.

• The spells occur most frequently in the morning on initial awakening or after episodes of vigorous crying.

• Management of Tet spells: Knee-chest position Increased peripheral resistance (due to compression of femoral artery): Right to Left shunting decreases IV Morphine IV Soda bicarbonate IV Methoxamine: It increases Systolic Blood Pressure: to counterbalance shunting by increasing left ventricular pressure IV propranolol

• Knee-chest position

• Increased peripheral resistance (due to compression of femoral artery): Right to Left shunting decreases

• IV Morphine

• IV Soda bicarbonate

• IV Methoxamine: It increases Systolic Blood Pressure: to counterbalance shunting by increasing left ventricular pressure

• IV propranolol

Incorrect Options:

Option A - O2 saturation < 70% in room air:

• Hypoxia provokes a hypercyanotic spell but is not a diagnostic feature of a Tet spell.

Option C - Hepatomegaly:

• Hepatomegaly is seen in congestive heart failure.

Option D - S3 gallop rhythm:

• S3 gallop is seen in volume-overloaded conditions like severe anemia, dilated cardiomyopathy, heart failure, and wet beriberi.

Solution for Question 8:

Correct Option B: - Tricuspid stenosis:

• Mid-diastolic murmur is seen in tricuspid stenosis and mitral stenosis.

• Prominent 'a' wave is seen in tricuspid stenosis. It is also seen in long-standing mitral stenosis, where pulmonary artery hypertension will be present.

• Since no features of PAH are present in this patient, mitral stenosis can be ruled out,

Incorrect Options:

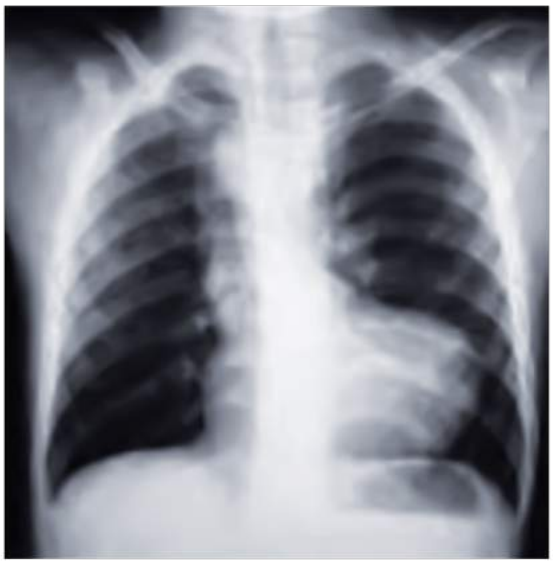
Option A - Mitral stenosis: Mitral stenosis causes a
change in left atrial pressure. Only long-standing mitral stenosis will produce 'a' wave changes.

Option C - Mitral regurgitation: Mitral regurgitation causes backflow of blood from the left ventricle into t he left atrium during contraction of the ventricle. There are trivial ‘v’ waves in the JVP wave due to incr eased left atrial compliance. There is no change in the ‘a’ waves noticed due to mitral regurgitation.

Option D - Tricuspid regurgitation: Tricuspid regurgitation causes backflow of blood from the right ventri cle into the right atrium during contraction of the ventricle. Tricuspid regurgitation causes obliteration of the ‘x’ wave, CV wave, and a steep 'y' descent.

Solution for Question 9:

Correct Option A: This CXR shows a "boot-shaped heart"



• The clinical presentation described in this case is consistent with the Tetralogy of Fallot (TOF).

• The classic CXR finding associated with TOF is a "boot-shaped heart."

• It occurs due to an upturned cardiac apex due to right ventricular hypertrophy and a concave pulmonary arterial segment due to overriding of the aorta.

Incorrect Options:

Option B: CXR shows an egg on a
string sign. This is found in the case of the Transposition of great vessels.

Option C: CXR shows the presence of snowman heart. This is associated with total anomalous pulmon ary venous return (TAPVR).

Option D: CXR shows the 3
SIGN of the heart. It is associated with coarctation of the aorta, where there is a
narrowing of the aorta near the site of the ductus arteriosus.

Hypertension

1. A 60-year-old female with poorly controlled hypertension presents to the emergency department with severe headache, blurred vision, and shortness of breath. Her blood pressure is 210/140 mmHg. Examination reveals papilledema. What is the most appropriate initial management for this patient?

(or)

What is the most appropriate initial management for a 60-year-old female with blood pressure of 210/140 mmHg, severe headache, blurred vision, shortness of breath, and papilledema?

A. Administer sublingual nitroglycerin

B. Begin oral antihypertensive medication as outpatient management

C. Admit the patient to the ICU and start IV labetalol

D. Order a head CT scan to rule out intracranial hemorrhage

---

2. Review the statements about the control of blood pressure and identify the incorrect one.

A. Physical activity like brisk walking for 30 minutes a day will reduce systolic blood pressure by approximately 10-20 mmHg.

B. Tracking of blood pressure implies that if a person is hypertensive in childhood, then the person remains hypertensive in adulthood.

C. The Rule of Halves is seen in hypertension, where only 50% of people who are aware of their hypertension receive treatment.

D. DASH stands for Dietary approaches to stop hypertension.

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	1

Solution for Question 1:

Correct Option C - Admit the patient to the ICU and start IV labetalol:

• In this scenario, the patient presents with severe symptoms including headache, blurred vision, and shortness of breath, along with a significantly elevated blood pressure of 210/140 mmHg. The presence of papilledema indicates end-organ damage and suggests the presence of a hypertensive emergency.

• The most appropriate initial management strategy is to admit the patient to the ICU and initiate intravenous antihypertensive medication.

• For patients with hypertensive encephalopathy such as this patient, the preferred parenteral antihypertensive drugs are nitroprusside, nicardipine, and labetalol.

Incorrect Options:

Option A - Administer sublingual nitroglycerin: Sublingual nitroglycerin is not appropriate for hypertensi ve emergencies and is more commonly used for angina or cardiac conditions.

Option B - Begin oral antihypertensive medication as outpatient management: Oral antihypertensive m edication is not suitable for immediate blood pressure control in a hypertensive emergency.

Option D - Order a head CT scan to rule out intracranial hemorrhage: A Head CT scan may be necess ary to rule out intracranial hemorrhage but should not delay the immediate management of the hyperte nsive emergency.

Solution for Question 2:

Correct Option A - Physical activity like brisk walking for 30 minutes a
day will reduce systolic blood pressure by approximately 10-20 mmHg:

• Physical activity like brisk walking for 30 minutes a day reduces systolic BP by approximately 4-9 mmHg and not by 10-20 mmHg as given in the statement.

Modification Recommendation

Approximate Systolic BP Reduction

Weight reduction

5-20 mmHg / 10kg weight loss

Adopt the DASH eating plan

8-14 mmHg

Dietary sodium reduction

2-8 mmHg

Physical activity

4-9 mmHg

Moderation of alcohol consumption

2-4 mmHg

Incorrect Options:

Option B - Tracking of blood pressure implies that if a person is hypertensive in childhood, then the per son remains hypertensive in adulthood: Tracking of blood pressure implies that BP levels of individuals are followed up from early childhood into adult life. It means that a person who is hypertensive in child hood will remain hypertensive in adulthood. Tracking is about monitoring and observing blood pressure levels over time.

Option C - The Rule of Halves is seen in hypertension, where only 50% of people who are aware of the ir hypertension receive treatment: The Rule of Halves is seen in hypertension, where only 50% of peop le who are aware of their hypertension receive treatment.

Option D - DASH stands for Dietary approaches to stop hypertension: DASH stands for Dietary approa ches to stop hypertension.

Cardiomyopathy and Diseases of Pericardium

1. A 38-year-old male, presents with chest pain and shortness of breath for 4 months. He experiences dizziness and fainting episodes on exertion. His family history is remarkable for the sudden cardiac death of his brother. On examination, a systolic murmur is heard at the left sternal border that increases with Valsalva maneuver and decreases with squatting. Which of the following pathological findings would be present in this patient's heart?

(or)

What pathological findings are expected in a patient's heart who has a family history of sudden cardiac death and a systolic murmur that increases with Valsalva and decreases with squatting?

A. Orphan Annie eye nucleus

B. Helter-skelter appearance

C. Ninja star nucleus

D. Psammoma bodies

---

2. Match the following : 1. Hypertrophic cardiomyopathy A. Dicrotic pulse 2. Dilated cardiomyopathy B. S3 gallop 3. Restrictive Cardiomyopathy C. Pulsus bisferians 4. Takotsubo cardiomyopathy D. Square root wave sign E. History of spouse death

1. Hypertrophic cardiomyopathy	A. Dicrotic pulse
2. Dilated cardiomyopathy	B. S3 gallop
3. Restrictive Cardiomyopathy	C. Pulsus bisferians
4. Takotsubo cardiomyopathy	D. Square root wave sign
	E. History of spouse death

A. 1:A ; 2:B, D ; 3:C ; 4:E

B. 1:C ; 2:A,B ; 3:D ; 4:E

C. 1:B,C ; 2:A ; 3: D; 4: E

D. 1:A,D ; 2:B ; 3:C ; 4:E

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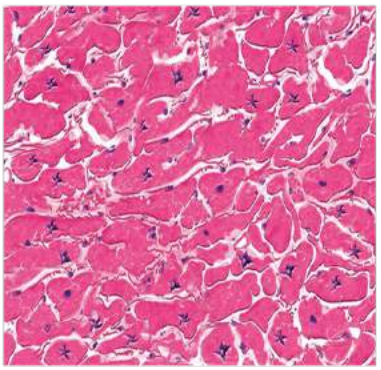
3. A 55-year-old male presents to the clinic with symptoms of progressive shortness of breath, fatigue, and exercise intolerance. Cardiac examination reveals a displaced point of maximal impulse. A myocardial biopsy is performed, and histological examination reveals the following: Which of the following is the most likely underlying cause of the observed histological finding?

(or)

What is the most likely underlying cause of the observed histological findings in a 55-year-old male with a displaced point of maximal impulse on cardiac examination?



A. Tobacco smoking

B. Genetic mutations

C. Viral infection

D. Ischemic injury

---

4. A 45-year-old male patient presents to the emergency department with bilateral pedal edema, discomfort in the right upper quadrant of the abdomen, and orthopnea. Chest auscultation reveals bilateral creptitaions, a loud S1 sound, and a pansystolic murmur. Point of maximal impulse is hypokinetic and diffuse. What is the most likely diagnosis?

(or)

What is the most likely diagnosis in a 45-year-old male presenting with bilateral pedal edema, abdominal discomfort, orthopnea, and a displaced point of maximal impulse?

A. Cardiomyopathy

B. Acute cor pulmonale

C. Alcoholic hepatitis

D. Pulmonary artery hypertension

---

5. A 60-year-old woman with a history of hypertension presents to the emergency department with severe chest pain and shortness of breath. Symptoms started abruptly after an intense argument with her son. Her blood pressure is 180/100 mmHg, heart rate is 110 bpm, and respiratory rate is 24 breaths per minute. An ECG shows ST-segment elevation in leads I, aVL, and V2 to V6. Cardiac biomarkers are significantly elevated. Select the most appropriate image that correlates with this presentation.

(or)

A 60-year-old woman presents to the emergency department with severe chest pain and shortness of breath that developed after an intense argument with her son, ST-segment elevation on ECG, and elevated cardiac biomarkers. Select the most appropriate image that correlates with this presentation.

A.

B.

C.

D.

---

6. A 15-year-old boy is brought to the emergency department in the early morning hours by his father, who reports that his son was having agonal respiration. His blood pressure is 80/50 mmHg with no palpable pulse. There is a family history of sudden death in a sibling. Workup shows a mutation in the SCN5A gene. Which of the following ECG patterns can be seen?

(or)

Which ECG finding is seen in Brugada syndrome?

A. ST elevation, cove pattern

B. ST elevation, Pardee sign

C. ST depression, downsloping

D. ST depression, upsloping

---

7. A 20-year-old female presents with palpitations and exercise intolerance. She reports recurrent syncopal episodes since her teenage years. On examination, she has sparse, coarse, and frizzy hair and thickened skin on the palms and soles. Her sister died at the age of 25. An echocardiogram reveals right ventricular abnormalities, including fatty infiltration and thinning of the myocardium. Which of the following genetic mutations is most likely to be associated?

(or)

Which genetic mutation is most likely associated with the clinical presentation of a 20-year-old female with exercise intolerance, woolly hair, palmoplantar keratoderma, a family history of sudden death?

A. SCN5A gene mutation

B. MYH7 gene mutation

C. DSP gene mutation

D. Plakoglobin gene mutation

---

8. A 45-year-old male with hypertrophic cardiomyopathy presents with increased exertional dyspnea and chest pain. The patient's symptoms worsen despite receiving nitroglycerin at the hospital. There is a subsequent drop in blood pressure and the drug is stopped. Further evaluation confirms dynamic left ventricular outflow tract obstruction, worsened by nitroglycerin. Which drug is not contraindicated in such patients?

(or)

Which of the following drugs is not contraindicated in a patient with hypertrophic cardiomyopathy with dynamic left ventricular outflow tract obstruction?

A. Digoxin

B. Furosemide

C. Amlodipine

D. Verapamil

---

9. A 35-year-old male presents to the clinic due to easy bruising, fatigue, and bone pain. He has a history of frequent infections. On examination, he has hepatosplenomegaly. Laboratory tests reveal a

low platelet count and elevated levels of glucocerebroside in the blood. This condition is a lysosomal storage disorder caused by a deficiency of glucocerebrosidase. Which cardiomyopathy is associated with this disease?

(or)

Which cardiomyopathy is commonly associated with a lysosomal storage disorder caused by a deficiency of the enzyme glucocerebrosidase?

A. Hypertrophic Cardiomyopathy

B. Dilated Cardiomyopathy

C. Restrictive Cardiomyopathy

D. Arrhythmogenic Right Ventricular Cardiomyopathy

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10. A 30-year-old male presents to the clinic due to exertional fatigue and difficulty breathing for the past few weeks. His blood pressure is 150/90 mmHg, heart rate is 80 beats per minute, respiratory rate is 16 breaths per minute, and SpO2 is 98%. Examination reveals a dicrotic pulse. Which of the following changes can be seen in this disease?

(or)

What changes can be seen in the disease of a 30-year-old male patient presenting with exertional fatigue, dyspnea, and a dicrotic pulse?

A. Increased EDV, Increased ESV, Increased contractility

B. Decreased EDV, Increased ESV, Increased contractility

C. Increased EDV, Increased ESV, Decreased contractility

D. Increased EDV, Decreased ESV, Decreased contractility

---

11. A 34-year-old primigravida woman at 37 weeks gestation comes to the physician because of a 1-week history of progressive fatigue and shortness of breath. On examination, there are bibasilar lung crackles, jugular venous distention, and 2+ pitting edema of the lower extremities. Urinalysis shows 1+ protein. Echocardiography shows a left ventricular ejection fraction of 0.35. Which of the following statements is true regarding the most likely diagnosis?

(or)

Which of the following statements about peripartum cardiomyopathy is true?

A. Peripartum cardiomyopathy occurs within 24 hours of delivery

B. Peripartum cardiomyopathy occurs within 7 days after pregnancy

C. Peripartum cardiomyopathy occurs within 6 weeks after pregnancy

D. Peripartum cardiomyopathy occurs within the last month of pregnancy or up to 6 months after pregnancy

---

12. A 50-year-old male presents to the emergency department with diffuse chest pain at rest. He says the pain radiates to his left shoulder and is relieved when he sits up. A scratchy sound that persists when the patient holds his breath is heard on cardiac auscultation along with normal S1 and S2. What is the most common etiology of this presentation?

(or)

What is the most common etiology for a condition characterized by diffuse chest pain relieved by sitting up and a scratchy sound on cardiac auscultation?

A. Idiopathic

B. Viral

C. Autoimmunity

D. Malignancy

---

13. A 42-year-old female presents to the ER with progressively worsening shortness of breath and chest discomfort for the past week. On examination, distant heart sounds, elevated jugular venous pressure with blood pressure 80/60 mmHg are noted. ECG shows low voltage QRS complexes. What is the most likely diagnosis?

(or)

What is the most likely diagnosis for a 42-year-old female with shortness of breath, chest discomfort, distant heart sounds, elevated jugular venous pressure with hypotension, and low-voltage QRS complexes on ECG?

A. Acute myocardial infarction

B. Acute pericarditis

C. Cardiac tamponade

D. Pericardial effusion

---

14. You are an intern measuring the blood pressure in the ER. You notice inspiratory fall of systolic blood pressure >12 mmHg. Which of the following conditions will not show this finding?

(or)

Pulsus paradoxus is seen in all of the following, except?

A. Pregnancy

B. Constrictive pericarditis

C. Pericardial effusion

D. Massive pulmonary embolism

---

15. A 40-year-old male presents to the clinic due to increasing shortness of breath and leg swelling for the past few months. On examination, jugular venous pressure is elevated and rises during deep inspiration. Chest auscultation reveals bilateral fine crepitations and a distinct pericardial shudder. Which of the following represents this patient's chest X-ray?

(or)

What chest X-ray findings are most likely associated with the condition in a 40-year-old male with elevated JVP, a pericardial shudder, prominent S4 heart sound, and bilateral fine lung crepitations?

A.

B.

C.

D.

Correct Answers

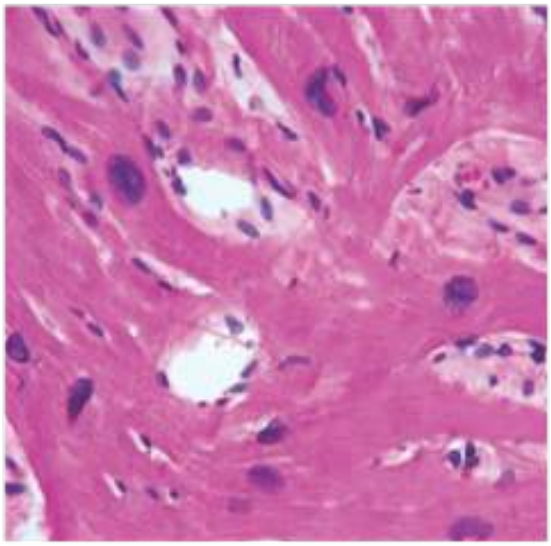
Question	Correct Answer
Question 1	2
Question 2	2
Question 3	2
Question 4	1
Question 5	3
Question 6	1
Question 7	4
Question 8	4
Question 9	3
Question 10	3
Question 11	4
Question 12	1
Question 13	3
Question 14	3
Question 15	2

Solution for Question 1:

Correct Option B - Helter-skelter appearance:

• The combination of chest pain, shortness of breath, dizziness, and fainting episodes, along with a systolic murmur that increases with the Valsalva maneuver and decreases with squatting, is diagnostic of hypertrophic cardiomyopathy (HCM).

• In HCM, histological examination of the heart would reveal a disorganized arrangement of cardiac muscle fibers, giving a characteristic "helter-skelter" appearance. This abnormal arrangement of muscle fibers is also called myocardial disarray.



Incorrect Options:

Option A - Orphan Annie eye nucleus: This term is associated with papillary thyroid carcinoma.

Option C
- Ninja star nucleus: In dilated cardiomyopathy, histological examination of the heart may reveal a "Ninja star nucleus," which is a
term used to describe the appearance of enlarged and irregularly shaped cardiac myocyte nuclei.

Option D - Psammoma bodies: Psammoma bodies are concentrically laminated calcifications commonl y seen in certain types of tumors, such as papillary thyroid carcinoma, ovarian serous carcinoma, and meningiomas.

Solution for Question 2:

Correct Option B - 1:C; 2:A,B; 3:D; 4:E:

Solution for Question 3:

Correct Option B - Genetic mutations:

• The "ninja star nucleus" appearance is a characteristic histological finding seen in certain genetic mutations associated with dilated cardiomyopathy.

• These genetic mutations can lead to abnormalities in the structure and function of myocardial cells, resulting in the dilatation of all cardiac chambers and reduced systolic function.

• TITIN or TTN mutation is most frequently implicated. Ninja star nuclei are commonly seen in Titin gene mutations.

Incorrect Options:

Option A - Tobacco smoking: Alcohol abuse can lead to alcoholic cardiomyopathy, which is a type of dilated cardiomyopathy.

Option C - Viral infection: While viral myocarditis can lead to dilated cardiomyopathy with dilatation of cardiac chambers and reduced systolic function, the specific histological finding of a "ninja star nucleus" is not typically associated with viral infections.

Option D - Ischemic injury: Ischemic cardiomyopathy is a type of dilated cardiomyopathy that occurs as a result of chronic coronary artery disease and reduced blood flow to the heart muscle.

Solution for Question 4:

Correct Option A - Cardiomyopathy:

• Patients have findings of biventricular failure that would be seen in cardiomyopathy.

Incorrect Options:

Option B - Acute cor pulmonale:

• It is seen with massive pulmonary embolism.

Option C - Alcoholic Hepatitis:

• It does not present with heart failure.

Option D - Pulmonary artery hypertension:

• It will not have lung crepitations and features of left ventricular failure.

Solution for Question 5:

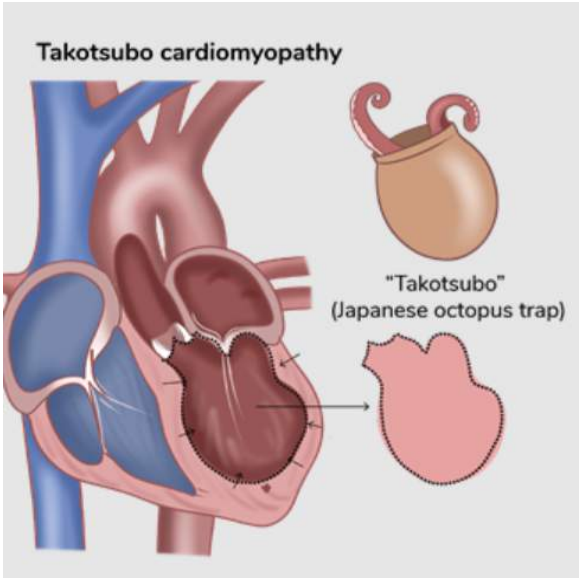
Correct Option C:

• Image 3 shows ballooning left ventricle on coronary angiography.

• The patient's presentation with severe chest pain and shortness of breath following an intense emotional trigger (argument with a family member) raises suspicion for a catecholamine surge-related cardiac condition. The most likely diagnosis is Takotsubo cardiomyopathy.

• ST-segment elevation in leads I, aVL, and V2 to V6 may initially be mistaken for an acute myocardial infarction. Takotsubo cardiomyopathy can be identified on echocardiography.

• TTCM is characterized by a transient ballooning of the left ventricle, typically involving the apex, which gives the heart the appearance of an "octopus trap" or "apical ballooning" on a chest X-ray.



Incorrect Options:

Option A: This X-ray finding of a boot-shaped heart is seen in Tetralogy of Fallot.

Option B: This X-ray shows a snowman-shaped heart or figure-of-eight-shaped heart. It is associated with Total Anomalous Pulmonary Venous Connection.

Option D: An X-ray of an egg-shaped heart is associated with Transposition of the Great Arteries.

Solution for Question 6:

Correct Option A: ST elevation, cove pattern:

• The above clinical scenario of Brugada syndrome is a cardiac channelopathy caused by a mutation in the SCN5A gene, which leads to a defective sodium channel function. The clinical presentation of the patient includes syncopal attacks, a family history of sudden death, episodes of palpitations, and dizziness.

Incorrect Options:

Option B: ST elevation, Pardee sign: It is seen in myocardial infarction.

Option C: ST depression, downsloping: It is seen in chronic stable angina.

Option D: ST depression, upsloping: It is seen in chronic stable angina.

Solution for Question 7:

Correct Option D - Plakoglobin gene mutation:

• This clinical scenario highly suggests Naxos Syndrome, an autosomal recessive disorder caused by a mutation in the Plakoglobin (JUP) gene. Plakoglobin is a protein involved in maintaining the integrity of

desmosomes, which are cell-to-cell junctions in the heart.

• Naxos Syndrome is characterized by a combination of Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC), woolly hair, and palmoplantar keratoderma.

• Key features in the patient's presentation include palpitations, exercise intolerance, recurrent syncope, and a family history of sudden cardiac death. Additionally, the presence of woolly hair (sparse, coarse, and frizzy hair) and palmoplantar keratoderma (thickened skin on the palms and soles) further supports the diagnosis.

• Echocardiography shows fatty infiltration and thinning of the myocardium, particularly in the right ventricle.

• Genetic testing for plakoglobin gene mutation aids diagnosis.

• Treatment is aimed at managing arrhythmias and cardiac symptoms.

• Regular cardiac monitoring and follow-up.

Incorrect Options:

Option A - SCN5A gene mutation: SCN5A gene mutation is associated with conditions like Brugada Sy ndrome and Long QT Syndrome.

Option B
- MYH7 gene mutation: MYH7 gene mutation is associated with Hypertrophic Cardiomyopathy (HCM).

Option C - DSP gene mutation: DSP gene mutation is associated with another form of Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) known as Carvajal Syndrome.

Solution for Question 8:

Correct Option D - Verapamil:

• The left ventricular outflow tract obstruction in hypertrophic obstructive cardiomyopathy in this patient worsened with the administration of nitroglycerin, a vasodilator.

• Propranolol is the drug of choice for managing patients with HCM.

• Verapamil is also a calcium channel blocker that can be used as an alternative to propranolol, particularly in patients who cannot tolerate beta-blockers due to conditions like asthma or COPD.

Incorrect Options:

Option A - Digoxin: Digoxin increases the force of contraction of the heart (inotropy) and can worsen lef t ventricular outflow tract obstruction in patients with HCM. Therefore, it is contraindicated in HCM as it can exacerbate symptoms and lead to adverse effects.

Option B - Furosemide: Furosemide causes fluid loss and decreases LV filling. This will worsen hypote nsion in these patients.

Option C - Amlodipine: Amlodipine is a dihydropyridine calcium channel blocker that is contraindicated in HCM due to its potential to worsen left ventricular outflow tract obstruction (LVOTO) in these patients . Unlike verapamil (a non-dihydropyridine CCB), amlodipine acts on vascular smooth muscle cells to ca use vasodilation and worsen the condition.

Solution for Question 9:

Correct Option C - Restrictive Cardiomyopathy:

• Gaucher Disease, a lysosomal storage disorder caused by a deficiency of the enzyme glucocerebrosidase, can lead to the accumulation of glucocerebroside in various tissues, including the heart.

• This accumulation in the heart can cause infiltration and fibrosis of the cardiac muscle and other structures, leading to the development of Restrictive Cardiomyopathy.

Incorrect Options:

Option A - Hypertrophic Cardiomyopathy: Occurs due to MYH7 mutation.

Option B - Dilated Cardiomyopathy: Seen with alcohol, viruses, and Duchenne muscular dystrophy.

Option D - Arrhythmogenic Right Ventricular Cardiomyopathy: ARVC is a condition characterized by the replacement of the right ventricular myocardium with fibrofatty tissue.

Solution for Question 10:

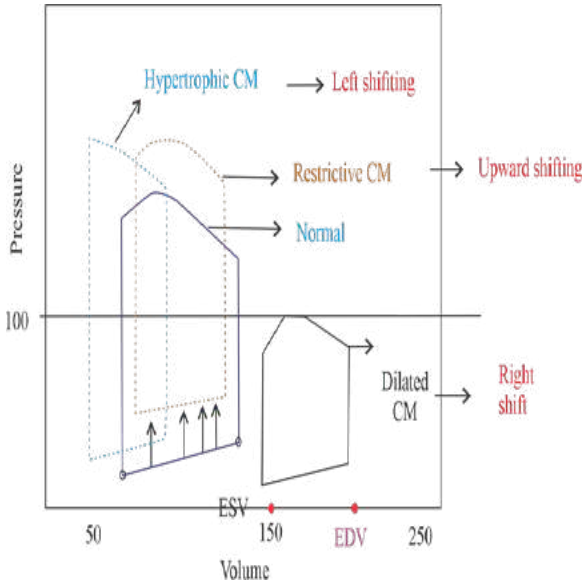
Correct Option C - Increased EDV, Increased ESV, Decreased contractility:

• Dicrotic pulse with exertional dyspnea indicates dilated cardiomyopathy.

• Increased End-Diastolic Volume (EDV): DCM is characterized by enlargement and dilation of the left ventricle, which leads to an increase in the volume of blood filling the ventricle during diastole, resulting in increased EDV.

• Increased End-Systolic Volume (ESV): As the heart's ability to contract and pump blood is impaired in DCM, the left ventricle is less effective in ejecting blood during systole. This results in an increased residual volume of blood remaining in the ventricle at the end of systole, leading to increased ESV.

• Decreased Contractility: DCM leads to a decrease in the heart's contractile function. The heart muscle becomes weakened and is less able to pump blood effectively, resulting in decreased contractility.



Incorrect Options:

Options A, B, and D: These are not the appropriate changes in cardiac parameters that result from dilat ed cardiomyopathy.

Solution for Question 11:

Correct Option D - Peripartum cardiomyopathy occurs within the last month of pregnancy or up to 6 months after pregnancy:

• Peripartum cardiomyopathy (PPCM) is characterized by the development of idiopathic heart failure with reduced ejection fraction (HFrEF) months after or before birth.

• It is diagnosed based on a left ventricular ejection fraction (LVEF) of < 0.45 on echocardiography and in the absence of other potential causes of heart failure.

• Most patients experience partial or complete postpartum resolution of heart failure within 6 months of delivery, but others require continued management with heart failure medications, devices, or heart transplantation.

Incorrect Options:

Options A, B, C

Solution for Question 12:

Correct Option A – Idiopathic:

• The clinical features of diffuse chest pain at rest that are relieved on sitting up, radiation of pain to the left shoulder, and the presence of a scratchy sound on auscultation (pericardial friction rub) are typical of pericarditis.

• Pericarditis can have various causes, and in most cases, the exact cause remains unknown. Thus, idiopathic pericarditis is the most common.

Incorrect Options:

Options B, C, D

Solution for Question 13:

Correct Option C - Cardiac tamponade:

• The findings of Beck's triad—distant heart sounds, elevated jugular venous pressure, and hypotension—indicate cardiac tamponade.

• The low-voltage QRS complexes on ECG are seen in both tamponade and pericardial effusion.

• Blood pressure is the differentiating factor.

Incorrect Options:

Option A - Acute myocardial infarction: Acute myocardial infarction causes ST segment and T wave changes on the ECG.

Option B - Acute pericarditis: Acute pericarditis can present with chest pain and a pericardial friction rub on auscultation.

Option D - Pericardial effusion: It will not cause hemodynamic instability.

Solution for Question 14:

Correct Option C - Pericardial effusion:

• Inspiratory fall of >10 mmHg indicates pulsus paradoxus.

• It is seen in cardiac tamponade but not in pericardial effusion.

• Tamponade causes diastolic collapse of ventricles, causing severe hypotension and a fall of systolic blood pressure.

Incorrect Options:

Option A - Pregnancy: During pregnancy, pressure on the IVC by the gravid uterus can reduce overall blood flow to the heart. This can lead to decreased blood pressure during inspiration, known as "physio logical pulsus paradoxus."

Option B - Constrictive pericarditis: Constrictive pericarditis leads to pulsus paradoxus due to impaired diastolic filling of the heart caused by the rigid pericardium. During inspiration, the increased venous ret urn cannot be accommodated, leading to a significant drop in systolic blood pressure.

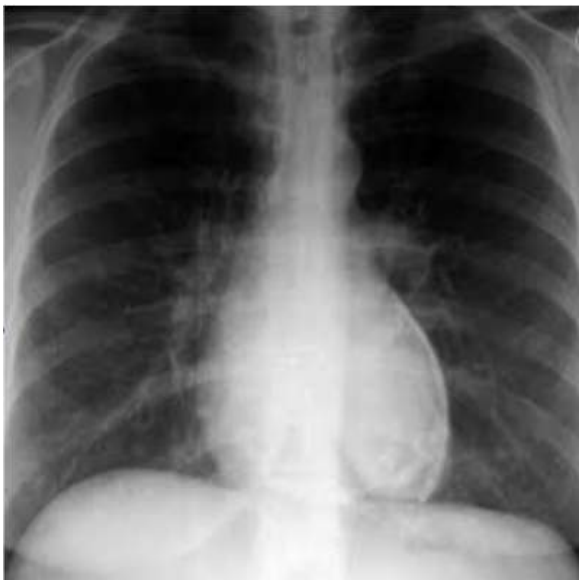
Option D - Massive pulmonary embolism: Massive pulmonary embolism can cause pulsus paradoxus, especially if it leads to significant strain on the right ventricle and impairs left ventricular filling.

Solution for Question 15:

Correct Option - B

• The clinical presentation, including elevated JVP with a rise during inspiration (Kussmaul sign), pericardial shudder, prominent S4 heart sound, and bilateral fine crepitations indicative of pulmonary edema, suggests constrictive pericarditis.

• Chest X-ray shows pericardial calcification called egg-in-cup appearance.



Incorrect Options:

Option A - CXR of water bottle appearance: It is seen in pericardial effusion.

Option C - CXR of Boot-Shaped Heart: It is seen in the Tetralogy of Fallot.

Option D - Hemithorax with meniscus sign: It is seen in pleural effusion.

Conduction and its Defects

1. Based on the findings of the His Bundle Electrogram, if the AH Interval is prolonged, the block is most likely located at?

A. Below the bundle branches

B. Within the AV node

C. In the atria

D. In the ventricles

---

2. Which of the following statements is/are true about the conduction of heart ? Depolarization spreads from apex to base Depolarization spreads from epicardium to endocardium Apical endocardium is the first part of the heart to get repolarised

A. Both 1 and 2 are true

B. Only 1 is true

C. Both 2 and 3 are true

D. All of them are true

---

3. A 65-year-old male with a medical history of hypertension and ischemic heart disease presents to the emergency department due to intermittent fainting episodes. He describes feeling dizzy and lightheaded before losing consciousness, and each episode lasts for a few seconds. His heart rate is slow with an irregular rhythm. ECG shows P waves at 100/min and QRS complexes at 30/min. What is the most likely diagnosis?

(or)

What is the most likely diagnosis for a patient with intermittent fainting episodes and ECG showing P waves at 100/min and QRS complexes at 30/min?

A. Atrial Fibrillation

B. Stokes-Adams Syndrome

C. Ventricular Tachycardia

D. Supraventricular Tachycardia

---

4. A 68-year-old male patient with COPD presents to the emergency department with palpitations, dizziness, and shortness of breath. His heart rate is 110 beats per minute and the rhythm is irregular, and auscultation reveals multiple rapid heartbeats. The ECG shows an irregular R-R interval, and P-waves are present, but they appear with varying morphologies. What is the most likely diagnosis?

(or)

Irregular R-R intervals with variable P wave morphologies on ECG in a patient with COPD is seen in?

A. Ventricular Tachycardia

B. Multifocal Atrial Tachycardia

C. Atrial Fibrillation

D. Sinus Tachycardia

---

5. A 45-year-old female presents to the clinic with palpitations and irregular heartbeats. On evaluation, an arrhythmia is detected, and the patient is prescribed an antiarrhythmic medication. The patient returns after a few weeks with malar rash and joint pain. Which of the following drugs has a similar antiarrhythmic mechanism of action as the medication initially prescribed?

(or)

A patient developed a malar rash and joint pain when he was prescribed an anti-arrhythmic drug. Which of the following will have similar pharmacological action?

A. Amiodarone

B. Lidocaine

C. Flecainide

D. Disopyramide

---

6. A 40-year-old male with a history of recurrent episodes of atrial fibrillation is prescribed quinidine, an antiarrhythmic medication. Which of the following statements regarding quinidine is true?

(or)

Which of the following is true about the features of quinidine?

A. Quinidine is a class Ib antiarrhythmic drug.

B. It primarily acts by blocking sodium channels, thereby prolonging the action potential duration.

C. Quinidine is known to cause a shortening of the QT interval on the electrocardiogram (ECG).

D. The most common adverse effect of Quinidine is hypokalemia.

---

7. Which of the following drugs has been withdrawn due to the side effect of polymorphic ventricular tachycardia?

A. Domperidone

B. Omeperazole

C. Ebastine

D. Cisapride

---

8. A child with a congenital heart disease is on digoxin. He develops prostration and is given IV lignocaine in the emergency department. Which rhythm disorder would have developed in this child?

(or)

For which type of arrhythmia has Lidocaine, also known as lignocaine, been approved for use?

A. Atrial fibrillation

B. Paroxysmal supraventricular tachycardia

C. Ventricular bigeminy

D. Premature ventricular contractions

---

9. A 25-year-old male presents with palpitations and recurrent syncopal attacks. There is a family history of sudden cardiac death of the brother. There are no abnormalities on examination. An ECG reveals the following findings: PR interval is short. QRS complex is normal. PJ interval is short. Based on these clinical and ECG findings, what is the most likely diagnosis for this patient?

(or)

What is the most likely diagnosis for a 25-year-old male with palpitations, recurrent syncopal attacks, a family history of sudden cardiac death, and ECG findings of a short PR interval and short PJ interval?

A. Wolff-Parkinson-White Syndrome

B. Lown-Ganong-Levine Syndrome

C. Long QT Syndrome

D. Brugada Syndrome

---

10. A 75-year-old female with a history of hypertension and diabetes, presents to the clinic due to palpitations, dizziness, and shortness of breath for several months. An ECG confirms atrial fibrillation. She is concerned about her risk of stroke and wants to understand her prognosis and treatment options. What are the components included in the risk assessment tool used to evaluate the risk of stroke in such patients?

(or)

What components are included in the risk assessment tool used to evaluate the risk of stroke in patients with atrial fibrillation?

A. Age, sex, and presence of hypertension

B. Ejection fraction, cholesterol levels, and blood pressure

C. Family history, smoking status, and BMI

D. Hemoglobin levels, platelet count, and INR values

---

11. A 62-year-old male patient presents to the emergency department with complaints of weakness, palpitations, and chest discomfort. He has a history of chronic kidney disease and hypertension. What ECG finding is the earliest to be seen in patient with hyperkalemia?

(or)

What ECG finding is the earliest to be seen in a patient with hyperkalemia?

A. Tall tented T wave

B. ST elevation

C. Absent P wave

D. QRS complex broad

---

12. A 32-year-old male presents to the emergency department with palpitations and dizziness that started abruptly 2 hours ago. He mentions experiencing occasional episodes of rapid heartbeats in the past, lasting for a few minutes and then spontaneously resolving. He is alert and oriented without any abnormalities on examination. An ECG showed the following findings: Heart rate: 150 bpm Regular

rhythm PR interval: 0.08 seconds QRS duration: 0.10 seconds Delta wave Wide QRS complexes What is the most likely diagnosis?

(or)

What is the most likely diagnosis in a 32-year-old male presenting with palpitations and an ECG showing a regular rhythm, heart rate of 150 bpm, delta wave, and wide QRS complexes?

A. Atrial Fibrillation

B. Supraventricular Tachycardia due to an accessory pathway

C. Ventricular Tachycardia

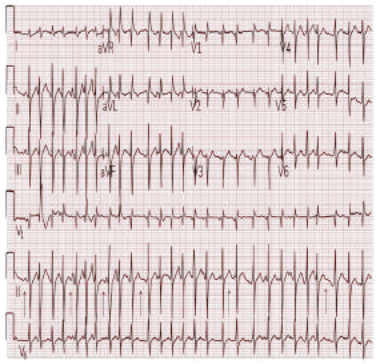
D. Sinus Tachycardia with premature ventricular contractions

---

13. A 68-year-old male with a history of COPD presents to the ER with palpitations, shortness of breath, and dizziness. He is on long-term theophylline therapy. His heart rate is 120 beats per minute, blood pressure is 100/80 mmHg, respiratory rate is 24 breaths per minute, and SpO2 is 92% on room air. An electrocardiogram is performed, which is shown below: Which of the following statements are true about the treatment of this condition?

(or)

What are the true statements regarding treating the condition in a patient on theophylline therapy for COPD, and the following ECG findings?



A. DC shock is the preferred treatment of choice

B. Amiodarone cannot be given as a long term treatment modality

C. Verapamil acts on SA node and stabilizes the heart rate

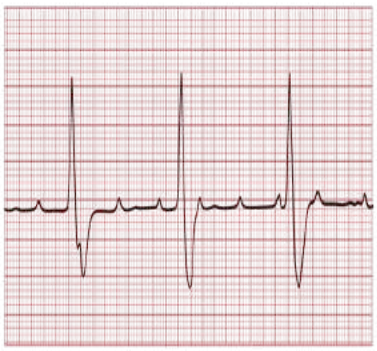
D. Metoprolol when given causes stabilization of the membrane

---

14. A 65-year-old male, presents to the emergency department due to persistent dizziness, fatigue, shortness of breath, and near-fainting for a week. He underwent percutaneous coronary intervention six months ago to address a severe blockage in one of his coronary arteries. His blood pressure is 130/80 mmHg, heart rate is 40 bpm, and respiratory rate is 20 breaths/min. ECG was performed which is given below : Which of the following is the cause of the patients symptoms?

(or)

What is the likely cause of dizziness, fatigue, a heart rate of 40 bpm, and the provided ECG findings, in the context of his medical history of coronary artery disease and recent PCI procedure?



A. Degenerative changes in the SA node

B. Damage to the AV node

C. Reentrant circuit

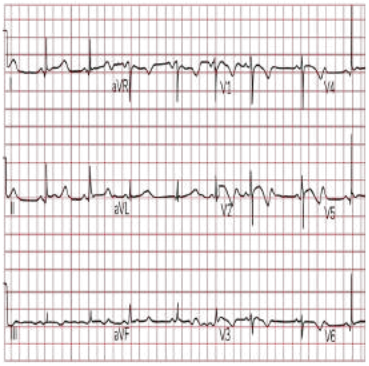
D. Ectopic foci

---

15. A 20-year-old otherwise healthy female presents to the emergency department with complaints of recurrent episodes of fainting and palpitations. The episodes have been occurring for the past few months and are triggered by sudden loud noises or emotional stress. Her heart rate is regular. ECG showed the following findings : Which of the following antiarrhythmics would be contraindicated in this condition ?

(or)

In a 20-year-old female with recurrent episodes of fainting and palpitations triggered by loud noises or emotional stress and ECG findings, which antiarrhythmic would be contraindicated?



A. Beta blocker

B. Amiodarone

C. Lignocaine

D. MgSO4

---

16. A 65-year-old male with a history of hypertension and diabetes presents to the emergency department with sudden-onset weakness on the right side of his body and difficulty speaking. On examination, the patient has right-sided facial droop, right arm and leg weakness, and slurred speech. His blood pressure is elevated, and he has an irregular heartbeat on auscultation. He appears confused

and disoriented. What is the most likely cause?

(or)

What is the most likely cause of the 65-year-old male patient's symptoms, including right-sided weakness, slurred speech, elevated blood pressure, irregular heartbeat, and confusion?

A. Atrial fibrillation

B. Atrial flutter

C. Multifocal atrial tachycardia

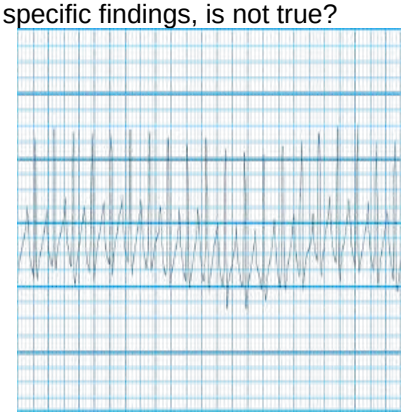
D. Ventricular tachycardia

---

17. A 28-year-old female presents to the ER with sudden onset palpitations and dizziness. She reports feeling her heart racing, which began abruptly about 30 minutes ago. Her heart rate is 180 beats per minute, and her blood pressure is 100/80 mmHg. ECG findings are given below. Which of the following statements is not true about the drug of choice for this condition ?

(or)

Which statement regarding the drug of choice for the patient's condition, characterized by sudden palpitations and an ECG showing specific findings, is not true?



A. It can produce asystole or atrial fibrillation

B. It is contraindicated in asthmatic patient

C. Its activity is increased by the methylxanthines

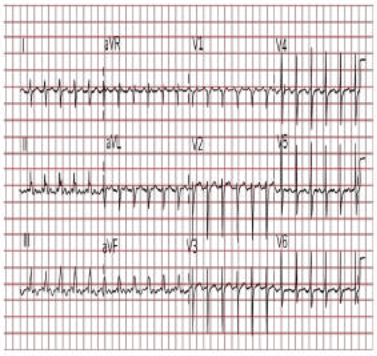
D. Its increase leads to coronary steal phenomenon.

---

18. A 70-year-old hypertensive patient presented to the clinic complaining of sudden onset of palpitations, dizziness, and loss of consciousness. His heart rate was 150 beats/minute, and his blood pressure was 80/60 mmHg. ECG was done, which showed the following findings. Diagnosis is?

(or)

What is the most likely diagnosis for a 70-year-old hypertensive patient with sudden palpitations, dizziness, and loss of consciousness whose ECG is shown below?



A. Atrial flutter

B. Atrial fibrillation

C. Multifocal atrial tachycardia

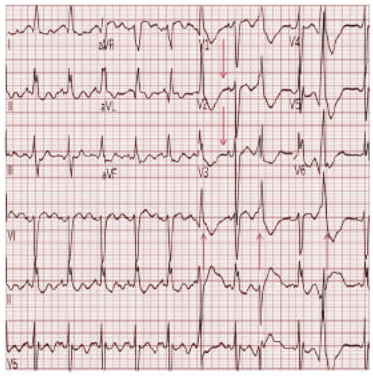
D. PSVT

---

19. 55-year-old lady presents to ER with complaints of fatigue and prostration. She is known case for C.K.D and is on multiple medications. BP is 160/100 mm Hg and severe pallor is noted. ECG shows?

(or)

Based on the clinical presentation and ECG findings, what is the likely diagnosis for the 55-year-old woman with a history of chronic kidney disease, weakness, fatigue, and muscle cramps?



A. Hypokalemia

B. Hyperkalemia

C. Hypercalcemia

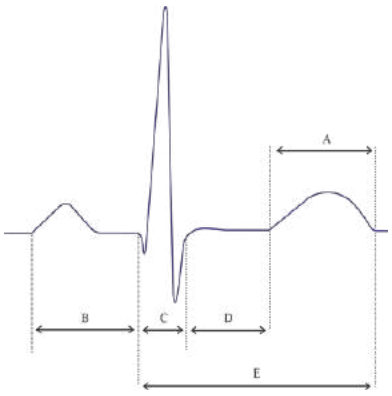
D. Hyponatremia

---

20. A 35-year-old patient with a history of recurrent episodes of supraventricular tachycardia presents to the cardiology clinic. The clinician prescribes a beta blocker. Which interval of the ECG is most likely to be affected by this drug?

(or)

A 35-year-old patient with supraventricular tachycardia is prescribed a beta blocker. Which ECG interval is most likely to be affected by this drug?



A. C

B. D

C. B

D. E

---

21. A 32-year-old male presents to the emergency department with palpitations, and dizziness. An ECG reveals a tachycardic rhythm with specific characteristics suggestive of Atrioventricular Reentrant Tachycardia. Which of the following characteristics describes Antidromic Conduction in AVRT?

(or)

Which of the following is correct about Antidromic Conduction in Atrioventricular Reentrant Tachycardia (AVRT)?

A. Retrograde conduction via bundle of Kent with narrow QRS complex

B. Anterograde conduction via bundle of Kent with broad QRS complex

C. Treatment of choice is defibrillation

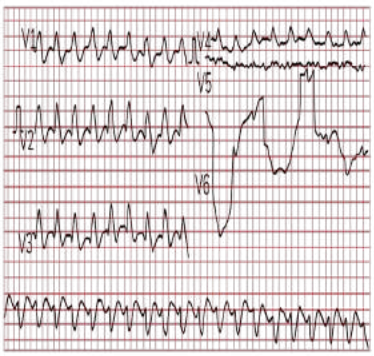
D. Carotid sinus massage will prevent paroxysmal attacks

---

22. A 60-year-old man with hypertension is complaining of feeling dizzy with palpitations and breathlessness. The blood pressure was 70/40 mm Hg and became unrecordable while ECG was being recorded. What should be the first step in the management of this patient?

(or)

What is the best treatment for a crashing patient with following ECG recording?



A. IV Amiodarone 150mg

B. IV Lasix 40mg

C. Defibrillation

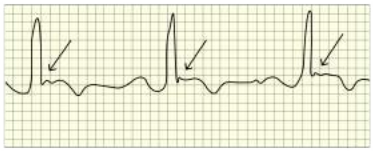
D. Cardioversion

---

23. A 25-year-old man was brought after falling due to a syncopal attack an hour ago. He had similar episodes in the past and family history of sudden death in sibling is present. ECG is given below. What is the likely diagnosis?

(or)

Comment on diagnosis based on the ECG shown.



A. WPW syndrome

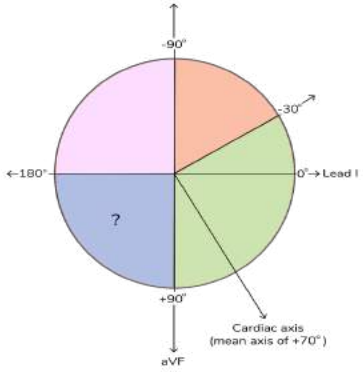
B. Hypokalemia

C. Arrhythmogenic right ventricular dysplasia

D. HOCM

---

24. What is the diagnosis if the axis is on the mark “?” from the diagram shown below?



A. Right axis deviation

B. Normal axis

C. Left axis deviation

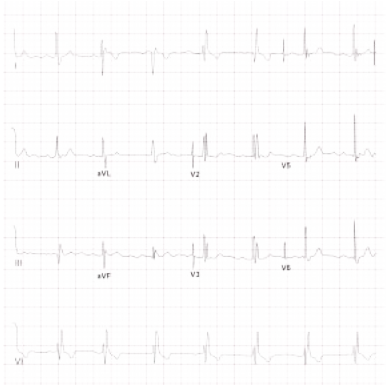
D. Extreme axis deviation

---

25. A 55-year-old man presented to the physician's office for a regular blood pressure checkup. On physical examination, there was a wide split second heart sound. The physician recommended an ECG for evaluation which revealed findings as shown below. Which of the following is the most likely diagnosis?

(or)

On physical examination, there was a wide split second heart sound, and ECG is given below. Which of the following is the most likely diagnosis?



A. Left bundle branch block

B. Right bundle branch block

C. Wolf Parkinson White Syndrome

D. Lown Ganong Levine Syndrome

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	2
Question 3	2
Question 4	2
Question 5	4
Question 6	2
Question 7	4
Question 8	3
Question 9	2
Question 10	1
Question 11	1
Question 12	2

Question 13	2
Question 14	2
Question 15	2
Question 16	1
Question 17	3
Question 18	1
Question 19	1
Question 20	3
Question 21	2
Question 22	3
Question 23	3
Question 24	1
Question 25	2

Solution for Question 1:

Correct Option B- Within the AV node:

• If the AH interval (the time between the activation of the atria and the activation of the His bundle, which reflects AV node conduction) is prolonged on the His Bundle Electrogram, it indicates that there is a delay within the AV node. This delay can lead to various degrees of AV block, depending on the severity of the conduction impairment.

HIS BUNDLE ELECTROGRAM (HBE)

• A Wave - SA Nodal Depolarisation

• H Wave - His Bundle depolarisation

• V Wave - Ventricular depolarization

Indications

• Heart Block → to Check whether the block is above (AV NODE) or below (Bundle branches) the His Bundle

• To differentiate b/w ventricular & supra ventricular tachycardias

• AH INTERVAL- (time taken for impulse to travel from SA Node to His bundle) 55 - 130ms

• HV INTERVAL – (time taken for impulse to travel from His bundle to ventricles) 35 - 55ms

• If AH Interval is prolonged - Block is above (AV block)

• HV Interval is prolonged - Block is below (bundle branch block)

Incorrect Options:

Option A- Below the bundle branches: If the AH interval is prolonged, it indicates a delay in the conduct ion through the atrioventricular (AV) node.The AV node is located above the bundle branches and is re sponsible for transmitting electrical signals from the atria to the ventricles. A
prolonged AH interval suggests that there is an issue within the AV node itself.

Option C- In the atria: The AH interval represents the time taken for an electrical signal to travel from th e atria to the ventricles. If it is prolonged, it implies a
delay in the AV node's conduction, not an issue in the atria.

Option D- In the ventricles: The AH interval does not directly assess conduction within the ventricles. In stead, it primarily reflects AV node conduction. If there were an issue in the ventricles causing a prolon ged AH interval, it would be indirectly due to the AV node's impaired ability to transmit signals effectivel y.

Solution for Question 2:

Correct Option B- Only 1 is true:

Solution for Question 3:

Correct Option B- Stokes-Adams Syndrome:

• The ECG findings described align with the features of Stokes-Adams Syndrome.

• It is characterized by recurrent episodes of loss of consciousness due to third degree heart block having no conduction via AV node.

Incorrect Options:

Option A- Atrial Fibrillation: Atrial Fibrillation is characterized by an irregularly irregular heart rhythm wit h absent P waves on the ECG.

Option C- Ventricular Tachycardia: Ventricular Tachycardia presents with broad QRS complex tachyca rdia.

Option D- Supraventricular Tachycardia: Supraventricular Tachycardia presents with narrow QRS com plex tachycardia.

Solution for Question 4:

Correct Option B- Multifocal Atrial Tachycardia (MAT):

• The clinical scenario and ECG findings align with the features of Multifocal Atrial Tachycardia (MAT).

• MAT is a type of atrial tachycardia characterized by irregular and rapid heartbeats originating from multiple ectopic foci in the atria.

• It is most commonly associated with underlying pulmonary disease (such as COPD in this patient), cardiac disease, electrolyte abnormalities (mainly hypokalemia and hypomagnesemia), and chronic renal failure.

Incorrect Options:

Option A- Ventricular Tachycardia: Ventricular Tachycardia typically presents with wide QRS complexe s on ECG.

Option C- Atrial Fibrillation: Atrial fibrillation has an irregularly irregular rhythm with absent P waves.

Option D- Sinus Tachycardia: Sinus Tachycardia exhibits normal sinus rhythm.

Solution for Question 5:

Correct Option D- Disopyramide:

• The drug initially prescribed to the patient is procainamide. Procainamide is an antiarrhythmic medication used to treat various types of arrhythmias. However, after a few weeks of taking procainamide, the patient developed symptoms of malar rash and joint pain, which are indicative of drug-induced lupus.

• Disopyramide is another class IA antiarrhythmic medication, similar to procainamide, and has comparable mechanism of action.

Incorrect Options:

Option A- Amiodarone: Amiodarone is a class III antiarrhythmic medication with a mechanism of action different from procainamide. It causes blue man syndrome.

Option B- Lidocaine: Lidocaine is a class IB antiarrhythmic drug that works by blocking sodium channels, leading to a reduction in the cond uction velocity in cardiac tissues. It is primarily used for the treatment of ventricular arrhythmias.

Option C- Flecainide: Flecainide is a class IC antiarrhythmic drug that works by blocking sodium chann els and slowing the conduction of electrical impulses in the heart. It is mainly used for the treatment of supraventricular and ventricular arrhythmias.

Solution for Question 6:

Correct Option B- It primarily acts by blocking sodium channels, thereby prolonging the action potential duration:

• This action prolongs the action potential duration and refractory period in cardiac cells, helping to stabilize the cardiac rhythm and prevent arrhythmias.

• Quinidine serves as a class 1a antiarrhythmic drug.

Incorrect Options:

Option A- Quinidine is a class Ib antiarrhythmic drug: is incorrect because quinidine is a class Ia antiarrhythmic drug.

Option C-Quinidine is known to cause a shortening of the QT interval on the electrocardiogram (ECG): is incorrect because quinidine is known to cause QT interval prolongation on the ECG.

Option D- The most common adverse effect of quinidine is hypokalemia: Also incorrect. Quinidine can cause various side effects, including gastrointestinal disturbances, cinchonism (a syndrome characteriz ed by symptoms like tinnitus, hearing loss, and visual disturbances), and potential cardiac effects like QT prolongation and polymorphic ventricular tachycardia.

Solution for Question 7:

Correct Option D- Cisapride:

• When a patient is taking cisapride for acid reflux disease, there is already a potential risk of QT interval prolongation and development of polymorphic ventricular tachycardia.

• It also interacts with commonly prescribed macrolide, erythromycin, used for the treatment of community-acquired pneumonia. It can inhibit the activity of CYP3A4 enzymes in the liver. This inhibition can slow down the metabolism of cisapride, causing higher levels of cisapride to trigger arrhythmia.

• The increased levels of cisapride in the bloodstream, combined with its inherent propensity to prolong the QT interval, can significantly raise the risk of developing a life-threatening arrhythmia like pulseless ventricular tachycardia or torsades de pointes.

Incorrect Options:

Option A- Domperidone: Domperidone is a
medication used to relieve symptoms of nausea and vomiting.

Option B- Omeprazole: Omeprazole is a
proton pump inhibitor commonly used to treat acid reflux disease (GERD).

Option C- Ebastine: Ebastine is an antihistamine used to relieve allergy symptoms. It is generally not k nown to cause significant cardiac arrhythmias.

Solution for Question 8:

Correct Option C- Ventricular bigeminy:

• Lidocaine is a local anesthetic of the amino amide type.

• It is the drug of choice for the treatment of digoxin-induced ventricular bigeminy.

• It reduces the enhanced automaticity of subsidiary pacemakers and AV nodal conduction in therapeutic concentrations.

Incorrect Options:

Option A- Atrial fibrillation:

• Beta-blockers and calcium channel blockers are the drugs of choice for atrial fibrillation.

Option B- Paroxysmal supraventricular tachycardia:

• Managed with vagal maneuvers, adenosine, or verapamil for chemical cardioversion.

Option D- Premature ventricular contractions:

• Beta-blockers in low doses are the first-line therapy for reducing the burden of premature ventricular contractions (PVC).

• Metoprolol and carvedilol are the beta blockers commonly used for this purpose.

Solution for Question 9:

Correct Option B- Lown-Ganong-Levine Syndrome:

• This patient's clinical presentation with palpitations, recurrent syncopal attacks, and a family history of sudden cardiac death, along with the ECG findings of a short PR interval, normal QRS complex, and short PJ interval, is diagnostic of a pre-excitation syndrome called LGL syndrome.

• In Lown-Ganong-Levine Syndrome, an accessory pathway known as the James fibers allows electrical impulses from the atria to bypass the atrioventricular (AV) node and directly reach the Bundle of His.

Incorrect Options:

Option A- Wolff-Parkinson-White Syndrome: Wolff-Parkinson-White Syndrome (WPW) is another pre-e xcitation syndrome characterized by an accessory pathway (Bundle of Kent) is ruled because this has a normal PJ interval.

Option C- Long QT Syndrome: Long QT Syndrome is characterized by a prolonged QT interval on the ECG and is associated with an increased risk of ventricular arrhythmias.

Option D- Brugada Syndrome: It is a sodium channel defect (SCN5A) characterized by specific ECG fi ndings, such as ST-segment elevation in the right precordial leads (V1-V3).

Solution for Question 10:

Correct Option A- Age, sex, and presence of hypertension:

• The components typically included in the risk assessment tool used to evaluate the risk of stroke in patients with atrial fibrillation (AF) are age, sex, and the presence of hypertension. This risk assessment tool is often referred to as the CHA2DS2-VASc score.

CHA2DS2 – VASs

Risk Factor

Score

Congestive HF (CHF)

1

Hypertension

Age ≥75

2

Diabetes mellitus

Stroke, TIA, or TE

Vascular disease (prior MI, PAD, or CABG)

Age 65-74

Sex category (female)

Incorrect Options:

Option B- Ejection fraction, cholesterol levels, and blood pressure: Only hypertension is a component of the CHA2DS2-VASc score.

Option C- Family history, smoking status, and BMI: None of these are components of the CHA2DS2-VASc score.

Option D- Hemoglobin levels, platelet count, and INR values: None of these are components of the CHA2DS2-VASc score.

Solution for Question 11:

Correct Option A- Tall tented T wave:

• Tall tented T waves are a classic earliest ECG findings associated with hyperkalemia. In hyperkalemia, as serum potassium levels rise, the resting membrane potential of cardiac myocytes becomes less negative. This leads to increased excitability of the cells, resulting in tall and peaked T waves.

Incorrect Options:

Option B- ST elevation: ST-segment follows the vector of T wave.

Option C- Absent P wave: Hyperkalemia leads to changes in P wave morphology, including decreased amplitude and duration. Additionally, PR interval prolongation can occur.

Option D- QRS complex broad: In hyperkalemia, as serum potassium levels increase, the depolarization phase of cardiac myocytes is affected. This can result in widening of the QRS complex on the ECG. A broad QRS complex is often a prominent feature of severe hyperkalemia and can lead to life-threatening arrhythmias.

Solution for Question 12:

Correct Option B- Supraventricular Tachycardia (SVT) due to an accessory pathway

• The patient's clinical presentation of abrupt-onset palpitations and dizziness, along with a regular rapid heart rate on examination, raises suspicion for SVT.

• The ECG findings are characteristic of Wolff-Parkinson-White (WPW) syndrome, which is accessory pathway mediated tachycardia.

Incorrect Options:

Option A- Atrial Fibrillation: Atrial fibrillation presents with an irregularly irregular rhythm, with no discernible P waves and varying R-R intervals.

Option C- Ventricular Tachycardia (VT): Ventricular tachycardia is broad QRS complex tachycardia. However, in this case, the QRS duration is not significantly prolonged (0.10 seconds), making VT less likely.

Option D- Sinus Tachycardia with premature ventricular contractions (PVCs): Sinus tachycardia is a normal response of the heart to various stressors, and it is characterized by a regular rhythm with a heart rate above 100 bpm. However, sinus tachycardia would have a normal PR interval (approximately 0.12 to 0.20 seconds), unlike the short PR interval seen in this case. Additionally, premature ventricular contractions (PVCs) would appear as ectopic beats with a wide QRS complex and will not have delta wave.

Solution for Question 13:

Correct Option B- Amiodarone cannot be given as a long-term treatment modality:

• The combination of an irregular rhythm with varying P-wave morphologies in a patient on theophylline therapy for COPD is consistent with the diagnosis of Multifocal Atrial Tachycardia (MAT).

• Amiodarone, a class III antiarrhythmic medication with a membrane-stabilizing effect, can be recommended for the treatment of MAT. However, its potential for toxicity limits its use as a long-term treatment option.

Incorrect Options:

Option A-DC shock is the preferred treatment of choice: DC shock is not the preferred treatment for Mu ltifocal Atrial Tachycardia (MAT) because it is ineffective in the presence of theophylline toxicity and do es not provide long-term benefit.

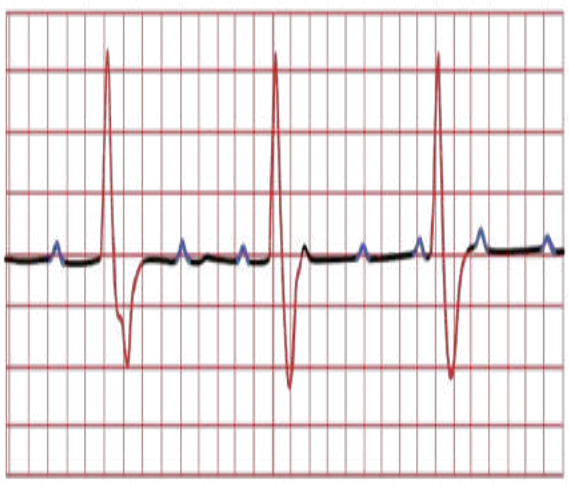
Option C- Verapamil acts on SA node and stabilizes the heart rate: Verapamil primarily acts on the AV node, not the SA node, and is not the preferred medication for managing MAT.

Option D- Metoprolol when given causes stabilization of the membrane: Metoprolol works by blocking a drenaline's effects on the heart, but it does not directly stabilize the membrane. It is used to manage he art rate and symptoms in MAT.

Solution for Question 14:

Correct Option B - Damage to the AV node:

• Based on the clinical presentation and the ECG showing P waves (atrial activity) that are not followed by QRS complexes (ventricular activity) in a consistent pattern with slow ventricular rate and no association between the P waves and QRS complexes confirms the diagnosis of third-degree heart block on the ECG.



• Damage to the AV nodal tissue is a potential cause of third-degree AV block.

• The underlying cause of the AV nodal tissue damage in this patient is likely related to his history of coronary artery disease. CAD can lead to reduced blood flow to the AV node, resulting in tissue damage.

Incorrect Options:

Option A- Degenerative changes in the SA node: This option is incorrect because degenerative change s in the SA nodal tissue typically result in sinus node dysfunction, which may lead to sinus bradycardia or sinus arrest.

Option C- Reentrant circuit: This option is incorrect because a reentrant circuit is a common mechanism in certain types of supraventricular tachycardias, not third-degree heart block.

Option D- Ectopic foci: This option is incorrect because ectopic foci are abnormal pacemaker cells that generate electrical impulses outside of the SA node. While ectopic foci can cause irregular heart rhyth ms, they are not responsible for the regular and slow heart rates seen in third-degree heart block.

Solution for Question 15:

Correct Option B- Amiodarone:

• The ECG findings, specifically the prolonged QT interval, suggest Long QT Syndrome.

• LQTS is characterized by prolongation of the QT interval on the ECG, which can predispose individuals to life-threatening arrhythmias, such as Torsades de Pointes.

• Amiodarone is contraindicated in patients with Long QT Syndrome due to its potential to prolong the QT interval further, which can increase the risk of Torsades de Pointes and other dangerous arrhythmias.

• Other drugs that are contraindicated: Class 1A and III antiarrhythmics Macrolides and fluoroquinolones Antipsychotics Antiemetics like ondansetron Antifungals like azoles

• Class 1A and III antiarrhythmics

• Macrolides and fluoroquinolones

• Antipsychotics

• Antiemetics like ondansetron

• Antifungals like azoles

Incorrect Options:

Option A- Beta-blockers: Beta-blockers can be used as a first-line treatment to manage LQTS, especially in patients with LQT1 subtype.

Option C- Lignocaine (lidocaine): Lignocaine (lidocaine) may be considered in certain situations to man age arrhythmias in LQTS, although it may not be the first-choice therapy.

Option D- MgSO4: Magnesium sulfate (MgSO4) can be used in certain situations to correct electrolyte i mbalances or manage arrhythmias. It is drug of choice for acute long QT syndrome.

Solution for Question 16:

Correct Option A- Atrial fibrillation:

• This patient's history of hypertension and diabetes, along with sudden-onset weakness on the right side of the body, difficulty speaking, right-sided facial droop, right arm and leg weakness, and slurred speech are indicative of a stroke. Atrial fibrillation is the most common arrhythmia associated with an increased risk of stroke.

• Atrial fibrillation is characterized by irregular and rapid beating of the atria, which can lead to the formation of blood clots in the heart. These clots can then be dislodged and travel to the brain, causing an ischemic stroke.

Incorrect Options:

Option B- Atrial flutter:

• Rapid and regular atrial contractions (250-350 bpm).

• "Sawtooth" pattern on the ECG.

Option C- Multifocal atrial tachycardia:

• Irregular heart rhythm with three or more distinct P-wave morphologies.

• Often seen in individuals with lung diseases or atrial irritation.

• Not directly associated with an increased risk of stroke.

Option D- Ventricular tachycardia:

• Rapid heart rhythm originating in the ventricles.

• Wide QRS complex on the ECG.

Solution for Question 17:

Correct Option C- Its activity is increased by the methylxanthines:

• The ECG findings of narrow QRS tachycardia with hidden P waves are diagnostic of paroxysmal supraventricular tachycardia.

• The question is about incorrect statement about the drug of choice for PSVT, which is adenosine.

Mechanism of Action

• Activates M2 receptors, decreasing heart rate, and conduction

• Increases potassium exit, leading to hyperpolarization

• Reduces tissue excitability

Drug Interactions

• Methylxanthines decrease Adenosine activity

• Dipyridamole increases Adenosine activity

Clinical Applications

• In patients on Methylxanthines with SVT/PSVT, Adenosine dosage should be increased

• In patients on Dipyridamole, a lower Adenosine dose needed

• Dipyridamole and Regadenoson (used in cardiac stress testing) can cause Coronary Steal Phenomenon (CSP) due to increased Adenosine activity

• Adenosine's activity is antagonized by methylxanthines, such as caffeine, which can reduce its effectiveness.

• Methylxanthines, therefore, diminish the desired effects of adenosine in terminating the arrhythmia.

Incorrect Options:

Option A- It can produce asystole or atrial fibrillation: This statement is true for adenosine. While adenosine is used to terminate SVT, it can transiently cause asystole (temporary absence of heartbeat) due to its potent inhibitory effect on the AV node. This is usually a brief effect and is often necessary to break the reentrant circuit causing the SVT. Adenosine can also transiently induce atrial fibrillation in some cases.

Option B- It is contraindicated in asthmatic patients: This statement is true for adenosine. Adenosine can cause bronchoconstriction and exacerbate symptoms in patients with asthma or other obstructive lung diseases. It is generally contraindicated in patients with a history of asthma.

Option D- Its increase leads to coronary steal phenomenon: This statement is true for adenosine. Adenosine is a potent vasodilator and can cause a phenomenon known as "coronary steal." This occurs when adenosine-induced vasodilation in healthy coronary vessels diverts blood flow away from stenotic (narrowed) coronary vessels, potentially worsening ischemia in regions with pre-existing coronary artery disease.

Solution for Question 18:

Correct Option A- Atrial flutter:

• Atrial flutter (also called cavotricuspid isthmus-dependent atrial flutter) occurs due to a circuit around the tricuspid valve annulus, bounded anteriorly by the annulus and posteriorly by the functional conduction block in the crista terminalis. The wavefront passes between the inferior venacava and the tricuspid valve annulus, known as the cavotricuspid isthmus.

• ECG shows, Flutter waves (negative saw tooth pattern) in the lead II, III, and aVF. 3 flutter waves before every QRS complex.

• Flutter waves (negative saw tooth pattern) in the lead II, III, and aVF.

• 3 flutter waves before every QRS complex.

• Flutter waves (negative saw tooth pattern) in the lead II, III, and aVF.

• 3 flutter waves before every QRS complex.

Incorrect Options:

Option B- Atrial fibrillation:

• In patients with AFib, a P wave will not be seen, with irregular R-R interval.

Option C- Multifocal atrial tachycardia:

• ECG findings include: Irregular R-R interval Variable P wave morphology: ≥ 3 different P wave morphology Variable P-R interval: Usually variable P-R interval is seen with Brady arrhythmias Right axis deviation will be present

• Irregular R-R interval

• Variable P wave morphology: ≥ 3 different P wave morphology

• Variable P-R interval: Usually variable P-R interval is seen with Brady arrhythmias

• Right axis deviation will be present

• Irregular R-R interval

• Variable P wave morphology: ≥ 3 different P wave morphology

• Variable P-R interval: Usually variable P-R interval is seen with Brady arrhythmias

• Right axis deviation will be present

Option D- PSVT:

• ECG findings of PSVT: Narrow QRS complex R-R interval decreased Hidden P waves ST segment depression: Because of the mismatch between demand and supply of oxygen the will be some magnitude of ST-segment depression

• Narrow QRS complex

• R-R interval decreased

• Hidden P waves

• ST segment depression: Because of the mismatch between demand and supply of oxygen the will be some magnitude of ST-segment depression

• Narrow QRS complex

• R-R interval decreased

• Hidden P waves

• ST segment depression: Because of the mismatch between demand and supply of oxygen the will be some magnitude of ST-segment depression

Solution for Question 19:

Correct Option A- Hypokalemia:

• The ECG in the image shows T wave inversion with ST depression seen in hypokalemia.

• Given this patient's history of chronic kidney disease and the use of diuretics, hypokalemia is a common electrolyte disturbance in such individuals.

• ECG abnormalities: T-wave flattening or inversion ST-segment depression U-wave (often the earliest ECG change) Prolonged QU interval

• T-wave flattening or inversion

• ST-segment depression

• U-wave (often the earliest ECG change)

• Prolonged QU interval

• Severe hypokalemia can lead to life-threatening muscle weakness and diaphragmatic paralysis if left untreated.

• T-wave flattening or inversion

• ST-segment depression

• U-wave (often the earliest ECG change)

• Prolonged QU interval

Incorrect Options:

Option B- Hyperkalemia: Hyperkalemia would typically present with widened QRS complexes and peak ed T-waves on the ECG.

Option C- Hypercalcemia: Hypercalcemia shows a shortened QT interval on the ECG.

Option D- Hyponatremia: Hyponatremia, or low sodium levels, can cause a wide range of symptoms, including weakness and fatigue.

Solution for Question 20:

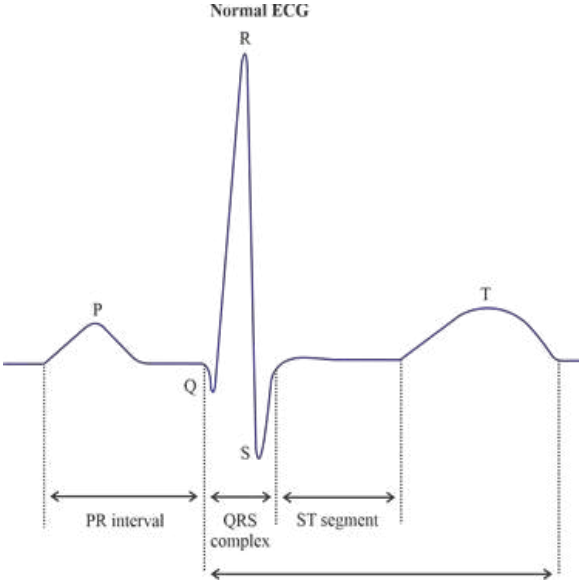
Correct Option C: B

• Beta-blockers are class II antiarrhythmic medications that work by blocking the effects of catecholamines (such as adrenaline) on the heart. Beta-blockers are commonly used to treat SVT.

• The action of beta blockers can lead to a prolongation of the PR interval on the ECG.

• The PR interval represents the time from the onset of atrial depolarization (P wave) to the onset of ventricular depolarization (QRS complex).

• By slowing down the conduction of electrical signals from the atria to the ventricles, beta blockers can increase the time it takes for the electrical impulse to travel through the atrioventricular node, resulting in a longer PR interval on the ECG.



Incorrect Options:

Option A: C - Beta blockers do not directly affect the QRS duration, which represents the time for ventri cular depolarization.

Option B: D - Beta blockers have no effect on ST segment.

Option D: E - Beta blockers may have some effect on the QT interval, but their primary action is on the PR interval, not the QT interval.

Solution for Question 21:

Correct Option B- Anterograde conduction via bundle of Kent with broad QRS complex:

• Antidromic conduction in AVRT involves anterograde conduction of electrical impulses through the accessory pathway (Bundle of Kent), activating the ventricles that can reenter via the AV node, resulting in a broad QRS complex.

Incorrect Options:

Option A- Retrograde conduction via bundle of Kent with narrow QRS complex: This description more closely resembles Orthodromic Conduction in AVRT, not Antidromic Conduction. Orthodromic conducti on involves normal atrioventricular conduction through the AV node and retrograde conduction through the accessory pathway (Bundle of Kent), resulting in a narrow QRS complex.

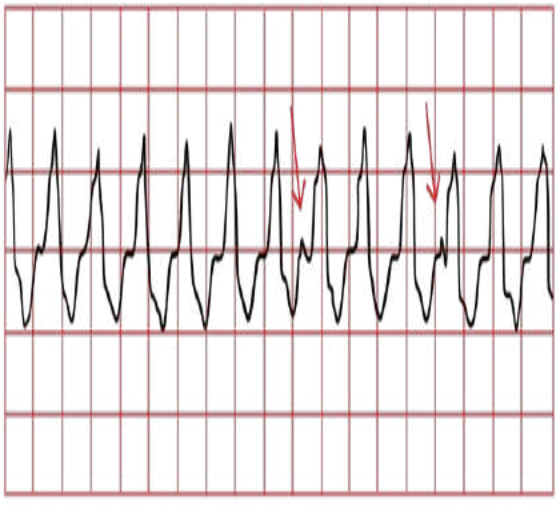
Option C- Treatment of choice is defibrillation: Defibrillation is used for ventricular fibrillation or unstable ventricular tachycardia. For AVRT, the initial approach is usually aimed at terminating the tachycardia using other methods like vagal maneuvers and IV Adenosine.

Option D- Carotid sinus massage will prevent paroxysmal attacks: Carotid sinus massage and IV Aden osine are used for acute termination of AVRT episodes, not for prevention.

Solution for Question 22:

Correct Option C- Defibrillation:

The ECG shows broad QRS complex tachycardia called Monomorphic ventricular tachycardia.



• Since the blood pressure of the patient is crashing→ defibrillation needs to be done.

Incorrect Options:

Option A- IV Amiodarone 150 mg:

• IV Amiodarone is the drug of choice for monomorphic ventricular tachycardia if heart disease is present. However, since the patient is hemodynamically unstable at this moment, the first step in management should be to achieve hemodynamic stability.

Option B- IV Lasix 40 mg:

• IV Lasix is given in patients with left ventricular failure resulting in symptoms of volume overload, e.g. pulmonary edema causing shortness of breath, cough and exertional fatigue.

Option D- Cardioversion:

• It is done in supraventricular tachycardia and is synchronous with the peak of R wave / carotid pulsations.

Solution for Question 23:

Correct Option C- Arrhythmogenic right ventricular dysplasia:

• ECG shows a "wiggle" at the terminal part of the QRS complex called the epsilon wave.

• The epsilon wave is a characteristic ECG finding in ARVD, indicating delayed activation of the right ventricle due to fibrofatty infiltration of the myocardium. This condition can lead to ventricular arrhythmias and sudden cardiac death.

• Palpitations and syncope are also consistent with ARVD, an inherited cardiomyopathy affecting the right ventricle.

Epsilon wave

Delta wave

Prominent U wave

Deep Q wave

A little deviation hidden after the QRS complex

It appears as an upswing of the R wave before the QRS complex

Seen after T waves

Are negative deflections after the P wave

Presents at leads V1 and V2

Occurs due to ventricular preexcitation

Are the ones who have > 1-2 mm or 25% of the height of the T wave

Considered when > 2 mm deep, > 40 ms wide, > 25% depth of QRS complex and seen in V1-V3

Seen in ARVD

Seen in WPW syndrome

Mostly seen in severe hypokalemia, bradycardia

Seen in myocardial infarction, hypertrophic cardiomyopathy

Incorrect Options:

Option A- WPW syndrome (Wolff-Parkinson-White syndrome): WPW syndrome is characterized by an accessory pathway called the Bundle of Kent that can cause pre-excitation of the ventricles. It typically presents with a short PR interval, a delta wave on the ECG, and a
risk of supraventricular tachycardias (e.g., atrioventricular reentrant tachycardia, AVRT).

Option B- Hypokalemia: Hypokalemia is an electrolyte imbalance characterized by low serum potassiu m levels. It can indeed lead to ECG changes, including U-waves and T-wave abnormalities.

Option D- HOCM (Hypertrophic Obstructive Cardiomyopathy): HOCM is a condition characterized by h ypertrophy of the left ventricular wall, leading to left ventricular outflow tract obstruction. HOCM-related ECG changes are more focused on left ventricular hypertrophy and repolarization abnormalities.

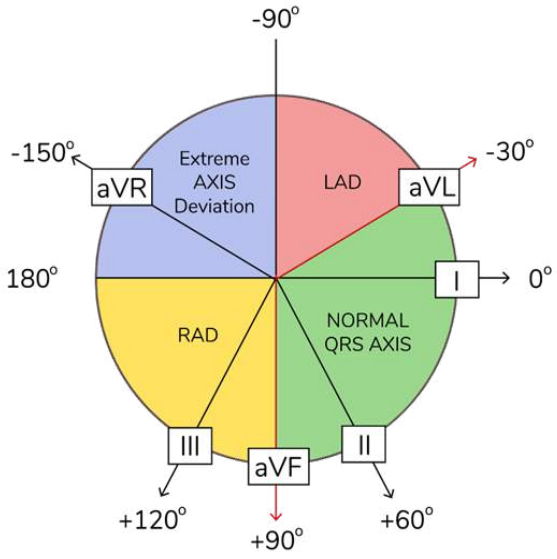
Solution for Question 24:

Correct Option A - Right axis deviation:

Axis Calculation: The electrical axis reflects the average direction of ventricular depolarization during th e ventricular contraction. The direction of depolarization (and electrical axis) is alongside the heart's lon gitudinal axis (to the left and downwards).

• Normal Axis: -30° to +110°

• Right axis deviation is when the QRS complex shifts between 90° and 180°.



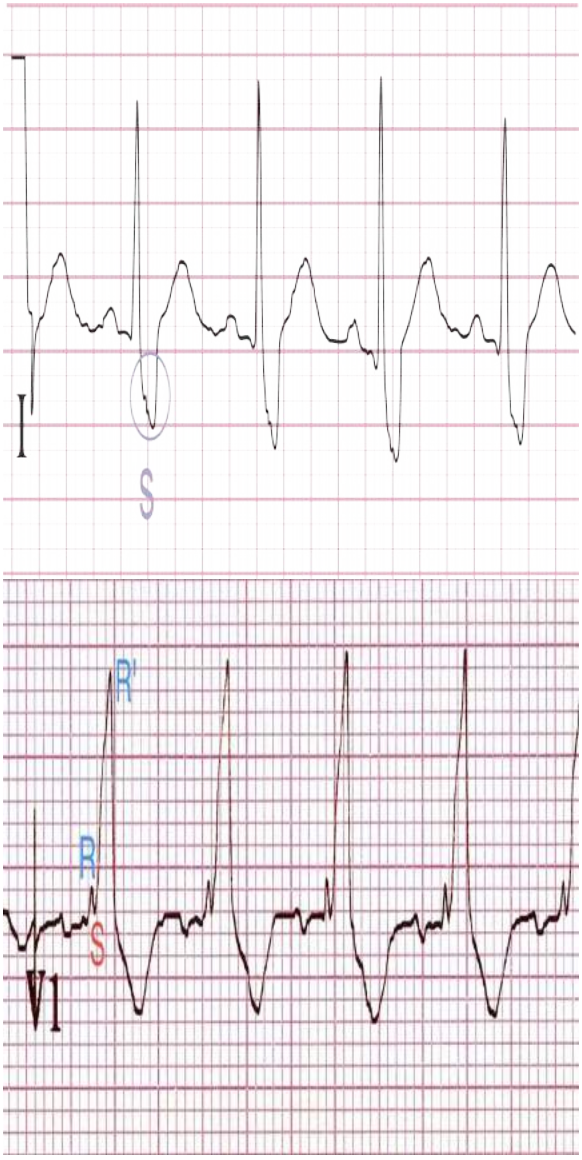
Incorrect Options:

• Options B, C, and D are incorrect.

Solution for Question 25:

Option B: Right Bundle Branch Block

• This patient has a wide split second heart sound. The ECG shows a wide S wave in the lateral leads and an rSR pattern in the V1-V3 leads, due to right bundle branch block.



• Features of RBBB: QRS duration is > 120 ms. RSR pattern is seen in V1-V3 (M-shaped QRS complex). Wide slurred S in lateral leads (I, aVL, V5-V6). ST depression and T wave depression in V1-V3.

• QRS duration is > 120 ms.

• RSR pattern is seen in V1-V3 (M-shaped QRS complex).

• Wide slurred S in lateral leads (I, aVL, V5-V6).

• ST depression and T wave depression in V1-V3.

• The patients are generally asymptomatic, with an occasional finding of a split S2.

• QRS duration is > 120 ms.

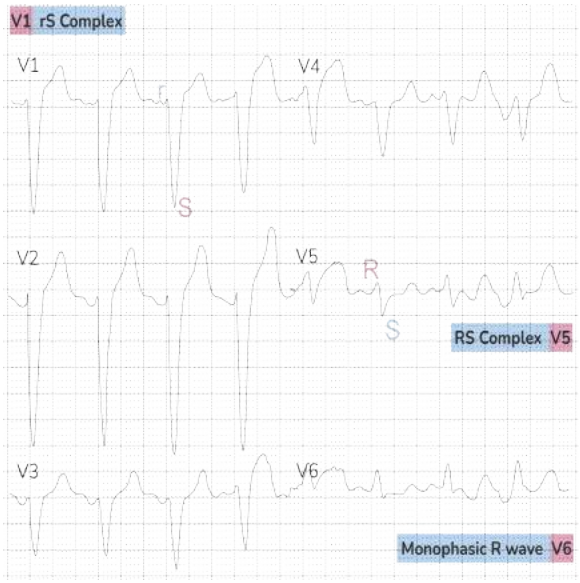
• RSR pattern is seen in V1-V3 (M-shaped QRS complex).

• Wide slurred S in lateral leads (I, aVL, V5-V6).

• ST depression and T wave depression in V1-V3.

Incorrect Options:

Option A: Left Bundle Branch Block



• ECG findings include QRS duration > 120 ms Absent 'Q' wave in lateral leads (I, aVL, V5-V6) Tall, broad monophasic R wave in lateral leads (I, aVL, V5-V6) Deep S wave in V1 and V2 Prolonged R wave peak time - Rabbit ear appearance seen

• QRS duration > 120 ms

• Absent 'Q' wave in lateral leads (I, aVL, V5-V6)

• Tall, broad monophasic R wave in lateral leads (I, aVL, V5-V6)

• Deep S wave in V1 and V2

• Prolonged R wave peak time - Rabbit ear appearance seen

• QRS duration > 120 ms

• Absent 'Q' wave in lateral leads (I, aVL, V5-V6)

• Tall, broad monophasic R wave in lateral leads (I, aVL, V5-V6)

• Deep S wave in V1 and V2

• Prolonged R wave peak time - Rabbit ear appearance seen

Option C: Wolf Parkinson White Syndrome

ECG findings:

• The PR interval is < 120 ms (shortened)

• ECG shows Delta waves (which is the slurring slow rise of the initial portion of the QRS)

• QRS prolongation > 110 ms

• Q wave is absent in WPW syndrome

• PJ is normal

Option D: Lown Ganong Levine Syndrome

• PR interval shorter

• QRS is normal

• PJ interval will be short (PR + QRS = PJ interval)

Brugada Syndrome, RHD & Infective Endocarditis

1. A 14-year-old girl presents with a 2-day history of walking with a limp due to ankle joint pain. Her mother mentioned that the girl had a sore throat three weeks ago, which resolved on its own. There are nontender nodules on the elbows bilaterally. What is the most likely diagnosis?

(or)

What is the most likely diagnosis in an adolescent with a history of sore throat presenting with fever, joint pain, evanescent rash, and skin nodules?

A. Rheumatoid Arthritis

B. Infective Endocarditis

C. Kawasaki Disease

D. Acute Rheumatic Fever

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2. A 13-year-old boy has had difficulty walking for one week due to joint pain. His mother reports a history of untreated sore throat. His temperature is 38.8°C. On examination, tenderness is present in the right knee joint, and a systolic murmur at the apex is present. The murmur radiates to his left axilla. What pathogenesis is involved in developing this condition?

(or)

What is the underlying mechanism responsible for a new-onset systolic marmur radiating to the left axilla in a young patient with a history of untreated throat infection?

A. Molecular mimicry

B. Direct toxic effects of bacterial exotoxins

C. Direct invasion by the organism

D. Mechanical obstruction to the valve

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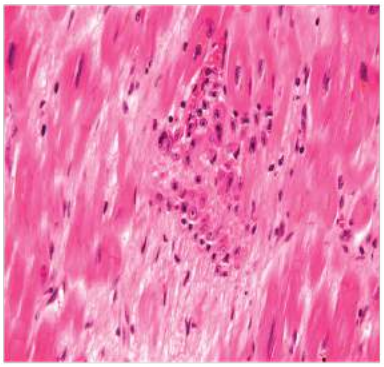
3. A 16-year-old female presents with recent episodes of palpitations and shortness of breath. On examination, she has a systolic murmur at the cardiac apex. Laboratory evaluation shows elevated anti-streptolysin O titers and erythrocyte sedimentation rate. An echocardiogram reveals moderate regurgitation in the mitral valve. A biopsy of her heart tissue is performed, and a pathology image is provided below. Which of the following statements about this pathology is not true?

(or)

Which statement is not true about the below pathology from a young patient's heart tissue whose laboratory evaluation showed elevated anti-streptolysin O titers and ESR?



A. Present in myocardium and endocardium only

B. Fibrinoid necrosis in the center

C. Uncommon in chronic stages

D. Anitschkow cells

---

4. A 10-year-old child presents with a fever and a skin rash on the chest. There is a pansystolic murmur at the cardiac apex on auscultation. Investigations reveal elevated inflammatory markers and evidence of recent streptococcal infection. The child is diagnosed with acute rheumatic fever. Which of the following statements regarding secondary prophylaxis for this condition is true?

(or)

Which of the following is the best recommendation for a child with acute rheumatic fever and a pansystolic cardiac murmur?

A. Injections are given up to at least 21 years of age or a minimum of 10 years after the last attack, whichever is longer

B. Injection are given till 21 years of age or 5 years after the last attack, whichever is longer

C. No prophylaxis is required as disease has already set in

D. The duration of antibiotic prophylaxis is till 40 years of age or 10 years after the last documented attacks, whichever is longer

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5. A 20-year-old male presents to the emergency department with complaints of fever, malaise, and joint pain for the past week. Upon further questioning, he reports a recent upper respiratory tract infection. On examination, he is found to have a heart murmur. Laboratory investigation results are pending. Which of the following is false about the pathogenesis and/or disease course in this patient?

(or)

Which of the following is not true about the pathogenesis and/or disease of acute rheumatic fever?

A. It is an autoimmune disease caused by a type 2 hypersensitivity reaction

B. N-Acetyl galactosamine is the cross antigen that reacts with the antibodies responsible

C. If untreated, the disease course is up to 12 weeks

D. Primary prevention comprises of starting oral penicillin within 9 days of documented infection

---

6. Which of the following statements about the features of acute rheumatic fever is not true?

A. Arthritis is the earliest manifestation

B. Sydenham’s chorea occurs after 6 months

C. Carditis can occur in 50-75% of the cases

D. Subcutaneous nodules have a high incidence of 60-70%

---

7. A 19-year-old male patient with a history of acute rheumatic fever is being administered antibiotics for the prevention of rheumatic heart disease. If this prophylaxis is not given, which of the following is most likely to occur?

(or)

What is the most likely cardiac outcome in patients with untreated acute rheumatic fever?

A. Aortic stenosis

B. Mitral regurgitation

C. Tricuspid stenosis

D. Pulmonary hypertension

---

8. A 13-year-old boy presents to the clinic due to falling school grades and poor handwriting. He has a history of throat infection. Physical examination reveals choreiform movements of the upper and lower extremities. Which of the following statements is true about this condition?

(or)

Idnetify the correct statement regarding a condition characterized by choreiform movements of the extremities in an adolescent with a history of throat infection?

A. It occurs due to damage in the caudate nucleus

B. It comprises hyperreflexia and spasticity in distal extremities

C. More common in males compared to females

D. It is not self limiting

---

9. A 12-year-old girl is brought to the clinic due to noticeable changes in her behavior and movements. Her parents report that she has become increasingly irritable over the past few weeks and has difficulty focusing on her schoolwork. She has a history of a sore throat a few weeks ago, which resolved without treatment. On examination, you observe dance-like involuntary movements of her arms and face. What is the inappropriate statement regarding the treatment of this manifestation?

(or)

Which statement is not appropriate regarding the treatment of a condition in an adolescent with behavioral changes and choreiform movements following a recent sore throat?

A. IVIG is used for refractory cases

B. Steroids are used for faster resolution

C. Haloperidol is a first-line drug

D. Moderate to severe cases are treated with valproate

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10. A 35-year-old woman with a known history of systemic lupus erythematosus presents with a new-onset heart murmur and fatigue. An echocardiogram reveals vegetations on the mitral valve. What is the most likely diagnosis?

(or)

What is the most likely diagnosis in a woman with systemic lupus erythematosus who presents with a new heart murmur and vegetations on the mitral valve detected by echocardiogram?

A. Rheumatic Heart Disease

B. Infective Endocarditis

C. Verrucous Endocarditis

D. Lupus Myocarditis

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11. A 45-year-old male presents with a three-week history of fever, fatigue, and generalized body aches. The patient is a known case of hypertrophic cardiomyopathy. A new-onset murmur is heard at the tricuspid area. His temperature is 101.5°F. An echocardiogram reveals a mobile, oscillating mass attached to the tricuspid valve. What is the diagnosis?

(or)

What is the most likely diagnosis in a patient with hypertrophic cardiomyopathy who presents with fever, fatigue, a new onset murmur at tricuspid area, and echocardiographic findings of a mobile, oscillating mass on the tricuspid valve?

A. Ventricular myxoma

B. Atrial myxoma

C. Non-Bacterial Thrombotic Endocarditis

D. Infective Endocarditis

---

12. Which of the following are correctly matched with the organism causing it ?

A. Early prosthetic valve endocarditis : Staphylococcus saprophyticus

B. Late prosthetic valve endocarditis (after 12 months) : Staphylococcus aureus

C. Community acquired native valve endocarditis : Streptococcus

D. Hospital acquired native valve endocarditis : Coagulase-Negative Staphylococcus (CONS)

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13. A 20-year-old male with a history of rheumatic heart disease presents with a three-month history of fatigue, night sweats, and low-grade fever. He received antibiotics for a suspected respiratory infection, but his symptoms persist. There is a diastolic murmur heard best in the aortic area. Blood cultures obtained before antibiotics were initiated did not yield any growth. Transesophageal echocardiography, reveals aortic valve vegetation. Which of the following is not responsible for this disease?

(or)

What is not responsible for aortic valve vegetations in a patient with rheumatic heart disease with negative blood culture and persistent symptoms despite antibiotic treatment?

A. HACEK group

B. Pseudomonas

C. Bartonella

D. Mycobacterium chimaera

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14. A 40-year-old man presents with fever, chills, weakness, and shortness of breath for two weeks. He had recently undergone valve replacement for mitral valve prolapse. Three weeks ago, he had a dental procedure. His blood pressure is 100/65 mm Hg, Pulse is 55/min, and BMI is 21 kg/m2. On examination, he has hemorrhagic macules on his palms. Which of the following is the correct description of his cutaneous findings?

(or)

A patient who had undergone mitral valve replacement last year presents with high-grade fever and hemorrhagic macules on the palms following a recent dental procedure. What is the correct description of his cutaneous findings?

A. Janeway lesions

B. Osler nodes

C. Erythema marginatum

D. Erythema nodosum

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15. A 12-year-old girl presents with recurrent fever and joint pain for the past few weeks. She had a sore throat about a month ago, which was treated with antibiotics. On examination, the girl has tender, swollen joints and small painless nodules under her skin, mainly on her elbows and knees. A diastolic murmur was heard at the apex of the heart. Laboratory tests show elevated anti-streptolysin O titers.What type of cardiac vegetations are most likely to be seen in this patient?

(or)

What type of cardiac vegetation is most likely to be seen in a patient with recurrent fever, joint pain, nodules, elevated ASO titers, and a diastolic murmur at apex?

A.

B.

C.

D.

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	1
Question 3	1
Question 4	4
Question 5	2

Question 6	4
Question 7	2
Question 8	1
Question 9	3
Question 10	3
Question 11	4
Question 12	3
Question 13	2
Question 14	1
Question 15	1

Solution for Question 1:

Correct Option D – Acute Rheumatic Fever:

• Acute rheumatic fever is a multisystem inflammatory disease that is a delayed sequela of group A streptococcal pharyngitis.

• Inadequate or lack of antibiotic treatment of streptococcal pharyngitis increases the risk of developing acute rheumatic fever, as in this patient, whose sore throat resolved without any treatment.

• The diagnosis of ARF is based on the Revised Jones Criteria.

• The presence of 2 major manifestations, or 1 major and 2 minor manifestations (see below), indicates a high probability of an initial ARF illness in any risk population.

• Clinical and/or subclinical

Arthritis

• Polyarthritis only

Chorea

Erythema marginatum

Subcutaneous nodules

• Polyarthralgia

• Fever (≥38.5oC)

• Elevated acute phase reactants ESR ≥60 mm in the first hour and/or CRP ≥3.0 mg/dl

• ESR ≥60 mm in the first hour and/or

• CRP ≥3.0 mg/dl

• Prolonged PR interval on electrocardiography after accounting for age variability unless carditis is a major criterion

• after accounting for age variability

• unless carditis is a major criterion

• ESR ≥60 mm in the first hour and/or

• CRP ≥3.0 mg/dl

• after accounting for age variability

• unless carditis is a major criterion

The presence of two major criteria and two minor criteria, along with evidence of preceding streptococcal infection, confirms the diagnosis of ARF in the patient.

Incorrect Options:

Option A - Rheumatoid Arthritis: It mostly affects middle-aged women. Patients present with pain and early morning stiffness, especially in the small joints of the hands. There is no association with streptococcal infections.

Option B - Infective Endocarditis: It is characterized by an infection of the heart valves, leading to fever and heart murmurs. Osler nodes (painful subcutaneous nodules typically found on the fingertips), subungual splinter hemorrhages, and Janeway lesions (painless hemorrhagic plaques on the palms/soles) are characteristic.

Option C - Kawasaki Disease: Kawasaki Disease primarily affects children and can cause fever, rash, strawberry tongue, and coronary artery aneurysms.

Solution for Question 2:

Correct Option A - Molecular mimicry:

• Patient's systolic murmur indicates mitral valve regurgitation, the characteristic manifestation of carditis, in previously unaffected individuals with ARF.

• Acute rheumatic fever (ARF) is an autoimmune inflammatory disease that occurs following an untreated or inadequately treated group A Streptococcus (GAS) pharyngitis.

• Molecular mimicry is the process by which antigens from infectious organisms resemble host antigens, leading to cross-reactivity and subsequent autoimmune response.

• In the case of ARF, antigens from GAS bear structural similarity to proteins present in human tissues, particularly cardiac tissues like the myocardium and heart valves.

• This similarity triggers an immune response against these host tissues, resulting in inflammation and damage, including mitral valve regurgitation.

Incorrect Options:

Option B - Direct toxic effects of bacterial exotoxins: Streptococcal exotoxins are involved in mediating scarlet fever.

Option C - Direct invasion by the organism: The primary mechanism in ARF is not direct invasion by the organism but rather an autoimmune response triggered by a previous streptococcal infection.

Option D - Mechanical obstruction to the valve: While mitral valve regurgitation can increase pressure in the left atrium, this pressure does not cause mechanical damage to the valve. Instead, the regurgitation is due to valve incompetence resulting from tissue damage.

Solution for Question 3:

Correct Option A - Present in myocardium and endocardium only:

• This patient's presentation, including elevated anti-streptolysin O titers and elevated ESR with heart valve involvement, suggests the diagnosis of acute rheumatic fever. The mitral and aortic valves are mostly involved, with resultant regurgitations in the acute stages of the disease.

• The pathology image shows a microscopic view of cardiac tissue stained with H&E; (Hematoxylin and Eosin).

• Within the myocardium, there are characteristic Aschoff bodies, which appear as granulomatous nodules containing central fibrinoid necrosis, foci of T lymphocytes, occasional plasma cells, and plump activated macrophages.

• During acute RF, Aschoff bodies may be found in any of the three layers of the heart, resulting in pericarditis, myocarditis, or endocarditis (pancarditis).

Incorrect Options:

Option B
- Fibrinoid necrosis in the center: Aschoff bodies typically show fibrinoid necrosis in the center.

Option C - Uncommon in chronic stages: Aschoff bodies are rarely seen in patients with chronic RHD b ecause of the long intervals between the initial insult and the development of valve deformity. They are most often seen only in patients with acute RF.

Option D - Anitschkow cells: Aschoff bodies are indeed surrounded by Anitschkow cells, the plump acti vated macrophages that have abundant cytoplasm and central round-to-ovoid nuclei (occasionally binu cleate) in which the chromatin condenses into a
central, slender, wavy ribbon (hence the designation “caterpillar cells”).

Solution for Question 4:

Correct Option D - The duration of antibiotic prophylaxis is until 40 years of age or 10 years after the la st documented attacks, whichever is longer:

• The pansystolic cardiac murmur in this patient with ARF suggests valvular involvement.

• Secondary antibiotic prophylaxis for acute rheumatic fever with valvular involvement is typically recommended until the patient reaches 40 or for a minimum of 10 years after the last documented attack, whichever is longer.

• Prophylaxis typically involves an intramuscular injection of benzathine penicillin every 4 weeks or oral penicillin V (250 mg) twice daily. Oral penicillin is less effective.

• The goal of this extended prophylaxis is to provide long-term protection against recurrent attacks and potential complications of rheumatic fever.

Incorrect Options:

Option A - Injections are given up to at least 21 years of age or a minimum of 10 years after the last att ack, whichever is longer: Secondary prophylaxis of this duration is given to patients with acute rheumat ic fever with carditis but no residual valvular involvement unlike this patient with a
pansystolic cardiac murmur.

Option B - Injections are given till 21 years of age or 5 years after the last attack, whichever is longer: T he duration of secondary prophylaxis until 21 years of age or a minimum of 5
years after the last documented attack is given to patients with acute rheumatic fever without carditis.

Option C - No prophylaxis is required as the disease has already set in: Prophylaxis is recommended f or individuals with a history of rheumatic fever to prevent recurrent attacks and complications, even if th e disease has already occurred. It is an essential part of managing the condition and reducing the risk of further damage to the heart and other organs.

Solution for Question 5:

Correct Option B
- N-Acetyl galactosamine is the cross antigen that reacts with the antibodies responsible:

• The cross antigen involved in acute rheumatic fever and rheumatic heart disease is N-acetyl beta-D glucosamine.

• It is the antigen common between the cell wall of the streptococcal bacteria and human connective tissue.

Incorrect Options:

Option A - It is an autoimmune disease caused by type 2 hypersensitivity reaction: Acute rheumatic fev er is indeed considered an autoimmune disease caused by a Type 2 hypersensitivity reaction, where th e immune system mistakenly targets self-antigens due to molecular mimicry.

Option C - If untreated, the disease course is up to 12 weeks: The course of acute rheumatic fever is 1 2 weeks if left untreated and 1-2 weeks if treated.

Option D - Primary prevention comprises starting oral penicillin within 9
days of documented infection: When commenced within 9 days of sore throat onset, a course of penicil lin will prevent almost all cases of ARF that would have otherwise developed. This accurately describe s the primary prevention strategy.

Solution for Question 6:

Correct Option D - Subcutaneous nodules have a high incidence of 60-70%:

• Subcutaneous nodules and erythema marginatum are the two major skin manifestations in patients with acute rheumatic fever.

• Subcutaneous nodules are mobile, painless, small (0.5 to 2 centimeters), and usually found over joint extensor surfaces. They are most commonly present in patients with carditis.

• However, they have a much lower incidence overall, typically less than 5%, and are considered rare manifestations of ARF.

Incorrect Options:

Option A - Arthritis is the earliest manifestation: In the course of ARF, arthritis is indeed one of the earli est manifestations and is often an initial symptom, characterized by joint pain and inflammation.

Option B - Sydenham's chorea occurs after 6 months: Sydenham's chorea is a
neurological manifestation of ARF and typically occurs about 6 months after the onset of a sore throat.

Option C - Carditis can occur in 50-75% of the cases: Carditis is a
common manifestation of ARF, and it can occur in a
significant proportion of cases, ranging from 50% to 75%.

Solution for Question 7:

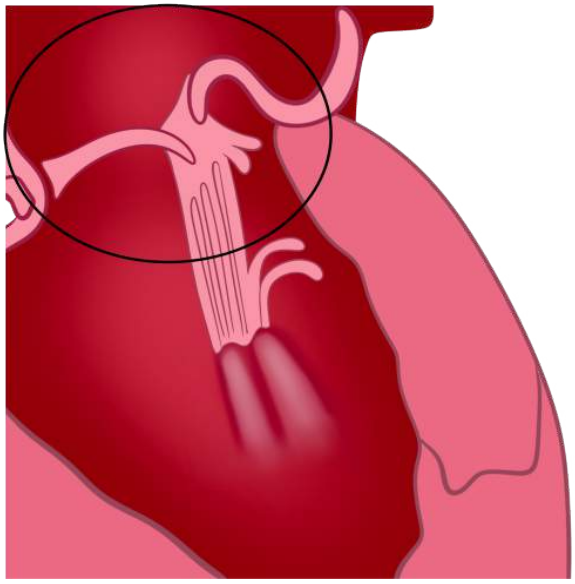
Correct Option B - Mitral regurgitation:

• Up to 60% of patients with acute rheumatic fever (ARF) progress to rheumatic heart disease (RHD). Any of the three layers of the heart might become affected.

• Valvular damage is the hallmark of the disease. The mitral valve is almost always affected.

• In RHD, the mitral valve leaflets can be damaged, leading to incomplete valve closure during systole.

• This causes blood to flow back into the left atrium (mitral regurgitation).



Incorrect Options:

Correct A
- Aortic stenosis: Aortic valve regurgitation is the second most common cardiac manifestation of ARF. Aortic stenosis typically results from calcification or congenital abnormalities rather than RHD.

Option C - Tricuspid stenosis: Tricuspid stenosis is less commonly associated with ARF. Damage to th e tricuspid valve is secondary to increased pulmonary pressures resulting from left-sided valvular disea se such as MR.

Option D - Pulmonary hypertension: Pulmonary hypertension is a complication that can occur in severe cases of Rheumatic heart disease, especially when there is significant damage to the mitral valve. Ho wever, it is not a primary cardiac manifestation, and mitral regurgitation is a more common initial finding in this condition.

Solution for Question 8:

Correct Option A - It occurs due to damage in the caudate nucleus:

• Chorea, also called Sydenham’s chorea or St. Vitus dance, is a major criterion for acute rheumatic fever.

• Chorea is a neurological disorder characterized by abrupt, purposeless, non-rhythmic, involuntary movements that are often associated with muscle weakness and emotional lability.

• It is a consequence of antibody-induced damage to the caudate nucleus.

• Chorea may not develop immediately after a sore throat but can have a prolonged latent period following a Group A beta-hemolytic streptococcus infection.

Incorrect Options:

Option B - It comprises hyperreflexia and spasticity in distal extremities: Sydenham's chorea is charact erized by choreiform movements (involuntary, rapid, irregular movements) rather than spasticity and hy perreflexia, which would suggest the involvement of the upper motor neurons.

Option C
- More common in males compared to females: Chorea is more common in females than males.

Option D - It is not self-limiting: This statement is false as Sydenham's chorea typically has a self-limiting course, meaning that the symptoms tend to improve over time.

Solution for Question 9:

Correct Option C - Haloperidol is a first-line drug:

• This patient, with involuntary movements and behavioral changes, most likely developed Chorea following her untreated sore throat.

• Haloperidol is generally not considered the first-line treatment for Chorea, especially in the context of ARF.

• It has been used in the past, but it carries the risk of drug-induced Parkinsonism and other potential side effects.

• There are safer and more effective treatment options available for Chorea.

Incorrect Options:

Option A - IVIG is used for refractory cases:

• Intravenous Immunoglobulins (IVIG) are a recognized and effective treatment for Chorea, especially when it is associated with ARF.

• IVIG is considered when other treatments have been ineffective or when a rapid response is needed.

• It works by modulating the immune system's response, reducing inflammation, and alleviating the symptoms of Chorea.

• IVIG is used for refractory cases because of its potential to provide a more rapid and significant improvement in symptoms.

Option B - Steroids are used for faster resolution:

• Steroids are another essential treatment option for Chorea associated with ARF.

• They are used to suppress the inflammatory response that contributes to the development of Chorea.

• Steroids can lead to a faster resolution of symptoms and are often considered in moderate to severe cases, especially when there is cardiac involvement.

Option D - Moderate to severe cases are treated with valproate:

• Valproate is sometimes used in the treatment of moderate to severe Chorea, especially when other treatments are not effective or if there are contraindications to the use of steroids or IVIG.

Solution for Question 10:

Correct Option C - Verrucous Endocarditis:

• Verrucous or Libman-Sacks Endocarditis is commonly associated with systemic lupus erythematosus.

• It results in sterile verrucous lesions on heart valves due to immune complex deposition.

• These sterile fibrofibrinous vegetations occur on the left-sided heart valves and usually form on the ventricular surface of the mitral valve.

Incorrect Options:

Option A - Rheumatic Heart Disease: Rheumatic Heart Disease (RHD) is typically associated with a his tory of untreated streptococcal throat infections, not SLE. RHD results in valve deformities such as reg urgitation and/or stenosis but does not typically involve vegetation.

Option B - Infective Endocarditis: SLE does not predispose to IE unless there are already Libman-Sack s lesions in the heart.

Option D - Lupus myocarditis: It is characterized by inflammation of the myocardium and can occur in p atients with SLE. However, it typically presents with symptoms such as chest pain, dyspnea, and signs of heart failure rather than new heart murmurs and vegetations on echocardiogram.

Solution for Question 11:

Correct Option D - Infective Endocarditis:

• IE is the most likely diagnosis, given the patient's presentation in the presence of structural heart disease.

• There are two main pointers in this case.

Incorrect Options:

Option A - Ventricular myxoma: It presents with embolic features and impaired ventricular filling with pu lmonary edema.

Option B - Atrial Myxoma: It causes tumor plop sound with embolic features.

Option C - Non-Bacterial Thrombotic Endocarditis (NBTE): NBTE is characterized by thrombus formati on on heart valves due to hypercoagulable states or systemic diseases, but it is not directly related to i ntravenous drug use.

Solution for Question 12:

Correct Option C - Community-Acquired Native Valve Endocarditis – Streptococcus:

• Community-acquired Native Valve Endocarditis is often caused by Streptococcus species.

• Other important associations in IE:

• Gastrointestinal malignancy: Streptococcus gallolyticus

• IV drug users: Staphylococcus auereus

Incorrect Options:

Option A - Early Prosthetic Valve Endocarditis : Staphylococcus saprophyticus: Early Prosthetic Valve Endocarditis is often caused by Coagulase-Negative Staphylococcus (CONS), not Staphylococcus sap rophyticus.

Option B - Late Prosthetic Valve Endocarditis (after 12 months) : Staphylococcus aureus: Late Prosthet ic Valve Endocarditis, occurring after 12 months, is more commonly associated with Streptococcus spe cies, not Staphylococcus aureus.

Option D - Hospital-Acquired Native Valve Endocarditis : Coagulase-Negative Staphylococcus (CONS) : Hospital-acquired Native Valve Endocarditis is typically associated with Staphylococcus aureus, not C oagulase-Negative Staphylococcus (CONS).

Solution for Question 13:

Correct Option B - Pseudomonas:

• This scenario described is of culture-negative infective endocarditis.

• Pseudomonas is not typically associated with infective endocarditis. Pseudomonas aeruginosa is more commonly associated with other infections, such as respiratory and urinary tract infections, but it is not a typical causative organism for infective endocarditis, especially in culture-negative cases.

Incorrect Options:

Option A - HACEK group:

• The HACEK group of organisms, including Haemophilus species, Aggregatibacter species, Cardiobacterium, Eikenella, and Kingella, is known to be associated with infective endocarditis, including culture-negative cases.

Option C - Bartonella:

• Bartonella species, such as Bartonella henselae, are known to cause infective endocarditis, including culture-negative cases. These organisms are associated with conditions like cat scratch disease and can lead to culture-negative results in blood cultures.

Option D - Mycobacterium chimaera:

• While not as commonly associated with classic infective endocarditis, Mycobacterium chimaera can still be responsible for culture-negative cases, especially in the context of prosthetic valve endocarditis outbreaks linked to healthcare settings.

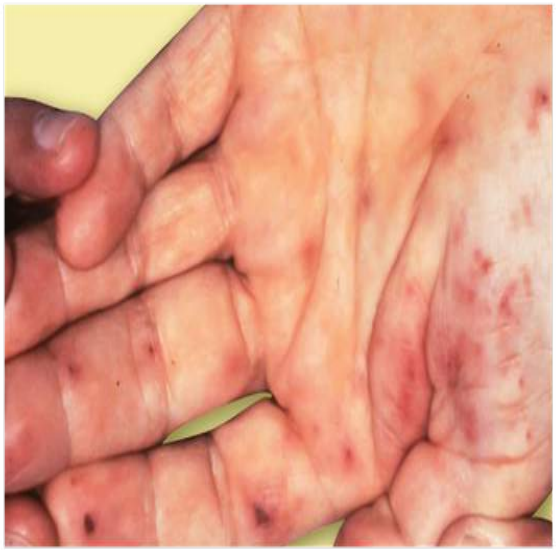
• It is relatively rare compared to other causative organisms but can lead to culture-negative results.

Solution for Question 14:

Correct Option A - Janeway lesions:

• Janeway lesions are irregular, hemorrhagic macules that usually involve the palms and can last for weeks.

• Lesions are caused by septic microemboli from the valvular lesion and, histologically, exhibit microabscesses in the dermis with thrombosis of small vessels.

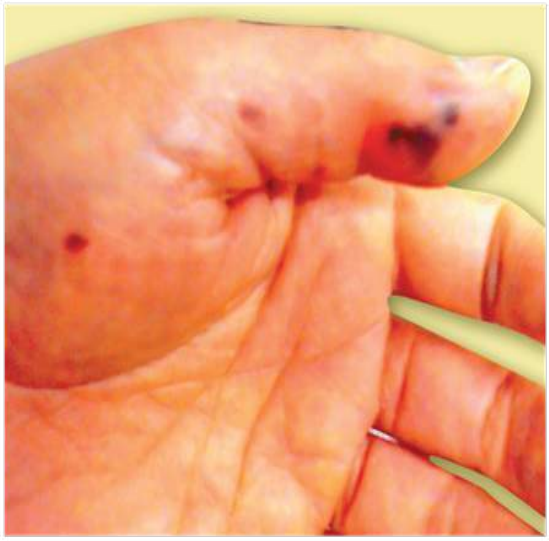


Incorrect Options:

Option B - Osler nodes:

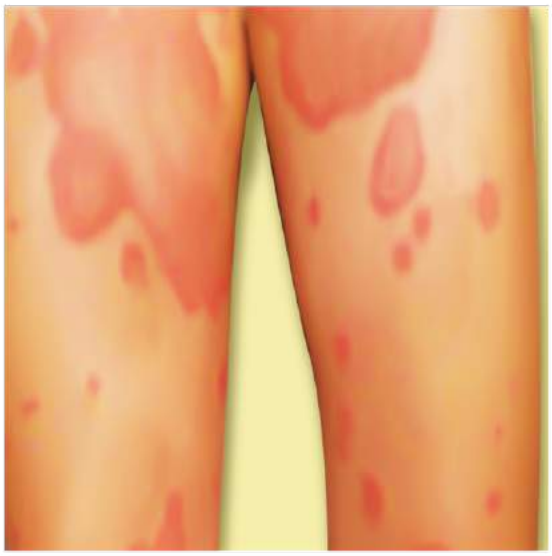
• They are usually painful, seen in the pads of fingers, and last for days.

• These nodes result from immunological phenomena.



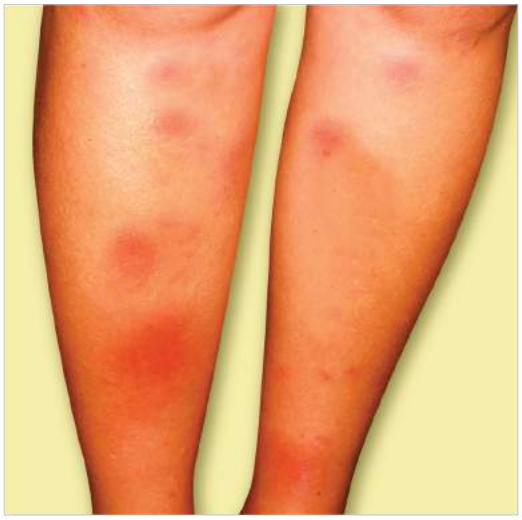
Option C - Erythema marginatum:

• Erythema marginatum is one of the criteria required for the diagnosis of rheumatic fever.



Option D - Erythema nodosum:

• Erythema nodosum is seen in sarcoidosis.



Solution for Question 15:

Correct Option A:

• In rheumatic heart disease, the cardiac vegetations are often described as "small and warty" in appearance.

• These vegetations form along the lines of closure within the heart, particularly affecting the mitral valve.

• These small and warty vegetations can adhere to the valve surfaces and may cause damage over time.

• They are an important feature of RHD and can contribute to valvular abnormalities, such as mitral stenosis or regurgitation.

Incorrect Options:

Option B: Large and bulky vegetations are more commonly associated with infective endocarditis. IE is characterized by the formation of larger, often destructive vegetations on heart valves. These vegetatio ns are typically composed of microorganisms, platelets, and fibrin.

Option C and D: Nonbacterial thrombotic endocarditis (NBTE) is characterized by the formation of steril e vegetations on the heart valves. These vegetations primarily consist of fibrin and platelets and are ty pically seen in the setting of underlying medical conditions, such as malignancies or autoimmune disea ses. In NBTE, the vegetations tend to be small, bland, and friable. They are often seen on both sides of the valve leaflets and can lead to complications such as embolism.

Previous Year Questions

1. A known case of lung cancer presents with breathing difficulty. On auscultation at the left infrascapular area bronchial breathing is heard with a dull percussion note. What is the diagnosis?

A. Cardiac tamponade

B. Chronic constrictive pericarditis

C. Pulmonary embolism

D. Left-sided pleural effusion

---

2. Which of the following would not be indicated by the absence of loud S1 in mitral stenosis?

A. Calcified valve

B. Aortic regurgitation

C. First degree heart block

D. Mild mitral stenosis

---

3. What immunological abnormality is observed due to the absence of CD40 in B cells?

A. Total lack of NK cells

B. Lack of CD8 mediated cytotoxicity

C. Decreased IgG and increase in IgM

D. Inability of neutrophil to act against infections

---

4. What medication can be administered to a patient who experiences altered consciousness, a blood pressure reading of 150/90 mm Hg, sweating, rapid heartbeat, persistent erection, and increased saliva production, after visiting a temple with their grandmother?

A. ASV

B. Adrenaline

C. Steroid

D. Prazosin

---

5. All of the following are the causes of high output cardiac failure, except?

A. Cor pulmonale

B. Beri beri

C. Anemia

D. Systemic AV shunt

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6. Which of the following is seen in Subclinical acute myocarditis?

A. Palpitations

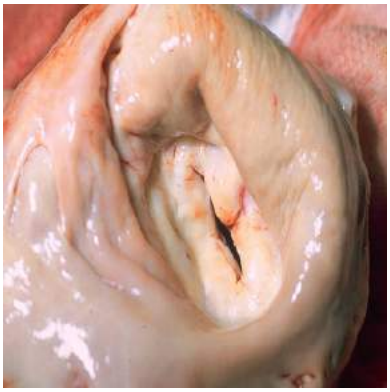
B. Elevated pro BNP, Trop T

C. Low LVEF on 2D ECHO

D. Elevated creatinine levels

---

7. Identify the disease?



A. Tricuspid stenosis

B. Mitral stenosis

C. Dilated cardiomyopathy

D. Hypertrophic obstructive cardiomyopathy

---

8. An intern observed that a patient in the ward was unresponsive, and an ECG which was performed urgently showed a rhythm as depicted below. DC shock was delivered but the arrhythmia persisted and the patient is still unresponsive. What is the next best step in the management of this patient?

A. Synchronized cardioversion

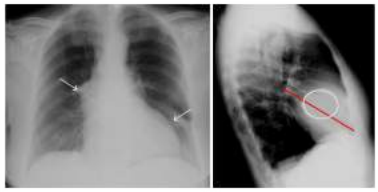
B. Start CPR

C. Deliver another DC shock

D. 1 mg epinephrine

---

9. A 65 year old male patient presented with chest pain, exertional dyspnea and syncope. He was diagnosed as a case of aortic stenosis and his chest x-ray was taken which is shown below. What is the most likely diagnosis?



A. Dilated aortic root

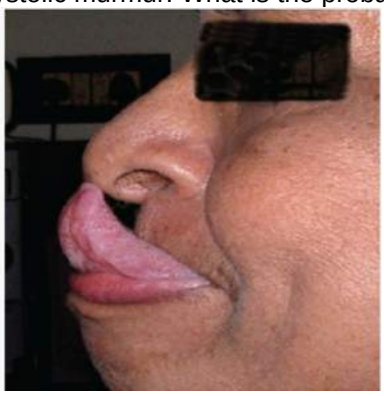
B. Widening of aortic knob

C. Widening of vascular pedicle

D. Post stenotic dilatation of aorta

---

10. A 5 year old child has flexible fingers and can even touch the back of his hand with his wrist extended. The child also demonstrates the sign shown in the image below. On auscultation, a click is heard after S1, followed by a late systolic murmur. What is the probable diagnosis?



A. Ehlers-Danlos syndrome

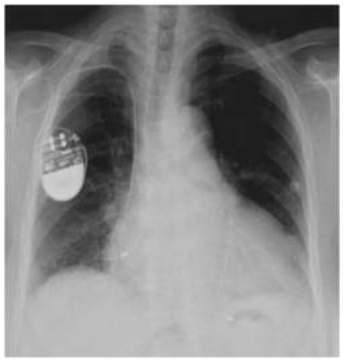
B. Marfan’s syndrome

C. Loeys-Dietz syndrome

D. Osteogenesis imperfecta

---

11. The device seen in the following image is?



A. Cardiac pacemaker

B. Chemo port device

C. Travel tract for accessory

D. Chest x ray artefact

---

12. Please select the incorrect statement regarding the bundle of Kent.

A. It is faster than AV nodal pathway

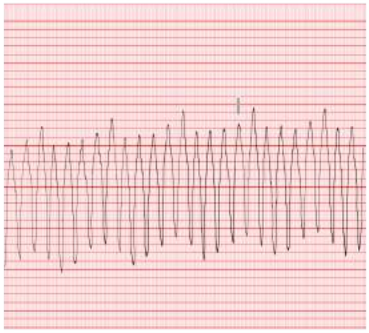
B. It is slower than AV nodal pathway

C. Leads to short PR interval

D. Leads to prolonged QRS duration

---

13. What is the diagnosis of this patient from the ECG shown below?



A. Normal ECG

B. Ventricular fibrillation

C. Ventricular tachycardia

D. Misplaced leads

---

14. Which organism is most likely responsible for the development of prosthetic valve endocarditis in a patient following valve replacement surgery?

A. Staphylococcus epidermidis

B. Staphylococcus aureus

C. Coagulase negative staphylococci

D. HACEK organisms

---

15. Which of the following conditions is linked to AV block?

A. Hypothyroidism

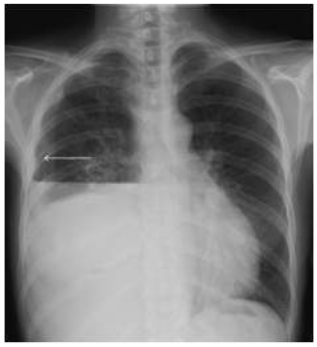
B. Cushing’s syndrome

C. Hyperthyroidism

D. Pheochromocytoma

---

16. Identify the following condition:



A. Hydropneumothorax

B. Pleural effusion

C. Pericardial effusion

D. Pneumothorax

---

17. Resistant hypertension is defined as?

A. BP >160/90 mmHg with one antihypertensive

B. BP >140/90 mmHg with one antihypertensive

C. BP >160/90 mmHg with three or more antihypertensive

D. BP >140/90 mmHg with three or more antihypertensive

---

18. What is the optimal approach for treating a patient who is hemodynamically stable, has a broad QRS complex on their ECG, and is experiencing antidromic tachycardia?

A. Oral verapamil

B. Oral Beta-blocker

C. Cardioversion

D. Intravenous Procainamide

---

19. Which of the following is an incorrect procedure when dealing with W.P.W?

(or)

Which of the following is not done in W.P.W?

A. Treadmill test

B. Electrophysiological studies

C. Oral beta blocker

D. Procainamide

---

20. For which of the following conditions is rescue percutaneous coronary intervention (PCI) performed?

A. Persistent chest pain with ST elevation > 60 min after thrombolysis

B. Persistent chest pain with ST elevation > 30 min after thrombolysis

C. Persistent chest persistent chest pain with ST elevation > 90 min after thrombolysis

D. Pain with ST elevation for > 120 min after thrombolysis

---

21. What are the effects on the fetus when Indomethacin is used in the uterus during the third trimester?

A. Patent ductus arteriosus

B. Early closure of ductus arteriosus

C. Ventricular septal defect

D. Atrial septal defect

---

22. Continuous murmur is heard in?

A. Patent ductus arteriosus

B. VSD

C. ASD

D. Tetralogy of Fallout

---

23. What is the waist to hip ratio that is associated with an increased risk of heart disease?

A. > 0.80 in males

B. > 0.80 in females

C. > 0.85 in males

D. > 0.85 in females

---

24. Which of the following is not correct about Defibrillation?

A. Only be used by a trained person

B. Decrease in success rate with delay in initiation

C. Improve prognosis

D. 1 minute gap between 2 shocks

---

25. Which of the following treatment options is not suitable for managing a patient with non-ST-elevation myocardial infarction (NSTEMI)?

A. Aspirin

B. Clopidogrel

C. Streptokinase

D. Prasugrel

---

26. What should be the next course of action in managing a patient who presents to the emergency room with symptoms of palpitation? The patient's pulse is measured at 180 beats per minute and their blood pressure is 70 mmHg systolic. The electrocardiogram (ECG) reveals a narrow QRS complex tachycardia with a regular heart rate.

A. DC cardioversion

B. Adenosine

C. Valsalva Maneuver

D. Verapamil

---

27. What would be the most appropriate management approach for a patient who arrives at the hospital within 3 hours of experiencing chest pain, where an ECG shows ST depression in anterior chest leads and T wave inversion?

A. PCI

B. Thrombolysis with alteplase

C. Prophylaxis for arrhythmia

D. Aspirin with heparin

---

28. A 45-year-old female patient presents to the clinic with complaints of increasing fatigue and shortness of breath. Upon auscultation, the physician detects a pan systolic murmur that is best heard at the right side of the heart. The murmur radiates to the axilla and is louder during inspiration. The patient denies any history of fever, chest pain, or recent infections. What is the most likely diagnosis for this patient's condition based on the described findings?

A. Aortic stenosis

B. Mitral valve prolapse

C. Ventricular septal defect

D. Tricuspid regurgitation

---

29. Correct sequence after p wave: A- ‘a’ wave B – 1st heart sound C – Rapid filling of ventricles D – ‘t’ wave

A. ABCD

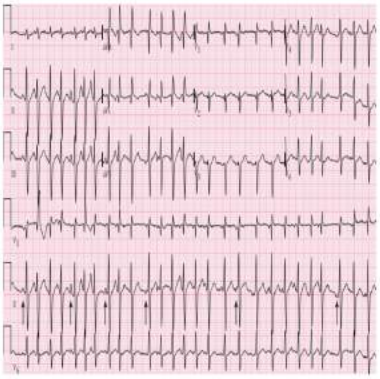
B. ABDC

C. CABD

D. ACBD

---

30. A 68-year-old male admitted to the ICU for acute exacerbation of COPD develops a sudden onset of palpitations. The following ECG changes are seen. What is the most likely diagnosis?



A. Ventricular tachycardia

B. Multifocal atrial tachycardia

C. Atrial fibrillation

D. Atrial tachycardia

---

31. Deep y descent in JVP is seen in all except:

A. Cardiac tamponade

B. Restrictive cardiomyopathy

C. Constrictive pericarditis

D. Tricuspid regurgitation

---

32. True about the definition of postural hypotension:

A. Decrease in systolic blood pressure 20 mmHg after 6 mins of standing

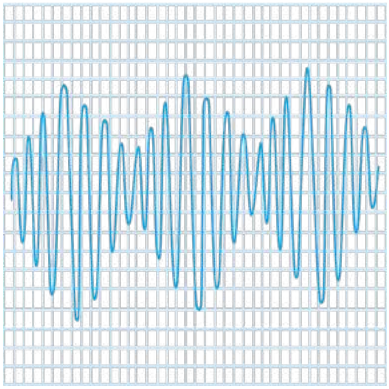
B. Decrease in systolic blood pressure 20 mmHg after 3 min of standing

C. Decrease in diastolic blood pressure 20 mmHg after 6 mins of standing

D. Decrease in diastolic blood pressure 20 mmHg after 3 mins of standing

---

33. The ECG of a pregnant lady having pre-eclampsia is shown below. Her vitals are stable. What is the best step in the management of the condition?



A. IV calcium

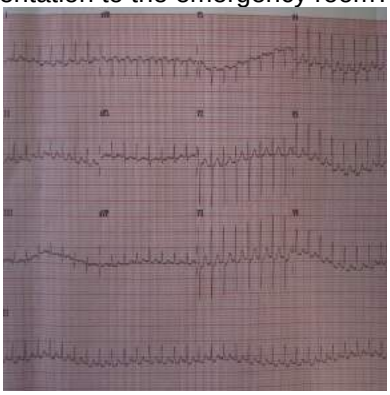
B. IV MgSO4

C. DC shock

D. Synchronized cardioversion

---

34. What should be the subsequent course of action in managing a patient with the following ECG, who has already undergone carotid massage and received IV adenosine, but currently has a blood pressure reading of 60/30 mm Hg upon presentation to the emergency room?



A. Repeat inj adenosine 6 mg

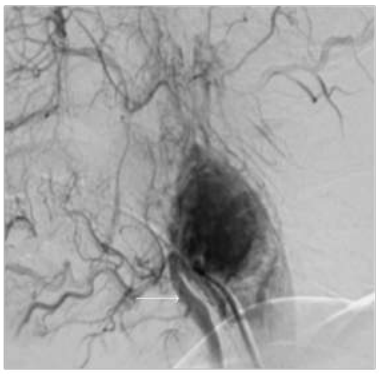
B. Inj amiodarone 300 mg

C. Synchronized cardioversion

D. DC cardioversion

---

35. What is the most likely diagnosis for an adult patient with a pulsatile swelling in the neck below the jaw angle that causes an outward expansile impulse, based on the findings of an MRI angiography?



A. Grave’s disease

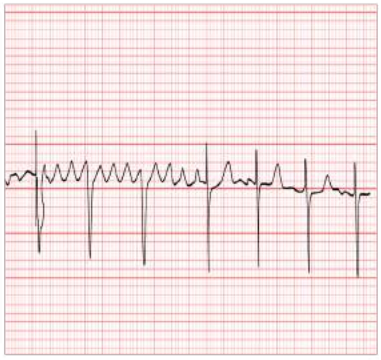
B. Branchial cyst

C. Thymic cyst

D. Carotid body tumour

---

36. Identify the tachycardia depicted in the given ECG.



A. Atrial fibrillation

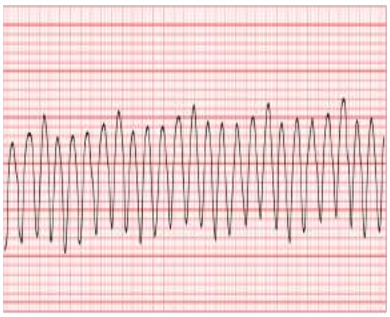
B. Atrial flutter

C. Ventricular tachycardia

D. Ventricular fibrillation

---

37. Identify the diagnosis:



A. Normal ECG

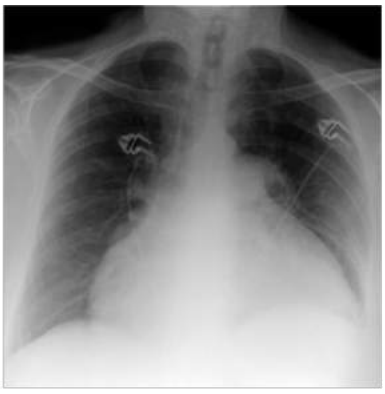
B. Ventricular fibrillation

C. Ventricular tachycardia

D. Misplaced leads

---

38. What is the most likely diagnosis for a 45-year-old man who experiences chest pain and difficulty breathing that worsens when lying down but improves when sitting upright, and has muffled heart sounds during examination?



A. Pericardial effusion

B. Tetralogy of Fallot

C. Transposition of great arteries

D. Pulmonary hypertension

---

39. Which is the best confirmatory method to ensure the central line is in the jugular vein?

A. Chest x-ray

B. Blood pH

C. Blood color

D. ETCO2

---

40. What is the purpose of using the Modified Duke Criteria in diagnosing?

A. Infective endarteritis

B. Infectious mononucleosis

C. Inflammatory myopathy

D. Infective endocarditis

---

41. Which medication could be the cause of recurrent falls in an elderly male patient?

A. Prazocin

B. Metformin

C. Acarbose

D. Thiazide

---

42. In the New York Heart Association functional classification, what category does a person with dyspnea belong to if they experience mild restrictions in physical activity and develop symptoms during ordinary activities, but remain symptom-free while at rest?

A. Class I

B. Class II

C. Class III

D. Class IV

---

43. What is the probable diagnosis for a 55-year-old male patient who came to the hospital complaining of palpitations, and during examination, a diastolic murmur is detected in the left third intercostal space, along with the presence of a pistol shot sound over the femoral arteries?

A. Aortic regurgitation

B. Aortic stenosis

C. Tricuspid regurgitation

D. Mitral regurgitation

---

44. A 25-year-old patient with caries is scheduled for a dental extraction. Which of the following cardiac conditions does not requires endocarditis prophylaxis prior to dental extraction?

A. Prior history of endocarditis

B. Atrial septal defect

C. Unrepaired cyanotic heart disease

D. Prosthetic heart valves

---

45. A patient presents to you with an irregularly irregular pulse of 120 beats/minute and a pulse deficit of 20. Which of the following would be the jugular venous pressure (JVP) finding?

A. Absent p wave

B. Absent a wave

C. Cannon a wave

D. Raised JVP with normal waveform

---

46. An 11-year-old child with a history of streptococcal pharyngitis presents to you with fever and arthralgia. There is no past history of rheumatic heart disease or features of carditis or valvular disease. The child weighs 25 kgs. How often is 6,00,000 IU of benzathine penicillin recommended for prophylaxis of rheumatic heart disease?

A. Immediately

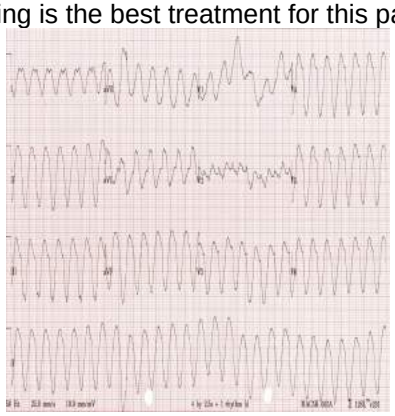
B. Thrice weekly lifelong

C. Once in four weeks for 5 years or till the age of 21, whichever is longer

D. Once in three weeks for 10 years or till the age of 25, whichever is longer

---

47. A 74-year-old patient with CAD presents with palpitations. ECG is shown below. Blood pressure is 120/84 mmHg. Which of the following is the best treatment for this patient?



A. Oral metoprolol

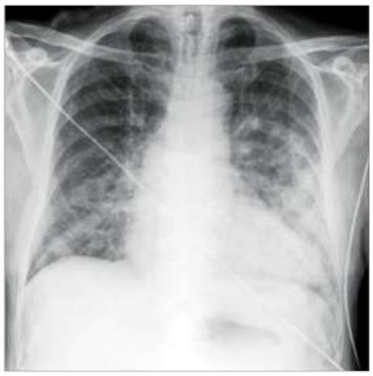
B. Oral amiodarone

C. Intravenous amiodarone

D. Intravenous metoprolol

---

48. A hypertensive patient who is non-compliant with medication presents to you with sudden onset breathlessness. A chest x-ray was done, which is shown below. How will you manage this patient?



A. Intravenous salbutamol

B. Intravenous nitro-glycerine

C. Nebulization with salbutamol

D. Oxygen and antibiotics

---

49. A patient on anti-depressants presented to you with hypotension. An ECG was done, which showed wide QRS complexes and right axis deviation. How will you manage this patient?

A. Antiarrhythmics

B. Intravenous sodium bicarbonate

C. Propranolol

D. Wait and watch

---

50. Which of the following conditions is characterized by the absence of P waves?

A. Ventricular tachycardia

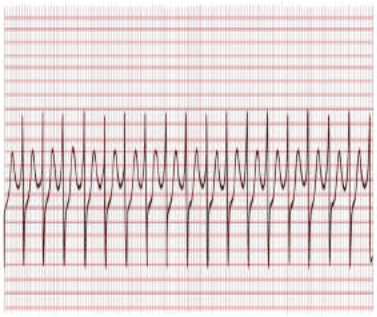
B. Focal atrial tachycardia

C. Ventricular fibrillation

D. Atrial fibrillation

---

51. Interpret the ECG given below.



A. Ventricular fibrillation

B. Atrial fibrillation

C. Supra ventricular tachycardia

D. Ventricular tachycardia

---

52. J-wave is seen in?

A. Hypothermia

B. Heat stroke

C. High-altitude pulmonary edema

D. Drowning

---

53. A 26-year-old male patient, an accident victim started developing difficulty in breathing. On examination, his BP as 80/40 mmHg and pulses were feeble, JVP was found to be elevated with an absent Y descent, and heart sounds were muffled. What is the most likely diagnosis?

A. Constrictive pericarditis

B. Cardiac tamponade

C. Acute pericarditis

D. Cardiac failure

---

54. A known hypertensive patient is brought to the ER with palpitations and breathlessness. On examination, his BP was 220/140 with signs of encephalopathy. All of the following can be used to treat this condition except?

A. IV Nicardipine

B. IV Mannitol

C. IV Esmolol

D. IV Sodium Nitroprusside

---

55. A patient with chronic stable angina is having signs of heart failure. The use of which of the following drugs can decrease mortality?

A. Nifedipine

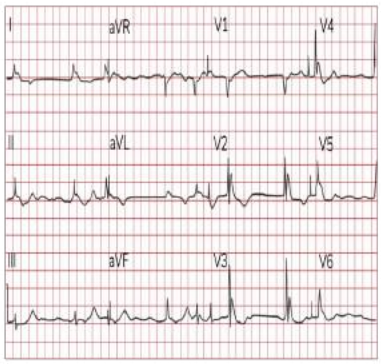
B. Digoxin

C. Lisinopril

D. Torsemide

---

56. What is the probable diagnosis based on the ECG given below?



A. Hypokalemia

B. Hyperkalemia

C. Hypothermia

D. Hypocalcemia

---

57. A 19-year-old woman with no comorbidities presented with numbness and paraesthesia of the fingers along with the characteristic finding shown in the image below. She has no other illnesses, and she says these episodes occur when she is under excess stress or during cold temperatures. What is the most likely diagnosis?

A. Primary Raynaud's phenomenon

B. Secondary Raynaud's phenomenon

C. Cold sores

D. Scleredema

---

58. Identify the false statement regarding management of NSTEMI

A. Aspirin loading dose should be initated immediately

B. ACC/AHA guidelines call for either a P2Y12 inhibitor (clopidogrel, prasugrel or ticagrelor) as a class I recommendation

C. Glycoprotein IIB/IIIA inhibitors are useful adjuncts

D. Fibrinolytic therapy is useful in acute coronary syndrome without ST-segment elevation

---

59. What is the diagnosis of a patient who exhibits dyspnea and increased distension of neck veins upon inspiration, with no murmur detected?

A. Constrictive pericarditis

B. Aortic regurgitation

C. Tricuspid stenosis

D. Pulmonary arterial hypertension

---

60. Which medications decrease mortality in individuals suffering from heart failure?

A. Metoprolol

B. Furosemide

C. Prazosin

D. Torsemide

---

61. Please determine the medical condition related to the image provided.

A. Mitral regurgitation

B. Aortic regurgitation

C. Aortic stenosis

D. Mitral stenosis

---

62. What is the most likely condition for a male patient who has been experiencing limb weakness and sensory loss for 3 months, along with angular stomatitis? In the examination, the patient shows a lack of proprioception and vibration sensations, upper motor neuron (UMN) type weakness in the lower limbs, and no ankle reflex.

A. Extradural cord compression

B. Amyotrophic lateral sclerosis

C. Multiple sclerosis

D. Subacute combined degeneration of cord

---

63. A 40-year-old female patient presents with palpitations and difficulty in breathing. Auscultation reveals a mid-diastolic murmur and JVP shows a prominent 'a' wave. What is the most likely diagnosis?

(or)

Prominent 'a' wave on JVP is seen in?

A. Mitral stenosis

B. Tricuspid stenosis

C. Mitral regurgitation

D. Tricuspid regurgitation

---

64. In a patient who is a chronic smoker, bilateral pitting pedal edema and abdominal distension were observed. Further examination showed the presence of ascites and an S3 sound during auscultation. What are the possible defects that can be observed in this patient?

A. Aortic regurgitation

B. Tricuspid regurgitation

C. Aortic stenosis

D. Mitral regurgitation

---

65. Which of the following does not cause central cyanosis?

A. Methemoglobinemia

B. Pulmonary arteriovenous fistula

C. High altitude

D. Hypothermia

---

66. Which one of the following medications is not employed for the urgent (immediate) treatment of hyperkalemia?

A. 10% calcium gluconate over 10 min

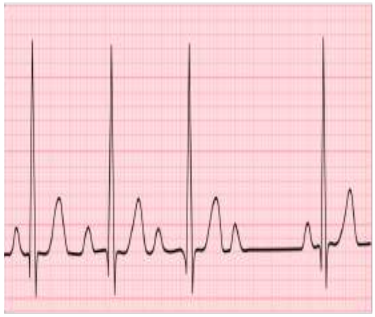
B. Salbutamol nebulisation

C. Insulin-dextrose

D. Injection MgSO4

---

67. Identify the conduction abnormality form the ECG give below?



A. First degree heart block

B. Ventricular tachycardia

C. Third degree heart block

D. Second degree heart block

---

68. Which of the following is a contraindication for thrombolysis?

A. MRI showing density in less than 1/3rd of the area supplied by MCA

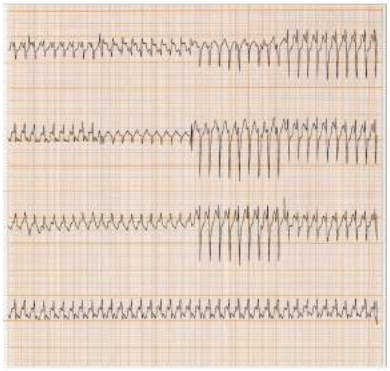
B. Blood pressure of more than 185/110 mmHg

C. Ischemic stroke within 2 hours

D. Onset of symptoms <4 hours

---

69. Which of the following is the initial treatment of choice for managing the condition in a female patient who comes to the hospital with palpitations, having stable vital signs and an ECG showing the following?



A. Amiodarone

B. Adenosine

C. DC cardioversion

D. Primary PCI

---

70. A patient with heart disease has breathlessness on going to the bathroom. What grade does he belong to?

A. NYHA 3

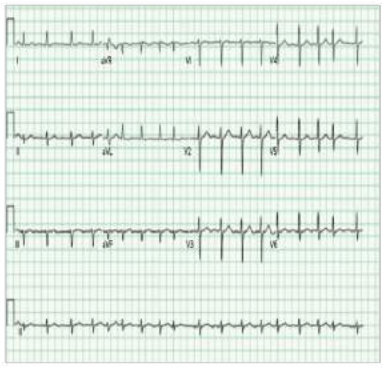
B. NYHA 4

C. mMRC 4

D. mMRC 5

---

71. Based on the ECG given below, which of the following is not used in the management of the condition?



A. Verapamil

B. Metoprolol

C. Amiodarone

D. Non synchronised DC shock

---

72. A female patient presents to the AIIMS emergency department with severe fatigue. She is a known case of chronic stable angina. While collecting a blood sample, you notice the blood has a brownish hue. What is the underlying diagnosis?

A. Carboxy-hemoglobinemia

B. Sideroblastic anaemia

C. Methemoglobinemia

D. Sulfhemoglobinemia

---

73. Which of the following are signs of heart failure? Non-pulsatile rise of JVP Orthopnoea Dyspnoea after 2 hours of sleep Right upper quadrant pain/right hypochondrial pain

A. 1 and 2

B. 1,2,3

C. 2,3,4

D. 1,3,4

---

74. What is the antibody linked to the condition in which a 35-year-old woman experiences skin thickening, muscle weakness, pale peripheries upon cold exposure, increased creatine kinase with positive ANA, and biopsy revealing scl-70 positivity and perifascicular infiltration?

A. Anti PM scl antibody

B. Anti Jo1 antibody

C. Anti centromere antibody

D. Antinuclear antibody

---

75. What is the correct order for cardiac auscultation, from superior to inferior? a. Pulmonary b. Tricuspid c. Mitral

A. a > b > c

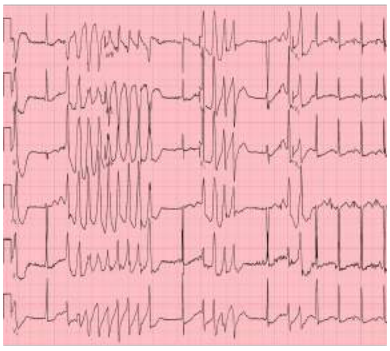
B. b > a > c

C. c > a > b

D. c > b > a

---

76. What is the ECG depicted in the following image?



A. Pericarditis

B. Viral myocarditis

C. Torsades de pointes

D. Cardiac tamponade

---

77. Which of the following describes aortic regurgitation murmur?

A. Ventricular contraction

B. Ejection systolic murmur

C. Diastolic murmur

D. Systolic murmur

---

78. A 20-year-old woman presents with breathlessness and chest pain. She is a known case of mitral stenosis. Her pulse is irregularly irregular. No thrombus is seen on echocardiography. What is the best

agent to prevent future thrombotic events?

A. Dabigatran

B. Aspirin 150mg

C. Oral warfarin

D. Aspirin + Clopidogrel

---

79. Evaluation of a patient revealed the presence of mild diastolic murmur. JVP showed prominent a-waves. What is the likely diagnosis?

A. Mitral stenosis

B. Tricuspid stenosis

C. Mitral regurgitation

D. Tricuspid regurgitation

---

80. A 45 year old woman with a history of hypertension presented to the emergency room with loss of consciousness, chest pain, and diaphoresis. On examination, she was unstable, and the bilateral pulses were unequal. ECG showed nonspecific ST-T changes. Which of the following is particularly useful in evaluating the function and integrity of cardiac valves?

A. MRI

B. Transoesophageal echocardiography

C. Cardiac enzymes

D. X-ray

---

81. What is the probable diagnosis for a male patient who presents with weak femoral pulses and an upper-limb blood pressure reading of 186/90 mmHg, along with an enlarged intercostal arteries seen on a chest x-ray?

A. Coarctation of aorta

B. Atrial septal defect

C. Bicuspid aortic valve

D. Patent ductus arteriosus

---

82. A 50-year-old man presents with a history of recurrent retrosternal chest pain with each episode lasting for 3-5 min and subsiding with sublingual nitrate. ECG shows left ventricular hypertrophy and flat T-wave. He is a known case of hypertension, diabetes mellitus, and hypercholesterolemia currently on aspirin, atenolol, metformin, and lovastatin. What is the next best step in management?

A. IV glyceryl trinitrate infusion

B. Injection enoxaparin

C. Add clopidogrel

D. Increase the dose of beta blocker

---

83. What condition is linked to Dilated Cardiomyopathy?

A. Diphtheria

B. Syphilis

C. Meningococcus

D. Brucellosis

---

84. PR segment in ECG indicates

A. Atrial depolarization

B. Atrioventricular nodal conduction

C. Ventricular depolarization

D. Ventricular repolarisation

---

85. Which heart sound is always pathological?

A. S1

B. S2

C. S3

D. S4

---

86. In which of the following conditions is water hammer pulse observed?

A. Aortic stenosis

B. Aortic regurgitation

C. Aortic stenosis and aortic regurgitation

D. Mitral regurgitation

---

87. What is the likely diagnosis for a 70-year-old man who has a medical history of diabetes mellitus (DM) and hypertension (HTN), takes regular medication, and is now experiencing increasing difficulty breathing during physical activity? Upon examination, the patient has an elevated jugular venous pressure (JVP), positive hepatojugular reflux, crackling sounds in the lower lungs, an enlarged liver, fluid buildup in the abdomen (ascites), and swelling in the feet (pedal edema).

A. Heart failure

B. Hypertrophic cardiomyopathy

C. Mitral regurgitation

D. Portal hypertension

---

88. Which one of the following is not an identifiable radiological observation in a patient experiencing left heart failure?

A. Kerley b lines

B. Focal oligemia

C. Increased venous blood in lung

D. Change in upper lobe circulation

---

89. A 60-year-old man presented with an episode of acute onset dizziness and loss of consciousness which lasted for a few seconds followed by a regain of full consciousness. There were no similar episodes in the past. Which of the following is a true statement regarding this scenario?

A. ECG to rule out atrial fibrillation

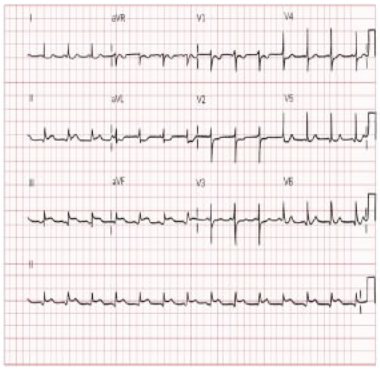
B. If ECG is normal, CT scan should be done

C. Tilt-table testing

D. Vestibular neuritis is a possible condition that can cause these symptoms

---

90. What is the probable diagnosis for an overweight elderly man who arrived at the emergency department with intense chest pain lasting for two hours? He also experienced excessive sweating, pain in the left arm, nausea, and one instance of vomiting. During examination, his pulse rate was recorded as 58 beats per minute and his blood pressure was 90/60 mm of Hg. An electrocardiogram (ECG) was conducted and revealed the following results. Additionally, the patient's cardiac biomarkers indicated increased troponin levels.



A. Anterior wall

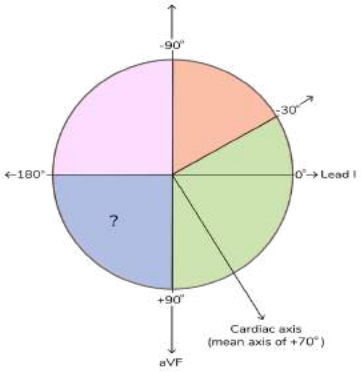
B. Inferior wall MI

C. Posterior wall MI

D. Pericarditis

---

91. What is the diagnosis if the axis is on the mark “?” from the diagram shown below?



A. Right axis deviation

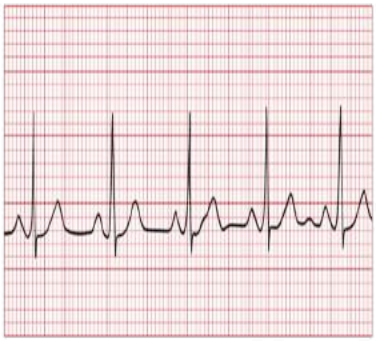
B. Normal axis

C. Left axis deviation

D. Extreme axis deviation

---

92. Please determine the rhythm displayed in the provided ECG rhythm strip.



A. Atrial fibrillation

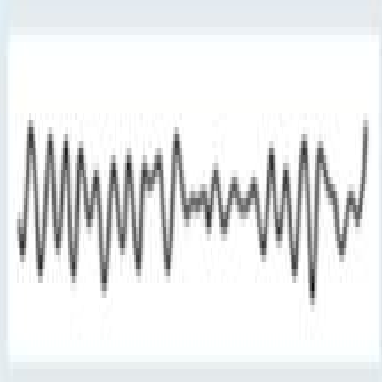
B. Atrial flutter

C. Normal sinus rhythm

D. AV block

---

93. An intern observed that a patient was unresponsive, and an ECG which was performed urgently showed an arrhythmia as below. DC shock was delivered but the arrhythmia persisted, and the patient is still unresponsive. What is the next best step in the management of this patient?



A. Synchronized cardioversion

B. Start CPR

C. Deliver another DC shock

D. 1 mg epinephrine IV

---

94. Tall and tented T waves, wide QRS, and absent P wave are features of:

A. Bundle branch block

B. Acute MI

C. Hyperkalemia

D. Ventricular ectopic

---

95. In order to diagnose resistant hypertension, the patient must have uncontrolled high blood pressure even after being treated with three different antihypertensive medications. One of these medications should be:

A. Calcium channel blocker

B. Beta-blocker

C. Alpha blocker

D. Diuretic

---

96. Which of the following foods is not included in the DASH diet?

A. Rich in potassium

B. Rich in calcium

C. Rich in sodium

D. Rich in magnesium

---

97. A 68-year-old male presents with palpitations and shortness of breath. His medical history includes hypertension, diabetes, and coronary artery disease. On examination, irregularly irregular heartbeats are noted. An electrocardiogram (ECG) reveals irregularly irregular rhythm, no P waves, and absence of an isoelectric baseline. His blood pressure is 132/84 mmHg, heart rate 130 bpm, and oxygen

saturation 94% on room air. Given the patient's clinical presentation and history, which of the following treatment options should be considered as a first-line approach for managing this case?

A. Amiodarone

B. Metoprolol

C. Electrical cardioversion

D. Direct oral anticoagulant (DOAC) therapy

---

98. Which of the following statements about heart failure is false? HFpEF refers to heart failure in which the ejection fraction is preserved, while HFrEF refers to heart failure with a reduced ejection fraction.

A. Regardless of ejection fraction and the type of heart failure, the 5-year mortality rate is around 50%

B. Non-cardiovascular death is more in HFpEF-30-40% as compared to HFrEF-15%

C. Angiotensin-converting enzyme (ACE) inhibitors cause cough in 15% and angioedema in 1%

D. Atrial fibrillation is common in the elderly and is the cause of stroke in a quarter of the stroke cases

---

99. A patient has presented with features of cardiac tamponade. Which of the following is correct regarding this condition?

A. Pulsus Paradoxsus is always present

B. Kussmaul sign is always present

C. Tall A wave is present

D. Jugular veins column is visibly distended without pulsations

---

100. What is the clinical diagnosis for a young male who has no symptoms but is found to have a wide fixed split S2 during auscultation?

A. ASD

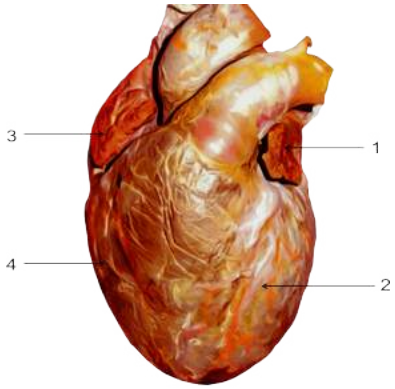
B. VSD

C. TOF

D. BAV

---

101. A chronic smoker presented with shortness of breath, bilateral pitting pedal edema, and abdominal distension. On examination, jugular venous pulse was found to be elevated and liver was palpable 8 cm below the costal margin. An abnormality in which of the following structures is responsible for the patient’s symptoms?



A. 1

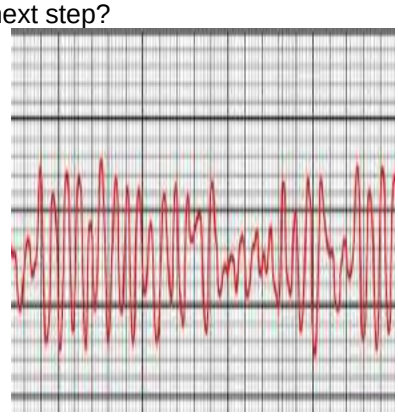
B. 2

C. 3

D. 4

---

102. A 47 year old woman was brought to the casualty in an unconscious state after having suddenly collapsed. As there was no pulse, cardiopulmonary resuscitation was started and the monitor showed the following rhythm. What is the next step?



A. Defibrillation

B. Synchronized cardioversion

C. 1mg epinephrine

D. 0.5mg atropine

---

103. Pulsus paradoxus is seen in:

A. Coronary artery disease

B. Severe Asthma or Chronic Obstructive Pulmonary Disease

C. Atrial Fibrillation

D. Right ventricular myocardial infarction

---

104. Takayasu arteritis most commonly involves:

A. Pulmonary artery

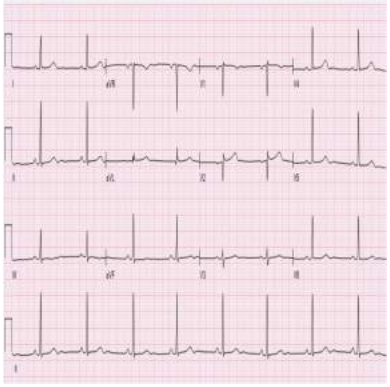
B. Coronary arteries

C. Abdominal aorta

D. Arch of aorta

---

105. A 64-year-old man presents with complaints of palpitations and syncope. He has a history of inferior-wall myocardial infarction a year ago. Holter study was done and his 24 hour ECG strip obtained is given below. What is the long-term treatment for this condition?



A. Amiodarone

B. Atropine only

C. Permanent pacemaker

D. Atropine and isoproterenol

---

106. A 50-year-old man presents with recurrent episodes of chest pain which is seen only on exertion or exercise and lasts 2-5 minutes. He was assessed and was diagnosed with a case of stable angina however his BP was consistently elevated. What is the most appropriate antihypertensive for this patient?

A. Atenolol

B. Thiazides

C. Enalapril

D. Amlodipine

---

107. Which of the following is the most appropriate position for placement of pacemaker leads?

A. Right ventricle

B. Left atrium

C. Left ventricle

D. Superior vena cava

---

108. A postoperative cardiac surgery patient developed sudden hypotension, raised central venous pressure, pulsus paradoxus at the 4th post operative hour. The most probable diagnosis is.

A. Ventricular dysfunction

B. Cardiac tamponade

C. CHF

D. Excessive mediastinal effusion

---

109. What is the most probable diagnosis for a female patient, aged 65, who visits the outpatient department with symptoms of breathlessness and fatigue? During examination, the patient's neck veins were engorged, and her jugular venous pulse displayed a swift X and Y descent.

A. Constrictive pericarditis

B. Cardiac tamponade

C. Dilated cardiomyopathy

D. Restricted cardiomyopathy

---

110. A female patient with fever and malar rashes was found to have vegetations on either side of the heart valves. What can be the diagnosis of the patient?

A. Infective endocarditis

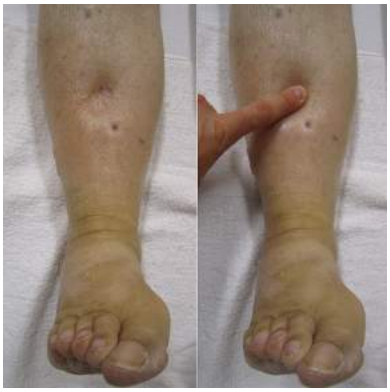
B. Libman sacks endocarditis

C. Rheumatic Heart Disease

D. None of the above

---

111. A 50 year old lady with hypertension is brought with shortness of breath and dyspnea on exertion for the past week. Physical examination reveals the presence of elevated jugular venous pressure and crepitations in the lungs along with palpable liver 3 cm below the costal margin. The image of her legs is given below what is the finding called?



A. Superficial venous thrombosis

B. Deep vein thrombosis

C. Clubbing

D. Pitting pedal edema

---

112. Which cardiac chamber enlargement is seen in the case of mitral stenosis on chest x-ray initially?

A. Left atrium

B. Right atrium

C. Left ventricle

D. Right ventricle

---

113. Osborn waves in ECG are seen in:

A. Hypothyroidism

B. Hypothermia

C. Hypocalcaemia

D. Hypokalaemia

---

114. Which of the following murmur increases on standing?

A. HOCM

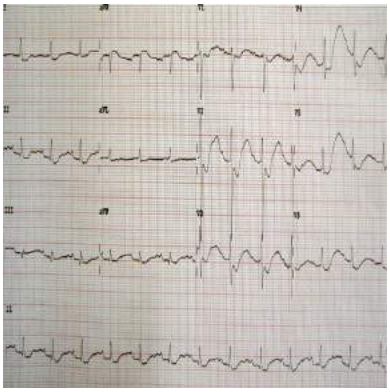
B. MR

C. MS

D. VSD

---

115. A 40 year old male patient came to ED with complaints of weakness, paresthesia, and breathing difficulty. Relevant investigations were done. The ECG obtained is suggestive of:



A. Hypokalaemia

B. Hyperkalemia

C. Hypocalcemia

D. Hypercalcemia

---

116. What is grade 2 hypertension values according to the American Heart Association?

A. >130/80 mmHg

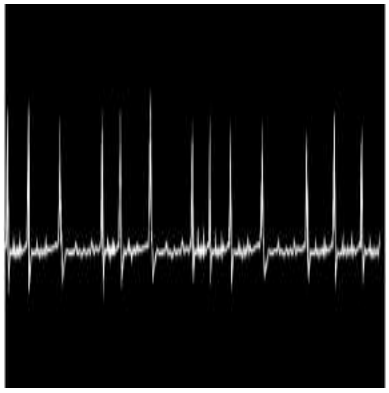
B. ≥140/90 mmHg

C. >150/96 mmHg

D. ≥160/100 mmHg

---

117. A 65 year old female patient is brought to the emergency department in a state of unconsciousness. Her BP is 70/50 mm of Hg. Her ECG is shown below. What is the next best step in the management of her condition?



A. IV verapamil

B. IV adenosine

C. Carotid massage

D. DC cardioversion

---

118. The observed myocardial stunning pattern does not match the patient's ECG findings. What is the probable diagnosis?

A. Takotsubo cardiomyopathy

B. Restrictive cardiomyopathy

C. Brugada syndrome

D. Pericardial tamponade

---

119. For which of the following conditions is automatic implantable cardioverter-defibrillator (AICD) implantation performed?

A. Brugada syndrome

B. Ventricular fibrillation

C. Acute coronary syndrome with low ejection fraction

D. All the above

---

120. Who is classified as a category III non-heart-beating donor?

A. Dead on arrival

B. A patient who died after failed resuscitation after reaching the hospital

C. A patient who was bought dead to the hospital

D. A patient who is awaiting cardiac arrest in the hospital

---

121. In which electrolyte abnormality is Pseudo P pulmonale observed?

A. Hypokalaemia

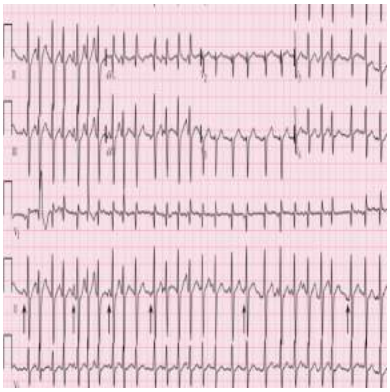
B. Hyponatremia

C. Hypocalcaemia

D. Hypercalcemia

---

122. A 50-year-old man was brought to the emergency in an unconscious state. He had a fever for the past two days and is a known case of severe COPD. His ECG is given below. What is the most likely diagnosis?



A. Ventricular tachycardia

B. Multifocal atrial tachycardia

C. Atrial fibrillation

D. Atrial tachycardia

---

123. Which of the following is used in the treatment of late cardiovascular syphilis?

A. Benzathine penicillin 2.4 million units weekly for three weeks

B. Benzathine penicillin 2.4 million units as single dose

C. Benzathine penicillin 12-24 million units for 21 days

D. Tetracycline 2g daily

---

124. Which of the following is NOT a component of Syndrome Z?

A. HDL cholesterol <40mg/dL in men

B. Blood pressure more than 130/85 mmHg

C. Fasting triglyceride of more than 150 mg/dl

D. LDL more than 100mg/dl

---

125. Two brothers were arguing over a property dispute when the elder of the two complained of chest pain and collapsed and was later declared brought dead by the hospital. His family says he was previously healthy and there was no similar disease in the family members. What is the likely diagnosis?

A. Infective cardiomyopathy

B. Takotsubo cardiomyopathy

C. Acute myocardial infarction

D. Hypertrophic cardiomyopathy

---

126. 'a' wave in JVP corresponds to?

A. Right atrial contraction

B. Closure of tricuspid valve

C. Onset of ventricular systole

D. Maximal atrial filling

---

127. Relative bradycardia occurs in:

A. Typhoid fever

B. Q fever

C. Leptospirosis

D. All of the above

---

128. What is the distinguishing characteristic that sets apart cardiac tamponade and tension pneumothorax?

A. Breath sounds

B. Muffled heart sounds

C. Increased heart rate

D. Raised JVP

---

129. Which electrocardiogram lead would display the highest R wave amplitude when the cardiac axis is positioned at +90 degrees?

A. Lead aVF

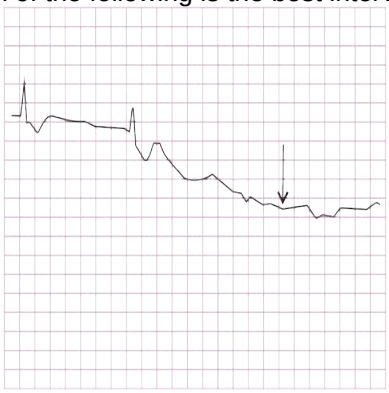
B. Lead aVL

C. Lead I

D. Lead II

---

130. A 70 year old man collapsed in his house and was rushed to the hospital. On arrival, his ECG tracing was as shown below. Which of the following is the best intervention for this patient?



A. Use of automated external defibrillator

B. Injection of vasopressin 40 IU

C. Injection of Adrenaline 1mg IV

D. Injection of Atropine 0.5mg IV

---

131. An intern is asked to measure the blood pressure of a patient with cardiac tamponade. He/she should ask the patient to:

A. Hold breath

B. Take rapid shallow breaths

C. Take long deep breaths

D. Breathe normally

---

132. What is the potential risk of adding verapamil to a hypertensive patient already on metoprolol?

A. Atrial fibrillation

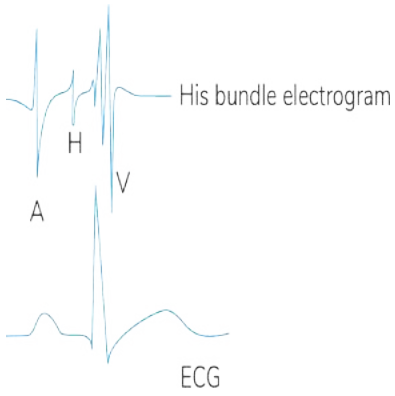
B. Bradycardia with AV block

C. Tachycardia

D. Torsades de pointes

---

133. What is the duration of the HV interval observed in the his bundle electrogram for conduction?



A. Through His – Purkinje system

B. From AV node to bundle of His

C. Purkinje to ventricular fibers

D. From bundle of His and bundle branches to ventricles

---

134. Which investigation is the most suitable for diagnosing myocardial infarction (MI) within a timeframe of 2-4 hours, as reported by a patient with chest pain?

A. LDH

B. CKMB

C. Troponin-T

D. BNP

---

135. High anion gap acidosis with low bicarbonate levels is seen in all of the following conditions except:

A. Renal disorders

B. Diabetic ketoacidosis

C. Lactic acidosis

D. Salicylate poisoning

---

136. All are true about steps followed in management of ventricular fibrillation except?

(or)

A 56-year-old unresponsive male was brought to the ER with GCS less than 7 and ECG shows ventricular fibrillation. All are true about steps followed in the management of ventricular fibrillation except?

A. CPR cycle duration is 2 minutes

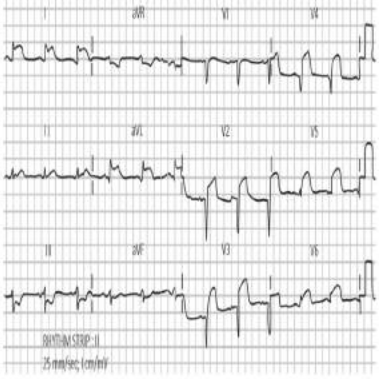
B. Chest compressions at 100-120/min

C. Start CPR followed by immediate defibrillation

D. Rescue breaths 15:2

---

137. In a 55-year-old male who arrives at the emergency department, symptoms of chest pain, sweating, nausea, and difficulty breathing have been experienced for the past four hours. The patient has a smoking history of one pack per day for 20 years and no previous medical conditions. Upon examination, the patient's pulse is recorded at 76 beats per minute, and blood pressure measures 110/70 mmHg. An electrocardiogram (ECG) has been performed and is provided below. Based on the information provided, what is the most probable diagnosis for this patient?



A. Prinzmetal angina

B. Myocardial ischemia

C. Pulmonary embolism

D. Hyperkalemia

---

138. Which of the following medications does not decrease mortality in a 70-year-old male patient diagnosed with heart failure and an ejection fraction

A. Metoprolol

B. Digoxin

C. Captopril

D. K+ sparing diuretics

---

139. Which of the following leads to a continuous murmur?

A. Peripheral Pulmonic stenosis

B. Severe Pulmonary artery hypertension

C. Type A aortic dissection

D. Rupture of cardiac chamber

---

140. What is a valid statement concerning Postural Hypotension?

A. Decrease in systolic blood pressure 20 mm Hg within 6 mins of postural change

B. Decrease in systolic blood pressure 20 mm Hg within 3 mins of postural change

C. Decrease in diastolic blood pressure 20 mm Hg within 6 mins of postural change

D. Decrease in diastolic blood pressure 20 mm Hg within 3 mins of postural change

---

141. What is the most accurate and distinctive marker for Myocardial Infarction (MI)?

A. Troponin

B. Cytokeratin

C. Myoglobin

D. CPK- MM

---

142. A 62 yr old man came to the hospital with a complaint of recurrent fainting episodes. His ECG shows P waves at 75/min, and QRS complexes duration is normal at 35 beats/min. The clinical diagnosis is?

A. 2nd degree AV block

B. Atrial tachycardia

C. First-degree AV block

D. Stokes adams syndrome

---

143. A Patient has muffled heart sounds with low blood pressure. Correct JVP finding is?

A. Steep x descent

B. Absent y descent

C. Steep y descent

D. Blunted x descent

---

144. A young male patient presents with sudden onset chest pain for one hour with ECG showing STE in lead 2,3 and aVf. Which is the best treatment for this case of inferior wall MI in a multispeciality hospital?

A. Alteplase

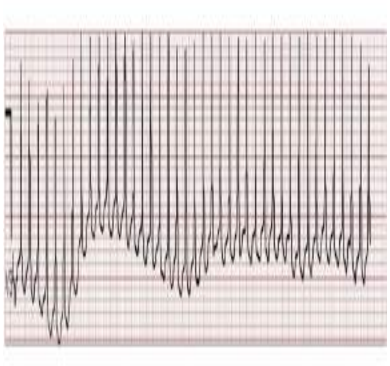
B. Streptokinase

C. Primary angioplasty

D. Dabigatran

---

145. A 55-year-old lady presents with complaints of dizziness and palpitations. ECG was done and is shown below. What is the best treatment?



A. Adenosine

B. Amiodarone

C. Beta-blocker

D. Valsalva maneuver

---

146. A 52-year-old lady develops sudden onset facial deviation with slurring of speech and inability to raise her right arm. The symptoms spontaneously begin to reduce and get completely resolved over the next 48 hours. She has a mid-diastolic murmur on auscultation in the left side of the heart and an irregular heart rhythm. What is the diagnosis?

A. T.I.A

B. Thrombo-embolic stroke

C. Cardio embolic stroke

D. Paradoxical embolism

---

147. A lady with mitral stenosis develops sudden onset respiratory difficulty, limb edema, and pain in the calves. What is the clinical diagnosis in this patient?

A. Pulmonary embolism

B. Pulmonary edema

C. Cerebral embolism

D. Paradoxical embolism

---

148. All of the following conditions will have an elevated JVP that rises with deep inspiration except?

A. HOCM

B. Constructive pericarditis

C. Cor pulmonale

D. Restrictive cardiomyopathy

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	2
Question 3	3
Question 4	4
Question 5	1
Question 6	2
Question 7	2
Question 8	2
Question 9	4
Question 10	1
Question 11	1
Question 12	2
Question 13	3
Question 14	1
Question 15	1
Question 16	1
Question 17	4
Question 18	4
Question 19	1
Question 20	3
Question 21	2
Question 22	1
Question 23	4
Question 24	4
Question 25	3
Question 26	1
Question 27	4
Question 28	4
Question 29	2
Question 30	2
Question 31	1
Question 32	2
Question 33	2

Question 34	3
Question 35	4
Question 36	2
Question 37	3
Question 38	1
Question 39	1
Question 40	4
Question 41	1
Question 42	2
Question 43	1
Question 44	2
Question 45	2
Question 46	3
Question 47	3
Question 48	2
Question 49	2
Question 50	4
Question 51	3
Question 52	1
Question 53	2
Question 54	2
Question 55	3
Question 56	3
Question 57	1
Question 58	4
Question 59	1
Question 60	1
Question 61	1
Question 62	4
Question 63	2
Question 64	2
Question 65	4
Question 66	4
Question 67	4
Question 68	2

Question 69	2
Question 70	1
Question 71	4
Question 72	3
Question 73	3
Question 74	1
Question 75	1
Question 76	3
Question 77	3
Question 78	3
Question 79	2
Question 80	2
Question 81	1
Question 82	2
Question 83	1
Question 84	2
Question 85	4
Question 86	2
Question 87	1
Question 88	2
Question 89	1
Question 90	2
Question 91	1
Question 92	3
Question 93	2
Question 94	3
Question 95	4
Question 96	3
Question 97	2
Question 98	2
Question 99	4
Question 100	1
Question 101	4
Question 102	1
Question 103	2

Question 104	4
Question 105	3
Question 106	4
Question 107	1
Question 108	2
Question 109	1
Question 110	2
Question 111	4
Question 112	1
Question 113	2
Question 114	1
Question 115	1
Question 116	4
Question 117	4
Question 118	1
Question 119	4
Question 120	4
Question 121	1
Question 122	2
Question 123	1
Question 124	4
Question 125	2
Question 126	1
Question 127	4
Question 128	1
Question 129	1
Question 130	3
Question 131	4
Question 132	2
Question 133	4
Question 134	3
Question 135	1
Question 136	4
Question 137	2
Question 138	2

Question 139	1
Question 140	2
Question 141	1
Question 142	4
Question 143	2
Question 144	3
Question 145	1
Question 146	1
Question 147	2
Question 148	1

Solution for Question 1:

option a.

• Dullness to percussion and decreased breath sounds near the base of the left lung infra-scapular location are characteristic findings in cardiac tamponade.

• Cardiac tamponade is a medical emergency that occurs when fluid accumulates in the pericardial space, compressing the heart and impairing its ability to pump blood effectively. As a result, patients with cardiac tamponade may present with symptoms such as shortness of breath, chest pain, tachycardia, and hypotension. Normal SBP falls < 10 mm Hg on deep inspiration if it falls > 10 mmHg (in the case of cardiac tamponade) this is known as Pulsus paradoxus.

• Beck's Triad BP fall: Obstructive shock (IV fluid contraindicated) JVP: Elevated, non-pulsatile, Kussmaul sign is absent S1S2 muffled/distant

• BP fall: Obstructive shock (IV fluid contraindicated)

• JVP: Elevated, non-pulsatile, Kussmaul sign is absent

• S1S2 muffled/distant

• BP fall: Obstructive shock (IV fluid contraindicated)

• JVP: Elevated, non-pulsatile, Kussmaul sign is absent

• S1S2 muffled/distant

Incorrect Choices:

b. Chronic constrictive pericarditis involves the chronic inflammation and fibrosis of the pericardium, lea ding to the thickening and stiffening of the pericardial sac. Patients with chronic constrictive pericarditis may present with symptoms such as dyspnea, fatigue, and peripheral edema. However, they are unlike ly to have dullness to percussion and decreased breath sounds near the base of the left lung infra-scap ular location.

c. Pulmonary embolism is a blockage of one or more pulmonary arteries by a blood clot, which can lea d to symptoms such as dyspnea, chest pain, and tachycardia. However, patients with pulmonary embol ism are more likely to have findings such as tachypnea, pleuritic chest pain, and clear breath sounds o n auscultation.

d: Left-sided pleural effusion involves fluid accumulation in the pleural space on the left side of the che st, leading to symptoms such as dyspnea and chest pain. However, dullness to percussion and decrea sed breath sounds are more commonly observed at the base of the affected lung, regardless of the loc ation.

Solution for Question 2:

Correct Option B - Aortic regurgitation:

• This option is correct because aortic regurgitation is unrelated to the production of the first heart sound (S1). Aortic regurgitation involves the leakage of blood back into the left ventricle during diastole, and it does not directly affect the closure of the mitral valve or the production of S1. Therefore, the absence of a loud S1 sound is not indicative of aortic regurgitation.

Incorrect Options:

Option A - Calcified valve: This option is incorrect because a
calcified valve in mitral stenosis can restrict the movement of the valve leaflets and result in a reduced or absent opening snap (OS), leading to a softer S1 sound. Therefore, the absence of a loud S1 sound is consistent with a calcified valve in mitral stenosis.

Option C - First degree heart block: The intensity of the first heart sound (S1) is decreased in patients with first-degree heart block. Therefore, the absence of loud S1 is consistent with first degree heart blo ck.

Option D - Mild mitral stenosis: In mitral stenosis, the presence of a loud first heart sound (S1) is a characteristic finding. Therefore, the absence of a
loud S1 sound would be inconsistent with mitral stenosis. A loud S1 is produced by mobile but stiff mitr al leaflets unless the leaflets are substantially calcified. Since elevated left atrial pressure has maintain ed the leaflets' rather wide spacing, the loud S1 is mostly caused by increased leaflet excursion during closure.

Solution for Question 3:

Correct Option C - Decreased IgG and increase in IgM:

• The lack of CD40 in B cells leads to an immunological abnormality known as Hyper-IgM syndrome.

• CD40 is a crucial co-stimulatory molecule required for the interaction between B cells and T cells causing the generation of high-affinity antibodies, class switching, and memory B cell formation.

• The lack of CD40 in B cells results in decreased IgG and IgA production, and an increase in IgM production, which leads to an immunological abnormality characterized by a decreased ability to mount an effective immune response against infections.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 4:

Correct Options D: Prazosin

• In the scenario described, the symptoms of altered sensorium, elevated blood pressure, sweating, palpitations, priapism, and mouth secretion are consistent with a condition known as hypertensive crisis or sympathomimetic crisis, which can be caused by excessive release or use of certain stimulant drugs (e.g., amphetamines, cocaine). Prazosin, as an alpha-1 blocker, can help counteract the effects of excessive sympathetic stimulation and lower blood pressure.

Incorrect options:

Options A: ASV (Anti-snake venom): ASV is a specific treatment used for snakebite envenomation an d is not indicated in the scenario described. The symptoms mentioned (altered sensorium, elevated blo od pressure, sweating, palpitations, priapism, and mouth secretion) are not consistent with a snakebite. Therefore, ASV would not be the appropriate treatment in this case.

Options B: Adrenaline (Epinephrine): Adrenaline is a hormone and medication that acts on the sympat hetic nervous system. It is commonly used in emergency situations to treat severe allergic reactions (a naphylaxis) and cardiac arrest. While some of the symptoms described, such as elevated blood pressu re, palpitations, and sweating, may be associated with an adrenaline surge, it would not be the first-line drug of choice for this particular scenario.

Options C: Steroid: Steroids, such as corticosteroids, have anti-inflammatory and immunosuppressive effects. They are used in various medical conditions, including allergic reactions, autoimmune diseases , and asthma. However, the symptoms described in the scenario do not suggest an immediate need for steroids as the first-line treatment.

Solution for Question 5:

Correct Option A: Cor pulmonale

• Cor pulmonale, also known as pulmonary heart disease, is a condition characterized by right-sided heart failure secondary to lung disorders, such as chronic obstructive pulmonary disease (COPD) or pulmonary hypertension. Cor pulmonale is typically considered a cause of low output cardiac failure rather than high output cardiac failure. In cor pulmonale, the right ventricle becomes enlarged and weak due to increased pulmonary vascular resistance or chronic lung disease.

Incorrect options:

Option B: Beri beri:

• Beri beri is a nutritional deficiency disorder caused by a deficiency of thiamine (vitamin B1). Thiamine is necessary for the proper functioning of the heart and nervous system. In severe cases of thiamine deficiency , wet beri can develop. High-output cardiac failure occurs due to decreased vascular resistance from vasodilation and the opening of AV shunts in the musculature. The combination of decreased vascular resistance and dilated cardiomyopathy leads to high-output cardiac failure.

Option C: Anemia:

• Anemia leads to a reduced oxygen-carrying capacity of the blood, which stimulates an increase in cardiac output to compensate for the decreased oxygen delivery. This increased cardiac output can lead to high-output cardiac failure.

Option D: Systemic AV shunt:

• A systemic arteriovenous (AV) shunt is an abnormal connection between an artery and a vein in the body, bypassing the normal capillary network. This can occur in conditions such as arteriovenous malformations (AVMs) or large arteriovenous fistulas. In a systemic AV shunt, blood bypasses the

capillaries and returns to the venous system without undergoing proper oxygen and nutrient exchange. This leads to increased blood flow and high-output cardiac failure.

Solution for Question 6:

Correct Option B - Elevated pro-BNP, Trop T:

• Myocarditis encompasses a spectrum of immune-mediated processes affecting the heart, characterized by lymphocyte and macrophage involvement, and antibody-mediated injury. This can lead to structural and functional abnormalities in cardiomyocytes, resulting in contractile impairment, chamber stiffness, or conduction system issues.

Criteria

Histological confirmation

Biomarker, ECG, or imaging abnormalities consistent with myocarditis

Possible subclinical acute myocarditis

In the clinical context of possible myocardial injury without cardiovascular symptoms but with at least o ne of the following:

Absent

Needed

Probable acute myocarditis

In the clinical context of possible myocardial injury with cardiovascular symptoms and at least one of th e following:

Definite myocarditis

Histological or immunohistological evidence of myocarditis

Not Needed

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 7:

Correct Option B - Mitral stenosis:

• The given specimen is of mitral stenosis.

• The mitral valve opening is reduced in area and has a "fish mouth" appearance. It is difficult to assess the left ventricle from this specimen, but there may be a degree of left ventricular hypertrophy.

The mitral valve opening is reduced in area and has a "fish mouth" appearance. It is difficult to assess t he left ventricle from this specimen, but there may be a degree of left ventricular hypertrophy.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 8:

Correct Option B - Start CPR:

• Based on the description provided, the next best step in the management of an unresponsive patient with the displayed ECG rhythm, despite the delivery of a DC shock, is to start CPR (Cardiopulmonary Resuscitation). The ECG rhythm depicted suggests ventricular fibrillation (VF), which is a life-threatening arrhythmia characterized by rapid, irregular, and disorganized electrical activity of the ventricles. Ventricular fibrillation results in ineffective pumping of the heart, leading to a lack of blood flow to vital organs and ultimately cardiac arrest.

Incorrect Options:

Option A - Synchronized cardioversion: While synchronized cardioversion is a potential treatment for c ertain arrhythmias, such as supraventricular tachycardia or atrial fibrillation, it is not appropriate for vent ricular fibrillation.

Option C - Deliver another DC shock: Ventricular fibrillation requires immediate CPR followed by defibri llation (DC shock) as the initial treatment. Since the patient has already received a DC shock without c onversion of the rhythm, repeating the shock without CPR in between is unlikely to be effective. Ventric ular fibrillation (VF) is a serious and life-threatening abnormal heart rhythm that occurs when the electri cal signals controlling the heart's contractions become chaotic. Instead of a coordinated contraction, th e ventricles (the lower chambers of the heart) quiver or fibrillate, leading to ineffective pumping and a si gnificant decrease in blood flow. During ventricular fibrillation, the heart is unable to effectively pump ox ygen-rich blood to the body's vital organs and tissues. This can result in a sudden loss of consciousnes s, cessation of pulse, and, if not promptly treated, irreversible brain damage or death within minutes.

Option D - 1 mg epinephrine: Administering 1 mg of epinephrine is a component of advanced cardiac life support and is typically given during CPR after a shock has been delivered. However, starting CPR should take priority over administering epinephrine.

Solution for Question 9:

Correct Option D - Post stenotic dilatation of aorta:

• Based on the given clinical presentation of chest pain, exertional dyspnea, and syncope, along with the diagnosis of aortic stenosis and chest x-ray findings, the most likely diagnosis in this case is Post stenotic dilatation of the aorta. The correct answer is: Post stenotic dilatation of aorta

• Aortic stenosis is a condition characterized by the narrowing of the aortic valve, leading to obstruction of blood flow from the left ventricle into the aorta. This can cause symptoms such as chest pain, exertional dyspnea, and syncope due to the decreased cardiac output and increased pressure load on the left ventricle.

• Post stenotic dilatation of the aorta refers to the enlargement or dilation of the aorta just distal to the stenotic aortic valve. It occurs as a compensatory mechanism in response to the increased pressure gradient across the narrowed valve. The dilatation allows for better forward blood flow and helps to reduce the afterload on the left ventricle.

• On a chest x-ray, post stenotic dilatation of the aorta can be visualized as an enlargement of the aortic contour immediately distal to the stenotic valve. It typically appears as a bulbous or widened appearance of the aorta.

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 10:

Correct Option A - Ehlers-Danlos syndrome:

• Ehlers-Danlos syndrome (EDS) is a group of genetic disorders that affect the connective tissues in the body. It is characterized by various systemic manifestations, primarily involving the skin, joints, and blood vessels. Based on the given clinical features of joint hypermobility, the ability to touch the back of the hand with the wrist extended, tongue to nose sign, and auscultatory findings of mitral valve prolapse the likely diagnosis is EDS.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 11:

Correct Option A - Cardiac Pacemaker:

• A cardiac pacemaker is a device implanted in the chest to regulate the heart's electrical activity. On a chest X-ray, a cardiac pacemaker appears as a small, metallic object usually located in the upper chest area or near the heart. It may appear as a well-defined structure with lead wires extending into the heart.

Incorrect Options:

• Options B, C, and D are incorrect.

Solution for Question 12:

Correct Option B - It is slower than AV nodal pathway:

• This statement is incorrect. The bundle of Kent is actually faster than the AV nodal pathway.

Incorrect Options:

Option A - It is faster than the AV nodal pathway: This statement is correct. The bundle of Kent, being an accessory pathway, can conduct electrical impulses faster than the normal AV nodal pathway.

Option C - Leads to short PR interval: The presence of an accessory pathway, such as the bundle of K ent, can lead to a short PR interval on an electrocardiogram (ECG).

Option D - Leads to prolonged QRS duration: The bundle of Kent can cause a delta wave on the ECG, which is an early ventricular activation, resulting in a widened or prolonged QRS complex.

Solution for Question 13:

Correct Option C - Ventricular tachycardia:

• Ventricular tachycardia is characterized by a rapid heart rate originating from the ventricles, resulting in a wide QRS complex. The absence of P waves suggests that the ventricles are not being activated through the normal atrioventricular conduction pathway.

Incorrect Options:

Option A - Normal ECG: This option is incorrect because the ECG presented does not represent a normal rhythm. It shows a rapid heart rate, wide QRS complex, and absence of P waves, which are indicative of an abnormal cardiac rhythm.

Option B - Ventricular fibrillation: ventricular fibrillation typically appears as a chaotic, irregular rhythm with no discernible QRS complexes or P waves. The ECG shown in the question displays a regular rhythm with wide QRS complexes, which is more consistent with ventricular tachycardia.

Option D - Misplaced leads: This option is incorrect The ECG pattern shown is consistent with ventricul ar tachycardia rather than an artifact caused by lead misplacement.

Solution for Question 14:

Correct Option A - Staphylococcus epidermidis:

• Staphylococcus epidermidis, is most commonly associated with prosthetic valve endocarditis.

Incorrect Options:

Option B - Staphylococcus aureus: This statement is incorrect. While Staphylococcus aureus is a com mon cause of infective endocarditis, including native valve endocarditis, it is less commonly associated with prosthetic valve endocarditis

Option C - Coagulase-negative staphylococci are more commonly associated with prosthetic valve end ocarditis within 12 months.

Option D - HACEK organisms: This statement is incorrect.

Solution for Question 15:

Correct Option A - Hypothyroidism:

• Hypothyroidism, a condition characterized by an underactive thyroid gland and reduced production of thyroid hormones, is known to be associated with AV block. The exact mechanism is not fully understood, but it is believed that the low levels of thyroid hormones can have direct effects on the electrical conduction system of the heart, leading to disturbances in the conduction pathway and

potentially resulting in AV block.

Incorrect Options:

• Options B, C and D are not associated with AV block.

Solution for Question 16:

Correct Option A - Hydropneumothorax:

• Hydropneumothorax refers to the presence of both air and fluid in the pleural cavity. On a chest X-ray, it may appear as a radiolucent (dark) area with air-fluid levels seen within the pleural space. This condition can occur in cases of trauma, infection, or underlying lung diseases.

Incorrect Options:

• Options B, C, and D are incorrect.

Solution for Question 17:

Correct Option D:

• Resistant hypertension is defined as persistently elevated blood pressure (BP) that remains above the target level despite the use of three or more antihypertensive medications, including a diuretic, at optimal doses. The BP threshold for defining resistant hypertension is typically set at >140/90 mmHg.

• The rationale behind this definition is that it distinguishes individuals who are truly resistant to treatment and require further evaluation and management. It indicates a failure to achieve adequate BP control despite multiple therapeutic interventions, which may warrant additional investigations to identify and address underlying causes or contributing factors.

Incorrect Options:

Options A, B and C are incorrect.

Solution for Question 18:

Correct option D

• Intravenous procainamide: Procainamide is an antiarrhythmic medication that can be effective in treating antidromic tachycardia with a broad QRS complex. It works by blocking certain cardiac ion channels and restoring normal rhythm. Intravenous administration allows for rapid onset of action and is the preferred treatment option in this scenario.

Incorrect options: Option A. Oral verapamil: Verapamil is a calcium channel blocker that can be effectiv e in treating certain types of supraventricular tachycardias. However, in the case of antidromic tachycar dia with a
broad QRS complex, verapamil is not recommended as it can potentially worsen the condition. Option B. Oral beta-blocker: Beta-blockers are commonly used for rate control in supraventricular tachycardia s. However, in the case of antidromic tachycardia with a
broad QRS complex, oral beta-blockers may not be effective and are not the first-line treatment choice.

Option C. Cardioversion: Cardioversion involves the electrical conversion of an abnormal heart rhythm back to normal sinus rhythm. While cardioversion may be appropriate in certain situations, it is not the f irst-line treatment for antidromic tachycardia with a broad QRS complex.

Solution for Question 19:

Correct option A: Treadmill test

• The treadmill test, also known as exercise stress testing, is not typically performed in individuals with Wolff-Parkinson-White (WPW) syndrome. WPW is a condition characterized by an abnormal electrical pathway (accessory pathway) in the heart that can cause rapid heart rates and potentially dangerous arrhythmias. Exercise stress testing may not be recommended in WPW because it can potentially induce tachycardias or ventricular fibrillation due to the presence of the accessory pathway.

Incorrect options:

Option B. Electrophysiological studies

• Electrophysiological studies (EPS) are commonly performed in individuals with WPW syndrome. EPS involves the placement of catheters inside the heart to study the electrical conduction system and identify the location of the accessory pathway. It helps in determining the risk of arrhythmias and guiding further treatment options.

Option C. Oral beta blocker

• Beta blockers are often used in the management of WPW syndrome. They work by blocking the effects of adrenaline on the heart, helping to slow down the heart rate and reduce the risk of arrhythmias. Oral beta blockers are frequently prescribed to control heart rate and prevent arrhythmias in individuals with WPW.

Option D. Procainamide

• Procainamide is an antiarrhythmic medication that is sometimes used in the acute treatment of arrhythmias associated with WPW syndrome. It works by slowing down the electrical conduction through the accessory pathway. However, its use is generally reserved for acute situations and may not be the first-line treatment option.

Solution for Question 20:

Correct option C

• Persistent chest pain with ST elevation > 90 min after thrombolysis: This option is correct. Rescue PCI is indicated when there is persistent chest pain accompanied by ST elevation more than 90 minutes after thrombolysis. In this case, the patient has ongoing ischemia despite thrombolysis, and urgent PCI is necessary to restore blood flow to the affected coronary artery. Therefore, option C is correct.

Incorrect options:

Option A. Persistent chest pain with ST elevation > 60 min after thrombolysis: This option is incorrect. Rescue PCI is not typically performed for chest pain persisting for 60 minutes after thrombolysis. In ge neral, the window of opportunity for rescue PCI is shorter, and intervention is more effective when perf ormed earlier.

Option B. Persistent chest pain with ST elevation > 30 min after thrombolysis: This option is incorrect. Similarly to option A, rescue PCI is not typically performed for chest pain persisting for 30 minutes after thrombolysis. Earlier intervention is generally preferred.

Option D. Pain with ST elevation for > 120 min after thrombolysis: This option is incorrect. Although the duration of chest pain and ST elevation is longer in this option, rescue PCI is typically performed when there is persistent chest pain and ST elevation more than 90 minutes after thrombolysis. Waiting for 1 20 minutes may delay necessary intervention

Solution for Question 21:

Correct option B

• Early closure of ductus arteriosus: Indomethacin is a prostaglandin inhibitor, and its use in utero can lead to premature closure of the ductus arteriosus before birth, which is the intended effect in certain cases.

Incorrect options:

Option A. Patent ductus arteriosus: Indomethacin is actually used to treat patent ductus arteriosus (PD A) in premature infants. PDA is a condition where the ductus arteriosus fails to close after birth. So, the use of Indomethacin would not lead to PDA.

Option C. Ventricular septal defect: Ventricular septal defect (VSD) is a congenital heart defect charact erized by an abnormal opening between the ventricles. The use of Indomethacin is not associated with the development of VSD.

Option D. Atrial septal defect: Atrial septal defect (ASD) is a congenital heart defect characterized by a n abnormal opening between the atria. The use of Indomethacin is not associated with the developmen t of ASD.

Solution for Question 22:

Correct option A

• Patent ductus arteriosus (PDA): A continuous murmur is commonly heard in individuals with a patent ductus arteriosus. PDA is a congenital heart defect characterized by the persistence of a connection between the aorta and the pulmonary artery after birth. This connection, known as the ductus arteriosus, should naturally close shortly after birth. However, in PDA, the ductus remains open, causing blood to flow from the aorta to the pulmonary artery throughout the cardiac cycle, resulting in a continuous murmur.

Incorrect options:

Option B. Ventricular septal defect (VSD): VSD is a common congenital heart defect characterized by a n abnormal opening between the right and left ventricles. The murmur associated with VSD is typically a holosystolic (pansystolic) murmur, heard best at the lower left sternal border. It is not a continuous murmur.

Option C. Atrial septal defect (ASD): ASD is a congenital heart defect characterized by an abnormal op ening between the atria. The murmur associated with ASD is typically a
systolic ejection murmur, heard best at the upper left sternal border. It is not a continuous murmur.

Option D. Tetralogy of Fallot (TOF): TOF is a complex congenital heart defect characterized by a combination of four specific heart abnormalities. The murmur associated with TOF is typically a systolic ejection murmur, often accompanied by a harsh or crescendo-decrescendo quality. It is not a continuous murmur.

Solution for Question 23:

Correct option D

• > 0.85 in females: This option is correct. A waist-to-hip ratio greater than 0.85 in females is associated with an increased risk of heart disease. It indicates a higher proportion of abdominal fat and is considered a marker of central obesity, which is linked to cardiovascular health risks.

Incorrect options:

Option A. > 0.80 in males: While a waist-to-hip ratio greater than 0.80 in males may suggest central ob esity, it is not specifically associated with an increased risk of heart disease. The threshold for increase d risk is higher in males.

Option B. > 0.80 in females: This option is incorrect. A waist-to-hip ratio greater than 0.80 in females is not the commonly accepted threshold for increased risk of heart disease.

Option C. > 0.85 in males: This option is incorrect. While a waist-to-hip ratio greater than 0.80 in males may indicate central obesity, it is not specifically associated with an increased risk of heart disease. Th e threshold for increased risk is typically lower in males compared to females.

Solution for Question 24:

Correct option D

• This option is incorrect. There is typically no fixed time interval between two defibrillation shocks. The decision to deliver subsequent shocks is based on the specific circumstances and the response of the patient. In some cases, it may be necessary to deliver multiple shocks in rapid succession, while in other cases, a pause may be required to assess the patient's response or to provide additional interventions.

Incorrect options:

Option A. Only be used by a trained person: This option is correct. Defibrillation is a medical procedure that involves delivering an electric shock to the heart to restore its normal rhythm. It is a complex procedure that typically requires training and certification. Using a defibrillator without proper training can be dangerous and potentially harmful.

Option B. Decrease in success rate with delay in initiation: This option is correct. Defibrillation is most e ffective when it is performed promptly after identifying a cardiac arrest. The longer the delay in initiating defibrillation, the lower the success rate becomes. Early defibrillation is crucial for improving the chanc es of survival in cardiac arrest cases.

Option C. Improve prognosis: This option is correct. Defibrillation is a critical intervention in cases of ca rdiac arrest caused by ventricular fibrillation (VF) or ventricular tachycardia (VT). Delivering an electric shock through defibrillation can restore a normal heart rhythm, which significantly improves the progno sis or outcome for the individual experiencing the cardiac arrest.

Solution for Question 25:

Correct Option C:

• In a patient with non-ST-elevation myocardial infarction (NSTEMI), streptokinase is not typically used for treatment. Streptokinase belongs to the class of fibrinolytic agents and is commonly used for the management of ST-elevation myocardial infarction (STEMI) to dissolve blood clots causing the blockage in the coronary arteries. However, in NSTEMI, the underlying mechanism is often different, and the management approach focuses on antiplatelet therapy and anticoagulation rather than fibrinolysis.

Incorrect Options:

Option A: Aspirin: Aspirin is a fundamental component of the treatment for NSTEMI. It is an antiplatelet agent that inhibits platelet aggregation and helps prevent further clot formation. Aspirin is commonly prescribed in the acute phase of NSTEMI and continued as long-term therapy to reduce the risk of recurrent cardiovascular events.

Option B: Clopidogrel: Clopidogrel is another antiplatelet medication that is commonly used in the management of NSTEMI. It belongs to the class of P2Y12 inhibitors and helps inhibit platelet activation and aggregation. Clopidogrel is often prescribed in combination with aspirin for dual antiplatelet therapy to further reduce the risk of thrombotic events.

Option D: Prasugrel: Prasugrel is a
potent antiplatelet medication that is also used in the management of NSTEMI. It is a newer P2Y12 inhibitor that provides more potent platelet inhibition compared to clopidogrel. Prasugrel is typically reserved for patients who undergo percutaneous coronary intervention (PCI) or have a
high risk of recurrent ischemic events.

Solution for Question 26:

Correct Option A:

• In a patient presenting with narrow QRS complex tachycardia, a regular heart rate, and signs of hemodynamic instability (low blood pressure), immediate cardioversion is the most appropriate next step in management.

• DC cardioversion involves delivering a synchronized electric shock to the heart in order to restore normal sinus rhythm. It is the treatment of choice for unstable tachyarrhythmias, such as in this scenario where the patient has a significantly elevated heart rate and low blood pressure.

Incorrect Options:

Option B: Adenosine: Adenosine is commonly used for the acute termination of supraventricular tachycardia (SVT) episodes. However, it is not the preferred initial treatment for a
patient with signs of hemodynamic instability and low blood pressure. Adenosine can cause a transient period of asystole when administered, which can further compromise the patient's blood pressure.

Option C: Valsalva Maneuver: The Valsalva Maneuver, which involves straining against a
closed glottis, can be attempted as a non-invasive method to terminate certain types of supraventricular tachycardias. However, in this scenario where the patient is hemodynamically unstable with low blood pressure, immediate intervention with DC cardioversion is required.

Option D: Verapamil: Verapamil is a calcium channel blocker that can be effective in terminating certai n types of supraventricular tachycardias, such as atrioventricular nodal reentrant tachycardia. However , in a hemodynamically unstable patient with low blood pressure, immediate electrical cardioversion is t he preferred and more effective approach.

Solution for Question 27:

Correct Option D:

• The patient presented within 3 hours of the onset of chest pain, which suggests an acute coronary syndrome (ACS). The ECG findings of ST depression in anterior chest leads and T wave inversion are consistent with myocardial ischemia.

• In this scenario, the patient is a candidate for early antithrombotic therapy to prevent further ischemic events and complications. Aspirin and heparin are commonly used in the initial management of ACS.

• Aspirin is an antiplatelet agent that inhibits platelet aggregation, reducing the risk of clot formation. It is administered promptly to patients suspected of having ACS to minimize ongoing thrombosis.

• Heparin is an anticoagulant that helps prevent the formation and propagation of blood clots. It is often used in combination with aspirin in the early management of ACS to provide additional anticoagulant effects.

Incorrect Options:

Option A: PCI (percutaneous coronary intervention): PCI is a preferred treatment option for patients wit h ST-segment elevation myocardial infarction (STEMI). However, in this case, the ECG findings indicat e ST depression and T wave inversion, which are suggestive of non-ST-elevation myocardial infarction (NSTEMI) or unstable angina. PCI is not the first-line treatment for NSTEMI or unstable angina within t he initial hours of symptom onset.

Option B: Thrombolysis with alteplase: Thrombolysis, or clot-dissolving therapy, is primarily indicated fo r patients with STEMI who present within a specific time window and are not candidates for primary PC I. In this case, the patient's ECG findings suggest NSTEMI or unstable angina, and thrombolysis is not the preferred treatment for these conditions.

Option C: Prophylaxis for arrhythmia: While arrhythmias can be a complication of ACS, prophylactic tre atment for arrhythmias is not the primary management strategy in the acute phase. The focus initially is on addressing the underlying ischemia and preventing further thrombosis through antiplatelet and anti coagulant therapy.

Solution for Question 28:

Option D) Tricuspid Regurgitation: Tricuspid regurgitation is characterized by a pan systolic murmur he ard best along the right side of the heart and it radiates to the right of the sternum. However, the murm ur does not typically radiate to the axilla. Additionally, tricuspid regurgitation is often secondary to other conditions affecting the right side of the heart, such as pulmonary hypertension or right heart failure, w hich might lead to clinical signs not mentioned in the case.

Correct Answer: D) Tricuspid Regurgitation

In Summary: The characteristics of a pan systolic murmur heard at the right side of the heart and radiating to the axilla, along with the absence of signs of aortic stenosis, mitral valve prolapse, and ventricular septal defect, point toward tricuspid regurgitation as the most likely diagnosis in this case. It's important to consider the entire clinical picture and potentially perform further tests (e.g., echocardiography) to confirm the diagnosis and assess the severity of the condition.

The key points, in this case, are the characteristics of the murmur (pan systolic, right sided location, radiation to axilla, louder during inspiration) and the absence of fever or infections, which helps to differentiate the options.

Option A) Aortic Stenosis: Aortic stenosis typically presents with a crescendo-decrescendo systolic ejection murmur best heard at the right upper sternal border, and it often radiates to the carotid arteries. This does not match the characteristics of the murmur described in the case.

Option B) Mitral Valve Prolapse: Mitral valve prolapse is characterized by a mid-systolic click followed by a late systolic murmur. The murmur usually occurs after the click and is not pan systolic. Additionally, mitral valve prolapse is not typically associated with radiation of the murmur to the axilla.

Option C) Ventricular Septal Defect (VSD): A VSD would cause a harsh, holosystolic murmur heard best at the left lower sternal border, as blood flows from the higher-pressure left ventricle to the lower-pressure right ventricle. The characteristics and location of the murmur in this case do not match those of a VSD.

Solution for Question 29:

Correct Option B:

The correct sequence after the P wave is as follows:

• A. 'a' wave: The 'a' wave represents atrial contraction. It occurs during atrial systole when the atria contract to push blood into the ventricles.

• B. 1st heart sound: The 1st heart sound, also known as S1, is the closure of the atrioventricular (AV) valves (mitral and tricuspid valves) at the beginning of ventricular systole. It marks the onset of ventricular contraction.

• D. 't' wave: The 't' wave is a repolarization phase of the ventricles. It represents the relaxation and resetting of the ventricles after contraction.

• C. Rapid filling of ventricles: After the 't' wave, the ventricles enter the diastole phase, during which they passively fill with blood from the atria. This is known as rapid ventricular filling.

Therefore, the correct sequence is ABDC: 'a' wave, 1st heart sound, rapid filling of ventricles, and 't' wave.

Incorrect Options:

Option A: ACBD: This option incorrectly places the rapid filling of ventricles (C) before the 'a' wave (A). The correct sequence is 'a' wave (A), 1st heart sound (B), rapid filling of ventricles (C), and 't' wave (D).

Option C:. CABD: This option incorrectly places the rapid filling of ventricles (C) before the 'a' wave (A) and the 1st heart sound (B). The correct sequence is 'a' wave (A), 1st heart sound (B), rapid filling of ventricles (C), and 't' wave (D).

Option D: ACBD: This option incorrectly places the rapid filling of ventricles (C) before the 'a' wave (A). The correct sequence is 'a' wave (A), 1st heart sound (B), rapid filling of ventricles (C), and 't' wave (D).

Solution for Question 30:

Correct Option:

Option B: Multifocal atrial tachycardia (MAT) is characterized by an irregular rhythm with at least three distinct P-wave morphologies in the same lead. The ECG changes described in the scenario, specifical ly the presence of multiple P-wave morphologies, are consistent with MAT.

Incorrect Option:

Option A: Ventricular tachycardia (VT) is characterized by wide QRS complexes and is usually a regular rhythm. The ECG shown in the scenario does not exhibit the characteristics of VT.

Option C: Atrial fibrillation (AF) is characterized by irregularly irregular rhythm with absent P waves and irregularly spaced QRS complexes. The scenario does not describe the absence of P waves, making AF less likely.

Option D: Atrial tachycardia is characterized by a regular rhythm with a single P-wave morphology. The presence of multiple P-wave morphologies in the ECG suggests a different diagnosis than atrial tachycardia.

Solution for Question 31:

Correct option:

Option A: Cardiac tamponade typically presents with an elevated JVP but a blunted or absent y descent due to impaired filling of the right ventricle during diastole. Therefore, deep y descent is not seen in cardiac tamponade.

Incorrect Option:

Option B: Restrictive cardiomyopathy is characterized by stiffening of the heart muscle, leading to impa ired ventricular filling. It can result in a prominent and rapid y descent in the JVP waveform.

Option C: Constrictive pericarditis involves the thickening and stiffening of the pericardium, leading to i mpaired cardiac filling. It is associated with a prominent and rapid y descent in the JVP waveform.

Option D: Tricuspid regurgitation is a condition in which the tricuspid valve fails to close properly, causi ng blood to flow backward into the right atrium during systole. This leads to an elevated JVP and a large v wave, but it does not affect the y descent.

Solution for Question 32:

Correct option:

Option B: Decrease in systolic blood pressure 20 mmHg after 3 min of standing: This option is correct. Postural hypotension, also known as orthostatic hypotension, is defined as a
decrease in systolic blood pressure of 20 mmHg or more or a
decrease in diastolic blood pressure of 10 mmHg or more within 3 minutes of standing up from a sitting or lying position

Incorrect Option:

Option A: Decrease in systolic blood pressure 20 mmHg after 6
mins of standing: This option is incorrect. The definition of postural hypotension does not specify a specific duration of standing as 6 minutes.

Option C: Decrease in diastolic blood pressure 20 mmHg after 6
mins of standing: This option is incorrect. The definition of postural hypotension does not specify a specific duration of standing as 6 minutes, and it focuses on the systolic blood pressure drop rather tha n the diastolic blood pressure drop.

Option D: Decrease in diastolic blood pressure 20 mmHg after 3
mins of standing: This option is incorrect. While a decrease in diastolic blood pressure can contribute t o postural hypotension, the primary criterion for its diagnosis is a
decrease in systolic blood pressure of 20 mmHg or more.

Solution for Question 33:

Correct Option:

Option b. IV MgSO4 (Magnesium sulfate): Magnesium sulfate is the preferred treatment for torsades d es pointes, especially in the setting of pre-eclampsia. Magnesium sulfate has antiarrhythmic properties and can effectively stabilize the cardiac rhythm.

Incorrect Option:

Option a. IV calcium: Intravenous calcium is not the recommended treatment for torsades des pointes. It is more commonly used in the management of calcium channel blocker overdose or hypocalcemia.

Option c. DC shock: Direct current (DC) shock, also known as defibrillation, is not the primary treatmen t for torsades des pointes. It is typically reserved for life-threatening ventricular arrhythmias such as ve ntricular fibrillation or pulseless ventricular tachycardia.

Option d. Synchronized cardioversion: Synchronized cardioversion is not the appropriate treatment for torsades des pointes. It is used for the conversion of certain supraventricular tachycardias and hemody namically unstable ventricular arrhythmias.

Solution for Question 34:

Correct Option:

Option C.

• Synchronized cardioversion: Synchronized cardioversion is the next best step of management in this scenario. It involves delivering a synchronized electrical shock to the heart at a specific moment in the cardiac cycle to restore normal sinus rhythm. It is an effective method for terminating PSVT and can rapidly improve the patient's condition.

Incorrect Options:

Option A. Repeat inj adenosine 6 mg: Adenosine is a medication used to treat supraventricular tachyca rdia (SVT). However, since the patient has already received adenosine and it did not result in the termi nation of the arrhythmia, repeating the same dose is unlikely to be effective.

Option B. Inj amiodarone 300 mg: Amiodarone is an antiarrhythmic medication that can be used for var ious types of arrhythmias. However, in this case, the patient's blood pressure is already low, and amiod arone may further lower the blood pressure, potentially causing hemodynamic instability.

Option D. DC cardioversion: DC cardioversion, also known as defibrillation, is not appropriate for this p atient as it is used to treat life-threatening arrhythmias such as ventricular fibrillation or pulseless ventri cular tachycardia. In PSVT, which is a
regular but rapid rhythm, synchronized cardioversion is the preferred approach.

Solution for Question 35:

Correct Option D: Carotid body tumour

• In the above case, there is a pulsatile swelling, and on MRI angiography, it shows Lyre,s sign which is splaying of internal and external arteries, which is diagnostic of carotid body tumour. It is a
slow-growing tumour and presents mainly after 40 years of age.

Incorrect Options:

Option A: Grave’s disease is a
hyperthyroid condition with bulging eyes, and the neck swelling is not pulsatile.

Option B: Branchial cysts are small fluid-filled sacs that look like lumps under the skin on the side of th e neck and are more common in children than adults.

Option C: Thymic cyst is a
benign mediastinal disease and presents with dyspnea, chest pain, cough, hoarseness and dysphagia.

Solution for Question 36:

Correct Option B: Atrial flutter

• The above ECG is that of atrial flutter as it shows narrow QRS complexes and sawtooth-shaped waves.

Incorrect Options:

Option A: In atrial fibrillation, the QRS complexes are irregularly irregular, is RR intervals vary.

Option C: Ventricular tachycardia has broad QRS complexes.

Option D: Ventricular Fibrillation has no identifiable P wave or QRS complexes.

Solution for Question 37:

Correct Option C: Ventricular tachycardia

• The above ECG is ventricular tachycardia as it has a vast QRS complex. P waves are absent, and the heart rate is over 100 beats per minute.

Incorrect Options:

Option A: The above is not a normal ECG as it has tachycardia, absent P wave, and vast QRS complexes.

Option B: Ventricular fibrillation has no identifiable QRS complex.

Option D: This is not the case for misplaced leads.

Solution for Question 38:

Correct Option A: Pericardial effusion

• The above presentation of breathlessness on lying down and it being relieved on sitting, and the x-ray given which shows an enlarged cardiac silhouette is suggestive of a probable diagnosis of pericardial effusion. It is also known as a money bag or leather bottle-shaped heart.

Incorrect Options:

Option B: Tetralogy of Fallot shows a boot-shaped heart on an x-ray.

Option C: Transposition of great arteries shows an egg-on-string appearance on x-ray.

Option D: Pulmonary hypertension shows a pruned tree appearance of the pulmonary vasculature.

Solution for Question 39:

Correct Option A: Chest x-ray

• X-ray is the best confirmatory method to ensure the central line is in the jugular vein.

Incorrect Options:

Option B: Blood pH is inconclusive and not the best confirmatory method.

Option C: Blood color is very subjective and may be misleading.

Option D: ETCO2 is not used in this case.

Solution for Question 40:

Correct option D

• The Modified Duke criteria are widely used criteria for the diagnosis of infective endocarditis, which is an infection of the endocardium (inner lining) of the heart, including heart valves. The criteria help in establishing a diagnosis based on clinical, laboratory, and echocardiographic findings. They take into account major and minor criteria, as well as the presence of predisposing factors, to classify the likelihood of infective endocarditis.

• Major Criteria Description Positive Blood Culture - Typical organisms isolated from 2 separate blood cultures. - Persistently positive blood cultures, with typical organisms isolated from cultures done > 12 hours apart. - Coxiella infection (Q fever) demonstrated by a single positive blood culture with Phase I IgG titre > 1:800. Echocardiographic Evidence - Evidence of vegetation or oscillating intracardiac mass on echocardiography. - Transesophageal echocardiography (TEE) is preferred over transthoracic echocardiography (TTE). - New valvular regurgitation or partial dehiscence of prosthetic valve. New Onset Murmur in Patient with Pre-existing Heart Lesion - Development of a new heart murmur in a patient with pre-existing heart disease. Minor Modified Criteria Description Predisposition - Presence of pre-existing heart disease or history of intravenous drug usage. Fever > 38°C - Fever with temperature exceeding 38°C. Vascular Phenomenon - Major embolic phenomenon. - Septic pulmonary infarction. - Mycotic aneurysm. - Intracranial hemorrhage. - Janeway lesions (palm, soles). Immunological Phenomenon (Mnemonic – ROG) - Roth spots. - Rheumatoid factor positivity. - Osler nodes (tip of fingers). - Glomerulonephritis. Microbiological Evidence - Positive blood culture not meeting major criteria. - Moderate-high clinical suspicion warrants transesophageal echocardiography (TEE), while low suspicion warrants transthoracic echocardiography (TTE). - Additional diagnostic modalities include SHOT metagenomics, FDG PET-CT, and multi-slice CT angiography.

Incorrect options:

Option A (Infective endarteritis) is incorrect because infective endarteritis is not a recognized term or condition. It may be a confusion with infective endocarditis.

Option B (Infectious mononucleosis) is incorrect because the Modified Duke criteria are not used for th e diagnosis of infectious mononucleosis, which is caused by the Epstein-Barr virus.

Option C (Inflammatory myopathy) is incorrect because the Modified Duke criteria are not used for the diagnosis of inflammatory myopathy, which refers to a group of muscle disorders characterized by muscle inflammation.

Solution for Question 41:

Correct option A

• Prazosin is an alpha-1 blocker medication used primarily for the treatment of hypertension and benign prostatic hyperplasia. However, one of the common side effects of prazosin is orthostatic hypotension, which can increase the risk of falls, especially in the elderly. Orthostatic hypotension refers to a sudden drop in blood pressure upon standing, leading to dizziness or lightheadedness, and can result in falls.

Incorrect options:

Option B: Metformin is a medication used for the management of diabetes mellitus, and it is not typicall y associated with an increased risk of falls.

Option C: Acarbose is an alpha-glucosidase inhibitor used in the treatment of diabetes mellitus. It does not commonly cause orthostatic hypotension or an increased risk of falls.

Option D: Thiazide refers to a class of diuretic medications commonly used for blood pressure control. While they can sometimes cause orthostatic hypotension, it is not a

common side effect compared to prazosin.

Solution for Question 42:

Correct Option B: Class II

• As the patient has dyspnea on light physical activity, there is slight limitation of physical activity. He is asymptomatic at rest. This is Class II in NYHA classification.

Incorrect Options:

Option A: Class I
has no limitations and no symptoms with ordinary exertion or day to day daily physical activity.

Option C: Class III has marked limitation of physical activity and less than ordinary activities cause sym ptoms. The individual is asymptomatic at rest.

Option D: Class IV has inability to carry out any physical activity without discomfort and symptoms are present even at rest.

Solution for Question 43:

Correct Option A: Aortic regurgitation

• The above patient presents with the diastolic murmur and the pistol shot over femoral arteries which is suggestive of aortic regurgitation. There is a backflow of blood from the aorta to the ventricle at the time of diastole.

Incorrect Options:

Option B: Aortic stenosis presents with a midsystolic ejection murmur at the upper sternal border.

Option C: Tricuspid regurgitation presents with a holosystolic murmur at the lower left sternal border.

Option D: Mitral regurgitation presents with a
systolic murmur at the apex of the heart with radiation to the left axilla.

Solution for Question 44:

Correct Option B - Atrial septal defect:

• Patients with atrial septal defects do not require endocarditis prophylaxis prior to dental extraction.

Incorrect Options:

Option A - Prior history of endocarditis

Option C - Unrepaired cyanotic heart disease

Option D - Prosthetic heart valves

• Patients with a prior history of endocarditis, unrepaired cyanotic heart disease, and prosthetic heart valves require endocarditis prophylaxis prior to dental procedures.

Solution for Question 45:

Correct Option B - Absent a wave:

• The likely diagnosis in this patient with an irregularly irregular pulse and an accompanying pulse deficit is atrial fibrillation. The corresponding finding on JVP examination would be 'absent a wave' due to inadequate/absent atrial contractions.

Incorrect Options:

Option A - Absent p wave: Absent p wave on ECG is a
finding seen in patients with atrial fibrillation. It is not seen on JVP examination.

Option C - Cannon a wave: Cannon a wave on JVP examination is seen in conditions such as atriovent ricular dissociation and is not seen in patients with atrial fibrillation.

Option D - Raised JVP with normal waveform: Raised JVP with normal waveforms may be seen in con ditions such as heart failure and constrictive pericarditis and not in atrial fibrillation.

Solution for Question 46:

Correct Option C - Once in four weeks for 5 years or till the age of 21, whichever is longer:

• This patient likely has Rheumatic Fever without carditis. He fulfills 2 major criteria for the diagnosis of Rheumatic Fever $\rightarrow$ Fever and polyarthralgia. This child should be initiated on secondary prophylaxis. Since this child weighs less than 27 kgs, the dose of benzathine penicillin G is 600,000 IU (1.2 million IU if the child weighs more than 27 kgs). The duration of prophylaxis in a patient with rheumatic fever without carditis is 'once in 3-4 weeks for 5 years after the last attack or 21 years of age whichever is longer'

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 47:

Correct Option C - Intravenous amiodarone:

• The diagnosis in this patient is stable ventricular tachycardia. The patient has a history of structural heart disease; hence, the appropriate course of management would be IV amiodarone.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 48:

Correct Option B - Intravenous nitro-glycerine:

• The chest x-ray shows findings of pulmonary edema, which is caused by severe left ventricular failure due to uncontrolled hypertension.

• Intravenous nitro-glycerine is commonly utilized in the treatment of acute pulmonary edema caused by left ventricular failure due to uncontrolled hypertension.

• Nitro-glycerine is a vasodilator that works by dilating the blood vessels, decreasing the preload on the heart and this improves cardiac output.

• In addition, nitroglycerine dilates the pulmonary blood vessels, diminishing the resistance to the bloodstream and decreasing the amount of fluid that leaks into the lungs.

Incorrect Options:

• Options A, C, and D are incorrect.

Solution for Question 49:

Correct Option B - Intravenous sodium bicarbonate:

• The ECG discoveries of wide QRS complexes and right axis deviation is due to sodium channel blockade, which is a feature of tricyclic antidepressant toxicity.

• The treatment is typically intravenous sodium bicarbonate, which can rectify the acidosis and turn around the impacts of the drug.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 50:

Correct Option D - Atrial Fibrillation:

• The P wave on an electrocardiogram (ECG) represents the depolarization of the atria. Atrial fibrillation (AF) is a common cardiac arrhythmia characterized by a fast and irregular heartbeat originating from multiple areas in the atria. Absent P waves are a feature of AF because the atria are not depolarizing in a coordinated fashion. Instead of a regular P wave preceding each QRS complex, there are rapid, irregular fibrillatory waves with no discernible P waves.

Incorrect Options:

• Options A, B and C are incorrect.

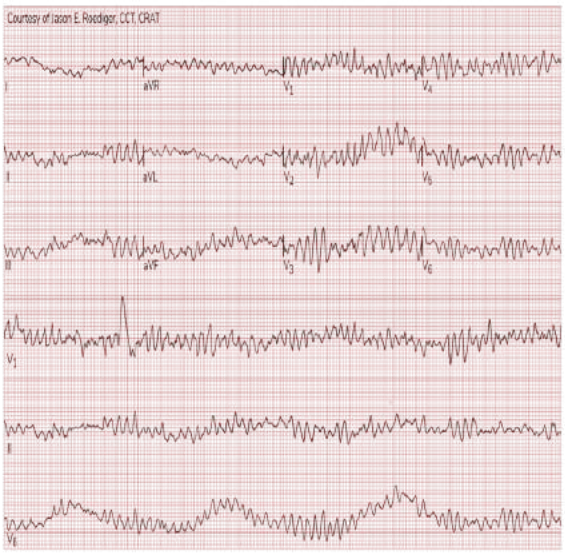
Solution for Question 51:

Correct Option C - Supra ventricular tachycardia:

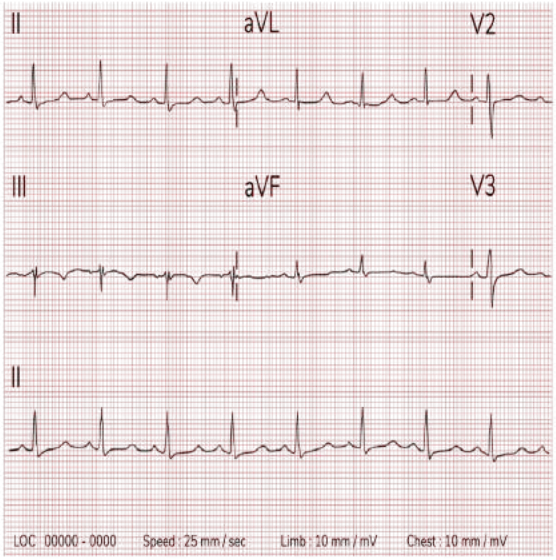
• The ECG in the question shows a narrow QRS complex with an increased heart rate. Supraventricular tachycardia (SVT) is a type of arrhythmia that originates above the ventricles and can cause a rapid heartbeat. The ECG tracing for SVT shows a regular rhythm with a narrow QRS complex, often with a sudden onset and termination. Thus, the above ECG indicates supraventricular tachycardia.

Incorrect Options:

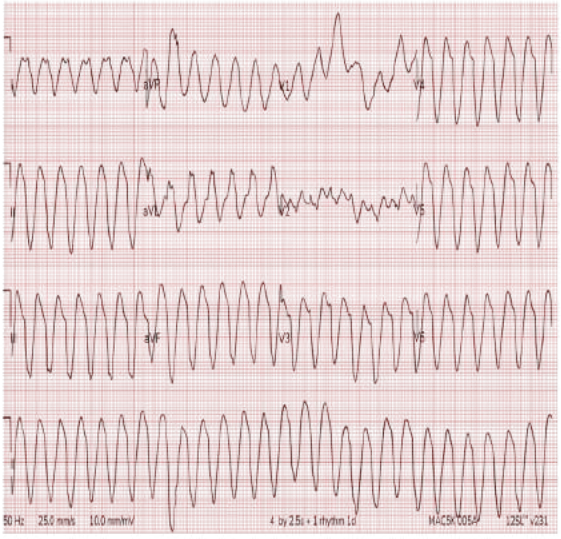
Option A - Ventricular fibrillation: Ventricular fibrillation is a life-threatening arrhythmia that occurs when the ventricles (lower chambers) of the heart quiver instead of contracting properly, leading to a lack of blood flow to the body's vital organs. The ECG tracing for ventricular fibrillation shows a rapid and chaotic pattern with no identifiable P, QRS, or T waves.



Option B - Atrial fibrillation: Atrial fibrillation is a common arrhythmia that occurs when the atria (upper chambers) of the heartbeat irregularly and often rapidly, leading to inefficient blood flow to the ventricles. The ECG tracing for atrial fibrillation shows an irregular rhythm with no discernible P waves and an irregularly spaced QRS complex



Option D - Ventricular tachycardia: Ventricular tachycardia is a type of arrhythmia that originates in the ventricles and can lead to a fast and potentially life-threatening heart rate. The ECG tracing for ventricular tachycardia shows a regular or irregular rhythm with a wide QRS complex, often with a repeating pattern.



Solution for Question 52:

Correct Option A - Hypothermia:

• J wave, also known as an Osborn wave, is a small hump or notch that appears on the QRS complex of an electrocardiogram (ECG) in certain conditions. It is most commonly associated with hypothermia, a condition in which the body temperature drops below normal.

• The exact mechanism by which J waves develop in hypothermia is not fully understood, but it is believed to be related to changes in the electrical properties of the heart caused by cold temperatures. Specifically, hypothermia can cause a decrease in the speed of electrical conduction in the heart, which can lead to the development of the J wave.

Incorrect Options:

• Options B, C, and D are not associated with J waves.

Solution for Question 53:

Correct Option B - Cardiac tamponade:

• The given scenario describes a young male patient who has developed difficulty in breathing and has signs of hemodynamic compromise, including hypotension and weak pulses, elevated jugular venous pressure with absent Y descent, and muffled heart sounds. Based on these findings, the most likely diagnosis is cardiac tamponade.

• Cardiac tamponade is a medical emergency that occurs when there is an accumulation of fluid in the pericardial sac surrounding the heart, leading to compression of the cardiac chambers and impaired filling during diastole. This can result in decreased cardiac output and hemodynamic compromise, which may manifest as hypotension, tachycardia, elevated jugular venous pressure, and muffled heart sounds. Cardiac tamponade can be caused by a variety of conditions, including trauma, infection, malignancy, and autoimmune disorders.

Incorrect Options:

Option A - Constrictive pericarditis: Constrictive pericarditis is a chronic condition that results from the t hickening and fibrosis of the pericardial sac, leading to impaired diastolic filling of the heart chambers. This can result in similar symptoms to those seen in cardiac tamponade, including elevated jugular ven ous pressure and muffled heart sounds, but the onset is typically more gradual, and the symptoms are not as severe. Constrictive pericarditis is also associated with other signs, such as Kussmaul's sign an d pericardial knock.

Option C - Acute pericarditis: Acute pericarditis is an inflammatory condition of the pericardial sac, whic h can lead to chest pain, fever, and pericardial friction rub on auscultation. However, the signs and sym ptoms are not typically as severe as those seen in cardiac tamponade, and there is no significant hemo dynamic compromise.

Option D - Cardiac failure: Cardiac failure is incorrect because while cardiac tamponade can lead to he art failure, it is not the primary diagnosis in this case. Furthermore, cardiac failure typically presents wit h different symptoms such as shortness of breath, fatigue, and fluid accumulation in the legs.

Solution for Question 54:

Correct Option B - IV Mannitol:

• IV Mannitol does not play a role in the management of patients with hypertensive encephalopathy.

Incorrect Options:

• Option A, C and D can be used in the treatment of hypertensive encephalopathy.

Solution for Question 55:

Correct Option C - Lisinopril:

• Lisinopril is an ACE inhibitor used to treat high blood pressure and heart failure and improve survival in patients with a history of myocardial infarction. It works by blocking the conversion of angiotensin I to angiotensin II, a hormone that causes blood vessels to constrict and retain fluid, leading to increased blood pressure and fluid buildup.

• Studies have shown that lisinopril improves survival in patients with heart failure and reduces the risk of hospitalization due to heart failure. It also improves symptoms such as shortness of breath, fatigue, and leg swelling.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 56:

Correct Option C - Hypothermia:

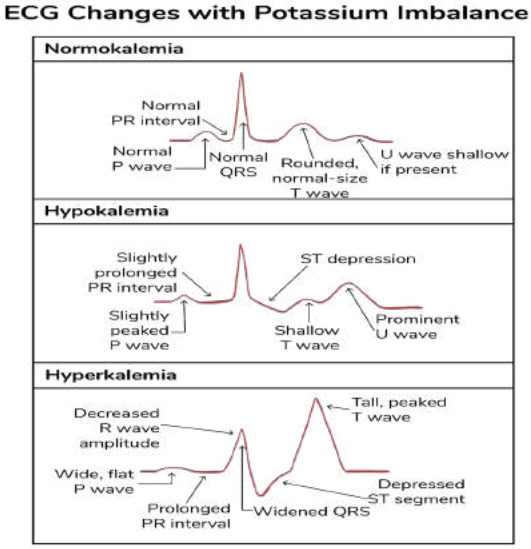
• Hypothermia is a medical emergency that occurs when the body temperature drops below 35°C (95°F). As the body temperature drops, various physiological functions are affected, including heart function. The ECG changes seen in hypothermia are due to alterations in the electrical conduction system of the heart and are often reversible with rewarming.

• The ECG findings shown above indicate it to be hypothermia; it includes bradycardia, prolonged PR interval, widened QRS complex, and J waves/Osborn waves. Osborn waves/J waves are positive deflections at the end of the QRS complex in the leads V3-V6 and are sometimes referred to as the "camel hump" sign.

Incorrect Options:

Option A - Hypokalemia: Hypokalemia is an electrolyte imbalance that can also affect the heart and ca use ECG changes. Hypokalemia can cause flattened or inverted T
waves, ST segment depression, and U
waves. However, in this ECG, the findings are not consistent with either hypokalemia or hyperkalemia.

Option B - Hyperkalemia: Hyperkalemia is also an electrolyte imbalance that can affect the heart and c ause ECG changes. Hyperkalemia can cause peaked T waves, widened QRS complex, and a
sine wave pattern.



Option D - Hypocalcemia: Hypocalcemia can also cause ECG changes, such as QT prolongation and ST segment depression. However, these changes are not seen in the given ECG, making hypocalcemi a an unlikely diagnosis.

Solution for Question 57:

Correct Option A - Primary Raynaud’s phenomenon:

• Primary Raynaud’s phenomenon is a condition in which the blood vessels in the fingers and toes narrow in response to cold temperatures or emotional stress. As a result, the fingers and toes may feel

numb or cold and may turn white or blue. This condition occurs without any underlying disease and is more common in women than men. The patient in this case has no other comorbidities and has symptoms that are typical of Primary Raynaud's phenomenon.

Incorrect Options:

• Options B, C, and D are incorrect.

Solution for Question 58:

Correct Option D
- Fibrinolytic therapy is useful in acute coronary syndrome without ST-segment elevation:

• Fibrinolytic therapy is not recommended for NSTEMI because the underlying cause of the condition is not a complete occlusion of a coronary artery by a blood clot. Fibrinolytic therapy is typically reserved for patients with STEMI (ST-segment elevation myocardial infarction) who have evidence of a complete occlusion of a coronary artery.

Incorrect Options:

Option A - Aspirin loading dose should be initiated immediately: True. Aspirin is a cornerstone of the treatment of NSTEMI, and a loading dose of 162-325 mg should be given immediately upon diagnosis.

Option B - ACC/AHA guidelines call for either a P2Y12 inhibitor (clopidogrel, prasugrel, or ticagrelor) as a class I recommendation: True. P2Y12 inhibitors are recommended as part of the standard treatment for NSTEMI, as they help to prevent platelet aggregation and reduce the risk of further cardiac events.

Option C - Glycoprotein IIB/IIIA inhibitors are useful adjuncts: True. Glycoprotein IIB/IIIA inhibitors are potent antiplatelet agents that can be used as adjunctive therapy in patients with NSTEMI who are at high risk for adverse cardiac events.

Solution for Question 59:

Correct Option A - Constrictive pericarditis:

• Constrictive pericarditis is a condition characterised by inflammation and fibrosis of the pericardium.

• This leads to stiffening of the pericardium, impairing the ability of the heart to expand and fill properly during diastole

• The key clinical findings include dyspnea and distended neck veins that increase with inspiration, known as Kussmaul's sign.

• During inspiration, the intrathoracic pressure decreases, causing an increase in venous return to the heart. In constrictive pericarditis, the rigid pericardium prevents the heart from expanding adequately, resulting in an exaggerated rise in jugular venous pressure. This also results in muffled heart sounds/absence of murmurs.

Incorrect Options:

Option B - Aortic regurgitation: Aortic regurgitation typically presents with a diastolic murmur, which is not mentioned in the patient's presentation. Additionally, aortic regurgitation would not cause the specific

findings of distended neck veins that increase with inspiration.

Option C - Tricuspid stenosis: Tricuspid stenosis is associated with a diastolic murmur and symptoms s uch as fatigue, edema, and ascites. The key finding in tricuspid stenosis is an elevated jugular venous pressure, but it does not increase with inspiration, as seen in the patient's presentation.

Option D - Pulmonary arterial hypertension: Pulmonary arterial hypertension can lead to symptoms of d yspnea and distended neck veins but it does not typically cause an increase in jugular venous pressure with inspiration. It is important to note that pulmonary arterial hypertension can result from constrictive pericarditis, but it is not the primary diagnosis based solely on the given presentation.

Solution for Question 60:

Correct Option A - Metoprolol:

• Metoprolol, a beta-blocker, has been shown to lower mortality in heart failure patients. ACE inhibitors have also been shown to decrease mortality in patients with heart failure.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 61:

Correct Option A - Mitral regurgitation:

• The likely diagnosis, according to the image provided, is Marfan's syndrome

• Marfan syndrome is an inherited autosomal dominant disorder of connective tissue with a high risk of aortic aneurysm and dissection.

• A common cardiovascular complication in patients with Marfan’s syndrome is mitral regurgitation due to improper connective tissue formation.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 62:

Correct Option D - Subacute combined degeneration of cord:

• The clinical presentation is suggestive of Subacute combined degeneration which occurs due to the Vitamin B12 deficiency.

• According to the vignette, the patient has a stocking-like distribution of loss of proprioception, vibration sensations, and UMN type of lower limb weakness.

• He also has angular stomatitis.

• Both neurological and dermatological findings are suggestive of vitamin B12 deficiency in the patient.

• The neurological findings correspond to subacute combined degeneration of the cord which is a complication of vitamin B12 deficiency.

Incorrect Options:

Option A - Extradural cord compression: Extradural cord compression in an adult can occur due to a multitude of causes like abnormal spine alignment (scoliosis), injury to the spine, spinal tumor, rheumatoid arthritis, infection, etc. Symptoms of cord compression include burning sensation, numbness, and loss of sensation over the hand, legs, buttocks, etc, because of injury to the nerve. There is an LMN type of nerve injury because the compression causes damage to the peripheral nerves.

Option B - Amyotrophic lateral sclerosis: Amyotrophic lateral sclerosis, or Lou Gehrig's disease, is a neurological disease that causes damage to motor neurons. The patients present with a combination of signs of both LMN and UMN types of nerve damage. This patient only presents with UMN type of lesions, hence, making ALS a very unlikely cause of the patient's symptoms.

Option C - Multiple Sclerosis: Multiple Sclerosis is an immunological disorder that occurs because of the immune system's response against the nerves of the body. There is the destruction of the oligodendrocytes, cells responsible for the formation of the myelin sheath around the nerve, which causes exposure of the nerves. This leads to episodes of pain, loss of sensation or numbness and tingling, muscle spasms, stiffness, and weakness that remit and recur. This patient does not have a history of remission and recurrence, making MS an unlikely diagnosis.

Solution for Question 63:

Correct Option B: - Tricuspid stenosis:

• Mid-diastolic murmur is seen in tricuspid stenosis and mitral stenosis.

• Prominent 'a' wave is seen in tricuspid stenosis. It is also seen in long-standing mitral stenosis, where pulmonary artery hypertension will be present.

• Since no features of PAH are present in this patient, mitral stenosis can be ruled out,

Incorrect Options:

Option A - Mitral stenosis: Mitral stenosis causes a change in left atrial pressure. Only long-standing mitral stenosis will produce 'a' wave changes.

Option C - Mitral regurgitation: Mitral regurgitation causes backflow of blood from the left ventricle into the left atrium during contraction of the ventricle. There are trivial 'v' waves in the JVP wave due to increased left atrial compliance. There is no change in the 'a' waves noticed due to mitral regurgitation.

Option D - Tricuspid regurgitation: Tricuspid regurgitation causes backflow of blood from the right ventricle into the right atrium during contraction of the ventricle. Tricuspid regurgitation causes obliteration of the 'x' wave, CV wave, and a steep 'y' descent.

Solution for Question 64:

Correct Option B - Tricuspid regurgitation:

• The clinical findings of this patient, which reveal reciprocal pitting pedal edema, ascites, and an S3 on auscultation, are suggestive of right ventricular failure.

• A history of chronic smoking likely suggests that the patient is suffering from chronic obstructive pulmonary disease leading to cor pulmonale (RV failure due to noncardiogenic causes)

• Increased RV pressure leads to tricuspid regurgitation

Incorrect Options:

• Options A, C, and D are incorrect.

Solution for Question 65:

Correct Option D - Hypothermia:

• Hypothermia refers to a decrease in core body temperature below the normal range. It occurs when the body temperature drops below 95 degrees Fahrenheit (35 degrees Celsius).

• Hypothermia causes peripheral cyanosis.

• Central cyanosis is seen due to decreased oxygen saturation or oxygen-carrying capacity of the blood.

Incorrect Options:

Option A
- Methemoglobinemia: Methemoglobin is oxidized hemoglobin due to nitrate exposure. This leads to a reduced oxygen-carrying capacity of the blood and can result in central cyanosis.

Option B - Pulmonary arteriovenous fistula: A
pulmonary arteriovenous fistula is an abnormal connection between an artery and a vein in the lung. T his can result in the bypassing of oxygenated blood from the lungs to the systemic circulation, leading t o a decrease in arterial oxygen saturation and central cyanosis.

Option C - High altitude: At high altitudes, the partial pressure of oxygen in the atmosphere is lower, re sulting in hypobaric hypoxia. This can cause central cyanosis due to reduced oxygen availability.

Solution for Question 66:

Correct Option D - Injection MgSO4:

• Magnesium sulfate (MgSO4) is not typically used for the immediate management of hyperkalemia. It may be used in certain situations, such as if the patient has concurrent magnesium deficiency, which can contribute to electrolyte imbalances. However, it is not the primary drug of choice for immediate intervention in hyperkalemia.

Incorrect Options:

Option A - 10% calcium gluconate over 10 min: Calcium gluconate is commonly used in the emergency management of hyperkalaemia. It helps stabilise the cardiac membrane and counteracts the effects of elevated potassium levels on the heart.

Option B - Salbutamol nebulisation: Salbutamol, a beta-2 agonist, is frequently used for the immediate management of hyperkalaemia. It promotes the cellular uptake of potassium, effectively lowering its co

ncentration in the blood.

Option C - Insulin-dextrose: Insulin, often administered with dextrose, is a key component of emergenc y hyperkalaemia management. Insulin drives potassium from the bloodstream into the cells, reducing s erum potassium levels.

Solution for Question 67:

Correct Option D - Second-degree heart block:

• This conduction abnormality is characterized by intermittent blockage of electrical impulses between the atria and ventricles. It can be further classified into two types:

• Mobitz Type I (Wenckebach) - is characterized by a progressive prolongation of the PR interval until a beat is dropped

• Mobitz Type II - involves intermittent blocked beats without progressive PR interval prolongation.

Incorrect Options:

Option A - First-degree heart block: This conduction abnormality is characterized by a prolonged PR interval on the ECG. It indicates a delay in the electrical conduction between the atria and ventricles.

Option B - Ventricular tachycardia: Ventricular tachycardia is a rapid heart rhythm originating from the ventricles. On the ECG, it appears as a wide QRS complex with a heart rate exceeding 100 beats per minute.

Option C - Third-degree heart block (complete heart block): This is a severe conduction abnormality characterised by atrioventricular dissociation.

Solution for Question 68:

Correct Option B - Blood pressure of more than 185/110 mmHg:

• Thrombolysis is generally contraindicated in patients with very high blood pressure.

Incorrect Options:

• Options A, C and D can be considered as indications for thrombolysis.

Solution for Question 69:

Correct Option B - Adenosine:

• Adenosine is the correct answer for first-line management of the presented condition.

• The ECG pattern shown suggests paroxysmal supraventricular tachycardia (PSVT), a common arrhythmia characterized by rapid heart rates originating above the ventricles. Adenosine is a potent vasodilator and affects the electrical conduction system of the heart. It activates specific receptors in

the heart, particularly the adenosine A1 receptors, which help to slow down the conduction through the AV node. This interruption of the abnormal electrical pathway in SVT can restore normal sinus rhythm.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 70:

Correct Option A - NYHA 3:

• NYHA functional classification assesses the impact of heart disease on a patient's daily activities.

• NYHA 3 indicates moderate symptoms. Patients classified as NYHA 3 experience symptoms such as marked limitation of physical activity, becoming symptomatic with less than ordinary activity (such as going to the bathroom), and having no symptoms at rest.

Incorrect Options:

Option B - NYHA 4: NYHA 4 indicates severe symptoms. Patients classified as NYHA 4 experience symptoms even at rest and are unable to carry out any physical activity without discomfort.

Option C - mMRC 4: The mMRC dyspnea scale is used to assess dyspnea (shortness of breath) in pati ents with respiratory conditions. mMRC 4 indicates severe dyspnea, where patients become too breath less to leave the house or experience significant discomfort even while at rest.

Option D - mMRC 5: mMRC 5 is not a standard category in the MMRC dyspnea scale. The scale typically ranges from 0 to 4, with 0 indicating no dyspnea and 4 indicating the most severe dyspnea.

Solution for Question 71:

Correct Option D - Non-synchronised DC shock:

• ECG is suggestive of atrial fibrillation as there is an irregularly irregular rhythm and absent P waves with narrow QRS complexes are present.

• In atrial fibrillation, synchronised DC shock/cardioversion can be used. Nonsynchronised DC shock (Defibrillation) is not used in the management of these patients.

Incorrect Options:

• Option A, B and C can be used in the management of patients with atrial fibrillation.

Solution for Question 72:

Correct Option C - Methemoglobinemia:

• The underlying diagnosis in this case is methemoglobinemia.

• Methemoglobinemia is a condition in which there is an increased level of methemoglobin, a form of hemoglobin that is unable to bind and transport oxygen effectively. The blood sample has a characteristic brownish hue on examination.

• As the patient is known case of chronic stable angina, it is likely that she is on nitrates and methemoglobinemia is a side effect of nitrates

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 73:

Correct Option C - 2, 3, 4:

• Orthopnoea is a symptom commonly seen in heart failure. It refers to difficulty breathing while lying flat and is relieved by sitting upright or propping oneself up with pillows.

• Dyspnoea after 2 hours of sleep: This is paroxysmal nocturnal dyspnoea (PND), which is frequently associated with heart failure. PND is characterized by sudden episodes of severe shortness of breath that awaken a person from sleep. It occurs due to fluid accumulation in the lungs when lying flat during sleep.

• Tender hepatomegaly is a sign of right heart failure.

• Pulsatile rise of JVP is a sign of heart failure

• Non pulsatile rise of JVP is seen in cardiac tamponade in which raised right ventricular and atrial pressure are present. Hence this statement is false/incorrect.

Incorrect Options:

• Options A, B and D are incorrect. Refer to the explanation of the correct answer.

Solution for Question 74:

Correct Option A - Anti PM scl antibody:

• The likely diagnosis in this patient with skin thickening, scl positivity, and perifascicular infiltration is overlap syndrome. This overlap syndrome is characteristic of systemic sclerosis + Dermatomyositis/Polymyositis.

• The characteristic antibody in this scenario is Anti PM scl antibody.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 75:

Correct Option A - a > b > c:

• The correct order for auscultation of the heart sound from superior to inferior is pulmonary > tricuspid > mitral.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 76:

Correct Option C - Torsades de pointes:

• In this ECG, there is a gradual change in QRS amplitude, twisting around the baseline and giving a "twisting" appearance. The QRS complexes may appear to "morph" or change in amplitude and direction. The QRS complexes may be wide and irregular, varying in amplitude and shape. Torsades de pointes is associated with a prolonged QT interval, often greater than 500 ms.

• Torsades de Pointes is a polymorphic ventricular tachycardia marked by QRS complex twisting around an isoelectric line on ECG, often associated with QTc prolongation (>450 ms in males, >460 ms in females). QTc >500 ms correlates with 2-3 fold higher risk. It may spontaneously resolve or degenerate into ventricular fibrillation.

• Causes include congenital or acquired QTc prolongation, often drug-related. Risk factors include older age (>65), female gender, electrolyte imbalances (hypokalemia and hypomagnesemia), bradycardia, heart disease, and diuretic use. Genetic variants are Romano-Ward and Jervell and Lange-Nielsen syndromes, the latter involving congenital deafness.

Incorrect Options:

• Options A, B and D are incorrect and are not associated with the findings shown in the image below.

Solution for Question 77:

Correct Option C - Diastolic Murmur:

• Aortic regurgitation is a valvular disorder where there is abnormal leakage or backward flow of blood from the aorta into the left ventricle during diastole (relaxation phase of the cardiac cycle). This causes a characteristic murmur that is heard during diastole.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 78:

Correct Option C - Oral warfarin:

• Oral warfarin is the best agent to prevent future thrombotic events in this patient with mitral stenosis. It addresses the underlying risk of thrombus formation in the left atrium associated with the irregularly irregular pulse seen in atrial fibrillation, which commonly coexists with mitral stenosis. Regular monitoring of the INR is necessary to maintain the therapeutic range and minimize bleeding risk.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 79:

Correct Option B - Tricuspid Stenosis:

• Tricuspid stenosis is the likely diagnosis based on the mild diastolic murmur and the presence of prominent a-waves on the JVP. These findings are consistent with the narrowing of the tricuspid valve and the resulting elevated right atrial pressure.

• Due to the narrow opening, when blood passes from Right Atrium to the right ventricle, turbulence is formed leading to the formation of mild diastolic murmur.

Incorrect Options:

• Options A, C and D are not associated with this clinical presentation.

Solution for Question 80:

Correct Option B - Transoesophageal echocardiography:

• The likely diagnosis in this patient is aortic dissection and the most appropriate investigation out of these options would be transesophageal echocardiography.

• Transoesophageal echocardiography is a diagnostic procedure that involves inserting a specialized probe into the esophagus to obtain high-resolution images of the heart and its structures. It allows for a detailed evaluation of cardiac function, valve function, and potential sources of cardiac pathology, such as blood clots, dissections, or structural abnormalities.

Incorrect Options:

Option A - MRI (Magnetic Resonance Imaging): MRI is a powerful imaging modality that provides detailed images of the body's structures. However, in an acute setting where a patient is unstable with symptoms of loss of consciousness, chest pain, and diaphoresis, MRI is not the most appropriate initial investigation. MRI scans take time to perform and may not be readily available in emergency situations. Additionally, in this case, the patient's condition suggests a
potential acute cardiovascular event, for which other investigations would be more suitable.

Option C - Cardiac enzymes: Cardiac enzymes, such as troponin and creatine kinase-MB (CK-MB), are blood tests that assess myocardial damage. Elevated levels of these enzymes indicate injury or infarction of the heart muscle, which can occur in conditions like a heart attack. While cardiac enzymes are essential in the evaluation of chest pain and suspected myocardial injury, they do not provide immediate information about the current hemodynamic instability and the cause of the patient's symptoms. Therefore, in this acute and unstable scenario, the priority lies in assessing the cardiac structures, which can be achieved through TOE.

Option D - X-ray: X-ray imaging can be useful for evaluating certain conditions, such as lung pathology or signs of heart enlargement. However, it is not the most appropriate investigation in this case where the patient's presentation suggests an acute cardiovascular event.

Solution for Question 81:

Correct Option A - Coarctation of the aorta:

• Coarctation of the aorta is a congenital heart defect characterized by a narrowing of the aorta, typically occurring after the branching of the left subclavian artery. This narrowing obstructs blood flow and leads to increased blood pressure in the upper extremities and decreased blood pressure in the lower extremities. The feeble femoral pulses and elevated upper-limb blood pressure (186/90 mmHg) seen in the patient are consistent with the findings seen in coarctation of the aorta. Enlarged intercostal arteries on the chest X-ray can also be seen as collateral circulation develops to bypass the aortic obstruction.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 82:

Correct Option B - Injection enoxaparin:

• This option is the correct answer. The patient's clinical presentation, history of recurrent chest pain, and ECG findings of left ventricular hypertrophy and flat T-waves raise concerns for unstable angina or acute coronary syndrome. Injection enoxaparin, a low molecular weight heparin, is often used as an initial treatment to prevent clot formation and progression of coronary artery disease. It is an appropriate choice in this setting to reduce the risk of thrombotic complications.

Incorrect Options:

• Option A, C and D are not appropriate next steps in this patient with unstable angina.

Solution for Question 83:

Correct Option A - Diphtheria:

• One of the common complications of diphtheria is the inflammation of heart muscles or myocarditis. This can eventually result in cardiomyopathies.

Incorrect Options:

• Options B, C and D are not characteristically associated with cardiomyopathies.

Solution for Question 84:

Correct Option B - Atrioventricular nodal conduction:

• The PR segment indicates atrioventricular nodal conduction.

Incorrect Options:

Option A - P wave indicates atrial depolarization in the ECG.

Option C - The QRS complex indicates ventricular depolarization.

Option D - The T wave represents ventricular repolarization in the ECG.

Solution for Question 85:

Correct Option D - S4:

• S4 heart sound is always pathological.

• An S4 heart sound is often a sign of diastolic heart failure or active ischemia. It is rarely a normal finding, unlike an S3.

• In individuals with active myocardial ischemia, adequate adenosine triphosphate cannot be synthesized to release myosin from actin. The myocardium will not be able to relax as a result of this. In such conditions, S4 will be present.

• In a patient experiencing atrial fibrillation, the S4 heart sound will not be heard if the atria do not contract.

• The S4 sound is low-pitched. It is best heard at the apex with the patient in the left lateral decubitus position.

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 86:

Correct Option B - Aortic regurgitation:

• Water hammer pulse, also known as Corrigan's pulse or pistol-shot pulse, refers to a forceful and rapidly collapsing arterial pulse. It is commonly associated with aortic regurgitation, a condition where the aortic valve fails to close properly, leading to backflow of blood from the aorta into the left ventricle during diastole.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 87:

Correct Option A - Heart failure:

• This is the correct answer. The patient's symptoms, examination findings, and medical history are consistent with heart failure. The presence of dyspnea on exertion, elevated jugular venous pressure (JVP), positive hepatojugular reflux, crackles at the lung bases, hepatomegaly, ascites, and pedal edema are classic signs of congestive heart failure. The patient's history of diabetes mellitus (DM) and hypertension (HTN) are common risk factors for the development of heart failure.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 88:

Correct Option B - Focal oligemia:

• Focal oligemia is not a typical radiological finding in a patient with left heart failure. Focal oligemia refers to decreased blood flow to a specific area of the lung. While decreased blood flow can occur in various lung conditions, it is not a specific radiological finding associated with left heart failure.

Incorrect Options:

Option A - Kerley B lines: Kerley B
lines are thin linear opacities seen peripherally in the lung fields on a chest X-ray or CT scan. They repr esent interstitial edema and are commonly associated with left heart failure.

Option C - Increased venous blood in lung: Left heart failure can lead to increased pressure in the pulm onary veins, causing congestion and the accumulation of venous blood in the lung. This can be visualiz ed on imaging studies such as chest X-rays as increased vascular markings and diffuse opacities in th e lung fields.

Option D - Change in upper lobe circulation: In left heart failure, there can be redistribution of blood flo w within the lung, leading to changes in the upper lobe circulation. This may manifest as increased blo od flow to the upper lobes and decreased blood flow to the lower lobes on imaging studies.

Solution for Question 89:

Correct Option A - ECG to rule out atrial fibrillation:

• In this scenario, the patient experienced a brief episode of dizziness and loss of consciousness, followed by a rapid return to full consciousness. This suggests a transient episode of syncope (temporary loss of consciousness) or near-syncope. Syncope can have various causes, including cardiac, neurological, and vasovagal etiologies.

• Performing an ECG (electrocardiogram) is an appropriate initial step to evaluate this patient. Atrial fibrillation (a type of abnormal heart rhythm) can cause episodes of syncope, particularly if it leads to significant changes in heart rate or rhythm. Therefore, ruling out atrial fibrillation is an important consideration.

Incorrect Options:

Option B - If ECG is normal, CT scan should be done: If the ECG is normal, it does not necessarily excl ude other potential causes of syncope. Further evaluation may still be required. CT scan is not typically the initial investigation for transient episodes of syncope unless there are specific indications based on the patient's history or examination findings.

Option C - Tilt-table testing: Tilt-table testing is generally reserved for patients with recurrent or unexpla ined syncope and is not typically indicated for a single episode with no previous similar events.

Option D - Vestibular neuritis is a possible condition that can cause these symptoms: While vestibular neuritis can cause dizziness, it does not typically cause loss of consciousness. It is not the most likely diagnosis in this case.

Solution for Question 90:

Correct Option B - Inferior wall MI:

• The diagnosis of an Inferior Wall myocardial infarction is made by elevated cardiac biomarkers (Trop I, CPK MB, LDH), the ECG changes of myocardial Ischemia and the clinical symptoms (Levine sign) such as profuse sweating pain radiating to the left and nausea and vomiting. Here the ECG depicts evident ST elevation in leads II, III and aVF.

Incorrect Options:

Option A - Anterior wall: In Anterior Wall MI, ECG changes in V1 to V4, aVL are seen.

Option C - Posterior wall MI: Posterior Wall MI, V1 to V4 ST segment involvement is seen.

Option D - Pericarditis: Pericarditis presents clinically with diffuse chest pain. Patient ECG reveals PR s egment depression and ST-segment elevation (saddle-like) in all leads except aVR.

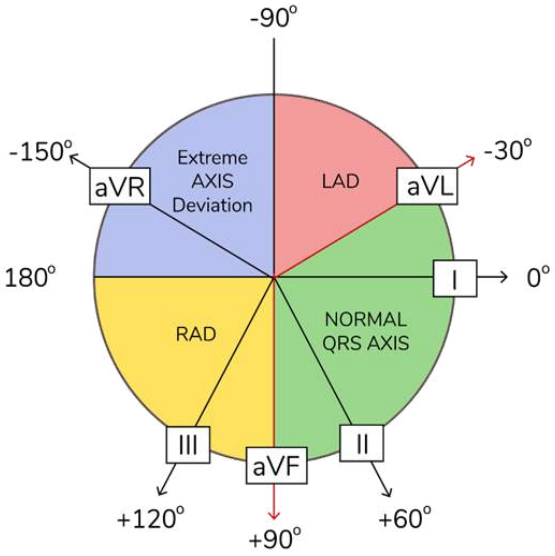
Solution for Question 91:

Correct Option A - Right axis deviation:

Axis Calculation: The electrical axis reflects the average direction of ventricular depolarization during th e ventricular contraction. The direction of depolarization (and electrical axis) is alongside the heart's lon gitudinal axis (to the left and downwards).

• Normal Axis: -30° to +110°

• Right axis deviation is when the QRS complex shifts between 90° and 180°.



Incorrect Options:

• Options B, C, and D are incorrect.

Solution for Question 92:

Correct Option C - Normal sinus rhythm:

• The above ECG strip is that of a normal sinus rhythm. The QRS complexes are narrow, each QRS complex is preceded by a P wave, the PR interval is constant and the RR interval is constant.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 93:

Correct Option B - Start CPR:

• Starting CPR is the next best step.

• The ECG reveals ventricular fibrillation which is a life-threatening arrhythmia having high-frequency ventricular contraction resulting in decreased cardiac output and hemodynamic collapse. Since one cycle of defibrillation is already given and the patient is still unresponsive, CPR has to be given for 2 minutes, after which the rhythm is to be assessed again.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 94:

Correct Option C - Hyperkalemia:

• Hyperkalemia is characterized by increased serum potassium levels. ECG reveals tall tented T waves with ST elevation with broad QRS complex and absent p waves.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 95:

Correct Option D - Diuretic:

• Resistant hypertension is defined as uncontrolled blood pressure despite using three different antihypertensive medications from different drug classes, including a diuretic. The diuretic is an essential component in treating hypertension as it helps reduce fluid volume and decrease blood pressure. It is recommended that at least one of the three antihypertensive drugs used in the treatment of resistant hypertension should be a diuretic.

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 96:

Correct Option C - Rich in sodium:

• The DASH diet recommends limiting the intake of sodium, as high sodium consumption is associated with increased blood pressure. The diet suggests reducing the use of table salt and avoiding processed foods that are typically high in sodium, such as fast food, canned soups, and salty snacks.

Incorrect Options:

Option A - Rich in potassium: The DASH diet encourages foods that are rich in potassium, such as fruit s (e.g., bananas, oranges), vegetables (e.g., spinach, broccoli), and legumes (e.g., beans, lentils). Pota ssium is known to help lower blood pressure.

Option B - Rich in calcium: The DASH diet also includes foods that are rich in calcium, such as low-fat dairy products (e.g., milk, yogurt, cheese) and calcium-fortified foods (e.g., tofu, cereals). Calcium is im portant for maintaining strong bones and teeth.

Option D - Rich in magnesium: The DASH diet promotes foods that are rich in magnesium, such as wh ole grains (e.g., brown rice, whole wheat bread), nuts, seeds, and green leafy vegetables. Magnesium i s beneficial for various body functions, including maintaining normal blood pressure.

Solution for Question 97:

Correct Option B - Metoprolol:

• In this case, the patient's age, comorbidities (hypertension, diabetes, coronary artery disease), and irregularly irregular heartbeats are indicative of atrial fibrillation (AF). The first step in managing AF is often to control the heart rate, especially in cases where the ventricular rate is elevated and causing symptoms like palpitations and shortness of breath. Beta-blockers, like metoprolol, are commonly used for rate control in AF. They slow down the heart rate and improve symptoms by reducing the frequency of ventricular response to the irregular atrial activity.

Incorrect Options:

Option A - Amiodarone: While amiodarone is an antiarrhythmic medication that can be used to restore normal sinus rhythm, it is typically reserved for rhythm control strategies and not the first-line approach in managing rate control in AF.

Option C - Electrical cardioversion: Cardioversion might be considered for patients with severe sympto ms or hemodynamic instability, but it's not usually the initial step unless urgent intervention is required.

Option D - Direct oral anticoagulant (DOAC) therapy: While anticoagulation is important in patients with AF to reduce the risk of thromboembolic events, initiating anticoagulation is not the primary step when dealing with the patient's palpitations and shortness of breath. Rate control and symptom management take precedence in this acute scenario.

Solution for Question 98:

Correct Option B - Non-cardiovascular death is more in HFpEF-30-40% as compared to HFrEF-15%:

• Heart failure with reduced ejection fraction (HFrEF) is associated with a higher rate of non-cardiovascular deaths compared to heart failure with preserved ejection fraction (HFpEF). In HFrEF, approximately deaths are attributed to non-cardiovascular causes, such as infections or other comorbidities. In contrast, HFpEF tends to have a lower proportion of non-cardiovascular deaths, estimated to be around 15%. Therefore this statement is false.

Incorrect Options:

Option A - Regardless of ejection fraction and the type of heart failure, the 5-year mortality rate is arou nd 50%: This statement is generally true. Heart failure, whether with preserved ejection fraction (HFpE F) or reduced ejection fraction (HFrEF), is associated with a significant risk of mortality. The 5-year mor tality rate for heart failure is indeed high, estimated to be around 50%, regardless of the specific type or ejection fraction.

Option C - Angiotensin converting enzyme (ACE) inhibitors cause cough in 15% and angioedema in 1 %: This statement is generally true. ACE inhibitors, commonly prescribed medications for heart failure management, can cause side effects such as cough and angioedema. Approximately 15% of patients t aking ACE inhibitors may experience a dry, persistent cough.

Option D - Atrial fibrillation is common in the elderly and is the cause of stroke in a quarter of stroke cases: This statement is generally true. Atrial fibrillation (AF) is a common cardiac arrhythmia, particularly in the elderly population. It is estimated that AF is present in a significant proportion of elderly individuals. AF is associated with an increased risk of stroke, and it is e stimated to be the cause of stroke in approximately one-quarter of all stroke cases.

Solution for Question 99:

Correct Option D - Jugular veins column is visibly distended without pulsations:

• Cardiac tamponade refers to the accumulation of fluid in the pericardial sac, which puts pressure on the heart and impairs its ability to pump effectively.

• Jugular veins column is visibly distended without pulsations: This is a characteristic finding in cardiac tamponade. Due to the increased pressure in the pericardial sac, the jugular veins become visibly distended, but the normal pulsations with each heartbeat are diminished or absent.

Incorrect Options:

Option A - Pulsus Paradoxus is always present: Pulsus paradoxus is a finding characterized by an abn ormal drop in blood pressure during inspiration. While it can be seen in cardiac tamponade, it is not alw ays present and can vary depending on the severity of tamponade and other factors.

Option B - Kussmaul sign is always present: Kussmaul sign refers to an abnormal rise in jugular venou s pressure during inspiration. It is not specific to cardiac tamponade and can be seen in various cardiac and respiratory conditions. It is not always present in cardiac tamponade.

Option C - Tall A wave is present: The A wave represents atrial contraction on the jugular venous pulse waveform. In cardiac tamponade, the elevated pressure in the pericardial sac can impair atrial filling, l eading to a reduced or absent A wave rather than a tall A wave.

Solution for Question 100:

Correct Option A - ASD:

• An atrial septal defect is a congenital heart defect characterized by an abnormal opening in the septum (the wall) between the two atria of the heart. A wide fixed split S2 on auscultation is a characteristic finding in atrial septal defects (ASD), where there is abnormal communication between the atria. It allows increased blood flow from the left atrium to the right atrium, causing a delay in the closure of the pulmonic valve, resulting in a wide fixed split S2.

Incorrect Options:

Option B - VSD (Ventricular Septal Defect): A ventricular septal defect is another type of congenital he art defect where there is an abnormal opening in the septum between the two ventricles. It typically pro duces a harsh holosystolic murmur, rather than a wide fixed split S2 heard on auscultation.

Option C - TOF (Tetralogy of Fallot): Tetralogy of Fallot is a
congenital heart condition characterized by a combination of four heart defects: ventricular septal defec t, pulmonary stenosis, right ventricular hypertrophy, and overriding aorta. The characteristic murmur in TOF is a systolic ejection murmur and not specifically associated with a wide fixed split S2.

Option D - BAV (Bicuspid Aortic Valve): Bicuspid aortic valve is a congenital heart condition in which th e aortic valve has two cusps instead of the normal three. While it can be associated with aortic stenosis or regurgitation, it is not specifically associated with a wide fixed split S2.

Solution for Question 101:

Correct Option D - 4:

• The combination of shortness of breath, bilateral pitting pedal edema, elevated jugular venous pulse, and hepatomegaly suggests right sided congestive heart failure (CHF).

• 4th arrow points at the right ventricle the likely affected chamber in this case.

Incorrect Options:

Option A - 1: The first points at the left atrium, but the diagnosis here is that of a
patient with right sided heart failure.

Option B -2: The second arrow points at the left ventricle. Therefore this option is also incorrect.

Option C -3: The third arrow points toward the right atrium.

Solution for Question 102:

Correct Option A - Defibrillation:

• Based on the information provided and the rhythm strip, the likely diagnosis is ventricular fibrillation. Out of the given options, the most appropriate next step in management would be unsynchronized cardioversion/defibrillation.

Incorrect Options:

• Options B, C, and D are incorrect

Solution for Question 103:

Correct Option B - Severe Asthma or Chronic Obstructive Pulmonary Disease:

• During severe asthma attacks or exacerbations of COPD, airway resistance increases significantly during inspiration. This leads to increased negative intrathoracic pressure, affecting venous return to the heart and causing a drop in systolic blood pressure during inspiration.

Incorrect Options:

• Options A, C and D are not associated with pulsus paradoxus.

Solution for Question 104:

Correct Option D - Arch of aorta:

• Takayasu arteritis typically affects the aorta and its major branches, particularly the branches arising from the arch of the aorta. The disease leads to inflammation, thickening, and narrowing of these arteries, which can result in reduced blood flow to various organs and tissues. The most commonly involved area in Takayasu arteritis is the aorta, specifically the branches arising from the aortic arch, which includes the brachiocephalic trunk, left common carotid artery, and left subclavian artery.

Incorrect Options:

Option A - Pulmonary artery: The involvement of the pulmonary artery, coronary arteries, and abdomin al aorta can occur in Takayasu arteritis, but it is less common compared to the involvement of the arch of the aorta. Pulmonary artery involvement, known as pulmonary artery arteritis, occurs in a small proportion of cases. It can lead to pulmonary hypertension and other pulmonary complications.

Option B - Coronary arteries: Coronary artery involvement, known as coronary arteritis, can occur in Ta kayasu arteritis but is relatively rare. It can result in reduced blood flow to the heart, leading to sympto ms such as chest pain (angina) or even heart attack.

Option C - Abdominal aorta: Abdominal aorta involvement can also be seen in Takayasu arteritis, but it is less common compared to the involvement of the arch of the aorta

Solution for Question 105:

Correct Option C - Permanent pacemaker:

• Based on the given information, the correct long-term treatment option for the condition described would be a "Permanent pacemaker." The 24-hour ECG strip suggests the presence of sinus node dysfunction (sick sinus syndrome) characterized by bradycardia (slow heart rate), pauses, and sinus

arrests. This condition is commonly seen in individuals who have had a previous myocardial infarction.

Incorrect Options:

Option A - Amiodarone: Amiodarone is an antiarrhythmic medication used to treat various cardiac arrhythmias. However, it is not the primary treatment for sinus node dysfunction. In this case, the patient's symptoms are related to bradycardia (slow heart rate) rather than a specific arrhythmia.

Option B - Atropine only: Atropine is a medication used for acute management of symptomatic bradycardia. However, in the long term, it is not a
suitable treatment for sinus node dysfunction. Atropine is typically used in emergency situations or as a temporary measure before definitive treatment such as a pacemaker is implemented.

Option D - Atropine and isoproterenol: Isoproterenol is a medication that acts as a cardiac stimulant and can increase heart rate. While it may be used in certain acute situations, it is not an appropriate long-term treatment for sinus node dysfunction. Additionally, combining atropine and isoproterenol is not a typical approach for managing this condition.

Solution for Question 106:

Correct Option D - Amlodipine:

• The most appropriate antihypertensive for a patient with stable angina and consistently elevated blood pressure would be Amlodipine.

• Amlodipine is a calcium channel blocker that is frequently used to treat hypertension. It is particularly beneficial in patients with stable angina, as it can improve coronary blood flow by reducing vasospasm and decreasing myocardial oxygen demand. Additionally, amlodipine has a favorable effect on blood pressure control, which makes it suitable for patients with both stable angina and hypertension.

• Therefore, based on the patient's diagnosis of stable angina and consistently elevated blood pressure, the most appropriate antihypertensive choice would be Amlodipine.

• Stable angina is a condition characterized by chest pain or discomfort that occurs during physical exertion or stress and is relieved by rest or nitroglycerin. It is commonly associated with underlying coronary artery disease.

• In this case, the patient has stable angina and consistently elevated blood pressure. Treating hypertension is an essential component of managing stable angina, as uncontrolled high blood pressure can worsen ischemic symptoms and increase the risk of cardiovascular events.

Incorrect Options:

Option A - Atenolol: Atenolol is a beta-blocker commonly used to treat hypertension. While beta-blockers can be effective in managing stable angina by reducing heart rate and myocardial oxygen demand, they are not the ideal choice in patients with consistently elevated blood pressure, as they may further worsen blood pressure control.

Option B - Thiazides: Thiazide diuretics are a class of medications used to treat hypertension. They help reduce blood pressure by promoting diuresis and decreasing fluid volume. However, they may not be the most appropriate choice in this case since the patient already has stable angina, and thiazides are not specifically indicated for the treatment of angina.

Option C - Enalapril: Enalapril is an angiotensin-converting enzyme (ACE) inhibitor that is commonly used in the management of hypertension. While ACE inhibitors are effective antihypertensive agents, the

y may not be the initial choice in this case, considering the patient's primary symptom of stable angina. Other factors, such as heart rate control and relief of ischemic symptoms, need to be considered.

Solution for Question 107:

Correct Option A - Right ventricle:

• The pacemaker lead is typically placed in the right ventricle for most pacemaker implantations. This positioning allows the electrical impulses generated by the pacemaker to be delivered to the right ventricle, which then stimulates the heart muscle to contract and maintain an appropriate heart rhythm.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 108:

Correct Option B - Cardiac tamponade:

• Based on the symptoms described in the postoperative cardiac surgical patient, the most probable diagnosis is cardiac tamponade.

• Cardiac tamponade is a medical emergency characterized by the accumulation of fluid or blood in the pericardial sac, which leads to compression of the heart and impaired cardiac function. The symptoms typically include sudden hypotension (low blood pressure), raised central venous pressure (elevated jugular venous distention), and pulsus paradoxus (an exaggerated drop in blood pressure during inspiration). These symptoms usually occur within the first few hours to days after surgery.

Incorrect Options:

Option A - Ventricular dysfunction: While ventricular dysfunction can cause hypotension and cardiac sy mptoms, it does not typically present with raised central venous pressure or pulsus paradoxus. Additio nally, the sudden onset of symptoms in this case suggests a
more acute problem like cardiac tamponade rather than chronic ventricular dysfunction.

Option C - CHF (Congestive Heart Failure): CHF can cause fluid retention, leading to increased venou s pressure and symptoms such as dyspnea and edema. However, it does not typically present with sud den hypotension, raised central venous pressure, or pulsus paradoxus. Cardiac tamponade is a
more likely explanation for the acute symptoms in this case.

Option D - Excessive mediastinal effusion: Excessive mediastinal effusion can potentially cause compr ession of the heart and lead to symptoms similar to cardiac tamponade. However, the specific mention of raised central venous pressure and pulsus paradoxus points more towards cardiac tamponade as th e likely diagnosis.

Solution for Question 109:

Correct Option A - Constrictive pericarditis:

• Constrictive pericarditis is a condition characterized by inflammation and fibrosis of the pericardium, the sac-like structure surrounding the heart. It leads to the stiffening of the pericardium, impairing the normal filling and functioning of the heart.Therefore, based on the given clinical features of shortness of breath, tiredness, engorged neck veins, and JVP showing rapid X and Y descent, the most likely diagnosis is constrictive pericarditis.

Incorrect Options:

• Options B, C and D are not associated with the features described in the vignette and are incorrect.

Solution for Question 110:

Correct Option B - Libman sacks endocarditis:

• Based on the given clinical findings, the most probable diagnosis for the patient is Libman-Sacks endocarditis.

• Libman-Sacks endocarditis is a form of nonbacterial endocarditis (also known as nonbacterial thrombotic endocarditis) that is commonly associated with systemic lupus erythematosus (SLE). It is characterized by the presence of small, sterile vegetations on the heart valves, particularly the mitral and aortic valves.

Incorrect Options:

Option A - Infective endocarditis: While infective endocarditis can also cause vegetations on the heart v alves, the presence of malar rashes suggests an autoimmune condition like SLE rather than an infectio us etiology.

Options C and D are incorrect.

Solution for Question 111:

Correct Option D - Pitting pedal edema:

• Pitting pedal edema refers to the swelling of the feet and ankles that occurs when pressure is applied to the affected area, causing an indentation or "pit" that persists for some time after the pressure is released. This type of edema is commonly associated with congestive cardiac failure.

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 112:

Correct Option A - Left atrium:

• Mitral stenosis leads to increased pressure in the left atrium, causing left atrial enlargement. On a chest x-ray, this can be visualized as a bulge or enlargement of the left heart border.

Incorrect Options:

Options B, C, and D are incorrect.

Solution for Question 113:

Correct Option B - Hypothermia:

• Osborn waves, also known as J waves or camel humps, are a characteristic ECG finding seen in hypothermia. They appear as positive deflections at the J point, just following the QRS complex. These waves are most prominent in the precordial leads (V2-V6) and can be seen in other leads as well.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 114:

Correct Option A - HOCM (Hypertrophic Obstructive Cardiomyopathy):

• In HOCM, the murmur increases on standing due to decreased preload. This is known as the "standing murmur" phenomenon. HOCM is characterized by the hypertrophy of the left ventricular wall, particularly the septum. This hypertrophy causes obstruction to the outflow of blood from the left ventricle during systole, resulting in a murmur.

Incorrect Options:

• Options B, C and D are not associated with a murmur that increases on standing.

Solution for Question 115:

Correct Option A - Hypokalemia:

• This option is correct because the ECG findings in the question, such as ST segment depression, decreased amplitude of T waves, and increased amplitude of U waves, are characteristic of hypokalemia. Hypokalemia refers to low levels of potassium in the blood, which can lead to disturbances in cardiac electrical conduction.

Incorrect Options:

Option B - Hyperkalemia: Hyperkalemia is characterized by different ECG changes, including peaked T waves, prolonged PR interval, widened QRS complex, and a sine wave pattern.

Option C - Hypocalcemia: Hypocalcemia can present with its own characteristic ECG changes, such as prolonged QT interval, but those findings are not mentioned in the question.

Option D - Hypercalcemia: Hypercalcemia can lead to various ECG changes, including short QT interv al and prolonged PR interval, but these findings are not mentioned in the question.

Solution for Question 116:

Correct Option D - ≥160/100 mmHg:

• According to the current guidelines of AHA, immediate pharmacological management should be initiated in patients with hypertension if their blood pressure readings are consistently at or above ≥160/100 mmHg

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 117:

Correct Option D - DC cardioversion:

• DC cardioversion is the correct option. In the case of a patient with atrial fibrillation who is unconscious and hemodynamically unstable, the next best step in management is immediate DC cardioversion. DC cardioversion involves delivering an electric shock synchronized with the patient's heartbeat to restore normal heart rhythm. This intervention is necessary to stabilize the patient and restore normal cardiac output.

Incorrect Options:

• Options A, B, and C are not appropriate management choices for this patient with AF with hemodynamic compromise.

Solution for Question 118:

Correct Option A - Takotsubo cardiomyopathy:

• Takotsubo cardiomyopathy, also known as "broken heart syndrome," is a condition characterized by transient left ventricular dysfunction that typically occurs following an emotional or physical stressor.

• The ECG findings in Takotsubo cardiomyopathy can vary and may not always match the observed myocardial stunning pattern.

• This discrepancy between ECG findings and myocardial function is a characteristic feature of Takotsubo cardiomyopathy.

Incorrect Options:

Option B - Restrictive cardiomyopathy: Restrictive cardiomyopathy is a type of cardiomyopathy charact erized by stiffening of the heart muscle, which impairs its ability to relax and fill with blood. The ECG fin dings in restrictive cardiomyopathy may show features such as low voltage QRS complexes and atrial abnormalities, but they are not typically associated with a
discrepancy between ECG findings and myocardial stunning pattern.

Option C - Brugada syndrome is an autosomal dominant disorder associated with a loss of function mutation in cardiac sodium channels that predisposes affected individuals to fatal cardiac arrhythmias.

Option D - Pericardial tamponade: Pericardial tamponade is a condition characterized by the accumulation of fluid in the pericardial sac, which compresses the heart and impairs its ability to fill properly. The ECG findings in pericardial tamponade often show specific patterns, such as electrical alternans and low voltage QRS complexes.

Solution for Question 119:

Correct Option D - All the above:

• Automatic implantable cardioverter-defibrillator (AICD) implantation is indicated for all of the mentioned conditions.

Option A - Brugada syndrome: AICD implantation is recommended for patients with Brugada syndrome who have a
history of aborted sudden cardiac death (SCD), syncope, or documented ventricular arrhythmias.

Option B
- Ventricular fibrillation: AICD implantation is the treatment of choice for patients who have survived a cardiac arrest due to ventricular fibrillation (VF) or sustained ventricular tachycardia (VT) with hemodynamic compromise.

Option C - Acute coronary syndrome with low ejection fraction: AICD implantation is considered for patients with acute coronary syndrome who have reduced left ventricular ejection fraction (EF) (typically ≤35%) and are at risk of sudden cardiac death.

Solution for Question 120:

Correct Option D - A patient who is awaiting cardiac arrest in the hospital:

• This refers to a patient who is in a critical condition and expected to die imminently within the hospital setting. These patients may have conditions such as end-stage organ failure, irreversible brain damage, or severe trauma that cannot be treated successfully. They are kept under palliative care until their natural death occurs, at which point their organs may be considered for donation.

Incorrect Options:

Option A - Dead on arrival: This is a category 1 donor.

Option B - A patient who died after failed resuscitation after reaching the hospital: This is a category 2 donor. In this case, resuscitation efforts were attempted upon the patient's arrival at the hospital but were unsuccessful. While this patient did experience cardiac arrest, they would not fall under the category of no-heart-beating donor as resuscitation attempts were made.

Option C - A patient who was bought dead to the hospital: If a patient is brought dead to the hospital, it means they were already deceased upon arrival. Similar to the first option, this patient would not meet the criteria for no-heart-beating donation.

Solution for Question 121:

Correct Option A - Hypokalemia:

• Pseudo p pulmonale is seen in hypokalemia, and it refers to tall peaked P waves seen in patients with this condition.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 122:

Correct Option B - Multifocal atrial tachycardia:

• Looking at the provided ECG, several key features suggest the diagnosis of multifocal atrial tachycardia: Irregular R-R intervals: The distance between consecutive R-waves (R-R intervals) varies, indicating irregularity in the heart rate. P-waves with different morphologies: In MAT, the P-waves originate from different sites within the atria, resulting in varying shapes and configurations. Heart rate >100 beats per minute: MAT is characterized by a rapid heart rate, typically exceeding 100 beats per minute.

• Irregular R-R intervals: The distance between consecutive R-waves (R-R intervals) varies, indicating irregularity in the heart rate.

• P-waves with different morphologies: In MAT, the P-waves originate from different sites within the atria, resulting in varying shapes and configurations.

• Heart rate >100 beats per minute: MAT is characterized by a rapid heart rate, typically exceeding 100 beats per minute.

• These features are consistent with the diagnosis of multifocal atrial tachycardia. MAT is a supraventricular tachycardia characterized by the presence of three or more different P-wave morphologies in the ECG, reflecting the activation of multiple ectopic atrial foci.

• Irregular R-R intervals: The distance between consecutive R-waves (R-R intervals) varies, indicating irregularity in the heart rate.

• P-waves with different morphologies: In MAT, the P-waves originate from different sites within the atria, resulting in varying shapes and configurations.

• Heart rate >100 beats per minute: MAT is characterized by a rapid heart rate, typically exceeding 100 beats per minute.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 123:

Correct Option A - Benzathine penicillin 2.4 million units weekly for three weeks:

• Late cardiovascular syphilis refers to the tertiary stage of syphilis where the infection has progressed and affected the cardiovascular system. It is characterized by the formation of gummas (soft, non-cancerous growths) in the cardiovascular tissues, including the heart, aorta, and blood vessels.

• The treatment of choice for late cardiovascular syphilis is benzathine penicillin. Benzathine penicillin is a long-acting form of penicillin that is administered intramuscularly. The recommended regimen for late cardiovascular syphilis is benzathine penicillin 2.4 million units administered once weekly for three weeks. This treatment regimen ensures adequate antibiotic levels in the blood to effectively eliminate the Treponema pallidum bacteria that cause syphilis.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 124:

Correct Option D - LDL more than 100mg/dl:

• Syndrome Z, also known as Metabolic Syndrome, is a cluster of risk factors that increase the risk of cardiovascular disease and type 2 diabetes. It is characterized by a combination of obesity (especially abdominal obesity), insulin resistance or glucose intolerance, hypertension (blood pressure more than 130/85 mmHg), and dyslipidemia (elevated triglycerides and/or reduced HDL cholesterol).

• LDL more than 100mg/dl: This is the correct answer. While LDL (low-density lipoprotein) cholesterol is an important lipid parameter to assess cardiovascular risk, it is not specifically included as a component of metabolic syndrome. However, it is worth noting that dyslipidemia in metabolic syndrome typically involves elevated triglycerides and decreased HDL cholesterol levels rather than specific LDL cutoffs.

Incorrect Options:

• Options A, B and C are components of metabolic syndrome

Solution for Question 125:

Correct Option B - Takotsubo cardiomyopathy:

• Takotsubo cardiomyopathy, also known as stress-induced cardiomyopathy or broken heart syndrome, is a condition characterized by sudden temporary weakening of the heart muscle. It is typically triggered by intense emotional or physical stress. The name "Takotsubo" refers to the shape of the affected left ventricle, which resembles a Japanese octopus trap.

• In the given scenario, the sudden onset of chest pain and collapse in the elder brother during an argument over a property dispute suggests a possible emotional trigger, which is commonly associated with Takotsubo cardiomyopathy. It is important to note that emotional stressors, such as arguments or intense emotional experiences, can lead to the release of stress hormones that can have a direct impact on the heart, causing transient cardiac dysfunction.

Incorrect Options:

Option A - Infective cardiomyopathy: Infective cardiomyopathy refers to myocardial inflammation cause d by an infection, such as viral or bacterial myocarditis. While infective cardiomyopathy can present wit h chest pain and sudden death, there is no mention of an infectious illness or symptoms suggestive of

an infection in the given scenario.

Option C - Acute myocardial infarction: Acute myocardial infarction, commonly known as a heart attack, occurs when there is a
sudden blockage of blood flow to the heart muscle, usually due to a clot in a coronary artery. While chest pain and sudden death can be associated with a heart attack, the absence of risk factors, such as atherosclerosis or a
previous history of heart disease, and the presence of emotional stress as a triggering factor make acute myocardial infarction less likely in this case.

Option D - Hypertrophic cardiomyopathy: Hypertrophic cardiomyopathy is a genetic heart condition cha racterized by abnormal thickening of the heart muscle, leading to impaired heart function. While hypertr ophic cardiomyopathy can cause sudden cardiac death, the absence of a
family history of similar diseases makes it less likely in this scenario.

Solution for Question 126:

Correct Option A - Right atrial contraction:

• 'a' wave in JVP corresponds to right atrial contraction.

• In the jugular venous pulse (JVP) waveform, there are different waves that correspond to specific events in the cardiac cycle. The 'a' wave represents the contraction of the right atrium, specifically the atrial systole.

• During the cardiac cycle, the 'a' wave occurs following the 'c' wave. The 'c' wave is caused by the bulging of the tricuspid valve into the right atrium during ventricular contraction. As the ventricles contract and the tricuspid valve closes, the right atrium contracts, leading to a rise in pressure. This atrial contraction creates the 'a' wave in the JVP waveform.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 127:

Correct Option D - All of the above:

• Relative bradycardia refers to a situation where the heart rate is lower than expected in the presence of an elevated body temperature. It is characterized by a heart rate that is relatively slower compared to the degree of fever. Relative bradycardia can occur in various infectious diseases, including typhoid fever, Q fever, and leptospirosis.

• In typhoid fever, caused by Salmonella typhi, relative bradycardia is a classic finding. The fever is typically high but the heart rate remains disproportionately lower than expected.

Incorrect Options:

• There are no incorrect choices in this question, as all of the options A, B & C (typhoid fever, Q fever, and leptospirosis) are correct

Solution for Question 128:

Correct Option A

• In tension pneumothorax, breath sounds are diminished or absent on the affected side. The accumulation of air compresses the lung, leading to reduced air entry and decreased breath sounds.

Incorrect options:

Options B, C and D are associated with cardiac tamponade and tension pneumothorax.

Solution for Question 129:

Correct Option A

• The cardiac axis represents the overall direction of electrical activity in the heart. The positive (+) sign indicates that the electrical activity is predominantly directed towards the positive electrode in a particular lead.

• Lead aVF: Lead aVF is positioned on the bottom of the hexaxial reference system, and it looks upwards towards the heart. In a normal heart with a +90-degree axis, the electrical activity is directed downwards and to the left side of the body. Therefore, lead aVF would show a maximum R wave, as it is oriented towards the direction of the electrical activity.

Incorrect options:

Options B, C and D are incorrect.

Solution for Question 130:

Correct Option: C

• In the case of an ECG tracing showing asystole, which represents the absence of any electrical activity in the heart, the best intervention is immediate cardiopulmonary resuscitation (CPR) followed by the administration of intravenous epinephrine (adrenaline) 1mg.

• Injection of Adrenaline (epinephrine) 1mg IV: This is the correct intervention for asystole. Epinephrine is a vasopressor and cardiac stimulant that helps increase coronary and cerebral blood flow during CPR, enhancing the chances of successful resuscitation.

Incorrect options:

Options A, B, and D are not the best treatment options in this patient. The appropriate course of manag ement would be to start CPR followed by IV adrenaline.

Solution for Question 131:

Correct Option D

• When measuring blood pressure in a patient with cardiac tamponade, it is important to ensure that the patient is in a relaxed state and breathing normally. This is because taking deep breaths or holding the breath can potentially alter the intrathoracic pressure and affect the hemodynamic status of the patient.

• Cardiac tamponade is a condition characterized by the accumulation of fluid or blood in the pericardial space, which puts pressure on the heart and impairs its ability to fill and pump effectively. This can lead to decreased cardiac output and compromised blood pressure.

• In this scenario, it is crucial to measure the patient's blood pressure accurately to assess the severity of the tamponade and guide appropriate management. Asking the patient to breathe normally helps maintain stable intrathoracic pressure and provides a more accurate reflection of the patient's true blood pressure.

Incorrect Option:

Options A, B and C are incorrect.

Solution for Question 132:

Correct Option B

• Metoprolol is a beta-blocker medication that primarily works by blocking beta-adrenergic receptors in the heart, leading to a decrease in heart rate and cardiac contractility. Verapamil, on the other hand, is a calcium channel blocker that primarily acts by blocking calcium channels in the heart and blood vessels, resulting in vasodilation and a decrease in heart rate.

• When verapamil is added to metoprolol, there is an increased risk of bradycardia (slow heart rate) with AV block (impairment of electrical conduction between the atria and ventricles). This is because both medications have negative chronotropic effects, meaning they decrease the heart rate. The combination of these drugs can potentiate this effect and lead to excessive slowing of the heart rate, potentially resulting in bradycardia and AV block.

Incorrect Option:

Options A, C and D are incorrect.

Solution for Question 133:

Correct Option: D

The correct answer for the HV interval in the given His bundle electrogram is "From bundle of His and bundle branches to ventricles."

• The HV interval represents the time it takes for electrical conduction to occur from the His bundle and bundle branches to the ventricles of the heart.

Incorrect Options:

Options A, B and C are incorrect.

Solution for Question 134:

Correct Option C:

Troponin-T is a cardiac biomarker that is highly specific to cardiac muscle injury. It is released into the bloodstream when there is damage to the heart muscle, such as in myocardial infarction (MI). Troponin -T levels typically start to rise within 3-4 hours after the onset of myocardial injury and remain elevated for several days. Therefore, it is considered the best investigation for diagnosing MI within 2-4 hours of symptom onset.

Troponin-T measurement is widely used in clinical practice for the diagnosis of MI, as it provides high s ensitivity and specificity for cardiac injury. Elevated troponin-T levels, in conjunction with clinical sympt oms and other diagnostic tests, help confirm the diagnosis of MI and guide appropriate management.

Incorrect Options:

Option A. LDH (Lactate dehydrogenase): LDH is an enzyme found in various tissues, including the hea rt. However, it lacks specificity for cardiac injury. LDH levels may increase in MI, but it is not the best in vestigation for early diagnosis within 2-4 hours.

Option B. CK-MB (Creatine kinase-MB): CK-MB is an isoform of the enzyme creatine kinase that is pre dominantly found in the heart. It is released into the bloodstream following cardiac muscle injury. Howe ver, CK-MB levels may take several hours to rise, and it is not as specific for early diagnosis of MI as tr oponin-T.

Option D. BNP (B-type natriuretic peptide): BNP is a hormone released by the ventricles of the heart in response to increased stretching of cardiac muscle cells. It is primarily used for diagnosing and assessi ng the severity of heart failure. BNP levels are not specific to myocardial infarction and do not provide ti mely diagnosis within 2-4 hours.

Solution for Question 135:

Correct Option A:

High anion gap acidosis with low bicarbonate levels is a characteristic finding in several metabolic acid osis conditions. However, renal disorders, specifically renal tubular acidosis (RTA), typically present wit h a normal anion gap acidosis rather than a high anion gap acidosis.

In RTA, the kidneys are unable to properly excrete hydrogen ions or reabsorb bicarbonate, resulting in a normal anion gap metabolic acidosis. This condition is often associated with a
normal or near-normal bicarbonate level.

Incorrect Options:

Option B. Diabetic ketoacidosis: Diabetic ketoacidosis (DKA) is a condition characterized by high blood glucose levels and the production of ketones due to insulin deficiency. It is a common cause of high an ion gap metabolic acidosis. In DKA, there is an increase in the production of ketones (such as beta-hyd roxybutyrate and acetoacetate), leading to the acidosis.

Option C. Lactic acidosis: Lactic acidosis occurs when there is an excessive production or reduced cle arance of lactic acid. It can result from various conditions, such as tissue hypoperfusion, severe infectio

ns, certain medications, and underlying metabolic disorders. Lactic acidosis is typically associated with a high anion gap and low bicarbonate levels.

Option D. Salicylate poisoning: Salicylate poisoning, often seen with aspirin overdose, can lead to high anion gap metabolic acidosis. Salicylates can directly affect cellular metabolism, leading to the producti on of organic acids and a
subsequent increase in anion gap. Bicarbonate levels are typically decreased in salicylate poisoning.

Solution for Question 136:

Correct option D:

• Rescue breaths are given in the ratio of 30:2 not 15:2

• Therefore this option is the answer

Incorrect options:

Option A: CPR cycle duration is 2
minutes. This is true and represents the recommended duration for each cycle of CPR (i.e., a combinat ion of chest compressions and rescue breaths) before reassessment of the patient's rhythm and pulse.

Option B: Chest compressions at 100-120/min. This is true and represents the recommended rate of c hest compressions during CPR. Adequate chest compressions help maintain blood circulation and imp rove the chances of successful defibrillation.

Option C: Start CPR followed by immediate defibrillation. This is true and represents the standard appr oach to managing ventricular fibrillation. In the event of a cardiac arrest due to ventricular fibrillation, im mediate CPR (consisting of chest compressions and rescue breaths) should be initiated, and defibrillati on should be performed as soon as a defibrillator is available. Early defibrillation is crucial in restoring a normal heart rhythm.

Solution for Question 137:

Correct option: B

Explanation

• In the ECG given above, the ST segment elevation is present in the: Anterior leads (V2-V4) Lateral leads (V5-V6, I, and aVL)

• Anterior leads (V2-V4)

• Lateral leads (V5-V6, I, and aVL)

• The patient’s symptoms and ECG findings are suggestive of myocardial infarction in the anterior and lateral walls of the heart.

• The most likely cause of it is an occlusion in the proximal left anterior descending artery.

• Anterior leads (V2-V4)

• Lateral leads (V5-V6, I, and aVL)

Incorrect options

Options A, C and D are incorrect.

Solution for Question 138:

Correct option B.

• Digoxin is primarily used to control symptoms and improve quality of life in patients with heart failure. It helps in reducing heart rate and controlling certain arrhythmias associated with heart failure, but it has not been shown to reduce mortality.

Incorrect options:

Option A. Metoprolol: Metoprolol is a beta-blocker and has been shown to reduce mortality in patients with heart failure. It improves symptoms, reduces hospitalizations, and improves overall survival.

Option C. Captopril: Captopril is an ACE inhibitor and has been demonstrated to reduce mortality and improve outcomes in patients with heart failure. It helps in reducing afterload, improving cardiac function, and slowing disease progression.

Option D. K+ sparing diuretics: K+ sparing diuretics such as spironolactone and eplerenone are used in combination with other heart failure medications. They help in reducing fluid retention and edema but have also been shown to reduce mortality in patients with heart failure.

Solution for Question 139:

Correct option: A

• Continuous murmurs begins in systole, peaks near the second heart sound, and continues into all or part of diastole.

• It is seen in Peripheral pulmonic stenosis

• Peripheral pulmonic stenosis is a Congenital heart defect

• Narrowing of one or more branches of the pulmonary artery is known as Peripheral pulmonic stenosis

• Due to narrowing there will be turbulence which will be present in both systole and diastole

Incorrect options

Options B, C and D are not associated with a continuous murmur.

Solution for Question 140:

Correct option B:

• "Decrease in systolic blood pressure 20 mm Hg within 3 mins of postural change."

• Postural hypotension, also known as orthostatic hypotension, refers to a drop in blood pressure that occurs upon assuming an upright position. It is characterized by a decrease in systolic blood pressure of at least 20 mm Hg or a decrease in diastolic blood pressure of at least 10 mm Hg within 3 minutes of standing up.

Incorrect options

Options A, C and D are incorrect

Solution for Question 141:

Correct options: A

• Troponin is the preferred and most widely used biomarker for diagnosing myocardial infarction. It is highly specific to cardiac muscle and has a high sensitivity for detecting cardiac injury. When there is damage to the heart muscle, troponin is released into the bloodstream, and elevated levels can be measured through blood tests.

Incorrect options

Options B, C and D are incorrect.

Solution for Question 142:

Correct Option D - Stokes adams syndrome:

• Recurrent syncopal episodes and an unequal number of P waves and QRS complexes are features of a patient with Stokes Adam syndrome/3rd heart block/Complete heart block.

• It is due to a lack of coordination between the atria and ventricles leading to AV dissociation.

• ECG features: Prolonged PR interval Broad QRS complex The number of P waves will not be equal to the number of R waves P-P interval (atrial rate) will not match the R-R interval (ventricular rate)

• Prolonged PR interval

• Broad QRS complex

• The number of P waves will not be equal to the number of R waves

• P-P interval (atrial rate) will not match the R-R interval (ventricular rate)

• Prolonged PR interval

• Broad QRS complex

• The number of P waves will not be equal to the number of R waves

• P-P interval (atrial rate) will not match the R-R interval (ventricular rate)

Incorrect Options:

Option A - 2nd degree AV block:

• 2nd-degree AV block presents with dropped beats or missed beats.

Option B - Atrial tachycardia:

• Atrial tachycardia is ruled out as the heart is not more than 100 beats/min.

Option C - First-degree AV block:

• First-degree heart block shows PR prolongation of more than 200 milliseconds

Solution for Question 143:

Correct Option B - Absent y descent:

• Muffled heart sounds and low blood pressure is seen in cardiac tamponade.

• Absent y descent and non-pulsatile elevated JVP are the JVP findings seen in cardiac tamponade due to ventricular filling defect.

• Becks triad is a presenting feature of cardiac tamponade: Muffled heart sounds Hypotension Elevated JVP

• Muffled heart sounds

• Hypotension

• Elevated JVP

• Muffled heart sounds

• Hypotension

• Elevated JVP

Incorrect Options:

Option A - Steep x descent:

• Steep x descent is seen in constrictive pericarditis along with steep y descent

Option C - Steep y descent:

• Steep y descent is seen in exaggerated tricuspid regurgitation

Option D - Blunted x descent :

• Blunted x descent is seen in restrictive cardiomyopathy

Solution for Question 144:

Correct Option C - Primary angioplasty:

• Primary angioplasty/Baloon angioplasty/Percutaneous coronary intervention is the treatment of choice in patients with ST-elevation MI.

• It is performed within the first medical contact-to-device time, which is 90 mins.

• A transradial or transfemoral approach (preferred) can be used.

• Earlier bare metal stents were used, but now drug-eluting stents coated with Everolimus or Zotarolimus are used.

Incorrect Options:

Option A - Alteplase:

• Alteplase (Tissue plasminogen activator) is preferred in non–PCI–capable hospitals.

• Door-in and door-out (DIDO) to initiate fibrinolysis within 30 minutes

Option B - Streptokinase:

• Streptokinase is not the treatment of choice according to the latest guidelines and it has the risk of anaphylaxis.

Option D - Dabigatran:

• Dabigatran is not used in the treatment of MI.

Solution for Question 145:

Correct Option A - Adenosine:

• The above ECG shows narrow QRS tachycardia indicating paroxysmal supraventricular tachycardia.

• The best treatment for PSVT is Inj. adenosine 6 mg/12 mg.

• It is administered in patients with stable systolic BP >90 mmHg

Incorrect Options:

Option B
- Amiodarone: Amiodarone is used along with beta-blockers in recurrent ventricular tachycardias

Option C - Beta-blocker: Beta-blockers may be helpful but can cause hypotension.

Option D
- Valsalva maneuver: Valsalva maneuver is the initial treatment in PSVT with systolic BP >90 mmHg.

Solution for Question 146:

Correct Option A - T.I.A (Transient ischemic attack):

• The transient ischemic attack is caused by a thrombus occluding a blood vessel causing neurological manifestations.

• In this patient, mid-diastolic murmur indicates mitral stenosis leading to atrial fibrillation which causes clot formation leading to cardio-embolic stroke.

• Improvement of symptoms occurs within 1 hour and complete resolution of symptoms occurs in <24 hours due to spontaneous destruction of clot and revascularization of blood vessels.

• Protein C, Protein S, and Anti Thrombin III are naturally occurring anti-coagulants that destroy the clot.

Incorrect Options:

Option B - Thrombo-embolic stroke:

• The neurological symptoms resolved completely which indicates TIA.

Option C - Cardio embolic stroke:

• Mid-diastolic murmur and an irregular heart rhythm along with neurological symptoms cause cardio-embolic stroke, but in this case, the symptoms resolved themselves completely.

Option D - Paradoxical embolism:

• The neurological symptoms resolve completely which indicates TIA

Solution for Question 147:

Correct Option B - Pulmonary edema:

• Mitral stenosis with sudden onset breathing difficulty, limb edema, and pain in calves indicates pulmonary edema.

• Mitral stenosis over time causes LA dilatation which causes pulmonary venous hypertension leading to pulmonary edema.

• Pulmonary edema leads to right ventricular hypertrophy causing limb edema.

• Pulmonary edema occurs mainly due to the increased pressure in LA and the pulmonary venous circuit.

Incorrect Options:

Option A - Pulmonary embolism:

• Pulmonary embolism causes pulmonary oligemia that does not cause cardiogenic pulmonary edema.

Option C - Cerebral embolism:

• Cerebral embolism is ruled out as no neurological features are present in this patient.

Option D - Paradoxical embolism:

• Paradoxical embolism is ruled as there are no neurological features present.

Solution for Question 148:

Correct Option A - HOCM:

• Normally JVP falls on deep inspiration, but if it rises it is called the Kussmaul sign.

• The Kussumaul sign is not seen in HOCM.

Incorrect Options:

Option B, C, and D: (Constructive pericarditis, Cor pulmonale & Restrictive cardiomyopathy)

• Kussumaul sign is seen in all these conditions

BCLS,ACLS,Mechanical Ventilation

1. A 50-year-old female collapsed to the ground while walking. You happened to be a bystander and approached the patient .On examination, a pulse was felt but breathing efforts were absent. .What is the next step in managing this patient?

A. One cycle of cardiopulmonary resuscitation in 2 minutes

B. 10-12 breaths/minute or 1 breath every 6 seconds

C. Monitor the patient until the emergency services arrive

D. Automated External Defibrillator

---

2. During a cardiopulmonary resuscitation (CPR) scenario, what is the recommended rate for chest compressions, and how often should 2 rescue breaths be administered in accordance with the standard compression-to-ventilation ratio?

A. Chest compressions at a rate of 80-100/minute with 2 rescue breaths every 15 compressions (15:2)

B. Chest compressions at a rate of 120-140/minute with 2 rescue breaths every 20 compressions (20:2)

C. Chest compressions at a rate of 100-120/minute with 2 rescue breaths every 30 compressions (30:2)

D. Chest compressions at a rate of 60-80/minute with 2 rescue breaths every 10 compressions (10:2)

---

3. A medical rescue team approached a man who collapsed in the middle of the road.Mark the option with the appropriate positioning of the doctor.

A. Head end

B. Foot end

C. Left side

D. Right side

---

4. During cardiopulmonary resuscitation (CPR), what is the most commonly injured solid organ?

A. Kidneys

B. Spleen

C. Liver

D. Lungs

---

5. Which of the following are true regarding mechanical ventilation? a. Tidal volume in ARDS is 12ml/kg b. Fi O2 is started from 0.4 c. Tidal volume can be adjusted according to the weight of the patient d. Respiratory rate is increased in DKA and raised ICT e. Peak pressure of 30 cm of water to limit Barotrauma f. PEEP of 5 cm of water will help in the recruitment of alveoli

A. a,c,e,f

B. b,d,e,f

C. b,c,d,e

D. a,d,e,f

---

6. During the use of an Automated External Defibrillator (AED), what is the standard energy level, measured in joules, delivered in a direct current (DC) shock when the device detects a shockable rhythm?

A. 50 Joules

B. 100 Joules

C. 150 Joules

D. 200 Joules

---

7. A newborn who was delivered through LSCS has no signs of breathing. Which of the following is true regarding CPR in this patient?

A. 3:2 with 1-2 rescuers

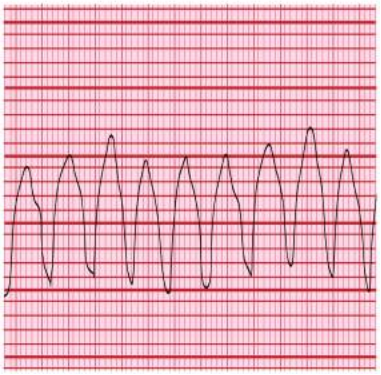
B. 30:2 with 1 rescuer

C. 15:2 with 2 rescuers

D. 3:1 with 2 rescuers

---

8. A 55-year-old male who collapsed was rushed to the Emergency department for rescue. The ECG was taken and is shown below. The doctor started resuscitation and failed even after giving two rounds of non-synchronized DC shock, CPR , and epinephrine administration.What is the next step in management?



A. Advanced airway

B. 3rd non-synchronized DC shock

C. IV Amiodrone

D. Targeted temperature management

---

9. Synchronized DC shock is given at the peak of which wave?

A. Peak of P wave

B. Peak of Q wave

C. Peak of R wave

D. Peak of T wave

---

10. Which of the following is stored at room temperature?

A. Platelets

B. PRBC

C. FFP

D. Plasma

---

11. Administration of 4 units of PRBC,4 units of FFP, one unit of SDP is done in which round of massive blood transfusion?

A. Round 1

B. Round 2

C. Round 3

D. Round 4

---

12. Which of the following correctly describes massive transfusion protocol?

A. Replacement of the entire blood volume with more than 10 Units of whole blood within 24 hours

B. Replacement of the entire blood volume with more than 3 units of whole blood given within 4 hours period

C. Replacement of the entire blood volume with by more than 10 Units of whole blood within 12 hours

D. Replacement of the entire blood volume more than 2.5 L of whole blood given within 2 hours period

---

13. The assessment of blood component score (ABC score) during massive blood transfusion includes all of the following except

A. HR

B. RR

C. SBP

D. Penetrating injury

---

14. Identify the correct ratio of PRBC:FFP:SDP to be administered in a massive transfusion protocol?

A. 1:1:1

B. 1:2:1

C. 1:1:6

D. 1:1:0.25

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	3
Question 3	3
Question 4	3
Question 5	2
Question 6	4
Question 7	4
Question 8	1
Question 9	3
Question 10	1
Question 11	2
Question 12	1
Question 13	2
Question 14	4

Solution for Question 1:

Correct Option B - 10-12 breaths/minute or 1 breath every 6 seconds:

• Absent respiration and positive pulse is an indication to give rescue breaths

Incorrect Options:

Option A - One cycle of cardiopulmonary resuscitation is 2
minutes: This is indicated when both pulse and respiration are absent

Option C - Monitor the patient until the emergency services arrive: This is indicated when both pulse an d respiration is present but there is loss of consciousness.

Option D - Automated External Defibrillator: This is done by trained paramedic staff and doctors once t he emergency services arrive.

Solution for Question 2:

Correct Option C - Chest compressions at a rate of 100-120/minute with 2
rescue breaths every 30 compressions (30:2):

• In cardiopulmonary resuscitation (CPR), the recommended rate for chest compressions is 100-120 compressions per minute. The standard compression-to-ventilation ratio is 30 compressions followed by 2 rescue breaths. This sequence helps maintain an effective balance between chest compressions and ventilation to optimize blood circulation and oxygenation during CPR.

Incorrect Options:

Option A - Chest compressions at a rate of 80-100/minute with 2 rescue breaths every 15 compressions (15:2): This option suggests a compression rate lower than the recommended range (80-100/minute) and an unusual compression-to-ventilation ratio (15:2).

Option B - Chest compressions at a rate of 120-140/minute with 2 rescue breaths every 20 compressions (20:2): This option suggests a higher compression rate (120-140/minute) than the recommended range and a different compression-to-ventilation ratio (20:2).

Option D - Chest compressions at a rate of 60-80/minute with 2 rescue breaths every 10 compressions (10:2): This option suggests a lower compression rate (60-80/minute) than the recommended range and an unusual compression-to-ventilation ratio (10:2).

Solution for Question 3:

Correct Option C - Left side:

• Doctor/ nurse stands to the left to gain IV access

Incorrect Options:

Options - A, B, D are incorrect statements

Solution for Question 4:

Correct Option C - Liver:

• During CPR, the most commonly injured solid organ is the liver. The liver is located in the right upper quadrant of the abdomen, beneath the ribcage. The forceful chest compressions involved in CPR can lead to injury, particularly when the hands are placed on the lower third of the sternum. Placing the hands too low, such as on the xiphisternum (pointed part of the sternum), can cause injury to the liver.

Incorrect Options:

Option A - Kidneys: The kidneys are not typically at risk of injury during chest compressions in CPR. They are located in the retroperitoneal space, well-protected by the spine and muscles.

Option B - Spleen: The spleen is located in the left upper quadrant of the abdomen. While it is an organ that can be injured in traumatic situations, it is less commonly affected during standard chest compressions in CPR.

Option D - Lungs: Lungs are not considered solid organs; they are soft and elastic tissues. During CPR, the focus is on chest compressions to circulate blood, and lung injury is not a common occurrence.

Solution for Question 5:

Correct Option B - b, d, e, f:

• b. Fi O2 is started from 0.4

• d. Respiratory rate is increased in DKA and raised ICT

• e. Peak pressure of 30 cm of water to limit Barotrauma

• f. PEEP of 5cm of water will help in the recruitment of alveoli

Incorrect Options:

Option A - a, c, e, f:

• a. Tidal volume in ARDS is 12ml/kg is a wrong statement 12-12 rule of tidal volume is not followed in Acute respiratory distress syndrome V = 6ml/ kg lean body weight is followed to minimize volutrauma in the patient ARDS is a condition with inflamed alveoli. Inflation and deflation with standard rule will cause Barotrauma to the alveoli

• 12-12 rule of tidal volume is not followed in Acute respiratory distress syndrome

• V = 6ml/ kg lean body weight is followed to minimize volutrauma in the patient

• ARDS is a condition with inflamed alveoli.

• Inflation and deflation with standard rule will cause Barotrauma to the alveoli

• c. Tidal volume can be adjusted according to the weight of the patient V = 12ml/ kg lean body weight - fat component should be subtracted and Respiratory rate= 12/min Patients with different body weights, the lung capacity will be the same ,This fat content should be subtracted from the total weight.

• V = 12ml/ kg lean body weight - fat component should be subtracted and Respiratory rate= 12/min

• Patients with different body weights, the lung capacity will be the same ,This fat content should be subtracted from the total weight.

• 12-12 rule of tidal volume is not followed in Acute respiratory distress syndrome

• V = 6ml/ kg lean body weight is followed to minimize volutrauma in the patient

• ARDS is a condition with inflamed alveoli.

• Inflation and deflation with standard rule will cause Barotrauma to the alveoli

• V = 12ml/ kg lean body weight - fat component should be subtracted and Respiratory rate= 12/min

• Patients with different body weights, the lung capacity will be the same ,This fat content should be subtracted from the total weight.

Option C and D - Refer to the above explanation.

Solution for Question 6:

Correct Option D - 200 Joules:

• During the use of an Automated External Defibrillator (AED), when the device detects a shockable rhythm, it delivers a standard energy level of 200 Joules in a direct current (DC) shock. This is the recommended energy level for treating ventricular fibrillation and pulseless ventricular tachycardia, which are considered shockable rhythms in cardiac arrest situations. The higher energy is necessary to

restore a normal heart rhythm and improve the chances of successful defibrillation.

Incorrect Options:

Options A, B, and C: Suggest energy levels that are not commonly used in standard AED protocols for shockable rhythms.

Solution for Question 7:

Correct Option D - 3:1 with 2 rescuers:

• Ratio of CPR administration

Adult

• 3:2

• 1-2 rescuers

Pediatrics (child)

• 30:2

• 15:2

• 1 rescuer

• 2 rescuers

Neonate

• 3:1

• 2 rescuers mandatory

Incorrect Options:

Options A, B, C: Refer to the above explanation

Solution for Question 8:

Correct Option A - Advanced airway:

• The ECG shows ventricular fibrillation which is a shockable rhythm.

• The doctor tried to give two rounds of two rounds of non-synchronized DC shock, CPR each, but failed and started administering epinephrine which showed no improvement.

• The next step in management is securing an advanced airway and capnography

Incorrect Options:

Option B - 3rd non-synchronized DC shock given: Only when advanced airway fails

Option C - IV Amiodrone: This is administered when even a third round of shock fails

Option D - Targeted temperature management: This is done if Return of spontaneous circulation (R.O.S.C) is achieved

Solution for Question 9:

Correct Option C - Peak of R wave:

• DC shock is given at Peak of R wave because it is point at which the heart is contracting abnormally.

Incorrect Option

Options A, B, D are incorrect

Solution for Question 10:

Correct Option A - Platelets:

• Platelets stored at room temperature (20-24 C)

Incorrect Option B, C, D - Stored in cool temperatures

Solution for Question 11:

Correct Option B - Round 2:

Round 2: of transfusion includes -Infusion of

• 4 Units PRBC , 4 Units FFP , 1 Unit SDP (Single Donor Platelet)

• Team B: Resend blood to lab so that we can evaluate coagulopathy and metabolic acidosis component.

• Calcium gluconate is given to prevent tetany (caused by citrate in PRBC).

• Cryoprecipitate is given: If the fibrinogen < 100 mg/L

• If No Improvement: ROUND 3

Incorrect Options:

Option A - Round 1: Infusion of 4 Units of PRBC (O-VE) & 2 units FFP (AB +)

Option C - Round 3: Repeat round 2 + factor VIIa

Option D - Round 4: Does not exist

Solution for Question 12:

Correct Option A
- Replacement of the entire blood volume with more than 10 Units of whole blood within 24 hours:

Definition of massive transfusion protocol

• Replacement of the entire blood volume of the patient by more than 10 Units of whole blood within 24 hours or more than 2.5 L (5 units) of whole blood given within 4 hours period.

Incorrect Options:

Options B, C, D- Refer to the above explanation.

Solution for Question 13:

Correct Option B- RR is not assessed in ABC score:

Triggers of massive transfusion protocol

• Assessment of blood component score (ABC score)

Components

Points

Penetrating injury

1

FAST positive

HR >100/min

SBP <90 mm Hg

• If ABC score ≥ 2 then there is 75% accuracy in the prediction of massive transfusion protocol (MTP)

Incorrect Options:

Options A, C, D: Components of ABC score

Solution for Question 14:

Correct Option D - 1:1:0.25:

• 6 units of platelet-rich plasma are condensed into a single bag and are available as SDP (Single donor Platelet) which is prepared by Apheresis.

• Efficacy of SDP is same as 6 Units of Platelet Rich Plasma (PRP) ·

• If single donor platelets is used then the ratio is 1:1:0.25

Incorrect Option-A, B, C-refer to the above explanation

ARDS,Snake Bite,High Altitude Pulmonary Edema

1. A 25-year-old male was rushed to the nearby hospital after two days of mountain climbing with a complaint of unexplained cough, vomiting, dizziness, and shortness of breath. He admitted that he is having trouble sleeping at night after mountaineering. Clinical examination showed a raised heart rate and respiratory rate. Auscultation revealed crackles in the middle lobes of the lungs. All of the following are the findings in the diagnosis except?

A. ABG shows Respiratory Alkalosis

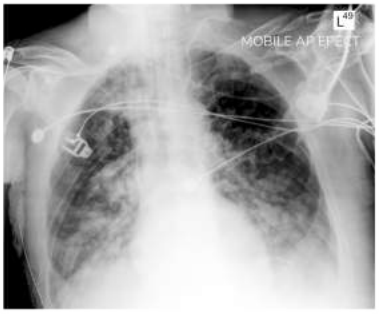
B. RV strain pattern on echocardiography

C. Batwing edema with cardiomegaly

D. Normal pulmonary capillary wedge pressure

---

2. A 25-year-old male who met with a road traffic accident with polytrauma was posted for a massive blood transfusion and was monitored carefully. The vitals showed no improvement even after the second round of transfusion hence started round 3. The patient started to have breathing difficulty, unexplained cough, turned cyanotic. A chest x ray was taken and is shown below. The PaO2 / FiO 2 is 150. Identify the condition and mark the option with the most important diagnostic criteria according to BERLIN criteria?



A. Sudden onset respiratory distress

B. Bilateral pulmonary infiltrates

C. PaO / FiO less than 300

D. Absence of left arterial Hypertension

---

3. Refractory hypoxia is seen in which phase of ARDS

A. Exudative phase

B. Transudative phase

C. Proliferative phase

D. Fibrotic phase

---

4. All of the following are features of ARDS except-

A. High protein pulmonary edema

B. CP angle is normal

C. Elevated Hydrostatic pressure

D. Exudative pulmonary edema

---

5. All of the following are management protocols regarding ventilation in a patient with pH- 7.40 pO2 - 60 ,· pCO2 - 40 except?

A. Increase FiO2

B. Increase PEEP

C. Maintain the same tidal volume

D. Increase Respiratory rate

---

6. Which of the following statements are true regarding the most common mode of invasive mechanical ventilation?

A. Used in patients with no spontaneous breathing

B. Hypoventilation is one of its side effects

C. The breathing is synchronized

D. Helps in weanING off the patient from ventilator

---

7. Match the following 1)CPAP a) Supports patient breathing efforts 2)BiPAP b)Used for weaning off patients from ventilation 3)ACMV c)Positive pressure varies in inspiration and expiration 4)SIMV d)helps to limit the inflation of the lungs 5)PCV e)Positive pressure generated is continuous for both inspiration and expiration

1)CPAP	a) Supports patient breathing efforts
2)BiPAP	b)Used for weaning off patients from ventilation
3)ACMV	c)Positive pressure varies in inspiration and expiration
4)SIMV	d)helps to limit the inflation of the lungs
5)PCV	e)Positive pressure generated is continuous for both inspiration and expiration

A. 1-e,2-c,3-a,4-b,5-d

B. 1-a,2-d,3-b,4-e,5-c

C. 1-c,2-e,3-b,4-d,5-a

D. 1-d,2-a,3-c,4-b,5-e

---

8. All of the following are indications for CPAP use except?

A. Hyaline membrane disease

B. Obstructive sleep apnoea

C. COPD

D. Cardiogenic pulmonary edema

---

9. Which of the followingsnakes is responsible for affecting the presynaptic transmission of release of acetylcholine?

A. Cobra

B. Krait

C. Russels viper

D. Humped nose viper

---

10. A farmer who was working in the field visited his nearby rural medical practitioner saying he was bitten by a snake but not sure which one. The patient started to have pain at the site of the bite,his eyes started turning red as shown below. He was referred to the nearby PHC and the doctor observed purpura over the skin, and tender lymphadenopathy. BP was recorded to be 90/80 mmHg. The patient started to have severe abdominal pain and bleeding through the nose. Identify the snake responsible for the features.

A. Viper

B. Krait

C. Cobra

D. Common sand Boa

---

11. What is the bite-to-needle time for administration of Polyvalent snake venom in a snake bite?

A. 4 hours

B. 2 hours

C. 6 hours

D. 5 hours

---

12. All of the following responds to anti-snake venom except

A. Cobra

B. Krait

C. Russels viper

D. Humped nose viper

---

13. All of the following are used to manage a case of snake bite except?

A. Immobilize the patient

B. Reassure

C. Apply a tourniquet

D. Check for clot features in the test tube after 20 min

---

14. Match the following presentations with their respective treatment of choice? 1)Acute mountain sickness a)Dexamethasone 2)High altitude pulmonary edema b)Acetazolamide 3)High altitude cerebral edema c)Nifedipine

1)Acute mountain sickness	a)Dexamethasone
2)High altitude pulmonary edema	b)Acetazolamide
3)High altitude cerebral edema	c)Nifedipine

A. 1-a,2-b,3-c

B. 1-b,2-c,3-a

C. 1-a,2-c,3-a

D. 1-b,2-a,3-c

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	3
Question 3	1
Question 4	3
Question 5	4
Question 6	1
Question 7	1
Question 8	3
Question 9	2
Question 10	1
Question 11	1
Question 12	4
Question 13	3
Question 14	2

Solution for Question 1:

Correct Option C - Batwing edema with cardiomegaly are not seen:

• The diagnosis is high altitude pulmonary edema.

• The question speaks about a mountaineer who experiences shortness of breath ,cough and vomiting (due to irritation of dura by hypoxia)

• High altitude always leads to hypoxia leading to vasoconstriction resulting in fluid leak causing non-cardiogenic pulmonary edema.

• These symptoms start 2-3 days after ascent

• BAL shows elevated RBC and proteins-indicating damaged pulmonary vessel integrity

• All of the following findings are seen in HAPE except batwing edema and cardiomegaly.(non-cardiogenic edema)

Incorrect Options:

Options - A, B, D: Seen in HAPE

Solution for Question 2:

Correct Option C - PaO / FiO less than 300:

• The diagnosis is Acute respiratory distress syndrome

• The hints in the question like massive blood transfusion which is followed by respiratory compromise and the chest xray-showing multiple bilateral infiltrates helps in the diagnosis

• The PaO2 / FiO 2 is 150, indicates moderate ARDS

• PaO2 / FiO2 less than 300 is an important diagnostic BERLIN criteria in ARDS

Incorrect Options:

Options A, B, C: These are also part of the diagnostic criteria but secondary to PaO2 / FiO2

Solution for Question 3:

Correct Option A - Refractory hypoxia (decreased pO2 and increased pCO2) is a part of the exudative phase:

• Exudative phase- 0-7 days Respiratory distress starts within 12-36 hours of triggers onset. Intrapulmonary shunting (Blood is getting wasted in the lungs due to alveolar collapse or endothelial injury) Increase in work of breathing. ↓ pO , ↑ pCO 2 2 (Refractory hypoxia) Dead space increased. Type 2 Respiratory failure / Respiratory acidosis

• 0-7 days

• Respiratory distress starts within 12-36 hours of triggers onset.

• Intrapulmonary shunting (Blood is getting wasted in the lungs due to alveolar collapse or endothelial injury)

• Increase in work of breathing.

• ↓ pO , ↑ pCO 2 2 (Refractory hypoxia)

• Dead space increased.

• Type 2 Respiratory failure / Respiratory acidosis

• 0-7 days

• Respiratory distress starts within 12-36 hours of triggers onset.

• Intrapulmonary shunting (Blood is getting wasted in the lungs due to alveolar collapse or endothelial injury)

• Increase in work of breathing.

• ↓ pO , ↑ pCO 2 2 (Refractory hypoxia)

• Dead space increased.

• Type 2 Respiratory failure / Respiratory acidosis

Incorrect Option:

Option B - Transudative phase:

• This phase is absent in ARDS

• Transudative fluids are seen in cardiogenic edema but ARDS is a non-cardiogenic pulmonary edema.

Option C - Proliferative phase:

• 7-21 days

• Able to wean off the ventilator.

• Proliferation of type 2 pneumocytes

• Some differentiate into type-1 pneumocytes.

• Recovery is possible

Option D - Fibrotic phase:

• >21 days

• Require supplemental oxygen for the rest of their life · It results in pulmonary artery hypertension.

• Bullae or blebs can also be seen in ARDS

Solution for Question 4:

Correct Option C - Elevated Hydrostatic:

• Elevated Hydrostatic pressure is seen in congestive heart failure and not in ARDS

Incorrect Options:

Options A,B,D are all features of ARDS

Solution for Question 5:

Correct Option D - Increase Respiratory rate:

• pH- 7.40(Normal) , pO2 - 60 (Deficient) , pCO2 - 40 (Normal) indicates hypoxia

• Increase FiO 2i

• Increase PEEP - Recruitment is better

• Since pH and pCO2 are normal, Increased RR has nothing to do with the management as increased RR is done to drive out CO2 which is used in treatment of respiratory acidosis.

Incorrect Options:

Options A, B, C: Refer to the above explanation.

Solution for Question 6:

Correct Option A - Used in patients with no spontaneous breathing:

• The most common mode of invasive mechanical ventilation is Assisted controlled mechanical ventilation

• Used in patients with no spontaneous breathing

• Patient triggered breaths are also assisted ·

• Side effects include HYPERVENTILATION -CO2 washout- Respiratory alkalosis-Hypocalcaemia (Tetany) and Laryngospasm- Hypoxia, Seizures and myoclonus

Incorrect Options:

Option B - Hypoventilation is one of its side effects: Hypoventilation is a side effect of SIMV

Option C - The breathing is synchronized: The breathing is synchronized and d) Helps in wean off the patient are features of SIMV

Solution for Question 7:

Correct Option A - 1-e, 2-c, 3-a, 4-b, 5-d:

1)CPAP-e)Positive pressure generated is continuous for both inspiration and expiration

2)BiPAP-c)Positive pressure varies in inspiration and expiration

3)ACMV-a) Supports patient breathing efforts

4)SIMV-b)Used for weaning off patients from ventilation

5)PCV-d)helps to limit the inflation of the lungs

Incorrect Options:

Options B, C, D: Refer to the above explanation

Solution for Question 8:

Correct Option C - COPD:

• COPD-is not an indication for CPAP

• Non-invasive ventilation is used in COPD

Incorrect Options:

Options A,B,D all are indications for CPAP use.

Solution for Question 9:

Correct Option B - Krait:

• Krait is neurotoxic, mainly affects presynaptic transmission that is release of ACh at the neuro-muscular junction is affected

Incorrect Options:

Option A - Cobra- (Neurotoxic): Affects postsynaptic transmission. It hampers the action of ACh at the neuromuscular junction.

Option C
- Russels viper- It is hemotoxic and causes acute kidney injury/ acute tubular necrosis and uremia

Option D - Humped nose viper: This is also hemotoxic and causes acute kidney injury/ acute tubular ne crosis and uremia.

Solution for Question 10:

Correct Option A - Viper:

• The question shows pain at the bite site, tender lymphadenopathy and bleeding manifestations such as subconjunctival hemorrhage, purpura, abdominal pain(due to bleeding in the stomach), lepistaxis and hypotension due to multiple bleeding sites and release of histamine are all features of Viper bite.

Incorrect Options:

Options B - Krait: Neurotoxic snake and the features like local pain and tender lymphadenopathy are a bsent here

Options C - Cobra: Same explanation as Krait

Options D - Common sand Boa: This is a non venomous Indian snake

Solution for Question 11:

Correct Option A - 4 hours:

• ASV should be given within 4 hours of snake bite. · ASV: Bite to needle Time <4 hours.

Incorrect Options:

Options B, C, D are incorrect

Solution for Question 12:

Correct Option D - Humped nose viper:

• Humped nose viper does not respond to ASV

Incorrect Options:

Options A, B, C All respond to anti-snake venom

Solution for Question 13:

Correct Option C - Apply a tourniquet

• Do not apply a tourniquet: To avoid pressure necrosis. ·

• If a tourniquet is already applied then, don't cut the tourniquet, as it may cause the extensive spread of poison resulting in Diaphragm paralysis Sudden onset hypotension due to histamine release

• Diaphragm paralysis

• Sudden onset hypotension due to histamine release

• Diaphragm paralysis

• Sudden onset hypotension due to histamine release

Incorrect Options:

Option A - Immobilize the patient: Which prevents faster spread of venom.

Option B - Reassure: Because 70% snake bites belong to nonvenomous species.

Option D - Check for clot features in test tube after 20 min: To assess coagulopathy

• Normal: a solid clot is retained on the inversion of the tube at 20 or 30 minutes (Grade 0, no coagulopathy)

• Abnormal: clot degrades rapidly (Grade 1, friable clot) or fails to coagulate whatsoever (Grade-2)

• 20 minutes Whole Blood Clotting Test - Repeat every 30 min for the first 3 hours of the admission (after giving ASV it can be done on a 1- hour basis).

Solution for Question 14:

Correct Option B - 1-b,2-c,3-a:

1)Acute mountain sickness- b)Acetazolamide

2)High altitude pulmonary edema- c)Nifedipine

3)High altitude cerebral edema- a)Dexamethasone

Incorrect Options:

Options A, C, D: Refer to the above explanation.

Previous Year Questions

1. Please match the following medical conditions with their corresponding descriptions: A) Caplan syndrome- 1) Initially observed in coal workers B) Asbestosis- 2) Presents with a characteristic "crazy pavement" appearance C) Mesothelioma- 3) Affects the lower lobe of the lungs D) Sarcoidosis- 4) Exhibits the presence of pleural effusion

A. A-1, B-4, C-3, D-2

B. A-4, B-2, C-3, D-1

C. A-3, B-4, C-2, D-1

D. A-2, B-4, C-3, D-1

---

2. Which of the following is NOT a complication of blood transfusion in a 25-year-old mother who developed acute postpartum hemorrhage (PPH), hypovolemic shock, and underwent major blood transfusion after delivering a baby boy?

A. Hypocalcemia

B. Hypokalemia

C. Hypothermia

D. Hyperkalemia

---

3. What is the lifelong treatment for individuals who have received a potent prosthetic mitral valve replacement?

A. Aspirin

B. Clopidogrel

C. Atorvastatin

D. Warfarin

---

4. A farmer has come with symptoms of pinpoint pupils, excessive salivation, and increased secretion from the body. The most probable diagnosis is

A. Opioid overdose

B. Organophosphate poisoning

C. Stroke

D. Heat stroke

---

5. What is the optimal temperature for the water bath recommended for a patient with frostbite?

A. 42 degree C

B. 37 degree C

C. 32 degree C

D. 30 degree C

---

6. Except for the following, which of the options listed can be used to manage a person experiencing breathlessness at a high altitude of 3000m?

A. Intravenous digoxin

B. Oxygen supplementation

C. Immediate descent

D. Acetazolamide

---

7. During a scorching summer afternoon, a man, who had been toiling in a field, unexpectedly collapsed. Upon examination, there were no apparent physical indications of dehydration, although his radial pulse was detectable. The doctor determined that the man's serum electrolyte levels were within the normal range. Shockingly, the man's body temperature measured 106 degrees Fahrenheit. Considering these circumstances, which of the following should be administered as an initial form of immediate assistance?

A. Inject epinephrine immediately

B. Cover with hot damp sheets

C. Cover with cool damp sheets

D. Start CPR

---

8. What are the most appropriate tests to perform in a 62-year-old male patient with heart failure who is scheduled for a heart transplant and experiences severe respiratory distress four hours after receiving 2 units of whole blood transfusion, and is found to be hypoxemic, tachycardic, and with elevated mean arterial pressure, considering that his renal function test is abnormal and his hemoglobin level is 6gm%? 1. Chest X-ray 2. Brain natriuretic peptide (BNP) level 3. Absolute neutrophil count 4. Leucocyte antibodies 5. Platelets

A. 4 and 5

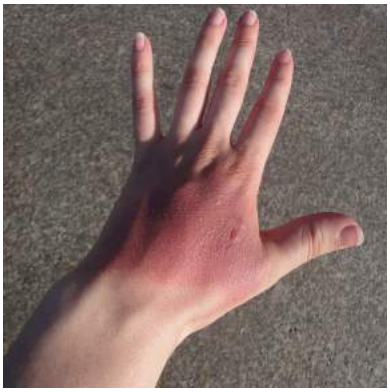
B. 3 and 5

C. 1 and 2

D. 2 only

---

9. A patient who is a tour guide of Mount Everest presented with blisters on her hand as shown in the figure below. She has severe pain and on examination is erythematous and tender. Which of the following is used in the management of this patient?



A. Oxygen

B. Apply heat to the area and cast it as soon as possible

C. Pentoxyphylline

D. NSAID’s

---

10. An elderly diabetic and hypertensive patient was carried to the emergency room in a comatose state. On examination, the blood pressure was 170/100 mmHg and pulse rate was >100/min. Plantar reflex was bilateral extensor. What is the next step to do?

A. Check blood sugar level

B. Give antihypertensive

C. IV mannitol

D. CT brain

---

11. Which of the following is not done before drawing blood for arterial blood gas analysis?

A. Allen's test

B. Rinse syringe with heparin

C. Flexion of wrist

D. Placing needle at 45 degree angle

---

12. Refractory Septic shock is defined as?

A. Shock persisting > 1 hour after IVF administration

B. Shock persisting > 1 hour after IVF administration and high dose vasopressors

C. Shock that is refractory to medical treatment

D. Shock that does not improve despite treatment for 24 hours

---

13. Which of the following animal is most likely responsible for biting a 10-year-old child who presented with symptoms of tachycardia, hypertension, tongue fasciculation, hypersalivation, dilated pupils, and mild erythema at the site of the wound? The child recalls that the animal had a curved tail pointing upwards.

A. Sea urchin

B. Caterpillar

C. Scorpion

D. Shellfish

---

14. Which test is the most sensitive for diagnosing Organophosphate poisoning among the following options?

A. Plasma acetylcholinesterase

B. Organophosphate level in blood

C. Organophosphate level in plasma

D. RBC transaminase levels

---

15. In a post-operative patient, after 2 hours of receiving FFP, sudden onset dyspnea, hypoxemia, tachypnea, hypotension, and bilateral pulmonary infiltrates on chest X-ray occur. What is the most likely diagnosis?

A. TRALI

B. TACO

C. Pulmonary edema

D. ARDS

E. Sepsis

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	2
Question 3	4
Question 4	2
Question 5	1
Question 6	1
Question 7	3
Question 8	3
Question 9	4
Question 10	1
Question 11	3
Question 12	2

Question 13	3
Question 14	1
Question 15	1

Solution for Question 1:

The correct match for the given options is:

A-1, B-4, C-3, D-2

Explanation:

A) Caplan syndrome - 1) Found first in coal worker Caplan syndrome is a condition characterized by th e presence of rheumatoid arthritis along with lung nodules or masses. It was initially described in coal miners who were also suffering from rheumatoid arthritis.

B) Asbestosis - 4) Pleural effusion is seen Asbestosis is a lung disease caused by the inhalation of asb estos fibers. Pleural effusion, the accumulation of fluid in the pleural space surrounding the lungs, can be seen in advanced stages of the disease.

C) Mesothelioma - 3) Involves lower lobe Mesothelioma is a type of cancer that primarily affects the me sothelial cells, which line the outer surface of the body's internal organs. While mesothelioma can invol ve various organs, it often affects the pleura (lining of the lungs). The involvement of the lower lobe of t he lung can be observed in cases where the tumor affects that particular region.

D) Sarcoidosis - 2) Crazy pavement Sarcoidosis is a systemic inflammatory disease that can affect mul tiple organs, but it most commonly involves the lungs and lymph nodes. The term "crazy pavement" is not specifically associated with sarcoidosis. It is a radiographic appearance seen in certain lung conditi ons, particularly pulmonary alveolar proteinosis, where the lung tissue exhibits a mosaic pattern resembling crazy paving.

To summarize: A) Caplan syndrome - 1) Found first in coal worker B) Asbestosis - 4) Pleural effusion is seen C) Mesothelioma - 3) Involves lower lobe D) Sarcoidosis - 2) Crazy pavement

Solution for Question 2:

Correct Options B: Hypokalemia

• Hypokalemia is not seen with blood transfusions. Instead, hyperkalemia occurs due to leakage of potassium from red blood cells in stored blood.

Incorrect Options:

Options A: Hypocalcemia: Hypocalcemia refers to low levels of calcium in the blood. While blood transf usion can potentially cause citrate-induced hypocalcemia, which is a temporary decrease in calcium levels due to the anticoagulant (citrate) present in stored blood, it is a recognized complication of blood transfusion.

Options C: Hypothermia: Hypothermia refers to abnormally low body temperature. Blood transfusion is generally administered at a temperature close to normal body temperature, and measures are taken to prevent hypothermia during transfusion. However, in certain situations, such as rapid transfusion or lar ge-volume transfusion, hypothermia can occur as a complication of blood transfusion.

Options D: Hyperkalemia occurs due to leakage of potassium from red blood cells in stored blood

Solution for Question 3:

Correct option:

Option D.

Warfarin is the most recommended anticoagulant in people who have undergone prosthetic mitral valv e replacement. Warfarin helps prevent thrombogenic events by inhibiting the clotting proteins in the blo od.

Incorrect options:

Option A. Warfarin and aspirin are both anticoagulants. But aspirin acts on blood platelets only. Warfari n, instead, inhibits the circulating blood clotting proteins in the blood.

Option B. Clopidogrel also has anti-platelet action like aspirin. Both these drugs act on platelets and no t on clotting proteins.

Option C. Atorvastatin is an anti-dyslipidemic drug. Patients with prosthetic valve requirements require regular intake of anticoagulants, more than anti-dyslipidemic.

Solution for Question 4:

Correct option:

Option B.

Miosis pupil or pinpoint pupil, increased salivation, and body secretion are characteristic clinical feature s of organophosphorus poisoning.

Incorrect options:

Option A. In opioid posing, the patient may present with pinpoint pupils. But they may not have features of increased salivation or body secretion.

Option C. In stroke, pinpoint pupils are present. But this essentially does not mean the patient had a str oke. Moreover, the patient may present with other neurological symptoms instead of increased body flu id secretion.

Option D. The patient suffers from extreme dehydration in heat stroke instead of increased salivation.

Solution for Question 5:

Correct Option A.

• The correct answer is 42 degree Celsius. When managing frostbite, one of the primary goals is to rewarm the affected tissue gradually. The recommended temperature for a water bath in the treatment of frostbite is typically set at 40-42 degree Celsius (104-107.6 degree Fahrenheit). This temperature

helps to promote vasodilation and improve blood flow to the affected area, aiding in the rewarming process.

Incorrect Options

Option B. 37 degree Celsius: While this temperature is within the normal body temperature range, it ma y not provide sufficient warmth to effectively rewarm the frostbitten tissue.

Option C. 32 degree Celsius: This temperature is below body temperature and would not be effective i n rewarming the tissue adequately.

Option D. 30 degree Celsius: Similar to 32 degree Celsius, this temperature is too low for effective rew arming of frostbitten tissue.

Solution for Question 6:

Correct option : A

• When a person complains of breathlessness at a high altitude of 3000m, it is likely due to altitude sickness, specifically high altitude pulmonary edema (HAPE). HAPE is a potentially life-threatening condition characterized by fluid accumulation in the lungs, leading to breathlessness and respiratory distress.

• Intravenous digoxin: Digoxin is a medication commonly used for heart conditions, particularly to treat heart failure and certain arrhythmias. However, in the context of high altitude breathlessness or HAPE, digoxin does not play a role in the management. HAPE is primarily caused by increased pulmonary artery pressure due to low oxygen levels and constriction of blood vessels in the lungs. Intravenous digoxin does not address these underlying mechanisms and is not indicated for the treatment of HAPE.

Incorrect options:

Option B) Oxygen supplementation: Oxygen supplementation is a crucial intervention for managing hig h altitude breathlessness. It helps increase the oxygen content in the blood, alleviating the symptoms a nd improving oxygenation to the body's tissues. Supplemental oxygen is commonly used in the manag ement of altitude sickness, including HAPE.

Option C) Immediate descent: Immediate descent to a
lower altitude is the most effective treatment for altitude sickness. If a
person is experiencing severe symptoms, including breathlessness, prompt descent to a
lower altitude allows for a decrease in altitude-related stress on the body, leading to improved oxygena tion and relief of symptoms.

Option D) Acetazolamide: Acetazolamide is a medication that helps prevent and treat altitude sickness. It works by stimulating increased breathing and reducing the build-up of fluid in the body, including the lungs. Acetazolamide can be used as a
prophylactic measure before ascending to high altitudes or as a
treatment option for mild to moderate altitude sickness, including breathlessness.

Solution for Question 7:

Correct Option C:

• The above patient seems to be suffering from a heat stroke. There are no signs of dehydration and the body temperature is quite high and the radial pulse is present. The next best step is to cover the body with cool damp sheets.

Incorrect Options:

Option A: Epinephrine injection can be fatal for the patient.

Option B: Cool and not hot damp cloth is used to cool the body down.

Option D: CPR is not required as a steady radial pulse is perceived and the patient is not in shock.

Solution for Question 8:

Correct Choice: C

• The patient developed severe respiratory distress after receiving a blood transfusion in the given scenario. This raises concerns about a possible transfusion reaction. To investigate the situation, the following investigations would be relevant:

• Chest X-ray: A chest X-ray can help assess the condition of the lungs and identify any signs of pulmonary edema or other respiratory abnormalities that may be causing respiratory distress.

• Brain natriuretic peptide (BNP) level: BNP is a hormone released by the heart in response to increased stretching of the cardiac chambers. Elevated BNP levels can indicate cardiac dysfunction, including heart failure. In this case, measuring BNP levels can help evaluate the extent of cardiac involvement and assess the impact of the transfusion reaction on the patient's heart.

• These 2 are the best investigations for the above scenario. Therefore, option c is correct.

Incorrect Choices:

Option A. Leucocyte antibodies: Testing for leucocyte antibodies can help identify potential immune rea ctions or transfusion-related complications, such as febrile non-hemolytic transfusion reactions or trans fusion-related acute lung injury (TRALI). These antibodies can trigger immune-mediated reactions and should be assessed in cases of suspected transfusion reactions.

Platelets: Platelet levels may be assessed to evaluate the patient's overall blood count and rule out any platelet-related complications or abnormalities contributing to the clinical presentation. However, as alr eady mentioned above, CXR and BNP are the best investigations for the patient.

Option B: Absolute neutrophil count: This investigation assesses the number of neutrophils in the blood stream, a type of white blood cell. It helps evaluate the patient's immune response and determine if the re is any evidence of an inflammatory reaction or infection that could be contributing to respiratory distr ess. Platelet levels may be assessed to evaluate the patient's overall blood count and rule out any plat elet-related complications therefore, this option is incorrect.

Option D. BNP alone cannot help the patient as there is the option for CXR also available. Therefore, t he best option is BNP and CXR.

Solution for Question 9:

The correct answer Option D: NSAIDs:

• Nonsteroidal anti-inflammatory drugs (NSAIDs) can be used to relieve pain and reduce inflammation associated with blisters. They may help alleviate the severe pain experienced by the patient in this case. NSAIDs can be beneficial as part of the overall management of blister-related pain.

• The recommended approach includes protecting the blister, keeping it clean, and using pain-relieving measures such as NSAIDs, if necessary.

Incorrect options:

Option A: Oxygen:

• Oxygen is not typically used in the management of blisters on the hand. Oxygen therapy is commonly used in various medical conditions to improve oxygenation in the body, but it is not a specific treatment for blisters.

Option B: "Apply heat to the area and cast it as soon as possible."

• Apply heat to the area and cast it as soon as possible: This option is not recommended for the management of blisters. Applying heat can increase inflammation and discomfort while enclosing the blister in a case may create a warm and moist environment that can promote bacterial growth and increase the risk of infection. It is important to avoid applying heat to the blistered area.

Option C: Pentoxyphylline:

• Pentoxyphylline is a medication that can improve blood flow and is sometimes used in the treatment of vascular disorders. However, it is not a standard treatment for blisters and is not typically used in their management.

Solution for Question 10:

Correct Option A

• In the given scenario, the patient is elderly and presents in a comatose state with hypertension and tachycardia. The presence of bilateral extensor plantar reflex suggests significant neurological involvement. Given the patient's history of diabetes and hypertension, it is important to first check the blood sugar level (Choice A) to evaluate for hypoglycemia.

Incorrect options:

Option B. Give antihypertensive: While the patient's blood pressure is elevated, administering antihyper tensive medications (Choice B) without identifying the underlying cause can be potentially harmful. The patient's comatose state and neurological findings indicate a need for further evaluation before initiating specific treatment.

Option C. IV mannitol: IV mannitol (Choice C) is commonly used in the treatment of raised intracranial pressure or cerebral edema. However, the decision to administer mannitol should be based on a definitive diagnosis, which requires further evaluation such as a CT scan of the brain.

Option D. CT brain: A
CT scan of the brain (Choice D) is an important diagnostic tool in the evaluation of a comatose patient with neurological findings. However, it should not be the immediate next step before considering other essential investigations, such as checking the blood sugar level

Solution for Question 11:

Correct Option C

• Flexion of wrist: This statement is incorrect. Flexion of the wrist is not a step that is typically performed before drawing blood for ABG analysis. Flexing the wrist can affect the arterial blood flow and potentially alter the accuracy of the blood gas measurement. It is important to keep the wrist in a neutral or slightly extended position during arterial puncture.

Option

• Before drawing blood for arterial blood gas (ABG) analysis, several steps are typically performed to ensure accurate and safe sampling.

Option A. Allen's test: This test is performed to assess the collateral circulation in the hand before obtaining an arterial blood sample. It involves applying pressure to both the ulnar and radial arteries while the patient makes a fist. The release of pressure on one artery should result in prompt color return to the hand, indicating adequate collateral circulation. Allen's test helps to minimize the risk of ischemia or necrosis in case of arterial occlusion during the blood sampling.

Option B. Rinse syringe with heparin: Heparin is commonly used to prevent blood clotting in the syringe and maintain the integrity of the blood sample. Before drawing arterial blood, the syringe is typically rinsed with heparin to ensure that the collected sample does not clot.

Option D. Placing needle at a
45-degree angle: When performing an arterial puncture, the needle is typically inserted at a 45-degree angle to the skin surface. This angle helps to ensure proper entry into the arterial vessel and minimize complications such as arterial wall damage or hematoma formation.

Solution for Question 12:

Correct option B

• Shock persisting > 1 hour after IVF administration and high-dose vasopressors: This is the correct option. Refractory septic shock is defined as shock that persists for more than 1 hour after adequate fluid resuscitation (IVF administration) and requires high-dose vasopressors. This indicates that despite receiving fluids and medications to increase blood pressure, the patient's condition remains unstable and unresponsive to treatment.

Incorrect options:

Option A. Shock persisting > 1 hour after IVF administration: This option does not fully define refractory septic shock. While persistent shock after intravenous fluid (IVF) administration may indicate a lack of response to initial fluid resuscitation, it does not encompass the additional criterion of high-dose vasopressors.

Option C. Shock that is refractory to medical treatment: This option is too broad and does not specifically address the criteria of IVF administration and high-dose vasopressors. While refractory septic shock can be described as shock that does not respond to medical treatment, the definition requires the additional factors mentioned in option B.

Option D. Shock that does not improve despite treatment for 24 hours: This option sets a specific time f rame of 24 hours, which is not consistent with the definition of refractory septic shock. The duration of s hock persistence is not limited to 24 hours but rather focuses on the lack of response to IVF administra tion and high-dose vasopressors

Solution for Question 13:

Correct Option C: Scorpion

• Tachycardia, hypertension, tongue fasciculation, hypersalivation, and dilated pupil following a bite is most suggestive of a bite of a scorpion.The venom is clear, colorless and is a hemolytic or neurotoxic, and is an autonomic stimulator that causes the release of large amounts of catecholamines from the adrenals.

Incorrect Options:

Option A: Sting from a
sea urchin causes granulomatous nodular lesions along with joint pain and dermatitis.

Option B: Caterpillar sting presents as pain, itching, and rash.

Option D: Shellfish sting usually leaves a purple or red painful mark.

Solution for Question 14:

Correct option A:

Organophosphate poisoning occurs due to exposure to organophosphate compounds, which inhibit the enzyme acetylcholinesterase, leading to an accumulation of acetylcholine and excessive cholinergic a ctivity. The most sensitive test for the diagnosis of organophosphate poisoning is the measurement of plasma acetylcholinesterase levels. Reduced levels of plasma acetylcholinesterase activity indicate org anophosphate poisoning.

Incorrect options:

Option B (Organophosphate level in blood) is incorrect because the measurement of organophosphate levels in the blood is not the primary diagnostic test for organophosphate poisoning. The clinical effect s and acetylcholinesterase activity are more indicative of the poisoning.

Option C (Organophosphate level in plasma) is incorrect because the measurement of organophospha te levels in the plasma is not the primary diagnostic test for organophosphate poisoning. The clinical eff ects and acetylcholinesterase activity are more indicative of the poisoning.

Option D (RBC transaminase levels) is incorrect because RBC transaminase levels are not relevant to the diagnosis of organophosphate poisoning.

Solution for Question 15:

Correct option:

Option A. TRALI (Transfusion-related acute lung injury).

• TRALI is a serious complication of blood transfusion characterized by acute respiratory distress and pulmonary edema. It occurs within a few hours of transfusion and is not related to circulatory overload (TACO), pulmonary edema, ARDS, or sepsis.

Incorrect options:

Option B. TACO (Transfusion-associated circulatory overload) -
Presents with circulatory overload and pulmonary edema, but not tachypnea.

Option C. Pulmonary edema -
General term for fluid accumulation in the lungs, but does not explain the specific findings mentioned.

Option D. ARDS (Acute respiratory distress syndrome) - Presents with severe respiratory distress, but t he X-ray appearance is different (diffuse alveolar damage).

Option E. Sepsis - Infection-related, but does not explain the specific findings mentioned.

Diseases of Thyroid Gland

1. What is the preferred medication to treat Grave's disease in a woman during her first trimester of pregnancy?

A. Carbimazole

B. Methimazole

C. Propylthiouracil

D. Radioactive ablation

---

2. A 35-year-old male presents with symptoms of weight gain, fatigue, constipation, and cold intolerance. Physical examination reveals dry skin, coarse hair, and a slow heart rate. Laboratory investigations revealed reduced serum levels of T3, T4, and TSH. Which of the following mechanisms is primarily responsible for the observed hormonal changes in this patient?

(or)

What mechanism is primarily responsible for the hormonal changes observed in a male with weight gain, fatigue, constipation, cold intolerance, dry skin, coarse hair, and reduced TSH, T4, and T3 serum levels?

A. Impaired iodide uptake by thyroid follicular cells

B. Defective synthesis of thyroglobulin

C. Inadequate conversion of T4 to T3 in peripheral tissues

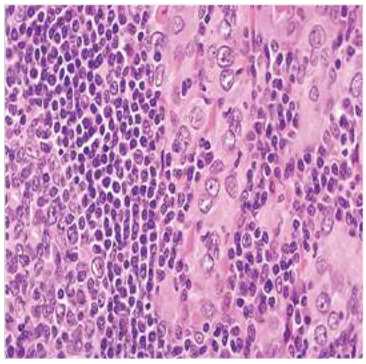
D. Reduced synthesis of thyroid-stimulating hormone (TSH) by the anterior pituitary gland

---

3. A 45-year-old female presents with fatigue, weight gain, cold intolerance, and constipation. Physical examination reveals dry skin, coarse hair, and a diffuse, non-tender enlargement of the thyroid gland. Laboratory investigations show increased TSH and decreased serum levels of T4 and T3. A fine-needle aspiration biopsy of the thyroid gland is shown below. Which of the following mechanisms is most likely responsible for the patient's clinical presentation?

(or)

What mechanism is most likely responsible for the clinical presentation in a female with fatigue, weight gain, cold intolerance, thyroid enlargement, elevated TSH, and decreased T3 and T4 levels, as indicated by the thyroid fine-needle aspiration biopsy?



A. Autoimmune destruction of thyroid follicular cells

B. Excess production of thyroglobulin by thyroid follicular cells

C. Activation of the hypothalamic-pituitary-thyroid axis

D. Decreased iodine intake in the diet

---

4. What is the drug of choice to manage thyroid storm intraoperatively in a patient with congestive cardiac failure?

A. Methimazole

B. Propranolol

C. Propylthiouracil

D. Hydrocortisone

---

5. Which of the following helps precipitate the thyroid storm?

A. Saturated solution of potassium iodide

B. Consumption of iodized salt for years

C. Methimazole

D. Cholestyramine

---

6. Which radioactive iodine isotope is used for the ablation of the thyroid gland to treat Grave's disease?

A. Iodine 123

B. Iodine 131

C. Iodine 132

D. None of the above

---

7. A 34-year-old female presents with complaints of palpitations and heat intolerance. She gave a history of consuming ayurvedic tablets for weight loss. Lab investigation revealed reduced levels of TSH and elevated levels of T4 and T3. What is the condition this patient is suffering from?

(or)

What is the likely diagnosis in a female experiencing palpitations and heat intolerance after consuming ayurvedic tablets for weight loss?

A. Grave's disease

B. Thyrotoxicosis factitia

C. Toxic multinodular goitre

D. Pituitary adenoma

---

8. A 32-year-old female presents with complaints of weight loss, palpitations, heat intolerance, and increased sweating for the past few months. On physical examination, she has a diffusely enlarged thyroid gland with a bruit. Her eyes appear prominent with lid lag. Laboratory tests reveal decreased

TSH and increased T3 and T4 levels. Thyroid-stimulating immunoglobulins are positive. Which of the following is the most likely diagnosis?

(or)

What is the most likely diagnosis for a female with weight loss, palpitations, heat intolerance, sweating, diffuse thyroid enlargement with a bruit, prominent eyes, lid lag, decreased TSH, increased free T4, and positive thyroid-stimulating immunoglobulins?

A. Hashimoto's thyroiditis

B. Toxic multinodular goiter

C. Graves' disease

D. Subacute thyroiditis

---

9. Which of the following options suggest the diagnosis of Hashimoto’s thyroiditis?

A.

B.

C.

D.

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10. Which of the following is the earliest feature of Grave’s Ophthalmopathy?

A. Proptosis

B. Lid lag

C. Exposure keratitis

D. Diplopia

---

11. A 68-year-old unconscious female with a known history of hypothyroidism was brought to the emergency department. Her medical records revealed she was diagnosed with a UTI 3 days back. Upon examination, the patient is lethargic, with a body temperature of 35 °C, bradycardia, and low blood pressure. Laboratory investigations reveal low free thyroxine (T4) and elevated thyroid-stimulating hormone (TSH) levels. ECG revealed increased PR interval. What is the most likely diagnosis?

(or)

What is the most likely diagnosis for a 68-year-old female with altered mental status, hypothermia, bradycardia, and ECG showing increased PR interval, along with low free T4 and elevated TSH levels, who has a known history of hypothyroidism, and recently diagnosed with UTI?

A. Hypothyroidism

B. Myxedema coma

C. Hyperthyroidism

D. Thyroid storm

---

12. A 55-year-old patient is admitted to the hospital with severe illness and multiple organ dysfunction. Laboratory investigations reveal low serum levels of triiodothyronine, normal levels of thyroxine, and normal or slightly elevated levels of thyroid-stimulating hormone. This pattern of thyroid function is most consistent with which of the following processes is defective?

(or)

What process is most likely defective in a severely ill 55-year-old patient with low T3, normal T4, and normal/slightly elevated TSH levels?

A. Conversion of T4 to T3 in peripheral tissues

B. Release of TSH from the pituitary gland

C. Production of T4 by the thyroid gland

D. Uptake of iodine by the thyroid gland

---

13. A 25-year-old female presents to the clinic with complaints of weight gain, cold intolerance, change in voice, and menorrhagia. Upon examination, hoarseness of voice is noted. Lab investigation revealed reduced levels of T3, T4, and TSH. What is the most reliable examination sign of this condition?

(or)

What is the most reliable examination sign of hypothyroidism?

A. Coarse skin

B. Hung up ankle jerk

C. Galactorrhoea

D. Pale yellow skin

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	4
Question 3	1
Question 4	3
Question 5	2
Question 6	2
Question 7	2
Question 8	3
Question 9	3
Question 10	2
Question 11	2
Question 12	1

Question 13	2

Solution for Question 1:

Correct Option C – Propylthiouracil:

Antithyroid Drugs

• Propylthiouracil is the drug of choice during 1st trimester of pregnancy/ breastfeeding as it has high protein binding. On prolonged usage of propylthiouracil, hepatotoxicity can occur.

• Carbimazole/ Methimazole is the drug of choice in 2nd Trimester. In 1st trimester it can cross the placenta and can cause Aplasia cutis and Choanal atresia.

Incorrect Options:

Options A and B (Carbimazole & Methimazole): These are incorrect. Refer to Option C for an explanation.

Option D - Radioactive ablation: It is contraindicated in pregnancy or breastfeeding.

Solution for Question 2:

Correct Option D
- Reduced synthesis of thyroid-stimulating hormone (TSH) by the anterior pituitary gland:

• The clinical presentation of weight gain, fatigue, constipation, feeling cold, dry skin, coarse hair, and a slow heart rate is consistent with hypothyroidism. The reduced levels of T4, T3, and TSH levels suggest the diagnosis of secondary hypothyroidism due to reduced synthesis of thyroid stimulating hormone.

Primary Hypothyroidism

Secondary Hypothyroidism

Thyroid gland is involved

Pituitary gland is involved

T4↓ T3↓, TSH↑

Causes

Incorrect Options:

Option A - Impaired iodide uptake by thyroid follicular cells: Iodide uptake by thyroid follicular cells is ne cessary for the synthesis of thyroid hormones. Impaired iodide uptake would lead to decreased hormon e production, but it would not explain the reduced TSH levels observed in this patient.

Option B - Defective synthesis of thyroglobulin: Thyroglobulin is a protein precursor for thyroid hormon e synthesis. Defects in thyroglobulin synthesis would result in decreased hormone production, but it wo uld not explain the reduced levels of TSH seen in this patient.

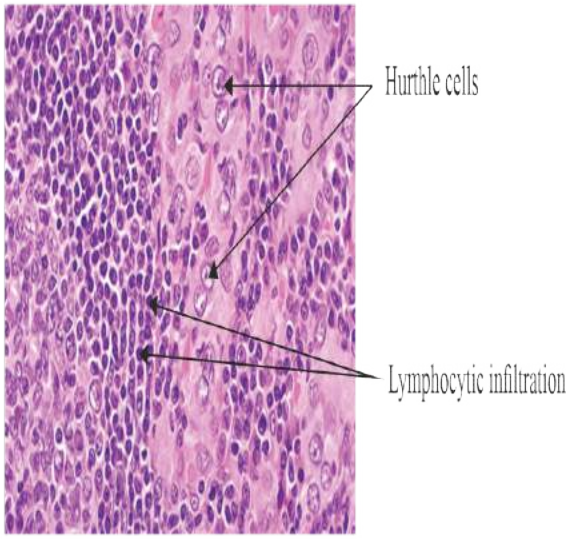
Option C - Inadequate conversion of T4 to T3 in peripheral tissues: Peripheral conversion of T4 (thyroxi ne) to T3 (triiodothyronine) is important for the active form of thyroid hormone. However, the primary is sue in this patient is reduced thyroid hormone synthesis due to deficiency of TSH, not inadequate conv ersion of T4 to T3.

Solution for Question 3:

Correct Option A - Autoimmune destruction of thyroid follicular cells:

• This patient's clinical presentation of fatigue, weight gain, cold intolerance, constipation, dry skin, and coarse hair is consistent with hypothyroidism. The laboratory findings of increased TSH levels, decreased T3 and T4 levels, and diffuse non-tender enlargement of the thyroid gland are suggestive of primary hypothyroidism. The fine-needle aspiration biopsy shows lymphocytic infiltration and Hurthle cells seen in Hashimoto's thyroiditis.

• Hashimoto's thyroiditis is an autoimmune disorder that causes primary hypothyroidism. Autoimmune destruction occurs due to the production of autoantibodies against thyroid antigens, resulting in chronic inflammation and progressive destruction of thyroid follicular cells. Hashimoto's thyroiditis is the most common cause of primary hypothyroidism in India.



Incorrect Options:

Option B - Excess production of thyroglobulin by thyroid follicular cells: While thyroglobulin is a protein i nvolved in thyroid hormone synthesis, excess production of thyroglobulin would lead to increased prod uction of thyroid hormones rather than decreased production of thyroid hormones as given in question.

Option C - Activation of the hypothalamic-pituitary-thyroid axis: This mechanism would lead to increase d TSH production and subsequent thyroid hormone synthesis, resulting in hyperthyroidism, not hypothy roidism.

Option D - Decreased iodine intake in the diet: Although iodine deficiency can cause hypothyroidism, th is patient's presentation and histology findings is more consistent with autoimmune thyroiditis rather tha n iodine deficiency.

Solution for Question 4:

Correct Option C - Propylthiouracil:

• Propylthiouracil (PTU) is an antithyroid medication used to block the synthesis of thyroid hormones. It acts quickly to inhibit the conversion of T4 to the more active form T3. In the setting of a thyroid storm,

PTU can help rapidly reduce thyroid hormone levels and mitigate the life-threatening effects of excessive thyroid hormone activity.

Incorrect Options:

Option A - Methimazole: Methimazole is another antithyroid medication similar to propylthiouracil (PTU) . It is the drug of choice to manage conditions like Grave's disease.

Option B - Propranolol: Propranolol is not suggested in a patient with established congestive heart failure. It is a long-acting drug and it worsens the falling blood pressure, hence not recommended.

Option D - Hydrocortisone: Hydrocortisone is a corticosteroid medication that is used to manage thyroi d storms by increasing the cortisol level and helping to manage stressful conditions.

Solution for Question 5:

Correct Option B - Consumption of iodized salt for years:

• Increased consumption of iodized salt for long duration increases the iodine trapping, which in turn increases the production of T4 and its conversion to T3, hence precipitating the thyroid storm. It is called the Jod-Basedow effect.

Incorrect Options:

Option A - Saturated solution of potassium iodide (SSKI): SSKI for 10 days is used to prevent thyroid st orm by decreasing iodide trapping and decreasing the production of T4 and T3. It is also known as the Wolf-Chaikoff effect.

Option C - Methimazole: Methimazole is an antithyroid medication used to treat hyperthyroidism by inhi biting thyroid hormone synthesis. It helps manage hyperthyroidism and prevent thyroid.

Option D - Cholestyramine: Cholestyramine is a bile acid sequestrant used to lower the levels of thyroi d hormones (T4 and T3), hence preventing thyroid storm.

Solution for Question 6:

Correct Option B – Iodine 131:

• Radioactive iodine therapy for the ablation of the thyroid gland in the treatment of Graves' disease typically utilizes radioactive iodine-131. This isotope emits beta particles that can destroy thyroid tissue, the half-life of iodine-131 is 8 days.

Incorrect Options:

Option A - Iodine 123: Iodine-123 is used for the imaging of the thyroid gland. The half-life of iodine-12 3 is 13.2 hours.

Option C
- Iodine 132: Iodine-132 is also used for the imaging of the thyroid gland. The half-life of iodine-132 is 2 to 3 hours.

Solution for Question 7:

Correct Option B - Thyrotoxicosis factitia:

• Thyrotoxicosis factitia refers to thyrotoxicosis caused by the ingestion of exogenous sources of thyroid hormones, such as medications or supplements, with a normal functioning thyroid gland.

• In this case, the patient's symptoms of palpitations and heat intolerance, along with the history of consuming ayurvedic tablets (containing levothyroxine) for weight loss and thyroid profile, strongly suggest thyrotoxicosis factitia as the underlying condition.

Incorrect Options:

Option A - Grave’s disease: Grave's disease is an autoimmune disorder characterized by the productio n of autoantibodies that stimulate the thyroid gland to overproduce thyroid hormones.

Option C - Toxic multinodular goitre: Toxic multinodular goiter refers to the presence of multiple nodule s in the thyroid gland, some of which autonomously produce thyroid hormones, leading to hyperthyroidi sm.

Option D - Pituitary adenoma: Pituitary adenoma is a condition in which there will be an increased synt hesis of TSH, which results in increased T4 and T3 levels.

Solution for Question 8:

Correct Option C - Graves' disease:

• The patient's symptoms of weight loss, palpitations, heat intolerance, and increased sweating, along with a diffusely enlarged thyroid gland, presence of lid lag, and positive TSI, are characteristic of Graves' disease.

• Graves' disease, aka diffuse toxic goiter, is an autoimmune disorder with a long-acting thyroid-stimulating antiobody (LATS) or thyroid-stimulating autoantibody against the TSH receptor, resulting in increased synthesis and release of thyroid hormones (T3 and T4) and reduced TSH. This causes clinical features of primary hyperthyroidism, such as weight loss, tachycardia, heat intolerance, and increased sweating. The diffusely enlarged thyroid gland with a bruit, known as a "thyroid thrill," is a characteristic finding in Graves' disease.

Incorrect Options:

Option A - Hashimoto's thyroiditis: Hashimoto's thyroiditis is an autoimmune disorder that leads to hypo thyroidism,

Option B - Toxic multinodular goiter: Toxic multinodular goiter that is characterized by multiple nodules in the thyroid gland causing hyperthyroidism.

Option D - Subacute thyroiditis: Subacute thyroiditis presents with painful thyroid enlargement and tran sient hyperthyroidism followed by hypothyroidism.

Solution for Question 9:

Correct Option C

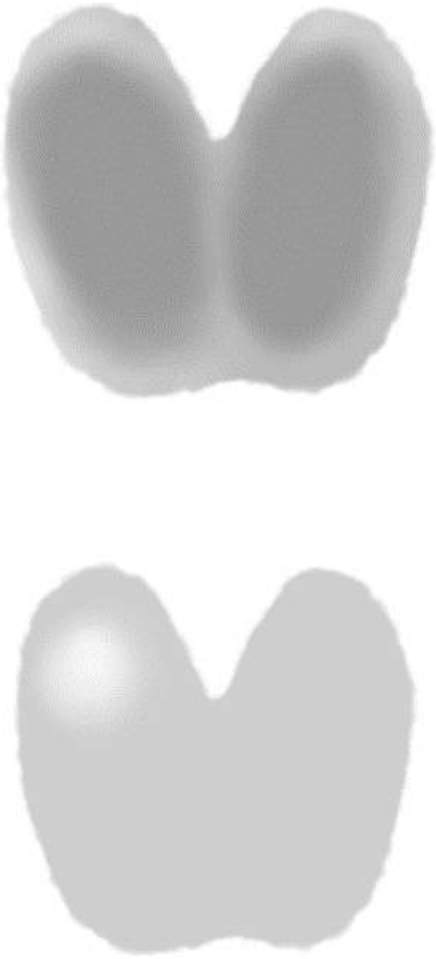
• Hashimoto's thyroiditis is an autoimmune disease. This results in the destruction of the thyroid gland and decreased diffuse uptake of radioactive iodine.

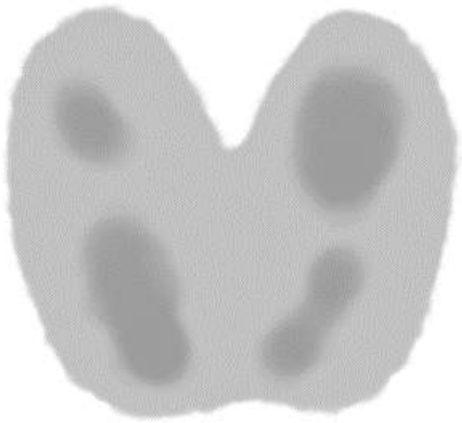
Hashimoto's thyroiditis

Grave’s disease

Malignancy

Toxic multinodular goitre





Decreased diffuse uptake of radioactive iodine

Increased diffuse uptake of radioactive iodine

Cold nodule suggesting malignancy

Focal areas of increased uptake of radioactive iodine

Incorrect Options:

Options A, B, and D are incorrect. Refer to Option C for an explanation.

Solution for Question 10:

Correct Option B – Lid lag:

• Lid lag/Stare sign is the earliest feature to be seen in the patient with Grave’s ophthalmopathy due to sympathetic stimulation caused by thyroid hormones resulting in contraction of the Muller’s muscle.

• Manifestations of Grave's ophthalmopathy NO SPECS scheme 0 = No signs or symptoms 1 = Only signs (lid retraction or lag), no symptoms 2 = Soft tissue involvement (periorbital edema) 3 = Proptosis (>22 mm) 4 = Extraocular muscle involvement (diplopia) 5 = Corneal involvement 6 = Sight loss

• 0 = No signs or symptoms

• 1 = Only signs (lid retraction or lag), no symptoms

• 2 = Soft tissue involvement (periorbital edema)

• 3 = Proptosis (>22 mm)

• 4 = Extraocular muscle involvement (diplopia)

• 5 = Corneal involvement

• 6 = Sight loss

• 0 = No signs or symptoms

• 1 = Only signs (lid retraction or lag), no symptoms

• 2 = Soft tissue involvement (periorbital edema)

• 3 = Proptosis (>22 mm)

• 4 = Extraocular muscle involvement (diplopia)

• 5 = Corneal involvement

• 6 = Sight loss

Incorrect Options:

Options A, C, and D- Proptosis, Exposure keratitis & Diplopia: These are incorrect. Refer to Option B for an explanation.

Solution for Question 11:

Correct Option B - Myxedema coma:

The most likely diagnosis for this patient's presentation is Myxedema coma.

• Myxedema coma is a severe and life-threatening form of hypothyroidism that is triggered by any intercurrent illness like UTI. It is characterized by extreme manifestations of hypothyroidism, including altered mental status, hypothermia, respiratory distress, and profound weakness.

• In the given scenario, the patient's altered mental status, hypothermia, and respiratory distress are indicative of a severe decompensation of hypothyroidism. The presence of bradycardia decreased respiratory rate, and ECG showing prolonged PR interval further support the diagnosis of myxedema coma.

• Laboratory investigations revealing low free thyroxine (T4) and elevated thyroid-stimulating hormone (TSH) levels are consistent with the diagnosis of severe hypothyroidism.

Incorrect Options:

Option A – Hypothyroidism: It is a broad term for an underactive thyroid gland, but myxedema coma re presents an extreme and life-threatening form of hypothyroidism, which is a more appropriate diagnosis in this case.

Option C – Hyperthyroidism: It is the opposite of hypothyroidism and would not explain the patient's clin ical features and laboratory findings.

Option D - Thyroid storm: It is a severe form of hyperthyroidism characterized by an exaggerated relea se of thyroid hormones. It presents with hypermetabolic symptoms such as high fever, tachycardia, an d agitation, which are contrary to the patient's hypometabolic and hypothermic state. Therefore, it is not the correct diagnosis in this case.

Solution for Question 12:

Correct Option A - Conversion of T4 to T3 in peripheral tissues:

• Sick euthyroid syndrome is a condition characterized by abnormal thyroid hormone levels in the absence of primary thyroid gland dysfunction. It commonly occurs in critically ill patients with severe systemic illness or sepsis.

• In this condition, there is a decrease in the peripheral conversion of the inactive prohormone thyroxine (T4) to the active form triiodothyronine (T3) in peripheral tissues. This results in low T3 levels, normal T4 levels, and normal or slightly elevated levels of thyroid-stimulating hormone (TSH).

Incorrect Options:

Option B - Release of TSH from the pituitary gland: It is not the defective process in Sick Euthyroid Syn drome. TSH levels can be normal or slightly elevated due to feedback mechanisms.

Option C - Production of T4 by the thyroid gland: It is generally not impaired in Sick Euthyroid Syndrom e. The thyroid gland can still produce and release normal levels of T4.

Option D - Uptake of iodine by the thyroid gland: It is also not typically affected in Sick Euthyroid Syndr ome. The thyroid gland can still take up iodine and produce T4, but the conversion of T4 to T3 is decre ased.

Solution for Question 13:

Correct Option B - Hung up ankle jerk:

• The clinical presentation of weight gain, cold intolerance, hoarseness of voice, menorrhagia, and lab investigation of reduced serum levels of T3, T4, and TSH is suggestive of hypothyroidism.

• On Examination

Incorrect Options:

Options A, C, and D - (Coarse skin, Galactorrhoea &
Pale yellow skin): These are incorrect. Refer to Option B for an explanation.

Diseases of Pancreas

1. A 45-year-old female is brought to the emergency department in a confused state. Her capillary blood glucose level was 44 mg/dl. Her bystander reported a history of similar recurrent illnesses and mentioned that she is always irritable, aggressive, and eats a lot. Lab investigations reveal elevated insulin and C peptide levels. Which of the following is the drug of choice for the management of this patient's condition?

(or)

What is the drug of choice for managing the recurrent episodes of hypoglycemia in a 45-year-old female with elevated insulin and C peptide levels?

A. Metformin

B. Glucagon

C. Diazoxide

D. Sulfonylureas

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2. A 55-year-old male presents with complaints of a persistent skin rash, diarrhea, and weight loss for the past 6 months. Upon examination, a rash characterized by necrolytic migratory erythema in the groin is noted. Laboratory investigation reveals impaired glucose tolerance. The hormone responsible for the patient's symptoms is involved in which physiological processes?

(or)

Which physiological process is primarily affected by the hormone responsible for the clinical manifestations in a patient with a pancreatic mass, weight loss, necrolytic migratory erythema and glucose intolerance?

A. Inhibit hepatic glycogenolysis

B. Enhancing adipose tissue lipolysis

C. Promoting gluconeogenesis in the liver

D. Inhibiting protein synthesis in muscle tissue

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3. A 45-year-old female, recently diagnosed with diabetes, presents with complaints of recurrent episodes of greasy diarrhea and right upper quadrant pain for the past 8 months. An ultrasound abdomen reveals gallstones and a mass located in the pancreas. Which of the following is the most likely diagnosis?

A. Glucagonoma

B. Insulinoma

C. Somatostatinoma

D. VIPoma

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4. A 58-year-old male presents to the clinic with a 6-month history of intermittent episodes of flushing and diarrhea. The patient's stool shows an osmolar gap of less than 50 mOsm and has a rice-water appearance. The lab investigation reveals a potassium level of 2.8 mmol/L. What is the diagnosis?

(or)

What is the likely diagnosis for a male with a history of flushing, rice-water diarrhea, an osmolar gap of less than 50 mOsm, and a potassium level of 2.8 mmol/L?

A. Carcinoid syndrome

B. Somatostatinoma

C. WDHA syndrome

D. Glucagonoma

---

5. A 28-year-old male presents with a two-day history of nausea, vomiting, and abdominal pain. He reports feeling extremely thirsty and has been urinating frequently. On examination, his breath has a fruity odor. His blood glucose level is 380 mg/dL (21.1 mmol/L). An arterial blood gas (ABG) analysis is performed. Which of the following ABG findings would be most consistent with the patient's condition?

(or)

What ABG finding would be most consistent with the condition of a male presenting with nausea, vomiting, fruity breath odor, and a blood glucose level of 380 mg/dL?

A. pH 7.30, PaCO2 30 mmHg, HCO3- 18 mEq/L

B. pH 7.45, PaCO2 40 mmHg, HCO3- 24 mEq/L

C. pH 7.50, PaCO2 50 mmHg, HCO3- 28 mEq/L

D. pH 7.40, PaCO2 45 mmHg, HCO3- 28 mEq/L

---

6. A 62-year-old male with a history of type 2 diabetes presents to the clinic for a routine follow-up appointment. He reports experiencing nausea, vomiting blurred vision, numbness, tingling sensations in his feet, and constipation. Fundoscopic examination reveals dot and blot hemorrhages and cotton wool spots. Which of the following complications is the patient most likely experiencing?

(or)

What complication is likely experienced by a male with type 2 diabetes, blurred vision, peripheral neuropathy symptoms, constipation, and retinal findings like dot & blot hemorrhages and cotton wool spots?

A. Bradycardia

B. Gastroparesis

C. Loss of light reflex

D. Hyperreflexia

---

7. A 65-year-old male with a known history of type 2 diabetes presents to the emergency department with altered mental status, extreme thirst, and frequent urination. Laboratory investigations reveal a blood glucose level of 600 mg/dL and an arterial pH of 7.35. Urine dipstick testing shows negative ketones. The patient is profoundly dehydrated. What is the most appropriate treatment for this patient?

(or)

What is the most appropriate treatment for a severely dehydrated male with altered mental status, high blood glucose, negative ketones in urine, and a pH of 7.35 in the emergency department?

A. Intravenous administration of regular insulin

B. Intravenous administration of bicarbonate solution

C. Intravenous administration of DNS solution

D. Intravenous administration of sodium bicarbonate

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8. A 52-year-old female presents to the clinic with a 3-year history of polyuria, polydipsia, and unintentional weight loss. She also complains of recurrent urinary tract infections (UTIs) characterized by dysuria, frequency, and urgency. Urine investigations revealed increased glucose excretion. Which of the following antidiabetic medications is most likely responsible for the patient's increased susceptibility to UTIs?

(or)

Which antidiabetic medication is most likely responsible for increased susceptibility to urinary tract infections (UTIs) presenting with increased urinary excretion of glucose in a diabetic patient?

A. Canagliflozin

B. Metformin

C. Glimepiride

D. Sitagliptin

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9. A 12-year-old girl came to the pediatric clinic with excessive thirst, frequent urination, weight loss, and fatigue. During examination, she appeared dehydrated, and tests showed a blood glucose level of 350 mg/dl and ketone bodies in urine. Her family has a history of autoimmune disorders. Which of the following preparations is the drug of choice for this condition with the shortest duration of action?

(or)

Which preparation of the drug of choice for a 12-year-old female with symptoms of hyperglycemia, dehydration, and positive urine glucose and ketones has the shortest duration of action?

A. Regular

B. NPH

C. Glargine

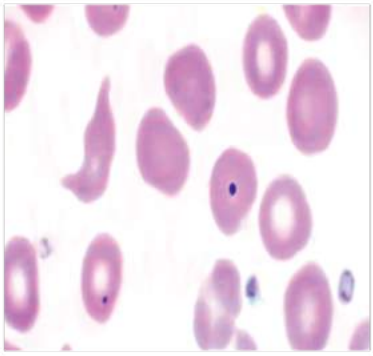
D. Lispro

---

10. A 60-year-old man with type 2 diabetes complains of weakness, fatigue, and shortness of breath. During a physical examination, the patient appears pale and has conjunctival pallor. Lab tests show low hemoglobin levels and elevated MCV. Peripheral smear shows the following findings. What is the mechanism of action of the drug responsible for the patient's condition?

(or)

What is the antidiabetic mechanism of action of the drug prescribed to a male with type 2 diabetes presented with fatigue, weakness, shortness of breath, and laboratory findings of low hemoglobin and elevated MCV, as shown on the peripheral smear?



A. Inhibition of hepatic glucose production and glucose absorption

B. Stimulation of insulin secretion

C. Inhibition of glucagon release

D. Enhancement of renal glucose excretion

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11. A 45-year-old female with type 1 diabetes mellitus presents to the endocrinology clinic for a routine follow-up visit. She is on insulin and reports experiencing episodes of postprandial hyperglycemia. On further evaluation, it was decided to add a medication that specifically target postprandial hyperglycemia in her treatment regimen. The drug is an analog of a certain hormone that is released by?

(or)

In the management of postprandial hyperglycemia in a female with type 1 diabetes on insulin, a drug is added to her regimen, which is an analog of hormone that is released by?

A. Alpha cells of the pancreas

B. Beta cells of the pancreas

C. Delta cells of the pancreas

D. F cells of the pancreas

---

12. What is the mechanism of action of the recently added diabetes medication that may exacerbate congestive heart failure symptoms in a male with a history of CHF?

A. Beta-adrenergic receptor antagonist (beta-blocker)

B. Angiotensin-converting enzyme (ACE) inhibitor

C. PPAR gamma upregulation

D. GLP-1 agonists

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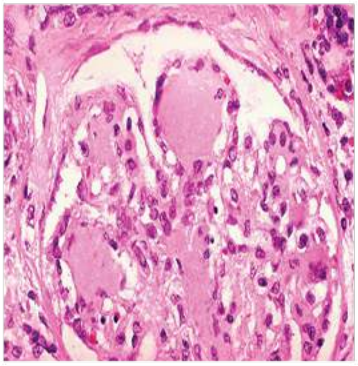
13. A 55-year-old male with a 10-year history of type 2 diabetes presents to the endocrinology clinic for a routine follow-up visit. He has been managing his diabetes with lifestyle modifications and metformin. However, recent laboratory investigations show elevated urinary albumin levels and declining estimated glomerular filtration rate (eGFR). Histopathology of the kidney is given below: Considering his renal impairment, which antidiabetic drug would be suitable to be added to his treatment regimen?

(or)

Which antidiabetic drug would be suitable to add to the treatment regimen of a 55-year-old male with type 2 diabetes, elevated urinary albumin levels, declining estimated GFR, and kidney histopathology indicative of renal impairment?



A. Metformin

B. Glibenclamide

C. Primlantide

D. Linagliptin

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14. A 25-year-old female came for a medical checkup to the clinic. On lab investigation, her fasting blood glucose levels are elevated, and an oral glucose tolerance test confirms impaired glucose tolerance. She has a family history of diabetes in every generation and the patient does not have any evidence of autoimmunity. What is the mechanism of action for the drug of choice in this patient's treatment regimen?

(or)

What is the mechanism of action of the drug of choice for a female with persistent hyperglycemia, a family history of diabetes, impaired glucose tolerance, and no evidence of autoimmunity?

A. Inhibition of alpha-glucosidase enzymes

B. Sensitization of insulin receptors

C. Stimulation of pancreatic beta cells

D. Inhibition of renal glucose reabsorption

---

15. A 27-year-old woman with a family history of diabetes presents to the clinic with a recent diagnosis of diabetes. The patient's blood glucose control has gradually worsened despite the initial response to oral antidiabetic medications She tests positive for autoantibodies against pancreatic beta cells. Which type of diabetes is responsible for her condition?

(or)

Which type of diabetes is most likely responsible for a 27-year-old female with a recent diagnosis of diabetes, a family history of diabetes, initial response to oral antidiabetic medications, and positive autoantibodies against pancreatic beta cells?

A. Type 1 diabetes mellitus

B. Type 2 diabetes mellitus

C. Maturity-onset diabetes of the young (MODY)

D. Type 1.5 diabetes mellitus (LADA)

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16. Which of the following statements about insulin is correct?

A. Insulin is synthesized from pre-pro-insulin, which is a short peptide.

B. The pro-insulin molecule consists of two peptide chains, A and C.

C. Bovine and porcine insulin have different amino acid sequences compared to human insulin.

D. Human insulin is no longer used in the treatment of diabetes mellitus due to antibody production.

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17. Which of the following actions of insulin on adipose tissue is incorrect?

A. Insulin stimulates lipoprotein lipase (LPL) activity.

B. Insulin increases the uptake of free fatty acids into fat cells.

C. Insulin inhibits hormone-sensitive lipase (HSL) activity.

D. Insulin promotes the breakdown of triglycerides into free fatty acids.

---

18. Which of the following statements about release of insulin is true?

A. For insulin to be released from a beta cell, both potassium and calcium channel need to be opened.

B. The calcium and potassium channels are both voltage gated

C. Potassium channels are blocked by a drug named Sulfonylurea

D. Incretins are the hormones secreted from cardiovascular system and act on the beta cells to release insulin

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Correct Answers

Question	Correct Answer
Question 1	3
Question 2	3
Question 3	3
Question 4	3
Question 5	1
Question 6	2
Question 7	1
Question 8	1
Question 9	4

Question 10	1
Question 11	2
Question 12	3
Question 13	4
Question 14	3
Question 15	4
Question 16	3
Question 17	4
Question 18	3

Solution for Question 1:

Correct Option C - Diazoxide:

• The clinical presentation, characterized by aggressive behavior, easy irritability, and frequent eating, along with recurrent episodes of hypoglycemia with elevated insulin and C peptide levels, is highly suggestive of insulinoma. Insulinoma is a pancreatic neuroendocrine tumor that secretes excessive amounts of insulin, leading to hypoglycemia.

• Diazoxide is the drug of choice for the medical management of insulinoma. It acts by inhibiting insulin release from pancreatic beta cells. It promotes hyperpolarization of beta cells, leading to decreased calcium influx and subsequent inhibition of insulin secretion.

Incorrect Options:

Option A
- Metformin: It is an oral antidiabetic medication commonly used for the management of type 2 diabete s. However, it is not effective in treating insulinoma as it does not directly target insulin secretion.

Option B - Glucagon: It is a hormone that has the opposite effect of insulin, as it raises blood glucose le vels. It can be used in emergency situations to treat severe hypoglycemia but is not the drug of choice f or long-term management of insulinoma.

Option D - Sulfonylureas: These are oral hypoglycemic agents that stimulate insulin secretion from pan creatic beta cells. However, their use in insulinoma is contraindicated, as they can exacerbate hypogly cemia by further increasing insulin secretion.

Solution for Question 2:

Correct Option C - Promoting gluconeogenesis in the liver:

• The clinical presentation of the patient is suggestive of glucagonoma, a rare pancreatic tumor that produces excessive amounts of glucagon. One of the key actions of glucagon is to promote gluconeogenesis in the liver.

• Glucagonoma is a malignant tumor of the tail of the pancreas characterized by necrolytic migratory erythema present mostly in the intertriginous area, diarrhea, weight loss, impaired glucose intolerance, and plasma glucagon level of more than 1000 pg/ml.

Incorrect Options:

Options A - Inhibit hepatic glycogenolysis: Glucagon stimulates hepatic glycogenolysis.

Option B - Enhancing adipose tissue lipolysis: It is not primarily regulated by glucagon but rather by hormones such as adrenaline and growth hormone.

Option D
- Inhibiting protein synthesis in muscle tissue: Inhibiting protein synthesis in muscle tissue is not a direct action of glucagon. Instead, glucagon favors protein breakdown in peripheral tissues to provide amino acids for gluconeogenesis. It does not directly inhibit protein synthesis.

Solution for Question 3:

Correct Option C - Somatostatinoma:

• The clinical presentation suggests the diagnosis of somatostatinoma, which is a type of neuroendocrine tumor that occurs in the pancreas or duodenum. This condition is characterized by excess secretion of somatostatin, which can cause diabetes, secretory diarrhea, steatorrhea, and gallbladder disease (such as gallstones). These symptoms occur because somatostatin inhibits insulin, pancreatic amylase, and cholecystokinin.

Incorrect Options:

Option A - Glucagonomas: Glucagonomas are tumors that secrete excessive amounts of glucagon and typically present with a
characteristic skin rash called necrolytic migratory erythema, diarrhea, and weight loss.

Option B—Insulinomas: Insulinomas are pancreatic neuroendocrine tumors that produce excessive amounts of insulin, leading to hypoglycemia characterized by confusion, aggressive behavior, frequent eating, and weight gain.

Option D - VIPomas: VIPomas are tumors that secrete vasoactive intestinal peptide (VIP) and are associated with watery diarrhea, hypokalemia, and achlorhydria (WDHA) syndrome.

Solution for Question 4:

Correct Option C - WDHA syndrome:

• The patient's clinical presentation is suggestive of VIPoma (Verner-Morrison syndrome), also known as WDHA syndrome (Watery Diarrhea, Hypokalemia, and Achlorhydria).

• VIPoma is a tumor of the tail of the pancreas, responsible for the excessive production of a vasoactive intestinal polypeptide produced by F cells of the pancreas. It causes secretory diarrhea (osmolar gap of stool less than 50 mOsm) which has a consistency of rice water stool, also known as pancreatic cholera. Other features include hypokalemia, flushing episodes, achlorhydria, hyperglycemia, and hypercalcemia.

Incorrect Options:

Option A - Carcinoid syndrome: Carcinoid syndrome presents with flushing, diarrhea, wheezing, pruritis, flushing, tricuspid insufficiency, and pulmonary stenosis.

Option B - Somatostatinoma: Somatostatinomas are characterized by fatty, foul-smelling diarrhea, diabetes, and cholelithiasis (gallstones) due to excess somatostatin produced by the tumor, which inhibits other hormones.

Option D - Glucagonoma: Glucagonomas are pancreatic tumors that produce glucagon. Symptoms ma y include a
characteristic rash called necrolytic migratory erythema, diabetes, weight loss, and diarrhea.

Solution for Question 5:

Correct Option A - pH 7.30, PaCO2 30 mmHg, HCO3- 18 mEq/L:

• The clinical presentation of nausea, vomiting, abdominal pain, fruity breath odor, and elevated blood glucose levels suggests diabetic ketoacidosis (DKA), a potentially life-threatening complication of uncontrolled diabetes. DKA is characterized by metabolic acidosis resulting from the accumulation of ketone bodies (such as beta-hydroxybutyrate and acetoacetate) due to insulin deficiency and increased gluconeogenesis.

• In DKA, ABG analysis typically reveals a low pH (acidosis), low bicarbonate (HCO3-) levels due to metabolic acidosis, and low partial pressure of carbon dioxide (PaCO2) as a compensatory response to increased ventilation and decreased carbon dioxide levels. Option A presents the most consistent ABG findings for DKA, with a pH of 7.30 (normal range 7.35 - 7.45), PaCO2 of 30 mmHg (lower than the normal range of 35-45 mmHg), and HCO3- of 18 mEq/L (lower than the normal range of 22-28 mEq/L).

Incorrect Options:

Option B - pH 7.45, PaCO2 40 mmHg, HCO3- 24 mEq/L: represents a
normal pH and ABG values within the reference range, not indicative of DKA.

Option C - pH 7.50, PaCO2 50 mmHg, HCO3- 28 mEq/L: suggests respiratory alkalosis rather than me tabolic acidosis seen in DKA.

Option D - pH 7.40, PaCO2 45 mmHg, HCO3- 28 mEq/L: represents a
normal pH and ABG values within the reference range, not indicative of DKA.

Solution for Question 6:

Correct Option B - Gastroparesis:

• In the given case, the patient's symptoms of blurred vision and the fundoscopic findings of dot blot hemorrhages and cotton wool spots are consistent with diabetic retinopathy and constipation, numbness, and tingling sensation in the feet are suggestive of diabetic neuropathy involving the autonomic nervous system and distal symmetric polyneuropathy.

• Among the listed options, gastroparesis is the complication this patient is suffering from due to involvement of the autonomic neuropathy, resulting in delayed gastric emptying, presenting as nausea, vomiting, and constipation (dominating sympathetic activation). Other features seen will be postural hypotension and resting tachycardia.

Incorrect Options:

Options A, C, and D (bradycardia, loss of light reflex, and hyperreflexia) are not directly related to the gi ven symptoms and findings in this case.

Solution for Question 7:

Correct Option A - Intravenous administration of regular insulin:

• In this case, the patient presents with altered mental status, extreme thirst, frequent urination, tachycardia, and low blood pressure. These symptoms may initially lead one to suspect diabetic ketoacidosis (DKA), which is characterized by hyperglycemia, ketosis, metabolic acidosis, and dehydration. However, the absence of ketones on urine dipstick testing indicates a different condition.

• The clinical presentation and laboratory findings are consistent with Nonketotic Hyperosmolar Coma (NKH), a severe complication of uncontrolled hyperglycemia in type 2 diabetes. In NKH, high blood glucose levels lead to marked hyperosmolarity and severe dehydration, but without the presence of significant ketosis.

• The most appropriate treatment for NKH is intravenous administration of regular insulin to lower blood glucose levels and reverse the hyperosmolar state. Insulin helps to promote glucose uptake by the cells, reducing blood glucose levels and resolving osmotic diuresis.

Incorrect Options:

Options B, C & D: Options B (bicarbonate solution), C
(DNS: Dextrose and sodium chloride solution), and D
(sodium bicarbonate) are not the recommended treatments for NKH. options B and D may be consider ed in certain situations, such as severe acidosis or electrolyte imbalances, but they are not the primary treatment for NKH. Dextrose in DNS can further worsen the condition of patient.

Solution for Question 8:

Correct Option A - Canagliflozin:

• Canagliflozin is a medication classified as a sodium-glucose co-transporter 2 (SGLT2) inhibitor. It works by inhibiting the reabsorption of glucose in the kidneys, leading to increased urinary glucose excretion and lowering blood glucose levels. However, a known side effect of SGLT2 inhibitors, including canagliflozin, dapagliflozin, empagliflozin, and ertugliflozin, is an increased risk of urinary tract infections (UTIs).

• The mechanism behind the increased susceptibility to UTIs with SGLT2 inhibitors is related to the presence of glucose in the urine. Since these medications enhance glucose excretion in the urine, the elevated glucose levels in the urine can provide a favorable environment for bacterial growth, increasing the risk of UTIs.

Incorrect Options:

Option A - Sitagliptin: It is a dipeptidyl peptidase-4 (DPP-4) inhibitor. This class of medications increase s insulin secretion and reduces glucagon levels, aiding in glycemic control. Sitagliptin does not have a direct impact on urinary tract health and is not typically linked to an increased risk of UTIs.

Option B - Metformin: It is a commonly prescribed medication for type 2 diabetes that reduces hepatic glucose production and enhances insulin sensitivity. It does not directly increase the risk of UTIs.

Option C - Glimepiride: It is a sulfonylurea medication that stimulates insulin release from pancreatic be ta cells. While sulfonylureas can lower blood glucose levels, they are not directly associated with an inc reased risk of UTIs.

Solution for Question 9:

Correct Option D - Lispro:

• In this case, the patient's presentation of excessive thirst, frequent urination, weight loss, fatigue, hyperglycemia, presence of glucose and ketones in the urine, and a family history of autoimmune disorders strongly suggests the diagnosis of diabetic ketoacidosis, likely due to type 1 diabetes.

• The drug of choice for type 1 diabetes is insulin. Insulin preparations can vary in their onset, peak action, and duration of action. Among the options listed, insulin lispro has the shortest duration of action.

• Lispro is a rapid-acting insulin analog with an onset of action of about 15 minutes, a peak action at around 1-2 hours, and a duration of action of 3-4 hours. Its rapid onset makes it suitable for use just before or after meals to control postprandial glucose levels.

Incorrect Options:

Option A - Regular: Regular insulin is a
short-acting insulin with an onset of action of about 30 minutes, a
peak action of around 2-4 hours, and a duration of action of approximately 4-6 hours.

Option B - NPH: NPH (Neutral Protamine Hagedorn) insulin is an intermediate-acting insulin with an on set of action of 1-2 hours, a peak action around 4-12 hours, and a duration of action of 14-24 hours.

Option C - Glargine: Glargine is a long-acting insulin with a
duration of action of approximately 24 hours and no pronounced peak action. It provides a
relatively constant level of insulin activity throughout the day.

Solution for Question 10:

Correct Option A - Inhibition of hepatic glucose production and glucose absorption:

• The presence of macrocytic anemia and elevated MCV suggests a potential deficiency in vitamin B12 or folate, leading to impaired red blood cell production and enlargement. The Howell-Jolly bodies seen in the peripheral smear indicate a potential dysfunction of the spleen.

• The antidiabetic drug that inhibits hepatic glucose production and glucose absorption is a biguanide, specifically metformin. While metformin does not directly cause macrocytic anemia or Howell-Jolly bodies, long-term use of metformin has been associated with reduced levels of vitamin B12 and possibly impaired spleen function.

Incorrect Options:

Option B - Stimulation of insulin secretion: This mechanism of action is associated with sulfonylureas. Sulfonylureas work by stimulating insulin secretion from pancreatic beta cells. It is associated with hyp oglycemia and weight gain.

Option C - Inhibition of glucagon release: This mechanism of action is associated with dipeptidyl peptid ase-4 (DPP-4) inhibitors, which degrades incretin hormones like glucagon-like peptide-1 (GLP-1), resul ting in increased insulin secretion and decreased glucagon release, associated with angioedema, urtic arial, and immune-mediated dermatologic effects.

Option D - Enhancement of renal glucose excretion: This mechanism of action is associated with sodium-glucose co-transporter 2 (SGLT2) inhibitors. SGLT2 inhibitors work by inhibiting glucose reabsorption in the kidneys, leading to increased glucose excretion in the urine. It is associated with urinary and genital infections, polyuria, and hyperkalemia.

Solution for Question 11:

Correct Option B - Beta cells of the pancreas:

• In the case where the drug used to target postprandial hyperglycemia is pramlintide, it is an analog of amylin. Amylin is a hormone co-secreted with insulin by the beta cells of the pancreas. It functions alongside insulin to regulate blood glucose levels. Pramlintide injected just before a meal slows gastric emptying and suppresses glucagon but does not alter insulin levels and promotes satiety, all of which contribute to the control of postprandial (after-meal) blood glucose levels. By mimicking amylin's actions, pramlintide can help reduce postprandial hyperglycemia in individuals with type 1 or type 2 diabetes mellitus.

Incorrect Options:

Option A - Alpha cells of the pancreas: Alpha cells of the pancreas secrete glucagon, a hormone that works in opposition to insulin. Glucagon raises blood glucose levels by stimulating the liver to release stored glucose. However, the drug mentioned in the scenario, pramlintide, is an analogue of amylin, which is secreted by beta cells, not alpha cells.

Option C - Delta cells of the pancreas: Delta cells of the pancreas secrete somatostatin, a hormone that inhibits the release of insulin and glucagon. While somatostatin plays a regulatory role in glucose metabolism, it is not the hormone mimicked by pramlintide, which is used to target postprandial hyperglycemia.

Option D - F cells of the pancreas: F cells, also known as pancreatic polypeptide (PP) cells, secrete pancreatic polypeptide. Pancreatic polypeptide plays a role in regulating pancreatic exocrine function and may have some influence on appetite regulation. However, it is not the hormone mimicked by pramlintide for targeting postprandial hyperglycemia.

Solution for Question 12:

Correct Option C - PPAR gamma upregulation:

• In this case, the patient with a history of congestive heart failure (CHF) and diabetes mellitus is experiencing worsening symptoms of CHF since starting a new medication for diabetes management. The medication belongs to a class of drugs known as thiazolidinediones (pioglitazone and rosiglitazone), which bind to the PPAR gamma (peroxisome proliferator-activated receptor gamma). Agonists of this receptor regulate a large number of genes, promote adipocyte differentiation, and increase peripheral utilization of glucose by increasing GLUT 4 Receptors on muscle/adipose tissue, responsible for decreasing insulin resistance.

• However, PPAR GAMMA inhibitors have been associated with several adverse effects, including fluid retention and worsening heart failure symptoms in patients with pre-existing cardiovascular conditions such as CHF. These drugs can cause sodium and water retention, leading to increased fluid volume and exacerbation of CHF symptoms.

Incorrect Options:

Option A and B: Beta-adrenergic receptor antagonists and Angiotensin-converting enzymes are comm only used medications for the management of CHF and cardiovascular conditions. They have different mechanisms of action and are not typically associated with worsening CHF symptoms in patients with appropriate indications and monitoring.

Option D - GLP-1 agonists: These are a class of medications used for the management of diabetes. Th ey work by stimulating the GLP-1 receptors to increase insulin secretion, decrease glucagon secretion, and delay gastric emptying. GLP-1 agonists have shown cardiovascular benefits and are not typically associated with worsening CHF symptoms.

Solution for Question 13:

Correct Option D - Linagliptin:

• Based on the given clinical scenario and the histopathology findings (which show Kimmelsteil Wilson lesions, i.e., nodular glomerulosclerosis due to diabetes), the most suitable antidiabetic drug to be added to the treatment regimen for this patient with declining renal function and elevated urinary albumin levels would be linagliptin.

• Linagliptin is a dipeptidyl peptidase-4 (DPP-4) inhibitor that helps regulate blood glucose levels by reducing the degradation of glucagon-like peptide-1 (GLP-1) produced by enterocytes responsible for increased uptake of glucose by adipose tissue. Unlike other antidiabetic drugs, linagliptin does not require dose adjustment based on renal function and has a favorable renal safety profile as it undergoes bile elimination and enterohepatic recycling. Therefore, it is a suitable choice for patients with renal impairment, including those with diabetic nephropathy.

Incorrect Options:

Option A - Metformin: Metformin is generally considered the first-line drug for managing type 2 diabete s. However, in the presence of declining renal function and elevated urinary albumin levels, metformin may need to be used with caution or discontinued due to the risk of lactic acidosis.

Option B - Glibenclamide: Glibenclamide is a sulfonylurea that stimulates insulin secretion from pancre atic beta cells. However, it is metabolized by the liver and excreted by the kidneys. With declining renal function, the risk of hypoglycemia may increase. Therefore, glibenclamide may not be the best choice i n this case.

Option C - Pramlintide: Pramlintide is an analog of amylin, a hormone that is co-secreted with insulin b y the beta cells of the pancreas. While pramlintide can be beneficial in certain cases, it is not primarily i ndicated for the management of renal impairment or diabetic nephropathy.

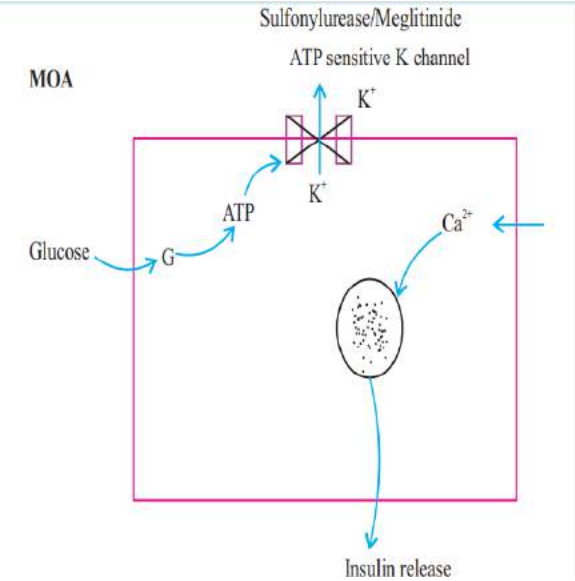
Solution for Question 14:

Correct Option C - Stimulation of pancreatic beta cells:

• The clinical presentation suggests the possibility of MODY (Maturity-Onset Diabetes of the Young). It is an asymptomatic condition with early onset of diabetes (starts at 25 years of age), strong familial inheritance, high blood glucose level, and absence of autoimmune markers.

• The drug of choice for MODY is sulfonylureas, which acts by stimulating pancreatic beta cells to release insulin. Sulfonylureas bind to the ATP-sensitive potassium channels on beta cells, causing depolarization and subsequent release of insulin. This mechanism of action enhances insulin secretion,

thereby improving glucose control in patients with MODY.



Incorrect Options:

Option A - Inhibition of alpha-glucosidase enzymes: Refers to the mechanism of action of another class of antidiabetic drugs known as alpha-glucosidase inhibitors. These medications work by slowing down the breakdown and absorption of carbohydrates in the intestine, thereby reducing postprandial blood glucose levels. However, they are not the drug of choice for MODY.

Option B - Sensitization of insulin receptors: Refers to the mechanism of action of insulin sensitizers such as thiazolidinediones (TZDs). These drugs improve insulin sensitivity in target tissues, such as skeletal muscle and adipose tissue. However, they are not the drug of choice for MODY.

Option D - Inhibition of renal glucose reabsorption: Refers to the mechanism of action of sodium-glucose co-transporter 2 (SGLT2) inhibitors. These medications reduce glucose reabsorption in the kidneys, leading to increased urinary glucose excretion. While SGLT2 inhibitors are effective in managing type 2 diabetes, they are not typically the drug of choice for MODY.

Solution for Question 15:

Correct Option D - Type 1.5 diabetes mellitus (LADA):

• In this case, the patient's clinical presentation, family history, and positive autoantibody status strongly suggest a diagnosis of type 1.5 diabetes mellitus, also known as LADA. Type 1.5 diabetes mellitus (LADA - latent autoimmune diabetes in adults), is a subtype of diabetes that shares characteristics of both type 1 and type 2 diabetes.

• It is characterized by a gradual onset of autoimmune beta cell destruction in adulthood. The patient's positive autoantibody status and the progressive decline in blood glucose control align with LADA, making it the most likely type of diabetes responsible for her condition.

Incorrect Options:

Option A - Type 1 diabetes mellitus: Type 1 diabetes is characterized by autoimmune destruction of pancreatic beta cells, leading to absolute insulin deficiency. The patient's positive autoantibody status supports an autoimmune component, making type 1 diabetes a possible consideration. However, the grad

ual onset and initial response to oral antidiabetic medications suggest a different subtype of diabetes.

Option B - Type 2 diabetes mellitus: Type 2 diabetes is characterized by insulin resistance and relative insulin deficiency. While the patient's age, family history, and lack of obesity may align with type 2 diab etes, the positive autoantibody status indicates an autoimmune component, which is not typically assoc iated with type 2 diabetes.

Option C) - Maturity-onset diabetes of the young (MODY): MODY refers to a group of monogenic forms of diabetes caused by mutations in specific genes. Although family history is present, the positive auto antibody status suggests an autoimmune mechanism, making MODY less likely in this case.

Solution for Question 16:

Correct Option C
- Bovine and porcine insulin have different amino acid sequences compared to human insulin:

• Bovine and porcine insulin have the same total number of amino acids as human insulin (51). However, there are slight differences in the sequence of amino acids in the A and B chains of bovine and porcine insulin compared to human insulin. These differences do not impact the overall activity and effectiveness of the insulin in the body.

Incorrect Options:

Option A - Insulin is synthesized from pre-pro-insulin, which is a
short peptide: Insulin is synthesized from pre-pro-insulin, which is a long peptide consisting of 51 amin o acids. It undergoes processing to form pro-insulin, which contains three peptide chains: A, B, and C. Therefore, the statement that pre-pro-insulin is a short peptide is incorrect.

Option B - The pro-insulin molecule consists of two peptide chains, A
and C: The pro-insulin molecule consists of three peptide chains: A, B, and C. The A and B
chains are the primary chains that form the insulin hormone, while the C peptide is cleaved during insul in synthesis. Therefore, the statement that the pro-insulin molecule consists of two peptide chains, A and C, is incorrect.

Option D - Human insulin is no longer used in the treatment of diabetes mellitus due to antibody produc tion: Human insulin is still widely used in the treatment of diabetes mellitus. The development of antibo dies against human insulin is a rare occurrence, and it does not significantly impact its efficacy or use. Therefore, the statement that human insulin is no longer used due to antibody production is incorrect.

Solution for Question 17:

Correct Option D - Insulin promotes the breakdown of triglycerides into free fatty acids:

• Insulin has various actions on adipose tissue, primarily aimed at promoting the storage of energy in the form of triglycerides. However, insulin does not promote the breakdown of triglycerides into free fatty acids. The correct action is the inhibition of hormone-sensitive lipase (HSL) activity.

Incorrect Options:

Option A - Insulin stimulates lipoprotein lipase (LPL) activity: Insulin indeed stimulates the activity of lip oprotein lipase, an enzyme that breaks down triglycerides into free fatty acids for uptake into fat cells.

Option B - Insulin increases the uptake of free fatty acids into fat cells: Insulin promotes the uptake of free fatty acids into fat cells by stimulating the activity of GLUT-4 transporters, which allow glucose and free fatty acids to enter the cell.

Option C - Insulin inhibits hormone-sensitive lipase (HSL) activity: Hormone-sensitive lipase is responsible for breaking down triglycerides into free fatty acids. Insulin inhibits the activity of HSL, preventing the breakdown of triglycerides and promoting their storage.

Solution for Question 18:

Correct Option C - Potassium channels are blocked by a drug named Sulfonylurea:

• Potassium channels in pancreatic beta cells play a crucial role in regulating insulin release. The closure of potassium channels leads to membrane depolarization, which triggers the opening of voltage-gated calcium channels and subsequent insulin secretion.

• Sulfonylurea drugs, such as glibenclamide, are commonly used in the treatment of type 2 diabetes. They work by binding to and blocking ATP-sensitive potassium channels, preventing potassium efflux and promoting membrane depolarization. This ultimately leads to increased insulin release from beta cells.

Incorrect Options:

Option A - For insulin to be released from a beta cell, both potassium and calcium channels need to be opened: While both potassium and calcium channels play a role in the release of insulin, they have different functions. Potassium channels in beta cells are involved in maintaining the resting membrane potential and controlling membrane potential changes. Calcium channels, on the other hand, are responsible for the influx of calcium ions, which triggers insulin secretion. Both channels do not need to be simultaneously opened for insulin release to occur.

Option B - The calcium and potassium channels are both voltage-gated: While calcium channels involved in insulin release are voltage-gated, the potassium channels are ATP-sensitive potassium channels, which are regulated by intracellular ATP levels.

Option D - Incretins are hormones secreted from the cardiovascular system and act on beta cells to release insulin: Incretins are gastrointestinal hormones secreted by specialized cells in the intestine in response to food intake. The two main incretins are glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropic peptide (GIP). Incretins act on beta cells of the pancreas to enhance insulin secretion in a glucose-dependent manner, meaning they stimulate insulin release when blood glucose levels are elevated.

Diseases of Pituitary Gland

1. A 25-year-old male presents with complaints of gradually increasing hand and shoe sizes, facial changes, joint pain, and excessive sweating. Upon examination, the patient was noted to have spade-like hands, coarse facies, and macroglossia. What is the leading cause of mortality in patients suffering from this disease?

(or)

What is the leading cause of mortality in patients suffering from acromegaly?

A. Stroke

B. Cardiovascular disease

C. Colonic malignancy

D. Obstructive sleep apnea

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2. A 20-year-old male presents with complaints of enlarged chest and milk secretion. Upon examination, spade-like hands, coarse facies, and macroglossia are noted. What is the cause of this condition?

(or)

What is the cause of galactorrhoea in a male with features of acromegaly?

A. Somatotroph adenoma

B. Hypothalamic hamartoma

C. Carcinoid tumor

D. Mixed mammosomatotroph adenoma

---

3. What is the investigation of choice to diagnose acromegaly?

A. Level of insulin-like growth factor

B. Oral glucose tolerance test

C. TSH level

D. Heel pad thickness

---

4. What is the treatment of choice for a patient with severe cardiomegaly due to increased growth hormone secretion by somatotroph adenoma?

A. Trans-sphenoidal surgery

B. Pegvisomant

C. Octreotide

D. None of the above

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5. A 26-year-old female presents with complaints of mood swings, constipation, weight gain, cold intolerance, and amenorrhea. Her medical history revealed that she suffered postpartum hemorrhage

after the delivery. Lab investigation reveals hypoglycemia and reduced levels of T3, T4, and TSH. What is the condition the patient is suffering from?

(or)

What is the diagnosis of a female presenting with mood swings, constipation, weight gain, cold intolerance, amenorrhea, and hypoglycemia following postpartum hemorrhage, with reduced levels of T3, T4, and TSH?

A. Addison's disease

B. Cushing's syndrome

C. Sheehan syndrome

D. Grave's disease

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6. What is the first hormone to fall in a female with Sheehan's syndrome?

A. Adrenocorticotropic hormone

B. Growth hormone

C. Follicle-stimulating hormone

D. Thyroid stimulating hormone

---

7. What will be the acute presentation in a female with Sheehan's syndrome?

A. Secondary hypothyroidism

B. Hypoglycemia

C. Amenorrhea

D. Failure of lactation

---

8. Which of the following is not used as a part of treatment for a female with a history of postpartum hemorrhage now presenting with secondary hypothyroidism, hypoglycemia, and amenorrhea?

(or)

Which of the following is not used for treating Sheehan's syndrome?

A. Fludrocortisone

B. Dexamethasone

C. Combined oral contraceptives

D. Levothyroxine

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9. An 18-year-old male presents with complaints of mood swings, constipation, weight gain, and cold intolerance. Lab investigation revealed hypoglycemia, reduced levels of T3, T4, and TSH, and secondary hypogonadism. A peripheral blood smear of the patient revealed sickle cells, anisocytosis, and poikilocytosis. What is the diagnosis?

(or)

What is the likely diagnosis in a patient with secondary hypothyroidism, hypoglycemia, secondary hypogonadism, and a peripheral blood smear showing sickle cells, anisocytosis, and poikilocytosis?

A. Sheehan’s syndrome

B. Addison’s disease

C. Cushing’s disease

D. Simmond’s disease

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10. In an 8-year-old child with a shrill voice, doll-like facies, and a height below the 3rd percentile, what diagnostic test is most appropriate to confirm suspected hormone deficiency?

(or)

What is the investigation of choice to confirm the diagnosis of hypopituitarism?

A. Salt loading test

B. Insulin tolerance test

C. Oral glucose tolerance test

D. Water deprivation test

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11. What is the most common functioning tumor of the pituitary gland?

A. Somatotroph adenoma

B. Corticotroph adenoma

C. Prolactinoma

D. Thyrotroph adenoma

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	4
Question 3	2
Question 4	3
Question 5	3
Question 6	2
Question 7	4
Question 8	1
Question 9	4
Question 10	2
Question 11	3

Solution for Question 1:

Correct Option B - Cardiovascular disease:

• The symptoms described in the scenario, such as spade-like hands (increase in size of hands and feet), coarse facies (frontal bossing and large fleshy nose), joint pain (arthropathy), excessive sweating, and macroglossia, are indicative of acromegaly caused by excessive production of growth hormone (GH) usually due to a pituitary adenoma.

• Acromegaly leads to cardiomegaly, which results in fatal arrhythmia and is the leading cause of mortality. Other manifestations include stroke due to hypertension, colonic polyps with a risk of malignancy, and obstructive sleep apnea (OSA) due to an enlarged tongue.

Incorrect Options:

Options A, C and D are incorrect. Refer to Option B for an explanation.

Solution for Question 2:

Correct Option D - Mixed Mammosomatotroph Adenoma:

• The symptoms described in the scenario, including spade-like hands, coarse facies, and macroglossia, are indicative of acromegaly. The presentation of galactorrhoea in males, along with features of acromegaly, suggest that both growth hormone and prolactin are increased.

• Mixed mammosomatotroph adenoma is responsible for secreting increased levels of prolactin and growth hormone, resulting in galactorrhoea and hypogonadism.

Incorrect Options:

Option A - Somatotroph adenoma: This tumor results in excess secretion of growth hormone, and the p atient presents only with features of acromegaly.

Option B - Hypothalamic hamartoma: This tumor is responsible for releasing growth hormone-releasing hormone (GHRH), resulting in increased secretion of growth hormone from the pituitary gland.

Option C - Carcinoid tumor: Carcinoid tumors usually arise from neuroendocrine cells and release GH RH, resulting in increased growth hormone secretion from the pituitary gland.

Solution for Question 3:

Correct Option B - Oral glucose tolerance test:

Work Up for acromegaly

• Screening test is insulin-like growth factor 1 (IGF-1) levels.

• The investigation of choice is an oral glucose intolerance test. In normal individuals, 75 grams of glucose suppresses the growth hormone. Failure to suppress growth hormone (less than 0.4 ■g/liters is seen in acromegaly). Prolactin levels increased.

• In normal individuals, 75 grams of glucose suppresses the growth hormone.

• Failure to suppress growth hormone (less than 0.4 ■g/liters is seen in acromegaly).

• Prolactin levels increased.

• TSH is normal or may be suppressed.

• MRI head: To localize the pituitary adenoma.

• X-ray foot (Lateral:) Heel pad thickness is increased.

• In normal individuals, 75 grams of glucose suppresses the growth hormone.

• Failure to suppress growth hormone (less than 0.4 ■g/liters is seen in acromegaly).

• Prolactin levels increased.

Incorrect Options:

Options A, C and D are incorrect. Refer to Option B for an explanation.

Solution for Question 4:

Correct Option C - Octreotide:

Management of acromegaly

• The treatment of choice is Trans-sphenoidal surgery.

• In patients who deny surgery or are frail, like those with severe cardiomegaly, somatostatin receptor ligand analogs like octreotide, lanreotide, and pasireotide are given. These somatostatin analogs act on the SST 2 and SST 5 receptors, which are highly expressed in these tumors. These somatostatin analogs inhibit the release of growth hormone.

• Pegvisomant is given in the recurrence of the tumor and if there is a poor response to somatostatin receptor ligand analogs. It acts by blocking the growth hormone receptors.

Incorrect Options:

Options A, B, and D are incorrect. Refer to Option C for an explanation.

Solution for Question 5:

Correct Option C - Sheehan syndrome:

• The patient's symptoms, including constipation, weight gain, cold intolerance, and reduced levels of T3, T4, and TSH, are suggestive of hypothyroidism, specifically secondary hypothyroidism. The history of postpartum hemorrhage, along with hypoglycemia, amenorrhoea and secondary hypothyroidism, suggests the diagnosis of Sheehan’s syndrome, which is caused by damage to the anterior pituitary by hypovolemia. Leading to a panhypopituitarism, resulting in these symptoms.

Incorrect Options:

Option A - Addison’s disease: Addison's disease is characterized by reduced cortisol levels produced b y the adrenal gland. It presents as fatigue, weight loss, low blood pressure, and hyperpigmentation.

Option B - Cushing’s syndrome: Cushing's syndrome results from prolonged exposure to high levels of corticosteroids. Symptoms can include weight gain, particularly in the upper body and face (moon face) , high blood pressure, and mood swings.

Option D - Grave’s disease: Grave's disease is an autoimmune condition leading to overactivity of the t hyroid gland and excess production of thyroid hormones. Common symptoms include weight loss, heat

intolerance, palpitations, and irritability.

Solution for Question 6:

Correct Option B - Growth hormone:

• Sheehan’s syndrome leads to panhypopituitarism due to hypovolemia caused by postpartum hemorrhage. Growth hormone is 1st to fall, resulting in hypoglycemia. ACTH decreases, leading to a decrease in cortisol, causing a decrease in blood sugar levels (the last hormone to fall). It worsens pre-existing hypoglycemia.

• Growth hormone is 1st to fall, resulting in hypoglycemia.

• ACTH decreases, leading to a decrease in cortisol, causing a decrease in blood sugar levels (the last hormone to fall). It worsens pre-existing hypoglycemia.

• Growth hormone is 1st to fall, resulting in hypoglycemia.

• ACTH decreases, leading to a decrease in cortisol, causing a decrease in blood sugar levels (the last hormone to fall). It worsens pre-existing hypoglycemia.

Incorrect Options:

Options A, C, and D are incorrect. Refer to Option B for an explanation.

Solution for Question 7:

Correct Option D - Failure of lactation:

• The acute presentation of Sheehan’s syndrome is the failure of lactation due to a falling level of prolactin hormone.

• Growth hormone decreases, resulting in hypoglycemia

• ACTH decreases, leading to a decrease in cortisol, causing a decrease in blood sugar levels (the last hormone to fall). It worsens pre-existing hypoglycemia.

• LH hormone decreases, leading to secondary amenorrhea and infertility.

• FSH hormone decreases.

• TSH decreases, leading to secondary hypothyroidism (chronic presentation of Sheehan’s syndrome).

Incorrect Options:

Options A, B, and C are incorrect. Refer to Option D for an explanation.

Solution for Question 8:

Correct Option A - Fludrocortisone:

• Management of Sheehan’s syndrome Dexamethasone is 1st to be supplemented. It replaces cortisol deficiency and stabilizes blood sugar levels. Combined oral contraceptives: Estrogen and

Progesterone. Levothyroxine.

• Dexamethasone is 1st to be supplemented. It replaces cortisol deficiency and stabilizes blood sugar levels.

• Combined oral contraceptives: Estrogen and Progesterone.

• Levothyroxine.

• Fludrocortisone is a mineralocorticoid, which is not decreased in Sheehan's syndrome. It is used for treating adrenal insufficiency like Addison's disease.

• Dexamethasone is 1st to be supplemented. It replaces cortisol deficiency and stabilizes blood sugar levels.

• Combined oral contraceptives: Estrogen and Progesterone.

• Levothyroxine.

Incorrect Options:

Options B, C, and D are incorrect. Refer to Option A for an explanation.

Solution for Question 9:

Correct Option D - Simmond's disease:

• The clinical presentation of constipation, weight gain, and cold intolerance, along with reduced levels of T3, T4, and TSH, is suggestive of secondary hypothyroidism. Peripheral blood smear is suggestive of sickle cell disease.

• Simmond's disease is the cause of non-obstetric damage to the anterior pituitary, presenting with features of secondary hypothyroidism, secondary hypogonadism, and hypoglycemia. It occurs in patients with hypertension, sickle cell disease, or rupture of AV Malformation

Incorrect Options:

Option A - Sheehan's syndrome: Sheehan's syndrome is caused by damage to the anterior pituitary, s een in patients with a history of postpartum hemorrhage.

Option B – Addison's disease: Addison's disease is characterized by reduced cortisol levels produced by the adrenal gland. It presents as fatigue, weight loss, low blood pressure, and hyperpigmentation.

Option C - Cushing's disease: Cushing's syndrome results from prolonged exposure to high levels of c orticosteroids. Symptoms can include weight gain, particularly in the upper body and face (moon face), high blood pressure, and mood swings.

Solution for Question 10:

Correct Option B - Insulin tolerance test:

• The clinical presentation of a shrill voice, doll-like facies, and a height below the 3rd percentile is suggestive of hypopituitarism, i.e., deficiency of growth hormone seen in the pediatric population.

• The investigation of choice to confirm the diagnosis is insulin tolerance test/arginine challenge test.

Incorrect Options:

Option A - Salt loading test: It is the diagnostic test for Conn syndrome.

Option C - Oral glucose tolerance test: It is the diagnostic test for acromegaly.

Option D - Water deprivation test: It is the diagnostic test for diabetes insipidus.

Solution for Question 11:

Correct Option C – Prolactinoma:

• The most common functioning tumor of the pituitary gland is prolactinoma. Prolactinomas are benign tumors that produce excess prolactin, a hormone responsible for stimulating milk production in the breast. They are often associated with symptoms like anovulation, amenorrhea, secondary infertility, galactorrhoea, and bitemporal hemianopia due to pressure on optic chiasma.

Incorrect Options:

Options A - Somatotroph adenoma: These tumors produce excess growth hormone, leading to acrome galy. Acromegaly is characterized by enlarged hands, feet, facial changes, and other systemic effects. Prolactinomas are more common than somatotroph adenomas.

Option B - Corticotroph adenoma: These tumors result in excess secretion of adrenocorticotropic horm one (ACTH), causing Cushing's disease. Symptoms include weight gain, central obesity, hypertension, and moon face. Prolactinomas are more prevalent.

Option D - Thyrotroph adenoma: These tumors lead to excess secretion of thyroid-stimulating hormone (TSH), causing hyperthyroidism. Symptoms include weight loss, tremors, heat intolerance, and palpitat ions. Prolactinomas are more frequent than thyrotroph adenomas.

Calcium Hemostasis

1. A 28-year-old woman presents to the emergency department with complaints of numbness and tingling in her hands and around her mouth. She reports feeling lightheaded and having muscle cramps in her legs. The patient has been experiencing increased anxiety and has been hyperventilating due to stress. Chvostek's sign is positive. Which of the following is the most likely explanation for the patient's symptoms?

(or)

What is the most likely explanation for a 28-year-old woman's symptoms, including numbness, tingling, lightheadedness, and muscle cramps, along with a positive Chvostek's sign, when she has been hyperventilating due to stress?

A. Respiratory acidosis

B. Metabolic acidosis

C. Respiratory alkalosis

D. Metabolic alkalosis

---

2. A 65-year-old postmenopausal woman presents with a history of multiple fragility fractures over the past few years. Dual-energy X-ray absorptiometry (DEXA) scan reveals low bone mineral density. Laboratory investigations show normal calcium, phosphate levels and Serum 25-hydroxyvitamin D levels. Which of the following best explains the mechanism underlying the development of this disease in this patient?

(or)

What is the most likely mechanism underlying the development of low bone mineral density in a sedentary postmenopausal woman with fragility fractures, normal calcium and phosphate levels, and normal 25-hydroxyvitamin D levels?

A. Increased osteoclast activity and bone resorption

B. Defective mineralization of bone matrix

C. Impaired collagen synthesis

D. Reduced osteoblast function and bone formation

---

3. A 60-year-old postmenopausal woman with a history of osteoporosis presents with complaints of bone pain and a recent fracture. She has been prescribed a medication that inhibits osteoclast activation and causes osteoclast apoptosis. Which of the following side effects is not associated with this medication?

(or)

Which common side effect is not associated with bisphosphonates?

A. renal failure

B. Esophagitis

C. Osteonecrosis of the jaw bone

D. vertigo

---

4. A 65-year-old postmenopausal woman with a history of osteoporosis presents for treatment. After a thorough evaluation, the physician decides to prescribe a medication that acts as an anabolic agent and forms bone. This medication is administered subcutaneously and is primarily used in severe cases of osteoporosis. Which of the following medications fits the description provided?

(or)

Which subcutaneously administered medication, primarily used in severe cases of osteoporosis, acts as an anabolic agent and promotes bone formation in a postmenopausal woman with a history of osteoporosis?

A. Teriparatide

B. Denosumab

C. Bisphosphonates

D. Calcitonin

---

5. A 4-month-old male infant is brought to the pediatrician with concerns of recurrent respiratory infections and has difficulty feeding. On examination, the infant appears small for his age, with distinctive facial features including a small jaw and widely spaced eyes. The pediatrician notes a heart murmur on auscultation. Which of the following is the most likely diagnosis for this infant's condition?

(or)

What is the most likely diagnosis for a 4-month-old male infant with growth and developmental concerns, recurrent respiratory infections, feeding difficulties, small jaw, widely spaced eyes, and a heart murmur?

A. Down syndrome

B. Marfan syndrome

C. Turner syndrome

D. DiGeorge syndrome

---

6. A 45-year-old female presents to her primary care physician with complaints of bone pain and frequent kidney stones. On physical examination, there is palpable tenderness in the left lower abdomen. Laboratory investigations reveal elevated serum calcium levels and decreased serum phosphate levels. Which of the following symptoms is most likely associated with this patient's condition?

(or)

Which symptom is most likely associated with bone pain, kidney stones, elevated serum calcium, decreased serum phosphate levels, and palpable tenderness in the left lower abdomen?

A. Easy fatigability and muscle weakness

B. Excessive hair growth and oily skin

C. Cold intolerance and weight gain

D. Heat intolerance and weight loss

---

7. A 60-year-old male with a history of chronic kidney disease presents to the clinic with complaints of fatigue, bone pain, and recurrent urinary tract infections. Laboratory investigations reveal elevated

serum phosphate levels, decreased serum calcium levels, Which of the following statements regarding the patient's condition is most accurate?

(or)

What is the most accurate statement about the condition of a 60-year-old male with chronic kidney disease, presenting with fatigue, bone pain, recurrent urinary tract infections, elevated serum phosphate levels, and decreased serum calcium levels?

A. Primary hyperparathyroidism

B. Secondary hyperparathyroidism

C. Tertiary hyperparathyroidism

D. Familial hyperparathyroidism

---

8. Which of the following statements about the treatment of parathyroid carcinoma is correct?

A. Surgical management involves unilateral neck exploration and en bloc resection of the tumor.

B. Recurrence of signs and symptoms of hypercalcemia after surgery is rare.

C. Distant metastasis is found in the majority of patients with parathyroid carcinoma.

D. Cinacalcet is the first-line treatment for parathyroid carcinoma.

---

9. A 35-year-old female presents with tingling sensation around her lips and fingertips three days after undergoing a total thyroidectomy for papillary thyroid cancer. Physical examination reveals muscle twitching around her lips and a positive Chvostek sign. The patient's serum calcium level is found to be below 7 mg%. Which of the following is the most likely cause of her symptoms?

(or)

What is the most likely cause of tingling, muscle twitching, and hypocalcemia in a 35-year-old female following a total thyroidectomy for papillary thyroid cancer, with a positive Chvostek sign?

A. Surgical hypoparathyroidism

B. Digeorge syndrome

C. Wilsons syndrome

D. Idiopathic hypoparathyroidism

---

10. A 10-year-old male presents with short stature, obesity, brachydactyly, and low IQ. Physical examination reveals a dimpled appearance over the knuckles. Laboratory findings show decreased serum calcium and increased phosphate levels. Serum alkaline phosphatase (SAP) is within the normal range. Which of the following best explains the underlying pathophysiology of this patient's condition?

(or)

What is the underlying pathophysiology that best explains the combination of short stature, obesity, brachydactyly, low IQ, knuckle dimpling, decreased serum calcium, increased phosphate levels, and normal serum alkaline phosphatase in a 10-year-old male?

A. Hypoparathyroidism

B. Pseudohypoparathyroidism

C. Pseudopseudohypoparathyroidism

D. Familial hypoparathyroidism

---

11. A 65-year-old woman with osteoporosis is started on a new medication to improve bone density. The drug acts by inhibiting osteoclast activity and reducing bone resorption. Which of the following hormones is likely the target of this medication?

(or)

Which hormone is likely the target of the medication prescribed to a 65-year-old woman with osteoporosis, which inhibits osteoclast activity and reduces bone resorption to improve bone density?

A. Vitamin D

B. Calcitonin

C. Parathyroid hormone (PTH)

D. Insulin

---

12. A 4-year-old child presents with bowing of the legs and difficulty walking. Laboratory findings reveal decreased calcium and phosphate levels, increased serum alkaline phosphatase (SAP) levels, and elevated parathyroid hormone (PTH) levels. The child is diagnosed with vitamin D-dependent rickets. Which of the following types of vitamin D-dependent rickets is most likely responsible for the patient's symptoms?

(or)

Which type of vitamin D-dependent rickets is most likely responsible for the symptoms of a 4-year-old child presenting with bowing of the legs, difficulty walking, decreased calcium and phosphate levels, increased serum alkaline phosphatase (SAP), and elevated parathyroid hormone (PTH) levels?

A. Type 1

B. Type 2

C. Type 3

D. Type 4

---

13. Which of the following statements is true about the PTH (parathyroid hormone)?

A. It is secreted by oxyphil cells of the parathyroid gland

B. PTH is inhibited by hypercalcemia, hypermagnesemia and vitamin D

C. It stimulates 1 alpha hydroxylase enzyme in kidneys

D. It increases calcium reabsorption from DCT through TRPV 3 and 4 channels

---

14. A 25-year-old male presents with a painless lump in the anterior neck that has been gradually increasing in size. Physical examination reveals a firm, non-tender thyroid nodule. The patient also reports a family history of medullary thyroid carcinoma. Laboratory investigations show elevated serum calcitonin levels. Further evaluation reveals bilateral adrenal masses on imaging. Which gene mutation is most likely responsible for this patient's condition?

(or)

Which gene mutation is most likely responsible for the development of a thyroid nodule, elevated serum calcitonin levels, and bilateral adrenal masses in a male with a family history of similar thyroid nodules and medullary thyroid carcinoma?

A. RET gene

B. TP53 gene

C. BRCA1 gene

D. APC gene

---

15. What specific finding can be seen in a female with a history of kidney stones, fatigue, elevated serum calcium, decreased serum phosphate, a parathyroid adenoma, and a pituitary adenoma?

A. Increased serum gastrin levels

B. Elevated serum cortisol levels

C. Hypokalemia

D. Impaired liver function

---

16. A 35-year-old man presents with complaints of recurring headaches and visual disturbances. Upon further evaluation, the patient was diagnosed with multiple hemangioblastomas in the cerebellum and retina. A renal ultrasound also revealed the presence of multiple renal cysts. The patient's family history is significant, with his father having a history of bilateral pheochromocytomas. Based on these findings, what is the most likely diagnosis for this patient?

(or)

What is the most likely diagnosis for a male with recurrent headaches, visual disturbances, multiple cerebellar and retinal hemangioblastomas, renal cysts, and a family history of bilateral pheochromocytomas in his father?

A. Neurofibromatosis type 1 (NF1)

B. Von Hippel-Lindau (VHL) syndrome

C. Multiple endocrine neoplasia type 1 (MEN1)

D. Hereditary paraganglioma-pheochromocytoma syndrome

---

17. A 35-year-old male presents to the endocrinology clinic with a history of multiple endocrine neoplasia. He reports a family history of similar endocrine disorders. On examination, the patient has enlarged lips, a thickened tongue, and multiple neuromas on the mucosal surfaces of his lips, tongue, and conjunctiva. He also has marfanoid habitus, with long limbs and hyperextensible joints. Laboratory investigations reveal elevated levels of calcitonin and catecholamines. Based on the patient's clinical presentation, which chromosome is most likely involved in this condition?

(or)

Which chromosome is most likely involved in the condition of a male with multiple endocrine neoplasias, enlarged lips, thickened tongue, mucosal neuromas, marfanoid habitus, and elevated levels of calcitonin and catecholamines, who also has a family history of similar endocrine disorders?

A. Chromosome 10

B. Chromosome 11

C. Chromosome 16

D. Chromosome 20

---

18. A 32-year-old woman presents to the endocrinology clinic with a history of multiple endocrine abnormalities. She reports fatigue, weight loss, recurrent infections, and irregular menstrual cycles. On examination, she has dry skin, oral thrush, and mild hypotension. Laboratory investigations reveal low levels of thyroid hormones, low parathyroid hormone (PTH) levels, and positive autoantibodies against the pancreatic islet cells. What is the most likely diagnosis for this patient?

(or)

What is the most likely diagnosis for a woman with a history of multiple endocrine abnormalities, including low thyroid hormones, low PTH levels, oral thrush, dry skin, and positive autoantibodies against pancreatic islet cells, and presents with symptoms of fatigue, weight loss, recurrent infections, and irregular menstrual cycles?

A. Type-1 Autoimmune Polyendocrine Syndrome (APS)

B. Type-2 Autoimmune Polyendocrine Syndrome (APS)

C. Addison's disease

D. Celiac disease

---

19. A 45-year-old woman presents to the dermatology clinic with multiple skin findings. She has a history of benign breast masses and thyroid nodules. On examination, she is noted to have multiple hamartomatous skin lesions, including trichilemmomas on her face and acral keratoses on her hands and feet. Her family history is significant for breast cancer in her mother and grandmother. Which of the following conditions is most likely to be associated with this patient's presentation?

(or)

Which condition is most likely associated in a woman with a history of benign breast masses and thyroid nodules, as well as multiple hamartomatous skin lesions, trichilemmomas on her face, acral keratoses on her hands and feet, and a family history of breast cancer in her mother and grandmother?

A. Cowden syndrome

B. Neurofibromatosis type 1

C. Tuberous sclerosis

D. Gorlin syndrome

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	4
Question 3	4
Question 4	1

Question 5	4
Question 6	1
Question 7	2
Question 8	4
Question 9	1
Question 10	2
Question 11	2
Question 12	2
Question 13	3
Question 14	1
Question 15	1
Question 16	2
Question 17	1
Question 18	1
Question 19	1

Solution for Question 1:

Correct Option C - Respiratory alkalosis:

• The patient's symptoms, including numbness, tingling, lightheadedness, muscle cramps, and positive Chvostek's sign, are consistent hyperventilation-induced respiratory alkalosis.

• Respiratory alkalosis: Hyperventilation causes excessive elimination of carbon dioxide (CO_2) from the body, leading to a decrease in blood carbonic acid (H_2CO_3) levels. This results in an increase in blood pH, leading to respiratory alkalosis.

• Decreased ionized calcium: Respiratory alkalosis causes a shift in the binding of calcium ions (Ca^{2+}) to albumin, resulting in a decrease in ionized calcium (Ca^{2+}) levels in the blood. Ionized calcium is the biologically active form of calcium and is essential for normal neuromuscular function.

• Increased excitability of nerves: Reduced ionized calcium levels increase the excitability of nerves, particularly the peripheral nerves, making them more sensitive to stimuli.

Calcium Level (mg/dL)

Manifestations

< 4.5

• Severe hypocalcemia

• Tetany (carpopedal spasm, muscle cramps, laryngospasm)

• Seizures

• Prolonged QT interval on ECG

• Chvostek's sign (facial muscle twitching upon tapping the facial nerve)

• Trousseau's sign (carpopedal spasm induced by inflating a blood pressure cuff)

• Cardiac arrhythmias (ventricular tachycardia, ventricular fibrillation)

• Bronchospasm

4.5-7.5

• Moderate hypocalcemia

• Numbness and tingling in the extremities

• Muscle cramps

• Fatigue

• Irritability

• Depression

• Confusion

• Impaired concentration

• Abnormal heart rhythms (e.g., prolonged QT interval)

7.5-8.5

Mild hypocalcemia

• Asymptomatic or minimal symptoms

8.5-9.0

Normal range

• May be incidental finding on routine laboratory testing

Incorrect Options:

Option A - Respiratory acidosis: Respiratory acidosis is characterized by an elevated arterial CO2 level , which would not cause the symptoms described in the patient.

Option B - Metabolic acidosis: Metabolic acidosis is characterized by a
decrease in serum bicarbonate levels, which would not cause the symptoms described in the patient.

Option D - Metabolic alkalosis: Metabolic alkalosis is characterized by an increase in serum bicarbonat e levels, which would not cause the symptoms described in the patient. E) Normal acid-base balance: The patient's symptoms and positive Chvostek's sign indicate an abnormal acid-base balance, specific ally respiratory alkalosis.

Solution for Question 2:

Correct Option D - Reduced osteoblast function and bone formation:

• The presentation of a postmenopausal woman with multiple fragility fractures, sedentary lifestyle, and family history of osteoporosis is consistent with the diagnosis of osteoporosis. Osteoporosis is characterized by reduced bone mass and microarchitectural deterioration of bone tissue, leading to increased bone fragility and susceptibility to fractures.

• In this patient, the underlying mechanism of osteoporosis is reduced osteoblast function and bone formation. Osteoblasts are responsible for the synthesis and deposition of bone matrix, including

collagen and other components necessary for bone mineralization. Inadequate osteoblast activity leads to decreased bone formation and results in lower bone density, increasing the risk of fractures.

Incorrect Options:

Option A - Increased osteoclast activity and bone resorption: While increased osteoclast activity and excessive bone resorption can contribute to bone loss, it is not the primary mechanism in postmenopausal osteoporosis. Estrogen deficiency after menopause leads to an imbalance between bone formation and resorption, with bone resorption exceeding bone formation.

Option B - Defective mineralization of bone matrix: Defective mineralization of the bone matrix is associated with conditions such as osteomalacia and rickets, where there is impaired mineralization of the osteoid matrix. However, in this patient, the laboratory investigations showed normal calcium and phosphate levels, indicating normal mineralization.

Option C - Impaired collagen synthesis: Collagen provides the structural framework for bone, and impaired collagen synthesis can lead to brittle bone disorders such as osteogenesis imperfecta. However, in postmenopausal osteoporosis, the primary defect is reduced osteoblast function and bone formation, rather than impaired collagen synthesis.

Solution for Question 3:

Correct Option D - Vertigo:

• The given information describes the features of bisphosphonates (BPNs), including examples such as Alendronate, Residronate, Pamidronate, and Zoledronate (Zoledronic acid). BPNs are administered intravenously and work by inhibiting osteoclast activation and causing osteoclast apoptosis. They also inhibit the enzyme farnesyl pyrophosphate in the Mevalonate pathway.

• Pnemonic: Bisphosphonate B: Best drug for osteoporosis (d.o.c) I: given Iv, causes Infusion reaction and Intertrochanteric fractures S: Stops(inhibits) osteoclast activation P: used to treat PAGETS DISEASE H: used to treat HYPERCALCEMIA OF PREGNANCY O: causes Osteonecrosis of the jaw S: causes Stomach problems orally (esophagitis) Ph: inhibits farnesyl PyroPhosphate ONATE: e.g. zoledrONATE, risedrONATE, alendronate

• B: Best drug for osteoporosis (d.o.c)

• I: given Iv, causes Infusion reaction and Intertrochanteric fractures

• S: Stops(inhibits) osteoclast activation

• P: used to treat PAGETS DISEASE

• H: used to treat HYPERCALCEMIA OF PREGNANCY

• O: causes Osteonecrosis of the jaw

• S: causes Stomach problems orally (esophagitis)

• Ph: inhibits farnesyl PyroPhosphate

• ONATE: e.g. zoledrONATE, risedrONATE, alendronate

• Vertigo is not a side effect of BNPs

• B: Best drug for osteoporosis (d.o.c)

• I: given Iv, causes Infusion reaction and Intertrochanteric fractures

• S: Stops(inhibits) osteoclast activation

• P: used to treat PAGETS DISEASE

• H: used to treat HYPERCALCEMIA OF PREGNANCY

• O: causes Osteonecrosis of the jaw

• S: causes Stomach problems orally (esophagitis)

• Ph: inhibits farnesyl PyroPhosphate

• ONATE: e.g. zoledrONATE, risedrONATE, alendronate

Incorrect Options:

Option A
- Nephrotoxicity: Nephrotoxicity can occur with intravenous administration of Zoledronate, but it is not a commonly associated side effect of BPNs in general.

Option B - Gastritis and esophagitis: Gastritis and esophagitis are adverse effects that can occur when BPNs are administered orally. However, the given information states that BPNs are primarily administe red intravenously, so this side effect is less likely.

Option C - Osteonecrosis of the jaw bone: It is a direct side effect of BPNs.

Solution for Question 4:

Correct Option A - Teriparatide:

• Teriparatide is a recombinant parathormone (rPTH) that is an anabolic agent. It is made up of 1 to 34 subunits and is not a complete parathormone unit. Teriparatide is administered subcutaneously and is prescribed only in severe cases of osteoporosis. However, it is associated with some important considerations and potential adverse effects.

• One of the notable adverse effects of teriparatide is hypercalcemia, which can occur due to its parathormone derivative nature. Prolonged use of teriparatide, exceeding two years, has been associated with an increased risk of osteosarcoma due to its stimulatory effect on osteoblast activity. As a result, a black box warning has been issued, recommending its use only in severe cases of osteoporosis and not in patients with mild to moderate osteoporosis.

Drug

Mechanism of Action

Route of Administration

Indications

Adverse Effects

Bisphosphonates

Inhibit osteoclast activation and cause apoptosis

Oral or Intravenous

Postmenopausal osteoporosis, steroid-induced osteoporosis, Paget's disease, osteolytic bone metasta sis

Gastritis, esophagitis, osteonecrosis of the jaw bone, increased risk of fractures with prolonged use

Denosumab

Monoclonal antibody against RANK ligand

Subcutaneous

Postmenopausal osteoporosis, steroid-induced osteoporosis, prevention of skeletal-related events in c ancer patients with bone metastasis

Hypocalcemia, infusion reactions, osteonecrosis of the jaw bone

Teriparatide

Recombinant parathormone

Severe cases of osteoporosis

Hypercalcemia, increased risk of osteosarcoma with prolonged use

Raloxifene

Selective estrogen receptor modulator

Oral

Postmenopausal osteoporosis

Hot flashes, leg cramps, increased risk of venous thromboembolism

Romosozumab

Targets sclerostin produced by osteocytes

Postmenopausal women at high risk for fracture

Cardiovascular events, hypersensitivity reactions, increased risk of stroke

Calcitonin

Inhibits osteoclast activity

Intranasal

Postmenopausal osteoporosis, Paget's disease

Nasal irritation, nasal ulceration

Strontium ranelate

Stimulates osteoblasts and inhibits osteoclasts

Cardiovascular events, hypersensitivity reactions

Estrogen/Hormone Therapy

Replaces declining estrogen levels

Oral or Transdermal

Increased risk of breast cancer, blood clots

Incorrect Options:

Option B - Denosumab: It is a monoclonal antibody against the RANK ligand, which inhibits the activati on of osteoclasts. It is not an anabolic agent like teriparatide.

Option C - Bisphosphonates: Bisphosphonates inhibit osteoclast activation and cause osteoclast apopt osis. They are administered intravenously and are the drug of choice for various types of osteoporosis. However, they do not fit the description of an anabolic agent.

Option D - Calcitonin: It is used to manage conditions such as hypercalcemia and osteoporosis. It is m ainly administered intranasally and is commonly used in postmenopausal osteoporosis. However, it is not an anabolic agent.

Solution for Question 5:

Correct Option D - DiGeorge syndrome:

Digeorge Syndrome

• DiGeorge syndrome is primarily characterized by abnormalities in structures derived from the third and fourth pharyngeal pouches during embryonic development.

• The third pharyngeal pouch gives rise to the thymus, which is responsible for the development and maturation of T lymphocytes, a type of white blood cell involved in the immune response.

• The fourth pharyngeal pouch gives rise to the parathyroid glands, which are responsible for regulating calcium and phosphorus levels in the body.

Salient Features of DiGeorge Syndrome

• Microdeletion on chromosome 22q11.2

• Facial features: micrognathia, hypertelorism, low-set ears, short/upturned nose, hooded eyelids

• Congenital heart defects (VSDs, tetralogy of Fallot, etc.)

• Immune system dysfunction due to underdeveloped or absent thymus

• Prone to recurrent respiratory, fungal, and viral infections

• Hypoparathyroidism leading to hypocalcemia and symptoms like muscle cramps, seizures, and tetany

• Developmental delays, learning disabilities, cognitive impairments

• Speech and language difficulties

• Renal abnormalities (renal agenesis, hydronephrosis)

• Skeletal abnormalities (scoliosis, vertebral abnormalities)

Incorrect Options:

Option A - Down syndrome: It is characterized by trisomy 21, with distinctive facial features such as epi canthal folds and a flat facial profile.

Option B - Marfan syndrome: It is a
connective tissue disorder characterized by tall stature, long limbs, and aortic root dilation.

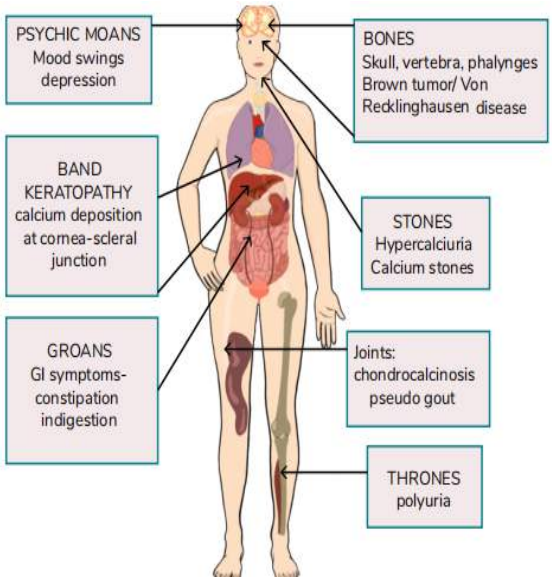
Option C - Turner syndrome: It is caused by the complete or partial absence of the second sex chromo some in females, leading to short stature, ovarian dysfunction, and characteristic physical features.

Solution for Question 6:

Correct Option A - Easy fatigability and muscle weakness:

• Symptoms given in the scenario with bone pain, kidney stones, elevated serum calcium, and decreased serum phosphate levels, and palpable tenderness in the left lower abdomen points towards the diagnosis of primary Hyperparathyroidism

Features of Primary Hyperparathyroidism



• Causes of Primary Hyperparathyroidism:

• Parathyroid Adenoma

• Parathyroid Hyperplasia

• Parathyroid Carcinoma

• Rare genetic syndromes (familial isolated hyperparathyroidism, neonatal severe hyperparathyroidism, hyperparathyroidism-jaw tumor syndrome)

Incorrect Options:

Option B - Excessive hair growth and oily skin: This symptom is not typically associated with hyperpara thyroidism. It is more commonly seen in conditions such as polycystic ovary syndrome (PCOS) or hirsu tism.

Option C - Cold intolerance and weight gain: These symptoms are not specific to hyperparathyroidism. Cold intolerance and weight gain are often seen in hypothyroidism due to an underactive thyroid gland.

Option D - Heat intolerance and weight loss: These symptoms are not characteristic of hyperparathyroi dism. Heat intolerance and weight loss are more commonly associated with hyperthyroidism, which is an overactive thyroid gland.

Solution for Question 7:

Correct Option B - Secondary hyperparathyroidism:

• The patient's history of chronic kidney disease, along with symptoms of fatigue, bone pain, and recurrent urinary tract infections, and laboratory findings of elevated serum phosphate levels, decreased serum calcium levels, and increased PTH levels, are consistent with the diagnosis of secondary hyperparathyroidism.

• Secondary hyperparathyroidism occurs as a compensatory response to chronic kidney disease, where there is impaired renal clearance of phosphate and reduced production of active vitamin D. The parathyroid glands become hyperactive and release excess PTH, resulting in increased bone resorption, decreased serum calcium levels, and elevated serum phosphate levels.

• Difference B/W Primary, Secondary and Tertiary Hyperparathyroidism

Condition

Cause

Serum Calcium

Serum Phosphate

Parathyroid Hormone (PTH)

Primary Hyperparathyroidism

Abnormal parathyroid gland function

Increased

Decreased

Secondary Hyperparathyroidism

Underlying condition (e.g., chronic renal failure, vitamin D deficiency)

Tertiary Hyperparathyroidism

Long-standing secondary hyperparathyroidism leading to autonomous parathyroid gland function

Variable

Increased Markedly

Incorrect Options:

Option A - Primary hyperparathyroidism: Primary hyperparathyroidism is characterized by excessive se cretion of PTH from one or more parathyroid adenomas, leading to hypercalcemia and hypophosphate mia. However, the patient in this scenario has decreased serum calcium levels, making primary hyperp arathyroidism less likely.

Option C - Tertiary hyperparathyroidism: Tertiary hyperparathyroidism occurs as a result of long-standi ng secondary hyperparathyroidism, typically in the setting of chronic renal failure. It is characterized by autonomous hypersecretion of PTH by the parathyroid glands, leading to persistent hypercalcemia eve n after the underlying cause of secondary hyperparathyroidism has been corrected. However, there is no indication of persistent hypercalcemia or evidence of long-standing secondary hyperparathyroidism in this case.

Option D - Familial hyperparathyroidism: Familial hyperparathyroidism is a rare genetic disorder charac terized by the development of parathyroid adenomas or hyperplasia. It can be inherited in an autosoma l dominant pattern and is associated with specific genetic mutations. However, there is no information i n the question stem to suggest a

family history or specific genetic mutation, making familial hyperparathyroidism less likely in this case.

Solution for Question 8:

Correct Option D - Cinacalcet is the first-line treatment for parathyroid carcinoma:

• Cinacalcet, a medication that works on the calcium-sensing receptor (CASR) of the parathyroid gland, is used to control hypercalcemia in refractory cases of parathyroid carcinoma. It is not the first-line treatment but can be employed when surgical management is not sufficient or feasible.

Parathyroid Carcinoma

Category

Information

Incidence

Approximately 1% of cases of primary hyperparathyroidism

Hypercalcemia

Present, with serum calcium levels >14 mg/dL

Parathyroid Hormone (PTH)

Markedly elevated levels (>5 times the normal value)

Clinical Features

Severe symptoms, palpable parathyroid gland, serum calcium >14 mg/dL

Route of Spread

Local invasion involving adjacent structures, such as the thyroid gland

Lymph Node Metastasis

Present in approximately 50% of cases, requiring ipsilateral MRND if positive

Distant Metastasis

Found in about 33% of patients

Surgical Management

Bilateral neck exploration and en bloc resection of the tumor

Recurrence

Possible, indicated by the reappearance of hypercalcemia symptoms

Management

Reoperation for recurrence or metastatic disease, Cinacalcet for refractory cases

Incorrect Options:

Option A - Surgical management involves unilateral neck exploration and en bloc resection of the tumo r: Surgical management of parathyroid carcinoma typically involves bilateral neck exploration to ensure thorough evaluation and removal of affected parathyroid glands. En bloc resection of the tumor is perf ormed, along with ipsilateral thyroid lobe resection if necessary. Unilateral neck exploration is insufficie

nt in addressing the extent of the disease and ensuring complete removal.

Option B - Recurrence of signs and symptoms of hypercalcemia after surgery is rare: Recurrence of si gns and symptoms of hypercalcemia after surgery for parathyroid carcinoma is possible, indicating the potential for disease recurrence or metastasis. Close monitoring is necessary, and if hypercalcemia rec urs, further evaluation and reoperation may be required.

Option C - Distant metastasis is found in the majority of patients with parathyroid carcinoma: While par athyroid carcinoma can spread to distant sites, such as the lungs, bones, and liver, it is found in approx imately 33% of patients, not the majority. Distant metastasis is a
serious complication of parathyroid carcinoma, but it is not present in the majority of cases.

Solution for Question 9:

Correct Option A - Surgical hypoparathyroidism:

• The patient's symptoms, such as tingling sensation around the lips and fingertips, along with muscle twitching and a positive Chvostek sign, are consistent with hypocalcemia. Hypocalcemia is a common complication following thyroidectomy due to accidental removal or damage to the parathyroid glands, leading to decreased parathyroid hormone (PTH) production and subsequent hypoparathyroidism. This scenario is often referred to as surgical hypoparathyroidism.

Causes

Description

Surgical hypoparathyroidism

Inadvertent removal or damage to the parathyroid glands during neck or thyroid surgery

Most common location where parathyroid gland is placed is BRACHIORADIALIS

Autoimmune hypoparathyroidism

Autoimmune destruction or dysfunction of the parathyroid glands

Congenital hypoparathyroidism

Genetic or developmental abnormalities leading to underdeveloped or absent glands

DiGeorge syndrome

Genetic disorder affecting the development of the parathyroid glands

Hereditary hypoparathyroidism

Inherited genetic mutations affecting parathyroid gland function

Idiopathic hypoparathyroidism

Hypoparathyroidism of unknown cause

Radiation-induced hypoparathyroidism

Damage to the parathyroid glands due to radiation therapy or exposure

Medications or toxins-induced hypoparathyroidism

Certain medications or toxins can impair parathyroid function

Hypomagnesemia-induced hypoparathyroidism

Low magnesium levels can disrupt parathyroid gland function

Other rare causes

Rare conditions such as infiltrative disorders, infiltrating tumors, or trauma

Incorrect Options:

Option B - DiGeorge syndrome: DiGeorge syndrome is a genetic disorder characterized by the abnormal development of several organs, including the parathyroid glands. It can lead to hypoparathyroidism and hypocalcemia. However, in this case, the patient's symptoms following a total thyroidectomy indicate a surgical cause rather than a genetic disorder like DiGeorge syndrome.

Option C - Wilson's syndrome: Wilson's syndrome, or Wilson-Mikity syndrome, is a genetic disorder that affects the parathyroid glands and can result in hypoparathyroidism. However, it is an extremely rare condition. In this case, the patient's symptoms are more likely related to the recent thyroidectomy rather than Wilson's syndrome.

Option D - Idiopathic hypoparathyroidism: Idiopathic hypoparathyroidism refers to hypoparathyroidism where the cause is unknown. While it is a possibility, in this case, the timing of the symptoms after thyroidectomy suggest a surgical cause rather than idiopathic hypoparathyroidism.

Solution for Question 10:

Correct Option B - Pseudohypoparathyroidism:

• The clinical presentation of short stature, obesity, brachydactyly, and low IQ, along with the dimpled appearance over the knuckles, is consistent with Albright hereditary osteodystrophy, which is a characteristic feature of pseudohypoparathyroidism. Pseudohypoparathyroidism is caused by a defect in the GNAS gene, leading to resistance to the actions of parathyroid hormone (PTH) at the receptor level. This resistance results in decreased responsiveness to PTH in the kidney, leading to decreased serum calcium levels and increased phosphate levels. The normal serum alkaline phosphatase (SAP) distinguishes pseudohypoparathyroidism from other conditions associated with low calcium levels.

Incorrect Options:

Option A - Hypoparathyroidism: Hypoparathyroidism is characterized by low levels of PTH and would not explain the clinical features observed in this patient.

Option C - Pseudopseudohypoparathyroidism: It is a rare condition in which the patient exhibits physical characteristics of pseudohypoparathyroidism but has normal calcium, phosphate, and PTH levels. It is inherited from the paternal side, which is not applicable in this case.

Option D - Familial hypoparathyroidism: It is a rare genetic condition characterized by low PTH levels, but it does not present with the specific clinical features and laboratory findings described in the patient .

Solution for Question 11:

Correct Option B - Calcitonin:

• Calcitonin is a hormone produced by the thyroid gland that plays a role in regulating calcium and bone metabolism. It acts by inhibiting osteoclast activity, which reduces bone resorption. By inhibiting osteoclasts, calcitonin helps to prevent excessive bone breakdown and maintain bone density. Therefore, a medication that inhibits osteoclast activity and reduces bone resorption is likely targeting calcitonin.

Incorrect Options:

Option A - Vitamin D: Vitamin D plays a crucial role in calcium absorption from the intestines and prom oting renal reabsorption of calcium. However, it does not directly inhibit osteoclast activity or reduce bo ne resorption. Vitamin D
is involved in maintaining calcium and phosphate homeostasis and promoting bone mineralization.

Option C - Parathyroid hormone (PTH): PTH is responsible for regulating calcium and phosphate levels in the body. It acts on the bones, kidneys, and intestines to increase calcium levels by promoting bone resorption, enhancing renal calcium reabsorption, and increasing intestinal calcium absorption. In this case, the medication described does not target PTH but rather inhibits osteoclast activity.

Option D - Insulin: Insulin is a hormone produced by the pancreas that regulates glucose metabolism. I t is not directly involved in bone metabolism or the regulation of calcium levels. Therefore, it is not the t arget hormone for a medication aimed at improving bone density by inhibiting osteoclast activity and re ducing bone resorption.

Solution for Question 12:

Correct Option B - Type 2:

• In Type 2 vitamin D-dependent rickets, there is end-organ resistance to the active form of vitamin D. Although the active vitamin D is present, the target tissues do not respond properly to its effects. This also leads to decreased calcium and phosphate levels, increased SAP levels, and increased PTH levels. Therefore, type 2 is the right answer.

Type 1

Type 2

• Previously known as pseudo vitamin D resistant rickets.

• The gene that encodes 1 a hydroxylase activity is defective.

• Synthesis of the active form of vitamin D is decreased. Calcium levels are decreased. Phosphate levels are decreased. SAP increased. PTH increased.

• Calcium levels are decreased.

• Phosphate levels are decreased.

• SAP increased.

• PTH increased.

• Calcium levels are decreased.

• Phosphate levels are decreased.

• SAP increased.

• PTH increased.

• End-organ resistance to active form of vitamin D

• Work up: Calcium levels are decreased. Phosphate levels are decreased. SAP increased. PTH increased.

• Calcium levels are decreased.

• Phosphate levels are decreased.

• SAP increased.

• PTH increased.

• Calcium levels are decreased.

• Phosphate levels are decreased.

• SAP increased.

• PTH increased.

Treatment

• Reverse by giving active form of vitamin D

• Calcium infusion

• It tends to normalize the PTH levels of the patient.

• Improves the Rickets and bone pain

Incorrect Options:

Option A - Type 1: In Type 1 vitamin D-dependent rickets, previously known as pseudo vitamin D resistant rickets, there is a defect in the gene that encodes 1-alpha hydroxylase activity. This enzyme i s responsible for the synthesis of the active form of vitamin D. As a result, there is a decreased product ion of active vitamin D, leading to decreased calcium and phosphate levels, increased SAP levels, and increased PTH levels.

Option C and D: Type 3 and Type 4 vitamin D-dependent rickets are much less common and are asso ciated with genetic mutations affecting specific receptors or transporters involved in vitamin D metaboli sm. These types are not typically associated with the clinical presentation and laboratory findings descr ibed in the case.

Solution for Question 13:

Correct Option C - It stimulates 1 alpha hydroxylase enzyme in kidneys:

• PTH stimulates the 1 alpha hydroxylase enzyme in the kidneys, which converts inactive vitamin D (calcidiol) to its active form (calcitriol). Active vitamin D enhances intestinal absorption of calcium.

Incorrect Options:

Option A - It is secreted by oxyphil cells of the parathyroid gland: This statement is false. Parathyroid h ormone (PTH) is primarily secreted by the chief cells of the parathyroid gland, not the oxyphil cells.

Option B - PTH is inhibited by hypercalcemia, hypermagnesemia and vitamin D: This statement is false . PTH secretion is regulated by negative feedback mechanisms, and elevated levels of calcium, and vit amin D can inhibit PTH secretion but it is rather inhibited by severe hypomagnesemia.

Option D - It increases calcium reabsorption from DCT through TRPV 3 and 4 channels: This statemen t is false. PTH primarily acts on the distal convoluted tubule (DCT) to increase calcium reabsorption thr ough the activation of the TRPV5 channel, not TRPV3 and TRPV4 channels.

Solution for Question 14:

Correct Option A - RET gene:

• MEN 2 syndrome is an autosomal dominant inherited disorder characterized by the development of tumors in multiple endocrine glands. It consists of three subtypes: MEN 2A, MEN 2B, and familial medullary thyroid carcinoma (FMTC). These subtypes are differentiated based on the presence or absence of additional clinical features.

• MEN 2 is primarily associated with medullary thyroid carcinoma (MTC), pheochromocytoma, and parathyroid hyperplasia or adenomas. The RET gene, located on chromosome 10q11.2, encodes a receptor tyrosine kinase involved in cell signaling pathways. Mutations in the RET gene lead to the development of MEN 2 syndrome.

Incorrect Options:

Option B - TP53 gene: The TP53 gene is associated with Li-Fraumeni syndrome, which is characterize d by an increased risk of various cancers, including sarcomas, breast cancer, brain tumors, and others. It is not directly related to MEN 2 syndrome.

Option C - BRCA1 gene: The BRCA1 gene is associated with hereditary breast and ovarian cancer syn drome. Mutations in this gene increase the risk of developing breast and ovarian cancers but are not i mplicated in MEN 2 syndrome.

Option D - APC gene: The APC gene is associated with familial adenomatous polyposis (FAP), an inhe rited condition characterized by the development of multiple polyps in the colon and rectum. It is not rel ated to MEN 2 syndrome, which primarily involves tumors in the endocrine glands.

Solution for Question 15:

Correct Option A - Increased serum gastrin levels:

• The likely diagnosis of this patient is Multiple Endocrine Neoplasia type 1 (MEN1). MEN1 is a hereditary condition characterized by the development of tumors involving multiple endocrine glands. It is associated with mutations in the MEN1 gene. The classic triad of MEN1 includes parathyroid adenomas, pancreatic neuroendocrine tumors (e.g., insulinomas, gastrinomas), and pituitary adenomas.

• The development of gastrinomas leads to increased serum gastrin levels and the development of Zollinger-Ellison syndrome (ZES). ZES is characterized by hypersecretion of gastric acid, resulting in recurrent peptic ulcers and other gastrointestinal symptoms.

Incorrect Options:

Option B - Elevated serum cortisol levels: Elevated serum cortisol levels are not typically associated wit h parathyroid adenomas or Multiple Endocrine Neoplasia Type 1 (MEN1) syndrome. Elevated cortisol l evels are characteristic of conditions such as Cushing's syndrome, which involves excessive productio n of cortisol from the adrenal glands.

Option C - Hypokalemia: Hypokalemia, or low potassium levels, is not directly associated with parathyr oid adenomas or MEN1 syndrome. It is more commonly seen in conditions such as primary aldosteroni sm or certain kidney disorders.

Option D - Impaired liver function: Impaired liver function is not a typical finding in patients with parathy roid adenomas or MEN1 syndrome. Liver dysfunction is more commonly associated with liver diseases , such as hepatitis, cirrhosis, or liver failure.

Solution for Question 16:

Correct Option B - Von Hippel-Lindau (VHL) syndrome:

• The most likely diagnosis for this patient is Von Hippel-Lindau (VHL) syndrome. VHL syndrome is an autosomal dominant disorder due to a defect in a pVHL gene located at chromosome 3p25.

• Von Hippel-Lindau (VHL) syndrome is characterized by the development of various tumors and cysts in multiple organs. The presence of hemangioblastomas in the cerebellum and retina, along with renal cysts and a family history of pheochromocytomas, are classic features of VHL syndrome. It is also associated with the development of renal cell carcinoma, clear cell carcinoma.

Incorrect Options:

Option A - Neurofibromatosis type 1 (NF1): Neurofibromatosis type 1 is a genetic disorder characterize d by the development of multiple neurofibromas, café-au-lait spots, and other characteristic features.

Option C - Multiple endocrine neoplasia type 1 (MEN1): MEN1 syndrome is an autosomal dominant dis order characterized by the development of tumors in multiple endocrine organs such as the parathyroid , pancreas, and pituitary.

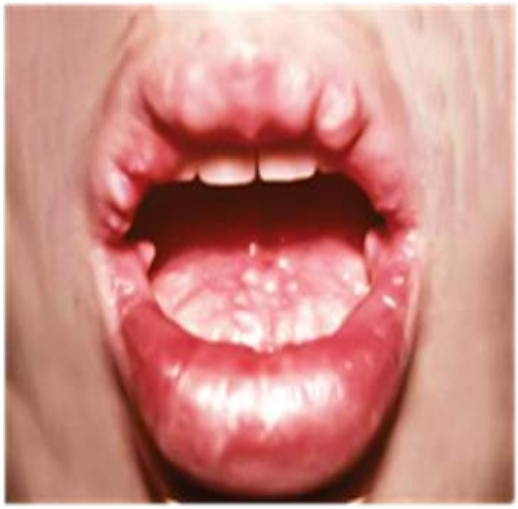
Option D - Hereditary paraganglioma-pheochromocytoma syndrome: Hereditary paraganglioma-pheoc hromocytoma syndrome is a
genetic disorder characterized by the development of paragangliomas and pheochromocytomas.

Solution for Question 17:

Correct Option A - Chromosome 10:

• MEN 2B, also known as MEN 2B syndrome, is a rare genetic disorder caused by mutations in the RET proto-oncogene. The RET gene is located on chromosome 10. Mutations in the RET gene result in the activation of signaling pathways that lead to the development of multiple endocrine neoplasia.

• The features seen in MEN 2B include characteristic physical findings such as enlarged lips, a thickened tongue, and multiple neuromas on the mucosal surfaces of the lips, tongue, and conjunctiva. Patients may also have a marfanoid habitus, with long limbs and hyperextensible joints. The condition is associated with the development of medullary thyroid carcinoma and pheochromocytoma, leading to elevated levels of calcitonin and catecholamines, respectively.



Incorrect Options:

Options B, C, and D are incorrect. Refer to Option A for an explanation.

Solution for Question 18:

Correct Option A - Type-1 Autoimmune Polyendocrine Syndrome (APS):

• The most likely diagnosis for this patient is Type-1 Autoimmune Polyendocrine Syndrome (APS). This syndrome involves multiple endocrine glands and is associated with a defect in chromosome 21.

• In this patient, there is evidence of autoimmune thyroiditis (low thyroid hormone levels), hypoparathyroidism (low PTH levels), and autoimmune damage to the pancreas leading to type-1 diabetes mellitus. Additionally, the destruction of the adrenal glands presents as Addison's disease. The presence of two out of these three findings is required for the diagnosis of Type-1 APS.

Incorrect Options:

Option B - Type-2 Autoimmune Polyendocrine Syndrome (APS): Type-2 APS is similar to Type-1 APS but does not include hypoparathyroidism. Therefore, option B is not the correct answer.

Option C - Addison's disease: It is characterized by adrenal gland destruction but does not explain the i nvolvement of other endocrine glands in this patient.

Option D - Celiac disease: It is associated with Type-2 APS but does not explain the entire constellatio n of symptoms and endocrine abnormalities in this case.

Solution for Question 19:

Correct Option A - Cowden syndrome:

• The most likely condition associated with this patient's presentation is Cowden syndrome. Cowden syndrome is an autosomal dominant disorder due to a mutation in the PTEN gene, characterized by multiple hamartomas and an increased risk of various malignancies, including breast, thyroid, and endometrial cancers. The presence of benign breast masses, thyroid nodules, and hamartomatous skin lesions such as trichilemmomas and acral keratoses are characteristic findings in Cowden syndrome.

Incorrect Options:

Option B - Neurofibromatosis type 1: It is characterized by neurofibromas, café-au-lait spots, and Lisch nodules of the iris. It does not typically present with the specific skin findings described in the case.

Option C - Tuberous sclerosis: Tuberous sclerosis is characterized by the development of hamartomas in various organs, including the brain, heart, kidneys, and skin. It is not typically associated with trichile mmomas or acral keratoses.

Option D - Gorlin syndrome: It is also known as nevoid basal cell carcinoma syndrome, is characterize d by multiple basal cell carcinomas, skeletal abnormalities, and jaw cysts. It does not typically present with the specific skin findings described in the case.

Previous Year Questions

1. Which of the subsequent is absent in MEN 2B syndrome?

A. Megacolon

B. Parathyroid adenoma

C. Mucosal neuroma

D. Marfanoid habitus

---

2. What should be the next course of action in managing a patient who has had diabetes mellitus for the last 5 years and is currently experiencing vomiting and abdominal pain? The patient is not adhering to medication and shows signs of dehydration. Diagnostic tests indicate a blood sugar level of 500 mg/dl and the presence of ketone bodies.

A. Intravenous fluids with long-acting insulin

B. Intravenous fluids

C. Intravenous insulin

D. Intravenous fluids with regular insulin

---

3. What should be done next in the management of a patient who is diabetic and presents with symptoms of vomiting and abdominal pain? Upon examination, the patient displays hyperventilation, sweet breath, and low blood pressure. The blood glucose level is 320 mg/dL, and urine ketones are detected.

A. IV insulin drip

B. IV soda-bicarbonate

C. Check blood ketone levels

D. IVF and check K+

---

4. Which medication is recommended as the primary treatment for high blood sugar in a 19-year-old woman with a medical history of type 1 diabetes mellitus, who has been brought to the emergency room due to symptoms of confusion, vomiting, and abdominal pain, and subsequently diagnosed with diabetic ketoacidosis?

A. Regular insulin

B. Lente insulin

C. Glyburide

D. 70/30 insulin

---

5. A 25-year-old P1L1 woman is planning for her second child. She has been recently diagnosed with Grave’s disease. Which of the following is the antithyroid drug to be used in early gestation?

A. Propylthiouracil

B. Methimazole

C. Carbimazole

D. All the above

---

6. What drug is recommended for the treatment of a 29-year-old male patient who has been experiencing coarse facial features and gradual enlargement of the hands and feet for the past decade, and has been diagnosed with acromegaly based on elevated levels of IGF-1 and growth hormone that did not suppress after a 75 g glucose challenge test?

A. Lanreotide depot formulation

B. Terlipressin

C. Ketoconazole

D. Leuprolide

---

7. A patient presents with complaints of sudden onset headache, palpitation, and profuse sweating. The patient has had multiple similar episodes in the past. During these episodes, the patient's blood pressure is elevated. A 24-hour urine metanephrine is elevated. What is the most likely diagnosis?

A. Addison's disease

B. Renal artery stenosis

C. Pheochromocytoma

D. Hyperthyroidism

---

8. What is the leading cause of death in diabetic ketoacidosis?

A. Acute respiratory distress syndrome

B. Cardiac arrhythmia

C. Cerebral edema

D. Acute kidney injury

---

9. In a 60-year-old male, what is the primary etiology typically associated with Cushing's disease?

A. Small-cell lung cancer

B. Adrenal tumor

C. Ectopic ACTH syndrome

D. Pituitary microadenoma

---

10. A 30-year-old female patient presented with bone pain and abdominal cramps. Her family reported a previous history of abnormal behavior. The consultant doctor made a tentative diagnosis based on the clinical symptoms. What would be the most appropriate investigative method to establish a conclusive diagnosis?

A. MRI

B. Ultrasonogram

C. Sestamibi scan

D. CT scan

---

11. Which type of neuroendocrine tumor could potentially cause these symptoms in a 49-year-old male who is experiencing recurring episodes of watery diarrhea, dehydration, hypokalemia, and achlorhydria?

A. Insulinoma

B. Somatostatinoma

C. VIPoma

D. Glucagonoma

---

12. In a female patient with bronchial asthma, who arrives at the emergency department experiencing intense restlessness, palpitations, and tremors, an examination reveals a swollen neck. Additionally, her blood pressure is elevated, and tachycardia is observed. The ECG results indicate atrial fibrillation. Which medication should be administered promptly for the initial treatment of this patient?

A. Diltiazem

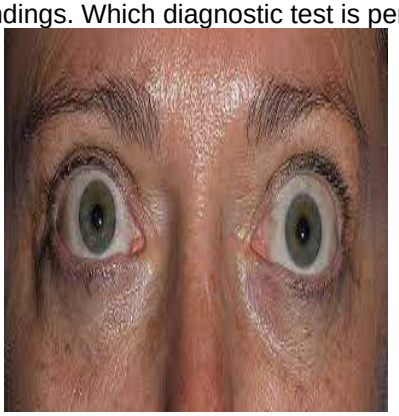
B. Propranolol

C. Esmolol

D. Propylthiouracil

---

13. The patient in question is a 25-year-old male who presented with symptoms of palpitations, sweating, and restlessness. He also mentioned experiencing sweaty palms. The image provided below displays the clinical examination findings. Which diagnostic test is performed on this patient?



A. Anti-thyroglobulin antibody

B. Anti-thyroid peroxidase antibody

C. Thyroid receptor antibody

D. Elevated ultrasensitive thyrotropin levels

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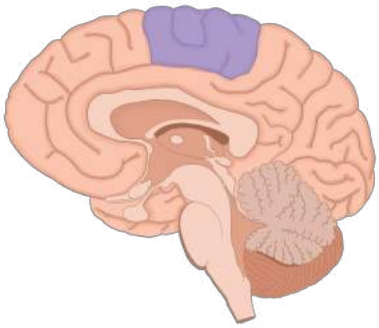
14. In the given sagittal brain section, the colored region corresponds to the paracentral lobule. What structures would be impacted by a lesion in this particular area?



A. Scapular region and neck

B. Trunk and shoulder

C. Perineum and leg

D. Face and neck

---

15. What recommendations would you give to a diabetic patient with a fasting blood glucose level of 160 mg/dL in terms of non-pharmacological management?

A. At least 80 mg of dietary fibre

B. <5 g sodium intake every day

C. <30% of the calories should come from fat

D. Cholesterol <100 mg

---

16. Which of the following is seen in MEN 2B syndrome?

A. Café au lait spot

B. Medullary thyroid carcinoma

C. Parathyroid adenoma

D. Optic nerve glioma

---

17. What is the probable diagnosis for a woman who has symptoms of altered mental state, difficulty breathing, low blood pressure, and slow heart rate, along with non-pitting swelling in the limbs? Additionally, she has a long-standing history of weight gain, constipation, sensitivity to cold, and heavy menstrual bleeding.

A. Septic shock

B. Cardiogenic shock

C. Myxedema coma

D. Hyperthyroidism

---

18. Which of the following is a characteristic feature of Kallmann syndrome?

A. Anosmia

B. Syndactyly in males

C. Precocious puberty in females

D. White forelock

---

19. All of the following are tests done for screening in patients with Turner's syndrome, except?

A. ANA

B. Audiometry

C. Echocardiography

D. Fasting blood glucose

---

20. Match the following? a. Trisomy 13 1. Huntington disease b. Trisomy 18 2. Patau syndrome c. Trinucleotide repeat sequence 3. Sickle disease d. Hb point mutation of glutamate to valine 4. Edward syndrome

a. Trisomy 13	1. Huntington disease
b. Trisomy 18	2. Patau syndrome
c. Trinucleotide repeat sequence	3. Sickle disease
d. Hb point mutation of glutamate to valine	4. Edward syndrome

A. a2-b4-c1-d3

B. b1-a3-d2-c4

C. a2-b1-c4-d3

D. a4-b1-c3-d2

---

21. Which of the microorganisms listed below will exhibit intrinsic resistance to meropenem and aminoglycosides, but have sensitivity to cotrimoxazole?

A. Burkholderia cepacia

B. Acinetobacter

C. Pseudomonas

D. Stenotrophomonas

---

22. What is the most frequently encountered tumor in the anterior mediastinum?

A. Thymoma

B. Lymphoma

C. Neurogenic tumors

D. Fibroma

---

23. Gynecomastia is caused by all except

A. Aromatase inhibitors

B. Liver failure

C. Spironolactone

D. Digoxin

---

24. What is the preferred medication for treating Hyperthyroidism during the second trimester of pregnancy?

A. Propyl Thiouracil

B. Carbimazole

C. Sodium iodide

D. Radioactive iodine

---

25. A patient came to the hospital with complaints of lethargy, increased sleep, and weight gain. Investigations revealed low plasma TSH concentration. However, on the administration of TRH, the TSH levels increased. Which of the conditions is likely in this patient?

A. Hyperthyroidism due to primary thyroid disease

B. Hypothyroidism due to disease in the pituitary

C. Hypothyroidism due to disease in the hypothalamus

D. Hyperthyroidism due to disease in the pituitary

---

26. Which of the subsequent manifestations is observed in pituitary apoplexy?

A. Hypertension

B. Shock

C. Unconsciousness

D. Fatigue

---

27. Which conditions are caused by a mutation in the gene for the aquaporin channel?

A. Liddle’s syndrome

B. Nephrogenic DI

C. Cystic fibrosis

D. Barter syndrome

---

28. What is the most appropriate course of action in managing a 12-year-old child with a history of type 1 diabetes mellitus who is experiencing confusion, drowsiness, rapid breathing, dry mucous membranes, low blood pressure (70/50 mmHg), a random blood glucose level of 415 mg/dl, and urine ketones of 4+?

A. 2-3 L of normal saline over 1-3 hours

B. Insulin infusion at 0.1 units/kg/hour

C. Arterial blood gas

D. Insulin bolus of 0.1 units/kg given

---

29. What would be the most appropriate next step in managing a 40-year-old female patient who is experiencing cold intolerance, dry skin, constipation, and has a slow ankle jerk on examination, with a TSH level of 15 IU/L and low T3 and T4 levels?

A. Begin treatment with levothyroxine (LT4)

B. Measure thyroxine binding globulin (TBG)

C. Order a thyroid radionuclide uptake and scan

D. Order thyroid ultrasonography

---

30. What substances found in urine are utilized as a screening tool for pheochromocytoma?

A. Urinary metanephrines and VMA

B. Albumin

C. 5-HIAA

D. Glucose

---

31. What investigations are necessary for a 30-year-old female patient presenting with neck swelling, weight loss, palpitations, exophthalmos, and a diffusely enlarged thyroid gland in the outpatient department? 1. Thyroid scan 2. Fine needle aspiration cytology (FNAC) 3. Thyroid function tests 4. Ultrasound of neck 5. Anti-thyroid antibody

A. 1,2,3,4 and 5

B. 1,3,5 only

C. 3,4,5 only

D. 1,3,4 and 5 only

---

32. What is the association of Rhino-cerebral Mucor mycosis?

A. Diabetic ketoacidosis

B. Pregnancy

C. Antibiotics

D. Inhaled steroids

---

33. What would be the most suitable course of action for managing a 65-year-old male who presented with symptoms of weakness, lethargy, excessive cold intolerance, and slow ankle jerk? His thyroid function test (TFT) revealed a TSH level of 16 Mu/L (normal range: 0.4 - 4.0 mu / l), T4 level of 0.3 ng/dl (normal range: 0.6 - 1.6 ng / dl), and T3 level of 70 pg /dl.

A. Start levothyroxine at 100 micrograms and decrease the dose gradually

B. Start levothyroxine at 25 micrograms and increase the dose gradually

C. Start levothyroxine at 25 micrograms and decrease the dose gradually

D. Give T3 and T4 drugs simultaneously

---

34. Which initial screening tests are employed in a primary healthcare center (PHC) for diagnosing diabetes? HbA1c >6.5 Fasting blood sugar >126mg/dl Random blood sugar >200mg/dl 2-hour post glucose load blood sugar

A. 1 and 2

B. 2 and 3

C. 2 and 4

D. 1,2 and 3

---

35. A comatose elderly patient with a weight of approximately 70 kilograms is presented to the emergency department. During examination, it was determined that the patient's serum glucose levels were 500mg/dL, arterial pH is 7.33, and there is an elevation in plasma ketones levels. However, the serum potassium levels are within the normal range. In order to treat this patient, what substance should be added to the saline solution?

A. Insulin

B. Bicarbonate

C. Potassium

D. 14 units of regular insulin intravenously

---

36. What is the most frequently observed delayed symptom of radiation therapy for the head and neck?

A. Dysphagia

B. Xerostomia

C. Myelopathy

D. Dysgeusia

---

37. In obesity, there is an increase in the production of which of the following hormones?

(or)

The production of which of the following hormones is increased in obesity?

A. Insulin

B. Thyroxine

C. Growth hormone

D. Adiponectin

---

38. Calcitonin levels are increased in:

A. Hyperthyroidism

B. Hypoparathyroidism

C. Hyperparathyroidism

D. Cushing’s syndrome

---

39. Which prolactin levels are indicative of prolactinoma?

A. >50µg/L

B. >100µg/L

C. >150µg/L

D. >200µg/L

---

40. What is the most probable cause of hypokalemia, hypertension, and metabolic alkalosis in a 35-year-old female patient?

A. Bartter syndrome

B. Gitelman’s syndrome

C. Liddle’s syndrome

D. Fanconi’s syndrome

---

41. Which of the following statements accurately describes the thyroid function test results for a middle-aged woman diagnosed with Grave's disease, presenting symptoms such as tremors, palpitations, weight loss, and menstrual irregularities?

A. Low TSH levels

B. Low free T4 levels

C. Low serum T3 levels

D. Radioactive iodine uptake (RAIU) at 24 hours below normal

---

42. A middle-aged woman with a history of constipation, dry skin and menorrhagia presents to the ER with altered sensorium, non-pitting edema, hypothermia, bradycardia, and hypotension. What is the most likely diagnosis?

A. Septic shock

B. Cardiogenic shock

C. Myxedema coma

D. Hypoglycemia

---

43. A patient presented with chronic diarrhea and steatorrhea. D- xylose test was normal and the Schilling test was abnormal. A duodenal biopsy was normal. What is the most likely diagnosis?

A. Celiac disease

B. Ulcerative colitis

C. Intestinal lymphangiectasia

D. Pancreatic insufficiency

---

44. Which of the following statements correctly describes an ideal candidate for a renal graft transplant in a patient with diabetic nephropathy?

A. The survival rate of graft is 95% in the first year

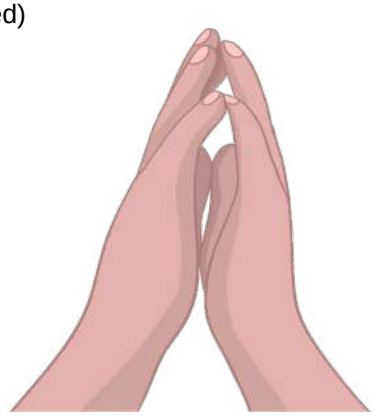
B. The transplantation is cost effective after the second transplant year

C. The life expectancy is doubled in a diabetic patient with renal transplant

D. The treatment of chronic rejection has improved over the last 10 years

---

45. What could be the possible reason for a diabetic patient to greet with a "namaste" gesture upon entering your clinic? (Image provided)



A. Flexor tenosynovitis

B. Cheiroarthropathy

C. Dupuytrens contracture

D. Ankyloses

---

46. During her pregnancy, a woman who had Grave's disease was consistently taking antithyroid medication. Consequently, the newborn suffered from aplasia cutis congenita. Which specific medication could be attributed to the occurrence of this condition?

A. Carbimazole

B. Levothyroxine

C. Methylthiouracil

D. Hydrouracil

---

47. In a medical camp established on a military base, a 20-year-old military recruit is discovered to have an HbA1C level of 6.1% and a fasting blood glucose of 120 mg/dL. The individual does not have a

familial background of diabetes mellitus and displays no indications or symptoms of diabetes. The general physical examination shows no noteworthy findings. Which of the following options most accurately characterizes the blood glucose levels in this patient?

A. Normal

B. Impaired Glucose tolerance

C. Diabetes Mellitus

D. Maturity onset diabetes in Young

---

48. What is the most frequent cause of fulminant diabetes?

(or)

Most common cause of fulminant diabetes is?

A. Viruses

B. Diabetic Ketoacidosis

C. Non-ketotic hyperosmolar coma

D. Autoimmunity

---

49. MC joint involved in diabetes is?

A. Ankle

B. Knee

C. Shoulder

D. Charcot

---

50. Which type of insulin should be administered to manage a 32-year-old male patient with a medical history of peptic ulcer disease and diabetes mellitus, who presents to the emergency department complaining of nausea, abdominal pain, and lethargy for the past two days? The patient also reports occasional dark, tarry stools. Laboratory tests indicate elevated blood glucose levels and a high anion gap metabolic acidosis on an arterial blood gas sample.

A. Regular insulin

B. Lispro

C. Glargine

D. Aspart

---

51. Slow onset of action is seen with?

A. Glargine

B. Lispro

C. Regular

D. NPH

---

52. What is the main physical finding of prolactinoma that follows galactorrhea in a 19-year-old nulligravida woman who has been experiencing milk discharge from her nipples for the last 5 months and is diagnosed with prolactinoma?

A. Bitemporal hemianopia

B. Anovulatory cycles

C. Amenorrhea

D. Infertility

---

53. What is not observed in Tumor Lysis Syndrome?

A. Hypophosphatemia

B. Hypocalcemia

C. Hyperuricemia

D. Hyperkalemia

---

54. What is the interpretation of elevated serum Calcium levels in a patient with normal SAP, PTH, and Vitamin D3 levels?

A. Vitamin D intoxication

B. Hyperparathyroidism

C. Multiple myeloma

D. Nutritional rickets

---

55. Pheochromocytoma produces all except?

A. Epinephrine

B. Norepinephrine

C. Cortisol

D. Dopamine

---

56. Please calculate the sodium deficit in the patient, who weighs 60 kg, using the provided serum electrolyte values: pH of 7.42, sodium (Na+) level of 120 mEq/L, and serum chloride (CI-) level of 90 mEq/L.

A. 20 mEq

B. 200 mEq

C. 400 mEq

D. 720 mEq

---

57. A 56-year-old woman presented with a gradually diminishing visual field. She was found to have a pituitary mass and underwent trans-sphenoidal hypophysectomy. Now she has low levels of ACTH, TSH, FSH and LH. Which of the following hormone supplements is not needed in the patient postoperatively?

A. Mineralocorticoids

B. Thyroid hormones

C. Glucocorticoids

D. Estradiol

---

58. Which condition is frequently linked to Addison's disease?

A. Autoimmune adrenalitis

B. Adrenocortical carcinoma

C. Hypernephroma

D. Medullary carcinoma thyroid

---

59. What is the treatment for hypercalcemia caused by vitamin D toxicity?

A. Dexamethasone

B. Hydroxychloroquine

C. Chloroquine

D. Ketoconazole

---

60. What is a macrovascular complication that develops in the advanced stages of diabetes?

A. Coronary artery disease

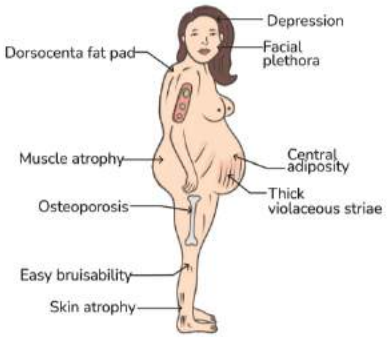
B. Foot ulcer

C. Nephropathy

D. Retinopathy

---

61. What is the disease depicted in the image below?



A. Acromegaly

B. PCOS

C. Cushing’s syndrome

D. Advanced obesity

---

62. Mark the true statements? 1. MEN 2B is also known as Sipple syndrome 2. MEN 1 is also known as Werner syndrome 3. MEN 2B is characterized by the presence of Marfanoid Habitus. 4. MEN 4 is a/w CDKN1B

A. 1 and 2 are true

B. 3 and 4 are true

C. 1, 2 and 4 are true

D. 2, 3 and 4 are true

---

63. Fulminant diabetes mellitus is seen in?

A. Diabetic ketoacidosis

B. Coxsackie B virus

C. Non ketonic hyperosmolar coma

D. Autoimmune pancreatis

---

64. A high-dose dexamethasone suppression test was done on a chronic smoker with complaints of weight gain and hyperpigmentation. The before and after ACTH values are high. What is the most likely clinical diagnosis?

A. Pituitary adenoma

B. Ectopic source

C. Exogenous source

D. Adrenal adenoma.

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	4
Question 3	4
Question 4	1
Question 5	1
Question 6	1

Question 7	3
Question 8	3
Question 9	4
Question 10	3
Question 11	3
Question 12	4
Question 13	3
Question 14	3
Question 15	3
Question 16	2
Question 17	3
Question 18	1
Question 19	1
Question 20	1
Question 21	4
Question 22	1
Question 23	1
Question 24	2
Question 25	3
Question 26	2
Question 27	2
Question 28	3
Question 29	1
Question 30	1
Question 31	4
Question 32	1
Question 33	2
Question 34	3
Question 35	1
Question 36	2
Question 37	1
Question 38	3
Question 39	4
Question 40	3
Question 41	1

Question 42	3
Question 43	4
Question 44	2
Question 45	2
Question 46	1
Question 47	2
Question 48	1
Question 49	4
Question 50	1
Question 51	1
Question 52	1
Question 53	1
Question 54	3
Question 55	3
Question 56	4
Question 57	1
Question 58	1
Question 59	1
Question 60	1
Question 61	3
Question 62	4
Question 63	2
Question 64	2

Solution for Question 1:

Correct Option B: Parathyroid adenoma

• Parathyroid adenoma is not visualized in MEN 2B syndrome.

• It is a common finding in another type of MEN syndrome, MEN 1, that occurs due to mutations in the MEN1 gene.

• In MEN 1 condition, patients may develop tumors in the parathyroid glands, pancreas, and pituitary gland, that can cause hyperparathyroidism, pancreatic neuroendocrine tumors, and pituitary adenomas, individually.

Incorrect Options:

Option A: Megacolon

• Megacolon is a feature of Hirschsprung's disease and is associated with accompanying MEN 2B syndrome.

Option C: Mucosal neuroma

• Mucosal neuromas are a hallmark of MEN 2B syndrome and are visualized in the oral mucosa, conjunctiva, and gastrointestinal tract.

Option D: Marfanoid habitus

• Marfanoid habitus is visualized in MEN 2B syndrome characterized by exaggerated stature, thin long fingers, and hypermobility of joints.

Solution for Question 2:

Correct Option D:

• The next best step in management for this patient is intravenous fluids with regular insulin.

• Usually, since the patient is displaying diabetic ketoacidosis (DKA), it is possibly a life-threatening complication of uncontrolled diabetes mellitus.

• In DKA, the body produces high levels of ketone bodies, driving to acidosis and electrolyte imbalances.

• Treatment includes replenishing fluid and electrolyte imbalances with intravenous fluids, taken after insulin therapy to diminish blood glucose levels and ketone bodies.

• Normal affront is utilized in a nonstop intravenous mixture until the blood glucose level is underneath 200 mg/dL, after which subcutaneous affront can be started.

Incorrect Options:

Option A. Intravenous fluids with long-acting insulin: Long-acting insulin isn't fitting for the administratio n of DKA, because it does not reduce blood glucose levels rapidly enough to treat the acute hyperglyce mia related to DKA.

Option B. Intravenous fluids alone: Whereas intravenous liquids are a critical component of DKA mana gement, insulin treatment is essential to reduce blood glucose levels and ketone bodies. Without insuli n therapy, the patient's acidosis and electrolyte imbalances will not improve.

Option C. Intravenous insulin alone: Whereas insulin treatment is vital for DKA management, intraveno us fluids are moreover required to correct liquid and electrolyte imbalances. Without intravenous fluids, the persistent may develop hypotension and declining electrolyte imbalances.

Solution for Question 3:

Option d:

The patient in the given scenario presents with symptoms of diabetic ketoacidosis (DKA), a potentially l ife-threatening complication of diabetes. DKA occurs when the body starts breaking down fat for energ y due to a lack of insulin, leading to the buildup of ketones in the blood.

The correct next step in managing this patient is to initiate intravenous fluid (IVF) therapy and check th e potassium levels. This is because patients with DKA are typically dehydrated due to excessive urinati on and vomiting, and they also lose potassium in the urine. Hypokalemia (low potassium levels) can oc cur due to insulin therapy, so it is important to check and monitor potassium levels closely during treat ment.

Incorrect Choices:

a. IV insulin drip is a
necessary treatment for DKA. Still, it should be initiated after fluid resuscitation to avoid causing a sudden drop in blood glucose levels, which can lead to cerebral edema.

b. IV soda-bicarbonate is not recommended for the initial management of DKA as it may worsen the ac idosis by causing a shift in the acid-base balance.

c. While checking blood ketone levels is important for diagnosing DKA, it does not address the acute m anagement of the condition.

Solution for Question 4:

• In the management of DKA (diabetic ketoacidosis), the main goal is to lower the blood glucose level and correct the acid-base and electrolyte imbalances. Regular insulin is the drug of choice for the management of hyperglycemia in DKA. It is a fast-acting insulin that is given intravenously and has a rapid onset of action, which helps to lower the blood glucose level quickly.

Incorrect choices:

• Option b: Lente insulin is a combination of short-acting and long-acting insulin, which is used for the management of type 1 and type 2 diabetes mellitus. It has a delayed onset of action and is not effective for the rapid correction of hyperglycemia in DKA.

• Option c: 70/30 insulin is a combination of intermediate-acting and short-acting insulin, which is used for the management of type 1 and type 2 diabetes mellitus. It is not appropriate for the rapid correction of hyperglycemia in DKA.

• Option d: Glyburide is an oral hypoglycemic agent that is used for the management of type 2 diabetes mellitus. It works by stimulating the release of insulin from the pancreas. It is not appropriate for the management of DKA as it does not lower the blood glucose level quickly enough to be effective in the treatment of this condition.

Solution for Question 5:

Option a. Propylthiouracil:

• Grave's disease is an autoimmune disorder that causes hyperthyroidism, which results in the overproduction of thyroid hormones by the thyroid gland. When a woman is planning for pregnancy or is already pregnant, it is crucial to manage Grave's disease effectively to ensure the health of both the mother and the developing fetus.

• Antithyroid drugs are the mainstay of treatment for Grave's disease, and among the antithyroid drugs, Propylthiouracil (PTU) is the preferred drug for use during early pregnancy.

• Propylthiouracil (PTU) is an antithyroid drug that works by inhibiting the production of thyroid hormones. PTU is the preferred drug for use during early pregnancy, particularly in the first trimester, as it has a lower risk of causing birth defects compared to Methimazole.

Incorrect choices:

Option b: Methimazole is also an antithyroid drug that works by inhibiting the production of thyroid hor mones. Methimazole is usually avoided during the first trimester of pregnancy due to its potential risk of causing birth defects. However, it can be used during the second and third trimesters of pregnancy if P

TU is not well-tolerated.

Option c: Carbimazole is a prodrug of Methimazole. Like Methimazole, it is avoided during the first trim ester of pregnancy due to the risk of causing birth defects.

Option d: Propylthiouracil can be used in early gestation, but Methimazole and Carbimazole are avoide d during the first trimester of the pregnancy.

Solution for Question 6:

• Lanreotide is a somatostatin analog that inhibits the release of GH.

• It is administered as a long-acting depot injection.

• Considered the preferred medical therapy for acromegaly due to its high efficacy in controlling GH and IGF-1 levels, as well as its long duration of action.

Incorrect Choices:

• Option B: Terlipressin Is a synthetic vasopressin analog used primarily for the treatment of hepatorenal syndrome and bleeding esophageal varices

• Option C: Ketoconazol is antifungal medication that inhibits the synthesis of adrenal and gonadal steroids. It has been used off-label for the medical management of acromegaly in the past,. However, it is associated with significant adverse effects and has been largely replaced by more effective and safer treatment options, such as somatostatin analogs (like lanreotide).

• Option D: Leuprolide is a gonadotropin-releasing hormone (GnRH) agonist commonly used for the treatment of conditions such as prostate cancer and endometriosis. It has no direct role in the management of acromegaly and is not the preferred drug for this condition.

Solution for Question 7:

Correct option C - Pheochromocytoma:

• Pheochromocytoma produces excessive amounts of catecholamines, leading to symptoms like sudden onset headache, palpitation and profuse sweating.

• The diagnosis is confirmed by measuring elevated levels of urinary metanephrines.

• A 24-hour urine metanephrine test is a diagnostic test for pheochromocytoma.

Incorrect options:

Option A - Addison's disease: It presents with symptoms like fatigue, weight loss, low blood pressure, a nd skin hyperpigmentation. While adrenal crisis can cause symptoms such as headache and sweating, it does not cause an episodic elevation of blood pressure.

Option B - Renal artery stenosis: It can lead to high blood pressure but does not cause sudden onset h eadaches, palpitation, and profuse sweating. An elevated 24-hour urine metanephrine is not associate d with renal artery stenosis.

Option D - Hyperthyroidism: Hyperthyroidism symptoms include weight loss, increased appetite, tremor s, heat intolerance, palpitations, and sweating. An elevated 24-hour urinary metanephrine is not associ ated with hyperthyroidism.

Solution for Question 8:

• Cerebral edema refers to fluid accumulation in the brain, leading to swelling and increased pressure within the skull. It is a serious complication of DKA and can potentially be fatal.

Incorrect Options:

• Option A: Acute respiratory distress syndrome (ARDS): While respiratory complications can occur in DKA, ARDS is not the most common cause of mortality. DKA can lead to respiratory acidosis but is typically reversible with appropriate treatment.

• Option B: Cardiac arrhythmia: DKA can lead to electrolyte imbalances, including abnormalities in potassium levels, which can contribute to cardiac arrhythmias, they are not the most common cause of mortality.

• Option D:. Acute kidney injury (AKI): AKI can occur in the setting of DKA, but it is not the most common cause of mortality. DKA can lead to dehydration and hypoperfusion, possibly contributing to kidney injury.

Solution for Question 9:

Option D: Pituitary microadenoma

• Pituitary microadenoma is the most common cause of Cushing's disease in a 60-year-old male.

• Cushing's disease is a type of hypercortisolism caused by an ACTH-secreting pituitary adenoma (a benign tumour in the pituitary gland).

• While other conditions can cause Cushing's syndrome, the term "Cushing's disease" is used when the primary cause is an ACTH-secreting pituitary tumour.

• This type of tumor overproduces ACTH, which stimulates the adrenal glands to produce excessive cortisol.

Incorrect Choices:

Option A: Small-cell lung cancer

• Certain cancers, most notably small-cell lung cancer, can produce ACTH or ACTH-like substances, resulting in Cushing's syndrome. However, especially in this age group, this is not the most common cause of Cushing's disease.

Option B: Adrenal tumor

• An adrenal tumor, specifically an adrenal adenoma or adrenal carcinoma, can produce cortisol on its own, resulting in Cushing's syndrome. However, as previously stated, the primary cause of Cushing's disease is a pituitary microadenoma.

Option C: Ectopic ACTH syndrome

• Ectopic ACTH syndrome occurs when a non-pituitary tumor (e.g., lung, pancreas, or thymus) produces ACTH, resulting in Cushing's syndrome. While this can be a cause of Cushing's syndrome, it is not the most common cause of Cushing's disease in a 60-year-old male.

Solution for Question 10:

• The presence of bone pain, abdominal cramps, and a history of abnormal behaviour point towards primary hyperparathyroidism.

• Most common cause is parathyroid adenoma and therefore sestamibi scan is best answer here

Incorrect Choices:

• Option a: MRI is not used in parathyroid pathologies usually.

• Option b: It is a technique for evaluating structures within the body that can be visualised using sound waves. In this case, it is less likely to provide the detailed information required to diagnose neurological or structural abnormalities.

• Option d: A CT scan is will not not be best answer here.

Solution for Question 11:

• VIPoma, which stands for vasoactive intestinal peptide-secreting tumor, is the neuroendocrine tumor that can be the cause of recurrent episodes of watery diarrhea, dehydration, hypokalemia, and achlorhydria.

• VIPomas are uncommon neuroendocrine tumors that secrete an excessive amount of the hormone VIP, which controls a variety of body processes.

• The WDHA syndrome, which includes Watery diarrhea, Dehydration, Hypokalemia, Achlorhydria, can be brought on by excessive VIP secretion.

• Watery diarrhea,

• Dehydration,

• Hypokalemia,

• Achlorhydria, can be brought on by excessive VIP secretion.

• Watery diarrhea,

• Dehydration,

• Hypokalemia,

• Achlorhydria, can be brought on by excessive VIP secretion.

Incorrect Choices:

• Option A: Insulinoma is a rare neuroendocrine tumor of the pancreas that causes hypoglycemia by producing an excessive amount of insulin. Insulinoma can cause weakness, fatigue, sweating, palpitations, confusion, seizures, and other symptoms

• Option B: A rare neuroendocrine tumor known as somatostatinoma is characterized by excessive secretion of somatostatin, a hormone that prevents the release of other hormones like insulin, glucagon, and growth hormone from the delta cells of the pancreas or the duodenum. Nonspecific symptoms of somatostatinoma include abdominal pain, diabetes mellitus, cholelithiasis, diarrhea, steatorrhea, and weight loss. Somatostatin inhibits the digestive enzymes' secretion and

gastrointestinal tract motility, resulting in diarrhea.

• Option D: A rare neuroendocrine tumor of the pancreatic alpha cells that secretes an excessive amount of glucagon,Hyperglycemia, a rash on the skin, a decrease in weight, and anemia are all possible signs of glucagonoma. Necrolytic migratory erythema is a distinctive skin rash that typically affects the lower extremities.

Solution for Question 12:

• Option D. According to the vignette, the patient has all signs of a Thyrotoxic crisis- thyroid storm including restlessness, palpitations, and tremors.

• Propylthiouracil Administration: Can be administered orally, via nasogastric (NG) tube, or rectally. Mechanism of Action: Inhibits the conversion of thyroxine (T4) to triiodothyronine (T3) by inhibiting the enzyme thyroid peroxidase. Indications: Used in the treatment of hyperthyroidism, Graves' disease, and thyroid storm(DOC). Alternative: Methimazole can be used as an alternative if PTU is not available.

• Administration: Can be administered orally, via nasogastric (NG) tube, or rectally.

• Mechanism of Action: Inhibits the conversion of thyroxine (T4) to triiodothyronine (T3) by inhibiting the enzyme thyroid peroxidase.

• Indications: Used in the treatment of hyperthyroidism, Graves' disease, and thyroid storm(DOC).

• Alternative: Methimazole can be used as an alternative if PTU is not available.

• Administration: Can be administered orally, via nasogastric (NG) tube, or rectally.

• Mechanism of Action: Inhibits the conversion of thyroxine (T4) to triiodothyronine (T3) by inhibiting the enzyme thyroid peroxidase.

• Indications: Used in the treatment of hyperthyroidism, Graves' disease, and thyroid storm(DOC).

• Alternative: Methimazole can be used as an alternative if PTU is not available.

Incorrect Choices:

• Option a:Diltiazem is not used in the treatment for thyrotoxic crisis.

• Option b. Propranolol is a beta blocker that is the first-line drug to treat tachycardia and palpitations in a patient with a thyrotoxic crisis. But the patient in the vignette is asthmatic, indicating she would be on regular beta-agonist doses. Administering a beta blocker in her would lead to a catastrophic asthma exacerbation. Hence, administering a second-line drug- a calcium channel blocker like diltiazem- is the right choice.

• Option c. Esmolol is also a beta blocker like propranolol and will not be appropriate to treat an asthmatic with a thyrotoxic crisis.

Solution for Question 13:

Option C: Thyroid receptor antibody

• According to the vignette, the patient suffers from hyperthyroidism symptoms, including palpitations, sweating, restlessness, and sweaty palms. The most common cause of hyperthyroidism is Grave’s

disease.

• Grave’s disease is an autoimmune disorder that causes the overproduction of thyroid hormones.

• This is because of thyroid receptor antibodies that mimic TSH, thus making the thyroid gland secrete excess thyroid hormone. This is the gold standard test for confirming the presence of Grave’s disease.

Option A: Anti-thyroglobulin antibody

• Anti-thyroglobulin antibody is a test that, when positive, represents an autoimmune disorder of lupus, Hashimoto’s thyroiditis, or Grave’s disease. It is not as sensitive as the thyroid receptor antibody for Grave’s disease and hence, does not need to be tested in the patient in the vignette.

Option B: Anti-thyroid peroxidase antibody

• Anti-thyroid peroxidase antibody is extremely specific for the presence of Hashimoto’s thyroiditis.

• Hashimoto’s thyroiditis is an autoimmune disorder that causes hypothyroidism, unlike the symptoms presented by the patient. Hence, this test does not need to be performed on the patient in the vignette.

Option D: Elevated ultrasensitive thyrotropin levels

• Elevated ultrasensitive thyrotropin levels, or TSH levels are seen in cases of hypothyroidism. The patient presents with hyperthyroidism symptoms; hence, this test does not need to be performed on the patient in the vignette.

Solution for Question 14:

• The paracentral lobule isa district situated in the average part of the cerebral half of the globe, neighbouring the longitudinal gap, and it is liable for the engine control of the lower limits, including the perineum and leg.

• As a result, a lesion in this area can affect the motor function of the perineum and leg, causing weakness, paralysis, or spasticity.

Incorrect Choices:

• Option a. Other parts of the brain, like the primary motor cortex, premotor cortex, and supplementary motor area in the precentral gyrus and surrounding regions of the cerebral hemisphere, control motor function in the scapular region and neck.

• Option b. The motor control of the trunk and shoulder is administered by different region of the cerebrum, like the essential engine cortex, premotor cortex, and valuable engine region, which are situated in the precentral gyrus and encompassing locales of the cerebral half of the globe.

• Option d. The primary motor cortex, which is located in the precentral gyrus of the frontal lobe, is primarily in charge of the motor control of the face and neck. Spasticity or weakness of the face and neck can result from lesions in these areas

Solution for Question 15:

Correct Option C - <30% of the calories should come from fat:

• <30% of the calories should come from fat. It is recommended that people with diabetes consume less than 30% of their total calories from fat, with less than 7% of calories from saturated fat.

Incorrect Options:

Option A - At least 80 mg of dietary fibre: It is also important for people with diabetes, as it can help to improve blood glucose control and reduce the risk of heart disease. However, the recommended daily dietary fiber intake is higher than 80 mg. The recommended daily intake of dietary fiber for adults is 25 grams for women and 38 grams for men.

Option B - <5 g sodium intake every day: It is important for people with diabetes who have high blood pressure or are at risk for developing high blood pressure. However, sodium intake is not directly related to blood glucose control, which is the focus of this question.

Option D - Cholesterol <100 mg: It is important for people with diabetes who have high cholesterol levels or are at risk for developing high cholesterol. However, cholesterol intake is not directly related to blood glucose control, which is the focus of this question.

Solution for Question 16:

Correct Option B - Medullary thyroid carcinoma:

• Medullary thyroid carcinoma is a characteristic feature of MEN 2B syndrome. It is a malignant tumor that arises from the C cells of the thyroid gland.

Incorrect Option:

Option A - Café au lait spot: Café au lait spots are light brown patches on the skin and are commonly seen in conditions such as neurofibromatosis.

Option C - Parathyroid adenoma: Parathyroid adenomas are not typically associated with MEN 2B syndrome. MEN 2B syndrome primarily involves tumors of the thyroid gland, adrenal glands, and mucosal neuromas.

Option D - Optic nerve glioma: Optic nerve gliomas are not typically associated with MEN 2B syndrome. They are more commonly seen in neurofibromatosis type 1.

Solution for Question 17:

Correct Option C - Myxedema coma:

• When the thyroid gland does not create enough thyroid hormones, the condition is known as hypothyroidism.

• A complication of severe hypothyroidism is myxedema coma, commonly referred to as myxedema crisis.

• The presence of altered sensorium, hypotension, bradycardia, long-standing history of weight gain, constipation, cold intolerance, menorrhagia, and non-pitting edema are characteristic features of myxedema coma.

Incorrect Options:

Option A - Septic shock: While septic shock can cause altered sensorium, hypotension, and bradycardia, it typically presents with warm extremities rather than non-pitting edema. The patient's long-standing

history of weight gain, constipation, cold intolerance, and menorrhagia suggests an underlying chronic condition rather than an acute infection.

Option B - Cardiogenic shock: Cardiogenic shock is characterized by a low cardiac output leading to hy potension, but it does not typically cause altered sensorium or non-pitting edema. The patient's history of weight gain, constipation, cold intolerance, and menorrhagia are more consistent with an endocrine disorder.

Option D - Hyperthyroidism: Hyperthyroidism is associated with symptoms such as weight loss, heat int olerance, palpitations, and tremors. The patient's symptoms of weight gain, constipation, cold intoleran ce, and menorrhagia are more indicative of hypothyroidism rather than hyperthyroidism.

Solution for Question 18:

Correct Option A - Anosmia:

• Anosmia which means loss of sense of smell is a key feature of Kallmann syndrome, and it is typically present in all affected individuals.

Incorrect Options:

Option B, C and D are not characteristic features of Kallman syndrome

Solution for Question 19:

Option A: ANA (Antinuclear Antibody) test:

• The ANA test is not typically performed as part of Turner mosaic screening. It is a blood test used to detect the presence of autoantibodies that target the nucleus of cells. ANA testing is primarily used to help diagnose autoimmune conditions such as systemic lupus erythematosus (SLE) or other connective tissue diseases.

Incorrect options:

Option B: Audiometry: Audiometry is a test used to screen for hearing loss at diagnosis and every one to five years thereafter in these patients. There is an association of Turner's syndrome with sensorineur al hearing loss, which makes audiometry essential in these patients.

Option C: Echocardiography: It is an important component of screening Turner's patients every five to t en years due to their increased risk of various cardiovascular abnormalities like aortic root dilatation. C ardiac MRI has higher sensitivity.

Option D: Fasting blood glucose: Annual fasting blood glucose is monitored as these patients are at inc reased risk of developing metabolic diseases including diabetes mellitus.

Solution for Question 20:

Correct Option A - a2-b4-c1-d3:

a. Trisomy 13

2. Patau syndrome

b. Trisomy 18

4. Edward syndrome

c. Trinucleotide repeat sequence

1. Huntington disease

d. Hb point mutation of glutamate to valine

3. Sickle disease

Solution for Question 21:

Correct Option D: Stenotrophomonas

The correct microorganism that is resistant to meropenem and aminoglycosides but sensitive to cotrim oxazole is Stenotrophomonas.

• Stenotrophomonas is a Gram-negative bacterium that can cause various infections, particularly in immunocompromised individuals or those with underlying medical conditions. It is known for its intrinsic resistance to many antibiotics, including meropenem and aminoglycosides.

• Meropenem is a carbapenem antibiotic, and aminoglycosides are a class of antibiotics commonly used to treat severe bacterial infections. However, Stenotrophomonas species often exhibit resistance mechanisms against these antibiotics, making them ineffective for treatment.

• On the other hand, cotrimoxazole (a combination of sulfamethoxazole and trimethoprim) and levofloxacin can still be effective against Stenotrophomonas. These antibiotics are often used as alternative treatment options due to their activity against Stenotrophomonas infections.

Incorrect options:

Option A,B, C: These organisms are susceptible to the drugs mentioned in the question.

Solution for Question 22:

Correct option:

Option A.

Thymoma is the most common tumor in the anterior mediastinum. Thymomas are malignant epithelial cell tumors that form in the Thymus. They are commonly found in the perivascular or anterior mediastin um.

Incorrect options:

Option B. Lymphoma refers to the cancerous condition of lymph nodes.

Option C. Neurogenic tumors are tumors affecting the cell constituting the nervous system.

Option D. Fibromas are tumors that form in the uterus. These are noncancerous and often referred to a s fibroids.

Solution for Question 23:

Correct option:

Option A.

Gynecomastia refers to the increased development of breast gland tissue in males. This occurs due to an imbalance in the production of Testosterone and estrogen.

Incorrect options:

Option B. Liver diseases can cause increased SHBG, resulting in the development of breast gland tiss ue.

Option C. Spironolactone causes decreased production of Testosterone, thereby causing Gynecomasti a.

Option D. Digoxin has estrogenic action, contributing to the development of breast gland tissue.

Solution for Question 24:

Correct option:

Option B.

• Carbimazole is the drug of choice for Hyperthyroidism in the second trimester of pregnancy.

Incorrect options:

Option A. Propyl Thiouracil is the drug of choice in Hyperthyroidism seen in the first trimester.

Option C. Sodium iodide is highly contraindicated because it can completely cross the placenta.

Option D. Pregnant women should avoid radioactive iodine as it can potentially cause miscarriage.

Solution for Question 25:

The correct option is:

Explanation:

The scenario described in the question is indicative of a dysfunction at the level of the hypothalamus, w hich is responsible for regulating the release of thyroid-stimulating hormone (TSH) from the pituitary gla nd.

When the hypothalamus senses low levels of thyroid hormones (T3 and T4) in the bloodstream, it relea ses thyrotropin-releasing hormone (TRH). TRH stimulates the anterior pituitary gland to release TSH, which, in turn, stimulates the thyroid gland to produce and release T3 and T4.

In the given scenario:

• The patient has complaints of lethargy, increased sleep, and weight gain, which are typical symptoms of hypothyroidism (low thyroid hormone levels).

• Investigations reveal low plasma TSH concentration, which is unexpected in primary hypothyroidism. In primary hypothyroidism, TSH levels are usually elevated due to the lack of negative feedback from thyroid hormones.

• However, when TRH is administered, the TSH levels increase. This suggests that the pituitary gland is capable of responding to TRH and producing TSH.

Given this information, it's likely that the patient's hypothalamus is not producing sufficient TRH, leadin g to decreased stimulation of the pituitary to produce TSH. This scenario points towards a dysfunction in the hypothalamus rather than the pituitary or thyroid gland.

Let's analyze the other options:

Hyperthyroidism due to primary thyroid disease: This is unlikely since the patient's symptoms and the l ow TSH levels indicate hypothyroidism rather than hyperthyroidism.

Hypothyroidism due to disease in the pituitary: This is unlikely because the administration of TRH leads to an increase in TSH levels, suggesting that the pituitary is capable of responding to TRH.

Hyperthyroidism due to disease in the pituitary: This is unlikely due to the patient's symptoms and the l ow TSH levels. Additionally, administration of TRH would not result in increased TSH levels in a hyperthyroid patient.

Solution for Question 26:

Correct Option B.

• Pituitary apoplexy refers to the sudden hemorrhage or infarction of the pituitary gland, typically occurring in the presence of a pre-existing pituitary adenoma. It is characterized by acute-onset symptoms due to the compression and damage to surrounding structures.In pituitary apoplexy, bleeding or infarction within the pituitary gland can lead to the release of vasoactive substances and cause a sudden drop in blood pressure. This can result in shock, which is characterized by decreased blood perfusion to vital organs and subsequent organ dysfunction.

Incorrect Options

Option A. Hypertension: Hypertension, or high blood pressure, is not a typical finding in pituitary apoplexy. Instead, pituitary apoplexy can cause a drop in blood pressure due to the development of shock, as discussed below.

Option C. Unconsciousness: Pituitary apoplexy can cause varying degrees of neurological symptoms, i ncluding headache, visual disturbances, and altered consciousness. However, the development of unc onsciousness may not be a specific or universal feature in all cases.

Option D. Fatigue: Fatigue is a non-specific symptom and is not typically a prominent feature of pituitar y apoplexy. Other symptoms, such as headache, visual changes, and hormonal disturbances, may be more characteristic.

Solution for Question 27:

Correct Option B.

• Aquaporins are water channel proteins that play a crucial role in the reabsorption of water in the kidney. They are responsible for allowing the movement of water molecules across cell membranes, particularly in the renal tubules.

• In the case of Nephrogenic DI, there is a mutation in the gene for aquaporin channels, specifically aquaporin-2 (AQP2). This mutation impairs the function of AQP2 channels in the collecting ducts of the kidney, leading to an inability of the kidneys to concentrate urine and reabsorb water properly.

• As a result, individuals with Nephrogenic DI experience excessive thirst and polyuria (excessive urine production), as the kidneys are unable to properly concentrate the urine and retain water. This condition is typically resistant to the antidiuretic hormone (ADH), also known as vasopressin, which is responsible for regulating water reabsorption in the kidneys.

Incorrect Options

Option A. Liddle's syndrome is a genetic disorder characterized by salt-sensitive hypertension and low plasma renin activity. It is caused by mutations in the epithelial sodium channel (ENaC) genes.

Option C. Cystic fibrosis is a genetic disorder that primarily affects the respiratory and digestive system s, caused by mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene.

Option D. Barter syndrome is a rare genetic disorder that affects the renal tubules and leads to abnorm al salt and water reabsorption, resulting in electrolyte imbalances and excessive urine production.

Solution for Question 28:

Correct Option C.

• The next best step in the management of a 12-year-old child with type 1 diabetes mellitus presenting with confusion, drowsiness, fast breathing (Kussmaul respirations), dry mucous membranes, hypotension, high blood glucose, and urine ketones is to perform an arterial blood gas (ABG) test.

• The given clinical scenario suggests the presence of diabetic ketoacidosis (DKA), which is a life-threatening complication of type 1 diabetes characterized by severe insulin deficiency and elevated levels of ketones in the blood. ABG is important to assess the acid-base status and guide further management.

Incorrect Options

Option A. 2-3 L of normal saline over 1-3 hours: This choice involves fluid resuscitation, which is a cruc ial step in managing DKA. However, without knowing the ABG results, it is not appropriate to determine the volume and rate of fluid administration. ABG helps in assessing the acid-base status and guiding fl uid therapy.

Option B. Insulin infusion at 0.1 units/kg/hour: Insulin is a key component in the treatment of DKA. How ever, before initiating insulin infusion, it is important to evaluate the acid-base status and correct any flu id and electrolyte imbalances.

Option D. Insulin bolus of 0.1 units/kg given: While insulin administration is necessary in DKA manage ment, it should not be given as a bolus without assessing the acid-base status and fluid status first.

Solution for Question 29:

Correct Option A:

• The above case is that of hypothyroidism as there are low levels of total and free T3 and T4 with high TSH.

• Treatment with levothyroxine should be started. Available as 25 µg / 50 µg / 88 µg / 100 µg If dose is >100µg, it increases O2 consumption → Resulting in Angina.

• Available as 25 µg / 50 µg / 88 µg / 100 µg

• If dose is >100µg, it increases O2 consumption → Resulting in Angina.

• Available as 25 µg / 50 µg / 88 µg / 100 µg

• If dose is >100µg, it increases O2 consumption → Resulting in Angina.

Incorrect Options:

Option B: Measurement of TBG is not the next best step in case of hypothyroidism

Option C: Thyroid radionuclide uptake and scan is not the next best step.

Option D: A thyroid ultrasound is not the next best step in a case of hypothyroidism.

Solution for Question 30:

Correct Option A:

• Urinary metanephrine and VMA or analysed for 24 hours in urine for diagnosis of pheochromocytoma which is a tumor of the adrenal Medulla also called chromaffinoma which produces norepinephrine and epinephrine. The clinical triad of Pheochromocytoma is palpitations, headache/ hypertension and diaphoresis.

Incorrect Options:

Option B: Albumin, here the 24 hour Urinary Albumin Analysis is done to evaluate Proteinuria which is done in cases to evaluate Renal Disease especially nephrotic syndrome.

Option C: 5-HIAA is serotonin, the 24 hour urinary evaluation for serotonin is done in case of carcinoid tumors.

Option D: Glucose is to analyze the level of glucose in urine, mainly for diabetic patients.

Solution for Question 31:

The essential investigations for a patient with a diffusely enlarged thyroid gland, exophthalmos, weight l oss, and palpitations suggestive of hyperthyroidism or Graves' disease include:

Thyroid scan: A thyroid scan, specifically a radioactive iodine uptake (RAIU) scan, can help determine t he activity of the thyroid gland. In Graves' disease, the thyroid gland is typically hyperactive and takes up an excessive amount of radioactive iodine.

Fine needle aspiration cytology (FNAC): FNAC may not be immediately necessary in this case becaus e the presentation strongly suggests Graves' disease, an autoimmune condition. However, FNAC is m ore commonly used to evaluate thyroid nodules when malignancy is suspected.

Thyroid function tests: These tests, which include measurements of thyroid hormones (T3 and T4) and thyroid-stimulating hormone (TSH), are crucial for diagnosing and monitoring hyperthyroidism. In Grav es' disease, there is typically a low TSH level and elevated levels of T3 and T4.

Ultrasound of the neck: A neck ultrasound is valuable for assessing the size, shape, and characteristic s of the thyroid gland, which can provide additional information about the nature of the enlargement an d rule out structural abnormalities.

Anti-thyroid antibodies: In Graves' disease, the presence of antibodies such as anti-thyroid peroxidase antibodies and anti-thyroglobulin antibodies is often detected. These antibodies can help confirm the a utoimmune nature of the disease.

So, the correct answer is 1, 3, 4, and 5. These investigations help in confirming the diagnosis of Grave s' disease and assessing the extent of thyroid involvement

Incorrect options:

Option A: As the case suggests. FNAC is not required in this patient therefore we rule out this option a s FNAC helps in evaluating the nature of any nodules or abnormalities within the thyroid gland.

Option B: Apart from investigation 1,3 and 5 we also need he help of ultrasound of neck for better asse ssment of the patient. Therefore this option is also incorrect.

Option C: Apart from the investigations 3,4 and 5 we also need the help of thyroid scan for better asses sment of the patient. Therefore this option is also incorrect.

Solution for Question 32:

Correct Option A

• Rhino-cerebral mucormycosis, also known as zygomycosis, is a serious fungal infection caused by various species of fungi belonging to the class Mucorales. It primarily affects the nose, sinuses, and brain.

• Diabetic ketoacidosis (DKA): Rhino-cerebral mucormycosis is strongly associated with uncontrolled diabetes, particularly diabetic ketoacidosis. DKA is a life-threatening complication of diabetes characterized by high blood sugar levels, ketone production, and metabolic acidosis. The elevated blood sugar levels and acidotic environment provide an ideal condition for the growth of Mucorales fungi.

Incorrect Options:

Option B: Pregnancy: Although pregnancy can cause immunological changes, it is not directly associat ed with an increased risk of rhino-cerebral mucormycosis. However, there have been rare cases report ed in pregnant women with uncontrolled diabetes or other predisposing factors.

Option C: Antibiotics: While the use of antibiotics can disrupt the normal microbial balance in the body and potentially lead to fungal infections, they are not specifically associated with rhino-cerebral mucor mycosis. This condition is primarily caused by Mucorales fungi, which are not commonly targeted by an tibiotics.

Option D: Inhaled steroids: The use of inhaled steroids, such as for asthma or chronic obstructive pulm onary disease (COPD), is not directly associated with an increased risk of rhino-cerebral mucormycosi

s. However, long-term and high-dose systemic corticosteroids (such as oral or intravenous) can suppre ss the immune system and increase the risk of fungal infections.

Solution for Question 33:

Correct Option B:

• The patient in the scenario is presenting with symptoms of hypothyroidism, including weakness, lethargy, excessive cold intolerance, and slow ankle jerk. The thyroid function test (TFT) results indicate elevated TSH levels and decreased T4 levels, confirming the diagnosis of primary hypothyroidism.

• The most appropriate management for primary hypothyroidism is to initiate treatment with levothyroxine, a synthetic form of thyroid hormone. The initial dose of levothyroxine should be low and gradually increased until the patient reaches the optimal replacement dose. Starting with a dose of 25 micrograms is a common practice in such cases.

Incorrect Options:

Option A: Start levothyroxine at 100 micrograms and decrease the dose gradually: This option suggest s starting with a
higher dose of levothyroxine and then gradually reducing it. However, initiating treatment with a high do se may lead to rapid correction of thyroid hormone levels, which can potentially cause adverse effects. Therefore, it is recommended to start with a
lower dose and adjust it based on the patient's response and follow-up thyroid function tests..

Option C: Start levothyroxine at 25 micrograms and decrease the dose gradually: This option suggests starting with a low dose and then gradually reducing it. However, in cases of primary hypothyroidism, t he goal of treatment is to provide adequate thyroid hormone replacement, not to taper off the medicatio n. Therefore, gradually decreasing the dose is not the recommended approach.

Option D: Give T3 and T4 drugs simultaneously: While combination therapy with T3 (triiodothyronine) a nd T4 (thyroxine) may be considered in certain cases, such as specific thyroid conditions or patient pre ferences, it is not the first-line treatment for primary hypothyroidism. Standard treatment involves the a dministration of levothyroxine, which is a
T4 hormone replacement, as it can be converted to T3 as needed by the body.

Solution for Question 34:

Correct Choice: C

• In a primary healthcare (PHC) setting, the initial screening tests used to diagnose diabetes includes FBS (fasting blood sugar) >126mg/dl and 2-hour post-glucose load blood sugar, which is also known as an oral glucose tolerance test (OGTT as these two tests are less time taking and can be done at any PHC.

Incorrect Choices:

Option A. 1 and 2: HbA1c (glycated hemoglobin) level greater than 6.5% is the marker to diagnose dia betes but the process of checking the values of HbA1c is time taking and costly than the FBS and PPB S. Therefore option A cannot be considered correct.

Option B: 2 and 3: FBS is considered as an initial screening test for diabetes but Random blood sugar (RBS) levels may fluctuate throughout the day and can be influenced by recent meals, making it less su itable for screening purposes.

Option D: 1, 2 and 3: Due to the above mentioned reasons RBS and HbA1c can not be considered as t he initial screening test for diabetes. Therefore option is D is also incorrect.

Solution for Question 35:

Correct choice: A

Explanation:

• The patient's clinical features suggest diabetic ketoacidosis (DKA), a potentially life-threatening complication of uncontrolled diabetes. DKA is characterized by hyperglycemia, metabolic acidosis, and the presence of ketones in the blood. To manage DKA, it is crucial to address the underlying cause of hyperglycemia and correct metabolic derangements. Insulin is the mainstay of treatment in DKA as it helps lower blood glucose levels and suppresses ketone production. Therefore, adding insulin to saline is the appropriate choice in this scenario.

Incorrect options:

Option B. Bicarbonate administration is generally not recommended for DKA unless the patient has sev ere acidosis (arterial pH <7.0). In this case, the arterial pH of 7.33 does not indicate severe acidosis, a nd thus, bicarbonate is not necessary.

Option C. Potassium levels are normal in this patient, so additional potassium supplementation may no t be required. However, regular monitoring of potassium levels is essential during the treatment of DKA , as insulin administration can cause a shift of potassium into the cells, leading to potential hypokalemi a. If the patient's potassium levels decrease during treatment, appropriate potassium supplementation can be initiated.

Option D. The specific dose of 14 units of regular insulin intravenously is not mentioned in the initial de scription and cannot be determined solely based on the given information. The insulin dosage should b e individualized based on the patient's clinical condition, blood glucose levels, and response to treatme nt. It is typically administered as an initial bolus followed by continuous intravenous infusion.

Solution for Question 36:

Correct Option: B

The correct answer is "Xerostomia."

• Xerostomia: Xerostomia, also known as dry mouth, is the most common delayed symptom of head and neck radiation therapy. Radiation to the head and neck area can damage the salivary glands, leading to decreased saliva production and resulting in dry mouth.

Incorrect Options:

Option A: Dysphagia: Dysphagia refers to difficulty in swallowing and can be a common side effect of h ead and neck radiation therapy. However, it is not the most common delayed symptom.

Option C: Myelopathy: Myelopathy refers to a condition affecting the spinal cord and is not a common delayed symptom of head and neck radiation therapy.

Option D: Dysgeusia: Dysgeusia refers to a distorted or altered sense of taste. While taste changes ca n occur after head and neck radiation therapy, xerostomia is more commonly observed as a delayed symptom.

Solution for Question 37:

Correct Option A: Insulin

• Insulin: Obesity is associated with insulin resistance, a condition in which the body's cells become less responsive to the effects of insulin. In response to insulin resistance, the pancreas produces and releases more insulin to compensate for the decreased effectiveness. This increased insulin production is a characteristic feature of obesity.

Incorrect options

Option B: Thyroxine (T4)

• Thyroid hormones, including thyroxine, are involved in regulating metabolism. While obesity can affect thyroid function, it typically does not cause a direct increase in thyroxine production.

Option C: Growth hormone

• Growth hormone (GH) levels may be altered in obesity, but the relationship is complex. In some cases, obese individuals may have reduced GH secretion or impaired response to GH. However, it is not a consistent finding that GH production is increased in obesity.

Option D: Adiponectin

• Adiponectin is an adipokine, a hormone secreted by adipose tissue. Its production is generally decreased in obesity, rather than increased. Lower levels of adiponectin are associated with insulin resistance and other metabolic abnormalities seen in obesity.

Solution for Question 38:

Correct Option

Option C: Hyperparathyroidism.

• Calcitonin is a hormone produced by the parafollicular or C-cells of the thyroid gland. Its primary function is to regulate calcium and phosphate levels in the body. Normally, calcitonin levels are low in healthy individuals.

• In hyperparathyroidism, there is excessive production of parathyroid hormone (PTH) by the parathyroid glands. This condition leads to increased levels of PTH, which in turn can stimulate the production of calcitonin by the thyroid gland. Therefore, in cases of primary hyperparathyroidism, there can be a concomitant increase in calcitonin levels.

• However, it's important to note that measuring calcitonin levels alone is not typically used as a diagnostic test for hyperparathyroidism. The primary diagnostic marker for hyperparathyroidism is the measurement of PTH levels.

Incorrect options:

Hyperthyroidism (option A) is characterized by an overactive thyroid gland and is not directly associate d with increased calcitonin levels.

Hypoparathyroidism (option B) is a condition where there is an underproduction of parathyroid hormon e, leading to decreased levels of PTH and subsequently decreased calcitonin levels.

Cushing's syndrome (option D) is a disorder caused by prolonged exposure to high levels of cortisol ho rmone, typically due to adrenal gland dysfunction. It is not directly associated with changes in calcitonin levels.

Solution for Question 39:

Correct Option: D >200µg/L

• Prolactin levels above 200µg/L are highly suggestive of a prolactinoma.

• Prolactinomas are benign tumors of the pituitary gland that secrete excessive amounts of prolactin.

• Elevated prolactin levels are a hallmark feature of prolactinomas, and levels exceeding 200µg/L are considered significantly elevated and strongly indicative of a prolactinoma.

Incorrect Options:

Option A: >50µg/L: This statement is incorrect.

Option B: >100µg/L: This statement is incorrect.

Option C: >150µg/L: This statement is incorrect.

Solution for Question 40:

Correct Option C: Liddle’s syndrome

• Liddle's syndrome is characterized by hypertension, hypokalemia, and metabolic alkalosis.

• It is caused by mutations in the genes encoding the epithelial sodium channel (ENaC) in the distal tubules of the kidney.

• These mutations lead to increased reabsorption of sodium and increased potassium and hydrogen ion secretion, resulting in the observed electrolyte and acid-base abnormalities.

Incorrect Options:

Option A- Bartter syndrome: Bartter syndrome is a rare genetic disorder that affects the loop of Henle i n the kidney and leads to salt wasting, hypokalemia, and metabolic alkalosis. However, it does not typi cally present with hypertension.

Option B- Gitelman's syndrome: Gitelman's syndrome is another genetic disorder that affects the distal convoluted tubules of the kidney and results in hypokalemia, metabolic alkalosis, and hypomagnesemi a. However, hypertension is not a characteristic feature of Gitelman's syndrome.

Option D- Fanconi's syndrome: Fanconi's syndrome is a condition characterized by dysfunction of the proximal tubules of the kidney, leading to impaired reabsorption of various substances, including electr olytes and glucose. Hypokalemia, metabolic acidosis, and other electrolyte abnormalities can occur, bu

t hypertension is not typically associated with Fanconi's syndrome.

Solution for Question 41:

Correct Option A: Low TSH levels

• Low TSH levels is the correct answer. In Grave's disease, an autoimmune disorder causing overactivity of the thyroid gland, the production and release of thyroid hormones (T3 and T4) are increased. The elevated levels of thyroid hormones exert negative feedback on the pituitary gland, suppressing the secretion of thyroid-stimulating hormone (TSH). Therefore, in Grave's disease, TSH levels are typically low.

Incorrect Options:

Option B- Low free T4 levels: In Grave's disease, there is excessive production of thyroid hormones, re sulting in elevated levels of free T4. Therefore, low free T4 levels would be an unlikely finding in this co ndition.

Option C- Low serum T3 levels: Grave's disease is characterized by increased production of both T3 a nd T4. Thus, low serum T3 levels would not be expected in this condition.

Option D- Radioactive iodine uptake (RAIU) at 24 hours below normal: In Grave's disease, the thyroid gland is hyperactive and takes up iodine more than usual. This results in an increased radioactive iodin e uptake (RAIU) on a nuclear medicine scan, not a below-normal uptake.

Solution for Question 42:

Correct Option: C.

• Myxedema coma: Myxedema coma is a life-threatening condition characterized by severe hypothyroidism. It is typically precipitated by factors such as infection, cold exposure, medication noncompliance, or other medical conditions. Patients with myxedema coma present with altered mental status, hypothermia, bradycardia, hypotension, and signs of systemic decompensation. The symptoms of constipation, dry skin, and menorrhagia are also commonly associated with hypothyroidism.

Incorrect Options:

Option A. Septic shock: Septic shock is a life-threatening condition caused by a severe infection leadin g to systemic inflammation and organ dysfunction. While septic shock can present with altered sensori um and hypotension, the presence of symptoms such as constipation, dry skin, menorrhagia, non-pittin g edema, hypothermia, and bradycardia is not consistent with septic shock. These symptoms are more indicative of severe hypothyroidism.

Option B. Cardiogenic shock: Cardiogenic shock occurs when the heart's ability to pump blood is sever ely compromised, leading to inadequate tissue perfusion. While cardiogenic shock can cause hypotens ion and bradycardia, the constellation of symptoms described, including constipation, dry skin, menorrh agia, non-pitting edema, and hypothermia, is not consistent with cardiogenic shock. These symptoms a re more suggestive of myxedema coma.

Option D. Hypoglycemia: Hypoglycemia, or low blood sugar, can cause altered mental status and hypo tension. However, the presence of symptoms such as constipation, dry skin, menorrhagia, non-pitting e dema, and hypothermia points more towards a
systemic condition like myxedema coma rather than isolated hypoglycemia.

Solution for Question 43:

Correct Option: D

• Pancreatic insufficiency refers to the inadequate production or secretion of pancreatic enzymes, including lipase, amylase, and proteases. This can lead to malabsorption of nutrients, particularly fats, resulting in chronic diarrhea and steatorrhea (excessive fat in the stool). In this case, the patient's symptoms of chronic diarrhea and steatorrhea suggest impaired fat digestion and absorption.

• The D-xylose test is used to assess the absorption of xylose, a sugar, in the small intestine. A normal D-xylose test result indicates that the small intestine is capable of absorbing this sugar properly, ruling out malabsorption as the cause of symptoms.

• The Schilling test is used to evaluate the absorption of vitamin B12 and can help diagnose pernicious anemia and other causes of vitamin B12 deficiency. An abnormal Schilling test result suggests impaired absorption of vitamin B12. However, in this case, the Schilling test is mentioned as abnormal, which is not specific to any particular diagnosis.

• A normal duodenal biopsy suggests that there are no structural abnormalities or significant inflammation in the duodenum, which would help rule out conditions like celiac disease and intestinal lymphangiectasia.

Incorrect Option:

Option A. Celiac disease: Celiac disease is an autoimmune condition characterized by an abnormal im mune response to gluten, leading to damage to the small intestine. It can cause malabsorption and res ult in chronic diarrhea and steatorrhea. However, the normal duodenal biopsy in this case makes celiac disease less likely.

Option B. Ulcerative colitis: Ulcerative colitis is a form of inflammatory bowel disease primarily affecting the colon and rectum. While it can cause chronic diarrhea, it is not typically associated with steatorrhe a. Additionally, the normal duodenal biopsy suggests that the small intestine is not affected.

Option C. Intestinal lymphangiectasia: Intestinal lymphangiectasia is a condition characterized by dilate d lymphatic vessels in the intestinal wall, leading to the leakage of lymphatic fluid into the intestinal lum en. It can cause protein and fat malabsorption, resulting in diarrhea. However, the normal duodenal bio psy makes this condition less likely.

Solution for Question 44:

Correct Option B:

• Renal transplantation is considered the treatment of choice for end-stage renal disease (ESRD) in patients with diabetic nephropathy. While the survival rate of the graft in the first year is generally high, it is not accurately represented as 95% in all cases (option A). Survival rates can vary depending on various factors, including patient characteristics, quality of the donor organ, and post-transplant management.

Incorrect Options:

Option A: "The survival rate of the graft is 95% in the first year," is an overgeneralization. While the sur vival rate of renal grafts in the first year can be relatively high, it is not consistently 95% for all patients. Success rates can vary based on individual factors, including the patient's overall health, adherence to

medications, and the compatibility of the donor organ.

Option C: "The life expectancy is doubled in a diabetic patient with renal transplant," is not entirely acc urate. While renal transplantation can improve the quality of life and increase life expectancy in patient s with ESRD, it does not necessarily double the life expectancy. Life expectancy improvements can var y among individuals and depend on multiple factors, including the patient's overall health, age, and adh erence to post-transplant care.

Option D: "The treatment of chronic rejection has improved over the last 10 years," is not directly addre ssed in the given statement. Chronic rejection remains a challenge in renal transplantation, and while a dvances have been made in understanding and managing rejection, the statement does not specificall y mention this progress.

Solution for Question 45:

Correct Option B:

• Cheiroarthropathy: Cheiroarthropathy is a condition commonly associated with diabetes mellitus. It refers to a thickening and tightening of the skin over the hands, resulting in limited joint mobility. This condition can cause difficulty in fully extending the fingers, leading to a characteristic hand posture resembling the "namaste" gesture. Cheiroarthropathy is thought to be related to long-standing poor glycemic control and the accumulation of advanced glycation end-products (AGEs) in the skin and soft tissues.

Incorrect Options:

Option A: Flexor tenosynovitis: Flexor tenosynovitis refers to inflammation and swelling of the synovial sheath surrounding the flexor tendons in the hand. It can cause pain, swelling, and difficulty in flexing o r extending the affected fingers. While flexor tenosynovitis can occur in individuals with diabetes, it doe s not specifically explain the "namaste" gesture mentioned in the question.

Option C: Dupuytren's contracture: Dupuytren's contracture is a condition characterized by the progres sive thickening and contracture of the palmar fascia, leading to the flexion deformity of the fingers. It pri marily affects the ring finger and little finger, causing them to curl towards the palm. Although Dupuytre n's contracture is associated with certain risk factors, such as family history and alcoholism, it is not dir ectly related to the "namaste" gesture mentioned in the question.

Option D: Ankyloses: Ankylosis refers to the abnormal fusion or immobility of a joint due to pathological changes. While ankylosis can occur in various conditions, including certain forms of arthritis, trauma, o r infection, it does not specifically explain the "namaste" gesture in the context of a diabetic patient.

Solution for Question 46:

Correct Option A:

Aplasia cutis congenita is a rare condition characterized by the absence of skin in localized or widespre ad areas at birth. It is believed to result from impaired development of the skin during fetal developmen t. While the exact cause of aplasia cutis congenita is not fully understood, certain medications have be en associated with an increased risk of this condition, including antithyroid drugs such as carbimazole.

Carbimazole is commonly used in the treatment of hyperthyroidism, including Grave's disease. It works by inhibiting the synthesis of thyroid hormones. Although it is generally well-tolerated, rare cases of aplasia cutis congenita have been reported in infants born to mothers who took carbimazole during pregnancy. The precise mechanism by which carbimazole may lead to aplasia cutis congenita is not fully elucidated.

Incorrect Options:

Option B. Levothyroxine: Levothyroxine is a synthetic thyroid hormone used to treat hypothyroidism. It is not associated with an increased risk of aplasia cutis congenita. In fact, untreated maternal hypothyroidism during pregnancy can have detrimental effects on the developing fetus, highlighting the importance of appropriate thyroid hormone replacement therapy with levothyroxine during pregnancy.

Option C. Methylthiouracil: Methylthiouracil is another antithyroid medication used in the management of hyperthyroidism. Like carbimazole, it works by inhibiting thyroid hormone synthesis. However, there is no significant evidence linking methylthiouracil to an increased risk of aplasia cutis congenita.

Option D. Hydrouracil: Hydrouracil is not a commonly used antithyroid medication. It is not associated with an increased risk of aplasia cutis congenita.

Solution for Question 47:

Correct option B:

• The patient in the scenario has an HbA1C level of 6.1% and a fasting blood glucose level of 120 mg/dL. These values fall within the range that indicates impaired glucose tolerance (IGT).

• Impaired glucose tolerance (IGT) is a condition in which blood glucose levels are higher than normal but not high enough to be classified as diabetes mellitus. It is considered a prediabetic state, indicating an increased risk for developing diabetes in the future. The patient's fasting blood glucose level of 120 mg/dL falls within the range for impaired glucose tolerance.

Incorrect options:

Option A: Normal blood glucose levels typically fall within a range of 70-99 mg/dL for fasting blood glucose and below 5.7% for HbA1C. Since the patient's fasting blood glucose level is 120 mg/dL, it is higher than the normal range, indicating an abnormality.

Option C: Diabetes Mellitus Diabetes mellitus is diagnosed when fasting blood glucose levels are consistently above 126 mg/dL or HbA1C levels are equal to or higher than 6.5%. Since the patient's fasting blood glucose level is 120 mg/dL and HbA1C is 6.1%, they do not meet the criteria for a diagnosis of diabetes mellitus.

Option D: Maturity onset diabetes in Young (MODY) Maturity onset diabetes of the young (MODY) is a type of diabetes characterized by a strong family history, early onset before the age of 25, and a specific genetic etiology. The patient in the scenario does not have a family history of diabetes, and the term "Maturity onset diabetes in Young" does not apply in this case.

Solution for Question 48:

Correct option A: Viruses

• Fulminant diabetes, also known as fulminant type 1 diabetes or acute-onset type 1 diabetes, is a rare and rapidly progressing form of diabetes characterized by severe hyperglycemia and a rapid loss of insulin-producing beta cells in the pancreas.

• Viruses, particularly enteroviruses such as Coxsackie B virus, have been implicated as a potential cause of fulminant diabetes. These viruses can infect and damage the pancreatic beta cells, leading to their destruction and subsequent loss of insulin production. Viral infections are considered one of the possible triggers for the development of fulminant diabetes.

Incorrect options

Option B: Diabetic Ketoacidosis

• While diabetic ketoacidosis (DKA) is a serious complication of diabetes, it is not the most common cause of fulminant diabetes. DKA occurs primarily in individuals with established diabetes, particularly in type 1 diabetes, and is characterized by the presence of hyperglycemia, ketosis, and acidosis.

Option C: Non-ketotic Hyperosmolar Coma

• Non-ketotic hyperosmolar coma is another severe complication of diabetes, typically seen in individuals with type 2 diabetes. It is characterized by extremely high blood glucose levels and severe dehydration. However, it is not the most common cause of fulminant diabetes.

Option D: Autoimmunity

• Autoimmunity is a major contributing factor in the development of type 1 diabetes. However, in the case of fulminant diabetes, the rapid onset and progression of the disease suggest a different underlying cause, such as viral infection, rather than the gradual autoimmune destruction of beta cells seen in typical type 1 diabetes.

Solution for Question 49:

Correct option D:

• In diabetes, one of the commonly affected joints is the Charcot joint, particularly the metatarsophalangeal (MTP) joints.

• Charcot joint mainly involves the foot is frequently affected in individuals with diabetes.

• Complications such as peripheral neuropathy, and poor circulation (peripheral arterial disease) can lead to foot-related issues such as ulcers, infections, and joint deformities.

Incorrect options:

Option A: Ankle While complications of diabetes can affect the ankle joint indirectly, such as peripheral neuropathy leading to instability and increased risk of ankle injuries, the ankle joint itself is not a primary site of involvement in diabetes.

Option B: Knee Diabetes can lead to various complications and conditions that may affect the knee join t indirectly, such as diabetic neuropathy or diabetic arthropathy (Charcot joint), but the knee joint itself i s not a primary site of involvement.

Option C: Shoulder Shoulder joint involvement is not commonly associated with diabetes. Diabetes-rel ated joint problems typically manifest in weight-bearing joints and those subjected to excessive pressur e, such as the foot.

Solution for Question 50:

Correct option A:

• In the given clinical scenario, the patient presents with symptoms suggestive of diabetic ketoacidosis (DKA), which is characterized by high blood glucose levels, metabolic acidosis, and ketosis. DKA is considered a medical emergency and requires prompt treatment with insulin.

• Regular insulin, also known as short-acting insulin, is the most appropriate choice for managing DKA. Regular insulin is the correct choice because it has an onset of action of approximately 30 minutes, peaks in 2 to 4 hours, and lasts for about 6 to 8 hours. Its slower onset and longer duration of action make it suitable for managing the prolonged hyperglycemia and metabolic acidosis associated with DKA.

Incorrect options:

Option B: Lispro insulin is a rapid-acting insulin with a quick onset of action but a shorter duration comp ared to regular insulin. It is commonly used to manage postprandial glucose spikes in individuals with d iabetes. However, in the context of DKA, regular insulin is preferred due to its longer duration of action.

Option C: Glargine insulin is a long-acting insulin that provides a steady release of insulin over an exte nded period (approximately 24 hours). It is used for basal insulin coverage and does not have a rapid o nset or peak effect, making it less suitable for managing acute hyperglycemia and acidosis in DKA.

Option D: Aspart insulin is a rapid-acting insulin similar to lispro insulin. It has a rapid onset and shorter duration of action, making it less suitable for the management of DKA

Solution for Question 51:

Correct option A:

• Glargine insulin is a long-acting insulin that is characterized by a slow onset of action, typically taking about 1 to 2 hours to begin working. It is designed to provide a steady release of insulin over an extended period (approximately 24 hours). This slow onset and prolonged duration make it suitable for providing basal insulin coverage.

Incorrect options:

Option B: Lispro insulin is a rapid-acting insulin that has a quick onset of action, typically within 15 minu tes of administration. It is used to control postprandial glucose spikes after meals. Unlike glargine, lispr o insulin has a fast onset rather than a slow onset.

Option C: Regular insulin, also known as short-acting insulin, has an onset of action of approximately 3 0 minutes. It is used for mealtime coverage or in combination with long-acting insulin for basal coverag e. It is not characterized by a slow onset like glargine.

Option D: NPH (Neutral Protamine Hagedorn) insulin is an intermediate-acting insulin. It has a slower onset compared to rapid-acting insulins but is not specifically known for having a slow onset like glargine. NPH insulin typically takes about 1 to 2 hours to start working

Solution for Question 52:

Correct option A:

• Prolactinomas are benign tumors of the pituitary gland that secrete excessive amounts of prolactin, a hormone responsible for milk production.Bitemporal hemianopia refers to a visual field defect where there is loss of peripheral vision in both the outer (temporal) sides. Prolactinomas can cause compression of the optic chiasm, which is located near the pituitary gland. This compression can result in bitemporal hemianopia as a characteristic physical finding of prolactinoma.

Incorrect options:

Option B: Anovulatory cycles refer to menstrual cycles in which ovulation does not occur. While prolacti nomas can disrupt normal menstrual cycles, leading to anovulatory cycles, it is not the characteristic ph ysical finding after galactorrhea.

Option C: Amenorrhea refers to the absence of menstrual periods. Prolactinomas can cause hormonal imbalances, including elevated prolactin levels, which can disrupt normal menstrual cycles and lead to amenorrhea. However, it is not the characteristic physical finding after galactorrhea.

Option D: Infertility refers to the inability to conceive a child. Prolactinomas can disrupt normal hormona l balance and interfere with ovulation, leading to difficulties in conceiving. However, infertility is not the characteristic physical finding after galactorrhea

Solution for Question 53:

Correct option A

• Hypophosphatemia: During TLS, there is a rapid release of intracellular phosphate from lysed cells, leading to an increase in serum phosphate levels (hyperphosphatemia) rather than a decrease.

Incorrect options

Option B. Hypocalcemia: Hypocalcemia is commonly observed in Tumor Lysis Syndrome. The increas ed phosphate levels caused by tumor lysis can bind to calcium, resulting in a decrease in ionized calcium levels.

Option C. Hyperuricemia:Hyperuricemia is a characteristic feature of Tumor Lysis Syndrome. The rele ase of purines from the breakdown of DNA in tumor cells leads to increased uric acid production.

Option D. Hyperkalemia: Hyperkalemia is frequently seen in Tumor Lysis Syndrome. The release of int racellular potassium from lysed cells, combined with impaired renal excretion, can result in increased s erum potassium levels.

Solution for Question 54:

Correct option C

• Multiple myeloma: Multiple myeloma is a type of cancer that involves plasma cells in the bone marrow. It can lead to the excessive production of monoclonal immunoglobulins (M-protein), which can cause hypercalcemia. In multiple myeloma, the serum calcium levels can be elevated while SAP, PTH, and vitamin D3 levels remain normal.

Incorrect options

Option A. Vitamin D intoxication: In cases of vitamin D intoxication, both serum calcium and vitamin D3 levels are typically elevated. The PTH levels are usually suppressed due to the feedback mechanism between vitamin D and PTH.

Option B. Hyperparathyroidism: Hyperparathyroidism is characterized by increased PTH levels, which stimulate the release of calcium from bone, resulting in elevated serum calcium levels. In this case, sin ce PTH levels are normal, hyperparathyroidism is not the likely diagnosis.

Option D. Nutritional rickets: This option is incorrect. Nutritional rickets is a condition caused by a defici ency of vitamin D, calcium, or phosphate. In this case, serum calcium levels would typically be decreas ed rather than elevated.

Solution for Question 55:

Correct Answer Explanation (C): C) Cortisol

Cortisol: Pheochromocytomas are not associated with cortisol production. Cortisol is primarily produce d by the adrenal cortex in response to adrenocorticotropic hormone (ACTH) stimulation, whereas pheo chromocytomas originate from the adrenal medulla and are more focused on the production of catecho lamines

Other Options: A) Epinephrine (Adrenaline): Pheochromocytomas often produce excessive amounts of epinephrine, contributing to the symptoms and complications associated with the condition.

B) Norepinephrine (Noradrenaline): Pheochromocytomas frequently overproduce norepinephrine, whic h contributes to the elevated blood pressure and other symptoms seen in affected individuals.

D) Dopamine: It is produced in this tumor

Solution for Question 56:

Correct Option D:

To calculate the sodium deficit in the patient, we need to determine the patient's total body water (TBW) and current sodium content, and then calculate the difference between the actual sodium content and the desired sodium level.

The formula to calculate sodium deficit is:

Sodium Deficit (mEq) = TBW (L) × (Desired Na+ - Current Na+)

To estimate the TBW, we can use the following formula:

TBW (L) = 0.6 × body weight (kg)

Given that the patient weighs 60 kg, the TBW would be:

TBW (L) = 0.6 × 60 kg = 36 L

The desired Na+ level is typically around 140 mEq/L. Using the given values, we can calculate the sodium deficit:

Sodium Deficit (mEq) = 36 L × (140 mEq/L - 120 mEq/L) Sodium Deficit (mEq) = 36 L × 20 mEq/L Sodium Deficit (mEq) = 720 mEq

Therefore, the correct option is D, "720 mEq."

Incorrect Options:

Option A: 20 mEq: This value does not account for the TBW calculation or the difference between the desired and current sodium levels.

Option B: 200 mEq: This value also does not account for the TBW calculation or the difference between the desired and current sodium levels.

Option C: 400 mEq: Again, this value does not consider the TBW calculation or the difference between the desired and current sodium levels.

Solution for Question 57:

Correct Option:

Option a. Mineralocorticoids: Mineralocorticoids, such as aldosterone, are responsible for regulating electrolyte and water balance in the body. They are not produced by the pituitary gland but rather by the adrenal cortex. Therefore, the patient's deficiency in ACTH (adrenocorticotropic hormone) will not directly affect mineralocorticoid production. Hence, mineralocorticoid supplementation is not needed in this case.

Incorrect Option:

Option b. Thyroid hormones: Thyroid hormones, including TSH (thyroid-stimulating hormone), play a crucial role in regulating metabolism. As the patient has low levels of TSH, indicating thyroid hormone deficiency, thyroid hormone supplementation is necessary to maintain normal thyroid function.

Option c. Glucocorticoids: Glucocorticoids, such as cortisol, are produced by the adrenal cortex under the stimulation of ACTH. With the deficiency of ACTH, the production of glucocorticoids is reduced. Therefore, glucocorticoid supplementation is needed to replace the deficient cortisol and provide the necessary physiological effects.

Optiond. Estradiol: Estradiol is a female sex hormone produced primarily by the ovaries. The deficiency of FSH (follicle-stimulating hormone) and LH (luteinizing hormone) indicates dysfunction of the gonadotropins, which regulate the production of estradiol. Consequently, estradiol supplementation may be required to maintain hormonal balance in premenopausal women.

Solution for Question 58:

Correct Option:

Option A.

• Autoimmune adrenalitis - This is the correct answer. Addison's disease, also known as primary adrenal insufficiency, is commonly associated with autoimmune adrenalitis. In this condition, the body's immune system mistakenly attacks and destroys the adrenal cortex, leading to inadequate production of adrenal hormones.

Incorrect Options:

Option B. Adrenocortical carcinoma - Adrenocortical carcinoma is a rare malignant tumor of the adrena l cortex. While it can cause adrenal hormone imbalances, it is not commonly associated with Addison's disease.

Option C. Hypernephroma - Hypernephroma is an outdated term for renal cell carcinoma, which is a type of kidney cancer. It is unrelated to Addison's disease.

Option D. Medullary carcinoma thyroid - Medullary carcinoma of the thyroid is a type of thyroid cancer that arises from the parafollicular C cells. It is not associated with Addison's disease.

Solution for Question 59:

Correct option:

Option A.

• Dexamethasone: Dexamethasone is a corticosteroid that can be used in the treatment of hypercalcemia due to vitamin D toxicity. It works by reducing intestinal calcium absorption and promoting renal calcium excretion.

Incorrect Option:

Option B. Hydroxychloroquine: Hydroxychloroquine is an antimalarial medication that is not typically us ed in the treatment of hypercalcemia due to vitamin D toxicity. Its main uses are in the treatment of mal aria and certain autoimmune disorders such as rheumatoid arthritis and lupus.

Option C. Chloroquine: Similar to hydroxychloroquine, chloroquine is an antimalarial drug and is not co mmonly used in the treatment of hypercalcemia due to vitamin D toxicity.

Option D. Ketoconazole: Ketoconazole is an antifungal medication and is not indicated for the treatmen t of hypercalcemia due to vitamin D toxicity. Its primary use is in the treatment of fungal infections.

Solution for Question 60:

Correct Option A: Coronary artery disease

• Coronary artery disease is a macrovascular complication of diabetes, while others are all microvascular complications.

Incorrect Options:

Option B: Foot ulcer is a microvascular complication of diabetes.

Option C: Nephropathy is a microvascular complication of diabetes.

Option D: Retinopathy is a microvascular complication of diabetes.

Solution for Question 61:

Correct Option C: Cushing’s syndrome

• The above image is that of Cushing’s syndrome which results from chronic exposure to glucocorticoids. They present with moon facies, striae, abnormal masculinization, proximal muscle weakness, hypertension, osteoporosis, hyperpigmentation, sepsis, hyperglycemia.

Incorrect Options:

Option A: Acromegaly is due to excess growth hormone and symptoms include enlargement of face, h ands, and feet.

Option B: PCOS is an hyper estrogenic state with presentation of the irregular menstrual cycle, acne a nd hirsutism.

Option D: This is not the case of advanced obesity.

Solution for Question 62:

Correct option B

Solution for Question 63:

Correct option B

• Fulminant diabetes mellitus refers to a rapid and severe onset of diabetes symptoms and complications. Coxsackie B virus, a type of enterovirus, has been associated with the development of fulminant diabetes mellitus. The virus can cause damage to the pancreatic beta cells, leading to a sudden and complete loss of insulin production.

Incorrect options:

Options A: Diabetic ketoacidosis (DKA): While DKA is a serious complication of diabetes characterized by high blood sugar, ketone production, and metabolic acidosis, it is not specifically associated with a rapid and severe onset like fulminant diabetes.

Options C: Non-ketotic hyperosmolar coma: Non-ketotic hyperosmolar coma is a life-threatening compl ication of diabetes characterized by extremely high blood sugar and severe dehydration. It is not typical ly associated with a rapid and sudden onset like fulminant diabetes.

Options D: Autoimmune pancreatitis: Autoimmune pancreatitis is a
rare form of chronic pancreatitis caused by an autoimmune reaction. It is not typically associated with a rapid and severe onset of diabetes.

Solution for Question 64:

Correct Option B - Ectopic source:

• High-dose dexamethasone suppression test is used for etiological diagnosis.

• It helps to differentiate between ectopic ACTH production and pituitary adenoma.

• Increased levels of both before and after indicate ectopic source.

• ACTH has partial melanocyte-stimulating hormone-like action which causes hyperpigmentation on creases of skin (palms and soles)

• Carcinoid tumors and Oat cell lung cancer are the two sources of ectopic production of ACTH

Incorrect Options:

Option A - Pituitary adenoma:

• Here both ACTH and cortisol levels are increased.

Option C - Exogenous source:

• Cortisol levels are raised and ACTH is decreased on administering iatrogenic steroids.

Option D - Adrenal adenoma:

• In adrenal adenoma, ACTCH and cortisol both are reduced.

Water & Electrolyte Imbalance

1. Which of the following conditions does not lead to hypokalemia?

A. Liddle syndrome

B. Renal tubular acidosis

C. Diabetic ketoacidosis

D. Respiratory alkalosis

---

2. Identify the ECG for Hypokalemia.

A.

B.

C.

D.

---

3. Which of the following is not an ECG finding seen in Hypokalemia?

A. T wave inversion

B. Sine wave pattern

C. Prominent U wave

D. ST depression

---

4. In a patient receiving amphotericin B who develops extreme lethargy, muscle weakness, and an increase in carbon dioxide levels with hyperventilation, and a serum potassium level of 2.3 mEq/L, what is the appropriate correction of potassium to be given to the patient?

(or)

What is the appropriate correction of potassium to be given to the patient with a serum potassium level of 2.3 mEq/L?

A. 0.14 mEq of KCl/24hrs

B. 1.4 mEq of KCl/24hrs

C. 14 mEq of KCl/24hrs

D. 140 mEq of KCl/24hrs

---

5. Which of the following conditions are not associated with Hyperkalemia?

A. Gordon syndrome

B. RBC lysis

C. Liddles syndrome

D. Addison's disease

---

6. A 30-year-old female came to the outpatient department with complaints of loss of appetite, weight loss, and extreme fatigue for the past two months. The patient admitted that she developed a craving for pickles recently. Her general examination showed dark skin on dependent areas like elbows, neck, etc. She denied any irregular menstrual cycles. Her blood investigations showed an RBS of 70 mg/dl. Guess the disease and the electrolyte imbalance associated with it and mark the option with appropriate treatment for the electrolyte removal by GI/renal route.

A. Sodium bicarbonate

B. Patiromer

C. Calcium chloride

D. Salbutamol

---

7. Identify the condition associated with the sign shown below and mark the option with the appropriate choice of treatment in its associated dyselectrolytemia.

A. Patiromeronate

B. ZS-9

C. Calcium gluconate

D. Calcitonin

---

8. A 65-year-old male patient with a history of hypertension and heart failure is admitted to the hospital due to exacerbation of his heart failure symptoms. During his hospitalization, he is started on diuretic therapy to manage fluid overload. On examination, the patient is disoriented, with slurred speech, decreased level of consciousness, and is refusing oral intake. Which of the following is causing these symptoms?

(or)

Which of the following can cause cerebral edema in hospitalized patients??

A. Dehydration

B. Hypernatremia

C. Hyponatremia

D. Hyperkalemia

---

9. What is the drug of choice to manage Hypercalcemic crisis?

A. Bisphosphonates

B. Steroids

C. Calcitonin nasal spray

D. Furosemide drip.

---

10. A 55-year-old male patient with a known history of chronic alcohol abuse presents to the emergency department complaining of increasing abdominal distention. On examination, there are massive ascites and peripheral edema. serum sodium: 125 mEq/L and serum potassium: 4.0 mEq/L The patient also reports increased salt intake for the past few weeks. Which of the following mechanisms most likely contributes to the development of hypervolemic hyponatremia in this patient?

(or)

Which of the following mechanisms most likely contributes to the development of hypervolemic hyponatremia in cirrhosis patients?

A. Activation of the renin-angiotensin-aldosterone system

B. Excessive intake of dietary sodium

C. Impaired secretion of antidiuretic hormone

D. Decreased reabsorption of water in the distal nephron

---

11. A 45-year-old woman presents to the emergency department with complaints of muscle cramps and tingling sensations in her fingers and toes. On examination, she exhibits positive Chvostek's sign and Trousseau's sign. Despite immediate intervention, the patient becomes unresponsive and dies. What is the most likely cause of death in this patient?

(or)

What is the most likely cause of death in a patient with severe hypocalcemia?

A. Cardiac arrest

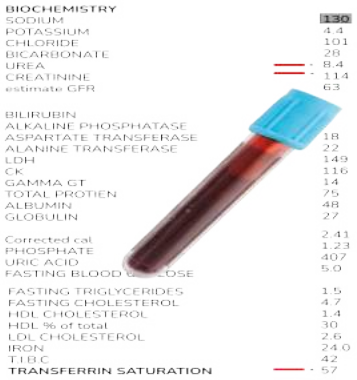
B. Cerebral edema

C. Pulmonary embolism

D. Respiratory failure due to laryngospasm

---

12. A 28-year-old male patient was admitted to the ED with the complaint of continuous vomiting and loose watery stools unrelieved by over the counter medication for the past one day. He admitted that he had street food the day before yesterday and suffered from severe abdominal pain. The lab investigations are done and shown below. Mark the option with appropriate findings and management.



A. Total Body Water ↓, Total Body Salts↑- IV Fluids

B. Total Body Water ↑, Total Body Salts-(n)-Vaptans

C. Total Body Water ↓, Total Body Salts ↓-IV fluids

D. Total Body Water ↑↑ , Total Body Salts ↑-Spironolactone

---

13. Choose the option that describes an appropriate treatment modality for the following electrolyte abnormalities: 1. Na+ < 125 mEq/L a. Hemodialysis 2. K+ > 8 mEq/L b. MgSO4 3. Ca+ > 13 mg% c. Hypertonic saline 4. Mg+ > 10 mEq/L d. KCl drip 5. Na+ > 158 mEq/L e. Ca chloride 6. K+ < 2.5 mEq/L f. Ca gluconate 7. Ca+ < 7 mg% g. Ibandronate 8. Mg+ < 1 mEq/L h. 5 % dextrose

1. Na+ < 125 mEq/L	a. Hemodialysis
2. K+ > 8 mEq/L	b. MgSO4
3. Ca+ > 13 mg%	c. Hypertonic saline
4. Mg+ > 10 mEq/L	d. KCl drip
5. Na+ > 158 mEq/L	e. Ca chloride
6. K+ < 2.5 mEq/L	f. Ca gluconate
7. Ca+ < 7 mg%	g. Ibandronate
8. Mg+ < 1 mEq/L	h. 5 % dextrose

A. 1-a, 2-c, 3-b, 4-d, 5-e, 6-g, 7-f, 8-h

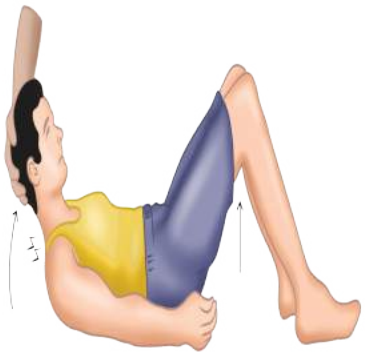
B. 1-c, 2-e, 3-g, 4-a, 5-h, 6-d, 7-f, 8-b

C. 1-f, 2-d, 3-a, 4-b, 5-c, 6-e, 7-h, 8-g

D. 1-h, 2-d, 3-g, 4-c, 5-f, 6-b, 7-e, 8-a

---

14. Using the image below, guess the infection and the electrolyte imbalance involved in it.



A. Hypervolemic Hyponatremia

B. Isotonic Hyponatremia

C. Euvolemic hyponatremia

D. Hypertonic Hypernatremia.

---

15. Match the following electrolyte imbalances with their respective clinical features. 1. Hypomagnesemia a. Diastolic arrest 2. Hypokalemia b. Asystole 3. Hyponatremia c. Laryngospasm 4. Hyperkalemia d. Seizure 5. Hypocalcemia e. Diaphragmatic paralysis 6. Hypermagnesemia f. Systolic arrest 7. Hypercalcemia g. Torsades de pointes

1. Hypomagnesemia	a. Diastolic arrest
2. Hypokalemia	b. Asystole
3. Hyponatremia	c. Laryngospasm
4. Hyperkalemia	d. Seizure
5. Hypocalcemia	e. Diaphragmatic paralysis
6. Hypermagnesemia	f. Systolic arrest
7. Hypercalcemia	g. Torsades de pointes

A. 1-a, 2-d, 3-b, 4-e, 5-c, 6-f, 7-g

B. 1-d, 2-g, 3-c, 4-f, 5-b, 6-e, 7-a

C. 1-e, 2-c, 3-a, 4-b, 5-d, 6-g, 7-f

D. 1-g, 2-e, 3-d, 4-a, 5-c, 6-b, 7-f

---

16. Which of the following does not lead to metabolic acidosis?

A. Diabetic ketoacidosis

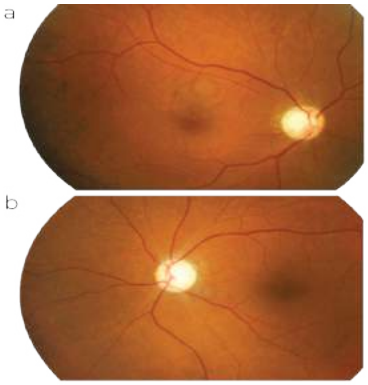
B. Short bowel syndrome

C. Gastric outlet obstruction

D. Shock

---

17. A 35-year-old male patient came to the outpatient department with a complaint of gradual diminished vision from the past two days. He admitted that he lately experiences some hallucinations and memory loss. His personal history shows he is a chronic alcoholic with a history of hooch consumption. The patient also and had a seizure episode during a recent episode of binge drinking. The ophthalmologist checked the eyes and the findings are shown below. Suggest an antidote to this condition and the appropriate treatment recommended for this condition.



A. Diazepam-5%Dextrose

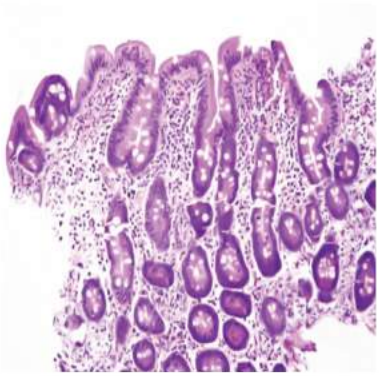
B. Activated charcoal-Normal saline

C. Fomepizole-Ringer lactate

D. Mannitol-Ringer lactate.

---

18. A 20-year-old female patient came to the outpatient department with complaint of recurrent episodes of alternating constipation, diarrhea, and abdominal pain. Her lab investigations showed low levels of K+ and H+. The physcian suspecting a malabsorption syndrome, ordered an intestinal biopsy which revealed the findings shown in the image below. Identify the disease and the electrolyte imbalance involved in it.



A. Hypervolemic Hyponatremia

B. Isotonic Hyponatremia

C. Euvolemic Hyponatremia

D. Hypovolemic Hypernatremia

---

19. Match the following 1) Cerebral salt wasting syndrome a) Hypervolemic hyponatremia 2) Oat cell cancer b) Hypovolemic hyponatremia 3) Nephrotic syndrome c) Euvolemic hyponatremia

1) Cerebral salt wasting syndrome	a) Hypervolemic hyponatremia
2) Oat cell cancer	b) Hypovolemic hyponatremia
3) Nephrotic syndrome	c) Euvolemic hyponatremia

A. 1-a,2-c,3-b

B. 1-c,2-a,3-b

C. 1-b,2-c,3-a

D. 1-a,2-b,3-c

---

20. Metabolic alkalosis secondary to which of the following conditions is not considered saline responsive?

A. Congenital Hypertrophic Pyloric Stenosis

B. Healed peptic ulcer disease.

C. Ca. stomach

D. Cirrhosis

---

21. A 20-year-old female patient weighing 60 kg was brought to the emergency department in an unconscious state. Her mother revealed that the girl is on a crash diet including only water and juice for quick weight loss. Lab investigations revealed sodium to be 125mEq.Calculate sodium correction to be given over the next 24 hours.

A. 135mEq/24hr

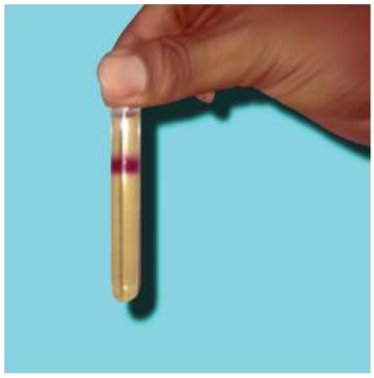
B. 145mEq/24hr

C. 240mEq/24hr

D. 235mEq/24hr

---

22. A 40-year-old male was rushed to the emergency department in an unconscious state by his wife. The patient is a known case of Diabetes mellitus type 1 for the past 15 years. History showed that he was under a lot of pressure in the past two days and ignored his medication,. Prior to loss of consciousness the patient reported symptoms of excess thirst, lethargy, and fruit-smelling breath. Lab investigations are done and shown below. Identify the diagnosis and mark the option with the appropriate electrolyte imbalance and fluid of choice.



A. Hypokalemic Metabolic Alkalosis-Normal saline

B. Hyperkalemic Metabolic Acidosis-Normal saline

C. Hypokalemic Metabolic Alkalosis- 5% Dextrose

D. Hyperkalemic Metabolic Acidosis-5%Dextrose.

---

23. Pick the option that has correct statements regarding sodium. a) Fluid of choice for hyponatremia- 3 % saline b) 1 ml of normal saline = 0.5 mEq Na c) 0.9% saline = 154 mEq of Na and 154 mEq Cl Per 1000 ml d) Gradual sodium correction to be done in case of seizures during Hyponatremia.

A. a,c

B. b,d

C. a,d

D. b,c

---

24. Match the following disorders with their respective management. 1. Metabolic acidosis a. Paper bag rebreathing 2. Respiratory acidosis b. Ringer Lactate 3. Metabolic alkalosis c. Positive pressure ventilation 4. Respiratory alkalosis d. Normal Saline

1. Metabolic acidosis	a. Paper bag rebreathing
2. Respiratory acidosis	b. Ringer Lactate
3. Metabolic alkalosis	c. Positive pressure ventilation
4. Respiratory alkalosis	d. Normal Saline

A. 1-a, 2-c, 3-d, 4-b

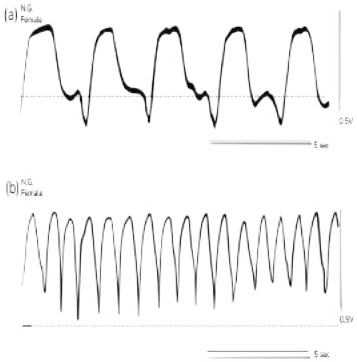
B. 1-c, 2-d, 3-a, 4-b

C. 1-d, 2-c, 3-b, 4-a

D. 1-b, 2-c, 3-d, 4-a

---

25. Identify the respiratory or metabolic disorder associated with the respiratory graph given below (b), Mark the option that is not associated with a similar disorder.



A. Pleural effusion

B. Acute asthma

C. High altitude pulmonary edema

D. COPD exacerbation

---

26. Which of the following conditions results in fine tremors?

A. Ammonia intoxication

B. Thyrotoxicosis

C. Uremia

D. CO_2 narcosis

---

27. Which of the following is not a factor affecting plasma osmolality?

A. Sodium

B. Glucose

C. Potassium

D. Total body water

---

28. Which of the following is the fluid of choice given to a patient with sodium levels>158mEq?

A. 3% saline

B. 0.9% saline

C. N/2 in 5% dextrose

D. 0.45% RL

---

29. Which of the following conditions can be associated with both hypernatremia and hyponatremia?

A. Hyperosmolar coma

B. Diabetes insipidus

C. Mannitol therapy

D. Extreme debilitation

---

30. A 25-year-old male patient weighing 60kg was brought to the emergency department in an unconscious state by his father. He is a known case of Diabetes insipidus. His lab reports showed sodium levels of 158mEq. Identify the electrolyte imbalance and calculate the volume for fluid correction.

(or)

What is the fluid correction volume required in a 25-year-old male with known diabetes insipidus who presents with serum sodium levels of 158 mEq/L after a body-building competition?

A. 4.6

B. 8.2

C. 6.5

D. 10

---

31. What's the corrected amount of potassium required for a 23-year-old male patient with serum potassium levels of 2.5mEq/L, presenting extreme weakness and muscle cramps, after aggressive treatment with steroids and salbutamol nebulization for a recent breathlessness episode?

(or)

What is the amount of corrected potassium that is to be given to a patient with serum potassium levels of 2.5 mEq?

A. 100mEqKCl/24hr fluid

B. 140mEqKCl/24hr fluid

C. 120mEqKCl/24hr fluid

D. 150mEqKCl/24hr fluid

---

32. Which of the following is the actual formula for the initial correction of sodium bicarbonate?

A. 0.5 × weight (24 - actual value)

B. 0.5 × weight (15 - actual value)

C. TBW × (Na actual - 140)/140

D. TBW × (desired sodium - actual value)

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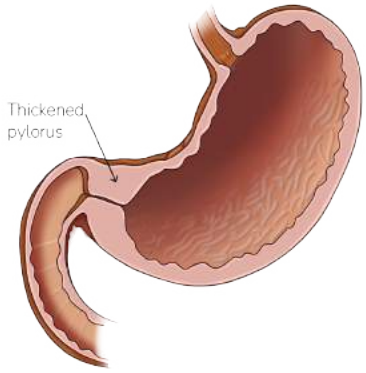
33. What metabolic disorder is associated with the condition depicted in the image below?



A. Hypochloremic Hypokalemic Metabolic Acidosis

B. Hypochloremic Hyperkalemic Metabolic Alkalosis

C. Hypochloremic Hypokalemic Metabolic Alkalosis

D. Hyporchloremic Hypokalemic Metabolic Acidosis

---

34. A 23-year-old female patient came to the outpatient department with a history that she recently collapsed after a rapid breathing episode during her new job interview. She experiences a numbing feeling around her mouth a few minutes before the collapse. The patient also describes profuse sweating and palpitations during this episode. The patient has a history of such episodes that occur during stressful social encounters. Identify the disorder and mark the option with the next step in

management.

(or)

Mark the option with the correct treatment in a patient with signs of hyperventilation and tetany.

A. Administer Ringer Lactate

B. Paper bag rebreathing

C. Administer NS

D. Administer calcium gluconate

---

35. Match the following lab readings with their associated electrolyte imbalances. 1)TBW ↓, TBS ↓ a)Euvolemic hyponatremia 2)TBW ↑, TBS-(n) b)Isotonic hyponatremia 3)TBW ↑↑ , TBS ↑ c)Hypovolemic hyponatremia 4)High glucose d)Hypertonic hyponatremia 5)Hyperproteinemia e)Hypervolemic hyponatremia

1)TBW ↓, TBS ↓	a)Euvolemic hyponatremia
2)TBW ↑, TBS-(n)	b)Isotonic hyponatremia
3)TBW ↑↑ , TBS ↑	c)Hypovolemic hyponatremia
4)High glucose	d)Hypertonic hyponatremia
5)Hyperproteinemia	e)Hypervolemic hyponatremia

A. 1-a,2-c,3-b,4-d,5-e

B. 1-c,2-e,3-b,4-d,5-a

C. 1-c,2-a,3-e,4-d,5-b

D. 1-e,2-c,3-a,4-b,5-d

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	3
Question 3	2
Question 4	4
Question 5	3
Question 6	2
Question 7	3
Question 8	3
Question 9	1
Question 10	1
Question 11	4

Question 12	3
Question 13	2
Question 14	3
Question 15	4
Question 16	3
Question 17	3
Question 18	1
Question 19	3
Question 20	4
Question 21	3
Question 22	2
Question 23	1
Question 24	4
Question 25	4
Question 26	2
Question 27	4
Question 28	3
Question 29	3
Question 30	1
Question 31	1
Question 32	2
Question 33	3
Question 34	2
Question 35	3

Solution for Question 1:

Correct Option C - Diabetic ketoacidosis leads to Hyperkelemia:

• Acidosis can lead to hyperkalemia

• DKA - sugar → Solvent drag → Potassium efflux (Draw potassium out of cells into blood) → ↑ K+

• So in Acidosis - potassium comes out of cells

Incorrect Options:

The remaining options lead to Hypokalemia:

Option A - Liddle syndrome:

• Renal losses leads to Hypokalemia

Option B - Renal tubular acidosis:

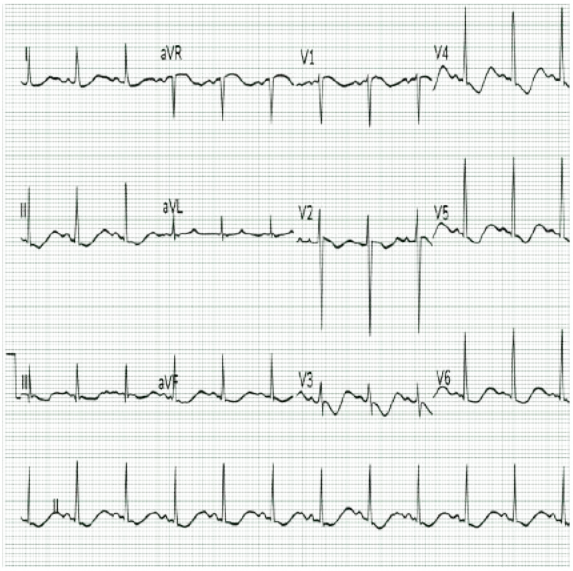
• Both type 1 and type 2 result in Hypokalemia

Option D - Respiratory alkalosis:

• Alkalosis → potassium shift into cells results in Hypokalemia.

Solution for Question 2:

Correct Option - C:



ECG: K+ Responsible for repolarization

• T wave decreased, absent or inverted.

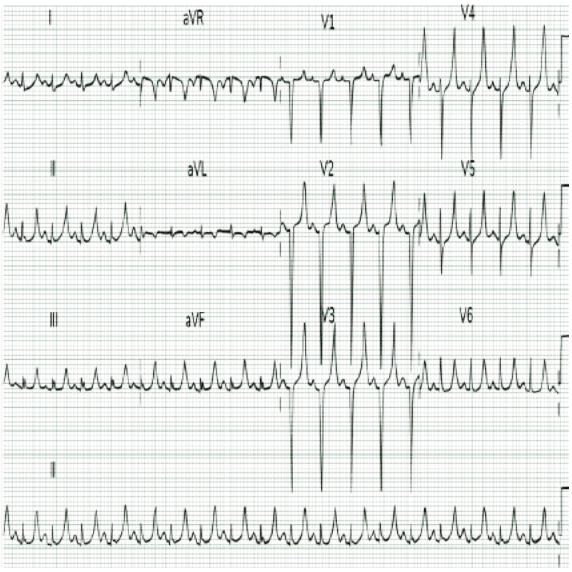
• ST segment depression

• Increased amplitude of P wave (pseudo p-pulmonale)

• Prominent U wave

• Prolonged QU and PR interval (QU because T wave is absent)

Incorrect Options:



This ECG is seen in Hyperkalemia.

• Tall tented T wave

• ST elevation

• P wave - Decreased amplitude, prolonged PR interval.

• Broad QRS complex

• Sine wave pattern seen when values exceed >8 mEq/L

• A and D are normal ECG

Solution for Question 3:

Correct Option B - Sine wave pattern:

• This is seen in Hyperkalemia.

Incorrect Options:

These are the findings in ECG of Hypokalemia.

Option A - T wave inversion

Option C - Prominent U wave

Option D - ST depression

Solution for Question 4:

Correct Option D - 140 mEq of KCl/24hrs:

• For potassium levels less than 3 mEq/L or in patients unable to take oral supplementation due to ileus or illness, intravenous correction with potassium chloride is indicated.

• Correction should be done slowly via infusion.

• To increase potassium levels from 2.3 to 3 mEq/L, approximately 200 mEq of KCl should be supplied slowly via IV. Once levels reach 3 mEq/L, oral supplementation can be considered.

• Additionally, to maintain a rise of 0.7 mEq/L, approximately 140 mEq of KCl should be administered over a 24-hour period.

Incorrect Options:

• A, B and C are incorrect due to the above given reasons.

Solution for Question 5:

Correct Option C - Liddle's syndrome:

• Liddle syndrome - gain of function of Enac(leading to more sodium resorption)

• Leads to loss of potassium and hydrogen - Hypokalemia.

Incorrect Options:

• Remaining options are the conditions resulting in Hyperkalemia.

Option A - Gordon syndrome:

• DCT- Gain of function of Na-Cl cotransporter

Option B - RBC lysis:

Option D - Addison's disease:

• If aldosterone is deficient $\rightarrow$ potassium excess

Solution for Question 6:

Correct Option B - Patiromer:

• Weight loss, loss of appetite, fatigue, salt craving(to eat pickles), skin pigmentation, and hypoglycemia are the features of Addison's disease.

• If aldosterone is deficient $\rightarrow$ decreased excretion of potassium $\rightarrow$ potassium excess.(hyperkalemia)

• The question asks about the elimination of potassium through GI/renal route, and the appropriate answer is Patiromer.

Incorrect Options:

Option A - Sodium bicarbonate:

• Sodium bicarbonate routinely used for management of Hyperkalemia

Option C - Calcium chloride:

• To Antagonize effects of potassium

Option D - Salbutamol:

• To Redistribute potassium.

Solution for Question 7:

Correct Option C - Calcium gluconate:

• The image shows the Trousseau sign seen in tetany due to hypocalcemia.

• Calicum < 7 mg%- Tetany

• Treatment: IV 10% Ca gluconate

Incorrect Options:

Option A - Patiromeronate:

• Patiromer is a cation exchange polymer used in the management of hyperkalemia

Option B - ZS - 9:

• ZS - 9 used in the management of Hyperkalemia

Option D - Calcitonin:

• Used in the management of Hypercalcemia.

Solution for Question 8:

Correct option C - Hyponatremia:

• The patient's decreased intake of oral fluids combined with diuretic therapy for heart failure management can lead to electrolyte imbalances, including hyponatremia.

• Hyponatremia is a common electrolyte imbalance in a hospitalized patient due to decreased intake of fluids

• Hyponatremia, defined as serum sodium concentration <135 mEq/L, can result from decreased intake, excessive diuretic use, syndrome of inappropriate antidiuretic hormone secretion (SIADH), or renal salt wasting. In hyponatremia, low plasma osmolality leads to a shift of water into brain cells, causing cerebral edema and neurological symptoms such as confusion, seizures, and coma.

Incorrect Options:

Option A - Dehydration: While dehydration can lead to electrolyte imbalances, including hyponatremia, in this scenario, the patient's symptoms of lethargy, confusion, and decreased level of consciousness a re more indicative of cerebral edema due to hyponatremia rather than dehydration.

Option B - Hypernatremia: Hypernatremia, defined as serum sodium concentration >145 mEq/L, result s from water loss exceeding sodium loss, increasing plasma osmolality. This condition is typically asso ciated with symptoms such as thirst, dry mucous membranes, and altered mental status. However, the patient in this scenario presents with signs of hyponatremia, not hypernatremic Hyponatremia

Option D - Hyperkalemia: Hyperkalemia, characterized by serum potassium concentration >5.5 mEq/L, can occur in patients with heart failure due to impaired renal potassium excretion or as a side effect of certain medications such as potassium-sparing diuretics or angiotensin-converting enzyme (ACE) inhib itors. However, the patient's symptoms are more consistent with hyponatremia-induced cerebral edem a rather than hyperkalemia.

Solution for Question 9:

Correct Option A - Bisphosphonates:

• Bisphosphonates such Ibandronate are the drugs of choice for patients in hypercalcemic crisis (>13mg%)

Incorrect Options:

• Options B, C and D are incorrect. Refer to the explanation of the correct answer and the learning objective.

Solution for Question 10:

Correct Option A - Activation of the renin-angiotensin-aldosterone system:

• In this patient with cirrhosis, hyponatremia is likely due to the activation of the renin-angiotensin-aldosterone system (RAAS).

• Cirrhosis leads to portal hypertension and decreased effective arterial blood volume, triggering the release of renin from the kidneys.

• Renin then initiates the cascade of RAAS activation, leading to increased aldosterone secretion. Aldosterone promotes sodium and water retention in the kidneys, expanding extracellular fluid volume and dilutional hyponatremia.

Incorrect Options:

Option B - Excessive intake of dietary sodium: Although excessive intake of dietary sodium may contrib ute to fluid retention in some cases, it is not the primary mechanism in cirrhotic patients with hypervole mic hyponatremia.

Option C - Impaired secretion of antidiuretic hormone (ADH): Impaired secretion of ADH can lead to hy pervolemic hyponatremia in certain conditions such as diabetes insipidus, it is not typically seen in cirrh osis.

Option D - Decreased water reabsorption in the distal nephron: Decreased water reabsorption in the di stal nephron would lead to a hypovolemic, rather than hypervolemic, state.

Solution for Question 11:

Correct Option D - Respiratory failure due to laryngospasm:

• The patient's symptoms of muscle cramps and tingling sensations, along with positive Chvostek's and Trousseau's signs, are indicative of severe hypocalcemia.

• These signs are manifestations of neuromuscular irritability associated with low serum calcium levels. Hypocalcemia can lead to laryngospasm or bronchospasm, which can result in respiratory failure and subsequent death.

Incorrect Options:

Option A - Cardiac arrest: Systolic arrest is the most common cause of death in hypercalcemia not hyp ocalcemia.

Option B - Cerebral edema: Cerebral edema is not a
typical complication of hypocalcemia and is unlikely to cause sudden death.

Option C - Pulmonary embolism: Pulmonary embolism is a separate condition that typically presents wi th symptoms such as chest pain, dyspnea, and hemoptysis. While it can be life-threatening, the sympto ms described in the scenario are more consistent with neuromuscular manifestations of hypocalcemia.

Solution for Question 12:

Correct Option C - TBW ↓, TBS ↓-IV fluids:

• The lab report shows sodium levels of 130meq which is less when compared to its normal values i.e 135-145meq.

• Gastrointestinal fluid losses such as diarrhea (in the question) and vomiting can lead to to hypovolemic hyponatremia.

Incorrect Options:

Options A, B and D are incorrect. Refer to the explanation of Option C and the learning objective.

Solution for Question 13:

Correct Option B - 1-c, 2-e, 3-g, 4-a, 5-h, 6-d, 7-f, 8-b:

1. Na+ < 125 mEq/L

c. Hypertonic saline

2. K+ > 8 mEq/L

e. Ca chloride

3. Ca+ > 13 mg%

g. Ibandronate

4. Mg+ > 10 mEq/L

a. Hemodialysis

5. Na+ > 158 mEq/L

h. 5 % dextrose

6. K+ < 2.5 mEq/L

d. KCl drip

7. Ca+ < 7 mg%

f. Ca gluconate

8. Mg+ < 1 mEq/L

b. MgSO4

Incorrect Options:

Option A - 1-a, 2-c, 3-b, 4-d, 5-e, 6-g, 7-f, 8-h

Option C - 1-f, 2-d, 3-a, 4-b, 5-c, 6-e, 7-h, 8-g

Option D - 1-h, 2-d, 3-g, 4-c, 5-f, 6-b, 7-e, 8-a

Solution for Question 14:

Correct Option C - Euvolemic hyponatremia:

• The image shows the Brudzinski sign which is positive in patients with Meningitis.

• Meningitis leads to Euvolemic hyponatremia.

Incorrect Options: Eliminated by the explanation of the above options.

Option A - Hypervolemic Hyponatremia: Hypervolemic Hyponatremia-seen in Cirrhosis.

Option B - Isotonic Hyponatremia: Isotonic Hyponatremia-Lab errors mostly.

Option D - Hypertonic Hypernatremia: Hypertonic Hypernatremia-seen in mannitol infusion.

Solution for Question 15:

Correct Option D - 1-g, 2-e, 3-d, 4-a, 5-c, 6-b, 7-f:

1. Hypomagnesemia

g. Torsades de pointes

2. Hypokalemia

e. Diaphragmatic paralysis

3. Hyponatremia

d. Seizure

4. Hyperkalemia

a. Diastolic arrest

5. Hypocalcemia

c. Laryngospasm

6. Hypermagnesemia

b. Asystole

7. Hypercalcemia

f. Systolic arrest

Incorrect Options:

Option A - 1-a, 2-d, 3-b, 4-e, 5-c, 6-f, 7-g

Option B - 1-d, 2-g, 3-c, 4-f, 5-b, 6-e, 7-a

Option C - 1-e, 2-c, 3-a, 4-b, 5-d, 6-g, 7-f

Solution for Question 16:

Correct Option C - Gastric outlet obstruction:

• Gastric outlet obstruction causes chronic vomiting → loss of H+ ions, eventually leading to metabolic alkalosis, not metabolic acidosis.

Incorrect Options:

• The remaining options cause metabolic alkalosis.

Option A - Diabetic ketoacidosis:

• It cause metabolic alkalosis.

Option B - Short bowel syndrome:

• Carbohydrate fermentation by bacterial flora produces D-lactate

Option D - Shock:

• It cause metabolic alkalosis.

Solution for Question 17:

Correct Option C - Fomepizole-Ringer lactate:

• The fundal images show a damaged retina.

• The question describes diminished vision(due to a damaged retina), and encephalopathy(signs of seizure activity, loss of memory, and hallucinations). The patient is a chronic alcoholic with a history of consuming hooch (illicit whiskey -likely methyl alcohol) and the likely diagnosis is methyl alcohol toxicity.

• Methyl alcohol- Metabolized by the same enzyme that metabolizes ethyl alcohol (Alcohol dehydrogenase)

• Metabolizes Methyl alcohol → Formaldehyde → Formic acid.

• Formic acid has Low pH leading to metabolic acidosis.

• Causes BBB damage - Encephalopathy and damage to retina

• Antidote - Fomepizole - Inhibits Alcohol dehydrogenase.

• Fluid of choice – Ringer Lactate

Incorrect Options:

Option A - Diazepam - 5%Dextrose:

• Diazepam is used for convulsions but the question asked about the overall antidote for metabolic acidosis due to excess methyl alcohol(formic acid)

Option B - Activated charcoal - Normal saline:

• Activated Charcoal is used as an antidote in most poisonings.

Option D - Mannitol-Ringer lactate:

• Mannitol is used in the treatment of cerebral edema and fluid retention.

Solution for Question 18:

Correct Option A - Hypervolemic Hyponatremia:

• The image shows blunting of small intestinal villi which is seen in patients with celiac disease.

• This results in a reduction in circulating fluid volume (fluid is redistributed in the 3rd space) ·

• Renal perfusion is low → low GFR.

• Activates RAAS, Leads to secondary hyperaldosteronism.

• Activate ENac - epithelial sodium channel, More water and more salt reabsorbed · Corresponding loss of K+ and H+ ·

• TBW and TBS are increased - Hypervolemic hyponatremia - both water and salt are more and water is disproportionate compared to salt

Incorrect Options:

Option B - Isotonic Hyponatremia: These are mostly due to variability in laboratory measurement.

Option C
- Euvolemic hyponatremia: It seen in infections like meningitis and herpes simplex encephalitis

Option D - Hypovolemic Hypernatremia: It seen in diarrhea and not to be confused with electrolyte imb alance seen in diarrhea or vomitings

Solution for Question 19:

Correct Option C - 1-b,2-c,3-a:

1) Cerebral salt wasting syndrome - b) Hypovolemic hyponatremia

2) Oat cell cancer (leads to SIADH) - c) Euvolemic hyponatremia

3) Nephrotic syndrome - a) Hypervolemic hyponatremia

Incorrect Options:

Option A - 1-a,2-c,3-b

Option B - 1-c,2-a,3-b

Option D - 1-a,2-b,3-c

Solution for Question 20:

Correct Option D - Cirrhosis:

• The metabolic alkalosis seen in cirrhosis is considered saline non responsive.

• This can be treated with Spironolactone.

Incorrect Options:

• The remaining options are saline-responsive conditions (eliminated by the explanation of the above options)

Option A - Congenital hypertrophic pyloric stenosis

Option B - Healed peptic ulcer disease.

Option C - Ca. stomach

Solution for Question 21:

Correct Option C - 240mEq/24hr:

• Formula to calculate the sodium correction over 24hrs→ TBW x (desired sodium - actual value)

• TBW = weight × 0.6 (for males) ·

• TBW = weight × 0.5 (for females)

• 60x0.5x(133-125)=240mEq/24hr

Hyponatremia is always corrected in increments of 8mEq over a
period of 24 hours.This explains the desired sodium value of 133(125+8) in this patient.

Incorrect Options:

Options A, B and D are incorrect. Refer to the explanation of Option C.

Solution for Question 22:

Correct Option B - Hyperkalemic Metabolic Acidosis-Normal saline:

• The image shows a purple color ring which indicates the presence of ketone bodies-ROTHERAS test.

• The patient is a diabetic with symptoms and features (in the vignette) such as loss of consciousness, excessive thirst, lethargy and a fruity smelling breath. These symptoms are suggestive of diabetic ketoacidosis.

• DKA leads to Hyperkalemic Metabolic Acidosis and normal saline is the fluid of choice.

Incorrect Options:

Option A - Hypokalemic Metabolic Alkalosis-Normal saline:

• DKA leads to metabolic acidosis, not alkalosis

Option C - Hypokalemic Metabolic Alkalosis-5%Dextrose:

• Patients with DKA present with acidosis and not alkalosis. The initial fluid of choice is normal saline.

Option D - Hyperkalemic Metabolic Acidosis-5%Dextrose:

• Refer to the explanation of the other options.

Solution for Question 23:

Correct Option A - a, c:

• a) Fluid of choice for hyponatremia- 3 % saline

• c) 0.9% saline = 154 mEq of Na and 154 mEq Cl Per 1000 ml

Incorrect Options:

Option B - b, d:

• b) 1 ml of normal saline = 0.15 mEq Na and 1 ml of 3% saline = 0.5 mEq of Na

• d) Quick sodium correction can be done in case of seizures during Hyponatremia(acute)

• Only in chronic Hyponatremia, gradual correction should be done.

Options C and D are incorrect. Refer to the explanation of the other options and the learning objective.

Solution for Question 24:

Correct Option D - 1-b, 2-c, 3-d, 4-a:

1. Metabolic acidosis

b. Ringer Lactate

2. Respiratory acidosis

c. Positive pressure ventilation

3. Metabolic alkalosis

d. Normal Saline

4. Respiratory alkalosis

a. Paper bag rebreathing

Incorrect Options:

Eliminated by the explanation of the above option

Option A - 1-a, 2-c, 3-d, 4-b

Option B - 1-c, 2-d, 3-a, 4-b

Option C - 1-d, 2-c, 3-b, 4-a

Solution for Question 25:

Correct Option D - COPD exacerbation:

• The graph shows (a) normal breathing pattern and (b) shows increase in the number of breaths- hyperventilation causing CO2 washout leading to Respiratory Alkalosis.

• COPD exacerbation leads to Respiratory Acidosis.

Incorrect Options:

• The remaining options lead to respiratory alkalosis.

Option A - Pleural effusion

Option B - Acute asthma

Option C - High altitude pulmonary edema

Solution for Question 26:

Correct Option B - Thyrotoxicosis:

• Thyrotoxicosis is associated with fine tremors:

Incorrect Options:

The remaining options are the conditions that result in flapping tremors.

Option A - Ammonia intoxication

Option C - Uremia

Option D - CO2 narcosis

Solution for Question 27:

Correct Option D - Total body water:

• According to the formula- Plasma osmolality = 2 (Na + K) + BUN/2.8 + Glucose/18,

• Total body water is not taken into consideration.

Incorrect Options:

Option A, B & D: All the remaining options are a
part of the formula and are factors that affect plasma osmolality.

Solution for Question 28:

Correct Option C - N/2 in 5% dextrose:

• Na+ levels>158mEq is Hypernatremia

• 5%Dextrose diluted in N/2 saline-0.45% saline is fluid of choice.

Incorrect Options:

Solution for Question 29:

Correct Option C - Mannitol therapy:

• Mannitol therapy can be associated with both Hypertonic hyponatremia(osmotic diuresis) and hypernatremia.

Incorrect Options:

Option A - Hyperosmolar coma:

• This leads to Hypertonic hyponatremia (dilutional hyponatremia)

• Sugar and sodium are inversely related and water is dragged in intravscularly by the increased sugar levels leads to dilutional/hypertonic Hyponatremia.

Option B - Diabetes insipidus: This leads to hypernatremia alone (Polydipsia but not drinking enough w ater/dehydrated)

Option D - Extreme debilitation: Also leads to hypernatremia.

Solution for Question 30:

Correct Option A - 4.67:

• The likely diagnosis in this unconscious patient with a serum sodium of 158 mEq is hypernatremia.

• Formula for Volume of fluid correction = TBW × (Na+ actual - 140)/140

• TBW in males $\rightarrow$ 0.6 x Body weight

• TBW in this patient is 0.6 x 60 $\rightarrow$ 36

• Substituting in the formula for volume of fluid correction we get,

• 36 x (158-140)/140 $\rightarrow$ ~4.6 litres.

Incorrect Options:

Option B, C & D:

• Eliminated by the explanation of the above option

• Refer to the explanation of the correct option

Solution for Question 31:

Correct Option A - 100 mEqKCl/24hr fluid:

• The patient had an aggressive therapy of salbutamol which leads to sequestering drawing of potassium into the cells leading to hypokalemia.

• The repeated shallow breaths indicate hyperventilation due to respiratory paralysis(due to hypokalemia).

• To be corrected 2.5 → 3 mEq ·

• After 3 mEq → correction can be given orally ·

• 1 mEq/L rise in the blood: 200 mEq of KCl has to be supplied as slow IV ·

• The corrected potassium to be given is 0.5mEq rise × 200 = 100 mEq KCl/24-hour fluid.

Incorrect Options:

Options A, C and D are incorrect. Refer to the explanation of the correct option.

Solution for Question 32:

Correct Options B - 0.5 × weight (15 - actual value):

• This is the formula for initial correction for sodium bicarbonate given If pH < 7.2 in spite of adequate fluid resuscitation.

• Half is given initially as a bolus and the other half was given as infusion

Incorrect Options:

Option A - 0.5 × weight (24 - actual value):

• After initial correction to 15,24 is used for further correction.

Option C - TBW × (Na actual - 140)/140:

• This formula is used for volume for fluid correction in Hypernatremia.

Option D - TBW × (desired sodium - actual value):

• This formula is used for sodium correction to be given in the first 24hr in chronic Hyponatremia.

Solution for Question 33:

Correct Option C - Hypochloremic Hypokalemic Metabolic Alkalosis:

• The image shows thickened pylorus → seen in patients with congenital hypertrophic pyloric stenosis.

• Excess vomiting → Loss of water, Loss of hydrochloric acid → Dehydration →Less blood supply to kidney → GFR reduced → RAAS activated → Aldosterone → Salt and water reabsorbed → K+ and H+ loss → Hypochloremic Hypokalemic Metabolic Alkalosis

Incorrect Options:

Option A, B & D: Eliminated by the explanation of the above options.

Solution for Question 34:

Correct Option B - Paper bag rebreathing:

• The patient describes hyperventialation, palpitations, and profuse sweating associated with stressful social encounters. This along with a history of recurrent episodes in similar situations points towards a diagnosis of social anxiety disorder.

• Rapid shallow breaths lead to Respiratory alkalosis.

• Respiratory alkalosis can trigger tetany (perioral paraesthesia)

Incorrect Options:

Option A - Administer Ringer Lactate: If RL is given bicarbonate produced will worsen alkalosis and tet any will worsen

Option C - Administer NS: This is used in the treatment of metabolic alkalosis.

Option D - Administer calcium gluconate Hypocalcemia is due to redistribution $\rightarrow$
so calcium gluconate not given

Solution for Question 35:

Correct Option C - 1-c,2-a,3-e,4-d,5-b:

1)TBW $\downarrow$, TBS $\downarrow$-c)Hypovolemic hyponatremia

2)TBW $\uparrow$, TBS-(n)-a)Euvolemic hyponatremia

3)TBW $\uparrow\uparrow$, TBS $\uparrow$-e)Hypervolemic hyponatremia. The increase in TBW is much more significant when compared to the increase in TBW leading to hyponatremia.

4)High glucose-d)Hypertonic hyponatremia

5)Hyperproteinemia-b)Isotonic hyponatremia

Incorrect Options:

Eliminated by the explanation of the above option

Option A - 1-a,2-c,3-b,4-d,5-e

Option B - 1-c,2-e,3-b,4-d,5-a

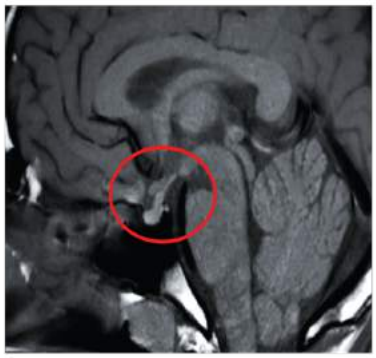
Option D - 1-e,2-c,3-a,4-b,5-d

Syndromes (Bartter Syndrome, Liddle syndrome, Gitelman Syndrome)

1. A 35-year-old male patient presents to the clinic with complaints of excessive thirst and frequent urination. He reports having to wake up multiple times during the night to urinate, and his urine output during the day seems abnormally high. Laboratory investigations reveal a urine output exceeding 3 liters per day. Radiograph image is given below, what is the first line treatment for this patient?

(or)

What is the first line treatment for central DI ?



A. Desmopressin acetate (DDAVP)

B. Hydrochlorothiazide

C. Amiloride

D. Furosemide

---

2. A 17-year-old male came to the outpatient with complaints of high fever, vomiting, joint pains, and confusion for the past three days. The blood cultures revealed a kidney-shaped gram-negative bacteria and a positive Kernigs sign. Further investigations showed a dark orange yellow urine with increased urinary sodium, reduced BUN, and a positive water load test. Identify the condition and mark the option which is not part of the diagnostic criteria.

(or)

Identify the diagnosis in a patient with fever, confusion caused by gram-negative diplococci with a positive Kernings sign, positive water load test, increased sodium, and reduced BUN. Mark the option which is not a part of the disease diagnostic criteria.

A. Plasma osmolarity <275 mosm/Kg H2O

B. Clinical Euvolemia

C. Normal Thyroid function test

D. Timed 24-hour Urine studies

---

3. Match the following: 1) SIADH a) U.osmolarity↓, P.osmolarity↓, Na+ conc↓ 2) Diabetes insipidus b) U.osmolarity↑, P.osmolarity↓, Na+ conc↓ 3) Psychogenic polydipsia c) U.osmolarity↑, P.osmolarity↑, Na+ conc.↑ 4) Adipsic Hypernatremia d) U.osmolarity↓, P.osmolarity↑, Na+ conc↑

1) SIADH	a) U.osmolarity↓, P.osmolarity↓, Na+ conc↓
2) Diabetes insipidus	b) U.osmolarity↑, P.osmolarity↓, Na+ conc↓
3) Psychogenic polydipsia	c) U.osmolarity↑, P.osmolarity↑, Na+ conc.↑
4) Adipsic Hypernatremia	d) U.osmolarity↓, P.osmolarity↑, Na+ conc↑

A. 1-a,2-c,3-b,4-d

B. 1-c,2-a,3-b,4-d

C. 1-b,2-d,3-a,4-c

D. 1-d,2-b,3-c,4-a

---

4. A 5-year-old male baby was brought to the outpatient department by his mother with a complaint saying that she has to change his diapers multiple times a day. The baby is underweight. Clinical examination revealed sunken anterior fontanelle, a poorly developed response of the reflex shown in the image below, and dry dehydrated skin. Lab reports showed Na+ of 130mEq and Mg+ of 1mEq/L. Identify the condition and mark the option with appropriate statements.

(or)

Which of the following is true regarding Gitelman syndrome ?

A. Investigation of choice is 24-hr urinary chloride

B. Defect in Na-K-2Cl co-transporter.

C. Hypokalemic metabolic acidosis

D. SNHL

---

5. A 12-year-old child presents to the pediatric clinic with complaints of hearing difficulties and frequent bone pain. Upon examination, the child is found to have bilateral sensorineural deafness and signs suggestive of calcium wasting, including nephrocalcinosis and renal rickets. Which medication is most likely to be prescribed for the treatment of this condition?

(or)

Which medication is most likely to be prescribed for the treatment of Bartter syndrome?

A. Furosemide

B. Hydrochlorothiazide

C. Spironolactone

D. Indomethacin

---

6. A 40-year-old woman presents to her primary care physician with complaints of persistent hypertension and occasional muscle weakness. Laboratory tests reveal hypokalemia and metabolic alkalosis. Further evaluation indicates low renin levels. Which of the following medications is most appropriate for the management of this patient's condition?

(or)

Which of the following is the treatment for liddle syndrome?

A. ACE inhibitor

B. Beta-blocker

C. Amiloride

D. Thiazide diuretic

---

7. Mark the option with correct statements regarding Diabetes insipidus. a) Urine output>3L/day b) First line drug for central DI is Indomethacin c) Reduced Plasma Osmolarity d) Miller Moses test is used for evaluation

A. b,c

B. a,d

C. a,c

D. b,d

---

8. All of the following can be treated with Indomethacin except?

A. Patent ductus arteriosus

B. Acute Gout

C. Bartter syndrome

D. Liddle syndrome

---

9. Which of the following laboratory findings is most likely to be observed in a patient with psychogenic polydipsia?

A. Increased urine osmolarity, decreased plasma osmolarity, and decreased sodium concentration

B. Decreased urine osmolarity, increased plasma osmolarity, and increased sodium concentration

C. Decreased urine osmolarity, decreased plasma osmolarity, and decreased sodium concentration

D. Increased urine osmolarity, increased plasma osmolarity, and increased sodium

---

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	4
Question 3	3
Question 4	1
Question 5	4
Question 6	3
Question 7	2
Question 8	4
Question 9	3

Solution for Question 1:

Correct Option A - Desmopressin acetate (DDAVP):

• Desmopressin is the synthetic analog of vasopressin and is the first-line treatment for central diabetes insipidus, as it helps to reduce excessive urination and thirst.

Incorrect Options:

Option B - Hydrochlorothiazide: Hydrochlorothiazide is not typically used as a first-line treatment for central diabetes insipidus. It is a diuretic medication that may exacerbate symptoms by increasing urine output.

Option C - Amiloride: Amiloride is not typically used as a first-line treatment for central diabetes insipidus. It is a potassium-sparing diuretic that may not address the underlying cause of excessive urination and thirst.

Option D - Furosemide: Thiazides are treatment choice for nephrogenic DI.

Solution for Question 2:

Correct Option D - Timed 24-hour Urine studies:

• Timed 24-hour Urine studies are not the diagnostic criteria for SIADH

• The diagnosis is SIADH (Syndrome of inappropriate antidiuretic hormone secretion)

• Fever, joint pains and a positive Kernigs sign hints towards meningitis caused by Neisseria meningitidis (Gram-negative kidney-shaped Diplococci)

• Meningitis is one of the causative factors for SIADH (Concentrated Urine, Increased Urinary sodium, reduced BUN, and a positive Water load test)

Incorrect Options:

Option A - Plasma osmolarity <275 mosm/Kg H2O

Option B - Clinical Euvolemia

Option C - Normal Thyroid function test

• Option A, B & C are the diagnostic criteria for SIADH.

Solution for Question 3:

Correct Option C - 1-b,2-d,3-a,4-c:

Solution for Question 4:

Correct Option A - Investigation of choice is 24-hr urinary chloride:

• The diagnosis is GITELMAN syndrome

• The child in the vignette has

• dehydration, frequent urination, low levels of sodium and magnesium (TRPM6 Transporter defect), sluggish moros reflex (moros relax demonstrated in the image) and a sunken anterior fontanelle. These are all features of Gitelman syndrome.

• Investigation of choice is 24-hr urinary chloride

• BP can be normal or reduced.

Incorrect Options:

Options B, C & D

• Hearing is normal because of the normal chloride channel in Gitelman syndrome.

• Hypokalemic metabolic alkalosis

• Gitelman syndrome is a defect in Na - Cl co-transporter and TRPM6 transporter in DCT and not Na-K-2Cl co-transporter

Solution for Question 5:

Correct Option D - Indomethacin:

• Bartter syndrome is a rare genetic disorder characterized by electrolyte imbalances, including renal salt wasting, leading to hypokalemia, metabolic alkalosis, and hypercalciuria. Indomethacin, a nonsteroidal anti-inflammatory drug (NSAID), is commonly used in the treatment of Bartter syndrome due to its ability to inhibit prostaglandin synthesis, thereby reducing renal salt wasting and helping to correct the electrolyte imbalances. It also helps in reducing urinary calcium excretion, which can prevent nephrocalcinosis and renal rickets.

Incorrect Options:

Option A - Furosemide: Furosemide is a loop diuretic commonly used to treat conditions of fluid overlo ad by promoting diuresis. However, it is not typically used in the treatment of Bartter syndrome as it ca n exacerbate electrolyte imbalances.

Option B - Hydrochlorothiazide: Hydrochlorothiazide is a thiazide diuretic that promotes diuresis by inhi biting sodium reabsorption in the distal convoluted tubule. While it may be used in some forms of Bartt er syndrome to reduce calcium excretion, it is not the first-line treatment.

Option C - Spironolactone: Spironolactone is a potassium-sparing diuretic that acts by antagonizing ald osterone receptors, leading to increased potassium retention and decreased sodium retention. It is not typically used in the treatment of Bartter syndrome.

Solution for Question 6:

Correct Option C - Amiloride:

• Amiloride is a potassium-sparing diuretic that directly inhibits the epithelial sodium channel (ENaC) in the distal nephron, leading to decreased sodium reabsorption and potassium retention. It is indicated for the management of hypokalemia and metabolic alkalosis, particularly in conditions associated with low renin levels, such as primary aldosteronism.

Incorrect Options:

Option A - ACE inhibitor: ACE inhibitors are not indicated in this case. They are typically used in conditi ons such as hypertension and heart failure, but they would not address the underlying cause of hypoka lemia and metabolic alkalosis with low renin levels.

Option B - Beta-blocker: Beta-blockers are not indicated in this case. While they are used to manage h ypertension, they would not correct hypokalemia and metabolic alkalosis.

Option D - Thiazide diuretic: Thiazide diuretics are contraindicated in this case. They can exacerbate h ypokalemia and metabolic alkalosis by promoting potassium loss in the urine. Therefore, they are not a ppropriate for the management of this patient's condition.

Solution for Question 7:

Correct Option B - a,d:

• a)Urine output>3L/day-Polyuria

• d)Miller Moses test which is a Water deprivation test is used for the evaluation of diabetes insipidus.

Incorrect Options:

Option A - b,c:

• b) First line drug for central diabetes insipidus is Desmopressin and not Indomethacin

• c) Diabetes insipidus leads to reduced Urine Osmolarity and increased Plasma Osmolarity

Option C & D - (a,c & b,d): Refer to the explanation of the correct answer.

Solution for Question 8:

Correct Option D
- Liddle syndrome is the only exception which is treated with Amiloride and not Indomethacin.

Incorrect Options:

All the remaining options are the conditions that can be treated with indomethacin

Option A - Patent ductus arteriosus

Option B - Acute Gout

Option C - Bartter syndrome

Solution for Question 9:

Correct Option C
- Decreased urine osmolarity, decreased plasma osmolarity, and decreased sodium concentration:

• Psychogenic polydipsia is characterized by excessive intake of water due to psychological factors, leading to dilutional hyponatremia. In this condition, the excess intake of water dilutes the plasma, resulting in decreased plasma osmolarity. The kidneys respond by excreting the excess water, causing decreased urine osmolarity. Additionally, the excessive water intake can lead to a decrease in sodium concentration in the blood due to dilutional effects. Therefore, the most likely laboratory findings in psychogenic polydipsia are decreased urine osmolarity, decreased plasma osmolarity, and decreased sodium concentration.

Incorrect Options:

Option A - Increased urine osmolarity, decreased plasma osmolarity, and decreased sodium concentra tion: This option describes findings more consistent with diabetes insipidus, where there is impaired wa ter reabsorption leading to increased urine osmolarity and decreased plasma osmolarity and sodium co ncentration.

Option B - Decreased urine osmolarity, increased plasma osmolarity, and increased sodium concentrat ion: These findings are not typical of any specific condition and do not match the characteristics of psyc hogenic polydipsia.

Option D - Increased urine osmolarity, increased plasma osmolarity, and increased sodium concentrati on: This combination of findings is not typical of psychogenic polydipsia. Increased osmolarity and sodi um concentration are more commonly associated with conditions such as dehydration or syndrome of i nappropriate antidiuretic hormone secretion (SIADH).

Ciliopathies, Kidney Injury and TTP

1. Which of the following findings are seen on excretory urography in a patient with medullary sponge kidney disease?

A. Flower vase appearance

B. Swiss cheese appearance

C. Bergman sign

D. Bouquet of flowers

---

2. Cilia is present in all of the following parts of the kidney except?

A. PCT

B. Loop of Henle

C. DCT

D. Collecting duct

---

3. A 2-day-old neonate was found dead in the neonatal ward. The child was delivered after an LSCS two days back. The mother's antenatal checkup and history showed an AFI of 5. A review of antenatal USG reports showed an enlarged and echogenic kidney of the fetus. The lungs are also noted to be hypoplastic.Which of the following statement is not true regarding this patient?

(or)

Which of the following statement is not true regarding ARPKD?

A. PKD-1 gene on Chromosome 16

B. Polyductin is the defective protein

C. It is an Autosomal recessive condition

D. Can be picked up on Antenatal level 2 scan

---

4. Which of the following is not an extra-renal manifestation of Autosomal recessive polycystic kidney disease?

A. Congenital hepatic periportal fibrosis

B. Caroli cysts

C. Pancreatic cysts

D. Biliary dysgenesis

---

5. Which of the following genes is not involved in Autosomal dominant tubulointerstitial kidney disease?

A. MCKD-1

B. UMOD

C. MUCIN-1

D. MCKD -3

---

6. Which of the following is not an extra-renal manifestation of ADPKD?

A. Tricuspid regurgitation

B. Berrys aneurysm

C. GI diverticulosis

D. Caroli cysts.

---

7. A 55-year-old male presents to the clinic with complaints of recurrent episodes of flank pain over the past few months. Upon further questioning, he mentions a family history of kidney problems, with his father having been diagnosed with renal cysts. Physical examination reveals bilateral tenderness at the costovertebral junction. Laboratory investigations show a mildly elevated serum creatinine level. Which of the following is true regarding the genetic cause of this condition?

(or)

Which of the following genetic defect cause Adult polycystic kidney disease?

A. PKD -1 GENE encoding for protein POLYCYSTIN-1 on chromosome 16

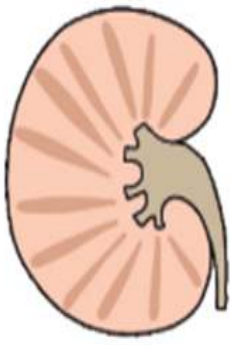
B. PKD -2 GENE encoding for protein POLYCYSTIN-2 related to chromosome 14

C. PKD -2 GENE encoding for protein POLYCYSTIN-2 related to chromosome 12

D. PKD -1 GENE encoding for protein POLYCYSTIN-1 on chromosome 18

---

8. Which of the following is cystic disorders is associated with the appearance of the kidney given below?



A. Autosomal dominant polycystic disease

B. Autosomal recessive polycystic disease

C. Medullary sponge kidney

D. Autosomal dominant tubulo interstitial kidney disease

---

9. Which of the following statements regarding extrarenal manifestations of autosomal dominant polycystic kidney disease (ADPKD) is correct?

A. Lung cysts are commonly seen in ADPKD patients

B. Brain parenchyma is frequently affected by cyst formation in ADPKD

C. Arachnoid cysts are not associated with ADPKD

D. Mitral valve prolapse with mid-systolic clicks

---

10. Which of the following is a lab finding in Prenal AKI?

A. FeNa>1%

B. Urine Osmolarity>500mOsmol

C. Urinary sodium-High

D. Tubular damage

---

11. Match the following SET 1 1)Tumor lysis syndrome 2) Contrast-induced nephropathy 3)Ethylene glycol poisoning SET 2 a)FomepizoleFomepizole b)Rasburicase c) N-Acetylcysteineiene

A. 1-a,2-c,3-b

B. 1-c,2-a,3-b

C. 1-a,2-b,3-c

D. 1-b,2-c,3-a

---

12. All of the following are the electrolyte disturbances observed in patient with tumor lysis syndrome on cancer therapy except?

A. Hyperkalemia

B. Hypernatremia

C. Hyperphosphatemia

D. Hypocalcemia

---

13. Match the following 1. Orange color urine a. Phenophthalene 2. Blue/green-color urine b. Nitrofurantoin 3. Red colored urine c. Rifampicin 4. Purple color urine d. Amitriptyline 5. Dark brown color urine e. Crush injury

1. Orange color urine	a. Phenophthalene
2. Blue/green-color urine	b. Nitrofurantoin
3. Red colored urine	c. Rifampicin
4. Purple color urine	d. Amitriptyline
5. Dark brown color urine	e. Crush injury

A. 1-c,2-d,3-e,4-a,5-b

B. 1-a,2-c,3-b,4-d,5-e

C. 1-b,2-e,3-a,4-a,5-d

D. 1-e,2-a,3-d,4-b,5-c

---

14. Which of the following describes the correct definition of CKD according to the old protocol?

A. GFR < 70 ml/min/1.73m² surface area with proteinuria X 6 months

B. GFR < 60 ml/min/1.73m² surface area with proteinuria X 3 months

C. GFR < 40 ml/min/1.73m² surface area with proteinuria X 6months

D. GFR < 960 ml/min/1.73m² surface area with proteinuria X 3 months

---

15. A 15-year-old boy presented to the outpatient department with complaints of abdominal pain, and vomiting episodes since the past few days. He was admitted to the inpatient ward. and started on empirical antibiotics.. Cultures showed E.coli . Further tests showed anemia, thrombocytopenia and helmet cells on peripheral smear, and increased levels of BUN. Identify the diagnosis and mark the option with the treatment choice that is not recommended for this disease.

A. Hemodialysis

B. Plasmapheresis

C. PRBC

D. Eculizumab

---

16. Which of the following antiplatelet drugs is associated with an increased risk of thrombotic thrombocytopenic purpura (TTP)?

A. Aspirin

B. Clopidogrel

C. Ticagrelor

D. Dipyridamole

---

17. A 45-year-old woman presents to the oncology clinic for follow-up after receiving chemotherapy for breast cancer. During the treatment course, she developed symptoms suggestive of thrombotic thrombocytopenic purpura (TTP). Which of the following chemotherapeutic agents is most likely responsible for inducing secondary TTP in this patient?

(or)

Which of the following chemotherapeutic agents is most likely responsible for inducing secondary TTP in this patient?

A. Doxorubicin

B. Methotrexate

C. Mitomycin C

D. Paclitaxel

---

18. A 7-year-old child is brought to the pediatric clinic with complaints of abdominal pain, vomiting, and bloody diarrhea for the past two days. On examination, the child appears pale, with petechiae and non-palpable purpura on the skin. Laboratory tests reveal decreased platelet count, normal fibrinogen

levels, and schistocytes on peripheral blood smear. Ultrasound examination of the kidneys shows normal echogenicity with bilateral kidney sizes within the normal range. Which of the following conditions is most likely responsible for the patient's presentation?

(or)

Which of the following is associated with decreased platelet count, normal fibrinogen levels, and the presence of schistocytes on peripheral blood smear?

A. Hemolytic Uremic Syndrome (HUS)

B. Thrombotic Thrombocytopenic Purpura (TTP)

C. Disseminated Intravascular Coagulation (DIC)

D. Hemorrhagic Stroke

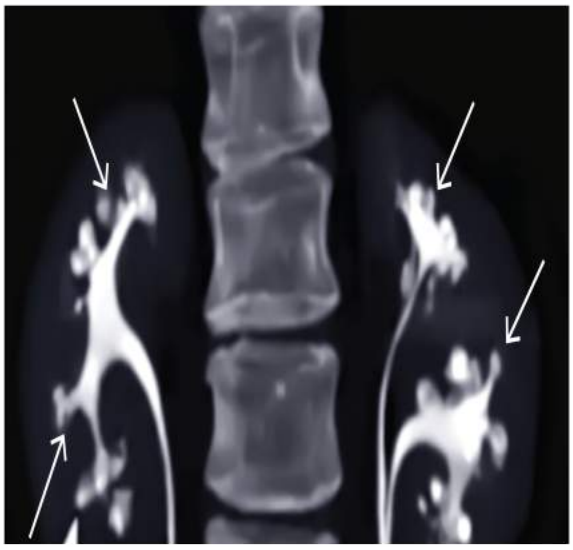
Correct Answers

Question	Correct Answer
Question 1	4
Question 2	2
Question 3	1
Question 4	3
Question 5	4
Question 6	4
Question 7	1
Question 8	2
Question 9	4
Question 10	2
Question 11	4
Question 12	2
Question 13	1
Question 14	2
Question 15	2
Question 16	2
Question 17	3
Question 18	1

Solution for Question 1:

Correct Option D - Bouquet of flowers/ Paintbrush/ Papillary brush appearance:

• On excretory urography in patients with medullary sponge kidney disease, bouquet of flowers/paint brush/papillary brush appearance is seen.



Incorrect Options:

Option A - Flower vase appearance:

Horseshoe Kidney

• Most common fusion anomaly in kidney

• Inferior poles of the kidney are medially located (B/L) and are fused: “flower vase/shaking hand calyces”

• Fused segment is referred as “Isthmus”

Option B - Swiss-cheese appearance: This is seen in ADPKD

Option C - Bergman sign: Coiling of catheter seen in carcinoma of renal pelvis

Solution for Question 2:

Correct Option B - Loop of Henle:

Incorrect Options:

Option A - PCT

Option C - DCT

Option D - Collecting duct

Solution for Question 3:

Correct Option A - PKD-1 gene on Chromosome 16:

• The diagnosis is ARPKD

• Underdeveloped lungs, enlarged kidneys, oligohydramnios, death → Potter sequence → Autosomal Recessive Polycystic Kidney Disease (ARPKD)

• ARPKD-The gene is PKHD 1, related to chromosome 6 not 16

Incorrect Options:

Option B, C & D:

• Polyductin is the defective protein

• It can be picked up on Antenatal level 2 scan

• It is an Autosomal recessive condition.

Solution for Question 4:

Correct Option C - Pancreatic cysts:

• Pancreatic cysts are an extra-renal manifestation of ADPKD and not ARPKD

Incorrect Options:

Option A - Congenital hepatic periportal fibrosis

Option B - Caroli cysts

Option D - Biliary dysgenesis

• Options A, B and D are incorrect. Refer to the explanation of the correct option.

Solution for Question 5:

Correct Option D - MCKD -3:

• Autosomal dominant tubulointerstitial kidney disease(ADTKD) formerly known as medullary cystic kidney disease, is associated with mutations in MCKD 1 and 2, not MCKD 3.

Incorrect Options:

Option A - MCKD-1

Option B - UMOD

Option C - MUCIN-1

• Refer to the explanation of the correct answer and the learning objective.

Solution for Question 6:

Correct Option D - Caroli cysts:

• Caroli cysts are found in ARPKD and not ADPKD.

Incorrect Options:

Option A - Tricuspid regurgitation

Option B - Berrys aneurysm

Option C - GI diverticulosis

Solution for Question 7:

Correct Option A - PKD -1 GENE encoding for protein POLYCYSTIN-1 on chromosome 16:

• Autosomal dominant polycystic kidney disease (ADPKD) is a genetic disorder characterized by the formation of numerous cysts in the kidneys. These cysts can lead to enlarged kidneys, which may fill up the abdomen and extend into the pelvis. Due to the extensive cyst formation, peritoneal dialysis may not be feasible as a treatment option for managing renal failure in these patients.

• In terms of genetics, ADPKD is associated with mutations in two main genes: PKD1 gene, located on chromosome 16, which encodes for the protein polycystin-1. PKD2 gene, located on chromosome 4, which encodes for the protein polycystin-2.

• PKD1 gene, located on chromosome 16, which encodes for the protein polycystin-1.

• PKD2 gene, located on chromosome 4, which encodes for the protein polycystin-2.

• Mutations in either of these genes can result in the development of ADPKD, with PKD1 mutations being more common and associated with a more severe disease phenotype compared to PKD2 mutations.

• PKD1 gene, located on chromosome 16, which encodes for the protein polycystin-1.

• PKD2 gene, located on chromosome 4, which encodes for the protein polycystin-2.

Incorrect Options:

Option B, C and D are incorrect

• ADPKD is associated with PKD1 gene, located on chromosome 16, which encodes for the protein polycystin-1 and PKD2 gene, located on chromosome 4, which encodes for the protein polycystin-2. All the other options are incorrect

Solution for Question 8:

Correct Option B - Autosomal recessive polycystic disease:

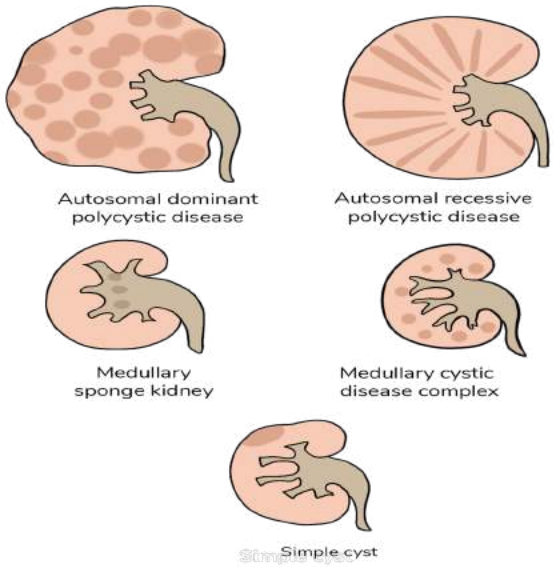
• Radial striations beginning in the calyces are seen in Autosomal recessive polycystic disease

Incorrect Options:

Option A - Autosomal dominant polycystic disease: Large cysts present in the cortex and medulla

Option C - Medullary sponge kidney: The cyst is only present in the medulla

Option D - Autosomal dominant tubulo interstitial kidney disease: The cysts are present at the cortex m edullary junction also known as medullary cystic disease complex



Solution for Question 9:

Correct Option D - Mitral valve prolapse with mid-systolic clicks:

• Mitral valve prolapse (MVP) with mid-systolic clicks is a well-known cardiovascular manifestation of autosomal dominant polycystic kidney disease (ADPKD). This is due to the connective tissue abnormalities associated with ADPKD, which can affect the structure and function of the heart valves. MVP is characterized by the abnormal movement of the mitral valve leaflets during systole, often accompanied by characteristic mid-systolic clicks heard on auscultation.

Incorrect Options:

Option A - Lung cysts are not commonly seen in ADPKD patients: While ADPKD primarily affects the ki dneys, cyst formation can also occur in other organs such as the liver, pancreas, and spleen, but lung cysts are not a typical extrarenal manifestation.

Option B - Brain parenchyma is not frequently affected by cyst formation in ADPKD: While ADPKD can lead to intracranial manifestations such as arachnoid cysts and cerebral aneurysms, cyst formation wit hin the brain parenchyma itself is not a common feature of the disease.

Option C - Arachnoid cysts are indeed associated with ADPKD: Arachnoid cysts, cerebral aneurysms, and arterial dolichoectasia are among the central nervous system (CNS) features that can occur in AD PKD patients. Therefore, this statement is incorrect.

Solution for Question 10:

Correct Option B - Urine Osmolarity>500mOsmol:

• Urine Osmolarity>500mOsmol is a finding in pre renal AKI

• Remaining options are lab findings of RENAL AKI

Solution for Question 11:

Correct Option D - 1-b,2-c,3-a:

• a) Fomepizole is used as an antidote for Ethylene glycol poisoning

• b) Rasburicase is used in the treatment of tumor lysis syndrome

• c) N-Acetylcysteine is used in the management of Contrast-induced nephropathy

Incorrect Options A,B,C- Refer to the above explanation

Solution for Question 12:

Correct Option B- Hypernatremia:Hypernatremia is not seen in tumor lysis syndrome

Incorrect Options- A,C &D; (Hyperkalemia, Hyperphosphatemia & Hypocalcemia): All are seen in tumor lysis syndrome

Solution for Question 13:

Correct Option A- 1-c,2-d,3-e,4-a,5-b:

Incorrect Options:

Option B- 1-a,2-c,3-b,4-d,5-e:

Option C- 1-b,2-e,3-a,4-a,5-d:

Option D- 1-e,2-a,3-d,4-b,5-c:

Eliminated by the explanation of the above options

Solution for Question 14:

Correct Option B - GFR < 60 ml/min/1.73m² surface area with proteinuria X 3 months:

• GFR < 60 ml/min/1.73m² surface area with proteinuria X 3 months was used to describe CKD before the newer classifications based on eGFR were widely adopted.identifies the disease when 50% of damage has already occurred.

Incorrect Options:

Option A, C, D - Refer to the above explanation

Solution for Question 15:

Correct Option B - Plasmapheresis:

• The diagnosis is Hemolytic Uremic Syndrome.

• The predominance of gastrointestinal symtpoms, culture demonstrating E. coli, anemia, thrombcytopenia, schistocytes and increased levels of BUN points towards a diagnosis of Hemolytic Uremic Syndrome.

• Plasmapheresis is used in TTP, not HUS.

Incorrect Options:

Options A, C, and D: Are treatment modalities in patients with HUS.

Solution for Question 16:

Correct Option B - Clopidogrel:

• Thrombotic thrombocytopenic purpura (TTP) can be triggered by various factors, including certain medications. Among antiplatelet drugs, clopidogrel has been associated with an increased risk of TTP. Clopidogrel, a thienopyridine derivative, inhibits platelet aggregation by irreversibly binding to the P2Y12 adenosine diphosphate (ADP) receptor on platelets. However, its use has been linked to the development of TTP, likely due to its impact on platelet function and the risk of microthrombi formation.

Incorrect Options:

Option A - Aspirin: Aspirin is not associated with an increased risk of TTP.

Option C - Ticagrelor: Ticagrelor, a P2Y12 receptor antagonist, has not been specifically linked to TTP.

Option D
- Dipyridamole: Dipyridamole, another antiplatelet agent, is not commonly associated with TTP.

Solution for Question 17:

Correct Option C - Mitomycin C:

• Secondary TTP can be induced by certain chemotherapeutic agents, including Mitomycin C and Gemcitabine. These drugs can cause endothelial damage and trigger the formation of autoantibodies against ADAM TS 13, leading to impaired cleavage of von Willebrand factor (VWF) and subsequent TTP. In this case, the patient's presentation of TTP following chemotherapy suggests that Mitomycin C is the likely culprit.

Incorrect Options:

Option A - Doxorubicin: Doxorubicin is not typically associated with the development of TTP.

Option B - Methotrexate: Methotrexate is more commonly associated with mucositis and myelosuppres sion rather than TTP.

• Option D - Paclitaxel: Paclitaxel is not known to induce secondary TTP.

Solution for Question 18:

Correct Option A - Hemolytic Uremic Syndrome (HUS):

• HUS typically presents with abdominal pain, vomiting, bloody diarrhea, and features of microangiopathic hemolytic anemia (e.g., petechiae, purpura).

• Laboratory findings in HUS include decreased platelet count, normal fibrinogen levels, and the presence of schistocytes on peripheral blood smear.

• Ultrasound examination of the kidneys in HUS typically shows normal echogenicity with bilateral kidney sizes within the normal range.

• HUS is commonly seen in pediatric age groups and is often triggered by gastrointestinal infections, especially those caused by certain strains of E. coli producing Shiga toxin.

Incorrect Options:

Option B - Thrombotic Thrombocytopenic Purpura (TTP): While TTP shares some similarities with HUS , such as the presence of microangiopathic hemolytic anemia and thrombocytopenia, it is typically asso ciated with low or absent levels of ADAMTS13 enzyme and may present with neurologic symptoms. Ad ditionally, kidney involvement in TTP is less common than in HUS.

Option C - Disseminated Intravascular Coagulation (DIC): DIC is characterized by systemic activation o f coagulation, leading to the widespread formation of fibrin clots in the microvasculature. Laboratory fin dings in DIC often include low platelet count, low fibrinogen levels, prolonged clotting times, and eviden ce of ongoing coagulation and fibrinolysis. While DIC can present with bleeding manifestations, it typic ally does not manifest with specific renal findings seen in HUS.

Option D - Hemorrhagic Stroke: This option is less likely given the absence of focal neurological deficit s or signs suggestive of a cerebrovascular event in the clinical presentation described. HUS and TTP a re more commonly associated with microvascular thrombosis and hemolysis rather than hemorrhagic s troke.

Kidney Urine Analysis

1. A 50-year-old woman presents to her primary care physician with complaints of frequent urination and abdominal discomfort. During the physical examination, the physician performs a dipstick test on the patient's urine sample, which reveals a result of 3+ for proteinuria. Based on the dipstick test result, what is the approximate protein concentration in the patient's urine?

(or)

What is the approximate protein concentration in the patient's urine if proteinuria in dipstick shows 3+?

A. 15-30 mg/dl

B. 30-100 mg/dl

C. 100-300 mg/dl

D. 300-1000 mg/dl

---

2. Identify the stage of acute kidney injury with the help of the given values of serum creatine 2.5 times its original value and urine output<0.5ml/kg/hr over a duration of 12 hours.

A. Stage 1

B. Stage 2

C. Stage 3

D. Stage 4

---

3. Identify the condition that is not associated with (AER) /(UAC) ratio of 100 mg/gm.

A. Diabetic nephropathy

B. HTN

C. Multiple myeloma

D. Glomerulonephritis

---

4. Identify the condition that is not associated with severely increased albuminuria.

A. Fever

B. CHF

C. Diabetic nephropathy

D. Para proteinuria

---

5. Using the image below, identify the condition and mark the option that is not its causative factor.

A. Amyloidosis

B. Focal segmental glomerulosclerosis

C. Para-proteinuria

D. Membrano-glomerulonephritis

---

6. Which of the following is an appropriate screening test for Multiple myeloma"?

A. Bone marrow biopsy

B. Urine dipstickX-ray

C. Urine electrophoresis

D. Blood investigations

---

7. All of the following causes pink/red colored urine except?

A. Porphyrins

B. Rifampin

C. Clofazimine

D. Chloroquine

---

8. The stain that is used to evaluate Eosinophiluria?

A. Sternheimer and Malbin staining

B. Wright and Hansel's stain

C. Hematoxylin and eosin stain

D. Sternheimer staining

---

9. Amount of protein in the urine of a normal individual?

A. 150mg/day

B. 250mg/day

C. 190mg/day

D. 200mg/day

---

10. Which of the following statements is true regarding significant hematuria.

A. >10RBC/ HPF

B. >3 RBC/ HPF centrifuged x 3 times; a gap of 1-week

C. > 100 RBC /HPF in single sample

D. >150 RBC/HPF

---

11. A 45-year-old male patient presents to the nephrology clinic with complaints of dark-colored urine and swelling in his legs. Urine microscopy reveals the presence of RBC casts. What is the most likely diagnosis for this patient based on the presence of RBC casts in the urine?

(or)

What is the most likely diagnosis for this patient based on the presence of RBC casts in the urine?

A. Acute glomerulonephritis

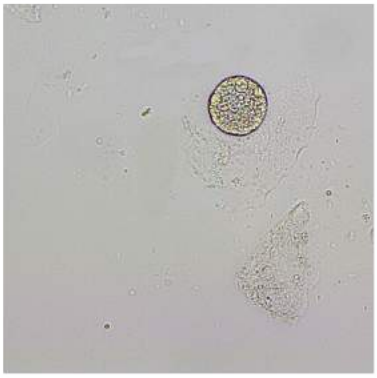
B. Chronic glomerulonephritis

C. Acute tubular necrosis

D. Chronic kidney disease

---

12. Using the image below, identify the condition which is not associated with it.



A. Nephrotic syndrome

B. Fat embolism

C. Chyluria

D. Pyelonephritis

---

13. A 7-month-old infant is brought to the pediatrician's office by her parents due to concerns about the color of her urine. The parents report noticing a pinkish discoloration of the infant's diapers for the past few days. Which of the follwoing organism is causeing this?

(or)

Which of the following organisms is likely causing the pinkish discoloration of the infant's diapers?

A. Serratia marcescens

B. Escherichia coli

C. Staphylococcus aureus

D. Streptococcus pneumoniae

---

14. A 60-year-old male patient with a history of hypertension and diabetes mellitus presents to the emergency department with complaints of decreased urine output and generalized weakness. Urinalysis reveals the presence of muddy brown casts. What is the most likely diagnosis based on these findings?

(or)

Presence of muddy brown casts is seen in?

A. Acute kidney injury (AKI) due to acute tubular necrosis (ATN)

B. Chronic kidney disease (CKD) exacerbation

C. Urinary tract infection (UTI)

D. Nephrotic syndrome

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	2
Question 3	3
Question 4	3
Question 5	3
Question 6	3
Question 7	4
Question 8	2
Question 9	1
Question 10	3
Question 11	1
Question 12	4
Question 13	1
Question 14	1

Solution for Question 1:

Correct Option D - 300 - 1000 mg/dl:

• A dipstick result of 3+ for proteinuria indicates a significant amount of protein in the urine.

• According to the provided dipstick test scale, 3+ corresponds to a protein concentration range of 300-1000 mg/dl.

• This level of proteinuria suggests potential kidney dysfunction or another underlying condition affecting the urinary system.

Incorrect Options:

Option A - 15-30 mg/dl: This range corresponds to trace proteinuria on the dipstick test, which is less th an the patient's observed proteinuria level.

Option B - 30-100 mg/dl: This range represents 1+ proteinuria on the dipstick test, which is lower than t he observed proteinuria level.

Option C - 100-300mg/dl: This range corresponds to 2+proteinuria on the dipstick test, indicating a higher protein concentration than observed in this case.

Solution for Question 2:

Correct Option B - Stage 2:

• The vignette describes a stage II AKI according to the AKIN(Acute Kidney Injury Network) classification of AKI. Refer to the learning objective for the full classification.

Incorrect Options:

Solution for Question 3:

Correct Option C - Multiple myeloma:

• Albumin excretion rate (AER) /Urinary albumin creatinine (UAC) ratio of 30-300 mg/gm = Moderately increased albuminuria (earlier known as Microalbuminuria)

• Multiple myeloma is associated withseen in severely increased albuminuria.

Incorrect Options: Eliminated by the explanation of the above options

Solution for Question 4:

Correct Option C - Diabetic nephropathy:

• Albumin excretion rate (AER) /Urinary albumin creatinine (UAC) ratio is 300 mg–3500 mg per gram/gm/g of urinary creatinine (U.C) is considered S severely increased albuminuria (earlier known as Macroalbuminuria)

• Diabetic nephropathy is associated with moderately increased albuminuria

Incorrect Options: All the other options show Severely increased albuminuria

Solution for Question 5:

Correct Option C - Para-proteinuria is the odd option here:

• The image shows frothy and yellow-colored urine with proteinuria(turns yellow on-air exposure

• Albumin excretion rate (AER) /Urinary albumin creatinine (UAC) ratio is >3500 mg /gm = Nephrotic Range proteinuria

• Paraproteinuria, seen in multiple myeloma is more commonly associated with ‘severely increased albuminuria’ rather than nephrotic range proteinuria. Patients with multiple myeloma who develop nephrotic range proteinuria usually have a coexisting disorder such as amyloidosis.

• Note - The urine dipstick test is good at picking up the presence of negatively charged proteins such as albumin, but is not effective when it comes to picking up positively charged paraproteins. Hence, Urine dipstick might be falsely negative in patients with multiple myeloma.

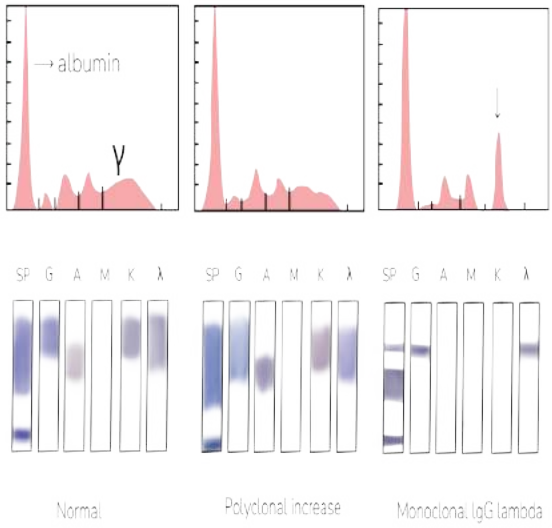
Incorrect Options: Eliminated by the explanation of the above option

Options A, B, and D - Are associated with nephrotic range proteinuria.

Solution for Question 6:

Correct Option C - Urine electrophoresis:

• Screening Test for Multiple myeloma: Urine Electrophoresis showing an M-Spike.



• Note - The urine dipstick test is good at picking up the presence of negatively charged proteins such as albumin, but is not effective when it comes to picking up positively charged paraproteins. Hence, Urine dipstick might be falsely negative in patients with multiple myeloma.

Incorrect Options:

Options A, B and D - Are inappropriate ‘screening tests’ in patients with multiple myeloma. Refer to the explanation of the correct answer.-eliminated by the explanation of the above options.

Solution for Question 7:

Correct Option D - Chloroquine:

• Chloroquine causes brown-coloured urine.

Incorrect Options:

Options A, B, and C cause pink/ red colored urine.

Solution for Question 8:

Correct Option B - Wright and Hansel's stain:

• Wright and Hansel's stain is used to evaluate eosinophilia

Incorrect Options:

Option A - Sternheimer and Malbin staining: Used to stain urine sediments

Option C - Hematoxylin and eosin stain: This is a regular stain used in histopathology slides

Option D - Sternheimer staining: Used to stain urine sediments

Solution for Question 9:

Correct Option A - 150mg/day:

Proteins in urine

• The protein present in the urine of a normal individual: <150mg/day

• ~30 mg or <30 mg of this 150 mg/day is albumin from the glomerulus. Protein Glomerulus: Albumin (<30mg/day)

• Protein Tubules: Tamm Horsfall proteins/ Uromodulin (120mg/day)

• From the tubules(ascending limb of Henle) produces Tamm Horsfall protein/Uromodulin. This contributes to 120 mg/day of the total 150 mg/day.

Incorrect Options:

Options B, C, and D: Are incorrect. Refer to the explanation of option A.

Solution for Question 10:

Correct Option C - > 100 RBC /HPF in single sample:

• Normally <3 RBC/HPF

• Significant / Persistent haematuria >5 RBC/ HPF centrifuged specimen x 3 times; at an interval of 1 week (or) > 100 RBC /HPF in single sample

• >5 RBC/ HPF centrifuged specimen x 3 times; at an interval of 1 week (or)

• > 100 RBC /HPF in single sample

• >5 RBC/ HPF centrifuged specimen x 3 times; at an interval of 1 week (or)

• > 100 RBC /HPF in single sample

Solution for Question 11:

Correct Option A - Acute glomerulonephritis:

• RBC casts in the urine are a characteristic finding in acute glomerulonephritis, a condition characterized by inflammation of the glomeruli in the kidneys.

• The presence of RBC casts indicates bleeding within the glomeruli, which is a hallmark feature of acute glomerulonephritis.

• This condition typically presents with symptoms such as dark-colored urine (hematuria), swelling in the legs (edema), and hypertension

Incorrect Options:

Option B - Chronic glomerulonephritis: Muddy brown casts are typically seen in acute tubular necrosis, not acute glomerulonephritis.

Option C - Acute tubular necrosis: Broad casts are associated with chronic kidney disease (CKD), not acute glomerulonephritis.

Option D - Chronic kidney disease: Granular waxy casts are commonly observed in chronic glomerulon ephritis, but acute glomerulonephritis is more likely in this case due to the presence of RBC casts.

Solution for Question 12:

Correct Option D - Pyelonephritis:

• The image shows an oval fat body in urine on exposure to polarized light.

The image shows an oval fat body in urine on exposure to polarized light.

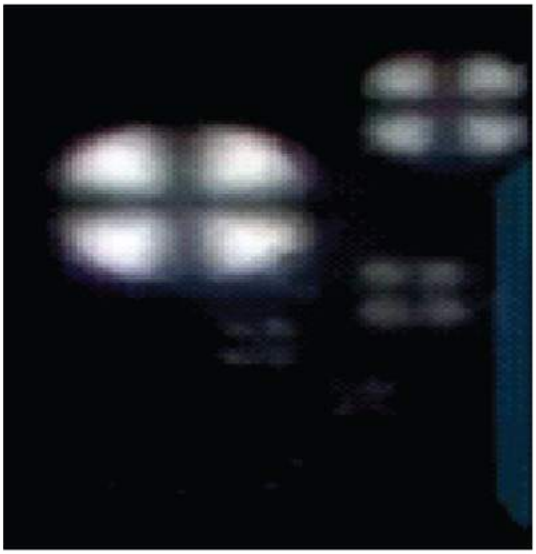
Fat in urine / Oval fat bodies are found in

1. Nephrotic syndrome

2. Fat embolism syndrome

3. Chyluria

• Maltese cross appearance in urine is associated with nephrotic syndrome and Fabry's disease (alpha-galactosidase deficiency)



Incorrect Options:

Options A, B, and C: Are associated with oval light bodies in urine on polarized light microscopy.

Solution for Question 13:

Correct Option A - Serratia marcescens:

• Serratia marcescens is known to cause a phenomenon known as the "pink diaper syndrome." This condition occurs when the bacteria produce a red pigment, resulting in pinkish discoloration of diapers. It is typically benign and self-limiting, often resolving without the need for treatment.

Incorrect Options:

Option B - Escherichia coli: While E. coli can cause urinary tract infections and hematuria in infants, it i s not associated with the specific pink diaper syndrome described in the scenario.

Option C - Staphylococcus aureus: Staphylococcus aureus infections can lead to various clinical manif estations, but it is not typically associated with pinkish discoloration of diapers.

Option D - Streptococcus pneumoniae: Streptococcus pneumoniae infections are primarily respiratory i n nature and are not typically associated with urinary or diaper-related symptoms.

Solution for Question 14:

Correct Option A - Acute kidney injury (AKI) due to acute tubular necrosis (ATN):

• Muddy brown casts are indicative of renal tubular epithelial cell casts, which are commonly seen in acute tubular necrosis (ATN). ATN is a type of acute kidney injury characterized by damage to the renal tubules, often caused by ischemia or nephrotoxic substances. The patient's history of hypertension and diabetes mellitus increases the risk of AKI due to ATN.

Incorrect Options:

Option B - Chronic kidney disease (CKD) exacerbation: CKD typically presents with persistent proteinuria, hypertension, and a gradual decline in kidney function over time. Muddy brown casts are not characteristic of CKD exacerbation.

Option C - Urinary tract infection (UTI): UTI may present with symptoms such as dysuria, frequency, and urgency, along with pyuria on urinalysis. Muddy brown casts are not commonly associated with UTI.

Option D - Nephrotic syndrome: Nephrotic syndrome is characterized by heavy proteinuria (>3.5 g/day), hypoalbuminemia, edema, and hyperlipidemia. While nephrotic syndrome may lead to renal pathology, muddy brown casts are not typical findings in this condition.

Chronic Kidney Disease & Management

1. Identify the Grade of GFR for CKD in a patient with-GFR ml/ min/1.73m² surface area of 45 with proteinuria.

A. Grade 1

B. Grade 2

C. Grade 3

D. Grade 4

---

2. Which is the most common cause of Chronic kidney disease?

A. Chronic glomerulonephritis

B. Diabetic nephropathy

C. Ischemic nephropathy

D. Chronic tubulointerstitial disorders

---

3. Which of the following complications is most likely to develop in a patient with chronic kidney disease (CKD) classified as Grade 4?

A. Hypertension

B. Anemia

C. Hyperkalemia

D. Uremia

---

4. Pick the option with appropriate statements regarding allogeneic renal transplantation. a) Prior Doppler showing unilateral renal artery stenosis in the donor is a contraindication b) The Right kidney of the donor is used c) The Donor's kidney is placed in the right iliac fossa of the recipient d) In recipients with 3/6 HLA match, ATG(antithymocyteglobulin) induction therapy is given.

A. A and C only

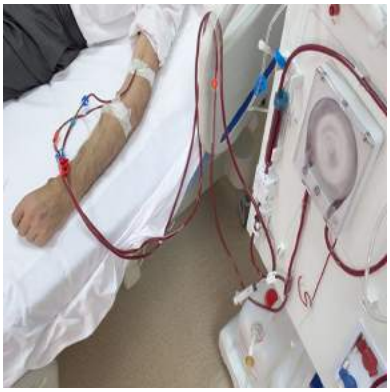
B. A and B only

C. C and D only

D. B and D only

---

5. Which of the following is not true regarding the procedure shown in the image?



A. Refractory acidosis is an indication for this therapy

B. The presence of Bruit indicates a damaged fistula

C. The principle is diffusion followed by ultrafiltration

D. Cimino Brescia fistula is between the radial artery and cephalic vein.

---

6. A 45-year-old patient with end-stage renal disease undergoes kidney transplantation. Pre-transplant testing reveals that the donor and recipient share only 3 out of 6 HLA antigens. What would be the appropriate induction therapy for this patient to prevent graft rejection?

(or)

What would be the appropriate induction therapy for this patient to prevent graft rejection in a patient with a mismatch of 3 out of 6 HLA antigens?

A. Anti-thymocyte globulin

B. Basiliximab

C. No induction required

D. Cyclosporine

---

7. A 35-year-old male patient who underwent kidney transplantation six months ago presents to the clinic with complaints of persistent cough and shortness of breath. He reports being generally unwell and experiencing fatigue. On further investigation, bronchoalveolar lavage reveals the presence of a specific causative organism. Which opportunistic infection is most commonly responsible?

(or)

Which opportunistic infection is most common opportunistic infection responsible for the patient's symptoms six months post-kidney transplantation?

A. BK virus

B. Pneumocystis jiroveci

C. Cytomegalovirus

D. Hepatitis B

---

8. HLA inheritance of the donor and recipient is given. Pick the option with appropriate matching Donor Recipient A - 2, 29 B - 44, 8 DR - 4, 3 A - 2, 29 B - 44, 33 DR - 3, 4

Donor	Recipient
A - 2, 29B - 44, 8DR - 4, 3	A - 2, 29B - 44, 33DR - 3, 4

A. 2/6

B. 1/6

C. 3/6

D. 6/6

---

9. Best method to calculate eGFR is?

A. CKD - EPI - Cystatin C Formula

B. Creatinine clearance

C. Cockroft Gault Formula

D. Inulin clearance

---

10. Pick the option with the accurate albumin grading of CKD with 30-300mg/g of urine albumin to urine creatinine ratio?

A. A1

B. A2

C. A3

D. A4

---

11. A 65-year-old patient with a history of chronic kidney disease (CKD) presents to the clinic for a routine follow-up visit. His latest laboratory results indicate a decline in kidney function, from CKD stage G2 to G3. Which of the following changes is most likely to occur in response to this decline in kidney function?

(or)

Which of the following changes is most likely to occur in kidney function, from CKD stage G2 to G3?

A. Decreased levels of parathyroid hormone (PTH)

B. Increased bone formation

C. Decreased risk of cardiovascular morbidity

D. Calci■cation of blood vessels

---

12. What is the pathology underlying the development of dialysis dementia, a condition often seen in patients undergoing recurrent hemodialysis?

A. Accumulation of beta-amyloid in the brain

B. Deposition of tau protein aggregates in the brain

C. Increased levels of glutamate

D. Oxidative stress-induced neuronal damage.

---

13. A 40-year-old patient who underwent kidney transplantation presents with new-onset skin lesions. On further evaluation, it is determined that the patient has post-transplantation lymphoma. Which of the following infections is most commonly associated with post-transplantation lymphoma?

(or)

Which of the following infections is most commonly associated with post-transplantation lymphoma?

A. CMV (Cytomegalovirus)

B. EBV (Ebstein Barr Virus)

C. HSV (Herpes Simplex Virus)

D. HIV (Human Immunodeficiency Virus)

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	2
Question 3	3
Question 4	1
Question 5	2
Question 6	2
Question 7	1
Question 8	3
Question 9	1
Question 10	2
Question 11	4
Question 12	1
Question 13	2

Solution for Question 1:

Correct Option C - Grade 3:

• The stage of CKD described in the vignette is Grade 3

Current GFR Grading for C.K.D

• Grade 1: GFR ml/ min/1.73m² surface area is > or = to 90 with proteinuria.

• Grade 2: GFR ml /min/1.73m² surface area is 60 to 89 with proteinuria.

• Grade 3: GFR ml/ min/1.73m² surface area is 30 to 59 with proteinuria. ·

• Grade 4: GFR ml /min/1.73m² surface area is 15 to 29 with proteinuria.

• Grade 5: GFR ml/min/1.73m² surface area is < 15 with proteinuria.

• End-stage renal disease, now called Renal failure. URAEMIA occurs.

• GFR can be greater than 125 ml in patients with diabetic nephropathy initially due to Hyperfiltration.

Incorrect options A,B,C: these options are incorrect due to the above given reasons

Solution for Question 2:

Correct Option B - Diabetic nephropathy:

• Diabetic nephropathy is the most common cause of Chronic kidney disease

Solution for Question 3:

Correct Option C - Hyperkalemia:

• In chronic kidney disease (CKD) classified as Grade 4, the kidneys' function is significantly impaired, leading to various complications. Hyperkalemia, which is characterized by elevated levels of potassium in the blood, is a common complication in Grade 4 CKD. As kidney function declines, the kidneys have difficulty removing potassium from the body, resulting in its accumulation in the bloodstream. Hyperkalemia can lead to serious cardiac arrhythmias and other cardiovascular complications if not properly managed.

Incorrect Options:

Option A - Hypertension: While hypertension is a common complication in CKD, it typically develops earlier in the disease progression, often in Grade 2 CKD.

Option B - Anemia: Anemia commonly develops in later stages of CKD, typically in Grade 3 due to decreased production of erythropoietin by the kidneys.

Option D - Uremia: Uremia, or the buildup of waste products in the blood, is a severe complication of advanced CKD, typically occurring in Grade 5 CKD. It manifests with symptoms such as nausea, vomiting, fatigue, and neurological symptoms.

Solution for Question 4:

Correct Option A -

True statements a and c

a) Prior Doppler showing unilateral renal artery stenosis in the donor is a contraindication

c) The donor's kidney is extraperitoneally placed in the right iliac fossa of the recipient for ease of remo val.

Incorrect statements

b) Donor's left kidney is used not the Right kidney

d) In recipients with 3/6 HLA match, anti CD25 molecule(Basilixumab) is used for induction.

Solution for Question 5:

Correct Option B -

• The image shows the procedure of Hemodialysis

• The presence of bruit indicates a functional fistula

Incorrect Options:

Option A, C, D

Refractory acidosis is an indication for hemodialysis

The principle is diffusion followed by ultrafiltration

Cimino Brescia fistula is between the radial artery and cephalic vein.

Solution for Question 6:

Correct option B - Basiliximab:

• The appropriate induction therapy for this patient with a mismatch of 3 out of 6 HLA antigens would be using Basiliximab, an anti-CD25 monoclonal antibody. Basiliximab is indicated for patients who have a 3/6 HLA match and is used as induction therapy to prevent graft rejection. It works by inhibiting the IL-2 receptor on T cells, thereby reducing T cell activation and proliferation.

Incorrect Options:

Option A - Anti-thymocyte globulin: This option is typically reserved for patients with a mismatch of 1 out of 6 or 2 out of 6 HLA antigens.

Option C - No induction required: This option is inappropriate for patients with a mismatch of 3 out of 6 HLA antigens, as they are at increased risk of graft rejection compared to those with fewer mismatches .

Option D - Cyclosporine: Maintenance therapy includes drugs such as steroids, calcineurin inhibitors (e .g., tacrolimus or cyclosporine), mycophenolate, azathioprine, and sirolimus.

Solution for Question 7:

Option A - BK virus:

• The most common opportunistic infection responsible for the patient's symptoms six months post-kidney transplantation is BK virus (polyomavirus) infection.

Incorrect Options:

Option B - Pneumocystis jiroveci: Pneumocystis jiroveci (formerly Pneumocystis carinii) is typically see n within the first six months post-transplantation. It presents with cough and shortness of breath sympt oms and is diagnosed through bronchoalveolar lavage. Treatment involves cotrimoxazole.

Option C - Cytomegalovirus: Cytomegalovirus (CMV) infection is also common within the first six mont hs after kidney transplantation and is associated with graft failure. It typically presents with systemic sy mptoms and may affect various organs, including the lungs.

Option D - Hepatitis B: Hepatitis B and C infections are not typically considered opportunistic infections in the context of kidney transplantation. They are more commonly associated with chronic liver diseas e and may require specific antiviral therapies.

Solution for Question 8:

Correct Option C - 3/6:

• Both A-2,29 are matching in both donor and recipient

• Only B-44 is matching in both and mismatch between donor and recipient regarding DR

•

Incorrect Options:

Option A, B & D: Refer to the above explanation

Solution for Question 9:

Correct Option A - CKD - EPI - Cystatin C Formula:

Incorrect Options - B, C, D

Solution for Question 10:

Correct Option B - A2:

Incorrect Options - A, C, D

Solution for Question 11:

Correct Option D - Calci■cation of blood vessels:

• As kidney function declines from CKD stage G2 to G3, there is a disruption in calcium and phosphate homeostasis, leading to an increase in serum phosphate levels. Elevated phosphate levels contribute to the formation of calcium-phosphate complexes, which can deposit in blood vessels and other soft tissues, causing vascular calcification. This process is associated with an increased risk of cardiovascular morbidity and mortality in patients with CKD.

Incorrect Options:

Option A - Decreased levels of parathyroid hormone (PTH): In response to declining kidney function, th ere is often an increase in PTH levels due to impaired phosphate excretion and decreased activation of vitamin D. Elevated PTH levels contribute to bone resorption and release of calcium from bone.

Option B - Increased bone formation: In CKD, there is typically an imbalance in bone metabolism chara cterized by increased bone resorption due to elevated PTH levels and decreased bone formation. This imbalance can lead to bone loss and an increased risk of fractures.

Option C - Decreased risk of cardiovascular morbidity: CKD is associated with an increased risk of car diovascular disease, including hypertension, coronary artery disease, and heart failure. As kidney funct ion declines, the risk of cardiovascular morbidity typically increases due to factors such as vascular cal cification, and volume overload, and dysregulation of mineral metabolism. Therefore, a decline in kidney function would not decrease the risk of cardiovascular morbidity.

Solution for Question 12:

Correct Option A - Accumulation of beta-amyloid in the brain:

• Dialysis dementia, a condition primarily seen in patients undergoing recurrent hemodialysis, is attributed to the accumulation of beta2-microglobulin, a protein normally cleared by healthy kidneys. Beta2-microglobulin aggregates in the brain, forming insoluble beta-amyloid fibrils, similar to those observed in Alzheimer's disease. This accumulation leads to neurotoxicity and cognitive decline.

Incorrect Options:

Option B - Deposition of tau protein aggregates in the brain: This mechanism is associated with neurod egenerative diseases like Alzheimer's disease and some forms of dementia, but not specifically with di alysis dementia.

Option C - Increased levels of glutamate: Glutamate-mediated excitotoxicity is involved in various neur odegenerative conditions but is not the primary mechanism underlying dialysis dementia.

Option D - Oxidative stress-induced neuronal damage: While oxidative stress can contribute to neuron al damage in various conditions, it is not the primary cause of dialysis dementia.

Solution for Question 13:

Correct Option B - EBV (Ebstein Barr Virus):

• Post-transplantation lymphoma is most commonly associated with the Epstein-Barr virus (EBV) infection. EBV is known to cause lymphoproliferative disorders in immunocompromised individuals, such as those who have undergone solid organ transplantation. EBV-induced lymphomas can affect various organs, including the skin, and may manifest as skin lesions in transplant recipients.

Incorrect Options:

Option A - CMV (Cytomegalovirus): While cytomegalovirus (CMV) infection is also common in transplant recipients and can lead to various complications, including tissue invasive disease, it is not typically associated with post-transplantation lymphoma.

Option C - HSV (Herpes Simplex Virus): Herpes simplex virus (HSV) infection can cause skin lesions, particularly in immunocompromised individuals. However, it is not a common cause of post-transplantation lymphoma.

Option D - HIV (Human Immunodeficiency Virus): HIV infection is associated with an increased risk of various malignancies, including lymphoma. However, in the context of kidney transplantation, where the patient is likely to be immunosuppressed, HIV infection would not be the cause of post-transplantation lymphoma.

Renal Tubular Acidosis and Renal Artery Stenosis

1. Which of the following is not the cause of Renal Tubular Acidosis Type 4 ?

A. Diabetic nephropathy

B. AIDS-HIV nephropathy

C. Chronic tubulointerstitial disease

D. Scleroderma

---

2. Which of the following is not true regarding Renal tubular acidosis?

A. All Increased bicarbonates,glucose and amino acids in urine is found in RTA type 2

B. Urine anion gap is positive in all RTA

C. Nephrocalcinosis is seen in Type 4 RTA

D. Sodium bicarbonate is used as a treatment in all types of RTA

---

3. A 50-year-old patient with a history of scleroderma and recurrent kidney stones, complaints of muscle weakness and metabolic acidosis prompted further evaluation. Lab results reveal hypokalemia and nephrocalcinosis. Which type of renal tubular acidosis is this patient manifesting?

(or)

Which type of RTA is caused by scleroderma?

A. TYPE 1

B. TYPE 2

C. TYPE 3

D. TYPE 4

---

4. A 55-year-old male with a history of poorly controlled diabetes mellitus presents to the emergency department with weakness, palpitations, and muscle cramps. Laboratory tests reveal hyperkalemia and metabolic acidosis. Further investigation confirms the diagnosis of Type IV Renal Tubular Acidosis (RTA 4). Which of the following treatment options would be most appropriate to manage the underlying electrolyte abnormalities in this patient?

(or)

Which of the following treatment options would be most appropriate to manage hyperkalemia and metabolic acidosis in Type IV Renal Tubular Acidosis?

A. Fludrocortisone

B. Dietary potassium restriction

C. Furosemide

D. Sodium bicarbonate supplementation

---

5. A 42-year-old female patient presents to the nephrology clinic with complaints of fatigue, muscle weakness, and occasional palpitations. She has a history of poorly controlled hypertension despite being on medications. An ultrasound examination of the kidneys reveals asymmetric kidneys, with one kidney appearing smaller in size while the contralateral kidney appears enlarged.Which of the following is the most common cause contributing to the patient's symptoms?

(or)

Which of the following is the most common cause contributing to renal artery stenosis?

A. Atherosclerosis

B. Fibromuscular dysplasia (FMD)

C. Takayasu arteritis

D. Polyarteritis nodosa

---

6. A 55-year-old Afro-American male presents to the emergency department with severe headaches, confusion, and visual disturbances. On examination, his blood pressure is significantly elevated. Fundus examination reveals retinal hemorrhages, and laboratory investigations show evidence of microangiopathic hemolytic anemia on peripheral smear. Based on these findings, which of the following conditions is most likely responsible for the patient's presentation?

(or)

Severe hypertension, retinal hemorrhages, encephalopathy, deranged kidney function, and microangiopathic hemolytic anemia are seen in?

A. Diabetic nephropathy

B. Chronic glomerulonephritis

C. Malignant hypertension

D. Polycystic kidney disease

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	3
Question 3	1
Question 4	1
Question 5	1
Question 6	3

Solution for Question 1:

Correct Option D - Scleroderma:

• Scleroderma causes renal tubular acidosis type 1 and results in Hypokalemia

Causes of RTA TYPE 4 -Aldosterone deficiency/resistance in distal Tubule-

• Diabetic nephropathy

• AIDS - HIV nephropathy

• CTID - chronic tubulointerstitial disease

• Hypertensive Nephrosclerosis

• Resistance to the effect of aldosterone leads to Hyperkalemia ·

• Metabolic acidosis due to the inability to excrete the hydrogen ions.

Treatment

• Fludrocortisone

• Dietary potassium restriction

• Furosemide - for a short duration to cause kaliuriresis and stabilize serum potassium

• Sodium bicarbonate

Solution for Question 2:

Correct Option C - Nephrocalcinosis is seen in Type 4 RTA:

• Nephrocalcinosis is seen in Type 1 RTA and not type 4

Incorrect Options:

Option A, B & D

• Urine anion gap is positive in all types of RTA

• Sodium bicarbonate is used as a treatment in all types of RTA

• Increased bicarbonates,glucose and amino acids in urine is found in RTA type 2

Solution for Question 3:

Correct Option A - TYPE 1:

• Type 1 RTA, also known as distal renal tubular acidosis, is characterized by impaired hydrogen ion secretion in the distal convoluted tubule, leading to metabolic acidosis and inability to acidify urine.

• This condition is associated with hypokalemia due to impaired potassium reabsorption in the distal tubule, resulting in muscle weakness.

• Nephrocalcinosis, or deposition of calcium salts in the renal parenchyma, is a common complication of Type 1 RTA due to impaired tubular reabsorption of calcium.

Incorrect Options:

Option B - Type 2 RTA: This type of RTA involves impaired bicarbonate reabsorption in the proximal tu bule and is not associated with hypokalemia.

Option C - Type 3 RTA: This type is a combination of Type 1 and Type 2
RTA and is not typically associated with scleroderma or nephrocalcinosis.

Option D - Type 4 RTA: This type is characterized by impaired aldosterone production or activity, result ing in hyperkalemia rather than hypokalemia. It is not associated with scleroderma or nephrocalcinosis.

Solution for Question 4:

Correct Option A - Fludrocortisone:

• Fludrocortisone, a synthetic mineralocorticoid, is a suitable treatment option for Type IV RTA as it helps to increase renal tubular absorption of sodium and water, while promoting the excretion of potassium and hydrogen ions. This addresses the underlying aldosterone deficiency or resistance in the distal tubule, thereby improving electrolyte balance.

Incorrect Options:

Option B - Dietary potassium restriction: Dietary potassium restriction may help manage hyperkalemia t o some extent, but it does not address the underlying cause of aldosterone deficiency or resistance.

Option C - Furosemide: Furosemide, a
loop diuretic, induces kaliuresis and may exacerbate potassium imbalance in patients with RTA 4.

Option D - Sodium bicarbonate supplementation: Sodium bicarbonate supplementation may correct me tabolic acidosis, but it does not address the hyperkalemia associated with Type IV RTA.

Solution for Question 5:

Correct Option A - Atherosclerosis:

• Atherosclerosis, particularly atherosclerotic renal artery stenosis, is the most common cause of renal artery stenosis . It is often associated with poorly controlled hypertension and can lead to electrolyte imbalances such as hyperkalemia and metabolic acidosis.

Incorrect Options:

Option B - Fibromuscular dysplasia (FMD): Fibromuscular dysplasia (FMD) can also cause renal artery stenosis but is more commonly associated with young females and may present with similar symptom s. However, it is less common than atherosclerosis.

Option C - Takayasu arteritis: Takayasu arteritis is another cause of renal artery stenosis but is relativel y rare and predominantly affects Asian populations.

Option D - Polyarteritis nodosa: Polyarteritis nodosa is not a
cause of renal artery stenosis and is unrelated to Type IV Renal Tubular Acidosis (RTA 4).

Solution for Question 6:

Correct Option C - Malignant hypertension:

• The patient's symptoms, including severe hypertension, retinal hemorrhages, encephalopathy, deranged kidney function, and microangiopathic hemolytic anemia, are consistent with malignant hypertension.

• This condition is characterized by a rapid rise in blood pressure, leading to end-organ damage, particularly affecting the kidneys and brain.

• Malignant hypertension is more common in Afro-American individuals and has a high mortality rate if left untreated.

Incorrect Options:

Option A - Diabetic nephropathy: Diabetic nephropathy typically presents with gradual onset kidney dys function in patients with diabetes mellitus.

Option B - Chronic glomerulonephritis: Chronic glomerulonephritis may present with renal dysfunction but is less commonly associated with the rapid onset of severe hypertension seen in malignant hyperte nsion.

Option D - Polycystic kidney disease: Polycystic kidney disease is characterized by the presence of mu ltiple cysts in the kidneys and is not typically associated with the acute symptoms described in maligna nt hypertension.

Nephritic Syndrome & Nephrotic Syndrome

1. Which of the following is not a part of the diagnostic criteria for nephrotic syndrome?

A. Urine protein more than 2g of protein/ gram of urinary creatinine

B. Serum Albumin less than 2.5 gm%

C. Accelerated atherosclerosis

D. Oedema

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2. A 40-year-old male who is a known case of HIV came to the outpatient department with complaints of headache and frothysurinae. General examination showed that he was pale, had pedal edema and a blood pressure of 140/100 mm Hg. Lab investigations showed more than 3RBC/HPF and a deranged GFR.USG guided kidney biopsy showed segmental obliteration of glomerulus on light microscopy and effaced podocytes accompanied by its vacuolization and detachment on electron microscopy. Identify the type of Nephrotic syndrome and mark the right option?

A. Focal segmental glomerulonephrosis

B. Membranous Glomerulopathy

C. Minimal Change Disease

D. Finnish type of nephritic syndrome

---

3. A 65 year old male came to the outpatient department with a complaint of foamy urine. Examination showed puffy eyes, pedal edema and increased blood pressure. Further lab tests showed fat bodies in urine, Urine protein > 2g/gm of Urinary creatinine and Urinary protein electrophoresis reveals albumin. Identify the diagnosis and mark the option with appropriate kidney biopsy changes on electron microscopy?

(or)

Which of the following kidney biopsy changes seen on electron microscopy are associated with membranous glomerulonephropathy?

A. Effaced podocytes

B. Subepithelial deposits and spikes

C. Podocyte vacuolization

D. Effaced podocytes

---

4. A 10-year-old boy presented to the outpatient department with a complaint of puffy eyes, swelling in the scrotal area, and abnormal weight gain in the past 10 days. Investigations showed normal BUN/creatinine and increased 24-hour urine protein. Kidney biopsy revealed a normal light microscopy and podocyte effacement on electron microscopy. Identify the disease and its management.

(or)

Which of the following is the treatment option for minimal change disease?

A. Steroids

B. ARB

C. Furosemide

D. Sodium Nitroprusside

---

5. A 20-year-old male patient came to the hospital with complaints of extreme headache and dark brown colored urine for the past 10 days. The patient has a history of antibiotic therapy for his sore throat three weeks back. A kidney biopsy showed a starry sky appearance in an immunofluorescence study. Which of the following is the diagnosis of this condition?

(or)

A kidney biopsy showed a starry sky appearance in an immunofluorescence study is seen in?

A. PSGN

B. Bergers disease

C. IgA nephropathy

D. FSGS

---

6. All of the following are findings of Bergers IgA nephropathy except?

A. Renal function tests are Normal

B. BP is normal

C. C3 is normal

D. 3 weeks history of sore throat

---

7. Which of the following statements is correct about the definition of steroid dependent nephrotic syndrome?

A. Two consecutive relapses when on alternate day steroid therapy

B. Two or more relapses in the initial 6-month period

C. More than 3 relapses in any 12 months

D. Two consecutive relapses within 3 weeks of its discontinuation.

---

8. A 45-year-old male with a history of diabetes mellitus presents to the clinic with complaints of progressively worsening swelling in his legs and face over the past few weeks. On examination, you note pitting edema and facial puffiness. Laboratory investigations reveal significant proteinuria on urine dipstick testing. Further evaluation shows elevated serum lipid levels. Which of the following additional findings is most likely to be present in this patient, given his clinical presentation?

(or)

Which of the following additional findings is most likely to be present in nephrotic syndrome.?

A. Increased serum antithrombin III levels

B. Presence of oval fat bodies in urine sediment

C. Elevated serum ferritin levels

D. Decreased ceruloplasmin levels in urine

---

9. A 65-year-old female patient with a known history of diabetes and hypertension presents to the nephrology clinic with complaints of swelling in her legs and foamy urine over the past few weeks. Further evaluation reveals proteinuria with a 3.5 g/g urinary protein-to-creatinine ratio. Anti-PLA Antibody is positive. Which complications are most concerning for this patient based on her diagnosis?

(or)

Which of the following is the the complication associated with Membranous glomerulonephritis ?

A. Acute kidney injury

B. Renal vein thrombosis

C. Nephrotic syndrome

D. Urinary tract infection

---

10. A 6-year-old boy with a history of nephrotic syndrome presents to the pediatric clinic for a follow-up visit. His parents report that he has been doing well for the past few months with no signs of proteinuria or edema. However, during today's visit, his urine dipstick test shows 3+ proteinuria. Upon further investigation, it is found that this proteinuria has been present for the past three consecutive early morning specimens. What term best describes the current status of the patient's nephrotic syndrome?

(or)

Which of the following is characterized by the recurrence of proteinuria (3+ or 4+) or significant proteinuria (>40 mg/m2/h) for three consecutive early morning specimens?

A. Remission

B. Relapse

C. Frequent relapses

D. Steroid dependence

---

11. A 3-month-old male infant presents to the pediatric clinic with generalized swelling and foamy urine noticed by his parents over the past week. On examination, the infant appears edematous, with marked ascites and facial puffiness. Given the suspicion of congenital nephrotic syndrome, which of the following laboratory tests would be most appropriate to confirm the diagnosis?

(or)

Given the suspicion of congenital nephrotic syndrome, which of the following laboratory tests would be most appropriate to confirm the diagnosis?

A. Serum creatinine level

B. BUN

C. 24-hour urinary protein measurement

D. Serum electrolyte panel

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	1
Question 3	2
Question 4	1
Question 5	1
Question 6	4
Question 7	1
Question 8	2
Question 9	2
Question 10	2
Question 11	3

Solution for Question 1:

Correct Option C - Accelerated atherosclerosis:

• Accelerated atherosclerosis is not a part of diagnostic criteria for nephrotic syndrome.

Incorrect Options:

Option A, B, D are incorrect options

Solution for Question 2:

Correct Option A - Focal segmental glomerulonephrosis:

• The age , pedal edema ,hypertension and headache are some of the clues for diagnosis of FSGS.

• HIV is one of the cause for FSGS

• Electron microscopic studies showing segmental obliteration of glomerulus on light microscopy and effaced podocytes accompanied by its vacuolization and detachment on electron microscopy are characteristic of FSGS.

Incorrect Options:

All the options can be eliminated by using age as a reference

Option B - Membranous Glomerulopathy: This is seen in the age group of 60 years

Option C - Minimal Change Disease: This is seen in children

Option D - Finnish type of nephritic syndrome: This is a congenital nephrotic syndrome

Solution for Question 3:

Correct Option B - Subepithelial deposits and spikes:

The diagnosis is Membranous glomerulonephropathy

• Using the age, features of nephrotic syndrome such as fat bodies in urine, Urine protein > 2g/gm of Urinary creatinine and Urinary protein electrophoresis revealing albumin helps in the diagnosis.

• Subepithelial deposits and spikes are found in the electron microscopy of kidney biopsy of MGN

Incorrect Options:

Option A - Effaced podocytes: Effaced podocytes are seen in FSGS and minimal change disease.

Option C - Podocyte vacuolization: Podocyte vacuolization is seen in FSGS

Option D - Efface podocytes: Effaced podocytes are seen in minimal change disease.

Solution for Question 4:

Correct Option A - Steroids:

• Using age as a clue, complaints of eyes and scrotal swelling with normal renal function tests and podocyte effacement on electron microscopy of kidney biopsy helps in the diagnosis of Minimal Change Disease

Clinical features

• 1. Puffy eyes o Vulvar edema / Scrotal edema o Pedal edema, with variation of edema

• 2. Weight gain (+)

• 3. Pleural effusion Bilateral (Transudative)-dyspnea

• 4. Ascites-Abdominal distention

Work up MCD

• Renal function tests: normal, BUN/creatinine – (Normal)

• Urine M/E - Oval fat Bodies

• 24-hour urine protein increased

• Kidney Biopsy o Light Microscopy (Normal), IgM deposits

• Electron Microscopy – Podocyte effacement

Treatment

• Steroids for 8 weeks.

• Spironolactone

Incorrect Options:

Option B,C,D are incorrect

Treatment for minimal change disease

• Steroids for 8 weeks

• Spironolactone to manage edema associated with liver disease and nephrotic syndrome by reducing fluid retention and promoting diuresis

• All other options are not given as a treatment

Solution for Question 5:

Correct Option A - PSGN:

• Past 3 weeks history of sore throat (most likelystreptococcus),hematuria (6RBC/HPF), cola coloured urine(dark brown urine) ,proteinuria of 3gm/24hr ,Kidney biopsy showing starry sky appearance on immunoflourescence study and headache due to increased blood pressure are diagnostic of post streptococcal glomerulonephritis.

• PSGN shows sub-epithelial deposits on electron microscopy and can be managed by Benzathine penicillin, along with furosemide and IV labetalol.

Incorrect Options:

Option B and C:

• Foot process effacement-tonsillectomy: It is seen in minimal change disease and tonsillectomy is an intervention that can be done in Bergers(IgA nephropathy) disease

• Diffuse mesangial deposits: It is seen in Bergers disease.

Option D -FSGS:

• Podocytes vacuolization: It is seen in FSGS and-Cyclosporine is used in the management of MCD

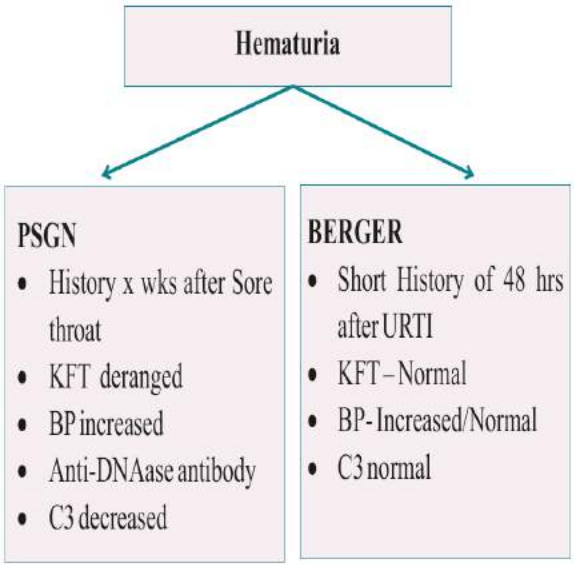
Solution for Question 6:

Correct Option D - 3 weeks history of sore throat:

It is seen in PSGN

• Bergers IgA nephropathy has short History of 48 hrs after URTI

•



Incorrect Options:

Options A, B and C are features of Bergers nephropathy(IgA nephropathy)

Solution for Question 7:

Correct Option A - Two consecutive relapses when on alternate day steroid therapy:

• Steroid dependent nephrotic syndrome is characterized by Two consecutive relapses when on alternate day steroid therapy or within 14 days of its discontinuation.

Incorrect Options:

Option B - Two or more relapses in the initial 6-month period

Option C - More than 3 relapses in any 12 months

B and C are both features of frequent relapse

Solution for Question 8:

Correct Option B - Presence of oval fat bodies in urine sediment:

• The patient's clinical presentation, including swelling (edema) in the legs and face, significant proteinuria, and elevated serum lipid levels, suggests nephrotic syndrome. Oval fat bodies are lipid-laden cells that can be observed in the urine sediment of patients with nephrotic syndrome due to increased lipid excretion. These oval fat bodies have a characteristic appearance under the microscope, resembling Maltese crosses, and their presence is indicative of lipiduria, a hallmark feature of nephrotic syndrome.

Incorrect Options:

Option A - Increased serum antithrombin III levels: Antithrombin III levels may be decreased in nephroti c syndrome due to urinary loss, leading to a hypercoagulable state.

Option C - Elevated serum ferritin levels: Serum ferritin levels may be increased in conditions of inflam mation or iron overload, but it is not typically associated with nephrotic syndrome.

Option D - Decreased ceruloplasmin levels in urine: Ceruloplasmin is not typically measured in urine, a nd its levels are not directly associated with nephrotic syndrome.

Solution for Question 9:

Correct Option B - Renal vein thrombosis:

• Membranous glomerulonephritis (MGN) is a glomerular disease characterized by the thickening of the glomerular basement membrane, leading to proteinuria. One of the most important complications associated with MGN is renal vein thrombosis

• The thickening of the glomerular basement membrane can disrupt normal blood flow within the kidney, predisposing patients to the formation of blood clots in the renal veins.

• Renal vein thrombosis can lead to further impairment of kidney function and may require aggressive management to prevent complications such as pulmonary embolism or renal infarction.

Incorrect Options:

Option A - Acute kidney injury: While acute kidney injury can occur in patients with MGN, it is not the m ost concerning complication associated with this condition.

Option C - Nephrotic syndrome: MGN itself is a cause of nephrotic syndrome due to significant protein uria, but the development of renal vein thrombosis is a more serious complication.

Option D - Urinary tract infection: While urinary tract infections can occur in patients with kidney diseas e, they are not typically considered the most concerning complication of MGN.

Solution for Question 10:

Correct Option B - Relapse:

• The patient's current status best fits the definition of a relapse in nephrotic syndrome. A relapse is characterized by the recurrence of proteinuria (3+ or 4+) or significant proteinuria (>40 mg/m2/h) for three consecutive early morning specimens, after having been in remission previously. Since the patient had been doing well with no signs of proteinuria or edema for the past few months but now presents with 3+ proteinuria on consecutive tests, this indicates a relapse of nephrotic syndrome.

Incorrect Options:

Option A - Remission: Remission refers to the absence of proteinuria or significant reduction in protein uria (nil or trace) for three consecutive early morning specimens. Since the patient is experiencing prot einuria again, he is not in remission.

Option C - Frequent relapses: Frequent relapses are defined as two or more relapses in the initial 6-month period or more than three relapses in any 12 months. The patient's history does not suggest frequent relapses.

Option D - Steroid dependence: Steroid dependence occurs when a patient experiences two consecutive relapses when on alternate-day steroid therapy or within 14 days of its discontinuation. This scenario does not match the patient's current situation.

Solution for Question 11:

Correct Option C - 24-hour urinary protein measurement:

• Congenital nephrotic syndrome (Finnish variety) typically presents with significant proteinuria, leading to foamy urine and generalized edema.

• To confirm the diagnosis, the most appropriate laboratory test is the measurement of urinary protein excretion over a 24-hour period.

• This test allows for the quantification of proteinuria, which is a hallmark feature of nephrotic syndrome. In this condition, the urinary protein excretion is markedly elevated, typically exceeding 40 mg/m^2 body surface area per hour.

Incorrect Options:

Option A - Serum creatinine level: While serum creatinine may be elevated in some cases of nephrotic syndrome due to impaired renal function, it is not the primary diagnostic test for confirming the condition.

Option B - BUN: Blood urea nitrogen (BUN) is another marker of kidney function, but like serum creatinine, it is not specific for diagnosing nephrotic syndrome. Elevated BUN levels may indicate impaired kidney function, but they do not directly assess the degree of proteinuria.

Option D - Serum electrolyte panel: While electrolyte abnormalities such as hypoalbuminemia and hyperlipidemia are common in nephrotic syndrome, they are not specific for diagnosis and are typically assessed as part of the overall management of the condition.

Diabetic Nephropathy, Kidney Stone and Acute Renal Failure

1. Which of the following drugs leads to Non-oliguric Renal AKI?

A. Amphotericin B

B. Cysplatin

C. Gentamycin

D. Cyclosporine

---

2. Which of the following parameters needs to be monitored in a patient suspected to have contrast induced nephropathy?

A. BUN

B. Urine output

C. Sr. Creatinine

D. Blood urea and Uric acid

---

3. Which of the following is the first investigation to be done in a patient with suspected Renal vein thrombosis?

A. Doppler

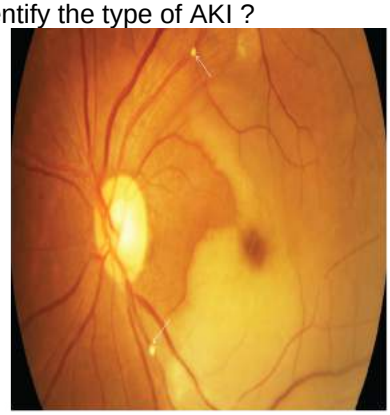
B. X-ray

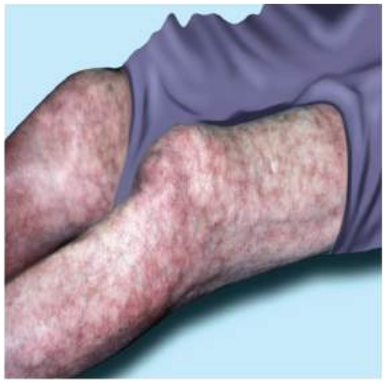
C. CT angiography

D. MRI

---

4. Using the two images below, Identify the type of AKI ?





A. CKD

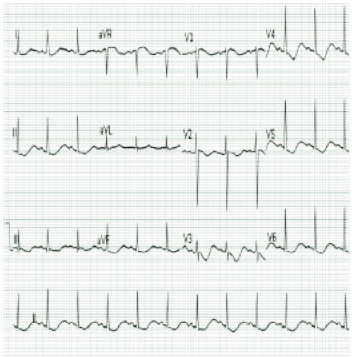
B. Prenal AKI

C. Post renal AKI

D. Renal AKI

---

5. A 35-year-old male patient came to the outpatient department with complaints of breathing difficulty, severe vomiting, and hiccup for the past two days. He experiences retrosternal chest pain, especially at night, and reduced urine frequency. The patient is a known case of hypertension. Clinical examination revealed asterixis, loss of memory, confusion, and puffy eyes. The patient's blood pressure is 190/120mmHg. Lab investigations show increased Sr.creatinine, increased BUN, Na+ of 130mEq, and an ECG is shown below. Identify the condition and mark the option which is not an indication for its treatment.



A. Correction of severe acidosis refractory to Medical Therapy

B. Hypertension refractory to medical therapy.

C. Severe Azotemia (BUN >100mg)

D. Volume expansion that cannot be managed with diuretics

---

6. A 65-year-old patient with a history of diabetes and hypertension presents to the emergency department with complaints of decreased urine output and swelling in his legs for the past two days. On examination, his serum creatinine level is found to be 2.5 mg/dL .Further assessment reveals that his urine output has been consistently below 0.5 ml/kg/hour over the past 12 hours. Which of the following stage is the patient suffering from?

(or)

Which of the following stages of AKI presents with a serum creatinine: 2.5 mg/dL and urine output below 0.5 ml/kg/hour over the past 12 hours

A. Stage I AKI

B. Stage II AKI

C. Stage III AKI

D. Stage IV AKI

---

7. A 60-year-old patient with a history of congestive heart failure presents to the emergency department with complaints of decreased urine output and generalized swelling for the past two days. Laboratory investigations reveal elevated serum creatinine and BUN levels. Which of the following conditions is least likely contributing to the development of pre-renal AKI in this patient?

(or)

Which of the following conditions is least likely contributing to the development of pre-renal AKI?

A. Congestive heart failure

B. Hepatorenal syndrome

C. Cyclosporine use

D. Tacrolimus use

---

8. A 55-year-old male with a history of type 2 diabetes mellitus presents to his primary care physician for a routine check-up. During the examination, the physician orders a spot urine sample to screen for diabetic nephropathy. Which of the following laboratory tests would be most appropriate for assessing renal function in this patient?

(or)

Which of the following laboratory tests would be most appropriate for assessing renal function in diabetic nephropathy?

A. Serum creatinine level

B. Blood urea nitrogen (BUN)

C. Urinary albumin creatinine ratio (UACR)

D. Urinary specific gravity

---

9. A 60-year-old male with a long-standing history of poorly controlled type 2 diabetes mellitus presents to the nephrology clinic with worsening kidney function. His serum creatinine levels have been gradually increasing over the past year. What histopathological finding is most characteristic in this patient associated with the development of nodular glomerulosclerosis?

(or)

What histopathological finding is most characteristic of diabetic nephropathy and is associated with the development of nodular glomerulosclerosis?

A. Diffuse glomerular sclerosis

B. Armani-Ebstein change

C. Kimmelstiel-Wilson change

D. Damage to distal convoluted tubules (DCT)

---

10. A 65-year-old male patient with type 2 diabetes mellitus presents for a routine follow-up appointment. His medical history is significant for chronic kidney disease (CKD), with an estimated glomerular filtration rate (eGFR) of 25 mL/min/1.73m². He is currently taking metformin and glipizide for glycemic control.Which of the following actions should be advised to this patient?

(or)

Which of the following is the best management for a diabetic nephropathy patient with an estimated glomerular filtration rate (eGFR) of 25 mL/min/1.73m² and currently on metformin and glipizide for glycemic control?

A. Continue metformin and glipizide at current doses

B. Discontinue metformin due to reduced kidney function

C. Discontinue glipizide due to reduced kidney function

D. Initiate linagliptin for better glycemic control

---

11. A 60-year-old patient with a history of hypertension and chronic kidney disease presents to the clinic for a follow-up visit. Despite being on ACE inhibitor therapy for blood pressure management, the patient's recent lab results show elevated potassium levels. What would be the most appropriate next step in managing this patient's hypertension, considering the provided information?

(or)

What would be the most appropriate next step in managing this patient's hypertension if serum potassium levels are high?

A. Increase the dose of ACE inhibitor

B. Switch to a different ACE inhibitor

C. Discontinue ACE inhibitor and initiate a calcium channel blocker

D. Add a thiazide diuretic to the ACE inhibitor therapy

---

12. 40-year-old male patient with a history of recurrent kidney stones, gross elevations in 24-hour urine calcium levels, and the presence of envelope-shaped crystals in his recent urine analysis.What treatment options should be considered for this patient?

A. Thiazides

B. Normal calcium diet

C. Sodium reduction in diet

D. Furosemide

---

13. A 40-year-old woman presents to the urology clinic with complaints of recurrent episodes of flank pain and difficulty passing urine. Upon further inquiry, she mentions a history of hyperparathyroidism diagnosed five years ago. Urinalysis reveals the presence of rosette-shaped crystals on microscopy.

What is the most likely cause of the patient's current symptoms?

(or)

Rosette-shaped crystals on microscopy is a feature of?

A. Uric acid stones

B. Calcium phosphate stones

C. Struvite stones

D. Cystine stones

---

14. A 45-year-old female patient presents to the urology clinic with complaints of recurrent urinary tract infections and flank pain. Upon further investigation, her urine microscopy reveals the presence of coffin-lid-shaped crystals. urinary tract infections in this patient are caused by?

(or)

Urinary tract infections in a patient with triple phosphate stones is caused by?

A. Escherichia coli

B. Klebsiella pneumoniae

C. Enterococcus faecalis

D. Proteus mirabilis

---

15. A 55-year-old male patient presents to the emergency department with severe flank pain and hematuria. A CT scan reveals the presence of kidney stones. Upon further analysis, the stones are found to be soft and yellowish in color. What type of kidney stones is most likely responsible for the formation of these stones?

(or)

What type of kidney stones is most likely found to be soft and yellowish in color?

A. Urate stones

B. Calcium stones

C. Cystine stones

D. Struvite stones:

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16. A 40-year-old male patient presents to the urology clinic with a history of recurrent kidney stone formation. His previous stone analysis revealed Cystine Stones. What medication would be most appropriate to prevent the recurrence of kidney stones in this patient?

(or)

What medication would be most appropriate to prevent the recurrence of Cystine Stones?

A. Tiopronin

B. Probenecid

C. Allopurinol

D. D-penicillamine

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	3
Question 3	1
Question 4	4
Question 5	2
Question 6	2
Question 7	4
Question 8	3
Question 9	3
Question 10	2
Question 11	3
Question 12	1
Question 13	2
Question 14	4
Question 15	1
Question 16	1

Solution for Question 1:

Correct Option C - Gentamycin:

• Aminoglycosides like gentamycin and Amikacin lead to non-oliguric Renal AKI

• Urine output > 400 ml/ day

• Aminoglycoside → Affects collecting duct, V2 Receptors impaired and reabsorption of water is impaired

Incorrect Options:

Option D - Cyclosporine: This drug leads to Pre-Renal AKI

Option A & B - (Amphotericin B & Cysplatin): Are exogenous nephrotoxins leading to renal AKI

Solution for Question 2:

Correct Option C - Sr. Creatinine:

• Serum creatinine needs to be monitored in patients with suspected contrast induced nephropathy.

• Iodinated contrast agents are associated with an increased risk of AKI, also known as ‘contrast induced nephropathy’.

• The most common course of this disease is characterised by a rise in serum creatinine 24-48 hours following exposure, peaking within 3-5 days and resolving within 1 week. Contrast induced nephropathy requiring dialysis is uncommon except in cases of patients with preexisting CKD.

• Hence the most important parameter that needs to be monitored is serum creatinine. There is a probable esophageal tear due to retching The question shows Contrast-induced nephropathy in a kidney patient. Dyspnea, chest pain, and vomiting are some of the symptoms of AKI(due to increased urea) The patient can recover in 7 days This is an exogenous cause for Renal AKI

• There is a probable esophageal tear due to retching

• The question shows Contrast-induced nephropathy in a kidney patient.

• Dyspnea, chest pain, and vomiting are some of the symptoms of AKI(due to increased urea)

• The patient can recover in 7 days

• This is an exogenous cause for Renal AKI

• There is a probable esophageal tear due to retching

• The question shows Contrast-induced nephropathy in a kidney patient.

• Dyspnea, chest pain, and vomiting are some of the symptoms of AKI(due to increased urea)

• The patient can recover in 7 days

• This is an exogenous cause for Renal AKI

Incorrect Options:

Options A, B, D - Refer to the above explanation

Solution for Question 3:

Correct Option A - Doppler:

• USG doppler can help visualize any potential thrombus in the renal artery. It is quicker and easier to obtain. Hence it would be an appropriate initial investigation in patients with suspected renal vein thrombosis when compared to the other options.

Incorrect Options

Options B,C,D - Refer to the above explanation

Solution for Question 4:

Correct Option D - Renal AKI:

• The first image shows:

Incorrect Options:

Option A, B & C: Refer to the above explanation

Solution for Question 5:

Correct Option B- Hypertension refractory to medical therapy:

The likely diagnosis in this patient is AKI Diagnosis is AKI

The question describes shows vomiting, hiccups, Low urine output, signs of encephalopathy(loss of me mory, confusion, and asterixis), and chest pain which are signs of Uremic encephalopathy and uremic pericarditis in AKI.

• The ECG shows tall tented T waves- hyperkalemia and the sodium of 130mEq
-Hyponatremia(Hypervolemic).

• The hypertension is in response to raised renin due to low GFR.

• The treatment for uremic manifestations is renal replacement therapy(Hemodialysis)Hemodialysis and Hypertension refractory to medical therapy is not an indication for dialysis.

Incorrect Options:

Option A- Correction of severe acidosis refractory to Medical Therapy

Option C- Severe Azotemia (BUN >100mg):

Option D- Volume expansion that cannot be managed with diuretics:

The above options are indications for hemodialysis.

Solution for Question 6:

Correct Option B - Stage II AKI:

• Stage II AKI is characterized by a serum creatinine level of 2.0 - 2.9 times normal and urine output below 0.5 ml/kg/hour over a duration of 12 hours.

• In this case, the patient's serum creatinine level is 2.5 mg/dL, which falls within the range for Stage II AKI.

• Additionally, the patient's decreased urine output below 0.5 ml/kg/hour over the past 12 hours further supports the diagnosis of Stage II AKI.

Incorrect options:

Option A - Stage I AKI: The patient's serum creatinine level exceeds the upper limit for Stage I AKI.

Option C
- Stage III AKI: The patient's serum creatinine level does not meet the criteria for Stage III AKI.

Option D - Stage IV AKI: There are only 3 stages of AKI

Stage

Serum creatinine

Urine output

Over a duration of

Stage I

1.5-1.9 times normal

<0.5 ml/kg/hour

6 hours

Stage II

2.0 - 2.9 times

12 hours

Stage III

≥3 times Absolute value of S. Creatine > 4mg%

<0.3 ml/kg/hour

24 hours

Solution for Question 7:

Correct Option D - Tacrolimus use:

• Pre-Renal AKI is caused by hypovolemia leading to underperfusion of the kidney.

• Conditions contributing to hypovolemia include rice water stool in cholera, congestive heart failure, and massive ascites in alcoholic cirrhosis.

• Hepatorenal syndrome can occur in cirrhotic patients, characterized by a fall in albumin and a rise in creatinine.

• Drugs such as NSAIDs and ACE inhibitors can cause pre-renal AKI, especially in patients with congestive heart failure or bilateral renal artery stenosis.

• Cyclosporine can lead to pre-renal AKI, while calcineurin inhibitors like Tacrolimus can lead to renal AKI.

Incorrect options

Options A, B, C:

• All these options can cause pre-renal AKI

Solution for Question 8:

Correct Option C - Urinary albumin creatinine ratio (UACR):

• Screening for diabetic nephropathy typically involves assessing urinary albumin excretion. The urinary albumin creatinine ratio (UACR) obtained from a spot urine sample is a reliable measure for detecting early signs of renal damage in diabetic patients.

Incorrect Options:

Option A - Serum creatinine level: While serum creatinine is a common marker for renal function, it ma y not be sensitive enough to detect early stages of diabetic nephropathy.

Option B - Blood urea nitrogen (BUN): BUN levels may be influenced by factors other than renal functio n, and they are not specific for diabetic nephropathy screening.

Option D - Urinary specific gravity: Urinary specific gravity is a
measure of urine concentration and is not typically used for screening diabetic nephropathy.

Solution for Question 9:

Correct Option C - Kimmelstiel-Wilson change:

• Kimmelstiel-Wilson change, also known as nodular glomerulosclerosis, is a characteristic histopathological finding of diabetic nephropathy. It presents as nodular deposits of mesangial matrix within glomeruli, which are pathognomonic for diabetic kidney disease.

Incorrect Options:

Option A - Diffuse glomerular sclerosis: While diffuse glomerular sclerosis is commonly seen in diabetic nephropathy, it is not specifically associated with the development of nodular glomerulosclerosis.

Option B - Armani-Ebstein change: Armani-Ebstein change refers to glycogen accumulation in the prox imal convoluted tubules (PCT) and is not directly related to nodular glomerulosclerosis.

Option D - Damage to distal convoluted tubules (DCT): Damage to the distal convoluted tubules may le ad to electrolyte disturbances, but it is not a
characteristic histopathological feature of diabetic nephropathy.

Solution for Question 10:

Correct Option B - Discontinue metformin due to reduced kidney function:

• Metformin is contraindicated in patients with an eGFR less than 30 mL/min/1.73m² due to the risk of lactic acidosis. Therefore, it should be discontinued in this patient given his eGFR of 25 mL/min/1.73m². Glipizide, on the other hand, can be safely used in patients with kidney disease as it is primarily metabolized by the liver and does not require renal excretion.

Incorrect Options:

Option A - Continue metformin and glipizide at current doses: Continuing metformin at the current dose would not be appropriate due to the patient's reduced kidney function.

Option C - Discontinue glipizide due to reduced kidney function: Glipizide can be safely used in patient s with kidney disease and does not require dosage adjustments.

Option D - Initiate linagliptin for better glycemic control: While linagliptin is a viable option for glycemic c ontrol in patients with CKD, the priority in this case is to address the contraindicated medication (metfor min) rather than initiating a new one.

Solution for Question 11:

Correct Option C - Discontinue ACE inhibitor and initiate a calcium channel blocker:

• ACE inhibitors (ACEIs) can lead to hyperkalemia, especially in patients with chronic kidney disease, due to their effect on reducing aldosterone secretion and impairing potassium excretion.

• Since the patient is already experiencing elevated potassium levels, discontinuing the ACE inhibitor would help prevent further exacerbation of hyperkalemia.

• Initiation of a calcium channel blocker (CCB) can provide effective blood pressure control without the risk of worsening hyperkalemia.

Incorrect Options:

Option A - Increase the dose of ACE inhibitor: Increasing the dose of ACE inhibitor would likely exacer bate hyperkalemia.

Option B - Switch to a different ACE inhibitor: Switching to a different ACE inhibitor may not significantl y alter the risk of hyperkalemia, as ACE inhibitors have similar mechanisms of action.

Option D - Add ARB : Side effect of ACEIs/ARBs: Hyperkalemia, often due to Type IV Renal Tubular A cidosis (RTA).

Solution for Question 12:

Correct Option A - Thiazides:

• The most common cause of Calcium Oxalate Stones is Idiopathic Hypercalciuria. resulting from defective handling of calcium by kidney tubules.

• Urine microscopy shows Envelope-shaped crystals.

• Thiazides are considered effective in preventing the recurrence of kidney stones, especially in patients with hypercalciuria, as they reduce calcium excretion in the renal tubules. .

Incorrect Options:

Option B - Normal calcium diet: While maintaining a normal calcium intake is important, it is not specific treatment for preventing recurrence of kidney stones in patients with hypercalciuria. In fact, reducing c alcium intake excessively can lead to increased risk of kidney stone formation.

Option C - Sodium reduction in diet: Sodium reduction in the diet can help prevent certain types of kidn ey stones, particularly those composed of sodium salts. However, it is not specifically indicated for pati ents with hypercalciuria and envelope-shaped crystals in urine analysis.

Option D - Furosemide: Furosemide, a loop diuretic, is contraindicated in patients with hypercalciuria a s it increases urinary calcium excretion, potentially exacerbating the risk of kidney stone formation. The refore, it is not an appropriate treatment option for preventing recurrence of kidney stones in this patien t population.

Solution for Question 13:

Correct Option B - Calcium phosphate stones:

• The patient's history of hyperparathyroidism and chronic gastrointestinal issues suggests a potential disturbance in calcium and phosphate metabolism, leading to the formation of calcium phosphate stones. Hyperparathyroidism can cause hypercalcemia, which increases the risk of calcium phosphate stone formation. Additionally, chronic use of antacids can lead to alkaline urine pH, further promoting calcium phosphate stone formation. The presence of rosette-shaped crystals on urinalysis is characteristic of calcium phosphate stones.

Incorrect Options:

Option A - Uric acid stones: These are typically associated with conditions such as gout and are not co mmonly seen in patients with hyperparathyroidism.

Option C - Struvite stones: These are associated with urinary tract infections and are typically compose d of magnesium ammonium phosphate. The patient's clinical history does not suggest a urinary tract infection.

Option D - Cystine stones: These are rare and typically seen in patients with cystinuria, a genetic disor der characterized by defective renal tubular reabsorption of cystine. The patient's clinical history does n ot suggest cystinuria.

Solution for Question 14:

Correct Option D - Proteus mirabilis:

• Triple phosphate stones are composed of $MgNH_4PO_4$.

• These three components crystallize to form a stone in an alkaline pH environment.

• They typically take the shape of the kidney and are often referred to as Struvite stones or Staghorn Calculi.

• Proteus mirabilis converts urea to ammonia, contributing to the urine's alkaline pH and facilitating the stone components' crystallization.

• Examining urine under the microscope may reveal crystals with a characteristic coffin lid appearance.

• These stones are commonly associated with urinary tract infections (UTIs) caused by urease-producing bacteria, such as Proteus mirabilis.

• Therefore, the urinary tract infections in this patient are likely caused by Proteus mirabilis.

Incorrect Options:

Option A, B, and C are incorrect

• Triple phosphate stones are composed of $MgNH_4PO_4$.

• These three components crystallize to form a stone in an alkaline pH environment.

• They typically take the shape of the kidney and are often referred to as Struvite stones or Staghorn Calculi.

• Proteus mirabilis converts urea to ammonia, contributing to the urine's alkaline pH and facilitating the stone components' crystallization.

• Examining urine under the microscope may reveal crystals with a characteristic coffin lid appearance.

Solution for Question 15:

Correct Option A - Urate stones:

• Urate stones are composed of uric acid, and they tend to be soft and yellowish in color. They are commonly associated with conditions such as gout, where there are high levels of uric acid in the urine. Urate stones form when there is an excess of uric acid in the urine, leading to the crystallization and formation of stones within the kidney.

Incorrect Options:

Option B - Calcium stones: These are the most common type of kidney stones and are typically hard a nd whitish in color.

Option C - Cystine stones: These stones are composed of the amino acid cystine and are known for be ing hard and yellowish-brown.

Option D - Struvite stones: These stones are composed of magnesium ammonium phosphate and are t ypically large, staghorn-shaped stones associated with urinary tract infections. They are not typically d escribed as soft or yellowish in color.

Solution for Question 16:

Correct Option A - Tiopronin:

• Cystine stones are composed of cystine, an amino acid. Tiopronin is a medication used to prevent the formation of cystine stones by binding to cystine in the urine and forming a soluble compound that can be excreted. Additionally, urine alkalinization helps to increase the solubility of cystine in the urine, further reducing the risk of stone formation.

Incorrect Options:

Option B
- Allopurinol: Allopurinol is used to prevent the formation of uric acid stones, not cystine stones.

Option C - Probenecid: Probenecid is used to increase uric acid excretion in under excretors with chron ic gout, but it is not effective for preventing cystine stone formation.

Option D - D-penicillamine: D-penicillamine was previously used to prevent cystine stone formation, but it has been replaced by Tiopronin due to better efficacy and fewer side effects.

Previous Year Questions

1. A woman presents to you with fever, arthralgia, ulcers, fatigue for the past six months, and new-onset hematuria. Urine examination reveals RBC casts and proteinuria. What is the likely diagnosis?

A. Acute interstitial nephritis

B. Poststreptococcal glomerulonephritis

C. Lupus nephritis

D. IgA nephropathy

---

2. What is the probable diagnosis for a male patient taking diuretics who presents with weakness and an ECG revealing flattened T waves and prominent U waves?

A. Hypokalaemia

B. Hyperkalaemia

C. Hypomagnesemia

D. Hypernatremia

---

3. Which of the following is the most probable diagnosis for a male patient who arrives at the emergency department with the following arterial blood gas report: pH of 7.2, pCO2 of 81 mmHg, and HCO3 of 40 meq/L?

A. Respiratory alkalosis

B. Metabolic acidosis

C. Respiratory acidosis

D. Metabolic alkalosis

---

4. Among the given options, which of the following is the correct course of action after you witnessed a person collapsing and initiated CPR in a road traffic accident (RTA) scenario, and the rescue team has now arrived?

A. a.Continue 5 rounds of CPR @ 30:2 followed by application of AED

B. Continue CPR while the team applies AED paddies

C. c.Stop CPR and let them apply paddies

D. d.Handover the patient and leave

---

5. What is the appropriate treatment for a patient who experienced a sudden seizure episode and became drowsy at the end of a dialysis session, with hypotension and pre-existing hyperkalemia and elevated urea levels?

A. Bumetanide

B. Ethacrynic acid

C. Nesiritide

D. IV Mannitol

---

6. What is the most probable cause of the muteness, quadriplegia, and rigidity observed in an elderly female patient who had a previous medical history of severe vomiting and was aggressively treated for severe dehydration at a different hospital one week ago?

A. Malignant hyperthermia

B. Severe catatonia

C. Rapid sodium correction

D. Neuroleptic malignant syndrome

---

7. What is the likely diagnosis for a patient who complains of pain in the flank region accompanied by hematuria, and has multiple calcifications (stones) observed in both kidneys on X-ray examination?

A. Parathyroid Adenoma

B. Renal calculi

C. Polycystic kidney disease

D. CKD

---

8. What acid-base imbalance is most likely to be observed in a middle-aged man with chronic renal failure on dialysis who experiences sudden collapse in the emergency department and exhibits labored breathing, as evidenced by tall, tented T waves on the ECG?

A. pH-7.14, pCO2-20 mmHg, HCO3- 5 mEq/L

B. pH-7.14, pCO2-20 mmHg, HCO3- 34 mEq/L

C. pH-7.54, HCO3- 27 mEq/L, pCO2- 34 mmHg

D. pH-7.4, HCO3- 27 mEq/L, pCO2- 40 mmHg

---

9. In a patient presenting with a seizure, when examining their urine osmolality (1000 mOsm/kg) and serum osmolality (270 mOsm/kg), what electrolyte abnormality can be anticipated?

A. Hypernatremia

B. Hyponatremia

C. Hyperkalaemia

D. Hypokalaemia

---

10. Which of the statements below is not true concerning pheochromocytoma?

A. Diagnosed by urine VMA & catecholamines

B. Surgical excision is the definitive treatment

C. Propranolol is given initially to manage hypertension

D. Can present as hypertension alone and sometimes with vomiting and pain abdomen

---

11. Which of the options below is commonly linked to pauci-immune glomerulonephritis?

A. SLE nephritis

B. Anti-GBM glomerulonephritis

C. IgA nephropathy

D. Granulomatosis with polyangiitis (GPA)

---

12. Which statement regarding syndrome of inappropriate antidiuretic hormone secretion (SIADH) is incorrect?

A. Urinary sodium <20 mEq/L

B. Serum sodium <135 mEq/L

C. Urine osmolality >100 mOsm/kg

D. Patient can be clinically euvolemic to hypervolemic

---

13. What are the conditions that are linked to hypertension and hypokalemic metabolic alkalosis?

A. Barter syndrome

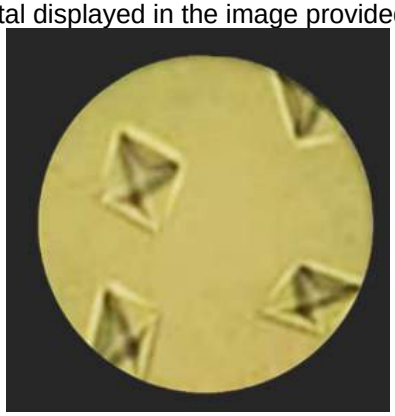
B. Liddle syndrome

C. Gitelman syndrome

D. Gordon syndrome

---

14. Please identify the urinary crystal displayed in the image provided.



A. Calcium oxalate

B. Calcium phosphate

C. Uric acid

D. Cysteine

---

15. What is the probable cause of the following symptoms in a 30-year-old male - sudden headache, palpitation, and excessive sweating, with previous similar episodes, high blood pressure during these

episodes, and elevated levels of 24-hour urinary metanephrine?

A. Fibromuscular dysplasia

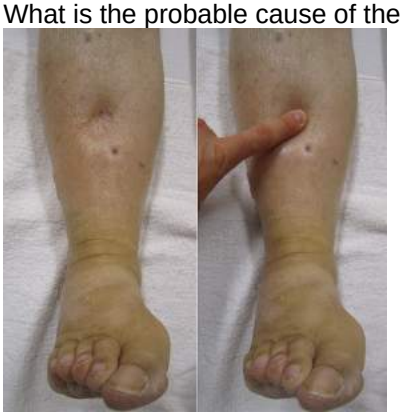
B. Renal artery stenosis

C. Pheochromocytoma

D. Hyperthyroidism

---

16. A 30-year-old woman presents to the OPD with palpitation and weight loss. On examination of her legs the following lesion was found which on applying pressure, the indentation does not persist on release. ECG shows sinus rhtyhm. What is the probable cause of the edema?



A. Myxedema

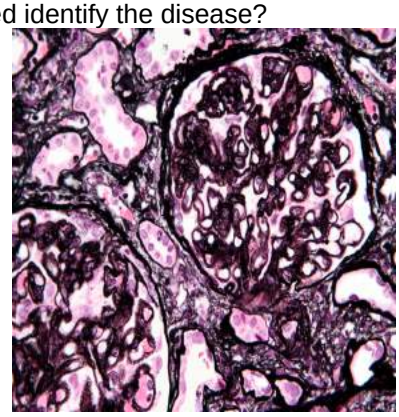
B. Nephrotic syndrome

C. Chronic lymphangitis

D. Dilated cardiomyopathy

---

17. A hepatitis B positive person came to your opd on routine urine massive proteinuria (> 3.5 g/day), Further renal biopsy was performed identify the disease?



A. Focal segmental glomerulosclerosis

B. Membranous glomerulonephritis

C. Membranoproliferative glomerulonephritis

D. Minimal change disease

---

18. What metabolic abnormality is likely to be observed in a 55-year-old patient who presents with chronic projectile vomiting and weight loss?

A. Hypokalemic hypochloremic metabolic alkalosis with hyponatremia

B. Hypokalemic hypochloremic metabolic alkalosis with hypernatremia

C. Hypokalemic hypochloremic metabolic alkalosis with hypercalcemia

D. Hypokalemic hypochloremic metabolic acidosis with hyponatremia

---

19. Which of the following laboratory values is observed in a patient who is experiencing approximately 20 episodes of loose stools per day and a decreased frequency of urination?

A. BUN: Cr >40:1, urine Na <40, FENa <1% urine osmolality >500

B. BUN: Cr >20:1, urine Na <20, FENa <1% urine osmolality >500

C. BUN: Cr >20:1, urine Na <20, FENa <1% urine osmolality >250

D. BUN: Cr >40:1, urine Na <20, FENa <1% urine osmolality >250

---

20. Which of the following symptoms will be observed in an 8-year-old girl who suddenly develops fever, reduced urine output, nausea, dark urine, and swollen eyes? The parents also mention that she had similar facial lesions as shown in the image below, but they are currently improving.

A. Nephrotic range proteinuria

B. RBC’s in urine

C. Derangement of liver enzymes

D. Neurological symptoms

---

21. Dialysis will prevent all except?

A. Seizures

B. Peripheral neuropathy

C. Metabolic acidosis

D. Uremic pericarditis

---

22. Which of the following options represents the most severe manifestation of Chronic Kidney Disease (CKD)?

A. Decreased GFR

B. Increased creatinine

C. Hyperkalaemia

D. Proteinuria

---

23. What is the probable diagnosis for a patient who has symptoms of frequent urination, nocturia, and enuresis, along with a 24-hour urine volume of 7 liters, a urine osmolarity of 260 mOsm/L, an ADH assay result of 0.8 pg/ml, and a brain MRI showing no bright spot on T1 weighted images?

A. Nephrogenic DI

B. Primary polydipsia

C. Pituitary DI

D. Mannitol infusion

---

24. The arterial blood gas findings of a patient are pH = 7.12, pCO2 = 50, HCO3 = 28. What is the diagnosis?

A. Respiratory acidosis with metabolic compensation

B. Metabolic acidosis with respiratory compensation

C. Respiratory alkalosis with metabolic compensation

D. Metabolic alkalosis with respiratory compensation

---

25. What is the probable reason for the quadriparesis developed by a 60-year-old patient after being treated with a significant amount of hypertonic fluids for 24 hours following a history of hyponatremia?

A. Brain infarct

B. Brainstem injury

C. Central pontine myelinolysis

D. Rare cause of hypernatremia

---

26. AKIN and RIFLE criteria are used to classify

A. Acute kidney injury

B. Chronic renal failure

C. Acute glomerulonephritis

D. Nephrotic syndrome

---

27. A patient with chronic kidney disease came with complaints of vomiting and diarrhea. His blood gas reports show pH = 7.40, HC03- = 23 mEq/L, Na+ = 145 mEq/L, = 100 mEq/L. What is your probable diagnosis?

(or)

A patient with chronic kidney disease came with complaints of vomiting and diarrhea. His blood gas reports show pH = 7.40, HC03- = 23 mEq/L, Na+ = 145 mEq/L, = 100 mEq/L. What is your probable diagnosis?

A. No acid base abnormality

B. Respiratory acidosis

C. Metabolic alkalosis

D. High anion gap metabolic acidosis with metabolic alkalosis

---

28. Which of these is a Nephritic syndrome?

A. Minimal change disease

B. Membranous Glomerulopathy

C. Post infectious Glomerulonephritis

D. Focal segmental glomerulosclerosis

---

29. A 26-year-old female named Rinku Devi, who works as a labourer, arrived with complaints of abdominal pain, nausea, and restlessness for the past 4 hours. She also mentioned having experienced two episodes of blood in her urine. An ultrasound scan revealed a 3x3 cm stone in her right renal pelvis, with no signs of hydronephrosis. What would be the most suitable procedure for treating this patient?

A. ESWL

B. PCNL

C. Antegrade Pyeloplasty

D. Retrograde pyeloplasty

---

30. Cut off for diagnosis of Priapism is?

A. 1 hours

B. 2 hours

C. 3 hours

D. 4 hours

---

31. Which of the following are not included in the components of the MELD (2016) score?

A. Bilirubin

B. Prothrombin time

C. Albumin

D. Creatinine

---

32. Calculate the anion gap from the following values: Na+ = 137 mmol/L K+ = 4 mmol/L CI- = 100 mmol/L HCO3- = 15 mmol/L

A. 22 mmol/L

B. 16 mmol/L

C. 10 mmol/L

D. 12 mmol/L

---

33. AKIN and RIFLE criteria are used classify—

A. Acute kidney injury

B. Chronic renal failure

C. Acute glomerulonephritis

D. Nephrotic syndrome

---

34. In the ICU, a patient experiencing renal failure presents with vomiting. Analysis of arterial blood gases reveals a pH level of 7.4, sodium (Na+) concentration of 14 mEq/L, chloride (CI-) concentration of 100 mEq/L, bicarbonate (HCO3-) concentration of 24 mEq/L, and a partial pressure of carbon dioxide (PaCO2) of 40 mmHg. What metabolic abnormality is most likely occurring?

A. Normal ABG

B. Normal anion gap, metabolic acidosis

C. High anion gap metabolic acidosis with metabolic alkalosis

D. High anion gap metabolic alkalosis with normal metabolic acidosis

---

35. A 56-year-old man presents to the emergency with severe shortness of breath and fatigue for the past 3 hours. He reports vomiting and epigastric pain 2 days back, for which he took an anti-emetic. His past medical history is significant for hypertension and diabetes mellitus type 1. The lab values show BSL=356mg/dL. The doctor advises immediate ABG analysis, which reveals a pH=7.32, pCO2=38mEq/L, and HCO3-=15mEq/L. This type of acidosis has increased the anion gap. Which of the following condition does not belong to the same classification of metabolic acidosis as this patient?

A. Renal failure

B. Lactic acidosis

C. Renal aciduria

D. Aspirin

---

36. What is the most probable diagnosis for a 5-year-old child who has been experiencing pedal edema and facial puffiness for the last 5 days, with a blood pressure of 126/80 mm Hg, proteinuria of 3+, and 100 red blood cells per high power field in the urine examination?

A. Post – streptococcal glomerulonephritis

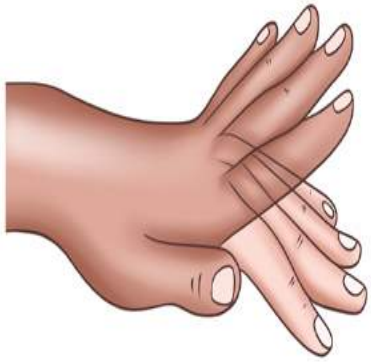
B. Minimal change disease

C. Membranous glomerulonephritis

D. Focal segmental glomerulosclerosis

---

37. The patient is having the following hand movements. In which of the following conditions would this be seen?



A. Thyrotoxicosis

B. Hypercarbia

C. Hemiballismus

D. Hypoxia

---

38. A 22-year-old patient has a fever with severe shortness of breath and red currant jelly sputum. On examination, he has altered sensorium with an RR of 40/min. Lab investigations show serum creatinine of 1.9 mg/dl and BUN with 5 mmol/L (Normal:<7 mmol/L). Which of the following is correct about its management?

A. OPD management with oral drugs

B. IPD management with IV drugs

C. ICU management with IV drugs

D. ICU management with oral drugs

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	1
Question 3	3
Question 4	2
Question 5	4
Question 6	3
Question 7	2

Question 8	1
Question 9	2
Question 10	3
Question 11	4
Question 12	1
Question 13	2
Question 14	1
Question 15	3
Question 16	2
Question 17	2
Question 18	1
Question 19	2
Question 20	2
Question 21	2
Question 22	3
Question 23	3
Question 24	1
Question 25	3
Question 26	1
Question 27	4
Question 28	3
Question 29	2
Question 30	4
Question 31	3
Question 32	1
Question 33	1
Question 34	3
Question 35	3
Question 36	1
Question 37	2
Question 38	2

Solution for Question 1:

Correct Option C:

• The clinical features of fever, arthralgia, ulcers, fatigue, and hematuria in addition to RBC casts and proteinuria on urine tests imply a disease of lupus nephritis.

• Lupus nephritis is a common complication of systemic lupus erythematosus (SLE) and can present accompanying differing dispassionate exhibitions, containing hematuria, proteinuria, and renal degradation.

• The presence of RBC casts and proteinuria is suggestive of glomerular involvement, which is a universal feature of lupus nephritis.

• In addition, the patient's syndromes of frenzy, arthralgia, and ulcers are still average features of SLE.

Incorrect Options:

Option A: Acute interstitial nephritis: It is characterized by inflammation and damage to the renal intersti tium and tubules, and can present with syndromes such as fever, rash, and eosinophilia. However, he maturia and glomerular connection are not conventional features of severe interstitial nephritis.

Option B: Poststreptococcal glomerulonephritis: It is a type of glomerulonephritis that happens after an infection accompanying group A beta-hemolytic streptococcus. It usually presents accompanying manifestations to a degree of hematur ia, proteinuria, and edema, but the lack of different clinical features such as fever, arthralgia, and ulcers makes this a rare disease.

Option D: IgA nephropathy: It is a chronic glomerulonephritis from the deposition of IgA antibodies in th e glomerular mesangium. It usually presents accompanying manifestations such as hematuria, protein uria, and renal impairment, but the lack of additional clinical features such as fever, arthralgia, and ulce rs makes this an unlikely disease.

Solution for Question 2:

Correct Option A:

• The most likely diagnosis is hypokalemia.

• Diuretics such as thiazides and loop diuretics can cause potassium loss, which can influence hypokalemia.

• The ECG judgments of flat T waves and prominent U waves are characteristic of hypokalemia. Other manifestations of hypokalemia can involve muscle weakness, fatigue, muscle spasm, and palpitations.

Incorrect Options:

Option B: Hyperkalemia: Hyperkalemia is a condition where there is an abnormally high level of potassi um in the blood. ECG changes associated with hyperkalemia usually involve tall, pale T waves, prolonged PR intervals, and a widened QRS complex. Flat T waves and prominent U waves are not characteristic of hyperkalemia.

Option C: Hypomagnesemia: Hypomagnesemia is a condition where there is an unusually low level of magnesium in the blood. ECG changes associated with hypomagnesemia usually contain prolongation of the QT interval and T wave abnormalities. Flat T waves and prominent U waves are not characteristic of hypomagnesemia.

Option D: Hypernatremia: Hypernatremia is a condition where there is an unusually high level of sodiu m in the blood. ECG changes associated with hypernatremia are unique but can involve a shortened QT interval and ST segment changes. Flat T waves and prominent U waves are not characteristic of hypernatremia.

Solution for Question 3:

Correct Option C:

• Based on the given arterial blood gas report, the patient has a low pH (acidemia) and extreme pCO2 (hypercapnia), signifying respiratory acidosis.

• The elevated bicarbonate (HCO3) levels imply that there can be little compensation occurring, likely metabolic compensation.

• This pattern of results is most usually seen in patients accompanying hypoventilation, which leads to an increase in carbon dioxide retention and a subsequent decrease in pH.

Incorrect Options:

Option A: Respiratory alkalosis: This condition results from a raised pH (alkalemia) and decreased pC O2, which is the opposite of the results seen in this patient. It is frequently produced by hyperventilatio n, which results in excessive carbon dioxide removal from the body.

Option B: Metabolic acidosis: This condition results from a decreased pH and decreased bicarbonate l evels. In metabolic acidosis, the kidneys are not able to excrete adequate acid, leading to an accumula tion of acid in the body fluids.

Option D: Metabolic alkalosis: This condition results from a
raised pH and high bicarbonate levels. It happens when there is a
deficit of acid in the body, due to disgorging or through the use of diuretics.

Solution for Question 4:

The scenario mentioned in the question is a case of a Road Traffic Accident (RTA) where a person has collapsed, and the responder is performing Cardiopulmonary Resuscitation (CPR) to revive the person . In such a
scenario, providing timely and appropriate care to the victim is crucial, as every second counts.

When the rescue team arrives, it is important to remember that they are equipped with advanced medi cal equipment, including an Automated External Defibrillator (AED). This device can diagnose and treat a person suffering from cardiac arrest by delivering an electrical shock to the heart.

In this situation, the recommended action is to continue performing CPR while the rescue team applies the AED paddles. This is because CPR provides oxygenated blood to the victim's vital organs, includin g the brain and heart, while the AED can deliver a shock to the heart to restore its natural rhythm.

Incorrect Choices:

Option a: Continue 5 rounds of CPR @ 30:2 followed by application of AED" is not recommended beca use it suggests stopping CPR after five cycles and applying the AED. Instead, it is advisable to continu e CPR until the AED is fully operational.

Option c: Stop CPR and let them apply paddles" is also not recommended because it suggests stoppin g CPR altogether. This can be dangerous, leading to a
drop in blood flow to the vital organs, which can cause irreversible damage.

Option d: “Handover the patient and leave” is not recommended because the responder has a duty of c are towards the victim until the arrival of the rescue team. Leaving the scene without handing over the

patient to the rescue team can be considered abandonment and can lead to legal consequences.

Solution for Question 5:

• According to the vignette, the patient developed seizures after undergoing dialysis. The most common cause of this is the development of dialysis disequilibrium syndrome. A range of symptoms occurs during or post-dialysis due to the rapid urea clearance from the blood. It is treated by infusion of either IV mannitol or IV hypertonic saline.

Incorrect Choices:

• Option a. Bumetanide is a loop diuretic that is used to treat edema in the body due to fluid retention. Fluid retention commonly occurs due to an increase in the loss of protein from the body or due to cardiac, renal, or hepatogenic causes. Fluid retention very rarely causes seizures, making it a very unlikely cause that needs to be treated. Hence, there is no need to use bumetanide.

• Opton b. Ethacrynic acid is also a diuretic that functions similarly to loop-diuretics. Since the patient does not have any fluid retention, its use in the patient is unnecessary.

• Option c. Nesiritide is a natriuretic peptide that is used in patients with acutely decompensated congestive heart failure. It causes vasodilation which causes hemo-stability. The patient in the vignette does not have any cardiac problems, hence making the use of this drug unnecessary in the patient.

Solution for Question 6:

Correct Option C - Rapid sodium correction:

• Rapid correction of sodium levels, particularly in cases of hyponatremia (low sodium levels), can lead to a condition known as osmotic demyelination syndrome (previously called central pontine myelinolysis).

• It is characterized by the destruction of the protective myelin sheath in the central nervous system, particularly in the pons region of the brainstem.

• This can result in various neurological manifestations, including mutism, quadriplegia, and rigidity.

Incorrect Options:

Option A - Malignant hyperthermia: This is a rare, life-threatening reaction to certain medications used during general anesthesia. It is characterized by a
rapid increase in body temperature, muscle rigidity, and other signs of a hypermetabolic state.

Option B - Severe catatonia: Catatonia is a neuropsychiatric syndrome characterized by a range of sy mptoms, including immobility, mutism, rigidity, and abnormal motor behaviors. However, catatonia is n ot typically associated with severe vomiting or dehydration.

Option D - Neuroleptic malignant syndrome (NMS): NMS is a
potentially life-threatening condition that can occur as a reaction to certain medications, particularly anti psychotic medications. It is characterized by hyperthermia, altered mental status, autonomic dysfunctio n, and generalized muscle rigidity.

Solution for Question 7:

Correct Options B: Renal calculi

• The presence of flank pain, hematuria, and multiple calcifications seen on X-ray in both kidneys strongly suggests the presence of kidney stones. Further evaluation and diagnostic tests, such as a renal ultrasound or CT scan, may be necessary to confirm the diagnosis and determine the appropriate management approach.

Incorrect options:

Options A: Parathyroid Adenoma: Parathyroid adenoma refers to the enlargement of one or more of th e parathyroid glands, which are responsible for regulating calcium levels in the body. This condition ca n lead to hyperparathyroidism, causing elevated levels of calcium in the blood and kidney stones. How ever the question does not state any other information regarding parathyroid adenoma therefore this o ption is ruled out

Options C: Polycystic kidney disease: Polycystic kidney disease (PKD) is an inherited disorder charact erized by the development of multiple cysts in the kidneys. While PKD can lead to kidney-related sympt oms, such as flank pain and hematuria, the presence of multiple calcifications (stones) in both kidneys i s not a typical feature of this condition. The calcifications seen in PKD are usually associated with the c ysts themselves, rather than kidney stones.

Options D: CKD (Chronic Kidney Disease): Chronic kidney disease is a condition characterized by the gradual loss of kidney function over time. While CKD can lead to various complications, such as the for mation of kidney stones, the presence of multiple calcifications (stones) in both kidneys on X-ray is not specific to CKD. It is important to note that CKD can be a risk factor for kidney stone formation, but it is not the primary diagnosis based on the information provided.

Solution for Question 8:

Correct Option A: pH-7.14, pCO2-20 mmHg, HCO3- 5 mEq/L: In this option, the pH is low (acidic) at 7. 14, indicating acidemia. The pCO2 is also low at 20 mmHg, suggesting respiratory alkalosis. The HCO 3- level is significantly decreased at 5
mEq/L, indicating metabolic acidosis. The presence of tall, tented T waves on the ECG is a characterist ic finding in severe hyperkalemia, which can occur in the setting of metabolic acidosis. Therefore, the most likely acid-base imbalance in this patient is severe metabolic acidosis with respiratory compensati on.

Incorrect Options:

Option B: pH-7.14, pCO2-20 mmHg, HCO3- 34 mEq/L: In this option, the pH is low (acidic) at 7.14, indi cating acidemia. The pCO2 is low at 20 mmHg, suggesting respiratory alkalosis. However, the HCO3- l evel is elevated at 34 mEq/L, indicating metabolic alkalosis. This combination of low pCO2 and high H CO3- is not consistent with a
physiological compensation pattern. Therefore, this option does not accurately represent a
typical acid-base imbalance.

Option C: pH-7.54, HCO3- 27 mEq/L, pCO2- 34 mmHg: In this option, the pH is high (alkaline) at 7.54, indicating alkalemia. The pCO2 is within the normal range at 34 mmHg, suggesting normal or compens ated respiratory status. The HCO3- level is slightly elevated at 27 mEq/L, indicating metabolic alkalosis

. This combination of high pH, normal pCO2, and elevated HCO3- is consistent with uncompensated or partially compensated metabolic alkalosis. However, this option does not align with the presented EC G findings of tall, tented T waves, which are indicative of hyperkalemia. Therefore, this option is less lik ely to be the correct acid-base imbalance in this case.

Option D: pH-7.4, HCO3- 27 mEq/L, pCO2- 40 mmHg: In this option, the pH is within the normal range at 7.4, indicating a normal acid-base balance. The pCO2 is within the normal range at 40 mmHg, sugg esting normal or compensated respiratory status. The HCO3- level is also within the normal range at 2 7 mEq/L. This combination of normal pH, normal pCO2, and normal HCO3- does not indicate any signi ficant acid-base imbalance. Therefore, this option is less likely to be the correct acid-base imbalance in this case.

Solution for Question 9:

Correct Option B. Hyponatremia: Hyponatremia is a condition characterized by a low level of sodium in the blood. The patient's serum osmolality of 270 mOsm/kg suggests normal tonicity, while the urine os molality of 1000 mOsm/kg indicates concentrated urine. This pattern is consistent with a syndrome of i nappropriate antidiuretic hormone secretion (SIADH), where excessive release of antidiuretic hormone (ADH) leads to increased water reabsorption in the kidneys and dilutional hyponatremia. Therefore, hy ponatremia is the expected electrolyte abnormality in this patient.

Incorrect Options:

Option A. Hypernatremia: Hypernatremia refers to an elevated level of sodium in the blood. In this case , the patient's serum osmolality is 270 mOsm/kg, which is within the normal range. Hypernatremia woul d typically be associated with increased serum osmolality due to a deficit of water in relation to sodium. Therefore, hypernatremia is not the expected electrolyte abnormality in this patient.

Option C. Hyperkalemia: Hyperkalemia refers to an elevated level of potassium in the blood. The provi ded clinical information does not indicate the patient's potassium level or suggest any abnormalities rel ated to potassium. Therefore, hyperkalemia is not the expected electrolyte abnormality in this case.

Option D.Hypokalemia: Hypokalemia is a condition characterized by a low level of potassium in the blo od. The given information does not specifically indicate the patient's potassium level or provide any clu es suggesting hypokalemia. Therefore, hypokalemia is not the expected electrolyte abnormality in this patient.

Solution for Question 10:

Correct Option C: Propranolol is given initially to manage hypertension This statement is incorrect. Pro pranolol, a non-selective beta-blocker, is not typically given initially to manage hypertension in patients with suspected or confirmed pheochromocytoma. Administering a
beta-blocker without adequate alpha-blockade can worsen hypertension and lead to a hypertensive cri sis. Therefore, it is essential to initiate alpha-blockade (e.g., with phenoxybenzamine) prior to beta-bloc kade in these patients.

Incorrect Options:

Option A Diagnosed by urine VMA & catecholamines This statement is correct. Pheochromocytoma, a rare adrenal gland tumor, can be diagnosed by measuring levels of vanillylmandelic acid (VMA) and ca techolamines (such as epinephrine and norepinephrine) in urine. Elevated levels of these substances c

an indicate the presence of a pheochromocytoma.

Option B: Surgical excision is the definitive treatment This statement is correct. Surgical excision is the definitive treatment for pheochromocytoma. Complete removal of the tumor is crucial to prevent further hormone secretion, control hypertension, and minimize the risk of complications associated with excess catecholamine release.

Option D: Can present as hypertension alone and sometimes with vomiting and pain abdomen This statement is correct. Pheochromocytoma can present with a variety of symptoms, but the most common clinical feature is hypertension. However, it is important to note that pheochromocytoma can also manifest with other symptoms, such as episodic or paroxysmal hypertension, headache, palpitations, sweating, anxiety, flushing, vomiting, and abdominal pain. The presence of these symptoms should raise suspicion for pheochromocytoma and prompt further investigation.

Solution for Question 11:

Correct option : D

• Pauci-immune glomerulonephritis refers to a type of kidney inflammation characterized by a lack of immune deposits within the glomeruli (the filtering units of the kidneys). It is typically associated with small-vessel vasculitides, which are a group of disorders involving inflammation of the blood vessels.

• Granulomatosis with polyangiitis (GPA), formerly known as Wegener's granulomatosis, is one of the small-vessel vasculitides associated with pauci-immune glomerulonephritis. GPA is an autoimmune condition that primarily affects the respiratory tract and kidneys. It is characterized by the formation of granulomas (areas of inflammation with immune cells) and necrotizing vasculitis (inflammation and destruction of blood vessel walls).

Incorrect options:

Option A) SLE nephritis: Systemic lupus erythematosus (SLE) is an autoimmune disease that can affect multiple organs, including the kidneys. Lupus nephritis refers to kidney inflammation associated with SLE. However, SLE nephritis typically presents with immune deposits in the glomeruli, which differentiates it from pauci-immune glomerulonephritis.

Option B) Anti-GBM glomerulonephritis: Anti-GBM (glomerular basement membrane) glomerulonephritis is a rare autoimmune disorder characterized by the presence of antibodies directed against the glomerular basement membrane. This condition causes severe kidney inflammation and damage. Unlike pauci-immune glomerulonephritis, anti-GBM glomerulonephritis exhibits immune deposits along the glomerular basement membrane.

Option C) IgA nephropathy: IgA nephropathy, also known as Berger's disease, is a kidney disorder characterized by the accumulation of immunoglobulin A (IgA) within the glomeruli. It is the most common form of glomerulonephritis worldwide. Unlike pauci-immune glomerulonephritis, IgA nephropathy involves immune deposits, specifically IgA, within the glomeruli.

Solution for Question 12:

Correct Option A - urinary sodium <20 mEq/L

• This statement is incorrect

• In the syndrome of inappropriate antidiuretic hormone secretion (SIADH), there is excessive secretion of antidiuretic hormone (ADH), also known as vasopressin, leading to water retention and dilutional hyponatremia. While the other options listed are true about SIADH, the statement “urinary sodium <20 mEq/L” is not accurate.

Incorrect Choices:

• Option b. Serum sodium: SIADH is associated with hyponatremia, which is defined as serum sodium levels less than 135 mEq/L. The excessive water retention dilutes the sodium concentration in the blood.

• Option c. Urine osmolality: SIADH leads to impaired water excretion and concentrated urine. Urine osmolality is typically greater than 100 mOsm/kg, indicating the kidneys’ inability to appropriately dilute urine.

• Option d. Patient can be clinically euvolemic to hypervolemic: Patients with SIADH can present as clinically euvolemic (normal volume status) or hypervolemic (excess fluid volume). The degree of volume expansion depends on the underlying cause of SIADH and associated factors such as fluid intake and comorbidities.

Solution for Question 13:

Liddle syndrome is a rare autosomal dominant disorder characterized by excessive sodium reabsorptio n in the renal tubules, leading to volume expansion, hypertension, and hypokalemia as well as metabol ic alkalosis.

Incorrect Choices:

Option A: Barter syndrome is rare autosomal recessive disorder that affects the kidney’s ability to reab sorb sodium and chloride in the thick ascending limb of the loop of Henle. It leads to a similar electrolyt e imbalance as Gitelman syndrome, including hypokalemia and metabolic alkalosis. However, hyperte nsion is not typically associated with Barter syndrome.

Option C: Gitelman syndrome is a rare autosomal recessive disorder that affects the kidneys’ ability to reabsorb electrolytes, particularly sodium, chloride, and magnesium. This leads to excessive urinary lo sses of these electrolytes. The main clinical features of Gitelman syndrome include hypokalemia (low p otassium levels), metabolic alkalosis (elevated pH and bicarbonate levels).

Option D: Gordon syndrome is also known as pseudohypoaldosteronism type II, it is a rare autosomal dominant disorder characterized by hypertension, hyperkalemia (high potassium levels), and metabolic acidosis. It is not associated with hypokalemic metabolic alkalosis.

Solution for Question 14:

Correct Choice: A

• It is a common type of kidney stone that forms due to high levels of calcium and oxalate in the urine. Calcium oxalate stones can vary in size and shape and may appear rough, brownish crystals.

• Factors contributing to calcium oxalate formation include a diet rich in oxalate-containing foods (such as spinach, rhubarb, and beetroot), low fluid intake, certain medical conditions, and certain medications. They can cause symptoms such as severe abdominal or back pain, blood in the urine, frequent urination, and difficulty passing urine.

Incorrect Choices:

Option B. Calcium phosphate: Calcium phosphate stones are another type of kidney stone that can for m in the urinary system. These stones are composed primarily of calcium phosphate and other mineral s such as calcium carbonate and magnesium phosphate.

Option C. Uric acid: Uric acid stones are a
type of kidney stone that forms due to high uric acid levels in the urine. Uric acid is a waste product tha t is normally excreted by the kidneys. However, when there is excessive production of uric acid or the u rine becomes too acidic, it can lead to the formation of uric acid stones.

Option D. Cysteine: Cysteine stones are a rare type of kidney stone that forms due to a
genetic disorder called cystinuria. Cystinuria is an inherited condition characterized by a
defect in the transport system that reabsorbs cysteine, an amino acid, in the kidneys. As a result, cystei ne and other amino acids accumulate in the urine and can precipitate to form cysteine stones. Cysteine stones are typically yellow or brown and have a rough, jagged appearance.

Solution for Question 15:

Correct Option: C

• Based on the given clinical presentation and test results, the most likely etiology in this case is pheochromocytoma. The correct answer is: Pheochromocytoma

• Pheochromocytoma is a rare neuroendocrine tumor that arises from chromaffin cells in the adrenal medulla, leading to excessive production and release of catecholamines such as epinephrine and norepinephrine. The clinical features of sudden-onset headache, palpitations, profuse sweating, and episodes of high blood pressure (hypertension) are characteristic of pheochromocytoma.

• Elevated urinary metanephrine levels are a key diagnostic finding in pheochromocytoma. Metanephrines are breakdown products of catecholamines, and increased levels in a 24-hour urine collection suggest excessive production and secretion of catecholamines, supporting the diagnosis of pheochromocytoma.

Incorrect Options:

Option A: Fibromuscular dysplasia (FMD) is a non-inflammatory and non-atherosclerotic arterial diseas e that primarily affects the medium-sized arteries. It commonly involves the renal arteries but is not typi cally associated with the symptoms described in the scenario.

Option B: Renal artery stenosis refers to the narrowing of one or both renal arteries, often due to ather osclerosis or fibromuscular dysplasia. While it can cause hypertension, it does not typically present wit h sudden-onset headache, palpitations, and profuse sweating.

Option D: Hyperthyroidism is a condition characterized by excessive production of thyroid hormones by the thyroid gland. Although hyperthyroidism can cause symptoms such as palpitations and sweating, s udden-onset headache and episodes of high blood pressure are not typical features of this condition.

Therefore, based on the given clinical presentation and elevated urinary metanephrine levels, the most likely etiology in this case is pheochromocytoma.

Solution for Question 16:

Correct Option: B

• Based on the given clinical presentation and examination findings, the most probable cause for the edema, in this case, is Nephrotic syndrome. The correct answer is: Nephrotic syndrome

• Nephrotic syndrome is a condition characterized by increased permeability of the glomerular filtration barrier in the kidneys, resulting in the loss of protein, particularly albumin, in the urine. This leads to hypoalbuminemia and subsequent fluid retention, causing edema.

• The presence of palpitation, weight loss, and the description of a non-pitting lesion on the legs suggest an underlying systemic condition. Nephrotic syndrome can present with generalized edema, including edema in the legs, due to hypoalbuminemia and fluid retention.

• The finding of non-pitting edema, where the indentation does not persist on release, is consistent with nephrotic syndrome. The loss of albumin leads to a decrease in oncotic pressure, resulting in the accumulation of interstitial fluid that does not readily shift with pressure changes.

• Sinus tachycardia on the ECG is a nonspecific finding and can be seen in various conditions, including nephrotic syndrome. It is not specific to any particular cause of edema.

Incorrect options

Option A: Myxedema refers to severe hypothyroidism and is not consistent with the presentation of pal pitation and weight loss. It is unlikely to be the cause of the edema in this case.

Option C: Chronic lymphangitis refers to inflammation of the lymphatic vessels and can cause lymphed ema. However, the presentation of palpitation, weight loss, and non-pitting edema is not consistent wit h chronic lymphangitis.

Option D: Dilated cardiomyopathy is incorrect answer

Therefore, based on the given clinical presentation, examination findings, and the most likely cause of t he non-pitting edema, the probable cause for the edema in this patient is Nephrotic syndrome.

Solution for Question 17:

Correct Option: B

• Based on the presentation of a patient with Hepatitis B and heavy proteinuria the most likely finding on renal biopsy would be membranous glomerulonephritis.

• Membranous glomerulonephritis is a type of glomerular disease characterized by the thickening and immune complex deposition along the glomerular basement membrane. It can be associated with various underlying conditions, including solid tumors

• The diffuse capillary and GBM thickening is characteristic finding

Incorrect options

Option A: Focal segmental glomerulosclerosis (FSGS): FSGS is characterized by scarring and sclerosi s of certain glomeruli in a focal and segmental pattern. this option is incorrect.

Option C: Membranoproliferative glomerulonephritis (MPGN): MPGN is characterized by both thickenin g and proliferation of the glomerular basement membrane. This option is incorrect.

Option D: Minimal change disease: Minimal change disease is a
common cause of nephrotic syndrome in children but is less common in adults. This option is incorrect.

Solution for Question 18:

Correct Options: A

The expected metabolic abnormality in a patient with chronic projectile vomiting and weight loss is hyp okalemic hypochloremic metabolic alkalosis with hyponatremia.

• Chronic projectile vomiting can lead to significant fluid and electrolyte imbalances in the body. In this case, the loss of gastric acid and chloride through vomiting results in a decrease in chloride levels (hypochloremia) and an increase in bicarbonate levels (metabolic alkalosis).

• The vomiting also leads to potassium loss (hypokalemia) due to the loss of gastric fluid that contains potassium ions. This can further contribute to the development of metabolic alkalosis.

• Additionally, the chronic vomiting may lead to dehydration and decreased fluid intake, which can result in hyponatremia (low sodium levels) due to dilutional effects.

Now let's review the provided options:

Option A: Hypokalemic hypochloremic metabolic alkalosis with hyponatremia: This option accurately d escribes the expected metabolic abnormality in a patient with chronic projectile vomiting. It reflects the l oss of chloride and potassium through vomiting, resulting in metabolic alkalosis, hypochloremia, and hy ponatremia.

Option B: Hypokalemic hypochloremic metabolic alkalosis with hypernatremia: This option is not consis tent with the clinical presentation. Chronic vomiting typically leads to hyponatremia due to fluid loss and decreased intake, not hypernatremia.

Option C: Hypokalemic hypochloremic metabolic alkalosis with hypercalcemia: Hypercalcemia is not ty pically associated with chronic vomiting and would not be the expected metabolic abnormality in this ca se.

Options D: Hypokalemic hypochloremic metabolic acidosis with hyponatremia: This option does not ma tch the expected metabolic abnormality. Chronic vomiting typically leads to metabolic alkalosis, not met abolic acidosis.

Therefore, the correct answer is hypokalemic hypochloremic metabolic alkalosis with hyponatremia, ref lecting the electrolyte and acid-base disturbances commonly seen in patients with chronic projectile vo miting.

Solution for Question 19:

Correct option: B

The correct answer is: BUN: Cr >20:1, urine Na <20, FENa <1% urine osmolality >500.

• BUN: Cr >20:1, urine Na <20, FENa <1% urine osmolality >500: This option matches the typical laboratory values seen in the described patient. The BUN: Cr ratio is increased, urine sodium is low,

FENa is less than 1%, and urine osmolality is greater than 500. These findings suggest prerenal azotemia, a condition characterized by decreased renal perfusion leading to reduced urine output.

Incorrect options:

Option A: BUN: Cr >40:1, urine Na <40, FENa <1% urine osmolality >500: This option does not match t he typical laboratory values seen in the described patient. In cases of acute tubular necrosis (ATN), wh ich can cause acute kidney injury and decreased urine output, the FENa (Fractional Excretion of Sodiu m) is typically higher than 1% and the urine osmolality is usually lower than 500.

Option C: BUN: Cr >20:1, urine Na <20, FENa <1% urine osmolality >250: This option does not match the typical laboratory values seen in the described patient. The urine osmolality is lower than expected in prerenal azotemia, where it is usually concentrated due to reduced urine output.

Option D: BUN: Cr >40:1, urine Na <20, FENa <1% urine osmolality >250: This option does not match the typical laboratory values seen in the described patient. The BUN: Cr ratio is higher than expected i n prerenal azotemia, and the urine osmolality is lower than expected.

In summary, the laboratory values that are seen in the patient with loose stools and reduced urine freq uency are: BUN: Cr >20:1, urine Na <20, FENa <1%, urine osmolality >500. These findings are consist ent with prerenal azotemia, which can occur due to decreased renal perfusion in conditions such as de hydration or volume depletion.

Solution for Question 20:

Correct Option: B

Based on the information provided, the most likely finding in this 8-year-old girl would be RBC's in the u rine.

Explanation: The clinical presentation of abrupt onset fever, oliguria (reduced urine output), nausea, s moky urine, and puffy eyes is suggestive of a poststreptococcal glomerulonephritis (PSGN) in a child. PSGN is an immune-mediated glomerulonephritis that typically follows a streptococcal infection, such as strep throat or impetigo.

The characteristic skin lesions described by the parents two weeks ago, which are now resolving, are c onsistent with a previous streptococcal infection.

In PSGN, the glomeruli in the kidneys become inflamed due to immune complex deposition. This can l ead to damage of the glomerular filtration barrier, causing red blood cells (RBCs) to leak into the urine, resulting in hematuria. Therefore, RBCs in the urine is a typical finding in PSGN.

Nephrotic range proteinuria, characterized by heavy proteinuria (>3.5 grams per day), is not a typical fe ature of PSGN. PSGN is more commonly associated with hematuria and mild to moderate proteinuria.

Derangement of liver enzymes and neurological symptoms are not typically associated with PSGN. PS GN primarily affects the kidneys and may present with symptoms related to kidney dysfunction, such a s oliguria and smoky urine.

Therefore, based on the given information, the most likely finding in this patient would be RBC's in the urine (hematuria), indicating glomerular involvement in the context of poststreptococcal glomeruloneph ritis.

Solution for Question 21:

Correct Option B:

Peripheral neuropathy is a condition characterized by damage to the peripheral nerves, leading to sym ptoms such as numbness, tingling, and weakness in the extremities. While dialysis is an important treat ment modality for end-stage renal disease (ESRD), it may not directly prevent or reverse peripheral ne uropathy. Peripheral neuropathy in patients with ESRD is typically caused by multiple factors, including diabetes, uremic toxins, and vitamin deficiencies. Dialysis primarily helps in removing waste products and excess fluid from the blood, but it may not directly address the underlying causes of peripheral neu ropathy.

Incorrect Options:

Option A. Seizures: Seizures can occur as a complication of uremia, which is the accumulation of wast e products and toxins in the blood due to kidney dysfunction. Dialysis helps in removing these toxins, r educing their impact on the brain, and lowering the risk of seizures. Therefore, dialysis can help preven t or control seizures in patients with ESRD.

Option C. Metabolic acidosis: Metabolic acidosis is a condition characterized by an imbalance in the bo dy's acid-base balance, resulting in excess acid accumulation. In patients with ESRD, metabolic acidos is commonly occurs due to impaired kidney function. Dialysis helps in removing acid and restoring the acid-base balance, thereby preventing or correcting metabolic acidosis.

Option D. Uremic pericarditis: Uremic pericarditis is inflammation of the pericardium (the sac around th e heart) caused by the accumulation of uremic toxins in the blood. Dialysis helps in removing these toxi ns, reducing inflammation, and preventing or resolving uremic pericarditis.

Solution for Question 22:

Correct Option C:

Hyperkalemia refers to an elevated level of potassium in the blood. In the context of chronic kidney dis ease (CKD), it is considered one of the most severe manifestations. As kidney function declines, the ab ility of the kidneys to excrete potassium decreases, leading to its accumulation in the bloodstream.

Hyperkalemia can have significant consequences on cardiac function and can potentially cause life-thr eatening arrhythmias, including ventricular tachycardia and ventricular fibrillation. The increased risk of cardiac arrhythmias makes hyperkalemia a severe and potentially dangerous complication of CKD.

Incorrect options:

Option A. Decreased GFR: Decreased glomerular filtration rate (GFR) is a hallmark of CKD and represents impaired kidney function. While decreased GFR is a key diagnostic cri terion for CKD, it alone does not indicate the severity of the disease. The progression of CKD and its c omplications, such as hyperkalemia, are influenced by factors beyond the GFR.

Option B. Increased creatinine: Elevated creatinine levels are commonly used as a marker of impaired kidney function. However, while increased creatinine levels are indicative of reduced kidney function in CKD, they do not directly reflect the severity of the disease. Creatinine levels can vary depending on v arious factors, including muscle mass, age, and hydration status.

Option D. Proteinuria: Proteinuria, the presence of excess protein in the urine, is a common finding in CKD. While it is an important marker of kidney damage and can be associated with disease progressio n, it is not considered the most severe manifestation of CKD. Proteinuria can be managed and controll ed through various interventions, including medication and lifestyle modifications, to minimize the risk o

f further kidney damage.

Solution for Question 23:

Correct Option: C: Pituitary DI (diabetes insipidus)

• The patient's presentation of frequent urination, nocturia, and enuresis along with a 24-hour urine volume of 7 liters and low urine osmolarity indicates the inability to concentrate urine, which is a characteristic feature of diabetes insipidus.

• The low ADH (antidiuretic hormone) level detected by the assay suggests a The absence of the bright spot on T1 weighted MRI is consistent with a lack of posterior pituitary gland hyperintensity, further supporting the diagnosis of pituitary DI.

Incorrect Options:

Option A - Nephrogenic DI: This statement is incorrect. Nephrogenic DI is characterized by impaired re nal response to ADH, resulting in the inability to concentrate urine. However, in this scenario, the low A DH level suggests a deficiency in ADH secretion rather than impaired renal response, indicating a different etiology.

Option B - Primary polydipsia: This statement is incorrect. Primary polydipsia refers to excessive water intake leading to water diuresis. It is not associated with a
deficiency in ADH secretion or impaired renal response to ADH, which are seen in diabetes insipidus.

Option D - Mannitol infusion: This statement is incorrect. Mannitol infusion is a
medical intervention involving the administration of mannitol, a
diuretic agent, to increase urine output in specific clinical situations. It is not a
diagnosis for the patient's condition.

Solution for Question 24:

Correct Option: A.

• Arterial blood gas (ABG) analysis is a diagnostic test used to assess a patient's acid-base balance and oxygenation status. In this case, the ABG findings show the following: pH = 7.12: This value indicates acidemia, as the pH is below the normal range of 7.35-7.45. pCO2 = 50: This value represents the partial pressure of carbon dioxide in the arterial blood. An elevated pCO2 indicates respiratory acidosis, as it suggests inadequate elimination of carbon dioxide by the lungs. HCO3 = 28: This value represents the bicarbonate concentration in the blood, which is an indicator of metabolic status. The HCO3 level is within the normal range, suggesting metabolic compensation.

• pH = 7.12: This value indicates acidemia, as the pH is below the normal range of 7.35-7.45.

• pCO2 = 50: This value represents the partial pressure of carbon dioxide in the arterial blood. An elevated pCO2 indicates respiratory acidosis, as it suggests inadequate elimination of carbon dioxide by the lungs.

• HCO3 = 28: This value represents the bicarbonate concentration in the blood, which is an indicator of metabolic status. The HCO3 level is within the normal range, suggesting metabolic compensation.

• Based on these findings, the diagnosis is respiratory acidosis with metabolic compensation. Respiratory acidosis occurs when there is a build-up of carbon dioxide in the blood due to inadequate

ventilation or impaired gas exchange in the lungs. The kidneys respond to the acidosis by increasing the reabsorption of bicarbonate, leading to metabolic compensation.

• pH = 7.12: This value indicates acidemia, as the pH is below the normal range of 7.35-7.45.

• pCO2 = 50: This value represents the partial pressure of carbon dioxide in the arterial blood. An elevated pCO2 indicates respiratory acidosis, as it suggests inadequate elimination of carbon dioxide by the lungs.

• HCO3 = 28: This value represents the bicarbonate concentration in the blood, which is an indicator of metabolic status. The HCO3 level is within the normal range, suggesting metabolic compensation.

Incorrect Options:

Option B. Metabolic acidosis with respiratory compensation: Metabolic acidosis is characterized by a lo w pH and low bicarbonate level. The given ABG findings do not support metabolic acidosis, as the HC O3 level is within the normal range. Additionally, respiratory compensation in metabolic acidosis would involve a decrease in pCO2, which is not seen in this case.

Option C. Respiratory alkalosis with metabolic compensation: Respiratory alkalosis is characterized by a high pH and low pCO2. However, the given ABG findings show acidemia (low pH) and an elevated p CO2, which are inconsistent with respiratory alkalosis.

Option D. Metabolic alkalosis with respiratory compensation: Metabolic alkalosis is characterized by a high pH and high bicarbonate level. The given ABG findings do not support metabolic alkalosis, as the HCO3 level is within the normal range. Additionally, respiratory compensation in metabolic alkalosis wo uld involve an increase in pCO2, which is not seen in this case.

Solution for Question 25:

Correct Option: C.

• In the given scenario, the patient presented with hyponatremia and was treated with a large volume of hypertonic fluids over a short period of time. Following this treatment, the patient developed quadriparesis. These findings are suggestive of central pontine myelinolysis (Choice C).

• Central pontine myelinolysis (CPM) is a condition characterized by the destruction of the myelin sheath in the central portion of the pons, which is a part of the brainstem. It is typically associated with rapid correction of hyponatremia, especially when the correction occurs too quickly. In this case, the hypertonic fluids caused a rapid increase in serum sodium levels, leading to osmotic changes in the brain and subsequent damage to the myelin sheath in the pons.

Incorrect Option:

Option A. Brain infarct: Brain infarct (Choice A) refers to the obstruction of blood flow to a specific area of the brain, resulting in tissue damage. While hyponatremia can contribute to the development of cere bral edema and increase the risk of brain infarction, the rapid correction of hyponatremia in this case is more consistent with CPM.

Option B. Brainstem injury: Brainstem injury (Choice B) can result from trauma or other causes and ca n lead to a range of neurological symptoms. However, the rapid development of quadriparesis followin g the treatment with hypertonic fluids suggests a more specific diagnosis of CPM.

Option D. Rare cause of hypernatremia: Hypernatremia refers to an elevated serum sodium level. In thi s case, the patient presented with hyponatremia and received hypertonic fluids, so the development of hypernatremia is not likely to be the cause of the patient's condition. Therefore, Choice D is an incorrect option.

Solution for Question 26:

Correct Option: A

• AKIN (Acute Kidney Injury Network) and RIFLE (Risk, Injury, Failure, Loss of kidney function, and End-stage kidney disease) criteria are used to classify and diagnose acute kidney injury (AKI). These criteria provide a standardized approach for assessing the severity of AKI based on changes in serum creatinine levels, urine output, and the duration of kidney dysfunction.

• The AKIN criteria were developed in 2007 as an updated version of the RIFLE criteria. Both sets of criteria categorize AKI into different stages based on the magnitude of serum creatinine increase or decrease in urine output. They also consider the duration of kidney dysfunction and the presence of other complications.

Incorrect Option :

Option B. Chronic renal failure: AKIN and RIFLE criteria are specifically designed to classify acute kidn ey injury and are not applicable to chronic renal failure. Chronic renal failure is a progressive and irreve rsible loss of kidney function over an extended period of time, whereas AKI represents a sudden decline in kidney function over a shorter timeframe.

Option C. Acute glomerulonephritis: AKIN and RIFLE criteria are not used to classify acute glomerulon ephritis. Acute glomerulonephritis is an inflammation of the glomeruli in the kidneys and is typically diag nosed based on clinical features, laboratory tests (such as urine analysis and serology), and kidney bio psy findings.

Option D. Nephrotic syndrome: AKIN and RIFLE criteria are not used to classify nephrotic syndrome. N ephrotic syndrome is a clinical syndrome characterized by a specific set of symptoms, including heavy proteinuria, hypoalbuminemia, edema, and hyperlipidemia. It is usually diagnosed based on clinical an d laboratory findings, including urine protein measurement and serum albumin levels.

Solution for Question 27:

Correct Option: D

• The given blood gas reports show a normal pH of 7.40, indicating no primary acid-base abnormality. However, the bicarbonate (HCO3-) level of 23 mEq/L falls within the normal range, suggesting that there is a compensatory mechanism in place. The sodium (Na+) level of 145 mEq/L is also within the normal range.

• The key finding in this case is the elevated anion gap of 100 mEq/L, which indicates the presence of an underlying metabolic acidosis. High anion gap metabolic acidosis is commonly seen in conditions such as diabetic ketoacidosis, lactic acidosis, and renal failure. In this case, the patient's chronic kidney disease is likely contributing to the development of high anion gap metabolic acidosis.

• Additionally, the presence of metabolic alkalosis is suggested by the elevated bicarbonate level (HCO3-). Metabolic alkalosis can occur in conditions such as vomiting or excessive loss of gastric acid, leading to an increase in bicarbonate levels.

• Therefore, the most probable diagnosis based on the given information is high anion gap metabolic acidosis with metabolic alkalosis. The elevated anion gap indicates an underlying acidosis, while the elevated bicarbonate level suggests concurrent metabolic alkalosis.

Incorrect Options:

Option A. No acid-base abnormality: This choice is incorrect because the blood gas reports indicate th e presence of an abnormality, specifically a high anion gap metabolic acidosis with metabolic alkalosis.

Option B. Respiratory acidosis: The blood gas reports do not show any abnormalities in the partial pres sure of carbon dioxide (pCO2), which is a
key indicator of respiratory acidosis. Therefore, respiratory acidosis is not the likely diagnosis.

Option C. Metabolic alkalosis: This choice is incorrect because it only accounts for the metabolic alkalo sis component of the patient's acid-base disturbance. The elevated anion gap metabolic acidosis is als o present and should be considered in the diagnosis.

Solution for Question 28:

Correct option C:

• Nephritic syndrome is characterized by glomerular inflammation, which leads to various clinical features such as hematuria (blood in the urine), proteinuria (excessive protein in the urine), hypertension (high blood pressure), and decreased glomerular filtration rate.

• Post-infectious Glomerulonephritis: This is a type of nephritic syndrome that occurs after an infection, most commonly caused by certain strains of Streptococcus bacteria (such as Streptococcus pyogenes). It is characterized by glomerular inflammation and often presents with hematuria, proteinuria, hypertension, and decreased kidney function. The inflammation is typically a result of immune complex deposition in the glomeruli in response to the infection.

Incorrect options:

Option A. Minimal change disease: Minimal change disease is a type of nephrotic syndrome, not nephr itic syndrome. It is characterized by minimal changes in the glomeruli on microscopic examination and i s commonly seen in children. It typically presents with proteinuria, edema, and hypoalbuminemia.

Option B. Membranous Glomerulopathy: Membranous glomerulopathy is another type of nephrotic syn drome, not nephritic syndrome. It is characterized by thickening of the glomerular basement membrane due to immune complex deposits. It typically presents with proteinuria, edema, and hypoalbuminemia.

Option D. Focal segmental glomerulosclerosis: Focal segmental glomerulosclerosis (FSGS) is another type of nephrotic syndrome, not nephritic syndrome. It is characterized by scarring and sclerosis of cert ain segments of the glomeruli. It typically presents with heavy proteinuria, edema, and hypoalbuminemi a.

Solution for Question 29:

Correct option B

• In this case, the patient presents with a 3x3 cm stone in the right renal pelvis, accompanied by symptoms such as pain abdomen, nausea, restlessness, and episodes of hematuria. The absence of hydronephrosis indicates that the stone has not caused significant obstruction in the urinary tract. Based on these factors, the best procedure for management of this patient is PCNL (Percutaneous Nephrolithotomy).

Incorrect options:

Option A: ESWL (Extracorporeal Shock Wave Lithotripsy) is a non-invasive procedure that uses shock waves to break down kidney stones. However, in this case, the size of the stone (3x3 cm) is relatively l arge, and ESWL may not be effective in fragmenting and removing the stone completely.

Option C: Antegrade Pyeloplasty is a surgical procedure used to treat ureteropelvic junction (UPJ) obst ruction, which is not the primary concern in this case.

Option D: Retrograde Pyeloplasty is also a surgical procedure used for the treatment of UPJ obstructio n, which is not the primary concern in this case.

Solution for Question 30:

Correct option D

• This is the correct option. Priapism is diagnosed when an erection persists for 4 hours or longer. This duration indicates a pathological condition that requires immediate medical attention to prevent complications.

Incorrect options:

Option A: 1 hour - This is an incorrect option. Priapism is defined as a persistent erection lasting longer than 4 hours, so a cutoff of 1 hour would not be appropriate for diagnosis.

Option B: 2 hours - This is an incorrect option. A cutoff of 2 hours is also not appropriate for diagnosing priapism. The prolonged erection should persist for a longer duration to meet the diagnostic criteria.

Option C: 3 hours - This is an incorrect option. A cutoff of 3 hours is still insufficient to diagnose priapism. The erection must persist for a longer duration to meet the diagnostic criteria.

Solution for Question 31:

Correct Option C:

The MELD (Model for End-Stage Liver Disease) score is a numerical scoring system used to assess th e severity and prognosis of liver disease. It is commonly used for liver transplant allocation. The MELD score is calculated using three laboratory parameters: bilirubin, creatinine, and prothrombin time- (INR) .

Incorrect Options:

Option A: Bilirubin: This option is incorrect. Bilirubin is included as one of the components of the MELD score.

Option B: Prothrombin time: This option is incorrect. Prothrombin time is included as one of the compo nents of the MELD score.

Option D: Creatinine: This option is incorrect. Creatinine is included as one of the components of the M ELD score.

Solution for Question 32:

Correct Option : A

Anion Gap = [Na+] - ([Cl-] + [HCO3-])

Given the values: [Na+] = 137 mmol/L [Cl-] = 100 mmol/L [HCO3-] = 15 mmol/L

Anion Gap = 137 - (100 + 15) = 137 - 115 = 22 mmol/L

Incorrect option:

Option B: Incorrect answer

Option C. Incorrect answer

Option D. Incorrect Answer

Solution for Question 33:

Correct option:

Option A.

• Acute kidney injury This option is correct. AKIN (Acute Kidney Injury Network) and RIFLE (Risk, Injury, Failure, Loss, End-stage kidney disease) criteria are used to classify and diagnose acute kidney injury. These criteria consider changes in serum creatinine levels, urine output, and the time frame in which these changes occur to determine the severity of acute kidney injury.

Incorrect options:

Option B. Chronic renal failure This option is incorrect. AKIN and RIFLE criteria are not used to classify chronic renal failure. Chronic renal failure is a progressive, long-term condition characterized by a per manent loss of kidney function over time. It is usually diagnosed and classified based on the estimated glomerular filtration rate (eGFR) and the presence of kidney damage lasting for at least three months.

Option C. Acute glomerulonephritis This option is incorrect. AKIN and RIFLE criteria are not used to cla ssify acute glomerulonephritis. Acute glomerulonephritis refers to the inflammation and damage of the glomeruli in the kidneys. It is typically diagnosed through clinical symptoms, laboratory tests, and kidne y biopsies.

Option D. Nephrotic syndrome This option is incorrect. AKIN and RIFLE criteria are not used to classify nephrotic syndrome. Nephrotic syndrome is a collection of symptoms characterized by increased prote inuria, hypoalbuminemia, edema, and hyperlipidemia. It is usually diagnosed based on clinical findings, urine tests, and blood tests.

Solution for Question 34:

Correct option:

Option C.

• High anion gap metabolic acidosis with metabolic alkalosis. The low sodium level suggests hyponatremia, which is associated with metabolic alkalosis. The elevated anion gap indicates the presence of a metabolic acidosis, likely due to renal failure or other underlying causes Let's analyze the given ABG values: pH: 7.4 (within the normal range, indicating no primary acid-base disturbance) Na+: 14 mEq/L (low) Cl-: 100 mEq/L (within the normal range) HCO3-: 24 mEq/L (within the normal range) PaCO2: 40 mmHg (within the normal range) From these values, we can determine the likely metabolic abnormality. The low sodium (Na+) level suggests hyponatremia, which can occur in patients with renal failure. In this case, the patient has a concurrent high anion gap metabolic acidosis with metabolic alkalosis.

• Let's analyze the given ABG values:

• pH: 7.4 (within the normal range, indicating no primary acid-base disturbance)

• Na+: 14 mEq/L (low)

• Cl-: 100 mEq/L (within the normal range)

• HCO3-: 24 mEq/L (within the normal range)

• PaCO2: 40 mmHg (within the normal range)

• From these values, we can determine the likely metabolic abnormality. The low sodium (Na+) level suggests hyponatremia, which can occur in patients with renal failure. In this case, the patient has a concurrent high anion gap metabolic acidosis with metabolic alkalosis.

• Let's analyze the given ABG values:

• pH: 7.4 (within the normal range, indicating no primary acid-base disturbance)

• Na+: 14 mEq/L (low)

• Cl-: 100 mEq/L (within the normal range)

• HCO3-: 24 mEq/L (within the normal range)

• PaCO2: 40 mmHg (within the normal range)

• From these values, we can determine the likely metabolic abnormality. The low sodium (Na+) level suggests hyponatremia, which can occur in patients with renal failure. In this case, the patient has a concurrent high anion gap metabolic acidosis with metabolic alkalosis.

Incorrect Option:

Option A. Normal ABG: This option is incorrect because there is evidence of an abnormality in the ABG analysis (low sodium level).

Option B. Normal anion gap, metabolic acidosis: This option is incorrect because the anion gap is elev ated in this case. The normal anion gap is associated with a
chloride-based metabolic acidosis, which is not present here.

Option D. High anion gap metabolic alkalosis with normal metabolic acidosis: This option is incorrect b ecause there is evidence of a metabolic acidosis in the ABG analysis (elevated anion gap).

Solution for Question 35:

Correct

Option C:

Renal aciduria refers to a condition characterized by the inability of the kidneys to effectively reabsorb bicarbonate or excrete hydrogen ions, leading to a
decreased bicarbonate concentration and metabolic acidosis. It is a
form of renal tubular acidosis (RTA). In this patient's case, the metabolic acidosis is likely due to a different cause, as indicated by the presence of an increased anion gap.

Incorrect Options:

Options A. Renal failure: Renal failure can lead to the accumulation of metabolic waste products and i mpaired acid-base regulation, resulting in metabolic acidosis. It can be classified as high anion gap me tabolic acidosis or normal anion gap metabolic acidosis, depending on the underlying cause. Therefore , renal failure can be associated with metabolic acidosis with an increased anion gap, similar to the pati ent's condition.

Options B. Lactic acidosis: Lactic acidosis occurs when there is an overproduction or impaired clearanc e of lactic acid. It can be caused by various conditions, such as tissue hypoperfusion, shock, sepsis, or certain medications. Lactic acidosis is typically associated with an increased anion gap metabolic acido sis, similar to the patient's presentation.

Options D. Aspirin: Aspirin, when taken in high doses, can cause toxicity and lead to metabolic acidosi s. Aspirin toxicity is characterized by increased production of organic acids and impaired respiratory co mpensation. This type of metabolic acidosis is also associated with an increased anion gap, similar to t he patient's condition.

Solution for Question 36:

Correct Ans: A

• Post-streptococcal glomerulonephritis (PSGN) is an immune-mediated glomerulonephritis that typically occurs after a streptococcal infection, such as strep throat or skin infection. It commonly affects children and presents with symptoms such as pedal edema (swelling of the feet), facial puffiness, hypertension (elevated blood pressure), and proteinuria (presence of excess protein in the urine).

• In PSGN, the immune response triggered by the streptococcal infection causes immune complexes (antigen-antibody complexes) to deposit in the glomeruli of the kidneys. This deposition leads to inflammation and damage to the glomerular filtration barrier, resulting in the clinical manifestations observed in the patient.

Incorrect options:

Option B. Minimal change disease: Minimal change disease is a common cause of nephrotic syndrome in children, characterized by proteinuria, hypoalbuminemia, edema, and normal renal function. It is usu ally not associated with hematuria (presence of red blood cells in the urine), as seen in the patient's ca se.

Option C. Membranous glomerulonephritis: Membranous glomerulonephritis is characterized by the thi ckening of the glomerular basement membrane due to immune complex deposition. It typically present s with nephrotic syndrome, including proteinuria, hypoalbuminemia, and edema. Hematuria is less com monly observed in membranous glomerulonephritis.

Option D. Focal segmental glomerulosclerosis: Focal segmental glomerulosclerosis is a pattern of glo merular injury that can be primary (idiopathic) or secondary to other conditions. It often presents with n

ephrotic syndrome, including proteinuria, hypoalbuminemia, and edema. Hematuria is not a typical finding in focal segmental glomerulosclerosis.

Solution for Question 37:

Correct Option B - Hypercarbia:

• Asterixis or flapping tremors is a sign of metabolic encephalopathy.

• This can occur due to increased levels of ammonia (hepatic encephalopathy), increased levels of urea, or increased levels of CO2.

• Hypercarbic encephalopathy occurs most frequently in patients with a history of chronic CO2 retention who are receiving oxygen therapy for emphysema or chronic pulmonary disease

• Asterixis can be elicited by having patients extend their arms and bend their wrists back. In this maneuver, patients who are encephalopathic have a “liver flap”—that is, a sudden forward movement of the wrist.

Incorrect Options:

Options A- Thyrotoxicosis:

• Thyrotoxicosis is ruled out as it presents with fine tremors.

Options C- Hemiballismus:

• Hemiballismus will have widing flinging movements at the shoulders.

Options D- Hypoxia:

• Hypoxia causes disorentation, and irritability.

Solution for Question 38:

Correct Option-B - IPD management with IV drugs:

• To decide if the patient needs hospitalization or not CURB-65 score needs to be calculated.

CURB-65 score

Confusion

1 point

BUN ≥ 7 mmol/L

Respiratory rate > 30/min

BP<90/60 mm Hg

• Based on the history on the above history and the laboratory parameters, the CURB-score is 2 (1 point each for respiratory rate and altered sensorium) and the patient needs to be admitted to the hospital

Incorrect Options:

Option A, C, and D:

• As the CURB-65 score is 2, the patient requires hospitalization.

GI Bleed

1. A 45-year-old male presents to the emergency department with severe abdominal pain and rebound tenderness. Upon further examination, the patient's history reveals a longstanding complaint of epigastric discomfort. The patient's symptoms have escalated over the past 24 hours, and he reports feeling lightheaded. An abdominal X-ray reveals the presence of gas under the diaphragm, consistent with the "Moustache sign." Which of the following statements aligns correctly with the diagnosis of this patient?

(or)

Which of the following statements aligns correctly with perforated duodenal ulcer?

A. Most common cause of peritonitis is a posteriorly located gastric ulcer

B. Bleeding is more commonly associated with duodenal ulcers with anterior location

C. "Moustache sign" on the abdominal X-ray indicates perforation peritonitis

D. Initial management of the perforated duodenal ulcer involves upper GI endoscopy with adrenaline application at the base of the ulcer and electrocautery

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2. A 38-year-old male presents to the emergency department with a complaint of severe hematemesis. The patient reports a recent episode of excessive alcohol consumption during a binge drinking session. He describes several bouts of forceful retching preceding the onset of hematemesis. On examination, heart rate is increased, and blood pressure is 100/70 mmHg. Which of the following options accurately corresponds to the likely diagnosis and management strategy for this patient?

(or)

Which of the following options accurately corresponds to Mallory-Weiss syndrome?

A. The patient is likely suffering from esophageal varices, and the initial management involves beta-blockers for hemodynamic control

B. Mallory-Weiss syndrome is suspected, and if bleeding recurs, the recommended approach is upper gastrointestinal endoscopy with local adrenaline injection and hemostatic clips

C. This patient's symptoms are indicative of a lower gastrointestinal bleed, and the initial diagnostic step should include a colonoscopy

D. Given the history of alcohol consumption, the patient is likely experiencing an acute pancreatitis episode, and treatment involves pancreatic enzyme replacement therapy.

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3. A 55-year-old male, a known case of chronic liver disease, presents to the ER with an episode of hematemesis and has splenomegaly on per abdomen examination. Which of the following accurately describes the source of bleeding in this patient's presentation?

(or)

Which of the following accurately describes the source of bleeding in portal hypertension?

A. The bleeding is likely originating from the hepatic artery due to increased pressure in the portal system

B. Esophageal varices with gastric veins are the source of bleeding in this patient with portal hypertension

C. The source of bleeding is primarily from the superior mesenteric artery

D. Hematemesis in portal hypertension is commonly caused by erosive gastritis with involvement of the gastric arteries

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4. A 28-year-old woman presents to a clinic with complaints of colicky abdominal pain and episodes of severe bloody diarrhea occurring 10-15 times a day. Physical examination reveals pallor, puffy eyes, and pedal edema. What is the likely diagnosis for this patient, and which antibody test may aid in confirming the specific subtype of inflammatory bowel disease?

A. The likely diagnosis is irritable bowel syndrome (IBS), and the antibody test for IBS is A.S.C.A (Anti saccharomyces cerevisiae antibody)

B. This patient likely has Crohn's disease, and the associated antibody test for Crohn's disease is p-ANCA

C. The diagnosis is ulcerative colitis, and the associated antibody test for ulcerative colitis is p-ANCA

D. The likely diagnosis is infectious gastroenteritis, and the antibody test for confirming the infection is p-ANCA.

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5. A 45-year-old woman presents with recurrent intermittent chest pain at rest, accompanied by episodes of dysphagia. An ECG is normal. Patient undergoes barium swallow. Which of the following is correct about the diagnosis and findings seen in this condition?

(or)

What is the characteristic barium swallow finding seen in diffuse esophageal spasm?

A. Barium swallow shows irregular narrowing of lower esophagus, suggesting stricture formation

B. Smooth and symmetric narrowing of the esophagus, consistent with diagnosis of esophageal diverticulum

C. Corkscrew or Rosary bead appearance is consistent with the diagnosis of diffuse esophageal spasm

D. Dilated esophagus with impaired peristalsis, resembling a "bird's beak" appearance

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6. A 40-year-old patient presents with painless rectal bleeding. Proctoscopy is performed to investigate the source of bleeding, revealing internal hemorrhoids. Which of the following statements accurately describes Grade III internal hemorrhoids?

(or)

Which of the following statements accurately describes Grade III internal hemorrhoids?

A. Only visible on proctoscopy

B. Veins prolapsing during defecation and show spontaneous reduction

C. Veins prolapse out during defecation and reduce only on digital repositioning

D. Veins prolapse out during defecation and do not reduce on digital repositioning

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7. A 55-year-old patient presents with hematemesis and workup reveals a bleeding gastric ulcer. Which of the following is correct about gastric ulcer?

(or)

Which of the following is correct about gastric ulcer?

A. Most common site for gastric ulcers is the greater curvature

B. Gastric ulcers most commonly occur in the lesser curvature

C. Bleeding gastric ulcers are predominantly found in the fundus, and are associated with hiatal hernia

D. Gastric ulcers commonly occur at the pylorus

E.

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8. A 50-year-old patient presents with sudden-onset chest pain after a bout of forceful vomiting. The patient reports feeling a tearing sensation in the lower chest. Considering suspected diagnosis of Boerhaave syndrome, which investigation is the most appropriate for confirming the rupture site and guiding further management?

(or)

Which investigation is the most appropriate for confirming the rupture site and guiding further management in Boerhaave syndrome?

A. Esophageal manometry

B. Upper gastrointestinal endoscopy

C. CT chest with oral contrast

D. Barium swallow

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9. Which of the following conditions causes increased lower esophageal sphincter tone?

A. Achalasia Cardia

B. Gastroesophageal Reflux Disease

C. Diffuse Esophageal Spasm

D. Nutcracker Esophagus

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10. A 35-year-old woman presents with progressive dysphagia, halitosis, and recurrent episodes of regurgitation of undigested food items. Esophageal manometry reveals increased tone of the lower esophageal sphincter. Which of the following is correct about the radiographic findings of this condition?

(or)

What specific radiographic appearance is expected in achalasia cardia?

A. "Bird's beak" appearance in barium enema

B. Pencil tip appearance in barium swallow

C. Rat tail filling defect on barium swallow

D. "String of beads" appearance on barium swallow

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	2
Question 3	2
Question 4	3
Question 5	3
Question 6	3
Question 7	2
Question 8	3
Question 9	1
Question 10	2

Solution for Question 1:

Correct Options C - "Moustache sign" on the abdominal X-ray indicates perforation peritonitis:

• The "Moustache sign" on an abdominal X-ray is characteristic of free intraperitoneal air, seen in cases of perforated duodenal ulcers.

• This sign indicates the presence of gas under the diaphragm.

Incorrect Options:

Option A - Most common cause of peritonitis is a posteriorly located gastric ulcer: The most frequent ca use of peritonitis in duodenal ulcers is an anteriorly located perforation, not a posterior perforation.

Option B- Bleeding is more commonly associated with duodenal ulcers with anterior location: Bleeding associated with duodenal ulcers primarily occurs from the posterior source, often involving the Gastrod uodenal artery, not the anterior source.

Option D - Initial management of the perforated duodenal ulcer involves upper GI endoscopy with adre naline application at the base of the ulcer and electrocautery: Initial management of a perforated duode nal ulcer involves emergent surgery, not upper GI endoscopy. Adrenaline and electrocautery are used i n the acute management of bleeding peptic ulcers.

Solution for Question 2:

Correct Option B - Mallory-Weiss syndrome is suspected, and if bleeding recurs, the recommended ap proach is upper gastrointestinal endoscopy with local adrenaline injection and hemostatic clips:

• The patient's presentation with severe hematemesis following excessive alcohol consumption and forceful retching is suggestive of Mallory-Weiss syndrome.

• This syndrome is characterized by submucosal tears near the gastroesophageal junction, often associated with vigorous vomiting or retching. The primary site of the tear is the lower esophageal sphincter, and the bleeding source is the left gastric artery.

• It is a self-limiting condition.

• However, in case of recurrence, endoscopic adrenaline injection and hemostatic clips may be required.

Incorrect Options:

Option A - The patient is likely suffering from esophageal varices, and the initial management involves beta-blockers for hemodynamic control: Esophageal varices are associated with chronic liver disease, not acute alcohol-related binge drinking. Initial management of esophageal varices involves vasoactive medications like octreotide or endoscopic intervention, not beta-blockers.

Option C - This patient's symptoms are indicative of a lower gastrointestinal bleed, and the initial diagnostic step should include a colonoscopy: The presentation and history suggest an upper gastrointestinal bleed (Mallory-Weiss syndrome) rather than a lower gastrointestinal bleed. A colonoscopy is not the initial diagnostic step in this context.

Option D - Given the history of alcohol consumption, the patient is likely experiencing an acute pancreatitis episode, and treatment involves pancreatic enzyme replacement therapy: The patient's symptoms and history are more indicative of Mallory-Weiss syndrome related to alcohol consumption and retching, not acute pancreatitis. Pancreatic enzyme replacement therapy is not the appropriate treatment for this scenario.

Solution for Question 3:

Correct Option B - Esophageal varices with gastric veins are the source of bleeding in this patient with portal hypertension:

• Portal hypertension, seen in chronic liver disease, leads to increased pressure in the portal venous system. When the hepatic venous pressure gradient exceeds 5 mmHg and particularly when it surpasses 12 mmHg, esophageal varices may rupture, resulting in hematemesis. The source of bleeding is attributed to the rupture of esophageal varices and esophageal collaterals with gastric veins.

Incorrect Options:

Option A - The bleeding is likely originating from the hepatic artery due to increased pressure in the portal system: Portal hypertension does not lead to bleeding from the hepatic artery. The primary impact is on the portal venous system and its tributaries.

Option C - The source of bleeding is primarily from the superior mesenteric artery: The superior mesenteric artery is not directly implicated in the source of bleeding in portal hypertension. The primary concern lies in the portal venous system and its complications, such as esophageal varices.

Option D - Hematemesis in portal hypertension is commonly caused by erosive gastritis with involvement of the gastric arteries: Erosive gastritis causes peptic ulceration.

Solution for Question 4:

Correct Option C
- The diagnosis is ulcerative colitis, and the associated antibody test for ulcerative colitis is p-ANCA:

• The patient's symptoms, including colicky abdominal pain, severe bloody diarrhea, and physical examination findings of pallor, puffy eyes, and pedal edema, are suggestive of severe ulcerative colitis. In ulcerative colitis, inflammation predominantly affects the colon, leading to bloody diarrhea and systemic symptoms. The associated antibody for ulcerative colitis is p-ANCA (perinuclear antineutrophil cytoplasmic antibody).

Incorrect Options:

Option A - The likely diagnosis is irritable bowel syndrome (IBS), and the antibody test for IBS is A.S.C.A (Anti saccharomyces cerevisiae antibody): The symptoms and clinical presentation described are more indicative of inflammatory bowel disease (IBD), not irritable bowel syndrome (IBS). The associated antibody for Crohn's disease is A.S.C.A, not IBS.

Option B - This patient likely has Crohn's disease, and the associated antibody test for Crohn's disease is p-ANCA: The symptoms and presentation align more with ulcerative colitis than Crohn's disease. Additionally, the correct antibody associated with Crohn's disease is A.S.C.A, not p-ANCA.

Option D - The likely diagnosis is infectious gastroenteritis, and the antibody test for confirming the infection is p-ANCA: The symptoms described are more suggestive of chronic inflammatory conditions like IBD rather than infectious gastroenteritis. Additionally, p-ANCA is associated with ulcerative colitis, not infectious gastroenteritis.

Solution for Question 5:

Correct Option C
- Corkscrew or Rosary bead appearance is consistent with the diagnosis of diffuse esophageal spasm:

• Diffuse esophageal spasm is associated with abnormal, uncoordinated contractions of the esophageal muscles, leading to a corkscrew or Rosary bead appearance on a barium swallow study.

• This distinctive radiographic finding results from the simultaneous, high-amplitude contractions of the esophageal wall.

Incorrect Options:

Option A - Barium swallow shows irregular narrowing of the lower esophagus, suggesting stricture formation: Narrowing at the lower esophagus is suggestive of stricture formation.

Option B - Smooth and symmetric narrowing of the esophagus, consistent with diagnosis of esophageal diverticulum: This description is suggestive of conditions such as achalasia or esophageal diverticula.

Option D - Dilated esophagus with impaired peristalsis, resembling a
"bird's beak" appearance: Dilated esophagus with impaired peristalsis, resembling a
"bird's beak" appearance, is more indicative of achalasia.

Solution for Question 6:

Correct Option C - Veins prolapse out during defecation and reduce only on digital repositioning:

In the grading system for internal hemorrhoids:

• Grade I: Veins are visible on proctoscopy.

• Grade II: Veins prolapse out, with spontaneous reduction.

• Grade III: Veins prolapse out, and they can be manually repositioned successfully.

• Grade IV: Veins prolapse out, and digital repositioning fails.

Incorrect Options:

Options A, B, and D: Are for grades I, II, and IV, respectively.

Solution for Question 7:

Correct Option B - Gastric ulcers most commonly occur in the lesser curvature:

In the context of gastric ulcers:

• The most common site for gastric ulcers is the lesser curvature.

• The bleeding in gastric ulcers is attributed to the left gastric artery.

• The presentation of bleeding gastric ulcers and duodenal ulcers often involves crashing blood pressure.

Incorrect Options:

Option A, C, D: The most common site of gastric ulcer is the lesser curvature.

Solution for Question 8:

Correct Option C - CT chest with oral contrast:

• In suspected Boerhaave syndrome, CT chest with oral contrast (commonly Gastrografin contrast) is the investigation of choice. This imaging modality is effective in confirming the rupture site, evaluating the extent of mediastinal involvement, and guiding further management.

Incorrect Options:

Option A - Esophageal manometry: It is used for assessing esophageal motility disorders.

Option B - Upper gastrointestinal endoscopy: It is not the primary investigation for confirming the ruptur e site. It can worsen the rupture.

Option D - Barium swallow: Barium swallow is not the preferred investigation in the acute setting of Bo erhaave syndrome. It can lead to leakage of contrast into the mediastinum, causing chemical mediastin itis.

Solution for Question 9:

Correct Option A - Achalasia Cardia:

• Due to the loss of nitric oxide and vasoactive intestinal peptide-releasing inhibitory neurons, loss of inhibitory innervation in achalasia results in failure of LES relaxation as well as loss of esophageal peristalsis.

Incorrect Options:

Options B, C, D: GERD will have reduced LES tone. Diffuse esophageal spasm and nutcracker esopha gus will have non-coordinated esophageal contractions.

Solution for Question 10:

Correct Option B - Pencil tip appearancein barium swallow:

• Achalasia cardia is the clinical diagnosis and shows smooth tapering of contrast in lower esophagus.

Incorrect Options:

Option A - "Bird's beak" appearance in barium enema: It is seen in sigmoid volvulus.

Option C - Rat tail filling defect on barium swallow: It is seen in carcinoma esophagus.

Option D - "String of beads" appearance on barium swallow: It is seen in diffuse esophageal spasm.

Peptic Ulcer Disease

1. A 35-year-old patient has been diagnosed with Peutz-Jeghers Syndrome. What is the most common site for the development of polyps seen in this condition?

(or)

What is the most common site for developing polyps in Peutz-Jeghers Syndrome?

A. Colon

B. Duodenum

C. Jejunum

D. Ileum

---

2. Which artery is the source of bleeding in gastric ulcer?

A. Celiac artery

B. Left gastric artery

C. Superior mesenteric artery

D. Splenic artery

---

3. Which artery is the most common source of bleeding in duodenal ulcer?

A. Left gastric artery

B. Superior mesenteric artery

C. Gastroduodenal artery

D. Splenic artery

---

4. A 60-year-old patient presents to the emergency department with severe left iliac fossa pain and obstipation, unable to pass even flatus. Which radiological finding is most likely to be observed in this patient's X-ray abdomen?

A. Cupola sign

B. Coffee bean sign

C. Target sign

D. Thumbprinting sign

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	2
Question 3	3

Question 4	2

Solution for Question 1:

Correct Option C - Jejunum:

• In Peutz-Jeghers Syndrome, hamartomatous polyps are most commonly found in the jejunum.

• These polyps can lead to recurrent episodes of bleeding, obstruction, and intussusception.

Incorrect Options:

Options A, B, and D are ruled out based on above explanation.

Solution for Question 2:

Correct Option B - Left gastric artery:

• The source of bleeding in gastric ulcer is primarily the left gastric artery. Gastric ulcers can erode into blood vessels, leading to gastrointestinal bleeding.

• The left gastric artery, a branch of the celiac artery, supplies blood to the lesser curvature of the stomach and is commonly implicated in bleeding associated with gastric ulcers.

Incorrect Option:

Option A - Celiac artery:

• The celiac artery is the main arterial supply to the upper abdominal organs, including the stomach. While it supplies blood to the stomach, the left gastric artery, a branch of the celiac artery, is specifically responsible for bleeding in gastric ulcers.

Option C - Superior mesenteric artery:

• The superior mesenteric artery supplies blood to the small intestine and parts of the large intestine, but it is not directly involved in bleeding associated with gastric ulcers.

Option A - Splenic artery:

• The splenic artery supplies blood to the spleen, pancreas, and parts of the stomach. While it contributes to the blood supply of the stomach, it is not the primary source of bleeding in gastric ulcers.

Solution for Question 3:

Correct Option C - Gastroduodenal artery:

• The most common source of bleeding in duodenal ulcer is the gastroduodenal artery. Duodenal ulcers can erode into blood vessels, leading to gastrointestinal bleeding.

• The gastroduodenal artery, a branch of the common hepatic artery, supplies blood to the stomach and duodenum. Bleeding from a duodenal ulcer typically occurs from the posterior branch of the gastroduodenal artery.

Incorrect Options:

Option A - Left gastric artery:

• While the left gastric artery is a branch of the celiac artery and contributes to the blood supply of the stomach, it is the primary source of bleeding in gastric ulcers not duodenal ulcers.

Option B - Superior mesenteric artery:

• The superior mesenteric artery supplies blood to the small intestine and parts of the large intestine but is not directly involved in bleeding associated with duodenal ulcers.

Option D - Splenic artery:

• The splenic artery supplies blood to the spleen, pancreas, and parts of the stomach but is not the primary source of bleeding in duodenal ulcers.

Solution for Question 4:

Correct Option B - Coffee bean sign:

• The patient's symptoms and clinical presentation are indicative of sigmoid volvulus.

• The radiological finding most commonly associated with sigmoid volvulus on X-ray abdomen is the "coffee bean sign." This sign appears due to the characteristic twisted appearance of the sigmoid colon resembling two adjacent coffee beans.

• It is a result of the torsion and subsequent obstruction of the sigmoid colon.

Incorrect Option:

Option A - Cupola sign:

• The cupola sign refers to the appearance of a rounded dome-like opacity seen on X-ray or CT scan in cases of colonic pseudo-obstruction (Ogilvie syndrome), not sigmoid volvulus.

Option C - Target sign:

• The target sign is typically observed in imaging studies such as CT scans in cases of intussusception, where the inner hypodense ring represents the intussusceptum and the outer hyperdense ring represents the intussuscipiens.

Option D - Thumbprinting sign:

• The thumbprinting sign refers to the appearance of thumbprint-like indentations seen on abdominal X-rays or CT scans in cases of acute colitis, often associated with inflammatory bowel disease or ischemic colitis. It is not specific to sigmoid volvulus.

Diseases of Adrenal Gland

1. Which of the following statements accurately describes the functional characteristics of different layers of the adrenal gland?

A. The zona glomerulosa primarily secretes cortisol

B. The zona fasciculata synthesizes mineralocorticoids such as aldosterone

C. The zona reticularis is responsible for the production of androgens.

D. The adrenal medulla secretes glucocorticoids.

---

2. A 12-year-old female presents with a lack of development of secondary sexual characteristics. Laboratory investigations reveal low serum potassium and elevated levels of mineralocorticoids, as well as decreased sex hormones and cortisol. Which of the following enzyme deficiencies is most likely responsible for this patient's condition?

(or)

What enzyme deficiency is likely responsible for the lack of secondary sexual characteristics, with low serum potassium, elevated mineralocorticoids, and decreased sex hormones and cortisol in a 12-year-old female?

A. 21-Hydroxylase Deficiency

B. 11-Beta Hydroxylase Deficiency

C. 17-Hydroxylase Deficiency

D. 3-Beta Hydroxysteroid Dehydrogenase Deficiency

---

3. Aldosterone exerts its effects on renal tubular cells to regulate sodium and potassium balance. Which of the following statements accurately describes the mechanism of action of aldosterone?

(or)

Which of the following describes the mechanism of action of aldosterone?

A. Aldosterone acts directly on the intercalated cells of the collecting duct, stimulating the secretion of acids in the urine.

B. Aldosterone binds to its receptor in the principal cells of the collecting duct, activating various channels and the Na-K-ATPase pump.

C. Aldosterone primarily acts on the distal convoluted tubule, inhibiting the reabsorption of sodium and enhancing the secretion of potassium.

D. Aldosterone exerts its effects by directly binding to cell membrane receptors, stimulating the activity of H+ ATPase.

---

4. A 42-year-old woman with a history of persistent hypertension presents with muscle weakness, frequent urination, and palpitations. Despite taking multiple antihypertensive medications for two years, her blood pressure remains high at 160/98 mmHg. Lab results show a serum potassium level of 2.8 mEq/L, high serum bicarbonate of 32 mEq/L, and plasma aldosterone concentration of 310 ng/dL with suppressed plasma renin activity. A salt loading test is performed to further evaluate her condition. What test result would be consistent with the suspected diagnosis?

(or)

Which result from the salt loading test is most consistent with the suspected diagnosis in a female with persistent refractory hypertension, hypokalemia, metabolic alkalosis, elevated plasma aldosterone concentration, and suppressed plasma renin activity?

A. A significant decrease in plasma aldosterone concentration after salt loading

B. A significant increase in plasma aldosterone concentration after salt loading

C. A significant decrease in plasma renin activity after salt loading

D. A significant increase in plasma renin activity after salt loading

---

5. A 45-year-old male presents with a long history of uncontrolled hypertension despite receiving multiple antihypertensive medications. Laboratory tests reveal persistently high potassium levels, a blood pH of 7.35, hyperchloremia, and decreased renin activity. Which of the following conditions is the most likely underlying cause?

(or)

What is the most likely underlying cause of uncontrolled hypertension, hyperkalemia, and metabolic acidosis in a male?

A. Gordon's syndrome

B. Bartter Syndrome

C. Addison's disease

D. Sheehan syndrome

---

6. A 35-year-old woman presents with weakness, weight loss, hyperpigmentation under her breast, and increased craving for salty foods. Upon examination, low blood pressure and hyperpigmentation under the breast were noticed. Lab tests indicate low cortisol levels and high plasma adrenocorticotropic hormone levels, as well as a serum sodium level of 128 mEq/L and a serum potassium level of 6.2 mEq/L. Which of the following is true about the drug of choice for treating this condition?

(or)

Which statement is true regarding the drug of choice for the treatment of the disease in a female with low blood pressure, hyperpigmentation, hyponatremia, hyperkalemia, low plasma cortisol, and elevated plasma ACTH levels?

A. It exhibits a high mineralocorticoid to glucocorticoid ratio

B. It exhibits a low mineralocorticoid to glucocorticoid ratio

C. It exhibits equal mineralocorticoid and glucocorticoid activity

D. It exhibits potent glucocorticoid activity only

---

7. A 38-year-old female presents with symptoms of chronic fatigue, increased susceptibility to infections, and difficulty coping with stress. Laboratory tests reveal low cortisol levels. Considering the functions of cortisol, which of the following physiological processes is primarily associated with cortisol?

(or)

Which physiological process is primarily associated with cortisol?

A. Maintenance of calcium homeostasis and bone health

B. Regulation of body temperature and thermoregulation

C. Modulation of the body's stress response and immune function

D. Regulation of fluid balance and electrolyte levels

---

8. A 32-year-old male with a known history of asthma has been on long-term oral prednisone. He presents to the clinic with complaints of easy bruising and poor wound healing. Upon examination, a round face, central obesity, and thin skin with striae are observed. Lab investigations revealed elevated blood glucose levels. Which of the following measures is the most appropriate to avoid the mentioned complications in this patient?

(or)

What is the most appropriate measure to prevent complications like elevated blood glucose, round face, central obesity, and poor wound healing in a male with asthma on long-term oral prednisone?

A. Increase the dose of oral corticosteroids for better control of asthma.

B. Switch to long-acting corticosteroids for a sustained effect.

C. Divide the daily corticosteroid dose into multiple administrations throughout the day.

D. Gradually taper the corticosteroid dose when discontinuing treatment.

---

9. A 40-year-old woman presents with a complaint of weight gain over the past 5 months. She has central obesity, buffalo hump, and abdominal striae on physical examination. A diagnosis of Cushing's syndrome is made. Mark the correct statement regarding the Cushing syndrome.

(or)

Mark the correct statement regarding the Cushing syndrome.

A. Leading cause of ACTH independent Cushing syndrome is Pituitary Corticotroph adenoma

B. ACTH independent Cushing syndrome constitutes 20% of total cases of Cushing syndrome

C. Leading cause of ACTH-dependent Cushing syndrome is Adrenocortical adenoma

D. Small cell lung cancer produces ectopic cortisol

---

10. A 60-year-old woman with a 40-pack-year history of smoking is experiencing shortness of breath and difficulty climbing stairs. Examination revealed reduced breath sounds over the right lung base, and a chest X-ray showed a lung mass in her right lower lobe. Her serum cortisol and ACTH levels are at the upper limit of normal and are not suppressed after low-dose dexamethasone administration. What changes are likely to occur in her cortisol and ACTH levels after administering high-dose dexamethasone?

(or)

Which of the following changes are most likely to occur to ACTH and cortisol after administration of high-dose dexamethasone in an old woman with small cell lung carcinoma?

A. Decrease, decrease

B. Increase, Increase

C. No change, No change

D. Increase , Decrease

---

11. A 38-year-old man with a family history of MEN2 presents with an intermittent and severe headache, palpitations, and excessive sweating. A palpable mass is detected in his upper left abdomen during the physical examination and his blood pressure is 180/100 mmHg. Laboratory tests reveal increased urinary levels of metanephrines and catecholamines. What is the investigation of choice for this patient?

(or)

What is the investigation of choice for a male who presents with intermittent headache, palpitations, and profuse sweating with a family history of multiple endocrine neoplasia type 2 (MEN2) and laboratory investigations demonstrating increased urinary levels of metanephrines and catecholamines?

A. Contrast-enhanced CT scan of the abdomen

B. 24-hour urine collection for vanillylmandelic acid (VMA)

C. Plasma-free metanephrines

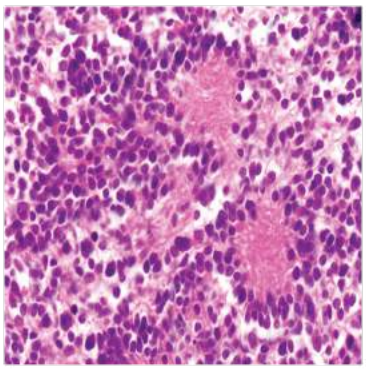
D. MRI of the abdomen

---

12. A 3-year-old child is brought a history of abdominal distension and diarrhea. The parents report that the child has lost weight and appears pale recently. Physical examination reveals a firm, irregular mass in the abdomen. Laboratory investigations show anemia and elevated urinary catecholamines. A biopsy of the mass is performed, and a histological image is shown below. Which of the following factors is most likely to be associated with a good prognosis in this patient?

(or)

What factor correlates with a favorable prognosis in a 3-year-old child with abdominal distension, weight loss, anemia, elevated urinary catecholamines, and an irregular abdominal mass on physical examination?



A. Age above 18 months

B. Poor differentiation (gangliocytic or schwannian)

C. High mitosis-karyorrhexis index (MKI >200/5000 cells)

D. TrkA expression

---

13. Which of the following diseases is NOT due to a peptide hormone?

A. Diabetes mellitus

B. Acromegaly

C. Cushing's disease

D. None of the above

---

14. A 35-year-old female presents with complaints of fatigue, weakness, weight loss, dizziness, and low blood pressure over the past few months. Upon examination, her skin appears hyperpigmented on the knuckles, elbows, and knees. Lab investigations reveal hyponatremia, hyperkalemia, and elevated plasma adrenocorticotropic hormone levels. Where are the receptors located for the involved hormone in this disease?

(or)

Where are the receptors located for the hormone responsible for causing Addison's disease?

A. Intracytoplasmic

B. On the nucleus

C. On cell membrane

D. Both nuclear and intracytoplasmic

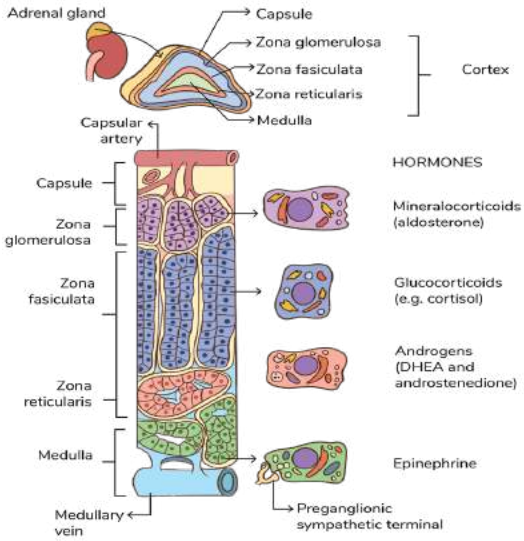
Correct Answers

Question	Correct Answer
Question 1	3
Question 2	3
Question 3	2
Question 4	2
Question 5	1
Question 6	3
Question 7	3
Question 8	4
Question 9	2
Question 10	3
Question 11	3
Question 12	4
Question 13	3
Question 14	4

Solution for Question 1:

Correct Option C - The zona reticularis is responsible for the production of androgens:

• The zona reticularis synthesizes androgens, including dehydroepiandrosterone (DHEA) and androstenedione. These androgens are precursors for the production of testosterone.



Incorrect Options:

Option A - The zona glomerulosa primarily secretes cortisol: The zona glomerulosa is responsible for t he production of mineralocorticoids, primarily aldosterone, which regulates electrolyte and fluid balance .

Option B - The zona fasciculata synthesizes mineralocorticoids such as aldosterone:
The zona fasciculata produces glucocorticoids, primarily cortisol, which plays a role in metabolism regulation and stress response.

Option D - The adrenal medulla secretes glucocorticoids: The adrenal medulla is responsible for the pr oduction and secretion of catecholamines, specifically epinephrine (adrenaline) and norepinephrine, w hich are involved in the "fight or flight" response.

Solution for Question 2:

Correct Option C - 17-Hydroxylase Deficiency:

• The patient's presentation of a lack of development of secondary sexual characteristics, with low serum potassium, elevated levels of mineralocorticoids, decreased sex hormones, and cortisol, is diagnostic of 17-hydroxylase deficiency.

• In male patients, there will be ambiguous genitalia and undescended testes.

Incorrect Options:

Option A - 21-Hydroxylase Deficiency: Its deficiency leads to glucocorticoid deficiency, mineralocorticoi d deficiency, and adrenal androgen excess.

Option B - 11-Beta Hydroxylase Deficiency: Its deficiency leads to glucocorticoid deficiency, mineraloc orticoid excess, and adrenal androgen excess.

Option D - 3-Beta Hydroxysteroid Dehydrogenase Deficiency: Its deficiency leads to glucocorticoid defi ciency, (mineralocorticoid deficiency), adrenal androgen excess (females and males), gonadal androge

n deficiency (males)

Solution for Question 3:

Correct Option B - Aldosterone binds to its receptor in the principal cells of the collecting duct, activatin g various channels and the Na-K-ATPase pump:

• This statement accurately describes the mechanism of action of aldosterone. Aldosterone binds to its receptor in the principal cells of the collecting duct. The hormone-receptor complex activates various channels, including the ENaC (Epithelial sodium) channel, leading to increased sodium reabsorption. Aldosterone also stimulates the Na-K-ATPase pump, facilitating sodium exit into the blood. This results in the reabsorption of sodium and the secretion of potassium.

Incorrect Options:

Option A - Aldosterone acts directly on the intercalated cells of the collecting duct, stimulating the secre tion of acids in the urine: Aldosterone does not directly act on the intercalated cells responsible for acid secretion in the urine. Its main action occurs on the principal cells of the collecting duct.

Option C - Aldosterone primarily acts on the distal convoluted tubule, inhibiting the reabsorption of sodi um and enhancing the secretion of potassium: Although aldosterone does play a role in regulating sodi um and potassium balance, its main site of action is not the distal convoluted tubule but rather the princ ipal cells of the collecting duct.

Option D - Aldosterone exerts its effects by directly binding to cell membrane receptors, stimulating the activity of H+ ATPase: While aldosterone does have cell membrane receptors, its main mechanism of action is not through these receptors. Aldosterone primarily acts through genomic action by binding to i ts receptor in the nucleus and affecting gene expression, leading to the activation of various channels i ncluding H+ ATPase.

Solution for Question 4:

Correct Option B - A significant increase in plasma aldosterone concentration after salt loading:

• The clinical features observed in this patient, including persistent hypertension that is difficult to control, muscle weakness, frequent urination, are consistent with the manifestations of Conn's syndrome. Hypertension is a hallmark of this condition and is often resistant to multiple antihypertensive medications. The presence of muscle weakness can be attributed to hypokalemia resulting from excessive aldosterone-induced potassium excretion in the kidneys. Metabolic alkalosis occurs due to hydrogen ion secretion and potassium reabsorption in the renal tubules, further reinforcing the suspicion of hyperaldosteronism.

• To confirm the suspected diagnosis, a salt loading test is performed. The rationale behind this test is that a high-sodium diet or intravenous saline infusion should normally suppress aldosterone secretion through feedback inhibition. However, in patients with Conn's syndrome, the autonomous aldosterone production persists despite salt loading. Therefore, the expected result in this patient is a significant increase in plasma aldosterone concentration after salt loading, as option B suggests.

Incorrect Options:

Option A - A significant decrease in plasma aldosterone concentration after salt loading: This option is incorrect because in Conn's syndrome, the autonomous overproduction of aldosterone by the adrenal glands is not suppressed by salt intake. Therefore, instead of a decrease, an increase in plasma aldosterone concentration is expected during the salt loading test.

Option C - A significant decrease in plasma renin activity after salt loading: This option is incorrect because in Conn's syndrome, plasma renin activity is usually suppressed due to the negative feedback exerted by aldosterone on the renin-angiotensin-aldosterone system. Therefore, a decrease in plasma renin activity is expected even without salt loading.

Option D - A significant increase in plasma renin activity after salt loading: This option is incorrect because in Conn's syndrome, plasma renin activity is typically suppressed rather than increased. The excessive production of aldosterone by the adrenal glands inhibits renin release and subsequently reduces plasma renin activity.

Solution for Question 5:

Correct Option A - Gordon's syndrome:

• Gordon's syndrome, also known as pseudohyperaldosteronism type II, is a genetic condition that causes persistent high blood pressure, high levels of potassium and chloride in the blood, metabolic acidosis, and decreased activity of renin in the plasma.

• This condition is caused by a gain of function in the sodium chloride cotransporter (NCC) at the distal convoluted tubule, which results in increased absorption of sodium and chloride. This excess absorption leads to a negative charge, which the body neutralizes by drawing hydrogen ions from the collecting duct, ultimately causing acidosis.

Incorrect Options:

Option B - Bartter syndrome: It is associated with persistent hypotension, hypokalemia, and metabolic alkalosis, but it is characterized by high plasma renin and aldosterone levels.

Option C - Addison's disease: It typically presents with symptoms such as fatigue, muscle weakness, and hypotension. Laboratory findings include hyponatremia, hyperkalemia, and metabolic acidosis, high renin activity.

Option D - Sheehan syndrome: This occurs due to postpartum hemorrhage and subsequent pituitary gland damage and may lead to various hormone deficiencies (panhypopituitarism), but it does not typically present with hypertension or altered potassium levels.

Solution for Question 6:

Correct Option C - It exhibits equal mineralocorticoid and glucocorticoid activity:

• The clinical presentation and laboratory findings described in the scenario are consistent with primary adrenal insufficiency, also known as Addison's disease. Addison's disease is characterized by insufficient production of adrenal hormones, including both glucocorticoids and mineralocorticoids.

• The drug of choice for the treatment of Addison's disease is hydrocortisone, a synthetic glucocorticoid. Hydrocortisone closely mimics the actions of cortisol, the naturally occurring glucocorticoid hormone. It

not only provides the necessary glucocorticoid activity to replace the deficient cortisol but also exhibits equal mineralocorticoid activity.

• Hydrocortisone has both glucocorticoid and mineralocorticoid effects, allowing it to provide balanced replacement therapy. By having equal mineralocorticoid and glucocorticoid activity, hydrocortisone helps maintain electrolyte balance and provides anti-inflammatory and metabolic effects.

Clinical features of Addison’s disease

Cause

Sign & symptoms

Glucocorticoids deficiency

• Hypoglycemia

• Fatigue, lack of energy

• Weight loss, anorexia

• Muscle & joint pain

• Anemia, lymphocytosis, eosinophilia

Mineralocorticoids deficiency

• Hypotension, postural hypotension & Dizziness

• Salt craving

• Hyperkalemia & hyponatremia

Sex steroids deficiency

• Lack of energy

• Dry & itchy skin (women)

• Loss of libido

• Loss of axillary and public hair

ACTH excess (loss of negative feedback)

• Hyperpigmentation of skin & mucous membrane (skin area exposed to friction & shear stress).

Incorrect Options:

Options A, B, and D are incorrect. Refer to Option C for an explanation.

Solution for Question 7:

Correct Option C - Modulation of the body's stress response and immune function:

• Cortisol, a glucocorticoid hormone, plays a crucial role in the regulation of the body's stress response. It helps the body respond to and cope with stressful situations by increasing energy availability, mobilizing glucose by increasing the secretion of glycogenolytic hormones promoting gluconeogenesis and suppressing inflammation by inhibiting mast cell degranulation and decreasing histamine release, suppressing migration of leukocytes to the site of inflammation, and inhibiting the phagocytic and bactericidal activity of neutrophils.

• Cortisol also influences immune function by decreasing circulating lymphocytes by increasing their apoptosis and inhibiting the production of IL-2 and T lymphocytes.

Incorrect Options:

Option A - Maintenance of calcium homeostasis and bone health: These are primarily regulated by hormones such as parathyroid hormone (PTH) and calcitonin, rather than cortisol.

Option B - Regulation of body temperature and thermoregulation: The regulation of body temperature primarily involves the hypothalamus and other thermoregulatory mechanisms, with limited involvement of cortisol.

Option D - Regulation of fluid balance and electrolyte levels: The primary hormone involved in fluid balance and electrolyte regulation is aldosterone.

Solution for Question 8:

Correct Option D - Gradually taper the corticosteroid dose when discontinuing treatment:

• The clinical features described in the patient, including a round face, central obesity, thin skin with striae, easy bruising, poor wound healing, and elevated blood glucose levels, are suggestive of Cushingoid features and hyperglycemia, which are commonly associated with prolonged and high-dose corticosteroid therapy. To avoid these complications, it is essential to gradually taper the corticosteroid dose when discontinuing treatment. Abrupt cessation of corticosteroids can lead to adrenal insufficiency due to HPA (hypothalamic-pituitary-adrenal) axis suppression. Gradual tapering allows the HPA axis to recover and resume normal cortisol production.

Incorrect Options:

Option A - Increase the dose of oral corticosteroids for better control of asthma: It can further exacerbate the adverse effects.

Option B - Switch to long-acting corticosteroids for a
sustained effect: Switching to long-acting corticosteroids may provide a
sustained effect, but it does not address the issue of avoiding complications.

Option C - Divide the daily corticosteroid dose into multiple administrations throughout the day: Dividing the daily corticosteroid dose into multiple administrations can be helpful in some cases, but it does not directly address the need for tapering to prevent HPA axis suppression and related complications.

Solution for Question 9:

Correct Option B
- ACTH-independent Cushing syndrome constitutes 20% of total cases of Cushing syndrome:

Classification of endogenous Cushing's syndrome

• ACTH-dependent – 80% Pituitary adenoma secreting ACTH (Cushing’s disease) – 70% Ectopic ACTH syndrome (bronchial carcinoid, small-cell lung carcinoma, other neuro-endocrine tumour) – 10%

• Pituitary adenoma secreting ACTH (Cushing’s disease) – 70%

• Ectopic ACTH syndrome (bronchial carcinoid, small-cell lung carcinoma, other neuro-endocrine tumour) – 10%

• Non-ACTH-dependent – 20% Adrenal adenoma – 15% Adrenal carcinoma – 5% ACTH-independent macronodular hyperplasia; primary pigmented nodular adrenal disease; McCune–Albright syndrome (together< 1%)

• Adrenal adenoma – 15%

• Adrenal carcinoma – 5%

• ACTH-independent macronodular hyperplasia; primary pigmented nodular adrenal disease; McCune–Albright syndrome (together< 1%)

• Pituitary adenoma secreting ACTH (Cushing's disease) – 70%

• Ectopic ACTH syndrome (bronchial carcinoid, small-cell lung carcinoma, other neuro-endocrine tumour) – 10%

• Adrenal adenoma – 15%

• Adrenal carcinoma – 5%

• ACTH-independent macronodular hyperplasia; primary pigmented nodular adrenal disease; McCune–Albright syndrome (together< 1%)

Incorrect Options:

Options A and C are incorrect. Refer to Option B for an explanation.

Option D - Small cell lung cancer produces ectopic Cortisol: Small cell lung cancer produces ectopic A CTH, not Cortisol

Solution for Question 10:

Correct Option C - No change, No change:

• The clinical presentation and laboratory findings suggest a diagnosis of ectopic ACTH syndrome, likely caused by small-cell lung carcinoma. Ectopic ACTH production leads to elevated levels of both ACTH and cortisol. However, in this scenario, the cortisol levels are already at the upper limit of normal and not suppressed by low-dose dexamethasone. This indicates that cortisol production is autonomous and not regulated by negative feedback from the HPA axis.

• When high-dose dexamethasone is administered, it acts as a synthetic glucocorticoid and usually suppresses ACTH production in a normal HPA axis feedback mechanism. However, in cases of ectopic ACTH syndrome, the tumor responsible for ACTH secretion is independent of the normal regulatory feedback mechanisms. Therefore, administration of high-dose dexamethasone will not cause any significant changes in ACTH or cortisol levels. Both will remain elevated or at their current levels.

• Hence, the expected changes in ACTH and cortisol levels after administration of high-dose dexamethasone in this patient are no change.

Incorrect Options:

Options A, B, and D are incorrect. Refer to Option C for an explanation.

Solution for Question 11:

Correct Option C - Plasma-free metanephrines:

• This clinical scenario is suggestive of a pheochromocytoma, a catecholamine-secreting tumor typically arising from the adrenal medulla. Pheochromocytomas can cause paroxysmal hypertension, severe headaches, palpitations, and sweating. The presence of a palpable mass in the left upper abdomen further supports this diagnosis.

• Measurement of plasma-free metanephrines is the most sensitive and specific initial test for detecting pheochromocytomas. Plasma-free metanephrines (metanephrine and normetanephrine) are the breakdown products of catecholamines and are elevated in the setting of a pheochromocytoma.

Incorrect Options:

Option A - Contrast-enhanced CT scan of the abdomen: It is a valuable imaging modality to localize th e tumor once the diagnosis of pheochromocytoma is confirmed. However, it is not the initial investigatio n of choice.

Option B - A 24-hour urine collection for vanillylmandelic acid (VMA): It is an older test that measures t he breakdown product of epinephrine and norepinephrine. Although it can be used in the workup of ph eochromocytoma, it is less sensitive and specific compared to plasma-free metanephrines.

Option D - MRI of the abdomen: It can provide detailed anatomical information about the tumor and sur rounding structures. However, it is not the initial investigation of choice in this scenario.

Solution for Question 12:

Correct Option D - TrkA expression:

• In this case, the 3-year-old child presented with abdominal distension, diarrhea, weight loss, and a firm, irregular mass in the abdomen. These clinical features are consistent with neuroblastoma, as abdominal tumors are commonly seen in this condition. Additionally, laboratory investigations showed anemia and elevated urinary catecholamines, which are often observed in neuroblastoma due to the tumor's production of catecholamine metabolites.

• The presence of neuroblastic cells with scant cytoplasm and hyperchromatic nuclei is often observed. Other characteristic features in the given histological image include Homer-Wright rosettes, which are circular arrangements of tumor cells around a central neurofibril or the presence of undifferentiated stroma. These features further support the diagnosis of neuroblastoma. The expression of TrkA, a neurotrophic tyrosine kinase receptor, is associated with a good prognosis in neuroblastoma.

Incorrect Options:

Option A
- Age above 18 months: In neuroblastoma, patients who are younger than 18 months of age have a mo re favorable prognosis compared to those older than 18 months. Therefore, age above 18 months is as sociated with a worse prognosis.

Option B - Poor differentiation (gangliocytic or schwannian): Poor differentiation, characterized by gang liocytic or schwannian features in the tumor, is associated with a worse prognosis in neuroblastoma.

Option C - High mitosis-karyorrhexis index (MKI >200/5000 cells): A high MKI, indicating a higher mitotic rate and karyorrhexis (fragmentation of nuclei), is associated with a worse prognosis in neuroblastoma. A low MKI(<200/500) would be more favorable.

Solution for Question 13:

Correct Option C - Cushing's disease:

• Cushing's disease is NOT due to a peptide hormone. Cushing's disease is a condition characterized by the excessive production of cortisol, a steroid hormone. It is caused by a pituitary gland tumor that stimulates the overproduction of adrenocorticotropic hormone (ACTH), which in turn leads to increased cortisol production by the adrenal glands. ACTH is a peptide hormone produced by the anterior pituitary gland.

Incorrect Options:

Option A - Diabetes mellitus: Diabetes mellitus is a metabolic disorder characterized by high blood sug ar levels. It can be caused by insufficient production or ineffective use of insulin, which is a peptide hormone produced by the beta cells of the pancreas.

Option B - Acromegaly: Acromegaly is a rare hormonal disorder caused by an excess of growth hormo ne (GH). Excessive GH production is usually due to a benign tumor of the pituitary gland. GH is a peptide hormone secreted by the anterior pituitary gland.

Option D - None of the above: Cushing's disease is a condition characterized by the excessive production of cortisol, a steroid hormone.

Solution for Question 14:

Correct Option D - Both nuclear and intracytoplasmic:

• In Addison's disease, there is a deficiency of cortisol due to the destruction or dysfunction of the adrenal cortex. This results in decreased cortisol production and elevated levels of adrenocorticotropic hormone (ACTH) from the anterior pituitary gland.

• The receptors for cortisol are present both in the cytoplasm and the nucleus of target cells. In the cytoplasm, cortisol binds to its receptor, forming a hormone-receptor complex. This complex then translocates to the nucleus, where it acts as a transcription factor, regulating gene expression and influencing various cellular processes.

Incorrect Options:

Options A, B, and C are incorrect. Refer to Option D for an explanation.

Zollinger Ellison Syndrome

1. A 38-year-old patient with giant duodenal ulcer is suspected to have Zollinger-Ellison Syndrome. To identify the precise location of the tumor responsible for the excessive gastrin production, which investigation should be done?

(or)

To identify the specific location of the tumor responsible for the excessive gastrin production in Zollinger-Ellison Syndrome, which investigation should be done?

A. Secretin study

B. Fasting gastrin levels

C. Ga-68 DOTATATE PET-CT scan

D. Somatostatin scintigraphy

---

2. Which of the following statements incorrectly describes a border of the Passaro's triangle?

A. Superiorly by the confluence of cystic and common bile ducts

B. Medially by the junction of the first and second part of the duodenum

C. Inferiorly by the junction of the second and third part of the duodenum

D. Medially by the junction of the neck and body of the pancreas.

---

3. A 40-year-old female presents with recurrent epigastric pain for which she has been taking proton pump inhibitors (PPIs) for a prolonged period. She also reports experiencing diarrhea. What is the most likely diagnosis based on this clinical scenario?

A. Peptic ulcer disease

B. Gastric cancer

C. Zollinger-Ellison Syndrome (Gastrinoma)

D. Irritable bowel syndrome (IBS)

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	2
Question 3	3

Solution for Question 1:

Correct Option C - Ga-68 DOTATATE PET-CT scan:

• Zollinger Ellison Syndrome (ZES) is characterized by excessive gastrin production, leading to recurrent peptic ulcers and acid reflux.

• The most common site of gastrinoma is the duodenum, followed by the pancreas and stomach.

• To localize the tumor, Gallium-68 DOTATATE PET-CT scan is the preferred imaging modality.

• It also the preferred imaging modality for pheochromocytoma.

Incorrect Options:

Option A - Secretin study: It is used to confirm the diagnosis of ZES by evaluating the increase in gastri n levels after administration of secretin.

Option B - Fasting gastrin levels: It is a diagnostic test to measure elevated fasting gastrin levels, but it does not provide information about tumor localization.

Option D - Somatostatin scintigraphy: It is used for imaging metastatic ZES but is not the primary choic e for initial tumor localization.

Solution for Question 2:

Correct Option B - Medially by the junction of the first and second part of the duodenum:

• Medially by the junction of the first and second parts of the duodenum is a wrong option because the passaros triangle is bounded by the junction of the second and third parts of the duodenum inferiorly.

Passaro's triangle is formed by joining the following three points:

Incorrect Options:

Options A, C, and D are incorrect, Refer to the explanation of the correct answer

Solution for Question 3:

Correct Option C - Zollinger-Ellison Syndrome (Gastrinoma)

• Given the patient's clinical presentation of recurrent epigastric pain despite prolonged use of proton pump inhibitors (PPIs) and diarrhea, along with the history of long-term PPI use, the most likely diagnosis is Zollinger-Ellison Syndrome (Gastrinoma).

• This syndrome is characterized by the presence of gastrin-secreting tumors (gastrinomas), typically located in the duodenum, pancreas, or stomach.

• These tumors lead to excessive gastrin production, resulting in increased gastric acid secretion, peptic ulcers, and refractory symptoms despite PPI therapy.

Incorrect answer

Option A - Peptic ulcer disease:

• While peptic ulcer disease can cause recurrent epigastric pain, the patient's symptoms persist despite prolonged use of proton pump inhibitors (PPIs), suggesting an underlying cause beyond typical peptic ulcer disease.

Option B - Gastric cancer:

• Gastric cancer may present with similar symptoms, but the history of long-term PPI use and the presence of diarrhea are more indicative of Zollinger-Ellison Syndrome (Gastrinoma) than gastric cancer.

Option D - Irritable bowel syndrome (IBS):

• While irritable bowel syndrome (IBS) can present with diarrhea and abdominal pain, the history of long-term PPI use and the persistence of symptoms despite treatment are not typical of IBS. Zollinger-Ellison Syndrome (Gastrinoma) is a more likely diagnosis in this case.

Inflammatory Bowel Disease

1. A 32-year-old patient with recurrent abdominal pain and diarrhea undergoes a barium meal follow-through (enteroclysis) as part of the diagnostic work-up for suspected Crohn's disease. Imaging reveals an irregular cobblestone pattern of the mucosa in the small intestine, and "String Sign of Kantor." Which of the following is correct about "String Sign of Kantor"?

(or)

What is correct about the "String Sign of Kantor" in the case of Crohn's disease?

A. Signifies presence of deep serpiginous ulcers in the entire gut

B. Indicates the sparing of the rectum in Crohn's disease

C. Associated with the earliest presentation of aphthous ulcers

D. Stricture formation in the small intestine

---

2. A 60-year-old patient presents with explosive watery diarrhea, cramps, and abdominal pain following recent antibiotic usage within the last 3 weeks. Which of the following antibiotics is most commonly associated with the given presentation?

(or)

Which of the following antibiotics is most commonly associated with the development of pseudomembranous colitis?

A. Penicillin

B. Tetracycline

C. Cephalosporins

D. Macrolides

---

3. A 28-year-old patient presents with chronic abdominal pain, diarrhea, and weight loss. A colonoscopy reveals a cobblestone pattern of the mucosa in the terminal ileum. What is the most likely diagnosis based on this clinical scenario?

A. Ulcerative colitis

B. Irritable bowel syndrome (IBS)

C. Crohn's disease

D. Diverticulitis

---

4. A 35-year-old patient presents with complaints of bloody diarrhea up to 15 times per day, anemia, and puffy eyes. A colonoscopy reveals proctitis without granulomas on biopsy. Which condition is most likely to be responsible for this clinical presentation?

A. Crohn's disease

B. Irritable bowel syndrome (IBS)

C. Ulcerative colitis (UC)

D. Diverticulitis

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	3
Question 3	3
Question 4	3

Solution for Question 1:

Correct Option D - Stricture formation in the small intestine:

• In Crohn's disease, the "String Sign of Kantor" refers to a characteristic radiographic finding observed during a barium meal follow-through (enteroclysis).

• This sign is associated with the development of strictures in the small intestine. Strictures are areas of narrowing and thickening of the intestinal wall, leading to a string-like appearance in imaging studies.

• The irregular cobblestone pattern of the mucosa and the "String Sign of Kantor" are indicative of transmural involvement and submucosal fibrosis in Crohn's disease.

Incorrect Options:

Option A - Signifies presence of deep serpiginous ulcers in the entire gut: The "String Sign of Kantor" i n Crohn's disease is not associated with deep serpiginous ulcers but rather with stricture formation in t he small intestine.

Option B - Indicates the sparing of the rectum in Crohn's disease: The "String Sign of Kantor" is not rel ated to the sparing of the rectum. Crohn's disease can involve any part of the gastrointestinal tract, incl uding the rectum.

Option C - Associated with the earliest presentation of aphthous ulcers: The "String Sign of Kantor" is n ot associated with the earliest presentation of aphthous ulcers. The earliest presentation in Crohn's dis ease involves aphthous ulcers, but the "String Sign of Kantor" is a
later radiographic finding related to stricture formation.

Solution for Question 2:

Correct Option C - Cephalosporins:

• Pseudo Membranous Colitis (PMC) is often associated with the use of antibiotics, and cephalosporins are among the antibiotics most commonly linked to its development. Other antibiotics, such as clindamycin, are also known to be associated with PMC. Clostridium difficile toxin, resulting from alteration in gut flora due to antibiotic use, is the causative factor in PMC. This condition typically presents with explosive watery diarrhea, cramps, and abdominal pain.

Incorrect Options:

Options A, B, and D: These are less likely to cause PMC.

Solution for Question 3:

Correct Option C - Crohn's disease:

• The patient's presentation of chronic abdominal pain, diarrhea, and weight loss, along with colonoscopic findings of a cobblestone pattern of the mucosa in the terminal ileum, is highly suggestive of Crohn's disease.

• Crohn's disease is characterized by chronic inflammation of the gastrointestinal tract, with the terminal ileum being the most commonly affected site.

• The cobblestone appearance of the mucosa results from transmural involvement and submucosal fibrosis, which is typical of Crohn's disease.

Incorrect Options:

Option A - Ulcerative colitis:

• While ulcerative colitis is another form of inflammatory bowel disease, it typically presents with continuous colonic involvement and does not exhibit the cobblestone pattern seen in Crohn's disease.

Option B - Irritable bowel syndrome (IBS):

• Irritable bowel syndrome (IBS) can cause abdominal pain and diarrhea, but it does not typically lead to weight loss, and it does not cause the cobblestone pattern observed in Crohn's disease.

Option D - Diverticulitis:

• Diverticulitis involves inflammation of the diverticula, typically in the colon, and does not typically present with a cobblestone pattern on colonoscopy.

• Additionally, diverticulitis usually occurs in older patients and is less commonly associated with weight loss compared to Crohn's disease.

Solution for Question 4:

Correct Option C - Ulcerative colitis (UC):

• The patient's symptoms of bloody diarrhea, anemia, and puffy eyes, along with colonoscopic findings of proctitis without granulomas, are highly indicative of ulcerative colitis (UC).

• UC is a type of inflammatory bowel disease characterized by chronic inflammation and ulceration of the colon and rectum. The hallmark feature of UC is bloody diarrhea, which can occur frequently throughout the day.

• Anemia is common due to chronic blood loss, and protein-losing enteropathy can lead to hypoalbuminemia, manifesting as puffy eyes.

• The most common site of involvement in UC is the rectum, and colonoscopy with biopsy is the preferred diagnostic method.

Incorrect Options: Option A - Crohn's disease:

• While Crohn's disease is another form of inflammatory bowel disease, it typically presents with skip lesions, transmural inflammation, and granulomas on biopsy, which are not characteristic findings of ulcerative colitis.

Option B - Irritable bowel syndrome (IBS):

• Irritable bowel syndrome (IBS) can present with symptoms of diarrhea, but it does not typically cause bloody diarrhea, anemia, or puffy eyes. Additionally, colonoscopic findings in IBS are typically normal.

Option D - Diverticulitis:

• Diverticulitis is characterized by inflammation of the diverticula, typically in the colon, and is not associated with the findings of proctitis seen in ulcerative colitis.

• Additionally, diverticulitis does not typically cause bloody diarrhea to the extent seen in ulcerative colitis.

Malabsorption Syndrome

1. A 40-year-old patient presents with chronic abdominal pain, steatorrhea, and weight loss. Schilling test is conducted and the results show normalization with supplementation of pancreatic enzymes. What condition is most likely responsible for the abnormal Schilling test results in this patient?

(or)

What condition is most likely responsible for the appearance of normalization with supplementation of pancreatic enzymes in Schilling test?

A. Small intestinal bacterial overgrowth

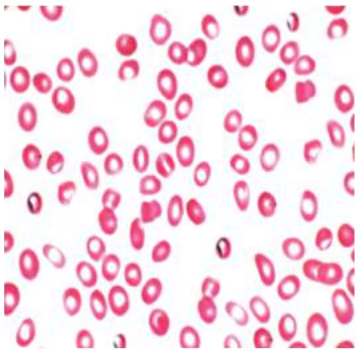
B. Chronic pancreatitis

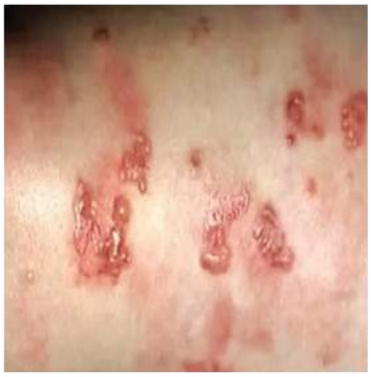
C. Type A gastritis

D. Intestinal lymphangiectasia

---

2. A 10-year-old boy is brought to the clinic by his mother with complaints of developing lesions shown below. She says that he has chronic diarrhea and has always been thin and skinny. Blood work was done. Using the images below, identify the diagnosis and mark the option with correlating statements. a) Anti-endomysial Ab is used for screening test b) Investigation of choice is a small intestine mucosal biopsy c) Most common cause of death is osmotic diarrhea d)Dietary restrictions can reduce the severity of the disease e) It predominantly affects absorption in the distal parts of the intestine f) Diabetes mellitus can be one of its complications in the future





A. b, c, f

B. a, d, e

C. b, d, f

D. a, c, e

---

3. A 50-year-old patient presents with symptoms of osmotic diarrhea, bloating, and weight loss. Patient subsequently develops CNS features of dementia, nystagmus, and myoclonic jerks. What is the causative organism responsible for the features described in this patient?

(or)

What is the causative organism for Whipple's disease?

A. E. coli

B. Tropheryma whipplei

C. Giardia lamblia

D. Clostridium difficile

---

4. A 30-year-old male comes to the outpatient department with complaints of numbing sensation in his hands and feet. He has bloating, flatulence, diarrhea, and steatorrhea. His blood worked showed increased folate levels. Identify the diagnosis and mark the correct option.

A. Tropical sprue

B. Bacterial overgrowth syndrome

C. Celiac disease

D. Whipples disease.

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	3
Question 3	2
Question 4	2

Solution for Question 1:

Correct Option B - Chronic pancreatitis:

• The Schilling test is primarily used to assess the absorption of vitamin B12 in the gastrointestinal tract.

• In chronic pancreatitis, there is insufficient production of pancreatic enzymes, including those needed for the digestion and absorption of vitamin B12.

• The normalization of the Schilling test results with pancreatic enzyme supplementation suggests that the malabsorption issue is related to pancreatic insufficiency.

Incorrect Options:

Option A - Small intestinal bacterial overgrowth - SIBO:
It is not directly associated with abnormalities in the Schilling test.

Option C - Type A gastritis: Involves autoimmune destruction of gastric parietal cells and is not a typical cause of abnormal Schilling test results.

Option D - Intestinal lymphangiectasia: It is characterized by dilated intestinal lacteals resulting in lymp h leakage into the small bowel lumen and is responsible for protein-losing enteropathy.

Solution for Question 2:

Correct Option C - b, d, f:

• The clinical history of malabsorption with blood work showing anemia points to a diagnosis of celiac sprue.

• The second image shows vesicobullous lesions of dermatitis herpetiformis.

Correct statements:

• Investigation of choice is a small intestine mucosal biopsy

• Dietary restrictions can reduce the severity of the disease by reducing antigenic stimulus

• Diabetes mellitus can be one of its future complications

• Most common cause of death in celiac sprue is due to lymphoma of the gut

• Though Anti-endomysial Ab is one of the Abs involved in celiac sprue, anti-TTG (tissue transglutaminase) is the screening test

• It mainly affects absorption in proximal parts of the intestine

Solution for Question 3:

Correct Option B - Tropheryma whipplei:

• CNS features in a patient with malabsorption syndrome indicate Whipple's disease.

• Whipple's disease is caused by the bacterium Tropheryma whipplei, an intracellular bacteria found in macrophages of the gut.

Incorrect Options:

Option A - E. coli, Option C - Giardia lamblia, and Option D - Clostridium difficile: Are not associated wit h the characteristic features and systemic involvement seen in Whipple's disease.

• This rare infectious disease can affect various systems, leading to a wide range of symptoms, including gastrointestinal issues, neurological manifestations, and cardiovascular complications.

• Oculomasticatory myorrhythmia is a rare hyperkinetic disorder seen in Whipple's disease.

Solution for Question 4:

Correct Option B - Bacterial overgrowth syndrome:

• The clinical presentation is of malabsorption syndrome.

• Numbing sensation in hands and feet points towards vitamin B12 deficiency.

• Vit B12 is absorbed from the ileum, which points to the site of involvement.

• The bloating described by the patient in the vignette is likely due to bacterial overgrowth.

• Diarrhea can be explained by the inability to process bile acids due to damage to the ileum, which is called ‘Bile Acid Diarrhea.’

• All these point towards a diagnosis of bacterial overgrowth syndrome.

• Another key hint is increased folate levels due to increased production of folate compounds by gut bacteria.

Incorrect Options:

Option A - Tropical sprue:

• This is due to coliform-induced damage to gut mucose and does not involve B12 vitamin deficiency in particular.

Option C - Celiac disease:

• This occurs due to gluten allergy.

Option D - Whipple's disease:

• This is caused by Tropheryma whipplei.

Irritable Bowel Syndrome.

1. A 38-year-old patient presents with recurrent abdominal pain associated with defecation and changes in the frequency and appearance of stool. The symptoms have been present for more than 3 months. Considering the patient's age and the clinical manifestations, IBS is being considered as a possible diagnosis. To further investigate and differentiate between IBS and inflammatory bowel disease, which laboratory test would be most helpful?

(or)

To further investigate and differentiate between IBS and inflammatory bowel disease, which laboratory test would be most helpful?

A. Serum C-reactive protein (CRP) levels

B. Stool culture for bacterial pathogens

C. Fecal calprotectin levels

D. Anti-tissue transglutaminase (TTG) antibodies

---

2. A 32-year-old patient presents with recurrent abdominal pain, changes in stool frequency, and alterations in stool appearance lasting for more than 3 months. The symptoms align with the criteria for irritable bowel syndrome (IBS). As part of the diagnostic work-up, various investigations are considered. One of the laboratory tests ordered is a complete blood count (CBC). What can be concluded from the absence of anemia in this patient's CBC results?

(or)

What can be concluded from the absence of anemia in this patient's CBC results in the context of IBS?

A. The absence of anemia rules out IBS, suggesting an alternative diagnosis

B. Anemia is a common finding in IBS, and its absence does not impact the diagnosis

C. The lack of anemia is consistent with IBS, as it is not typically associated with this condition

D. The absence of anemia indicates the need for further investigations to explore alternative diagnoses.

---

3. A 35-year-old patient presents with a history of chronic diarrhea, bloody stools occurring 10-15 times a day. On examination, anemia and pedal edema are noted. The workup shows serum albumin 2.0 g/dL, and the MR enterography report is awaited. Which of the following is correct about this condition?

(or)

Which of the following statements accurately identifies the most common site affected by ulcerative colitis?

A. Most common site of involvement in UC is the terminal ileum

B. UC predominantly affects the cecum and ascending colon

C. Rectum is the most common site of involvement in UC

D. UC primarily targets the transverse colon and descending colon.

---

4. A 40-year-old female patient came to the OPD with complaints of recurrent abdominal pain. She has frequent episodes of nausea, bloating, and pain after having lunch. General examination reveals an

anxious patient with irregular bowel habits that alternate between loose motions and constipation. Mark the wrong option regarding the clinical condition described.

A. Change in frequency of the stool

B. Recurrent abdominal pain for >3 days/week for 1-month

C. Pain relieved on defecation and passage of flatus

D. Change in the appearance of the stool

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	3
Question 3	3
Question 4	2

Solution for Question 1:

Correct Option C - Fecal calprotectin levels:

• Inflammatory bowel disease, such as Crohn's disease and ulcerative colitis, is associated with inflammation in the gastrointestinal tract, leading to an increase in inflammatory markers.

• Fecal calprotectin, a protein released by neutrophils during inflammation, is elevated in the presence of intestinal inflammation. Therefore, measuring fecal calprotectin levels can help differentiate between irritable bowel syndrome and IBD.

Incorrect Options:

• Serum C-reactive protein (CRP) levels, stool culture for bacterial pathogens, and anti-tissue transglutaminase (TTG) antibodies are more relevant to assessing and diagnosing celiac disease. Fecal calprotectin is a specific marker for intestinal inflammation, making it a valuable tool in distinguishing between IBS and IBD.

Solution for Question 2:

Correct Option C
- The lack of anemia is consistent with IBS, as it is not typically associated with this condition:

• Irritable bowel syndrome (IBS) is a functional gastrointestinal disorder characterized by recurrent abdominal pain and changes in bowel habits without evidence of structural or biochemical abnormalities. In IBS, the absence of anemia is expected, as it is not a typical feature of the condition. Anemia is more commonly associated with inflammatory bowel diseases (such as Crohn's disease and ulcerative colitis) where chronic inflammation and gastrointestinal bleeding can lead to a decrease in hemoglobin levels.

Incorrect Options:

Option A - The absence of anemia rules out IBS, suggesting an alternative diagnosis: This is incorrect because the absence of anemia does not rule out IBS; in fact, it is consistent with the condition.

Option B - Anemia is a common finding in IBS, and its absence does not impact the diagnosis: This is i ncorrect because anemia is not a
common finding in IBS, and its absence aligns with the expected laboratory profile of IBS.

Option D - The absence of anemia indicates the need for further investigations to explore alternative di agnoses: This is incorrect because the absence of anemia in the context of IBS does not necessarily w arrant further investigations for alternative diagnoses.

Solution for Question 3:

Correct Option C - Rectum is the most common site of involvement in UC:

• The clinical diagnosis is ulcerative colitis. Proctitis explains anemia.

• UC is a protein-losing enteropathy that causes low serum albumin levels.

Incorrect Options:

Options A, B, and D: Can be ruled out on the basis of the above explanation.

Solution for Question 4:

Correct Option B - Recurrent abdominal pain for >3 days/week for 1-month:

• Recurrent abdominal pain for >3 days/week for min 1 month is an incorrect statement.

• The correct statement is recurrent abdominal pain >1 day/ week for min 3 months

• The question describes symptoms like recurrent abdominal pain, postprandial pain, bloating, nausea, and alternating episodes of constipation and diarrhea help in the diagnosis of irritable bowel syndrome.

Previous Year Questions

1. What is the most probable diagnosis for a patient with a past medical record of chronic liver disease, who is currently experiencing abdominal distension, jaundice, and itching, and whose ascitic fluid analysis shows a neutrophil count exceeding 650 per cubic mm?

A. Spontaneous bacterial peritonitis

B. Malignant ascites

C. Tubercular ascites

D. Intestinal obstruction

---

2. What is the probable diagnosis for a patient being assessed for jaundice, based on laboratory findings of increased bilirubin and alkaline phosphatase levels, while the levels of other liver enzymes remain within normal range?

A. Obstructive jaundice

B. Hemolytic jaundice

C. Hepatic jaundice

D. Prehepatic jaundice

---

3. Patient is identified as having a tumor in the ileum and leading to urinary 5 HIAA being elevated. What is the diagnosis?

A. Carcinoid tumor

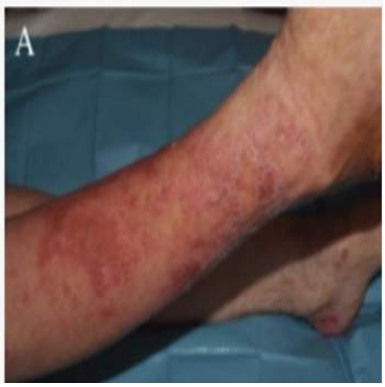
B. Neuroblastoma

C. c.Leiomyoma

D. d.Chromaffinoma

---

4. What is the probable diagnosis for a 50-year-old woman with a skin lesion visible in the provided image, which initially appeared small but has now spread to her entire limb and abdomen? Despite being on anticoagulation therapy, she has a longstanding history of diabetes and recurring deep vein thrombosis episodes.



A. Insulinoma

B. Gastrinoma

C. Glucagonoma

D. VIPoma

---

5. Mark the correct statement regarding inflammatory bowel disease.

A. Skip lesions are present in Crohn’s disease

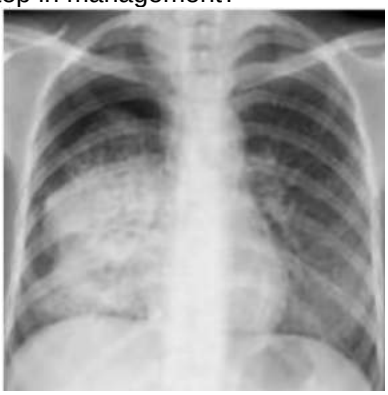
B. Mucosal layers are involved in Crohn’s while transmural involvement seen in ulcerative colitis

C. Inflammatory bowel disease doesn’t have a genetic predisposition

D. Crohn’s is curable through surgical resection of the affected segment

---

6. A patient presents with cough, cold, fever and malaise associated with weight loss and ascites. A radiograph of the chest is shown below. Ascitic fluid analysis showed elevated adenosine deaminase. Which of the following is the next step in management?



A. Biopsy

B. Start ATT after laparotomy stricture removal

C. Start anti-tubercular therapy

D. Symptomatic management

---

7. A patient with peptic ulcer was treated with an H. pylori regimen. Which of the following is used to assess the success of treatment?

A. Endoscopy

B. IgG antibody study

C. Urea breath test

D. Urease test of biopsy

---

8. What is the enzyme deficiency in Pompe’s disease?

A. Lysosomal acid alpha glucosidase

B. Glucose 6 phosphatase

C. Muscle phosphorylase

D. Phosphofructokinase

---

9. A 10-year-old child presented with recurrent pulmonary infections, and bulky greasy stools. Quantitative estimation of the stool fat was more than 10 gm/day. Which of the following will be seen in this child?

A. Protein-losing enteropathy

B. Distal intestinal obstruction

C. Hypernatremia

D. Rectal prolapse occurs after treatment

---

10. What is the underlying reason for the arterial blood gas (ABG) findings in a diabetic woman who has been admitted to the hospital due to continuous vomiting after consuming food from outside, and has a blood pressure reading of 90/60 mmHg? pH-7.52 HCO3 – 30 meq/L PaCO2 - 20 mmHg Na – 123 mEq/L K – 3.2 mEq/L Cl – 67 mEq/L

A. Diabetic ketoacidosis

B. Persistent vomiting

C. Septic shock

D. Renal tubular acidosis

---

11. A 15-year-old girl presented with fatigue, chronic diarrhoea, weight loss, bone pain and abdominal distension. Investigations revealed iron deficiency anaemia and osteoporosis. Which of the following is the single best test to be done for her evaluation?

A. TSH levels

B. C-peptide levels

C. Urine sugar and ketone

D. IgA tissue transglutaminase antibody

---

12. The blood investigation of a patient is given below. What is the probable diagnosis? HBsAg- Nonreactive HBeAg- Nonreactive IgG anti-HbcAg – Reactive IgM anti-HbcAg – Nonreactive

A. Acute hepatitis B

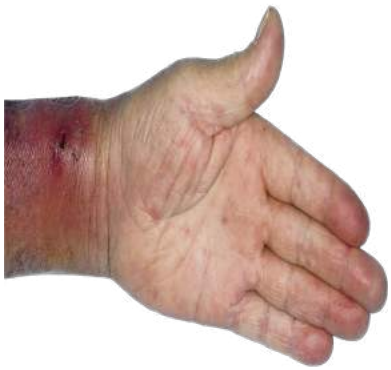
B. Chronic hepatitis B

C. Remote infection of hepatitis B

D. Core window period

---

13. A male patient in his youth comes to the clinic complaining of a persistent high fever over the past 5 days. During the examination of his hands, painless lesions are observed, and a new regurgitant murmur is detected. The echocardiogram reveals the existence of a mass on the mitral valve. Based on these findings, which of the following abdominal findings would be expected in this case?



A. Ascites

B. Splenomegaly

C. Hepatomegaly

D. Portal hypertension

---

14. What clinical examination is being performed in the image?

A. Shifting dullness

B. Ascites

C. Puddle sign

D. Fluid thrill

---

15. Iritis is seen in all except:

A. SLE

B. Behcet’s disease

C. Ulcerative colitis

D. Rheumatoid arthritis

---

16. Except for which of the following, all the mentioned characteristics are associated with Crohn's disease?

A. Transmural involvement

B. Lead pipe appearance

C. Rectal sparing

D. Perianal fistula

---

17. Cushing’s ulcers are seen in

A. Burns

B. Stress

C. Head injury

D. Cell necrosis

---

18. In which condition are macrophages observed to be positive for periodic acid Schiff staining?

A. Agammaglobulinemia

B. Whipple’s disease

C. Abetalipoproteinemia

D. Crohn’s disease

---

19. The reason behind low levels of copper in the bloodstream, which is associated with the ATP7A gene, is:

A. Dubin-Johnson syndrome

B. Wilson’s disease

C. Menke’s disease

D. Gilbert’s syndrome

---

20. A 22-year-old man presented with diarrhea and intolerance to dairy products. On investigation, he was found to have a lactase deficiency. Which of the following agents is least likely to cause symptoms of lactose intolerance?

A. Condensed Milk

B. Skimmed Milk

C. Yogurt

D. Ice Cream

---

21. What is the most common immediate complication following a splenectomy?

A. Hemorrhage

B. Fistula

C. Bleeding from gastric mucosa

D. Pancreatitis

---

22. In what situations is surgery contraindicated for patients with Ulcerative Colitis?

A. Toxic megacolon

B. Colonic perforation

C. Colonic obstruction

D. Refractory fistula

---

23. Which of the options accurately describes the development of cancer in patients with ulcerative colitis?

A. Bad prognosis if it involved only rectum

B. Good prognosis if it involves only rectum and is low grade

C. 2% chance of malignancy if present for 10 years

D. Young age onset has low chances as compared to old age onset

---

24. What is the probable diagnosis of a patient who has significant abdominal swelling and laboratory analysis of the fluid obtained through paracentesis reveals SAAG <1.1 what is the likely diagnosis?

(or)

What is the probable diagnosis of a patient who has significant abdominal swelling and laboratory analysis of the fluid obtained through paracentesis reveals SAAG <1.1 what is the likely diagnosis?

A. Congestive heart failure

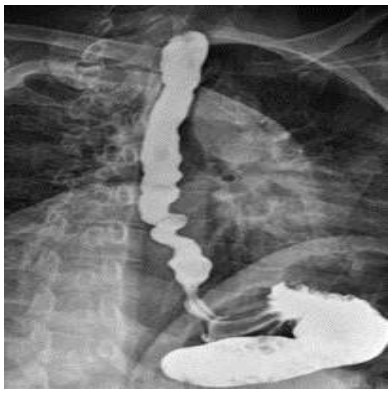
B. Myxoedema

C. Budd Chiari syndrome

D. Tuberculosis

---

25. The following image shows?



A. Achalasia cardia

B. Diffuse oesophageal spasm

C. Carcinoma Oesophagus spasm

D. Schatzki's Ring

---

26. Which of the following actions is not typically performed in cases of Carcinoma of the Esophagus?

A. Biopsy

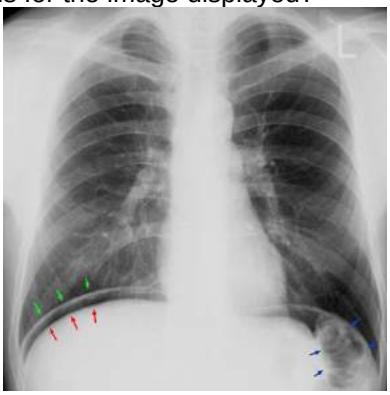
B. pH-metry

C. CT chest

D. PET scan

---

27. What is the most likely diagnosis for the image displayed?



A. Pneumoperitoneum

B. Pneumothorax

C. Eventration of diaphragm

D. Pneumomediastinum

---

28. Which of the following has the least chance of developing malignancy?

(or)

Which of the following has the least chance of developing malignancy?

A. Chronic hyperplastic candiatisis

B. Oral submucosal fibrosis

C. Oral lichen planus

D. Leukoplakia

Correct Answers

Question	Correct Answer
Question 1	1

Question 2	1
Question 3	1
Question 4	3
Question 5	1
Question 6	3
Question 7	3
Question 8	1
Question 9	2
Question 10	2
Question 11	4
Question 12	3
Question 13	2
Question 14	4
Question 15	4
Question 16	2
Question 17	3
Question 18	2
Question 19	3
Question 20	3
Question 21	1
Question 22	1
Question 23	3
Question 24	4
Question 25	2
Question 26	2
Question 27	1
Question 28	3

Solution for Question 1:

Correct Option A:

• The patient's presentation of abdominal distension, jaundice, and pruritis is suggestive of liver disease, which can cause the accumulation of fluid in the abdomen (ascites).

• Neutrophil count >650 per cubic mm in the ascitic fluid signifies the closeness of spontaneous bacterial peritonitis (SBP), an accepted condition of ascites in sufferers accompanying chronic liver disease. SBP is induced by the migration of bacteria from the gut into the ascitic fluid, developing an inflammatory response.

Incorrect Options:

Option B. Malignant ascites: It is a
complication of cancer, and the presence of neutrophils in the ascitic fluid would be different.

Option C. Tubercular ascites: It is an infrequent proof of infection and usually guides a
lymphocytic predominance in the ascitic fluid.

Option D. Intestinal obstruction: It is an independent condition that presents accompanying manifestati ons including abdominal pain, vomiting, and constipation.

Solution for Question 2:

Correct Option A:

• Elevated bilirubin and alkaline phosphatase levels are suggestive of obstructive jaundice, which happens when there's hindrance of the biliary tree.

• Obstruction can happen due to different reasons, such as gallstones, tumors, or strictures. Alkaline phosphatase levels raise due to the increased generation of the enzyme by the liver and biliary system, whereas bilirubin elevated due to the collection of conjugated bilirubin within the bloodstream, which cannot be excreted through the bile duct.

Incorrect Options:

Option B: Hemolytic jaundice: Hemolytic jaundice is caused by the excessive breakdown of red blood c ells, driving an increment in unconjugated bilirubin levels. Alkaline phosphatase levels are not elevated in hemolytic jaundice.

Option C: Hepatic jaundice: Hepatic jaundice happens due to liver cell damage, driving to impeded bilir ubin processing and excretion. Alkaline phosphatase levels may not be elevated in hepatic jaundice.

Option D: Prehepatic jaundice: Prehepatic jaundice happens due to excessive red blood cell breakdow n, driving an increment in unconjugated bilirubin levels. Alkaline phosphatase levels are ordinarily not e levated in prehepatic jaundice.

Solution for Question 3:

Carcinoid tumors are a type of neuroendocrine tumor that can arise in various parts of the body, includi ng the gastrointestinal tract (especially the ileum), lungs, and pancreas. They are usually slow-growing but can metastasize to other organs over time.

One of the hallmark features of carcinoid tumors is the secretion of serotonin, which can lead to elevat ed levels of urinary 5-hydroxy indole acetic acid (5-HIAA). This is because serotonin is converted to 5- HIAA in the liver and then excreted in the urine.

Incorrect Choices:

b. Neuroblastoma is a type of cancer that arises in immature nerve cells, usually in the adrenal glands (located above the kidneys). It is most commonly diagnosed in infants and young children and can caus e symptoms such as abdominal swelling or pain, fever, and weight loss. Neuroblastoma does not typic ally secrete serotonin or cause elevated 5-HIAA levels.

c. Leiomyoma is a benign tumor arising from smooth muscle tissue and can occur in various parts of th e body (including the uterus, gastrointestinal tract, and skin). It does not secrete serotonin or cause ele vated 5-HIAA levels.

d. Chromaffinoma (also known as a pheochromocytoma) is a type of tumor arising from chromaffin cell s in the adrenal glands and sympathetic ganglia (part of the autonomic nervous system). Chromaffinom as can cause symptoms such as high blood pressure, palpitations, sweating, and headache but do not typically secrete serotonin or cause elevated 5-HIAA levels (although they can secrete other hormones such as adrenaline and noradrenaline).

Solution for Question 4:

• Based on the information provided, the most likely diagnosis for this patient's condition is glucagonoma. A glucagonoma is a rare pancreatic neuroendocrine tumor that produces excessive amounts of glucagon. The presence of a skin lesion that has spread to the entire limb and the abdomen, along with a history of long-standing diabetes and recurrent deep vein thrombosis, are all signs that suggest the presence of a glucagonoma. The skin lesion shown in the image is necrolytic migratory erythema (NME), which is a characteristic skin rash associated with glucagonoma. NME is a red, scaly rash that can appear in multiple locations on the body, including the lower extremities, buttocks, groin, and perineum.

Incorrect choices:

• Option a: An insulinoma is a pancreatic neuroendocrine tumor that secretes excessive amounts of insulin. This condition can lead to hypoglycemia, which can cause symptoms such as weakness, confusion, sweating, and palpitations. However, skin lesions and recurrent deep vein thrombosis are not typically associated with insulinoma, so it is an unlikely diagnosis in this case.

• Option b: A gastrinoma is a pancreatic neuroendocrine tumor that produces excessive amounts of gastrin, a hormone that stimulates the production of stomach acid. This can cause symptoms such as abdominal pain, nausea, vomiting, and diarrhea. However, skin lesions and deep vein thrombosis are not typically associated with gastrinoma, so it is an unlikely diagnosis in this case.

• Option d: A VIPoma is a rare pancreatic neuroendocrine tumor that produces excessive amounts of vasoactive intestinal peptide (VIP), a hormone that regulates the secretion of fluids and electrolytes in the intestines. This can cause symptoms such as watery diarrhea, dehydration, and electrolyte imbalances. While VIPomas can cause skin lesions, they are not typically associated with recurrent deep vein thrombosis or long-standing diabetes, so it is an unlikely diagnosis in this case.

Solution for Question 5:

Correct Option A - Skip lesions are present in Crohn’s disease:

• Skip lesions refer to the characteristic feature of Crohn's disease where there are areas of inflammation that are separated by normal or unaffected segments of the bowel. This pattern of involvement is not seen in ulcerative colitis. Skip lesions can occur throughout the entire gastrointestinal tract, from the mouth to the anus, in Crohn's disease.

Incorrect Options:

Option B - Mucosal layers are involved in Crohn's while transmural involvement seen in ulcerative coliti s: This statement is incorrect. In Crohn's disease, the inflammation can involve all layers of the bowel w all, which is known as transmural involvement. In ulcerative colitis, the inflammation is limited to the mu cosal layer of the colon and rectum.

Option C - Inflammatory bowel disease does have a strong genetic predisposition: This statement is in correct. Both Crohn's disease and ulcerative colitis have a strong genetic component, indicating a predisposition to developing these conditions. Family history of inflammatory bowel disease is a known risk factor.

Option D - Crohn's is curable through surgical resection of the affected segment: This statement is inco rrect. While surgical resection may be necessary in some cases of Crohn's disease to manage complic ations or alleviate symptoms, it is not considered a cure. Crohn's disease is a chronic condition that req uires long-term management and treatment to control inflammation and maintain remission.

Solution for Question 6:

Correct Option C - Start anti-tubercular therapy:

• Chest x-ray and clinical symptoms are suggestive of tuberculous peritonitis secondary to pulmonary tuberculosis.

• It is typically managed with a combination of anti-tubercular drugs, including isoniazid, rifampicin, pyrazinamide, and ethambutol

Incorrect Options:

Option A - Biopsy: Biopsy may be considered if the diagnosis is uncertain or to establish the definitive diagnosis. However, in this case, the clinical presentation and adenosine deaminase elevation strongly suggest tuberculous peritonitis, making biopsy less necessary for initial management.

Option B - Start ATT after laparotomy stricture removal: Laparotomy stricture removal is not indicated i n the management of tuberculous peritonitis. Anti-tubercular therapy (ATT) is the mainstay of treatment and should be initiated promptly.

Option D - Symptomatic management: Symptomatic management is inadequate and initiation of anti-tu bercular therapy is a more appropriate option

Solution for Question 7:

Correct Option C - Urea breath test:

• This is the preferred method to assess the success of H. pylori treatment.

• It involves administering a solution containing labeled urea, which is metabolized by H. pylori if present.

• The patient then exhales into a collection bag, and the breath sample is analyzed for the presence of labeled carbon dioxide, indicating the presence or absence of H. pylori.

Incorrect Options:

Option A, B and D are incorrect. Urea breath test is used to determine treatment response in patients o n anti H.pylori regimens.

Solution for Question 8:

Correct Option A: Lysosomal acid alpha glucosidase

• Pompe's disease, also known as glycogen storage disease type II, is caused by a deficiency of the enzyme lysosomal acid alpha glucosidase, also called acid alpha-glucosidase or acid maltase. This enzyme is responsible for breaking down glycogen, a stored form of glucose, into glucose molecules within the lysosomes of cells.

Incorrect options:

Option B: Glucose 6 phosphatase:

• Glucose 6 phosphatase is an enzyme involved in gluconeogenesis and glycogenolysis. Deficiency of this enzyme is seen in Von Gierke's disease (glycogen storage disease type I), not in Pompe's disease.

Option C: Muscle phosphorylase:

• Muscle phosphorylase, also known as myophosphorylase, is an enzyme involved in glycogenolysis (the breakdown of glycogen into glucose) in muscle tissue. Deficiency of muscle phosphorylase leads to McArdle disease (glycogen storage disease type V), characterized by exercise intolerance and muscle cramps.

Option D: Phosphofructokinase:

• Phosphofructokinase is an enzyme involved in glycolysis, the breakdown of glucose to produce energy. Deficiency of phosphofructokinase leads to Tarui disease (glycogen storage disease type VII), characterized by exercise intolerance and muscle weakness.

Solution for Question 9:

Correct Option B: Distal intestinal obstruction:

• Distal intestinal obstruction refers to a blockage or narrowing in the lower part of the intestine, which can lead to symptoms such as recurrent pulmonary infections, bulky greasy stools (steatorrhea), and increased stool fat content.

• The obstruction hinders the proper absorption of fats and nutrients, resulting in the passage of undigested fats in the stool.

• Signs and symptoms of DIOS include a sudden onset of crampy abdominal pain, vomiting, and a palpable mass (often in the right lower quadrant) in the abdomen.

• X-rays of the abdomen may reveal stool in the colon and air-fluid levels in the small intestines.

Incorrect Options:

Option A. Protein-losing enteropathy: Protein-losing enteropathy is a condition characterized by excess ive loss of proteins from the intestines. It can result in edema, hypoalbuminemia, and other signs of pro tein deficiency. While it can cause changes in stool consistency, such as frothy or pale stools, it is not t ypically associated with bulky greasy stools.

Option C. Hypernatremia: Hypernatremia refers to elevated levels of sodium in the blood. It is not direct ly associated with the symptoms described in the case, which are more suggestive of gastrointestinal malabsorption.

Option D. Rectal prolapse occurs after treatment: Rectal prolapse is a condition where the rectum protr udes through the anus. While it can occur in some cases of chronic diarrhea and malabsorption, it is no

t directly related to the symptoms mentioned in the case.

Solution for Question 10:

Correct Option B: Persistent vomiting: Persistent vomiting can lead to a condition called metabolic alkalosis. When a person vomits, they lose stomach acid (hydrochloric acid), which results in a decrease in hydrogen ions (H+). This loss of acid leads to an imbalance in the body's acid-base status, causing the blood pH to increase (become more alkaline). In the given ABG report, the pH of 7.52 is indicative of alkalosis, supporting the diagnosis of metabolic alkalosis due to persistent vomiting.

Incorrect Options:

Option A: Diabetic ketoacidosis (DKA): DKA is a serious complication of diabetes characterized by high blood sugar levels, ketone production, and metabolic acidosis. In DKA, the pH of the blood is typically low (acidic) due to the accumulation of ketones. In the given ABG report, the pH is 7.52, which indicates alkalosis rather than acidosis. Therefore, DKA is not the cause of the ABG findings.

Option C: Septic shock: Septic shock is a life-threatening condition caused by a severe infection. It can lead to multiple organ dysfunction and a state of metabolic acidosis. In septic shock, the body's cells are unable to effectively use oxygen, resulting in increased production of lactic acid. This accumulation of acid causes the blood pH to decrease (become more acidic). The pH of 7.52 in the ABG report suggests alkalosis rather than acidosis, so septic shock is unlikely to be the cause.

Option D: Renal tubular acidosis (RTA): RTA is a condition characterized by a defect in the kidneys' ability to excrete acid, leading to a buildup of acid in the body. There are different types of RTA, but they generally result in metabolic acidosis rather than alkalosis. Since the ABG report shows alkalosis with a pH of 7.52, RTA is not the likely cause.

Solution for Question 11:

Correct Option D.

• The correct answer is IgA tissue transglutaminase antibody (IgA-TTG) testing. This test is used to evaluate for celiac disease, an autoimmune condition characterized by an immune reaction to gluten, a protein found in wheat, barley, and rye. Celiac disease can lead to malabsorption, chronic diarrhea, weight loss, fatigue, and other symptoms mentioned in the case.

Incorrect Options

Option A. TSH levels: Thyroid-stimulating hormone (TSH) levels are typically measured to evaluate thyroid function. However, the symptoms described in the case (fatigue, chronic diarrhea, weight loss, bone pain, abdominal distension) are not typically associated with thyroid dysfunction, making TSH testing less relevant in this context.

Option B. C-peptide levels: C-peptide is a marker of insulin production and can be measured to assess pancreatic function. However, the symptoms described in the case are not suggestive of a primary pancreatic disorder, and C-peptide testing is not typically indicated in the initial evaluation of the described clinical presentation.

Option C. Urine sugar and ketone: Testing urine for sugar and ketones is often performed to evaluate for diabetes mellitus or diabetic ketoacidosis. However, the symptoms described in the case are not con

sistent with diabetes or diabetic ketoacidosis, making this testing less relevant in this context.

Solution for Question 12:

• HBsAg (Hepatitis B surface antigen) nonreactive: The absence of HBsAg indicates that the patient is not currently infected with the hepatitis B virus (HBV).

• HBeAg (Hepatitis B e antigen) nonreactive: The absence of HBeAg suggests that the patient is not actively replicating HBV.

• IgG anti-HBcAg (IgG antibody to hepatitis B core antigen) reactive: The presence of IgG anti-HBcAg indicates a previous or remote infection with HBV. IgG antibodies to HBcAg persist after the acute phase of infection and can provide long-term immunity.

• IgM anti-HBcAg (IgM antibody to hepatitis B core antigen) nonreactive: The absence of IgM anti-HBcAg suggests that there is no recent or ongoing acute hepatitis B infection. IgM antibodies to HBcAg are typically present during the acute phase of infection.

• Based on the viral markers findings, we can diagnose Remote infection of hepatitis B.

Incorrect Choices:

Option A: The patient does not have acute hepatitis B because the key markers for active infection (HBsAg and HBeAg) are non-reactive. Therefore, acute hepatitis B cannot be the diagnosis.

Option B: Based on these findings, the patient does not have chronic hepatitis B because the key markers for active infection (HBsAg and HBeAg) are non-reactive. Therefore chronic hepatitis B cannot be the diagnosis.

Option D: The core window period is not applicable in this case, as the core window period refers to a specific phase of hepatitis B infection. During the window period, there may be a temporary absence or low levels of detectable hepatitis B surface antigen (HBsAg) and hepatitis B e antigen (HBeAg) in the blood, while the person may still have detectable IgM antibodies to hepatitis B core antigen (IgM anti-HBcAg).

Solution for Question 13:

Correct Option: B

Based on the given clinical presentation, the most likely abdomen finding in this case would be splenomegaly. The correct answer is: Splenomegaly

Explanation:

The presence of high-grade fever, painless lesions on the hands, and a new regurgitant murmur suggests the possibility of infective endocarditis, which is an infection of the heart valves. The mitral valve involvement indicated by the presence of a mass on the echocardiogram further supports this diagnosis.

In infective endocarditis, microorganisms can enter the bloodstream and colonize the heart valves, leading to the formation of vegetations. These vegetations can embolize, causing systemic manifestations and affecting various organs, including the spleen.

Splenomegaly is a common finding in infective endocarditis due to septic emboli. As the infected emboli reach the spleen, they can cause local inflammation and enlargement of the organ.

While ascites, hepatomegaly, and portal hypertension can be seen in certain liver diseases, they are n ot typically associated with infective endocarditis. Therefore, the correct answer is splenomegaly in this case.

Solution for Question 14:

Correct Option: D

• Fluid Thrill: Fluid thrill, also known as fluid wave, is another technique used to detect ascites. The patient or an assistant places their hand firmly on the midline of the abdomen, and the examiner taps one side of the abdomen sharply with their hand or fingers. If ascitic fluid is present, a palpable wave of fluid can be felt across the abdomen.

Incorrect Options:

Option A: Shifting Dullness: Shifting dullness is a maneuver used to assess the presence of fluid in the abdomen. During this examination, the patient lies supine, and percussion is performed along the flank s and the midline of the abdomen. Initially, when the patient is on their back, a dull sound is heard over the dependent (lower) areas where fluid collects. However, as the patient is gradually rolled onto one si de, the fluid shifts, and the previously dull areas become resonant (tympanic) due to the displacement of the fluid. The shifting dullness sign indicates the presence of free fluid (such as ascites) within the ab domen.

Option B: Ascites: Ascites refers to the accumulation of excess fluid in the peritoneal cavity, resulting in abdominal distension. It is commonly associated with liver disease, such as cirrhosis, but can also occ ur due to other conditions like heart failure, malignancies, or infections. On physical examination, ascite s is characterized by a tense and protuberant abdomen.

Option A: Puddle Sign: The puddle sign is an extension of the shifting dullness maneuver. After elicitin g shifting dullness, gentle palpation is performed over the areas of dullness. If there is a significant amount of ascitic fluid present, the examiner's hand may sink into the fluid, giving a sensation similar to palpating a puddle of water.

Solution for Question 15:

Correct Option D:

Iritis, also known as anterior uveitis, is inflammation of the iris, which is the colored part of the eye. It ca n occur as a result of various underlying conditions. Among the options provided, rheumatoid arthritis (RA) is not typically associated with iritis. While RA primarily affects the joints, it can also involve other o rgans such as the skin, heart, lungs, and blood vessels. However, ocular involvement, specifically iritis, is not a characteristic feature of RA.

Incorrect Options:

Option A. SLE (Systemic Lupus Erythematosus): SLE is an autoimmune disease that can affect multipl e organs, including the eyes. Ocular manifestations in SLE can include iritis, uveitis, and other conditio ns such as dry eyes and keratitis.

Option B. Behcet's disease: Behcet's disease is a rare autoimmune condition characterized by recurrent oral and genital ulcers, skin lesions, and uveitis. Uveitis, including iritis, is a well-known ocular manifestation of Behcet's disease.

Option C. Ulcerative colitis: Ulcerative colitis is a type of inflammatory bowel disease that primarily affects the colon and rectum. While its primary manifestations are related to the gastrointestinal system, extraintestinal manifestations can occur, including ocular involvement. Uveitis, including iritis, can occur in patients with ulcerative colitis.

Solution for Question 16:

Correct Option:

Option B

Lead pipe appearance: This feature is not typically associated with Crohn's disease. The term "lead pipe appearance" is used to describe the smooth, uniform narrowing of the colon seen in conditions like ulcerative colitis. In Crohn's disease, the involvement can be patchy and may lead to skip lesions or segmental involvement rather than a continuous, uniform appearance.

Incorrect options

Option a. Transmural involvement: This is a characteristic feature of Crohn's disease. It refers to inflammation that extends through all layers of the intestinal wall, including the mucosa, submucosa, muscularis propria, and serosa.

Option c. Rectal sparing: This is a feature seen in Crohn's disease. It refers to the relative sparing of the rectum from inflammation. Crohn's disease often involves the terminal ileum (the last part of the small intestine) and can extend to other parts of the gastrointestinal tract, but the rectum is commonly spared.

Option d. Perianal fistula: Perianal fistulas are frequently associated with Crohn's disease. These abnormal connections between the intestine and the skin around the anus can cause pain, discharge, and recurrent infections.

Solution for Question 17:

Correct Option:

Option C: Head injury.

Cushing's ulcers can develop in patients with severe head injuries, particularly those with elevated intracranial pressure. The increased intracranial pressure leads to activation of the vagus nerve, which stimulates the release of gastric acid and increases gastric motility, resulting in the development of gastric ulcers.

Incorrect options

Option a. Burns: Burns are not typically associated with the development of Cushing's ulcers. Gastric ulcers in burn patients are more commonly attributed to other factors such as stress, decreased mucosal

blood flow, and altered acid secretion.

Option b. Stress: While stress can contribute to the development of gastric ulcers, it is not specific to C ushing's ulcers. Stress-related ulcers, also known as stress ulcers, can occur in various conditions suc h as severe illness, trauma, surgery, or critical illness.

Optiond. Cell necrosis: Cell necrosis alone is not a direct cause of Cushing's ulcers. The development of gastric ulcers involves complex mechanisms related to the autonomic nervous system and altered a cid secretion.

Solution for Question 18:

Correct Option: B: Whipple's disease

• Periodic acid-Schiff (PAS) positive macrophages are a characteristic finding in Whipple's disease.

• Whipple's disease is a rare systemic infectious disorder caused by the bacterium Tropheryma whipplei.

• PAS staining is used to detect the presence of glycoproteins, which accumulate in the cytoplasm of macrophages in affected tissues, including the small intestine, lymph nodes, and other organs.

Incorrect Options:

Option A: Agammaglobulinemia: This statement is incorrect. Agammaglobulinemia refers to a group of primary immunodeficiency disorders characterized by a lack of mature B cells and reduced or absent immunoglobulin production. PAS-positive macrophages are not a characteristic finding in agammaglobulinemia.

Option C: Abetalipoproteinemia: This statement is incorrect. Abetalipoproteinemia is a rare genetic diso rder characterized by the absence of beta-lipoproteins, leading to impaired absorption and transport of dietary fats and fat-soluble vitamins. PAS-positive macrophages are not typically seen in abetalipoprot einemia.

Option D: Crohn's disease: This statement is incorrect. Crohn's disease is a chronic inflammatory bowe l disease that can affect any part of the gastrointestinal tract. While Crohn's disease is associated with t he presence of macrophages and other immune cells in the affected intestinal tissue, PAS-positive ma crophages are not a specific feature of Crohn's disease.

Solution for Question 19:

Correct Option C: Menke's disease

• Menke's disease, also known as Menkes syndrome or copper transport disease, is a rare X-linked recessive disorder characterized by impaired copper absorption and transport.

• It is caused by mutations in the ATP7A gene, which encodes a copper-transporting ATPase involved in the transport of copper into the cells.

Incorrect options:

Option A: Dubin-Johnson syndrome is a rare genetic disorder characterized by impaired bilirubin trans port and conjugation in the liver. It does not affect copper levels.

Option B: Wilson's disease is a genetic disorder characterized by impaired copper transport and metab olism, leading to copper accumulation in various tissues, particularly the liver and brain. It does not cau se low serum copper levels.

Option D: Gilbert's syndrome is a benign genetic disorder characterized by mild unconjugated hyperbili rubinemia. It does not affect copper levels.

Solution for Question 20:

Correct Option: C.

• Lactose intolerance is a condition characterized by the inability to digest lactose, a sugar found in dairy products. It occurs due to a deficiency or reduced activity of the enzyme lactase, which is responsible for breaking down lactose into simpler sugars for absorption.

• Yogurt is produced through the fermentation of milk by bacteria, typically Lactobacillus and Streptococcus species. During the fermentation process, these bacteria produce lactase, which helps break down lactose into simpler sugars. As a result, yogurt contains lower levels of lactose compared to other dairy products.

Incorrect Option:

Option A. Condensed Milk: Condensed milk is milk from which water has been removed, resulting in a concentrated form. It contains a high concentration of lactose, and therefore, is likely to cause sympto ms of lactose intolerance in individuals with lactase deficiency.

Option B. Skimmed Milk: Skimmed milk refers to milk from which the cream (high-fat portion) has been removed. While the fat content is reduced, lactose content remains relatively unchanged. Therefore, sk immed milk can still cause symptoms of lactose intolerance in individuals with lactase deficiency.

Option D. Ice Cream: Ice cream is a dairy product that typically contains high amounts of lactose. It is made by combining milk or cream with sugar and flavorings. Therefore, ice cream is likely to cause sy mptoms of lactose intolerance in individuals with lactase deficiency.

Solution for Question 21:

Correct option A

• Hemorrhage: This is the correct option. Hemorrhage, or bleeding, is one of the most common immediate complications of splenectomy. The spleen is a highly vascular organ, and during surgery, there is a risk of bleeding from the splenic artery or its branches. Measures are taken to control bleeding during and after the procedure, but it remains a potential complication. Therefore, option A is correct.

Incorrect options:

Option B. Fistula: Fistula formation is not a common immediate complication of splenectomy. A fistula is an abnormal connection between two organs or structures. While it is possible for a fistula to d evelop after splenectomy, it is not the most common immediate complication. Therefore, option B is incorrect.

Option C. Bleeding from gastric mucosa: Bleeding from the gastric mucosa is not a common immediate complication of splenectomy. The spleen is not directly involved in regulating gastric mucosal integrity

or bleeding control. Therefore, option C is incorrect.

Option D. Pancreatitis: Pancreatitis is not a common immediate complication of splenectomy. The spleen and the pancreas are separate organs with distinct functions. While complications related to the pancreas can occur after splenectomy in some cases, pancreatitis itself is not the most common immediate complication. Therefore, option D is incorrect.

Solution for Question 22:

Correct Option A. Toxic megacolon: Fulminant colitis or toxic megacolon is a severe and potentially life-threatening complication of UC characterized by acute colonic dilation and systemic toxicity. Surgery may be contraindicated if the patient is in an unstable condition, as the risk of surgical complications may outweigh the potential benefits. Medical management and stabilization are typically attempted initially, and surgery is considered if conservative measures fail.

Incorrect options:

option D - Refractory fistula: A fistula is an abnormal connection between two organs or structures. In UC, fistulas can occur, typically between the colon and adjacent organs such as the bladder or skin. When a fistula is refractory, meaning it does not respond to medical treatments and causes persistent symptoms or complications, surgical intervention may be considered.

Option B. Colonic perforation: Colonic perforation is a serious complication of UC that can lead to life-threatening infections and requires prompt surgical intervention.

Option C. Colonic obstruction: Colonic obstruction is another complication of UC that can lead to significant symptoms and complications. In cases of complete or persistent colonic obstruction that does not resolve with conservative measures, surgery may be necessary.

Solution for Question 23:

Correct option C

• 2% chance of malignancy if present for 10 years This statement is generally true.

• Patients with ulcerative colitis have an increased risk of developing colorectal cancer compared to the general population. The risk is directly related to the duration of the disease. It is estimated that after 10 years of ulcerative colitis, the cumulative risk of developing colorectal cancer is around 2%.

• However, it is important to note that individual risks can vary depending on other factors such as disease severity, extent, and presence of dysplasia.

Incorrect options:

Option A: Bad prognosis if it involved only rectum This statement is not entirely accurate. The prognosis of cancer developing in ulcerative colitis depends on various factors, including the extent and severity of the disease, the presence of dysplasia (precancerous changes), and the stage of the cancer. While rectal involvement can increase the risk of cancer development, the prognosis is determined by multiple factors and cannot be solely based on the involvement of the rectum.

Option B: Good prognosis if it involves only rectum and is low grade This statement is partially correct. The prognosis of colorectal cancer in ulcerative colitis can vary based on multiple factors, including the extent and grade of the cancer. Generally, if the cancer is confined to the rectum and is low grade, the

prognosis may be relatively better compared to more advanced or high-grade cancers. However, other factors such as the presence of dysplasia, depth of invasion, and lymph node involvement also play a role in determining prognosis.

Option D: Young age onset has low chances as compared to old age onset This statement is not entire ly accurate. While it is true that the risk of colorectal cancer increases with age, young individuals with ulcerative colitis can still develop cancer. The risk factors for cancer development in ulcerative colitis in clude the duration and severity of the disease, the presence of dysplasia, family history, and other indiv idual factors. Young age onset does not guarantee a low chance of developing cancer, and regular sur veillance and monitoring are important regardless of age.

Solution for Question 24:

Correct Option D:

• Tuberculosis - SAAG score < 1.1 mg/dl is strongly suggestive of Tuberculosis.

Incorrect Options:

Option A: Congestive heart failure: Congestive heart failure can also lead to the development of ascites . However, in congestive heart failure, the SAAG is usually greater than 1.1 g/dL.

Option B: Myxoedema: the SAAG is usually greater than 1.1 g/dL in this condition.

Option C: Budd Chiari syndrome - the SAAG is usually greater than 1.1 g/dL in this condition.

Solution for Question 25:

Correct option B

• Diffuse oesophageal spasm is a motility disorder characterized by uncoordinated contractions of the muscles in the esophagus. This condition leads to difficulties in swallowing, chest pain, and sometimes regurgitation. The X-ray image provided shows the characteristic findings associated with Diffuse Oesophageal Spasm, which include multiple contractions along the length of the esophagus, often referred to as "corkscrew" or "rosary bead" appearance. These contractions result in a disorganized and irregular movement of the esophageal muscles. Therefore, the X-ray image aligns with the diagnosis of Diffuse Oesophageal Spasm.

Incorrect options:

Option A: Achalasia cardia: Achalasia cardia is a condition characterized by the inability of the lower es ophageal sphincter (LES) to relax properly, leading to difficulty in swallowing. This condition is typically associated with a dilated esophagus and absent or weak peristalsis. The X-ray image does not display the typical findings associated with Achalasia cardia, such as a dilated esophagus or absent peristalsis . Therefore, the image does not support the diagnosis of Achalasia cardia.

Option C: Carcinoma Oesophagus spasm: Carcinoma of the esophagus refers to cancerous growth in t he esophageal tissues. It can cause various symptoms, including difficulty swallowing, weight loss, and pain. However, the X-ray image does not provide any evidence of a
tumor or cancerous growth, which is a characteristic feature of Carcinoma Oesophagus spasm. Theref ore, the image does not support the diagnosis of Carcinoma Oesophagus spasm.

Option D: Schatzki's Ring: Schatzki's ring, also known as an esophageal ring, is a narrowing of the lower esophagus, typically caused by a band of tissue or fibrous ring. It can lead to symptoms of dysphagia (difficulty swallowing) and food impaction. However, the X-ray image does not show any evidence of a narrowing or ring-like structure in the esophagus, which is characteristic of Schatzki's Ring. Thus, the image does not support the diagnosis of Schatzki's Ring.

Solution for Question 26:

Correct option B

• pH-metry: pH-metry is not typically performed for the evaluation of Carcinoma Oesophagus. pH-metry is a test used to measure the pH levels in the esophagus to evaluate for conditions such as gastroesophageal reflux disease (GERD) or esophageal motility disorders. It is not specific to Carcinoma Oesophagus.

Incorrect options:

Option A. Biopsy: A biopsy is typically performed to obtain a tissue sample from the suspected area of carcinoma in the esophagus. The tissue sample is then examined under a microscope to confirm the diagnosis and determine the histological type and grade of the cancer.

Option C. CT chest: A CT (computed tomography) scan of the chest is commonly performed to evaluate the extent and stage of Carcinoma Oesophagus. It helps visualize the size and location of the tumor, as well as any spread to nearby lymph nodes or distant organs.

Option D. PET scan: A PET (positron emission tomography) scan is often used to detect the spread of Carcinoma Oesophagus beyond the primary tumor site. It can help identify metastases to distant organs or lymph nodes by detecting areas of increased metabolic activity.

Solution for Question 27:

Correct option A:

• The correct diagnosis based on the given description and the X-ray image showing air under the diaphragm is pneumoperitoneum.

• Pneumoperitoneum refers to the presence of air or gas within the peritoneal cavity, which is the space between the abdominal organs and the abdominal wall. It is commonly caused by perforation or rupture of a hollow organ in the abdomen, such as the stomach, intestine, or appendix. The presence of air under the diaphragm on an X-ray image is a classic finding seen in pneumoperitoneum.

• Pneumothorax: Pneumothorax is the presence of air or gas in the pleural cavity, which is the space between the lung and the chest wall. It typically appears as air surrounding the lung tissue on an X-ray image and may cause lung collapse.

• Eventration of diaphragm: Eventration of the diaphragm is a condition in which the diaphragm muscle is abnormally thin or weak, leading to an elevated and dome-shaped appearance. It does not involve the presence of air under the diaphragm.

• Pneumomediastinum: Pneumomediastinum refers to the presence of air or gas in the mediastinum, which is the central region of the chest between the lungs. It can be caused by various factors, including trauma or medical conditions, and is typically seen on X-ray as air surrounding the mediastinal structures.

Incorrect options:

Option A: Pneumothorax: Pneumothorax refers to the presence of air or gas in the pleural cavity, which is the space between the lung and the chest wall. It typically appears as air surrounding the lung tissue on an X-ray image. In the given scenario, the air is localized under the diaphragm, indicating pneumoperitoneum, not pneumothorax.

Option C: Eventration of diaphragm: Eventration of the diaphragm is a condition in which the diaphragm muscle is abnormally thin or weak, leading to an elevated and dome-shaped appearance. It does not involve the presence of air under the diaphragm. The X-ray image showing air under the diaphragm is not consistent with eventration of the diaphragm.

Option D: Pneumomediastinum: Pneumomediastinum refers to the presence of air or gas in the mediastinum, which is the central region of the chest between the lungs. It can be caused by various factors, including trauma or medical conditions. However, in the given scenario, the air is localized under the diaphragm and not in the mediastinum, making pneumomediastinum an incorrect diagnosis.

Solution for Question 28:

Correct option C:

• Oral lichen planus (OLP) is a chronic inflammatory condition that affects the mucous membranes in the mouth. It is not considered a pre-malignant condition in itself, but there have been discussions and research about its potential association with an increased risk of oral squamous cell carcinoma (OSCC), which is a type of oral cancer.

Oral lichen planus (OLP) is a
chronic inflammatory condition that affects the mucous membranes in the mouth. It is not considered a pre-malignant condition in itself, but there have been discussions and research about its potential association with an increased risk of oral squamous cell carcinoma (OSCC), which is a type of oral cancer.

Incorrect Options:

Option A (Chronic hyperplastic candidiasis) is incorrect because chronic hyperplastic candidiasis, caused by the fungus Candida, is considered a
premalignant condition due to its association with an increased risk of oral cancer.

Option B (Oral submucosal fibrosis) is incorrect because oral submucosal fibrosis, typically caused by the chewing of betel nuts or other irritants, is considered a
premalignant condition associated with an increased risk of oral cancer.

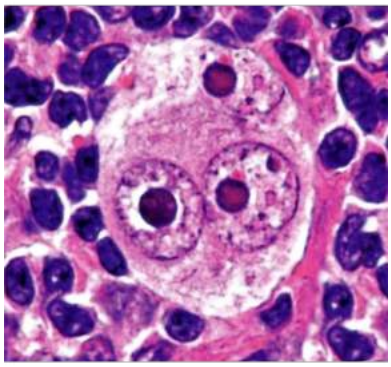
Option D (Leukoplakia) is incorrect because leukoplakia, characterized by white patches in the oral mucosa, is considered a premalignant condition as it has a higher risk of progressing to oral cancer.

Hodgkin's and Non-Hodgkin's Lymphoma

1. A 28-year-old patient presents with painless swelling of cervical lymph nodes and intermittent fever. Physical examination reveals rubbery lymph nodes.Lymph node biopsy is shown below. Which of the following markers would not be positive for the diagnosis in this patient?

(or)

Which of the following markers will be positive in a disease with a biopsy showing Reed -Sternberg cells as shown in the image?



A. CD15

B. CD30

C. PAX5

D. CD20

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2. A 45-year-old male presents with painless swelling of multiple lymph nodes in the neck and groin. On further evaluation, he is diagnosed with non-Hodgkin's lymphoma. Which of the following statements regarding non-Hodgkin's lymphoma is correct?

(or)

Which of the following statements regarding non-Hodgkin's lymphoma is correct?

A. Non-Hodgkin's lymphoma has a favorable prognosis.

B. Spread of non-Hodgkin's lymphoma occurs primarily through direct invasion of contiguous lymph nodes.

C. Subdiaphragmatic lymphadenopathy is commonly observed in non-Hodgkin's lymphoma.

D. Testicular involvement is a rare presentation of non-Hodgkin's lymphoma.

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3. A 55-year-old patient presents with painless swelling of multiple lymph nodes in the neck and groin. Biopsy of an affected lymph node reveals the presence of centrocytes and centroblasts. Immunohistochemistry shows positive staining for Bcl2, CD19, and CD20. What is the most likely diagnosis?

(or)

A middle-aged patient presented with painless swelling of multiple lymph nodes in the neck and groin. Biopsy of an affected lymph node reveals the presence of centrocytes and centroblasts.

Immunohistochemistry shows positive staining for Bcl2, CD19, and CD20. What is the most likely diagnosis?

A. Diffuse Large B-cell Lymphoma

B. Hodgkin's Lymphoma

C. Follicular Lymphoma

D. Burkitt's Lymphoma

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4. A 60-year-old male presents with generalized lymphadenopathy and B symptoms (fever, night sweats, and weight loss). Biopsy of the lymph node reveals large, atypical lymphoid cells with positive expression of CD30 and CD38, as well as BCL 6 rearrangements. The patient has a history of HIV infection. What is the most likely diagnosis?

(or)

An elderly male with a history of HIV presented with generalized lymphadenopathy and B symptoms (fever, night sweats, and weight loss). Biopsy of the lymph node reveals large, atypical lymphoid cells with positive expression of CD30 and CD38, as well as BCL6 rearrangements. What is the most likely diagnosis?

A. Hodgkin's Lymphoma

B. Follicular Lymphoma

C. Diffuse Large B-cell Lymphoma (DLBCL)

D. Mantle Cell Lymphoma

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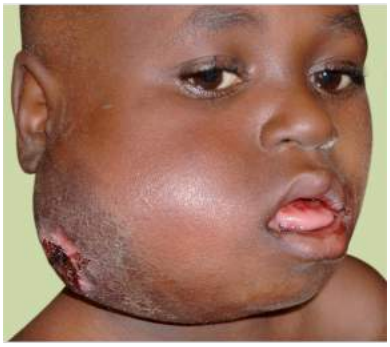
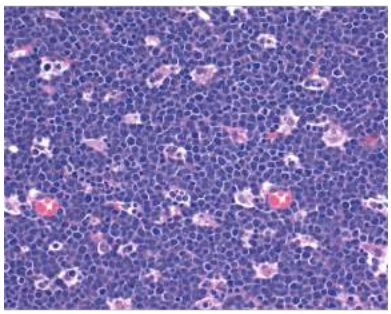
5. A 5-year-old African child presents with painless swelling of the jaw. On examination, a visible swelling is observed in the mandibular region. An image of the patient's jaw is shown below. Based on the clinical presentation, findings, and biopsy image, All of the following chromosomal swaps are seen in this patient except??

(or)

Which of the following chromosomal swaps is not seen in a patient with the following clinical feature and biopsy finding?





A. t(2:8)

B. t(8:14)

C. t(8:22)

D. t(8:20)

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6. A 60-year-old patient presented with generalized lymphadenopathy and hepatosplenomegaly. The lymph nodes are not tender. Flow cytometry analysis of the lymph node biopsy sample reveals positivity for Cyclin D1, CD5 and CD23, while CD200 is negative. Based on the clinical presentation and findings, what is the most likely diagnosis?

(or)

An elderly patient presented with generalized lymphadenopathy with non-tender lymph nodes and hepatosplenomegaly. Flow cytometry analysis of the lymph node biopsy sample reveals positivity for Cyclin D1, CD5, and CD23, while CD200 is negative. What is the most likely diagnosis?

A. Chronic lymphocytic leukemia/small lymphocytic lymphoma (CLL/SLL)

B. Mantle Cell Lymphoma

C. Marginal zone lymphoma (MZL)

D. Diffuse large B-cell lymphoma (DLBCL)

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7. A 65-year-old patient visited her primary care physician with complaints of persistent fatigue, night sweats, and painless swelling in her neck and armpits. She noticed a lump in her neck that has been gradually increasing in size over the past few weeks. She denies any recent infections or significant weight loss. Lymph Nodes appear enlarged and painless excisional biopsy of a cervical lymph node reveals Reed-Sternberg cells All of the following are true regarding the condition that the patient is suffering from except?

(or)

Which of the following statements is not true regarding Hodgkin's lymphoma?

A. Hodgkin lymphomas are unusual tumours of T cell origin

B. Reed-Sternberg (RS) cells are the malignant cells in Hodgkin's Lymphoma

C. Classic RS cells are common in the mixed-cellularity subtype

D. Hodgkin lymphomas arise in a chain of lymph nodes and typically spread in a stepwise fashion to anatomically contiguous nodes.

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8. Regarding chemotherapy regimens, all of the following are true, except?

(or)

Regarding chemotherapy regimens, all of the following are true, except?

A. ATRA (All-trans retinoid acid) is used in the treatment of acute promyelocytic leukaemia

B. Hodgkin's lymphoma is best treated by R-CHOP (Rituximab, cyclophosphamide, hydroxydaunorubicin hydrochloride, oncovin and prednisone)

C. Imatinib mesylate is used in the treatment of chronic myeloid leukaemia.

D. Fludarabine is used in the treatment of chronic lymphocytic leukaemia.

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9. A patient has been recently diagnosed with Hodgkin's lymphoma. A relative of his was also diagnosed with a type of lymphoma. He schedules an appointment with a haematologist to discuss the details of his illness. Which of the following statements regarding lymphoma is not true?

(or)

Which of the following statements regarding lymphoma is not true?

A. A single classification system of Hodgkin's disease is almost universally accepted

B. Hodgkin's lymphoma tends to remain localized to a single group of lymph nodes and spreads by contiguity

C. Several types of Non-Hodgkin's lymphoma may have a leukemic phase

D. In general follicular NHL has worse prognosis compared to diffuse NHL

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10. A student is assigned to give a presentation on the Reed-Sternberg cell to the class. To engage the class actively, he starts the presentation by asking the following Question: Which of the following statements is incorrect regarding the Reed-Sternberg cell?

(or)

Which of the following statements is incorrect regarding the Reed-Sternberg cell?

A. Popcorn variant of Reed-Sternberg cell is seen in Lymphocyte depleted Hodgkin's disease

B. Mononuclear variant of Reed-Sternberg cell is seen in Mixed cellularity Hodgkin's disease

C. Lacunar Variant of Reed-Sternberg cell is seen in Nodular sclerosis

D. Lacunar Variant of Reed-Sternberg cell is a Large cell with a hyperlobated nucleus, multiple small nuclei and eosinophilic cytoplasm around the nucleus

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Correct Answers

Question	Correct Answer
Question 1	4
Question 2	3

Question 3	3
Question 4	3
Question 5	4
Question 6	2
Question 7	1
Question 8	2
Question 9	4
Question 10	1

Solution for Question 1:

Correct Option D- CD20:

• Explanation: In the scenario described, the patient's clinical presentation, including painless lymphadenopathy, intermittent fever, and presence of Reed-Sternberg cells on the lymph node biopsy, suggests the possibility of Hodgkin's lymphoma.

• CD20 is commonly expressed in various B-cell lymphomas but are not specific for Hodgkin's lymphoma.

Incorrect Options:

Option A and B- (CD15 and CD30):

• CD15 and CD30 are markers associated with classical Hodgkin's lymphoma

Option C- PAX5:

• The most specific marker for Hodgkin's lymphoma is PAX5.

• PAX5 is a transcription factor that is most specific for B-cell origin tumors, including Hodgkin's lymphoma.

Solution for Question 2:

Correct Options C- Subdiaphragmatic lymphadenopathy is commonly observed in non-Hodgkin's lymp homa:

• Non-Hodgkin's lymphoma typically starts with subdiaphragmatic lymphadenopathy, making option C the correct answer

Incorrect Options:

Option A- Non-Hodgkin's lymphoma has a favorable prognosis.

• Non-Hodgkin's lymphoma generally has a poor prognosis. Therefore, option A is incorrect.

Option B- Spread of non-Hodgkin's lymphoma occurs primarily through direct invasion of contiguous ly mph nodes.

• The spread of non-Hodgkin's lymphoma occurs through the hematogenous route rather than directly by invasion of contiguous lymph nodes. Thus, option B is incorrect.

Option D-Testicular involvement is a rare presentation of non-Hodgkin's lymphoma.

• Non-hodgkin's lymphoma can also be presented as a testicular lump.

Solution for Question 3:

Correct Option C- Follicular Lymphoma:

• The clinical presentation of painless swelling of multiple lymph nodes and the histological features of centrocytes and centroblasts are characteristic of Follicular Lymphoma. The positive staining for Bcl2, CD19, and CD20 supports the diagnosis of Follicular Lymphoma.

Incorrect Options:

Option A- Diffuse Large B-cell Lymphoma: Diffuse Large B-cell Lymphoma typically presents as rapidly growing lymphadenopathy, often involving a single lymph node or a localized group of lymph nodes.

Option B- Hodgkin's Lymphoma: Hodgkin's Lymphoma is characterized by the presence of Reed-Stern berg cells, which are not mentioned in the scenario.

Option D- Burkitt's Lymphoma: Burkitt's Lymphoma typically presents as a rapidly growing mass, often involving the abdomen or jaw. Additionally, Burkitt's Lymphoma is associated with MYC translocation, which is not mentioned in the scenario. Biopsy shows "Starry Sky" appearance, tumor cells (sky), and t ingible body macrophages (stars)

Solution for Question 4:

Correct Option C- Diffuse Large B-cell Lymphoma (DLBCL):

• Diffuse Large B-cell Lymphoma (DLBCL): DLBCL is the most common NHL worldwide and can present with generalized lymphadenopathy, B symptoms, and the presence of large atypical cells with positive expression of CD30 and CD38. BCL6 rearrangements are also frequently observed in DLBCL. It is associated with HIV infection in some cases.

Incorrect Options:

Option A- Hodgkin's Lymphoma: While Hodgkin's Lymphoma can also present with lymphadenopathy and B symptoms, the positive expression of CD30, CD38, and BCL6 rearrangements is more character istic of DLBCL.

In Hodgkin's Lymphoma

o CD 15 and 30 are positivity (cHL)

o CD 15 and 30 are negative in Atypical Hodgkin's lymphoma.

o As it is a B cell tumor: CD 19, CD 20 (Low or no expression)

o PAX 5 positivity is expressed.

Option B- Follicular Lymphoma: Follicular Lymphoma is an indolent (slow-growing) lymphoma and doe s not typically exhibit large atypical cells or positive expression of CD30 and CD38. BCL6 rearrangeme nts are not commonly seen in follicular lymphoma.

Flow cytometric markers of follicular lymphoma are: · CD 10 positive · CD 19 positive · CD 20 (dim) positive · CD 23 positive · CD 5 is not present · Cyclin D1 is not present

Option D—Mantle Cell Lymphoma: Mantle Cell Lymphoma is a distinct subtype of NHL characterized b y the t(11:14) translocation, which results in cyclin D1 overexpression. It typically presents with lympha denopathy, but the immunophenotype differs from DLBCL, with CD30 and CD38 being negative and B CL6 rearrangements not commonly seen. MCL is positive for B-cell markers (CD19, CD20, CD22, CD7 9a). It is distinguished from other B-cell lymphomas by diffuse positivity for cyclin D1 and SOX11.

Solution for Question 5:

Correct Option D- t(8:20):

• Burkitt's lymphoma, especially the endemic type, is strongly associated with Epstein-Barr virus (EBV) infection and is commonly observed in African children. The clinical presentation of jaw swelling in an African child, along with the image showing jaw involvement and the biopsy image demonstrating the "Starry Sky" appearance, strongly supports the diagnosis of Burkitt's lymphoma

• t(8:20) is not seen in burkits lymphoma

Incorrect Options:

Option A,B,C- t(2:8), t(8:14) & t(8:22):

• Chromosomal swaps in burkits lymphoma includes t(2:8),t(8:14) and t(8:22)

Solution for Question 6:

Correct Option B- Mantle Cell Lymphoma:

• Mantle Cell Lymphoma is characterized by the presence of translocation (11:14), Cyclin D1 positivity, and CD5 positivity along with CD23 and CD200 negativity. The clinical presentation of generalized lymphadenopathy and hepatosplenomegaly, along with the flow cytometry findings described, strongly support the diagnosis of Mantle Cell Lymphoma.

Incorrect Options:

Option A- Chronic lymphocytic leukemia/small lymphocytic lymphoma (CLL/SLL): CLL/SLL may also pr esent with lymphadenopathy and hepatosplenomegaly.

CLL must be suspected if the Absolute lymphocyte count is more than 5 × 10■ cells per ml for 3 consecutive months.

Option C- Marginal zone lymphoma (MZL): MZL typically presents with specific clinical features. MZL is an indolent B-cell lymphoma arising from marginal zone B-cells present in lymph nodes and extranoda l tissues.

Option D- Diffuse large B-cell lymphoma (DLBCL): DLBCL is a common type of non-Hodgkin lymphom a. It typically presents as rapidly growing lymphadenopathy, often involving a single lymph node or a localized group of lymph nodes

Solution for Question 7:

Correct Option A- Hodgkin's lymphomas are unusual tumours of T cell origin:

• Reed-Sternberg (RS) cells are the malignant cells in Hodgkin's Lymphoma, which is a malignancy of germinal centre mature B lymphocytes.

• These are large cells with abundant cytoplasm with bilobed and/or multiple nuclei

• Hodgkin lymphomas are now understood to be unusual tumours of B cell origin.

Incorrect Options:

Option B- Reed-Sternberg (RS) cells are the malignant cells in Hodgkin's Lymphoma:

• Typical RS cells and variants have a characteristic immunophenotype, as they express CD15 and CD30 and fail to express CD45 (leukocyte common antigen), B cell antigens, and T cell antigens.

• These are the classic malignant cells in Hodgkin’s lymphoma.

Option C- Classic RS cells are common in the mixed-cellularity subtype:

• “Classic” RS cells are common in the mixed-cellularity subtype, uncommon in the nodular sclerosis subtype, and rare in the lymphocyte-predominance subtype; in these latter two subtypes, other characteristic RS cell variants predominate.

Option D- Hodgkin lymphomas arise in a chain of lymph nodes and are typically spread in a stepwise fashion to anatomically contiguous nodes:

• Unlike most Non-Hodgkin's Lymphomas, Hodgkin's lymphomas arise in a single lymph node or chain of lymph nodes and typically spread in a stepwise fashion to anatomically contiguous nodes.

Solution for Question 8:

Option B: Hodgkin’s lymphoma is best treated by R-CHOP (Rituximab, cyclophosphamide, hydroxydau norubicin hydrochloride, oncovin and prednisone)

• Adriamycin, Bleomycin, Vinblastine, and Dacarbazine (ABVD) is used in the treatment of Hodgkin's lymphoma.

• R-CHOP is the first line treatment used in Non-Hodgkin's lymphoma

• A revised international prognostic index (IPI) has proposed better outcomes with chemotherapy plus Rituximab

Option A: ATRA (All-trans retinoid acid) is used in the treatment of acute promyelocytic leukaemia

• This statement is correct as ATRA (All-trans retinoid acid) is used to treat acute promyelocytic leukaemia.

Option C: Imatinib mesylate is used in the treatment of chronic myeloid leukaemia

• This statement is correct because imatinib mesylate treats chronic myeloid leukaemia.

Option D: Fludarabine is used in the treatment of chronic lymphocytic leukaemia

• This statement is correct because fludarabine is used to treat chronic lymphocytic leukaemia.

Solution for Question 9:

Option D: In general follicular NHL has a worse prognosis compared to diffuse NHL

• A classification system of Non - Hodgkin’s disease is the “Ann Arbor” staging system.

• The prognosis of Non-Hodgkin’s lymphoma varies markedly with various histological types of Non-Hodgkin’s lymphoma.

• In general, lymphomas with a follicular histological pattern are of lower grade (more prolonged survival than those of diffuse pattern).

Option A: A single classification system of Hodgkin’s disease is almost universally accepted

• “WHO classification” is the universally accepted classification of Hodgkin’s lymphoma.

Hodgkin’s Lymphoma	
• Classic Hodgkin's Lymphoma	95%
• Nodular Lymphocyte-predominant	5%
Classic Hodgkin's Lymphoma	
• Nodular Sclerosis	70%
• Mixed Cellularity	25%
• Lymphocyte Rich	5%
• Lymphocyte Depleted	1%

Option B: Hodgkin’s lymphoma tends to remain localized to a single group of lymph nodes and spreads by contiguity

• This statement is true; Hodgkin’s lymphoma remains localized to a single group of nodes and spreads to the axial group in contiguity.

Option C: Several types of Non-Hodgkin’s lymphoma may have a leukaemic phase

• This statement is true because adult lymphoblastic lymphoma, diffuse large B-cell lymphoma and nodular poorly differentiated lymphocytic lymphoma have a leukaemic phase.

• Therefore, this option is correct.

Solution for Question 10:

Option A: Popcorn variant of Reed-Sternberg cell is seen in Lymphocyte depleted Hodgkin’s disease

• Cell with multiple folded or convoluted nuclear contours resembling a “popcorn kernel.”

• Popcorn variant of Reed-Sternberg cell is seen in Lymphocyte predominant Hodgkin’s disease

Option B: Mononuclear variant of Reed-Sternberg cell is seen in Mixed cellularity Hodgkin’s disease

• The variant of Reed Sternberg cell that is mononucleated is seen in Mixed cellularity Hodgkin’s disease

Option C: Lacunar Variant of Reed-Sternberg cell is seen in Nodular sclerosis

• Large cells with hyperlobated nuclei, multiple small nuclei, and eosinophilic cytoplasm around the nucleus create an empty space called lacunae.

• Reed-Sternberg cells containing these lacunae are seen in Nodular sclerosis.

Option D: Lacunar Variant of Reed-Sternberg cell is a Large cell with a hyperlobated nucleus, multiple small nuclei and eosinophilic cytoplasm around the nucleus

Acute Lymphoblastic Leukemia

1. A 56-year-old male presented with anaemia & pallor and was found to have acute lymphoblastic leukaemia (ALL). He is on induction chemotherapy with vincristine, L-asparaginase, prednisolone, daunorubicin & intrathecal methotrexate. Which of the following is the most important prognostic marker in patients with ALL?

(or)

What is the most important prognostic marker for acute lymphoblastic leukemia (ALL)?

A. Leucocyte count >50000

B. Hyperploidy

C. Response to treatment

D. Organomegaly

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2. A 6-year-old child presents with fatigue, pallor, and recurrent infections for the past few weeks. Physical examination reveals hepatosplenomegaly. Laboratory investigations show peripheral blood and bone marrow samples with more than 20% lymphoblasts. Which of the following markers is associated with this patient?

(or)

Which of the following markers is associated with ALL?

A. CD10

B. CD20

C. CD33

D. CD38

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3. An 8-year-old patient Isha was brought by her mother to the pediatrician due to concerns about her recent health. Over the past few weeks, they noticed changes in her behavior and appearance. she has become unusually pale, experiences fatigue easily, and has developed an increased frequency of bruising. A diagnosis of ALL was made and treatment was started. If present, which of the following features would characterize Isha's cancer as a high risk ALL?

(or)

Which of the following features would be characterized as a high-risk ALL?

A. WBC count: <50000 per microlitre

B. Pre-B cell ALL

C. Hyperploidy

D. Hypoploidy

---

4. A 7-year-old girl child’s parents noticed changes in her behavior and overall well-being over the past few weeks. She complained of severe headaches, experienced nausea and vomiting, and developed an unsteady gait after she underwent a lumbar puncture. Which of the following would have prevented this patient's condition?

(or)

What is the method employed to treat or prevent the spread of cancer cells to the central nervous system in leukemia?

A. Intrathecal methotrexate

B. Dasatinib

C. Blinatumomab

D. sulfasalazine

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	1
Question 3	4
Question 4	1

Solution for Question 1:

Option C: Response to treatment

• Response to treatment is the most important prognostic marker in ALL.

Option A: Leucocyte count >50000/uL

• Leucocyte count >50000/uL is associated with a poor prognosis.

Option B: Hyperploidy

• Hyperploidy is a favourable prognostic factor.

Option D: Organomegaly

• Organomegaly has a poor prognosis, which indicates the spread of cancer.

Solution for Question 2:

Correct Option A – CD10:

• The above mentionec scenario is suggestive of ALL

• CD10, also known as common acute lymphoblastic leukemia antigen (CALLA), is a cell surface marker that is commonly used in the classification and diagnosis of leukemias and lymphomas, particularly in the context of acute lymphoblastic leukemia (ALL)

Incorrect Options:

Option B - CD 20: Is associated with CLL not ALL

Option C - CD33: Is associated with AML not ALL

Option D - CD38: Is associated with CLL not ALL

Solution for Question 3:

Correct Option D – Hypoploidy:

• The patient will be considered as a high-risk ALL if the cells show hypoploidy.

The patient will be considered as a high-risk ALL if the cells show hypoploidy.

High-Risk ALL

• Age group: <1 and >10 years.

• Higher WBC count: >50000 per microlitre

• Organomegaly Lymphadenopathy or Hepatosplenomegaly or Mediastinal mass (Manifestations like stridor, superior vena syndrome, cholecystitis).

• Lymphadenopathy or Hepatosplenomegaly or Mediastinal mass (Manifestations like stridor, superior vena syndrome, cholecystitis).

• Mature-B Cells are more dangerous.

• Hypoploidy

• Chromosomal swaps: t(9:22), t(8:14 - For Burkitt's lymphoma), t(4:11), t(1:19). They increase the need for bone marrow transplantation.

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Higher WBC count: >50000 per microlitre

Organomegaly

• Lymphadenopathy or Hepatosplenomegaly or Mediastinal mass (Manifestations like stridor, superior vena syndrome, cholecystitis).

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Hypoploidy

Chromosomal swaps:

• t(9:22), t(8:14 - For Burkitt's lymphoma), t(4:11), t(1:19).

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t(9:22), t(8:14 - For Burkitt's lymphoma), t(4:11), t(1:19).

They increase the need for bone marrow transplantation.

• Blasts: >1,000/cumm in the peripheral smear after 14 days of chemotherapy. The chemotherapy can risk TLS of the kidney by clogging the tubules.

• >1,000/cumm in the peripheral smear after 14 days of chemotherapy.

• The chemotherapy can risk TLS of the kidney by clogging the tubules.

• Absence of Cd10.

• Recommended management - Allogeneic stem cell transplantation in the 1st remission with chemotherapy, and later on bone marrow transplantation from a healthy person.

Blasts:

• >1,000/cumm in the peripheral smear after 14 days of chemotherapy.

• The chemotherapy can risk TLS of the kidney by clogging the tubules.

>1,000/cumm in the peripheral smear after 14 days of chemotherapy.

The chemotherapy can risk TLS of the kidney by clogging the tubules.

Absence of Cd10.

Recommended management - Allogeneic stem cell transplantation in the 1st remission with chemother apy, and later on bone marrow transplantation from a healthy person.

Incorrect Options

Option A,B,C is seen in low risk ALL

Low Risk ALL

• Age group: 1-9 years.

• Higher WBC count: <50000 per microlitre

• Pre-B cell ALL.

• Hyperploidy.

Age group: 1-9 years.

Higher WBC count: <50000 per microlitre

Pre-B cell ALL.

Hyperploidy.

Solution for Question 4:

Correct Option A - Intrathecal methotrexate:

• Intrathecal methotrexate is a medical procedure involving the administration of the chemotherapy drug methotrexate directly into the cerebrospinal fluid (CSF) within the spinal canal. This method is employed to treat or prevent the spread of cancer cells to the central nervous system (CNS), particularly in conditions such as leukemia or lymphoma where there is a risk of CNS involvement

Incorrect Options:

Option B – Dasatinib: Inhibits the activity of tyrosine kinases, including BCR-ABL, which is characteristi c of CML and some forms of ALL.

Option C – Blinatumomab: Is used for the treatment of Philadelphia chromosome-negative (Ph) relapse d or refractory B-cell precursor ALL.

Option D – Sulfasalazine: Is a
disease-modifying anti-rheumatic drug (DMARD) and anti-inflammatory agent.

Chronic Lymphocytic Leukemia

1. An oncology resident is conducting research on the leading cause of death in patients with chronic lymphocytic lymphoma. The results of his study affirm the current data on CLL patients' mortality causes. What is the leading cause of death in patients with CLL?

(or)

What is the leading cause of death in patients with CLL?

A. Infections

B. Bleeding

C. Meningeal and ventricular extension

D. Disseminated intravascular coagulation

---

2. A 72-year-old male presented with complaints of progressive cervical lymphadenopathy, night sweats. Initial investigations revealed B cell lymphocytosis. Flow cytometry results showed CD19,CD20,CD21,CD23,CD5 positive. He is also found to have NOTCH1 mutations, del(17)(p13.1). Which of the following transformation is likely to happen in this patient?

(or)

A patient with progressive cervical lymphadenopathy. CD19,CD20,CD21,CD23,CD5 positive and NOTCH1 mutations, del(17)(p13.1). Which of the following transformation is likely to happen in this patient?

A. Chronic lymphocytic lymphoma into diffuse large B cell lymphoma

B. Diffuse large B cell lymphoma into chronic lymphocytic lymphoma

C. Small cell lymphoma into chronic lymphocytic lymphoma

D. Chronic lymphocytic lymphoma into small cell lymphoma

---

3. A 72-year-old male is found to have clinical features of Chronic Lymphocytic Leukemia on a peripheral smear. Initial investigations revealed B-cell lymphocytosis. All of the following genetic abnormalities are related to the worse prognosis in patients with the above diagnosis, except?

(or)

All of the following genetic abnormalities are related to the worse prognosis in patients with Chronic Lymphocytic Leukemia, except?

A. 11q Deletion

B. 12q Trisomy

C. 17p Deletion

D. 13q Deletion

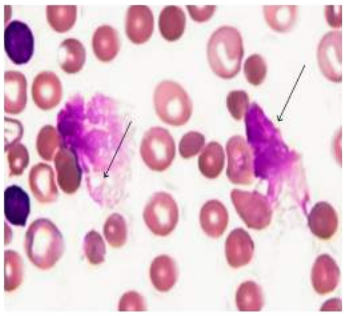
---

4. A 68-year-old patient presents with fatigue and enlarged lymph nodes. Physical examination reveals hepatosplenomegaly. A complete blood count shows an absolute lymphocyte count of 8,000/mm^3. Flow cytometry is performed, and microscopic examination reveals the presence of cells as shown below. Based on the investigation findings, which of the following markers are most likely to be positive on flow

cytometry?

(or)

Which of the following markers are most likely to be positive on flow cytometry



A. CD 5 and CD 23

B. CD 19 and CD 20

C. CD 38 and CD 79

D. CD 10 and CD 200

---

5. A 65-year-old male patient presents to the clinic with complaints of fatigue, night sweats, unintentional weight loss, and enlarged lymph nodes in the neck and axilla. Physical examination reveals palpable splenomegaly. Laboratory investigations show an absolute lymphocyte count of 45 × 10^9 cells/mL. Flow cytometry analysis confirms the presence of CD19, CD20 (dim), CD23, and CD5 positivity. The patient's medical history is unremarkable, and no other significant findings are noted. Based on the clinical scenario and diagnostic findings, which of the following statements regarding the genetic association of ZAP-70 and the above-mentioned clinical scenario is most accurate?

(or)

which of the following statements regarding the genetic association of ZAP-70 and CLL?

A. ZAP-70 mutation is seen in Chronic Myeloid Leukemia (CML), not CLL

B. ZAP-70 mutation is associated with a favorable prognosis in CLL

C. ZAP-70 mutation is associated with a poor prognosis in CLL

D. ZAP-70 mutation does not have any impact on the prognosis of CLL

---

6. A 65-year-old male patient presents to the clinic with complaints of persistent fatigue, unintentional weight loss, and occasional night sweats over the past few months. He reports a feeling of fullness in the upper abdomen after eating only small amounts of food. After further diagnosis, CLL was confirmed. All of the following can be a complication in this patient except?

(or)

All of the following can be a complication in CLL except?

A. Autoimmune Hemolytic anemia

B. Autoimmune Glomerulonephritis

C. Autoimmune Vasculitis

D. Autoimmune Hepatitis

---

7. A 60 female was diagnosed with CLL three years ago. During a routine follow-up appointment, she reported a sudden onset of worsening symptoms over the past few weeks such as increasing fatigue, rapidly growing lymph nodes, unexplained weight loss, and night sweats. A biopsy of an enlarged lymph node is performed, revealing transformation to diffuse large B-cell lymphoma (DLBCL). Which of the following is appropriate for this patient's condition?

(or)

CLL transformation to diffuse large B-cell lymphoma is called ?

A. Evan Syndrome

B. Richter transformation

C. Mantle cell Lymphoma

D. Blast Crisis

---

8. An 80-year-old, asymptomatic man presents with a total leucocyte count of 100,000/uL, with 80% lymphocytes and 20% polymorphonuclear cells. What is the most probable diagnosis?

(or)

What is the most probable diagnosis for an elderly man having total leucocyte count of 100,000/uL, with 80% lymphocytes and 20% polymorphonuclear cells?

A. Acquired immunodeficiency syndrome

B. Chronic myeloid leukaemia

C. Chronic lymphocytic leukaemia

D. Tuberculosis

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	1
Question 3	4
Question 4	1
Question 5	3
Question 6	4
Question 7	2
Question 8	3

Solution for Question 1:

Option A: Infections

• Infections are a leading cause of death in patients with CLL.

• Most CLL therapies can increase infection risk.

• Hence, prophylaxis for pneumocystis pneumonia and viral infections is indicated for at least 6 months following therapy to allow recovery of functional T cells.

Option B: Bleeding

• Although bleeding is a complication of chronic lymphocytic leukaemia, it is not the leading cause of death in patients with chronic lymphocytic leukaemia.

Option C: Meningeal and ventricular extension

• The meningeal and ventricular extension is an exceedingly rare complication of chronic lymphocytic leukaemia. It is not the leading cause of death in patients with chronic lymphocytic leukaemia.

Option D: Disseminated intravascular coagulation

• Disseminated intravascular coagulation is a complication of acute lymphoblastic leukaemia, not chronic lymphocytic leukaemia.

Solution for Question 2:

Option A: Chronic lymphocytic lymphoma into diffuse large B cell lymphoma

• Progression of Chronic lymphocytic lymphoma/small cell lymphoma into diffuse large B cell lymphoma is “Richter transformation”.

• It is associated with NOTCH1, Del (17)(13.1) mutations.

• Clinical signs of Richter’s transformation are rapid progression in lymphadenopathy, fatigue, night sweats, fever and weight loss.

• Treatment is chemotherapy + immunotherapy

Option B: Diffuse large B cell lymphoma into chronic lymphocytic lymphoma

• There is no evidence of the transformation of diffuse large B cell lymphoma into chronic lymphocytic lymphoma.

Option C: Small cell lymphoma into chronic lymphocytic lymphoma

• There is no evidence of transformation of small cell lymphoma into chronic lymphocytic lymphoma.

Option D: Chronic lymphocytic lymphoma into small cell lymphoma

• There is no evidence of the transformation of chronic lymphocytic lymphoma into small cell lymphoma.

Solution for Question 3:

Option D: 13q Deletion

• 13q deletion is associated with a good prognosis.

• It is the most common chromosomal abnormalities in CLL

• It is present in 55% of the patients.

• It has a long median survival

Option A: 11q Deletion

• 11q deletion is associated with a worse prognosis

Option B: 12q Trisomy

• 12q trisomy is associated with a worse prognosis

Option C: 17p Deletion

• 17p deletion (short arm) is associated with a worse prognosis.

Solution for Question 4:

Correct Option A - CD 5 and CD 23:

• In Chronic Lymphocytic Leukemia (CLL), flow cytometry is used to identify specific markers expressed on the surface of the leukemic cells. CLL is a double positive leukemia with both CD5, CD23 positive.The combination of CD 5 and CD 23 positivity is highly indicative of CLL, especially when associated with the presence of smudge cells.

Incorrect Options:

Option B - CD 19 and CD 20: CD 19 and CD 20 are B-cell markers that are typically positive in CLL. H owever, for this particular scenario, CD 19 and CD 20 alone are not the best combination of markers to differentiate CLL from other lymphoproliferative disorders.

Option C - CD 38 and CD 79b: CD 38 is a marker associated with plasma cells, and CD 79b is a B-cell marker. While CD 38 and CD 79b can be expressed in CLL, they are less specific compared to CD 5 and CD 23.

Option D - CD 10 and CD 200: CD 10 is a marker associated with immature B-cells, and CD 200 is ano ther marker that can be positive in CLL. However, CD 10 is typically negative in CLL, and CD 200 alon e is not specific enough for the diagnosis.

Solution for Question 5:

Correct Option C - ZAP-70 mutation is associated with a poor prognosis in CLL:

• In CLL, ZAP-70 expression is associated with disease aggressiveness and is considered a poor prognostic factor.

• The expression of zeta chain-associated protein 70 (ZAP-70) and CD38 are imperfect surrogates for IGHV mutation status.

• Increased expression of ZAP-70 and CD38 is associated with unmutated IGHV genes, a higher clinical stage, a greater tendency for disease progression, a poor response to treatment, and shorter

survival.

Incorrect Options:

Option A—ZAP-70 mutation is seen in Chronic Myeloid Leukemia (CML), not CLL: The ZAP-70 mutatio n is not typically associated with CML but rather with CLL. The presence of a ZAP-70 mutation in CLL is associated with a poor prognosis.

Option B - ZAP-70 mutation is associated with a favorable prognosis in CLL: ZAP-70 positivity in CLL i s associated with an unfavorable prognosis. High levels of ZAP-70 expression are indicative of a more aggressive disease course and poorer outcomes.Zap 70 is not a great diagnostic marker because the cut off value keeps changing over time

Option D - ZAP-70 mutation does not have any impact on the prognosis of CLL: ZAP-70 expression ha s been extensively studied as a prognostic marker in CLL, and its presence is associated with a poor prognosis. It is used to assess disease aggressiveness and guide treatment decisions.

Solution for Question 6:

Correct Option D - Autoimmune Hepatitis:

• CLL is a type of leukemia characterized by the accumulation of abnormal lymphocytes, and the altered immune response associated with CLL can lead to various autoimmune complications. However, Autoimmune hepatitis is not a complication seen in CLL

Incorrect options

Option A - Autoimmune Hemolytic Anemia (AIHA): It is a complication of CLL

• Evans syndrome: AIHA+ITP+CLL

• In AIHA, the immune system produces antibodies that target and destroy red blood cells, leading to hemolysis (breakdown of red blood cells).

• Clinical Presentation: Fatigue, weakness, and pallor due to anemia. Jaundice (yellowing of the skin and eyes) resulting from the release of bilirubin during red blood cell breakdown. Dark urine due to the presence of hemoglobin.

• Fatigue, weakness, and pallor due to anemia.

• Jaundice (yellowing of the skin and eyes) resulting from the release of bilirubin during red blood cell breakdown.

• Dark urine due to the presence of hemoglobin.

• Fatigue, weakness, and pallor due to anemia.

• Jaundice (yellowing of the skin and eyes) resulting from the release of bilirubin during red blood cell breakdown.

• Dark urine due to the presence of hemoglobin.

Option B - Autoimmune Glomerulonephritis: It is a complication of CLL

• Autoimmune glomerulonephritis involves the immune system attacking the glomeruli, which are the filtering units in the kidneys. This can lead to inflammation and impaired kidney function.

• Clinical Presentation: Proteinuria (presence of excess proteins in the urine). Hematuria (blood in the urine). Hypertension (high blood pressure). Edema (fluid retention) in some cases.

• Proteinuria (presence of excess proteins in the urine).

• Hematuria (blood in the urine).

• Hypertension (high blood pressure).

• Edema (fluid retention) in some cases.

• Proteinuria (presence of excess proteins in the urine).

• Hematuria (blood in the urine).

• Hypertension (high blood pressure).

• Edema (fluid retention) in some cases.

Option C - Autoimmune Vasculitis: It is a complication of CLL

• Autoimmune vasculitis involves inflammation of blood vessels due to an immune system attack. Small- to medium-sized blood vessels are typically affected.

• Clinical Presentation: Depending on the specific blood vessels involved, symptoms can range from skin rash, joint pain, and nerve-related symptoms to more severe manifestations such as organ damage. Constitutional symptoms such as fever, fatigue, and weight loss may also occur.

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• Depending on the specific blood vessels involved, symptoms can range from skin rash, joint pain, and nerve-related symptoms to more severe manifestations such as organ damage.

• Constitutional symptoms such as fever, fatigue, and weight loss may also occur.

Solution for Question 7:

Correct Option B - Richter transformation:

• The above-mentioned symptoms and lymph node biopsy showing CLL transformation to diffuse large B-cell lymphoma is called Richter transformation. It is treated on the lines of Non-Hodgkin Lymphoma

Incorrect Options:

Option A - Evan Syndrome: Is described as the presence of concomitant autoimmune hemolytic anemi a and immune-mediated thrombocytopenia.

Option C - Mantle Cell Lymphoma (MCL): Is a
type of non-Hodgkin lymphoma (NHL) characterized by the abnormal proliferation of B
cells, specifically in the outer edge (mantle zone) of the lymph nodes. It is considered a relatively rare a nd aggressive subtype of B-cell lymphoma. Cyclin D1 mutation is pathonomic- Translocation t(11;14). The above-mentioned features are suggestive of Richter transformation not mantle cell lymphoma

Option D - Blast Crisis: Is seen in Chronic Myeloid Leukemia when blasts are more than 30% in periph eral blood or bone marrow

Solution for Question 8:

Option C: Chronic lymphocytic leukaemia

• The above-given clinical presentation points toward a diagnosis of CLL (Chronic Lymphocytic Leukemia)

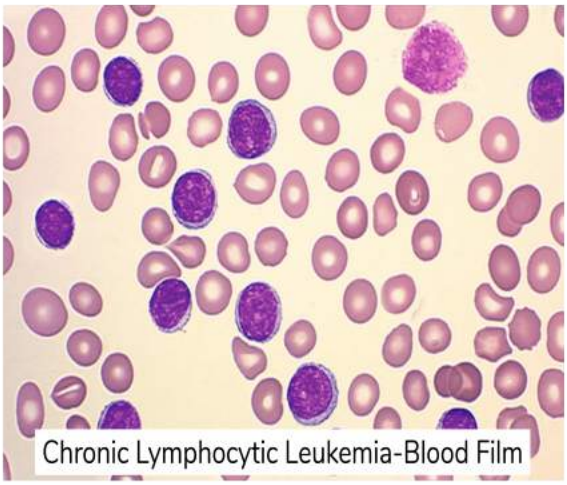
• Its median age of presentation is 65 years, with 53% male presentation.

• Most common presentation is Asymptomatic >> fatigue(anemia) > Left upper quadrant pain/mass(splenomegaly)

• In the accelerated or blastic phase, the presentation would be unexplained fever, significant weight loss, severe fatigue, bone and joint aches, bleeding and thrombotic events, and infections.

• The diagnosis of typical CLL is made with B-cell lymphocytosis greater than 5000/µL & co-expression of CD19 and CD5 on lymphocytes.

• The peripheral blood smear shows "smudge" or "basket" cells.

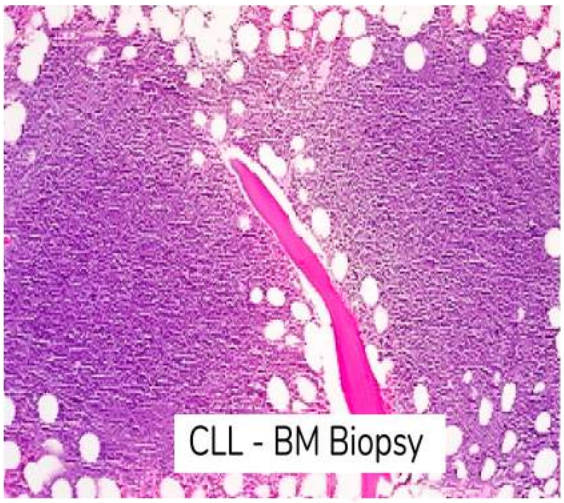


• Warm autoimmune hemolytic anaemia (IgG), Coombs test positive

• Cytogenetic studies reveal trisomy 12

• CML presents with massive splenomegaly, elevated WBC, increase in both immature and mature granulocytes.

• At diagnosis, bone marrow cellularity is increased, with an increased myeloid-to-erythroid ratio.



Option A: Acquired immunodeficiency syndrome (AIDS)

• Normal CD4 count can vary from 500 to 1500 cells per cubic mL of blood.

• AIDS is diagnosed when CD4 levels drop below 200 cells per cubic mL of blood.

• In contrast, lymphocyte count is increased in chronic lymphocytic leukaemia.

Option B: Chronic myeloid leukaemia

• Chronic myeloid leukaemia is a disorder of neoplastic proliferation of mature myeloid cells, especially granulocytes and their precursors; basophils are characteristically increased.

• Lymphocyte count in chronic myeloid leukaemia does not exceed 100,000/cubic mm

Option D: Tuberculosis

• Tuberculosis presents symptoms such as dry fever, cough, weight loss and night sweats, whereas the presentation of the given patient is asymptomatic.

• Moreover, lymphocyte count in tuberculosis does not exceed 100,000/cubic mm

Chronic Myeloid Leukemia

1. A 63-year-old man presented with a long history of upper abdominal discomfort, anorexia and two episodes of recent gum bleeds without fever or other bleeding manifestations. Examination revealed moderate hepatosplenomegaly. On investigation, he was found to have extreme thrombocytosis and leucocytosis. He was investigated for CML and found to be positive for BCR-ABL by reverse transcription PCR (RT-PCR). Vitamin B12 level in this patient would be?

(or)

What will be vitamin B12 level in CML patient would be?

A. Elevated

B. Decreased (slightly)

C. Normal

D. Markedly decreased

---

2. A 58-year-old male was diagnosed with chronic myeloid leukaemia after an incidental finding of leukocytosis last year. He was treated with imatinib, and the treatment was changed to nilotinib because of progressive leukocytosis. On follow-up, investigations revealed worsening of leukocytosis & thrombocytopenia. His peripheral blood showed >30% blasts with promyelocytes. What is the most effective treatment for this patient?

(or)

Chronic myeloid leukemia On follow-up has >30% blasts with promyelocytes on PBS. What is the most effective treatment for this patient?

A. Allogeneic bone marrow transplantation

B. Autologous bone marrow transplantation

C. Chemotherapy

D. Hydroxyurea & interferon

---

3. A 62-year-old male was found to have clinical features of Chronic Myeloid Leukemia(CML) on a peripheral blood smear. On detailed evaluation, the patient also had a T315I mutation in BCR-ABL. What is the first-line treatment for this patient?

(or)

A patient has Chronic Myeloid Leukemia(CML) and T315I mutation in BCR-ABL. What is the first-line treatment for this patient?

A. Bosutinib

B. Tofacitinib

C. Ponatinib

D. Nilotinib

---

4. During the morning clinical round in the oncology ward, the professor attends to a patient with CML. He then asks his residents. All of the following features can be present in patients with chronic myeloid

leukaemia (CML), except?

(or)

All of the following features can be present in patients with chronic myeloid leukaemia, except?

A. Pruritus

B. Infections

C. Shift of neutrophils to the left

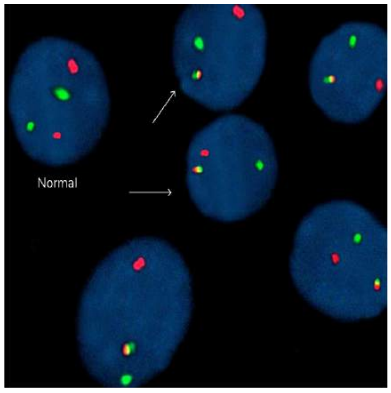
D. Autoimmune hemolytic anaemia

---

5. A 45-year-old patient presents with fatigue, night sweats, and weight loss. Physical examination reveals splenomegaly, and laboratory investigations show an elevated white blood cell count with a left shift and increased basophils. FISH test was done and image is shown below. Based on these findings, which of the following translocations and translocation products are most likely associated with this condition?

(or)

Based on the fish test given below,which of the following translocations and translocation products are most likely associated with CML



A. t(8:14) - MYC-IGH fusion

B. t(9:22) - BCR-ABL fusion

C. t(15:17) - PML-RARA fusion

D. No translocation is seen in this condition

---

6. A 55-year-old patient presents with fatigue, weight loss, and splenomegaly. Laboratory investigations reveal an elevated white blood cell count and the presence of myelocytes, metamyelocytes, and promyelocytes in the peripheral smear. Bone marrow examination shows a hypercellular marrow with myeloid hyperplasia. Further testing confirms the presence of the Philadelphia chromosome. What is the most appropriate treatment option for this patient?

(or)

What is the mainstay of treatment for CML?

A. Traditional leukemic chemotherapy

B. Radiation therapy

C. Tyrosine kinase inhibitors (TKIs)

D. Bone marrow transplantation

---

7. You are a first-year medicine resident rotating in the department of haematology. A group of patients came for follow-up after having allogeneic bone marrow transplantation. Which of the following has the least 5-year survival rate following allogeneic bone marrow transplantation?

(or)

A group of patients came for a follow-up after having allogeneic bone marrow transplantation. Which has the least 5-year survival rate?

A. Severe Combined Immunodeficiency state

B. Aplastic Anemia

C. Blast crisis in CML

D. Chronic lymphocytic leukaemia

---

8. A 45 year old male visited his primary care physician complaining of persistent fatigue, weight loss, and abdominal discomfort. Blood tests revealed an elevated white blood cell count and the presence of Philadelphia chromosome, confirming the diagnosis of Chronic Myeloid Leukemia (CML). Sokal Risk Score is used to calculate the median survival of this patient.Which of the following is not a component of Sokal Risk Score?

(or)

Which of the following is not a component of Sokal Risk Score?

A. Percentage of myeloblast in the peripheral smear

B. Platelet Count

C. White Blood Cell Count

D. Spleen Size

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	1
Question 3	3
Question 4	4
Question 5	2
Question 6	3
Question 7	3
Question 8	3

Solution for Question 1:

Option A: Elevated

• Vitamin B12 is markedly increased in CML

• The increase in circulating Vitamin B12 levels is predominantly caused by enhanced production of haptocorrin.

• The haptocorrin is also known as transcobalamin-1 (TC-1) or cobalophilin.

• It is a unique glycoprotein produced by the salivary glands of the oral cavity in response to the ingestion of food.

• The essential function of haptocorrin is the protection of the acid-sensitive vitamin B12 while it moves through the stomach.

Option B: Decreased (slightly)

• The level of vitamin B12 is markedly increased in CML.

• The level of LAP (Leukocyte Alkaline Phosphatase) is decreased in CML.

• Therefore, this option is incorrect.

Option C: Normal

• The level of vitamin B12 is markedly increased in CML.

• Therefore, this option is incorrect.

Option D: Markedly decreased

• The level of vitamin B12 is markedly increased in CML.

• Therefore, this option is incorrect.

Solution for Question 2:

Option A: Allogeneic bone marrow transplantation

• The above features are suggestive of the Accelerated phase of CML.

• Among patients who present with or evolve to the blastic phase, combinations of chemotherapy and Tyrosine Kinase Inhibitors (TKI) should be used to induce remission, followed by allogeneic stem cell transplantation as soon as possible.

• The same applies to patients who evolve from chronic to accelerated phase. Patients with de novo accelerated-phase CML may do well with long-term TKI therapy; the timing of allogeneic stem cell transplantation depends on their optimal response to TKI (achievement of complete cytogenetic response). The most effective is stem cell transplantation.

• Among patients who relapse in the chronic phase, the treatment sequence depends on several factors, such as the patient's age and risk factors for stem cell transplantation.

Option B: Autologous bone marrow transplantation

• Autologous bone marrow transplantation is not the treatment of choice; because the patient's bone marrow is already infiltrated with cancer.

Option C: Chemotherapy

• The patient's peripheral blood shows >30% blasts with promyelocytes after treatment with imatinib and nilotinib. It shows chemotherapy is ineffective in this case.

• Therefore, this option is incorrect.

Option D: Hydroxyurea & interferon

• Hydroxyurea, a ribonucleotide reductase inhibitor, is used for controlling cell counts.

• Interferons are given when allogeneic stem cell transplantation is not feasible.

Solution for Question 3:

Option C: Ponatinib

• T315I mutation is a mutation in the critical BCR-ABL kinase in the ATP-binding pocket.

• This prevents imatinib binding and hence leads to resistance to imatinib, nilotinib, bosutinib, and dasatinib.

• The only drug effective for T315I mutation CML is ponatinib.

• Otherwise, the drug of choice for CML is imatinib.

• The drug of choice in case of failure of > 2 Tyrosine kinase inhibitor is Omacetaxine

Option A: Bosutinib

• The drug of choice for imatinib-resistant CML is bosutinib

Option B: Tofacitinib

• Tofacitinib is a Janus kinase inhibitor; it works by blocking the action of the Janus kinase enzyme.

• It is used to treat moderately active rheumatoid arthritis, psoriatic arthritis, ulcerative colitis, ankylosing spondylitis and polyarticular course juvenile idiopathic arthritis.

Option D: Nilotinib

• T315I mutation is a mutation in the critical BCR-ABL kinase in the ATP-binding pocket

• This prevents imatinib binding and hence leads to resistance to nilotinib.

Solution for Question 4:

Option D: Autoimmune hemolytic anaemia

• Autoimmune hemolytic anaemia is a feature of Chronic lymphocytic lymphoma.

Features of CLL

• Asymptomatic

• Fatigue, frequent infections, lymphadenopathy, fever, weight loss, night sweats

• Warm autoimmune hemolytic anaemia (lgG), Coombs test positive Autoimmune thrombocytopenia

Option A: Pruritus

• CML is associated with the release of histamine, which causes itching, pruritis, flushing episodes, peptic ulcers, and secretory diarrhoea.

Option B: Infections

• Patients with CML are more prone to infection because CML is associated with a low neutrophil alkaline phosphatase (NAP) score.

• Neutrophil alkaline phosphatase (NAP) score is responsible for neutrophils to fight infections.

Option C: Shift neutrophils to the left

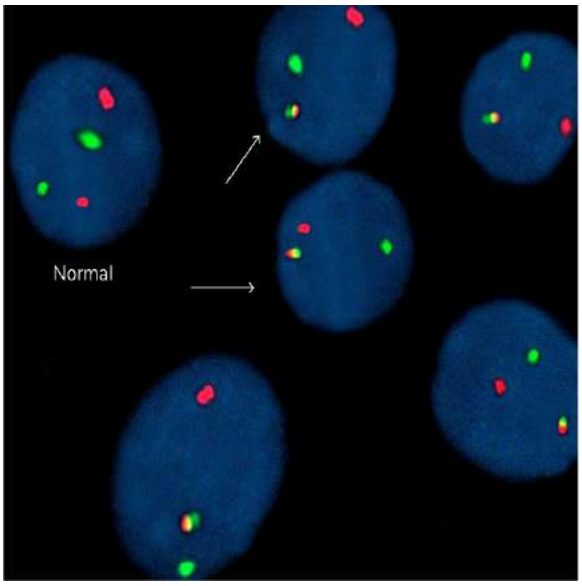
• Chronic myelocytic leukaemia is a neoplastic proliferation of mature myeloid cells, especially granulocytes and their precursors; basophils are characteristically increased.

• Therefore, immature cells in peripheral smear (Shift to the left)

Solution for Question 5:

Correct Option B - t(9:22) - BCR-ABL fusion:

• The clinical presentation of fatigue, night sweats, weight loss, splenomegaly, elevated white blood cell count with a left shift and increased basophils, is suggestive of a myeloproliferative neoplasm, specifically Chronic Myeloid Leukemia (CML). CML is associated with the t(9:22) translocation, also known as the Philadelphia chromosome, which results in the fusion of the BCR (breakpoint cluster region) gene on chromosome 22 and the ABL (Abelson) gene on chromosome 9, forming the BCR-ABL fusion gene.



• The image shows FISH

• The technique involved is fluorescent in situ hybridization Green represents: bcr Red represents: abl

• Green represents: bcr

• Red represents: abl

• Green represents: bcr

• Red represents: abl

Incorrect Options:

Option A - t(8:14) - MYC-IGH fusion: This translocation is associated with Burkitt lymphoma, not Chroni c Myeloid Leukemia (CML).

Option C - t(15:17) -
PML-RARA fusion: This translocation is associated with Acute Promyelocytic Leukemia (APL), a subty pe of Acute Myeloid Leukemia (AML), characterized by the fusion of the PML (promyelocytic leukemia) gene on chromosome 15 and the RARA (retinoic acid receptor alpha) gene on chromosome 17.

Option D - No translocation is seen in this condition

Solution for Question 6:

Correct Option C - Tyrosine kinase inhibitors (TKIs):

• CML (Chronic Myeloid Leukemia) is a myeloproliferative neoplasm characterized by the presence of the Philadelphia chromosome, resulting from the t(9:22) translocation. This translocation leads to the formation of the BCR-ABL fusion gene, which produces a constitutively active tyrosine kinase responsible for the pathogenesis of CML.

• The mainstay of treatment for CML is targeted therapy with tyrosine kinase inhibitors (TKIs). These drugs specifically inhibit the activity of the BCR-ABL tyrosine kinase, reducing the proliferation of leukemic cells and promoting disease control. Imatinib is the first-line TKI used in most cases of CML. Second-generation TKIs such as Dasatinib and Nilotinib, as well as third-generation TKIs like Ponatinib, are used in specific situations such as resistance or intolerance to Imatinib.

Incorrect Options:

Option A – Traditional leukemic chemotherapy: Is not the preferred treatment for CML. TKIs have repla ced traditional chemotherapy regimens as the standard of care for CML due to their targeted mechanis m of action and improved efficacy.

Option B - Radiation therapy: Is not a primary treatment option for CML. It may be used in specific case s where there is localized extramedullary blast proliferation or to palliate symptomatic splenomegaly.

Option D - Bone marrow transplantation (BMT): Also known as stem cell transplantation, is a treatment option for CML, particularly in patients who fail TKI therapy or progress to blast crisis. However, it is no t the first-line treatment choice and is reserved for specific cases.

Solution for Question 7:

Option C: Blast crisis in CML

• Blast crisis in CML has the least five-year survival rate following allogeneic bone marrow transplantation.

• The median survival time is <1.5 years.

Option A: Severe Combined Immunodeficiency syndrome

• Severe Combined Immunodeficiency syndrome has a 90% five-year survival rate following allogeneic bone marrow transplantation.

• Therefore, this option is incorrect.

Option B: Aplastic Anemia

• Aplastic anaemia has a 90% five-year survival rate following allogeneic bone marrow transplantation.

• Therefore, this option is incorrect.

Option D: Chronic lymphocytic leukaemia

• Chronic lymphocytic leukaemia has a 50% five-year survival rate following allogeneic bone marrow transplantation.

• Therefore, this option is incorrect.

Solution for Question 8:

Correct Option C - White Blood Cell Count:

• The Sokal Risk Score is a prognostic tool used in the field of hematology, particularly in the context of Chronic Myeloid Leukemia (CML). It was developed to predict the risk of disease progression in patients with CML shortly after they begin treatment.However, White Blood Cell Count is not a compnent of sokal Risk Score.The following are the component of Sokal Risk Score

• A: Age

• S: Spleen size (cm below costal margins)

• It can also be measured through: Ultrasonography Clonal evaluation

• Ultrasonography

• Clonal evaluation

• P: Platelet count

• M: Percentage of myeloblast in the peripheral smear

• Ultrasonography

• Clonal evaluation

Incorrect Options:

Option A, C, D: are included in the sokal risk score

Acute Myeloblastic Leukemia

1. A 67-year-old male complained of generalized fatigue associated with difficulty breathing. On examination, pallor & gingival hypertrophy is noted. Initial investigations revealed hyperleukocytosis. Follow-up investigations showed leukostasis. This feature is most predominantly seen in which of the following disorders?

(or)

Leukostasis is most predominantly seen in which of the following disorders?

A. Acute lymphoblastic leukaemia (ALL)

B. Acute myeloid leukaemia (AML)

C. Chronic myelocytic leukaemia (CML)

D. Chronic lymphocytic leukaemia (CLL)

---

2. A 42-year-old male presented with complaints of generalized fatigue. His complaints are also associated with petechiae & purpura. On detailed evaluation, peripheral blood smear showed characteristic "Auer rods", suggesting Acute Myeloblastic Leukemia (AML). Which of the following subtypes could be the probable diagnosis?

(or)

What is the probable diagnosis characterized by Auer rods on the peripheral blood smear?

A. M3-AML

B. M4-AML

C. M2-AML

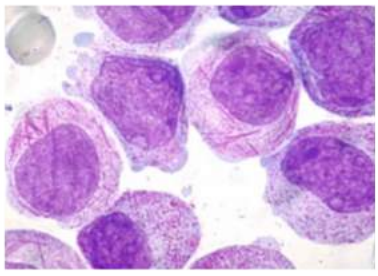
D. M5-AML

---

3. A 55-year-old female presents with fatigue, weight loss, and easy bruising. On physical examination, hepatosplenomegaly is noted. Laboratory investigations reveal a decreased hemoglobin level, low platelet count, and elevated total leukocyte count. A bone marrow aspiration is performed and the results are as shown below.Which of the following is not a cause for this condition?

(or)

Which of the following is not a cause for this condition?



A. Idiopathic

B. Downs syndrome

C. Diamond Black Fann syndrome

D. NF-1

---

4. Match the following appropriately 1. Acute monoblastic leukaemia A. M0 2. AML without maturation B. M2 3. Acute myelomonocytic Leukaemia C. M5 4. AML with minimal di■erentiation D. M4 E. M1

1. Acute monoblastic leukaemia	A. M0
2. AML without maturation	B. M2
3. Acute myelomonocytic Leukaemia	C. M5
4. AML with minimal di■erentiation	D. M4
	E. M1

A. 1-C, 2-E,3-D,4-A

B. 1-B, 2-A,3-D,4-E

C. 1-D, 2-E,3-C,4-B

D. 1-D, 2-E,3-A,4-B

---

5. A 67-year-old male presented with clinical features of Acute Myeloid Leukemia in peripheral blood smear. Initial investigation revealed leukostasis. Which organ is mainly affected in patients with Hyperleukocytosis - Leukostasis syndrome?

(or)

Which organ is mainly affected in hyperleukocytosis-leukostasis syndrome?

A. Liver

B. Heart

C. Kidney

D. Lung

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	1
Question 3	4
Question 4	1
Question 5	4

Solution for Question 1:

Option B: Acute myeloid leukaemia (AML)

• Leukostasis (also called symptomatic hyperleukocytosis) is a medical emergency most commonly seen in patients with acute myeloid leukaemia.

• It is characterized by an extremely elevated blast cell count and symptoms of decreased tissue perfusion.

• The most common symptoms are dyspnea and hypoxia, usually accompanied by visual changes, headache, dizziness, confusion, somnolence and coma.

• Hyperleukocytosis and leukostasis syndrome are commonly associated with a complication of acute leukaemia (particularly myeloid leukaemia).

• It can occur when the peripheral blast cell count is >100,000/mL.

• The frequency of hyperleukocytosis is 13% in acute myeloid leukaemia (AML); however, leukostasis is rare in lymphoid leukaemia.

Option A: Acute lymphoblastic leukaemia (ALL)

• Leukostasis is seen primarily in myeloid leukaemia and is very rare in lymphoblastic leukaemia.

• Clinical features: Lymphoblast is proliferating so much → other lineages are suppressed Anemia Fatigue, Tiredness, and Pallor Depletion in neutrophils, eosinophils, basophils, and monocytes causes Recurrent infections Thrombocytopenia

• Lymphoblast is proliferating so much → other lineages are suppressed

• Anemia Fatigue, Tiredness, and Pallor

• Fatigue, Tiredness, and Pallor

• Depletion in neutrophils, eosinophils, basophils, and monocytes causes Recurrent infections

• Thrombocytopenia

• Lymphoblast is proliferating so much → other lineages are suppressed

• Anemia Fatigue, Tiredness, and Pallor

• Fatigue, Tiredness, and Pallor

• Depletion in neutrophils, eosinophils, basophils, and monocytes causes Recurrent infections

• Thrombocytopenia

• Fatigue, Tiredness, and Pallor

Option C: Chronic myelocytic leukaemia (CML)

• Leukostasis is seen very rarely in Chronic myeloid leukaemia

• CML has three phases (Chronic, Accelerated and Blast Crisis).

• Clinical features: Dragging sensation in the abdomen. Massive Splenomegaly (something pulling the abdomen down).

• Dragging sensation in the abdomen.

• Massive Splenomegaly (something pulling the abdomen down).

• Dragging sensation in the abdomen.

• Massive Splenomegaly (something pulling the abdomen down).

Option D: Chronic lymphocytic leukaemia (CLL)

• Leukostasis is seen primarily in myeloid leukaemia and is very rare in lymphocytic leukaemia.

• The earliest finding is a Fatigue. Shows Lymphadenopathy (LAP) Shows Hepatosplenomegaly (HSM) Shows Organ involvement

• Shows Lymphadenopathy (LAP)

• Shows Hepatosplenomegaly (HSM)

• Shows Organ involvement

• Shows Lymphadenopathy (LAP)

• Shows Hepatosplenomegaly (HSM)

• Shows Organ involvement

Solution for Question 2:

Option A: M3-AML

• M3 subtype is Acute promyelocytic leukaemia (APL)

• Seen in young patients with chromosomal translocation t(15,17).

• Myeloblasts are usually characterized by positive cytoplasmic staining for myeloperoxidase (MPO); crystal aggregates of MPO are seen as "Auer rods".

• Disseminated intravascular coagulation (bleeding tendencies) are characteristic.

• M3 AML is associated with PML-RARA mutation.

• The PML gene region in chromosome 15 fuses with the RARA gene region in chromosome 17 (reciprocal translocation)

• Treatment is ATRA (All trans-retinoic acid) and Arsenic trioxide.

• This subtype has an excellent prognosis.

Option B: M4-AML

• M4 subtype of AML has chromosomal translocation t(16,16).

• It is associated with eosinophilia and gingival hyperplasia

Option C: M2-AML

• M2 type of AML is the most common subtype with chromosomal translocation of t(8,21).

• This subtype has an excellent prognosis.

• Myeloid Sarcoma is also seen in the M2 subtype.

• Associated with Choloroma

Option D: M5-AML

• M5 subtype of AML is associated with organ infiltration, gingival hyperplasia, increased WBCs count and fever sweat syndrome.

Solution for Question 3:

Correct Option D - NF-1:

• The diagnosis is Acute Megakaryoblastic Leukemia

• NF-1is not an etiology of AML. It is rather associated with ALL

Incorrect Options:

Option A – Idiopathic:

• The most common cause of AML is Idiopathic in 25- 50%cases

Option B - Downs syndrome:

• One of the hematologic disorders that can occur in individuals with Down syndrome is Acute Megakaryoblastic Leukemia (AMKL). AMKL is a subtype of Acute Myeloid Leukemia (AML) that specifically involves abnormal proliferation of megakaryoblasts, which are early cells in the platelet-forming lineage. A specific genetic mutation associated with Down syndrome and AMKL involves the GATA1 gene.

Option C - Diamond Black Fann syndrome:

• Diamond-Black Fann anemia (DBA) is a rare congenital disorder characterized by a failure of the bone marrow to produce red blood cells, leading to anemia.While Diamond-Black Fann anemia primarily affects red blood cell production, there is an association between DBA and an increased risk of certain malignancies, including acute myeloid leukemia (AML).

Solution for Question 4:

Correct Option A - 1-C, 2-E,3-D,4-A:

• Acute monoblastic leukaemia: M5

• AML without maturation: M1

• Acute myelomonocytic Leukaemia: M4

• AML with minimal di■erentiation: M0

Incorrect Options:

Option B,C,D are incorrect match

Solution for Question 5:

Option D: Lung

• The brain and Lungs are the most commonly affected organs (44% and 36%, respectively) by hyperleukocytosis-leukostasis syndrome.

• WBC counts more than 100,000/cu.mm lead to leukostasis plugging of the capillaries followed by endothelial damage to blood vessels.

• The presence of dyspnea, tachypnea and respiratory distress indicate pulmonary leukostasis.

• C.N.S. leukostasis presents with stupor, headache and dizziness.

• The mortality occurs due to respiratory failure, intracranial haemorrhage and coma.

• The low PO2 is due to increased consumption of oxygen by leucocytes.

Option A: Liver

• Involvement of liver/G.I. in hyperleukocytosis-leukostasis syndrome is 3%

Option B: Heart

• Involvement of heart (myocardial infarction) in hyperleukocytosis-leukostasis syndrome is 6%

Option C: Kidney

• Involvement of kidneys in hyperleukocytosis-leukostasis syndrome is 5%

Multiple Myeloma

1. A 55-year-old man complains of pain in his back, fatigue and occasional confusion. He admits to polyuria and polydipsia. An X-ray examination reveals numerous lytic lesions in the lumbar vertebral bodies. X-ray skull shows Classical ‘Rain drop’ lesions. Laboratory studies show hypoalbuminemia, mild anaemia, and thrombocytopenia. A monoclonal IgG peak is demonstrated by serum electrophoresis. What is the likely diagnosis?

(or)

A man with lytic lesions in the lumbar vertebra and ‘Raindrop’ lesions in the skull on X-ray, a monoclonal IgG peak in serum electrophoresis. What is the likely diagnosis?

A. Burkitt’s lymphoma

B. Hodgkin’s lymphoma

C. Multiple myeloma

D. Haemophilia

---

2. A 65-year-old male patient presents with bone pain, fatigue, and recurrent infections. On physical examination, the patient has hypercalcemia and anemia. Laboratory investigations reveal the presence of a monoclonal spike (M-spike) on serum protein electrophoresis. Which of the following will be seen in the Arterial Blood Gas of this patient?

(or)

Which of the following will be seen in the Arterial Blood Gas in a case of multiple myeloma?

A. Normal anion gap

B. ncreased anion gap

C. Decreased anion gap

D. Both A and C

---

3. A 55-year-old man complains of pain in his back, fatigue, and occasional confusion. He admits to polyuria and polydipsia. An X-ray examination reveals numerous lytic lesions in the lumbar vertebral bodies. X-ray skull shows Classical ‘Raindrop’ lesions. Laboratory studies show hypoalbuminemia, mild anemia, and thrombocytopenia. A monoclonal IgG peak is demonstrated by serum electrophoresis. Which of the following is done as a screening test in these patients?

(or)

Which of the following is done as a screening test in patients with Multiple myeloma?

A. FISH

B. Bone marrow biopsy

C. PET-CT

D. MRI

---

4. Diagnostic Criteria for Smouldering Myeloma include all of the following Except? Plasma cells in bone marrow: >10%. M-component: >30 g/L. No evidence of CRAB or myeloma-like events in the

patient. Evidence of CRAB or myeloma-like events in the patient. Plasma cells in peripheral blood - >2,000/µL.

A. 1,2

B. 1,2,3

C. 4,5

D. 2,4,5

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5. A 72-year-old woman with a history of hypertension and osteoarthritis presents with fatigue, weakness, recurrent nosebleeds, and visual disturbances. Physical examination reveals pallor, lymphadenopathy, and hepatosplenomegaly. Laboratory tests show a significantly reduced hemoglobin level, leukocytosis with lymphocytosis, thrombocytopenia, and elevated total protein. After further evaluation, a diagnosis of Waldenstrom Macroglobulinemia was made by the physician. Which of the following is seen in this?

(or)

Which of the following is seen in Waldenstrom Macroglobulinemia ?

A. Excess IgM

B. Hypercalcemia

C. Bony lytic lesions

D. Excess IgG

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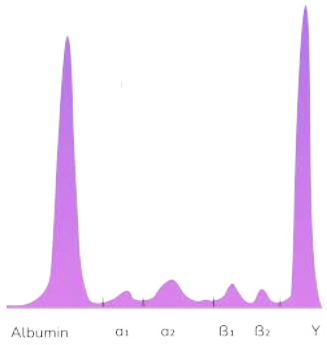
6. A 65-year-old male patient presents with bone pain, fatigue, and elevated serum protein levels. A urine protein electrophoresis test is performed, and the image below shows the electrophoresis pattern. Based on the clinical presentation and the electrophoresis pattern, what is the most appropriate treatment for this patient?

(or)

What is the most appropriate treatment for Multiple myeloma based on the electrophoresis pattern?



A. Chemotherapy with vincristine and doxorubicin

B. Radiation therapy to the affected bones

C. Autologous bone marrow transplantation

D. Antibiotic therapy with broad-spectrum agents

---

7. Which of the following statements is incorrect regarding gammopathies?

A. Monoclonal Gammopathy of Unknown Significance (MGUS) is characterized by plasma cells in the bone marrow of less than 10%.

B. Smouldering Myeloma is defined by the presence of a monoclonal protein (M-component) level of greater than 10 g/L.

C. Multiple Myeloma is diagnosed when there is evidence of CRAB or myeloma-like events along with an M-component level of greater than 30 g/L.

D. Heavy Chain Disease is associated with the overproduction of Alpha mu and gamma chains

---

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	3
Question 3	2
Question 4	3
Question 5	1
Question 6	3
Question 7	2

Solution for Question 1:

Option C: Multiple myeloma

• The above case scenario is diagnostic of Multiple myeloma.

• The malignant proliferation of plasma cells in the bone marrow.

• Most common primary malignancy of bone; metastatic cancer, however, is the most common malignant lesion of bone overall.

• High serum IL-6 may be present; it stimulates plasma cell growth and immunoglobulin production

• The appearance of multiple, well-defined lytic lesions (Punched out/Rain drop lesions) of various sizes scattered throughout the skull constitutes the raindrop skull appearance of multiple myeloma.

• These lytic lesions result in hypercalcemia.

• Neoplastic cells produce immunoglobulins, “M spike” is present on serum protein electrophoresis.

• Infection is the most common cause of death in multiple myeloma due to a lack of antigenic diversity on a monoclonal antibody.

• Rouleaux formation of RBCs is seen on blood smear due to decreased charge between RBCs

• The free light chain is excreted in the urine as Bence Jones proteins; deposition in kidney tubules leads to risk for renal failure (myeloma kidney)

Imaging in Multiple Myeloma:

• Bone X-ray: Lytic lesions are most commonly seen in the axial skeleton: skull, spine, proximal long bones, and ribs.

• Bone scan: The radionuclide bone scan does not help detect bone lesions in myeloma since there is little osteoblastic component. MRI and PET/CT scans are more sensitive to detect bone disease than plain radiographs and are preferred.

Option A: Burkitt's lymphoma

• The neoplastic proliferation of intermediate-sized B-cells (CD20); is associated with the Ebstein Barr virus.

• Classically presents as an extra-nodal mass in a child or young.

• African form usually involves the jaw.

• The sporadic form usually consists of the abdomen.

• Driven by translocation of c-Myc (chromosome 8)

• t(8;14) is most common, resulting in translocation of c-Myc to the Ig heavy chain locus on chromosome 14.

• Overexpression of c-Myc oncogene promotes cell growth.

• It has a highly mitotic index and a 'starry-sky' appearance on microscopy.

Option B: Hodgkin's lymphoma

• Reed-Sternberg (RS) cells are the malignant cells in Hodgkin's Lymphoma, a malignancy of germinal centre mature B lymphocytes.

• These are large cells with abundant cytoplasm with bilobed and/or multiple nuclei.

• Typical Reed-Sternberg cells and variants have a characteristic immunophenotype, as they express CD15 and CD30 and fail to express CD45 (leukocyte common antigen), B cell antigens, and T cell antigens.

• These are the classic malignant cell in Hodgkin's lymphoma.

• "Classic" RS cells are typical in the mixed-cellularity subtype, uncommon in the nodular sclerosis subtype, and rare in the lymphocyte-predominance subtype; in these latter two subtypes, other characteristic RS cell variants predominate.

• Hodgkin lymphomas arise in a single lymph node or chain of lymph nodes and are typically spread stepwise to anatomically contiguous nodes.

Option D: Haemophilia

• Genetic factor VIII deficiency.

• X-linked recessive (predominantly affects males)

• It can arise from a new mutation (de novo) without a family history.

• It presents with pain and swelling in the joints, deep cuts and bruises, uncontrolled bleeding from cuts or injuries, nose bleeds

• Clinical severity depends on the degree of deficiency.

• Lab findings include increased aPTT, regular PT, normal platelet count and bleeding time.

• Treatment involves recombinant factor VIII.

Solution for Question 2:

Correct Option C - Decreased anion gap:

• The diagnosis here is multiple myeloma

• Paraproteins are elevated in multiple myeloma. These are abnormal proteins produced by plasma cells in excess.These proteins, including immunoglobulins, can contribute to an increase in positive charges in the body.

• The kidneys play a crucial role in maintaining electrolyte balance and electroneutrality in the body.

• In response to the elevated paraproteins and increased positive charges, the kidneys may respond by increasing the urinary reabsorption of chloride ions.

• To maintain electroneutrality, the kidneys enhance the reabsorption of chloride ions, contributing to more negative charges in the body.

• An increase chloride concentration will cause a decreased anion gap

The diagnosis here is multiple myeloma

Incorrect Options:

Option A - Normal anion gap: Is not feature of MM

Option B - Increased anion gap: Is not feature of MM

Option D - Both A and C: This choice is incorrect as decreased anion gap is seen in MM

Solution for Question 3:

Correct Option B - Bone marrow biopsy:

• The diagnosis is Multiple myeloma

• Bone marrow biopsy is the investigation of choice in Multiple myeloma

• A bone marrow biopsy is essential to confirm the diagnosis of multiple myeloma.

• Determining the extent of involvement in the bone marrow helps in staging the disease.

• Cytogenetic analysis of bone marrow cells helps identify specific chromosomal abnormalities associated with multiple myeloma.

• Bone marrow biopsy may provide information about bone lesions caused by the infiltration of myeloma cells.

Incorrect Options:

Option A - FISH: Is a
diagnostic modality used in multiple myeloma but is not an investigation of choicefor multiple myeloma

Option C and D:PET-CT > MRI To detect the bony lytic lesions however it is not the IOC

Solution for Question 4:

Correct Option C - 4,5:

• Evidence of CRAB or myeloma-like events in the patient is diagnostic criteria for Multiple Myeloma not Smouldering Myeloma

• Plasma cells in peripheral blood - >2,000/µL is Diagnostic Criteria for Plasma Cell leukemia

Incorrect Options:

Option A, B, D:

• The diagnostic criteria for Smouldering Myeloma is

• Plasma cells in bone marrow: >10%.

• M-component: >30 g/L.

• No evidence of CRAB or myeloma-like events in the patient.

Solution for Question 5:

Correct Option A - Excess IgM:

• Waldenstrom Macroglobulinemia is a tumor of lymphoplasmacytoid cells with excess production of immunoglobulin IgM with coomb positive hemolytic anemia

Incorrect Options:

Option B - Hypercalcemia: There will be no Hypercalcemia in Waldenstrom Macroglobulinemia

Option C - Bony lytic lesion: No bony lytic lesions are seen in Waldenstrom Macroglobulinemia

Option D - Excess IgG: Is not a feature of Waldenstrom Macroglobulinemia

• Excess IgM is seen

Solution for Question 6:

Correct Option C - Autologous bone marrow transplantation:

• The diagnosis is Multiple myeloma.

• This is the most appropriate treatment option for multiple myeloma in eligible patients. Autologous bone marrow transplantation involves collecting the patient's own bone marrow stem cells, administering high-dose chemotherapy to eliminate cancer cells, and then reinfusing the collected stem cells to restore bone marrow function. In the electrophoresis The IgG will increase and show a spike in multiple myeloma.

Incorrect Options:

Option A - Chemotherapy with vincristine and doxorubicin: This option is not the most appropriate treat ment for multiple myeloma. Vincristine and doxorubicin are not commonly used in the treatment of mult iple myeloma.

Option B - Radiation therapy to the affected bones: Radiation therapy may be used to relieve localized pain and control bone destruction in multiple myeloma. However, it is not the primary treatment for the disease as a whole.

Option D - Antibiotic therapy with broad-spectrum agents: Antibiotic therapy is not the mainstay of treat ment for multiple myeloma. This option does not address the underlying disease process and is not eff ective in managing the condition.

Solution for Question 7:

Correct Option B - Smouldering Myeloma is defined by the presence of a monoclonal protein (M-component) level of greater than 30 g/L:

Incorrect Options

Option A - In Monoclonal Gammopathy of Unknown Significance (MGUS), the presence of plasma cell s in the bone marrow is less than 10%

Option C - Multiple Myeloma is diagnosed when there is evidence of CRAB or myeloma-like events alo ng with an M-component level of greater than 30 g/L:Multiple Myeloma is diagnosed when there is evid ence of CRAB (Calcium elevation, Renal dysfunction, Anemia, Bone lesions) or myeloma-like events al ong with an M-component level of greater than 30 g/L.

Option D - Heavy Chain Disease is associated with the overproduction of Alpha mu and gamma chains :Heavy Chain Disease is associated with the overproduction of alpha , mu chains or gamma chains. It presents with features such as palatal edema and involvement of Waldeyer's Ring.

Thalassemia

1. A 6-year-old girl from a Punjabi family is brought to the hospital complaining of pale-coloured skin, fatigue and dyspnea. She has a history of repeated hospital admissions for blood transfusions. Physical examination reveals a palpable liver and spleen. Her lab findings include haemoglobin 7.5 g/dl, MCV – 70 fL, RDW – 22 and decreased osmotic fragility. The peripheral smear reveals golf ball inclusion bodies. What is the probable diagnosis in this case?

(or)

The peripheral blood smear stained with a supravital stain shows multiple inclusion bodies (Golf ball inclusion), What is the likely diagnosis?

A. Iron deficiency anaemia

B. HbH disease

C. Pernicious anaemia

D. G6PD deficiency

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2. A 13-year-old girl is brought to the hospital complaining of fatigue, weakness, pale-coloured skin and shortness of breath. Lab findings reveal MCV 59 fl, MCH 26.1 pg, and target cells on peripheral blood film. X-ray skull characteristically shows hair on end appearance. After proper evaluation, she is diagnosed with β-thalassemia major, and the physician advises frequent blood transfusion. Which of the following is the most appropriate drug that should be used to prevent iron overload in this patient?

(or)

Which drug can be used to prevent iron overload in β-thalassemia major with frequent blood transfusion?

A. Oral desferrioxamine

B. Oral deferiprone

C. Intramuscular EDTA

D. Oral succimer

---

3. A 30-year-old female comes to the hospital for a healthcare check-up. She is healthy and has no history of serious illness except chronic fatigue. Her menstrual cycle is regular and lasts 4-5 days with moderate bleeding. She has no history of blood transfusion or IV substance abuse. On physical examination, her vitals are normal, and lab findings include an RBC count of 4.5 million, MCV- 55 fl, total lymphocyte count is 7000/µL, and Mentzer index of 12. Which of the following is the most probable diagnosis?

(or)

The lab findings of a 30-year-old female include an MCV- 55 fl and a Mentzer index of 12. Which of the following is the most probable diagnosis?

A. Iron deficiency anaemia

B. Thalassemia major

C. Thalassemia minor

D. Megaloblastic anaemia

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4. A 19-year-old female comes to the outpatient department complaining of chronic fatigue. She has no other history of chronic illness or transfusion history, or significant past medical history. Her menstrual cycle is regular and lasts 3-5 days with moderate bleeding. On physical examination, her vitals are normal, and lab findings include an RBC count of 4.5 million, Hb 9.7 gm/dl, MCV- 56 fl, and Mentzer index of 11. Which of the following is incorrect about this patient's condition?

(or)

A female comes to the outpatient department complaining of chronic fatigue. Her lab findings include a Hb 9.7 gm/dl, MCV- 56 fl, and Mentzer index of 11. Which of the following is incorrect about this patient's condition?

A. Hypochromic microcytic cells

B. Raised HbA2

C. Severe anemia

D. RBC count increased

---

5. A 28 years female comes to the office complaining of shortness of breath, weakness and fatigue. She has no history of smoking or other illicit substance abuse. Her past medical or family history is insignificant. On physical examination, she is anaemic, and her vitals are normal; lab studies reveal Hb 8.0 gm/dL. After a proper evaluation, she is diagnosed with the alpha-thalassemia trait. Which of the following will be found in this patient's electrophoresis study?

(or)

A female is diagnosed with the alpha-thalassemia trait. Which of the following will be found in this patient's electrophoresis study?

A. Increased HbF & normal HbA2

B. Normal HbF & normal HbA2

C. Normal HbF & decreased HbA2

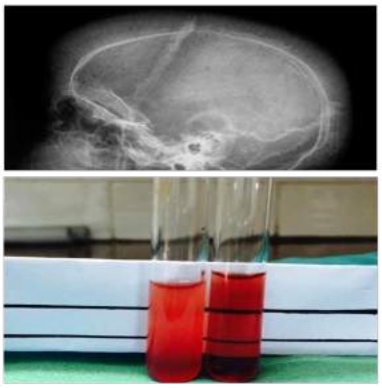
D. Decreased HbF & normal HbA2

---

6. A 32-year-old man of Mediterranean descent presents with fatigue, weakness, and jaundice. Laboratory investigations reveal a decreased hemoglobin level, microcytic hypochromic RBCs, and elevated levels of total bilirubin. Skull X ray was taken and the findings are as shown below.. A screening test was performed as shown below. Which of the following will be seen in the test shown below for this patient?

(or)

Which of the following will be seen in the test shown below for a patient with the following Skull Xray?



A. Osmotic fragility is increased

B. Osmotic fragility has no change

C. Osmotic fragility is decreased

D. None of the above

---

7. A 32-year-old pregnant woman presents to the emergency department at 30 weeks gestation with complaints of decreased fetal movements and increased abdominal girth. Ultrasound reveals significant edema involving the fetus, including generalized subcutaneous edema, ascites, and pleural effusion. The fetal heart rate is irregular, and the mother reports a history of multiple miscarriages. Based on these findings, which of the following conditions is most likely responsible for the presentation?

(or)

Which of the following condition is characterized by generalized edema involving the fetus, including subcutaneous edema, ascites, and pleural effusion on ultrasound with a history of repeated miscarriages?

A. Alpha-thalassemia trait

B. Hemoglobin H disease

C. Hydrops fetalis

D. Beta-thalassemia

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	2
Question 3	3
Question 4	3
Question 5	2
Question 6	3
Question 7	3

Solution for Question 1:

Option B: HbH disease

The history, presenting complaints and lab findings in this patient mostly suggest a diagnosis of HbH disease.

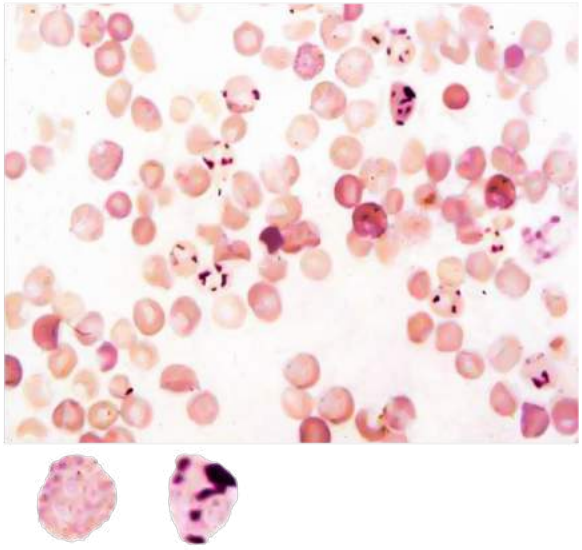
HbH disease:

• It is the most severe form of alpha thalassemia, mainly caused by the loss of three of the four alpha-globin alleles.

• Golf ball inclusion bodies are known as HbH bodies and are found in alpha thalassemia.

• Lab findings include: Decreased haemoglobin, MCV <80, raised RDW, and decreased osmotic fragility of RBC.

• The peripheral smear stained with supravital stain (brilliant cresyl blue stain) shows multiple inclusions in an evenly distributed panel (see image below).



• The diagnosis is confirmed by genetic testing.

• Children with mild-to-moderate microcytic hypochromic hemolytic anaemia and hepatosplenomegaly should be evaluated for HbH disease.

Option A: Iron deficiency anaemia

• It is microcytic hypochromic anaemia resulting from a reduced iron level in the body.

• It does not cause hepatosplenomegaly, and repeated blood transfusions are usually not required.

Option C: Pernicious anaemia

• It results from vitamin B12 deficiency in the body due to an autoimmune inflammation of the stomach.

Option D: G6PD deficiency

• It is an inherited condition caused by deficient glucose-6-phosphate dehydrogenase enzyme in the body that leads to hemolysis.

• The peripheral smear will show Heinz bodies (denatured and precipitated haemoglobin) in a supravital stain.

Solution for Question 2:

Option B: Oral deferiprone

Iron overload in frequent blood transfusion:

• During a blood transfusion, the body receives more iron, and as red cells break down over time, the iron in the haemoglobin is released.

• The body has no natural way to get rid of excess iron.

• So extra iron is stored in body tissues. That's why patients receiving frequent transfusions are at risk for iron overload.

• Excess iron usually deposits in the heart, pancreas, liver, and pituitary and causes organ damage.

• In β-thalassemia major, iron excess can occur due to repeated blood transfusions and massive hemolysis.

• So, thalassemia patients need to be treated with an iron-chelating agent to prevent iron overload.

• In this case, the chelating agent must be administered for a long time. Therefore, oral deferiprone is preferred in this case.

Other options

Option A: Oral desferrioxamine

• The drug of choice for acute iron poisoning is desferrioxamine.

• It has to be administered parenterally.

• It is not effective by oral route.

Option C: Intramuscular EDTA

• EDTA is also an iron-chelating agent, but it is mainly used to prevent clotting in a blood sample.

• It is not safe for use in humans longer than 5-7 days.

Option D: Oral succimer

• It is used in acute lead poisoning to remove excess lead from the body.

Solution for Question 3:

Option C: Thalassemia minor

This asymptomatic patient with decreased MCV and Mentzer index <13 most probably have Thalasse mia minor.

Thalassemia minor:

• It is an inherited disorder of the blood characterized by decreased haemoglobin production.

• Thalassemia minor patients may not have symptoms, and life expectancy is also long.

• It is microcytic anaemia, so the MCV level will be reduced.

• Thalassemia major patients need a repeated blood transfusion, but Thalassemia minor patients do not.

• Mentzer index = MCV/RBC count

If the Mentzer index is-

< 13 - Thalassemia minor

> 13 - Iron deficiency

• The Mentzer index in the given question is 12; thus, it is most likely a case of thalassemia minor.

Option A: Iron deficiency anaemia

• It is also microcytic anaemia, but here, the Mentzer index will be >13.

Option B: Thalassemia major

• This patient has no history of blood transfusion, which rules out thalassemia major.

Option D: Megaloblastic anaemia

• Megaloblastic anaemia is characterized by an increase in mean corpuscular haemoglobin (MCV).

• The MCV is less than normal here, so it's not megaloblastic anaemia.

Solution for Question 4:

Option C: Severe anemia

This patient with chronic fatigue, decreased MCV and Mentzer index <13 most probably has thalassemia minor.

Thalassemia minor:

• It is an inherited disorder of the blood characterised by decreased haemoglobin production.

• Thalassemia minor patients may not have symptoms, and life expectancy is also long.

• Patients have modest anaemia with hematocrit between 28% and 40%.

• It is microcytic anaemia, so that the MCV level will be reduced.

• The MCV ranges from 55 to 75 fl, and the RBC count is normal or increased.

• The peripheral blood smear is mildly abnormal, with hypochromia, microcytosis, and target cells.

• Hb electrophoresis- shows an elevation of Hb A2 up to 4-8%.

Option A: Hypochromic microcytic cells

• In thalassemia, both hypochromia and microcytosis in seen on peripheral blood film.

Option B: Raised HbA2

• HbA2 may be raised up to 4-8% in thalassemia minor patients.

Option D: RBC count increased

• In thalassemia, the RBC count remains normal or increases slightly.

In thalassemia, the RBC count remains normal or increases slightly.

Solution for Question 5:

Option B: Normal HbF & normal HbA2

Haemoglobin electrophoresis:

• Electrophoresis is a screening test for haemoglobinopathies.

• The foundation of this test is the separation of haemoglobin molecules in an electric field, principally as a result of variations in total molecular charge.

• It detects any abnormal type of haemoglobin while measuring the haemoglobin level.

Hb type

Normal

Sickle cell anaemia

α thalassemia

β thalassemia

HbA

95%

Absent

Less

HbF

2%

Present

Increased

HbA2

3%

• In the α-thalassemia trait, the haemoglobin electrophoresis will show normal HbF and HbA2 levels.

• In sickle cell anaemia absence of HbA means the disease severity is very high. But in the sickle cell trait, HbA is present.

• The screening test for both α & β thalassemia is NESTROFT (Naked Eye Single Tube Red Cell Osmotic Fragility Test).

• The investigation of choice for both α & β thalassemia is HPLC (High-performance liquid chromatography).

Option A: Increased HbF & normal HbA2

• In the case of β thalassemia major, HbF markedly raises with a normal or slightly raised HbA2.

Option C: Normal HbF & decreased HbA2

• In the α-thalassemia trait, the HbF level is normal, but HbA2 will also be normal.

Option D: Decreased HbF & normal HbA2

• This finding will be found in a normal adult individual.

Solution for Question 6:

Correct Option C- Osmotic fragility is decreased:

• The screening test shown in image is Nestroft Test :

• One of the screening tests for β thalassemia.

• It is the Naked Eye Single Tube RBC Osmotic Fragility.

• Osmotic fragility of RBCs in thalassemia is reduced

Incorrect Options:

Option A- Osmotic fragility is increased:

• In Hereditary Spherocytosis, osmotic fragility is increased, which makes RBCs to burst easily

• Osmotic fragility of RBCs in thalassemia is reduced.

Option B- Osmotic fragility has no change:

• Osmotic fragility of RBCs in thalassemia is reduced.

Solution for Question 7:

Correct Option C- Hydrops fetalis:

C. Hydrops fetalis is a condition characterized by generalized edema involving the fetus, including subc utaneous edema, ascites, and pleural effusion. In cases of severe hydrops fetalis, intrauterine death ca n occur. The formation of gamma 4 tetramers, known as Hb Barts, is a
feature of alpha-thalassemia and is associated with hydrops fetalis.

Incorrect Options:

Option A- Alpha-thalassemia trait: Alpha-thalassemia trait" refers to the condition where two alpha-glob in genes are deleted, resulting in a mild form of alpha-thalassemia. It does not present with intrauterine death and the formation of gamma 4 tetramers.

Option B- Hemoglobin H disease: is caused by the deletion of three alpha-globin genes, resulting in the production of abnormal beta 4 tetramers. It is not associated with intrauterine death but may present w ith anemia and other symptoms.

Option D- Beta-thalassemia: is a different type of thalassemia caused by mutations in the beta-globin g ene. It does not involve the formation of gamma 4 tetramers or result in hydrops fetalis.

Sickle Cell Anemia,G6PD Deficiency,Hemolytic Anemia

1. A 20-year-old previously healthy swimmer is admitted for new-onset severe fatigue and left upper abdominal pain. She was treated two days ago in hospital for presumed typhoid fever with cefotaxime. Her family or past medical history is insignificant except for recurrent typhoid fever. She is a non-alcoholic and non-smoker. Her blood pressure is 120/85 mmHg, and her heart rate is 120 bpm. Physical examination reveals a palpable spleen. The stool is negative for heme. Lab investigations show haemoglobin of 5 g/dL with normal total lymphocyte count (TLC) and platelets. A peripheral blood smear reveals IgG antibodies and an excess of spherocytes. Which of the following do not cause a similar type of condition?

(or)

Which of the following does not cause autoimmune hemolytic anemia?

A. SLE

B. α-Methyldopa ingestion

C. Quinidine

D. Infectious mononucleosis

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2. A 14-year-old girl is brought to the OPD complaining of fatigue, weakness, painful swelling of the fingers and toes, pale-coloured skin, and dark urine. She also has a history of recurrent joint pains and infections. Her lab findings include decreased Hb, high reticulocyte count and sickled RBC on PBF. Which of the following is not true regarding this patient's condition?

(or)

Which of the following is not true regarding sickle cell anaemia?

A. HbA will be undetectable

B. She may have retinopathy

C. She can present with pulmonary bleeds

D. Hydroxyurea would help her

---

3. A 22 years male comes to OPD complaining of persistent painful erection of the penis for the last 6 hours. His past medical history includes severe anaemia in early childhood, for which he required a blood transfusion several times. He also has a history of multiple episodes of non-healing leg ulcers and abdominal and chest pain. His lab findings include decreased Hb, high reticulocyte count and an abnormal shaped RBC on PBF. What may be the probable diagnosis for this patient?

(or)

What may be the probable diagnosis for a patient with early childhood history of severe anaemia with acute, persistent painful erection, non-healing leg ulcers? His lab findings shows decreased Hb, high reticulocyte count and an abnormal shaped RBC on PBF.

A. Sickle cell anaemia

B. Hairy cell leukaemia

C. ALL

D. Beta thalassemia

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4. A 17-year-old male is brought to the OPD complaining of painful swelling of the fingers and toes for the last 4 hours. He has no significant past medical or family history except several episodes of blood transfusion for chronic anaemia. On examination, he is anaemic and icteric, and his lab findings include sickled RBC on PBF. After a proper evaluation, he is diagnosed with an inherited disease caused by a point mutation of the β -globin gene. Which of the following is not associated with this patient's condition?

(or)

Which of the following is not associated with Sickle cell anemia?

A. Shortened RBC life span

B. Normal reticulocyte count

C. Abnormality in haemoglobin

D. Polymer formation is reversible

---

5. An 8-year-old boy is brought to the outpatient department by his mother, complaining of pale skin, dark urine, fatigue, dyspnea, and extreme tiredness. On examination, a palpable spleen is found. After a proper evaluation, he is diagnosed with an x-linked recessive disorder due to an enzyme deficiency that helps the RBC to work properly. Regarding his condition, which of the following statement is not true?

(or)

Which of the following statement is not true reagrding (G6PD) deficiency?

A. Bite cells

B. Intravascular hemolysis

C. Favism

D. Confers protection against plasmodium vivax

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6. A 10-year-old boy is brought to the outpatient department complaining dark-colored urine, very pale skin, yellow skin, and breathlessness. What is the diagnosis?

A. SLE

B. Myelodysplasia

C. Paroxysmal nocturnal hemoglobinuria

D. G6PD deficiency

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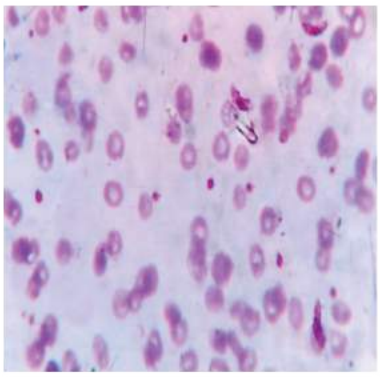
7. A 23-year-old male comes to the outpatient department complaining of new onset of yellow-coloured skin and scleras. The patient has no significant past medical or family history and doesn't take any illicit drugs. He is a hill climber and recently came from a hill trip. On physical examination, anaemia is found. On blood smears under a microscope, crescent-shaped gametocytes are seen as in the image below. What may be the most probable diagnosis for this patient?

(or)

On blood smears under a microscope, crescent-shaped gametocytes are seen as in the image below. What may be the most probable diagnosis for this patient?



A. Malaria

B. Hereditary spherocytosis

C. G6PD Deficiency

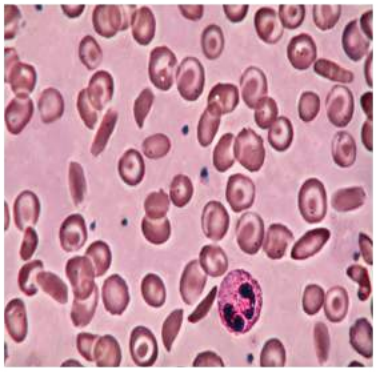
D. Thalassemia

---

8. A 30-year-old male comes to OPD complaining of worsening malaise, body weakness, abdominal pain, and dark urine for 1 day. He has had a past medical history of a carbuncle on his buttock, for which he received cotrimoxazole 3 days before. On physical examination, he is icteric with normal vital signs. Investigations reveal that haemoglobin has fallen from 14.4 g/dL to 9.1 g/dL, and his bilirubin has risen from normal to 3.5 mg/dL, urine dipstick is positive for bilirubin. A peripheral blood smear is shown in the image below. What may be the most common cause of death regarding this patient's condition?

(or)

A peripheral blood smear is shown in the image below. What may be the most common cause of death in G6PD deficiency patient's?



A. Low oxyhemoglobin values

B. Acute renal failure

C. Sequestration crisis

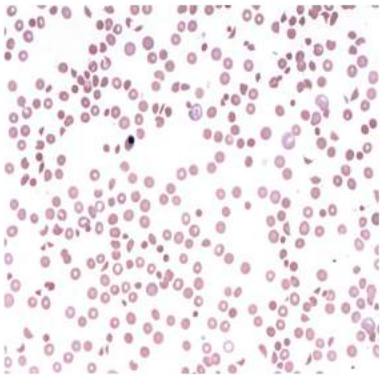
D. Low oxygen affinity

---

9. A 30-year-old male presented with a skin lesion in his right axilla. A presumptive diagnosis of staphylococcal skin carbuncle is made & the patient is treated with empiric sulfamethoxazole. After 2 days, the patient comes to an emergency with excessive weakness, abdominal pain & dark-coloured urine. On physical examination, his vitals are normal & jaundice is present. Lab studies show a drop in Hb from 14 g/dl to 8 g/dl & significant rise in bilirubin levels. The urine dipstick is positive for bilirubin. His peripheral blood smear is shown below. What may be the possible diagnosis of this patient?

(or)

A patient treated with sulfamethoxazole comes to an emergency with excessive weakness, abdominal pain & dark-coloured urine. The urine dipstick is positive for bilirubin. His peripheral blood smear is shown below. What may be the possible diagnosis of this patient?



A. Glucose 6-phosphate dehydrogenase (G6PD) deficiency

B. Hemolytic-uremic syndrome

C. Hereditary spherocytosis

D. Iron deficiency anaemia

---

10. A 25-year-old female comes to the outpatient department complaining of bony pain, dyspnea, fever & cough. On examination, her heart rate is 110 beats/min, BP is 140/88 mmHg, and SpO2 is 85% at room air. Lab findings reveal decreased Hb, increased reticulocyte count and sickled RBC on blood film. CXR shows bilateral diffuse alveolar infiltrates. Her mother gives a history of four similar episodes in the last 12 months. Regarding her condition, which of the following statement is not true?

(or)

A 25-year-old female has sickled RBCs on blood film. CXR shows bilateral diffuse alveolar infiltrates. Her mother gives a history of four similar episodes in the last 12 months. Regarding her condition, which of the following statement is not true?

A. Chronic therapy with oral hydroxyurea should be considered

B. She is suffering from a sickle cell acute chest syndrome

C. She should receive daily sildenafil

D. Hematocrit should be maintained at >30%

---

11. A 40-year-old female presented to the OPD complaining of pale-coloured skin, dark-coloured urine, fatigue, shortness of breath and weakness. She has been non-diabetic but hypertensive for 15 years. Her past medical history includes SLE and recurrent typhoid fever treated with intravenous ceftriaxone. A palpable spleen is found on physical examination. Her peripheral blood smear shows spherocytes.

Which of the following is the best investigation to diagnose her condition?

(or)

Which of the following is the best investigation to diagnose autoimmune hemolytic anemia?

A. Reticulocyte count

B. Osmotic fragility test

C. Coombs test

D. Bone marrow aspiration

---

12. A 12-year-old girl is brought to the outpatient department complaining of generalized weakness and fatigue, dark urine, pale conjunctiva and shortness of breath. She has no history of chronic infection or significant past medical or family history. Lab findings include increased unconjugated bilirubin, increased lactate dehydrogenase, decreased haptoglobin levels, and hemoglobinuria. For further evaluation, the physician advises an osmotic fragility test. Which of the following is incorrect regarding this test?

(or)

An adolescent girl has been advised an osmotic fragility test. Which of the following is incorrect regarding this test?

A. Increased in hereditary spherocytosis

B. Decreased in thalassemia

C. Hemolysis on exposure to a hypertonic saline environment

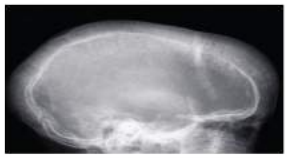
D. Osmotic fragility decreased in iron deficiency

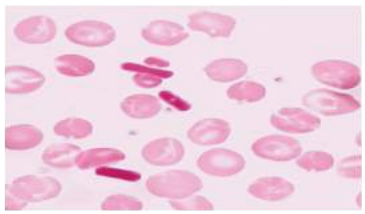
---

13. A 10-year-old Afro-American boy presents to the emergency department. On physical examination, the patient has hepatosplenomegaly and skull X-ray as shown below. Laboratory findings show reduced hemoglobin, elevated lactate dehydrogenase (LDH), and red blood cells as observed in the peripheral blood smear given below. Which of the following is the most appropriate initial treatment for this patient?

(or)

Which of the following is the most appropriate initial treatment for a patient with skull X-ray and peripheral smear as shown below?





A. Hydroxyurea therapy

B. Fresh blood transfusion

C. Phosphodiesterase-5 inhibitors

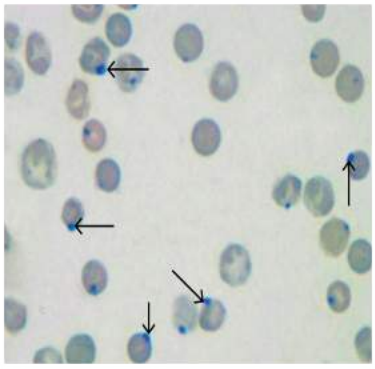
D. Monoclonal antibody therapy

---

14. A 5-year-old boy presents to the emergency department with sudden onset of pallor and jaundice. The mother mentions that the boy had a fever for the past few days, which subsided a day before. The family history is significant for a maternal uncle who had a similar episode in childhood. On examination, there is no splenomegaly or gallstones. Peripheral smear is as shown below. Which of the following is not contraindicated in this patient?

(or)

Which of the following is not contraindicated in a patient with peripheral smear is as shown below?



A. Aspirin

B. Nitrofurantion

C. Artesunate

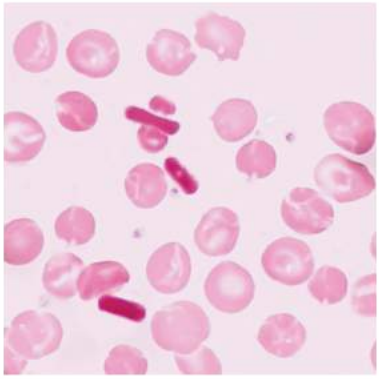
D. Me■oquine

---

15. A 16-year-old African-American male presents to the emergency department with severe pain in his left arm and leg. He also complains of shortness of breath and chest pain on deep inspiration. On examination, the patient appears in distress and has tenderness and swelling in the affected extremities. His vital signs are stable. On physical examination, the patient has hepatosplenomegaly and skull X-ray as shown below. Laboratory findings show reduced hemoglobin, elevated lactate dehydrogenase (LDH), and red blood cells as observed in the peripheral blood smear given below. What is the most appropriate initial treatment for this patient?

(or)

What is the most appropriate initial treatment for a patient having severe pain? Laboratory findings show reduced hemoglobin, elevated lactate dehydrogenase (LDH), and red blood cells as observed in the peripheral blood smear given below.



A. Intravenous (IV) analgesia with IV fluids

B. Antibiotic therapy

C. Packed red blood cell transfusion

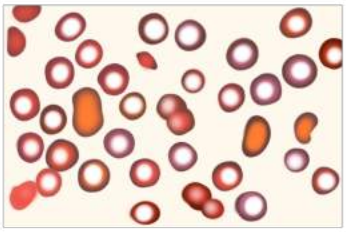
D. crizanlizumab

---

16. A 45-year-old woman presents to the emergency room with symptoms of fatigue, weakness, and dark urine over the past week. She has a history of hypertension and is currently taking medication for it. Hb:8.2 g/dL, Reticulocyte count: Elevated, Serum lactate dehydrogenase (LDH): Elevated, Serum haptoglobin: Decreased and Coagulation studies: Normal. Which of the following is not associated with this disease?

(or)

Which of the following is not associated with the below given blood smear?



A. Hemolytic uremic syndrome

B. Thrombotic thrombocytopenic purpura.

C. Eclampsia

D. Hereditary spherocytosis

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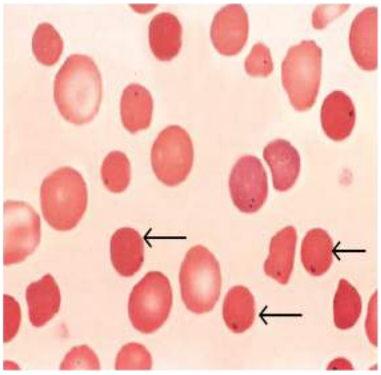
17. A 35-year-old female presents to her primary care physician with complaints of chronic fatigue and intermittent jaundice. She reports a history of similar episodes throughout her life. On physical examination, mild splenomegaly is noted. Laboratory tests reveal decreased hemoglobin, reduced mean corpuscular volume (MCV), and an increased reticulocyte count. A blood smear is obtained and is as shown below. Which of the following conditions is the most likely cause of her symptoms?

(or)

Which of the following conditions is the most likely cause of a blood smear as shown below?



A. Hereditary Spherocytosis (HS)

B. Paroxysmal Nocturnal Hemoglobinuria (PNH)

C. Autoimmune Hemolytic Anemia (AIHA)

D. Thalassemia

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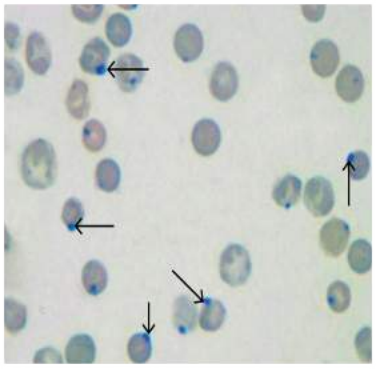
18. A 5-year-old boy presents to the emergency department with sudden onset of pallor and jaundice. The mother mentions that the boy had a fever for the past few days, which subsided a day before. The family history is significant for a maternal uncle who had a similar episode in childhood. On examination, there is no splenomegaly or gallstones. Peripheral smear is as shown below. Which of the following is not contraindicated in this patient?

(or)

Which of the following is not contraindicated in a patient with peripheral smear is as shown below?



A. Aspirin

B. Nitrofurantion

C. Artesunate

D. Me■oquine

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19. Which of the following is a true statement regarding sickle cell disease? X-ray shows squaring of the metacarpals HbA is absent in Hemoglobin electrophoresis HbS is created when glutamate is

replaced with valine Blood supply of the upper and lower parts of the vertebral body is a■ected

A. 1,3,4

B. 2,3

C. 2,3,4

D. 1,4

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20. Which of the following statements about autoimmune hemolytic anemia (AIHA) is incorrect?

A. Warm AIHA is characterized by IgG antibodies targeting the P-Antigen on red blood cells.

B. Cold AIHA is caused by IgM antibodies and primarily leads to intravascular hemolysis (IVH).

C. In Paroxysmal cold hemoglobinuria, the red blood cells are broken down, resulting in extravascular hemolysis (EVH).

D. Both Warm AIHA and Cold AIHA can cause extravascular hemolysis (EVH).

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	3
Question 3	1
Question 4	2
Question 5	4
Question 6	4
Question 7	1
Question 8	2
Question 9	1
Question 10	3
Question 11	3
Question 12	3
Question 13	1
Question 14	3
Question 15	1
Question 16	4
Question 17	1
Question 18	3
Question 19	3

Question 20	2

Solution for Question 1:

Option D: Infectious mononucleosis

This patient’s recent medication history with the lab values mostly suggests autoimmune hemolytic ane mia (AIHA) due to the development of warm immunoglobulin G (IgG) antibodies as a consequence of cefotaxime exposure.

Autoimmune haemolytic anaemia (AIHA):

• It is idiopathic normocytic anaemia, where the body’s immune system produces autoantibodies directed against its own RBC that attack and destroy RBC.

• These autoantibodies bind to RBC cell surface antigens and cause them to clump

• A warm antibody (IgG) hemolytic anaemia is the most common form of AIHA.

• Another form of AIHA is cold (IgM) antibody hemolytic anaemia.

• Infectious mononucleosis is associated with cold (IgM) AIHA.

• Autoantibodies generally react at temperatures > 37° C.

• Hemolysis occurs primarily in the spleen, resulting in splenomegaly.

• The autoantibodies production may occur due to: Spontaneously SLE, lymphoma, CLL Drug exposure: alpha-methyldopa, high-dose penicillin, cephalosporins, quinidine.

• Spontaneously

• SLE, lymphoma, CLL

• Drug exposure: alpha-methyldopa, high-dose penicillin, cephalosporins, quinidine.

• Coombs test is the best investigation to diagnose AIHA.

• Spontaneously

• SLE, lymphoma, CLL

• Drug exposure: alpha-methyldopa, high-dose penicillin, cephalosporins, quinidine.

Option A: SLE

• SLE is an autoimmune disease that is associated with AIHA.

Option B: α-Methyldopa ingestion

• This drug can also cause the development of autoantibodies to RBC, resulting in AIHA.

Option C: Quinidine

• Quinidine exposure can also cause AIHA by producing antibodies against RBC.

Solution for Question 2:

Option C: She can present with pulmonary bleeds

• This patient's anaemia with jaundice points to hemolytic anaemia, and joint pain indicates sickling leading to a vaso-occlusive crisis.

• Moreover, the sickled RBC on lab findings suggests sickle cell anaemia.

Sickle cell anaemia:

• It is an inherited blood disorder caused by a point mutation in the β-globin gene.

• Mutant HbA is termed HbS (sickle haemoglobin).

• Deoxygenated HbS polymerizes and causes sickling.

• Pathogenesis: Low O2, high altitudes, dehydration, or acidosis triggers sickling.

• Sickled RBCs precipitate in the blood vessel and cause vaso-occlusion.

• Signs/Symptoms include: Recurrent painful episodes. Anaemia. Painful swelling of hands and feet.

• Recurrent painful episodes.

• Anaemia.

• Painful swelling of hands and feet.

• The major haemoglobin in sickle cell anaemia is HbS, and HbA will be undetectable.

• Proliferative sickle retinopathy (PSR) is the most severe ocular change in SCD.

• Patients can present with acute chest syndrome (not pulmonary syndrome).

• Acute chest syndrome is characterized by chest pain, tachypnea, fever, cough, and arterial oxygen desaturation., pulmonary bleeds are not seen.

• Treatment: Hydroxyurea

• Increases foetal haemoglobin and reduces sickling.

• Beneficial effects on RBC hydration.

• Reduces vascular wall adherence of sticky reticulocytes.

• Recurrent painful episodes.

• Anaemia.

• Painful swelling of hands and feet.

Option A: HbA will be undetectable

• The HbA is mutated in sickle cell anaemia, and the mutant form is termed HbS.

• Therefore, HbA is almost undetectable in this condition.

Option B: She may have retinopathy

• The most severe ocular change in sickle cell disease is proliferative sickle retinopathy.

Option D: Hydroxyurea would help her

• The most effective oral treatment for sickle cell anaemia is hydroxyurea.

• It reduces sickling by increasing the amount of fetal haemoglobin.

Solution for Question 3:

Option A: Sickle cell anaemia

This patient's early childhood history of severe anaemia with the current presentation of acute, persiste nt painful erection (vaso-occlusive crisis), non-healing leg ulcers and lab findings mostly suggest sickle cell anaemia.

Sickle cell anaemia:

• It is an inherited blood disorder caused by a point mutation in the β-globin gene.

• Mutant HbA is termed HbS (sickle haemoglobin).

• Deoxygenated HbS polymerizes and causes sickling.

• Pathogenesis: Low O2, high altitudes, dehydration, or acidosis triggers sickling.

• Sickled RBCs precipitate in the blood vessel and cause vaso-occlusion.

• Signs/Symptoms of a vaso-occlusive crisis include: Acute chest syndrome (most severe form). Priapism (persistent painful erection of the penis for >4 hours). Dactylitis (painful swelling of hands and feet). Abdominal pain.

• Acute chest syndrome (most severe form).

• Priapism (persistent painful erection of the penis for >4 hours).

• Dactylitis (painful swelling of hands and feet).

• Abdominal pain.

• Acute chest syndrome (most severe form).

• Priapism (persistent painful erection of the penis for >4 hours).

• Dactylitis (painful swelling of hands and feet).

• Abdominal pain.

• Priapism occurs due to the following: An excessive release of neurotransmitters Blockage of draining venules (e.g., mechanical interference in sickle cell crisis, leukaemia, or excessive use of intravenous parenteral lipids) Prolonged relaxation of the intracavernous smooth muscles (most often caused by using exogenous smooth-muscle relaxants such as injectable intra-cavernosal prostaglandin E1)

• An excessive release of neurotransmitters

• Blockage of draining venules (e.g., mechanical interference in sickle cell crisis, leukaemia, or excessive use of intravenous parenteral lipids)

• Prolonged relaxation of the intracavernous smooth muscles (most often caused by using exogenous smooth-muscle relaxants such as injectable intra-cavernosal prostaglandin E1)

• Lab findings include: Decreased Hb. High reticulocyte count (>1.5%). Peripheral blood smear: Target cells and Howell-Jolly bodies. Haemoglobin electrophoresis: Abnormal Hb (HbS) with sickling of RBC.

• Decreased Hb.

• High reticulocyte count (>1.5%).

• Peripheral blood smear: Target cells and Howell-Jolly bodies.

• Haemoglobin electrophoresis: Abnormal Hb (HbS) with sickling of RBC.

• An excessive release of neurotransmitters

• Blockage of draining venules (e.g., mechanical interference in sickle cell crisis, leukaemia, or excessive use of intravenous parenteral lipids)

• Prolonged relaxation of the intracavernous smooth muscles (most often caused by using exogenous smooth-muscle relaxants such as injectable intra-cavernosal prostaglandin E1)

• Decreased Hb.

• High reticulocyte count (>1.5%).

• Peripheral blood smear: Target cells and Howell-Jolly bodies.

• Haemoglobin electrophoresis: Abnormal Hb (HbS) with sickling of RBC.

Option B: Hairy cell leukaemia

• It is a rare type of blood and bone marrow cancer where the bone marrow makes excessive lymphocytes.

• It can cause anaemia, but vaso-occlusive symptoms and abnormal sickled RBCs won't be found here.

Option C: ALL

• Acute lymphoblastic leukaemia is the most common childhood cancer.

• Signs include- Fever, anaemia, easy bruising, petechiae, bone or joint pain, and shortness of breath.

• But sickled RBC and priapism are highly unlikely in this condition.

Option D: Beta thalassemia

• It is also an inherited blood disorder caused by a point mutation in the β-globin gene.

• PBF will reveal target cells but no sickled RBC.

• Also, the reticulocyte count will be lower than normal.

Solution for Question 4:

Option B: Normal reticulocyte count

• This patient's history of chronic anaemia with jaundice points to haemolytic anaemia and painful swelling of fingers and toes (Dactylitis), indicating vaso-occlusive symptoms.

• Moreover, the sickled RBC on lab findings suggests sickle cell anaemia.

Sickle cell anaemia:

• It is an inherited blood disorder caused by a point mutation in the β-globin gene.

• The major haemoglobin in sickle cell anaemia is HbS.

• When in the deoxygenated form, HbS forms a polymer that damages the red blood cell membrane resulting in haemolysis.

• Lab findings include: Decreased Hb. High reticulocyte count (>1.5%). Peripheral blood smear: Target cells and Howell-Jolly bodies. Haemoglobin electrophoresis: Abnormal Hb (HbS) with sickling of RBC.

• Decreased Hb.

• High reticulocyte count (>1.5%).

• Peripheral blood smear: Target cells and Howell-Jolly bodies.

• Haemoglobin electrophoresis: Abnormal Hb (HbS) with sickling of RBC.

• Decreased Hb.

• High reticulocyte count (>1.5%).

• Peripheral blood smear: Target cells and Howell-Jolly bodies.

• Haemoglobin electrophoresis: Abnormal Hb (HbS) with sickling of RBC.

Reticulocyte:

• Reticulocytes are young red blood cells that contain cytoplasmic RNA.

• A reticulocyte count measures how rapidly reticulocytes are produced by the bone marrow and then released into the bloodstream.

• Reticulocytosis is a feature of hemolytic anaemia.

• Reticulocyte count is increased in: Hemolytic anaemia Blood loss (before the development of iron deficiency) Recovery from iron, vitamin B12or folate deficiency or Drug-induced hemolytic anaemia.

• Hemolytic anaemia

• Blood loss (before the development of iron deficiency)

• Recovery from iron, vitamin B12or folate deficiency or

• Drug-induced hemolytic anaemia.

• Hemolytic anaemia

• Blood loss (before the development of iron deficiency)

• Recovery from iron, vitamin B12or folate deficiency or

• Drug-induced hemolytic anaemia.

• Reticulocyte count is decreased in: Iron deficiency anaemia Aplastic anaemia Anaemia of chronic disease Megaloblastic anaemia Infiltration (tumour, infection, etc.) Myelodysplastic syndrome.

• Iron deficiency anaemia

• Aplastic anaemia

• Anaemia of chronic disease

• Megaloblastic anaemia

• Infiltration (tumour, infection, etc.)

• Myelodysplastic syndrome.

• Iron deficiency anaemia

• Aplastic anaemia

• Anaemia of chronic disease

• Megaloblastic anaemia

• Infiltration (tumour, infection, etc.)

• Myelodysplastic syndrome.

Option A: Shortened RBC lifespan

• HbS forms a polymer that damages the RBC membrane and causes haemolysis.

• Therefore, the RBC life span is shortened in sickle cell anaemia.

Option C: Abnormality in haemoglobin

• Sickle cell anaemia is characterized by abnormal Hb forming sickle-shaped RBC.

Option D: Polymer formation is reversible

• Deoxygenated HbS polymerizes, and it reverses to normal shape on exposure to oxygen.

• However, RBCs that have undergone repeated sickling are damaged beyond repair & become irreversibly sickled.

Solution for Question 5:

Option D: Confers protection against plasmodium vivax

This patient's presenting complaints suggest hemolytic anaemia, and the diagnosis of an x-linked reces sive disorder is most probably glucose-6-phosphate dehydrogenase (G6PD) deficiency.

G6PD deficiency:

• It is an x-linked recessive disorder due to the deficiency of the G6PD enzyme.

• G6PD neutralizes free radical-induced damage inside RBC.

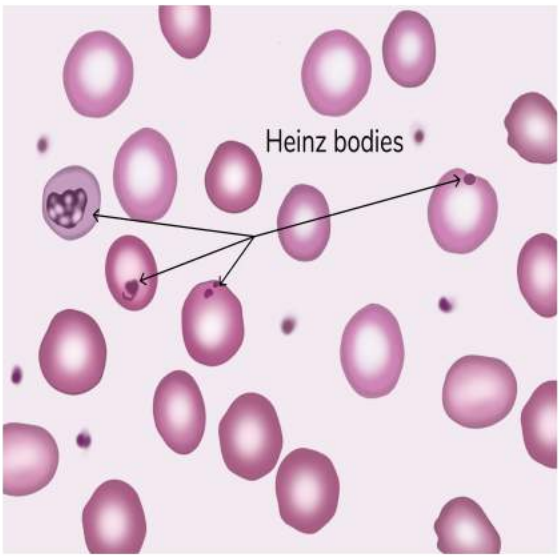
• Its deficiency leads to unopposed oxidative stress → Intravascular hemolysis → hemoglobinemia, hemoglobinuria / black urine → Acute Tubular Necrosis → Death.

• There are three types of triggers for oxidative damage to RBC:

• The most typical feature is the presence of bizarre poikilocytes with red cells that appear to have unevenly distributed haemoglobin ("hemighosts") and red cells that appear to have had parts of them bitten away ("bite cells" or "blister cells").

• Bite cells are formed due to the splenic removal of abnormal haemoglobin aggregates (Heinz bodies) (see image below).

• G6PD deficiency confers a relative resistance against Plasmodium falciparum (not vivax).



Option A: Bite cells

• These are found in G6PD deficient patients due to splenic removal of abnormal haemoglobin aggregates (Heinz bodies).

Option B: Intravascular hemolysis

• RBC undergo intravascular breakdown due to oxidative stress in G6PD deficiency.

Option C: Favism

• It refers to an acute haemolytic syndrome due to fava bean ingestion in G6PD deficient patients.

Solution for Question 6:

Answer

Option D: G6PD deficiency

• The symptoms confirm G6PD deficiency.

• An inherited genetic disorder that affects the red blood cells, leading to their destruction when exposed to certain triggers.

• The symptoms of G6PD deficiency are - Dark-coloured urine. Very pale skin. Yellow skin, eyes or tongue. Breathlessness. An enlarged spleen. Very fast heart rate. Low back pain. Fever.

• Dark-coloured urine.

• Very pale skin.

• Yellow skin, eyes or tongue.

• Breathlessness.

• An enlarged spleen.

• Very fast heart rate.

• Low back pain.

• Fever.

The symptoms of G6PD deficiency are -

• Dark-coloured urine.

• Very pale skin.

• Yellow skin, eyes or tongue.

• Breathlessness.

• An enlarged spleen.

• Very fast heart rate.

• Low back pain.

• Fever.

Other options

Option A: SLE

Option B: Myelodysplasia

Option C: Paroxysmal nocturnal hemoglobinuria

• Systemic lupus erythematosus (SLE) is an autoimmune disease that causes widespread systemic inflammation.

• It is a rare type of blood cancer.

• Here blood cells are poorly formed and don't work properly; therefore, they undergo early destruction.

Solution for Question 7:

Option A: Malaria

The above image shows the crescent or banana-shaped gametocytes are characteristic of plasmodium falciparum malaria.

Plasmodium falciparum malaria:

• Plasmodium falciparum is a unicellular protozoan parasite that causes malaria in humans.

• It is transmitted by the bite of a female anopheles mosquito.

• It is more common in larger forests or hilly areas.

• An infected mosquito bites the human and transmitted sporozoites into the bloodstream.

• Clinical features include- Severe, irregular fever patterns Chills and rigour Severe headache Muscle aches Tiredness.

• Severe, irregular fever patterns

• Chills and rigour

• Severe headache

• Muscle aches

• Tiredness.

• It can cause both anaemia and jaundice due to the breakdown of RBCs.

• Diagnosis: Crescent-shaped or banana-shaped gametocytes are seen on blood smears under a microscope.

• Treatment: Chloroquine or hydroxychloroquine.

• Severe, irregular fever patterns

• Chills and rigour

• Severe headache

• Muscle aches

• Tiredness.

Option B: Hereditary spherocytosis

• Spherocytes (absence of central pallor) are the characteristic finding of hereditary spherocytosis.

Option C: G6PD deficiency

• In G6PD deficiency, bite cells will be found in the blood film.

Option D: Thalassemia

• Target cells are seen on peripheral blood film in thalassemia.

Solution for Question 8:

Option B: Acute renal failure

The presenting complaints and lab findings of this patient suggest G6PD deficiency. Acute renal failure is the most common cause of death in G6PD deficiency.

G6PD deficiency:

• It is an x-linked recessive disorder due to the deficiency of the G6PD enzyme.

• G6PD neutralises free radical-induced damage inside RBC.

• Its deficiency leads to unopposed oxidative stress and intravascular hemolysis, which leads to acute renal failure.

• Acute renal failure is the most common cause of death in G6PD deficiency.

• PBF shows bite cells, anisocytosis, and spherocytes, diagnosing glucose 6-phosphate dehydrogenase (G6PD) deficiency.

• Bite cells are formed due to the splenic removal of abnormal haemoglobin aggregates. (Heinz bodies)

Pathophysiology of acute renal failure in G6PD deficiency:

Hemolytic episode

↓

Hemoglobinemia

Hemoglobinuria (Black urine)

Blockage of tubules of the kidney

Acute tubular necrosis

Renal failure

Option A: Low oxyhemoglobin values

• Low oxyhemoglobin level is found in aplastic anaemia.

• It is not a cause of death in G6PD deficiency.

Option C: Sequestration crisis

• Sequestration crisis is characteristic of sickle cell anaemia.

Option D: Low oxygen affinity

• Low oxygen affinity is not a common cause of death in G6PD deficiency.

Solution for Question 9:

Option A: Glucose 6-phosphate dehydrogenase (G6PD) deficiency

G6PD deficiency:

• It is an x-linked recessive disorder due to the deficiency of the G6PD enzyme.

• G6PD neutralises free radical-induced damage inside RBC.

• Its deficiency leads to unopposed oxidative stress → intravascular hemolysis → hemoglobinemia, hemoglobinuria / black urine → acute tubular necrosis → death.

• There are three types of triggers for oxidative damage to RBC:

• PBF shows bite cells, anisocytosis, and spherocytes with jaundice after receiving sulfamethoxazole, which diagnoses glucose 6-phosphate dehydrogenase (G6PD) deficiency.

• Bite cells are formed due to the splenic removal of abnormal haemoglobin aggregates. (Heinz bodies)

Option B: Hemolytic-uremic syndrome

• Hemolytic-uremic syndrome causes a microangiopathic hemolytic anaemia with prominent schistocytes.

Option C: Hereditary spherocytosis

• It causes normocytic normochromic anaemia.

Option D: Iron deficiency anaemia

• Iron deficiency causes microcytic and hypochromic anaemia.

Solution for Question 10:

Option C: She should receive daily sildenafil

The given scenario suggests the diagnosis of acute chest syndrome- a medical emergency that may require management in the ICU.

Sickle cell anaemia:

• It is an inherited blood disorder caused by a point mutation in the β-globin gene.

• Mutant HbA is termed HbS (sickle haemoglobin).

• Deoxygenated HbS polymerises and causes sickling.

• Pathogenesis: Low O2, high altitudes, dehydration, or acidosis triggers sickling.

• Sickled RBCs precipitate in the blood vessel and cause vaso-occlusion.

• Patients can present with acute chest syndrome (not pulmonary syndrome).

• Acute chest syndrome is characterised by chest pain, tachypnea, fever, cough, and arterial oxygen desaturation.

• Treatment of acute chest syndrome- Hydration- monitored carefully to avoid the development of pulmonary oedema. Oxygen therapy- to avoid hypoxemia. Transfusion to maintain a hematocrit >30% and emergency exchange transfusion if arterial saturation drops to <90%. Hydroxyurea- a mainstay of therapy for patients with severe symptoms. It increases fetal haemoglobin and exerts beneficial effects on RBC hydration, vascular wall adherence, and suppression of the granulocyte and reticulocyte counts Trials of sildenafil to restore NO levels were terminated because of adverse effects.

• ■■■■■■■Hydration- monitored carefully to avoid the development of pulmonary oedema.

• Oxygen therapy- to avoid hypoxemia.

• Transfusion to maintain a hematocrit >30% and emergency exchange transfusion if arterial saturation drops to <90%.

• Hydroxyurea- a mainstay of therapy for patients with severe symptoms. It increases fetal haemoglobin and exerts beneficial effects on RBC hydration, vascular wall adherence, and suppression of the granulocyte and reticulocyte counts

• Trials of sildenafil to restore NO levels were terminated because of adverse effects.

• ■■■■■■■Hydration- monitored carefully to avoid the development of pulmonary oedema.

• Oxygen therapy- to avoid hypoxemia.

• Transfusion to maintain a hematocrit >30% and emergency exchange transfusion if arterial saturation drops to <90%.

• Hydroxyurea- a mainstay of therapy for patients with severe symptoms. It increases fetal haemoglobin and exerts beneficial effects on RBC hydration, vascular wall adherence, and suppression of the granulocyte and reticulocyte counts

• Trials of sildenafil to restore NO levels were terminated because of adverse effects.

Option A: Chronic therapy with oral hydroxyurea should be considered

• Chronic therapy with oral hydroxyurea is used in sickle cell acute chest syndrome to increase fetal haemoglobin.

Option B: She is suffering from a sickle cell acute chest syndrome

• Acute chest syndrome is a serious complication of sickle cell anaemia.

Option D: Hematocrit should be maintained at >30%

• Patients with acute chest syndrome are treated with transfusion to maintain a hematocrit >30%.

Solution for Question 11:

Option C: Coombs test

Spherocytes in adult patients indicate the presence of autoimmune haemolytic anaemia; hence, Coom bs test should be performed.

Autoimmune haemolytic anaemia (AIHA):

• It is idiopathic normocytic anaemia.

• In this condition, the body’s immune system produces autoantibodies directed against its own RBC that attack and destroy RBC.

• These autoantibodies bind to RBC cell surface antigens and cause them to clump together, which is termed RBC agglutination

• The best test to diagnose AIHA is Coombs test.

• Coombs test is of 2 types- Direct Indirect

• Direct

• Indirect

• The direct Coombs test detects agglutinated RBCs in AIHA.

• The peripheral blood smear will show spherocytes, so RBC osmotic fragility will also increase in AIHA.

• But increased osmotic fragility merely reflects the presence of spherocytes and does not distinguish hereditary spherocytosis from other spherocytic hemolytic disorders.

• Direct

• Indirect

Option A: Reticulocyte count

• Reticulocyte count is increased hemolytic anaemia as bone marrow makes more reticulocytes to replace destroyed RBC.

• But it cannot specify the different types of haemolytic anaemia.

Option B: Osmotic fragility test

• It is done to diagnose hereditary spherocytosis.

• The presence of spherocytes alone is insufficient for diagnosing hereditary spherocytosis.

• Osmotic fragility of RBC will also increase in other causes of hemolytic anaemia with spherocytes.

Option D: Bone marrow aspiration

• This test is done to confirm the diagnosis of aplastic anaemia.

• It cannot diagnose AIHA.

Solution for Question 12:

Option C: Hemolysis on exposure to a hypertonic saline environment

The osmotic fragility test (OFT):

• It measures erythrocyte resistance to hemolysis while being exposed to varying levels of dilution of a saline solution.

• The susceptibility of osmotic lysis of erythrocytes is a function of the surface area to volume ratio.

• In a disease such as hereditary spherocytosis, erythrocytes have a smaller ratio of surface area to volume, i.e., more susceptible to osmotic stress.

• Therefore, in hereditary spherocytosis, the osmotic fragility of RBC increases.

• Increased resistance, i.e., decreased osmotic fragility, is characteristic of thalassemia and iron deficiency anaemia due to an increased surface area to volume ratio.

• Hereditary spherocytosis

• Poisoning

• Severe burns

• Thalassemia

• Iron deficiency anaemia

• Sickle cell anaemia

Option A: Increased in hereditary spherocytosis

• The osmotic fragility of RBC is increased in hereditary spherocytosis due to a smaller surface area to volume ratio.

Option B: Decreased in thalassemia

• Thalassemia causes an increased surface area to volume ratio of RBC, resulting in decreased osmotic fragility.

Option D: Osmotic fragility decreased in iron deficiency

• In iron deficiency anaemia, the RBC surface area to volume ratio increases, so osmotic fragility decreases.

Solution for Question 13:

Correct Option A - Hydroxyurea therapy:

• Hydroxyurea therapy: Hydroxyurea is the recommended initial treatment for sickle cell disease. It helps to increase fetal hemoglobin (HbF) levels, which mitigates the clinical manifestations of the disease. Hydroxyurea decreases cell count and decreases the frequency of painful crises, acute chest syndrome, and hospitalizations.

Incorrect Options:

Option B - Fresh blood transfusion: Fresh blood transfusion is indicated in sickle cell disease but is typi cally reserved for specific indications such as acute severe anemia, acute chest syndrome, or stroke. It is not the most appropriate initial treatment in this patient.

Option C - Phosphodiesterase-5 inhibitors: Phosphodiesterase-5 inhibitors, such as tadalafil, are used i n the treatment of pulmonary artery hypertension (PAH) in sickle cell disease. While PAH is a potential complication, it is not the most appropriate initial treatment in this patient.

Option D - Monoclonal antibody therapy: Monoclonal antibody therapy, such as crizanlizumab, is used to reduce the frequency of vaso-occlusive crises in sickle cell disease. However, it is not the most appr opriate initial treatment in this patient.

Solution for Question 14:

Correct Option C - Artesunate:

• Artesunate, which is used in the treatment of malaria, is generally safe for individuals with G6PD deficiency. It does not induce hemolysis and is considered an acceptable option for treating malaria in areas where G6PD deficiency is prevalent.

Incorrect Options:

Option A - Aspirin:

• Aspirin oxidative stress and trigger hemolysis in G6PD-deficient individuals. Aspirin is commonly used for pain relief, anti-inflammatory purposes, and as an antiplatelet agent.

Option B - Nitrofurantoin:

• Nitrofurantoin can cause hemolysis in individuals with G6PD deficiency. It is considered contraindicated in G6PD deficiency due to its potential to induce oxidative stress and damage red blood cells.

Option D - Mefloquine:

• Explanation: Mefloquine is contraindicated for individuals with G6PD deficiency and is considered an acceptable antimalarial option. It triggers intravascular hemolysis in G6PD-deficient individuals.

Solution for Question 15:

Correct Option A - Intravenous (IV) analgesia with iv fluids:

• Intravenous (IV) analgesia with iv fluids: Severe pain is a hallmark symptom of a sickle cell crisis, and IV analgesia is the mainstay of treatment to provide pain relief. Opioids are effective in managing acute pain episodes associated with sickle cell disease.

Option B - Antibiotic therapy: Although patients with sickle cell disease have an increased risk of infecti ons, the presence of severe pain and acute chest pain in this scenario suggests a vaso-occlusive crisis rather than an infectious process. Antibiotic therapy would not be the most appropriate initial treatment .

Option C - Packed red blood cell transfusion: Packed red blood cells should not be administered in sick le cell anemia. Fresh blood transfusion is reserved for specific indications in sickle cell disease, such a s acute severe anemia, acute chest syndrome, or stroke. While it may be necessary in some cases, it i s not the initial treatment for a vaso-occlusive crisis.

Option D - Crizanlizumab: It is a monoclonal antibody that is used to reduce the frequency of vaso-occl usive crises in sickle-cell patients. It is not the initial treatment of choice.

Solution for Question 16:

Correct Option D - Hereditary spherocytosis:

• The above given scenario and blood smear image showing schistocytes is suggestive of the diagnosis of Microangiopathic Hemolytic Anemia (MAHA)

• Hereditary spherocytosis is not associated with MAHA

Incorrect Options:

Option A, B & C:

Disorders associated with MAHA

• Hemolytic uremic syndrome caused by Escherichia coli O157:H7.

• Thrombotic thrombocytopenic purpura.

• Eclampsia.

Solution for Question 17:

Correct Option A - Hereditary Spherocytosis (HS):

• Hereditary Spherocytosis (HS): HS is the most likely cause of the patient's symptoms. It is an autosomal dominant disorder characterized by defects in the RBC membrane, leading to the formation of spherical-shaped RBCs (spherocytes). The clinical presentation includes chronic fatigue, intermittent jaundice, splenomegaly, decreased hemoglobin, reduced MCV, and an increased reticulocyte count.

• The image shows spherocytes seen in hereditary spherocytosis.

Incorrect Options:

Option B - Paroxysmal Nocturnal Hemoglobinuria (PNH): PNH is characterized by a mutation in the PIGA gene, resulting in a deficiency of glycosylphosphatidylinositol (GPI)-anchored prot eins on the surface of RBCs. This leads to intravascular hemolysis, but it does not typically present wit h spherocytes on blood smear examination.

Option C - Autoimmune Hemolytic Anemia (AIHA): AIHA is caused by the production of autoantibodies against RBCs, leading to their destruction. It can present with fatigue, jaundice, and anemia, but the pr esence of spherocytes on blood smear examination is more indicative of HS.

Option D - Thalassemia: Thalassemia is a group of inherited disorders characterized by abnormal or d eficient synthesis of globin chains in hemoglobin. It typically presents with microcytic hypochromic ane mia, but spherocytes are not a characteristic finding

Solution for Question 18:

Correct Option C - Artesunate:

• Artesunate, which is used in the treatment of malaria, is generally safe for individuals with G6PD deficiency. It does not induce hemolysis and is considered an acceptable option for treating malaria in areas where G6PD deficiency is prevalent.

Incorrect Options:

Option A - Aspirin:

• Aspirin oxidative stress and trigger hemolysis in G6PD-deficient individuals. Aspirin is commonly used for pain relief, anti-inflammatory purposes, and as an antiplatelet agent.

Option B - Nitrofurantoin:

• Nitrofurantoin can cause hemolysis in individuals with G6PD deficiency. It is considered contraindicated in G6PD deficiency due to its potential to induce oxidative stress and damage red blood cells.

Option D - Mefloquine:

• Explanation: Mefloquine is contraindicated for individuals with G6PD deficiency and is considered an acceptable antimalarial option. It triggers intravascular hemolysis in G6PD-deficient individuals.

Solution for Question 19:

Correct Option C - 2,3,4

True statement

Option B - 2,3: In hemoglobin electrophoresis,HbS, HbF, HbA2 is Present and HbA is absent whereas i n sickle cell trait ,HbS, HbF, HbA2 and HbA is present.

Option C - 2,3,4: Hemoglobin S (HbS) is a variant of normal hemoglobin (HbA) where a glutamic acid residue at position 6 of the beta-globin chain is replaced with valine. This single amino ac id substitution results in the formation of abnormal hemoglobin molecules known as hemoglobin S.

Option D - 1,4: Fish vertebrae are often seen in the context of sickle cell disease, where vaso-occlusive crises can lead to ischemia and necrosis of bone tissue, including the vertebral bodies. The H-shaped appearance on imaging is a result of the spared central portion of the vertebral body, which retains its blood supply from the anterior and posterior segmental arteries.Blood supply of the upper and lower pa rts of the vertebral body is a■ected

Incorrect Options:

Option A - 1,3,4

• X-ray shows squaring of the metacarpals in thalassemia not in sickle cell disease.

• Hand X-ray shows dactylitis in sickle cell disease

Solution for Question 20:

Correct Option B
- Cold AIHA is caused by IgM antibodies and primarily leads to intravascular hemolysis (IVH).

• This statement is incorrect. Cold AIHA is primarily caused by IgM antibodies and predominantly causes extravascular hemolysis (EVH), not intravascular hemolysis (IVH).

Incorrect Options:

Option A - Warm AIHA is characterized by IgG antibodies targeting the P-Antigen on red blood cells:

• This statement is correct. Warm AIHA is characterized by IgG antibodies targeting the P-Antigen on red blood cells.

Option C - In Paroxysmal cold hemoglobinuria, the red blood cells are broken down, resulting in extrav ascular hemolysis (EVH):

• This statement is correct. In Paroxysmal cold hemoglobinuria, the red blood cells are indeed broken down, resulting in extravascular hemolysis (EVH).

Option D - Both Warm AIHA and Cold AIHA can cause extravascular hemolysis (EVH):

• This statement is correct. Both Warm AIHA and Cold AIHA can cause extravascular hemolysis (EVH):

Blood Grouping & Transfusion

1. A 16-year-old male patient has come to the hospital for a follow-up. He was diagnosed with leukaemia 1 year back. He is receiving chemotherapy according to his schedule. His last dose of chemotherapy was one month back. Complete blood count showing less than 50,000 platelets. He has been referred to the haematology department for platelet transfusion. What is the shelf life of platelets in the blood bank?

(or)

What is the shelf life of platelets in the blood bank?

A. A. Storage temperature: 4°C; Shelf life: 35 days

B. B. Storage temperature: -30°C; Shelf life: 1 year

C. C. Storage temperature: 20-24°C; Shelf life: 5 days

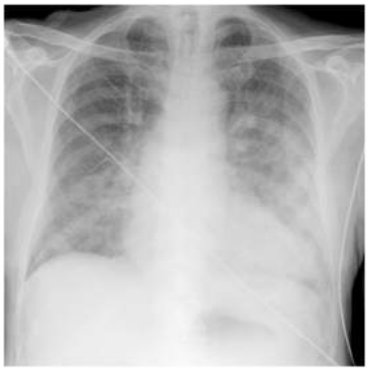
D. D. Storage temperature: Varies; Shelf life: Not applicable

---

2. A 33-year-old man is brought to the ED by an ambulance after being involved in a road traffic accident. He was an unrestrained passenger and sustained considerable trauma. The patient in ICU receives an emergency blood transfusion as part of the resuscitation efforts. 3 hours later, SpO2 is reduced to 75% with respiratory difficulty. CVP is 15cm water and PCWP is 25mm Hg. CXR is shown below. What should be the probable diagnosis?

(or)

What is the diagnosis for presence of respiratory distress after 3hours of blood transfusion, along with elevated CVP and PCWP with the following chest X-ray?



A. Tension pneumothorax

B. Transfusion-related acute lung injury

C. Transfusion-associated circulatory overload

D. Mismatched blood transfusion

---

3. Which of the following option is true regarding blood transfusion? Complete Packed RBC transfusion within 6 hours of issue from the blood bank. Complete Platelet concentrate transfusion within 1 hour of issue from the blood bank. Complete FFP transfusion within half hour of issue from the blood bank. Complete Cryoprecipitate transfusion within 5 hours of issue from the blood bank.

A. 1

B. 2 and 3

C. 3

D. 1 and 4

---

4. A 23-year-old man was brought to the ED by ambulance after sustaining a road traffic accident. There were multiple abrasions in the patient's whole body and took multiple stitches at different sites of the body. The patient in ED receives 3 emergency blood transfusions due to profound hypotension and bleeding. Which of the following is a major complication of massive blood transfusion?

(or)

Which of the following is a major complication of massive blood transfusion?

A. Hyperthermia

B. Hypokalemia

C. Coagulopathy

D. Hypercalcemia

---

5. A 30 years old man is brought to the hospital by ambulance after a road traffic accident. He was an unrestrained passenger and sustained considerable trauma. He was given a blood transfusion in the OT and developed tachycardia, hypotension (BP 70/40 mm of Hg), temperature 100°F and haematuria within 10 minutes of starting the transfusion. Which of the following is most likely the reason for his presenting symptoms?

(or)

Which of the following is most likely the reason for tachycardia, hypotension, hyperthermia and hematuria to occur within 10 minutes of starting blood transfusion?

A. Anaesthetic drug hypersensitivity

B. Disseminated intravascular coagulation

C. Graft-versus-host disease

D. ABO incompatibility

---

6. A 16 year old female thalassemia patient has come to the hospital for follow-up. She has complained of weakness and shortness of breath. CBC shows haemoglobin less than 6 mg/dl. The consultant planned to transfuse 2 units of blood. On duty, an intern was sent to the blood bank to arrange the blood. The blood bank personnel told the intern that the blood units had been in storage for a long time. Which of the following is the most likely complication of transfusing prolonged stored blood?

(or)

Which of the following is the most likely complication of transfusing prolonged stored blood?

A. Citrate intoxication

B. Potassium toxicity

C. Circulatory overload

D. Haemorrhagic diathesis

---

7. A 25-year-old man is brought to the ED by ambulance immediately after a road traffic accident. The patient in ICU receives an emergency blood transfusion as part of the resuscitation efforts. SpO2 is reduced to 75% at room air three hours later with sudden respiratory difficulty. CVP is 15cm water and PCWP is 16 mm Hg. Which of the following is the most likely associated with the diagnosis?

(or)

What is the most likely associated diagnosis when a patient has severe hypoxemia and ARDS like features after 3 hours of blood transfusion?

A. Characterized by acute respiratory distress within 12 hrs of transfusion

B. Results from the donor plasma that contains high-titre anti-HLA antibodies

C. Leukocytes aggregate in the pulmonary vasculature and release mediators that decrease capillary permeability

D. The implicated donors are frequently nulliparous women

---

8. What purpose is the device shown in the image used for?

(or)

A 20-year-old man is brought to the hospital after being involved in physical fights in a bar. He has multiple injuries and fractures in his body. The patient receives an emergency blood transfusion as part of the resuscitation. The nurse uses a device during a blood transfusion. What purpose is the device shown in the image used for?

A. Prevent transmission of RBCs which have expired

B. Prevent transfusion-related reactions

C. Prevent transfusion-associated circulatory overload

D. Prevents transfusion-related acute lung injury

---

9. A 19-year-old girl came to the hospital with her parents with complaints of weakness and fatigue. She doesn't have any other disease. On physical examination, her sclera was found to be whitish. CBC reveals 7 g/dl of Hb. The physician has prepared her for an RBC transfusion. Which of the following is the true statement?

(or)

Which of the following is a true statement about blood transfusion?

A. CPDA is Citrate-Phosphate-Dextrose buffer supplemented with alanine

B. The shelf life of RBC concentrates in CPDA is 45 days

C. The shelf life of RBC concentrates in CPD is 21 days

D. The shelf life of RBC concentrates in ACD is 51 days

---

10. A 19-year-old was brought to the hospital by his parents after a road traffic accident. On physical examination, multiple skin abrasions and cuts were present all over the body. Continuous bleeding was occurring through multiple sites. His BP was 90/70 mmHg, and his pulse was 100/min. He was given 2 units of whole blood for resuscitation at the ED. After 3 hours, his temperature rises to 101°C. Headache, chills, and flushing are predominant. Urine output is decreased, but the colour is straw. What is the most common cause of the patient's present condition?

(or)

What is the most common cause of febrile non-haemolytic transfusion reaction?

A. ABO mismatch

B. Rh mismatch

C. HLA mismatch

D. All of the above

---

11. Which of the following is true regarding this blood grouping system?

A. Most common blood group is AB positive

B. The ABO locus is located on chromosome 19

C. Most common blood group is O positive

D. ABO blood type is inherited in an autosomal recessive fashion

---

12. A 25-year-old male is brought to the hospital after sustaining a car accident. There are multiple abrasions on his body and profuse bleeding. His BP is 100/70 mmHg, and his pulse is 97 beats/min. The patient is prepared for neurosurgery due to a scalp fracture revealed in a scalp x-ray. Peripheral blood film shows less than 100000/mm3 platelets, and the patient is selected for platelet transfusion. Which of the following is a true statement regarding platelet transfusion?

(or)

Which of the following is a true statement regarding platelet transfusion?

A. Platelets are given either as pools of 4 to 6 prepared RDP (Random donor platelets) or as SDP (Single donor platelets) from a single donor

B. Transfusion is indicated during childbirth if maternal blood is less than <200,000/mm3

C. Platelet transfusion is usually recommended to treat HIT

D. Platelets express the Rh antigens

---

13. A 10-year-old boy has come to the hospital for taking a blood transfusion. He is a known case of thalassemia major and is on repeated packed RBC transfusions. He is on iron chelators and has a

history of arrhythmias. He suddenly developed chest pain during the current blood transfusion and looked very anxious. Which of the following will be the next management for this patient?

(or)

What is the next step in management when there is development of back pain, fever, chills, urticaria and itching during the blood transfusion?

A. Observe for changes in the colour of the urine

B. Continue BT

C. Stop BT and wait for the patient to become normal, and then restart BT

D. Stop BT and perform a clerical check of the blood group

---

14. Which of the following group's FFP's can be transfused safely?

(or)

A 16-year-old male patient is brought to the emergency department immediately after an accident.. The patient is actively bleeding in multiple sites of the body. Primary interventions have not stopped the bleeding, and vitals are deteriorating. The physician has decided to give FFP's, but there is no time for cross-matching. Which of the following group's FFP's can be transfused safely?

A. O –

B. O +

C. A+

D. AB +

---

15. A 9-year-old female child is brought to the hospital for a blood transfusion. She was diagnosed with thalassemia in early childhood. After 15 minutes of the current blood transfusion, she suddenly developed a fever, chills, and body aches. Blood transfusion is immediately stopped. What should have been done to decrease the rate of reactions during blood transfusion?

(or)

What is done to decrease the rate of reactions during blood transfusion?

A. Leucocyte depletion

B. Antibiotics

C. Irradiation

D. Washed RBCs

---

16. What is the most likely diagnosis for the presence of respiratory distress within 8 hours after the third blood transfusion, along with elevated CVP and PCWP ?

(or)

A 50-year-old male patient has come to the hospital to undergo dialysis. His Hb was 5.5 mg/dl at the time of admission. Three units of blood transfusions were given as a part of resuscitation. After the third blood transfusion, within 8 hours, he developed shortness of breath and hypertension, SpO2 was reduced to 65%, CVP was 16cm water, and PCWP was 26mm Hg. Which of the following is the most likely diagnosis?

A. Allergic

B. Transfusion-related circulatory overload (TACO)

C. TRALI

D. Febrile non-hemolytic transfusion reaction(FNHTR)

---

17. Which of the following is the most likely ABG finding in the case of Massive blood transfusion?

(or)

A 30-year-old man has been admitted to the hospital for multiple injuries following an accident. At the time of admission, his BP was 90/60 mmHg, pulse was 99 beats/min. There was active bleeding from some injured sites. He has received 8 units of packed RBCs (PRBCs). Which of the following is the most likely ABG finding in this patient?

A. Metabolic alkalosis

B. Respiratory alkalosis

C. Metabolic acidosis

D. Respiratory acidosis

---

18. A 32-year-old man is brought to the hospital by ambulance immediately after a car accident. The patient receives three emergency blood transfusions due to active bleeding and persistent hypotension. After 4 hours, the patient developed sudden respiratory distress. SpO2 is reduced to 80%, and PCWP is 16 mm Hg. Which of the following can be the reason behind this symptom in this patient that can lead to death?

(or)

Which of the following is the most common complication of blood transfusion leading to death?

A. Hyperkalemia

B. Citrate toxicity

C. TRALI

D. Hypothermia

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	3
Question 3	3
Question 4	3
Question 5	4
Question 6	2

Question 7	2
Question 8	2
Question 9	3
Question 10	3
Question 11	3
Question 12	1
Question 13	4
Question 14	4
Question 15	1
Question 16	2
Question 17	1
Question 18	3

Solution for Question 1:

Correct Option C - Storage temperature: 20-24°C; Shelf life: 5 days:

• Shelf life: 5 days.

• Storage temperature: 20 to 24°C

• Stored in a state of constant agitation

• Should be transfused immediately

• Chances of infection are high with platelets due to storage at room temperature.

• Platelets are stored in plasma or additive solution for up to 5–7 days at 20–24°C and under permanent motion.

• Due to this specific storage requirement, platelets have a very short shelf life compared with other blood components to minimize the risk of bacterial contamination

• Patients diagnosed with haematological cancer (thalassemia, leukaemia) and blood disorders usually take blood transfusions according to the severity of decreased blood cells.

• The introduction of chemotherapy and radiotherapy in a patient with carcinoma causes bone marrow depression, resulting in decreased levels of blood cells- RBC, WBC, and platelets.

Options B,A and D are incorrect.

Solution for Question 2:

Option C: Transfusion-associated circulatory overload

• Transfusion-associated circulatory overload (TACO) is a frequently found transfusion reaction.

• Pulmonary oedema develops initially due to excessive volume or circulatory overload.

• Findings on an x-ray suggestive of pulmonary oedema include Kerley B lines or interlobular septa thickening.

• The presence of respiratory distress after blood transfusion, along with elevated CVP and PCWP, points towards a diagnosis of transfusion-associated circulatory overload.

• Management include: Immediate stopping of transfusion and other steps for suspected transfusion reactions. Placing the patient in an upright position. Oxygen and diuretics can be needed in some patients. Mechanical ventilation and treatment in the intensive care unit (ICU) may be required in serious cases.

• Immediate stopping of transfusion and other steps for suspected transfusion reactions.

• Placing the patient in an upright position.

• Oxygen and diuretics can be needed in some patients.

• Mechanical ventilation and treatment in the intensive care unit (ICU) may be required in serious cases.

• Table showing the difference between findings of transfusion-associated circulatory overload (TACO) and transfusion-related acute lung injury (TRALI)

• Immediate stopping of transfusion and other steps for suspected transfusion reactions.

• Placing the patient in an upright position.

• Oxygen and diuretics can be needed in some patients.

• Mechanical ventilation and treatment in the intensive care unit (ICU) may be required in serious cases.

Option A: Tension pneumothorax

• Symptoms include chest pain, rapid breathing, shortness of breath, and palpitation, followed by shock.

• X-ray chest P/A view findings suggesting a tension pneumothorax include increased translucency in one hemithorax with increased intercostal space compared to the contralateral hemithorax and deviation of tracheal, oesophageal, and mediastinum away from the pneumothorax.

Option B: Transfusion-related acute lung injury.

• The typical presentation of transfusion-related acute lung injury (TRALI) is the sudden development of shortness of breath, severe hypoxemia (O2 saturation <90% in room air), and hypotension.

• Can also present with fever (develop within 6 hours after transfusion) typically resolve within 48 to 96 hours.

• PCWP in TRALI is ≤ 18 mm Hg.

Option D: Mismatched blood transfusion

• Fever, chills, urticaria (hives), and itching are commonly found in mismatched blood transfusions.

• Some symptoms resolve with no or little treatment. However, high fever, respiratory distress, hypotension and red urine indicate a more serious reaction.

Solution for Question 3:

Option C: 3

• Complete FFP (fresh frozen plasma) transfusion must be done within half hour of the issue from the blood bank.

• Immediately after thawing, fresh frozen plasma should be administered.

• It should be stored at 1 to 6°C if it is not given immediately after thawing.

• 12 months is the shelf life of FFP , but it can be extended to 7 years if stored at –65°C temperature.

• Blood administration regulations of FFP: Use a new, sterile blood administration set containing an integral 170-200 μ filter. All blood components can be slowly infused through 18-20 G cannulas. Large bore cannulas, e.g., 14 G, are needed for rapid infusion.

• Use a new, sterile blood administration set containing an integral 170-200 μ filter.

• All blood components can be slowly infused through 18-20 G cannulas.

• Large bore cannulas, e.g., 14 G, are needed for rapid infusion.

• Use a new, sterile blood administration set containing an integral 170-200 μ filter.

• All blood components can be slowly infused through 18-20 G cannulas.

• Large bore cannulas, e.g., 14 G, are needed for rapid infusion.

Option A: 1

• Complete Packed RBC or whole blood must be transfused within 4 hours of issue from the blood bank.

Option B: 2 and 3

• Although no 3 statement is true, no 2 is not correct.

• Complete Platelet concentrate transfusion within half an hour of issue from the blood bank.

Option D: 1 and 4

• Both 1 and 4 are incorrect as complete packed RBC and cryoprecipitate transfusion must be transferred within 4 hours and 30 minutes of issuing from the blood bank, respectively.

Solution for Question 4:

Option C: Coagulopathy

• Massive blood transfusion refers to a transfusion of >10 units of blood in 24 hours or >50% blood volume within 4 hours.

• Complications of massive transfusions are- Hypothermia (MC) Hyperkalemia The presence of citrate toxicity will lead to hypocalcaemia as citrate and calcium will chelate. Dilutional thrombocytopenia explains the coagulopathy component.

• Hypothermia (MC)

• Hyperkalemia

• The presence of citrate toxicity will lead to hypocalcaemia as citrate and calcium will chelate.

• Dilutional thrombocytopenia explains the coagulopathy component.

• Coagulopathy is defined as any impairment of hemostasis resulting in either excessive clotting or bleeding; most commonly, it is characterized as impaired clot formation.

• Hypothermia (MC)

• Hyperkalemia

• The presence of citrate toxicity will lead to hypocalcaemia as citrate and calcium will chelate.

• Dilutional thrombocytopenia explains the coagulopathy component.

Option A: Hyperthermia

• Hypothermia is a complication that occurs due to a massive blood transfusion.

Option B: Hypokalemia

• Massive blood transfusion usually causes hyperkalemia.

Option D: Hypercalcemia

• Hypocalcemia, not hypercalcemia, is a complication of a massive blood transfusion.

Solution for Question 5:

Option D: ABO incompatibility

• This is likely a case of ABO incompatibility. It is a type 2 hypersensitivity.

• It presents with hypotension, tachycardia, tachypnea, and fever.

• The patient develops intravascular hemolysis leading to hemoglobinemia and hemoglobinuria, and jaundice develops due to intravascular hemolysis.

• Hemolysis leads to acute renal failure.

• Reaction due to ABO incompatibility typically occurs within 1 hour.

• Hemolysis occurs due to transfusion reaction by the preformed antibody.

• Positive Coombs test is found in ABO incompatibility.

Option A: Anesthetic drug hypersensitivity

• Anaesthetic drug hypersensitivity usually occurs immediately in patients who have undergone major surgery.

• Tachycardia, hypotension, and vasodilation are the usual presentation in this condition.

• Most inhalational agents cause vasodilatation.

Option B: Disseminated intravascular coagulation

• Disseminated intravascular coagulation presents with bleeding from venepuncture sites, GIT, lungs, and skin along with thrombosis of microcirculation and large vessels.

Option C: Graft-versus-host disease

• Graft-versus-host disease presents with fever, maculopapular rash, diarrhoea, and LFT abnormalities.

Solution for Question 6:

Option B: Potassium toxicity

• Red blood cells degrade progressively during the weeks of refrigerated storage.

• Preservative solutions can lengthen the shelf life of red blood cells by as long as 7 weeks.

• Transfusion of stored RBCs, particularly those at the end of the approved shelf life, has been associated with adverse clinical outcomes.

• Prolonged storage of blood can lead to hyperkalemia due to lysis of RBC.

• Prolonged stored blood may show increased extravascular haemolysis, disruption in iron hemostasis, and the circulating non–transferrin-bound iron formation.

Option A: Citrate intoxication

• Citrate intoxication → Hypocalcemia, manifested by circumoral numbness and/or tingling sensation of the fingers and toes.

• It is a complication of massive transfusion of blood.

Option C: Circulatory overload

• Circulatory overload is a complication of massive blood transfusion.

• Circulatory overload → Transfusion-associated circulatory overload (TACO).

• Signs and symptoms of TACO are dyspnoea and bilateral infiltrates on CXR with systolic hypertension and elevated levels of Brain natriuretic peptide (BNP).

Option D: Haemorrhagic diathesis

• Haemorrhagic diathesis refers to an abnormal tendency to severe spontaneous bleeding.

• It occurs due to vascular problems, vitamin K deficiency, low platelet counts, increased platelet destruction, liver disease, kidney failure, and anticoagulant therapy.

Solution for Question 7:

Option B: Results from the donor plasma that contains high-titre anti-HLA antibodies

• The typical presentation of Transfusion-Related Acute Lung Injury (TRALI) is the sudden development of shortness of breath, severe hypoxemia (O2 saturation <90% in room air), and hypotension within 6hr of transfusion.

• PCWP in TRALI is ≤ 18 mm Hg.

• TRALI results from the donor plasma that contains high-titre anti-HLA antibodies that bind recipient leukocytes.

• Pathogenesis of TRALI is similar to ARDS

• The leukocytes aggregate in the pulmonary vasculature and release mediators that increase capillary permeability.

• The implicated donors are frequently multiparous women, and transfusion of their plasma component should be avoided.

• It can also present with fever (which develops within 6 hours after transfusion) and typically resolves within 48 to 96 hours.

Option A: Characterized by acute respiratory distress within 12 hrs of transfusion

• TRALI developes within 6 hours of transfusion and characterized acute respiratory distress.

Option C: Leukocytes aggregate in the pulmonary vasculature and release mediators that decrease ca pillary permeability

• The leukocytes aggregate in the pulmonary vasculature and release mediators that don't decrease but increase capillary permeability.

Option D: The implicated donors are frequently nulliparous women

• Multiparous women are often implicated donors of blood transfusions, resulting in transfusion-related acute lung injury.

Solution for Question 8:

Correct Option B: Prevent transfusion-related reactions

• The image shows a blood transfusion set with a Leukocyte reduction filter that will generate leuco-depleted blood.

• The second-generation filters of size 40 μm can remove micro aggregates of fibrin, platelets and leucocytes

• The main immediate advantage is reduced incidence of febrile non-haemolytic transfusions.

• Blood components should be filtered during blood transfusion to remove small clumps and clots of white blood cells and platelets that form during collection and storage.

• 170 - 260 micron filters are present in standard blood infusion set.

• Smaller component sets, including in-line filters for RBC, WBC, platelet, and plasma, are also available.

Option A: Prevent transmission of RBCs which have expired

• This blood transfusion set cannot prevent the transmission of expired RBCs.

Option C: Prevent transfusion-associated circulatory overload

• Blood transfusion set with a filter can prevent febrile non-haemolytic transfusions.

• Transfusion-associated circulatory overload occurs due to the excessive volume of transfused blood.

Option D: Prevents transfusion-related acute lung injury

• Activation of recipient neutrophils by donor-derived antibodies that target HLA (human leukocyte antigens) or HNA (human neutrophil antigen) causes transfusion-related acute lung injury.

• A blood transfusion set cannot prevent this reaction.

Solution for Question 9:

Option C: The shelf life of RBC concentrates in CPD is 21 days

• Citrate-phosphate-dextrose (CPD) is an anticoagulant commonly used for blood storage.

• The shelf life of RBC concentrates in CPD is 21 days.

• Blood that had been collected in a solution of CPD, after 21 days of storage, most of the available glucose was consumed by CPD.

• In contrast, the red cells collected from blood stored in CPDA, a medium containing supplementary adenine, show maintained higher glucose and adenosine triphosphate levels.

• Satisfactory post-transfusion viability is more consistent with blood stored in CPDA.

Option A: CPDA is Citrate-Phosphate-Dextrose buffer supplemented with alanine

• CPDA is a Citrate-Phosphate-Dextrose buffer that is not supplemented with alanine but adenine.

Option B: The shelf life of RBC concentrates in CPDA is 45 days

• The shelf life of RBC concentrates in CPDA is 35 days.

Option D: The shelf life of RBC concentrates in ACD is 51 days

• Acid Citrate Dextrose (ACD) solution is used as an anticoagulant for erythrocyte survival and whole blood and is routinely used for blood storage.

• The shelf life of RBC concentrates in ACD is 21 days.

Solution for Question 10:

Option C: HLA mismatch

• This patient with hypotension, tachycardia, increased temperature, headache, chills and flushing within 3 hours of blood transfusions resembles a febrile non-haemolytic transfusion reaction (FNHTR).

• It typically occurs within 1-6 hours.

• Causes of FNHTR-

• HLA antibodies are most commonly found, followed by platelet-specific antibodies and granulocyte-specific antibodies. Cytokines that have developed in vitro, especially in whole blood-derived platelet concentrates stored at room temperature Bacterial contamination or their toxins: Platelet components are more involved because they are stored at room temperature. However, certain organisms such as Yersinia enterocolitica proliferate in red cells at storage temperatures of 1° to 6°C.

• HLA antibodies are most commonly found, followed by platelet-specific antibodies and granulocyte-specific antibodies.

• Cytokines that have developed in vitro, especially in whole blood-derived platelet concentrates stored at room temperature

• Bacterial contamination or their toxins: Platelet components are more involved because they are stored at room temperature. However, certain organisms such as Yersinia enterocolitica proliferate in red cells at storage temperatures of 1° to 6°C.

• HLA antibodies are most commonly found, followed by platelet-specific antibodies and granulocyte-specific antibodies.

• Cytokines that have developed in vitro, especially in whole blood-derived platelet concentrates stored at room temperature

• Bacterial contamination or their toxins: Platelet components are more involved because they are stored at room temperature. However, certain organisms such as Yersinia enterocolitica proliferate in red cells at storage temperatures of 1° to 6°C.

Option A: ABO mismatch

• Acute haemolytic transfusion reaction occurs typically due to ABO mismatch.

• It occurs due to intravascular haemolysis and presents as flank pain, hemoglobinuria, fever, and hypotension.

Option B: Rh mismatch

• Rh mismatched blood usually causes a haemolytic transfusion reaction.

• Symptoms include fever, hypotension, tachycardia, and jaundice.

Option D: All of the above

• This patient's condition is persistent with a febrile non-haemolytic transfusion reaction.

• HLA mismatch is the most common reason for this blood transfusion reaction.

Solution for Question 11:

Answer

Option C: Most common blood group is O positive

• This option is correct.

• 35% of indias population is o positive.

Other options

Option A: Most common blood group is AB-positive

• This option is incorrect

Option B: The ABO locus is located on chromosome 19

• The ABO locus is located on chromosome 9.

Option D: ABO blood type is inherited in an autosomal recessive fashion

• ABO blood type is inherited in an autosomal codominant fashion

Solution for Question 12:

Option A: Platelets are given either as pools of 4 to 6 prepared RDP or as SDPs from a single donor

• Platelets suspended in platelet additive solution or plasma.

• Platelets bear both intrinsic and adsorbed antigens of the ABO system.

• Platelets are given either as RDP or as SDAP.

• RDP or random door pooled platelets packs derived from 4-6 units of whole blood from different donors. It contains around 280 x 109 platelets in 200 mL.

• SDAP or single donor apheresis platelets are produced from 1 unit of whole blood from a single donor. It contains approximately 310 x 109 platelets in 300 mL.

• Transfusion is indicated in bleeding patients with platelet dysfunction regardless of the platelet count.

• Platelet transfusion is indicated if a patient undergoing neurosurgery has less than 100000/mm3 platelets.

• Transfusion to achieve a platelet count of 50 x 109 /L is generally recommended for bleeding patients.

Option B: Transfusion is indicated during childbirth if maternal blood is less than <200,000/mm3

• Platelet transfusion is indicated if maternal platelets are found to be <50000/mm3 during childbirth.

Option C: Platelet transfusion is usually recommended to treat HIT

• Platelet transfusion is not recommended to treat HIT as it can cause arterial thrombosis.

Option D: Platelets express the Rh antigens

• Platelet like RBCs, express ABO antigens. But it is variable.

Solution for Question 13:

Option D: Stop BT and perform a clerical check of the blood group

• The development of back pain and anxiety during the blood transfusion refers to mismatched blood transfusion. A clerical error is the most common cause of mismatched blood transfusion.

• Fever, chills, urticaria (hives), and itching are also commonly found in mismatched blood transfusions.

• Some symptoms resolve with no or little treatment.

• Mismatched blood transfusion causes type 2 hypersensitivity.

• High fever, respiratory distress, hypotension and red urine indicate a more serious reaction.

• The immediate management of this condition is to stop the blood transfusion and investigate if there was any clerical error during blood bag choosing.

Option A: Observe for changes in the colour of the urine

• Changes in the colour of urine, such as red urine, result from intravascular hemolysis.

• It is a serious complication due to mismatched blood transfusion.

• The appearance of primary symptoms of mismatched blood transfusion should be taken seriously, and discontinuing transfusion is preferred.

Option B: Continue BT

• Continuation of mismatched blood transfusion can lead to serious effects.

• It results in hemolysis and eventually acute renal failure and DIC.

Option C: Stop BT and wait for the patient to become normal, and then restart BT

• Once a mismatched blood transfusion is recognized, it will be fatal if the same blood is transfused again.

Solution for Question 14:

Option D: AB +

• Fresh frozen plasma contains the labile clotting factors and plasma proteins.

• After separation and freezing plasma at -30°C from a donor unit of blood, FFP is collected.

• FFP should be used within six hours after thawing, ideally within two hours, to prevent deterioration of clotting factors.

• FFP does not need to be cross-matched but should be ABO compatible.

• The first preference of FFP is that of the same ABO group as the patient.

• In an emergency, FFP of a different ABO group is preferable if it has no significant anti-A or anti-B antibodies.

• FFP from the AB group has no anti-A or anti-B antibodies and is usually preferred if blood grouping is not possible.

• FFP doesn't need RhD compatibility as it is unlikely to cause RhD sensitization.

Universal Blood donor

O negative

Universal Blood Acceptor

AB positive

Universal FFP acceptor

Option A: O –

• O – blood group has anti-A and anti-B antibodies but no antigens in the plasma.

• As it has significant anti-A or anti-B antibodies, it can't be used as a universal FFP donor.

Option B: O +

• O+ blood has no A or B antigens, and Rh antigen is present.

• It has anti-A and anti-B antibodies, so it can't be transfused as a universal FFP donor.

Option C: A +

• A+ blood has both A and Rh antigens. It also has an anti-B antibody.

• The presence of any antibody in a blood group is a contraindication for being a universal donor.

Solution for Question 15:

ANSWER

Option A: Leucocyte depletion

• In multi-transfused patients, removing leucocytes from blood has been shown to decrease febrile nonhemolytic transfusion reactions, platelet refractoriness, and HLA alloimmunization.

• Transmission of leukotropic viruses such as EBV and CMV can be prevented by leucodepletion.

• Removing leucocytes below a level ≤ 5 × 106 in a blood component helps to prevent blood transfusion reactions.

• Leucodepletion can be achieved with the help of leuko-filters.

• leukofilter → prevent WBC from entering the recipient's body, So chances of transfusion reaction will be minimal.

• Leucodepletion can be done by Irradiation Filters [easier and convenient]

• Irradiation

• Filters [easier and convenient]

• Irradiation

• Filters [easier and convenient]

Other options

Option B: Antibiotics

• Antibiotic is only indicated if septic transfusion reactions develop.

• Typically this reaction occurs due to contamination of the donor blood components by bacteria, including Staphylococcus aureus and Staphylococcus epidermidis.

Option C: Irradiation

• Irradiation can also deplete leucocytes, but it is expensive and can't be used routinely.

Option D: Washed RBCs

• Triple-washed RBCs were a method to deplete leucocytes, used earlier but was not very effective.

Solution for Question 16:

Option B: Transfusion-related circulatory overload (TACO)

• The presence of respiratory distress after blood transfusion, elevated CVP (normal is 8-12 mm Hg) and elevated PCWP (normal is 4-12 mm Hg) refers to transfusion-associated circulatory overload (TACO).

• Pulmonary symptoms develop due to pulmonary oedema from excessive volume or circulatory overload from massive blood transfusion within a short period.

• Usually, 1 unit of blood takes 4 hours for transfusion.

• Chest x-ray shows pulmonary oedema, including Kerley B lines or interlobular septa thickening.

• Management includes- Immediate stopping of transfusion and other steps for suspected transfusion reactions. Placing the patient in an upright position. Oxygen and diuretics can be needed in some patients. In serious cases, mechanical ventilation and treatment in the intensive care unit (ICU) may be required.

• Immediate stopping of transfusion and other steps for suspected transfusion reactions.

• Placing the patient in an upright position.

• Oxygen and diuretics can be needed in some patients.

• In serious cases, mechanical ventilation and treatment in the intensive care unit (ICU) may be required.

• Immediate stopping of transfusion and other steps for suspected transfusion reactions.

• Placing the patient in an upright position.

• Oxygen and diuretics can be needed in some patients.

• In serious cases, mechanical ventilation and treatment in the intensive care unit (ICU) may be required.

Option A: Allergic

• Allergic reactions after blood transfusion can occur due to type 1 hypersensitivity against plasma proteins in transfused blood.

• Urticaria, pruritus, and fever develop within minutes to 2-3 hours in this condition.

Option C: TRALI

• Occurs within 6 hours of transfusion

• The typical presentation of transfusion-related acute lung injury (TRALI) is the sudden development of shortness of breath, severe hypoxemia (O2 saturation <90% in room air), and hypotension.

• PCWP in TRALI is ≤ 18 mm Hg.

Option D: FNHTR

• Febrile non-haemolytic transfusion reaction (FNHTR) commonly occurs due to HLA mismatched blood transfusion.

• Cytokines and bacterial contamination during blood storage are also associated with FNHTR.

• Within 3 hours of transfusion, fever is the predominant symptom in this condition. Headache, chills and flushing are usually present.

Solution for Question 17:

Option A: Metabolic alkalosis

• Massive blood transfusion refers to a transfusion of >1 blood volume in 24 hours or >50% blood volume within 3 hours.

• Excessive blood transfusion leads to metabolic alkalosis.

• Citrate is used as an anticoagulant in blood bags.

• Excessive blood transfusion leads to citrate & lactate excess in the body. This citrate & lactate are converted to bicarbonate in the liver, which leads to metabolic alkalosis.

• Most likely metabolic alkalosis occurs in patients with renal impairment since kidneys are responsible for HCO3- elimination.

• If alkalosis develops, there is a left shift for O2 affinity which leads to cellular hypoxia.

• Other complications of massive blood transfusion include -

Option B: Respiratory alkalosis

• When high levels of CO2 disrupt the acid-base balance in the blood, respiratory alkalosis occurs.

• It usually occurs in people who experience hyperventilation. In massive transfusion amount of HCO3 increases, leading to metabolic alkalosis.

Option C: Metabolic acidosis

• When excessive acid is produced (e.g., diabetic ketoacidosis, lactic acidosis) metabolic acidosis develops in the body.

Option D: Respiratory acidosis

• Respiratory acidosis occurs when the lungs cannot remove all the CO2 that the body produces.

Solution for Question 18:

Option C: TRALI

• The typical presentation of Transfusion Related Acute Lung Injury (TRALI) is the sudden development of shortness of breath, severe hypoxemia (O2 saturation <90% in room air), and hypotension within 6 hours of transfusion.

• PCWP in TRALI is ≤ 18 mm Hg.

• TRALI results from the donor plasma that contains high-titre anti-HLA antibodies that bind recipient leukocytes.

• The leukocytes aggregate in the pulmonary vasculature and release inflammatory mediators that increase capillary permeability.

Cytokine released due to antigenic difference

↓

Damage to the microvasculature of the lungs

TRALI

Death

• The most common complication of blood transfusion leading to death is TRALI.

Option A: Hypokalemia

• Massive blood transfusion usually causes hyperkalemia but rarely leads a patient to death.

Option B: Citrate toxicity

• Citrate intoxication → Hypocalcemia, manifested by circumoral numbness and tingling sensation of the fingers and toes.

• It is a complication of a massive blood transfusion, but it usually doesn't lead to death.

Option D: Hypothermia

• Hypothermia is a complication that occurs due to a massive blood transfusion. But it doesn't lead to death.

Aplastic Anemia & Iron Deficiency Anemia

1. A panel of haemoglobin and iron studies is ordered for a female patient with SLE. Results are as: Hemoglobin=9.8 gm%, MCV=70, serum iron= 50µg/dl, serum ferritin=100 ng/dl. Which of the following is the most likely diagnosis?

(or)

A 28-year-old young female presents to you with complaints of tiredness and breathlessness. She appears pale. Her medical history is significant for SLE. A panel of haemoglobin and iron studies is ordered. Results are as: Hemoglobin=9.8 gm%, MCV=70, serum iron= 50µg/dl, serum ferritin=100 ng/dl. Which of the following is the most likely diagnosis?

A. Thalassemia intermedia

B. Chronic iron deficiency anaemia

C. Megaloblastic anaemia

D. Anaemia of chronic infection

---

2. The CBC shows anaemia and reticulocytosis. Increased cellularity is seen on bone marrow aspiration. What is the most likely diagnosis of this patient presenting with pallor and splenomegaly?

(or)

An 8-year-old African child presents to you at the clinic complaining of tiredness and breathlessness. On examination, pallor is noticed in the conjunctiva, and splenomegaly is also evident. A complete blood count is ordered, which shows anaemia & shows reticulocytosis. On bone marrow aspiration, increased cellularity is noted. What is the most likely diagnosis?

A. Pernicious anaemia

B. Hemolytic anaemia

C. Myelofibrosis

D. Hairy cell leukaemia

---

3. When she woke up this morning, a 32-year-old lady presented to the emergency room complaining of severe abdominal pain. A complete blood count is ordered, and the report shows pancytopenia. Ultrasound of the abdomen shows decreased doppler flow in the hepatic vein. A presumptive diagnosis of paroxysmal hemoglobinuria is suspected. All of the following are consistent with paroxysmal nocturnal hemoglobinuria (PNH), except?

(or)

All of the following are consistent with paroxysmal nocturnal hemoglobinuria, except?

A. Aplastic anaemia

B. Increased LAP scores

C. Venous thrombosis

D. Iron deficiency anaemia

---

4. A 35-year-old female patient presents at the clinic complaining of bloating and tiredness from the last 2 months. Her medical history is significant for multiple sclerosis. A complete blood count is ordered, and it shows macrocytic anaemia. A Schilling test is then performed, which comes out abnormal. Antibiotics are then given for 5 days which results in normalization of the Schilling test. What is the most likely diagnosis of the patient?

(or)

What is the most likely diagnosis of the patient with macrocytic anaemia and an abnormal schilling test?

A. Bacterial overgrowth syndrome

B. Chronic pancreatitis

C. Atrophic gastritis

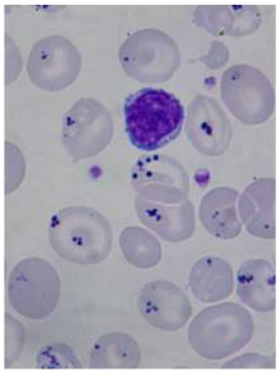
D. Ileocecal TB

---

5. During a haematology workshop, a station is placed with the following smear to test the candidates. Identify the inclusions in RBC in the blood smear of a patient given below?

(or)

Identify the inclusions in RBC in the blood smear of a patient given below?



A. Pappenheimer Bodies

B. Cabot rings

C. Howell-Jolly Bodies

D. Heinz Bodies

---

6. A middle-aged chronic alcoholic man complains of a burning sensation in the mouth. On examination, he has thickened, dry, smooth tongue without the filiform papillae. Mean corpuscular volume(MCV) is 100 fl. Which of the following should be the first line of approach in the management of this patient?

(or)

Which of the following should be the first line of approach in the management of a patient with vitamin B12 deficiency?

A. Estimation of Vitamin B12 levels

B. Brush biopsy

C. Start Antifungal therapy

D. Incisional biopsy

---

7. A 46-year-old patient presents to the clinic with severe pain in the finger joints. Her medical history is significant for rheumatoid arthritis. Besides joint pain, she complains of excessive tiredness and breathlessness. On general physical examination, pallor is noted in the conjunctiva. A panel of complete blood count and iron studies is ordered. Regarding anaemia of chronic diseases, all of the following are true, except?

(or)

All of the following are true regarding anaemia of chronic diseases, except?

A. Decreased serum iron

B. Decreased ferritin

C. Decreased total iron binding capacity

D. Increased bone marrow iron

---

8. A 43-year-old female presented to medical outdoors with complaints of fatigue, weakness, and shortness of breath with minimal activity. Her friends and family have told her she appears pale, and with her recent symptoms, she has decided to get checked out. She also states that her hair and fingernails become extremely thin and brittle, causing even more concern. The patient started noticing these symptoms a few months ago and has been getting progressively worse. Upon initial assessment, her mucosal membranes and conjunctivae are pale. Considering the above scenario, which of the following is the most sensitive and specific test to diagnose this deficiency anaemia?

(or)

A 43-year-old female presented with fatigue, weakness, and shortness of breath with minimal activity, thin and brittle hair, and fingernails. Her mucosal membranes and conjunctivae are pale. What is the most sensitive and specific test to diagnose iron deficiency anemia?

A. Serum iron levels

B. Serum ferritin levels

C. Serum transferring receptor population

D. Transferring saturation

---

9. A researcher is conducting a study on the morphological spectrum of iron deficiency anaemia on blood smear of anaemic patients. All of the following are true about iron deficiency anaemia, except?

(or)

All of the following are true about iron deficiency anaemia, except?

A. Hyper-segmented neutrophils

B. Microcytosis precedes hypochromia

C. Mean corpuscular haemoglobin concentration MCHC<50%

D. Most common cause of anaemia in India

---

10. Which of the following statements is incorrect about Aplastic anemia?

(or)

A 23-year-old male presented with a nosebleed. Lab parameters show Hb= 5 g/dl, Platelet count = 23,000/mm^3 and absolute neutrophil count = 176/mm^3. Bone marrow is hypocellular with fatty infiltration. All of the following statements are true regarding this condition, except?

A. Can be cured by Hematopoietic stem cell transplantation

B. Lymphadenopathy and splenomegaly are highly typical

C. Bleeding is the most common symptom

D. Immunosuppressants are given to cure the disease

---

11. A 65-year-old man has anaemia, splenomegaly, and extramedullary hematopoiesis. He has experienced easy fatigability, weight loss, and weakness. Bone marrow biopsy reveals a marked proliferation of fibrous tissue (myelofibrosis). Which of the following is a characteristic finding in this disorder?

(or)

Which of the following is a characteristic finding in myelofibrosis?

A. Depletion of bone marrow megakaryocytes

B. Teardrop-shaped erythrocytes

C. Autosplenectomy

D. Neoplastic plasma cells in the bone marrow

---

12. A 23-year-old female comes to the office complaining of continuous fatigue, dyspnea and weakness. She has no other symptoms or significant past medical or family history. Her menstrual cycle is regular but bleeds heavily and lasts 5-6 days. On physical examination, conjunctival pallor and spoon-shaped nails are present. Lab findings include decreased iron, increased TIBC, and a decreased ferritin level. Which of the following is the most probable diagnosis for this patient?

(or)

Low serum iron and ferritin with high TIBC are seen in which of the following condition?

A. Iron deficiency anaemia

B. Chronic kidney disease

C. Sideroblastic anaemia

D. Fanconi anaemia

---

13. A 13-year-old girl is brought to the outpatient department by his mother complaining of generalized weakness and fatigue, pale skin, dark-coloured urine, and shortness of breath. She has no history of chronic infection or significant past medical or family history. Lab findings include increased unconjugated bilirubin, increased lactate dehydrogenase, decreased haptoglobin levels, and hemoglobinuria. Which of the following is not true regarding this patient's condition?

(or)

Which of the following is not true regarding hemolytic anemia?

A. Increased indirect bilirubin in the serum

B. Decreased red cell survival

C. Increased number of reticulocytes

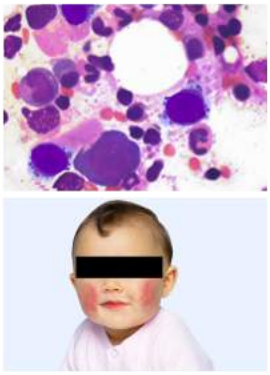
D. Decreased faecal urobilinogen

---

14. A 3 year old male child presents with fatigue, weakness, and generalized body ache. He reports having a recent respiratory infection. On physical examination, he appears pale with a rash as shown in the image below, and his conjunctiva and mucous membranes are noticeably pale as well. Laboratory tests reveal a significant decrease in his red blood cell count and a normal white blood cell and platelet count. Which of the following conditions is the most likely diagnosis for this patient?

(or)

The image cue of dog ear projections on erythroblasts is indicative of which of the following diagnosis ?



A. Pure Red Cell Aplasia (PRCA)

B. Iron deficiency anemia

C. Autoimmune hemolytic anemia

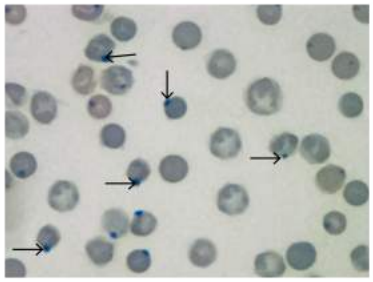
D. Sickle cell anemia

---

15. A 5-year-old boy presents to the emergency department with sudden onset of pallor and jaundice. The mother mentions that the boy had a fever for the past few days, which subsided a day before. The family history is significant for a maternal uncle who had a similar episode in childhood. On examination, there is no splenomegaly or gallstones. Peripheral smear is as shown below. What is the most likely cause of the boy's symptoms?

(or)

What is the most likely cause of a patient with peripheral smear as shown below. ?



A. Iron deficiency anemia

B. Hereditary spherocytosis

C. Glucose-6-phosphate dehydrogenase (G6PD) deficiency

D. Thalassemia

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	2
Question 3	2
Question 4	1
Question 5	1
Question 6	1
Question 7	2
Question 8	2
Question 9	1
Question 10	2
Question 11	2
Question 12	1
Question 13	4
Question 14	1
Question 15	3

Solution for Question 1:

Option D: Anaemia of chronic infection

Interpretation of parameters provided in Question:

MCV

Decreased

(N 80-100 fl)

Serum iron

Lower range of normal

(N 50-150 µg/dl)

Serum ferritin

Normal

(N 50-300 ng/ml)

Haemoglobin

(N 14-16 g/dl)

• This is a likely case of anaemia of chronic disease in which serum ferritin is normal to increase, while the serum iron level is usually on the lower side.

Option A: Thalassemia intermedia

• Diagnosis of Thalassemia intermedia is based on High-performance liquid chromatography or Hemoglobin electrophoresis.

• Thalassemia's serum iron level increases because of increased intestinal absorption of iron and ongoing hemolysis.

• The patient's serum iron levels are in the low range of normal.

Option B: Chronic iron deficiency anaemia

• In chronic iron deficiency anaemia, iron stores are depleted first.

• "Low ferritin" is the hallmark of diagnosing iron deficiency anaemia.

• Due to low iron but normal ferritin, iron deficiency is ruled out as serum ferritin is the first to reduce iron deficiency anaemia..

Option C: Megaloblastic anaemia

• Since MCV is low; hence, it is microcytic anaemia.

Solution for Question 2:

Option B: Hemolytic anaemia

• Anaemia and reticulocytosis with splenomegaly are suggestive of Hemolytic anaemia.

• To maintain RBC count, there is increased cellularity of bone marrow due to reticulocytosis.

• Skull and skeletal deformities can occur in childhood due to increased hematopoiesis and bone marrow expansion.

Option A: Pernicious anaemia

• Pernicious anaemia is an autoimmune condition in which the body cannot absorb vitamin B12 due to the auto-antibodies against parietal cells, intrinsic factors, and vitamin B12.

• The patient presents with a smooth, beefy, and painful tongue. Moreover, tingling and numbness are also present in the hands and feet.

• Though bone marrow is hypercellular in pernicious anaemia due to the megaloblast's rapid turnover, splenomegaly is usually absent in pernicious anaemia.

• Therefore, this option is not correct.

Option C: Myelofibrosis

• In myelofibrosis, the normal bone marrow is replaced by scar tissue, resulting in a lack of production of normal blood cells.

• Splenomegaly is present in myelofibrosis, but the bone marrow is hypocellular, decreasing all cell lines.

• Peripheral smear shows "Tear-drop" shaped RBCs.

Option D: Hairy cell leukaemia

• Hairy cell leukaemia is a B-cell neoplasm of the bone marrow.

• Though massive splenomegaly is seen in Hairy cell leukaemia, reticulocytosis is unusual as the tumour infiltrates bone marrow resulting in pancytopenia.

Solution for Question 3:

Option B: Increased LAP scores

• PNH is not associated with Increased LAP (Leukocyte Alkaline Phosphatase) scores.

Conditions with decreased LAP scores

Conditions with increased LAP scores

• Paroxysmal nocturnal hemoglobinuria

• Sickle cell anaemia

• Hypophosphatemia

• Leukemoid reaction

• Pregnancy

• Polycythemia vera

• Aplastic anaemia

• Multiple myeloma

• Hodgkin’s disease

Symptoms

• An acquired intracorpuscular hemolytic anaemia due to the abnormal susceptibility of the RBC membrane to the hemolytic activity of complement.

• Thrombosis in large vessels

• A deficiency in hematopoiesis may be mild or severe, such as pancytopenia in an aplastic anaemia state.

Diagnosis

• Flow cytometry: Absence or reduced expression of both CD59 and CD55 on PNH RBCs is diagnostic.

• The Ham test (acidified serum lysis) establishes the diagnosis of paroxysmal nocturnal hemoglobinuria (PNH)

Option A: Aplastic anaemia

• It is an acquired stem cell defect. Therefore, it can lead to aplastic anaemia.

• A deficiency in hematopoiesis may be mild or severe, such as pancytopenia in an aplastic anaemia state.

Option C: Venous thrombosis

• The hypercoagulable state in PNH leads to Budd Chiari syndrome (Hepatic vein thrombosis)

Option D: Iron deficiency anaemia

• In PNH, haemoglobin and iron are lost in urine; the negative iron deficit leads to iron deficiency anaemia.

Solution for Question 4:

Option A: Bacterial overgrowth syndrome

• An abnormal schilling test implies impaired vitamin B12 absorption.

• It can be due to: Pernicious anaemia Chronic pancreatitis Bacterial overgrowth Ileal disease

• Pernicious anaemia

• Chronic pancreatitis

• Bacterial overgrowth

• Ileal disease

• Schilling test becoming normal after giving antibiotics implies Bacterial overgrowth.

• In bacterial overgrowth syndrome, there is a migration of large intestine flora into the small intestine leading to damage to the terminal ileum, which is the site of Vitamin B12 absorption.

• Pernicious anaemia

• Chronic pancreatitis

• Bacterial overgrowth

• Ileal disease

Option B: Chronic pancreatitis

• The haptocorrin is proteolytically degraded in the small intestine by pancreatic enzymes, and the released vitamin B-12 then binds to the intrinsic factor.

• In chronic pancreatitis, haptocorrin remains bound to vitamin-B12 and is not available for absorption at the terminal ileum.

• In the case of chronic pancreatitis, even after antibiotics, schilling's test remains abnormal.

Option C: Atrophic gastritis

• Pernicious anaemia is an autoimmune condition in which the body cannot absorb vitamin B12 due to the auto-antibodies against parietal cells, intrinsic factors, and vitamin B12.

• In the case of atrophic gastritis, schilling's test remains abnormal even after antibiotics.

Option D: Ileocecal TB

• Intestinal tuberculosis, especially ileal TB, is not uncommon in Asia.

• It is an important cause of vitamin B-12 malabsorption.

• In the case of ileocecal TB, Schilling's test remains abnormal even after antibiotics.

Solution for Question 5:

Option A: Pappenheimer Bodies

• Pappenheimer bodies are visible with a Wright and/or Giemsa stain. Confirmation of non-heme iron in the granules is made with a Perls' Prussian blue stain.

• They appear as dense, blue-purple granules within the red blood cell, and there are usually only one or two located in the cell periphery and are irregular in shape in contrast to Howell Jolly bodies which are circular.

• They are seen in sideroblastic anaemia, hemolytic anaemia, and sickle cell disease.

Option B: Cabot rings

• Cabot rings are thin, thread like rings or "figure eight" shaped red blood cell inclusions, likely remnants from mitotic spindles.

• They are rarely seen in peripheral blood, indicating a defect in erythrocyte production, especially in pernicious anaemia and lead poisoning.

Option C: Howell-Jolly Bodies

• Howell-jolly bodies are seen on RBCs and contain chromatic remnants of basophilic cells.

• These are the hallmark of "Autosplenectomy or asplenia."

Option D: Heinz Bodies

• Due to oxidative stress, Heinz bodies are inclusions within red blood cells composed of denatured haemoglobin.

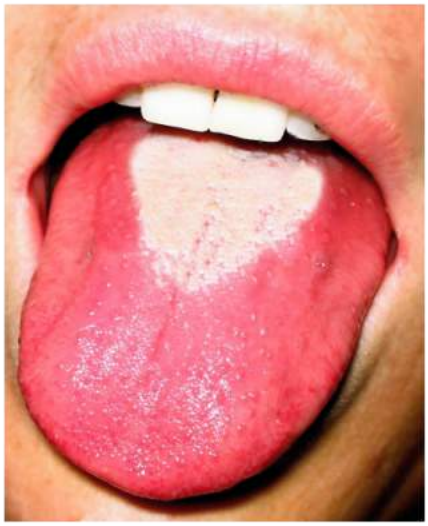
• These are classically observed in Glucose 6-phosphate dehydrogenase deficiency that causes hemolytic anaemia.

Solution for Question 6:

Option A: Estimation of Vitamin B12 levels

• The above-given scenario is likely a case of Vitamin B12 deficiency; hence estimation of Vitamin B12 levels should be the first step. Its deficiency may cause bilateral peripheral neuropathy or degeneration

(demyelination) of the spinal cord's cervical and thoracic posterior and lateral (pyramidal) tracts.



Glossitis

Option B: Brush biopsy

• It consists of the oral brush biopsy instrument used to rapidly obtain a transepithelial specimen.

• The sample is spread onto an enclosed glass slide and fixed; the computer system detects potentially abnormal cells by searching for a combination of abnormal cellular morphology unique to the oral epithelium.

• Brush biopsies are utilized routinely in the detection of precancerous and cancerous lesions.

• This patient has more likely glossitis due to vitamin B12 deficiency.

Option C: Start Antifungal therapy

• The MCV of 100fL and burning sensation suggest glossitis due to vitamin B12 deficiency.

• Antifungal therapy is the treatment of oral thrush, which is a white plaque on the tongue that can be scrapped off.

Option D: Incisional biopsy

• An incisional biopsy is performed on patients with abnormal growth, such as lumps, tumours, and lesions.

• This patient has more likely glossitis due to vitamin B12 deficiency.

Solution for Question 7:

Option B: Decreased ferritin

• In anaemia of chronic inflammation, ferritin is normal or high, reflecting the fact that iron is sequestered within cells and ferritin is produced as an acute phase reactant.

• Chronic disease results in the production of acute phase reactants from the liver, including hepcidin.

• Hepcidin sequesters iron in storage sites by limiting iron transfer from macrophages to erythroid precursors and decreasing erythropoietin production. Thus, making serum iron unavailable to use.

• Therefore, this option is incorrect.

Option A: Decreased serum iron

• In anaemia of chronic disease, serum iron is decreased because iron is sequestered in macrophages by acute phase reactants.

Option C: Decreased total iron binding capacity

• In anaemia of chronic disease, serum ferritin increases; therefore, total iron binding capacity decreases.

Option D: Increased bone marrow iron

• In anaemia of chronic disease, serum ferritin increases because iron is trapped in the bone marrow.

Solution for Question 8:

Option B: Serum ferritin levels

• This is the classic presentation of iron deficiency anaemia.

• Serum ferritin levels are the most sensitive and specific test to diagnose iron deficiency anaemia.

• Under steady-state conditions, the serum ferritin level correlates with total body iron stores; thus, the serum ferritin level is the most convenient laboratory test to estimate iron stores. The normal value for ferritin varies according to the age and gender of the individual. As iron stores are depleted, the serum ferritin falls to <15 μg/L. Such levels are diagnostic of absent body iron stores.

• Adult males have serum ferritin levels that average ~100 μg/L, corresponding to iron stores of ~1 g.

• Adult females have lower serum ferritin levels, an average of 30 μg/L, reflecting lower iron stores (~300 mg).

• Ferritin is also an acute-phase reactant and may rise several-fold above baseline levels in the presence of acute or chronic inflammation.

Option A: Serum iron levels

• Serum iron is the measure of iron in the blood and does not provide an estimate of iron stored in the body.

Option C: Serum transferrin receptor population

• Transferrin receptors are the conventional pathway by which cells acquire iron for physiological requirements.

• Under iron-deficient conditions, surface transferrin receptors increase, especially on bone marrow erythroid precursors, as a mechanism to sequester needed iron.

Option D: Transferrin saturation

• Transferrin saturation is the percentage of transferrin molecules that are bound by iron.

• In iron deficiency anaemia, percentage transferrin saturation is decreased.

• It is not a reliable indicator of iron stores. Therefore, this option is incorrect.

Solution for Question 9:

Option A: Hyper-segmented neutrophils

• Hypersegmented neutrophils (more than 5 lobes of neutrophils) are seen in vitamin B12 and folate deficiency.

• Therefore, this is not correct about iron deficiency anaemia.

Option B: Microcytosis precedes hypochromia

• In peripheral smear, the red cells are small (microcytic) and pale (hypochromic).

• Normal red cells with sufficient haemoglobin have a zone of central pallor measuring about one-third of the cell diameter.

• In established iron deficiency, the zone of pallor is enlarged; haemoglobin may be seen only in a narrow peripheral rim.

• Therefore, it is characterized by a microcytic hypochromic peripheral smear.

Option C: Mean corpuscular hemoglobin concentration (MCHC)<50%

• The reference range for MCHC in adults is 33.4-35.5 g/dL.

• If MCHC is below 33.4 g/dL, it specifies low MCHC.

• Low MCHC indicates iron deficiency anaemia.

Option D: Most common cause of anaemia in India

• Iron deficiency anaemia is the most common cause of anaemia in India.

$$\#MCHC = \frac{MCH(\text{Mean cell hemoglobin})}{MCV\ (\text{Mean cell volume})} \{In\ IDA\ MCH \downarrow \&MCV \downarrow So\ MCHC < 50\%\ Normal\ is\ 30 - 34\%\}$$

$$\#If\ MCHC \uparrow\uparrow = \frac{MCH}{MCV \downarrow\downarrow(Small\ RBC's)} \rightarrow Hereditary\ spherocytosis$$

Solution for Question 10:

Option B: Lymphadenopathy and splenomegaly are highly typical

• The above clinical presentation is suggestive of Aplastic anaemia.

• Lymphadenopathy and splenomegaly are highly atypical of aplastic anaemia.

Aplastic anaemia:

• Aplastic anaemia is pancytopenia with bone marrow hypocellularity.

• Easy bruising, oozing from the gums, nose bleeds, heavy menstrual flow, and sometimes petechiae are noticed.

• Thrombocytopenia leads to small amounts of bleeding in the central nervous system resulting in intracranial or retinal haemorrhage.

• The following finds are supportive for aplastic anaemia: Mean corpuscular volume (MCV) is commonly increased. Reticulocytes are absent or few, and lymphocyte numbers may be normal or reduced. Bone marrow is hypocellular and shows mainly fat under the microscope.

• Mean corpuscular volume (MCV) is commonly increased.

• Reticulocytes are absent or few, and lymphocyte numbers may be normal or reduced.

• Bone marrow is hypocellular and shows mainly fat under the microscope.

• Mean corpuscular volume (MCV) is commonly increased.

• Reticulocytes are absent or few, and lymphocyte numbers may be normal or reduced.

• Bone marrow is hypocellular and shows mainly fat under the microscope.

The severity of the disease is defined by the presence of 2 of 3 following parameters

a) Absolute neutrophil count <500/μL

b) Platelet count <20,000/μL

c) Corrected reticulocyte count <1% (or absolute reticulocyte count <60,000/μL).

Option A: Can be cured by Hematopoietic stem cell transplantation

• A bone marrow transplant also called a stem cell transplant, is the only standard cure for aplastic anaemia.

Option C: Bleeding is the most common symptom

• Thrombocytopenia leads to small amounts of bleeding in the central nervous system resulting in intracranial or retinal haemorrhage.

Option D: Immunosuppressants are given to cure the disease

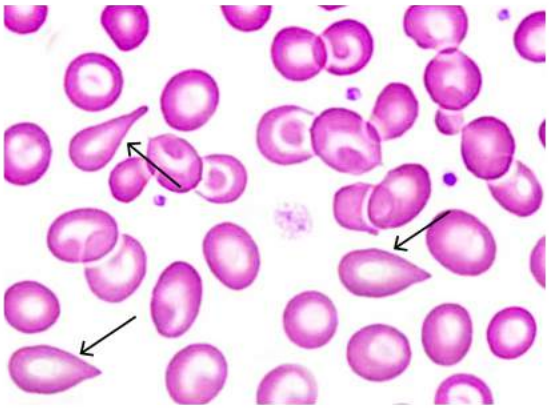
• Immunosuppressant therapy with anti-thymocyte globulins and cyclosporin A is the first-line therapy for acquired aplastic anaemia in candidates unsuitable for bone marrow transplants

Solution for Question 11:

Option B: Teardrop-shaped erythrocytes

• Agnogenic (idiopathic) myeloid metaplasia is characterized by extensive non-neoplastic myelofibrosis and extramedullary hematopoiesis resulting in hepatosplenomegaly.

• Teardrop-shaped erythrocytes scattered nucleated red cells and granulocytic precursor cells can be found in the peripheral blood smear.



Option A: Depletion of bone marrow megakaryocytes

• Megakaryocytes give rise to platelets, which have a wide variety of functions in coagulation, immune response, inflammation, and tissue repair. Dysregulation of megakaryocytes is a key feature of in the myeloproliferative neoplasms (MPNs), especially myelofibrosis

Option C: Autosplenectomy

• Autosplenectomy is seen in cases of sickle-cell disease where the deformed sickle cells block blood flow to the spleen causing scarring and eventual atrophy of the organ, making it non-functional.

• Howell-jolly bodies are seen on RBCs are the hallmark of "Autosplenectomy or asplenia" and contain chromatic remnants of basophilic cells.

Option D: Neoplastic plasma cells in the bone marrow

• Neoplastic plasma cells are seen in the bone marrow in case of multiple myeloma.

• This patient is suffering from myelofibrosis.

• Therefore, this option is incorrect.

Solution for Question 12:

Option A: Iron deficiency anaemia

Low serum iron and ferritin with high TIBC are seen in iron deficiency anaemia.

Iron deficiency anaemia:

• It occurs when the body does not have enough iron to produce haemoglobin.

• It is microcytic hypochromic type anaemia.

• Iron deficiency can occur due to- Inadequate iron intake Impaired iron absorption Increased demand (e.g., pregnancy) Excessive blood loss (e.g., heavy menstruation)

• Inadequate iron intake

• Impaired iron absorption

• Increased demand (e.g., pregnancy)

• Excessive blood loss (e.g., heavy menstruation)

• Inadequate iron intake

• Impaired iron absorption

• Increased demand (e.g., pregnancy)

• Excessive blood loss (e.g., heavy menstruation)

• Signs/Symptoms: Generalized weakness and fatigue Pale skin and conjunctiva Breathlessness Dizziness Koilonychia (Spoon-shaped nails) Craving to eat unusual things.

• Generalized weakness and fatigue

• Pale skin and conjunctiva

• Breathlessness

• Dizziness

• Koilonychia (Spoon-shaped nails)

• Craving to eat unusual things.

• Generalized weakness and fatigue

• Pale skin and conjunctiva

• Breathlessness

• Dizziness

• Koilonychia (Spoon-shaped nails)

• Craving to eat unusual things.

• Treatment: Iron tablet supplements.

Disease

Serum iron

Serum ferritin

TIBC

Iron deficiency anaemia

Decreased

Increased

Chronic kidney disease (deficiency of erythropoietin)

Normal

Normal/decreased if lost in urine due to kidney pathology

Sideroblastic anaemia

Fanconi anaemia (congenital aplastic anemia)

Option B: Chronic kidney disease

• Anaemia due to chronic kidney disease is a normocytic normochromic type, and S. iron, ferritin and TIBC will be normal in lab findings.

Option C: Sideroblastic anaemia

• It is also microcytic hypochromic type anaemia, but lab values will show increased S. iron and ferritin with a decrease in TIBC.

Option D: Fanconi anaemia

• It is congenital aplastic anaemia.

• Lab findings will show normal S. iron, ferritin and TIBC levels.

Solution for Question 13:

Option D: Decreased faecal Urobilinogen

This patient's presenting symptoms and lab findings mostly suggest haemolytic anaemia.

Haemolytic anaemia:

• It occurs due to abnormal RBC breakdown either in intravascular or extravascular space.

• Symptoms are similar to anaemia due to other causes, but one additional symptom is the development of jaundice due to haemoglobin breakdown causes increased unconjugated bilirubin levels.

• It is characterized by: Hemoglobinuria Increased reticulocyte count Unconjugated hyper-bilirubinaemia Increased LDH Increased faecal urobilinogen Polychromatophilia Bone marrow erythroid hyperplasia.

• Hemoglobinuria

• Increased reticulocyte count

• Unconjugated hyper-bilirubinaemia

• Increased LDH

• Increased faecal urobilinogen

• Polychromatophilia

• Bone marrow erythroid hyperplasia.

• Treatment is directed to the type and cause of hemolysis.

• Hemoglobinuria

• Increased reticulocyte count

• Unconjugated hyper-bilirubinaemia

• Increased LDH

• Increased faecal urobilinogen

• Polychromatophilia

• Bone marrow erythroid hyperplasia.

Option A: Increased indirect bilirubin in the serum

• Hemolysis causes a breakdown of haemoglobin that releases free bilirubin in the blood, which leads to excessive unconjugated bilirubin.

Option B: Decreased red cell survival

• A decrease in red cell survival leads to premature breakdown of RBC, resulting in haemolytic anaemia.

Option C: Increased number of reticulocytes

• The reticulocyte number is increased in hemolytic anaemia because the bone marrow tries to compensate for the decrease in RBC.

Solution for Question 14:

Correct Option A - Pure Red Cell Aplasia (PRCA):

• Parvovirus B19 infection leading to Pure Red Cell Aplasia (PRCA): This option is the correct answer. Parvovirus B19 infection can cause PRCA, which is characterized by a selective absence of erythroblasts in the bone marrow, resulting in decreased production of red blood cells. The image cue of dog ear projections on erythroblasts is indicative of Parvovirus B19-associated PRCA.

Incorrect Options:

Option B - Iron deficiency anemia: Iron deficiency anemia is a condition caused by a deficiency of iron i n the body, leading to decreased production of red blood cells. However, it does not present with the s elective absence of erythroblasts or the specific association with Parvovirus B19 infection seen in PRC A.

Option C - Autoimmune hemolytic anemia: Autoimmune hemolytic anemia is a condition characterized by the destruction of red blood cells by the immune system. It does not involve the selective absence o f erythroblasts in the bone marrow, as seen in PRCA.

Option D - Sickle cell anemia: Sickle cell anemia is an inherited blood disorder characterized by abnor mal hemoglobin that causes red blood cells to become misshapen. It does not present with the selectiv e absence of erythroblasts or the specific association with Parvovirus B19 infection seen in PRCA.

Solution for Question 15:

Correct Option C - Glucose-6-phosphate dehydrogenase (G6PD) deficiency:

• Glucose-6-phosphate dehydrogenase (G6PD) deficiency: G6PD deficiency is an X-linked recessive disorder that commonly affects boys. It presents with intermittent episodes of pallor and jaundice, often triggered by factors such as fever, infection, and certain drugs (e.g., antimalarials). Bite cells and Heinz bodies are characteristic findings on peripheral smear. The absence of splenomegaly and gallstones

further supports G6PD deficiency.

Incorrect Options:

Option A - Iron deficiency anemia: Iron deficiency anemia typically presents with microcytic hypochromic red blood cells on peripheral smear. However, it does not cause the formation of bite cells or Heinz bodies. Moreover, iron deficiency anemia does not have an association with pallor and jaundice in the absence of other factors.

Option B - Hereditary spherocytosis: Hereditary spherocytosis is characterized by the presence of spherocytes on peripheral smear. It can cause anemia, but it does not typically present with intermittent episodes of pallor and jaundice. Additionally, it is an autosomal dominant disorder and not X-linked recessive like G6PD deficiency.

Option D - Thalassemia: Thalassemia is a group of inherited blood disorders characterized by reduced synthesis of globin chains. It can cause chronic hemolytic anemia, but intermittent episodes of pallor and jaundice are not typical. Peripheral smear findings in thalassemia include microcytosis, hypochromia, and target cells, rather than bite cells and Heinz bodies.

Platelet Disorders

1. Immune thrombocytopenia purpura (ITP) is the immune-mediated destruction of platelets. It is characterized by autoantibodies that bind to the platelets, which are then removed by the splenic macrophages. Which of the following statements is true regarding ITP?

(or)

Which of the following statements is true regarding ITP?

A. Acute ITP occurs in children between 2-6 years of age

B. Chronic ITP has Hemorrhagic bullae in the mouth

C. Acute ITP more common in girls than boys

D. Chronic ITP has spontaneous remission

---

2. A 27-year-old male complains of bruises on the legs. Complete blood counts show decreased platelet levels. A diagnosis of ITP is made. He is started on steroid therapy and undergoes splenectomy 3 months later. The patient develops dyspnea on the 3rd postoperative day. Which of the following is the likely diagnosis?

(or)

What is the most common early postoperative complication of splenectomy presenting with breathing difficulty?

A. Left lower lobe atelectasis

B. Port site infection

C. Focal Intra-abdominal collection

D. UTI

---

3. Disseminated intravascular coagulation is a consumptive coagulopathy. It is characterized by activation of the coagulation cascade throughout the body leading to decreased coagulation factors and bleeding from the body orifices. Which of the following is not seen in DIC?

(or)

Which of the following is not seen in DIC?

A. Hyperfibrinogenemia

B. Increased fibrin degradation products

C. Prolonged PT

D. Increased APTT

---

4. Which of the following is not a causative factor of DIC?

(or)

Disseminated intravascular coagulation is a consumptive coagulopathy. It is characterized by activation of the coagulation cascade leading to decreased coagulation factors and bleeding from the body orifices. Which of the following is not a causative factor of DIC?

A. Snakebite

B. Placenta Previa

C. Falciparum malaria

D. Hemophilia

---

5. Which of the following does not lead to a thrombotic event?

(or)

Thrombotic events are life-threatening complications of coagulation disorders. They can lead to death in severe cases. Which of the following does not lead to a thrombotic event?

A. PNH

B. DIC

C. ITP

D. Heparin-induced thrombocytopenia

---

6. Which of the following is incorrect regarding ITP?

(or)

Idiopathic thrombocytopenic purpura (ITP) is an immune-mediated disorder resulting in platelet destruction by autoantibodies. It can have an acute or chronic course. Which of the following is incorrect regarding ITP?

A. The peak age of incidence of acute ITP is Children aged 2-6 years

B. Onset of bleeding is insidious in Chronic ITP

C. Lymphocytosis is common in Chronic ITP

D. Splenectomy is the best treatment for patients with relapse

---

7. Idiopathic thrombocytopenic purpura (ITP) is an immune-mediated disorder resulting in platelet destruction by autoantibodies. It presents with skin and mucosal bleeding. Which of the following is not a management option for the bleeding crisis in acute Idiopathic thrombocytopenic purpura?

(or)

Which of the following is not a management option for the bleeding crisis in acute Idiopathic thrombocytopenic purpura?

A. RhIG

B. Prednisolone

C. Intravenous immunoglobulin

D. Eltrombopag

---

8. Bleeding time is the time required for a standardized incision to stop bleeding. It is a measure of platelet function. Which of the following does not present with an increased bleeding time?

(or)

Which of the following does not present with an increased bleeding time?

A. Thrombocytopenia

B. Thrombasthenia

C. Renal failure

D. Hemophilia

---

9. A 24-year-old female presents to the dentist with severe tooth pain. She is diagnosed with dental caries. Tooth extraction is planned for her. She is a known case of Von Willebrand disease. What prophylaxis should be given before tooth extraction?

(or)

What prophylaxis should be given before tooth extraction for a known case of Von Willebrand disease?

A. Desmopressin

B. Blood transfusion

C. Fresh frozen plasma

D. Cryoprecipitate

---

10. Von Willebrand disease is a congenital disorder with quantitative or qualitative dysfunction of the Von Willebrand factor. It has different types depending upon the kind of dysfunction and the levels of Von Willebrand factor. Which is the rarest type of Von Willebrand disease?

(or)

Which is the rarest type of Von Willebrand disease?

A. vWD type 1

B. vWD type 2A

C. vWD type 2B

D. vWD type 3

---

11. Hereditary bleeding disorders are due to congenital deficiency of proteins involved in forming platelet plugs or in the coagulation cascade. Which of the following is the most common inherited bleeding disorder?

(or)

Which of the following is the most common inherited bleeding disorder?

A. von Willebrand disease

B. Bernard soulier syndrome

C. Glanzmann Thrombasthenia

D. ITP

---

12. Hemophilia B is a bleeding disorder caused by a deficiency of clotting factor IX. It is an inherited coagulation disorder. Which of the following is the most common cause of death in hemophilia B?

(or)

Which of the following is the most common cause of death in hemophilia B?

A. Hemorrhage

B. HIV, HBV, HCV due to transfusions

C. Transfusion reactions

D. Deep vein thrombosis

---

13. Factor VIII is a procoagulant protein involved in the intrinsic coagulation pathway. Antibodies against factor VIII result in abnormal factor VIII function and an increased risk of bleeding. Which of the following will most likely have anti-factor VIII antibodies?

(or)

Which of the following will most likely have anti-factor VIII antibodies?

A. Postpartum state

B. Hemophilia patients who have received an infusion of plasma concentrates

C. Both A & B

D. None

---

14. Von Willebrand disease is a congenital disorder with quantitative or qualitative dysfunction of the Von Willebrand factor. Von Willebrand factor is involved in the formation of the platelet plug. Dysfunction results in an increased risk of bleeding. Which of the following is true regarding this disease?

(or)

Which of the following is true regarding Von Willebrand disease?

A. Normal partial thromboplastin time

B. Decreased platelets

C. Normal prothrombin time

D. Normal bleeding time

---

15. Which of the following tests differentiates between a coagulation factor deficiency and a factor inhibitor?

(or)

A 22-year-old pregnant female presents to the hospital with labour pains. Following delivery, she experiences severe postpartum haemorrhage. The blood loss is about 2 litres. Investigations reveal a normal PT and a prolonged aPTT. Which of the following test differentiates between a coagulation factor deficiency and a factor inhibitor?

A. Tissue thromboplastin inhibition time

B. Ecarin clotting time

C. Dilute Russel viper venom time

D. Mixing studies

---

16. A 30-year-old female presents to the hospital with a complaint of mucosal bleeding on trauma. She has a history of menorrhagia. On investigations, BT and PTT are prolonged. The Ristocetin assay is positive. What is the likely diagnosis?

(or)

What is the likely diagnosis of a patient with mucosal bleeding, menorrhagia, prolonged BT and PTT, and positive ristocetin assay?

A. Immune thrombocytopenic purpura (ITP)

B. Hemophilia A

C. Hemophilia B

D. Von Willebrand disease

---

17. Which of the following best describes the factor V Leiden mutation?

(or)

A 33-year-old female with a history of knee arthroscopy seven days back is admitted to the hospital with extensive lower extremity deep vein thrombosis (DVT). Her family history is significant for DVT. Thorough investigations and work-up reveal factor V gene R506Q mutation. Which of the following best describes the factor V leiden mutation?

A. Increased bleeding tendency

B. Factor V becomes resistant to cleavage by protein C

C. Arginine to glycine substitution

D. Deficiency of factor V

---

18. A 62-year-old male patient with a history of atrial fibrillation and a mechanical heart valve presents to the emergency department with complaints of easy bruising and hematuria. He has been taking Warfarin for anticoagulation therapy for the past three months. On examination, the patient appears pale, and his vital signs are stable. Laboratory investigations reveal an International Normalized Ratio (INR) of 5.0 (normal range: 2-3). Which of the following is the most appropriate initial treatment for the patient's elevated INR and bleeding symptoms?

(or)

Which of the following is the most appropriate initial treatment for a patient with elevated INR and bleeding symptoms?

A. Intravenous Vitamin K

B. Fresh Frozen Plasma (FFP) transfusion

C. Protamine Sulfate

D. Unfractionated Heparin (UFH) infusion

---

19. A 65-year-old male patient with a recent history of receiving heparin therapy for treatment of a thromboembolic event presents with new-onset thrombocytopenia, accompanied by symptoms of limb

ischemia. Laboratory tests reveal the presence of platelet factor 4 antibodies. The patient's condition is suspected to be related to heparin administration. Which of the following is the drug of choice for this condition?

(or)

Which of the following is the drug of choice for heparin-induced thrombocytopenia?

A. Warfarin

B. Argatroban

C. Fondaparinux

D. Aspirin

---

20. A newborn infant presents with persistent bleeding from the umbilical cord stump. All routine coagulation tests, including bleeding time (BT), clotting time (CT), prothrombin time (PT), activated partial thromboplastin time (APTT), and thrombin time (TT), are within normal limits. Which of the following tests is most appropriate to confirm the suspected diagnosis?

(or)

Which of the following tests is most appropriate to confirm suspected diagnosis of factor 13 deficiency?

A. Platelet aggregometry

B. Mixing studies

C. Urea clot solubility test

D. Thromboelastography (TEG)

---

21. Which of the following statements about thromboelastography (TEG) is incorrect?

A. Stage R represents the time taken to start forming the clot and is primarily affected by clotting factors.

B. Stage K represents the clot firmness and is affected by fibrinogen levels.

C. Stage Alpha angle measures the speed of fibrin accumulation and is primarily affected by platelets.

D. Stage Maximum Amplitude (MA) reflects the highest vertical amplitude of TEG and is affected by both platelets and clotting factors.

---

22. A 45-year-old male presents to the clinic with easy bruising and petechiae on his arms and legs. He denies any recent history of viral infections. On examination, his platelet count is found to be significantly low, and a peripheral smear reveals larger-sized platelets. Bleeding time is prolonged, and bone marrow aspiration shows increased megakaryocyte size and count. Which of the following statements about the condition described above is incorrect?

(or)

Which of the following statements about ITP is incorrect?

A. It is a quantitative platelet defect

B. Non-palpable purpura can be seen in this condition

C. Platelet transfusion is recommended since the platelet count is low

D. Elective splenectomy is done in chronic cases

---

23. A 67-year-old male presents with recurrent episodes of gastrointestinal bleeding characterized by hematochezia. He also has a history of aortic stenosis. Which of the following conditions is most likely causing his gastrointestinal bleeding?

(or)

Which of the following conditions is most likely cause of gastrointestinal bleeding and hematochezia for a patient with aortic stenosis?

A. Heyde Syndrome

B. Hemophilia A

C. Von Willebrand Disease

D. Glanzmann Thrombasthenia

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	1
Question 3	1
Question 4	4
Question 5	3
Question 6	3
Question 7	4
Question 8	4
Question 9	1
Question 10	4
Question 11	1
Question 12	1
Question 13	3
Question 14	3
Question 15	4
Question 16	4
Question 17	2
Question 18	1
Question 19	2
Question 20	3

Question 21	3
Question 22	3
Question 23	1

Solution for Question 1:

Option A: Acute ITP occurs in children between 2-6 years of age

• Acute ITP predominantly occurs in children between 2-6 years of age.

• Chronic ITP usually occurs in adults.

Option B: Chronic ITP has Hemorrhagic bullae in the mouth

• Hemorrhagic bullae are usually absent in chronic ITP.

• They are present in children in acute ITP.

Option C: Acute ITP more common in girls than boys

• Acute ITP affects male and female children equally. There is no sex predilection.

• Chronic ITP, in contrast, is more common in females.

Option D: Chronic ITP has spontaneous remission

• Chronic ITP rarely shows spontaneous remission. It almost always requires steroid therapy.

• Acute ITP usually remits spontaneously.

Solution for Question 2:

Option A: Left lower lobe atelectasis

• This patient with post-splenectomy dyspnea likely has left lower lobe atelectasis.

• It is the most common early postoperative complication of splenectomy.

• It presents with difficulty in breathing, wheezing and tachypnea.

Option B: Port site infection

• It will present with fever and a high WBC count.

• There will be purulent discharge from the wound site.

• This patient has no such features.

Option C: Focal Intra-abdominal collection

• It presents with persistent high-grade fever and abdominal tenderness.

• USG will confirm intra-abdominal collection of fluid.

Option D: UTI

• It presents with fever and dysuria.

• Urinalysis will show pus cells.

Solution for Question 3:

Option A: Hyperfibrinogenemia

• In DIC, there is an activation of the coagulation cascade and consumption of coagulation factors.

• There will be decreased serum fibrinogen in DIC.

• Characterized by widespread intravascular fibring formationin response to excessive blood protease activity that overcomes the natural anticoagulant mechanisms

• Causes: Spesis Trauma and injury Drugs (Aprotinin, fibrinolytic agents, warfarin) Vascular disorders (large vessel aneurysm) Envenomation Cancer Obstetrical complications (septic abortion, dead fetus syndrome) Liver disease Vascular disorders Miscellaneous (Shock, massive transfusion)

• Spesis

• Trauma and injury

• Drugs (Aprotinin, fibrinolytic agents, warfarin)

• Vascular disorders (large vessel aneurysm)

• Envenomation

• Cancer

• Obstetrical complications (septic abortion, dead fetus syndrome)

• Liver disease

• Vascular disorders

• Miscellaneous (Shock, massive transfusion)

• Spesis

• Trauma and injury

• Drugs (Aprotinin, fibrinolytic agents, warfarin)

• Vascular disorders (large vessel aneurysm)

• Envenomation

• Cancer

• Obstetrical complications (septic abortion, dead fetus syndrome)

• Liver disease

• Vascular disorders

• Miscellaneous (Shock, massive transfusion)

Option B: Increased fibrin degradation products

• There is an activation of the coagulation cascade in DIC, leading to the consumption of coagulation factors.

• Fibrin degradation products (D-dimers) are increased in DIC as fibrin is used.

Option C: Prolonged PT

• Prothrombin time (PT) is prolonged in DIC as the extrinsic pathway coagulation factors are used.

• It leads to bleeding from the mucosal surfaces.

Option D: Increased APTT

• Activated partial thromboplastin time (APTT) is prolonged in DIC as the intrinsic pathway coagulation factors are used.

• It also leads to bleeding tendency.

Solution for Question 4:

Option D: Hemophilia

• It is an X-linked disorder leading to deficiency of coagulation factor 8.

• Haemophilia leads to deep internal bleeding, It does not lead to DIC.

• Two types: Haemophilia A- mutations in F8 gene Haemophilia B- mutations in F9 gene

• Haemophilia A- mutations in F8 gene

• Haemophilia B- mutations in F9 gene

• Haemophilia complications include: Deep internal bleeding Bleeding into the throat, neck and joints Damage to joints infection Adverse reaction to clotting factor treatment

• ■■■■■■■Deep internal bleeding

• Bleeding into the throat, neck and joints

• Damage to joints

• infection

• Adverse reaction to clotting factor treatment

• Haemophilia A- mutations in F8 gene

• Haemophilia B- mutations in F9 gene

• ■■■■■■■Deep internal bleeding

• Bleeding into the throat, neck and joints

• Damage to joints

• infection

• Adverse reaction to clotting factor treatment

Option A: Snakebite

• Snakebite venom can activate the coagulation cascade leading to DIC.

Option B: Placenta Previa

• Placenta previa can lead to amniotic fluid entering the bloodstream.

• Amniotic fluid has tissue thromboplastin that can cause DIC.

Option C: Falciparum malaria

• Severe Plasmodium falciparum infection can lead to DIC.

• This is especially common in cerebral malaria.

Solution for Question 5:

Option C: ITP

• ITP is associated with decreased platelets in the blood.

• It leads to bleeding from the mucosal surfaces, not thrombosis.

• Two types: Acute thrombocytopenic purpura Chronic thrombocytopenic purpura

• Acute thrombocytopenic purpura

• Chronic thrombocytopenic purpura

• Clinical features; Nosebleeds bleeding in the mouth or gums Petechiae Purpura Blood in urine and stools Extreme tiredness

• ■■■■■■■Nosebleeds

• bleeding in the mouth or gums

• Petechiae

• Purpura

• Blood in urine and stools

• Extreme tiredness

• Acute thrombocytopenic purpura

• Chronic thrombocytopenic purpura

• ■■■■■■■Nosebleeds

• bleeding in the mouth or gums

• Petechiae

• Purpura

• Blood in urine and stools

• Extreme tiredness

Option A: PNH

• Paroxysmal nocturnal hemoglobinuria leads to activation of complement cascade at night due to mild respiratory acidosis.

• It can activate the coagulation pathway leading to thrombosis.

Option B: DIC

• DIC is a consumptive coagulopathy. It leads to widespread activation of the coagulation cascade and thrombosis throughout the body.

Option D: Heparin-induced thrombocytopenia

• Patients with HIT have antibodies against the heparin platelet F4 complex.

• Thrombocytopenia in HIT is mainly due to the reticuloendothelial system's clearance of antibody-coated platelets.

Solution for Question 6:

Option C: Lymphocytosis is common in Chronic ITP

• Lymphocytosis is a rare finding in chronic ITP.

• It is common in acute ITP

Option A: The peak age of incidence of acute ITP is Children aged 2-6 years

• Acute ITP predominantly affects children aged 2-6 years.

• Chronic ITP affects adults.

Option B: Onset of bleeding is insidious in Chronic ITP

• Chronic ITP has an insidious course.

• It does not present with abrupt onset of bleeding like acute ITP.

Option D: Splenectomy is the best treatment for patients with relapse

• 1st line therapy for ITP: Prednisone or Anti-D immunoglobulin therapy (Rh-positive patients) or Intravenous immunoglobulin (IVIG) (has more efficacy than anti-D in post-splenectomy patients)

• Prednisone or Anti-D immunoglobulin therapy (Rh-positive patients) or

• Intravenous immunoglobulin (IVIG) (has more efficacy than anti-D in post-splenectomy patients)

• Patients with relapse after 1st line therapy: Splenectomy

• Unresponsive to other therapy or relapse after splenectomy: TPO receptor agonists: Romiplostim (subcutaneous), Eltrombopag (oral)

• Prednisone or Anti-D immunoglobulin therapy (Rh-positive patients) or

• Intravenous immunoglobulin (IVIG) (has more efficacy than anti-D in post-splenectomy patients)

Solution for Question 7:

Option D: Eltrombopag

• Thrombopoietin (TPO) receptor agonist eltrombopag interacts with the transmembrane domain of the human TPO receptor and induces megakaryocyte proliferation and differentiation from bone marrow progenitor cells.

• It is indicated for thrombocytopenia associated with chronic idiopathic thrombocytopenic purpura and not bleeding crisis of acute ITP.

Option A: RhIG

• It is indicated in Rh+ patients with ITP.

• It can rapidly increase the platelet count during a bleeding crisis.

Option B: Prednisolone

• Steroids are the 1st line drugs for acute ITP.

• Prednisolone reduces the production of autoantibodies, thereby increasing the platelet count in acute ITP.

Option C: Intravenous immunoglobulin

• IVIG is also a 1st line drug for acute ITP.

• It temporarily increases the platelet levels by binding to the autoantibodies.

• It prevents platelet destruction in the spleen.

Solution for Question 8:

Option D: Hemophilia

• It is due to a deficiency of clotting factor VIII.

• aPTT is increased in haemophilia due to factor VIII deficiency.

• Bleeding time remains normal as there is no platelet dysfunction.

• Two type: Haemophilia A- Mutation in F8 gene Haemophilia B- Mutation in F9 gene

• Haemophilia A- Mutation in F8 gene

• Haemophilia B- Mutation in F9 gene

• Haemophilia A- Mutation in F8 gene

• Haemophilia B- Mutation in F9 gene

Option A: Thrombocytopenia

• There is impaired hemostasis due to decreased number of platelets.

• Consequently, bleeding time is increased.

Option B: Thrombasthenia

• In Glanzmann’s Thrombasthenia, platelets lack receptors Gp IIb/IIIa for fibrinogen, which form the bridges between platelets during aggregation.

• Glanzmann’s thrombasthenia is a defect of platelet function(aggregation).

• Platelet numbers and morphology are normal, but the bleeding time is markedly prolonged.

Option C: Renal failure

• Platelet dysfunction in renal failure is due to the retention of uremic toxins and decreased thrombopoietin production.

Solution for Question 9:

Option A: Desmopressin

• In Von Willebrand disease, there is decreased or non-functional Von Willebrand factor involved in platelet adhesion.

• Consequently, patients with this disorder have an increased risk of bleeding during a surgical procedure.

• Desmopressin increases the release of Von Willebrand factor from the endothelial cells. It is used for prophylaxis in Von Willebrand disease.

Option B: Blood transfusion

• Blood transfusion is not indicated for prophylaxis in Von Willebrand disease.

• Blood transfusion may be required after the surgical procedure in case of heavy bleeding.

Option C: Fresh frozen plasma

• It is indicated in case of clotting factors deficiencies, not for Von Willebrand disease.

Option D: Cryoprecipitate

• It contains factor VIII and fibrinogen.

• It is given in haemophilia to replenish factor VIII.

• It is not given for bleeding prophylaxis in Von Willebrand disease.

Solution for Question 10:

Option D: vWD type 3

• Type III vWD is the rarest type of von Willebrand disease.

• It results from inheriting a mutant vWF gene from both parents.

• There is a total or near-total absence of vWF.

Option A: vWD type 1

• It is an autosomal dominant disorder with reduced vWF.

• It is the most common type.

Options B: vWD type 2A

• In vWD type 2, there is a qualitative dysfunction of vWF.

• Type 2A is autosomal dominant.

• There is a moderate to severe risk of bleeding.

Option C: vWD type 2B

• In vWD type 2, there is a qualitative dysfunction of vWF.

• Type 2B is autosomal recessive.

• There is a moderate to severe risk of bleeding.

Solution for Question 11:

Option A: von Willebrand disease

• Von Willebrand disease (vWD) is the most common inherited bleeding disorder.

• It has an autosomal dominant inheritance.

• The hallmark of von Willebrand disease is defective platelet adhesion to sub-endothelial components caused by a deficiency of the plasma protein vWf.

Option B: Bernard soulier syndrome

• It is a qualitative platelet disorder due to defective platelet receptor GP1b involved in platelet adhesion.

• It is not the most common inherited bleeding disorder.

Option C: Glanzmann thrombasthenia

• It is a qualitative platelet disorder due to defective platelet receptor GP2b/3a involved in platelet aggregation.

• It is not the most common inherited bleeding disorder.

Option D: ITP

• It is the immune-mediated destruction of platelets.

• It is also less common than von Willebrand disease.

Solution for Question 12:

Option A: Hemorrhage

• In haemophilia B, functional plasma coagulation factor IX is deficient.

• As a result of this deficiency, there is an increased risk of deep tissue bleeding in these patients.

• The primary cause of death in haemophilia B is haemorrhage.

Option B: HIV, HBV, HCV due to transfusions

• Patients with haemophilia do not require multiple transfusions as in thalassemia.

• Moreover, all blood transfusions are screened for HIV, HBV and HCV. So, the transmission of these viruses through blood transfusions is unlikely.

Option C: Transfusion reactions

• Patients with haemophilia do not require multiple transfusions as there is no Hb synthesis defect.

• Moreover, all blood products are cross-matched before transfusion. So, life-threatening transfusion reactions are not common.

Option D: Deep vein thrombosis

• Hemophilia B results in an increased risk of bleeding, not clotting.

• Deep venous thrombosis does not occur in haemophilia B.

Solution for Question 13:

Option C: Both A & B

• Haemophilia patients receive plasma concentrates to replenish factor VIII levels.

• Anti-factor VIII antibodies are found in these patients following the infusion.

• These antibodies are also found in maternal serum following delivery.

Option A: Postpartum state

• Anti-factor VIII antibodies are found in the postpartum state. They are also present in haemophilia patients after an infusion of plasma concentrates.

Option B: Hemophilia patients who have received an infusion of plasma concentrates

• Anti-factor VIII antibodies are found in haemophilia patients after an infusion of plasma concentrates.

• They are also found in the postpartum state.

Option D: None

• Anti-factor VIII antibodies can be found in the postpartum state and haemophilia patients.

Solution for Question 14:

Option C: Normal prothrombin time

• Von Willebrand factor is involved in platelet adhesion.

• Prothrombin time is a measure of the extrinsic coagulation pathway.

• Von Willebrand disease does not affect the extrinsic coagulation cascade. So, prothrombin time remains normal in this disorder.

Option A: Normal partial thromboplastin time

• Partial thromboplastin time is a measure of the intrinsic coagulation pathway.

• Von Willebrand factor serves as a carrier protein for factor VIII. Its deficiency results in a decreased half-life of factor VIII.

• Factor VIII is involved in the intrinsic coagulation pathway. Consequently, PTT is raised in von Willebrand disease.

Option B: Decreased platelets

• In von Willebrand disease, there is a defect in platelet adhesion due to deficiency of the von Willebrand factor.

• The platelet count remains normal in this disorder.

Option D: Normal bleeding time

• Due to defective platelet plug formation, bleeding time is raised in von Willebrand disease.

Solution for Question 15:

Option D: Mixing studies

• This patient with severe postpartum haemorrhage and prolonged PTT likely has a defect in factors of the intrinsic coagulation pathway.

• Mixing the patient’s plasma with normal plasma can differentiate between a clotting factor deficiency or a factor inhibitor.

• PTT will be corrected in case of a factor deficiency.

• It will remain prolonged if there is a factor inhibitor.

Option A: Tissue thromboplastin inhibition time

• It is a highly sensitive test used to diagnose lupus anticoagulants.

• Prolonged time can be due to factor deficiency or factor inhibitor. So, it does not differentiate between the two.

Option B: Ecarin clotting time

• It is a laboratory test that monitors anticoagulation during treatment with Hirudin, a thrombin inhibitor.

• It serves to quantify the direct thrombin inhibitors.

• It does not differentiate between a clotting factor deficiency or a factor inhibitor.

Option C: Dilute Russel viper venom time

• This test is also used to diagnose lupus anticoagulants.

• Prolonged time can be due to factor deficiency or factor inhibitor. So, it does not differentiate between the two.

Solution for Question 16:

Option D: von Willebrand disease

• This patient with mucosal bleeding, menorrhagia, prolonged BT and PTT and positive ristocetin assay likely has von Willebrand disease.

• It is the most common inherited bleeding disorder due to deficient von Willebrand factor.

• Ristocetin fails to cause platelet agglutination, which is diagnostic of this disorder.

• There is an increased bleeding tendency in this disorder.

Option A: Immune thrombocytopenic purpura (ITP)

• In this disorder, there is immune-mediated destruction of platelets.

• BT is elevated, but PTT is normal.

• The ristocetin assay is negative in this disorder.

Option B: Hemophilia A

• It is an X-linked recessive disorder resulting in factor VIII deficiency.

• BT is normal, but PTT is elevated.

• The ristocetin assay is negative.

Option C: Hemophilia B

• It is an X-linked recessive disorder resulting in the deficiency of factor IX.

• BT is normal, but PTT is elevated.

• The ristocetin assay is negative.

Solution for Question 17:

Option B: Factor V becomes resistant to cleavage by protein C

• Factor V Leiden (FVL) is the most common heritable hypercoagulability disorder. It is caused by a single nucleotide substitution resulting in an R506Q mutation.

• FVL renders factor V (both activated and inactivated forms) insensitive to the actions of activated protein C (aPC), a natural anticoagulant.

• As a result, individuals carrying the FVL variant are at an increased risk of venous thromboembolism (VTE).

• Clinical features are related to the site of venous thromboses, such as DVT and pulmonary embolism.

• Individuals with FVL must avoid other risk factors for thromboembolism, including immobility, estrogen, OCPs and surgeries.

• Management includes lifestyle modifications, blood thinners, compression stockings, and an ambulatory lifestyle.

Option A: Increased Bleeding Tendency

• Factor V Leiden leads to an increased tendency of the blood to clot rather than an increased bleeding tendency.

Option C: Arginine to Glycine Substitution

• Factor V Leiden is caused by a point mutation resulting in an arginine to glutamine substitution at position 506 in coagulation factor V.

Option D: Deficiency of Factor V

• Factor V Leiden mutation leads to the production of a defective factor V rather than decreased production and, thus, the deficiency of factor V.

Solution for Question 18:

Correct Options A- Intravenous Vitamin K:

• Vitamin K is the specific antidote for Warfarin toxicity. It acts by replenishing the depleted Vitamin K-dependent clotting factors, thus correcting the elevated INR and controlling bleeding.

• Intravenous administration of Vitamin K is used in cases of serious or life-threatening bleeding and when a rapid reversal of Warfarin is required.

• It is essential to monitor the patient's response to Vitamin K therapy and adjust the dose accordingly.

Incorrect Options:

Option B- Fresh Frozen Plasma (FFP) transfusion:

• FFP contains various clotting factors, including those affected by Warfarin. It is sometimes used as a source of clotting factors in patients with elevated INR and bleeding.

• However, FFP transfusion is not the initial treatment of choice in this scenario, as it may take time to thaw and administer the product, delaying the reversal of anticoagulation.

Option C- Protamine Sulfate:

• Protamine sulfate is the specific antidote for unfractionated heparin (UFH) and not for Warfarin.

• It is not appropriate for reversing the effects of Warfarin.

Option D- Unfractionated Heparin (UFH) infusion:

• UFH is not the initial treatment of choice in this scenario. While heparin can be used for anticoagulation, it is not indicated for the immediate reversal of Warfarin's effects.

• Heparin can be considered for bridge therapy once the effects of Warfarin are adequately reversed, but it should not be used initially to address the elevated INR and bleeding.

Solution for Question 19:

Correct Option B- Argatroban:

• Argatroban: Argatroban is the drug of choice for heparin-induced thrombocytopenia. It is a direct thrombin inhibitor that binds to the catalytic site of factor IIa, preventing thrombus formation. It is used as an alternative anticoagulant in patients with heparin-induced thrombocytopenia.

Incorrect Options:

Options A- Warfarin: Warfarin is not the drug of choice for heparin-induced thrombocytopenia. Warfarin is a vitamin K antagonist and is used for long-term anticoagulation therapy but is not effective in treatin g acute heparin-induced thrombocytopenia.

Option C- Fondaparinux: Fondaparinux is not the drug of choice for heparin-induced thrombocytopenia . Fondaparinux is a factor Xa inhibitor and can be used in treating heparin-induced thrombocytopenia b ut is not the drug of choice. It may be used for prophylaxis or treatment of venous thromboembolism in patients without heparin-induced thrombocytopenia.

Option D- Aspirin: Aspirin is not the drug of choice for heparin-induced thrombocytopenia. Aspirin is an antiplatelet agent and is not effective in treating heparin-induced thrombocytopenia, which involves plat elet activation and thrombus formation.

Solution for Question 20:

Correct Option C- Urea clot solubility test:

• Urea clot solubility test: The urea clot solubility test is the most appropriate test to confirm the suspected diagnosis of factor 13 deficiency in this scenario. It directly measures the solubility of the clot formed in the presence of urea. In factor 13 deficiency, the clot is soluble due to the lack of factor 13 activity.

Incorrect Options:

Option A- Platelet aggregometry: Platelet aggregometry is a test used to assess platelet function and aggregation. It is not specific for diagnosing factor 13 deficiency, which is the suspected condition in this clinical scenario. Platelet function disorders would typically present with abnormal results in other coagulation tests as well.

Option B- Mixing studies: Mixing studies are performed to evaluate the presence of factor inhibitors or deficiencies. While mixing studies may be helpful in assessing certain coagulation disorders, they are not specific to factor 13 deficiency.

Option D- Thromboelastography (TEG): Thromboelastography is a test that evaluates the entire process of clot formation and breakdown, providing information about clot strength, stability, and fibrinolysis. While it can be useful in assessing overall coagulation function, it is not specific for diagnosing factor 13 deficiency.

Solution for Question 21:

Correct Option C- Stage Alpha angle measures the speed of fibrin accumulation and is primarily affected by platelets:

• Stage Alpha angle measures the speed of fibrin accumulation. This stage is primarily affected by fibrinogen levels, not platelets. Therefore, this statement is incorrect.

Incorrect Options:

Option A- Stage R
represents the time taken to start forming the clot and is primarily affected by clotting factors:

• Stage R represents the time taken to start forming the clot. An elevated R-time indicates a problem with clotting factors, not platelets.

Option B- Stage K represents the clot firmness and is affected by fibrinogen levels:

• Stage K represents the clot firmness. If the K-time is affected, it suggests a fibrinogen defect.

Option D- Stage Maximum Amplitude (MA) reflects the highest vertical amplitude of TEG and is affected by both platelets and clotting factors:

• Stage Maximum Amplitude (MA) reflects the highest vertical amplitude of TEG. It is influenced by both platelets and clotting factors. Decreased MA may indicate platelet dysfunction or deficiency of clotting factors.

Solution for Question 22:

Correct Option C - Platelet transfusion is recommended since the platelet count is low:

• Platelet transfusion is recommended since the platelet count is low: This statement is incorrect. Platelet transfusion is generally not recommended as a treatment option for ITP. The underlying mechanism of ITP involves the destruction of platelets by autoantibodies rather than a deficiency in platelet production. Platelet transfusion does not address the underlying immune-mediated pathology and may not provide long-term benefit.

Incorrect Options:

Option A - It is a quantitative platelet defect: This statement is correct. Immune thrombocytopenic purpura (ITP) is characterized by a decreased platelet count, indicating a quantitative defect in platelet numbers.

Option B - Non-palpable purpura can be seen in this condition: This statement is correct. In ITP, purpura (bruising) is typically non-palpable, meaning it cannot be felt or raised on the skin surface.

Option D - Elective splenectomy is done in chronic cases: This statement is correct. In chronic cases of ITP, when medical management fails to control symptoms, elective splenectomy (surgical removal of the spleen) may be considered as a treatment option.

Solution for Question 23:

Correct Option A - Heyde Syndrome:

• Heyde Syndrome is a condition characterized by the association between aortic stenosis and gastrointestinal bleeding. In patients with aortic stenosis, shear stress generated on red blood cells due to turbulence can lead to a decrease in von Willebrand factor (VWF) activity. This reduction in VWF activity is believed to contribute to the development of angiodysplasias in the gastrointestinal tract, leading to bleeding and hematochezia. Given the patient's history of aortic stenosis and recurrent episodes of gastrointestinal bleeding, Heyde Syndrome is the most likely cause.

Incorrect Options:

Option B - Hemophilia A: Is a disorder caused by factor VIII deficiency and is not directly associated with aortic stenosis or gastrointestinal bleeding.

Option C - Von Willebrand Disease: is a bleeding disorder characterized by a deficiency or dysfunction of von Willebrand factor, but it is not specifically associated with aortic stenosis.

Option D - Glanzmann Thrombasthenia: Is a rare inherited platelet disorder that does not have a direct association with aortic stenosis or gastrointestinal bleeding.

Previous Year Questions

1. A 60-year-old man presents with fatigue, pallor, weight loss, and heaviness in the left hypochondrium, for the past 2 months. Abdominal palpation reveals splenomegaly. His hemogram and peripheral smear results are given below. What is the most likely diagnosis? Hemogram: Hb-10 gm/dl WBC count – 1,65,000/cu.mm (leukocytosis) Platelet count – 3 lakhs/mm3 Peripheral smear: Metamyelocytes – 15% Promyeloblasts – 30% Myeloblasts – 45%

A. Chronic lymphocytic leukemia

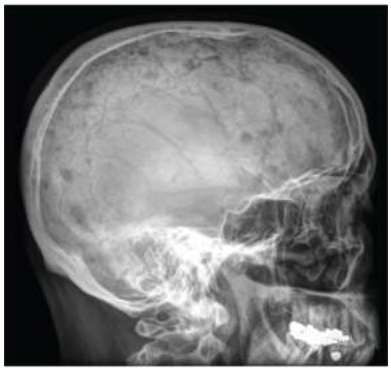
B. Chronic myeloid leukemia

C. Acute lymphoblastic leukemia

D. Acute myeloid leukemia

---

2. An elderly woman presented with symptoms of confusion, thirst, and abdominal pain. On examination, she had pallor and thoracic spine tenderness. Her lab investigations showed the following findings. An x-ray of her skull is shown below. What is the most likely diagnosis? Hb-6.9g/dl WBC 4000/cm3 with normal differential count Serum calcium 13mg/dl Creatinine 2.3mg/dl Albumin 2.4g/dl Urinalysis: positive for Bence-Jones proteins



A. Metastatic breast cancer

B. Multiple myeloma

C. Primary hyperparathyroidism

D. Milk alkali syndrome

---

3. In which of the following conditions is elective splenectomy the preferred treatment option?

A. G6PD deficiency-Glucose-6-phosphate dehydrogenase deficiency

B. Paroxysmal nocturnal hemoglobinuria

C. Hereditary spherocytosis

D. Hairy cell leukemia

---

4. Which medication should be included in the treatment regimen of a patient with a history of atherosclerosis who recently underwent a successful circumflex artery bypass and is currently taking lisinopril, verapamil, and metoprolol?

A. PDE 3 inhibitor

B. Direct oral anticoagulant

C. P2Y12 receptor blocker

D. PDE 5 inhibitor

---

5. Sickle cell Anemia is

A. AD

B. AR

C. X-linked dominant

D. X-linked recessive

---

6. What is the usage of anti-CD 20 monoclonal antibodies in cancer therapy?

A. Methotrexate

B. Rituximab

C. Cisplatin

D. Cisplatin

---

7. Vitamin B12 deficiency leads to anemia which is

A. Normocytic normochromic

B. Microcytic hypochromic

C. Macrocytic hypochromic

D. None of the above

---

8. Which conditions are associated with thrombocytopenia, eczema, and recurrent infections?

A. Wiskott-Aldrich syndrome

B. Chediak-Higashi syndrome

C. Thrombocytopenia – absent radius syndrome

D. Hermansky-Pudlak syndrome

---

9. What is the probable diagnosis for a ten-year-old boy who presents with fever, hand swelling, and a history of recurrent hand swelling episodes, along with imaging showing a contracted spleen?

A. Sickle cell anaemia

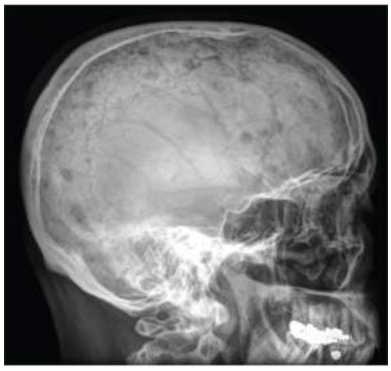
B. Malaria

C. Pancreatitis

D. Measles

---

10. An elderly woman presented with symptoms of confusion, thirst, and abdominal pain. On examination, she had pallor and thoracic spine tenderness. Her lab investigations showed the following findings. An x-ray of her skull is shown below. What is the most likely diagnosis? Hb – 6.9g/dL WBC 4000/cm3 with normal differential count Serum calcium 13 mg/dL Creatinine 2.3mg/dL Total protein 9g/dL Albumin 2.4g/dL Urinalysis: positive for Bence-Jones proteins



A. Metastatic breast cancer

B. Multiple myeloma

C. Primary hyperparathyroidism

D. Milk alkali syndrome

---

11. What is the most probable outcome for the patient after undergoing gastrectomy?

A. Folic acid deficiency

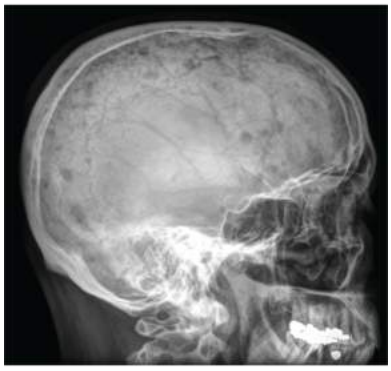
B. Vitamin B12 deficiency

C. Gastric ulcer

D. Constipation

---

12. A 68 year old male came to the physician with complaints of chronic back pain and easy fatigability and past history of multiple urinary tract infections in the last 3 months. His ESR is elevated and an x-ray of his skull is shown below. Which of the following investigations is useful for diagnosis?



A. MRI brain

B. PET scan

C. Head CT scan with contrast

D. Serum electrophoresis

---

13. What is the diagnosis of a 50-year-old man who presents with symptoms of anemia, fever, and recurrent nosebleeds? The patient has hepatosplenomegaly and lab investigations indicate a hemoglobin level of 6g/dL, a total leukocyte count of 40,000/cu.mm with 10% blasts, and a platelet count of 12,000/cu.mm. Further investigation reveals the presence of t(8;21) in the blasts.

A. Acute lymphoblastic leukemia

B. Acute myeloblastic leukemia

C. Preleukemia

D. Aleukemic leukemia

---

14. Next, which of the following investigations should be conducted in a 7-month-old child who has a hemoglobin level of 6.3, a history of recurrent blood transfusions, an MCV of 70fl, normal MCH, normal MCHC, and a peripheral smear indicating a hypochromic microcytic image?

A. Serum iron

B. Direct coomb's test

C. Osmotic fragility test

D. Hb electrophoresis

---

15. What is the probable diagnosis for an aged lady who exhibited symptoms of confusion, thirst, and abdominal pain, and upon examination was found to have pallor and tenderness in the thoracic spine? The X-ray results revealed the presence of osteolytic lesions, and her lab investigations demonstrated the following findings. Hb -6.9g/dl WBC 4000/cm3 with normal differential count Serum calcium 13mg/dl Creatinine 2.3mg/dl Total protein 9g/dl Albumin 2.4g/dl

A. Metastatic breast cancer

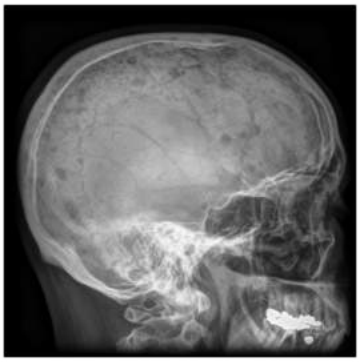
B. Multiple myeloma

C. Primary hyperparathyroidism

D. Milk alkali syndrome

---

16. A 68 year old male came to the physician with complaints of chronic back pain and easy fatigability and past history of multiple urinary tract infections in the last 3 months. His ESR is elevated, and x-ray of his skull is shown below. Which of the following investigations is useful for diagnosis?



A. MRI brain

B. PET scan

C. Head CT can with contrast

D. Serum electrophoresis

---

17. A 30-year-old female patient complains of tiredness and shows signs of paleness during physical examination. The patient's lab results are as follows: Hemoglobin level - 9.8 g/dL, Platelet count - 1,80,000/m3, Leukocyte count - 7800/mm3, Mean Corpuscular Volume (MCV) - 160 fl. Serum methyl malonyl CoA levels are within the normal range. Based on these findings, which therapy should be administered to this patient?

A. Vitamin B12

B. Iron

C. Vitamin C

D. Folic acid

---

18. What should be given to a 30-year-old woman who complains of body pain, excessive tiredness, and difficulty in standing, and shows neurological findings of loss of vibration sense and proprioception, with a haemoglobin level of 7gm/dL?

A. Vitamin B1

B. Vitamin C

C. Vitamin B12

D. Vitamin D

---

19. What is the most appropriate treatment strategy for a 25-year-old patient who presents with symptoms of chronic diarrhea, fatigue, tiredness, and exhibits the nail findings shown below, with a hemoglobin level of 8 gm%?

A. Folic acid

B. Metronidazole

C. Iron supplements

D. Vitamins B12

---

20. What would be the appropriate approach for managing a patient who presents with fatigue symptoms and a blood smear indicating macrocytic anemia? Although the patient's methyl malonate levels are normal, homocystinuria is observed, and serum B12 values are within the normal range.

A. Iron supplements

B. Treatment with folate and B12

C. Folate and vitamin b1

D. Folate therapy

---

21. A 47-year-old man with a diagnosis of acute myeloid leukemia with a blood type O negative blood group presents to the transplant clinic to discuss proceeding with an allogeneic stem cell transplant. Which of the following would be an optimal donor?

A. His identical twin brother

B. Umbilical cord transplant

C. His HLA identical brother who is otherwise healthy and is blood type O+

D. An HLA identical matched unrelated donor who is blood type

---

22. What is the most effective treatment for idiopathic thrombocytopenic purpura among the options provided?

A. IV immunoglobulins

B. Steroids

C. Splenectomy

D. Blood transfusion

---

23. Which statement is accurate regarding paroxysmal nocturnal hemoglobinuria (PNH)?

A. Inherited defect in PIG-A

B. Extravascular haemolysis

C. Deficiency of CD 55 and CD 59

D. Microcytic anaemia

---

24. What is the most probable condition that a 10-year-old boy is experiencing if he has been complaining of recurrent episodes of intense pain in his fingers and toes that spontaneously resolve over the course of the last year?

A. Alpha-thalassemia

B. Beta-thalassemia

C. Sickle cell anemia

D. Von Willebrand disease type 1

---

25. An 18-year-old girl with the diagnosis of acute promyelocytic leukemia was treated medically. She developed fever and tachypnea and a chest X-ray showed pulmonary infiltrates. What drug should she be given next?

A. Cytarabine

B. Dexamethasone

C. Doxorubicin

D. Methotrexate

---

26. What is the most frequently observed bleeding manifestation in individuals with severe hemophilia?

A. Recurrent hematomas

B. Recurrent hemarthrosis

C. Hematuria

D. Intracranial hemorrhage

---

27. A patient with thalassemia has a history of multiple blood transfusions, iron overload, and cardiac arrhythmia. She has now come for blood transfusion and during the process, complains of backache and looks very anxious. What would you do next?

A. Stop the blood transfusion

B. Continue the transfusion but do an ECG

C. Stop the transfusion. Wait for patient to become normal and then start it again

D. Do clerical check and get ECG

---

28. What is incorrect regarding Disseminated Intravascular Coagulation (DIC)?

A. Increased schistocytes

B. Increased PT

C. Increased fibrinogen

D. Increased FDPs

---

29. For hairy cell leukemia, which drug is considered the preferred choice?

A. Rituximab

B. Vemurafenib

C. Cladribine

D. Interferon-alpha

---

30. What is the next course of action for the management of a 65-year-old woman who arrived at the emergency department with a hemoglobin level of 5.4 g/dl, urea level of 86 mg/dl, creatinine level of 6 mg/dl, calcium level of 12, and potassium level of 4.4? Additionally, the bone marrow aspiration reveals over 60% plasma cells.

A. Urgent consultation for dialysis

B. Dexamethasone + lenalidomide

C. Dexamethasone + fluids

D. Bone marrow transplantation

---

31. Mark the true statements 1. Pernicious anemia is an example of Type II Hypersensitivity 2. Serum Sickness is a example of Type III Hypersensitivity 3. Pathergy test is an example of Type IV Hypersensitivity 4. Pathergy test is done for Reiter's disease

A. 1, 2 and 3 are true

B. 2, 3 and 4 are true

C. 1, 2, 3 and 4 are true

D. 3 and 4 are true

---

32. Which of the following factors hinder the absorption of iron?

A. Vitamin C

B. Phytates

C. Oxalate

D. Myoglobin

---

33. In fever of unknown origin, blood sample should be drawn how many times?

A. 2

B. 3

C. 4

D. 5

---

34. What is the treatment for neutropenia following chemotherapy?

A. Leucovorin

B. Filgastrim

C. Ondansetron

D. Darbepoetin

---

35. Which of the following statements is correct regarding polycythemia vera?

A. Risk of thrombosis strongly correlates with the degree of thrombocytosis

B. Generalized pruritus is a consequence of mast cell activation by JAK 2 mutation

C. It is protective against H. Pylori infection

D. Acute myeloid leukaemia is the most common cause of mortality

---

36. A patient of haemophilia received multiple blood transfusions. Which of the following metabolic abnormalities can be seen in a patient?

A. Metabolic alkalosis

B. Respiratory alkalosis

C. Metabolic acidosis

D. Respiratory acidosis

---

37. A 30-year-old female with a history of recurrent headaches presented for further evaluation. On further workup, hemoglobin and total WBC count were normal, while an elevated platelet count was seen. Bone marrow aspiration showed increased megakaryocytes and a JAK2 mutation. Which is the most likely diagnosis?

(or)

A 30-year-old female with a history of recurrent headaches presented for further evaluation. On further workup, hemoglobin and total WBC count were normal, while an elevated platelet count was seen. Bone marrow aspiration showed increased megakaryocytes and a JAK2 mutation. Which is the most likely diagnosis?

A. Polycythemia vera

B. Essential thrombocytosis

C. Primary myelofibrosis

D. Chronic myelogenous leukemia

---

38. Which test is utilized for the diagnosis of DIC among the following options?

A. Fibrin degradation products

B. Activation partial thromboplastin time

C. Prothrombin time

D. Dimer assay

---

39. What is the probable diagnosis for a girl who experiences prolonged menstrual bleeding and has normal platelet count, PT, and aPTT, but an increased bleeding time, which was determined to be due to a deficiency of GpIIb-IIIa after further analysis?

A. Bernard Soulier syndrome

B. Glanzmann thrombasthenia

C. Haemophilia A

D. Von Willebrand disease

---

40. True for von-willebrand disease

A. Normal partial thromboplastin time

B. Decreased platelets

C. Normal prothrombin time

D. Normal bleeding time

---

41. Translocation of lymphoma asked in match the following Column A Column B Burkitt lymphoma Mantle cell lymphoma Marginal cell lymphoma Follicular lymphoma Ewing's sarcoma t(11,18) t(14,18) t(8,14) t(11,22) t(11,14)

Column A					Column B
Burkitt lymphoma	Mantle cell lymphoma	Marginal cell lymphoma	Follicular lymphoma	Ewing's sarcoma	t(11,18)t(14,18)t(8,14)t(11,22)t(11,14

A. 1-A, 2-E; 3-C; 4-B; 5-D

B. 1-C, 2-D; 3-A; 4-B; 5-E

C. 1-C, 2-E; 3-A; 4-D; 5-B

D. 1-C, 2-E; 3-A; 4-B; 5-D

---

42. Which type of cancer is not linked to viral infection among the options provided?

A. Kaposi sarcoma

B. Primary effusion lymphoma

C. Merkel cell carcinoma

D. Superficial spreading melanoma

---

43. Which of the following statements is false regarding the diagnosis of accelerated phase of chronic myeloid leukemia (CML)?

(or)

Mark the false statement regarding diagnosis of accelerated phase of CML:

A. Leukocytosis more than 1000 ×106 not responding to treatment

B. Thrombocytosis 100 × 109 not responding to treatment

C. Increased spleen size not responsive to therapy

D. No response to tyrosine kinase inhibitor

---

44. In which of the following conditions will the pneumococcal vaccine PPV-23 provide the greatest advantage?

A. Recurrent rhinitis and sinusitis

B. Cystic fibrosis

C. Sickle cell anemia

D. Child <2 years

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	2
Question 3	3
Question 4	3
Question 5	2
Question 6	2
Question 7	3
Question 8	1
Question 9	1
Question 10	2
Question 11	2
Question 12	4
Question 13	2
Question 14	4
Question 15	2
Question 16	4
Question 17	4
Question 18	3
Question 19	3
Question 20	4

Question 21	3
Question 22	3
Question 23	3
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Solution for Question 1:

• The most likely diagnosis for the patient in this scenario is chronic myeloid leukemia (CML). The patients presenting symptoms of fatigue, pallor, weight loss, and splenomegaly are common in CML. The hemogram and peripheral smear results also support this diagnosis. The patient has leukocytosis with a very high white blood cell count (1,65,000/cu.mm), which is a hallmark of CML. Additionally, the peripheral smear shows an increase in myeloblasts, promyelocytes, and metamyelocytes, which are immature forms of white blood cells commonly seen in CML.

Incorrect choices:

• Option a: Chronic lymphocytic leukemia (CLL) is a type of leukemia that typically presents with lymphocytosis, or an increase in lymphocytes, rather than leukocytosis. The peripheral smear would also show an increase in lymphocytes rather than myeloid cells.

• Option c: Acute lymphoblastic leukemia (ALL) is a type of leukemia that typically presents with symptoms such as fever, fatigue, and easy bruising or bleeding. The peripheral smear would show a

predominance of lymphoblasts rather than myeloblasts.

• Option d: Acute myeloid leukemia (AML) is a type of leukemia that presents with symptoms such as fatigue, fever, and easy bruising or bleeding. The peripheral smear would show a predominance of myeloblasts, similar to the peripheral smear findings in this patient. However, AML typically presents with more acute symptoms and a shorter disease course compared to CML.

Solution for Question 2:

Option b. Multiple myeloma:

• Multiple myeloma is a cancer of plasma cells that often presents with symptoms such as bone pain, fatigue, and weakness. The lab findings in the question, such as low albumin, high serum calcium, and the presence of Bence-Jones proteins in urine, are consistent with multiple myeloma. Additionally, the skull X-ray may show punched-out lesions, a common feature of multiple myeloma. Therefore, multiple myeloma is the most likely diagnosis in this case.

Incorrect choices:

• Option a: Metastatic breast cancer: Metastasis of breast cancer to the bones can cause hypercalcemia, bone pain, and pathological fractures. However, the presence of Bence-Jones proteins in the urine is not typically associated with breast cancer.

• Option c: Primary hyperparathyroidism is a condition in which there is an overproduction of parathyroid hormone, leading to hypercalcemia. However, the presence of Bence-Jones proteins in the urine is not typically associated with this condition.

• Option d: Milk alkali syndrome is a condition that can occur due to excessive intake of calcium and absorbable alkali. This can lead to hypercalcemia and metabolic alkalosis. However, the low total protein and albumin levels, as well as the presence of Bence-Jones proteins in the urine, are not typically associated with milk alkali syndrome.

Solution for Question 3:

• Hereditary spherocytosis is an inherited disorder characterized by abnormal red blood cells that are spherical in shape instead of the normal disc shape.

• By removing the spleen, which is responsible for destroying these abnormal red blood cells, a splenectomy can help improve anemia and reduce the symptoms associated with the condition.

Incorrect Choices:

• Option A: G6PD deficiency is an inherited condition leads to the breakdown of red blood cells, causing anaemia. Splenectomy is not the preferred treatment for G6PD deficiency. In fact, splenectomy may worsen the anaemia in these individuals because the spleen filters and removes damaged red blood cells from the circulation.

• Option B: Paroxysmal nocturnal hemoglobinuria (PNH) is a rare acquired disorder characterised by the destruction of red blood cells, leading to anaemia, blood clots, and other complications. In PNH, there is an abnormality in the complement system. Stem cell transplant is the best treatment.

• Option D: Hairy cell leukemia is not typically treated with splenectomy as the primary treatment. Chemotherapy is the standard treatment for hairy cell leukemia. Splenectomy may be considered

massively enlarged spleen or if there is resistance to other treatments. However, it is not the preferred initial treatment option for hairy cell leukemia.

Solution for Question 4:

Correct Option C:

• P2Y12 receptor blocker: P2Y12 receptor blockers, such as clopidogrel, ticagrelor, and prasugrel, are antiplatelet medications commonly used in patients undergoing percutaneous coronary intervention (PCI), including the placement of stents. These drugs inhibit platelet activation and aggregation, reducing the risk of clot formation in the stent and preventing complications such as stent thrombosis. Given that the patient in the scenario has undergone a stent placement, the addition of a P2Y12 receptor blocker, such as clopidogrel, would be appropriate to prevent stent-related complications.

Incorrect Options:

Option A. PDE 3 inhibitor: Phosphodiesterase-3 (PDE 3) inhibitors, such as milrinone and cilostazol, ar e primarily used for their vasodilatory effects and positive inotropic properties. They are commonly use d in the treatment of heart failure and peripheral vascular disease. However, in the given scenario of a patient with atherosclerosis who underwent a circumflex artery bypass, the addition of a PDE 3 inhibito r is not typically indicated as the main purpose is to prevent further clot formation or complications relat ed to the stent.

Option B. Direct oral anticoagulant: Direct oral anticoagulants (DOACs), such as rivaroxaban, apixaban , and dabigatran, are medications used to prevent blood clot formation. They work by inhibiting specific coagulation factors in the blood. While anticoagulation may be considered in some patients with certai n indications, such as atrial fibrillation or mechanical heart valves, the routine use of DOACs may not b e necessary in all patients who undergo a circumflex artery bypass for atherosclerosis.

Option D. PDE 5 inhibitor: Phosphodiesterase-5 (PDE 5) inhibitors, such as sildenafil, tadalafil, and var denafil, are primarily used for the treatment of erectile dysfunction and pulmonary arterial hypertension. They enhance the effects of nitric oxide, leading to vasodilation. However, in the given clinical scenari o, the use of PDE 5
inhibitors is not directly indicated for the management of atherosclerosis or post-stent placement.

Solution for Question 5:

Correct option:

Option B.

Sickle cell anemia is a genetic disorder caused by the mislocation of valine in the position of glutamate at the β-6 position of the Haemoglobin gene. It is an inherited autosomal recessive disorder as the indi vidual is symptomatic, but the parents each have a copy of the defective gene and are asymptomatic.

Incorrect options:

Option A. In an autosomal dominant disease, every individual with a copy of the gene is symptomatic. The trait, as such, is expressed in every individual carrying the defective gene.

Option C. In X-linked dominant disorders, mutations are passed down from parents via a single X chromosome. In a female with a normal X and a mutated X
chromosome, the single mutated chromosome is enough to express the condition.

Option D. In X-linked recessive disorders, mutations are passed down from parents via a single X chromosome, such that a male carrying only one X chromosome is affected while a female carrying a normal X and a mutated X chromosome is usually unaffected.

Solution for Question 6:

Correct option:

Option B.

Rituximab is an anti-CD 20 monoclonal antibody used in cancer treatments. It is used in cancer treatm ent because it can attach to the CD 20 protein found on the surface of cancerous cells.

Incorrect options:

Option A. Methotrexate is an antimetabolite. It is also a chemotherapy agent and immune suppressant.

Option C. Cisplatin is an antineoplastic agent.

Option D. 5-Fluorouracil is a cytotoxic drug.

Solution for Question 7:

Correct option:

Option C.

Vitamin B12 is also called cobalamin. Cobalamine is essential for the formation of RBCs. Deficiency of cobalamin results in the production of abnormally large RBCs (macrocytic cells). Cobalamin deficiency can fail in Hb production as well. This can result in the production of hypochromic cells.

Incorrect options:

Option A. Normochromic means that the cell is of normal color. Normocytic means the blood cell is of n ormal size. In vitamin B12 deficiency, neither of these happens.

Option B. Microcytic means the blood cells are very small in size. In vitamin B12 deficiency, the blood c ells produced are extremely large compared to the normal size.

Option D. One of the options is right.

Solution for Question 8:

Correct Option A.

• Wiskott-Aldrich syndrome is a rare genetic disorder characterized by the triad of thrombocytopenia (low platelet count), eczema (skin rash), and recurrent infections. It is an X-linked disorder that primarily affects males, although there have been rare cases reported in females.

Incorrect Options

Option B. Chediak-Higashi syndrome: Chediak-Higashi syndrome is a rare autosomal recessive disord er characterized by abnormal immune system function and abnormal pigmentation of the skin and hair.

It can lead to recurrent infections, but thrombocytopenia and eczema are not typically associated with t his syndrome.

Option C. Thrombocytopenia – absent radius syndrome: Thrombocytopenia – absent radius syndrome (TAR syndrome) is a rare genetic disorder characterized by low platelet count (thrombocytopenia) and the absence or underdevelopment of the radius bone in the forearm. Eczema and recurrent infections are not typically part of this syndrome.

Option D. Hermansky-Pudlak syndrome: Hermansky-Pudlak syndrome is a rare genetic disorder chara cterized by oculocutaneous albinism, bleeding problems due to platelet dysfunction, and various other symptoms. While thrombocytopenia and recurrent infections can occur in some cases, eczema is not a typical feature of this syndrome.

Solution for Question 9:

Correct Option A.

• Sickle cell anemia is an inherited blood disorder characterized by the presence of abnormal hemoglobin called hemoglobin S. It leads to the formation of sickle-shaped red blood cells that can cause blockages in the blood vessels, leading to tissue damage and pain.

• In sickle cell anemia, the spleen can undergo progressive damage and become shrunken (splenic atrophy). This is due to repeated episodes of vaso-occlusion, where sickle-shaped red blood cells block the blood flow to the spleen, leading to infarction and subsequent scarring.

Incorrect Options

Option B. Malaria: While malaria can cause splenomegaly (enlarged spleen), it does not typically lead t o splenic atrophy.

Option C. Pancreatitis: Pancreatitis is inflammation of the pancreas and is not associated with fever, ha nd swelling, or splenic atrophy.

Option D. Measles: Measles is a viral infection that primarily affects the respiratory system. It does not cause splenic atrophy or hand swelling.

Solution for Question 10:

Correct Option B:

• Multiple myeloma is a malignant plasma cell dyscrasia which is depicted by uncontrolled proliferation of cells or bone marrow. Here The skull x-ray reveals Raindrop configuration of Lytic lesions of the skull which is a characteristic feature for multiple myeloma. And the complaint or thoracic tenderness is one of the most common and initial complaints of multiple myeloma. The other diagnostic modalities include hypercalcaemia, creatinine > 2 mg and Bence Jones protein is typical in Urine analysis.

Incorrect Options:

Option A: Metastatic breast cancer can be excluded as the radiography doesn’t match.

Option C: Primary hyperparathyroidism, Is a condition in which the PTH are made in excess which deg enerates the bone tissue.The radiography in primary hyperparathyroidism reveals salt and pepper app earance of the skull.

Option D: Milk Alkali syndrome:- It is a
triad of hypercalcaemia, metabolic alkalosis and acute kidney injury due to excessive intake of calcium.

Solution for Question 11:

Correct Option B:

• Vitamin B12 deficiency is the correct choice as Vitamin B12 is absorbed in the ileum as vitamin B12 binds to IF or the intrinsic factor and the complex is absorbed by the ileal mucosa.

• After gastrectomy this is disrupted.

• Intrinsic factor also called castle's factor. Released by the Parietal cells of the stomach.

• Released by the Parietal cells of the stomach.

• Vegetarian food is deficient in vitamin B12.

• Released by the Parietal cells of the stomach.

Incorrect Options:

Option A: Folic acid deficiency

• Folic acid is absorbed at the level of jejunum.

• Damage to mucosa of Jejunum leads to reduced absorption of folic acid leads to Folic acid deficiency. RBC folate levels Urinary FIGLU (formiminoglutamic acid)

• RBC folate levels

• Urinary FIGLU (formiminoglutamic acid)

• RBC folate levels

• Urinary FIGLU (formiminoglutamic acid)

Option C: Gastric ulcer

• It does not occur after gastrectomy.

• The source of bleeding is the Left gastric artery

• The most common site for Gastric Ulcer is lesser curvature

Option D: Constipation does not occur after gastrectomy.

Solution for Question 12:

Correct Option D:

• Serum electrophoresis is the right answer here. The skull radiography reveals multiple punched out lytic lesions which is evident for multiple myeloma combining his clinical complaints of chronic back pain and fatigueness. It is most probably a case of Multiple Myeloma and the investigation useful for its diagnosis is serum electrophoresis.

Incorrect Options:

Option A: MRI brain of multiple myeloma reveals diffuse bone marrow involvement.Osteolysis and oste openia can also be detected.

Option B: Pet CT is having the highest sensitivity for extra medullary diseases and active lytic lesions o f bone.

Option C:Head CT scan with contrast is not useful for diagnosis. It is very non specific.

Solution for Question 13:

Correct Option B:

The above is the case of AML as it has t(8;21). Generally to make a diagnosis of AML, blast cell count should be >=20% either in peripheral blood or bone marrow. In cases of low blast count, any one of the following being present is enough for its diagnosis:

• t(15;17)

• t(8;21)

• Inversion 16 or t(16;16)

Incorrect Options:

Option A: ALL is the most common childhood leukaemia having symptoms such as fever night sweats unexplained weight loss painless lymphadenopathy bone pain which are not present here.

Option C: Pre-leukaemia Is a myelodysplastic syndrome

Option D: Aleukemic leukaemia Is a
rare type of leukaemia in which the leucocyte count is normal or to the lower side.

Solution for Question 14:

Correct Option D:

• The above case is most probably a case of thalassemia as there is a history of repeated transfusions, low MCV and low Hb and the peripheral smear shows a picture that is hypochromic microcytic. The next best step is to get Hb electrophoresis done.

Incorrect Options:

Option A: Serum iron is measured to check for iron overload due to repeated blood transfusions and is not the next best step.

Option B: Direct coomb’s test is for autoimmune haemolytic anemia and not for thalassemia.

Option C: Osmotic fragility test is done for hereditary spherocytosis.

Solution for Question 15:

Correct Answer Option B - Multiple myeloma

• Multiple myeloma is a malignant plasma cell disorder characterized by the proliferation of abnormal plasma cells in the bone marrow. The disease can lead to various clinical manifestations and laboratory abnormalities. The given finding, in this case, supports the diagnosis of multiple myeloma.

• Osteolytic lesions seen on X-ray spine: Multiple myeloma commonly involves the bones, destroying bone tissue and the appearance of lytic lesions.

• Low hemoglobin (Hb): Multiple myeloma can cause anemia due to the infiltration of abnormal plasma cells in the bone marrow, leading to a decrease in normal red blood cell production.

• Elevated serum calcium (hypercalcemia): Multiple myeloma can cause calcium release from the bones, leading to high calcium levels in the blood.

• Abnormal kidney function (elevated creatinine): Multiple myeloma can affect the kidneys, leading to impaired kidney function and elevated creatinine levels.

• Low albumin levels: Multiple myeloma can result in reduced production of normal proteins, including albumin, by the liver.

Incorrect Choices:

• Option a. Metastatic breast cancer: While metastatic breast cancer can involve the bones and cause similar symptoms, the presence of monoclonal gammopathy (elevated total protein) and anemia are more suggestive of multiple myeloma.

• Option c. Primary hyperparathyroidism: Primary hyperparathyroidism typically presents with hypercalcemia, but it is not associated with multiple myeloma-like bone lesions or the other laboratory abnormalities seen in this case.

• Option d. Milk alkali syndrome: This condition is characterized by hypercalcemia, but it is caused by excessive intake of calcium and alkali, which is not evident from the provided information.

Solution for Question 16:

Correct Option: D

The most appropriate investigation for the given clinical scenario would be "Serum electrophoresis."

• Serum electrophoresis: Serum electrophoresis is a blood test that separates proteins based on their electrical charge and size. It is a valuable tool for evaluating various conditions, including plasma cell disorders (e.g., multiple myeloma), which can present with chronic back pain, fatigue, and elevated ESR. Additionally, multiple urinary tract infections could be associated with an underlying immunoglobulin abnormality. Therefore, serum electrophoresis is a relevant investigation to consider in this case to assess for any potential plasma cell disorders.

Incorrect options:

Option A: MRI brain: MRI brain is a useful imaging modality for evaluating structural abnormalities in th e brain. However, in this case, the patient's complaints of chronic back pain, easy fatigability, and histor y of urinary tract infections suggest a systemic condition rather than a primary brain pathology. Therefo

re, an MRI brain may not provide specific information relevant to the diagnosis.

Option B: PET scan: PET scan (Positron Emission Tomography) is a nuclear medicine imaging techniq ue that provides functional information about the body's metabolism and cellular activity. While it can b e helpful in detecting certain cancers and evaluating brain function, it may not be the initial investigatio n of choice for the presented symptoms.

Option C: Head CT scan with contrast: A head CT scan with contrast is primarily used to assess acute intracranial pathologies such as hemorrhage, stroke, or space-occupying lesions. Given the patient's c hronic back pain, easy fatigability, and urinary tract infections, a
head CT scan may not provide relevant information for the diagnosis in this case.

In summary, among the given options, "Serum electrophoresis" is the most useful investigation for diag nosis in a 68-year-old male presenting with chronic back pain, easy fatigability, and multiple urinary tra ct infections, along with an elevated ESR. It can help identify any underlying plasma cell disorders or i mmunoglobulin abnormalities.

Solution for Question 17:

Correct choice: D

Explanation:

• Based on the given information of a 30-year-old woman with fatigue, pallor on physical examination, and laboratory values indicating low hemoglobin (9.8 g/dL) and high mean corpuscular volume (MCV) (160 fl) while serum methyl malonyl CoA levels are normal, the correct option to administer as therapy for this patient is Folic acid.

Incorrect options:

Option A. While Vitamin B12 deficiency can cause macrocytic anemia (high MCV), it is not the most lik ely cause in this case because the serum methyl malonyl CoA levels are normal. Vitamin B12 deficienc y is typically associated with elevated levels of serum methyl malonyl CoA. Therefore, administering Vit amin B12 would not be the appropriate therapy in this scenario.

Option B. Iron deficiency anemia can cause microcytic (small-sized) anemia, but the laboratory values provided indicate a high MCV, which is inconsistent with iron deficiency anemia. Iron supplementation would not be the appropriate therapy based on the given information.

Option C. Vitamin C
deficiency is not typically associated with anemia or elevated MCV. While Vitamin C
is important for iron absorption, the lab values and symptoms described do not point to a Vitamin C deficiency. Therefore, administering Vitamin C
would not address the underlying cause of the anemia and elevated MCV

Solution for Question 18:

Correct choice:C Explanation:

• Based on the provided information of a 30-year-old lady with body pain, easy fatigability, problems while standing, loss of vibration sense and proprioception on neurological examination, and a hemoglobin level of 7gm/dL, the correct option to administer for the patient is Vitamin B12.

• Vitamin B12 (cobalamin) deficiency can lead to neurological symptoms and anemia, which are consistent with the patient's presentation. The neurological symptoms, including loss of vibration sense and proprioception, are characteristic of the neurological complications that can occur due to vitamin B12 deficiency.

Incorrect options: Option A. Vitamin B1 deficiency can cause a condition called beriberi, which primarily affects the cardiovascular and nervous systems. However, the symptoms described by the patient, such as loss of vibration sense and proprioception, are more indicative of vitamin B12 deficiency rather than vitamin B1 deficiency. Option B. Vitamin C deficiency can lead to scurvy, a condition characterized by fatigue, joint and muscle pain, and easy bruising. However, scurvy does not typically cause the neurological symptoms or anemia seen in the patient's presentation. Option D. Vitamin D deficiency is associated with various musculoskeletal symptoms, such as bone pain, muscle weakness, and difficulty standing. However, it does not typically cause the specific neurological symptoms or anemia seen in the patient. Additionally, vitamin D deficiency is less likely to cause such severe anemia with a hemoglobin level of 7gm/dL

Solution for Question 19:

Correct choice: C

Explanation:

• The nail findings shown in the image might indicate koilonychia, which is characterized by spoon-shaped or concave nails. Koilonychia can be associated with iron deficiency anemia. Chronic diarrhea, fatigue, tiredness, and a low hemoglobin level (anemia) can also be signs of iron deficiency. The best treatment approach would be Iron supplements.

Incorrect options:

Option A. Folic acid is typically used to address folic acid deficiency anemia, which can also cause fatigue and tiredness. However, the specific nail findings described and the low hemoglobin level suggest iron deficiency rather than folic acid deficiency, making iron supplements the more appropriate choice in this case.

Option B. Metronidazole is an antibiotic used to treat certain types of infections, particularly those caused by anaerobic bacteria and protozoa. It is not the appropriate treatment for iron deficiency anemia or the symptoms described.

Option D. Vitamin B12 is used to treat vitamin B12 deficiency anemia, which can cause fatigue and tiredness. However, the presence of nail findings and a low hemoglobin level suggests iron deficiency anemia rather than vitamin B12 deficiency, making iron supplements the more suitable treatment choice.

Solution for Question 20:

Correct Option: D

Based on the given information, the appropriate management for a patient with symptoms of fatigue, m acrocytic anemia, normal methylmalonate levels, homocystinuria, and normal serum B12 values is trea tment with folate therapy.

• Macrocytic anemia refers to the presence of larger-than-normal red blood cells (RBCs) in the bloodstream. It can be classified into megaloblastic and non-megaloblastic anemia. Megaloblastic anemia is characterized by impaired DNA synthesis, resulting in delayed maturation of RBC precursors.

• In this case, the patient has macrocytic anemia with elevated homocystinuria but normal methylmalonate levels and normal serum B12 values. Homocystinuria is associated with a deficiency in enzymes involved in the metabolism of homocysteine, such as cystathionine beta-synthase (CBS) deficiency. CBS deficiency leads to the accumulation of homocysteine and the conversion of homocysteine to methionine is impaired. This can result in the increased production of methylmalonic acid (methylmalonic aciduria) and homocystinuria.

• However, in this patient, methylmalonate levels are normal, indicating that the elevated homocystinuria is not due to a deficiency of vitamin B12 or methylmalonic acid metabolism. Additionally, the serum B12 values are normal, ruling out vitamin B12 deficiency as the cause of macrocytic anemia.

• Folate (vitamin B9) is essential for DNA synthesis and red blood cell production. Folate deficiency can lead to macrocytic anemia. In this case, providing folate therapy can help correct the folate deficiency and improve the anemia. Folate therapy alone is appropriate because the patient's serum B12 levels are normal and there is no evidence of vitamin B12 deficiency.

Incorrect Options

Option A: Iron supplements are not the appropriate management in this case since the patient does not have evidence of iron deficiency anemia. Iron deficiency anemia is characterized by microcytic (smalle r-than-normal) red blood cells and low serum iron levels.

Option B: Treatment with folate and vitamin B12 is not necessary because the serum B12 levels are alr eady normal, and there is no evidence of vitamin B12 deficiency.

Option C: Folate and vitamin B1 (thiamine) combination therapy is not indicated in this case as there is no evidence of thiamine deficiency or specific indications for its use in the given clinical presentation.

Therefore, folate therapy is the most appropriate management in this case of macrocytic anemia with n ormal serum B12 levels and elevated homocystinuria.

Solution for Question 21:

Correct option:

Option C: His HLA identical brother who is otherwise healthy and is blood type O+ (Correct) -

• The correct option would be the patient's HLA identical brother who is otherwise healthy and has blood type O+. HLA matching is a crucial factor in determining the compatibility of the donor for an allogeneic stem cell transplant. As long as the HLA types match, the patient can receive stem cells from a donor with a different blood type without significant adverse effects.

Incorrect Options:

Option A: His identical twin brother (Incorrect)- While an identical twin brother is a perfect genetic match, an allogeneic stem cell transplant refers to receiving stem cells from a donor who is not an identical twin. Therefore, an identical twin brother would not be considered an optimal donor in this case.

Option B: Umbilical cord transplant (Incorrect) Umbilical cord blood can be a source of stem cells for transplantation, but the patient's blood type O negative may limit the availability of compatible cord blood units. Additionally, the HLA match from umbilical cord blood may not be as precise as that of a matched unrelated donor. Therefore, an umbilical cord transplant is not the most optimal choice in this scenario.

Option D: An HLA identical matched unrelated donor who is blood type (Not Provided) (Incorrect) The information regarding the blood type of the unrelated donor is not provided. Without knowing the blood type compatibility, it is difficult to determine the suitability of this option. However, assuming the blood type is compatible, an HLA identical matched unrelated donor would be a suitable option for transplantation. HLA matching is a critical factor in minimizing the risk of GVHD and graft rejection.

Solution for Question 22:

Correct Option:

Option C- Splenectomy.

• Splenectomy is considered the best treatment option for ITP in patients who do not respond to other treatments or who have chronic or recurrent ITP. The spleen is the primary site of platelet destruction in ITP, and removing it can help increase platelet counts and improve symptoms.

Incorrect options:

Option a. IV immunoglobulins: IV immunoglobulins (IVIG) are commonly used in the treatment of ITP, especially in acute cases or when immediate platelet count elevation is required. IVIG works by increasing the platelet count temporarily. However, it is not considered the best long-term treatment option for ITP.

Option b. Steroids: Steroids, such as prednisone, are often used as an initial treatment for ITP. They help to suppress the immune system and reduce platelet destruction. Steroids can be effective in increasing platelet counts, but they are associated with potential side effects and are not considered the best long-term treatment option.

Option d. Blood transfusion: Blood transfusion is not a primary treatment for ITP. It may be used in specific cases when there is severe bleeding or to manage acute complications, but it does not address the underlying immune dysfunction causing ITP and is not considered a curative treatment.

Solution for Question 23:

Correct option:

Option C. Deficiency of CD55 and CD59:

• PNH is associated with a deficiency of CD55 (decay-accelerating factor) and CD59 (membrane inhibitor of reactive lysis), which are GPI-anchored proteins that regulate the complement system and protect blood cells from complement-mediated destruction.

Incorrect options

Option A: Inherited defect in PIG-A. Paroxysmal nocturnal hemoglobinuria (PNH) is caused by a somatic mutation in the PIG-A gene, which results in a deficiency of glycosylphosphatidylinositol (GPI)-anchored proteins on the surface of blood cells. This defect is acquired and not inherited, so this option is ruled out.

Option B: PNH is characterized by intravascular hemolysis, not extravascular hemolysis. The deficienc y of GPI-anchored proteins leads to the activation of the complement system, resulting in the destructio n of red blood cells within the bloodstream.

Option D: PNH is not typically associated with microcytic anemia. Microcytic anemia is more commonly seen in conditions such as iron deficiency anemia or thalassemia.

Solution for Question 24:

Correct Option C: Sickle cell anemia

• Sickle cell anemia is a genetic blood disorder characterized by the presence of abnormal hemoglobin, known as hemoglobin S.

• It is caused by a mutation in the HBB gene, resulting in the production of abnormal sickle-shaped red blood cells.

• In sickle cell anemia, the abnormal red blood cells can become stiff and sticky, leading to blockages in the blood vessels.

• These blockages can cause episodes of pain called vaso-occlusive crises of sickle cell crises. These crises can occur in various parts of the body, including the bones, joints, and organs.

Incorrect Options:

Option A: Alpha-thalassemia: Alpha-thalassemia is a genetic disorder characterized by reduced or abs ent production of alpha-globin chains. It can lead to anemia, but it typically does not cause episodes of pain or resolve on its own.

Option B: Beta-thalassemia: Beta-thalassemia is a genetic disorder characterized by reduced or absen t production of beta-globin chains. Similar to alpha-thalassemia, it can cause anemia but does not typic ally present with episodes of pain that resolve spontaneously.

Option D: Von Willebrand disease type 1: Von Willebrand disease is a bleeding disorder caused by a deficiency or dysfunction of von Willebrand factor, a protein involved in blood clotting. Type 1 is the mil dest form of the disease, but it is not associated with symptoms of pain or episodes that resolve on thei r own.

Solution for Question 25:

Correct Option: B

• In this scenario, the 18-year-old girl with acute promyelocytic leukemia (APL) developed fever, tachypnea, and pulmonary infiltrates on a chest X-ray. These symptoms and findings suggest the development of a potentially serious complication called acute respiratory distress syndrome (ARDS) associated with APL.

• Dexamethasone, a corticosteroid, is the appropriate choice of drug in this situation. It is commonly used in the management of APL to help mitigate the differentiation syndrome, also known as retinoic acid syndrome, which can occur during the initial treatment with all-trans retinoic acid (ATRA) or arsenic trioxide (ATO). Differentiation syndrome is characterized by symptoms such as fever, respiratory distress, pulmonary infiltrates, and multi-organ dysfunction. Dexamethasone has anti-inflammatory properties and helps reduce the severity of the syndrome.

Incorrect Options:

Option A. Cytarabine: Cytarabine is a chemotherapy drug commonly used in the treatment of acute my eloid leukemia (AML), including certain subtypes of APL. However, in the context of the patient's sympt oms and findings of pulmonary infiltrates, dexamethasone is a
more appropriate choice to address the potential complication of differentiation syndrome.

Option C. Doxorubicin: Doxorubicin is a chemotherapy drug commonly used in the treatment of various cancers, including APL. However, it is not the drug of choice for managing differentiation syndrome or its associated respiratory complications. Dexamethasone would be a
more appropriate choice in this situation.

Option D. Methotrexate: Methotrexate is a chemotherapy drug used in the treatment of various maligna ncies, including certain types of leukemia. However, in the context of the patient's symptoms and findin gs, dexamethasone is the preferred drug to address the potential complication of differentiation syndro me associated with APL.

Solution for Question 26:

Correct Option B

• In severe hemophilia, which is characterized by a deficiency of clotting factor VIII (hemophilia A) or clotting factor IX (hemophilia B), the most common bleeding manifestation is recurrent hemarthrosis. Hemarthrosis refers to bleeding into the joints, particularly the knees, ankles, and elbows. This occurs because the lack of clotting factors impairs the blood's ability to form a stable clot, leading to prolonged bleeding and accumulation of blood within the joint space. The repeated episodes of hemarthrosis can cause joint pain, swelling, stiffness, and ultimately, joint damage.

Incorrect options:

Option A. Recurrent hematomas: While hematomas can occur in individuals with severe hemophilia, th ey are not as common as recurrent hemarthrosis. Hematomas are localized collections of blood outsid e the blood vessels, often caused by trauma or injury.

Option C. Hematuria: Hematuria, which is the presence of blood in the urine, can occur in hemophilia, but it is not the most common bleeding manifestation. Hematuria may result from bleeding in the urinar y tract, such as in the kidneys or bladder.

Option D. Intracranial hemorrhage: Intracranial hemorrhage, which refers to bleeding within the skull or brain, is a severe complication of hemophilia but is relatively rare. It is more commonly seen in individu als with severe hemophilia who have experienced head trauma or undergone invasive procedures. Intr acranial hemorrhage can be life-threatening and requires immediate medical attention

Solution for Question 27:

Correct Option A

• In a patient with thalassemia who has a history of multiple blood transfusions, iron overload, and cardiac arrhythmia, the presenting symptoms of backache and anxiety during a blood transfusion raise concerns for a transfusion reaction, specifically an acute hemolytic transfusion reaction.

• An acute hemolytic transfusion reaction occurs when incompatible blood is transfused, resulting in the destruction of red blood cells. The patient may experience symptoms such as back pain, fever, chills, anxiety, dyspnea, and hemoglobinuria. This reaction is potentially life-threatening and requires immediate intervention.

• In this scenario, the appropriate course of action is to stop the blood transfusion immediately to prevent further complications. Once the transfusion is stopped, the patient should be closely monitored for any signs of worsening symptoms, and supportive measures should be initiated as necessary. It is important to assess the patient's vital signs, oxygen saturation, and urine output during this period.

Incorrect options:

Option B. Continue the transfusion but do an ECG: Continuing the transfusion without addressing the p otential transfusion reaction can lead to further complications and risks the patient's safety. Performing an ECG alone would not address the underlying issue or provide appropriate management for the susp ected transfusion reaction.

Option C. Stop the transfusion, wait for the patient to become normal, and then start it again: This appr oach is not recommended because a suspected transfusion reaction requires prompt action. Stopping t he transfusion is the first step to prevent the reaction from worsening and to ensure the patient's safety . It is important to assess and manage the patient's condition before considering resuming the transfusi on, if necessary.

Option D. Do clerical check and get ECG: While a clerical check and ECG may be relevant in certain si tuations, such as ensuring the correct blood product is being transfused or assessing for potential cardi ac complications, they should not take priority over stopping the transfusion when a transfusion reactio n is suspected. Immediate cessation of the transfusion is crucial to prevent further harm to the patient

Solution for Question 28:

Correct Option: C

• Increased fibrinogen is wrong about DIC (Disseminated Intravascular Coagulation).

• DIC is a condition characterized by widespread activation of the coagulation system, leading to both thrombotic and hemorrhagic complications. It is typically associated with an underlying condition such as sepsis, trauma, or malignancy.

• In DIC, there is consumption and depletion of fibrinogen as it is converted to fibrin in the excessive clotting process. Therefore, the levels of fibrinogen are decreased or reduced in DIC, not increased. This is because fibrinogen is consumed in the formation of fibrin clots and is not available in the

circulation to be measured.

Incorrect Options:

Option A. Increased schistocytes: Schistocytes are fragmented red blood cells that result from mechanical destruction as they pass through areas of microvascular thrombosis. In DIC, the presence of schistocytes is a characteristic finding due to the formation of microvascular clots and the subsequent shearing of red blood cells.

Option B. Increased PT: Prothrombin time (PT) is a laboratory test that measures the extrinsic pathway of the coagulation cascade. In DIC, there is activation of the coagulation system, leading to consumption of clotting factors. This consumption results in prolongation of PT, indicating impaired clotting function.

Option D. Increased FDPs: Fibrin degradation products (FDPs) are produced as a result of fibrinolysis, which occurs during the breakdown of fibrin clots. In DIC, there is increased activation of the fibrinolytic system, leading to increased levels of FDPs. Elevated levels of FDPs are often observed in DIC and can be used as a diagnostic marker.

Solution for Question 29:

Correct Option C:

• Cladribine (also known as 2-chlorodeoxyadenosine or 2-CdA) is a purine analog chemotherapy drug that has shown high efficacy in the treatment of hairy cell leukemia. It is considered the drug of choice for HCL because it achieves high response rates and durable remissions in most patients.

• Cladribine works by inhibiting DNA synthesis and causing the death of hairy cells, which are the abnormal B lymphocytes characteristic of hairy cell leukemia. The drug is administered through an intravenous infusion or subcutaneous injection over a series of treatment cycles.

Incorrect Options:

Option A: Rituximab (incorrect): Rituximab is an immunotherapy drug that targets the CD20 antigen on B cells. While rituximab has shown efficacy in the treatment of various B-cell lymphomas, it is not the drug of choice for hairy cell leukemia. Cladribine is the preferred treatment for HCL.

Option B: Vemurafenib (incorrect): Vemurafenib is a targeted therapy drug primarily used for the treatment of certain forms of metastatic melanoma with BRAF V600E mutation. It is not the drug of choice for hairy cell leukemia.

Option D: Interferon-alpha (incorrect): Interferon-alpha is a type of immunotherapy that has been used in the treatment of hairy cell leukemia in the past. However, it is less commonly used nowadays due to the superior response rates and durability of remission achieved with cladribine. Cladribine has become the preferred treatment option for HCL.

Solution for Question 30:

Correct Option C:

In this scenario, the patient's clinical presentation, laboratory findings, and bone marrow aspiration results suggest the possibility of multiple myeloma, a type of cancer involving plasma cells in the bone marr

ow. The next line of management in this situation typically involves initiating treatment with a combination of dexamethasone (a corticosteroid) and fluids.

Dexamethasone is a potent anti-inflammatory and immunosuppressive medication commonly used in t he treatment of multiple myeloma. It helps in reducing plasma cell proliferation and suppressing the im mune response against the abnormal plasma cells.

Fluids are also an essential component of the management plan, as patients with multiple myeloma oft en experience dehydration and electrolyte imbalances due to increased protein production and renal d ysfunction. Adequate hydration and electrolyte replacement help optimize the patient's renal function a nd prevent complications.

Incorrect Options:

Option A. Urgent consultation for dialysis: Dialysis is not the immediate next step in the management of the presented case. Dialysis is primarily used in cases of severe renal failure where conservative man agement measures, including medications and fluid management, have failed to adequately manage th e patient's condition. In this case, while the patient has elevated urea and creatinine levels, initiating di alysis as the next line of management would be premature without attempting less invasive interventio ns first.

Option B. Dexamethasone + lenalidomide: Dexamethasone is an appropriate component of the treatm ent for multiple myeloma, as mentioned in the correct option. However, lenalidomide (an immunomodul atory drug) is typically included in the treatment regimen for multiple myeloma, especially in combinatio n with dexamethasone, but it is not the immediate next step. The initial management involves dexamet hasone and fluids, and the addition of lenalidomide can be considered in subsequent treatment stages.

Option D. Bone marrow transplantation: Bone marrow transplantation is a treatment option for multiple myeloma in certain cases, particularly in younger patients or those with high-risk disease. However, it i s not the immediate next step in the management of the presented case. Initial treatment with dexamet hasone and fluids is typically undertaken before considering more intensive therapies such as bone ma rrow transplantation.

Solution for Question 31:

Correct option: A

• Pernicious anemia is an example of Type II Hypersensitivity.

• Serum Sickness is an example of Type III Hypersensitivity.

• Pathergy test is an example of Type IV Hypersensitivity.

• Pernicious anemia is an autoimmune condition characterized by the destruction of gastric parietal cells, which produce intrinsic factors. Intrinsic factor is necessary for the absorption of vitamin B12. In this condition, autoantibodies (specifically, anti-intrinsic factor antibodies and anti-parietal cell antibodies) are produced, leading to the destruction of the gastric parietal cells. This immune response is classified as Type II Hypersensitivity, where antibodies bind to specific cells or tissues, leading to their destruction.

• Serum Sickness is a hypersensitivity reaction that occurs in response to the administration of foreign serum or certain medications. It is characterized by the formation of immune complexes composed of antigen and antibody. These immune complexes can deposit in various tissues, leading to inflammation and tissue damage. Serum Sickness is an example of Type III Hypersensitivity, which involves immune complex-mediated reactions.

• Pathergy test is indeed an example of Type IV Hypersensitivity. It is a diagnostic test used to assess abnormal skin reactions in certain diseases, such as Behçet's disease. In the Pathergy test, a small incision or puncture is made on the skin, and the development of a localized papule or pustule at the site of injury is observed. This abnormal skin reaction is indicative of a Type IV Hypersensitivity response, which is mediated by T cells and involves delayed hypersensitivity reactions.

The false statement is:

• A Pathergy test is done for Reiter's disease.

• Explanation: The Pathergy test is not specifically performed for Reiter's disease. Reiter's disease, also known as reactive arthritis, is characterized by joint inflammation, urethritis, and conjunctivitis. The diagnosis of Reiter's disease is based on clinical features and does not involve the Pathergy test. The Pathergy test is primarily associated with Behçet's disease and is not specific to Reiter's disease.

Incorrect options

Option B. 2, 3 and 4 are true : this option is incorrect

Option C.1, 2, 3 and 4 are true : this option is incorrect

Option D.3 and 4 are true : this option is incorrect

Solution for Question 32:

Correct option B.

• Phytates are naturally occurring compounds found in certain plant foods such as whole grains, legumes, and nuts. They have the ability to bind to iron and form insoluble complexes, which reduces the absorption of iron in the digestive tract. This can lead to decreased iron availability for the body.

Incorrect options:

Option A. Vitamin C: Vitamin C, also known as ascorbic acid, actually enhances iron absorption. It help s in the conversion of non-heme iron (the form of iron found in plant-based foods) to a more absorbable form. Therefore, vitamin C promotes iron absorption rather than interfering with it.

Option C. Oxalate: Oxalate, found in certain foods like spinach, rhubarb, and beet greens, can form ins oluble complexes with calcium but does not significantly interfere with iron absorption. Oxalate-rich foo ds can affect calcium absorption, but they do not directly inhibit iron absorption.

Option D. Myoglobin: Myoglobin is a protein found in muscle tissue that stores oxygen. While myoglobi n does contain iron, it is not involved in the absorption of iron from the diet. The focus of iron absorptio n is primarily on dietary sources and factors in the digestive tract rather than myoglobin.

Solution for Question 33:

Correct option B

• This option is correct. Drawing blood samples three times allows for a more comprehensive evaluation. It enables the healthcare provider to assess any trends or changes in laboratory values over

time and increases the chances of identifying potential causes of the fever.

Incorrect options:

Option A. 2: Drawing blood samples only twice may not provide sufficient information for identifying the cause of the fever. Additional samples are often needed to detect any evolving changes or to repeat certain tests if necessary.

Option C. 4: While drawing blood samples four times may provide additional information, it is not typically required in the initial evaluation of FUO. Three samples are generally sufficient, unless there are specific clinical indications for further testing.

Option D. 5: Drawing blood samples five times is excessive and not routinely performed in the evaluation of FUO. It can lead to unnecessary blood loss and discomfort for the patient without significantly increasing the diagnostic yield.

• In summary, in the evaluation of fever of unknown origin, it is recommended to draw blood samples at least three times to maximize the chances of identifying the underlying cause.

Solution for Question 34:

Correct option B

• Filgrastim: Filgrastim is a granulocyte colony-stimulating factor (G-CSF) that stimulates the production of neutrophils, a type of white blood cell. It is commonly used to treat neutropenia caused by chemotherapy by promoting the production of new neutrophils in the bone marrow.

Incorrect options:

Option A. Leucovorin: Leucovorin is a medication that is used in combination with certain chemotherapy drugs to enhance their effectiveness. It is not specifically indicated for the treatment of neutropenia.

Option C. Ondansetron: Ondansetron is an antiemetic medication used to prevent nausea and vomiting, particularly associated with chemotherapy or radiation treatment. It does not directly address neutropenia.

Option D. Darbepoetin: Darbepoetin is a synthetic form of erythropoietin, a hormone that stimulates the production of red blood cells. It is used to treat anemia, but it does not have a
direct effect on neutropenia.

Solution for Question 35:

Correct Option:

Option b. Generalized pruritus is a
consequence of mast cell activation by JAK2 mutation: In polycythemia vera, a mutation in the JAK2 gene (JAK2 V617F mutation) is commonly observed. This mutation leads to the overactivation of certain cells, including mast cells, which release mediators that can cause generalized pruritus (itching) as a characteristic symptom of the disease.

Incorrect Option:

Option a. Risk of thrombosis strongly correlates with the degree of thrombocytosis: While polycythemia vera is associated with an increased risk of thrombosis, the degree of thrombocytosis alone does not strongly correlate with the risk. Other factors, such as increased red blood cell mass and abnormal clotting factors, also contribute to the thrombotic risk.

Option c. It is protective against H. pylori infection: Polycythemia vera does not confer protection against Helicobacter pylori (H. pylori) infection. In fact, studies have suggested that H. pylori infection may be associated with an increased risk of developing polycythemia vera.

Optiond. Acute myeloid leukemia is the most common cause of mortality: While patients with polycythemia vera have an increased risk of developing acute myeloid leukemia (AML) and other myeloproliferative neoplasms, it is not the most common cause of mortality in polycythemia vera. Thrombotic events, such as stroke or myocardial infarction, are the leading causes of morbidity and mortality in polycythemia vera.

Solution for Question 36:

Correct Option:

Option a. Metabolic alkalosis: In patients with haemophilia who receive multiple blood transfusions, metabolic alkalosis can occur as a result of the citrate anticoagulant used in stored blood products. Citrate is metabolized in the liver, which can lead to the generation of bicarbonate ions and an increase in serum bicarbonate levels, causing metabolic alkalosis.

Incorrect Option:

Option b. Respiratory alkalosis: Respiratory alkalosis is characterized by a decrease in arterial carbon dioxide (CO_2) levels, resulting in an increase in blood pH. It is not directly associated with multiple blood transfusions in patients with haemophilia.

Option c. Metabolic acidosis: Metabolic acidosis is characterized by a decrease in blood pH and bicarbonate levels. It is not typically associated with multiple blood transfusions in patients with haemophilia.

Option d. Respiratory acidosis: Respiratory acidosis is characterized by an increase in arterial carbon dioxide (CO_2) levels, resulting in a decrease in blood pH. It is not directly associated with multiple blood transfusions in patients with haemophilia.

Solution for Question 37:

Correct Option B: Essential thrombocytosis

• The most probable diagnosis is essential thrombocytosis. It is a clonal stem cell disorder in which the platelet count is significantly elevated with no evidence of prolonged platelet survival.

Incorrect Options:

Option A: Polycythemia vera

• Patients have raised hemoglobin levels in polycythemia vera.

Option C: Primary myelofibrosis

• Bone marrow yields dry tap in primary myelofibrosis.

Option D: Chronic myelogenous leukemia

• CML has a Philadelphia chromosome due to reciprocal translocation t (9;22) and hypercellular marrow.

Solution for Question 38:

Correct option D

• DIC (Disseminated Intravascular Coagulation) is a condition characterized by widespread activation of clotting factors, leading to both excessive clot formation and depletion of clotting factors, which can result in bleeding. D-dimer assay is a blood test used to detect the presence of D-dimer, a fibrin degradation product that is elevated in conditions associated with fibrin formation and breakdown, such as DIC. Elevated D-dimer levels indicate the activation of the clotting system and can support the diagnosis of DIC.

Incorrect options:

Option A (Fibrin degradation products) is incorrect because while the presence of fibrin degradation pr oducts is a characteristic feature of DIC, the specific test used for their detection is the D-dimer assay.

Option B (Activated partial thromboplastin time) is incorrect because activated partial thromboplastin ti me (aPTT) is a coagulation test that measures the intrinsic pathway of coagulation and is not specific t o the diagnosis of DIC.

Option C (Prothrombin time) is incorrect because prothrombin time (PT) is a coagulation test that meas ures the extrinsic pathway of coagulation and is not specific to the diagnosis of DIC.

Solution for Question 39:

Correct Option B: Glanzmann thrombasthenia

• The above case is that of Glanzmann thrombasthenia which is an autosomal recessive platelet surface disorder of GPIIb/IIIa. It has normal platelet morphology, prolonged BT, absent or decreased clot retraction, and normal platelet aggregation in the presence of ristocetin.

Incorrect Options:

Option A: Bernard Soulier syndrome is an inherited deficiency of Ib-IX in which platelet count is decrea sed, BT is increased, PT is normal, and aPTT is normal.

Option C: Haemophilia A is a hereditary bleeding disorder due to a deficiency of factor VIII.

Option D: Von Willebrand disease is due to qualitative and quantitative defects in VWF in which platele t count is usually normal, BT is increased, PT is normal, and aPTT is increased.

Solution for Question 40:

Correct option C.

• Von Willebrand disease (VWD) is a bleeding disorder caused by a deficiency or dysfunction of von Willebrand factor (VWF), a protein involved in platelet adhesion and the stabilization of factor VIII in the blood clotting cascade.

Explanation

• Normal prothrombin time (PT): PT measures the extrinsic pathway of the coagulation cascade, which primarily assesses the activity of factors VII, X, V, and II. Von Willebrand disease primarily affects the platelet function and the intrinsic pathway, so it does not typically affect the prothrombin time. Therefore, the prothrombin time is expected to be normal in patients with VWD.

Incorrect options:

Option A: "Normal partial thromboplastin time (PTT)": PTT measures the intrinsic pathway of the coagu lation cascade, which includes factors VIII, IX, XI, and XII. Since von Willebrand factor is involved in sta bilizing factor VIII, a deficiency or dysfunction of VWF can affect the PTT, leading to prolonged PTT in VWD. Therefore, option A is incorrect.

Option B: "Decreased platelets": Von Willebrand disease does not directly affect platelet production or cause a decrease in platelet count. Platelet count is generally normal in VWD. Therefore, option B is incorrect.

Option D: "Normal bleeding time": Bleeding time assesses the primary hemostasis and platelet function . Since von Willebrand factor plays a crucial role in platelet adhesion, patients with VWD may have an i ncreased bleeding time due to impaired platelet function. Therefore, option D is incorrect.

Solution for Question 41:

Correct Ans: D.

• This option is correct. The translocations are accurately matched with the corresponding lymphoma types. Burkitt lymphoma is associated with t(8,14), Mantle cell lymphoma is associated with t(11,14), Marginal cell lymphoma is associated with t(11,18), Follicular lymphoma is associated with t(14,18), and Ewing's sarcoma is associated with t(11,22).

Incorrect option:

Option A: 1-A, 2-E; 3-C; 4-B; 5-D

• This option is incorrect. The correct translocations are not matched to the corresponding lymphoma types. Therefore, this option is not valid.

Option B: 1-C, 2-D; 3-A; 4-B; 5-E

• This option is incorrect. The translocations are not matched correctly with the lymphoma types. Therefore, this option is not valid.

Option C: 1-C, 2-E; 3-A; 4-D; 5-B

• This option is incorrect. While some of the translocations are correctly matched with the lymphoma types, others are not. Therefore, this option is not valid.

Solution for Question 42:

Correct Ans: D

• Superficial spreading melanoma is a type of skin cancer that primarily occurs due to exposure to ultraviolet (UV) radiation from the sun or artificial sources, such as tanning beds. It is not directly associated with viral infections like the other options.

Incorrect Option:

Option A: Kaposi sarcoma Kaposi sarcoma is caused by human herpesvirus 8 (HHV-8) infection. It co mmonly affects individuals with weakened immune systems, such as those with HIV/AIDS.

Option B: Primary effusion lymphoma Primary effusion lymphoma is associated with human herpesviru s 8 (HHV-8) infection. It primarily occurs in individuals with compromised immune systems, such as tho se with HIV/AIDS.

Option C: Merkel cell carcinoma Merkel cell carcinoma is associated with Merkel cell polyomavirus (M CV) infection. This virus is thought to play a role in the development of Merkel cell carcinoma, a rare and aggressive form of skin cancer.

Solution for Question 43:

Correct option:

Option A. Leukocytosis more than 1000 × 10^6 not responding to treatment.

• This statement is false. Leukocytosis refers to an increased number of white blood cells in the blood. In the accelerated phase of chronic myeloid leukemia (CML), the white blood cell count is typically elevated. Therefore, leukocytosis more than 1000 × 10^6 is actually a characteristic feature of the accelerated phase of CML. However, it's important to note that the response to treatment can vary, and the lack of response to treatment is not specific to the diagnosis of the accelerated phase of CML.

Incorrect options:

Option B: Thrombocytosis 100 × 10^9 not responding to treatment.

• This statement is not mentioned in the question and cannot be evaluated as true or false.

Option C: Increased spleen size not responsive to therapy.

• This statement is true. In the accelerated phase of CML, the spleen typically becomes enlarged (splenomegaly), and this enlargement may not respond adequately to therapy. The inability of the spleen size to decrease or stabilize despite treatment is a characteristic feature of the accelerated phase.

Option D: No response to tyrosine kinase inhibitor.

• This statement is true. In the accelerated phase of CML, there may be a reduced response or lack of response to tyrosine kinase inhibitor (TKI) therapy, which is the standard treatment for CML. Resistance to TKIs is a significant concern in managing CML in the accelerated phase.

• In summary, the false statement is Option A: Leukocytosis more than 1000 × 10^6 not responding to treatment. In the accelerated phase of CML, leukocytosis is expected, and the lack of response to treatment is not specific to the diagnosis of the accelerated phase.

Solution for Question 44:

Correct option:

Option C.

• Sickle cell anemia: Sickle cell anemia is an inherited blood disorder that increases the risk of severe bacterial infections, including pneumococcal infections. People with sickle cell anemia have functional asplenia (loss or dysfunction of the spleen), which impairs their ability to fight off certain infections, including those caused by Streptococcus pneumoniae. Vaccination, including the pneumococcal vaccine PPV-23, is recommended to prevent pneumococcal infections in individuals with sickle cell anemia.

Incorrect options:

Option A. Recurrent rhinitis and sinusitis: While recurrent rhinitis and sinusitis may be troublesome conditions, they are not specifically indications for the pneumococcal vaccine PPV-23. The vaccine primarily targets invasive pneumococcal diseases such as pneumonia, meningitis, and bloodstream infections.

Option B. Cystic fibrosis: Cystic fibrosis is a genetic disorder that primarily affects the respiratory and digestive systems. Individuals with cystic fibrosis are more susceptible to respiratory infections, including those caused by Streptococcus pneumoniae, the bacteria targeted by the pneumococcal vaccine. However, there are specific guidelines and recommendations for vaccination in individuals with cystic fibrosis, and the choice of pneumococcal vaccine (PPV-13 or PPV-23) may depend on various factors, including age and previous vaccination history. Therefore, while the pneumococcal vaccine is beneficial for individuals with cystic fibrosis, the specific vaccine and timing may vary based on guidelines and individual circumstances.

Option D. Child <2 years: Vaccination against Streptococcus pneumoniae is essential for infants and children, and the pneumococcal conjugate vaccine (PCV) series is generally recommended in this age group. The PPV-23 vaccine is typically given to individuals aged 2 years and older who are at increased risk of invasive pneumococcal disease. Therefore, while young children should receive pneumococcal vaccination, the PPV-23 vaccine is not the primary choice for this age group.

Multiple Sclerosis

1. A 32-year-old woman presents to the neurology clinic with complaints of progressive weakness and numbness in her legs over the past several months. Neurological examination reveals bilateral lower extremity weakness, hyperreflexia, and impaired sensation below the waist. Visual acuity testing shows decreased vision in the left eye. Which of the following is not the pathophysiology involved in this condition?

(or)

All are included under the pathophysiology of Multiple sclerosis except?

A. Myelin damage

B. Axon damage

C. B cells Involvement

D. Schwann cells response

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2. A 32-year-old female presents to the neurology clinic with a history of recurrent episodes of blurred vision, weakness in her legs, and difficulty coordinating movements. She reports experiencing intermittent urinary urgency and frequency, along with occasional urinary incontinence. On examination, the patient demonstrates signs of internuclear ophthalmoplegia (INO). All are associated with this condition except?

(or)

All are the clinical features of Multiple sclerosis except?

A. Internuclear Ophthalmoplegia

B. One and half syndrome

C. Eight and half syndrome

D. Detrusor hyporeflexia

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3. A 45-year-old male presents to the neurology clinic with complaints of shooting pain radiating down his legs upon flexing his neck forward. The patient reports experiencing this symptom intermittently over the past few weeks, particularly when bending his neck forward or looking down. On examination, the neurologist elicits the Lhermitte sign .This is seen in all of the following except?

(or)

Which of the following is not a condition where the Lhermitte sign is seen?

A. Tabes dorsalis

B. Cervical spondylosis

C. Multiple sclerosis

D. Neuromyelitis Optica

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4. A 20 year 20-year-old male came to the clinic with pins and needle sensation in one arm or both arms and decreased vision for 1 day. On examination, Lhermitte sign was positive, Brisk deep tendon reflexes and positive Babinski sign. The patient was managed with IV methylprednisolone. Which of the

following is the investigation of choice in this condition?

(or)

Which of the following is the investigation of choice in Multiple sclerosis ?

A. Gadolinium enhanced MRI

B. CSF study

C. CSF Electrophoresis

D. VEP

---

5. A 35-year-old female with a history of relapsing-remitting multiple sclerosis (MS) presents to the neurology clinic for a follow-up visit. She has been receiving natalizumab as part of her treatment regimen. Which of the following is the side effect of this medication?

(or)

Which of the following is the side effect of Natalizumab that is used for the management of Multiple sclerosis?

A. Thrombocytopenia

B. Neutrophilia

C. Neutropenia

D. Progressive Multifocal Leukoencephalopathy

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	4
Question 3	4
Question 4	1
Question 5	4

Solution for Question 1:

Correct Option D - Schwann cells response:

The pathophysiology of Multiple sclerosis includes the following:

• Myelin damage: MS is characterized by the immune system's attack on the myelin sheath, the protective covering of nerve fibers in the central nervous system (CNS).

• Axon damage: Prolonged and repeated attacks on the myelin sheath can lead to damage or destruction of the underlying nerve fibers (axons).

• B cell involvement: B cells within the brain start producing antibodies that target Myelin Oligodendrocyte Glycoprotein (MOG), a component of myelin. These antibodies are produced locally within the CNS, not originating from the bloodstream.

• Oligodendrocyte response: Oligodendrocytes, the cells responsible for producing myelin, attempt to repair the damage caused by the immune system. However, this repair process can result in gliosis (scar tissue formation) and the formation of plaques in the white matter of the CNS.

• Plaque visualization: These plaques, areas of demyelination and scarring, can be visualized on MRI scans. Periventricular plaques, known as Dawson's fingers, are a characteristic finding in MS and appear near the brain's ventricles.

• Schwann cells are not affected in Multiple sclerosis

Incorrect Options:

Options A,B,C:

• These are correct about the pathophysiology of Multiple sclerosis

Solution for Question 2:

Correct Option D - Detrusor hyporeflexia:

• Multiple sclerosis (MS) is a chronic autoimmune disease characterized by inflammatory demyelination and neurodegeneration in the central nervous system (CNS).

• Some of the hallmark clinical manifestations of MS include: Internuclear Ophthalmoplegia (INO) is a common ophthalmological finding in MS, characterized by impaired adduction of one eye during horizontal gaze due to lesions affecting the medial longitudinal fasciculus (MLF) characterized by a combination of horizontal gaze palsy in one direction and ipsilateral internuclear ophthalmoplegia (INO). Eight and a half syndrome is another rare neurological syndrome characterized by horizontal diplopia and facial weakness in association with one and half syndrome features. It results from pontine tegmental lesions affecting multiple cranial nerve nuclei and the MLF.

• Internuclear Ophthalmoplegia (INO) is a common ophthalmological finding in MS, characterized by impaired adduction of one eye during horizontal gaze due to lesions affecting the medial longitudinal fasciculus (MLF) characterized by a combination of horizontal gaze palsy in one direction and ipsilateral internuclear ophthalmoplegia (INO).

• Eight and a half syndrome is another rare neurological syndrome characterized by horizontal diplopia and facial weakness in association with one and half syndrome features. It results from pontine tegmental lesions affecting multiple cranial nerve nuclei and the MLF.

• Detrusor Hyperreflexia: Detrusor hyperreflexia, or overactive bladder, is a common autonomic dysfunction observed in MS. Detrusor hyperreflexia results from disruption of neural pathways controlling bladder function in the spinal cord and brainstem.Detrusor hyporeflexia, or underactive bladder, is not typically associated with MS. Instead, detrusor hyperreflexia is the more common bladder dysfunction observed in MS

• Internuclear Ophthalmoplegia (INO) is a common ophthalmological finding in MS, characterized by impaired adduction of one eye during horizontal gaze due to lesions affecting the medial longitudinal fasciculus (MLF) characterized by a combination of horizontal gaze palsy in one direction and ipsilateral internuclear ophthalmoplegia (INO).

• Eight and a half syndrome is another rare neurological syndrome characterized by horizontal diplopia and facial weakness in association with one and half syndrome features. It results from pontine tegmental lesions affecting multiple cranial nerve nuclei and the MLF.

Incorrect Options:

Options A,B,C:

• These are the correct features of Multiple sclerosis

Solution for Question 3:

Correct Option D - Neuromyelitis Optica:

• The Lhermitte sign, also known as the "barber chair phenomenon," is a clinical finding characterized by the sensation of an electric shock or tingling sensation that radiates down the spine and into the limbs upon flexion of the neck.

• This sign is typically elicited by passively flexing the patient's neck forward, leading to the transient sensation that travels along the spinal cord and peripheral nerves.

• Lhermitte sign is not seen in Neuromyelitis Optica

• Instead, the Lhermitte sign is more commonly observed in patients with lesions affecting the cervical spinal cord, such as those seen in MS or cervical spondylosis.

Incorrect Options:

Options A,B,C:

• Lhermitte sign is seen in Tabes dorsalis, Cervical spondylosis, and Multiple sclerosis

Solution for Question 4:

Correct Option A - Gadolinium-enhanced MRI:

• Gadolinium-enhanced MRI is the cornerstone of the diagnostic work-up for multiple sclerosis (MS), particularly to identify characteristic plaques or lesions in the central nervous system.

• The presence of these lesions, known as Dawson fingers, at specific sites is indicative of MS. Dawson fingers are areas of demyelination that appear as finger-like projections extending perpendicular to the ventricular surface of the brain.

• The key features to assess on MRI include the location and size of the plaques. Periventricular: This is a common location for MS lesions and is characterized by hyperintense signals on T2-weighted MRI sequences. Juxtacortical: Juxtacortical lesions are often perpendicular to the cortical surface and can be visualized on MRI. Infratentorial: Infratentorial lesions are less common but can contribute to the clinical manifestations of MS, including motor and coordination impairments. Size of plaque > 6 mm: Plaques larger than 6 mm in diameter are considered significant findings on MRI and are suggestive of MS.

• Periventricular: This is a common location for MS lesions and is characterized by hyperintense signals on T2-weighted MRI sequences.

• Juxtacortical: Juxtacortical lesions are often perpendicular to the cortical surface and can be visualized on MRI.

• Infratentorial: Infratentorial lesions are less common but can contribute to the clinical manifestations of MS, including motor and coordination impairments.

• Size of plaque > 6 mm: Plaques larger than 6 mm in diameter are considered significant findings on MRI and are suggestive of MS.

• Periventricular: This is a common location for MS lesions and is characterized by hyperintense signals on T2-weighted MRI sequences.

• Juxtacortical: Juxtacortical lesions are often perpendicular to the cortical surface and can be visualized on MRI.

• Infratentorial: Infratentorial lesions are less common but can contribute to the clinical manifestations of MS, including motor and coordination impairments.

• Size of plaque > 6 mm: Plaques larger than 6 mm in diameter are considered significant findings on MRI and are suggestive of MS.

Incorrect Options:

Options B - CSF study:

• CSF study showed mild to moderate pleocytosis and a slight increase in protein > 75 cells - unlikely to be multiple sclerosis Protein > 100 mg - unlikely to be multiple sclerosis Normal - 0-4 lymphocytes

• > 75 cells - unlikely to be multiple sclerosis

• Protein > 100 mg - unlikely to be multiple sclerosis

• Normal - 0-4 lymphocytes

• > 75 cells - unlikely to be multiple sclerosis

• Protein > 100 mg - unlikely to be multiple sclerosis

• Normal - 0-4 lymphocytes

Option C - CSF Electrophoresis:

• Oligoclonal band in CSF

• Helps in identifying antibodies produced by B cells that attack MOG - myelin oligodendrocyte glycoprotein

Option D – VEP:

• VEP is used for detecting the presence of small plaques that cannot be visualized

• VEP is Visual evoked potential

Solution for Question 5:

Correct Option D -Progressive Multifocal Leukoencephalopathy:

• Natalizumab is a monoclonal antibody used for the management of relapsing forms of multiple sclerosis (MS), including relapsing-remitting MS (RRMS).

• It works by binding to α4-integrin, a cell adhesion molecule expressed on the surface of leukocytes, thereby inhibiting leukocyte migration across the blood-brain barrier (BBB) into the central nervous system (CNS).

• By reducing the infiltration of immune cells into the CNS, natalizumab helps mitigate the inflammatory response and subsequent neuronal damage characteristic of MS.

• However, one significant side effect associated with natalizumab therapy is the development of Progressive Multifocal Leukoencephalopathy (PML)

Incorrect Options:

Options A,B,C:

• These are not the side effects of Natalizumab

Subarachnoid Hemorrhage.

1. Which of the following is not a cause of Subarachnoid hemorrhage?

A. Rupture of berry aneurysm

B. Arteriovenous malformation

C. Charcot Bouchard aneurysm

D. Diabetes mellitus

---

2. A 60-year-old female patient presents to the emergency department with sudden-onset severe headache, vomiting, and loss of consciousness. A computed tomography (CT) scan reveals subarachnoid hemorrhage. An electrocardiogram (ECG) is performed as part of the initial evaluation. Which of the following is not an ECG change seen in this patient?

(or)

Which of the following is not an ECG change seen in Subarachnoid hemorrhage?

A. ST depression and T-wave inversion are seen

B. Peaked T waves may also be seen

C. QT prolongation

D. Narrow QRS complex

---

3. A 65-year-old male presents to the emergency department with a sudden onset of severe headache, accompanied by nausea and vomiting. Upon examination, the patient is alert and oriented but appears distressed due to the intensity of the headache. Which of the following is the grade of the Hunt Hess Scale in this patient?

(or)

Which of the following is the grade of the Hunt Hess Scale when the patient has a severe headache?

A. Grade 1

B. Grade 2

C. Grade 3

D. Grade 4

---

4. A 55-year-old male patient presents to the emergency department with sudden-onset severe headache, nausea, and vomiting. A computed tomography (CT) scan of the head reveals evidence of subarachnoid hemorrhage (SAH). Which of the following is not useful in the management of this patient?

(or)

Which of the following is not useful in managing Subarachnoid hemorrhage?

A. Steroids

B. Labetalol

C. Nimodipine

D. Aneurysmal clip

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	4
Question 3	2
Question 4	1

Solution for Question 1:

Correct Option D - Diabetes mellitus:

• The causes of Subarachnoid hemorrhage are as follows: Trauma(Most common) Rupture of berry aneurysm Arteriovenous malformation Charcot Bouchard aneurysm Extension of intracerebral hemorrhage: Hypertensive crisis

• Trauma(Most common)

• Rupture of berry aneurysm

• Arteriovenous malformation

• Charcot Bouchard aneurysm

• Extension of intracerebral hemorrhage: Hypertensive crisis

• Mycotic aneurysmDiabetes mellitus is not a cause of Subarachnoid hemorrhage

• Trauma(Most common)

• Rupture of berry aneurysm

• Arteriovenous malformation

• Charcot Bouchard aneurysm

• Extension of intracerebral hemorrhage: Hypertensive crisis

Incorrect Options:

Options A, B, C:

• These are the causes of Subarachnoid hemorrhage

Solution for Question 2:

Correct Option D - Narrow QRS complex:

• Subarachnoid hemorrhage (SAH) can cause various ECG changes due to its impact on cardiac function and autonomic regulation. However, a narrow QRS complex is not typically observed in patients with SAH.

• ECG changes seen in subarachnoid hemorrhage include: ST depression and T-wave inversion, which are indicative of myocardial ischemia or injury. Peaked T waves, which can result from sympathetic nervous system activation and electrolyte disturbances. QT prolongation, which is often seen due to autonomic dysfunction and catecholamine release.

• ST depression and T-wave inversion, which are indicative of myocardial ischemia or injury.

• Peaked T waves, which can result from sympathetic nervous system activation and electrolyte disturbances.

• QT prolongation, which is often seen due to autonomic dysfunction and catecholamine release.

• In contrast, a narrow QRS complex is not characteristic of SAH. Instead, patients with SAH may exhibit a broad QRS complex, which can be indicative of various cardiac abnormalities or electrolyte imbalances secondary to sympathetic nervous system activation.

• ST depression and T-wave inversion, which are indicative of myocardial ischemia or injury.

• Peaked T waves, which can result from sympathetic nervous system activation and electrolyte disturbances.

• QT prolongation, which is often seen due to autonomic dysfunction and catecholamine release.

Incorrect Options:

Option - A, B, C:

• These are the correct ECG changes seen in Subarachnoid hemorrhage

Solution for Question 3:

Correct Option B - Grade 2:

• When a patient presents with a severe headache, he/she is classified under grade 2 of the Hunt Hess Scale. Grade 2 indicates moderate to severe headache without neurological deficit, which aligns with the patient's presentation in this scenario.

Incorrect Options:

Option A - Grade 1: Grade 1 on the Hunt Hess Scale denotes a
mild headache without any neurological deficit. Since the patient in this scenario has a
severe headache, grade 1 is not applicable.

Option C - Grade 3: Grade 3 corresponds to somnolence and confusion. However, the patient in this sc enario is alert and oriented, ruling out grade 3.

Option D - Grade 4: Grade 4 is characterized by stupor. Since the patient is alert and oriented, grade 4 is not appropriate for this case.

Solution for Question 4:

Correct Option A - Steroids:

• Subarachnoid hemorrhage (SAH) is a medical emergency characterized by bleeding into the subarachnoid space surrounding the brain.

• Steroids, such as dexamethasone, are not recommended in the treatment of SAH because they do not provide significant benefits and may potentially increase the risk of complications.

Incorrect Options:

Options - B, C, D:

• Labetalol: Labetalol is a beta-blocker that is commonly used to manage hypertension, which frequently occurs in patients with SAH. It helps to control blood pressure and reduce the risk of rebleeding and complications.

• Nimodipine: Nimodipine is a calcium channel blocker that is specifically indicated for the prevention and treatment of cerebral vasospasm, a potentially serious complication of SAH. By blocking calcium channels in cerebral blood vessels, nimodipine helps to prevent vasospasm and improve cerebral perfusion.

• Aneurysmal clip: Surgical clipping of the ruptured aneurysm is a crucial intervention in the management of SAH. Aneurysmal clipping involves placing a metallic clip across the neck of the aneurysm to prevent further bleeding and reduce the risk of rebleeding.

Epilepsy

1. A 48-year-old male patient presents to the ED with complaints of 2 episodes of unprovoked seizures within the last 2 days. While he is in the hospital, he starts seizing, IV access is not yet obtained. What can be given to control his seizures?

(or)

Which of the following can be given to control a GTCS seizure in the absence of IV line?

A. IM Lorazepam

B. Subcutaneous Phenytoin

C. Rectal diazepam

D. Intranasal midazolam

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2. A 2-year-old child presents to the pediatrician's office accompanied by their mother, who reports episodes of repeated blinking of the eyes followed by sudden unresponsiveness. The child may appear to be taking normally and then suddenly becomes unconscious, only to resume activity as if nothing has happened. What is the drug of choice for this patient?

(or)

What is the drug of choice in a 2-year-old male child with absence seizures?

A. Valproate

B. lamotrigine

C. carbamazepine

D. Ethosuximide

---

3. A 7-year-old boy is brought to the OPD due to recurrent 3-4 min episodes of facial grimacing and hand gestures over the past 2 weeks. He is nonresponsive during these episodes and doesn't remember them afterward. He recalls smelling kerosene before the symptoms started. After the incident, he feels lethargic and confused. What is the possible diagnosis?

(or)

Aura, motionless stare ,automatism and post ictal confusion is seen in?

A. Focal seizure with impaired awareness

B. Generalized tonic-clonic seizure

C. Atonic seizure

D. Absence seizure

---

4. A 58-year-old male patient has been brought to the hospital due to weakness in his left arm for two days. According to the patient, two days ago, he developed involuntary movement in his left arm and twitching on the left side of his face. He was aware and tried to stop the movement with his other hand, but he was unable to do so. He has been experiencing weakness in his left arm since then. What is the diagnosis?

(or)

Which of the following manifests as temporary weakness following focal seizures, distinguishing it from stroke or atonic seizures.

A. MCA stroke

B. Todd’s palsy

C. Atonic seizure

D. ACA stroke

---

5. What is the EEG pattern observed in patients with JANZ syndrome?

A. 3 Hz spike of slow wave pattern

B. 2.5 Hz spike and slow wave pattern

C. Grossly chaotic pattern

D. 4-6 Hz polyspike pattern

---

6. A previously healthy 24-year-old man is brought to the ED immediately after an episode of loss of consciousness. He fell down and lost consciousness, this was followed by 4 minutes of violent jerky movements of his arms and legs. He was confused after the episode. He has no recollection of the events. What lab values do you expect in this patient?

(or)

Which of the following laboratory finding is seen after GTCS?

A. Hypomagnesemia

B. Increased serum prolactin

C. Increased serum calcium

D. Decreased serum prolactin

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	4
Question 3	1
Question 4	2
Question 5	4
Question 6	2

Solution for Question 1:

Correct Option C - Rectal diazepam:

• Rectal administration of diazepam is a well-established approach for terminating acute seizures, especially when IV access is unavailable or delayed.

• Diazepam rapidly crosses the blood-brain barrier, exerting its antiepileptic effects within minutes. This route bypasses the need for IV access, making it ideal for urgent seizure management.

Incorrect Options

Option A - IM Lorazepam:

• Intramuscular lorazepam is not typically recommended for acute seizure management due to its slower onset of action compared to other routes like intravenous or rectal administration.IV Lorazepam is the ideal choice to terminate active seizures,

Option B - Subcutaneous Phenytoin:

• While phenytoin is an antiepileptic drug used for seizure control, subcutaneous administration is not a common route for acute seizure management.

Option D - Intranasal midazolam:

• Intranasal midazolam is a choice for status epilepticus not GTCS

Solution for Question 2:

Correct Option D - Ethosuximide:

• In pediatric patients younger than 2 years of age, ethosuximide is the drug of choice for the management of absence seizures.

• While valproate is effective for absence seizures in older children, its use in children younger than 2 years is associated with a higher risk of fulminant liver failure.

• Ethosuximide is preferred in this age group due to its safety profile.

Incorrect Options:

Option A - Valproate is the drug of choice in treating Absence seizures in kids >2 years of age

Option B
- Lamotrigine is primarily used for generalized tonic-clonic seizures rather than absence seizures

Option C - Carbamazepine is typically indicated for focal seizures and is not considered a first-line treatment for absence seizures.

Solution for Question 3:

Correct Option A - Focal seizure with impaired awareness:

• Based on the above-given scenario, the diagnosis is focal seizure with impaired awareness.

• kerosene like smell signifies aura which precedes focal seizures.

• Focal seizure with impaired awareness typically presents as follows:

• Aura: Initial sensation or feeling that precedes the seizure.

• Motionless stare: Characterized by a fixed gaze and lack of responsiveness.

• Automatisms: Involuntary movements or behaviors that occur during the seizure, such as: Lip-smacking movements Chewing movements Swallowing movements Picking movements Uncontrollable laughing or crying

• Lip-smacking movements

• Chewing movements

• Swallowing movements

• Picking movements

• Uncontrollable laughing or crying

• Postictal confusion: Following the seizure, the person may experience: Feeling dazed and disoriented Lack of awareness of recent events No memory of the seizure episode.

• Feeling dazed and disoriented

• Lack of awareness of recent events

• No memory of the seizure episode.

• Lip-smacking movements

• Chewing movements

• Swallowing movements

• Picking movements

• Uncontrollable laughing or crying

• Feeling dazed and disoriented

• Lack of awareness of recent events

• No memory of the seizure episode.

Incorrect Options -

Option B - Generalized tonic-clonic seizure:

• Auras are not a feature of GTCS. GTCS also involves stiffness followed by rhythmic jerking movements in all limbs.

Option C - Atonic seizures result in loss of muscle tone. Tone is retained in this patient.

Option D - Absence seizures can present with brief unresponsiveness and anterograde amnesia, but th ey are not accompanied by an aura, postictal lethargy, or confusion.

Solution for Question 4:

Correct Answer- Option B

• This patient's symptoms are consistent with focal seizures with intact awareness, commonly known as Todd's palsy.

• Following such seizures, temporary weakness may persist for hours to days, known as Todd's palsy.

• Todd's palsy manifests as temporary weakness following focal seizures, distinguishing it from stroke or atonic seizures.

Incorrect Options -

Options A and D - Stroke can be confused with Todd’s palsy, but it's important to remember that the m uscle's power will not return after the stroke.

Option C - In Atonic seizures, the tone of the muscle is lost, the tone is preserved here in this patient

Solution for Question 5:

Correct Option D - 4-6 Hz polyspike pattern

• Juvenile myoclonic epilepsy (JME), also known as JANZ syndrome, is a common form of genetic epilepsy that typically begins in adolescence, usually between the ages of 10 and 19 years.

• It is characterized by myoclonic jerks, generalized tonic-clonic seizures (GTCS), and occasionally absence seizures.

• The characteristic EEG pattern observed in patients with JME is a 4-6 Hz polyspike and wave discharge, particularly during sleep.

• These spikes and waves are often bilaterally synchronous and symmetrical, reflecting the generalized nature of the epilepsy in JME.

Incorrect options-

Option A - This EEG pattern is typical of absence seizures

Option B - This EEG pattern is typical of Atypical absence seizures

Option C - This EEG pattern is seen in epileptic spasms.

Solution for Question 6:

Correct Option B - Increased serum prolactin:

• After a GTCS, serum prolactin levels typically rise.

• Prolactin is a hormone produced by the pituitary gland, and its levels can increase significantly following a seizure.

• This increase is thought to be due to neuroendocrine stimulation during the seizure activity.

Incorrect Options - A, C, D:

• Hypomagnesemia is not seen post-GTCS

• Increased serum calcium: Hypercalcemia is not typically associated with seizures. In fact, hypocalcemia (low serum calcium levels) can lead to seizures. Therefore, an increase in serum calcium would not be expected after a seizure.

• Decreased serum prolactin: This option is incorrect because, as mentioned earlier, serum prolactin levels are typically increased after a GTCS, not decreased.

Intraparenchymal Hemorrhage and Other CNS Bleeds

1. A retired military personnel, aged 80, presents to the clinic for a routine checkup. He has no history of diabetes or hypertension. However, earlier this morning, he experienced a brain hemorrhage, leading to increased intracranial pressure and subsequent demise. Which of the following is most likely involved in this case?

A. BRCA1 gene mutation

B. Mutations in the APP gene

C. Apolipoprotein E

D. Mutations in the LDLR gene

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2. A 50-year-old banker presents to the emergency department with sudden onset speech difficulties during a sales meeting. Upon examination, he is found to speak fluently but lacks comprehension or understanding of his speech. Which blood vessel is most likely involved in this patient's condition?

A. Inferior branch of the left middle cerebral artery

B. Superior branch of the left middle cerebral artery

C. Posterior cerebral artery

D. Main trunk of the left middle cerebral artery

---

3. A 60-year-old male patient with a history of poorly controlled hypertension presents to the emergency department with severe headache, nausea, and vomiting. On examination, his blood pressure is measured at 230/140 mmHg. A head CT scan reveals signs of increased intracranial pressure (ICP) with evidence of midline shift. What is the most appropriate initial management for this patient's condition?

A. Initiate IV sodium nitroprusside infusion for blood pressure control

B. Perform decompressive hemicraniectomy

C. Administer IV mannitol for reduction of intracranial pressure

D. Insert a ventriculostomy for monitoring of intracranial pressure

---

4. A 25-year-old man is brought to the emergency department after sustaining a head injury from a bike accident. He was not wearing a helmet at the time of the incident. Initially, he was conscious but later lost consciousness. CT shows a middle meningeal artery bleed. Upon further assessment, the patient was unconscious, began posturing, and eventually slipped into a coma. Which of the following conditions is characterized by a lucid interval followed by deterioration in consciousness?

A. Meningitis

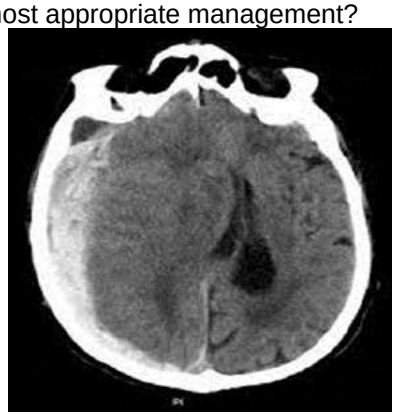
B. Subdural hemorrhage (SDH)

C. Extradural hemorrhage (EDH)

D. Cerebral contusion

---

5. A 70-year-old female with a history of type 2 diabetes and neuropathy slipped in the bathroom and hit her head against the floor. Over the course of 10 days, her headache worsened, and she experienced vomiting. On the 10th day, she developed weakness in her right arm and was unable to lift it. Upon arrival at the hospital, her Glasgow Coma Scale (GCS) score was 15/15, but extensor plantar reflexes were noted. What is the most appropriate management?



A. Prescribe acetazolamide for gradual improvement

B. Monitor closely for spontaneous resolution

C. Perform decompressive surgery

D. Administer anticoagulant therapy

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	1
Question 3	3
Question 4	3
Question 5	3

Solution for Question 1:

Correct Option C - Apolipoprotein E:

• The weakening of brain vessels, resulting in cerebral amyloid angiopathy (CAA), is often associated with genetic factors.

• Among them, Apolipoprotein E (APOE) gene polymorphisms are frequently implicated in the pathogenesis of CAA.

• These genetic variations are linked to an increased risk of developing CAA, which can lead to cerebral hemorrhage, as observed in the patient's case.

Incorrect Options:

Option A - BRCA1 gene mutation: BRCA1 mutations are primarily associated with an increased risk of breast and ovarian cancer, and they are not related to cerebral amyloid angiopathy or brain hemorrhag

e.

Option B - Mutations in the APP gene: Mutations in the amyloid precursor protein (APP) gene are linke d to familial forms of Alzheimer's disease, characterized by abnormal accumulation of amyloid plaques in the brain. However, they are not directly associated with cerebral amyloid angiopathy leading to brai n hemorrhage.

Option D - Mutations in the LDLR gene: Mutations in the LDLR gene are associated with familial hyper cholesterolemia, a condition characterized by elevated levels of LDL cholesterol in the blood. While hig h LDL cholesterol levels may contribute to atherosclerosis and vascular diseases, mutations in the LDL R gene are not specifically linked to cerebral amyloid angiopathy.

Solution for Question 2:

Correct Option A - Inferior branch of the left middle cerebral artery:

• In this scenario, the patient's presentation of fluent speech without comprehension suggests the involvement of the inferior branch of the left middle cerebral artery.

• This branch supplies the posterior portion of the frontal lobe and the temporal lobe, including Wernicke's area, which is crucial for language comprehension.

• Damage to this area leads to receptive dysphasia, where the patient's speech remains fluent but lacks meaning or understanding, termed as jargon speech.

• Manifestations of occlusion of Middle Cerebral Artery (MCA) branches: LMCA Superior branch: Loss of ability of expression (fluency), termed as Motor aphasia. LMCA Inferior branch: Loss of reception, resulting in receptive dysphasia. Fluency of speech remains, but words lack meaning or understanding, termed as Jargon speech. LMCA Main Trunk: Results in global aphasia, involving both expression and reception deficits.

• LMCA Superior branch: Loss of ability of expression (fluency), termed as Motor aphasia.

• LMCA Inferior branch: Loss of reception, resulting in receptive dysphasia. Fluency of speech remains, but words lack meaning or understanding, termed as Jargon speech.

• LMCA Main Trunk: Results in global aphasia, involving both expression and reception deficits.

• LMCA Superior branch: Loss of ability of expression (fluency), termed as Motor aphasia.

• LMCA Inferior branch: Loss of reception, resulting in receptive dysphasia. Fluency of speech remains, but words lack meaning or understanding, termed as Jargon speech.

• LMCA Main Trunk: Results in global aphasia, involving both expression and reception deficits.

Incorrect Options:

• The other options (b, c, d) are not consistent with the clinical features described in the case.

Solution for Question 3:

Correct Option C - Administer IV mannitol for reduction of intracranial pressure: Mannitol is an osmotic diuretic used to reduce intracranial pressure by drawing water out of brain tissue. It is commonly used as initial management in patients with signs of increased ICP, making it the most appropriate option in t his scenario.

Incorrect Options:

Option A - Initiate IV sodium nitroprusside infusion for blood pressure control: Sodium nitroprusside ca n be used in case of HTN control for this patient but nicardipine is the choice of drug as sodium nitropr usside can cause rapid fall in BP in such situations.

Option B and D: Perform decompressive hemicraniectomy and Insert a ventriculostomy for monitoring of intracranial pressure: Decompressive hemicraniectomy and ventriculostomy is a surgical procedure performed to relieve intracranial pressure in cases of severe brain swelling, but it is typically considere d in refractory cases or when there is impending herniation, and not as the initial management.

Solution for Question 4:

Correct Option C - Extradural hemorrhage (EDH):

• The above given case with lucid interval is suggestive of EDH

• Epidural hematoma typically results from bleeding from the middle meningeal artery, a branch of the external carotid artery.

• On non-contrast CT scans, a convex hyperdensity may be observed, often described as a lenticular hyperdensity, indicating the presence of the hematoma in the epidural space.

Incorrect Options:

Option A - Meningitis: Meningitis typically presents with fever, headache, neck stiffness, and altered m ental status but does not typically feature a lucid interval followed by deterioration in consciousness.

Option B - Subdural hemorrhage (SDH): A lucid interval can also be seen in SDH but middle meningea l artery bleed suggests EDH

Option D - Cerebral contusion: Cerebral contusion results from direct trauma to the brain and can caus e immediate loss of consciousness or altered mental status without a lucid interval.

Solution for Question 5:

Correct Option C - Perform decompressive surgery:

• In cases of subdural hemorrhage, the management depends on factors such as the volume of bleed and the location. If the Glasgow Coma Scale (GCS) is low, the volume of bleed is substantial (>30 cc), or the location of the bleed is infratentorial, decompressive surgery becomes necessary to alleviate intracranial pressure and prevent further neurological deterioration.

• Acetazolamide may be sufficient for minimal bleeding and gradual improvement, but in cases where the bleed is significant and causing neurological deficits, surgical intervention is required.

Incorrect Options:

Options A and B: Prescribe acetazolamide for gradual improvement, and Monitor closely for spontaneo us resolution are incorrect because they do not address the need for surgical intervention in cases of s ubstantial bleeding and neurological deficits.

Option D - Administering anticoagulant therapy: is inappropriate and could exacerbate the hemorrhage, leading to further complications.

Intracranial Space Occupying Lesion

1. A 30-year-old Rickshaw puller presents to the neurology clinic with multiple episodes of focal seizures. Despite treatment with medications prescribed by a local doctor, he continues to experience seizures. On physical examination, his Glasgow Coma Scale (GCS) score is 15/15, and cranial nerves examination is normal, with normal deep tendon reflexes (DTR). Fundus examination reveals papilledema, and the patient has lumps and bumps all over his body. Which of the following is the most likely MRI findings in this patient?

A. Starry sky appearance

B. Popcorn appearance

C. Owl eye appearance

D. Tigroid appearance

---

2. A 25-year-old male presents to the emergency department with complaints of severe headaches, dizziness, and generalized weakness for the past week. Upon further questioning, he mentions a recent trip to a rural area where he consumed undercooked pork. Neurological examination reveals signs of increased intracranial pressure, including papilledema. Which of the following treatment strategies is most appropriate for managing cerebral edema in this patient?

A. Initiating IV Dexamethasone to reduce vasogenic cerebral edema.

B. Commencing Albendazole concurrently with IV Dexamethasone

C. Administering Carbamazepine to control focal seizures.

D. A Ventriculoperitoneal shunt should be placed to alleviate increased intracranial pressure.

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3. A 55-year-old male presents to the clinic with a history of progressively worsening headaches over the past few months. He describes the headaches as dull and constant, with occasional episodes of sharp pain, especially in the morning. A brain tumour is being suspected in this patient. Which brain tumor in this patient will have the worst prognosis?

A. Meningioma

B. Grade 4 Glioma/Glioblastoma multiforme

C. Pituitary adenoma

D. Schwannoma

---

4. A 3-year-old child presents to the pediatric clinic with complaints of frequent urination and excessive thirst. On examination, the child is noted to have short stature and visual deficits consistent with bitemporal hemianopia. Imaging studies reveal the presence of a tumor near the optic chiasm with intracranial calcifications. Which of the following conditions is most likely responsible for the clinical presentation of this patient?

A. Craniopharyngioma

B. Meningioma

C. Glioblastoma multiforme

D. Ependymoma

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	1
Question 3	2
Question 4	1

Solution for Question 1:

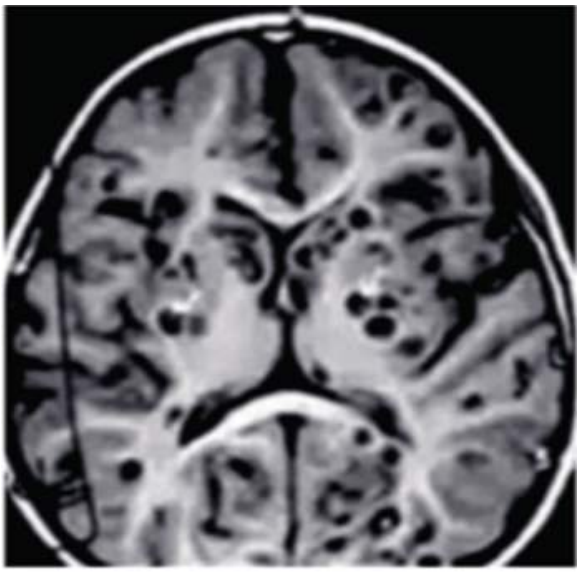
Correct Option A - Starry sky appearance:

• The above-given case is suggestive of neurocysticercosis

• Starry sky appearance refers to the presence of multiple hypointense lesions with surrounding perilesional cerebral edema on MRI.

• This appearance is characteristic of neurocysticercosis, a parasitic infection caused by the larval stage of the pork tapeworm Taenia solium.

• The hypointense lesions represent cysticerci with scolex, while the perilesional edema results from the host inflammatory response.



Incorrect options B,C,D

• These findings are not related to neurocysticercosis

Solution for Question 2:

Correct Option A - Initiating IV Dexamethasone to reduce vasogenic cerebral edema:

• IV Dexamethasone is used to reduce vasogenic cerebral edema associated with neurocysticercosis. It is initiated first to prevent allergic reactions and reduce cerebral edema. After 48 hours, when cerebral edema subsides, Albendazole can be started sequentially to treat the parasitic infection.

Incorrect Options:

Option B - Commencing Albendazole concurrently with IV Dexamethasone : Albendazole should not b e commenced concurrently with IV Dexamethasone. Sequential treatment is preferred, with Dexameth asone initiated first to address cerebral edema.

Option C - Administering Carbamazepine to control focal seizures: It is not the primary treatment for ce rebral edema associated with neurocysticercosis. Carbamazepine is used to control focal seizures, whi ch may occur as a complication of neurocysticercosis.

Option D - A Ventriculoperitoneal shunt should be placed to alleviate increased intracranial pressure: V entriculoperitoneal shunting is indicated for cases of raised intracranial pressure that do not respond to medical management. It is not the first-line treatment for cerebral edema associated with neurocysticer cosis.

Solution for Question 3:

Correct Option B - Grade 4 Glioma/Glioblastoma multiforme:

• Grade 4 Glioma/Glioblastoma multiforme is a highly malignant brain tumor with the worst prognosis among the options listed. Glioblastoma multiforme is known for its aggressive growth and resistance to treatment. Despite advances in therapy, including surgery, radiation, and chemotherapy, the prognosis remains poor, with a median survival of approximately 12 to 18 months from the time of diagnosis.

Incorrect Options:

Option A - Meningioma: Meningiomas are typically benign tumors that arise from the meninges surroun ding the brain and spinal cord. While they can cause symptoms and complications depending on their size and location, they generally have a better prognosis compared to glioblastoma multiforme.

Option C
- Pituitary adenoma: Pituitary adenomas are usually benign tumors of the pituitary gland and have a relatively good prognosis, especially when diagnosed early and managed appropriately.

Option D - Schwannoma: Schwannomas, also known as vestibular schwannomas or acoustic neuroma s when they arise from the vestibular nerve, are typically slow-growing benign tumors. They can cause symptoms related to compression of adjacent structures but generally have a
favorable prognosis compared to malignant brain tumors like glioblastoma multiforme.

Solution for Question 4:

Correct Option A - Craniopharyngioma:

• Craniopharyngiomas develop from Rathke pouch and often present with symptoms such as short stature, visual deficits (bitemporal hemianopia due to compression of the optic chiasm), and central diabetes insipidus (polyuria and polydipsia). Intracranial calcifications are frequently observed on

imaging.

Incorrect Options:

Option B - Meningioma: Meningiomas are tumors arising from the meninges, typically located outside the brain parenchyma. They can cause various symptoms depending on their location but are less likely to present with the specific combination of findings described in the case.

Option C - Glioblastoma multiforme: Glioblastoma multiforme is a highly aggressive brain tumor that usually arises in the cerebral hemispheres. It is more commonly seen in adults and may present with symptoms such as headache, seizures, and focal neurological deficits. While visual disturbances can occur with tumors in certain locations, the combination of symptoms described is not typical for glioblastoma multiforme.

Option D - Ependymoma: Ependymomas are tumors derived from ependymal cells lining the ventricles of the brain and the central canal of the spinal cord. They can lead to symptoms related to increased intracranial pressure, such as headache, nausea, and vomiting, but are less commonly associated with the specific findings of short stature, bitemporal hemianopia, and diabetes insipidus seen in craniopharyngiomas.

Raised ICP And Brain Death

1. A 45-year-old man with a history of chronic hypertension presents to the emergency department with a severe headache and projectile vomiting. Upon examination, he is found to have altered sensorium, with drowsiness progressing to stupor. Neurological examination reveals diplopia laterally. Which of the following interventions is most appropriate for managing his condition?

A. Pentobarbital coma

B. Therapeutic hypothermia

C. Dopamine infusion

D. Increasing mean arterial pressure

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2. A 45-year-old man presents to the emergency department after sustaining a head injury to the right side in a motor vehicle accident. Upon examination, the physician observes unequal pupil size. The right pupil is constricted, while the left pupil is normal. Further evaluation reveals no other neurological deficits. Based on these findings, what stage of oculomotor nerve injury does this patient likely have?

A. Stage 1

B. Stage 2

C. Stage 3

D. Stage 4

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3. A 58-year-old man presents to the emergency department with altered mental status. His family reports that he has been increasingly confused and lethargic over the past 24 hours. On examination, the patient is found to have bilateral small pupils that react sluggishly to light. What is the most likely cause of the patient's altered mental status and pupil abnormalities?

A. Head trauma

B. Ischemic stroke

C. Fulminant hepatic failure

D. Opioid poisoning

---

4. A 50-year-old male is brought to the emergency department after being found unresponsive at home. On arrival, the patient is comatose with no response to painful stimuli. The medical team suspects a potential reversible cause of the coma and decides to perform tests to rule out certain conditions. Which of the following tests is contraindicated in this patient due to the presence of cervical spine trauma?

A. Gag reflex test

B. Cough reflex test

C. Caloric stimulation test

D. Oculocephalic test

---

5. A 65-year-old male patient presents to the emergency department with sudden-onset weakness on his right side and difficulty speaking. Upon examination, he demonstrates right-sided hemiparesis and aphasia. A neurological examination reveals a preference for gaze towards the left side. Further assessment of his eye movements reveals a slow downward movement of both eyes and rapid upward movement. What is most likely responsible for these findings?

A. Cortical stroke

B. Brainstem stroke

C. Diffuse cortical anoxia

D. Basilar artery stroke

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	1
Question 3	3
Question 4	4
Question 5	3

Solution for Question 1:

Correct Option D - Increasing mean arterial pressure:

• Increasing mean arterial pressure: In cases of increased intracranial pressure, maintaining adequate cerebral perfusion pressure is crucial to prevent cerebral ischemia. Increasing mean arterial pressure helps ensure adequate cerebral perfusion despite elevated intracranial pressure. This intervention can counterbalance the increased intracranial pressure and maintain cerebral perfusion, thereby preventing ischemia-related complications.

Incorrect Options:

Option A - Pentobarbital coma: Pentobarbital coma is used in cases of severe refractory intracranial hy pertension. It acts by reducing neuronal metabolism, thereby decreasing cerebral metabolic demand. While it may be considered in cases of severe intracranial pressure (ICP) elevation, it is typically a tier II therapy after other measures have failed.

Option B Therapeutic hypothermia: Therapeutic hypothermia is used in various medical conditions, but it is not the first-line treatment for managing increased intracranial pressure. In this case, the patient's a ltered sensorium and neurological symptoms suggest acute intracranial pathology requiring immediate intervention to reduce intracranial pressure.

Option C - Dopamine infusion: Dopamine is a vasopressor used in conditions like cardiogenic and septi c shock. While it can increase blood pressure, it is not the primary intervention for managing intracrania l hypertension. Moreover, dopamine may increase cerebral blood flow, potentially exacerbating intracra nial pressure.

Solution for Question 2:

Correct Option A - Stage 1 Hutchinson's Pupil:

• Pupil becomes dilated at the side of bleeding or hemorrhage (ipsilateral mid-dilated pupil).

• Reacts poorly to light.

This stage is characterized by unequal pupil size, with the affected pupil being smaller (constricted) du e to irritation of the oculomotor nerve on that side. Since the patient's right pupil is constricted and the l eft pupil is normal, this matches the findings of Stage 1, making it the correct answer.

Incorrect Options:

Option B - Stage 2: In this stage, the pupil of the injured side becomes dilated due to paralysis of the o culomotor nerve, while the pupil of the other side contracts. This stage typically follows Stage 1 and is not consistent with the findings described in the scenario.

Option C - Stage 3: Both pupils are dilated, and there is no reaction to light. This stage indicates sever e oculomotor nerve injury and is not consistent with the findings described in the scenario.

Option D - Stage 4: Only 3 stages are seen

Solution for Question 3:

Correct Option C - Fulminant hepatic failure:

• Fulminant hepatic failure (FHF) can lead to metabolic encephalopathy, characterized by altered mental status and bilateral small pupils that are reactive to light.

• FHF can cause elevated serum ammonia levels due to impaired ammonia metabolism by the liver.

• This condition can result in encephalopathy, leading to confusion and lethargy.

Incorrect Options:

• A, B, and D are incorrect as they do not show bilateral small pupils that react sluggishly to light

Solution for Question 4:

Correct Option D - Oculocephalic Test:

• Also known as the Doll's eye reflex, this test involves moving the patient's head and observing the independent movement of the eyes. Absence of this reflex may indicate brainstem dysfunction. It is generally safe to perform unless there are concerns about cervical spine injury, as moving the head can potentially worsen spinal cord damage.

Incorrect Options

• Options A, B, and C can be performed in a patient with cervical spine trauma

Solution for Question 5:

Correct Option C - Diffuse cortical anoxia:

• Ocular dipping refers to a condition where the downward movement of the eyes is slow and the upward movement is very fast. It is characteristic of diffuse cortical anoxia.

Incorrect Options:

Option A - Cortical stroke: Patient will always look towards the site of the lesion

Option B
- Brainstem stroke: Patient will always look opposite to the site of the lesion (Crossed Feature)

Option D - Basilar artery stroke: Ocular bobbing, characterized by fast downward movement of both ey es with very slow upward movement, often accompanied by nystagmus, is indicative of a basilar artery stroke.

Stroke,TIA

1. Lacunar stroke is seen due to damage of the lenticulostriate branches which are branches of ?

A. M1: Horizontal part of middle cerebral artery

B. M2: Insular part of middle cerebral artery

C. M3: Opercular part of middle cerebral artery

D. M4: Cortical part of middle cerebral artery

---

2. All of the following are located on the lateral side of the brainstem except?

A. Spinothalamic tract

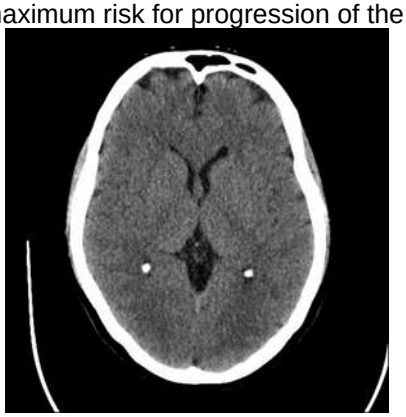
B. Spinocerebellar tract

C. Corticospinal tract

D. Sympathetic chain

---

3. A 45-year-old male with a history of hypertension and diabetes, went for a walk early in the morning. He was rushed to the emergency department on feeling weakness in the left arm. His symptoms started to resolve within 30 minutes of admission. A CT scan of the head was done and is shown below. How long is the patient at maximum risk for progression of the condition?



A. 4.5 hrs

B. 24hrs

C. 48 hrs

D. 12 hrs

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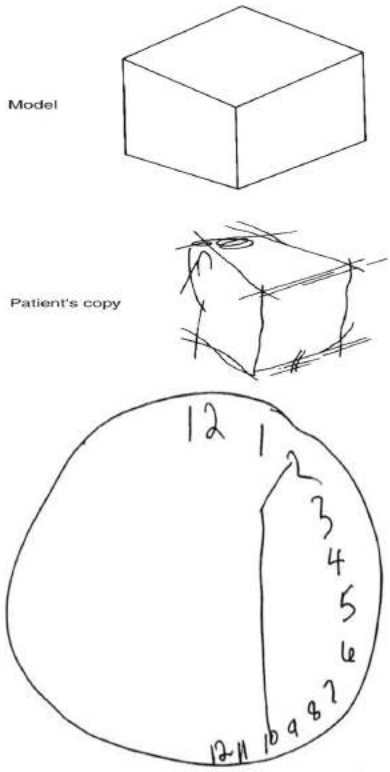
4. Identify the site of involvement and the artery supplying the area in a patient with a cerebrovascular incident demonstrating the following clinical findings.



A. Dominant parietal lobe-Left middle cerebral artery

B. Temporal lobe-Middle cerebral artery

C. Non dominant parietal lobe-Right middle cerebral artery

D. Frontal lobe-Anterior cerebral artery

---

5. All of the following are features of lateral medullary syndrome except?

A. Horner's syndrome

B. Crossed hemianesthesia

C. Aguesia and vertigo

D. Deviated tongue

---

6. CADASIL is associated with which of the following genes?

A. NOTCH 1

B. NOTCH 2

C. NOTCH 3

D. NOTCH 4

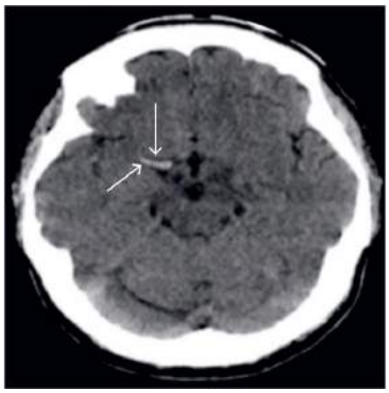
---

7. A 62-year-old male, who is a known case of hypertension and T2DM, experiences weakness in his left arm and difficulty in speech while climbing stairs at home. His BP is 130/85mmHg, NIHSS score is >5 and he gives no history of recent head injury. NCCT head findings are shown below. He managed to

reach the hospital in 45 minutes What is the next step in the management of this patient?

(or)

What is the next step in the management of an acute ischemia stroke patient who reached the hospital within 4.5 hours?



A. Thrombolysis

B. CT Angiography

C. MR venography

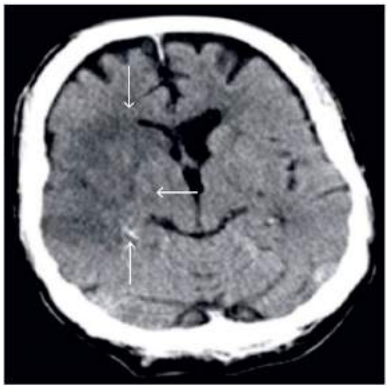
D. Thrombectomy

---

8. A 64-year-old male with a history of hypertension and T2DM is non-compliant to medication. Upon waking up in the morning he cannot feel his left leg and is unable to speak. He was fine when he went to sleep 7 hours ago at night. Upon reaching the hospital in the next 30 mins, his BP is 138/85mmHg, and his NIHSS score is >5. NCCT head findings are shown below. What is the treatment of choice for this patient?

(or)

What is the treatment of choice if a patient experienced an acute ischemia stroke 7.5 hours before reaching the hospital?



A. Thrombolysis

B. CT perfusion scan

C. Thrombectomy

D. Ventriculostomy

---

9. An elderly male patient with right upper and lower limb weakness that began 4 hours ago presents to emergency OPD. His BP is 180/100 mmHg, INR is 1.65 and NCCT head shows a hypodensity expanding to >2/3rd of MCA territory. He also had a laparoscopic cholecystectomy 3 months ago. Why is thrombolysis contraindicated in this case?

(or)

Which of the following is a contraindication for thrombolysis

A. Raised BP

B. INR>1.7

C. Hypodensity expanding to >2/3rd of MCA territory

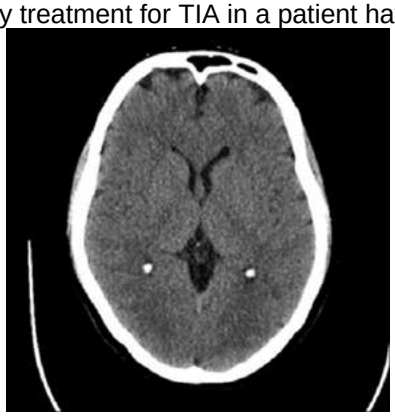
D. Major Surgery > 3 Months

---

10. A 64-year-old hypertensive male with poorly controlled diabetes, developed a sudden left arm weakness, drooping of corners of the mouth, and inability to speak, in the early morning while going for a walk. Upon reaching home after 45 minutes, his wife rushed him to the nearest hospital but his symptoms started subsiding gradually on the way. NCCT is given below .what is the best course of treatment in this patient?

(or)

Which of the following is a mainstay treatment for TIA in a patient having risk factors?



A. Dual antiplatelet therapy

B. Thrombolysis

C. Rosuvastatin

D. Idarucizumab

---

11. A 65-year-old male presents to the emergency department with sudden onset visual disturbances and headache. Upon examination, he demonstrates symptoms consistent with an occipital lobe infarct. Which of the following will not be seen?

(or)

Which of the following symptom(s) is not seen in a case of occipital lobe infarct?

A. Anton syndrome

B. Asimultagnosia

C. Anosognosia

D. Gun-barrel vision

---

12. A 58-year-old male patient presents with drooping of left eyelids and weakness in right upper and lower limbs. Which part of the brain is affected in his case?

(or)

Which of the following is affected in Weber syndrome?

A. Medial midbrain

B. Medial medulla

C. Pons

D. Thalamus

---

13. An elderly male with a history of chronic smoking and uncontrolled hypertension is brought to the medicine outpatient department (OPD) by his wife. She reports that he has been experiencing short-term memory disturbances and undue familiarity with unknown people. Upon investigation, a diagnosis of stroke is made. Which of the following is not seen in this patient considering the affected area?

(or)

Which of the following is not seen in a Temporal Lobe stroke?

A. Prosopagnosia

B. Visual hallucinations

C. Thought that his food is poisoned

D. Pure word deafness

---

14. A 65-year-old man is brought to the emergency department with sudden onset right-sided weakness and difficulty speaking. The patient's wife reports that he was fine just an hour ago but suddenly became unable to move his right arm and leg and began slurring his speech. Which of the following is the drug of choice for thrombolysis in stroke?

(or)

Which of the following is the drug of choice for thrombolysis in stroke?

A. Dual antiplatelet

B. Dabigatran

C. Reteplase

D. Enoxaparin

---

15. Which of the following is true regarding TIA. Symptoms should resolve completely within 12 hours Improvement of symptoms usually begins after 1 hour Dual antiplatelet therapy is the treatment of choice AB2CD score is used to predict the risk of stroke ECG is done to rule out atrial fibrillation

A. 1,2,3,5

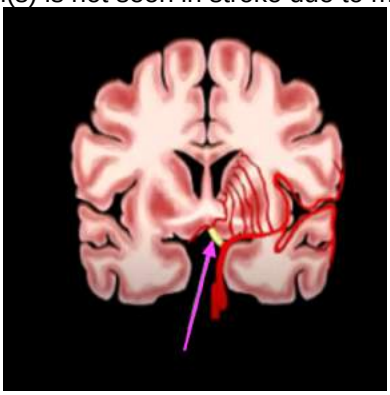
B. 2,3,4

C. 2,3,5

D. 1,3,4,5

---

16. Which of the following symptom(s) is not seen in stroke due to marked artery involvement?



A. Abulia

B. Apathy

C. Urge incontinence

D. Anosognosia

---

17. A 68 year old smoker with T2DM, experiences weakness in right arm and leg when he is about to start his morning walk at 6:30 AM. He immediately rushes to the nearby emergency room and reaches by 7:30 AM, where he is evaluated further. His BP is 180/112 mmHg, INR is 1.3 and the NCCT head shows a acute ischemic stroke. What is the next step in management of this patient?

(or)

which of the following is the next best management for an acute ischemic stroke patient < 4.5 hrs with BP 180/112mm Hg?

A. Thrombolysis

B. Mannitol

C. Thrombectomy

D. BP control

---

18. A 65-year-old male presents to the emergency department with sudden onset weakness in his right arm and slurred speech that lasted for about 20 minutes. His blood pressure is measured at 160/95 mmHg.A risk of stroke is being calculated using ABCD2 score. All of the following are true regarding this score except?

(or)

All are correct factors of the ABCD2 score except?

A. Age should be more than 50 years

B. BP more than 140/90 mmHg

C. Arm weakness

D. Diabetes mellitus

---

19. A 65-year-old man presents to the emergency department with sudden onset weakness on the right side of his body and difficulty speaking. A neurological examination reveals right-sided hemiparesis and expressive aphasia. A CT scan of the brain confirms the diagnosis of acute ischemic stroke.Which of the following is not a management option for this patient?

(or)

Which of the following is not a management option for acute ischemic Stroke?

A. Airway

B. BP control

C. Thrombolysis

D. Hemicraniectomy

---

20. A 65-year-old male patient with a known history of hypertension and diabetes presents to the emergency department with sudden onset weakness on one side of his body and slurred speech. On examination, he has facial droop, arm weakness, and difficulty speaking. A CT scan of the brain reveals a hemorrhagic stroke. Which of the following is the most common site of hemorrhagic stroke in this patient?

(or)

Which of the following is the most common site of hemorrhagic stroke?

A. Putamen

B. Internal capsule

C. Caudate nucleus

D. Substantia nigra

---

21. A 65-year-old male patient arrives at the emergency department presenting with sudden-onset weakness on one side of his body and difficulty speaking. His family reports that these symptoms started approximately 3 hours ago. All are indications for thrombolysis except?

(or)

All are indications for thrombolysis except?

A. NIHSS > 5: Clinical stroke

B. Age > 18 years

C. The onset of symptoms < 2.5 hours at the time of drug administration

D. CT scan showed no hemorrhage or edema for > 1/3rd MCA territory

---

22. A 37 year old female was brought to the emergency department with seizures and headache for one day. On examination, paraplegia and increased ICP were present. The patient is taking oral

contraceptice pills for quiet a long time. She was managed with Aspirin .Which of the following is the investigation of choice in this condition?

(or)

Which of the following is the investigation of choice in the condition characterized by seizures, paraplegia, headache and managed with Aspirin?

A. MRI head

B. CT head

C. Magnetic resonance venography

D. X-ray of spine

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	3
Question 3	3
Question 4	3
Question 5	4
Question 6	3
Question 7	1
Question 8	3
Question 9	3
Question 10	1
Question 11	3
Question 12	1
Question 13	2
Question 14	3
Question 15	3
Question 16	4
Question 17	4
Question 18	1
Question 19	4
Question 20	1
Question 21	3
Question 22	3

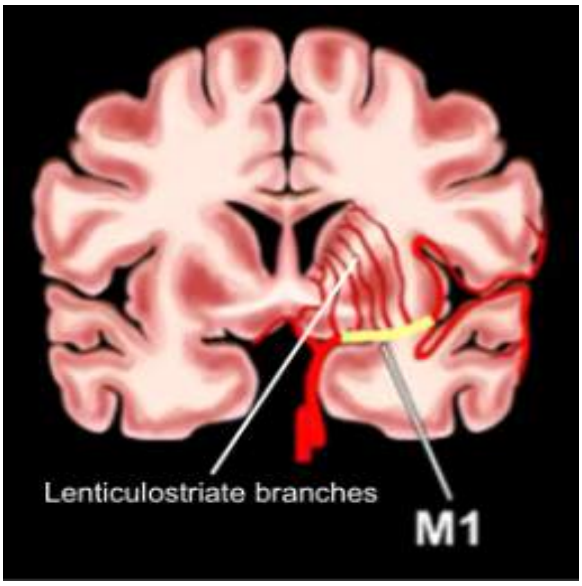
Solution for Question 1:

Correct Option A - M1: Horizontal part of middle cerebral artery:

• The branches that are seen arising superiorly from the M1 segment of the middle cerebral artery are called lenticulostriate branches.

• If lenticulostriate branches are involved, it will contribute to the development of basal ganglia manifestations.

• They are involved in lacunar stroke.

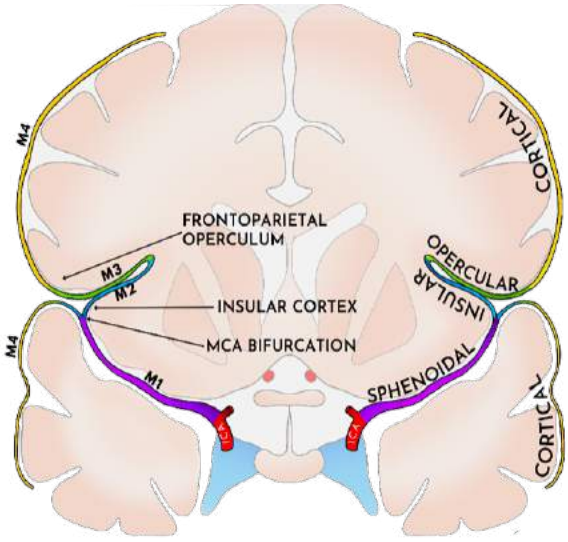


Incorrect Options:

Option B - M2: Insular part of middle cerebral artery- present on the lateral surface of the insula.

Option C - M3: Opercular part of middle cerebral artery-runs in the Sylvian fissure. It separates the pari etal from the temporal lobe.

Option D - M4: Cortical part of middle cerebral artery-supplies the cortical surface and is usually involv ed in cortical stroke.



Solution for Question 2:

Correct Option C - Corticospinal tract- It is a motor tract present in the midline of the brain stem:

Note: All structures that begin with the letter S are located laterally(side) in the brain stem:

• Spinothalamic tract (carries pain & temperature)

• Spinocerebellar tract

• Sympathetic chain

• Sensory CN nuclei

All structures that begin with the letter M are midline.

• Medial longitudinal fasciculus (eye movement)

• Motor tract (corticospinal Tract)

• Medial lemniscus (carries proprioception/vibration)

• Motor nuclei of CN (3,4,6,12)

Incorrect Options A, B & D - all are located laterally on the brain stem.

Solution for Question 3:

Correct Option C - 48 hrs:

• A history of HTN and DM with symptoms of a focal neurological deficit beginning to resolve in 30 minutes is indicative of a transient ischemic attack (TIA). like

• CT scan of the brain is normal in most patients of TIA.

Time period in TIA

• Improvement in symptoms begin within 1 hour

• Resolves completely within 24 hours

• Highest chance of developing stroke after TIA - within first 48 hours

Incorrect Options:

Option A - 4.5 hrs: This is the window period for thrombolysis in stroke

Option B - 24hrs: The symptoms of TIA usually resolve within 24 hrs

Option D - 12 hrs: This option is irrelevant.

Solution for Question 4:

Correct option C - Non dominant parietal lobe-Right middle cerebral artery:

• The first image shows the patient was not able to copy and draw the pictures which indicates a constructional apraxia and the second image shows a drawing with all the numbers to one side which indicates hemineglect of one side of the body.

• All these are features of damage to the non dominant parietal lobe which is supplied by the right middle cerebral artery.

Incorrect Options:

Option A - Dominant parietal lobe: Supplied by the left middle cerebral artery; lesion is associated with acalculia, agraphia, facial agnosia

Option B - Temporal lobe: Supplied by the middle cerebral artery; lesion is associated with symptoms li ke hallucinations, pure word deafness, pure word blindness, and amnesia

Option D - Frontal lobe: Supplied by the anterior cerebral artery; lesions associated with personality ch anges and antisocial behavior, urge incontinence, abulia, appearance of primitive reflexes i.e., Moro's r eflex and magnetic gait/gait apraxia

Solution for Question 5:

Correct Option D - Deviated tongue:

• Tongue deviation is caused by the 12th cranial nerve palsy, which originates medially and is associated with medial medullary syndrome.

Incorrect Options:

• Option A, B, C - are all features of lateral medullary syndrome.

Solution for Question 6:

Correct Option C - NOTCH 3:

• CADASIL: Cerebral Autosomal Dominant Arteriopathy with subcortical infarcts is associated with NOTCH 3 gene

Incorrect Options:

• Option A, B, D are incorrect.

Solution for Question 7:

Correct Option A – Thrombolysis:

The symptoms and NCCT findings (Hyperdense MCA sign (right MCA, M1 segment)) are suggestive of acute ischemic stroke, and thrombolysis is the best next step in management

• The patient reached the hospital within 4.5 hours (Window period for thrombolysis)

• No contraindications for thrombolysis present

Incorrect Options:

Option B - CT angiography: Perfusion scan is done when

• the patient is not a candidate for thrombolysis or after failed recanalization of the occluded vessel in the initial 6 hrs or to check for resolution of thrombus post thrombolysis therapy

• When a patient presents between 6-24 hours, to see for large vessel occlusion

Option C - MR venography:

• It is an IOC for cerebral venous thrombosis (involves sagittal/lateral sinus) that manifests as headache, seizures, paraplegia, and raised ICP.

Option D – Thrombectomy:

• It is done for patients who are not a candidate for thrombolysis or failed recanalization of occluded vessel, and CT angiography shows thrombosis or occlusion in ICA, M1/M2 branches of MCA or basilar artery in initial 6 hours)

Solution for Question 8:

Correct Option C – Thrombectomy:

• The symptoms and NCCT findings (hypodensity in the right MCA territory) are suggestive of acute ischemic stroke.

• When the exact time of onset of symptoms is uncertain, the window period is from last known to be normal (7.5 hours ago) and hence thrombolysis will not be done in this case.

• In patients presenting between 6-24 hours If CT angiography/perfusion scan shows large vessel occlusion (ICA/M1,M2 of MCA/Basilar artery) then thrombectomy is performed

• If CT angiography/perfusion scan shows large vessel occlusion (ICA/M1,M2 of MCA/Basilar artery) then thrombectomy is performed

• If CT angiography/perfusion scan shows large vessel occlusion (ICA/M1,M2 of MCA/Basilar artery) then thrombectomy is performed

Incorrect Options:

Option A – Thrombolysis:

• It is not done out of stroke window period (4.5 hours)

Option B - CT angiography:

Perfusion scan is done when

• Patient is not a candidate for thrombolysis or after failed recanalization of occluded vessel in the initial 6 hrs or to check for resolution of thrombus post thrombolysis therapy

• When patient presents between 6-24 hours, to see for large vessel occlusion

• So it would be the next step in management and not the treatment of choice

Option D - Ventriculostomy:

• It is done for hemorrhagic stroke

Solution for Question 9:

Correct Option C - Hypodensity expanding to 2/3rd of MCA territory:

• Thrombolysis is contraindicated in ischemic stroke patients with extensive regions of hypodensity as it has an increased risk of converting to hemorrhagic stroke.

Incorrect Options:

Option A – Raised BP:

• Sustained BP> 185/110 mmHg despite treatment is a contraindication for thrombolysis

Option B - INR>1.7:

• Thrombolysis is contraindicated in patients with INR>1.7

Option D - major surgery > 3 months:

• Major surgery in the last 14 days is a contraindication for thrombolysis (here the patient had surgery 3 months ago)

Solution for Question 10:

Correct Option A - Dual platelet therapy:

• This is a case of TIA with patient having risk factors (uncontrolled diabetes and hypertension) where the symptoms start resolving after 1 hour of onset and NCCT findings are normal.

• Dual platelet therapy(aspirin+clopidogrel) is the mainstay of treatment for TIA patients

Incorrect Options:

Option B - Thrombolysis:

• Thrombolysis with tissue plasminogen activator (tPA) is not indicated in the acute management of TIA, as there is no evidence of acute infarction on imaging.

• Thrombolysis is reserved for acute ischemic stroke within the therapeutic window and evidence of ischemic changes on neuroimaging.

Option C – Rosuvastatin:

• While statin therapy, including rosuvastatin, plays a crucial role in secondary prevention following a TIA or ischemic stroke, its initiation is not considered the mainstay of acute management.

Option D – Idarucizumab:

• Idarucizumab is a specific antidote used to reverse the anticoagulant effects of dabigatran, a novel oral anticoagulant (NOAC).

• It is indicated in patients with life-threatening bleeding or in urgent situations requiring reversal of dabigatran's anticoagulant effects.

• However, it is not indicated in the acute management of TIA.

Solution for Question 11:

Correct Option C - Anosognosia:

• Anosognosia : Inability to appreciate severity of motor and cognition defects seen in non-dominant parietal lobe infarct The person is not bothered about the deficit Also seen in alzheimer's due to cortical atrophy

• The person is not bothered about the deficit

• Also seen in alzheimer's due to cortical atrophy

• The person is not bothered about the deficit

• Also seen in alzheimer's due to cortical atrophy

Incorrect Options:

Options A,B,D are Occipital Lobe infarct symptoms

Solution for Question 12:

Correct Option A - Medial midbrain:

• Given that the patient has drooping of the left eyelids (3rd nerve palsy) and weakness in the right upper and lower limbs (contralateral hemiplegia), Weber's syndrome is the most likely diagnosis

• Weber syndrome, also known as ventral midbrain syndrome, presents with:

• Ipsilateral oculomotor nerve palsy, characterized by: Ptosis (drooping eyelid). Squint (deviation of the eye).

• Ptosis (drooping eyelid).

• Squint (deviation of the eye).

• Contralateral hemiplegia, which involves paralysis of one side of the body opposite to the affected oculomotor nerve.

• Ptosis (drooping eyelid).

• Squint (deviation of the eye).

Incorrect Options:

Option B - Medial medulla: It is involved in medial medullary syndrome

• Contralateral hemiplegia

• Ipsilateral 12th nerve palsy Tongue deviation to same side

• Tongue deviation to same side

• Tongue deviation to same side

Option C – Pontine: Stroke causes Millard Gubler syndrome

• Ipsilateral nerve fascicles affected of 6th nerve

• 7th lower motor neuron palsy

• Contralateral hemiplegia

Option D - Thalamus: Dejerine-Roussy syndrome

• Thalamus: Dejerine-Roussy syndrome, also known as thalamic pain syndrome, results from a stroke affecting the thalamus, particularly the posterior cerebral artery (PCA) territory. It presents with severe, lancinating pain, often described as burning or agonizing, typically on the contralateral side of the body.

Solution for Question 13:

Correct Option B - Visual hallucinations:

• Asimultagnosia, or simultanagnosia, is typically associated with stroke in the occipital lobe rather than the temporal lobe. It refers to a deficit in perceiving multiple objects simultaneously, often seen in conditions such as posterior cortical atrophy.

Incorrect Options:

Option A, C and D all findings of a temporal lobe stroke involving the MCA territory

Solution for Question 14:

Correct Option C - Reteplase:

• Reteplase is a recombinant tissue plasminogen activator (rt-PA) used for thrombolysis in acute ischemic stroke.

• It is administered intravenously to dissolve blood clots obstructing cerebral arteries and restore blood flow to ischemic brain tissue.

• The recommended dose of reteplase for thrombolysis in stroke is 0.9 mg/kg (maximum dose of 90 mg).

Incorrect Options:

Option A - Dual antiplatelet: Dual antiplatelet therapy is used for TIA and post thrombolysis as prophyla xis in patients of ischemic stroke

Option B – Dabigatran: Dabigatran is a novel anticoagulant used for prophylaxis of thrombosis in TIA a nd stroke patients with non-valvular atrial fibrillation.

Option D – Enoxaparin: Enoxaparin is a LMWH used as bridge therapy with warfarin for prophylaxis of thrombosis in patients with mechanical valve-atrial fibrillation.

Solution for Question 15:

Correct Option C - Statement 2,3,5:

• Statement 2: Improvement of symptoms usually begins after 1 hour

• Statement 3: Dual antiplatelet therapy is the treatment of choice

• Statement 5: ECG is done to rule out atrial fibrillation

Incorrect Options:

• Statement 1 is incorrect : Symptoms resolve within 24 hours

• Statement 4 is incorrect: ABCD2 scoring is used

Options A,B,D contain statement 1&4 hence wrong

Solution for Question 16:

Correct Option D - Anosognosia:

• The image points out to the anterior cerebral artery which supplies the frontal lobe

• Anosognosia: inability to appreciate severity of motor and cognitive defects (also seen in Alzheimer's disease due to cortical atrophy); it is a feature of damaged non dominant parietal lobe supplied by the right middle cerebral artery.

Incorrect Options:

Options A, B, C are all features of damaged frontal lobe supplied by the anterior cerebral artery.

Solution for Question 17:

Correct Option D - BP control:

• Even though the patient has reached hospital within the window period of 4.5 hours for thrombolysis, it can only be done after reduction in BP to <180/100mmHg.

Incorrect Options:

Option A - Thrombolysis:

• It is the treatment option of choice but only after controlling the BP in this patient

Option B - Mannitol:

• It is used to manage the cerebral edema seen due to mass effect in stroke patients

Option C: Thrombectomy:

• Thrombolysis has failed i.e., in cases of large vessel occlusion-LVO (Basilar artery, MCA etc)

• Patients not a candidate for thrombolysis

• Patients preset after 6 hours of onset of symptoms and CT angiography shows LVO

Solution for Question 18:

Correct Option A - Age should be more than 50 years:

• The ABCD2 score is used to predict the risk of stroke following a transient ischemic attack (TIA). The components of the ABCD2 score include age, blood pressure, clinical features (such as arm weakness), duration of symptoms, and presence of diabetes mellitus.

Factor

Points

Age > 60 years

1

Blood pressure > 140/90 mmHg

Clinical feature: Arm weakness

2

Aphasia

Duration of symptoms

<10 minutes

0

10-59 minutes

>60 minutes

Diabetes mellitus

Incorrect Options:

Option B - BP more than 140/90 mmHg: This is a correct factor of the ABCD2 score, contributing 1 point.

Option C - Arm weakness: This is a correct factor in the ABCD2 score, contributing 2 points.

Option D - Diabetes mellitus: This is a correct factor of the ABCD2 score, contributing 1 point if present.

Solution for Question 19:

Correct Option D – Hemicraniectomy:

• Hemicraniectomy is not used for the treatment of stroke. It is the treatment option for hemorrhagic stroke, not ischemic stroke.

• Hemicraniectomy: While hemicraniectomy involves the surgical removal of part of the skull to relieve intracranial pressure, it is typically performed in patients with large hemispheric hemorrhages rather than ischemic strokes. In ischemic stroke management, the focus is on reperfusion therapies such as thrombolysis or thrombectomy, along with supportive care and secondary prevention strategies.

Incorrect Options:

Option A - Airway: Maintaining a patent airway is crucial in stroke management to ensure adequate oxy genation and ventilation, especially in patients with impaired consciousness or compromised respirator y function.

Option B - BP control: Blood pressure control is essential in acute ischemic stroke to prevent complicati ons such as intracranial hemorrhage and worsening of ischemia. Optimal blood pressure targets depen d on various factors such as the patient's comorbidities and eligibility for thrombolytic therapy.

Option C - Thrombolysis: Thrombolytic therapy, such as alteplase (tPA), is a cornerstone treatment for acute ischemic stroke, particularly when administered within the therapeutic window (typically within 4. 5 hours of symptom onset). It aims to dissolve the clot causing the ischemic stroke and restore blood fl ow to the affected area of the brain

Solution for Question 20:

Correct Option A – Putamen:

• Hemorrhagic strokes, which occur due to bleeding in the brain, are often classified based on their location. Among the options provided, the putamen, which is part of the basal ganglia, is the most common site for hemorrhagic strokes.

• Bleeding in the putamen can lead to significant neurological deficits, including weakness, sensory changes, and speech difficulties, which are consistent with the patient's presentation.

Incorrect Options:

Options B, C, D:

• While bleeding can occur in these areas of the brain, they are not as commonly affected as the putamen in cases of hemorrhagic stroke.

• Bleeding in the internal capsule, caudate nucleus, or substantia nigra can also result in neurological deficits, but they are less frequently observed compared to putaminal hemorrhages.

Solution for Question 21:

Correct Option C - The onset of symptoms < 2.5 hours at the time of drug administration:

• Thrombolysis, or the administration of tissue plasminogen activator (tPA), is a time-sensitive intervention indicated for acute ischemic stroke.

• The standard time window for thrombolysis is within 4.5 hours from the onset of symptoms. Therefore, option c, which states that the onset of symptoms should be less than 2.5 hours at the time of drug administration, is incorrect. The correct time window is within 4.5 hours, as per current guidelines.

Incorrect Options:

Option A - NIHSS >
5: Clinical stroke: This is an indication for thrombolysis. NIHSS score greater than 5 indicates a moderate to severe clinical stroke.

Option B - Age > 18 years: Age greater than 18 years is an inclusion criterion for thrombolysis.

Option D - CT scan showed no hemorrhage or edema for > 1/3rd MCA territory: This finding on CT sca n is an indication for thrombolysis, as it suggests the absence of contraindications such as hemorrhage .

Solution for Question 22:

Correct Option C - Magnetic resonance venography:

• The diagnosis is Cerebral venous thrombosis

• Clinical Features: Headache Seizures Paraplegia Increased intracranial pressure (ICP) Coma

• Headache

• Seizures

• Paraplegia

• Increased intracranial pressure (ICP)

• Coma

• Workup: Non-contrast CT head: May show normal findings or an empty delta sign Investigation of choice: Magnetic resonance venography (MRV)

• Non-contrast CT head: May show normal findings or an empty delta sign

• Investigation of choice: Magnetic resonance venography (MRV)

• Treatment: Intravenous Heparin followed by warfarin therapy for 3-6 months Aspirin therapy may be considered.

• Intravenous Heparin followed by warfarin therapy for 3-6 months

• Aspirin therapy may be considered.

• Headache

• Seizures

• Paraplegia
• Increased intracranial pressure (ICP)
• Coma
• Non-contrast CT head: May show normal findings or an empty delta sign
• Investigation of choice: Magnetic resonance venography (MRV)
• Intravenous Heparin followed by warfarin therapy for 3-6 months
• Aspirin therapy may be considered.

Incorrect Options:

Options A,B,D:

• These are not the investigations of choice in Cerebral venous thrombosis

Parkinsonism

1. Which of the following correctly differentiates Alzheimer’s from parkinsonism ?

A. Low dopamine levels

B. Presence of Lewy bodies

C. Damaged Nucleus of Meynert basalis

D. Decreased Thalamus activity

---

2. A 75-year-old banker complains of increasing difficulty buttoning his shirt every morning and brushing his teeth. He states that his hand shakes while relaxing in front of the TV but stops while reaching for the remote and switching channels. Which of the following is the next most appropriate step in managing this patient?

A. Deep brain stimulation

B. Send him for cognitive behaviour therapy (CBT)

C. Prescribe L-Dopa

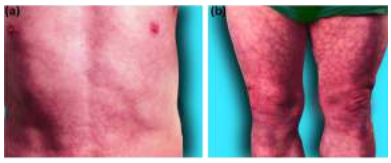
D. Prescribe memantine

---

3. A patient who was recently started on medication for Parkinsonism and developed the following condition (fig. a & b) after treatment of his ailment. What is the drug's mechanism of action likely to cause this adverse effect?

(or)

After treatment for Parkinsonism, a patient develops a specific condition (fig. a & b). What is the mechanism of action of the drug likely responsible for this adverse effect in dermatology?



A. D2 antagonism

B. NMDA antagonism

C. MAO inhibitor

D. Adenosine antagonist

---

4. A 55-year-old male with a history of Parkinson's disease abruptly discontinues his levodopa-carbidopa therapy due to fears of side effects. Shortly after, he manifests severe muscle

rigidity, hyperthermia, confusion, elevated heart rate, blood pressure fluctuations, and profuse sweating. What is the most probable condition this patient is experiencing?

(or)

What condition is likely causing severe muscle rigidity, hyperthermia, confusion, and other symptoms in a patient with a history of Parkinson's disease who abruptly stopped taking levodopa-carbidopa?

A. Wearing-off phenomenon

B. Atypical parkinsonism

C. Serotonin syndrome

D. Neuroleptic malignant syndrome

---

5. A 60-year-old male presents to the neurology clinic with complaints of tremors, bradykinesia, and stiffness in his limbs. He reports difficulty in initiating movements and experiences tremors primarily in his hands at rest. On examination, the patient demonstrates cogwheel rigidity and a shuffling gait. What is the gene present in this disease?

(or)

Which of the following is the disease in which the Parkin gene is found?

A. Parkinson's disease

B. Alzheimer's Disease

C. Corticobasal degeneration syndrome

D. Myasthenia gravis

---

6. A 65-year-old male patient with a history of Parkinson's disease presents to the neurology clinic for a follow-up visit. He has been on levodopa therapy for several months, and the clinician is discussing potential side effects of the medication except?

(or)

All of the following are the side effects of Levadopa except?

A. Dyskinesia

B. Nausea

C. Orthostatic hypotension

D. Obesity

---

7. A 40-year-old man is brought to the doctor by his family for rapid intellectual decline. His wife states that he used to be fun and lively and has become verbally and physically aggressive. Examination shows fast semi-purposive movements in hands. His father and grandfather had died from a similar illness. Which of the following is the most likely diagnosis?

(or)

What is the most likely diagnosis for a 40-year-old man with rapid intellectual decline, increased aggression, fast semi-purposive hand movements, and a family history of a similar illness?

A. Early onset Alzheimers disease

B. Lewy body dementia

C. Corticobasal degeneration

D. Huntington’s chorea

---

8. A 35-year-old male presents with weakness persisting for 3 months, accompanied by tongue fasciculations, 4+ deep tendon reflexes at the knee, and muscle atrophy in certain regions alongside spasticity. Which additional test is warranted for this patient, considering suspected ALS?

A. V.E.P

B. MRI whole spine

C. CT whole Spine

D. Electromyography

---

9. What is the trinucleotide repeat sequence in Huntington's Disease?

A. CTG

B. CAG

C. CGG

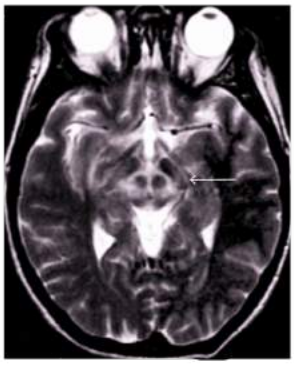
D. GAA

---

10. A 16-year-old adolescent presents to the neurology clinic with a history of parkinsonism-like symptoms, including tremors, rigidity, and difficulty with coordination. He also experiences migraine-like headaches. These symptoms have been progressively worsening over the past few years. On further evaluation, an MRI was done and findings are given below. Which mineral is responsible for this condition?

(or)

Which mineral is responsible for parkinsonism-like symptoms in a 16-year-old with progressive worsening and specific MRI findings?



A. Copper

B. Zinc

C. Iron

D. Magnesium

---

11. A 58-year-old woman presents to a neurology clinic. Her family reports that she has become socially inappropriate, often making impulsive comments and displaying emotional bluntness. Additionally, they have noticed difficulties in her language abilities, such as difficulty finding words and forming coherent sentences. On examination, there are executive function deficits and memory problems. Imaging studies reveal frontal and temporal lobe atrophy on brain MRI. Based on the provided clinical information, what is the most likely diagnosis for this patient?

(or)

What is the likely diagnosis for a patient presenting with changes in behavior, impulsivity, language difficulties, and frontal and temporal lobe atrophy on brain MRI?

A. Alzheimer's Disease

B. Pick's Disease

C. Multiple Sclerosis

D. Multiple system atrophy

---

12. A 58-year-old man presents to the neurology clinic with a complaint of several troubling symptoms. He reports difficulty with balance and coordination, leading to frequent falls. He often feels lightheaded when standing up, which has caused him to faint on several occasions. The patient also experiences bladder and bowel dysfunction, including urinary urgency and constipation. On examination, you notice orthostatic hypotension, marked rigidity, and bradykinesia. Based on the provided clinical information, what is the most likely diagnosis for this patient?

(or)

What is the most likely diagnosis for a 58-year-old man with balance and coordination difficulties, orthostatic hypotension, rigidity, bradykinesia, and bladder/bowel dysfunction?

A. Parkinson's Disease

B. Pick's disease

C. Multiple System Atrophy

D. Huntington's Disease

---

13. A 40-year-old with a family history of similar symptoms comes to a neurology clinic with progressive motor and cognitive issues, including involuntary movements, balance problems, and personality changes. The diagnosis reveals an expanded trinucleotide repeat in the HTT gene. What's the mechanism of action of the preferred medication for this condition?

(or)

What is the mechanism of action of the drug of choice for Huntington's disease?

A. MAO inhibitor

B. VMAT2 inhibitor

C. D2 inhibitor

D. AchE inhibitor

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	3
Question 3	2
Question 4	4
Question 5	1
Question 6	4
Question 7	4
Question 8	4
Question 9	2
Question 10	1
Question 11	2
Question 12	3
Question 13	2

Solution for Question 1:

Correct Option C - Damaged Nucleus of Meynert basalis:

• In Alzheimer’s disease, the neurotransmitter acetylcholine decreases. Acetylcholine is synthesized by the nucleus of Meynert basalis, which is damaged in this disease. This decrease in acetylcholine further leads to various degenerative changes in the brain.

• In Parkinson's Substantia nigra is damaged

Incorrect Options:

Option A - Low dopamine levels: Parkinsonism, including Parkinson's disease, is characterized by a significant reduction in dopamine levels in the brain, particularly in the substantia nigra region.

Option B - Presence of Lewy bodies: Lewy bodies are abnormal protein aggregates that are a hallmark of several disorders, including Parkinson's disease and Lewy body dementia. They are commonly see n in Parkinsonism.

Option D— Decreased Thalamus activity: In parkinsonism, the thalamic activity decreases, whereas th e activity of the globus pallidus interna increases.

Solution for Question 2:

Correct Option C- Prescribe L-dopa:

• Given the symptoms described, including difficulty with fine motor tasks and resting tremor that improves with purposeful movement, this patient likely has Parkinson's disease.

• L-Dopa is the mainstay of treatment for Parkinson's disease, as it helps to replenish dopamine levels in the brain, alleviating motor symptoms.

• Initiation of L-Dopa therapy can significantly improve the patient's quality of life by reducing tremors and enhancing motor function.

Incorrect Options:

Option A- Deep brain stimulation:

• Deep brain stimulation can be done in Parkinson's disease patients when medical therapy fails.

Option B- Send him for cognitive behavioural therapy (CBT):

• Cognitive behavioural therapy has no role in improving parkinsonian symptoms.

Option D- Prescribe memantine:

• Memantine is a medication primarily used in the management of Alzheimer's disease and other forms of dementia.

Solution for Question 3:

Correct Option B- NMDA antagonism:

• The purplish-red, net-like, blotchy spots on the skin shown in the images are consistent with livedo reticularis, a condition characterized by a mottled, net-like pattern due to reduced blood flow in the skin's capillaries. Amantadine, an antiviral and antiparkinsonian medication, has been associated with the development of livedo reticularis as a potential adverse reaction.

• The mechanism of action of amantadine involves NMDA (N-Methyl-D-Aspartate) antagonism, which affects glutamate neurotransmission and may contribute to its effects in Parkinson's disease. However, this mechanism of action can also lead to various central and peripheral side effects, including livedo reticularis in some cases.

Incorrect Options:

Option A- D2 antagonism: D2 antagonists are not typically used as a primary treatment for Parkinson's disease. Instead, D2 agonists, which stimulate dopamine receptors, are more commonly employed. De rmatological side effects such as photosensitivity, skin rashes, and pruritus. Livedo reticularis is not a known adverse effect of D2 antagonism.

Option C- MAO inhibitor (Monoamine Oxidase Inhibitor): While some MAO inhibitors, such as selegilin e and rasagiline, are used in the treatment of Parkinson's disease to prevent the breakdown of dopami ne, they are not typically associated with livedo reticularis as an adverse effect. Dermatological side eff ects such as rash, itching, and photosensitivity. Instead, MAO inhibitors can have other side effects, su ch as potential interactions with certain foods and medications.

Option D- Adenosine antagonist: While some adenosine antagonists, such as istradefylline, are used in the treatment of Parkinson's disease , they are not typically associated with livedo reticularis as an adv erse effect. Dermatological side effects such as rash and pruritus.

Solution for Question 4:

Correct Option D- Neuroleptic malignant syndrome:

• Neuroleptic Malignant Syndrome (NMS) is primarily associated with the use of antipsychotic medications, which block dopamine receptors, particularly D2 receptors. This blockade can lead to dysregulation of dopamine transmission in the brain, contributing to the development of NMS. Additionally, abrupt withdrawal or reduction of dopamine agonist medications, such as levodopa-carbidopa therapy used in Parkinson's disease, can also precipitate NMS due to sudden changes in dopamine levels.

• The hallmark symptoms of NMS include severe muscle rigidity, hyperthermia, altered mental status (confusion), and autonomic instability (elevated heart rate, blood pressure fluctuations, sweating, etc.).

• NMS is a medical emergency that requires immediate attention and typically involves hospitalization.

• Treatment of Neuroleptic Malignant Syndrome (NMS) involves halting the suspected neuroleptic medication and, if the withdrawal of dopaminergic drugs triggered the syndrome, reinstituting them promptly. Supportive medical care, including hydration and managing hyperthermia, is crucial. Bromocriptine and dantrolene are commonly used pharmacological treatments, while other dopaminergic agents and adjunctive medications may also be considered.

Incorrect Options:

Option A - Wearing-off phenomenon:

• This refers to a phenomenon in which the effectiveness of Parkinson's disease medications, such as levodopa, starts to wear off before the next dose is due. It is characterized by a return of Parkinson's symptoms, such as tremors and rigidity, but it does not involve hyperthermia, severe muscle rigidity, or altered mental status.

Option B- Atypical parkinsonism:

• Atypical parkinsonism refers to a group of neurodegenerative disorders that share some clinical features with Parkinson's disease but have different underlying pathology.

• Conditions such as multiple system atrophy (MSA) and progressive supranuclear palsy (PSP) are examples of atypical parkinsonism.

• These conditions may present with various symptoms including parkinsonism, autonomic dysfunction, and cognitive impairment, but they usually have a more insidious onset rather than the abrupt presentation described in the scenario.

Option C- Serotonin syndrome:

• Serotonin syndrome is a condition characterized by excessive serotonin activity in the central nervous system. It can result from interactions between certain medications, including serotonergic antidepressants.

• Symptoms may include agitation, confusion, muscle rigidity, hyperthermia, and autonomic instability, resembling NMS. However, the context of abrupt withdrawal from levodopa is not typically associated with serotonin syndrome.

• The treatment of choice for serotonin syndrome involves discontinuation of the offending medications, supportive care, and in severe cases, administration of serotonin receptor antagonists such as cyproheptadine.

Solution for Question 5:

Correct Option A - Parkinson's disease:

• The Parkin gene is found in Parkinson's disease

• Another gene found in Parkinson's disease is PARK SCN4A gene

Incorrect Options:

Options B, C, D:

• These are the conditions that are not associated with the Parkin gene

Solution for Question 6:

Correct Option D – Obesity:

• Obesity is not typically listed as a side effect of levodopa therapy. While weight changes may occur in patients with Parkinson's disease due to various factors such as changes in appetite, dietary habits, or physical activity levels, obesity itself is not directly caused by levodopa medication.

Incorrect Options

Options A, B, C:

• Dyskinesia, nausea, and orthostatic hypotension are the side effects of Levodopa

Solution for Question 7:

Correct Option D- Huntington’s chorea:

• Huntington's disease/Huntington's chorea is an autosomal dominant condition, so a family history of a similar disease is always present.

• It is caused by trinucleotide repeat (CAG) expansion in the Huntington gene found on chromosome 4. Decreased levels of acetylcholine and gamma-aminobutyric acid (GABA) are seen in the brain. Neuronal death occurs due to glutamate excitotoxicity via NMDA (N-methyl D-aspartate) receptor binding.

• DNA testing can confirm the diagnosis. On neuroimaging, atrophy of caudate and putamen with subsequent ventriculomegaly is seen.

• Symptoms appear between the age of 20-50 years and include: Chorea (Huntington’s chorea) is fast semi-purposive movements. It can involve the face, head and neck, tongue, trunk, and extremities. It presents as abnormal involuntary movements. With advancing age, chorea reduces, and dystonia, rigidity, and myoclonus appear. Athetosis (slow, continuous, involuntary writhing movement) Altered behaviour (aggression, irritability, personality changes, antisocial behaviour, obsessive-compulsive features, and psychosis) Depression. Dementia and intellectual decline are key features. Gait is unsteady and irregular. Bradykinesia and rigidity may occur. Incontinence.

• Chorea (Huntington’s chorea) is fast semi-purposive movements. It can involve the face, head and neck, tongue, trunk, and extremities. It presents as abnormal involuntary movements. With advancing age, chorea reduces, and dystonia, rigidity, and myoclonus appear.

• Athetosis (slow, continuous, involuntary writhing movement)

• Altered behaviour (aggression, irritability, personality changes, antisocial behaviour, obsessive-compulsive features, and psychosis)

• Depression.

• Dementia and intellectual decline are key features.

• Gait is unsteady and irregular. Bradykinesia and rigidity may occur.

• Incontinence.

• Treatment of Huntington's disease is symptomatic. Anxiolytics, antidepressants, and dopamine blockers may provide symptomatic relief.

• Chorea (Huntington’s chorea) is fast semi-purposive movements. It can involve the face, head and neck, tongue, trunk, and extremities. It presents as abnormal involuntary movements. With advancing age, chorea reduces, and dystonia, rigidity, and myoclonus appear.

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• Altered behaviour (aggression, irritability, personality changes, antisocial behaviour, obsessive-compulsive features, and psychosis)

• Depression.

• Dementia and intellectual decline are key features.

• Gait is unsteady and irregular. Bradykinesia and rigidity may occur.

• Incontinence.

Incorrect Options:

Option A- Early-onset Alzheimer's disease:

• Early-onset Alzheimer's disease typically presents with memory loss and cognitive decline as the initial symptoms rather than rapid intellectual decline and choreiform movements.

• While behavioral changes may occur, they are usually less prominent than in Huntington's disease.

• The absence of a strong family history of similar illness makes this option less likely.

Option B- Lewy body dementia:

• Lewy body dementia is characterized by fluctuating cognition, visual hallucinations, and parkinsonism, which includes symptoms such as bradykinesia and rigidity, rather than choreiform movements.

• While behavioral changes can occur, they are not typically described as increased aggression.

• The family history of a similar illness is not characteristic of Lewy body dementia.

Option C- Corticobasal degeneration:

• Alien hand syndrome may manifest as a potential symptom in corticobasal degeneration.

• It presents as asymmetric dystonia, apraxia (loss of visuospatial skills) and focal limb myoclonus. It is not associated with chorea and dementia.

Solution for Question 8:

Correct Option D- Electromyography:

• Electromyography is the test done for A.L.S. It is the first line of investigation

• A.L.S. is a Neurodegenerative disorder characterized by The death of anterior horn cells in the spinal cord and their brainstem homologs innervating bulbar muscles. Progressive weakness affecting any segment of the body Asymmetric limb weakness (most common) Upper and lower motor neuron signs

• The death of anterior horn cells in the spinal cord and their brainstem homologs innervating bulbar muscles.

• Progressive weakness affecting any segment of the body

• Asymmetric limb weakness (most common)

• Upper and lower motor neuron signs

• upper motor neuron (U.M.N.) signs Spasticity or stiffness Hyperreflexia Dysarthria Dysphagia

• Spasticity or stiffness

• Hyperreflexia

• Dysarthria

• Dysphagia

• lower motor neuron (L.M.N.) signs Atrophy Fasciculations Hyporeflexia Weakness

• Atrophy

• Fasciculations

• Hyporeflexia

• Weakness

• Diagnosis of A.L.S. Peripheral nerve conduction studies Electromyography

• Peripheral nerve conduction studies

• Electromyography

• The death of anterior horn cells in the spinal cord and their brainstem homologs innervating bulbar muscles.

• Progressive weakness affecting any segment of the body

• Asymmetric limb weakness (most common)

• Upper and lower motor neuron signs

• Spasticity or stiffness

• Hyperreflexia

• Dysarthria

• Dysphagia

• Atrophy

• Fasciculations

• Hyporeflexia

• Weakness

• Peripheral nerve conduction studies

• Electromyography

Incorrect Options:

Option A- VEP:

• V.E.P [Visual evoked potential] is used to evaluate optic nerve involvement in multiple sclerosis.

Option B- M.R.I. whole Spine:

• M.R.I. The Spine cannot visualize the loss of anterior horn cells or pyramidal cells in the cortex.

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Option C- C.T whole Spine:

• CT spine cannot visualize the loss of anterior horn or pyramidal cells in the cortex.

Solution for Question 9:

Correct Option B - CAG: The trinucleotide repeat sequence of CAG is associated with Huntington's Dis ease. In individuals with Huntington's Disease, there is an expansion of the CAG repeat in the HTT gen e, leading to the production of a
mutated huntingtin protein, which causes the characteristic symptoms of the disease.

Disorder

Trinucleotide Repeat Sequence

Huntington's Disease

CAG

Myotonic Dystrophy Type 1

CTG

Fragile X Syndrome

CGG

Friedreich's Ataxia

GAA

Spinocerebellar Ataxia

Machado-Joseph Disease

Incorrect Options:

Option A - CTG: This trinucleotide repeat sequence is associated with various disorders, including myo tonic dystrophy.

Option C- CGG: This trinucleotide repeat sequence is associated with Fragile X Syndrome, a different genetic disorder characterized by intellectual and developmental disabilities.

Option D - GAA: The GAA trinucleotide repeat sequence is associated with Friedreich's Ataxia, a rare inherited disorder that affects muscle coordination.

Solution for Question 10:

Correct Option A- Copper:

• Wilson's disease, also known as hepatolenticular degeneration, is an autosomal recessive disorder characterized by the abnormal accumulation of copper in various tissues, particularly the liver and

brain.

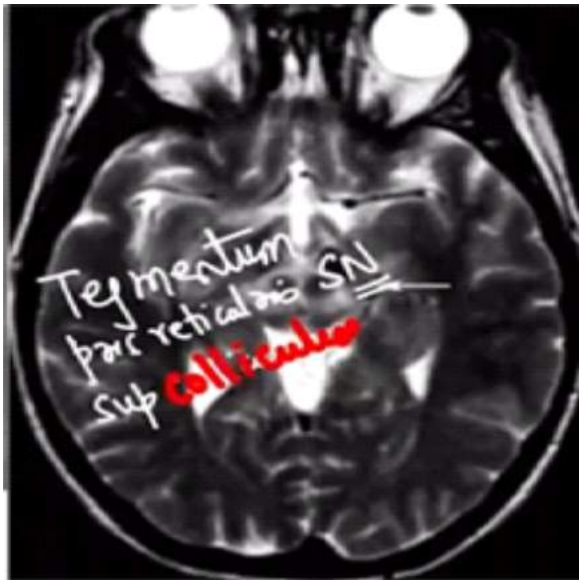
• The typical clinical features of Wilson's disease include neurological symptoms such as tremors, rigidity, dystonia, and difficulty with coordination, which resemble Parkinsonism.

• Other common symptoms include liver dysfunction, such as jaundice and hepatomegaly.

• Wilson's disease can also present with psychiatric symptoms, Kayser-Fleischer rings (copper deposits in the cornea), and renal dysfunction.

• MRI findings in Wilson's disease often show abnormalities in the basal ganglia, particularly the putamen, which may appear hyperintense on T2-weighted images.

• In the Lenticular nucleus, this copper accumulation can result in characteristic MRI findings known as the "Face of Gaint Panda" appearance.



Incorrect Options:

Option B- Zinc: Zinc is not responsible for the condition described in the case scenario. Wilson's Disea se is specifically associated with copper accumulation.

Option C- Iron: Iron accumulation is associated with a different neurodegenerative disorder known as H allervorden-Spatz Disease, which can lead to iron deposition in the globus pallidus and presents with a n "Eye of the Tiger" appearance on MRI.

Option D- Magnesium: Magnesium is not related to the condition described. Wilson's Disease is primari ly associated with copper accumulation, not magnesium.

Solution for Question 11:

Correct Option B- Pick's Disease: This is the correct answer. Pick's Disease is a subtype of frontotemp oral dementia characterized by changes in behaviour, personality, and language abilities. Patients ofte n exhibit social inappropriateness, impulsivity, and difficulties with language, all of which are consistent with the presented clinical scenario. Frontal and temporal lobe atrophy is a hallmark of Pick's Disease.

Incorrect Options:

Option A- Alzheimer's Disease:

• Alzheimer's disease typically presents with progressive memory loss and cognitive decline, including difficulties with language and executive function. However, it is less likely to manifest as prominent social inappropriateness and impulsivity early in the disease course, which are more characteristic of Pick's Disease.

• In Alzheimer's, gyri and sulci blunting can mimic hydrocephalus on plain MRI due to pseudo-enlargement of brain ventricles.

Option C- Multiple Sclerosis:

• Multiple sclerosis primarily presents with a wide range of neurological symptoms, including sensory disturbances, weakness, and coordination problems. It does not typically lead to the specific behavioural and language changes seen in Pick's Disease.

• Plaques or Dawson fingers are noted in periventricular, juxtacortical, and infratentorial areas, with plaque size exceeding 6 mm in Multiple Sclerosis.

Option D- Multiple System Atrophy:

• Multiple system atrophy is characterized by motor symptoms, autonomic dysfunction, and cerebellar signs, which are not in line with the behavioural and language changes described in the case scenario.

•

Solution for Question 12:

Correct Option C- Multiple System Atrophy (MSA):

• Shy-Drager Syndrome, or MSA, is a rare neurological disorder characterized by a combination of motor symptoms (rigidity and bradykinesia), autonomic dysfunction (orthostatic hypotension, bladder and bowel dysfunction), and cerebellar symptoms (balance and coordination problems). It often leads to falls and fainting due to the blood pressure drop upon standing.

• Multiple system atrophy (MSA) often presents with parkinsonism, but patients also exhibit varying degrees of dysautonomia, cerebellar involvement, and pyramidal signs. The prominence of these manifestations, along with symmetry of onset and poor response to levodopa, suggests multiple system atrophy (MSA) rather than Parkinson's disease (PD).

• This is an Atypical Parkinson's Syndrome.

Incorrect Options:

Option A- Parkinson's Disease:

• Parkinson's disease does present with symptoms such as rigidity and bradykinesia, but it typically does not cause significant orthostatic hypotension, bladder and bowel dysfunction, or frequent fainting. These features are more suggestive of an atypical parkinsonism disorder like MSA.

Option B- Pick's Disease:

• Picks Disease, also known as Frontotemporal Dementia (FTD), primarily affects behavior, personality, and language abilities, with symptoms such as social inappropriateness and language difficulties. It does not typically cause the motor symptoms and autonomic dysfunction as described in the scenario.

Option D- Huntington's Disease:

• Huntington's disease is a genetic neurodegenerative disorder characterized by motor symptoms, cognitive decline, and psychiatric features. While it can lead to balance and coordination problems, it does not typically cause the significant autonomic dysfunction and orthostatic hypotension seen in Shy-Drager Syndrome.

Solution for Question 13:

Correct Option B- VMAT2 Inhibitor (Vesicular Monoamine Transporter 2 Inhibitor):

• The expanded trinucleotide repeat in the HTT gene indicates Huntington's disease (HD), a neurodegenerative disorder.

• VMAT2 inhibitors, such as Tetrabenazine, are the drug of choice for Huntington's Disease.

• These drugs deplete presynaptic dopamine storage and reduce dopamine release, helping to manage the chorea and hyperkinetic movements characteristic of the disease. This mechanism of action directly targets the excessive dopamine activity seen in Huntington's Disease.

• Tetrabenazine is used to treat hyperkinetic movement disorders, including Huntington's disease and tardive dyskinesia.

Incorrect Options:

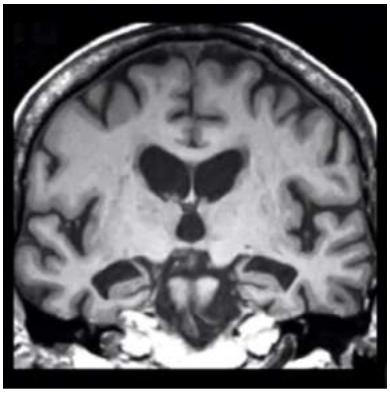
Option A- MAO Inhibitor (Monoamine Oxidase Inhibitor): MAO inhibitors work by inhibiting the enzyme monoamine oxidase, which is responsible for breaking down neurotransmitters like dopamine, serotonin, and norepinephrine. They are not typically used as the drug of choice for Huntington's Disease, as they do not directly address the underlying pathophysiology of the disease.

Option C- D2 Inhibitor (Dopamine D2 Receptor Inhibitor): D2 inhibitors, by blocking dopamine receptors, diminish dopamine signaling. They serve as secondary medications if tetrabenazine proves ineffective and can also alleviate chorea symptoms.

Option D- AChE Inhibitor (Acetylcholinesterase Inhibitor): Acetylcholinesterase inhibitors are used in conditions like Alzheimer's Disease to increase acetylcholine levels in the brain. They are not typically used to treat the motor and cognitive symptoms of Huntington's Disease.

Alzheimer's Disease.

1. A 75-year-old man, devoid of comorbidities, presents at the outpatient department with recurring instances of forgetting the route home from the nearby grocery store, a place he frequents, and struggling to recall the names of common items he interacts with daily. Upon examination, his Mini-Mental State Examination (MMSE) score is 22. The neurologist proceeds to request an MRI scan of the brain, the results of which are provided below. What probable diagnosis does this scenario suggest?



A. Alzheimer’s disease

B. Pick’s disease

C. Parkinson’s disease

D. Pseudodementia

---

2. All of the following are seen in Alzheimer’s except

A. Cortical dementia

B. Amnesia

C. Neurofibrillary tangles

D. Socially inappropriate behavior

---

3. An 80-year-old female presents to the outpatient clinic with complaints of forgetfulness over the past 6 months. A mini mental state examination a score of 19 out of 30. Given the clinical suspicion of Alzheimer's disease which of the following can be done for further diagnostic evaluation to confirm the diagnosis.?

(or)

Which of the following is a further diagnostic evaluation to confirm the diagnosis of Alzheimer's disease?

A. Plain MRI

B. Functional MRI

C. Head CT

D. MMSE

---

4. A 72-year-old female presents to the neurology clinic with progressive memory loss and difficulties in daily functioning. Her family reports that she frequently forgets recent events, repeats questions, and struggles with tasks that were once routine for her.Which of the following drugs are NOT used in the condition this patient is suffering from?

(or)

Which of the following drugs are NOT used in the treatment of Alzheimer’s disease?

A. Donepezil

B. Memantine

C. Rivastigmine

D. Tacrine

---

5. A 60-year-old woman presents to the memory clinic with complaints of progressive forgetfulness and difficulty in performing daily tasks. Her family history reveals a paternal grandmother who was diagnosed with Alzheimer's disease in her late 70s. Which chromosome is associated with the defective gene encoding Apolipoprotein E in affected individuals?

(or)

Which chromosome is associated with the defective gene encoding Apolipoprotein E in affected individuals?

A. Chromosome 1

B. Chromosome 14

C. Chromosome 19

D. Chromosome 21

---

6. A 75-year-old woman presents to the neurology clinic with complaints of memory problems and difficulty in performing daily tasks. Her family reports that she often forgets appointments and struggles to follow conversations. The neurologist performs the clock face test during the assessment to evaluate cognitive function. Which of the following is diagnosed by this test?

(or)

Which of the following is diagnosed by the Clock face test?

A. Dementia

B. Apraxia

C. Amnesia

D. Hemineglect

---

7. A 70-year-old patient presents to the primary care clinic with complaints of memory impairment and difficulty performing daily activities. The physician suspects dementia and decides to perform a Mini-Mental State Examination (MMSE) to assess cognitive function.All of the following are the parts of the MMSE score for dementia except?

(or)

All of the following are the parts of the MMSE score for dementia except?

A. The patient will be asked about the current date, month or year, or address

B. The patient will be asked to do basic calculations

C. Ask the patient to draw intersecting pentagons

D. Drawing clock face

---

8. A 78-year-old woman presents to the memory clinic with complaints of increasing forgetfulness and difficulty in performing daily tasks. She frequently forgets appointments, repeats questions, and struggles to manage her medications. healthcare moderate dementiawhich is categorized as?

(or)

Which among the following is the score of the MMSE for moderate dementia?

A. 12

B. 4

C. 6

D. 22

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	4
Question 3	2
Question 4	4
Question 5	3
Question 6	1
Question 7	4
Question 8	1

Solution for Question 1:

Correct option A - Alzheimer’s disease:

• It is the leading cause of cortical dementia.

• Earliest and most serious damage is seen in medial temporal lobe or entorhinal cortex; parietal and temporal lobes are affected

• In the hippocampus, Nucleus of Meynert Basalisis is affected, reducing acetylcholine levels.

• Acetylcholine, noradrenaline and serotonin levels are reduced

• Genetic predisposition: Chromosome 1: Defective gene is Presenilin -2 Chromosome 14: Defective gene is Presenilin-1 Chromosome 19: Defective gene is Apolipoprotein E4 allele Chromosome 2: Down syndrome (die before 35 years due to pneumonia or congenital heart disease, if they survive after 35

years, they can develop Alzheimer's - Presenile dementia) Amyloid precursor protein

• Chromosome 1: Defective gene is Presenilin -2

• Chromosome 14: Defective gene is Presenilin-1

• Chromosome 19: Defective gene is Apolipoprotein E4 allele

• Chromosome 2: Down syndrome (die before 35 years due to pneumonia or congenital heart disease, if they survive after 35 years, they can develop Alzheimer's - Presenile dementia)

• Amyloid precursor protein

• Chromosome 1: Defective gene is Presenilin -2

• Chromosome 14: Defective gene is Presenilin-1

• Chromosome 19: Defective gene is Apolipoprotein E4 allele

• Chromosome 2: Down syndrome (die before 35 years due to pneumonia or congenital heart disease, if they survive after 35 years, they can develop Alzheimer's - Presenile dementia)

• Amyloid precursor protein

• Histopathology: Amyloid protein between neurons Neurofibrillary tangles composed of Tau protein

• Amyloid protein between neurons

• Neurofibrillary tangles composed of Tau protein

• Clinical features include amnesia, aphasia, apraxia, anosognosia, later progressing to mutism and incontinence. Initially, short-term memory is lost and later progresses to long term memory deficit.

• Initially, short-term memory is lost and later progresses to long term memory deficit.

• MRI brain will show blunting of gyri and sulci which leads to pseudo-enlargement of the ventricles of the brain and could be misinterpreted as hydrocephalus when a plain MRI is

• Amyloid protein between neurons

• Neurofibrillary tangles composed of Tau protein

• Initially, short-term memory is lost and later progresses to long term memory deficit.

performed.

• IOC: Amyloid PET scan

• Treatment: 1. Donepezil

2. Memantine (new drug)- Mostly prescribed in initial stages

3. Rivastigmine + Galantamine

Incorrect Options:

Option B - Pick’s disease:

• Damage to the frontal lobe makes the patient aggressive or socially inappropriate (patient may physically expose themselves without any guilt)

• Patient may experience psychotic features like OCD or delusions and hallucinations

Option C - Parkinson’s dementia:

• Parkinson’s disease characteristically presents with the symptoms of bradykinesia, rigidity and resting tremors, none of which is present in the patient, ruling out the diagnosis.

Option D - Pseudodementia:

• Patients with pseudodementia display cognitive deficits or memory issues due to an underlying psychiatric disorder, most commonly depression.

Solution for Question 2:

Correct Option D - Socially inappropriate behavior

• Socially inappropriate behaviors, such as disinhibition, impulsivity, and inappropriate sexual behavior, are more commonly associated with frontotemporal dementia (including Pick's disease) rather than Alzheimer's disease.

• Frontotemporal dementia primarily affects the frontal and/or temporal lobes of the brain, leading to changes in behavior, personality, and social conduct.

Incorrect Options-

Options A, B and C- All of the above options are features of Alzheimer’s disease.

Solution for Question 3:

Correct Option B - Functional MRI:

• Functional MRI is a neuroimaging technique that measures brain activity by detecting changes in blood flow.

• In patients suspected of having Alzheimer's disease, fMRI can assess metabolic activity in specific brain regions, particularly the parietal and temporal lobes, which are commonly affected by the disease.

Incorrect Options:

Option A and C:

• A plain MRI and is not preferred because it shows the findings at a later stage of the disease.

Option D - MMSE:

• It is important to remember that an MMSE should be used as a screening tool and not to confirm the diagnosis.

• This is because various other diseases, like depression, can also result in an abnormal MMSE score.

Solution for Question 4:

Correct Option D : Tacrine

• Alzheimer's disease is a progressive neurodegenerative disorder characterized by cognitive decline, memory impairment, and functional decline as given in the scenario

• Tacrine, also known as tetrahydroaminoacridine (THA), was one of the first drugs approved for the treatment of Alzheimer's disease.

• However, its use has been discontinued due to significant hepatotoxicity and the availability of safer alternatives such as donepezil, memantine, and rivastigmine.

Incorrect Options -

Option A- Donepezil is an acetylcholinesterase inhibitor, given in the initial stages to treat Alzheimer's.

Option B- Memantine, an NMDA receptor antagonist is also given for Alzheimer’s

Option C- Rivastigmine is also an acetylcholinesterase inhibitor used in treating Alzheimer’s.

Solution for Question 5:

Correct Option C - Chromosome 19:

• The defective gene associated with Alzheimer's disease and encoding Apolipoprotein E is located on Chromosome 19. Specifically, the Apolipoprotein E 4 allele has been implicated as a risk factor for late-onset Alzheimer's disease.

Incorrect Options:

Option A - Chromosome 1: Chromosome 1 is associated with a defective gene encoding Presenilin-2, which is implicated in some cases of familial Alzheimer's disease.

Option B - Chromosome 14: Chromosome 14 is associated with a
defective gene encoding Presenilin-1, another gene implicated in familial Alzheimer's disease.

Option D - Chromosome 21: Chromosome 21 is associated with Down syndrome (Trisomy 21) but is n ot directly linked to Alzheimer's disease. However, individuals with Down syndrome have an increased risk of developing Alzheimer's disease due to triplication of the Amyloid Precursor Protein (APP) gene l ocated on Chromosome 21.

Solution for Question 6:

Correct Option A – Dementia:

• The clock face test is used to assess various cognitive functions, including visuospatial abilities, executive function, and memory.

• In this test, the patient is asked to draw a clock face showing a specific time, typically 10 minutes past 11.

• Abnormalities in the drawing, such as missing numbers, incorrect placement of hands, or disproportionate size, may indicate cognitive impairment consistent with dementia.

Incorrect Options:

Options B, C, D:

• These are not diagnosed by the clock face test

Solution for Question 7:

Correct Option D - Drawing clock face:

• While drawing a clock face is a common task in cognitive assessments, it is not part of the MMSE score.

• Instead, it is included in other cognitive screening tools, such as the Montreal Cognitive Assessment (MoCA).

Incorrect Options:

Options A, B, C:

• These are the parts of the MMSE score

Solution for Question 8:

Correct Option A - 12:

A score of 12 on the MMSE is indicative of moderate dementia. Dementia severity is categorized base d on MMSE scores as follows:

• Mild dementia: MMSE score between 21 and 24

• Moderate dementia: MMSE score between 10 and 20

• Severe dementia: MMSE score less than 10

Incorrect Options:

Options B, C:

• These indicate severe dementia

• Scores< 10 indicate severe dementia

Option D - 22:

• A score between 21-24 indicates mild dementia

Headache and Migraine

1. The migraine disability assessment score is evaluated based on the history of headaches for how many months?

A. 6 months

B. 1 year

C. 3 months

D. 1 month

---

2. A 25-year-old female comes to the OPD with a complaint of a throbbing one-sided headache which starts with blurred vision and nausea followed by aversion to light and sound which lasts for 24 hrs. The doctor examined the patient and gave a MIDAS score of 18. All of the following are the first line of approach in the condition except?

(or)

What is the treatment for migraine with moderate disability?

A. Indomethacin

B. Triptans

C. Naproxen

D. Paracetamol

---

3. A 25-year-old female was watching movies at night with all the lights switched off, when she suddenly developed severe pain and redness in the right eye along with 3 episodes of vomiting. What is the likely diagnosis?

A. Cluster headache

B. Angle-closure glaucoma

C. Migraine

D. Tension headache

---

4. Match the following migraine variants in set 1 with their features in set 2 SET 1 1) Ophthalmoplegic Migraine 2) Retinal Migraine 3) Familial Hemiplegic Migraine SET 2 a) Calcium channel defect b) Ptosis and squint c) Blindness and scotoma

A. 1-a,2-c,3-b

B. 1-b,2-c,3-a

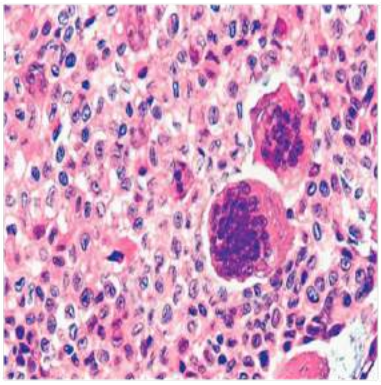
C. 1-c,2-a,3-b

D. 1-a,2-b,3-c

---

5. A 58-year-old male presents at the OPD reporting severe headaches, particularly in the area anterior to the ears, exacerbated by chewing gum. He has recently experienced intermittent fever and has been self-medicating with paracetamol. Laboratory results reveal a hemoglobin level of 11%, a white blood

cell count of 15,000 cells/mm³, and an erythrocyte sedimentation rate (ESR) of 100 mm in 1 hour. Temporal artery biopsy findings are shown in the image. What is the recommended course of action for managing this patient?



A. Sumatriptan

B. Ibuprofen

C. Steroids

D. Celecoxib

---

6. A 28-year-old male presents to the hospital with a complaint of extreme headache with red and watery eyes three to four times a day, each episode lasting for at least 20 minutes at about the same hour everyday for the last 2 months. Which of the following should be used in this patient to prevent future attacks?

(or)

Which of the following is used to prevent future attacks in cluster headache?

A. Lignocaine

B. Sumariptan

C. Verapamil

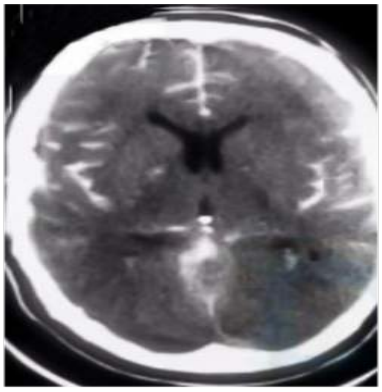
D. Aspirin

---

7. A 50-year-old woman presents to the emergency department with a sudden onset severe headache described as "the worst headache of her life." Upon examination, she appears agitated and is experiencing neck stiffness. NCCT is given below. Which of the following is not a cause of the condition that the patient is suffering from?

(or)

Which of the following is not a cause of Subarachnoid hemorrhage?



A. Rupture of berry aneurysm

B. Arteriovenous malformation

C. Charcot Bouchard aneurysm

D. Diabetes mellitus

---

8. A 60-year-old female patient presents to the emergency department with sudden-onset severe headache, vomiting, and loss of consciousness. A computed tomography (CT) scan reveals subarachnoid hemorrhage. An electrocardiogram (ECG) is performed as part of the initial evaluation. Which of the following is not an ECG change seen in this patient?

(or)

Which of the following is not an ECG change seen in Subarachnoid hemorrhage?

A. ST depression and T-wave inversion are seen

B. Peaked T waves may also be seen

C. QT prolongation

D. Narrow QRS complex

---

9. A 65-year-old male presents to the emergency department with a sudden onset of severe headache, accompanied by nausea and vomiting. Upon examination, the patient is alert and oriented but appears distressed due to the intensity of the headache. Which of the following is the grade of the Hunt Hess Scale in this patient?

(or)

Which of the following is the grade of the Hunt Hess Scale when the patient has a severe headache?

A. Grade 1

B. Grade 2

C. Grade 3

D. Grade 4

---

10. A 55-year-old male patient presents to the emergency department with sudden-onset severe headache, nausea, and vomiting. A computed tomography (CT) scan of the head reveals evidence of subarachnoid hemorrhage (SAH). Which of the following is not useful in the management of this

patient?

(or)

Which of the following is not useful in managing Subarachnoid hemorrhage?

A. Steroids

B. Labetalol

C. Nimodipine

D. Aneurysmal clip

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	2
Question 3	2
Question 4	2
Question 5	3
Question 6	3
Question 7	4
Question 8	4
Question 9	2
Question 10	1

Solution for Question 1:

Correct Option C - 3 months:

• Migraine disability assessment score (MIDAS) is evaluated based on the history of headaches for the past three months.

• The MIDAS (Migraine Disability Assessment) questionnaire gauges the impact of headaches on daily life.

• Instructions: Answer questions regarding all headaches experienced in the last three months.

• Respond in the provided boxes, entering zero if an activity didn't occur in the last three months.

• Questions focus on missed work/school days, reduced productivity, neglected household tasks, and missed social activities due to headaches.

• Physicians require additional headache frequency (counting each day a headache occurred) and average pain intensity on a scale of 0 to 10.

• Scoring: Total the days from questions 1-5 to determine the impact of headaches.

• The MIDAS (Migraine disability assessment score) is used to assess the severity of migraine episodes/attacks.

MIDAS Grade

Definition

MIDAS Score

I

Little or no disability

0-5

II

Mid Disability

6-10

III

Moderate Disability

11-20

IV

Severe Disability

21+

Incorrect Options:

• Options A, B, and D are incorrect.

Solution for Question 2:

Correct Options B - Triptans:

• A female with throbbing one-sided headache that started with blurred vision and is later accompanied by nausea, photophobia, and phonophobia and which lasts for one day is diagnostic of migraine

• According to the MIDAS score (migraine disability assessment score), 18 belongs to the mild to moderate grade, and the first-line approach is the use of COX-1 inhibitors and COX-2 inhibitors if COX-1 is not tolerable.

• Triptans are used when a MIDAS score is more than 21.

• MIDAS - >21 (Severe): 1st line of approach: Triptans (Generally, sumatriptan). If the person is having nausea, the following choices can be considered: Mouth dissolving tablets Nasal sprays- Highly efficacious, works within a few minutes of administration. SC Injector - Autoinjectors. Transdermal patches- Easy to carry and very handy.

• 1st line of approach: Triptans (Generally, sumatriptan).

• If the person is having nausea, the following choices can be considered: Mouth dissolving tablets Nasal sprays- Highly efficacious, works within a few minutes of administration. SC Injector - Autoinjectors. Transdermal patches- Easy to carry and very handy.

• Mouth dissolving tablets

• Nasal sprays- Highly efficacious, works within a few minutes of administration.

• SC Injector - Autoinjectors.

• Transdermal patches- Easy to carry and very handy.

• MIDAS - <20 (Mild to Moderate): 1st line of approach: COX-1 inhibitors Indomethacin can contribute to gastritis, which can be treated with antacids or PPIs. Naproxen Some patients cannot tolerate painkillers in such conditions; COX-2 inhibitors- Etoricoxib COX-3 inhibitors Paracetamol 1g with caffeine. Advice to the Patient: To prevent recurrent severe attacks, always have autoinjectors, 6 mg of sumatriptan, which is administered subcutaneously for fast relief.

• 1st line of approach: COX-1 inhibitors

• Indomethacin can contribute to gastritis, which can be treated with antacids or PPIs.

• Naproxen

• Some patients cannot tolerate painkillers in such conditions; COX-2 inhibitors- Etoricoxib COX-3 inhibitors Paracetamol 1g with caffeine.

• COX-2 inhibitors- Etoricoxib

• COX-3 inhibitors

• Paracetamol 1g with caffeine.

• Advice to the Patient: To prevent recurrent severe attacks, always have autoinjectors, 6 mg of sumatriptan, which is administered subcutaneously for fast relief.

• 1st line of approach: Triptans (Generally, sumatriptan).

• If the person is having nausea, the following choices can be considered: Mouth dissolving tablets Nasal sprays- Highly efficacious, works within a few minutes of administration. SC Injector - Autoinjectors. Transdermal patches- Easy to carry and very handy.

• Mouth dissolving tablets

• Nasal sprays- Highly efficacious, works within a few minutes of administration.

• SC Injector - Autoinjectors.

• Transdermal patches- Easy to carry and very handy.

• Mouth dissolving tablets

• Nasal sprays- Highly efficacious, works within a few minutes of administration.

• SC Injector - Autoinjectors.

• Transdermal patches- Easy to carry and very handy.

• 1st line of approach: COX-1 inhibitors

• Indomethacin can contribute to gastritis, which can be treated with antacids or PPIs.

• Naproxen

• Some patients cannot tolerate painkillers in such conditions; COX-2 inhibitors- Etoricoxib COX-3 inhibitors Paracetamol 1g with caffeine.

• COX-2 inhibitors- Etoricoxib

• COX-3 inhibitors

• Paracetamol 1g with caffeine.

• Advice to the Patient: To prevent recurrent severe attacks, always have autoinjectors, 6 mg of sumatriptan, which is administered subcutaneously for fast relief.

• COX-2 inhibitors- Etoricoxib

• COX-3 inhibitors

• Paracetamol 1g with caffeine.

Incorrect Options:

• Options A, C, and D belong to COX-1,2 inhibitors and are used as the first-line approach in acute migraine with a MIDAS score of less than 20.

Solution for Question 3:

Correct Option B - Angle-closure glaucoma:

• Angle-closure glaucoma is a condition preferentially more common in females, where there is a sudden increase in intraocular pressure due to blockage of the drainage angle in the eye. The symptoms described in the case fit well with an acute angle-closure glaucoma attack.

• Severe pain and redness in the right eye: This is a classic symptom of acute angle-closure glaucoma. The sudden increase in intraocular pressure causes intense pain and redness in the affected eye.

• Episodes of vomiting: Acute angle-closure glaucoma can cause nausea and vomiting due to the severe pain and increased intraocular pressure affecting the autonomic nervous system.

• Watching movies at night with all lights switched off: This is a risk factor for angle-closure glaucoma as it can cause dilation of the pupil, which can further narrow the drainage angle in susceptible individuals, leading to an acute attack.

Incorrect Options:

Option A - Cluster headache:

• Cluster headaches manifest as retroorbital pain accompanied by autonomic symptoms such as epiphora, nasal stuffiness, and bulbar congestion. They typically occur with multiple daily attacks and predominantly affect males. Restlessness is a common characteristic, and none of the above-mentioned features in the patient points to this diagnosis.

Option C - Migraine:

• Migraine presents with a pulsating headache often accompanied by visual disturbances like aura or zigzag lines, along with symptoms such as sensitivity to light and sound, and nausea. Attacks typically last 4 to 72 hours, with an average duration of approximately 24 hours. None of the above-mentioned features in the patient point to this diagnosis.

Option D - Tension headache:

• Tension headaches manifest as band-like pressure across the forehead and occipital area, often linked with stress and anxiety, with a normal physical examination. Exclusion of other common headache causes is essential, and none of the above-mentioned features in the patient points to this diagnosis.

Solution for Question 4:

Correct Option B - 1-b,2-c,3-a:

1) Ophthalmoplegic Migraine - b) Ptosis and squint

2) Retinal Migraine - c) Blindness and scotoma

3) Familial Hemiplegic Migraine - a) Calcium channel defect

Migraine Variant

Features

Note

Ophthalmoplegic Migraine

• Presents with 3rd nerve palsy

• Potential recovery over hours or days

• Neurological deficits can persist post migraine attack

• Manifestations may include ptosis and squints

Retinal Migraine

• May be associated with blindness

• Gradual resolution of symptoms

• Scintillating scotoma(s) may occur

• Initial episode may mimic stroke, warranting careful diagnosis

Familial Hemiplegic Migraine

• First migraine attack may present with hemiplegia

• Neuroimaging required to rule out cerebrovascular accidents

• Diagnosis might be mistaken for stroke

• Linked to calcium channel defect

Incorrect Options:

• Option A, C, D - refer to the above options

Solution for Question 5:

Correct Options C - Steroids:

• Temporal region headache (headache in the area anterior to the ears), jaw claudication (pain on chewing), and images showing a cord-like structure near the temporal region and giant cells in the biopsy of the temporal artery are clues for the diagnosis of Giant cell arteritis.

• The mainstay of treatment for temporal arteritis is high-dose corticosteroids, typically prednisone.

• Corticosteroids rapidly reduce inflammation and prevent complications such as vision loss, which can occur due to involvement of the ophthalmic artery.

• Prednisone is usually started at a dose of 40-60 mg/day, with gradual tapering over several months to years, depending on the patient's response and disease activity.

Incorrect Options:

Option A - Sumatriptan:

• Sumatriptan is a medication used for the treatment of migraine headaches. However, it is not appropriate for the management of temporal arteritis.

• Temporal arteritis is a systemic vasculitis involving inflammation of the temporal arteries, not a primary headache disorder like migraines. Therefore, sumatriptan would not address the underlying inflammation and is not indicated for this condition.

Option B - Ibuprofen:

• Ibuprofen is a nonsteroidal anti-inflammatory drug (NSAID) commonly used for pain relief and to reduce inflammation. However, it is not the first-line treatment for temporal arteritis.

• In temporal arteritis, high-dose corticosteroids are necessary to rapidly suppress the inflammatory process and prevent complications such as vision loss. Ibuprofen alone would not adequately address the underlying inflammation and is not recommended as the primary treatment.

Option D – Celecoxib:

• Celecoxib is another NSAID, similar to ibuprofen, but it specifically inhibits cyclooxygenase-2 (COX-2) enzyme.

• Like ibuprofen, celecoxib is not the appropriate treatment for temporal arteritis. High-dose corticosteroids are required to suppress inflammation and prevent complications in patients with temporal arteritis.

Solution for Question 6:

Correct Option C - Verapamil:

• The patient with 3 to 4 episodes of severe headache lasting about 20 minutes every day at the same time and red, watery eyes is likely to have a cluster headache.

• The 1st choice for the prophylaxis of future attacks is Verapamil.

• Drugs used for the prevention of cluster headaches: Verapamil Galcanezumab Topiramate Melatonin Lithium

• Verapamil

• Galcanezumab

• Topiramate

• Melatonin

• Lithium

• Verapamil

• Galcanezumab

• Topiramate

• Melatonin

• Lithium

Incorrect Options:

Option A - Lignocaine: This is used in IV form in the management of SUNCT. SUNCT (Short Lasting U nilateral Neuralgiform Headache with Conjunctival injection and Tearing) is characterized by multiple (3 -200 attacks per day) episodes of headaches, each lasting for a
very short period (5-240 sec). It is not used for preventing future attacks of cluster headaches.

Option C - Sumatriptan: Triptans are used as subcutaneous injections or nasal sprays in the managem ent of an acute attack of cluster headaches or migraine, not for preventing future attacks.

Option D - Aspirin: NSAIDs are used in the acute management of migraine, not for preventing future ep isodes of cluster headaches.

Solution for Question 7:

Correct Option D - Diabetes mellitus:

• The causes of Subarachnoid hemorrhage are as follows: Trauma (Most common) Rupture of berry aneurysm Arteriovenous malformation Charcot Bouchard aneurysm Extension of intracerebral hemorrhage: Hypertensive crisis

• Trauma (Most common)

• Rupture of berry aneurysm

• Arteriovenous malformation

• Charcot Bouchard aneurysm

• Extension of intracerebral hemorrhage: Hypertensive crisis

• Mycotic aneurysm diabetes mellitus is not a cause of Subarachnoid hemorrhage.

• Trauma (Most common)

• Rupture of berry aneurysm

• Arteriovenous malformation

• Charcot Bouchard aneurysm

• Extension of intracerebral hemorrhage: Hypertensive crisis

Incorrect Options

Options A, B, C:

• These are the causes of Subarachnoid hemorrhage.

Solution for Question 8:

Correct Option D - Narrow QRS complex:

• Subarachnoid hemorrhage (SAH) can cause various ECG changes due to its impact on cardiac function and autonomic regulation. However, a narrow QRS complex is not typically observed in patients with SAH.

• The correct ECG changes seen in subarachnoid hemorrhage include: A - ST depression and T-wave inversion, which are indicative of myocardial ischemia or injury. B - Peaked T waves, which can result from sympathetic nervous system activation and electrolyte disturbances. C - QT prolongation, which is often seen due to autonomic dysfunction and catecholamine release.

• A - ST depression and T-wave inversion, which are indicative of myocardial ischemia or injury.

• B - Peaked T waves, which can result from sympathetic nervous system activation and electrolyte disturbances.

• C - QT prolongation, which is often seen due to autonomic dysfunction and catecholamine release.

• In contrast, a narrow QRS complex is not characteristic of SAH. Instead, patients with SAH may exhibit a broad QRS complex, which can be indicative of various cardiac abnormalities or electrolyte imbalances secondary to sympathetic nervous system activation.

• A - ST depression and T-wave inversion, which are indicative of myocardial ischemia or injury.

• B - Peaked T waves, which can result from sympathetic nervous system activation and electrolyte disturbances.

• C - QT prolongation, which is often seen due to autonomic dysfunction and catecholamine release.

Options A, B, C:

• These are the correct ECG changes seen in Subarachnoid hemorrhage.

Solution for Question 9:

Correct Option B – Grade 2:

• When a patient presents with a severe headache, he/she is classified under grade 2 of the Hunt Hess Scale. Grade 2 indicates moderate to severe headache without neurological deficit, which aligns with the patient's presentation in this scenario.

Incorrect Options:

Option A - Grade 1: Grade 1 on the Hunt Hess Scale denotes a
mild headache without any neurological deficit. Since the patient in this scenario has a
severe headache, grade 1 is not applicable.

Option C - Grade 3: Grade 3 corresponds to somnolence and confusion. However, the patient in this sc enario is alert and oriented, ruling out grade 3.

Option D - Grade 4: Grade 4 is characterized by stupor. Since the patient is alert and oriented, grade 4 is not appropriate for this case.

Solution for Question 10:

Correct Option A – Steroids:

• Subarachnoid hemorrhage (SAH) is a medical emergency characterized by bleeding into the subarachnoid space surrounding the brain.

• Steroids, such as dexamethasone, are not recommended in the treatment of SAH because they do not provide significant benefits and may potentially increase the risk of complications.

Incorrect Options:

Options B, C, D:

• Labetalol: Labetalol is a beta-blocker that is commonly used to manage hypertension, which frequently occurs in patients with SAH. It helps to control blood pressure and reduce the risk of rebleeding and complications.

• Nimodipine: Nimodipine is a calcium channel blocker that is specifically indicated for the prevention and treatment of cerebral vasospasm, a potentially serious complication of SAH. By blocking calcium channels in cerebral blood vessels, nimodipine helps to prevent vasospasm and improve cerebral perfusion.

Aneurysmal clip: Surgical clipping of the ruptured aneurysm is a
crucial intervention in the management of SAH. Aneurysmal clipping involves placing a metallic clip acr
oss the neck of the aneurysm to prevent further bleeding and reduce the risk of rebleeding.

Meningitis

1. A 55-year-old patient presents to the emergency department with complaints of headache, fever, and altered mental status. Lumbar puncture is performed, and cerebrospinal fluid (CSF) analysis is conducted to evaluate for possible meningitis. Which of the following CSF findings is typically observed in tuberculous meningitis?

(or)

Which of the following CSF findings is typically observed in tuberculous meningitis?

A. Low sugar

B. Eosinophils are predominant

C. Clear CSF

D. The opening pressure is normal

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2. A 25-year-old patient presents to the emergency department with symptoms suggestive of meningitis, including headache, photophobia, and neck stiffness. A lumbar puncture is performed, and cerebrospinal fluid (CSF) analysis is consistent with viral meningitis. Which of the following CSF findings is NOT typically observed in viral meningitis?

(or)

Which of the following is not a CSF finding seen in Viral meningitis?

A. Glucose is normal

B. Neutrophils < 100x10 6/L

C. Protein in the range of < 0.4 g/L

D. predominance of lymphocytes

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3. A 25-year-old patient presents to the emergency department with fever, severe headache, and neck stiffness. A lumbar puncture is performed to collect cerebrospinal fluid (CSF) for analysis. Which of the following cerebrospinal fluid (CSF) findings is typically observed in bacterial meningitis?

(or)

Which of the following is the CSF finding seen in Bacterial meningitis?

A. Turbid CSF

B. The opening pressure is normal

C. Glucose is normal

D. Lymphocytic predominance

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4. A 2-month-old infant is brought to the pediatric emergency department with fever, irritability, and poor feeding. The infant's mother reports that the baby has been lethargic and difficult to console. Suspecting acute bacterial meningitis, the physician plans to initiate antibiotic therapy promptly.Which antibiotic regimen is the most appropriate initial treatment for this baby?

(or)

Which antibiotic regimen is the most appropriate initial treatment for acute bacterial meningitis in a child under 3 months of age?

A. Ceftriaxone and vancomycin

B. Ampicillin and cefotaxime

C. Ampicillin and ceftriaxone

D. Ampicillin, cefixime, and vancomycin

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5. A 45-year-old patient presents to the emergency department with altered mental status, fever, and focal neurological deficits. The physician suspects viral encephalitis and performs a lumbar puncture to collect cerebrospinal fluid (CSF) for analysis. Which of the following findings would suggest a diagnosis of traumatic lumbar puncture?

(or)

Which of the following findings on the cerebrospinal fluid (CSF) analysis would suggest a diagnosis of traumatic lumbar puncture rather than subarachnoid hemorrhage?

A. Uniform presence of red blood cells (RBCs) in all three sequential CSF tubes

B. Gradual disappearance of RBCs in the second or third CSF tube

C. Bloody appearance of the CSF

D. Detection of periodic lateralized epileptiform discharge on EEG

---

6. A 60-year-old immunocompromised patient presents to the clinic with a persistent headache, fever, and altered mental status. A lumbar puncture is performed, and cerebrospinal fluid (CSF) analysis reveals evidence of fungal meningitis. What is the choice of investigation for confirming the diagnosis of fungal meningitis caused by Cryptococcus species?

(or)

What is the investigation of choice for confirming the diagnosis of fungal meningitis caused by Cryptococcus species?

A. CSF culture for Cryptococcus

B. CSF Gram stain

C. CSF ELISA for CrAg

D. CSF India ink stain

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7. Which of the following is not a contraindication of Lumbar puncture?

A. Bleeding diathesis

B. Raised Intracranial pressure

C. Kyphoscoliosis

D. Chickenpox

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8. A 30-year-old patient undergoes a lumbar puncture (LP) for diagnostic evaluation. Post-procedure, the patient experiences a persistent headache. She tried painkillers and has been lying down as

advised, but there is no improvement. What should be done next?

A. Bed rest for 8-12 hours

B. Painkillers

C. Intravenous caffeine

D. Codeine

---

9. A 70-year-old patient presents with a history of progressive gait disturbances, urinary incontinence, and cognitive decline. The clinical presentation is suggestive of normal pressure hydrocephalus (NPH). What is the therapeutic procedure used to assess and potentially alleviate symptoms in patients with normal pressure hydrocephalus (NPH)?

A. Lumbar puncture with removal of 20 ml of cerebrospinal fluid (CSF)

B. Lumbar puncture with removal of 30 ml of cerebrospinal fluid (CSF)

C. Lumbar puncture with removal of 40 ml of cerebrospinal fluid (CSF)

D. Lumbar puncture with removal of 50 ml of cerebrospinal fluid (CSF)

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10. A 40-year-old male came to the clinic with complaints of fever, headache, and vomiting for 3 days. On examination, the kerning sign was positive, with bilaterally dilated pupils, and photophobia was present. The doctor advised a Lumbar puncture for CSF analysis and was prescribed Antibiotics and dexamethasone. The report which came after a few days showed > 100-1000 lymphocytes per cubic mm and straw-coloured CSF. Which of the following is the treatment to be started?

(or)

Which of the following is the treatment to be started in the condition characterized by fever, headache, vomiting, positive kerning sign, photophobia, and > 100-1000 lymphocytes per cubic mm and straw-colored CSFon CSF analysis?

A. ATT at least for 6 months and continue steroids for 6-8 weeks

B. Ampicillin + cefotaxime

C. Ampicillin + Cefixime + Vancomycin

D. Ampicillin + Ceftazidime + Meropenem

---

11. A 68-year-old male came to the clinic with complaints of fever, headache, and vomiting for 3 days. On examination, the kerning sign was positive, with bilaterally dilated pupils, and photophobia was present. The doctor advised a lumbar puncture and the report showed turbid CSF,>1000 PMN, low sugar, and spiked protein levels. Which of the following is the empiric antibiotic regimen to be started?

(or)

Which of the following is the empiric antibiotic regimen to be started in the condition characterized by fever, headache, vomiting, positive kerning sign, photophobia and turbid CSF,>1000 PMN, low sugar, and spiked protein levels on CSF analysis?

A. Ampicillin + Cefixime + Vancomycin

B. Ampicillin + cefotaxime

C. Ceftriaxone/cefixime and Vancomycin

D. Ampicillin + Ceftazidime + Meropenem

---

12. A 45-year-old male came to the clinic with complaints of fever, headache, and vomiting for 5 days. On examination, kerning and Brudzinski signs were positive. The doctor advised a lumbar puncture which showed turbid CSF and >1000 PMN. Which of the following is the empiric antibiotic regimen to be started?

(or)

Which of the following is the empiric antibiotic regimen to be started in a case of Acute bacterial meningitis?

A. Ceftriaxone/cefixime and Vancomycin

B. Ampicillin + cefotaxime

C. Ampicillin + Cefixime + Vancomycin

D. Ampicillin + Ceftazidime + Meropenem

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13. A 55-year-old immunocompromised patient presents to the clinic with symptoms suggestive of meningitis, including headache, fever, and altered mental status. Lumbar puncture is performed, and Cryptococcus is identified in the cerebrospinal fluid (CSF). What is the recommended treatment regimen for this patient?

(or)

What is the recommended treatment regimen for fungal meningitis caused by Cryptococcus species?

A. Liposomal Amphotericin B (LAMB) and Fluconazole for 2 weeks

B. 5-Fluorocytosine and Fluconazole for 2 weeks

C. Liposomal Amphotericin B (LAMB) and 5-Fluorocytosine for 2 weeks, followed by Fluconazole for 6 weeks

D. Itraconazole and Voriconazole for 6 weeks

---

14. A 7-year-old child is brought to the pediatric clinic by their parents, who report that the child has been experiencing a long-standing illness for several weeks, characterized by irritability, head banging, drowsiness, and episodes of focal seizures. On physical examination, nuchal rigidity along with signs of altered sensorium. A non-contrast CT scan of the head reveals basal exudates. Which of the following treatments will be given to this patient?

(or)

Which of the following will be given as a treatment for Tubercular meningitis?

A. PCM

B. Lorazepam

C. Ampicillin + cefotaxime

D. Steroids

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15. A 42-year-old patient with a confirmed diagnosis of multiple sclerosis and undergoing treatment with Natalizumab, a monoclonal antibody, presents with worsening neurological symptoms. These

symptoms include seizures, ataxia, visual impairment, and hemiparesis. MRI imaging reveals subcortical demyelination. What is the probable diagnosis?

A. Menningococcal meningitis

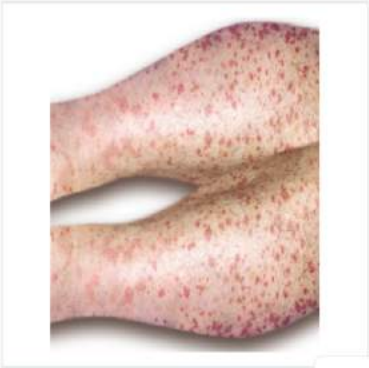
B. Acute Viral Encephalitis

C. Progressive Multifocal Leukoencephalopathy (PML)

D. Guillain-Barré Syndrome

---

16. What is the most probable cause for a 22-year-old man who has a high-grade fever, a purpuric rash, and a CSF sample showing gram-negative diplococci?



A. Neisseria meningitidis

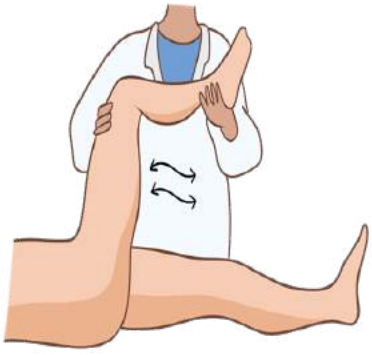
B. Pseudomonas aeruginosa

C. Streptococcus pneumoniae

D. E.coli

---

17. A 25-year-old female presents to the emergency department with a severe headache, photophobia, neck stiffness, and a high-grade fever. She also mentions experiencing nausea and vomiting. On examination, the following sign is elicited. What is the most likely diagnosis?



A. Intracranial Space-Occupying Lesion (ICSOL)

B. Bacterial Meningitis

C. Migraine

D. Brain abscess

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18. Which of the following statements is not true about the causative organisms of bacterial meningitis?

A. In children, Pneumococcus is the leading cause for meningitis followed by Neisseria meningitidis

B. Pneumococcus is the leading cause of meningitis in adults

C. Globally, the most common cause is Klebsiella

D. Listeria monocytogenes cause meningitis in neonates

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19. A 45-year-old male presents to the emergency department with a sudden onset of fever and altered mental status. On examination, the patient is febrile with a temperature of 104°F (40°C). Neurological examination reveals temporal lobe involvement with memory loss. An EEG shows periodic lateralized epileptiform discharges. A lumbar puncture is performed, and the cerebrospinal fluid (CSF) appears bloody. Which of the following diagnostic tests should be prioritized for this patient?

(or)

What diagnostic test should be prioritized for a 45-year-old male with fever, altered mental status, temporal lobe involvement, memory loss, bloody CSF, and a history of herpes simplex virus (HSV) infection?

A. MRI of the brain

B. PCR for HSV-1 on CSF

C. CT scan of the head

D. EEG with sleep deprivation

---

20. A 48-year-old male presents to the emergency department with a two-week history of progressively worsening headache, fever, and altered mental status. He has a past medical history of HIV infection and is currently not on antiretroviral therapy. On examination, the patient appears disoriented and lethargic. He is febrile with a temperature of 102.5°F (39.2°C). Neurological examination reveals nuchal rigidity. Laboratory tests show a CD4 cell count of 90 cells/µL. Cerebrospinal fluid (CSF) analysis reveals pleocytosis, an elevated protein concentration, and a low glucose concentration. CSF Gram stain shows the presence of encapsulated yeast-like organisms. What is the most appropriate course of action for this patient?

(or)

What is the most appropriate treatment for cryptococcal meningitis in an AIDS patient?

A. Initiate antiretroviral therapy (ART)

B. Administer ceftriaxone and vancomycin

C. Start liposomal amphotericin-B (LAMB)

D. Order a brain MRI

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21. A 25-year-old previously healthy female presents to the emergency department with a sudden onset of severe headache, photophobia, high fever, and vomiting. On physical examination, she exhibits neck stiffness, positive Brudzinski's sign, and Kernig's sign. Given the suspicion of acute meningitis lumbar puncture is ordered . What is the correct sequence in which layers are pierced from outwards to inside during a spinal procedure?

(or)

In what order are the layers pierced from the outermost to the innermost layers during a spinal procedure such as lumbar puncture?

A. Skin, Subcutaneous Tissue, Supraspinous ligament, Interspinous ligament, Ligamentum flavum, Duramater and arachnoid mater

B. Skin, Subcutaneous Tissue, Interspinous ligament, Supraspinous ligament, Ligamentum flavum, Duramater and arachnoid mater

C. Skin, Subcutaneous Tissue, Supraspinous ligament, Ligamentum flavum, Interspinous ligament, Duramater and arachnoid mater

D. Skin, Subcutaneous Tissue, Ligamentum flavum, Interspinous ligament, Supraspinous ligament, Duramater and arachnoid mater

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22. Which of the following statements is true about lumbar puncture ?

A. Site of doing lumbar puncture is L4-L5

B. For diagnostic purposes, 30 ml of CSF is removed

C. Drug of choice (DOC) in case of LP induced headache is caffeine

D. Quincke needle is an atraumatic needle

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23. A 28-year-old previously healthy woman presents to the emergency department with a three-day history of progressively worsening headache, fever, and neck stiffness. She denies any recent travel but reports exposure to her friend who had a respiratory illness a week ago. On physical examination, she has a fever (101.3°F or 38.5°C), neck stiffness, photophobia, and a positive Brudzinski's sign .A lumbar puncture is performed, and cerebrospinal fluid (CSF) is collected. The CSF analysis results are as follows: White Blood Cell Count (WBC): 350 cells/mm^3 Differential: Predominantly lymphocytes Red Blood Cell Count (RBC): 20 cells/mm^3 Glucose Level: Normal Protein Level: Mildly elevated Based on the provided clinical history and CSF findings, what is the most likely diagnosis for this patient's condition?

(or)

What is the most likely diagnosis for a 28-year-old woman with worsening headache, fever, neck stiffness, photophobia, and CSF findings of lymphocytosis mildly elevated protein, and normal glucose levels, following exposure to a friend with a respiratory illness?

A. Bacterial Meningitis

B. Fungal Meningitis

C. Viral Meningitis

D. Tuberculous Meningitis

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24. A 16-year-old adolescent presents with a prolonged history of illness characterized by irritability, head banging, drowsiness, and episodes of focal seizures. On examination, nuchal rigidity is noted, along with positive Kernig sign. A neuroimaging study reveals basal exudates. A lumbar puncture is performed, and the cerebrospinal fluid (CSF) analysis shows elevated white blood cell count with lymphocyte predominance, low glucose levels, and mildly elevated protein levels. Which of the following is not associated with this disease ?

(or)

Which of the following is not associated with tuberculous meningitis?

A. Basal exudates on NCCT

B. Crackpot sign

C. Sutural diastasis

D. Obstructive hydrocephalus

---

25. A 35-year-old HIV-positive male with a CD4 count of 80 cells/µL presents with a four-week history of progressive neurological symptoms. He complains of severe headaches, altered mental status, and difficulty with coordination. Physical examination reveals right-sided weakness, cranial nerve abnormalities, and impaired fine motor skills. A brain MRI shows multiple ring-enhancing lesions with surrounding edema in the basal ganglia and frontal lobes. Given the clinical presentation, further tests are conducted. Based on the clinical history, MRI findings, and the patient's immunocompromised status, which of the following is the most likely diagnosis for this patient's neurological condition?

A. Cerebral abscess due to Staphylococcus aureus

B. Neurocysticercosis

C. Primary central nervous system lymphoma (PCNSL)

D. Cerebral Toxoplasmosis

---

26. A 20-year-old male is admitted to a government hospital due to fever, vomiting, lethargy, altered sensorium, and headache. He is a college student and lives in a dormitory. On the next day of admission, he developed petechial hemorrhages on his body. Gram staining of the cerebrospinal fluid reveals gram-negative cocci in pairs. The doctor on duty taking care of the patient is advised to get prophylaxis against this infection. Which of the following is the drug of choice for prophylaxis of meningitis in the healthcare worker caused by these organisms?

(or)

What is the drug of choice for prophylaxis of meningococcal meningitis in healthcare workers?

A. Ceftriaxone

B. Penicillin G

C. Cotrimazole

D. Doxycycline

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27. A 30-year-old truck driver, who is known to be HIV/AIDS positive, presents with a history of not feeling well and having a headache for several days. Initially, he took over-the-counter paracetamol (PCM) for fever, but his headache worsened, and he developed severe photophobia. On physical examination, nuchal rigidity, Brudzinski sign, and Kernig sign are present. Deep tendon reflexes (DTR) are brisk. The patient's medical history includes a CD4 count of less than 100. Which of the following findings is not present in this patient?

(or)

Which of the following is cryptococcal meningitis?

A.

B.

C.

D.

---

28. A 30-year-old male was brought to the emergency department with an impaired ability to memorize things and sudden jerky movements for one day. The bystander gave a history of regular intake of red meat for the past 2 weeks. On examination, myoclonus was present. The doctor advised CSF analysis and the report showed increased tau protein in CSF. Which of the following is the most likely cause of disease?

(or)

Which of the following is the most likely cause of Creutzfeldt-Jacob disease?

A. Prions

B. Mycobacterium tuberculosis

C. HSV

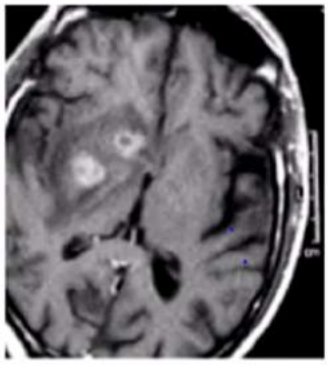
D. Cryptococcus

---

29. A 30-year-old male,AIDS presented to the emergency department with seizures for one day. The doctor advised an MRI brain on evaluation and examination, and the report showed lesions in the basal ganglia. The MRI picture is given below.CSF IgM/IgG showed antibodies for Toxoplasma. Which of the following is the treatment of choice in this condition?

(or)

Which of the following is the treatment of choice for Cerebral toxoplasmosis?



A. Sulfadiazine + Pyrimethamine

B. Azithromycin + Pyrimethamine

C. Streptomycin + Pyrimethamine

D. Penicillin + Sulfadiazine

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	3
Question 3	1
Question 4	2
Question 5	2
Question 6	3
Question 7	4
Question 8	3
Question 9	2
Question 10	1
Question 11	1
Question 12	1
Question 13	3
Question 14	4
Question 15	3
Question 16	1
Question 17	2
Question 18	3
Question 19	2
Question 20	3
Question 21	1
Question 22	3
Question 23	3
Question 24	4
Question 25	4
Question 26	1
Question 27	3
Question 28	1
Question 29	1

Solution for Question 1:

Correct option a - Low sugar

• Low sugar levels in CSF: Hypoglycemia in the CSF is often observed in tuberculous meningitis due to the increased utilization of glucose by the infecting Mycobacterium tuberculosis bacteria.

• CSF lymphocytosis: Tuberculous meningitis typically presents with increased lymphocytes in the CSF, reflecting the inflammatory response to the infection.

• Elevated opening pressure: The opening pressure during lumbar puncture is often elevated in cases of tuberculous meningitis, indicating increased intracranial pressure due to inflammation and swelling within the meninges.

Incorrect options

Options B, C & D:

• These are incorrect due to the above given reason.

Solution for Question 2:

Correct Option C - Protein in the range of <0.4 g/L:

• In viral meningitis, the protein concentration in the cerebrospinal fluid (CSF) typically ranges from 0.4 to 1 g/L.

• Therefore, a protein level exceeding 1 g/L is not a typical finding in viral meningitis.

• The other options, including normal glucose levels, a predominance of lymphocytes, and a neutrophil count of less than 100x10^6/L, are commonly observed in viral meningitis.

Incorrect Options:

Options A, B & D:

• These are the findings seen in Viral meningitis.

Solution for Question 3:

Correct Option A - Turbid CSF:

• Turbid or cloudy CSF is a characteristic finding in bacterial meningitis due to the presence of increased white blood cells (WBCs) and bacteria in the CSF.

• This turbidity results from the inflammatory response and the presence of pus in the CSF.

Incorrect Options:

Option B - Normal opening pressure: In bacterial meningitis, the opening pressure of CSF is typically el evated due to increased intracranial pressure resulting from inflammation and edema.

Option C - Normal glucose level: Bacterial meningitis is associated with low CSF glucose levels due to bacterial consumption of glucose and impaired glucose transport across the blood-brain barrier.

Option D - Lymphocytic predominance: Bacterial meningitis is characterized by a predominance of neu trophils (polymorphonuclear leukocytes) in the CSF, whereas lymphocytic predominance is more com monly observed in viral meningitis.

Solution for Question 4:

Correct Option B - Ampicillin and cefotaxime:

• In infants under 3 months of age, acute bacterial meningitis is commonly caused by pathogens such as Listeria monocytogenes.

• Therefore, the initial antibiotic regimen should cover this organism.

• The recommended antibiotics for this age group are ampicillin plus a third-generation cephalosporin such as cefotaxime.

• The combination of ampicillin and cefotaxime provides broad coverage against common pathogens, including Listeria monocytogenes and Group B Streptococcus (GBS).

Incorrect Options:

Option A - Ceftriaxone and vancomycin: While ceftriaxone is a component of antibiotic therapy for acut e bacterial meningitis, vancomycin is not typically used in this age group unless there is a specific indication, such as suspected methicillin-resistant Staphylococcus aureus (MRSA) infection.

Option C - Ampicillin and ceftriaxone: While ampicillin is appropriate for coverage of Listeria monocytog enes, ceftriaxone is not used in infants due to the risk of jaundice.

Option D - Ampicillin, cefixime, and vancomycin: This regimen includes unnecessary antibiotics and do es not provide optimal coverage for the likely pathogens in infants under 3 months of age.

Solution for Question 5:

Correct Option B - Gradual disappearance of RBCs in the second or third CSF tube:

• In a traumatic lumbar puncture, red blood cells (RBCs) in the CSF are present due to blood contamination during the procedure.

• However, unlike subarachnoid hemorrhage (SAH), where the bleeding is uniform throughout the CSF collection, in traumatic lumbar puncture, the number of RBCs typically decreases in subsequent CSF tubes as the contamination is diluted.

• Therefore, the gradual disappearance of RBCs in the second or third CSF tube is more indicative of a traumatic lumbar puncture.

Incorrect Options:

Option A - Uniform presence of red blood cells (RBCs) in all three sequential CSF tubes: This finding is more consistent with subarachnoid hemorrhage (SAH) rather than traumatic lumbar puncture.

Option C - Bloody appearance of the CSF: While traumatic lumbar puncture can lead to a bloody appe arance of the CSF, this finding alone does not differentiate between traumatic LP and SAH.

Option D - Detection of periodic lateralized epileptiform discharge on EEG: This finding is suggestive of underlying brain dysfunction, such as epilepsy, but it is not specific to traumatic lumbar puncture or SA H.

Solution for Question 6:

Correct Option C - CSF ELISA for CrAg (Cryptococcal Antigen):

• The investigation of choice for confirming the diagnosis of fungal meningitis caused by Cryptococcus species, including Cryptococcus neoformans and Cryptococcus gattii, is CSF ELISA for CrAg (Cryptococcal Antigen).

• This test detects the presence of Cryptococcal Antigen in the cerebrospinal fluid and is highly sensitive and specific for the diagnosis of cryptococcal meningitis.

Incorrect Options:

Option A - CSF culture for Cryptococcus: While CSF culture can confirm the presence of Cryptococcus species, it may take several days to yield results and is less sensitive compared to CSF ELISA for CrAg.

Option B - CSF Gram stain: CSF Gram stain is not specific for Cryptococcus and may not reliably detect fungal organisms in cases of fungal meningitis.

Option D - CSF India ink stain: CSF India ink stain is used to visualize Cryptococcus organisms under microscopy, but it is less sensitive than CSF ELISA for CrAg and may yield false-negative results.

Solution for Question 7:

Correct Option D - Chickenpox:

• Chickenpox is not considered as a contraindication to lumbar puncture

• While it may not be an absolute contraindication in all cases, caution is warranted, especially if there are active lesions or systemic symptoms present. Lumbar puncture should be deferred until the patient has recovered from chickenpox.

Other contraindications of lumbar puncture are as follows:

• 1. Raised ICP

• 2. Bleeding diathesis

• 3. Local site infection (poor patients sweaty or sticky)

• 4 Kyphoscoliosis

Incorrect Options:

Options A, B & C:

• These are the contraindications of Lumbar puncture

Solution for Question 8:

Correct Option C - Intravenous caffeine (preferred drugs): Tea and coffee

• Post-lumbar puncture headache is commonly managed with conservative measures such as bed rest and painkillers.

• However, intravenous caffeine administration is often recommended if the headache persists despite these measures.

• Caffeine constricts cerebral blood vessels and reduces intracranial pressure, thereby alleviating the headache associated with cerebrospinal fluid leakage.

Incorrect Options:

Option A - Bed rest for 8-12 hours: While bed rest is initially advised after an LP, it may not alleviate th e headache if it persists beyond the usual recovery period.

Option B - Painkillers: Painkillers such as nonsteroidal anti-inflammatory drugs (NSAIDs) or acetamino phen are commonly used for mild to moderate post-LP headaches. However, alternative treatments lik e caffeine may be necessary if the headache persists despite their use.

Option D - Codeine: Codeine is an opioid analgesic that can be used to relieve pain, but it is not typicall y the first-line treatment for post-LP headaches due to its potential side effects, such as constipation, w hich may exacerbate the headache.

Solution for Question 9:

Correct Option B - Lumbar puncture with removal of 30 ml of cerebrospinal fluid (CSF):

• For therapeutic relief in normal pressure hydrocephalus (NPH), a lumbar puncture is performed with the removal of approximately 30 ml of cerebrospinal fluid (CSF).

• This procedure, known as the Fisher Test, is used to assess the patient's response to CSF drainage.

• Improvement in gait following CSF removal is suggestive of NPH and may indicate a positive response to further management, such as ventriculoperitoneal shunting.

Incorrect Options:

Option A - Lumbar puncture with removal of 20 ml of cerebrospinal fluid (CSF): The standard amount o f CSF removed for diagnostic purposes in NPH is approximately 20 ml

Options C and D: Lumbar puncture with removal of 40 ml of cerebrospinal fluid (CSF): Incorrect. Remo ving 40 ml of CSF exceeds the typical amount removed for therapeutic relief in NPH and may pose risk s of over-drainage.

Solution for Question 10:

Correct Option A - ATT at least for 6 months and continue steroids for 6-8 weeks:

• The condition described in the question is Tuberculous meningitis

• It is characterized by fever, headache, vomiting, positive kerning signs, bilaterally dilated pupils, and photophobia

• The CSF analysis showed > 100-1000 lymphocytes per cubic mm and straw-colored CSF suggestive of Acute bacterial meningitis

• The condition is treated with ATT at least for 6 months and steroids for 6-8 weeks

Incorrect Options:

Options B - Ampicillin + cefotaxime: In a child < 3 months of age with listeria monocytogenes infection of Acute bacterial meningitis, the antibiotics given are Ampicillin + cefotaxime.

Option C - Ceftriaxone/cefixime and Vancomycin: Children> 3 months and adults up to 55 years of age with Acute bacterial meningitis, Ceftriaxone/cefixime, and Vancomycin are given for treatment.

Option D - Ampicillin + Ceftazidime +
Meropenem: For hospital-based Pseudomonas infection(Acute bacterial meningits), Ampicillin + Ceftazidime +Meropenem are given.

Solution for Question 11:

Correct Option A - Ampicillin + Cefixime + Vancomycin:

• The condition described in the question is Acute bacterial meningitis

• It is characterized by fever, headache, vomiting, positive kerning signs, bilaterally dilated pupils, and photophobia

• The CSF analysis showed turbid CSF and >1000 PMN and low sugar, and spiked protein levels suggestive of Acute bacterial meningitis

• The condition is treated with Ampicillin + Cefixime + Vancomycin

Incorrect Options:

Options B - Ampicillin + cefotaxime: In a child <
3 months of age with listeria monocytogenes infection, the antibiotics given are Ampicillin + cefotaxime

Option C - Ceftriaxone/cefixime and Vancomycin: Child > 3 months and adults up to 55 years of age, C eftriaxone/cefixime and Vancomycin are given for treatment

Option D - Ampicillin + Ceftazidime +
Meropenem: For hospital-based Pseudomonas infection, Ampicillin +
Ceftazidime +Meropenem are given

Solution for Question 12:

Correct Option A - Ceftriaxone/cefixime and Vancomycin:

• The condition described in the question is Acute bacterial meningitis

• It is characterized by fever, headache, vomiting, positive kerning, and Brudzinski signs

• The CSF analysis showed turbid CSF and >1000 PMN suggestive of Acute bacterial meningitis

• The condition is treated with Ceftriaxone/cefixime and Vancomycin

Incorrect Options:

Options B - Ampicillin + cefotaxime: In a child <
3 months of age with listeria monocytogenes infection, the antibiotics given are Ampicillin + cefotaxime

Option C - Ampicillin + Cefixime + Vancomycin: Patients >
55 years old patient with bacterial meningitis, Ampicillin + Cefixime + Vancomycin are given

Option D - Ampicillin + Ceftazidime +
Meropenem: For hospital-based Pseudomonas infection, Ampicillin +
Ceftazidime +Meropenem are given

Solution for Question 13:

Correct Option C - Liposomal Amphotericin B (LAMB) and 5-Fluorocytosine for 2
weeks, followed by Fluconazole for 6 weeks:

• For the treatment of fungal meningitis caused by Cryptococcus species, the recommended initial regimen consists of induction therapy with Liposomal Amphotericin B (LAMB) in combination with 5-Fluorocytosine for 2 weeks to achieve rapid fungal clearance.

• Subsequently, maintenance therapy with Fluconazole is given for an additional 6 weeks to prevent relapse and consolidate treatment.

Incorrect Options:

Option A - Liposomal Amphotericin B (LAMB) and Fluconazole for 2 weeks:

While Liposomal Amphotericin B is part of the induction therapy, Fluconazole alone is not sufficient for the treatment of Cryptococcal meningitis.

Option B - 5-Fluorocytosine and Fluconazole for 2 weeks: Fluconazole alone is not recommended as t he initial treatment for Cryptococcal meningitis; combination therapy with Amphotericin B
is required for induction therapy.

Option D - Itraconazole and Voriconazole for 6 weeks: Itraconazole and Voriconazole are not the prefe rred agents for the treatment of Cryptococcal meningitis.

Solution for Question 14:

Correct Option D - Steroids:

• In the management of tubercular meningitis, steroids such as dexamethasone are often administered as adjunctive therapy along with antitubercular medications.

• Steroids help to reduce inflammation and minimize complications associated with the infection, such as cerebral edema and intracranial pressure.

• They are particularly beneficial in cases where there is evidence of basal exudates on imaging studies, as seen in this patient's non-contrast CT scan.

• Therefore, steroids would be an appropriate treatment option for this child with tubercular meningitis.

Incorrect Options:

Option A - PCM (Paracetamol): Paracetamol may be used to manage fever and alleviate discomfort as sociated with tubercular meningitis, but it does not address the underlying infection or inflammation.

Option B - Lorazepam: Lorazepam is a benzodiazepine medication used to control seizures and anxiet y. While it may be administered to manage seizures in this patient, it does not directly target the underl ying tubercular meningitis.

Option C - Ampicillin + cefotaxime: This combination of antibiotics is typically used to treat bacterial me ningitis caused by organisms such as Streptococcus pneumoniae or Neisseria meningitidis.

Solution for Question 15:

Correct Option C- Progressive Multifocal Leukoencephalopathy (PML):

• PML is a rare but severe viral infection of the brain caused by the JC virus (JCV), a type of human polyomavirus.

• Patients with multiple sclerosis (MS) who are treated with immunomodulatory drugs, particularly Natalizumab, are at increased risk of developing PML. Natalizumab inhibits the migration of lymphocytes into the CNS, which can lead to impaired immune surveillance against opportunistic infections like JCV.

• PML typically presents with progressive neurological symptoms, including seizures, ataxia, visual impairment, and hemiparesis, which align with the symptoms described in the patient.

• MRI findings in PML often show multifocal subcortical demyelination, which is consistent with the imaging findings in this case.

• The diagnosis is confirmed by detecting JCV DNA in the cerebrospinal fluid (CSF) via polymerase chain reaction (PCR) or brain biopsy.

• Treatment primarily involves discontinuing Natalizumab and immune reconstitution, if possible. There is no specific antiviral therapy for PML, but strategies to enhance the immune response against JCV, such as plasma exchange or infusion of JCV-specific T cells, may be considered.

Incorrect Options:

Option A- Meningococcal meningitis:

• Meningococcal meningitis typically presents with symptoms such as fever, severe headache, neck stiffness, photophobia, and a petechial rash. Seizures and hemiparesis are less common presentations.

• MRI findings in meningitis may show leptomeningeal enhancement, but subcortical demyelination is not a characteristic feature.

Option B- Acute Viral Encephalitis:

• Acute viral encephalitis presents with symptoms such as fever, altered mental status, headache, seizures, and focal neurological deficits.

• MRI findings may include focal cortical or subcortical abnormalities, but the presence of multifocal subcortical demyelination as described in the case is not typical.

Option D- Guillain-Barré Syndrome:

• Guillain-Barré Syndrome is characterized by acute-onset ascending weakness, usually starting in the legs, often with sensory abnormalities and areflexia.

• Symptoms such as seizures, ataxia, and hemiparesis are not typical of Guillain-Barré Syndrome.

• MRI findings typically do not show demyelination; instead, nerve conduction studies and cerebrospinal fluid analysis demonstrating albuminocytological dissociation are supportive of the diagnosis.

Solution for Question 16:

Correct Option A- Neisseria meningitidis:

• The above image is that of a purpuric rash which is seen in meningococcemia caused by Neisseria meningitides. Neisseria meningitidis is a gram negative diplococci. Fulminant meningococcemia presents with a very high fever and hemorrhagic rash.

Incorrect Options:

Option B- Pseudomonas aeruginosa: Pseudomonas aeruginosa is a gram-negative rod-shaped bacteria.

Option C- Streptococcus pneumoniae: Streptococcus pneumoniae is a gram-positive, spherical bacteria.

Option D- E. Coli: E. Coli is a gram-negative rod-shaped bacteria.

Solution for Question 17:

Correct Option B - Bacterial Meningitis:

• Bacterial meningitis presents with symptoms such as a severe headache, photophobia (sensitivity to light), neck stiffness, positive Kernig sign, and a high-grade fever.

• Nausea and vomiting are also common symptoms.

• The Kernig sign (given above), which is the inability to fully extend the knee when the hip is flexed to 90 degrees, is a clinical sign often seen in patients with meningitis.

• Bacterial meningitis is a medical emergency that requires urgent treatment with antibiotics.

• Lumbar puncture (spinal tap) is typically performed to confirm the diagnosis by analysing cerebrospinal fluid, which shows an elevated white blood cell count with a predominance of neutrophils.

Incorrect Options:

Option A- ICSOL (Intracranial Space-Occupying Lesion):

• While ICSOLs can cause headaches, they typically do not present with classic signs of meningitis such as neck stiffness and photophobia.

• Presence of focal neurological deficits and seizures may be more characteristic of ICSOLs.

Option C- Migraine:

• Migraines can indeed cause severe headaches and may be associated with nausea and vomiting.

• However, the presence of neck stiffness (Kernig’s sign) is not a typical feature of migraines.

Option D- Brain Abscess:

• Brain abscesses can also cause severe headaches and may lead to neurological symptoms.

• However, the combination of photophobia, neck stiffness, and Kernig sign is more suggestive of meningitis than a brain abscess.

Solution for Question 18:

Correct Option C- Globally, the most common cause is Klebsiella:

• This statement is not true. Globally, Klebsiella is not the most common cause of bacterial meningitis. While Klebsiella can cause meningitis, it is not the leading cause worldwide. Group B streptococcus is the most common cause worldwide.

Incorrect Options:

Option A- In children, Pneumococcus is the leading cause of meningitis followed by Neisseria meningiti dis: which is true. Pneumococcus (Streptococcus pneumoniae) is a
common cause of bacterial meningitis in children.

Option B-Pneumococcus is the leading cause of meningitis in adults: Pneumococcus is indeed the lead ing cause of meningitis in adults. Streptococcus pneumoniae is a
common cause of bacterial meningitis in both children and adults.

Option D- Listeria monocytogenes causes Meningitis in neonates: Listeria monocytogenes can cause meningitis in neonates. Listeria monocytogenes is a known cause of neonatal meningitis, especially in i nfants born to mothers who have consumed unpasteurized dairy products and cold deli meats during p regnancy.

Solution for Question 19:

Correct Option B- PCR for HSV-1:

• This patient's presentation is highly suggestive of HSV-1 encephalitis, characterized by fever, altered mental status, temporal lobe involvement, memory loss, and EEG findings of periodic lateralized epileptiform discharges (PSWC). The most suitable test for the diagnosis is PCR for HSV-1 on the CSF sample.

Incorrect Options:

Option A- MRI of the brain: is valuable for detecting specific brain abnormalities associated with encep halitis, but PCR for HSV-1 should be performed first to confirm the diagnosis.

Option C- CT scan of the head: may reveal structural abnormalities but is less sensitive than MRI for d etecting encephalitis-related changes.

Option D- EEG with sleep deprivation: is not the primary diagnostic test for HSV-1 encephalitis. EEG fi ndings may support the diagnosis, but PCR for HSV-1 is essential for diagnosis.

Solution for Question 20:

Correct Option C- Start liposomal amphotericin-B (LAMB):

• This is the most appropriate course of action (D.O.C) for this patient. Cryptococcal meningitis, caused by Cryptococcus neoformans or Cryptococcus gattii, is a serious fungal infection that requires prompt treatment. Liposomal amphotericin-B (LAMB) and flucytosine are the recommended antifungal agents for initial therapy. This treatment should be initiated as soon as possible to improve the patient's chances of recovery.

Incorrect Options:

Option A-Initiate antiretroviral therapy (ART): Suggests initiating antiretroviral therapy (ART) as the initial course of action for this patient presenting with symptoms of fungal meningitis. However, this approach is not appropriate as we give antifungal as initial treatment in a patient of cryptococcal meningitis.

Option B-Administer ceftriaxone and vancomycin: is wrong because Ceftriaxone and vancomycin are antibiotics used to treat bacterial infections, not fungal infections like cryptococcal meningitis. Administering these antibiotics would not effectively treat the underlying cause of the patient's symptoms.

Option D- Order a brain MRI: is wrong because while a brain MRI can provide valuable information about the patient's neurological condition, it should not be the initial course of action in a case of suspected cryptococcal meningitis. Treatment for the underlying fungal infection should take precedence, as it can be life-threatening if not addressed promptly.

Solution for Question 21:

Correct Option A- Skin, Subcutaneous Tissue, Supraspinous ligament, Interspinous ligament, Ligamentum flavum, Duramater and arachnoid mater:

• Skin, Subcutaneous Tissue, Supraspinous ligament, Interspinous ligament, Ligamentum flavum, Duramater and arachnoid mater.

• This option is correct. It correctly identifies the sequence in which layers are pierced during a spinal procedure, starting from the skin, moving through the Subcutaneous Tissue, Supraspinous ligament, Interspinous ligament, Ligamentum flavum, and finally the Duramater and arachnoid mater reaching the subarachnoid space filled with CSF.

This option is correct. It correctly identifies the sequence in which layers are pierced during a spinal procedure, starting from the skin, moving through the Subcutaneous Tissue, Supraspinous ligament, Interspinous ligament, Ligamentum flavum, and finally the Duramater and arachnoid mater reaching the subarachnoid space filled with CSF.

Incorrect Options:

Option B- Skin, Subcutaneous Tissue, Interspinous ligament, Supraspinous ligament, Ligamentum flavum, Duramater and subarachnoid space:

• This option is incorrect because it places the Interspinous ligament before the Supraspinous ligament in the sequence. The correct order is to pierce the Supraspinous ligament first before reaching the Interspinous ligament.

Option C- Skin, Subcutaneous Tissue, Supraspinous ligament, Ligamentum flavum, Interspinous ligam ent, Duramater and subarachnoid space:

• This option is incorrect because it places the Ligamentum flavum before the Interspinous ligament in the sequence. The correct order is to pierce the Interspinous ligament before reaching the Ligamentum flavum.

Option D- Skin, Subcutaneous Tissue, Ligamentum flavum, Interspinous ligament, Supraspinous ligam ent, Duramater and subarachnoid space:

• This option is incorrect because it places the Ligamentum flavum before the Interspinous ligament in the sequence. The correct order is to pierce the Interspinous ligament before reaching the Ligamentum flavum.

Solution for Question 22:

Correct Option C - D.O.C in case of LP induced headache is caffeine:

• This statement is true. In case a lumbar puncture (LP) induces a headache, caffeine is often considered the drug of choice for relief. It helps by constricting blood vessels in the brain and can be administered intravenously.

Incorrect Options:

Option A- Site of doing lumbar puncture is L4-L5:

• This statement is incorrect. The typical site for performing a lumbar puncture is between the L3 and L4 . This is often referred to as the L3-L4

Option B- For diagnostic purpose, 30 ml of CSF is removed:

• This statement is incorrect. For diagnostic purposes, typically, a smaller amount of cerebrospinal fluid (CSF) is removed, which is around 20 ml. The amount may vary depending on the specific clinical needs, but 30 ml is generally more than what is typically taken for diagnostic purposes.

Option D- Quincke needle is an atraumatic needle:

• This statement is incorrect. The Quincke needle is not an atraumatic needle; it is considered a traumatic lumbar puncture needle because of its sharp bevel and pointed edge. An atraumatic lumbar puncture needle, on the other hand, is designed to minimize trauma to the surrounding tissues and reduce the risk of post-LP headaches.

Solution for Question 23:

Correct Option C- Viral Meningitis:

• This option is correct based on the provided information. The CSF findings in this case, including an elevated white blood cell count with a predominance of lymphocytes, normal glucose levels, and mildly elevated protein levels, are consistent with viral meningitis.

• Additionally, the patient's exposure to a friend with a recent respiratory illness suggests a viral etiology. The clinical presentation, including fever, neck stiffness, photophobia, and a positive Brudzinski's sign is suggestive of viral meningitis.

Incorrect Options:

Option A- Bacterial Meningitis:

• This option is incorrect because the CSF findings in this case do not support the diagnosis of bacterial meningitis. In bacterial meningitis, CSF typically shows a marked elevation in white blood cell count , primarily neutrophils, along with elevated protein levels and decreased glucose levels. However, in this case, the CSF reveals a predominantly lymphocytic pleocytosis, normal glucose levels, and only mildly elevated protein levels, which is not characteristic of bacterial meningitis.

Option B- Fungal Meningitis:

• This option is incorrect because the CSF findings and the clinical presentation are not suggestive of fungal meningitis. Fungal meningitis often presents with a chronic and indolent course, and CSF analysis may show a lymphocytic pleocytosis along with elevated protein levels and low glucose levels. However, the rapid onset of symptoms in this case is not typical of fungal meningitis.

Option D- Tuberculous Meningitis:

• This option is incorrect because tuberculous meningitis typically presents with a chronic and subacute course, and CSF findings often include an elevated white blood cell count, predominantly lymphocytes, elevated protein levels, and decreased glucose levels. The patient's rapid onset of symptoms and normal glucose levels in the CSF make tuberculous meningitis less likely in this case.

Solution for Question 24:

Correct Option D- Obstructive hydrocephalus :

• This option is not associated with Tuberculous Meningitis. Tuberculous Meningitis primarily affects the central nervous system and does not typically cause obstructive hydrocephalus. It primarily affects the meninges and brain. In fact, it causes non obstructive hydrocephalus.

Incorrect Options:

Option A- Basal exudates on NCCT: This option is associated with Tuberculous Meningitis. Basal exud ates on neuroimaging such as Non-Contrast Computed Tomography or NCCT are a characteristic findi ng in TBM and indicate the presence of inflammatory changes at the base of the brain.

Option B- Crackpot sign: This option is associated with Tuberculous Meningitis. The "Crackpot sign" is a clinical sign where there is a distinctive sound, similar to the sound of a wooden spoon tapping on a c racked pot, when percussing the skull in patients with TBM. It indicates increased intracranial pressure due to the presence of exudates.

Option C- Sutural diastasis: This option is associated with Tuberculous Meningitis. Sutural diastasis ref ers to the separation or widening of the cranial sutures seen on imaging studies, and it can occur in TB M due to increased intracranial pressure.

Solution for Question 25:

Correct Option D- Cerebral Toxoplasmosis: This option is correct based on the clinical presentation, M RI findings, and the patient's immunocompromised status. Cerebral toxoplasmosis is an opportunistic i nfection commonly seen in individuals with HIV/AIDS, especially those with low CD4 counts. It often pr esents with multiple ring-enhancing lesions in the brain, particularly basal ganglia, which can cause a v ariety of neurological symptoms, including altered mental status, headaches, and focal neurological def icits, as described in the case scenario.

Incorrect Options:

Option A- Cerebral abscess due to Staphylococcus aureus: This option is incorrect in this case. While cerebral abscesses can also present with ring-enhancing lesions on brain imaging, the clinical context of this patient, which includes HIV infection with a low CD4 count and characteristic MRI findings, is mo re suggestive of an opportunistic infection like cerebral toxoplasmosis, which is common in immunoco mpromised individuals with AIDS.

Option B- Neurocysticercosis: This option is incorrect in this case. Neurocysticercosis is caused by the larval stage of the pork tapeworm (Taenia solium) and typically presents with cystic lesions in the brain. The ring-enhancing lesions particularly seen in the basal ganglia in this immunocompromised patient's MRI findings are more indicative of toxoplasmosis than neurocysticercosis.

Option C- Primary central nervous system lymphoma (PCNSL): This option is incorrect in this case. PC NSL is a type of brain tumor that often presents with focal neurological deficits and imaging findings tha t may include contrast-enhancing lesions. However, the presence of multiple ring-enhancing lesions an d the patient's immunocompromised status with a
low CD4 count are more consistent with cerebral toxoplasmosis in the context of HIV.

Solution for Question 26:

Correct Option A- Ceftriaxone:

• Neisseria meningitidis is a gram-negative bacteria that causes meningitis.

• Meningococcal infection presents as meningitis (headache, fever), meningococcemia, petechial hemorrhages, and gangrene of the toes,Waterhouse-Friderichsen syndrome (adrenal insufficiency), fever, disseminated intravascular coagulation, and shock.

• Meningococci are spread via respiratory droplets and oral secretions.

• Diagnosis is made by culture or polymerase chain reaction.

• Treatment is with penicillin G or ceftriaxone.

• Quadrivalent conjugate vaccine is available for meningococcus.

• Prophylaxis to meningococcus is important. Rifampin, ciprofloxacin or ceftriaxone prophylaxis should be given to close contacts. Ciprofloxacin can be given to family contacts. Ceftriaxone is given to pregnant women. Ceftriaxone is also given to healthcare workers.

• Ciprofloxacin can be given to family contacts.

• Ceftriaxone is given to pregnant women.

• Ceftriaxone is also given to healthcare workers.

• Administration of antimicrobial drugs should be given to healthcare workers exposed to Neisseria meningitidis regardless of vaccination status.

• When a healthcare worker develops meningococcal meningitis, he should be given relief from work.

• Work restriction is unnecessary for healthcare personnel with nasopharyngeal colonization of Neisseria meningitidis. Droplet precautions should be taken.

• Ciprofloxacin can be given to family contacts.

• Ceftriaxone is given to pregnant women.

• Ceftriaxone is also given to healthcare workers.

Incorrect Options:

Option B - Penicillin G:

• Penicillin G is used in treating meningococcal meningitis. It is not used in prophylaxis of Neisseria meningitidis meningitis.

Option C - Cotrimazole:

• Cotrimazole is an antifungal agent used to treat topical fungal infections.

Option D - Doxycycline:

• Doxycycline is a tetracycline used to treat infections caused by Borrelia burgdorferi, Mycoplasma pneumoniae, Rickettsia, and Chlamydia. It is not used for prophylaxis of meningococcal meningitis.

Solution for Question 27:

Correct Option C- Diplococci Showing Pneumococcus: This finding is not associated with the disease. The presence of diplococci showing pneumococcus is characteristic of pneumococcal meningitis, whic h is not the likely diagnosis in this patient. The clinical presentation, history of HIV/AIDS, and the menti oned findings are more indicative of Cryptococcal Meningitis.

Incorrect Options:

Option A- Capsule on India Ink Stain: This option is correctly present in this patient. Cryptococcal Meni ngitis is associated with the presence of the Cryptococcus neoformans organism, which has a characte ristic encapsulated structure. The India ink stain is used to highlight the capsule surrounding the Crypto coccus organisms in cerebrospinal fluid (CSF) samples. It is a type of negative stain

Option B- Mucicarmine Stain: This option is correct in this case. Mucicarmine stain is used to highlight t he capsule of Cryptococcus neoformans.

Option D- Soap Bubble Appearance on Head MRI: This option is correct in this case. A "soap bubble" appearance on head MRI is associated with Cryptococcal Meningitis.

Solution for Question 28:

Correct Option A - Prions

• The condition described in the question is Creutzfeldt-Jacob disease, which is caused by Prions

• It is characterized by dementia and myoclonus and increased tau protein in CSF

• The patient has a history of consumption of poor quality beef

• It may contain Prion particles, which, upon entering the body, multiply in the cytoplasm of neurons and cause irritation of neurons, leading to their abnormal firing.

Incorrect Options:

Options B, C, D:

• These are not the causative agents of Creutzfeldt-Jacob disease

Solution for Question 29:

Correct option A - Sulfadiazine + Pyrimethamine:

In the scenario described, the patient with AIDS presents with cerebral toxoplasmosis, characterized b y:

• Seizures: Seizures are a common symptom in cerebral toxoplasmosis, particularly in AIDS patients.

• MRI Head: Lesions are observed in the area of the Basal Ganglia on MRI, a characteristic finding in cerebral toxoplasmosis.

• CSF antibody testing: IgM/IgG class antibodies for toxoplasma are detected in the cerebrospinal fluid (CSF), supporting the diagnosis of cerebral toxoplasmosis.

Incorrect Options:

Options B, C, D:

• These are not the drugs given for the treatment of Toxoplasmosis

Myasthenia Gravis

1. A 45-year-old woman presents to the neurology clinic with complaints of progressive muscle weakness, particularly in her facial and proximal limb muscles. She reports difficulty in swallowing and speaking, which worsens throughout the day and improves with rest. On examination, the patient demonstrates ptosis, diplopia, and generalized weakness. All of these are the antibodies seen in this condition except?

(or)

All of these are the antibodies seen in Myasthenia gravis except?

A. Anti-acetylcholine receptor antibody

B. Anti M.U.S.K antibody

C. Anti LRP4 antibody

D. Anti Netrin-3 receptor antibody

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2. A 20-year-old male came to the clinic with complaints of nasal regurgitation of fluids and unclear speech for 1 week. On examination, ptosis, diplopia, and nasal twang of voice were present. The doctor advised an Anti AchR Antibody test and it showed positive results and was given Pyridostigmine for treatment. Which of the following is not a clinical feature of this condition?

(or)

Which of the following is not a clinical feature of Myasthenia gravis?

A. Aspiration Risk

B. Oropharyngeal dysphagia

C. Proximall Muscle Weakness

D. DTR not preserved

---

3. A 45-year-old woman presents to the neurology clinic with complaints of intermittent double vision and drooping of her eyelids, particularly worsening in the evenings. She also reports generalized fatigue and weakness, especially after prolonged activity. On examination, the patient demonstrates bilateral ptosis and limited eye movements. Which of the following is the mandatory test that should be done in this patient?

(or)

Which of the following is the mandatory test that is used in all cases of Ocular Myasthenia gravis?

A. CT/MRI head

B. CT Chest

C. Ice pack test

D. Anti AchR Antibody

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4. A 25-year-old female came to the clinic with complaints of unclear speech for 3 days. On examination, the patient had ptosis, diplopia, nasal regurgitation of fluids, and oropharyngeal dysphagia. The doctor advised an edrophonium test and the result was positive. Which of the following

is the treatment of choice for the generalized condition?

(or)

Which of the following is the treatment of choice for Generalised Myasthenia gravis?

A. Thymectomy

B. Pyridostigmine

C. Plasmapheresis

D. Intravenous immunoglobulin.

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5. A 30-year-old female, who is a known case of Myasthenia gravis delivered a baby by LSCS. During breastfeeding the baby, the mother experienced regurgitation of milk and choking episodes in the baby. Which of the following is the drug of choice for this condition?

(or)

Which of the following is the drug of choice for Neonatal Transient Myasthenia Gravis?

A. Physostigmine

B. Neostigmine

C. Edrophonium

D. Azithromycin

---

6. A 55-year-old male presents to the neurology clinic with complaints of progressive muscle weakness, particularly in the proximal muscles of his limbs, dry mouth and constipation. He reports difficulty in standing up from a seated position and lifting objects. On examination, the patient demonstrates reduced deep tendon reflexes (DTRs) and fatigability upon repetitive muscle testing. All are true about this syndrome except?

(or)

All are true about Lambert Eaton Syndrome except?

A. It is a paraneoplastic manifestation related to Oat cell lung cancer.

B. Lambert Eaton Syndrome is a post-junctional disease.

C. DTR is reduced

D. The drug of choice is 3,4 diaminopyridine.

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	4
Question 3	1
Question 4	1

Question 5	2
Question 6	2

Solution for Question 1:

Correct option D - Anti Netrin-3 receptor antibody:

• The antibody that is not seen in Myasthenia gravis is the Anti Netrin-3 receptor antibody

• It is the Anti Netrin-1 receptor antibody that is seen in Myasthenia gravis

• The antibodies seen in the Myasthenia gravis are: Anti-Acetylcholine Receptor Antibody (AChR): Found in approximately 85% of patients. Blocks the alpha subunit of acetylcholine receptors. Anti-MUSK Antibody: Present in about 10% of patients. Stands for Muscle-Specific Kinase antibodies. Commonly found in AchR-negative patients. Anti-LRP4 Antibody: Targets Low-Density Lipoprotein-Related Protein 4. Anti-Netrin-1 Receptor Antibody: Targets Netrin-1 receptor. Anti-Caspr-2 Antibody: Targets Contactin-Associated Protein-Like 2. Anti-Striated Muscle Antibody: Antibodies against striated muscle proteins.

• Anti-Acetylcholine Receptor Antibody (AChR): Found in approximately 85% of patients. Blocks the alpha subunit of acetylcholine receptors.

• Found in approximately 85% of patients.

• Blocks the alpha subunit of acetylcholine receptors.

• Anti-MUSK Antibody: Present in about 10% of patients. Stands for Muscle-Specific Kinase antibodies. Commonly found in AchR-negative patients.

• Present in about 10% of patients.

• Stands for Muscle-Specific Kinase antibodies.

• Commonly found in AchR-negative patients.

• Anti-LRP4 Antibody: Targets Low-Density Lipoprotein-Related Protein 4.

• Targets Low-Density Lipoprotein-Related Protein 4.

• Anti-Netrin-1 Receptor Antibody: Targets Netrin-1 receptor.

• Targets Netrin-1 receptor.

• Anti-Caspr-2 Antibody: Targets Contactin-Associated Protein-Like 2.

• Targets Contactin-Associated Protein-Like 2.

• Anti-Striated Muscle Antibody: Antibodies against striated muscle proteins.

• Antibodies against striated muscle proteins.

• Anti-Acetylcholine Receptor Antibody (AChR): Found in approximately 85% of patients. Blocks the alpha subunit of acetylcholine receptors.

• Found in approximately 85% of patients.

• Blocks the alpha subunit of acetylcholine receptors.

• Anti-MUSK Antibody: Present in about 10% of patients. Stands for Muscle-Specific Kinase antibodies. Commonly found in AchR-negative patients.

• Present in about 10% of patients.

• Stands for Muscle-Specific Kinase antibodies.

• Commonly found in AchR-negative patients.

• Anti-LRP4 Antibody: Targets Low-Density Lipoprotein-Related Protein 4.

• Targets Low-Density Lipoprotein-Related Protein 4.

• Anti-Netrin-1 Receptor Antibody: Targets Netrin-1 receptor.

• Targets Netrin-1 receptor.

• Anti-Caspr-2 Antibody: Targets Contactin-Associated Protein-Like 2.

• Targets Contactin-Associated Protein-Like 2.

• Anti-Striated Muscle Antibody: Antibodies against striated muscle proteins.

• Antibodies against striated muscle proteins.

• Found in approximately 85% of patients.

• Blocks the alpha subunit of acetylcholine receptors.

• Present in about 10% of patients.

• Stands for Muscle-Specific Kinase antibodies.

• Commonly found in AchR-negative patients.

• Targets Low-Density Lipoprotein-Related Protein 4.

• Targets Netrin-1 receptor.

• Targets Contactin-Associated Protein-Like 2.

• Antibodies against striated muscle proteins.

Incorrect Options:

Options A, B, C:

• These are the antibodies seen in Myasthenia gravis.

Solution for Question 2:

Correct option D - DTR not preserved:

• The condition in the given scenario is Myasthenia gravis

• It is characterized by nasal regurgitation of fluids, unclear speech, ptosis, diplopia, nasal twang of voice

• An Anti AchR Antibody test shows positive results

• Pyridostigmine is one of the treatments given for the condition

• Deep tendon replex is preserved

Incorrect Options:

Options A, B, C:

• These are the clinical features of Myasthenia gravis

Solution for Question 3:

Correct Option A - CT/MRI head:

• Ocular myasthenia gravis (OMG) is a localized form of myasthenia gravis characterized by weakness and fatigue of the extraocular muscles, leading to ptosis (drooping eyelids) and diplopia (double vision).

• Among the diagnostic tests used in OMG, the mandatory test is a CT or MRI head scan. This imaging study is performed in all cases of OMG to rule out structural abnormalities or intracranial lesions contributing to ocular manifestations such as ptosis and ophthalmoplegia.

• The CT/MRI head scan helps identify potential causes of ocular symptoms, including brain tumors, vascular abnormalities (e.g., arteriovenous malformations), or other space-occupying lesions affecting the cranial nerves or neuromuscular junction.

Incorrect Options:

Option B - CT Chest: While not a mandatory test for OMG, CT imaging of the chest is indicated to eval uate for thymic abnormalities, particularly thymoma, in patients with generalized myasthenia gravis.

Option C - Ice pack test: The ice pack test is a bedside diagnostic maneuver used to temporarily impro ve ptosis in patients with suspected OMG. By applying a cold pack to the affected eyelid, the test explo its the temperature sensitivity of acetylcholinesterase enzyme activity. Cold temperature reduces enzy me activity, leading to increased acetylcholine levels at the neuromuscular junction and transient impro vement in ptosis.

(Ice Pack test- alternative of Tensilon Test)

Option D - Anti AchR Antibody:

• It is a screening test positive in 85% of cases

• Testing for serum antibodies against the acetylcholine receptor (AchR) is a sensitive diagnostic test for myasthenia gravis.

Solution for Question 4:

Correct option A - Thymectomy:

• The condition described in the question is Generalised Myasthenia gravis

• It is characterized by unclear, ptosis, diplopia,nasal regurgitation of fluids, and oropharyngeal dysphagia

• Edrophonium test is used for the diagnosis of Generalised Myasthenia gravis

• Thymectomy is the treatment of choice for Generalised Myasthenia gravis.

Incorrect Options:

Options B - Physostigmine: Pyridostigmine is the drug of choice for symptom relief in generalized myas thenia gravis and not treatment of choice.

Option C - Plasmapheresis: In Myasthenic crisis patients, we will use plasmapheresis for the patients t o get rid of the dangerous antibodies.

Option D - Intravenous immunoglobulin: In Myasthenic crisis patients, we will use plasmapheresis for t he patients to get rid of the dangerous antibodies. If facilities for plasmapheresis are not available. It is i ntravenous immunoglobulin.

Solution for Question 5:

Correct Option B - Neostigmine:

• The condition described in the question is Neonatal Transient Myasthenia Gravis

• The condition is characterized by regurgitation of milk and choking episodes in the baby

• The mother of the baby is a known case of Myasthenia gravis

• The antibodies that are found in this condition are immunoglobulin G class which can very easily cross the placenta.

• The drug of choice for neonatal Transient Myasthenia Gravis is neostigmine.

Incorrect Options:

Option A - Physostigmine: Pyridostigmine is the drug of choice for symptomatic relief in Generalised M yasthenia gravis in adults.

Option C - Edrophonium: Edrophonium is a drug that is used for the diagnosis of Myasthenia gravis.

Option D - Azithromycin: Azithromycin is not used for the treatment of Myasthenia gravis.

Solution for Question 6:

Correct Option B - Lambert Eaton Syndrome is a post-junctional disease:

• The correct statement is that Lambert-Eaton Syndrome is a pre-junctional disease, whereas Myasthenia gravis is a post-junctional disease where the receptors of Acetylcholine are defective.

Incorrect Options:

Options A, C, D:

• This is true about the Lambert Eaton Syndrome

Guillain Barre Syndrome

1. A 30-year-old male was brought to the clinic by his wife, complaining of weakness in both legs for one day. On examination, biceps paralysis, neck floppiness, and bulbar palsy were present. The doctor advised a CSF examination, which showed albumino cytological dissociation, which was managed with plasmapheresis and intravenous immunoglobulin. Which of the following is the earliest manifestation seen in this condition?

(or)

Which of the following is the earliest manifestation seen in Guillain Barre syndrome?

A. Distal areflexia

B. Truncal Paralysis

C. Facial Diplegia

D. Bulbar Palsy

---

2. Which of the following are the regions where damage is seen in the Demyelinating polyneuropathy type of GBS?

A. Axons and Schwann cells

B. Dendrites and nucleus

C. Cell body and nucleus

D. Dendrites and cell body

---

3. Which of the following best describes the characteristic triad of symptoms seen in Miller Fisher Syndrome?

A. Diplopia, dysarthria, and ataxia

B. Ptosis, ophthalmoplegia, and areflexia

C. Facial weakness, sensory loss, and autonomic dysfunction

D. Tremor, rigidity, and bradykinesia

---

4. A 32-year-old male presents to the emergency department with weakness and numbness in his legs that has progressively worsened over the past few days. He reports having a diarrheal illness approximately four weeks ago, which resolved without specific treatment. On examination, the patient is noted to have decreased deep tendon reflexes and ascending paralysis. Which of the following etiological agents is most commonly associated with this condition?

(or)

Which of the following etiological agents is most commonly associated with the development of Guillain-Barré Syndrome (GBS), particularly following a recent diarrheal illness?

A. Covid-19

B. Zika virus

C. Campylobacter jejuni

D. Epstein-Barr virus

---

5. Which of the following features is characteristic of Chronic Inflammatory Demyelinating Polyneuropathy (CIDP)?

A. Rapidly ascending paralysis typically progressing over a 28-day period

B. Absence of post-void residual urine due to impaired bladder contraction

C. Symmetrical flaccid paralysis evolving over months, accompanied by sensory disturbances

D. Onion bulb appearance on nerve biopsy indicative of axonal degeneration

---

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	1
Question 3	2
Question 4	3
Question 5	3

Solution for Question 1:

Correct Option A - Distal areflexia:

• The earliest manifestation seen in GBS is Distal areflexia

• The condition described in the scenario is Guillain Barre syndrome

• It is characterized by weakness in both legs, biceps paralysis, neck floppiness, and bulbar palsy

• CSF examination showed Albumino cytological dissociation

Incorrect Options:

Options B, C, D:

• These are not the earliest manifestations of GBS

Solution for Question 2:

Correct Option A - Axons and Schwann cells:

• Axons and Schwann cells are the parts where damage has occurred in the Demyelinating polyneuropathy type of GBS.

Subtypes of GBS

• AIDP (Acute Inflammatory Demyelinating Polyneuropathy) is the most common subtype of GBS, representing approximately 85% of cases.

• It is characterized by widespread demyelination of peripheral nerves Patients typically present with ascending weakness, sensory abnormalities, and autonomic dysfunction. Deep tendon reflexes may be diminished or absent. The pathogenesis of AIDP involves immune-mediated attack on peripheral nerve myelin.

• It is characterized by widespread demyelination of peripheral nerves

• Patients typically present with ascending weakness, sensory abnormalities, and autonomic dysfunction.

• Deep tendon reflexes may be diminished or absent.

• The pathogenesis of AIDP involves immune-mediated attack on peripheral nerve myelin.

• It is characterized by widespread demyelination of peripheral nerves

• Patients typically present with ascending weakness, sensory abnormalities, and autonomic dysfunction.

• Deep tendon reflexes may be diminished or absent.

• The pathogenesis of AIDP involves immune-mediated attack on peripheral nerve myelin.

• AMAN (Acute Motor Axonal Neuropathy) is a subtype of GBS characterized by predominant motor involvement, with axonal damage observed in nerve conduction studies. Patients typically present with rapidly progressive weakness and absent sensory deficits. AMAN is associated with anti-ganglioside antibodies, particularly anti-GM1 antibodies.

• AMSAN (Acute Motor Sensory Axonal Neuropathy)is another subtype of GBS characterized by motor and sensory involvement, with axonal damage affecting both motor and sensory nerve fibers. Anti-ganglioside antibodies, including anti-GM1 antibodies, may be present in AMSAN.

• MFS (Miller Fisher Syndrome) is a rare variant of GBS characterized by a triad of symptoms: ophthalmoplegia, ataxia, and areflexia. Sensory deficits are typically minimal or absent in MFS. Anti-GQ1b antibodies are commonly associated with MFS, suggesting an autoimmune etiology.

Incorrect Options:

Options B, C, D:

• These are not the regions where damage is seen in the Demyelinating polyneuropathy of GBS

Solution for Question 3:

Correct Option B - Ptosis, ophthalmoplegia, and areflexia:

• Miller Fisher Syndrome (MFS) is characterized by a triad of symptoms, including ptosis , ophthalmoplegia), and areflexia . These features distinguish MFS from other neurological disorders. The presence of all three components of the triad is highly suggestive of MFS.

Incorrect Options:

Option A - Diplopia, dysarthria, and ataxia: This combination of symptoms is not characteristic of Miller-Fisher Syndrome.

Option C - Facial weakness, sensory loss, and autonomic dysfunction: These symptoms are not typical ly part of the triad seen in MFS.

Option D - Tremor, rigidity, and bradykinesia: These features are more consistent with Parkinson's dise ase and are not typical of MFS.

Solution for Question 4:

Correct Option C - Campylobacter jejuni:

• Guillain-Barré Syndrome (GBS) is commonly preceded by infections, with Campylobacter jejuni being one of the most frequently implicated pathogens. Patients often develop GBS following a diarrheal illness caused by Campylobacter jejuni infection. This bacterium triggers an immune response that leads to the development of GBS, characterized by ascending paralysis and other neurological complications.

Incorrect Options:

Option A - COVID-19: While some cases of GBS have been reported in individuals with COVID-19, Ca mpylobacter jejuni is a more established etiological agent associated with GBS.

Option B - Zika virus: Zika virus infection can lead to neurological manifestations, including GBS, but it i s less commonly associated with GBS compared to Campylobacter jejuni.

Option D - Epstein-Barr virus: Epstein-Barr virus is not a common cause of GBS. While it is associated with other neurological complications, GBS is typically not directly linked to Epstein-Barr virus infection.

Solution for Question 5:

Correct Option C
- Symmetrical flaccid paralysis evolving over months, accompanied by sensory disturbances:

• Chronic Inflammatory Demyelinating Polyneuropathy (CIDP) typically presents with symmetrical flaccid paralysis, often evolving over months, and is accompanied by sensory disturbances.

• This pattern of weakness distinguishes CIDP from other neuropathies. Additionally, CIDP is associated with albuminocytological dissociation on lumbar puncture and prolonged latency periods on nerve conduction studies.

• Urinary symptoms, such as overactive bladder and overflow incontinence, can also occur due to autonomous bladder contraction. These features collectively support the diagnosis of CIDP.

Incorrect Options:

Option A - Rapidly ascending paralysis typically progressing over a 28-day period: This description alig ns more with the presentation of Guillain-Barré Syndrome (GBS), another demyelinating neuropathy.

Option B - Absence of post-void residual urine due to impaired bladder contraction: This statement is in consistent with the described features of CIDP, as urinary symptoms such as overflow incontinence an d post-void residual urine are commonly observed.

Option D - Onion bulb appearance on nerve biopsy indicative of axonal degeneration: While onion bulb appearance may be seen in nerve biopsies of patients with CIDP, it is not specific to CIDP and can als o be observed in other neuropathies characterized by repeated cycles of demyelination and remyelinati on.

Neuromyelitis Optica

1. A 32-year-old female presents to the neurology clinic and reports experiencing severe eye pain and blurred vision in her right eye over the past week, accompanied by difficulty in walking and coordination. On examination, the patient demonstrates decreased visual acuity in the right eye, along with relative afferent pupillary defect (RAPD) and optic disc edema on fundoscopic examination. Additionally, she exhibits spasticity and hyperreflexia in her lower limbs. Which of the following will not be seen in this patient?

(or)

Which of the following is not a clinical finding seen in Neuromyelitis optica?

A. Area Postrema Syndrome

B. Acute Brainstem Syndrome

C. Optic neuritis

D. Retinal detachment

---

2. A 42-year-old female presents to the neurology clinic with visual disturbances, including blurred vision and loss of color vision, along with weakness and sensory changes in her lower limbs. Neurological examination reveals bilateral optic disc swelling and spastic paraparesis. All of the following are the correct MRI findings seen in this patient except?

(or)

All of the following are the correct MRI findings seen in Neuromyelitis Optics except?

A. More than half the length of the optic nerve inflammation should be demonstrated definitely

B. Damage to the area postrema is seen

C. Periependymal brain lesions

D. Longitudinally extensive transverse myelitis (LETM) spreading over more than 2 segments

---

3. A 20 year old female was brought to the clinic with complaints of blindness in both eyes and tingling sensation for 3 days. On examination, the patient had weakness in the lower limbs. The doctor advised an MRI and it showed cloud-like lesions developing in the brain parenchyma and damage to the area postrema. Which of the following is the drug of choice in this condition?

(or)

Which of the following is the drug of choice for Neuromyelitis Optics?

A. Methylprednisolone

B. Mycophenolate

C. Intravenous Immunoglobulin

D. Labetalol

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	4
Question 3	1

Solution for Question 1:

Correct Option D - Retinal detachment:

• Neuromyelitis Optica (NMO), also known as Neuromyelitis Optica Spectrum Disorder (NMOSD), is an autoimmune inflammatory disorder characterized by recurrent episodes of optic neuritis and longitudinally extensive transverse myelitis (LETM) involving the spinal cord.

• While NMOSD primarily affects the optic nerves and spinal cord, it can also involve other areas of the central nervous system (CNS), leading to various clinical manifestations.

• Retinal detachment, characterized by the separation of the neurosensory retina from the underlying retinal pigment epithelium (RPE), is not a typical clinical finding observed in NMOSD.

• While NMOSD primarily affects the optic nerves and spinal cord, it does not typically involve the retina or predispose to retinal detachment.

Incorrect Options

Options A ,B, C:

• These are the clinical findings seen in Neuromyelitis Optica

Solution for Question 2:

Correct Option D - Longitudinally extensive transverse myelitis (LETM) spreading over more than 2 segments:

• Longitudinally extensive transverse myelitis (LETM)is a hallmark feature of NMO, characterized by spinal cord inflammation extending over three or more contiguous vertebral segments on MRI.

Incorrect Options:

Option A - More than half the length of the optic nerve inflammation should be demonstrated definitely:

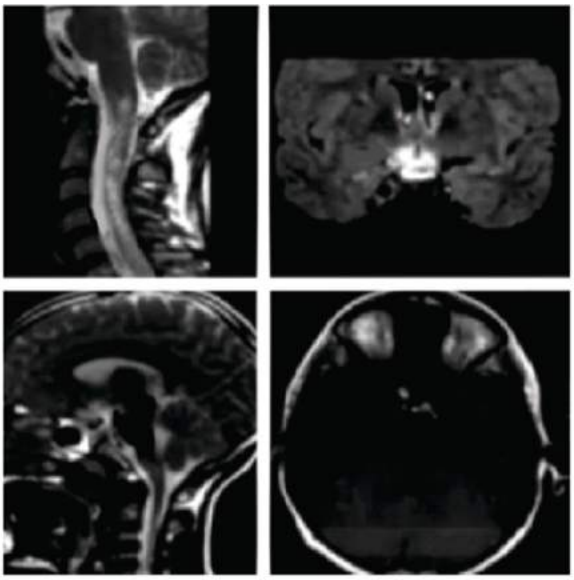
• More than half the length of the optic nerve inflammation should be definitely demonstrated: Optic nerve involvement in NMO typically extends over a significant portion of its length, often affecting more than half of the optic nerve.

Option B - Damage to the area postrema is seen:

• Damage to the area postrema is seen: The area postrema, a region of the brainstem involved in the control of vomiting, is commonly affected in NMO, leading to symptoms such as intractable nausea and vomiting.

Option C - Periependymal brain lesions:

• Periependymal brain lesions: NMO is associated with periependymal brain lesions, which are characterized by lesions adjacent to the ependymal lining of the ventricles in the brain. These lesions can appear as longitudinally extensive lesions involving the periventricular regions.



Solution for Question 3:

Correct Option A – Methylprednisolone:

• It is characterized by blindness in both eyes, tingling sensation, weakness of lower limbs

• MRI brain showed cloud-like lesions developing in the brain parenchyma and damage to the area postrema

• The drug of choice for Neuromyelitis Optics is Methylprednisolone

• Plasmapheresis: This is considered a secondary treatment option, used if there's a poor response to methylprednisolone.

Incorrect Options:

Option B – Mycophenolate:

• Mycophenolate mofetil (MMF) is also used in the maintenance therapy of NMO to prevent relapses and reduce disease activity, but it's not typically considered the first-line treatment for acute attacks.

• Methylprednisolone, often given as high-dose intravenous pulses followed by oral tapering, is the standard acute treatment for NMO relapses.

Options C, D:

• These are not used for the management of Neuromyelitis Optica

Amyotrophic Lateral Sclerosis

1. A 55-year-old male presents to the neurology clinic with progressive weakness and muscle atrophy in his limbs. He reports difficulty in performing daily activities such as walking and lifting objects. Upon examination, the patient exhibits muscle fasciculations and hyperreflexia. All are the factors contributing to the pathology of this condition except?

(or)

All are the factors contributing to the pathology of Amyotrophic lateral sclerosis except?

A. Defective protein degradation in neuron

B. Defective RNA processing

C. Increased Glutamate levels

D. Increased Methionine levels

---

2. A 20-year-old male was brought to the clinic by his parents with complaints of weakness in his legs for 1 day. On examination by the Physician, he had fasciculations, a slapping gait, absent knee jerk in one leg, and brisk biceps jerk. The doctor advised EMG which showed a denervation pattern in LMN involved. Which of the following is not a treatment used to manage this condition?

(or)

Which of the following is not a treatment option used to manage Amyotrophic lateral sclerosis?

A. Physiotherapy

B. Finger extension splint

C. Tracheostomy

D. Steroids

---

3. A 65-year-old male presents with progressive dysphagia, dysarthria, and difficulty in chewing for the past few months. He also reports frequent choking episodes while eating and speech changes characterized by slurred speech and nasal quality. On examination, the patient demonstrates weakness and atrophy of the tongue, palate, and pharyngeal muscles, along with absent gag reflex and weakness of the shoulder. Which of the following nerves are affected in this condition?

(or)

Which of the following nerves are affected in Bulbar palsy?

A. Damage to 9, 10, 11, and 12 cranial nerves

B. Damage to 9, 10, 11 cranial nerves

C. Damage to 7, 9, 11 cranial nerves

D. Damage to 9, 10, and 12 cranial nerves

---

4. A 25-year-old male presents to the neurology clinic with complaints of progressive difficulty walking and coordination issues. He reports experiencing frequent falls and stumbling, along with weakness and numbness in his extremities. Upon further evaluation, the patient demonstrates gait instability, limb ataxia, and dysarthria, indicative of a cerebellar disorder. Family history reveals a sibling with similar

symptoms. Which of the following is the etiology?

(or)

Which of the following is the cause of Friedreich's Ataxia?

A. Due to frataxin gene defect

B. Due to Vit B12 deficiency

C. Damage to Anterior horn cells (spinal cord) and Pyramidal neurons (brain)

D. Defective RNA processing

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	4
Question 3	1
Question 4	1

Solution for Question 1:

Correct option D - Increased Methionine levels:

• Amyotrophic lateral sclerosis (ALS) is a progressive neurodegenerative disorder characterized by the degeneration of upper and lower motor neurons, leading to muscle weakness, atrophy, and eventual paralysis.

• Several factors contribute to the pathology of ALS: Defective protein degradation in neurons: Defective RNA processing In ALS, dysfunctional glutamate handling mechanisms, such as impaired glutamate uptake by astrocytes and downregulation of glutamate transporters like EAAT2 (excitatory amino acid transporter 2), lead to increased extracellular glutamate levels. Excessive glutamate accumulation overactivates glutamate receptors, triggering calcium influx and subsequent neuronal injury. Excitotoxicity contributes to motor neuron degeneration in ALS and is implicated in disease pathogenesis.

• Defective protein degradation in neurons:

• Defective RNA processing

• In ALS, dysfunctional glutamate handling mechanisms, such as impaired glutamate uptake by astrocytes and downregulation of glutamate transporters like EAAT2 (excitatory amino acid transporter 2), lead to increased extracellular glutamate levels.

• Excessive glutamate accumulation overactivates glutamate receptors, triggering calcium influx and subsequent neuronal injury.

• Excitotoxicity contributes to motor neuron degeneration in ALS and is implicated in disease pathogenesis.

• There is no increase in the level of Methionine in the pathology of Amyotrophic lateral sclerosis

• Defective protein degradation in neurons:

• Defective RNA processing

• In ALS, dysfunctional glutamate handling mechanisms, such as impaired glutamate uptake by astrocytes and downregulation of glutamate transporters like EAAT2 (excitatory amino acid transporter 2), lead to increased extracellular glutamate levels.

• Excessive glutamate accumulation overactivates glutamate receptors, triggering calcium influx and subsequent neuronal injury.

• Excitotoxicity contributes to motor neuron degeneration in ALS and is implicated in disease pathogenesis.

Incorrect Options:

Options A, B, C:

• These are the factors associated with the pathology of Amyotrophic lateral sclerosis.

Solution for Question 2:

Correct option D - Steroids:

• The condition described in the given scenario is Amyotrophic lateral sclerosis

• It is characterized by weakness of legs, fasciculations, slapping gait, brisk knee reflexes, absent knee jerk.

• Treatment of Amyotrophic lateral sclerosis :Drugs: Riluzole: Known to decrease both glutamate and aspartate levels. It is one of the few drugs approved for the treatment of ALS. Edavarone: Another medication used in the treatment of ALS, thought to have antioxidant properties.

• Riluzole: Known to decrease both glutamate and aspartate levels. It is one of the few drugs approved for the treatment of ALS.

• Edavarone: Another medication used in the treatment of ALS, thought to have antioxidant properties.

• Steroids are not used for the management of Amyotrophic lateral sclerosis

• Riluzole: Known to decrease both glutamate and aspartate levels. It is one of the few drugs approved for the treatment of ALS.

• Edavarone: Another medication used in the treatment of ALS, thought to have antioxidant properties.

Incorrect Options:

Option A - Physiotherapy: A crucial part of managing ALS, helping to maintain muscle strength, flexibilit y, and mobility for as long as possible.

Option B - Finger extension splint: Used to prevent or manage contractions, which can occur as muscl es weaken.

Option C - Tracheostomy: This procedure may be necessary to support respiratory function as ALS pro gresses and breathing becomes more difficult.

Solution for Question 3:

Correct Option A - Damage to 9, 10, 11, and 12 cranial nerves:

• Bulbar palsy refers to the weakness or paralysis of the muscles innervated by the motor nuclei of several cranial nerves located in the bulbar region of the brainstem. The cranial nerves affected in bulbar palsy include: Cranial nerve IX (glossopharyngeal nerve): Responsible for innervating the muscles involved in swallowing (pharyngeal muscles) and the sensation of the posterior one-third of the tongue. Cranial nerve X (vagus nerve): Innervates the muscles involved in swallowing (pharyngeal and laryngeal muscles), phonation (voice production), and the sensation of the larynx and pharynx. Cranial nerve XI (accessory nerve): Supplies the sternocleidomastoid and trapezius muscles, contributing to head movement and shoulder elevation. Cranial nerve XII (hypoglossal nerve): Innervates the intrinsic and extrinsic muscles of the tongue, controlling tongue movement and coordination.

• Cranial nerve IX (glossopharyngeal nerve): Responsible for innervating the muscles involved in swallowing (pharyngeal muscles) and the sensation of the posterior one-third of the tongue.

• Cranial nerve X (vagus nerve): Innervates the muscles involved in swallowing (pharyngeal and laryngeal muscles), phonation (voice production), and the sensation of the larynx and pharynx.

• Cranial nerve XI (accessory nerve): Supplies the sternocleidomastoid and trapezius muscles, contributing to head movement and shoulder elevation.

• Cranial nerve XII (hypoglossal nerve): Innervates the intrinsic and extrinsic muscles of the tongue, controlling tongue movement and coordination.

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• Cranial nerve XI (accessory nerve): Supplies the sternocleidomastoid and trapezius muscles, contributing to head movement and shoulder elevation.

• Cranial nerve XII (hypoglossal nerve): Innervates the intrinsic and extrinsic muscles of the tongue, controlling tongue movement and coordination.

Incorrect Options:

Options B, C & D:

• These are not the correct options that include all the nerves damaged in Bulbar palsy.

Solution for Question 4:

Correct option A - Due to frataxin gene defect:

• Friedreich's ataxia is an autosomal recessive neurodegenerative disorder characterized by progressive gait and limb ataxia, dysarthria, loss of proprioception and vibration sensation, and often associated cardiomyopathy and diabetes mellitus.

• The condition typically manifests in childhood or adolescence and progresses over time, leading to significant disability.

• The underlying cause of Friedreich's ataxia is a mutation in the frataxin (FXN) gene, located on chromosome 9q13-q21.1.

Incorrect Options:

Options B - Due to Vit B12 deficiency: Vitamin B12 deficiency, option b, typically presents with subacute combined degeneration (SACD) of the spinal cord, characterized by sensory ataxia, weakness, and proprioceptive deficits due to demyelination of the dorsal and lateral columns of the spinal cord.

Option C - Damage to Anterior horn cells (spinal cord) and Pyramidal neurons (brain): Damage to anterior horn cells and pyramidal neurons, option c, is characteristic of motor neuron disease (MND) or amyotrophic lateral sclerosis (ALS), which manifests with progressive weakness, muscle atrophy, and spasticity due to degeneration of upper and lower motor neurons.

Option D - Defective RNA processing: Defective RNA processing, option d, is implicated in the pathogenesis of ALS, particularly involving mutations in RNA-binding proteins such as TDP-43 and FUS, leading to abnormal RNA metabolism and protein aggregation within motor neurons.

Syringomyelia and Conus Medullaris Syndrome

1. A 30-year-old male presents to the neurology clinic with complaints of progressive weakness and sensory abnormalities in his upper extremities. After further evaluation, a diagnosis of syringomyelia was made. All of the following are the features of this condition except?

(or)

All of the following are the features of Syringomyelia except?

A. Painless burn in hand

B. Non-healing ulcer on foot

C. Asymmetrical patchy loss of pain and temperature sensations

D. Bilateral brisk deep tendon reflexes.

---

2. A 20 year old female was brought to the clinic with a painless burn in hand for 4 days. On examiantion, sensory deficit of pain and temperature progresses from shoulders (proximal) to palm (distal), wasting of arms and hands were present. Which of the following is the investigation of choice of the condition?

(or)

Which of the following is the investigation of choice in Syringomyelia?

A. MRI spine

B. X ray spine

C. CT spine

D. HRCT spine

---

3. A 45-year-old female reports experiencing neck pain and stiffness, along with numbness and tingling sensations in her hands. Upon further evaluation, magnetic resonance imaging (MRI) reveals the presence of a syrinx, or fluid-filled cavity, within the spinal cord .Which of the following is the treatment of choice for this condition?

(or)

Which of the following is the treatment of choice for Syringomyelia?

A. Surgical decompression

B. Steroids

C. Intravenous immunoglobulins

D. Mexiletine

---

4. A 50-year-old male presents to the emergency department with acute onset back pain following a fall from a ladder. He complains of bilateral leg weakness, numbness in the saddle area, and difficulty with bladder control. On examination, the patient has absent knee and ankle reflexes, sensory loss in the perianal region, and urinary retention.

(or)

Which of the following neurological conditions is most likely responsible for the patient's symptoms?

A. Conus Medullaris Syndrome

B. Cauda Equina Syndrome

C. Spinal Cord Injury

D. Lumbar Disc Herniation

---

5. A 55-year-old construction worker fell from a height and sustained a spinal fracture. He initially presents with flaccid paralysis of the lower extremities and absent bulbocavernosus reflexes. One week later, he begins to exhibit spasticity in the lower limbs below the level of the lesion. Which of the following neurological phenomena is most likely to occur in this patient?

(or)

Which of the following neurological phenomena is most likely to occur in Spinal shock?

A. Development of upper motor neuron manifestations in the lower limbs

B. Persistence of lower motor neuron manifestations throughout the course of the illness

C. Recovery of bulbocavernosus reflexes within one week

D. Resolution of spasticity in the lower limbs within one week

---

6. A 55-year-old male presents to the emergency department with complaints of progressive weakness in his lower limbs and difficulty with urination and defecation. Upon further questioning, he reports a history of prostate carcinoma diagnosed two years ago, which has now metastasized. On examination, the patient demonstrates decreased sensation in the perineal area, loss of ankle jerk reflexes, and preserved knee jerk reflexes.

(or)

What is the most likely neurological syndrome affecting this patient, based on the clinical presentation and history?

A. Cauda Equina Syndrome

B. Conus Medullaris Syndrome

C. Anterior Cord Syndrome

D. Brown-Séquard Syndrome

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	1
Question 3	1
Question 4	2
Question 5	1

Question 6	2

Solution for Question 1:

Correct option B - Non-healing ulcer on foot:

Clinical Features of Syringomyelia:

• Loss of pain and temperature sensation in the hands, progressing from shoulders to palms.

• Characteristic feature: Painless burns in the hands.

• Cape distribution: Initial sensory deficit in hands and arms due to involvement of cervical nerve fibers.

• Specific manifestations: Non-healing ulcers on the hands, distinct from diabetic ulcers on the feet. Charcot joints: Painless, paralyzed joints, different from diabetic or tabes dorsalis-related Charcot joints.

• Non-healing ulcers on the hands, distinct from diabetic ulcers on the feet.

• Charcot joints: Painless, paralyzed joints, different from diabetic or tabes dorsalis-related Charcot joints.

• Asymmetrical patchy loss of pain and temperature sensations, eventually becoming symmetrical with disease progression.

• Bilateral deep tendon reflexes

• Bilateral deep tendon reflexes are seen in Syringomyelia

• Non-healing ulcers on the hands, distinct from diabetic ulcers on the feet.

• Charcot joints: Painless, paralyzed joints, different from diabetic or tabes dorsalis-related Charcot joints.

Incorrect Options:

Options A, C, D:

• These are the features of Syringomyelia.

Solution for Question 2:

Correct option A - MRI spine:

• Given the suspicion of syringomyelia based on the clinical presentation, the investigation of choice for confirming the diagnosis and evaluating the extent of spinal cord involvement is magnetic resonance imaging (MRI) of the spine.

• MRI provides detailed images of the spinal cord and surrounding structures, allowing for visualization of any cysts or syrinx formation within the spinal cord.

• Additionally, MRI can help identify any underlying causes or associated abnormalities, such as Chiari malformation or spinal cord tumors, which may contribute to syringomyelia development.

Incorrect Options:

Options B, C, D:

• These are not the investigation of choice for the diagnosis of Syringomyelia

Solution for Question 3:

Correct option A - Surgical decompression:

• Surgical intervention is often the mainstay of treatment for syringomyelia, especially when associated with Chiari malformation or spinal cord compression. Decompressive surgery aims to relieve pressure on the spinal cord, restore cerebrospinal fluid (CSF) flow dynamics, and prevent further expansion of the syrinx.

• Procedures may include posterior fossa decompression for Chiari malformation, laminectomy, syrinx shunting, or syringo-subarachnoid shunt placement.

• Surgical decompression can help alleviate symptoms, improve neurological function, and halt disease progression in syringomyelia.

Incorrect Options:

Options B, C, D:

• These are not the treatment options for Syringomyelia

Solution for Question 4:

Correct Option B - Cauda Equina Syndrome:

• Cauda equina syndrome and conus medullaris syndrome are two distinct neurological conditions caused by injury or compression of different anatomical regions within the spinal cord. While they share some similarities in clinical presentation, certain features help differentiate between the two conditions:

Conus Medullaris Syndrome:

• Mainly due to Mets: Conus medullaris syndrome is typically associated with metastatic cancer involving the lower spinal cord segments.

• Bladder complaints: Patients may experience urinary symptoms such as retention or incontinence due to involvement of sacral spinal cord segments controlling bladder function.

• Knee jerk preserved: Knee jerk reflexes (patellar reflexes) may be preserved or diminished in conus medullaris syndrome, depending on the extent of spinal cord injury.

• S1-S5 lesion: Lesions primarily affect the sacral spinal cord segments (S1-S5), resulting in motor, sensory, and autonomic deficits localized to the lower extremities and pelvic organs.

Incorrect Options:

Option A - Conus Medullaris Syndrome: Conus Medullaris Syndrome is less likely given the absence of metastatic cancer and the involvement of lumbar and sacral nerve roots rather than the conus medullaris itself.

Options C - Spinal Cord Injury and Option D: Lumbar Disc Herniation: May present with overlapping sy mptoms but are less specific to the constellation of findings observed in this case.

Solution for Question 5:

Correct Option A - Development of upper motor neuron manifestations in the lower limbs:

• In spinal shock, patients initially exhibit lower motor neuron manifestations due to acute spinal cord injury. However, after approximately one week, upper motor neuron manifestations may develop, characterized by the appearance of spasticity below the level of the lesion. This phenomenon is consistent with the patient's clinical course.

Incorrect Options:

Option B - Persistence of lower motor neuron manifestations throughout the course of the illness: This i s incorrect as spinal shock is typically transient, and upper motor neuron manifestations may develop a fter one week.

Option C - Recovery of bulbocavernosus reflexes within one week: This is incorrect as bulbocavernosu s reflexes typically return after one week in spinal shock, not resolve.

Option D - Resolution of spasticity in the lower limbs within one week: This is incorrect as spasticity ma y develop after one week in spinal cord injuries involving the corticospinal pathway, contributing to upp er motor neuron manifestations.

Solution for Question 6:

Correct Option B - Conus Medullaris Syndrome:

• Conus Medullaris Syndrome occurs when there is injury or compression affecting the terminal part of the spinal cord, known as the conus medullaris, typically at the level of L1.

• In this patient with prostate carcinoma metastasized to the conus medullaris region, the involvement of S1-S5 nerve roots results in characteristic clinical features.

• These include bowel and bladder dysfunction, such as over■ow incontinence or autonomous bladder, due to impaired S2-S4 nerve root function.

• Additionally, loss of ankle jerk reflexes (associated with S1-S2) and preserved knee jerk reflexes (associated with L2-L4) are consistent with the neurological deficits seen in Conus Medullaris Syndrome.

Incorrect Options:

Option A - Cauda Equina Syndrome:

• This syndrome involves compression or injury to the nerve roots below the level of the conus medullaris, typically affecting the lumbar and sacral nerve roots.

• While it shares some features with Conus Medullaris Syndrome, such as bowel and bladder dysfunction, the specific neurological deficits observed in this patient, such as loss of ankle jerk

reflexes, are more indicative of Conus Medullaris Syndrome.

Option C - Anterior Cord Syndrome:

• This syndrome results from damage to the anterior portion of the spinal cord, leading to motor paralysis and loss of pain and temperature sensation below the level of injury.

• The clinical presentation described in this patient, including perineal sensory changes and bowel and bladder complaints, does not align with the characteristic features of Anterior Cord Syndrome.

Option D - Brown-Séquard Syndrome:

• This syndrome results from hemisection (damage to one half) of the spinal cord, leading to ipsilateral motor weakness and contralateral loss of pain and temperature sensation below the level of injury.

• While it can present with some similar features, such as sensory deficits, the specific pattern of neurological deficits observed in this patient, including perineal sensory changes and loss of ankle jerk reflexes, is more consistent with Conus Medullaris Syndrome.

Channelopathies

1. A 30-year-old male presents to the emergency department complaining of recurrent episodes of weakness and paralysis, particularly after meals. Initially, the healthcare provider suspects malingering due to the episodic nature of the symptoms. However, further evaluation reveals these episodes consistently occur after consuming carbohydrate-rich meals. All are correct about the workup of this patient except?

(or)

All are correct about the workup of Hypokalemic periodic paralysis except?

A. Serum potassium is either normal or less

B. CPK-MM is normal

C. Nerve conduction velocity is normal

D. Genetic studies showed autosomal recessive inheritance

---

2. A 35-year-old male patient presents to the neurology clinic with a history of recurrent episodes of muscle weakness and paralysis, which typically occur after exercise or consumption of high-potassium foods. Which of the following is not a treatment option for this patient?

(or)

Which of the following is not a treatment of choice for hyperkalemic periodic paralysis?

A. Acetazolamide

B. Mexiletine

C. Lasix

D. Implantable Cardioverter Defibrillator

---

3. A 25-year-old female presents to the neurology clinic with complaints of progressive weakness and muscle wasting in her lower extremities. Upon examination, her legs exhibit a characteristic "stork-leg" appearance, with muscle atrophy particularly affecting the peroneal muscles. Which of the following is not a feature of the disease that the patient is suffering from?

(or)

Which of the following is not a feature of Charcot Marie Tooth Disease?

A. Champagne bottle appearance

B. Foot contractures

C. Onion bulb appearance on biopsy

D. Waddling gait

---

4. Guess the leading cause of death in Duchenne's Muscular Dystrophy.

A. Renal failure

B. Congestive heart failure due to dilated cardiomyopathy

C. Stroke

D. Liver failure

---

5. A 20-year-old male presents to the clinic with complaints of progressive weakness in his upper and lower extremities. On examination, the patient demonstrates tenting of the upper lip, characteristic myopathic facies, and bilateral cataracts with a Christmas tree appearance. All are true regarding the features of this patient except?

(or)

All are the features of Myotonic dystrophy except?

A. Tenting of the upper lip

B. Myopathic facies/Hatchet facies

C. Cataract

D. Type 1 Diabetes Mellitus

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	4
Question 3	4
Question 4	2
Question 5	4

Solution for Question 1:

Correct Option D - Genetic studies showed autosomal recessive inheritance:

• This is incorrect regarding the workup of Hypokalemic periodic analysis

• The correct statement is that the genetic studies showed autosomal dominant inheritance

• Hypokalemic periodic paralysis is a rare neuromuscular disorder characterized by recurrent episodes of muscle weakness or paralysis associated with hypokalemia.

Incorrect Options:

Options A, B, C:

• These are the correct methods used for the workup of hypokalemic periodic paralysis

Solution for Question 2:

Correct Option D - Implantable Cardioverter Defibrillator:

• Implantable Cardioverter Defibrillator (ICD) is not a treatment of choice for hyperkalemic periodic paralysis (HyperPP).

• HyperPP is a disorder primarily affecting skeletal muscle function due to mutations in genes encoding voltage-gated sodium channels.

• It is characterized by intermittent episodes of muscle weakness or paralysis associated with elevated serum potassium levels.

Incorrect Options

Options A, B, C:

• Acetazolamide: Acetazolamide is a carbonic anhydrase inhibitor that can help reduce serum potassium levels by promoting renal excretion.

• Mexiletine: Mexiletine, a class IB antiarrhythmic agent, stabilizes excitable membranes and can effectively prevent or attenuate attacks of weakness in HyperPP.

• Lasix (Furosemide): Lasix is a loop diuretic that promotes potassium excretion through the kidneys, thus helping to lower serum potassium levels.

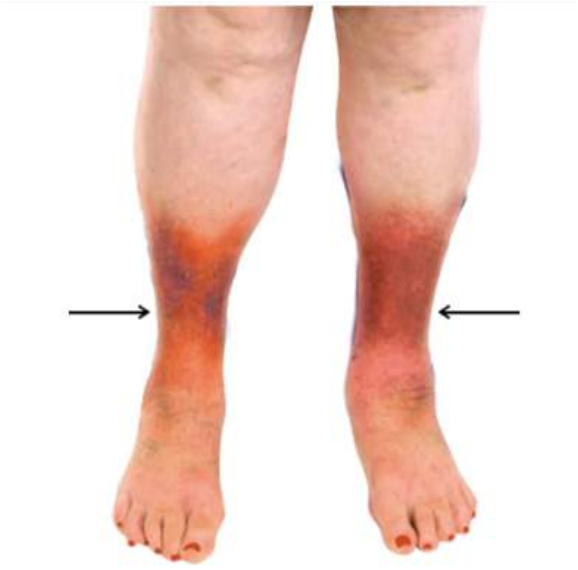
Solution for Question 3:

Correct Option D - Waddling gait:

• Charcot-Marie-Tooth disease (CMT) is a hereditary neurological disorder characterized by progressive muscle weakness and wasting, primarily affecting the peripheral nerves.

• waddling gait is not a characteristic feature of Charcot-Marie-Tooth disease.

• Instead, it is commonly observed in conditions such as Duchenne muscular dystrophy, where progressive muscle weakness affects the pelvic girdle muscles, leading to an abnormal gait pattern resembling waddling.



Incorrect Options:

Options A, B, C:

• These are the features of Charcot Marie Tooth Disease

Solution for Question 4:

Correct Option B - Congestive heart failure due to dilated cardiomyopathy:

• The leading cause of death in Duchenne's Muscular Dystrophy is congestive heart failure due to dilated cardiomyopathy.

• Pneumonia and Respiratory failures are the other leading causes of death in Duchenne's Muscular Dystrophy.

Incorrect Options

Options A, C, D:

• These are not the leading causes of death in Duchenne’s muscular dystrophy

Solution for Question 5:

Correct Option D - Type 1 Diabetes Mellitus:

• Myotonic dystrophy, also known as Steinert's disease, is a multisystem disorder characterized by muscle weakness, myotonia (delayed relaxation of muscles after contraction), and various systemic manifestations.

• Common features of myotonic dystrophy include myopathic facies or "hatchet facies," characterized by a thin upper lip and chin, leading to a characteristic appearance resembling a hatchet.

• This facial feature results from muscle weakness and wasting in the facial muscles.

• Cataracts are another common feature of myotonic dystrophy, occurring in a significant proportion of affected individuals.

• Type 2 Diabetes Mellitus is a feature of Myotonic Dystrophy, Type 1 Diabetes Mellitus is not commonly seen.

Incorrect Options

Options A, B, C:

• These are the features of Myotonic Dystrophy

Previous Year Questions

1. A female patient presents to you with a unilateral headache. It is associated with nausea, photophobia, and phonophobia. What is the drug of choice for acute management?

A. Flunarizine

B. Sumatriptan

C. Propranolol

D. Topiramate

---

2. What is observed in cases of hypoglossal nerve injury?

A. a.Tongue deviation to the contralateral side

B. b.Tongue deviation to the same side

C. c.Falling of the tongue

D. d.Inability in tongue protrusion

---

3. A young man presents with a sudden onset of severe headache, dizziness, breathlessness, and blurring of vision while trekking on a mountain at an altitude of 5000 meters. He is unable to climb any further. Which of the following develops at high-altitude?

(or)

A young man presents with a sudden onset of severe headache, dizziness, breathlessness, and blurring of vision while trekking on a mountain at an altitude of 5000 meters. He is unable to climb any further. Which of the following develops at high-altitude?

A. Metabolic alkalosis

B. Respiratory alkalosis

C. Respiratory acidosis

D. Metabolic acidosis

---

4. What is the diagnosis for a 24-year-old female patient who presents with fever, headache, ataxia, nausea, and vomiting for the past 3 days? The patient exhibits neck rigidity and hip and knee flexion upon passive flexion of the neck. A lumbar puncture was performed, and the CSF findings are provided below. Opening pressure – increased Color – cloudy white WBCs – 7000/µl; neutrophil predominant Sugar – 15 mg/dl CSF/serum glucose ratio – 0.2 Protein – 70 mg/dl Latex agglutination – positive Limulus lysate test – negative

A. Bacterial meningitis

B. Tubercular meningitis

C. Viral meningitis

D. Fungal meningitis

---

5. In myasthenia gravis, which type of hypersensitivity reaction is observed?

A. Type 1 hypersensitivity reaction

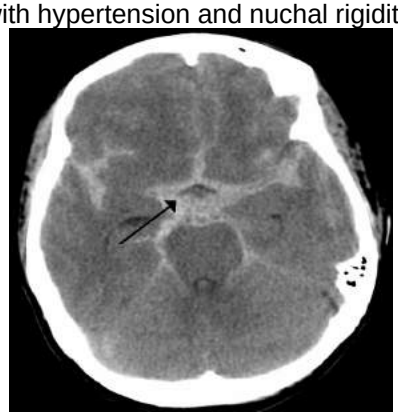
B. Type 2 hypersensitivity reaction

C. Type 3 hypersensitivity reaction

D. Type 4 hypersensitivity reaction

---

6. What could be the possible diagnosis for a young patient who presents with a severe headache, never experienced before, along with hypertension and nuchal rigidity on examination?



A. Cluster headache

B. Subarachnoid haemorrhage

C. Encephalitis

D. Meningitis

---

7. What is the likely diagnosis for a 26-year-old male who had a respiratory tract infection 4 weeks ago and has been experiencing progressive, symmetrical weakness, starting in the lower limbs and gradually affecting the upper limbs? The weakness has made it difficult for him to stand or walk for the past 2 weeks. On examination, there is a lack of reflexes, but pain sensation and proprioception are normal.

A. Guillain Barre syndrome

B. Myasthenia gravis

C. Polymyositis

D. Multiple sclerosis

---

8. What is the recommended treatment for a patient who is HIV-positive and presents with a high-grade fever, positive Kernig's sign, and laboratory findings of reduced glucose, increased protein, and increased leukocytes in the CSF, leading to a diagnosis of cryptococcal meningitis?

A. Vancomycin

B. High dose fluconazole with flucytosine

C. Voriconazole

D. Liposomal amphotericin B

---

9. What could be the likely cause of the headaches experienced by a woman who has a history of headaches for the past 9 months that worsen when lying down and improve throughout the day? Additionally, she reports using oral contraceptives and her fundal examination reveals papilledema, with no presence of focal neurological deficits.

A. Myasthenia gravis

B. Temporal arteritis

C. Chronic migraine

D. Pseudotumor cerebri

---

10. What is the probable medical condition of a young male patient who experiences drooping of the upper eyelid and muscular weakness that appears to intensify during the evening and alleviate in the morning, and is relieved by neostigmine?

A. Myasthenia gravis

B. Huntington chorea

C. Amyotrophic lateral sclerosis

D. External ophthalmoplegia

---

11. Bell's palsy is characterized by

A. Ipsilateral upper and lower halves of the face.

B. Contralateral upper and lower halves of the face.

C. Ipsilateral lower half of the face.

D. Contralateral lower half of the face.

---

12. The patient's wife brings him to the outpatient department (OPD) and reports his difficulty in expressing emotions and lack of involvement in daily activities. During the examination, the presence of resting tremors and rigidity is observed. Considering the potential diagnosis, which specific region of the patient's brain is impacted?

A. Basal ganglia

B. Hippocampus

C. Cerebellum

D. Premotor cortex

---

13. What is the most probable cause for the symptoms of seizures, along with a history of fever, headache, and confusion, in a male patient who arrived at the emergency room? An MRI brain scan revealed inflammation in the bitemporal lobe.

A. Cytomegalovirus

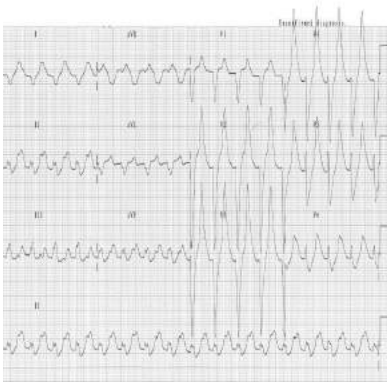
B. Toxoplasma gondii

C. Herpes simplex virus

D. Mycobacterium tuberculosis

---

14. A patient with a history of hypertension and taking multiple anti-hypertensive medications presents at the outpatient department (OPD). The provided ECG results indicate a particular drug as the cause for the observed ECG findings. Which of the following medications is accountable for these ECG findings?



A. Prazosin

B. Metoprolol

C. Hydrochlorothiazide

D. Spironolactone

---

15. a 65-year-old patient presents with tremors, rigidity, and bradykinesia. Pathological examination shows the presence of Lewy bodies within the neurons. What is the most probable diagnosis?

A. Parkinson's disease

B. Prion disease

C. Huntington's chorea

D. Alzheimer's disease

---

16. A patient came to the medical OPD with complaints of polyuria. He has a history of undergoing total hypophysectomy. His Na+ levels were found to be 155 mEq/ L, urine osmolarity was 200 mOsm/L. What is the definitive management in this patient?

A. DDAVP for 2 weeks and then discontinue

B. DDAVP supplementation for lifelong

C. Upsetting of receptors so no treatment is required

D. Thiazides for 2 weeks

---

17. Which region of the internal capsule is responsible for the manifestation of left-sided hemiparesis in a 50-year-old male patient?

A. Retrolentiform

B. Sublentiform

C. Anterior limb

D. Posterior limb

---

18. Where is the site of the lesion that leads to the occurrence of hemiballismus in a patient displaying forceful, flinging movements?

A. Putamen

B. Subthalamic nucleus

C. Caudate nucleus

D. Globus pallidus

---

19. What is the cause of the following symptoms in a patient: Horner's syndrome and loss of pain and temperature sensations in the face on the same side, along with vertigo, numbness, loss of sweating, and dysarthria on the opposite side? A. Medial medulla B. Lateral medulla C. Ventromedial medulla D. Lateral medulla including nucleus ambiguous and spinothalamic tract

A. B and D

B. B, C, D

C. A, B, C

D. A and B

---

20. What could be the possible diagnosis for a female patient who has experienced a loss of pain and temperature sensation, but still retains her touch sensation, as indicated by imaging findings that reveal cavitation around the central canal?

A. Brown-Sequard syndrome

B. Tabes dorsalis

C. Syringobulbia

D. Syringomyelia

---

21. All of the following aid in the localization of the lesion to the spinal cord except?

A. Contralateral hemiplegia

B. Fasciculation at the level of lesion

C. Upper motor neuron lesion and lower motor neuron lesion

D. Bladder involvement

---

22. Which of the following is not characteristic of Brown Sequard syndrome?

A. Complete transection of spinal cord

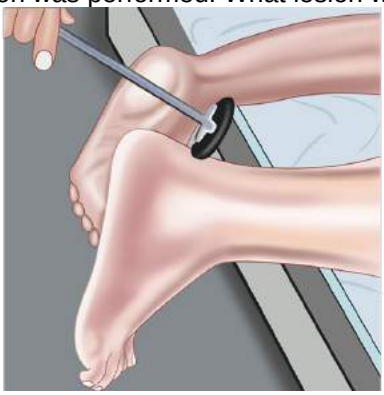
B. Ipsilateral loss of vibration & touch

C. Contralateral loss of pain & temperature

D. Ipsilateral loss of proprioception

---

23. The following clinical examination was performed. What lesion would cause an exaggerated reflex?



A. Polyneuropathy

B. Radiculopathy

C. Upper motor neuron

D. Lower motor neuron

---

24. A young man is brought to the hospital with high-grade fever and altered consciousness. On examination, he had neck rigidity and pain when bending the neck. A lumbar puncture was performed, which showed a WBC count of 145 cells/µL, majorly lymphocytes, elevated opening pressure with protein of 120 mg/dL, and glucose level of 35 mg/dL. How will you manage this patient?

A. Piperacillin + tazobactam

B. Vancomycin + ceftriaxone

C. Amphotericin B + flucytosine

D. Ceftriaxone + ampicillin

---

25. What could be the potential reason behind irreversible dementia?

A. NPH

B. Hypothyroid

C. Lewy body

D. Vitamin B12 deficiency

---

26. Why does a 35-year-old male patient with schizophrenia, who is currently receiving clozapine treatment, require frequent blood monitoring?

(or)

Why does a patient with schizophrenia, who is receiving clozapine treatment, require frequent blood monitoring?

A. Agranulocytosis

B. Myocarditis

C. Cerebral bleed

D. Seizures

---

27. What is observed in the case of an abnormal accumulation of misfolded protein?

A. Creutzfeldt jakob disease

B. Nephritic syndrome

C. Sickle cell anemia

D. Megaloblastic anemia

---

28. What is the probable medical condition in a 37-year-old female patient who has been experiencing headaches for the past 6 months and has been using painkillers consistently? The severity of the headache recently worsened for a period of 3 days but improved upon discontinuing the analgesic medication.

A. Medication overuse headache

B. Tension headache

C. Chronic migraine

D. Cluster headache

---

29. What is the most probable diagnosis for a 30-year-old man who experiences increased fatigue towards the end of the day, which improves with rest, and has a history of ptosis, difficulty in speech, and swallowing?

A. Myasthenia gravis

B. Lambert-Eaton syndrome

C. Duchenne muscular dystrophy

D. Systemic lupus erythematosus

---

30. “Office headache” simulation is

A. Frontal sinusitis

B. Maxillary sinusitis

C. Migraine

D. Temporal arteritis

---

31. Which antiepileptic medication has the lowest teratogenic effects and is considered safe for use during pregnancy?

A. Phenytoin

B. Valproate

C. Carbamazepine

D. Levetiracetam

---

32. SSPE is a complication of

A. Mumps

B. Measles

C. Rubella

D. RSV

---

33. Antidote for opioid poisoning is

A. Naloxone

B. Flumazenil

C. Fomepizole

D. Pethidine

---

34. What is the diagnosis of an elderly woman who is brought to the OPD with complaints of behavioral changes, a history of multiple falls, urinary incontinence, and dementia?

A. Normal pressure hydrocephalus

B. Frontotemporal dementia

C. Parkinson disease

D. Creutzfeldt-Jakob disease

---

35. What type of aphasia is observed in individuals with lesions in the posterior region of the superior temporal gyrus?

A. Fluent

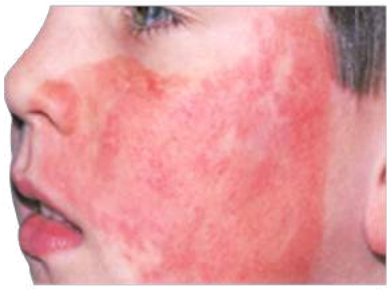
B. Non fluent

C. Anomic

D. Conduction

---

36. What is shown in given below image



A. Port Wine stain

B. Melanoma

C. Molluscum contagiosum

D. Squamous cell carcinoma

---

37. All are true about Brown Sequard Syndrome except

A. I/L loss of vibration

B. I/L loss of joint position

C. C/L loss of pain

D. C/L loss of vibration

---

38. Lesion producing incongruous homonymous hemianopia with wernicke's pupil?

A. Optic tract

B. Visual cortex

C. Optic radiations

D. Optic nerve

---

39. In the scenario of paralysis of all Extraocular muscles, where would the suspected lesion be located?

A. Frontal eye field

B. Cerebral surface

C. Midbrain and Pons

D. Spinal cord

---

40. What is the preferred medication for the presented case? A male patient, 54 years old, was brought to the emergency room with symptoms of fever, headache, and a focal seizure. The EEG results indicate the presence of spikes in the temporal lobe. Analysis of the cerebrospinal fluid (CSF) sample reveals the presence of 50 cells, with 90% lymphocytes and 10% neutrophils.

A. Valacyclovir

B. Acyclovir

C. Ganciclovir

D. Foscarnet

---

41. A patient comes with a blood pressure of 160/100 mmHg and left-sided facial paralysis and weakness since 8 hrs. Her CT appears normal. What would be your next step?

A. Observation and monitoring

B. Intravenous labetalol

C. Intravenous thrombolysis

D. Oral Nifedipine

---

42. What is the most probable diagnosis for a 30-year-old man who experiences increased tiredness at the end of the day that gets better with rest, along with symptoms of drooping eyelids, difficulty in speaking, and swallowing?

A. Myasthenia gravis

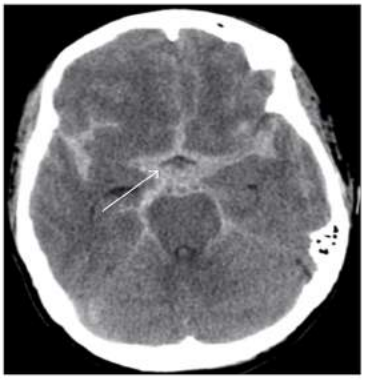
B. Lambert-Eaton syndrome

C. Duchenne muscular dystrophy

D. Systemic lupus erythematosus

---

43. What is the probable diagnosis for a patient who presented at the emergency department with a complaint of intense headache, showing no specific neurological impairment except for the presence of neck stiffness, and subsequently underwent an urgent CT scan that revealed the following result?



A. Subdural hemorrhage

B. Pituitary apoplexy

C. Subarachnoid hemorrhage

D. Pituitary carcinoma

---

44. What is the diagnosis of a 20-year-old male who was brought for psychiatric evaluation due to intellectual disability and has an IQ of 45? He exhibits physical characteristics such as a long face, large ears, and large testis. Additionally, a cardiac murmur is detected during examination, and there is a history of poor intellectual function in the paternal family.

A. Cushing's syndrome

B. Rett syndrome

C. Fragile X syndrome

D. William syndrome

---

45. What is the treatment of Grade I Meningioma?

A. Reassurance

B. Surgical excision

C. Chemotherapy

D. Radiotherapy

---

46. What should be the next course of action in the management of a 50-year-old male who experienced sudden onset of right-sided weakness and aphasia within a two-hour timeframe, with a recorded blood pressure of 160/110mmHg and a clear non-contrast computed tomography (NCCT) scan?

A. CT angiography to look for large vessel occlusion

B. MRI to look for infarct

C. Tab Labetalol 10 mg stat

D. Thrombolysis

---

47. What is the preferred treatment for relieving symptoms during an acute episode of cluster headache?

A. Oral sumatriptan

B. Subcutaneous sumatriptan

C. 100% oxygen at 6 L/minute

D. 100% oxygen at 8 L/minute

---

48. Which of the following is not considered a primary diagnostic factor for neuromyelitis optica?

A. Area postrema syndrome

B. Acute myelitis

C. Focal epilepsy

D. Optic neuritis

---

49. Which of the following does not show hypokinesia movements?

A. Parkinson’s disease

B. Apraxia

C. Catatonia

D. Chorea

---

50. Which of the following statements regarding electroencephalogram (EEG) is not correct?

(or)

Which of the following statements regarding electroencephalogram (EEG) is correct?

A. 1-5% of the population can have epileptiform discharges

B. Doing EEG is mandatory for diagnosis of seizures

C. Scalp EEG may be helpful in localizing frontal lobe epilepsy

D. Progressive multifocal leukoencephalopathy shows triphasic and slow waves on EEG

---

51. A 45-year-old male patient presented with a history of bilateral lower limb weakness, which progressed to his upper limbs in a year. On examination, he had weakness in both lower limbs and wasting in the left upper limb. Babinski sign was positive and the deep tendon reflexes were absent. He has no sensory loss or any autonomic dysfunction. What is the likely diagnosis?

A. MS

B. ALS

C. GBS

D. Tropical spastic paraparesis

---

52. In a patient who is 66 years old and has a history of chronic hypertension, he arrives at the emergency room with changes in mental state and high blood pressure measuring 210/110 mm Hg. A brain CT scan shows bleeding within the brain tissue. The typical location of this bleeding in similar cases is known as the:

A. Putamen

B. Thalamus

C. Pons

D. Cerebellum

---

53. What is the likely diagnosis for a 60-year-old female patient with a six-hour duration of weakness in the right arm that gradually improves and resolves? The patient has a history of diabetes, hypertension, and obesity.

A. Compressive neuropathy

B. Transient ischaemic attack

C. Ischaemic stroke

D. Diabetic neuropathy

---

54. What is the Glasgow Coma Scale (GCS) score of a patient suffering from a head injury, who exhibits eye-opening in response to a loud voice, pain localization, and confusion with disorientation?

A. E3M5V4

B. E3M6V5

C. E4M4V5

D. E3M5V5

---

55. What is the purpose of using AKIN and RIFLE criteria in the classification of...?

A. Acute kidney injury

B. Chronic kidney failure

C. Acute glomerulonephritis

D. nephrotic syndrome

---

56. A 28-year-old male was brought to the emergency room with a history of RTA. GCS progressively declines over hours and axial T2 MRI below shows multiple small hypointense lesions at the corticomedullary junction and basal ganglia, what is the diagnosis?

A. Diffuse axonal injury

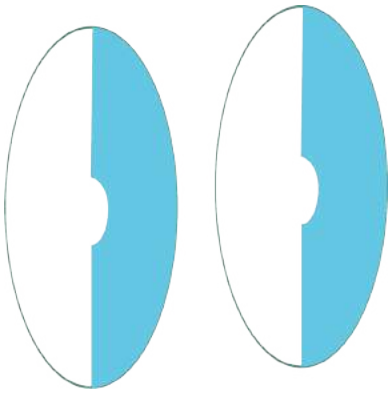
B. Extensive subarachnoid haemorrhage

C. Hypoxic cerebral injury

D. Multiple haemorrhagic contusion

---

57. In a patient undergoing visual field testing, the observed loss suggests a potential site of lesion within the optic pathway.



A. Frontal visual field

B. Occipital lobe

C. Optic radiation

D. Optic chiasma

---

58. What is the probable diagnosis for a 37-year-old male, who is a chronic alcoholic and has recently stopped drinking alcohol, but presents to the emergency department after three days with symptoms of disorientation, tremors, hallucinations, and hypertension?

A. Alcoholic hallucinosis

B. Korsakoff's psychosis

C. Delirium tremens

D. Marchiafava-Bignami disease

---

59. Which of the following combinations of seizure and its corresponding medication is not accurate? Generalized onset tonic – Clonic: Lamotrigine Focal seizures: Levetiracetam Typical absence seizures: Topiramate Myoclonic: Valporic acid

A. 1

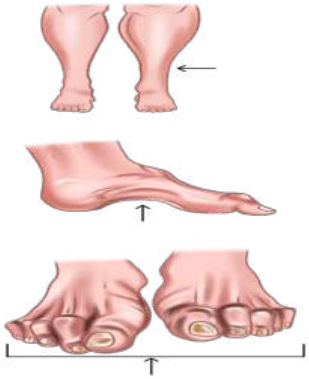
B. 2

C. 3

D. 4

---

60. A 30 year old man presents with distal leg weakness, reduced muscle stretch reflexes, with no complaints of tingling or numbness. On examination, there is atrophy of the muscles below the knee. The following clinical findings are seen and similar history is seen in elder brother. The most probable diagnosis is—



A. Charcot-Marie-Tooth disease

B. Refsum's disease

C. Neuropathy associated with Sjogren's syndrome

D. Rheumatoid arthritis

---

61. What could be the most probable cause for the progressive vision loss in both eyes of a 25-year-old male who has been undergoing low-dose oral steroid therapy for the past decade?

A. Cataract

B. Glaucoma

C. Cystoid macular edema

D. Retinal detachment

---

62. Which of the subsequent options is not a viable treatment choice for Guillain Barre syndrome?

A. Steroids

B. Plasmapheresis

C. IVIG

D. Ventilator support

---

63. According to the ABCD2 scoring, which factors indicate a greater likelihood of a patient with TIA experiencing a future stroke?

A. Age <60 years

B. SBP>140 mm Hg and DBP <90 mmHg

C. Duration of TIA >5 mins

D. Diabetes

---

64. Which of the following statements is false regarding Guillain-Barre syndrome?

A. Ascending paralysis

B. Descending paralysis is seen

C. Plasmapheresis is a treatment method

D. Demyelinating disorder

---

65. Which of the following statements is false regarding patients with trigeminal neuralgia?

A. More common in females

B. Pain along V2 and V3 division of trigeminal nerve

C. Deep seated pain

D. No objective signs of sensory loss

---

66. What is the most frequently observed form of Guillain-Barre syndrome among the options provided?

A. Acute motor axonal neuropathy

B. Acute inflammatory demyelinating polyneuropathy

C. Acute motor sensory axonal neuropathy

D. Miller fisher syndrome

---

67. What is the consequence of thrombosis in the posterior inferior cerebellar artery?

A. Lateral medullary syndrome

B. Weber syndrome

C. Medial medullary syndrome

D. Millard Gubler syndrome

---

68. Myasthenia gravis is associated witH___

A. Decreased acetylcholine release at the nerve endings

B. Decreased myosin

C. Absence of troponin C

D. Decreased synaptic transmission at thee myoneural junction

---

69. Which of the following statements about Weber's syndrome is incorrect?

A. Contralateral hemiplegia

B. Ipsilateral oculomotor nerve palsy

C. Contralateral parkinsonism

D. Ipsilateral paralysis of lower face

---

70. What is the typical pattern observed in Brown-Sequard syndrome?

A. Contralateral loss of joint sense and position

B. Contralateral loss of pain sensation

C. Ipsilateral loss of complete sensory functions

D. Contralateral motor functions

---

71. What medication is employed for mass chemoprophylaxis in the case of meningococcal meningitis?

A. Ciprofloxacin

B. Chloramphenicol

C. Tetracycline

D. Penicillin

---

72. A patient with a history of a backache for 10 days, has now presented with sudden onset difficulty in micturition and defaecation. There was no history of a cough or fever previously. What is the diagnosis?

A. Pott's Spine

B. Gullian Barre Syndrome

C. Cauda Equina Syndrome

D. Multiple Sclerosis

---

73. A 16-year-old girl, who is taking antiepileptics, has had a seizure-free period of 6 months. She has no family history of epilepsy. Her EEG is now normal and she has a normal neurological exam and intelligence. What would your advice be?

A. Stop the treatment and follow up

B. Gradually taper the drug and stop treatment

C. Continue treatment for another 2 years

D. Continue lifelong treatment with antiepileptics

---

74. A patient presents with left-sided facial paralysis and weakness for the past 1 hour. Her blood pressure is 160/100 mmHg and CT appears normal. What would be your next step?

A. Nothing, since CT was normal

B. Start on aspirin + clopidogrel

C. Intravenous thrombolysis

D. Advice BP control

---

75. A patient walks with a stomping gait. When asked to close his eyes and walk, he is unable to do so. Which of the following tracts is probably affected?

A. Spinocerebellar tract

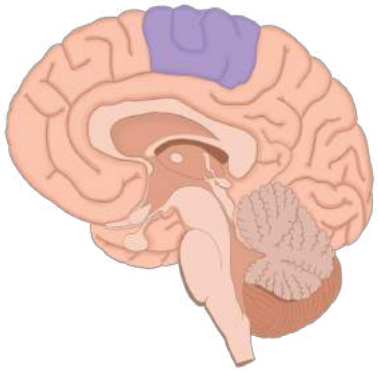
B. Posterior column tract

C. Vestibulospinal tract

D. Rubrospinal tract

---

76. In the sagittal section of the brain given below, if the coloured area is affected, which of the following is not seen?



A. Urinary incontinence

B. Gait apraxia

C. Perianal anesthesia

D. Fecal incontinence

---

77. What is the recommended treatment for a patient who has a severe history of a road traffic accident and exhibits signs of elevated intracranial pressure upon examination?

A. Administer antibiotics for potential infection.

B. Initiate anticoagulant therapy to prevent blood clot formation.

C. Perform immediate surgical intervention.

D. Administer mannitol

---

78. In hemiplegia caused by an ischemic stroke, which region of the internal capsule is impacted?

A. Retrolentiform

B. Sublentiform

C. Anterior limb

D. Posterior limb

---

79. Which artery is involved in a patient who presents with vertigo, diplopia, hoarseness, dysphagia, left Horner's syndrome, and numbness in the left face and right side limbs?

A. Posterior inferior cerebellar artery

B. Superior cerebellar artery

C. Anterior inferior cerebellar artery

D. Basilar artery

---

80. Which of the subsequent statements accurately describe tremors? PD is characterized by resting tremor Tremor consist of alternate contraction of agonist and antagonist muscle in an oscillating rhythmic manner Essential tremor is an uncommon movement disorder affecting 5% of the population Normal individuals can have physiologic tremors that manifest as mild high frequency, postural or action tremors

A. 1,2,3 only

B. 2,3,4 only

C. 1,2,4 only

D. All of the above

---

81. A 37-year-old man is brought to the emergency room by his son. He complains of being unable to move his left arm and leg. According to his son, the patient was reading a book half an hour ago when he realized he couldn't lift his left arm to pick up another book. As he tried to move away from the table, he noticed that his left leg also became very weak. Additionally, he experienced double vision. The patient has a history of hypertension and hyperlipidemia. His body temperature is 36.1°C (97°F), blood pressure is 165/100 mmHg, pulse is 85 beats/min, and he has a respiratory rate of 16 breaths/min. During the examination, it is observed that the patient has drooping of the right eyelid and his right eye is directed downwards and to the side. When requested to smile, there is a drooping of the left corner of the mouth. The strength of the left upper and lower limbs is rated as 3 out of 5, whereas the strength of the right upper and lower limbs is rated as 5 out of 5. Which region of his brain has experienced ischemia among the following options?

A. Inner capsule

B. Medulla

C. Midbrain

D. Occipital lobe

---

82. What is the most common cause of Berry aneurysm?

A. Endothelial injury of vessel due to HTN

B. Muscle intimal elastic lamina layer defect

C. Endothelial layer defect

D. Adventitia defect

---

83. A 65-year-old, male with hypertension develops sudden onset weakness on the right side of the face & arm. His attender recalls history of headache, blurred vision in the patient which leads to the suspicion of increased ICP. Which is the most common cranial nerve involved in raised ICP?

A. Abducens nerve

B. Facial nerve

C. Trigeminal nerve

D. Facial nerve

---

84. What is the recommended method for preventing meningococcal meningitis during pregnancy?

A. Ceftriaxone

B. Rifampicin

C. Ciprofloxacin

D. Penicillin G

---

85. Which of the following symptoms is absent in Horner syndrome?

A. Mydriasis

B. Ptosis

C. Anhidrosis

D. Enophthalmos

---

86. A 16 year old girl, who is taking antiepileptics, has had a seizure-free period of 6 months. She has no family history of epilepsy. Her EEG is now normal and she has a normal neurological exam and intelligence. What would be your advice?

A. Stop the treatment and follow up

B. Gradually taper the drug and stop treatment

C. Continue treatment for another 2 years

D. Continue lifelong treatment with antiepileptics

---

87. Tigroid white matter on MR imaging is seen in which of the following conditions?

A. Pantothenate kinase deficiency

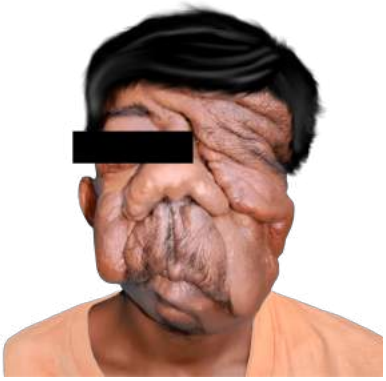
B. Pelizaeus-Merzbacher disease

C. Neuroferritinopathy

D. Aceruloplasminemia

---

88. Identify the diagnosis?



A. Facial nerve palsy

B. Plexiform neurofibromatosis

C. Masticator space abscess

D. Fibrous dysplasia

---

89. Which of the following is not one of the key clinical features used to diagnose Lewy body dementia?

A. Fluctuating cognition

B. Recurrent visual hallucinations

C. REM sleep behaviour disorder

D. Orthostatic hypotension

---

90. What is the probable diagnosis for a patient experiencing repeated inflammation of the optic nerve in both eyes along with widespread inflammation of the spinal cord, and exhibiting visual acuity of 6/60 in the right eye and 6/18 in the left eye, with only a partial response to steroid treatment?

A. Neuromyelitis optica

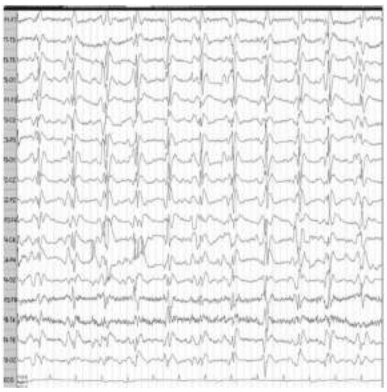
B. Subacute combined degeneration of spinal cord

C. Posterior cerebral artery stroke

D. Neurosyphilis

---

91. The given pattern of EEG is found in:



A. Hepatic encephalopathy

B. Creuzfeldt-Jakob disease

C. Generalized tonic clonic seizures

D. Herpes simplex encephalitis

---

92. What is the correct statement about the condition of a 32-year-old woman who visits the clinic with complaints of frequent falls and walking difficulties? The patient has a history of smoking and type-1 diabetes but no history of hypertension or coronary artery disease. During examination, the patient exhibits weakness in both lower limbs, increased reflexes and muscle tone, as well as an unsteady gait. Furthermore, there is a decrease in proprioception and vibration sense in both lower limbs.

A. Only the dorsal column is involved.

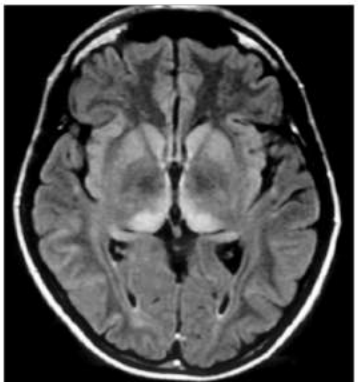
B. All patients with a neurological impairment will show macrocytosis.

C. Vitamin B12 supplements do not improve the condition.

D. Copper deficiency produces similar symptoms.

---

93. What is the probable diagnosis for a 72-year-old former pilot who visits a neurologist, accompanied by his wife, exhibiting symptoms of rapidly advancing dementia, myoclonus, ataxia, and visual impairments? The provided FLAIR MRI scans can assist in confirming the diagnosis.



A. Alzheimer's disease

B. Vascular dementia

C. Sporadic CJD

D. Variant CJD

---

94. Mental retardation is seen in?

A. Phenylketonuria

B. Alkaptonuria

C. Albinism

D. MSUD

---

95. Reversible dementia is seen in?

A. SACD

B. AD

C. CJD

D. Pick's disease

---

96. Which of the statements below is NOT accurate regarding Parkinson's disease?

A. Manganese can cause secondary Parkinsonism

B. Usage of Carbidopa leads to on and off phenomenon

C. Slight tremor in the hand or foot followed by jaw

D. Cog wheel rigidity or lead pipe rigidity is seen

---

97. What is the probable diagnosis for a patient who exhibits symptoms of increased urination, nighttime urination, and involuntary urination, along with a recorded 24-hour urine volume of 7 liters and a urine osmolarity of 260 mOsm/L? The ADH assay shows a recorded value of 0.8 pg/ml, and an MRI of the brain reveals the absence of a bright spot on T1 weighted imaging.

A. Nephrogenic DI

B. Primary polydipsia

C. Pituitary DI

D. Mannitol infusion

---

98. As an intern in the neurology ward of the Department of Internal Medicine, you encounter a 48-year-old female patient who has been admitted due to muscle weakness. After conducting investigations and examinations, it is found that her nerve conduction is normal, but she displays signs of flaccidity. Based on these findings, what possible diagnosis would you consider?

A. Myasthenia gravis

B. GBS

C. Transverse myelitis

D. Traumatic neuritis

---

99. What is the most probable diagnosis for a 30-year-old female patient who reports symptoms of headache, vomiting, absence of menstruation, lactation without pregnancy, decreased sexual desire, acromegaly, and infertility, along with the presence of bitemporal hemianopia during a physical examination?

A. Corticotroph adenoma

B. Gonadotroph adenoma

C. Mammosomatotroph adenoma

D. Glioma

---

100. Extensor Reflex on pinching gastrocnemius muscle is called?

A. Gower Sign

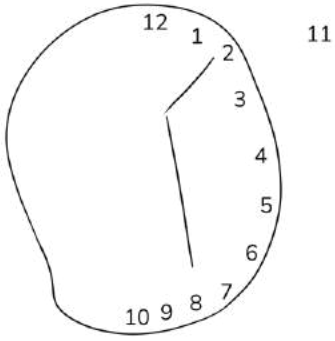
B. Homan Sign

C. Oppenheim Sign

D. Gordon Sign

---

101. A patient was asked to copy the face of a clock and his drawing is shown below. What is the correct term to be used here?



A. Confabulation

B. Hemispatial neglect

C. Kinetic apraxia

D. Asterixis

---

102. Which of the following statements about juvenile myoclonic epilepsy is false? Polygenic inheritance Lamotrigine helps in controlling myoclonic jerks Benzodiazepines alone can control myoclonic jerks Valproate should be avoided

A. 1,2 & 3 are correct

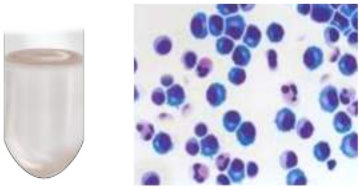
B. 1&3 are correct

C. 2& 4 are correct

D. 1,2,3 and 4 are correct

---

103. What is the probable cause of the patient's condition based on the cerebrospinal fluid (CSF) specimen shown below, which exhibits mononuclear cytosis, increased proteins, and decreased sugars?



A. Tuberculous meningitis

B. Aseptic meningitis

C. Bacterial meningitis

D. Chemical meningitis

---

104. What is the most suitable medication for treating a female patient with galactorrhea, who has tested negative for pregnancy and has been diagnosed with a significant pituitary tumor through an MRI, considering her refusal for surgery?

A. Bromocriptine

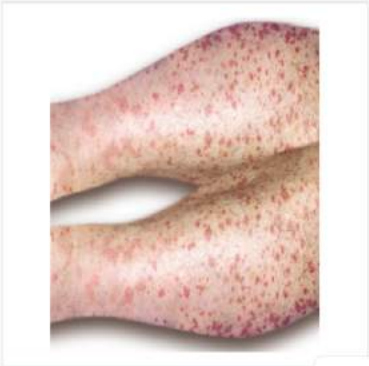
B. Promethazine

C. Octreotide

D. Clozapine

---

105. What is the most probable cause for a 22-year-old man who has a high-grade fever, a purpuric rash, and a CSF sample showing gram-negative diplococci?



A. Neisseria meningitidis

B. Pseudomonas aeruginosa

C. Streptococcus pneumoniae

D. E.coli

---

106. Unilateral pulsatile headache in a woman with photophobia and phonophobia which is exaggerated on eating meals is seen in?

A. Migraine

B. Tension headache

C. Cluster headache

D. Malingering

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	2
Question 3	2
Question 4	1
Question 5	2
Question 6	2
Question 7	1
Question 8	4
Question 9	4
Question 10	1
Question 11	1
Question 12	1
Question 13	3
Question 14	4
Question 15	1
Question 16	2
Question 17	4
Question 18	2
Question 19	1
Question 20	4

Question 21	1
Question 22	1
Question 23	3
Question 24	3
Question 25	3
Question 26	1
Question 27	1
Question 28	1
Question 29	1
Question 30	1
Question 31	4
Question 32	2
Question 33	1
Question 34	1
Question 35	1
Question 36	1
Question 37	4
Question 38	1
Question 39	3
Question 40	2
Question 41	1
Question 42	1
Question 43	3
Question 44	3
Question 45	2
Question 46	4
Question 47	2
Question 48	3
Question 49	4
Question 50	2
Question 51	2
Question 52	1
Question 53	2
Question 54	1
Question 55	1

Question 56	1
Question 57	2
Question 58	3
Question 59	3
Question 60	1
Question 61	1
Question 62	1
Question 63	4
Question 64	2
Question 65	3
Question 66	2
Question 67	1
Question 68	4
Question 69	4
Question 70	2
Question 71	1
Question 72	3
Question 73	3
Question 74	3
Question 75	2
Question 76	3
Question 77	4
Question 78	4
Question 79	1
Question 80	3
Question 81	3
Question 82	2
Question 83	1
Question 84	1
Question 85	1
Question 86	3
Question 87	2
Question 88	2
Question 89	4
Question 90	1

Question 91	2
Question 92	4
Question 93	4
Question 94	1
Question 95	1
Question 96	2
Question 97	3
Question 98	1
Question 99	3
Question 100	4
Question 101	2
Question 102	1
Question 103	1
Question 104	1
Question 105	1
Question 106	1

Solution for Question 1:

Correct Option B:

• The patient's introduction suggests a migraine headache.

• Sumatriptan is a serotonin 5-HT1B/1D receptor agonist and is considered the drug of choice for acute administration of migraines.

• It works by constricting the cranial blood vessels and decreasing the release of inflammatory peptides, in this manner diminishing the headache and related symptoms.

Incorrect Options:

Option A. Flunarizine: It is a calcium channel blocker that's used for migraine prophylaxis and not for ac ute administration. It can take weeks to months to attain a therapeutic effect.

Option C. Propranolol: It is a beta-blocker that's moreover utilized for migraine prophylaxis and not for acute administration. It can take weeks to months to realize a therapeutic effect.

Option D. Topiramate: It is an anticonvulsant that's moreover utilized for migraine prophylaxis and not f or acute administration. It can take weeks to months to realize a therapeutic effect.

Solution for Question 2:

The hypoglossal nerve is the 12th cranial nerve that controls the movement of the tongue. Injury to this nerve can result in a range of symptoms, depending on the location and severity of the injury.

When the hypoglossal nerve is injured, tongue deviation to the same side as the injury is the most com mon symptom. This is because the muscles on the affected side of the tongue become weak or paraly zed while the muscles on the unaffected side remain functional. As a result, the tongue will protrude towards the affected side, away from the midline.

Incorrect Choices:

a. Tongue deviation to the contralateral side is incorrect as it suggests that the tongue would move tow ards the opposite side of the injury. However, this is not a typical presentation of hypoglossal nerve injury.

c. Falling of the tongue is also incorrect, as this is a nonspecific symptom that could occur due to vario us reasons, including weakness or paralysis of the tongue muscles. It is not a specific symptom of hypoglossal nerve injury.

d. Inability in tongue protrusion is also incorrect. This symptom would suggest complete paralysis of th e tongue muscles on the affected side, which is not always the case with hypoglossal nerve injury. In s ome cases, the tongue can still be protruded, albeit with deviation towards the affected side.

Solution for Question 3:

The correct answer is Option B - Respiratory alkalosis

Respiratory alkalosis is a condition characterized by a higher-than-normal blood pH (alkaline) due to an increase in respiratory rate and a decrease in carbon dioxide levels (hypocapnia). It can occur at high altitudes as a physiological respon se to the reduced oxygen availability (hypoxia) that is commonly encountered at higher elevations. Her e's how respiratory alkalosis can occur at high altitude:

Hyperventilation: At high altitudes, the partial pressure of oxygen (PO_2) in the atmosphere decreases d ue to lower oxygen concentration. As a result, the body's respiratory centers are stimulated, leading to an increase in respiratory rate (hyperventilation). This hyperventilation is an attempt to compensate for the reduced oxygen levels by increasing the removal of carbon dioxide (CO_2) from the body.

CO_2 Washout: The increased respiratory rate leads to a greater exhalation of carbon dioxide. Carbon dioxide is an acidic waste product that can combine with water in the blood to form carbonic acid (H_2CO_3). When CO_2 is removed from the blood through hyperventilation, it reduces the concentration of car bonic acid and shifts the balance towards alkalinity.

Shift in Blood pH: With reduced CO_2 levels, there is less carbonic acid formed, and this results in an in crease in blood pH (alkalosis). The normal acid-base balance of the blood is disrupted, leading to respi ratory alkalosis.

Other options are incorrect.

Solution for Question 4:

• The clinical presentation of the patient, including fever, headache, ataxia, nausea, vomiting, and neck rigidity, suggests meningitis. The findings from the CSF analysis also support this diagnosis. The presence of increased opening pressure, cloudy white color, neutrophil-predominant leukocytosis, low CSF/serum glucose ratio, and elevated protein levels are all indicative of meningitis.

• The positive latex agglutination test and negative Limulus lysate test suggest bacterial etiology. The most common bacterial cause of meningitis in young adults is Neisseria meningitidis, followed by Streptococcus pneumoniae and Haemophilus influenzae. The neutrophil-predominant leukocytosis and low CSF/serum glucose ratio are typical of bacterial meningitis.

Incorrect choices:

• Option b: tubercular meningitis. The positive latex agglutination test is suggestive of tuberculosis, and the presence of neutrophil-predominant leukocytosis is typical of early-stage tubercular meningitis. The low CSF/serum glucose ratio is also a characteristic finding in tubercular meningitis. But it is not the correct option.

• Option c: Viral meningitis is typically a self-limiting condition caused by various viruses, including enteroviruses, herpes simplex virus, and varicella-zoster virus. The clinical presentation of viral meningitis is like bacterial meningitis and includes symptoms such as fever, headache, neck stiffness, and photophobia. However, the CSF findings in viral meningitis are usually different from bacterial or tubercular meningitis. In viral meningitis, the CSF typically shows lymphocytic pleocytosis, with normal or slightly elevated protein levels and normal glucose levels.

• Option d: Fungal meningitis can also present with similar symptoms and CSF findings, including increased opening pressure, low glucose, and elevated protein. However, fungal meningitis is rare and usually occurs in immunocompromised individuals.

Solution for Question 5:

Correct Option B - Type 2 hypersensitivity reaction:

• The type of hypersensitivity reaction seen in myasthenia gravis is a type 2 hypersensitivity reaction. Hypersensitivity reactions are exaggerated immune responses that can cause tissue damage and disease. They are classified into four types based on the mechanism of the immune response and the timing of the reaction.

• Type 2 hypersensitivity reactions are caused by the activation of complement and the binding of IgG or IgM antibodies to specific cells or tissues. This results in destruction of the target cells by complement-mediated lysis, opsonization, or antibody-dependent cell-mediated cytotoxicity (ADCC). Examples of type 2 hypersensitivity reactions include autoimmune hemolytic anemia, Goodpasture syndrome, and myasthenia gravis.

• Myasthenia gravis is an autoimmune disorder that affects the neuromuscular junction and is caused by the presence of autoantibodies that target and destroy acetylcholine receptors in muscle cells. This results in muscle weakness and fatigue, particularly in the muscles responsible for eye movement, swallowing, and breathing. The autoantibodies in myasthenia gravis are primarily of the IgG subtype and lead to complement-mediated destruction of the acetylcholine receptors.

Incorrect Options:

Option A - Type 1 hypersensitivity reaction: It is also known as immediate hypersensitivity reactions, ar e caused by the release of IgE antibodies in response to an allergen. These reactions typically occur wi thin minutes of exposure and can cause symptoms such as hives, itching, and anaphylaxis.

Option C - Type 3 hypersensitivity reaction: It is caused by the formation of immune complexes that de posit in tissues, leading to inflammation and tissue damage. Examples of type 3 hypersensitivity reactions include systemic lupus erythematosus (SLE) and rheumatoid arthritis.

Option D - Type 4 hypersensitivity reaction: It is also known as delayed-type hypersensitivity reactions, are mediated by T

cells and occur hours to days after exposure to an antigen. Examples of type 4 hypersensitivity reactions include contact dermatitis and some forms of drug reactions.

Solution for Question 6:

• A subarachnoid hemorrhage is a type of bleeding that occurs in the space between the brain and the thin tissues that cover it. It is often caused by the rupture of a blood vessel, such as an aneurysm.

• A severe headache is the hallmark symptom of a subarachnoid hemorrhage, often described as the "worst headache of my life." The presence of hypertension and nuchal rigidity further supports this diagnosis.

• .It is important to promptly assess and manage this condition, as it can be life-threatening.

Incorrect Choices:

• Option A: Cluster headache: Cluster headaches are a type of primary headache disorder characterised by severe, unilateral (one-sided) pain that is often centred around the eye. They are called cluster headaches because they tend to occur in clusters or cycles, with frequent attacks over a period of weeks to months followed by periods of remission. Cluster headaches are not associated with hypertension or nuchal rigidity.

• Option C: Encephalitis: Inflammation of the brain, usually caused by an infection, such as a viral or bacterial infection. While headache can be a symptom of encephalitis, it is not specific to this condition. Encephalitis often presents with other symptoms such as fever, altered mental status, seizures, and focal neurological deficits. Other signs, such as behavioral changes, abnormal movements, and sensitivity to light, may be present in encephalitis.

• Option D: Meningitis: Meningitis is an infection or inflammation of the meninges. It can be caused by various infectious agents, including bacteria, viruses, and fungi. Meningitis commonly presents with symptoms such as severe headache, fever, neck stiffness (nuchal rigidity), and sensitivity to light (photophobia). Other signs and symptoms, such as altered mental status, nausea and vomiting, seizures, and a characteristic rash (in bacterial meningitis), may also be present.

Solution for Question 7:

Guillain-Barre syndrome (GBS)-

• is a rare neurological disorder characterized by progressive muscle weakness and loss of reflexes.

• The weakness in GBS is symmetrical and ascending, meaning it starts in the lower limbs and moves upward symmetrically.

Incorrect Choices:

• Option B: Myasthenia gravis: Myasthenia gravis is an autoimmune disorder characterized by muscle weakness and fatigue. However, the weakness in myasthenia gravis typically worsens with repeated use of the affected muscles and improves with rest. In addition, myasthenia gravis often affects the muscles of the face and eyes before involving the limb

• Option C: Polymyositis: Polymyositis is an inflammatory muscle disease that causes symmetric weakness in the proximal muscles (muscle) . deep tendon reflexes are usually preserved.

• Opton D: Multiple sclerosis: Multiple sclerosis is a chronic autoimmune disease that primarily affects the central nervous system . It does not typically present with ascending weakness or areflexia as seen in GBS. Moreover, multiple sclerosis is not usually associated with a preceding respiratory tract infection.

Solution for Question 8:

• Liposomal amphotericin B is the preferred initial therapy for severe cryptococcal meningitis due to its higher efficacy and better penetration into the central nervous system.

• It is usually combined with flucytosine for induction therapy.

Incorrect choices:

• Option A: Vancomycin is primarily used to treat bacterial infections, particularly those caused by MRSA. It has no activity against fungal infections such as cryptococcal meningitis.

• Option B: High dose fluconazole with flucytosine: Fluconazole is commonly used for the treatment and maintenance therapy of cryptococcal meningitis. Flucytosine works synergistically with fluconazole. However, in severe cases like the one described in the scenario, initial induction therapy with liposomal amphotericin B is preferred over fluconazole-based therapy.

• Option C: Voriconazole is primarily used to treat invasive aspergillosis and other filamentous fungal infections. It does not have significant activity against Cryptococcus species.

Solution for Question 9:

• Pseudotumor cerebri, also known as idiopathic intracranial hypertension (IIH), is the probable cause of the woman's headaches based on the information provided.

• Pseudotumor cerebri is a condition characterized by increased intracranial pressure without any identifiable cause, such as a tumor.

Incorrect Options:

• Option A; Myasthenia gravis: results in muscle weakness and fatigue. It is not typically associated with headaches or papilledema.

• Option B: Temporal arteritis: also known as giant cell arteritis, is an inflammatory condition that affects the blood vessels, especially the temporal arteries. It commonly presents with headaches, but there are additional symptoms such as scalp tenderness, jaw pain, and vision problems. Fundal examination may reveal ischemic optic neuropathy rather than papilledema. Additionally, temporal arteritis is more commonly seen in older individuals.

• Option C: Chronic migraine: is a subtype of migraine headache that occurs on 15 or more days per month for at least three months. While chronic migraines can cause daily headaches, they are usually not associated with worsening in a recumbent position or papilledema.

Solution for Question 10:

• Myasthenia gravis is an autoimmune disorder characterised by voluntary muscle weakness and fatigue caused by antibodies that attack the neuromuscular junction.

• Ptosis is a common symptom, as is muscle weakness, which tends to worsen with activity and improve with rest.

• Neostigmine increases the amount of acetylcholine at the neuromuscular junction and can help alleviate Myasthenia gravis symptoms.

Incorrect Choices:

• Option B: Huntington's chorea is a genetic condition that causes involuntary movements, cognitive decline, and psychiatric symptoms. Ptosis and muscle weakness that worsens in the evening are not typical symptoms.

• Option C: Amyotrophic lateral sclerosis (ALS) is a neurodegenerative disease that causes muscle weakness and atrophy by affecting motor neurons. While weakness is a common symptom of ALS, the pattern of worsening in the evening and improving in the morning, with relief from neostigmine, is unusual.

• Option D: External ophthalmoplegia is defined as weakness or paralysis of the eye muscles that control eye movements. It can be caused by a variety of conditions, but it does not usually present with diurnal variation or respond to neostigmine in the same way that the case described did.

Solution for Question 11:

• Bell's palsy is a condition that affects the facial nerve causing temporary paralysis or weakness of the muscles on one side of the face.

• Bell's palsy causes paralysis or weakness in both the upper and lower halves of the face on the same side

Incorrect Choices:

• Option B: Upper and lower halves of the face are contralateral:Bell's palsy, on the other hand, affects the facial nerve on the same side of the body, so the symptoms would not be contralateral.

• Option C: This option is incorrect because Bell's palsy affects both the upper and lower halves of the face on the same side. It is not restricted to the lower half.

• Option D: Contralateral lower half of the face: For the same reasons as option B, this option is incorrect. Bell's palsy does not affect the opposite side of the face or only the lower half of the face.

Solution for Question 12:

• According to the vignette, the patient suffers from Parkinson’s disease. Parkinson’s disease is a neurological disorder that occurs due to damage to neural cells in the substantia nigra. Substantia nigra is a part of the basal ganglia. Parkinson’s disease results in tremors, rigidity, bradykinesia or akinesia and postural instability, similar to the patient’s.

Incorrect Choices:

• Option b. The hippocampus consists of the dentate gyrus and the Cornu Ammonis. The hippocampus is responsible for learning and memory. Damage to it causes amnesia that prevents patients from forming new memories and/or recalling old ones. The patient in the vignette does not have any memory problems. Hence, he has a normal, unaffected hippocampus.

• Option c. The cerebellum is responsible for the coordination of motor functions. A defect in it causes ataxia, Intention tremors, akinesia, bradykinesia, dysphagia and fatigue of \which are absent in the patient.

• Option d. The premotor cortex is responsible for the selection of movements. It also helps initiate movements. Damage to the premotor cortex causes apraxia- the inability to perform skilled actions- and deficits in contralateral fine motor control.

Solution for Question 13:

• According to the vignette, the patient has a headache, fever and confusion, with a presentation of seizures in the emergency room. These signs are very indicative of meningitis, for which an MRI done of the patient shows inflammation of the temporal lobe. Temporal lobe involvement during meningitis is a pathognomic feature of Herpes Meningoencephalitis.

• Herpes simplex virus causes meningitis that involves the temporal lobe, most often, and the frontal lobe.

• MRI brain shows, hyperintensity in the temporal lobe.

• Bilateral involvement is more common.

Incorrect Choices:

• Option a. Cytomegalovirus is a common cause of meningitis in adulthood. It preferentially infects the ventricular and/or subventricular areas as it replicates in the neural stem or precursor cells residing in that area. It very rarely causes inflammation of the temporal lobe.

• Option b. Toxoplasma gondii is a microbe that causes encephalitis of the brain. It predominantly affects the brain's white matter surrounding the basal and basal ganglia. MRI of the brain in toxoplasmosis shows multiple ring-enhancing regions all over the brain’s cerebral hemispheres. It is not localised to the temporal lobes, like that seen in the patient.

• Option d. Mycobacterium tuberculosis causes inflammation of the meninges alone and very rarely causes encephalitis. On an MRI, there is an enhancement of the leptomeningeal junction because of the sedimentation of infectious material there. There is also an enhancement of the linear periventricular region. Temporal lobes bilaterally are not affected.

Solution for Question 14:

Option D: Spironolactone

• The ECG of the patient shows signs of hyperkalemia that include peaked T-waves, PR interval widening, and QRS interval widening.

• Hyperkalemia is a common side effect of potassium-sparing diuretics like spironolactone.

• Spironolactone works to stop sodium reabsorption in the collecting tubule by blocking aldosterone receptors.

• This causes the prevention of excessive K+ excretion in the urine and reduced water retention causing increased levels of potassium i.e., hyperkalemia.

Option A: Prazosin

• Prazosin is an alpha-channel blocker that has a common side of orthostatic hypotension. Patients consuming prazosin also present with first-dose hypotension. Because of these reasons, it is advised to the patient to consume this tablet in the evening. It does not cause electrolyte abnormalities.

Option B: Metoprolol

• Metoprolol is a beta blocker that causes bradycardia, hypotension, and arrhythmias when used for a long period of time. It does not have any effect on the cells of the nephrons and hence does not alter the excretion of potassium.

Option C: Hydrochlorothiazide

• Hydrochlorothiazide is a thiazide diuretic that acts on the distal convoluted tubules of the nephrons. Its side effects include hyperglycemia, hyperlipidemia, hyperuricemia, hypercalcemia, and hypokalemia.

Solution for Question 15:

Correct Option A- Parkinson’s disease: Parkinson’s disease is a movement disorder that affects the ne rvous system. Its symptoms occur because of low dopamine levels in the brain.

• Early signs of the disease include tremors, a loss of a sense of smell, and coordination problems. It is also many times accompanied by depression, visual hallucinations, and convulsions.

• On biopsy, of the brain of patients with Parkinson’s disease the presence of Lewy bodies, and unusual clumps of the protein alpha-synuclein, are found.

Incorrect Options:

Option B- Prion disease: Prion diseases are rare, fatal neurodegenerative disorders caused by misfold ed prion proteins (PrP) in the brain. This can lead to memory loss, behavior changes, and movement p roblems. There is no presence of Lewy bodies in these patients.

Option C- Huntington’s chorea: Huntington’s disease is a progressive brain disorder that causes uncon trolled movements, emotional problems, and loss of thinking ability (cognition). Affected individuals ma y have trouble walking, speaking, and swallowing. Huntington’s is rarely associated with depressive sy mptoms like that present in the patient in the vignette.

Option D- Alzheimer's disease: Alzheimer’s disease is a type of dementia that affects memory, thinking , and behavior. Symptoms eventually grow severe enough to interfere with daily tasks. There is a notab le shrinking of the brain noticed in patients with Alzheimer’s and on biopsy, there is an increase in beta-amyloid content or tau proteins.

Solution for Question 16:

Option B. DDAVP supplementation for lifelong:

• The patient underwent hypophysectomy following which he developed symptoms of polyuria with an increase in serum sodium concentration and urine osmolality.

• These findings are indicative of central diabetes insipidus which is a result of inefficient function of the pituitary. DDAVP (1-deamino-8-D-arginine vasopressin) is a synthetic analog of vasopressin, having a prolonged action profile with minimal vasopressor activity.

• It can be administered orally, intranasally, subcutaneously, or intravenously.

• This patient requires its administration lifelong due to the loss of pituitary function.

Incorrect Choices:

• Option A. DDAVP for 2 weeks and then discontinue: Since the patient has central diabetes insipidus due to the loss of pituitary function permanently, the patient requires DDAVP (vasopressin) for a lifetime and not 2 weeks only.

• Option C. Upsetting of receptors so no treatment is required: Since the patient has a deranged serum sodium level and an abnormal urine osmolality, treatment needs to be provided. Also, the patient has developed central diabetes insipidus after the surgery which is a disorder of insufficient secretion of ADH and not receptors.

• Option D. Thiazides for 2 weeks: Thiazides are used to treat nephrogenic diabetes insipidus which results due to the absence of vasopressin receptors on the nephrons. The patient has central diabetes insipidus and is not nephrogenic, making this treatment with thiazides inefficient for him.

Solution for Question 17:

Correct Option - Posterior limb:

• The posterior limb of the internal capsule contains the corticospinal tract, which is responsible for motor control of the limbs. Damage to this area can lead to contralateral hemiparesis, as seen in the patient's left-sided weakness.

Incorrect Options:

Option A - Retrolentiform: Damage to the retrolentiform part of the internal capsule would typically resul t in sensory deficits, such as loss of sensation or abnormal sensation, rather than hemiparesis.

Option B - Sublentiform: Similar to the retrolentiform part, damage to the sublentiform part of the intern al capsule is more likely to produce sensory deficits rather than hemiparesis.

Option C - Anterior limb: Damage to the anterior limb of the internal capsule can cause a variety of sym ptoms, including contralateral weakness, but it usually affects the face more than the limbs. Therefore, it is less likely to be the cause of the isolated left-sided hemiparesis described in the scenario.

Solution for Question 18:

Correct Option B - Subthalamic nucleus:

• Hemiballismus is a movement disorder characterized by sudden, involuntary, and violent flinging movements of one side of the body.

• It is typically caused by a lesion in the subthalamic nucleus (STN) of the basal ganglia.

Incorrect Options:

Option A - Putamen: Lesions in the putamen are associated with chorea, not hemiballismus. Chorea is characterized by brief, irregular, and jerky movements.

Option C - Caudate nucleus: Lesions in the caudate nucleus are associated with Huntington's disease, which causes chorea as well. Hemiballismus is not specifically related to caudate nucleus lesions.

Option D - Globus pallidus: Lesions in the globus pallidus can cause various movement disorders, suc h as dystonia or Parkinson's disease, but they are not specifically associated with hemiballismus.

Solution for Question 19:

Correct Option A - B and D:

• The symptoms described in the question are consistent with a syndrome known as Wallenberg syndrome or lateral medullary syndrome.

• This syndrome is caused by a lesion in the lateral part of the medulla oblongata, specifically involving the lateral medulla.

• The features of Wallenberg syndrome -

• ipsilateral Horner's syndrome (ptosis, miosis, anhidrosis), Ipsilateral loss of pain and temperature sensations in the face (due to involvement of the spinal trigeminal nucleus and tract), Vertigo with numbness (due to involvement of the vestibular nuclei) Dysarthria on the contralateral side (due to involvement of the corticobulbar fibers).

• Ipsilateral loss of pain and temperature sensations in the face (due to involvement of the spinal trigeminal nucleus and tract),

• Vertigo with numbness (due to involvement of the vestibular nuclei)

• Dysarthria on the contralateral side (due to involvement of the corticobulbar fibers).

• Ipsilateral loss of pain and temperature sensations in the face (due to involvement of the spinal trigeminal nucleus and tract),

• Vertigo with numbness (due to involvement of the vestibular nuclei)

• Dysarthria on the contralateral side (due to involvement of the corticobulbar fibers).

Incorrect Options:

Option B - B, C, D: Lateral medulla lesions can cause the presented symptoms in question, but the ven tromedial medulla does not because lesions in these areas would typically result in different sets of sy mptoms.

Option C - A, B, C: Lateral medulla lesions can cause the presented symptoms in question, but the me dial medulla and ventromedial medulla do not because lesions in these areas would typically result in d ifferent sets of symptoms, such as contralateral hemiparesis and tongue deviation, rather than the spec ific symptoms mentioned in the question.

Option D - A and B: Medial medulla lesions do not cause the presented symptoms.

Solution for Question 20:

Correct Option D - Syringomyelia:

• Syringomyelia is a neurological condition in which the spinal cord develops a fluid-filled cyst (syrinx).

• The syrinx can enlarge to the point that it injures the spinal cord and the nerve fibers that transmit signals from the brain to the body.

• Loss of pain and temperature sensation, with intact touch sensation, is indicative of syringomyelia.

Incorrect Options:

Option A - Brown-Sequard syndrome: Brown-Sequard syndrome involves loss of joint position and vibr ation senses and motor deficits on the same side of the lesion and contralateral pain and temperature i s lost.

Option B - Tabes dorsalis: Tabes dorsalis is associated with sensory ataxia, lightning-like pain, and imp aired proprioception, differing from the symptoms described.

Option C - Syringobulbia: Syringobulbia refers to the presence of a
syrinx (fluid-filled cavity) in the brainstem, which is not described in the case.

Solution for Question 21:

Correct Option A - Contralateral hemiplegia:

• Contralateral hemiplegia refers to weakness or paralysis affecting one side of the body that is opposite to the side of the lesion. However, contralateral hemiplegia is not characteristic of lesions within the spinal cord. It is more commonly associated with brainstem lesions.

Incorrect Options:

Option B - Fasciculation at the level of the lesion: Fasciculation refers to involuntary muscle twitches or contractions. If fasciculation is observed at the uppermost level of the lesion in the spinal cord, it can p rovide clues about the involvement of the corresponding spinal cord segment. Therefore, fasciculation can help in localizing the lesion.

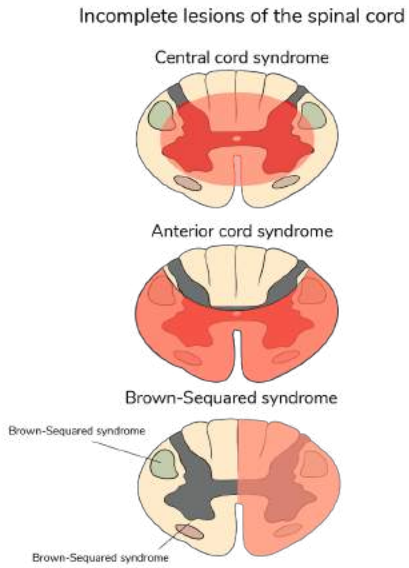
Option C - Upper motor neuron (UMN) lesion and lower motor neuron (LMN) lesion: UMN and LMN les ions indicate damage to different parts of the nervous system. UMN lesions involve the descending mo tor pathways(corticospinal) originating from the brain and traveling through the spinal cord, while LMN l esions affect the peripheral nerves or nerve roots exiting the spinal cord. The presence of UMN or LMN signs and symptoms can provide valuable information about the location of the lesion within the spinal cord.

Option D - Bladder involvement: Bladder involvement, such as urinary retention or incontinence, can in dicate dysfunction or damage to the nerves controlling bladder function within the spinal cord. The spe cific pattern of bladder involvement can help localize the transverse lesion within the spinal cord.

Solution for Question 22:

Correct Option A - Complete transection of spinal cord:

• Complete transection of the spinal cord is not a feature of Brown-Séquard syndrome. Brown-Séquard syndrome is a specific pattern of spinal cord injury characterized by a hemisection of the spinal cord (one half of the spinal cord is damaged or severed).



Incorrect Options:

Option B - Ipsilateral loss of vibration and touch: This is a characteristic feature of Brown-Séquard syndrome.

Option C - Contralateral loss of pain and temperature: This is another feature of Brown-Séquard syndrome. The side of the body opposite to the lesion (contralateral side) will exhibit a loss of pain and temperature sensation.

Option D - Ipsilateral loss of proprioception: This is also a feature of Brown-Séquard syndrome. The side of the body with the lesion (ipsilateral side) will experience a loss of proprioception, which refers to the ability to sense the position and movement of one's own body.

Solution for Question 23:

Correct Option C - Upper motor neuron:

• Upper motor neuron lesion: An exaggerated reflex, also known as hyperreflexia, is a clinical finding associated with dysfunction or pathology involving the upper motor neuron system.

Incorrect Options:

Option A - Polyneuropathy: Polyneuropathy refers to a condition that affects multiple peripheral nerves. It typically results in sensory and motor deficits rather than exaggerated reflexes. In polyneuropathy, reflexes may be diminished or absent due to the involvement of peripheral nerves.

Option B - Radiculopathy: Radiculopathy refers to compression, irritation, or damage to the nerve roots as they exit the spinal cord. Although radiculopathy can lead to abnormal reflexes, the reflexes are usually diminished or weakened rather than exaggerated.

Option D - Lower motor neuron: Lower motor neuron lesions typically result in diminished or absent reflexes rather than exaggerated reflexes. Damage or dysfunction in the lower motor neuron, which includes the spinal cord and peripheral nerves, can lead to decreased reflex activity.

Solution for Question 24:

Correct Option C - Amphotericin B + flucytosine:

• Based on the clinical presentation and the results of the lumbar puncture, this patient is most likely suffering from fungal meningitis. The WBC count is what gives away the diagnosis, hence, Amphotericin B an anti-fungal will be used for the treatment. Amphotericin B is typically used in conjunction with flucytosine to combat some fungal illnesses because it increases the uptake of flucytosine by fungi.

Incorrect Options:

Option A, B and D are not used to treat patients with fungal meningitis.

Solution for Question 25:

Correct Option C: Lewy body

• Lewy body dementia is generally considered a progressive condition with irreversible cognitive decline. It commonly presents with cognitive impairment, visual hallucinations, and fluctuations in alertness and attention

Incorrect options

Option A: NPH (Normal Pressure Hydrocephalus): NPH is a condition characterized by the accumulation of cerebrospinal fluid in the brain's ventricles, leading to enlarged ventricles. It can cause a triad of symptoms known as Hakim's triad, which includes gait disturbances, urinary incontinence, and cognitive impairment. NPH is potentially reversible with the surgical placement of a
shunt to drain the excess cerebrospinal fluid, thus alleviating the symptoms of dementia.

Option B: Hypothyroidism: Hypothyroidism occurs when the thyroid gland fails to produce an adequate amount of thyroid hormones. This condition can lead to various symptoms, including cognitive impairment, depression, and memory problems. Reversing hypothyroidism through hormone replacement therapy can often result in the resolution or improvement of the associated cognitive symptoms.

Option D: Vitamin B12 deficiency: Vitamin B12 is essential for the proper functioning of the nervous system, and its deficiency can lead to neurological symptoms, including cognitive impairment and dementia-like symptoms. Replenishing vitamin B12 levels through supplementation or dietary changes can often reverse or improve the associated cognitive symptoms.

Solution for Question 26:

Correct Option A: Agranulocytosis

• Clozapine is an atypical antipsychotic medication commonly used in the treatment of schizophrenia. While it can be an effective treatment, it is associated with certain side effects that require close monitoring.

• One of the most significant side effects of clozapine is agranulocytosis, defined as neutrophil count of less than 0.5 × 109/L (500/μL). Thus, blood cell counts are monitored.

• On starting clozapine, blood counts are monitored every week for 6 months, then every other week for 6 months, then monthly, if all neutrophil counts are adequate.

Incorrect Options:

Option B: Myocarditis: While clozapine can potentially cause myocarditis, it is a rare side effect. It typic ally presents with symptoms such as chest pain, shortness of breath, and an abnormal increase in cert ain cardiac enzymes. However, regular blood monitoring is not primarily performed to detect myocarditi s.

Option C: Cerebral bleed: Cerebral bleeding, or intracranial hemorrhage, is not a commonly reported s ide effect of clozapine nor does regular blood tests help in assessing risk or occurrence of one.

Option D: Seizures: Seizures can occur as a side effect of clozapine, particularly at higher doses. How ever, regular blood monitoring is not useful in assessing risk for seizures.

Solution for Question 27:

Correct Option A: Creutzfeldt jakob disease

• Creutzfeldt-Jakob disease (CJD) is a neurodegenerative disorder characterized by the abnormal accumulation of misfolded prion proteins in the brain. Prions are infectious agents composed of abnormal isoforms of the prion protein (PrP). These misfolded proteins can induce the conversion of normal PrP into the abnormal form, leading to the accumulation of amyloid plaques in the brain tissue. This accumulation of misfolded proteins contributes to the progressive neurodegeneration seen in CJD.

Incorrect options:

Option B: Nephritic syndrome: Nephritic syndrome is a kidney disorder characterized by inflammation o f the glomeruli, which are the filtering units of the kidney. It is primarily associated with immune-mediat ed damage and not the accumulation of misfolded proteins.

Option C: Sickle cell anemia: Sickle cell anemia is a genetic disorder characterized by the presence of abnormal hemoglobin molecules in red blood cells. It is caused by a mutation in the hemoglobin gene, resulting in the production of abnormal hemoglobin S. While there is an abnormality in the structure of hemoglobin in sickle cell anemia, it does not involve the accumulation of misfolded proteins as seen in CJD.

Option D: Megaloblastic anemia: Megaloblastic anemia is a type of anemia characterized by the prese nce of large, immature red blood cells (megaloblasts) in the bone marrow. It is typically caused by defic iencies in vitamin B12 or folate. Megaloblastic anemia does not involve the accumulation of misfolded proteins

Solution for Question 28:

Correct Option A:

• The use of analgesics and anti-migraine medications frequently or regularly can increase headache frequency and cause the transition from episodic to chronic headache. A patient who previously experienced primary headaches and who takes analgesics on average of 15 days per month, anti-migraine medications (triptans or ergot alkaloids), opioid medications, or combined analgesics on average of 10 days per month is said to have a chronic headache caused by medication overuse.

Incorrect Options:

Option B: Tension headache is the most common one. There may be a feeling of a band around the he ad or pressure at the vertex, and the pain is described as "dull," "tight," or as "pressure."

Option C: Migraine sufferers describe a
prodrome of fatigue, agitation, or behavioural changes that last for a
few hours or days. Typical migraine symptoms include a
strong, throbbing headache, photophobia, phonophobia, and vomiting that lasts 4 to 72 hours.

Option D: The 'cluster', which consists of runs of identical headaches starting at the same time and last ing for weeks at a time. Cluster headaches are notably periodic.

Solution for Question 29:

Correct Option A:

In this case, the patient's symptoms of fatiguability, ptosis, difficulty in speech and swallowing are char acteristic of myasthenia gravis

• Myasthenia gravis is an autoimmune disorder characterized by muscle weakness and fatiguability, especially with repetitive use. It commonly affects the muscles controlling eye movements (causing ptosis and diplopia), facial muscles (causing difficulty in speech and swallowing), and the skeletal muscles of the limbs.

• The fatiguability typically improves with rest. Myasthenia gravis is caused by the production of autoantibodies that block or destroy the acetylcholine receptors at the neuromuscular junction, leading to impaired transmission of nerve impulses to the muscles.

Incorrect Options:

Option B: Lambert-Eaton syndrome

• Lambert-Eaton syndrome (LES) is a rare autoimmune disorder characterized by muscle weakness and fatiguability. It is often associated with an underlying malignancy, particularly small cell lung cancer.

• Unlike myasthenia gravis, the weakness in LES typically improves with repeated muscle use (post-exercise facilitation). In LES, autoantibodies target the presynaptic voltage-gated calcium channels at the neuromuscular junction, leading to decreased release of acetylcholine.

Option C: Duchenne muscular dystrophy

• Duchenne muscular dystrophy (DMD) is a genetic disorder characterized by progressive muscle weakness and wasting. It primarily affects boys and usually becomes evident in early childhood.

• Unlike myasthenia gravis, the weakness in DMD is not fatigable and typically involves the proximal muscles of the limbs. DMD is caused by mutations in the dystrophin gene, leading to the absence or dysfunction of dystrophin, an important protein for maintaining muscle integrity.

Option D: Systemic lupus erythematosus (SLE)

• Systemic lupus erythematosus is a chronic autoimmune disease that canaffect multiple organ systems, including the musculoskeletal system. Muscle weakness and fatigue can occur in patients with SLE, but it is not the primary feature of the disease.

• Other manifestations of SLE, such as arthritis, rash, renal involvement, and serositis, are typically more prominent.

Solution for Question 30:

Correct option:

Option A.

Office headache is the name given to indicate the pain pattern in frontal sinusitis. In this condition, Pain occurs in a specific time-bound ascending pattern. The Pain usually occurs near the brows.

Incorrect options:

Option B. In maxillary sinusitis, the Pain is characterized by aggravation on leaning forward or stooping forward.

Option C. Migraine headaches are characterized by an aura (classical) and sensory disturbances. Pain occurs mainly unilaterally.

Option D. In temporal arteritis, Pain mainly occurs in the temporal region. Pain is usually frequent and s evere. Tenderness is also present over temples.

Solution for Question 31:

Correct option:

Option D.

Levetiracetam does not interact with other drugs, is excreted through the kidney, and has rapid onset a ction. So it is used as the most preferred antiepileptic drug during pregnancy.

Incorrect options:

Option A. Exposure to Phenytoin can result in a complication called fetal hydantoin syndrome.

Option B. Exposure to Valproate can result in fetal Valproate syndrome.

Option C. Carbamazepine has teratogenic effects, such that it can cause developmental delay, growth retardation, and abnormal IQ.

Solution for Question 32:

Correct option:

Option B.

Subacute Sclerosing Panencephalitis occurs due to the reactivation of the measles virus or an inappro priate immune response to the measles virus.

Incorrect options:

Option A. Complications of mumps are expressed as inflammation of various organs such as orchitis, o ophoritis, encephalitis, pancreatitis, etc.

Option C. Complications of rubella include heart problems, loss of hearing and eyesight, intellectual dis ability, and liver or spleen damage.

Option D. The respiratory syncytial virus causes complications of the respiratory tract only.

Solution for Question 33:

Correct option:

Option A.

Naloxone sodium is used as an antidote for opioid poisoning cases. This is because Naloxone can bloc k opioid receptors.

Incorrect options:

Option B. Flumazenil is used as the antidote for Benxodiazepene poisoning.

Option C. Fomepizole is used as an antidote in case of methanol poisoning.

Option D. Pethidine itself is a
kind of opioid used for relieving pain. The antidote for pethidine is Naloxone.

Solution for Question 34:

Correct Option A.

• The elderly woman's symptoms of behavioral change, history of falls, urinary incontinence, and dementia are consistent with Normal Pressure Hydrocephalus (NPH). NPH occurs due to impaired CSF absorption, leading to enlarged ventricles and the characteristic symptoms of Hakim's triad , which includes gait disturbance (difficulty walking), cognitive impairment (dementia), and urinary incontinence.

Incorrect Options

Option B. Frontotemporal dementia: Frontotemporal dementia is a form of dementia characterized by p rogressive changes in behavior, personality, and language difficulties. While behavioral changes and d ementia are present in this case, urinary incontinence and gait disturbance are less commonly associat ed with frontotemporal dementia.

Option C. Parkinson's disease: Parkinson's disease primarily presents with movement-related sympto ms such as tremors, rigidity, bradykinesia (slowness of movement), and postural instability. While urina ry incontinence and cognitive impairment can occur in advanced stages, they are not typically the pred ominant features of Parkinson's disease.

Option D. Creutzfeldt-Jakob disease: Creutzfeldt-Jakob disease (CJD) is a rare degenerative neurologi cal disorder that leads to rapid cognitive decline, involuntary movements, and muscle stiffness. The sy mptoms progress rapidly, usually over a few months. While cognitive impairment is seen in CJD, the pr esence of gait disturbance and urinary incontinence is less typical.

Solution for Question 35:

Correct Option A.

• Fluent aphasia: This is the correct answer. Lesions in the posterior part of the superior temporal gyrus typically result in fluent aphasia. Fluent aphasia, also known as Wernicke's aphasia, is characterized by fluent speech with normal grammar and syntax but impaired comprehension and poor word choice. Patients with fluent aphasia may produce speech that is fluent and effortless but lacks meaning and coherence.

Incorrect Options

Option B. Non-fluent aphasia: This is an incorrect choice. Non-fluent aphasia, also known as Broca's aphasia, is associated with lesions in the frontal lobe, particularly the posterior part of the frontal gyrus. It is characterized by non-fluent, effortful speech with impaired grammar and syntax but relatively preserved comprehension.

Option C. Anomic aphasia: This is an incorrect choice. Anomic aphasia is characterized by difficulty in finding and producing the appropriate words. It is typically associated with lesions in various regions of the brain, including the temporal and parietal lobes.

Option D. Conduction aphasia: This is an incorrect choice. Conduction aphasia is associated with lesions in the arcuate fasciculus, a white matter tract connecting Broca's area and Wernicke's area. It is characterized by difficulty repeating words and phrases despite intact comprehension and relatively fluent speech production.

Solution for Question 36:

Correct option:

Option A.

Port Wine Stain is a phenomenon seen in children. It is a
kind of hemangioma. It is usually present at birth and later fades with age. But it does not disappear. A hemangioma is, in fact, a vascular birthmark.

Incorrect options:

Option B. Melanoma is one of the most severe skin cancer. It is seen as a
black-coloured mark on the skin.

Option C. Molluscum contagiosum is a
viral infection where the lesions are present in the form of dome-shaped pearly lesions.

Option D. Squamous cell carcinoma is the cancer of the skin's outer and middle layer squamous cells.

Solution for Question 37:

Correct option:

Option D.

Contralateral loss of vibration is not a characteristic feature of Brown-Sequard Syndrome. In this syndrome, the loss of sensation occurs on the same side (ipsilateral) as the spinal cord injury. The incorrect option implies a loss of vibration sensation on the opposite side of the injury, which is not a typical finding in Brown-Sequard Syndrome.

Brown-Sequard Syndrome is a neurological condition characterized by damage to one side of the spinal cord, leading to specific sensory and motor deficits. The correct features associated with Brown-Sequard Syndrome are as follows:

Incorrect options:

Option A. It is feature of Brown-Sequard Syndrome

Option B. It is feature of Brown-Sequard Syndrome

Option C. It is feature of Brown-Sequard Syndrome

Solution for Question 38:

Correct option: A

• Incongruous homonymous hemianopia refers to a visual field defect where there is loss of vision on one side of the visual field in both eyes, but the defect does not match exactly between the eyes. In this case, the lesion causing the incongruous homonymous hemianopia is associated with Wernicke's pupil.

• Wernicke's pupil, also known as an afferent pupillary defect or Marcus Gunn pupil, is a condition where there is a relative pupillary dilation in response to direct light stimulation in the affected eye. It indicates dysfunction of the afferent pathway carrying visual information from the retina to the brain.

Incorrect options:

Option B) Visual cortex: Lesions in the visual cortex, which is located in the occipital lobe at the back of the brain, can cause visual field defects, but they typically result in congruous homonymous hemianopia. In congruous hemianopia, the defect matches between the eyes. Wernicke's pupil is not associated with lesions in the visual cortex.

Option C) Optic radiations: The optic radiations are nerve pathways that carry visual information from the visual cortex to the lateral geniculate nucleus (LGN) in the thalamus. Lesions in the optic radiations can cause visual field defects, but they typically result in congruous hemianopia. Wernicke's pupil is not associated with lesions in the optic radiations.

Option D) Optic nerve: Lesions in the optic nerve, which connects the eye to the brain, can cause visual field defects, but they typically result in monocular vision loss (loss of vision in one eye) rather than a homonymous hemianopia. Wernicke's pupil is not associated with lesions in the optic nerve.

Solution for Question 39:

Correct Option C:

• When the midbrain and pons are affected the cranial nerves 3,4,5,6,7 and 8 are lost due to its location. The oculomotor nerve loses its control and hence extraocular movements are lost hence extraocular muscles are paralyzed.

Incorrect Options:

Option A: Frontal Eye Field is located in the brodmann area 8 controlled by the cerebellum which for ho rizontal gaze. It connects the extra ocular muscles with paramedian pontine reticular formation.

Option B: Cerebral surface the cerebral cortex mainly deals with motor-sensory pathways and associati on areas.

Option D: Spinal Cord , a lesion/injury of the spinal cord care causes complete sensory and motor loss at the site of injury, compression or a
shame here resulting in flaccid areflexic paralysis below the level of injury.

Solution for Question 40:

Correct Option B:

• Acyclovir is the drug of choice here. Here the CSF analysis revealed lymphocytic predominance. CSF Analysis with the clinical symptoms of fever, headache and seizures suggest infective etiology with viral meningitis. The Focal temporal lobe spikes indicate HSV meningitis. The empirical therapy of HSV is Acyclovir.

Incorrect Options:

Option A: Valacyclovir Is indicated in Varicella Zoster associated meningitis.

Option C: Is mainly considered for cytomegalovirus associated meningitis and can be sometimes supp ortively added with acyclovir in HSV.

Option D: It is the drug of choice for immunocompromised cytomegalovirus meningitis in drug-resistant ganciclovir cases.

Solution for Question 41:

Correct Option A:

• This patient may be experiencing a transient ischemic attack or an ischemic stroke if they have sudden onset hemiparesis and a normal CT scan. For this patient, observation and monitoring would be the next course of action.

• The preferred imaging method for stroke patients is non-contrast CT (NCCT). For the first few hours, CT could appear normal, and the infarct might not be seen for 24-48 hours.

• The early detection of brain infarction is more easily detected using diffusion-weighted MRI (DW MRI).

Incorrect Options:

Option B: Labetalol is used in the acute phase of stroke.

Option C: Intravenous thrombolysis this should be done only after confirmation of Ischemic stroke in th e patient and should be initiated within 4.5 hours.

Option D: Oral Nifedipine can be an antihypertensive agent used in the acute phase of stroke.

Solution for Question 42:

Correct Option A:

• In the above case the most probable diagnosis is that of myasthenia gravis as he presents with easy fatigability towards the end of the day that improves with rest and also has a history of ptosis, difficulty in speech and swallowing. It is due to the autoantibody-mediated destruction of the acetylcholine receptors (AChRs) at the postsynaptic membrane. This consequently leads to a decreased transmission at the neuromuscular junction. Failure of transmission results in muscle weakness.

Incorrect Options:

Option B: In LEMS, the patient presents with proximal muscle weakness. The symptoms improve after brief exercise. They also present with absent or reduced deep tendon reflexes.

Option C: In Duchenne muscular dystrophy, the patient initially presents with proximal muscle weaknes s. Calf muscle hypertrophy is a classical feature.

Option D: In SLE, there is a
discoid rash, malar rash, photosensitivity and lupus nephritis and is more commonly seen in women.

Solution for Question 43:

Correct Option C:

• The above image is that of subarachnoid haemorrhage and shows blood in the basal cistern. Trauma is the most common cause. The patient defines it as the worst headache of their life. It is also known as thunderclap headache. It presents with neck rigidity, transient loss of consciousness and no focal neurological deficit.

Incorrect Options:

Option A: Subdural hemorrhage is a venous bleed and CT shows a crescentic opacity.

Option B: In pituitary apoplexy there is sudden hemorrhage into pituitary gland due to hematogenic hyp operfusion

Option D: MRI is used for pituitary carcinomas.

Solution for Question 44:

Correct Option C:

• The above case is that of Fragile X as the patient has a long face, large ears, large testis, cardiac murmur and a history of poor intellectual function present in the paternal family. It is the second most common cause of mental retardation. Fragile X syndrome is an X-linked dominant disease due to CGG trinucleotide repeat expansion.

Incorrect Options:

Option A: Cushing syndrome is an endocrine disorder mainly due to high levels of cortisol, it can be ca used exogenously because of glucocorticoid administration. Clinical features such as acne, hirsutism, t hin skin, delayed wound healing, anxiety, irritability, depression are seen along with involvement of mu sculoskeletal, endocrine and metabolic systems.

Option B: Rett syndrome is a progressive neurodevelopmental disorder that almost exclusively affects f emales. Affected children often develop autistic-like behaviors, breathing irregularities, feeding and sw allowing difficulties, growth retardation, and seizures. Most Rett syndrome cases are caused by identifi able mutations of the MECP2 gene on the X chromosome and can present with a wide range of disability ranging from mild to severe.

Option D: Williams syndrome is a developmental disorder that affects many parts of the body. This con dition is characterized by mild to moderate intellectual disability or learning problems, unique personalit y characteristics, distinctive facial features, and heart and blood vessel (cardiovascular) problems.

Solution for Question 45:

Correct Option B:

• The treatment of grade 1 meningioma is surgical excision.

• Meningiomas are benign tumors seen in adults and originate from the meningothelial cells of the arachnoid. They are round, well-defined, and compress the underlying brain.

Incorrect Options:

Option A: All meningioma need treatment. Reassurance is not enough.

Option C: Chemotherapy is not used for meningiomas.

Option D: Radiotherapy is employed in grade 2 and grade 3.

Solution for Question 46:

The next step in management would be CT Angiography. NCCT and CT Angiography must be done co ncurrently during stroke evaluation. The given features of hemiparesis with aphasia and a clear NCCT are suggestive of an acute ischemic stroke with a proximal large vessel occlusion. Therefo re the patient should undergo immediate CT Angiography to localize.

Solution for Question 47:

Correct answer: Option B:

• Sumatriptan is a medication from the triptan class that is commonly used to treat acute migraine and cluster headaches. It works by constricting blood vessels and reducing inflammation in the brain. Subcutaneous administration of sumatriptan is considered an effective and fast-acting treatment for cluster headaches. It can provide relief within 10 to 15 minutes, making it a suitable option for patients

who require rapid pain relief.

Incorrect Choices:

• Option a. oral Sumatriptan: Sumatriptan, a medication from the triptan class, is commonly used to treat acute migraine and cluster headaches. Oral sumatriptan is available in tablet form and is a convenient option for patients who prefer oral administration. However, when it comes to the treatment of cluster headaches, oral sumatriptan may not provide the same rapid relief as other forms of administration, such as subcutaneous injection.

• Option c. 100% oxygen at 6 L/minute: This option refers to the administration of 100% oxygen at a flow rate of 6 liters per minute for the treatment of an acute cluster headache. Oxygen therapy has shown to be highly effective in relieving the intense pain associated with cluster headaches. The exact mechanism by which oxygen relieves cluster headaches is not fully understood, but it is believed to involve the regulation of cerebral blood flow. Therefore subcutaneous sumatriptan is considered first line treatment instead of administration of 100% oxygen at a flow rate of 6 liters per minute.

• Option d. 100% oxygen at 8 L/minute: Although 100% oxygen is an effective treatment for cluster headaches, the recommended flow rate is 6 liters per minute, not 8 liters per minute. Increasing the flow rate to 8 liters per minute may not provide additional benefits and may lead to discomfort or a waste of oxygen. Therefore, the option of 100% oxygen at 8 L/minute is not the recommended approach for treating cluster headaches.

Solution for Question 48:

Neuromyelitis optica (NMO), also known as Devic's disease, is an autoimmune inflammatory disorder t hat primarily affects the optic nerves and spinal cord. It is characterized by recurrent episodes of optic neuritis (inflammation of the optic nerve) and acute myelitis (inflammation of the spinal cord).

Incorrect Choices:

Option A: Area postrema syndrome: This refers to symptoms related to inflammation of the area postre ma, a region in the brainstem involved in regulating vomiting. Symptoms may include intractable hiccup s, nausea, and vomiting.

Option B: Acute myelitis: This involves inflammation of the spinal cord, resulting in neurological sympto ms such as limb weakness, sensory loss, and bladder/bowel dysfunction.

Option D: Optic neuritis: Inflammation of the optic nerves leading to visual impairment, often characteri zed by pain behind the eyes and vision loss.

Solution for Question 49:

Option D - Chorea Chorea is a movement disorder that causes sudden, unintended, and uncontrollable jerky movements of the arms, legs, and facial muscles. Chorea is seen in many diseases and conditio ns and is caused by an overactivity of the chemical dopamine in the areas of the brain that control mov ement. Mainly there are hyperkinetic movements.

Incorrect Choices:

Option A: Parkinson's disease is primarily characterized by hypokinetic movements, which reduce volu ntary and automatic movements. The cardinal features of Parkinson's disease include bradykinesia (sl owness of movement), rigidity (stiffness), resting tremors, and postural instability. These symptoms refl

ect the hypokinetic nature of the disease. As the disease progresses, it also shows hyperkinetic feature s.

Option B: Apraxia- Apraxia is the loss of ability to execute or carry out skilled movement and gestures, despite having the physical ability and desire to perform them.

Option C: Catatonia- Catatonia, a neuropsychiatric syndrome characterized by abnormal movements, behaviors, and withdrawal, is a condition that is most often seen in mood disorders but can also be see n in psychotic, medical, neurologic, and other disorders

Solution for Question 50:

The statement that is NOT correct among the options provided is:

b. Doing EEG is mandatory for the diagnosis of seizures.

Explanation:

1-5% of the population can have epileptiform discharges:

• This statement is correct. Epileptiform discharges on EEG can be found in a percentage of the population without a history of clinical seizures.

Doing EEG is mandatory for the diagnosis of seizures:

• This statement is not correct. While EEG is a valuable tool in diagnosing and characterizing seizures, it is not always mandatory. The diagnosis of seizures is often based on a combination of clinical history, physical examination, and sometimes additional diagnostic tests. EEG is particularly useful when there is uncertainty about the nature of events or when further information is needed to guide treatment, but it is not mandatory for all cases.

Scalp EEG may be helpful in localizing frontal lobe epilepsy:

• This statement is correct. Scalp EEG can be valuable in localizing the origin of epileptic activity in the brain, including identifying specific lobe involvement such as the frontal lobe.

Progressive multifocal leukoencephalopathy shows triphasic and slow waves on EEG:

• This statement is not accurate. Progressive multifocal leukoencephalopathy (PML) typically does not show specific EEG patterns like triphasic and slow waves. EEG findings in PML can vary but often show focal or multifocal abnormalities rather than a specific triphasic pattern.

Solution for Question 51:

Correct Option: B

• ALS (Amyotrophic Lateral Sclerosis) is a neurodegenerative disease affecting motor neurons, leading to progressive muscle weakness and atrophy. The symptoms typically begin in one region of body region and gradually spread to other areas. In this case, the patient initially experienced bilateral lower limb weakness, which later progressed to involve the upper limbs.

• The presence of Babinski sign (upward movement of the big toe when the sole of the foot is stimulated) and absent deep tendon reflexes indicate upper motor neuron involvement, a characteristic feature of ALS.

Incorrect Option:

Option a: Multiple Sclerosis (MS) typically presents with a relapsing-remitting course and involves vario us neurological symptoms, including sensory loss, autonomic dysfunction, and optic neuritis. These sy mptoms are not described in the given scenario.

Option c: Guillain-Barré Syndrome (GBS) is characterized by ascending weakness and sensory loss, w hich usually begins in the lower limbs and progresses upward. It typically presents with absent deep te ndon reflexes, but it is less likely in this case as the weakness started in the upper limbs.

Option d: Tropical spastic paraparesis is a
condition associated with Human T-cell lymphotropic virus type 1 (HTLV-1) infection. It primarily affects the lower limbs, causing weakness and spasticity. In the given scenario, the upper limb involvement a nd absent deep tendon reflexes are inconsistent with tropical spastic paraparesis.

Solution for Question 52:

Correct Option: A

Based on the given clinical scenario, the most common site of hemorrhage in cases of intraparenchym al hemorrhage with chronic hypertension is the Putamen. The correct answer is: Putamen

Explanation:

In individuals with chronic hypertension, the most common site of intraparenchymal hemorrhage is with in the deep structures of the brain. The basal ganglia, which includes the Putamen, is frequently affecte d in these cases.

The Putamen is a component of the basal ganglia located deep within the brain. It plays a role in motor control and coordination. Chronic hypertension can lead to the development of hypertensive arteriopat hy, which weakens the small blood vessels in the brain. Over time, this can result in vessel rupture and bleeding, leading to an intraparenchymal hemorrhage. The high pressure within the blood vessels, par ticularly in the small perforating arteries, contributes to the vulnerability of the Putamen to hemorrhage.

While intraparenchymal hemorrhage can occur in other brain regions, such as the Thalamus, Pons, or Cerebellum, the Putamen is the most commonly affected site in cases of chronic hypertension-associat ed hemorrhage.

Solution for Question 53:

Correct Option: B

• Based on the given clinical presentation, the probable diagnosis in this case is Transient Ischaemic Attack (TIA).

• Transient Ischaemic Attack (TIA) refers to a temporary episode of neurological symptoms that occur due to a temporary disruption of blood flow to a specific area of the brain. TIAs are often considered a warning sign of an impending stroke.

• The key feature in this case that suggests TIA is the sudden onset of weakness in the right arm, which gradually becomes lesser and resolves completely. This transient nature of the symptoms is characteristic of a TIA, where the blood flow obstruction is temporary, allowing the symptoms to resolve

within 24 hours.

• The patient's medical history of diabetes, hypertension, and obesity are risk factors for vascular diseases, including TIAs and strokes.

Incorrect Options:

Option A: Compressive neuropathy refers to nerve compression due to factors like anatomical abnorm alities, trauma, or repetitive use. It typically results in persistent symptoms rather than transient sympto ms as described in the case.

Option C: Ischaemic stroke involves a more prolonged disruption of blood flow to a specific area of the brain, leading to persistent neurological deficits that do not resolve within 24 hours. In this case, the sy mptoms gradually became lesser and completely resolved, suggesting a
TIA rather than an ischaemic stroke.

Option A: Diabetic neuropathy is a condition that affects peripheral nerves and typically presents with s ymmetric sensory and motor symptoms. It is unlikely to cause transient weakness limited to one side of the body, as seen in this case.

Solution for Question 54:

Correct choice: A

Explanation:

• The Glasgow Coma Scale (GCS) is a neurological assessment tool used to evaluate the level of consciousness in patients with head injuries. It consists of three components: eye opening response (E), verbal response (M), and motor response (V). Each component is scored on a scale from 1 to 5 or 6, with higher scores indicating a higher level of consciousness.

• Based on the information provided, the GCS score for the patient would be E3M5V4. Here's a breakdown of what each component score means in this context:

• Eye opening response (E3): The patient opens her eyes in response to a loud voice, which corresponds to a score of 3 on the E component.

• Verbal response (M5): The patient is confused and disoriented, but is able to localize pain. This corresponds to a score of 5 on the M component.

• Motor response (V4): The patient's motor response is localized to pain, indicating a withdrawal from the painful stimulus. This corresponds to a score of 4 on the V component.

• Therefore, the overall GCS score for the patient is E3M5V4.

Incorrect options:

Option B. This option suggests a higher verbal response score of 6, indicating that the patient is oriente d and conversing normally. However, the information provided states that the patient is confused and d isoriented, which corresponds to a lower verbal response score of 5. Therefore, this option is incorrect.

Option C. This option suggests a higher eye opening response score of 4, indicating spontaneous eye opening. However, the information provided states that the patient opens her eyes in response to a loud voice, which corresponds to a
lower eye opening response score of 3. Therefore, this option is incorrect.

Option D. This option suggests a higher motor response score of 5, indicating localized response to pai n. However, the information provided states that the patient's motor response is lower, with a withdrawal from the painful stimulus, which corresponds to a
motor response score of 4. Therefore, this option is incorrect

Solution for Question 55:

Correct choice: A

Explanation:

• The AKIN (Acute Kidney Injury Network) and RIFLE (Risk, Injury, Failure, Loss, End-stage kidney disease) criteria are used to classify and stage acute kidney injury (AKI). These criteria help healthcare professionals assess the severity of AKI and guide treatment decisions.

Incorrect options:

Option B. and C AND Option D. AKIN and RIFLE CRITERIA ARE NOT USED TO CLASSIFY these 3 diseases.

Solution for Question 56:

Correct Option: A

• Based on the information provided, the most likely diagnosis in this case is diffuse axonal injury (DAI).

• Diffuse axonal injury (DAI) is a type of traumatic brain injury that occurs as a result of acceleration-deceleration forces during a motor vehicle accident (RTA). It is characterized by widespread shearing and tearing of the axons in the brain, particularly at the corticomedullary junction and basal ganglia.

• The clinical presentation of a progressive decline in the Glasgow Coma Scale (GCS) over hours following the RTA is consistent with DAI. DAI is often associated with a poor prognosis and can lead to significant neurological impairments.

• The axial T2 MRI showing multiple small hypointense lesions at the corticomedullary junction and basal ganglia is a characteristic finding of DAI. These lesions represent areas of axonal injury and can be visualized on MRI scans.

Incorrect options:

Option B: Extensive subarachnoid hemorrhage: Subarachnoid hemorrhage occurs due to the rupture o f blood vessels into the subarachnoid space. While it can be seen in traumatic brain injury, the presenc e of multiple small hypointense lesions on MRI is more indicative of DAI.

Option C: Hypoxic cerebral injury: Hypoxic cerebral injury occurs due to a lack of oxygen supply to the brain. It can result from various causes such as cardiac arrest, near-drowning, or severe respiratory fail ure. The MRI findings described in the scenario are not consistent with hypoxic cerebral injury.

Option D: Multiple hemorrhagic contusion: Hemorrhagic contusions are localized areas of bleeding and bruising within the brain tissue that occur as a result of direct trauma. While multiple hemorrhagic cont usions can be seen in traumatic brain injury, the specific location of the lesions described in the scenari

o (corticomedullary junction and basal ganglia) is more suggestive of diffuse axonal injury.

Considering the history of RTA, progressive decline in GCS, and the characteristic MRI findings, the m ost likely diagnosis in this case is diffuse axonal injury (DAI).

Solution for Question 57:

Correct answer

Option B: Occipital lobe.

• Occipital lobe: The occipital lobe is primarily responsible for processing visual information received from the eyes. A lesion in the occipital lobe can result in various visual disturbances, such as visual field defects, hallucinations, or difficulty with visual perception.

Incorrect options

Option A:

• Frontal visual field: Lesion in the frontal visual field refers to damage or impairment in the area of the visual field that is processed by the frontal part of the brain. It can result from a lesion in the frontal lobe or the corresponding pathways involved in visual processing. The specific location of the lesion determines the extent and nature of visual field loss in the frontal region.

Option C: Optic radiation:

• The optic radiation refers to the nerve fibers that transmit visual information from the lateral geniculate nucleus of the thalamus to the primary visual cortex in the occipital lobe. A lesion in the optic radiation can lead to visual field defects that are specific to the affected area. For example, a lesion in the temporal optic radiation may result in a contralateral superior quadrantanopia.

Option D: Optic chiasm:

• Lesion at the optic chiasm, where the optic nerves partially cross over. Can cause visual field defects involving the nasal visual field of each eye, such as bitemporal hemianopia.

Solution for Question 58:

Correct Option: C

The most likely diagnosis for the 37-year-old male who is a chronic alcoholic and presents with disorien tation, tremors, hallucinations, and hypertension three days after abstaining from alcohol is "Delirium tr emens."

• Delirium tremens: Delirium tremens (DT) is a severe form of alcohol withdrawal syndrome that usually occurs 2 to 5 days after alcohol cessation. It is characterized by altered mental status, disorientation, tremors, hallucinations (often visual), autonomic hyperactivity (such as hypertension), and can progress to seizures and life-threatening cardiovascular complications if not managed promptly. DT is considered a medical emergency and requires immediate medical attention.

Incorrect options:

Option A: Alcoholic hallucinosis: Alcoholic hallucinosis is a condition characterized by auditory hallucinations that occur within 12 to 24 hours after alcohol cessation. However, it does not typically cause significant disorientation, tremors, or hypertension as seen in the patient's presentation.

Option B: Korsakoff's psychosis: Korsakoff's psychosis, also known as Wernicke-Korsakoff syndrome, is caused by thiamine (vitamin B1) deficiency, often associated with chronic alcoholism. It primarily presents with severe memory loss and confabulation. While cognitive impairment may be present, it does not typically manifest with significant disorientation, tremors, hallucinations, or hypertension as seen in the patient's presentation.

Option D: Marchiafava-Bignami disease: Marchiafava-Bignami disease is a rare disorder associated with chronic alcoholism characterized by demyelination and necrosis of the corpus callosum, leading to neurological deficits. While it can present with cognitive impairment and neurological symptoms, it is not typically associated with significant disorientation, tremors, hallucinations, or hypertension as seen in the patient's presentation.

In summary, based on the patient's history of chronic alcoholism, the presentation of disorientation, tremors, hallucinations, and hypertension after alcohol cessation, the most likely diagnosis is "Delirium tremens."

Solution for Question 59:

Correct choice: C

Explanation:

• Topiramate is not typically used as a first-line medication for typical absence seizures.

• The first-line treatment for typical absence seizures is Ethosuximide or Valproic acid.

• Ethosuximide is considered the drug of choice for the treatment of typical absence seizures. Valproic acid is also commonly used and has efficacy against various seizure types, including typical absence seizures.

Incorrect options:

Option A. Lamotrigine is a commonly used medication for generalized onset tonic-clonic seizures, as well as other seizure types. It is an antiepileptic drug that can be used as a monotherapy or in combination with other medications.

Option B. Levetiracetam is an effective medication for focal seizures and is widely used as a first-line treatment for this seizure type. It is also used as an adjunctive therapy for other seizure types.

Option D. Valproic acid (Sodium valproate) is commonly used for the treatment of various seizure types, including myoclonic seizures. It is considered one of the first-line medications for myoclonic seizures.

Solution for Question 60:

Correct choice: A

Explanation:

• Charcot-Marie-Tooth disease is a hereditary neurological disorder that affects the peripheral nerves, resulting in muscle weakness and wasting, particularly in the distal parts of the limbs. The characteristic features of CMT include reduced muscle stretch reflexes (hyporeflexia or areflexia), muscle atrophy, and weakness, which are consistent with the clinical findings described in the case. The absence of tingling or numbness in the patient's complaints is also in line with CMT. Sensory symptoms such as tingling and numbness are generally not prominent in CMT, as the primary manifestation of the condition is motor dysfunction.

Incorrect options:

Option b. Refsum disease, also known as heredopathia atactica polyneuritiformis, is a rare genetic disorder characterized by the body's inability to break down phytanic acid, leading to its accumulation in various tissues. This condition is caused by a mutation in the PHYH gene, resulting in a deficiency of the enzyme responsible for phytanic acid metabolism. The buildup of phytanic acid can cause a range of symptoms, including peripheral neuropathy, retinitis pigmentosa, hearing loss, balance issues, muscle weakness, and skin changes. Anosmia, or loss of smell, is a
notable feature of Refsum disease. Treatment involves following a low-phytanic acid diet and, in severe cases, plasmapheresis to reduce phytanic acid levels. Early diagnosis and ongoing management can help alleviate symptoms and improve the quality of life for individuals with Refsum disease. Regular monitoring by a healthcare team comprising various specialists is crucial for effective treatment.

Option C. Sjögren's syndrome is a chronic autoimmune disorder that primarily affects the moisture-producing glands in the body, leading to symptoms of dryness in the eyes and mouth. It can also cause systemic manifestations, affecting other organs and causing fatigue, joint pain, and dry skin. The condition is more common in women and typically develops in middle-aged individuals. Diagnosis involves a combination of medical history, physical examination, and specific tests to assess glandular function and detect specific antibodies. While there is no cure, treatment focuses on managing symptoms and preventing complications. This may involve the use of lubricating eye drops, saliva substitutes, medications to reduce inflammation, and lifestyle modifications. Regular monitoring by a healthcare team is important to ensure proper management of Sjögren's syndrome and improve the quality of life for affected individuals.

Option D. Rheumatoid arthritis (RA) is a chronic autoimmune disease that primarily affects the joints, causing inflammation, pain, stiffness, and swelling. It occurs when the body's immune system mistakenly attacks the synovium, the lining of the joints. This results in chronic inflammation that can lead to joint damage and deformity over time. Rheumatoid arthritis commonly affects the small joints of the hands and feet but can involve multiple joints throughout the body. The exact cause of RA is unknown, but it is believed to involve a combination of genetic and environmental factors. Women are more commonly affected, and the condition can develop at any age. Treatment for rheumatoid arthritis aims to manage symptoms, control inflammation, and prevent joint damage. This may involve a combination of medications, such as nonsteroidal anti-inflammatory drugs (NSAIDs), disease-modifying antirheumatic drugs (DMARDs), and biologic therapies. Physical therapy, joint protection techniques, and lifestyle modifications, such as regular exercise and a healthy diet, can also play a
role in managing the disease. Regular medical monitoring and collaboration with a healthcare team, including rheumatologists, can help individuals with rheumatoid arthritis effectively manage their symptoms and improve their quality of life.

Solution for Question 61:

Correct Option: A

• The most likely reason for the progressive loss of vision in a 25-year-old male who has been on low-dose oral steroid therapy for the last 10 years is Cataract.

• Cataract is the clouding of the lens in the eye, leading to progressive loss of vision. Prolonged use of corticosteroids, such as oral steroids, is a known risk factor for the development of cataracts. Steroids can accelerate the formation of cataracts by affecting the metabolism and structure of the lens.

Incorrect Options:

Option B: Glaucoma is a condition characterized by increased intraocular pressure that can lead to opti c nerve damage and vision loss. While long-term steroid use can cause secondary glaucoma in some cases, it is less likely to be the primary cause of progressive vision loss in this scenario.

Option C: Cystoid macular edema refers to the accumulation of fluid in the macula, the central part of t he retina responsible for sharp, detailed vision. While steroid use can be associated with the developm ent of macular edema, it typically presents with symptoms such as blurry vision, central vision loss, and distortion. The description of progressive loss of vision in both eyes is not consistent with cystoid macu lar edema as the primary cause.

Option D: Retinal detachment is the separation of the retina from the underlying tissue. It can cause su dden and dramatic vision loss, typically described as a curtain or shadow across the visual field. The pr ogressive loss of vision described in the case is not consistent with retinal detachment as the primary c ause.

Therefore, considering the patient's history of long-term oral steroid use and the symptom of progressiv e loss of vision, cataract formation is the most likely reason for his symptoms.

Solution for Question 62:

Correct Option A:

Option A. Steroids: Steroids, such as corticosteroids, are generally not recommended as a treatment o ption for Guillain-Barre syndrome. Studies have shown that steroid use does not provide significant be nefits in GBS and may even prolong the recovery process. Therefore, steroids are not considered a standard treatment for GBS.

Incorrect options:

Option B. Plasmapheresis: Plasmapheresis, also known as plasma exchange, is a recognized treatme nt option for Guillain-Barre syndrome. It involves removing plasma from the patient's blood and replacin g it with donor plasma or a plasma substitute. Plasmapheresis helps remove harmful antibodies that m ay be contributing to the immune attack on peripheral nerves in GBS, potentially speeding up recovery.

Option C. IVIG (intravenous immunoglobulin): IVIG is another established treatment option for Guillain-Barre syndrome. It involves administering high-dose immunoglobulin intravenously, which contains anti bodies that can modify the immune response and reduce the severity and duration of the disease. IVIG is considered an effective and commonly used treatment for GBS.

Option D. Ventilator support: Ventilator support is an essential component of the management of Guilla in-Barre syndrome, particularly in severe cases. GBS can lead to muscle weakness and paralysis, incl uding the muscles involved in breathing. Ventilator support is provided to ensure adequate oxygenation and ventilation until the patient's respiratory muscles recover.

Solution for Question 63:

Correct Option D:

The ABCD2 scoring system is used to assess the risk of stroke following a transient ischemic attack (TIA). It assigns points to different factors associated with increased stroke risk. The higher the total score, the higher the risk of subsequent stroke. In the ABCD2 scoring system, the presence of diabetes is one of the factors that contribute to a higher score and indicates an increased risk of stroke.

Diabetes is considered a significant risk factor for stroke in general. It is associated with vascular changes, including endothelial dysfunction and increased atherosclerosis, which can contribute to the development of ischemic stroke. Patients with diabetes have a higher likelihood of experiencing a subsequent stroke after a
TIA compared to those without diabetes. Therefore, the presence of diabetes in a
patient with TIA would suggest a higher risk for developing a
stroke in the future according to the ABCD2 scoring system.

Incorrect options:

Option A. Age <60 years: Age is a factor in the ABCD2 scoring system, but it is assigned points differently. Patients aged 60 years or older receive 1 point, while those younger than 60 do not receive any points. Therefore, age <60 years does not contribute to a
higher risk according to the ABCD2 scoring system.

Option B. SBP >140 mm Hg and DBP <90 mmHg: Blood pressure is also a factor in the ABCD2 scoring system. However, specific blood pressure criteria are not mentioned in the options provided. According to the scoring system, patients with a systolic blood pressure (SBP) of 140 mm Hg or higher and a diastolic blood pressure (DBP) of 90 mmHg or higher receive 1 point. The blood pressure range provided in the option (SBP>140 mm Hg and DBP<90 mmHg) does not meet the criteria for assigning points, so it does not contribute to a higher risk according to the ABCD2 scoring system.

Option C. Duration of TIA >5 mins: The duration of TIA (transient ischemic attack) is another factor in the ABCD2 scoring system. TIAs lasting 60 minutes or longer receive 2
points, while those lasting less than 60 minutes receive 1 point. The option provided states a duration of TIA >5 minutes but does not specify if it exceeds 60 minutes. Therefore, based on the information provided, it is not possible to determine whether it contributes to a
higher risk according to the ABCD2 scoring system.

Solution for Question 64:

Correct Option:

Option b: Descending paralysis is seen.

Guillain-Barre syndrome (GBS) is a neurological disorder characterized by an inflammatory condition that affects the peripheral nerves. It is typically characterized by ascending paralysis, meaning that weakness and loss of muscle function start in the lower extremities and progress upward to the upper body.

Incorrect options:

Option a. Ascending paralysis: GBS typically presents as ascending paralysis, meaning that muscle weakness and loss of function start in the lower extremities and progress upward towards the upper body. This pattern is one of the hallmark features of GBS.

Option c. Plasmapheresis is a treatment method: Plasmapheresis, also known as plasma exchange, is one of the treatment options for GBS. It involves removing the patient's plasma, which contains the harmful antibodies, and replacing it with donated plasma or albumin.

Option d. Demyelinating disorder: GBS is characterized by damage to the myelin sheath, the protective covering of nerve fibers. This damage leads to impaired nerve signal transmission and contributes to the symptoms of GBS.

Solution for Question 65:

Correct Option:

Option c. Deep-seated pain: The characteristic pain of trigeminal neuralgia is described as superficial, sharp, and lancinating. It is often triggered by certain activities such as eating, talking, or touching specific areas of the face. The pain is not typically described as deep-seated.

Incorrect options:

Option a. More common in females: Trigeminal neuralgia is more commonly seen in females, although it can affect both sexes.

Option b. Pain along V2 and V3 division of trigeminal nerve: Trigeminal neuralgia typically presents with severe, sharp, electric shock-like pain along the distribution of the trigeminal nerve, most commonly involving the V2 (maxillary) and V3 (mandibular) divisions.

Optiond. No objective signs of sensory loss: Patients with trigeminal neuralgia do not exhibit objective sensory loss in the affected areas. The pain is usually paroxysmal and does not cause long-term sensory deficits.

Solution for Question 66:

Correct Option:

Option B: Acute inflammatory demyelinating polyneuropathy (AIDP).

Acute inflammatory demyelinating polyneuropathy (AIDP): This is the most common type of GBS, accounting for the majority of cases. It involves autoimmune-mediated demyelination of peripheral nerves, leading to motor and sensory dysfunction.

Incorrect options

Option a. Acute motor axonal neuropathy (AMAN): This is a subtype of Guillain-Barre syndrome (GBS) characterized by axonal damage to motor nerves. It is less common than AIDP.

Option c. Acute motor sensory axonal neuropathy (AMSAN): This is another subtype of GBS characterized by axonal damage to both motor and sensory nerves. It is less common than AIDP.

Optiond. Miller Fisher syndrome (MFS): This is a variant of GBS characterized by a triad of symptoms: ataxia , ophthalmoplegia , and areflexia . It is less common than AIDP.

Solution for Question 67:

Correct Option: A Lateral medullary syndrome

• Thrombosis of the posterior inferior cerebellar artery (PICA) can cause lateral medullary syndrome, also known as Wallenberg syndrome.

• It is characterized by a range of neurological symptoms, including loss of pain and temperature sensation on the contralateral side of the body, ipsilateral facial pain and temperature sensation loss, dysphagia (difficulty swallowing), hoarseness, dizziness, and ataxia.

Incorrect Options:

Option B - Weber syndrome: This statement is incorrect. Weber syndrome is not caused by thrombosis of the posterior inferior cerebellar artery. It is typically associated with lesions affecting the midbrain and manifests as a combination of contralateral hemiparesis (weakness on one side of the body) and ipsilateral oculomotor nerve palsy.

Option C - Medial medullary syndrome: This statement is incorrect. Medial medullary syndrome, also known as Dejerine syndrome or anterior spinal artery syndrome, is caused by occlusion or thrombosis of the anterior spinal artery, not the posterior inferior cerebellar artery. It is characterized by contralateral hemiparesis (weakness on one side of the body) affecting the arm and leg, along with other symptoms such as contralateral loss of proprioception and vibration sense, and ipsilateral tongue deviation.

Option D - Millard Gubler syndrome: This statement is incorrect. Millard Gubler syndrome, also known as ventral pontine syndrome, is caused by a lesion affecting the pons, particularly involving the corticospinal tracts and abducens nerve (cranial nerve VI). It does not result from thrombosis of the posterior inferior cerebellar artery.

Solution for Question 68:

Correct Option D: Decreased synaptic transmission at thee myoneural junction

• Myasthenia gravis is an autoimmune disorder characterized by muscle weakness and fatigue.

• It is caused by the production of autoantibodies that target the acetylcholine receptors (AChRs) at the neuromuscular junction.

• These autoantibodies disrupt normal synaptic transmission by blocking or destroying AChRs, leading to a decreased ability of the nerve impulses to stimulate muscle contraction.

• As a result, there is a reduced synaptic transmission at the myoneural junction, causing muscle weakness and fatigue.

Incorrect Options:

Option A: Decreased acetylcholine release at the nerve endings: This option is incorrect. In myasthenia gravis, the primary defect lies in the postsynaptic membrane of the neuromuscular junction, where autoantibodies target and interfere with AChRs. The release of acetylcholine (ACh) from the nerve endings is not directly affected in myasthenia gravis.

Option B: Decreased myosin: This option is incorrect. Myosin is a protein involved in muscle contraction. Myasthenia gravis does not involve a decrease in myosin levels or dysfunction of myosin.

Option C: Absence of troponin C: This option is incorrect. Troponin C is a component of the regulatory complex involved in muscle contraction. Its absence is not associated with myasthenia gravis.

Solution for Question 69:

Correct Options D: Ipsilateral paralysis of lower face

• Weber's syndrome typically does not involve paralysis of the lower face. Ipsilateral facial nerve palsy, or paralysis of the facial muscles on the same side as the brain lesion, is more commonly associated with other conditions, such as Bell's palsy or lesions affecting the facial nerve itself.

Incorrect Option:

Option A - Contralateral hemiplegia: Weber's syndrome, also known as midbrain syndrome, is characte rized by the presence of contralateral hemiplegia. This means that the paralysis or weakness affects th e side of the body opposite to the side of the brain lesion.

Option B - Ipsilateral oculomotor nerve palsy: Weber's syndrome is associated with ipsilateral oculomot or nerve palsy. This means that there is paralysis or weakness of the muscles controlled by the ipsilate ral (same side) oculomotor nerve, which results in various eye movement abnormalities.

Option C - Contralateral parkinsonism: Weber's syndrome is commonly associated with contralateral p arkinsonism. This refers to the presence of Parkinson's disease-like symptoms, such as resting tremor s, bradykinesia (slowness of movement), and rigidity, on the side opposite to the brain lesion.

Solution for Question 70:

Correct Option B: Contralateral loss of pain sensation

• The characteristic pattern seen in Brown-Sequard syndrome is contralateral loss of pain sensation.

• Brown-Sequard syndrome is a neurological condition caused by damage to one half of the spinal cord.

Incorrect Options:

Option A - Contralateral loss of joint sense and position: This is not correct.

Option C - Ipsilateral loss of complete sensory functions: This is not correct

Option D - Contralateral motor functions: This is not correct

Solution for Question 71:

Correct Option A: Ciprofloxacin

• Ciprofloxacin is a broad-spectrum antibiotic that is effective against Neisseria meningitidis. It is the drug of choice for mass chemoprophylaxis in individuals who have been in close contact with a person diagnosed with meningococcal meningitis. The goal of mass chemoprophylaxis is to prevent the spread of the bacteria to others who may be at risk. Ciprofloxacin is effective in eradicating the bacteria from the nasopharynx, reducing the risk of transmission.

Incorrect Options:

Option B- Chloramphenicol: Chloramphenicol is an antibiotic with activity against many bacteria, including Neisseria meningitidis. While it can be used for the treatment of meningococcal meningitis, it is not the preferred choice for mass chemoprophylaxis. This is because other antibiotics, such as ciprofloxacin, have shown better efficacy and safety profiles for this purpose.

Option C- Tetracycline: Tetracycline is another antibiotic with activity against Neisseria meningitidis. However, like chloramphenicol, it is not the drug of choice for mass chemoprophylaxis. Other antibiotics, such as ciprofloxacin, are preferred due to their higher efficacy and lower risk of adverse effects.

Option D- Penicillin: Penicillin is effective against many strains of Neisseria meningitidis and is commonly used for the treatment of meningococcal meningitis. However, it is not the preferred drug for mass chemoprophylaxis. This is because penicillin is less effective in eradicating the bacteria from the nasopharynx compared to other antibiotics such as ciprofloxacin.

Solution for Question 72:

Correct Option: C

• Cauda Equina Syndrome is a medical emergency characterized by the compression of the cauda equina nerve roots in the lower spinal canal. It typically presents with a combination of symptoms including sudden onset difficulty in micturition (urination) and defecation (bowel movement), as well as saddle anesthesia (loss of sensation in the areas that would touch a saddle), perineal numbness, and varying degrees of lower limb weakness or paralysis.

• The compression of the cauda equina nerve roots can result from various causes, such as a herniated disc, spinal stenosis, trauma, or tumors. In the given scenario, the patient's history of backache followed by sudden onset difficulty in micturition and defecation suggests the possibility of cauda equina syndrome. The symptoms arise due to the involvement of the nerves responsible for bladder and bowel control, as well as sensation in the perineal area.

Incorrect Option:

Option A. Pott's Spine: Pott's Spine, also known as spinal tuberculosis, is a form of tuberculosis that affects the spine. It typically presents with chronic back pain, deformity, and constitutional symptoms such as weight loss and fever. While spinal tuberculosis can potentially lead to compression of the spinal cord or nerve roots, it does not specifically cause sudden onset difficulty in micturition and defecation as seen in cauda equina syndrome.

Option B. Guillain-Barré Syndrome: Guillain-Barré Syndrome is an autoimmune condition characterized by ascending muscle weakness, usually starting in the legs and progressing upwards. It can also involve sensory abnormalities and autonomic dysfunction. While it may cause bladder and bowel dysfunction in some cases, the sudden onset difficulty in micturition and defecation without preceding muscle weakness or sensory changes described in the question is not typical of Guillain-Barré Syndrome.

Option D. Multiple Sclerosis: Multiple Sclerosis (MS) is a
chronic autoimmune disease affecting the central nervous system. It presents with a wide range of neurological symptoms, including muscle weakness, sensory changes, and coordination problems. However, sudden onset difficulty in micturition and defecation without other associated neurological symptoms is not a typical presentation of multiple sclerosis.

Solution for Question 73:

Correct Option C

• Continue treatment for another 2 years: In this scenario, the patient has experienced a seizure-free period of 6 months and has a normal EEG, normal neurological examination, and normal intelligence. However, it is recommended to continue treatment with antiepileptic drugs (AEDs) for another 2 years before considering the option of tapering or discontinuing the medication. This is because the risk of seizure recurrence after a seizure-free period is highest within the first 2 years. Continuing treatment for this duration helps to consolidate the remission and reduce the risk of relapse.

Incorrect options: :

Option A. Stop the treatment and follow up: Stopping the treatment abruptly in a patient with a history of epilepsy, even after a seizure-free period, carries a risk of seizure recurrence. It is important to maintain a consistent treatment approach to prevent the occurrence of seizures.

Option B. Gradually taper the drug and stop treatment: Tapering and stopping the drug immediately after a 6-month seizure-free period may increase the risk of seizure recurrence. Gradual tapering of AEDs is us ually considered after a longer period of sustained seizure freedom and in consultation with a neurologist.

Option D. Continue lifelong treatment with antiepileptics: Lifelong treatment with AEDs is not necessary in all cases of epilepsy. In some individuals, especially those who achieve long-term seizure control an d meet specific criteria (such as normal EEG and normal neurological examination), the possibility of di scontinuing AEDs can be considered. However, the recommended duration of continued treatment bef ore considering discontinuation varies, and in this case, continuing treatment for another 2 years is the appropriate approach

Solution for Question 74:

Correct Option: C

• The presentation of left-sided facial paralysis and weakness in a patient with high blood pressure suggests a possible ischemic stroke involving the territory of the middle cerebral artery. In this scenario, the next step would be to initiate intravenous thrombolysis with a thrombolytic agent such as alteplase (tissue plasminogen activator, tPA). Thrombolysis aims to dissolve the blood clot causing the ischemic stroke and restore blood flow to the affected area of the brain. Time is a critical factor in the administration of thrombolysis, and it is most effective when given within a few hours of symptom onset.

• Ischemic stroke Thrombolytic candidate To initiate thrombolysis first bring BP <185/110 mmHg with Nicardipine Not a thrombolytic candidate If BP is 220/130 mmHg (first lower BP)

• Thrombolytic candidate To initiate thrombolysis first bring BP <185/110 mmHg with Nicardipine

• To initiate thrombolysis first bring BP <185/110 mmHg with Nicardipine

• Not a thrombolytic candidate If BP is 220/130 mmHg (first lower BP)

• If BP is 220/130 mmHg (first lower BP)

• Thrombolytic candidate To initiate thrombolysis first bring BP <185/110 mmHg with Nicardipine

• To initiate thrombolysis first bring BP <185/110 mmHg with Nicardipine

• Not a thrombolytic candidate If BP is 220/130 mmHg (first lower BP)

• If BP is 220/130 mmHg (first lower BP)

• To initiate thrombolysis first bring BP <185/110 mmHg with Nicardipine

• If BP is 220/130 mmHg (first lower BP)

Option Options:

Option A. Nothing, since CT was normal: While the CT scan may not show any immediate abnormalities, it does not rule out an acute ischemic stroke. In the case of suspected acute ischemic stroke, clinical judgment takes precedence over imaging findings, and thrombolysis should not be withheld solely based on a normal CT scan.

Option B. Start on aspirin + clopidogrel: Dual antiplatelet therapy with aspirin and clopidogrel is commonly used for the prevention of recurrent strokes in patients with ischemic stroke of atherosclerotic origin. However, in this acute setting, initiating antiplatelet therapy alone is not sufficient, as it does not address the underlying clot causing the current ischemic event.

Option D. Advice BP control: Blood pressure control is an essential aspect of managing acute ischemic stroke, but in this scenario, the immediate concern is the potential for thrombolysis. Blood pressure management would typically be addressed concurrently or after thrombolysis, depending on the patient's blood pressure level and specific guidelines.

Solution for Question 75:

Correct Option: B

• The patient's presentation of a stomping gait and inability to perform the tandem walk (walking with closed eyes) suggests a disturbance in proprioception and coordination. These functions are primarily mediated by the posterior column tract.

• The posterior column tract, also known as the dorsal column-medial lemniscus pathway, carries sensory information related to proprioception, fine touch, and vibration sense. It runs in the posterior part of the spinal cord and ascends to the brainstem, where it synapses with the second-order neurons before relaying the information to the thalamus and ultimately the sensory cortex.

• When the posterior column tract is affected, as seen in conditions such as vitamin B12 deficiency, spinal cord injury, or posterior column lesions, patients may experience sensory ataxia. Sensory ataxia is characterized by impaired proprioception and coordination, leading to an abnormal gait and difficulty performing tasks that require precise movements.

Incorrect Options:

Option A. Spinocerebellar tract: The spinocerebellar tracts carry proprioceptive information from the spinal cord to the cerebellum. Damage to these tracts can result in ataxic gait, but it would not specifically cause the stomping gait described in the question.

Option C. Vestibulospinal tract: The vestibulospinal tract originates from the vestibular nuclei in the brainstem and controls postural adjustments and balance. Lesions affecting this tract may result in disturbances of balance, but they are unlikely to cause the specific gait abnormality described in the question.

Option D. Rubrospinal tract: The rubrospinal tract is involved in the control of voluntary movements, particularly in the upper extremities. It does not play a major role in gait coordination, and therefore, its dysfunction is less likely to result in the stomping gait observed in the patient.

Solution for Question 76:

Correct Option: C

• The sagittal section of the brain shown in the image likely represents a lesion in the area of the cerebral cortex known as the precentral gyrus or primary motor cortex. This region is responsible for motor control and coordination.

• Perianal anesthesia: Perianal anesthesia refers to the loss of sensation around the anus. The precentral gyrus, which is primarily involved in motor function, is not directly responsible for sensory perception. Sensory information, including perianal sensation, is processed in the somatosensory cortex, which is located in the postcentral gyrus.

Incorrect Options:

Option A. Urinary incontinence: The precentral gyrus is involved in the control of voluntary movement, i ncluding the coordination of the muscles involved in urinary continence. Damage to this area can disru pt the normal control of urinary function, leading to urinary incontinence.

Option B. Gait apraxia: Gait apraxia refers to the inability to coordinate and perform voluntary moveme nts involved in walking, despite the absence of any paralysis or muscle weakness. The precentral gyru s is crucial for the initiation and coordination of voluntary movements, including walking. Therefore, da mage to this area can result in gait apraxia.

Option D. Fecal incontinence: Fecal incontinence refers to the inability to control bowel movements, re sulting in the involuntary passage of feces. The precentral gyrus is involved in the coordination of the m uscles involved in maintaining bowel continence. Damage to this area can disrupt the normal control of bowel function, leading to fecal incontinence.

Solution for Question 77:

Correct Answer: D.

• Administer mannitol to reduce intracranial pressure.

• In cases of raised intracranial pressure, such as in traumatic brain injury, the administration of mannitol is a common treatment approach. Mannitol is an osmotic diuretic that works by drawing fluid out of the brain tissue and into the bloodstream, reducing cerebral edema and intracranial pressure. It can help improve cerebral blood flow and oxygenation, preventing further damage to brain tissue.

Other option:

Option A . Administering antibiotics would be appropriate if there is evidence of an infection, but it may not directly address the raised intracranial pressure.

Option B. Initiating anticoagulant therapy may be indicated for certain conditions (e.g., deep vein throm bosis), but it is not the primary treatment for raised intracranial pressure.

Option C. Immediate surgical intervention may be necessary in some cases, such as for the evacuatio n of an intracranial hematoma or for decompressive craniectomy. However, mannitol administration is often initiated as the first-line treatment to rapidly reduce intracranial pressure before considering surgi cal options.

Solution for Question 78:

Correct Option D:

• Hemiplegia refers to paralysis or weakness affecting one side of the body. In the context of an ischemic stroke, where blood supply to a part of the brain is blocked, the posterior limb of the internal capsule is the area commonly affected in hemiplegia.

• The internal capsule is a white matter structure located deep within the brain that carries nerve fibers connecting the cerebral cortex to other parts of the central nervous system. It consists of three main parts: the anterior limb, genu (bend), and posterior limb. The posterior limb of the internal capsule contains motor fibers that originate from the motor cortex and descend to the spinal cord, carrying signals responsible for voluntary motor control.

• When an ischemic stroke occurs in the area supplied by the blood vessels surrounding the posterior limb of the internal capsule, the motor fibers within this region can be damaged. This results in hemiplegia on the opposite side of the body from the affected internal capsule. For example, if the stroke affects the right posterior limb, it would lead to left-sided hemiplegia.

Incorrect Options:

Option A: Retrolentiform: This term is not anatomically accurate and does not correspond to a specific part of the internal capsule.

Option B: Sublentiform: Similar to option A, this term is not anatomically accurate and does not corresp ond to a specific part of the internal capsule.

Option C: Anterior limb: The anterior limb of the internal capsule primarily contains fibers involved in no n-motor functions, such as connecting the prefrontal cortex to other brain regions involved in cognitive and emotional processing. Damage to the anterior limb can cause different symptoms but is not typicall y associated with hemiplegia.

Solution for Question 79:

Correct Option A:

• The symptoms described in the patient, including vertigo, diplopia, hoarseness, dysphagia, left Horner's syndrome, and numbness of the left face and right side limbs, are indicative of a lateral medullary syndrome, also known as Wallenberg syndrome or posterior inferior cerebellar artery (PICA) syndrome.

• The PICA is a branch of the vertebral artery and supplies the lateral medulla, including the dorsolateral aspect of the medulla, inferior cerebellar peduncle, and parts of the cerebellum. Occlusion or infarction of the PICA leads to ischemia in the corresponding territories, resulting in the characteristic symptoms seen in Wallenberg syndrome.

Incorrect Options:

Option B. Superior cerebellar artery: The superior cerebellar artery supplies the superior cerebellar he misphere, midbrain, and parts of the cerebellar nuclei. It does not supply the lateral medulla or the stru ctures associated with Wallenberg syndrome, so it is not the artery affected in this patient.

Option C. Anterior inferior cerebellar artery: The anterior inferior cerebellar artery supplies the anterior i nferior portion of the cerebellum, the lateral pons, and parts of the internal auditory canal. It is not direct ly involved in the supply of the lateral medulla, where the symptoms of Wallenberg syndrome originate.

Option D. Basilar artery: The basilar artery is formed by the fusion of the vertebral arteries and supplies various structures in the brainstem, including the pons, midbrain, and cerebellum. The symptoms desc ribed are specific to the involvement of the PICA territory.

Solution for Question 80:

Correct option C:

True statements about tremors are:

• PD is characterized by resting tremor: Resting tremor is a hallmark feature of Parkinson's disease (PD). It is typically present when the affected body part is at rest and diminishes or disappears during voluntary movement. This tremor often begins in one hand and can later involve other limbs or body parts.

• Tremor consists of alternate contraction of agonist and antagonist muscles in an oscillating rhythmic manner: Tremors involve rhythmic oscillations of body parts and are typically caused by alternating contractions of agonist and antagonist muscles. This pattern of muscle contractions creates the characteristic shaking or trembling movement seen in tremors.

• Normal individuals can have physiologic tremors that manifest as mild high frequency, postural, or action tremors: Physiologic tremors are normal variations in hand or body tremors that can occur in healthy individuals. They are typically mild and high frequency, occurring during certain postures or actions such as holding a position against gravity or during fine motor tasks. These tremors are usually not indicative of any underlying neurological disorder.

• Essential tremor is an uncommon movement disorder affecting 5% of the population: Essential tremor is actually a common movement disorder, affecting a significant portion of the population. It is considered one of the most prevalent movement disorders, with estimates suggesting that it affects around 5% to 10% of individuals, especially in older age groups. Essential tremor is characterized by postural or action tremors, often involving the hands, head, or voice.

Incorrect Options:

Option A : 1,2,3 only - this is the incorrect option

Option B. 2,3,4 only - this is the incorrect options

Option D. All of the above -this is the incorrect options

Solution for Question 81:

Correct option C:

• The patient's clinical presentation is consistent with a lacunar infarct, which is a small, localized ischemic stroke that occurs in the deep structures of the brain.

• Midbrain, also known as the mesencephalon, is a region of the brainstem that plays a role in coordinating motor movements and controlling eye movements. In this case, the patient's symptoms, including weakness on the left side of the body and abnormal eye movements (ptosis, downward and

lateral deviation of the right eye), suggest an ischemic event affecting the midbrain.

Incorrect options:

Option A: Inner capsule refers to a structure in the brain that contains ascending and descending fibers . Damage to the inner capsule can cause motor and sensory deficits. However, in this case, the patient 's symptoms are not consistent with an infarct in the inner capsule.

Option B: Medulla, also known as the medulla oblongata, is the lower part of the brainstem that control s vital functions such as breathing and heart rate. While a stroke in the medulla can cause various neur ological deficits, the patient's symptoms, such as weakness in the left arm and leg and double vision, a re not specific to a medullary infarct.

Option D: Occipital lobe is responsible for visual processing. However, the patient's visual symptoms of double vision are more likely related to the involvement of the midbrain and its control over eye move ments rather than a specific occipital lobe infarct

Solution for Question 82:

Correct option B:

• "Muscle intimal elastic lamina layer defect."

• Berry aneurysms, also known as saccular aneurysms or intracranial aneurysms, are commonly caused by a defect in the muscle intimal elastic lamina layer of the arterial wall. These aneurysms are characterized by a localized outpouching or ballooning of the arterial wall, typically at the branching points of cerebral arteries.

Incorrect options

Option A is incorrect because while hypertension (HTN) can contribute to the weakening of blood vess els, it is not the primary cause of berry aneurysms. The defect in the muscle intimal elastic lamina layer is the key factor.

Option C is incorrect because it mentions an endothelial layer defect, which is not the primary cause of berry aneurysms. Although endothelial dysfunction may play a role in aneurysm formation, the specific defect in the muscle intimal elastic lamina layer is more significant.

Option D is incorrect because adventitia defect alone is not the primary cause of berry aneurysms. The defect in the muscle intimal elastic lamina layer is the primary underlying abnormality

Solution for Question 83:

Correct option A

• Abducens nerve: This is the correct option. The abducens nerve (cranial nerve VI) is most commonly affected in cases of increased ICP. The nerve supplies the lateral rectus muscle, which is responsible for outward (abduction) movement of the eye. When the ICP increases, it can lead to compression or stretching of the abducens nerve, resulting in weakness or paralysis of the lateral rectus muscle. This leads to a characteristic finding called "abducens nerve palsy," which presents as an inability to move

the affected eye laterally. Therefore, option A is correct.

Incorrect options:

Option B. Trochlear nerve: The trochlear nerve (cranial nerve IV) is responsible for the superior oblique muscle, which is involved in downward and inward (depression and intorsion) movement of the eye. While increased ICP can potentially affect the trochlear nerve, it is not the most common cranial nerve involved in raised ICP. Therefore, option B is incorrect.

Option C. Trigeminal nerve: The trigeminal nerve (cranial nerve V) is responsible for sensory innervation of the face and motor innervation of the muscles involved in chewing. While increased ICP can cause headache and facial pain, the trigeminal nerve itself is not typically affected as the primary cranial nerve involved in raised ICP. Therefore, option C is incorrect.

Option D. Facial nerve: The facial nerve (cranial nerve VII) is responsible for the motor innervation of the muscles of facial expression. While increased ICP can potentially affect the facial nerve, it is not the most common cranial nerve involved in raised ICP. Facial weakness or paralysis may be present in some cases, but it is not as common as abducens nerve involvement. Therefore, option D is incorrect.

Solution for Question 84:

Correct option A.

• Ceftriaxone is commonly used for the prophylaxis of meningococcal meningitis in pregnancy. It is a broad-spectrum antibiotic effective against Neisseria meningitidis, the bacteria responsible for meningococcal meningitis. It is given as a single intramuscular or intravenous dose for prophylaxis in individuals who have had close contact with a person diagnosed with meningococcal disease. Therefore, option A is correct.

Incorrect options:

Option B. Rifampicin: Rifampicin is also used for the prophylaxis of meningococcal meningitis; however, it is not the preferred choice in pregnancy. Rifampicin is generally avoided during pregnancy unless the benefits outweigh the potential risks. Therefore, option B is incorrect.

Option C. Ciprofloxacin: Ciprofloxacin is effective against Neisseria meningitidis; however, it is not the first-line choice for prophylaxis in pregnancy. It is generally avoided in pregnancy due to potential adverse effects on the developing fetus. Therefore, option C is incorrect.

Option D. Penicillin G: Penicillin G is effective against many bacterial infections, but it is not the recommended prophylactic treatment for meningococcal meningitis. Other antibiotics like ceftriaxone are more commonly used for prophylaxis. Therefore, option D is incorrect.

Solution for Question 85:

Correct option A

• Mydriasis (dilated pupil): This is incorrect. Horner syndrome is characterized by miosis (constricted pupil) rather than mydriasis. The affected pupil appears smaller compared to the unaffected pupil due to the disruption of sympathetic innervation.

Incorrect options:

Option B. Ptosis (drooping eyelid): This is correct. Ptosis is one of the classic features of Horner syndrome. It occurs due to the interruption of sympathetic innervation to the muscles that elevate the eyelid. As a result, the affected eyelid appears droopy or lower than the unaffected eyelid.

Option C. Anhidrosis (lack of sweating): This is correct. Anhidrosis or decreased sweating is commonly observed in Horner syndrome. Sympathetic innervation plays a role in regulating sweat production, and the disruption of sympathetic fibers can lead to reduced or absent sweating on the affected side of the face.

Option D. Enophthalmos (sunken appearance of the eye): This is correct. Enophthalmos, or a sunken appearance of the eye, can be observed in Horner syndrome. It is caused by the loss of sympathetic innervation to the smooth muscle surrounding the eye, leading to a slight retraction of the eyeball.

Solution for Question 86:

Correct option:

Option c: Continue treatment for another 2 years: This option is correct. The recommended approach in this scenario is to continue treatment for another 2 years. The duration of seizure freedom required before considering discontinuation of antiepileptic drugs varies, but typically 2-5 years of seizure freedom is considered an appropriate period.

Incorrect Option:

Option a. Stop the treatment and follow up: This option is incorrect. The 16-year-old girl has been seizure-free for 6 months, but it does not necessarily mean that she can safely stop the treatment altogether. Stopping the treatment abruptly can increase the risk of seizure recurrence.

Option b. Gradually taper the drug and stop treatment: This option is incorrect. While the girl has been seizure-free for 6 months, it is generally recommended to continue treatment for a longer period before considering tapering and stopping the antiepileptic drug. Gradual tapering of the drug under medical supervision may be considered later, but not at this stage.

Optiond. Continue lifelong treatment with antiepileptics: This option is incorrect. Lifelong treatment with antiepileptic drugs is not necessary in all cases. If the girl remains seizure-free for a prolonged period (usually 2-5 years), there may be an opportunity to gradually taper and discontinue the medication under medical supervision.

Solution for Question 87:

Correct Option

Option B: Pelizaeus-Merzbacher disease is a genetic disorder characterized by abnormal myelination of the central nervous system. The tigroid white matter appearance on MR imaging is a
classic finding in this condition due to alternating areas of myelination and demyelination

Incorrect Option:

Option A: Pantothenate kinase deficiency is a
rare neurodegenerative disorder characterized by impaired synthesis of coenzyme A

(CoA). It is not specifically associated with a tigroid white matter pattern on MR imaging.

Option C: Neuroferritinopathy is an autosomal dominant neurodegenerative disorder characterized by abnormal iron deposition in the brain. It typically does not present with a tigroid white matter pattern on MR imaging.

Option D: Aceruloplasminemia is a rare genetic disorder characterized by the absence or dysfunction of ceruloplasmin, leading to abnormal iron metabolism. It is not specifically associated with a tigroid white matter pattern on MR imaging.

Solution for Question 88:

Correct Option:

Option b. Plexiform neurofibromatosis: Plexiform neurofibromatosis is a subtype of neurofibromatosis type 1 (NF1), a genetic disorder characterized by the development of neurofibromas, which are benign tumors arising from nerve tissue. Plexiform neurofibromas involve multiple nerves and can cause disfigurement and functional impairments.

Incorrect option:

Option a. Facial nerve palsy: Facial nerve palsy refers to the weakness or paralysis of the muscles innervated by the facial nerve. It is not directly related to the image of plexiform neurofibromatosis.

Option c. Masticator space abscess: Masticator space abscess refers to an abscess (collection of pus) within the masticator space, which is an anatomical region containing the muscles of mastication (chewing). It is not related to the image of plexiform neurofibromatosis.

Option d. Fibrous dysplasia: Fibrous dysplasia is a bone disorder characterized by the abnormal development of fibrous tissue within the bone, leading to weakening and deformity. It is not directly related to the image of plexiform neurofibromatosis.

Solution for Question 89:

Correct option:

Option D.

• Orthostatic hypotension: This option is correct. Orthostatic hypotension, which refers to a drop in blood pressure upon standing, is not a core clinical feature of LBD. While some individuals with LBD may experience orthostatic hypotension, it is not specific to the diagnosis and can be seen in other neurological or cardiovascular conditions as well.

Incorrect Options:

Option A. Fluctuating cognition: This is a core clinical feature of Lewy body dementia (LBD). Patients with LBD commonly experience variations in cognitive function, such as fluctuations in attention, alertness, and ability to process information. These fluctuations can occur throughout the day or from one day to another.

Option B. Recurrent visual hallucinations: This is a core clinical feature of LBD. Visual hallucinations, often vivid and detailed, are a common symptom in L

BD. These hallucinations typically involve seeing people, animals, or objects that are not present.

Option C. REM sleep behavior disorder (RBD): This is a core clinical feature of LBD. RBD refers to a disturbance during REM sleep where individuals physically act out their dreams, sometimes leading to injury or harm to themselves or their bed partners. RBD is considered a prodromal symptom of LBD and can precede the onset of cognitive decline.

Solution for Question 90:

Correct Option:

Option A.

• Neuromyelitis optica (NMO): This option is correct. NMO is a rare autoimmune disorder characterized by recurrent episodes of optic neuritis and transverse myelitis. It primarily affects the optic nerves and spinal cord. Patients with NMO typically experience severe visual impairment and varying degrees of motor and sensory deficits due to inflammation and damage to the optic nerves and spinal cord. Steroids are often used as a treatment, and some patients may show a partial response to them.

Incorrect options:

Option B. Subacute combined degeneration of spinal cord: This option is incorrect. Subacute combined degeneration of the spinal cord is typically associated with vitamin B12 deficiency, leading to neurological symptoms such as sensory disturbances, difficulty walking, and spasticity. Optic neuritis is not a characteristic feature of this condition.

Option C. Posterior cerebral artery stroke: This option is incorrect. Posterior cerebral artery stroke refers to an ischemic stroke affecting the posterior cerebral artery territory of the brain. It can cause visual disturbances, but the presence of optic neuritis and transverse myelitis makes this diagnosis less likely.

Option D. Neurosyphilis: This option is incorrect. Neurosyphilis is a complication of syphilis infection that affects the central nervous system. It can present with various neurological symptoms, but recurrent optic neuritis and transverse myelitis are not typical features of neurosyphilis.

Solution for Question 91:

Correct option:

Option B.

• Creutzfeldt-Jakob disease is a rare degenerative neurological disorder. The EEG pattern in CJD often shows characteristic findings, including periodic sharp wave complexes (PSWCs) and generalized slowing, which are consistent with the given EEG pattern.

Incorrect Options:

Option A. Hepatic encephalopathy is a condition that affects the brain due to liver dysfunction. The EEG pattern in hepatic encephalopathy typically shows diffuse slowing rather than the specific pattern seen in the given EEG.

Option C. Generalized tonic-clonic seizures (also known as grand mal seizures) typically manifest with a different EEG pattern characterized by generalized spike and wave discharges during the seizure activity. This pattern differs from the findings seen in the given EEG.

Option D. Herpes simplex encephalitis is a viral infection that affects the brain. The EEG findings in herpes simplex encephalitis may show focal or multifocal abnormalities, such as periodic lateralized epileptiform discharges (PLEDs) or focal slowing, which are different from the EEG pattern observed in the given image.

Solution for Question 92:

Correct Option D.

Copper deficiency produces similar symptoms: The patient's clinical presentation is consistent with subacute combined degeneration (SCD) of the spinal cord, which is commonly caused by vitamin B12 deficiency. SCD primarily affects the posterior (dorsal) and lateral columns of the spinal cord. The posterior column involvement leads to decreased proprioception and vibration sense, resulting in ataxic gait. However, it's important to note that the lateral corticospinal tracts are also affected, causing weakness, increased reflexes, and increased tone in the lower limbs. Vitamin B12 supplements are the mainstay of treatment for vitamin B12 deficiency, and they can improve the patient's condition.

Incorrect Options:

Option A. Only the dorsal column is involved: This statement is incorrect because in subacute combined degeneration (SCD) of the spinal cord, both the posterior (dorsal) and lateral columns are involved. The posterior column involvement leads to sensory deficits, while the lateral column involvement results in motor deficits.

Option B. All patients with a neurological impairment will show macrocytosis: This statement is incorrect. While macrocytosis (enlarged red blood cells) can be seen in some cases of vitamin B12 deficiency, it is not a universal finding. Additionally, not all neurological impairments are associated with macrocytosis. Other causes of neurological impairment may not necessarily be associated with macrocytosis, such as in this patient's case.

Option C. Vitamin B12 supplements do not improve the condition: This statement is incorrect. Vitamin B12 supplements are the standard treatment for vitamin B12 deficiency, including subacute combined degeneration (SCD) of the spinal cord. Early diagnosis and timely treatment with vitamin B12 supplementation can lead to improvement in symptoms and prevent further neurological deterioration.

Solution for Question 93:

Correct Option D: Variant CJD

• In the above-given case, there is rapidly progressive dementia, myoclonus, ataxia, and visual disturbances. FLAIR MRI scans show a hyperintense signal involving the pulvinar and dorsomedial thalamic nuclei bilaterally and are known as the hockey stick sign, which is diagnostic of variant CJD.

Incorrect Options:

Option A: In the initial stages, the MRI is normal in Alzheimer’s, and in later stages shows temporal and parietal atrophy.

Option B: There is no history of stroke; hence vascular dementia is unlikely to be the diagnosis.

Option C: The hockey stick sign is not seen in sporadic CJD.

Solution for Question 94:

Correct option A

• Phenylketonuria (PKU) is a genetic disorder characterized by the inability to properly metabolize the amino acid phenylalanine. This is due to a deficiency in the enzyme phenylalanine hydroxylase, which leads to the accumulation of phenylalanine in the body. If left untreated, the elevated levels of phenylalanine can cause damage to the developing brain, leading to intellectual disability or mental retardation. Therefore, mental retardation is a characteristic feature of untreated PKU.

Incorrect options:

Options B. Alkaptonuria: Alkaptonuria is a rare metabolic disorder characterized by the inability to meta bolize the amino acids phenylalanine and tyrosine. However, it does not typically cause mental retardat ion. Instead, it leads to the accumulation of homogentisic acid, which can cause dark urine, darkening of connective tissues, and joint problems.

Options C. Albinism: Albinism is a genetic condition characterized by a lack of melanin pigment in the s kin, hair, and eyes. While individuals with albinism may have visual impairments, it does not directly ca use mental retardation.

Options D. MSUD (Maple Syrup Urine Disease): MSUD is a rare metabolic disorder characterized by t he inability to break down certain amino acids, including leucine, isoleucine, and valine. If left untreated , it can lead to severe neurological symptoms. However, mental retardation is not a typical feature of MSUD.

Solution for Question 95:

Correct option A

• Subacute Combined Degeneration (SACD) is a neurological condition characterized by the degeneration of the spinal cord, peripheral nerves, and sometimes the brain. It is primarily caused by vitamin B12 deficiency, which can occur due to various factors such as malabsorption, inadequate dietary intake, or certain medical conditions. When vitamin B12 deficiency is identified and treated early, the symptoms of SACD, including dementia, can be reversed or significantly improved. Therefore, SACD is an example of reversible dementia.

Incorrect options:

Options B: AD (Alzheimer's Disease): Alzheimer's disease is a progressive neurodegenerative disorder characterized by memory loss, cognitive decline, and behavioral changes. Unfortunately, AD is current ly irreversible, and the available treatments aim to manage symptoms rather than cure the disease.

Options C: CJD (Creutzfeldt-Jakob Disease): Creutzfeldt-Jakob disease is a rare, degenerative brain di sorder caused by abnormal proteins called prions. It leads to rapid neurological decline, including dem entia, and unfortunately, it is a fatal condition. CJD is not reversible.

Options D. Pick's Disease: Pick's disease, also known as frontotemporal dementia, is a type of dementi a characterized by the degeneration of the frontal and temporal lobes of the brain. It leads to progressi ve cognitive decline, personality changes, and behavioral disturbances. Pick's disease is not reversible .

Solution for Question 96:

Correct Option B- Usage of Carbidopa leads to on and off phenomenon:

• Carbidopa is commonly used in combination with levodopa as a treatment for Parkinson's disease. Carbidopa is not known to directly cause the "on and off phenomenon." The "on and off phenomenon" refers to fluctuations in motor response, where individuals with Parkinson's disease experience periods of improved motor function (on) followed by periods of reduced or absent response to medication (off). This phenomenon is more commonly associated with fluctuations in the effectiveness of levodopa itself, rather than carbidopa.

Incorrect Options:

Option A- Manganese can cause secondary Parkinsonism: Exposure to high levels of manganese, suc h as through occupational or environmental sources, can lead to a form of parkinsonism known as manganism.

Option C- Slight tremor in the hand or foot followed by jaw: One of the cardinal symptoms of Parkinson' s disease is a resting tremor, typically starting in the hand or foot. The tremor can progress to involve o ther body parts, including the jaw.

Option D- Cogwheel rigidity or lead pipe rigidity is seen: Rigidity is a characteristic feature of Parkinson's disease. Cogwheel rigidity refers to a jerky resistance to passive movement characterized by a series of brief interruptions, while lead pipe rigidity refers to a continuous resistance throughout the range of movement.

Solution for Question 97:

Correct Option C: Pituitary DI

• The above case is most suggestive of pituitary diabetes insipidus. There is polyuria and polydipsia. The absence of a pituitary bright spot is suggestive of central DI.

Incorrect Options:

Option A: In nephrogenic DI, the ADH levels are >1pg/ml.

Option B: In primary polydipsia, a pituitary bright spot will be observed.

Option D: In mannitol infusion, the urine osmolality is >300 mOsm/L.

Solution for Question 98:

Correct option A

• Explanation: The presentation of muscle weakness with normal nerve conduction and flaccidity suggests a neuromuscular disorder rather than a primary nerve problem. Myasthenia gravis is an autoimmune disorder characterized by muscle weakness and fatigue, typically caused by antibodies targeting the neuromuscular junction. It can present with normal nerve conduction studies and a flaccid

weakness pattern. In myasthenia gravis, weakness often worsens with exertion and improves with rest.

Incorrect options:

Option B (GBS - Guillain-Barré syndrome) is incorrect because GBS typically presents with a symmetrical pattern of ascending muscle weakness, starting in the lower extremities and progressing upward. It is characterized by reduced or absent deep tendon reflexes and can show abnormalities in nerve conduction studies.

Option C (Transverse myelitis) is incorrect because transverse myelitis involves inflammation of the spinal cord, leading to sensory and motor deficits at a specific spinal level. It is typically associated with abnormalities in nerve conduction studies and may present with spastic weakness rather than flaccid weakness.

Option D (Traumatic neuritis) is incorrect because traumatic neuritis refers to nerve damage resulting from trauma, leading to focal neurological deficits. It would not typically present with flaccid weakness and normal nerve conduction studies.

Solution for Question 99:

Correct Option C: Mammosomatotroph adenoma

• The above case is that of a mammosomatotroph adenoma of the pituitary which causes an excess of prolactin and growth hormone secretion. Common symptoms include headache, vomiting, amenorrhea, galactorrhoea, loss of libido, acromegaly, and infertility.

Incorrect Options:

Option A: Corticotroph adenoma secretes ACTH and has features of Cushing’s.

Option B: Gonadotroph adenoma secretes FSH and LH and can present with PCOS and ovarian hyper sensitivity syndrome.

Option D: Gliomas are derived from glial cells and present with headache, nausea, vomiting, and seizures.

Solution for Question 100:

Correct option D

• The extensor reflex on pinching the gastrocnemius muscle is known as the Gordon sign. It is an abnormal reflex response where pinching the gastrocnemius muscle leads to extension of the big toe instead of the normal flexion response. The Gordon sign can be seen in upper motor neuron lesions, such as in pyramidal tract dysfunction.

Incorrect options:

Option A (Gower Sign) is incorrect because the Gower sign is associated with Duchenne muscular dystrophy and refers to the characteristic way that individuals with muscle weakness in the lower extremities rise from a
squatting or sitting position. They use their hands to "walk" up their legs and push themselves into a standing position.

Option B (Homan Sign) is incorrect because the Homan sign is a clinical finding associated with deep v ein thrombosis (DVT) in the lower extremities. It is characterized by pain in the calf upon passive dorsifl exion of the foot.

Option C (Oppenheim Sign) is incorrect because the Oppenheim sign is a test used to assess upper m otor neuron dysfunction. It involves applying firm pressure along the anterior tibial surface from the kne e to the ankle, and a positive sign is indicated by a downward movement of the big toe.

Solution for Question 101:

Correct Option B: Hemispatial neglect

• In the above image drawn by the patient, the clock is blank on one side. The hemispatial defect is the most accurate term used. It is the inability to report, respond, and orient to stimuli in one-half of the space despite having no motor or sensory deficits.

Incorrect Options:

Option A: Confabulation is a
phenomenon in which the patient fills in memory gaps with made up stories and inaccurate facts.

Option C: Kinetic apraxia is the inability to perform a fine movement or task despite having the desire a nd physical capability to do it. The lesion lies in the paracentral cortex.

Option D: Asterixis is a
type of negative myoclonus where irregular lapses of the posture of body parts is noted.

Solution for Question 102:

Correct option:

Option A (1, 2, and 3 are correct).

• This option correctly states that statements 1, 2, and 3 are true, while statement 4 is incorrect.

Incorrect Options:

Option B. 1 & 3 are correct.

• This option incorrectly states that only statements 1 and 3 are correct. It omits statement 2, which is true. Lamotrigine is indeed effective in controlling myoclonic jerks in juvenile myoclonic epilepsy.

Option C. 2 & 4 are correct.

• This option incorrectly states that statements 2 and 4 are correct. It omits statement 1, which is true. Juvenile myoclonic epilepsy is associated with polygenic inheritance. Additionally, statement 4 is incorrect as valproate is not contraindicated in the treatment of juvenile myoclonic epilepsy.

Option D. 1, 2, 3, and 4 are correct.

• This option incorrectly states that all statements are correct. However, statement 4 is incorrect, as mentioned before. Valproate is not contraindicated in the treatment of juvenile myoclonic epilepsy.

Solution for Question 103:

Correct Option A-Tuberculous meningitis:

Etiology of the irregular CSF findings:

• The given CSF report appears the following abnormalities: Mononuclear cytosis (increased number of mononuclear cells, which are ordinarily lymphocytes or monocytes) Elevated proteins (suggestive of inflammation) Low sugars (suggestive of increased metabolism by the inflammatory cells)

• Mononuclear cytosis (increased number of mononuclear cells, which are ordinarily lymphocytes or monocytes)

• Elevated proteins (suggestive of inflammation)

• Low sugars (suggestive of increased metabolism by the inflammatory cells)

• These discoveries show the nearness of a disease or inflammation within the central nervous system (CNS).

• Likely etiology of the irregular CSF findings: Based on the CSF report, the foremost likely etiology is tuberculous meningitis. This can be because tuberculosis (TB) could be a constant bacterial contamination that can influence different organs, counting the CNS. CNS tuberculosis is characterized by a persistent inflammatory response. The presence of mononuclear cytosis, elevated proteins, and low sugars within the CSF is normal for TB meningitis.

• Based on the CSF report, the foremost likely etiology is tuberculous meningitis. This can be because tuberculosis (TB) could be a constant bacterial contamination that can influence different organs, counting the CNS.

• CNS tuberculosis is characterized by a persistent inflammatory response. The presence of mononuclear cytosis, elevated proteins, and low sugars within the CSF is normal for TB meningitis.

• Mononuclear cytosis (increased number of mononuclear cells, which are ordinarily lymphocytes or monocytes)

• Elevated proteins (suggestive of inflammation)

• Low sugars (suggestive of increased metabolism by the inflammatory cells)

• Based on the CSF report, the foremost likely etiology is tuberculous meningitis. This can be because tuberculosis (TB) could be a constant bacterial contamination that can influence different organs, counting the CNS.

• CNS tuberculosis is characterized by a persistent inflammatory response. The presence of mononuclear cytosis, elevated proteins, and low sugars within the CSF is normal for TB meningitis.

Incorrect Options:

Option B- Aseptic meningitis:

• This could be viral or fungal contamination that can moreover cause aggravation of the CNS.

• However, aseptic meningitis ordinarily incorporates a shorter length of indications than TB meningitis.

Option C- Bacterial meningitis:

• It is an acute disease caused by microbes.

• Findings: Elevated opening pressure, increased PMN

• Increased Protein and turbid in appearance.

• However, bacterial meningitis has C/F, high fever, and altered mental status.

Option D- Chemical meningitis:

• It is caused by the disturbance of the meninges by different chemicals or medicines.

Solution for Question 104:

Correct Option A- Bromocriptine:

• Bromocriptine is a dopamine agonist that prevents prolactin discharge and is the drug of choice for the situation of prolactinomas, which are pituitary tumors that hide prolactin.

• In this case, the patient has galactorrhea, which is an indication of hyperprolactinemia. Therefore, bromocriptine is the choice of drug for the situation.

Incorrect Options:

Option B- Promethazine: It is an antihistamine drug used to treat allergies, motion sickness, and nause a. It has no role in the situation of pituitary tumors.

Option C- Octreotide: It is a somatostatin analog that restricts the discharge of various hormones, cont aining development hormone and insulin-like growth factor-1. It is used to treat acromegaly and neuroe ndocrine tumors but has no function in the situation of prolactinomas.

Option D-Clozapine: It is an antipsychotic drug used to treat emotional disorders and additional psychia tric disorders. It has no role in the situation of pituitary tumors.

Solution for Question 105:

Correct Option A- Neisseria meningitidis:

• The above image is that of a purpuric rash which is seen in meningococcemia caused by Neisseria meningitides. Neisseria meningitidis is a gram negative diplococci. Fulminant meningococcemia presents with a very high fever and hemorrhagic rash.

Incorrect Options:

Option B- Pseudomonas aeruginosa: Pseudomonas aeruginosa is a gram-negative rod-shaped bacteria.

Option C- Streptococcus pneumoniae: Streptococcus pneumoniae is a gram-positive, spherical bacteria.

Option D- E. Coli: E. Coli is a gram-negative rod-shaped bacteria.

Solution for Question 106:

Correct Option A - Migraine:

• Unilateral pulsatile headaches with photophobia and phonophobia are the clinical features of migraine.

• If 4 out of 5 below symptoms are present with ≥5 episodes of migraine per year - Routine case of migraine. (Mneumonic: POUND) P: Pulsatile / Throbbing headache - Nature of the headache. O: One-day illness (After some rest, the patient can perform the usual routine tasks) U: Unilateral headache (can also be bilateral) N: Nausea (In most patients, the smell or sight of food makes them pukish) D: Disabling in character (Very important factor)

• P: Pulsatile / Throbbing headache - Nature of the headache.

• O: One-day illness (After some rest, the patient can perform the usual routine tasks)

• U: Unilateral headache (can also be bilateral)

• N: Nausea (In most patients, the smell or sight of food makes them pukish)

• D: Disabling in character (Very important factor)

• P: Pulsatile / Throbbing headache - Nature of the headache.

• O: One-day illness (After some rest, the patient can perform the usual routine tasks)

• U: Unilateral headache (can also be bilateral)

• N: Nausea (In most patients, the smell or sight of food makes them pukish)

• D: Disabling in character (Very important factor)

Incorrect Options:

Option B - Tension headache:

• Tension headache presents with band-like compression over the head at the forehead/Occipital area.

Option C - Cluster headache:

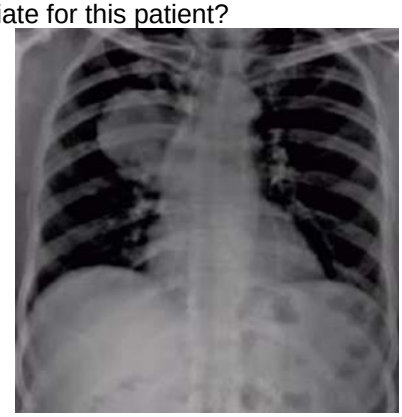
• Cluster headache presents with retro-orbital pain and epiphora.

Option D - Malingering:

• The above symptoms indicate migraine.

IgG4 Related Disease

1. A 55-year-old male presents with a persistent cough and chest discomfort. Imaging Imaging is given below. Biopsy findings show lymphoplasmacytic infiltration of the lung tissue. Which of the following treatment options is most appropriate for this patient?



A. Chemotherapy

B. Surgical resection

C. Antibiotics

D. Corticosteroids

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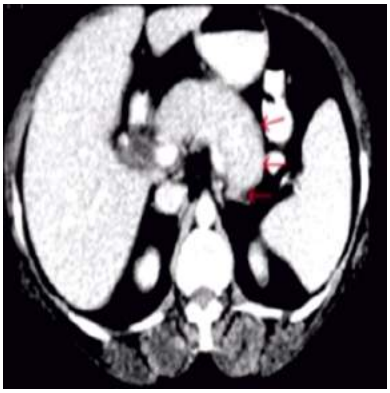
2. A 55-year-old male presents to the gastroenterology clinic with complaints of persistent abdominal pain, diarrhea, and unintentional weight loss over the past few months. A CT scan of the abdomen is given below. Which of the following symptoms is most likely associated with the organ involvement shown in this condition?



A. Cholangiocarcinoma

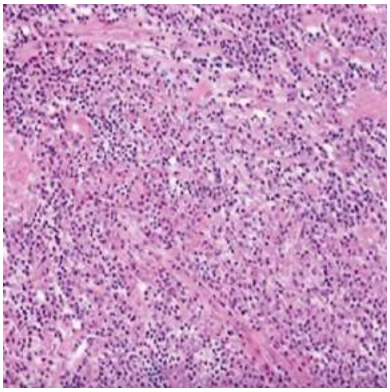
B. Primary sclerosing cholangitis

C. Diabetes mellitus

D. Pancreatic adenocarcinoma

---

3. A 45-year-old male presents to the gastroenterology clinic with complaints of chronic diarrhea, steatorrhea, and unintentional weight loss over the past few months. Which of the following is true regarding histopathological findings of this patient?



A. IgM plasma cell infiltrate

B. Cris-cross infiltration of tissue known as Lymphoid follicles

C. Involvement of arteries known as Vasculitis

D. Involvement of veins known as Obliterative phlebitis

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	3
Question 3	4

Solution for Question 1:

Correct Option D - Corticosteroids:

• Well-circumscribed mass present on the right upper zone following biopsy showing lymphoplasmacytic infiltration of the lung the diagnosis is inflammatory pseudotumor

• Corticosteroids are the treatment of choice for inflammatory pseudotumors. These tumors typically respond well to corticosteroid therapy, which helps reduce inflammation and lymphoplasmacytic infiltration in the affected lung tissue.

Incorrect Options:

Option A - Chemotherapy: Inflammatory pseudotumors are typically benign and do not respond well to chemotherapy. Chemotherapy is primarily used to treat malignant tumors and would not be the first-lin e treatment for an inflammatory pseudotumor.

Option B - Surgical resection: Surgical resection may be considered if the tumor is causing significant s ymptoms or if there is concern for malignancy. However, inflammatory pseudotumors often respond we ll to less invasive treatments, and surgery may carry risks.

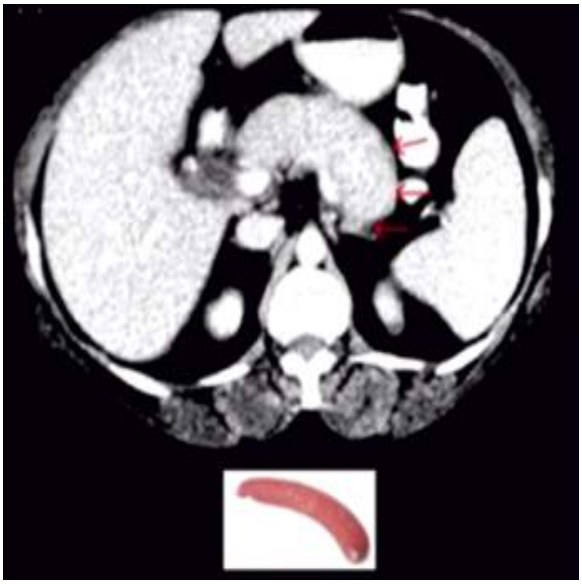
Option C - Antibiotics: Inflammatory pseudotumors are not caused by infection, so antibiotics would not be effective in treating this condition. Inflammatory pseudotumors are characterized by inflammatory c ell infiltration rather than infection.

Solution for Question 2:

Correct Option C - Diabetes mellitus:

• In Type 1 autoimmune pancreatitis, endocrine involvement can lead to the development of diabetes mellitus due to damage to the beta cells of the pancreas.

• The CT abdomen shows abnormal morphology of the pancreas due to lymphoplasmacytic infiltration known as “Sausage pancreas”/ Type 1 autoimmune pancreatitis. This can be misdiagnosed as Pancreatic adenocarcinoma



• As the autoimmune process affects the islets of Langerhans, insulin production may become impaired, resulting in elevated blood glucose levels and the manifestation of diabetes mellitus.

• This can present with symptoms such as polyuria, polydipsia, and unexplained weight loss.

Incorrect Options:

Option A and B - (Cholangiocarcinoma & Primary sclerosing cholangitis):

• Biliary tract involvement mimics the manifestations of either Cholangiocarcinoma or Primary sclerosing cholangitis. But it is not associated with inflammatory pseudotumor

Option D - Pancreatic adenocarcinoma:

• The CT abdomen shows “Sausage pancreas”/ Type 1 autoimmune pancreatitis. This can be misdiagnosed as Pancreatic adenocarcinoma.

Solution for Question 3:

Correct Option D - Involvement of veins known as Obliterative phlebitis:

• The condition described exhibits characteristic histopathological findings, including IgG plasma cell infiltrate, criss-cross infiltration of tissue known as Storiform fibrosis, and involvement of veins known as

Obliterative phlebitis seen in IgG4 related disease.

Incorrect Options:

Option A - IgM plasma cell infiltrate: IgG4 plasma cell infiltrate, not IgM, is characteristic of the describe d condition.

Option B - Cris-cross infiltration of tissue known as Lymphoid follicles: The interwoven appearance of ti ssue, known as Storiform fibrosis, is characteristic, not lymphoid follicles.

Option C - Involvement of arteries known as Vasculitis: The involvement of veins, not arteries, is terme d Obliterative phlebitis, characteristic of the described condition.

Ankylosing Spondylitis

1. A 28-year-old male presents to the clinic with complaints of low backache persisting for the past 3 months. Which of the following statements regarding the presentation of back pain is appropriate?

A. Back pain in sciatica and disc prolapse is diurnal.

B. Pain in neurogenic claudication worsens with standing.

C. Pain in Buerger's disease typically worsens at night.

D. Pain relief is typically observed with the use of gabapentin or pregabalin in ankylosing spondylosis.

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2. Which of the following will be the earliest involvement in a 30-year-old male presenting with complaints of chronic lower back pain and stiffness, particularly in the morning and after periods of inactivity, along with buttock pain and difficulty bending forward to touch his toes?

A. Sacroiliitis

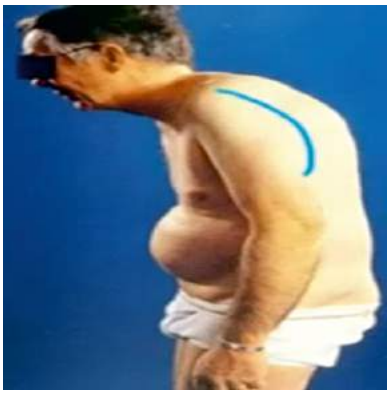
B. Pain at the sternoclavicular joint

C. Buttock muscle atrophy

D. Decreased height

---

3. A 62-year-old male presents to the rheumatologist with complaints of chronic lower back pain and stiffness, On examination modified Schober's test and lateral bending are reduced. He also reports episodes of eye redness and discomfort. Which of the following is the most common extra articular manifestation of this patient?



A. Psoriasis

B. Uveitis

C. Rheumatoid nodules

D. Keratoconjunctivitis sicca

---

4. In a case of ankylosing spondylitis, which of the following manifestations is typically considered a late involvement?

A. Bamboo spine formation

B. Intervertebral disc herniation

C. Bone marrow edema on MRI

D. Sacroiliitis on X-ray

---

5. A 45-year-old male presents to the cardiology clinic with a known history of ankylosing spondylosis. He complains of intermittent chest pain and occasional palpitations. Which of the following will not be a possibility in this patient?

A. Aortic regurgitation

B. Atrial fibrillation

C. Ischemic heart disease (IHD)

D. Third-degree heart block

---

6. Which of the following is a true statement regarding the diagnostic criteria for Ankylosing Spondylitis?

A. MRI of the spine may show bone marrow edema or sacroiliitis

B. The presence of HLA-B27

C. MRI of the spine show bone marrow edema with Enthesopathy

D. The presence of HLA-B27 along with psoriasis

---

7. A 45-year-old male presents to the rheumatology clinic with complaints of chronic lower back pain and stiffness, particularly worse in the mornings and at night. He reports difficulty sleeping due to nocturnal pain, which is affecting his productivity at work. His BADSAI Index is >5. Which of the following treatment options would be most appropriate for this patient's condition?

A. NSAIDs

B. Sulphasalazine

C. Methotrexate

D. Infliximab infusion

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	1
Question 3	2
Question 4	1
Question 5	2
Question 6	3
Question 7	4

Solution for Question 1:

Correct Option B - Pain in neurogenic claudication worsens with standing:

True statement

• Neurogenic claudication typically presents with pain that worsens with standing and walking

Incorrect Options:

Option A - Back pain in sciatica and disc prolapse is diurnal:

• Back pain in sciatica and disc prolapse typically worsens with activities that involve bending, lifting, or prolonged sitting. Physical activity tends to exacerbate the symptoms in these conditions.

Option C - Pain in Buerger's disease typically worsens at night:

• Pain in Buerger's disease, also known as thromboangiitis obliterans, is typically associated with ischemia and usually worsens with physical activity or exposure to cold temperatures. It is not specifically noted to worsen at night.

Option D
- Pain relief is typically observed with the use of gabapentin or pregabalin in ankylosing spondylosis:

• While gabapentin and pregabalin are commonly prescribed for neuropathic pain, their effectiveness varies among individuals. Pain relief is not typically observed in ankylosing spondylosis.

Solution for Question 2:

Correct Option A - Sacroiliitis:

• In Ankylosing Spondylitis (AS), tenderness or pain at the sacroiliac joint or sacroiliitis is one of the earliest manifestations. It is often accompanied by radiological findings such as bone marrow edema.

Incorrect Options:

Option B - Pain at the sternoclavicular joint: Sternoclavicular joint involvement is less common in AS co mpared to the sacroiliac joint, and it typically occurs in later stages of the disease.

Option C - Buttock muscle atrophy: Buttock muscle atrophy may occur in AS due to chronic inflammati on and stiffness, but it is not typically an early manifestation.

Option D - Decreased height: Decrease in height is a consequence of AS-related changes such as thor acic kyphosis and loss of lumbar lordosis, but it usually occurs in later stages of the disease after the s pine has undergone significant structural changes.

Solution for Question 3:

Correct Option B - Uveitis:

• This patient's clinical presentation, including chronic lower back pain and stiffness, reduced spinal mobility on examination, and episodes of eye redness and discomfort, are highly suggestive of Ankylosing Spondylitis (AS).

• AS is a type of spondyloarthropathy characterized by inflammation primarily affecting the axial skeleton, leading to chronic lower back pain and stiffness.

• The most common extra-articular manifestation of AS is uveitis, which involves inflammation of the uveal tract of the eye. Uveitis can present with symptoms such as eye redness, discomfort, pain, and blurred vision.

Incorrect Options:

Option A - Psoriasis: While psoriasis can occur concurrently with AS and is part of the SPINE ACHE m nemonic, it is not the most common extra-articular manifestation of AS.

Option C
- Rheumatoid nodules: Rheumatoid nodules are characteristic of Rheumatoid Arthritis (RA), not AS.

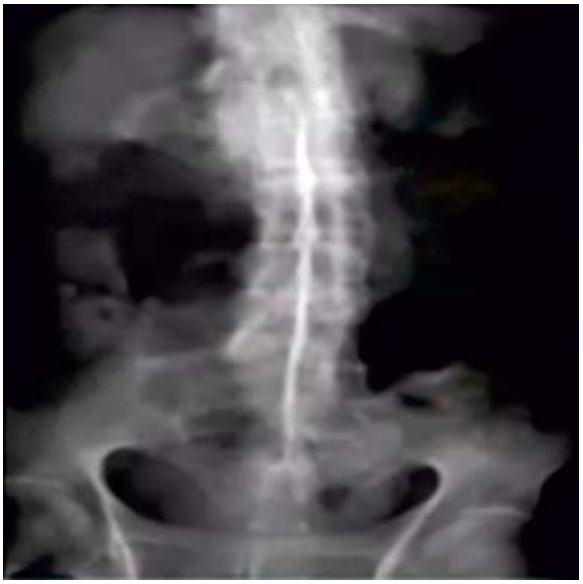
Option D - Keratoconjunctivitis sicca: While dry eyes (keratoconjunctivitis sicca) can occur in autoimmu ne conditions like Sjögren's syndrome, it is not the most common extra-articular manifestation of AS.

Solution for Question 4:

Correct Option A - Bamboo spine formation:

• Bamboo spine formation and Dagger sign characterized by fusion of the vertebrae in the spine, is typically considered a late manifestation of ankylosing spondylitis.

• This occurs due to progressive inflammation and ossification of the spinal ligaments, leading to the characteristic rigid appearance of the spine seen on X-ray.



Incorrect Options:

Option B - Intervertebral disc herniation:

• Intervertebral disc herniation is not seen in ankylosing spondylitis

Option C and D - (Bone marrow edema on MRI & Sacroiliitis on X-ray):

• Bone marrow edema and Sacroiliitis occur early in the disease.

Solution for Question 5:

Correct Option B - Atrial fibrillation:

• Atrial fibrillation is not associated with ankylosing spondylosis.

• Cardiac manifestations of ankylosing spondylitis include: Valvular lesions, particularly aortic regurgitation (AR). Ischemic heart disease (IHD). Development of third-degree heart block. Bradyarrhythmia.

• Valvular lesions, particularly aortic regurgitation (AR).

• Ischemic heart disease (IHD).

• Development of third-degree heart block.

• Bradyarrhythmia.

• Valvular lesions, particularly aortic regurgitation (AR).

• Ischemic heart disease (IHD).

• Development of third-degree heart block.

• Bradyarrhythmia.

Incorrect Options:

Option A, C & D:

• All these options are included in the cardiac manifestations of ankylosing spondylitis

Solution for Question 6:

Correct Option C - MRI of the spine show bone marrow edema with Enthesopathy:

• Diagnostic criteria for ankylosing spondylitis (AS) typically include:

• MRI Spine: Presence of bone marrow edema or sacroiliitis, along with at least one spondyloarthropathy feature.

• Presence of bone marrow edema or sacroiliitis, along with at least one spondyloarthropathy feature.

• HLA-B27 positive: Presence of HLA-B27 antigen along with at least two spondyloarthropathy features.

• Presence of HLA-B27 antigen along with at least two spondyloarthropathy features.

• MRI of the spine show bone marrow edema with Enthesopathy(spondyloarthropathy feature) is a true statement

• Presence of bone marrow edema or sacroiliitis, along with at least one spondyloarthropathy feature.

• Presence of HLA-B27 antigen along with at least two spondyloarthropathy features.

Incorrect Options:

Option A,B and D are false due to the above given reasons

Solution for Question 7:

Correct Option D - Infliximab infusion:

• The BADSAI Index, developed by Dr. Bath, stands for Bath Ankylosing Spondylitis Disease Activity Index.

• It is utilized to assess patients' response to treatment with prescribed medications. Patients are regularly questioned about their symptoms, and if their BADSAI Index is greater than 4, it suggests that biologicals should be initiated.

• The preferred drug in such cases is Infliximab infusion.

Incorrect Options:

Option A - NSAIDs: While NSAIDs are commonly used as first-line management for ankylosing spondy litis, this patient's nocturnal pain, which is disabling and affecting productivity, indicates inadequate res ponse to NSAIDs alone.

Option B - Sulphasalazine: Sulphasalazine may help ease the manifestations of ankylosing spondylitis, but in patients with a high BADSAI Index (>4), biological agents like infliximab are preferred due to thei r superior efficacy in reducing disease activity.

Option C - Methotrexate: Methotrexate is not typically used as a first-line treatment for ankylosing spon dylitis. It may be considered in patients who do not respond adequately to NSAIDs or biological agents, but it does not have disease-modifying roles in ankylosing spondylitis

Scleroderma & Sjogren Syndrome

1. A 55-year-old male presents to the emergency department with severe hypertension and acute kidney injury. He has a history of poorly controlled hypertension and diabetes mellitus. On examination, his skin appears shiny and taut. Which of the following histopathological findings is most likely to be observed in this patient's skin biopsy?

A. Loss of sweat and sebaceous glands

B. Thinning of the dermis

C. Hyperplasia of the sweat glands

D. Normal appearance of skin architecture

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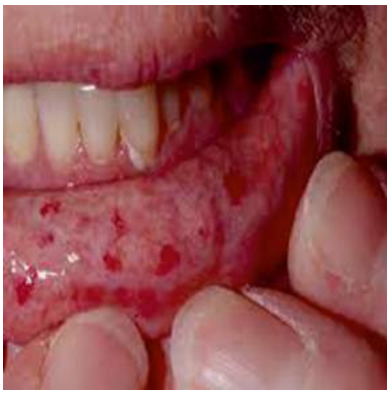
2. What cardiac manifestation is least likely manifested in a 50-year-old female patient presented to the cardiology clinic with complaints of chest pain and shortness of breath.Upon examination, you notice that her nose appears pinched, and her lips are tightly approximated. Additionally, her facial expression seems diminished , you also note the presence of a pericardial friction rub and the following as shown in the image?



A. Dilated cardiomyopathy

B. Sick sinus syndrome

C. Pericarditis

D. Diastolic malfunction of the heart

---

3. A 50-year-old female patient presents with complaints characterized by episodic color changes in her fingers in response to cold temperatures or emotional stress. She mentions experiencing these symptoms for several years. Upon further examination, the patient is noted to have thickening and tightening of the skin on her fingers. She also reports occasional episodes of ischemic pain in her digits, particularly during cold weather. Which of the following antibodies is most likely to be positive in this patient?

A. Anti-Centromere antibody

B. Anti-Topoisomerase antibodies

C. Ku antibody

D. U1 RNP

---

4. A 50-year-old female patient presents to the rheumatology clinic with complaints of skin changes and difficulty in opening mouth. Upon examination there is tendon friction rub and she reports experiencing dry mouth. She also mentions a history of Raynaud's phenomenon. Which subtype of systemic sclerosis is most likely to be associated with these clinical features?

A. Diffuse cutaneous variety of systemic sclerosis

B. Limited cutaneous variety of systemic sclerosis

C. Systemic sclerosis sine scleroderma

D. Systemic sclerosis overlap syndrome

---

5. A 30-year-old female presents to her primary care physician with complaints of recurrent episodes of discoloration and coldness in her fingertips, especially during cold weather or when she experiences emotional stress. On examination, the physician notes pallor followed by cyanosis in the patient's fingertips. Which of the following is the most appropriate diagnostic test to evaluate for the underlying cause of these symptoms?

A. MRI of the hands

B. Nail fold capillaroscopy

C. Arterial blood gas analysis

D. Doppler ultrasound of the extremities

---

6. A 50-year-old woman with a known history of scleroderma presents to the emergency department with BP 200/110 and low urine output. biopsy findings reveal an "onion skin" appearance. There is presence of anti-RNA polymerase III antibody. Which of the following treatments is most appropriate for managing this patient's condition?

A. Corticosteroids

B. Methotrexate

C. ACE inhibitors

D. Anticoagulants

---

7. A 45-year-old woman presents to her rheumatologist with complaints of persistent dryness in her eyes and mouth for the past several months. On further examination, she also mentions occasional

joint pain and stiffness. Laboratory tests reveal the presence of anti-Ro antibodies.Which of the following diagnostic tests would be most appropriate to confirm the suspected diagnosis in this patient?

A. Schirmer's test

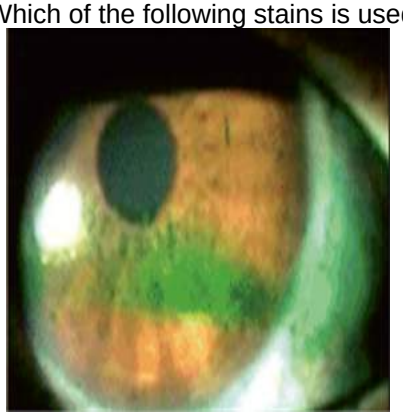
B. Salivary gland biopsy

C. Lip biopsy

D. Tear breakup time test

---

8. A 55-year-old female presents to the ophthalmology clinic with complaints of dry eyes and a gritty sensation in her eyes for the past several months. The ophthalmologist decides to perform an eye stain test to assess the ocular surface. Which of the following stains is used in this patient?



A. Fluorescein

B. Lissamine Green

C. Indocyanine Green

D. Methylene Blue

---

9. A 45-year-old woman presents to her primary care physician with complaints of persistent dry eyes and mouth. She reports experiencing frequent episodes of gritty sensation in her eyes and difficulty swallowing dry food. In a suspected case of Sjogren's syndrome , which HLA associations would be most relevant to investigate in this patient?

A. HLA DR4, Drw53

B. HLA DR5, Drw52

C. HLA DR3, Drw52

D. HLA DR2, Drw52

---

10. A 50-year-old woman presents to the rheumatology clinic with complaints of dry eyes and mouth for the past several months. She also reports experiencing joint pain and fatigue. Which of the following statements is true regarding the diagnostic criteria for Sjogren Syndrome in this patient?

A. Unstimulated salivary flow of 0.5 ml/min is indicative of Sjogren Syndrome.

B. A positive anti-La antibody test confirms the diagnosis of Sjogren Syndrome.

C. A Schirmer's test result of <5mm/5 mins in one eye is consistent with the diagnosis of Sjogren Syndrome.

D. A rose bengal eye stain score of <5 is characteristic of Sjogren Syndrome.

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	1
Question 3	1
Question 4	2
Question 5	2
Question 6	3
Question 7	2
Question 8	2
Question 9	3
Question 10	3

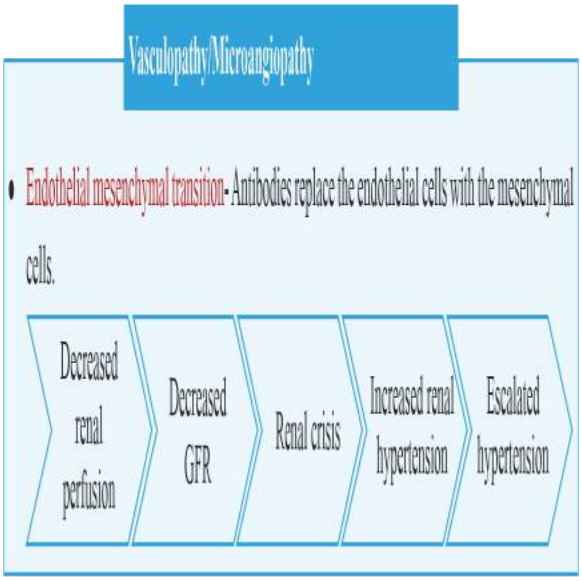
Solution for Question 1:

Correct Option A - Loss of sweat and sebaceous glands:

• Damage to sweat and sebaceous glands can contribute to the shiny appearance of the skin observed in systemic sclerosis.

• The above given image shows sclerodactyly:Tightening of the skin with loss of digital transverse creases

• Vasculopathy/Microangiopathy in systemic sclerosis (SSc) can lead to various manifestations"



Incorrect Options:

Option B - Thinning of the dermis: Structural changes associated with systemic sclerosis, including der mal thickening and atrophy of adrenal glands

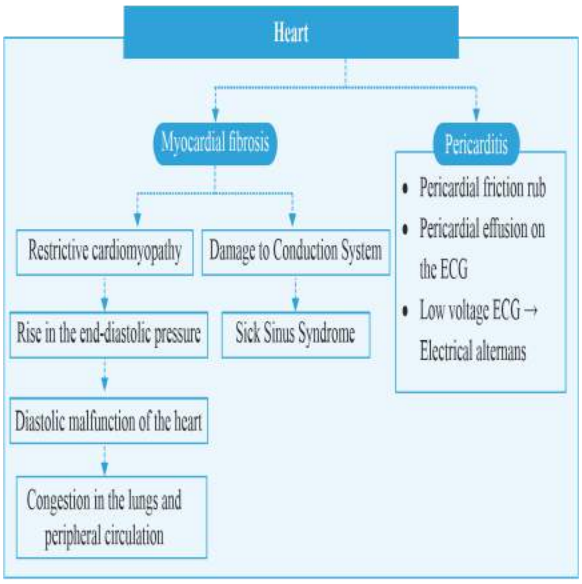
Option C and D - (Hyperplasia of the sweat glands & Normal appearance of skin architecture):

• Damage to sweat and sebaceous glands can contribute to the shiny appearance of the skin observed in systemic sclerosis.

Solution for Question 2:

Correct Option A - Dilated cardiomyopathy:

• Systemic sclerosis can lead to various cardiac manifestations however it does not manifest Dilated cardiomyopathy.



Incorrect Options:

Option B, C and D are associated with systemic scleroderma

Solution for Question 3:

Correct Option A - Anti-Centromere antibody:

• The patient's presentation, including Raynaud's phenomenon, sclerodactyly (thickening and tightening of the skin on the fingers), and ischemic pain in the digits, is suggestive of limited cutaneous systemic sclerosis.

• In this, Raynaud's phenomenon often precedes the development of sclerodactyly by several years.

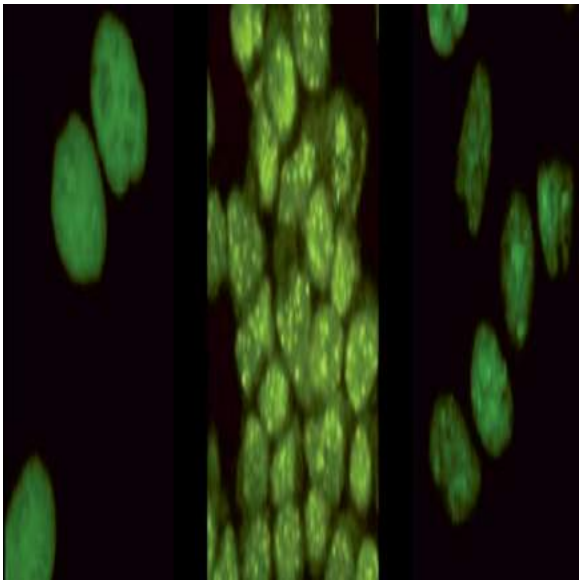
• One of the characteristic antibodies associated with systemic sclerosis, particularly in limited cutaneous systemic sclerosis (lcSSc), is the Anti-Centromere antibody.

• Autoantibodies in systemic sclerosis

• Image 1:Anti-Topoisomerase antibodies

• Image 2:Anti-Centromere antibody

• Image 3:Anti-RNA Polymerase III



Incorrect Options:

Options B, C, and D:

• Other antibodies such as Anti-Topoisomerase antibodies (anti-Scl-70), Ku antibody, and U1 RNP may be seen in systemic sclerosis, they are less commonly associated with the limited cutaneous form

Solution for Question 4:

Correct Option B - Limited cutaneous variety of systemic sclerosis:

• The clinical features described, including a tendon friction rub , dry mouth (xerostomia), difficulty in opening the mouth (microstomia), are characteristic of the limited cutaneous variety of systemic sclerosis (Lc Ssc).

• This subtype is typically associated with skin involvement limited to the distal extremities, face, and neck, along with involvement of internal organs such as the gastrointestinal tract.

Incorrect Options:

Option A - Diffuse cutaneous variety of systemic sclerosis (Dc Ssc): This subtype typically presents wit h more widespread skin involvement, affecting proximal extremities and trunk, and is associated with a higher risk of interstitial lung disease and renal involvement.

Option C - Systemic sclerosis sine scleroderma: This refers to systemic sclerosis without apparent skin involvement but with internal organ manifestations.

Option D - Systemic sclerosis overlap syndrome: This term is used when systemic sclerosis coexists wi th features of other autoimmune connective tissue diseases, such as systemic lupus erythematosus or polymyositis.

Solution for Question 5:

Correct Option B - Nail fold capillaroscopy:

• The most appropriate diagnostic test to evaluate for the underlying cause of the patient's symptoms of recurrent discoloration and coldness in her fingertips, consistent with Raynaud's Phenomenon, is nail fold capillaroscopy.

• This test allows visualization of the nail bed capillaries and aids in the early diagnosis of systemic sclerosis, which is commonly associated with Raynaud's Phenomenon.

Incorrect Options:

Option A
- MRI of the hands: While MRI can provide detailed imaging of the hands, it is not typically used as a first-line diagnostic test for Raynaud's Phenomenon.

Option C - Arterial blood gas analysis: Arterial blood gas analysis may be helpful in assessing oxygena tion status but is not specific for diagnosing Raynaud's Phenomenon.

Option D - Doppler ultrasound of the extremities: Doppler ultrasound can assess blood flow in the extre mities but is not the primary diagnostic test for Raynaud's Phenomenon.

Solution for Question 6:

Correct Option C - ACE inhibitors:

• The presentation described is consistent with scleroderma renal crisis, a serious complication of systemic sclerosis known as Scleroderma Crisis characterized by severe hypertension, acute kidney injury, microangiopathic hemolytic anemia, and thrombocytopenia. The "onion skin" appearance on biopsy is indicative of fibrinoid necrosis of small arteries and arterioles.

• ACE inhibitors are commonly used for the management of hypertension crises in scleroderma patients.

Incorrect Options:

Option A, B and D are incorrect as they are not used in treatment of

Solution for Question 7:

Correct Option B - Salivary gland biopsy:

• Sjogren's syndrome is characterized by lymphocytic infiltration of exocrine glands, leading to symptoms such as dry eyes (keratoconjunctivitis sicca) and dry mouth (xerostomia). To confirm the diagnosis of Sjogren's syndrome, a salivary gland biopsy is often performed. This biopsy typically shows lymphoid infiltration of labial minor salivary glands, which is a characteristic histological finding in Sjogren's syndrome.

Incorrect Options:

Option A - Schirmer's test: While Schirmer's test can be used to evaluate tear production in cases of dr y eyes, it is not specific for Sjogren's syndrome and does not confirm the diagnosis.

Option C - Lip biopsy: While lip biopsy may also show lymphocytic infiltration, it is less commonly perfo rmed compared to salivary gland biopsy and may not yield as conclusive results for diagnosing Sjogren 's syndrome.

Option D - Tear breakup time test: This test measures the time it takes for tears to break up on the surf ace of the eye. While it can indicate dry eye syndrome, it is not specific for Sjogren's syndrome and do es not confirm the diagnosis.

Solution for Question 8:

Correct Option B - Lissamine Green:

• Lissamine Green is used to evaluate ocular surface damage and assess dry eye syndrome. It stains devitalized or damaged cells on the ocular surface, including the conjunctiva and cornea, and helps identify areas of inflammation and epithelial defects.

Incorrect Options:

Option A - Fluorescein: Fluorescein is commonly used to assess corneal abrasions, ulcers, and defects in the corneal epithelium. It highlights damaged areas of the cornea under blue light.

Option C - Indocyanine Green: Indocyanine Green is primarily used in angiography to visualize choroid al vasculature and retinal blood vessels. It is not typically used for assessing ocular surface damage or dry eye syndrome.

Option D - Methylene Blue: Methylene Blue is a dye commonly used in various medical procedures, bu t it is not commonly used in ophthalmology for assessing ocular surface conditions.

Solution for Question 9:

Correct Option C - HLA DR3, Drw52:

• Sjögren's syndrome is associated with specific HLA associations, including HLA DR3 and Drw52.

• Therefore, investigating HLA DR3 and Drw52 would be most relevant in this patient to confirm the diagnosis of Sjögren's syndrome.

Incorrect Options:

Option A - HLA DR4, Drw53: While HLA DR4 is associated with other autoimmune diseases like rheum atoid arthritis, it is not a common HLA association in Sjögren's syndrome.

Option B - HLA DR5, Drw52: HLA DR5 is not a known HLA association in Sjögren's syndrome.

Option D - HLA DR2, Drw52: While HLA DR2 is associated with other autoimmune diseases like multip le sclerosis, it is not a common HLA association in Sjögren's syndrome.

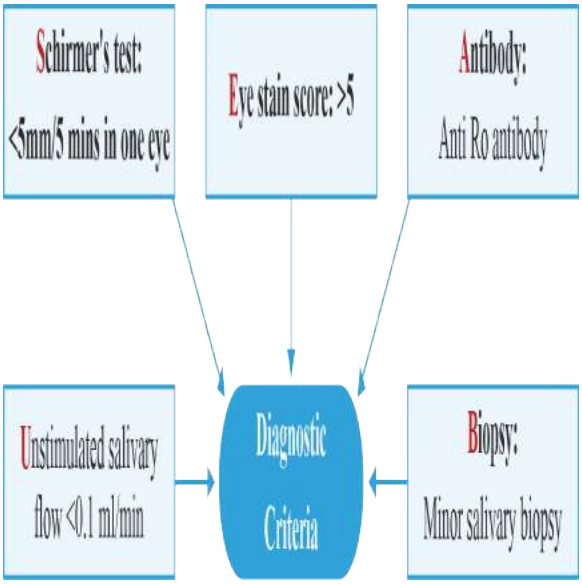
Solution for Question 10:

Correct Option A - A Schirmer's test result of <5mm/5 mins in one eye is consistent with the diagnosis of Sjogren Syndrome:

• Mnemonic: USEAB If two features are present: Sjogren Syndrome

• If two features are present: Sjogren Syndrome

• If two features are present: Sjogren Syndrome



Incorrect Options:

Option A,B and D are incorrect due to the above given reasons

Rheumatoid Arthritis

1. A 45-year-old postmenopausal woman presents with joint pain and morning stiffness that improves with activity. There is bilateral symmetrical involvement of small hand joints, including the PIP, MCP, and wrist joints with evidence of flexor tenosynovitis and reduced grip strength. What is the most likely diagnosis?

(or)

Which condition causes joint pain, morning stiffness involving small hand joints, including the PIP, MCP, and wrist joints, with evidence of flexor tenosynovitis and reduced grip strength

A. Osteoarthritis

B. Rheumatic fever

C. Rheumatoid arthritis

D. Gout

---

2. Which pair mentioning the deformity name and the deformity involved is incorrect?

A. Swan-Neck Deformity: Extension at PIP and flexion at DIP.

B. Boutonniere Deformity: Extension at PIP and flexion at DIP.

C. Mallet Finger: No extension at PIP and flexion at DIP.

D. Z Line Deformity: Subluxation of the first metacarpophalangeal joint, subluxation of the distal radio ulnar joint, and hyperextension of the interphalangeal joint.

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3. Which of the following statements about rheumatoid nodules is incorrect?

A. Rheumatoid nodules are typically tender when palpated.

B. Lung involvement can occur in association with rheumatoid nodules.

C. Pulmonary rheumatoid nodules can lead to exudative pleural effusion.

D. Rheumatoid nodules can compress peripheral nerves, causing mononeuritis multiplex.

E. Rheumatoid nodules on the median nerve can contribute to Carpal Tunnel syndrome.

---

4. A 55-year-old female presents with a 6-month history of gradually worsening joint pain and stiffness, predominantly involving the hands, wrists, and knees. On examination, there is symmetrical swelling and tenderness of the proximal interphalangeal joints and metacarpophalangeal joints. Laboratory investigations reveal positive anti-cyclic citrullinated peptide (anti-CCP) antibodies. Which ocular manifestation is not typically associated with this patient’s condition?

(or)

Which of the following ocular manifestations is not typically associated with rheumatoid arthritis?

A. Keratoconjunctivitis sicca

B. Scleritis

C. Episcleritis

D. Uveitis

---

5. A 55-year-old male coal worker presents with a history of joint pain, stiffness, and swelling in multiple joints, particularly in the hands and wrists. He also reports a chronic cough, shortness of breath, and a history of working in a coal mine for the past 20 years. Chest X-ray reveals the presence of multiple rounded opacities in the lungs. What is the name of the syndrome associated with the combination of these symptoms?

(or)

Which of the following is associated with the combination of rheumatoid arthritis and pneumoconiosis?

A. Goodpasture syndrome

B. Caplan syndrome

C. Cushing syndrome

D. Guillain-Barré syndrome

---

6. A 57-year-old woman presents to OPD with pain in her right knee and wrist for 5 years. She complains of increased morning stiffness in joints, which is relieved after some time on its own. She also gives a history of recurrent throat and urinary infections. On examination, there is a restriction of movement and tender symmetrical large joints. Also, her spleen is 2 fingers below the costal margin. Which of the following clinical manifestation will be most likely present?

(or)

Which clinical manifestation will be present in a patient with likely rheumatoid arthritis and enlarged spleen?

A. Normocytic normochromic anaemia

B. Hepatomegaly

C. Neutropenia

D. Neuropathy

---

7. A 35-year-old female presents with joint pain, swelling, and morning stiffness that lasts for more than an hour. The symptoms primarily affect her hands and wrists but have also gradually involved multiple small joints. On examination, you observe tenderness and swelling in the affected joints. Based on the clinical presentation, which of the following diagnostic criteria is not relevant?

(or)

Which of the following is not involved in the diagnosis of rheumatoid arthritis?

A. Involvement of at least one large joint

B. Low titer of rheumatoid factor (RA factor)

C. Duration of symptoms more than six weeks

D. Serological evidence of anti-cyclic citrullinated peptide (anti-CCP) antibodies

---

8. A 45-year-old woman has been experiencing joint pain, stiffness, and swelling in her hands and feet for several months. She finds it challenging to perform her daily activities. Her rheumatologist suspects an autoimmune disorder and prescribes a medication that inhibits the enzyme dihydroorotate

dehydrogenase. What drug could this be?

(or)

Which of the following drugs inhibits the enzyme dihydroorotate dehydrogenase?

A. Methotrexate

B. Sulfasalazine

C. Leflunomide

D. Hydroxychloroquine

---

9. A 50-year-old man with rheumatoid arthritis is started on methotrexate but shows limited response despite several weeks of treatment. Leflunomide is added, but the patient again fails to respond after several weeks. Which of the following medications is likely to be prescribed next?

(or)

Which of the following medications is likely to be prescribed next if there is no improvement with methotrexate and leflunomide in a patient with rheumatoid arthritis?

A. Try the same regimen

B. Adalimumab

C. Hydroxychloroquine

D. Sulfsalazine

---

10. A 57-year-old woman presents to OPD with symptoms involving pain in her right knee joint and right wrist joint for 5 years now. She complains of increased morning stiffness in joints which relieves after some time on its own. She also gives a history of the recurrent throat or urinary infections. On examination, there is a restriction of movement and tender symmetrical large joints. Also, her spleen is 2 fingers below the costal margin. Physician orders CBC and a diagnosis of Felty's syndrome is made. Which of the following clinical manifestation will be most likely present in Felty Syndrome?

(or)

Diagnosis of felty's syndrome is made. What will be present in this patient?

A. Normocytic normochromic anaemia

B. Hepatomegaly

C. Neutropenia

D. Neuropathy

---

11. A 45-year-old post-menopausal woman presents with bilateral symmetrical involvement of small hand joints, including the PIP, MCP, and wrist joints. She complains of inflamed joints, pain, tenderness, and morning stiffness that improves with activity. On examination, there is evidence of flexor tenosynovitis and reduced grip strength. Which of the following is the most likely diagnosis?

A. Osteoarthritis

B. Rheumatic fever

C. Rheumatoid arthritis

D. Gout

---

12. A 50-year-old man is diagnosed with Rheumatoid Arthritis.The rheumatologist initiates treatment with Methotrexate, However, despite being on Methotrexate for several weeks the symptoms show limited improvement. In response to the inadequate response to Methotrexate, the rheumatologist decides to add a second DMARD to the treatment regimen. Leflunomide is chosen as an adjunct to Methotrexate in an attempt to achieve better disease control and symptom remission. However, after a few more weeks on this combination therapy the symptoms still persist and have not shown significant improvement. Considering lack of improvement with Methotrexate and the addition of Leflunomide, which of the following medications is likely to be prescribed next?

(or)

Which of the following medications is likely to be prescribed next if there is no improvement with Methotrexate and Leflunomide in a patient with rheumatoid arthritis?

A. Try the same regimen

B. Adalimumab

C. Hydroxychloroquine

D. Sulfsalazine

---

13. A 55-year-old male coal worker presents with a history of joint pain, stiffness, and swelling in multiple joints, particularly in the hands and wrists. He also reports a chronic cough, shortness of breath, and a history of working in a coal mine for the past 20 years. Chest X-ray reveals the presence of multiple rounded opacities in the lungs. What is the name of the syndrome associated with the combination of these symptoms?

(or)

Which of the following is associated with the combination of rheumatoid arthritis and pneumoconiosis?

A. Goodpasture syndrome

B. Caplan syndrome

C. Cushing syndrome

D. Guillain-Barré syndrome

---

14. Which pair mentioning the deformity name and the deformity involved is incorrect?

A. Swan-Neck Deformity: Extension at PIP and flexion at DIP

B. Boutonniere Deformity: Extension at PIP and flexion at DIP

C. Mallet Finger: No extension at PIP and flexion at DIP

D. Z Line Deformity: Subluxation of the first metacarpophalangeal joint, subluxation of the distal radio ulnar joint, and hyperextension of the interphalangeal joint

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15. A 55-year-old female patient with dryness of the eyes and mouth. She also complains of chest pain and shortness of breath on exertion. She has a pericardial friction rub auscultated on cardiac examination. Laboratory tests reveal positive anti-CCP antibodies. Which of the following ocular manifestations is NOT typically associated with the patient’s condition ?

(or)

Which of the following ocular manifestations is NOT typically associated with Rheumatoid arthritis?

A. Keratoconjunctivitis sicca

B. Scleritis

C. Episcleritis

D. Uveitis

---

16. A 45-year-old woman, has been experiencing joint pain, stiffness, and swelling in her hands and feet for several months. She finds it challenging to perform her daily activities due to the discomfort and decreased range of motion in her joints. She visits her rheumatologist, who suspects an autoimmune disorder based on her symptoms and physical examination. After careful evaluation, the rheumatologist prescribes a medication that inhibits the enzyme Dehydro Orotate Dehydrogenase. Based on the information provided, which drug has the rheumatologist prescribed for this patients condition?

(or)

Which of the following inhibits the enzyme Dehydro Orotate Dehydrogenase.?

A. Methotrexate

B. Sulfasalazine

C. Leflunomide

D. Hydroxychloroquine

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17. Which of the following statements about Rheumatoid Nodules is incorrect?

A. Rheumatoid nodules are typically tender when palpated

B. Lung involvement can occur in association with rheumatoid nodules

C. Rheumatoid nodules can lead to exudative pleural effusion

D. Rheumatoid nodules can compress peripheral nerves, causing mononeuritis multiplex

E. Rheumatoid nodules on the median nerve can contribute to Carpal Tunnel syndrome

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18. A 35-year-old female presents with joint pain, swelling, and morning stiffness that lasts for more than an hour. The symptoms primarily affect her hands and wrists but have gradually involved multiple small joints as well. She reports that the symptoms have been present for the past four months. On examination, you observe tenderness and swelling in the affected joints. Based on the clinical presentation, which of the following diagnostic criteria are NOTinvolved in the evaluation of this patient suspected of having a specific condition?

(or)

Which of the following diagnostic criteria are NOTinvolved in the diagnosis of rheumatoid arthritis?

A. Involvement of at least one large joint

B. Low titre of rheumatoid factor (RA factor)

C. Duration of symptoms more than six weeks

D. Serological evidence of anti-cyclic citrullinated peptide (anti-CCP) antibodies

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Correct Answers

Question	Correct Answer
Question 1	3
Question 2	2
Question 3	1
Question 4	4
Question 5	2
Question 6	3
Question 7	2
Question 8	3
Question 9	2
Question 10	3
Question 11	3
Question 12	2
Question 13	2
Question 14	2
Question 15	4
Question 16	3
Question 17	1
Question 18	2

Solution for Question 1:

Correct Option C - Rheumatoid arthritis:

Option C - Rheumatoid arthritis:

• The clinical features mentioned in the scenario are characteristic of rheumatoid arthritis (RA).

• RA is a systemic autoimmune disease characterized by inflammatory arthritis and extra-articular involvement.

• It is a chronic inflammatory disorder caused in many cases by the interaction between genes and environmental factors, primarily involving synovial joints.

• It primarily affects women between the ages of 25 and 55, including postmenopausal women.

• It involves small hand joints (PIP, MCP) and wrist joint.

• It exhibits bilateral symmetrical involvement and presents with inflamed joints, pain, tenderness, morning stiffness, and reduced grip strength.

• Joint pain classical improves with activity.

• Flexor tenosynovitis is a hallmark manifestation of the disease.

Incorrect Options:

Option A - Osteoarthritis:

• Osteoarthritis primarily affects weight-bearing joints such as the knees, hips, and spine.

• It is typically associated with aging, joint degeneration, and mechanical stress.

• DIP, PIP, and 1st CMC are the small hand joints involved.

• Joint pain improves with rest.

Option B - Rheumatic fever:

• Rheumatic fever is a systemic inflammatory condition that can occur following an untreated or inadequately treated streptococcal throat infection.

• It is characterized by migratory polyarthritis affecting large joints, along with other manifestations such as carditis, chorea, and subcutaneous nodules.

Option D - Gout:

• Gout is a form of inflammatory arthritis caused by the deposition of uric acid crystals in joints.

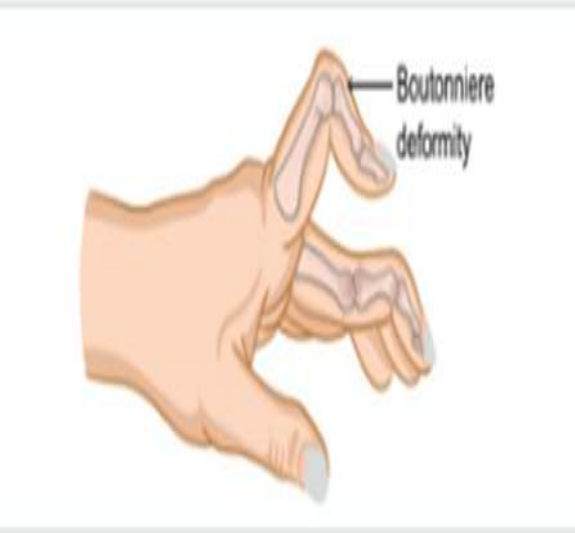
• It typically affects the big toe (first metatarsophalangeal joint) but can involve other joints as well.

Solution for Question 2:

Correct Option B - Boutonniere Deformity-Extension at PIP and flexion at DIP:

• Boutonniere deformity describes a condition in which the finger is flexed at the proximal interphalangeal joint (PIP) and hyperextended at the distal interphalangeal joint (DIP).

• It is seen in rheumatoid arthritis.



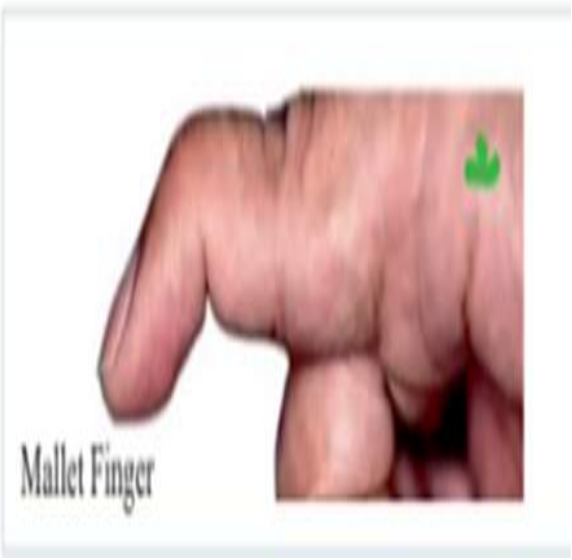
Incorrect Options:

Option A - Swan-Neck Deformity: Extension at PIP and flexion at DIP:

• This statement is correct. In Swan-Neck Deformity, there is extension at the proximal interphalangeal joint (PIP) and flexion at the distal interphalangeal joint (DIP).

Option C - Mallet Finger: No extension at PIP and flexion at DIP:

• This statement is correct. In Mallet Finger, there is no extension at the PIP joint and flexion at the DIP joint. It occurs due to the avulsion of the extensor tendon related to the DIP.



Option D - Z Line Deformity: Subluxation of the first metacarpophalangeal joint, subluxation of the dista l radio ulnar joint, and hyperextension of the interphalangeal joint:

• This statement is correct. Z Line Deformity involves three features: subluxation of the first metacarpophalangeal joint, subluxation of the distal radio ulnar joint, and hyperextension of the interphalangeal joint.

• subluxation of the first metacarpophalangeal joint,

• subluxation of the distal radio ulnar joint, and

• hyperextension of the interphalangeal joint.

• subluxation of the first metacarpophalangeal joint,

• subluxation of the distal radio ulnar joint, and

• hyperextension of the interphalangeal joint.

Solution for Question 3:

Correct Option A - Rheumatoid nodules are typically tender when palpated:

• Rheumatoid nodules are usually non-tender when palpated.

• Rheumatoid nodules are a common extraarticular manifestation of rheumatoid arthritis (RA).

• Patients with rheumatoid nodules often have severe disease phenotypes, including joint destruction, other extraarticular manifestations, and increased cardiovascular, pulmonary, and all-cause mortality.

• Pathology: They have a similar histologic appearance wherever they are found, featuring a central area of necrosis surrounded by concentric layers of palisading macrophages and lymphocytes.

• The pathogenesis involves components of both innate and adaptive immunity.

Incorrect Options:

Option B - Lung involvement can occur in association with rheumatoid nodules:

• Rheumatoid nodules can involve the lungs, leading to complications such as pleural effusion.

• Asymptomatic single lung nodules require thorough evaluation to rule out resectable lung cancer.

• Multiple pulmonary nodules necessitate evaluation to exclude treatable infectious and potentially curable neoplastic diseases.

Option C - Pulmonary rheumatoid nodules can lead to exudative pleural effusion:

• Rheumatoid nodules can contribute to the development of exudative pleural effusion, a fluid buildup in the pleural space of the lungs.

Option D - Rheumatoid nodules can compress peripheral nerves, causing mononeuritis multiplex:

• Rheumatoid nodules can compress peripheral nerves, resulting in mononeuritis multiplex, which refers to multiple nerve damage and neuropathy occurring simultaneously.

Option E - Rheumatoid nodules on the median nerve can contribute to Carpal Tunnel syndrome:

• These nodules located on the median nerve can contribute to the development of Carpal Tunnel syndrome, a condition characterized by compression of the median nerve in the wrist.

Solution for Question 4:

Correct Option D - Uveitis:

Option D - Uveitis:

• Uveitis is not commonly seen in rheumatoid arthritis. It is rather associated with seronegative spondyloarthritis, such as reactive arthritis.

• Early diagnosis of ophthalmic disease in RA is crucial for the timely management of potentially serious complications.

• While ocular manifestations may not always correlate directly with systemic disease, they require attention due to their variable clinical course.

• Patients with significant changes in visual acuity, moderate to severe ocular pain, or progressive redness should be referred to an ophthalmologist.

• Corneal involvement, often from Sjögren's disease, is common in RA and may increase the risk of corneal infection.

• Anterior uveitis, while not more common in RA, can occur alongside scleritis, potentially leading to glaucoma.

• Therapy-related ocular disorders such as glaucoma or cataracts from glucocorticoids and retinal toxicity from antimalarials should also be considered.

Incorrect Options:

Option A - Keratoconjunctivitis sicca:

• Keratoconjunctivitis sicca (dry eye) is the most frequent ocular manifestation of RA, with symptoms such as dryness, burning, and photophobia.

Option B - Scleritis:

• Corneal inflammation, sometimes with scleritis, can lead to corneal melting, necessitating surgical intervention in severe cases.

Option C - Episcleritis:

• Episcleritis and scleritis are less common but may occur in RA, with scleritis carrying a more serious prognosis.

• Necrotizing scleritis, while painless, requires careful examination as it can lead to severe thinning of the sclera.

• Treatment involves systemic therapy tailored to the severity of scleritis or corneal ulcerative disease, often in collaboration with a rheumatologist.

• Diffuse scleritis may respond well to systemic NSAIDs or prednisone, with methotrexate or cyclophosphamide added for severe or necrotizing disease.

Solution for Question 5:

Correct Option B - Caplan syndrome:

Option B - Caplan syndrome:

• Caplan syndrome arises exclusively in individuals with both rheumatoid arthritis (RA) and occupational pneumoconiosis, typically caused by exposure to coal, asbestos, or silica dust.

• It is characterized by the rapid development of multiple basilar nodules in the periphery of the lungs, often accompanied by mild airflow obstruction.

• Although Caplan syndrome can lead to progressive massive fibrosis (PMF), RA patients are not at higher risk of PMF compared to others exposed to mining dust.

• Histologically, Caplan nodules resemble simple rheumatoid nodules but with the distinctive feature of a layer of black dust surrounding a central necrotic area. Inflammatory cells, including polymorphonuclear granulocytes and macrophages, form a layer around the dust ring, with some macrophages containing dust particles.

• Most individuals test positive for rheumatoid factor.

• While there is no specific treatment for Caplan syndrome, the prognosis is generally favorable.

Incorrect Options:

Option A - Goodpasture syndrome:

• A condition characterized by the presence of autoimmune antibodies attacking the lungs and kidneys, leading to lung hemorrhage and kidney damage.

Option C - Cushing syndrome:

• A disorder caused by prolonged exposure to high levels of cortisol hormone, resulting in various symptoms such as weight gain, round face, and muscle weakness.

Option D - Guillain-Barré syndrome:

• A rare neurological disorder characterized by muscle weakness, numbness, and paralysis.

Solution for Question 6:

Correct Option C - Neutropenia:

• Felty's syndrome is characterized by Rheumatoid arthritis with splenomegaly and neutropenia.

• Felty's syndrome occurs in chronic patients of RA, usually 10-15 years after the occurrence of RA.

• If a patient with RA is treated aggressively with DMARD, the chance of developing Felty's syndrome becomes negligible.

• Symptoms of patients having Felty's Syndrome: Anaemia Chronic fatigue Pale skin Fever Swollen lymph nodes.

• Anaemia

• Chronic fatigue

• Pale skin

• Fever

• Swollen lymph nodes.

• Diagnosis of Felty's syndrome can be made by taking a detailed history from the patient and the following investigations Full Blood Count (Anaemia and thrombocytopenia). RA Factor will be present in the blood. Anti-CCP antibody test. C-reactive protein (CRP). Erythrocyte sedimentation rate test (ESR). Antinuclear antibody (ANA). The 14-3-3η (eta) protein.

• Full Blood Count (Anaemia and thrombocytopenia).

• RA Factor will be present in the blood.

• Anti-CCP antibody test.

• C-reactive protein (CRP).

• Erythrocyte sedimentation rate test (ESR).

• Antinuclear antibody (ANA).

• The 14-3-3η (eta) protein.

• There is no specific treatment for Felty's syndrome.

• Only underlying RA is treated by giving DMARD.

• Steroids can also be given to alleviate pain.

• Anaemia

• Chronic fatigue

• Pale skin

• Fever

• Swollen lymph nodes.

• Full Blood Count (Anaemia and thrombocytopenia).

• RA Factor will be present in the blood.

• Anti-CCP antibody test.

• C-reactive protein (CRP).

• Erythrocyte sedimentation rate test (ESR).

• Antinuclear antibody (ANA).

• The 14-3-3η (eta) protein.

Incorrect Optrions:

Option A - Normocytic normochromic anaemia:

• Anaemia of chronic illness traditionally encompassed any long-standing inflammatory, infectious, or malignant disease, including RA, severe trauma, heart disease, or diabetes mellitus.

• There is primarily a decreased availability of iron, relatively decreased levels of erythropoietin, and a mild decrease in the lifespan of RBCs to 70-80 days.

• Early-onset rheumatoid arthritis with positive rheumatoid factor is more likely to have normocytic normochromic anaemia.

Option B - Hepatomegaly:

• Splenomegaly is a classic finding in Felty’s syndrome.

• Hepatomegaly is not seen in Felty's syndrome

Option D - Neuropathy:

• Neuropathy is not seen in Felty's syndrome.

Solution for Question 7:

Correct Option B - Low titer of rheumatoid factor (RA factor):

• It decreases the credibility of the diagnosis of rheumatoid arthritis.

• High titer of RA factor and anti- CCP, then the credibility of the diagnosis is increased.

• If both are low, then the credibility is decreased

• RA factor: IgM class of antibodies. This test may be biologically false positive in 5% of the normal population. This cannot be used as the best diagnosis. It is a screening test but not the investigation of choice

Incorrect Options:

Option A - Involvement of at least one large joint:

• There could be 1 large joint, 2 to 10 large joints, 1 to 2 small joints, and 4 to 10 small joint involvements.

• It could be even more than 10 joint involvements. The greater the number of small joint involvements, the more credibility.

Option C -Duration of symptoms more than six weeks:

• If the duration of symptoms is more than 6 weeks, then the diagnosis will be more credible

Option D - Serological evidence of anti-cyclic citrullinated peptide (anti-CCP) antibodies:

• Antibody - cyclic citrullinated peptide antibody.

• Low titer - means the value is less than 3 times the upper limit of normal.

• A high titer means more than 3 times the upper limit of normal.

• High titer of RA factor and anti- CCP, then the credibility of the diagnosis is increased.

Solution for Question 8:

Correct Option C - Leflunomide:

• Leflunomide is a DMARD that inhibits Dihydroorotate Dehydrogenase, an enzyme responsible for de-novo pyrimidine synthesis.

• By inhibiting this enzyme, Leflunomide decreases T and B cell proliferation and exhibits immunosuppressive and anti-inflammatory effects, effectively managing Rheumatoid Arthritis.

DMARDs (Disease Modifying Anti-Rheumatoid Drugs)

Two Types: Conventional (Non-Biological) and Biological Agents

Conventional DMARDs: Methotrexate, Sulfasalazine, Leflunomide, Hydroxychloroquine, Azathioprine, Cyclosporine

Incorrect Options:

Option A - Methotrexate:

• While Methotrexate is a DMARD used in the treatment of Rheumatoid Arthritis, its mechanism of action involves inhibiting Dihydrofolate Reductase.

Option B - Sulfasalazine:

• Sulfasalazine is another conventional DMARD used in treating Rheumatoid Arthritis, but it does not inhibit Dihydroorotate Dehydrogenase.

• Sulfasalazine splits into 5-ASA and Sulfapyridine, which have anti-inflammatory properties.

Option D - Hydroxychloroquine:

• Hydroxychloroquine has anti-inflammatory effects but contains lower efficacy compared to other DMARDs.

• While it may be used in Rheumatoid Arthritis treatment, it does not inhibit Dihydroorotate Dehydrogenase.

Solution for Question 9:

Correct Option B - Adalimumab:

• Given the patient's insufficient response to methotrexate and the addition of leflunomide, the next step in the treatment plan would be to introduce a Biological DMARD.

• Adalimumab is a TNF alpha antagonist, which means it targets Tumor Necrosis Factor-alpha, a pro-inflammatory cytokine involved in the pathogenesis of Rheumatoid Arthritis.

• By blocking TNF alpha, Adalimumab helps reduce inflammation and slow down the progression of the disease.

• It is also prescribed for various other autoimmune diseases such as psoriatic arthritis, ankylosing spondylitis, Crohn's disease, ulcerative colitis, and plaque psoriasis.

• Adalimumab can suppress the immune system, increasing susceptibility to infections such as tuberculosis (TB), bacterial infections, fungal infections, and viral infections.

Incorrect Options:

Option A - Try the same regimen:

• The patient is not improving and, hence, needs to be put on a biological DMARD.

Option C - Hydroxychloroquine:

• Hydroxychloroquine is a conventional DMARD with lower efficacy compared to Biological DMARDs.

• It is often used in milder cases of RA or as an adjunct to other therapies.

• However, in this case, where the symptoms have not improved despite being on two DMARDs, a Biological DMARD like Adalimumab may be more appropriate.

Option D - Sulfasalazine:

• This is the incorrect answer. Sulfasalazine is another conventional DMARD that can be added to the treatment regimen in patients who do not respond adequately to Methotrexate in place of leflunomide.

• It has anti-inflammatory properties and is used to manage RA.

• Adalimumab is a better option and is the next step in the treatment algorithm for rheumatoid arthritis.

Solution for Question 10:

Correct Option C - Neutropenia:

• Felty's syndrome is characterised by Rheumatoid arthritis with splenomegaly and neutropenia.

• Felty's syndrome occurs in chronic patients of Rheumatoid Arthritis, usually 10-15 years after the occurrence of RA.

• If a patient with Rheumatoid arthritis is treated aggressively with DMARD, the chance of developing Felty's syndrome becomes negligible.

• Symptoms of Patients having Felty's syndrome: Anaemia Chronic fatigue Pale skin Fever Swollen lymph nodes.

• Anaemia

• Chronic fatigue

• Pale skin

• Fever

• Swollen lymph nodes.

• Diagnosis of Felty's syndrome can be made by taking a detailed history from the patient and the following investigations By FBC (on FBC, patients will have anaemia and thrombocytopenia RA Factor will be present in the blood. Anti-CCP antibody test. C-reactive protein (CRP). Erythrocyte sedimentation rate test (ESR). Antinuclear antibody (ANA). The 14-3-3η (eta) protein.

• By FBC (on FBC, patients will have anaemia and thrombocytopenia

• RA Factor will be present in the blood.

• Anti-CCP antibody test.

• C-reactive protein (CRP).

• Erythrocyte sedimentation rate test (ESR).

• Antinuclear antibody (ANA).

• The 14-3-3η (eta) protein.

• There is no specific treatment for Felty's syndrome.

• Only underlying Rheumatoid arthritis is treated by giving DMARD.

• Steroids can also be given to alleviate pain.

• Anaemia

• Chronic fatigue

• Pale skin

• Fever

• Swollen lymph nodes.

• By FBC (on FBC, patients will have anaemia and thrombocytopenia

• RA Factor will be present in the blood.

• Anti-CCP antibody test.

• C-reactive protein (CRP).

• Erythrocyte sedimentation rate test (ESR).

• Antinuclear antibody (ANA).

• The 14-3-3η (eta) protein.

Incorrect Options:

Option A - Normocytic normochromic anaemia:

• Anaemia of chronic illness traditionally encompassed any long-standing inflammatory, infectious, or malignant disease. Including rheumatoid arthritis, severe trauma, heart disease, or diabetes mellitus.

• There is primarily a decreased availability of iron, relatively decreased levels of erythropoietin, and a mild decrease in the lifespan of RBCs to 70-80 days.

• Early-onset rheumatoid arthritis with positive rheumatoid factor is more likely to have normocytic normochromic anaemia.

Option B - Hepatomegaly:

• Splenomegaly is a classic finding in Felty’s syndrome.

• Hepatomegaly is not seen in Felty's syndrome

Option D - Neuropathy:

• Neuropathy is not seen in Felty's syndrome

Solution for Question 11:

Correct Option C - Rheumatoid arthritis:

• The clinical features mentioned in the scenario are characteristic of rheumatoid arthritis. It is an autoimmune disease that primarily affects women between the ages of 25 and 55, including post-menopausal women. Rheumatoid arthritis commonly involves small hand joints, exhibits bilateral symmetrical involvement, and presents with inflamed joints, pain, tenderness, morning stiffness, and reduced grip strength. Flexor tenosynovitis is a hallmark manifestation of the disease.

Incorrect Options:

Option A - Osteoarthritis: Osteoarthritis primarily affects weight-bearing joints such as the knees, hips, and spine. It is typically associated with aging, joint degeneration, and mechanical stress. Unlike rheum atoid arthritis, osteoarthritis does not exhibit bilateral symmetrical involvement, flexor tenosynovitis, or s ystemic symptoms like morning stiffness.

Option B - Rheumatic fever: Rheumatic fever is a systemic inflammatory condition that can occur follow ing an untreated or inadequately treated streptococcal throat infection. It is characterized by migratory polyarthritis affecting large joints, along with other manifestations such as carditis, chorea, and subcuta neous nodules. The clinical scenario described in the question is not consistent with rheumatic fever.

Option D - Gout: Gout is a form of inflammatory arthritis caused by the deposition of uric acid crystals i n joints. It typically affects the big toe (first metatarsophalangeal joint) but can involve other joints as we ll. The clinical features mentioned in the scenario, such as bilateral symmetrical involvement of small h and joints and flexor tenosynovitis, are not consistent with gout.

Solution for Question 12:

Correct Option B – Adalimumab:

• Given the patients insufficient response to Methotrexate and the addition of Leflunomide, the next step in the treatment plan would be to introduce a Biological DMARD. Adalimumab is a TNF alpha antagonist, which means it targets Tumor Necrosis Factor-alpha, a pro-inflammatory cytokine involved in the pathogenesis of Rheumatoid Arthritis. By blocking TNF alpha, Adalimumab helps reduce inflammation and slow down the progression of the disease.

Incorrect Options:

Option A - Try the same regimen: Incorrect ,
because the patient is not improving and hence needs to be put on a biological DMARD.

Option C - Hydroxychloroquine: Hydroxychloroquine is a conventional DMARD with lower efficacy com pared to Biological DMARDs. It is often used in milder cases of Rheumatoid Arthritis or as an adjunct t o other therapies. However, in Mr. Johnson's case, where the symptoms have not improved despite bei ng on two DMARDs, a Biological DMARD like Adalimumab may be more appropriate.

Option D - Sulfasalazine: This is the incorrect answer. Sulfasalazine is another conventional DMARD t hat can be added to the treatment regimen in patients who do not respond adequately to Methotrexate in place of leflunomide. It has anti-inflammatory properties and is used in the management of Rheumat oid Arthritis. Adalimumab is a
better option and is the next step in the treatment algorithm of the rheumatoid arthritis.

Solution for Question 13:

Correct Option B - Caplan syndrome:

• This syndrome is associated with the combination of rheumatoid arthritis and coal workers' pneumoconiosis. In this case, the patient's symptoms of joint pain, swelling, and stiffness along with the occupational history of coal mining suggest the presence of Caplan syndrome.

Incorrect Options:

Option A - Goodpasture syndrome: A condition characterized by the presence of autoimmune antibodi es attacking the lungs and kidneys, leading to lung hemorrhage and kidney damage. Not related to the symptoms described in the scenario.

Option C - Cushing syndrome: A disorder caused by prolonged exposure to high levels of cortisol horm one, resulting in various symptoms such as weight gain, round face, and muscle weakness. Not related to the symptoms described in the scenario.

Option D - Guillain-Barré syndrome: A rare neurological disorder characterized by muscle weakness, n umbness, and paralysis. Not related to the symptoms described in the scenario.

Solution for Question 14:

Correct Option B - Boutonniere Deformity: Extension at PIP and flexion at DIP: This statement is incorr ect. In Boutonniere Deformity, there is flexion at the PIP and extension at the DIP, not the other way ar ound.

Incorrect Options:

Option A - Swan-Neck Deformity: Extension at PIP and flexion at DIP: This statement is correct. In Swan-Neck Deformity, there is extension at the proximal interphalangeal joint (PIP) and flexion at the distal interphalangeal joint (DIP).

Option C - Mallet Finger: No extension at PIP and flexion at DIP: This statement is correct. In Mallet Finger, there is no extension at the PIP joint and flexion at the DIP joint. It occurs due to the avulsion of the extensor tendon related to the DIP.

Option D - Z Line Deformity: Subluxation of the first metacarpophalangeal joint, subluxation of the distal radio ulnar joint, and hyperextension of the interphalangeal joint: This statement is correct. Z Line Deformity involves three features: subluxation of the first metacarpophalangeal joint, subluxation of the distal radio ulnar joint, and hyperextension of the interphalangeal joint.

Solution for Question 15:

Correct Option D - Uveitis:

• Not commonly seen in rheumatoid arthritis, it causes eye redness, pain, and can lead to vision problems if untreated.

Incorrect Options:

Option A - Keratoconjunctivitis sicca: Dry eye syndrome due to reduced tear production or increased tear evaporation.

Option B - Scleritis: Inflammation of the sclera causing severe eye pain, redness, and tenderness.

Option C
- Episcleritis: Mild inflammation of the episclera characterized by localized redness and discomfort.

Solution for Question 16:

Correct Option C – Leflunomide:

• This option is the correct answer. Leflunomide is a DMARD that inhibits Dehydro Orotate Dehydrogenase, an enzyme responsible for de-novo pyrimidine synthesis. By inhibiting this enzyme, Leflunomide decreases T and B cell proliferation and exhibits immunosuppressive and anti-inflammatory effects, making it effective in managing Rheumatoid Arthritis.

Incorrect Options:

Option A - Methotrexate: This option is not the correct answer. While Methotrexate is a DMARD used in the treatment of Rheumatoid Arthritis, its mechanism of action involves inhibiting Dihydrofolate Reductase, not Dehydro Orotate Dehydrogenase.

Option B - Sulfasalazine: This option is not the correct answer. Sulfasalazine is another conventional DMARD used in the treatment of Rheumatoid Arthritis, but it does not inhibit Dehydro Orotate Dehydrogenase. Sulfasalazine splits into 5-ASA and Sulfapyridine, which have anti-inflammatory properties.

Option D - Hydroxychloroquine: This option is not the correct answer. Hydroxychloroquine has anti-inflammatory effects but contains lower efficacy compared to other DMARDs. While it may be used in Rheumatoid Arthritis treatment, it does not inhibit Dehydro Orotate Dehydrogenase like Leflunomide.

Solution for Question 17:

Correct Option A - Rheumatoid nodules are typically tender when palpated: This statement is incorrect. Rheumatoid nodules are usually non-tender when palpated. They are firm, subcutaneous nodules co mmonly found on the extensor surfaces of the body.

Incorrect Options:

Option B - Lung involvement can occur in association with rheumatoid nodules: This statement is corre ct. Rheumatoid nodules can involve the lungs, leading to complications such as pleural effusion.

Option C - Rheumatoid nodules can lead to exudative pleural effusion: This statement is correct. Rheu matoid nodules can contribute to the development of exudative pleural effusion, a buildup of fluid in the pleural space of the lungs.

Option D - Rheumatoid nodules can compress peripheral nerves, causing mononeuritis multiplex: This statement is correct. Rheumatoid nodules can compress peripheral nerves, resulting in mononeuritis m ultiplex, which refers to multiple nerve damage and neuropathy occurring simultaneously.

Option E - Rheumatoid nodules on the median nerve can contribute to Carpal Tunnel syndrome: This s tatement is correct. Rheumatoid nodules located on the median nerve can contribute to the developme nt of Carpal Tunnel syndrome, a condition characterized by compression of the median nerve in the wrist.

Solution for Question 18:

Correct Option: B – Low titre of rheumatoid factor (RA factor):

• It decreases the credibility of the diagnosis of rheumatoid arthritis

• High titre of RA factor and anti- CCP then the credibility of diagnosis is increased. If both are low then the credibility is decreased

• RA factor: IgM class of antibodies. This test may be biologically false positive in 5% of the normal population. This cannot be used as the best diagnosis. It is a screening test but it can't be the investigation of choice

Incorrect Options:

Option A - Involvement of at least one large joint: There could be 1 large joint, 2 to 10 large joint, 1 to 2 small joints, 4 to 10 small joint involvements. It could be even more than 10 joint involvements as well. The more the number of small joint involvement, the more credibility.

Option C - Duration of symptoms more than six weeks: If the duration of symptoms is more than 6 weeks then the diagnosis will be more credible

Option D - Serological evidence of anti-cyclic citrullinated peptide (anti-CCP) antibodies: Antibody - cyclic citrullinated peptide antibody

• Low titre - means the value is less than 3 times upper limit of normal

• High titre - means more than 3 times of upper limit of normal

• High titre of RA factor and anti- CCP then the credibility of diagnosis is increased

Crystal Arthropathy

1. A 55-year-old male with alcohol use disorder presents to the emergency department with sudden-onset severe pain and swelling in his right big toe. He has a past medical history of hypertension well-controlled with a calcium channel blocker. On examination, the affected toe appears red, tender, and warm to touch. Which of the following is the most likely cause of his symptoms?

(or)

Which of the following is the most likely cause for a male with alcoholic use disorder who presents with severe pain and swelling in his right big toe, which appears red, tender, and warm to touch?

A. Cellulitis

B. Osteoarthritis

C. Rheumatoid arthritis

D. Acute gout

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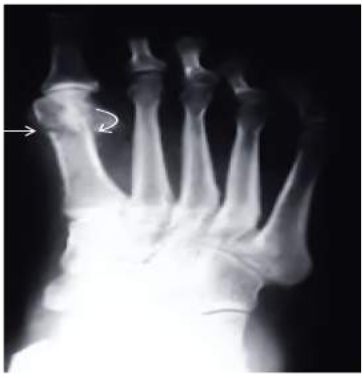
2. A 60-year-old male presents with recurrent episodes of joint pain and swelling in his right big toe. He describes the pain as sudden and excruciating, often waking him up at night. On examination, the affected joint is warm, erythematous, and tender on palpation. Based on the clinical presentation and the X-ray image shown below, what is the most likely diagnosis in this patient?

(or)

What is the diagnosis and what does the given X-ray depict?



A. Osteoarthritis with tophi formation

B. Rheumatoid arthritis with joint erosions

C. Gout with monosodium urate crystal deposition

D. Septic arthritis with joint effusion

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3. A 45-year-old male presents with sudden-onset severe pain, redness, and swelling in his right big toe. He describes the pain as excruciating, making it difficult to walk or even touch the affected joint. On examination, the joint is warm and tender to palpation. Laboratory investigations reveal an elevated serum uric acid level. What is the most appropriate treatment?

(or)

Which of the following is the most initial management for acute gout?

A. Hot pack application

B. Ice pack application

C. Aspirin administration

D. Steroid injection

---

4. A 65-year-old male with a known history of renal failure presents to the clinic with recurrent episodes of acute gout. He complains of severe pain, redness, and swelling in his left ankle joint. Laboratory investigations reveal elevated serum uric acid levels. What is the most appropriate drug of choice for managing his gout?

(or)

Which of the following is the treatment of choice for managing gout with renal failure?

A. Allopurinol

B. Colchicine

C. Prednisone

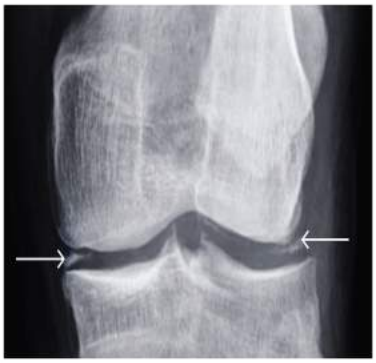
D. Febuxostat

---

5. A 60-year-old male presents with stiffness and limited range of motion in his right knee. On examination, no significant swelling or redness is observed in the affected knee, which is non-tender to palpation. The X-ray image is shown below. The patient undergoes synovial fluid aspiration and microscopic examination of the synovial fluid. What type of crystals is most likely to be seen in this patient's synovial aspirate?

(or)

Which type of crystals is most likely to be seen in the synovial aspirate in a condition whose X-ray image is shown?



A. Monosodium urate (MSU)

B. Cystine

C. Calcium oxalate

D. Calcium pyrophosphate

---

6. A 45-year-old male who works in a battery manufacturing factory presents to the emergency department with joint pain and swelling. He complains of pain in his wrists, knees, and ankles. On examination, there is evidence of joint effusion in multiple joints, including the wrists and knees. Laboratory investigations reveal elevated levels of serum uric acid. What is the diagnosis for the patient?

(or)

Which of the following is caused by a condition that manifesting in those who work in battery manudactirng factories?

A. Gout

B. Pseudogout

C. Rheumatoid arthritis

D. Saturnine gout

---

7. Mr. Smith, a 58-year-old male patient, has been diagnosed with acute lymphoblastic leukemia and is currently undergoing chemotherapy with 6-mercaptopurine. He has a history of chronic gout, and his uric acid levels have been consistently high despite dietary modifications. His physician decides to prescribe allopurinol to manage his chronic gout. What dose adjustment, if any, is required?

(or)

What dose adjustment, if any, is required when combining allopurinol with 6-mercaptopurine?

A. No Change

B. Increase the dose of 6-mercaptopurine

C. Decrease the dose of 6-mercaptopurine

D. Cannot give this combination together

---

8. A 62-year-old woman presented to the hospital experiencing an acute gout attack. Her physician prescribes aspirin for another medical condition. Which of the following doses of aspirin would be appropriate considering her symptoms of an acute gout attack?

(or)

Which of the following doses of aspirin would be appropriate for decreasing Uric acid by inhibiting re - absorption ?

A. Dose > 5 gm/day

B. Dose 2-5 gm/day

C. Dose < 2 gm/day

D. All doses of aspirin have the same effect on uric acid levels

---

9. A 55-year-old male presents with sudden onset joint pain, redness, and swelling in his right big toe. On examination, the affected joint is warm and tender. Laboratory investigations reveal an elevated serum uric acid level. Synovial (joint) aspiration was done to evaluate fluid characteristics and cell count. Which of the following correctly describes the nature of fluid seen in this condition?

(or)

Which of the following correctly describes the nature of fluid seen in acute gout?

A. Turbid or chalky white fluid, increased cell count (2000 - 6000 cells/mm3)

B. Clear fluid, normal cell count (less than 200 cells/mm3)

C. Yellowish fluid, increased cell count (greater than 10,000 cells/mm3)

D. Bloody fluid, decreased cell count (less than 50 cells/mm3)

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	3
Question 3	2
Question 4	4
Question 5	4
Question 6	4
Question 7	3
Question 8	1
Question 9	1

Solution for Question 1:

Correct Option D- Acute gout:

• Acute gout manifests as sudden and severe joint pain, swelling, redness, and tenderness. It commonly affects the big toe but also other joints like the ankle, knee, wrist, or elbow.

• It occurs due to the buildup of uric acid crystals in the joints, triggered by consuming purine-rich foods such as red meat, organ meats, certain seafood, or excessive alcohol consumption.

• During an acute attack, the affected joint becomes extremely sensitive, with pain described as throbbing or excruciating, even the slightest touch can cause discomfort, and the joint may appear red, swollen, and warm.

• Joint aspiration is commonly performed, where fluid is withdrawn and examined for uric acid crystals under a microscope.

• Medications like NSAIDs, corticosteroids, or colchicine are used to manage symptoms during an attack.

• Lifestyle modifications play a crucial role in managing gout, including avoiding trigger foods high in purines and limiting alcohol intake to reduce uric acid levels in the blood.

• In some cases, medications like allopurinol or febuxostat are prescribed to lower uric acid levels and prevent recurrent attacks by inhibiting its production or increasing its excretion.

Incorrect Options:

Option A - Cellulitis: This option is incorrect. Although acute gout can mimic cellulitis due to the presen ce of redness, tenderness, and warmth, the history of sudden-onset severe pain, along with the patient' s risk factors (e.g., hypertension, hyperuricemia), points towards acute gout as the more likely cause.

Option B - Osteoarthritis: This option is incorrect. While osteoarthritis can cause joint pain and swelling, acute gout typically presents with sudden-onset severe pain, redness, and warmth in a joint, especially the big toe (podagra), which is not typical of osteoarthritis.

Option C - Rheumatoid arthritis: This option is incorrect. Rheumatoid arthritis is characterized by symm etrical joint involvement and typically affects multiple joints, whereas acute gout commonly presents wit h monoarticular involvement, often starting in the big toe.

Solution for Question 2:

Correct Option C - Gout with monosodium urate crystal deposition:

• The "Martel sign" is a radiographic finding associated with gout, a type of inflammatory arthritis caused by the deposition of urate crystals in the joints.

• In gout, the Martel sign refers to the appearance of a sharply outlined triangular or V-shaped opacity adjacent to the bone cortex at the joint margin, typically seen on X-rays of affected joints.

• This sign is most commonly observed in the first metatarsophalangeal joint (big toe), a common site of gouty arthritis. The triangular opacity represents the deposition of urate crystals within the soft tissues adjacent to the bone.

• The presence of the Martel sign on X-ray, along with clinical symptoms and other imaging findings, can help diagnose gout.

• However, it is important to note that the absence of the Martel sign does not exclude the diagnosis of gout, as it may not always be present or visible in all cases.

• Other imaging modalities, such as ultrasound or MRI, can also aid in the diagnosis of gout and may reveal findings not seen on X-ray.

Incorrect Options:

Option A - Osteoarthritis with tophi formation: Osteoarthritis is a degenerative joint disease characteriz ed by the breakdown of joint cartilage, while tophi formation is typically seen in gout.

Option B - Rheumatoid arthritis with joint erosions: Rheumatoid arthritis is an autoimmune condition tha t primarily affects the joints, but it is characterized by symmetrical joint involvement and specific rheum atoid factor and anti-cyclic citrullinated peptide (anti-CCP) antibody testing. Joint erosions are a hallmark feature of rheumatoid arthritis, but they are not specific to gout.

Option D - Septic arthritis with joint effusion: Septic arthritis is an infection of the joint caused by bacteri a or other pathogens. It typically presents with a hot, swollen, and acutely painful joint, along with syste mic signs of infection. Joint effusion (fluid accumulation) is a common feature, but it is not specific to gout.

Solution for Question 3:

Correct Option B - Ice pack application:

• The above clinical vignette points towards the diagnosis of acute gout, and the most appropriate initial treatment for the patient is ice pack application.

• This is the correct treatment of choice. Applying an ice pack to the affected joint can help reduce swelling and inflammation and provide pain relief in acute gout. In addition, NSAIDs are most important for managing these patients.

Medication

Considerations/Notes

Ice packs

Apply to reduce swelling and inflammation, avoid hot packs

COX-1 inhibitors

Use indomethacin or naproxen for pain relief, but monitor for gastritis

Hypersensitivity to painkillers

Some patients may have allergies or adverse reactions, such as rashes or breathing problems

COX-2 inhibitors

Alternative option if there is intolerance to COX-1 inhibitors, but less effective

Steroids

Consider use in patients hypersensitive to painkillers, anti-inflammatory effect

Colchicine

Can be used after 2-3 days, but watch for diarrhea as a side effect

Aspirin

Contraindicated in acute gout due to potential worsening of symptoms

Allopurinol

Used for chronic gout, contraindicated in acute gout

Incorrect Options:

Option A - Hot pack application: Applying a
hot pack can actually worsen the symptoms in acute gout by increasing inflammation and pain.

Option C - Aspirin administration: Aspirin is contraindicated in acute gout because it can interfere with t he excretion of uric acid and potentially worsen the condition.

Option D - Steroid injection: Steroid injections can provide significant anti-inflammatory effects and pain relief in acute gout, particularly in patients who are hypersensitive to other pain medications or have co ntraindications to NSAIDs. However, they are not the first-line treatment and are typically reserved for c ases where other options have failed or are not feasible.

Solution for Question 4:

Correct Option D - Febuxostat:

• Febuxostat is a xanthine oxidase inhibitor that reduces uric acid production and is considered a suitable alternative to allopurinol in patients with renal impairment. Unlike allopurinol, febuxostat does

not require dose adjustment based on renal function.

• Therefore, it is the most appropriate drug of choice for managing gout in this patient with renal failure.

• Before initiating treatment with febuxostat, acute gout should be managed. The use of xanthine oxidase inhibitors is contraindicated during a gout flare-up due to the possibility of worsening of the acute condition.

Information

Summary

Treatment initiation

Start hypouricemic therapy when the patient's condition improves

Tophi disappearance

Continue therapy until tophi completely disappear

Uric acid levels

Maintain normal uric acid levels for 6 consecutive months

Dietary considerations

Limit non-vegetarian food and control purine intake

Weight management

Control weight to support management of gout symptoms

Diuretic adjustment

Adjust diuretic dosage or switch to calcium channel blockers, if necessary

24-hour urinary uric acid levels

Evaluate levels to determine if the patient is an overproducer or under excretor of uric acid

Incorrect Options:

Option A - Allopurinol: Allopurinol is a commonly used medication for managing gout by reducing uric acid production. However, it is metabolized in the liver and excreted by the kidneys. In patients with renal failure, the dosage of allopurinol needs to be adjusted due to the increased risk of adverse effects and toxicity.

Option B - Colchicine: Colchicine is an anti-inflammatory medication used for the treatment of acute gout attacks. However, it is primarily metabolized in the liver and eliminated by the kidneys. In patients with renal failure, colchicine can accumulate and lead to increased toxicity. Therefore, it is not the ideal choice in this scenario.

Option C - Prednisone: Prednisone is a corticosteroid that can be used to manage acute gout attacks by reducing inflammation. It is not specifically contraindicated in patients with renal failure. However, it is not the drug of choice for long-term management of gout in these patients.

Solution for Question 5:

Correct Option D - Calcium pyrophosphate:

• Pseudogout, also known as calcium pyrophosphate deposition disease (CPPD), is a condition characterized by the deposition of calcium pyrophosphate crystals in the joints.

• Chondrocalcinosis: This term refers to the presence of calcium deposits within the cartilage of joints, which is a hallmark feature of pseudogout.

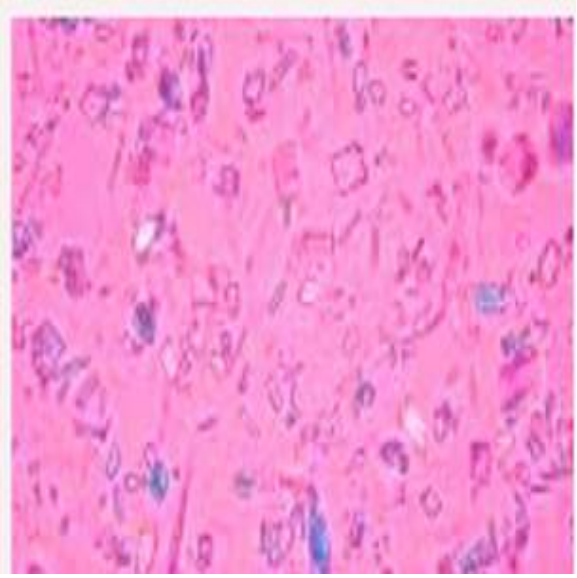
• On X-rays, chondrocalcinosis may appear as linear or punctate calcifications within the joint space. Commonly affected joints include the knees, wrists, hips, and shoulders.

• Other findings include joint space narrowing and subchondral cysts.

• Calcium pyrophosphate crystals are the crystals that are characteristic of pseudogout.

Needle Like

Rhomboid



Incorrect Options:

Option A - Monosodium urate (MSU): Monosodium urate crystals are typically seen in gout, which is ch aracterized by the deposition of uric acid crystals in joints and surrounding tissues. These crystals app ear as needle-shaped crystals with negative birefringence under polarized microscopy.

Option B - Cystine: Cystine crystals are associated with a genetic disorder called cystinuria, which lead s to the formation of cystine kidney stones. However, cystine crystals are not commonly observed in sy novial fluid, so this option is not applicable.

Option C - Calcium oxalate: Calcium oxalate crystals are commonly associated with kidney stones and are not typically seen in synovial fluid in the context of acute joint inflammation. Therefore, this option is not relevant to the given clinical scenario.

Solution for Question 6:

Correct Option D - Saturnine gout:

• Saturnine gout, also known as lead-induced gout, is a condition characterized by developing gout symptoms due to chronic lead exposure. When lead exposure is the underlying cause of gout, it is referred to as saturnine gout.

• Individuals working in battery manufacturing units are at risk of exposure to lead.

• Lead exposure can disrupt the normal metabolism of uric acid in the body, leading to elevated levels of uric acid in the blood. This excess uric acid can then crystallize in the joints, particularly in the big toe, causing intense pain, swelling, redness, and stiffness, characteristic of gout attacks.

• Clinical manifestations of lead toxicity: abdominal pain, joint/muscle aches, fatigue, cognitive deficits, and hypertension.

• Acute toxicity may present as "lead colic" and irritability, while chronic exposure can lead to anemia, neurocognitive decline, tremors, and kidney damage.

Incorrect Options:

Option A - Gout: Gout is a form of inflammatory arthritis caused by the deposition of urate crystals in th e joints. It typically presents with sudden onset, severe joint pain, redness, and swelling. Gout is not th e most likely condition in this scenario as lead poisoning is the main focus.

Option B - Pseudogout: Pseudogout, also known as calcium pyrophosphate deposition disease, is char acterized by the deposition of calcium pyrophosphate crystals in the joints. It can cause acute joint pain , swelling, and inflammation, similar to gout. However, in this specific scenario, the symptoms are asso ciated with lead poisoning, making pseudogout less likely.

Option C - Rheumatoid arthritis: Rheumatoid arthritis is an autoimmune condition that causes chronic i nflammation in the joints, leading to joint pain, swelling, and stiffness. It is not directly related to lead po isoning and is less likely to cause joint symptoms in this scenario.

Solution for Question 7:

Correct Option C - Decrease the dose of 6-mercaptopurine:

• Allopurinol can enhance the effects of immunosuppressive drugs like 6-mercaptopurine (6-MP) and azathioprine, as they are partly metabolized by xanthine oxidase.

• Thus, it is generally recommended to avoid allopurinol in patients taking these medications.

• In cases where severe gout necessitates allopurinol use, azathioprine doses are often reduced by at least 50% while closely monitoring white blood cell counts.

• However, many patients eventually need to discontinue azathioprine. In some cases, switching from azathioprine to mycophenolate, which does not interact with allopurinol, might be considered an alternative treatment option.

Incorrect Options:

Option A - No Change: This option is not correct because when allopurinol is added to the treatment regimen, it inhibits xanthine oxidase, which can lead to an increase in the concentration of 6-mercaptopurine. This can result in 6-mercaptopurine toxicity, which may be harmful to the patient.

Option B - Increase the dose of 6-mercaptopurine: This option is not correct because, as mentioned earlier, combining allopurinol with 6-mercaptopurine can increase the concentration of 6-mercaptopurine in the body. Increasing the dose would only exacerbate the risk of toxicity.

Option D - Cannot give this combination together: This option is not correct. While the combination of allopurinol and 6-mercaptopurine requires careful management due to potential drug interactions, it is not an absolute contraindication. With appropriate dose adjustments, this combination can be used safely and effectively to manage chronic gout and the underlying condition (ALL).

Solution for Question 8:

Correct Option A - Dose > 5 gm/day:

• This option is correct. During an acute gout episode, high doses of aspirin (> 5 gm/day) can decrease uric acid levels by inhibiting the reabsorption of uric acid in the kidneys. This effect may be beneficial in managing acute gout, as it helps in reducing uric acid levels in the blood and mitigating gout symptoms.

This option is correct. During an acute gout episode, high doses of aspirin (> 5 gm/day) can decrease uric acid levels by inhibiting the reabsorption of uric acid in the kidneys. This effect may be beneficial in managing acute gout, as it helps in reducing uric acid levels in the blood and mitigating gout symptoms.

Incorrect Options:

Option B - Dose 2-5 gm/day: This option is incorrect. At doses between 2 and 5 gm/day, aspirin has no significant effect on uric acid levels. It neither increases nor decreases uric acid levels during an acute gout episode.

Option C - Dose < 2 gm/day: This option is incorrect. Lower doses of aspirin (< 2 gm/day) can increase uric acid levels by inhibiting the secretion of uric acid in the kidneys. Prescribing such doses during an acute gout episode might lead to higher uric acid levels in the blood, potentially worsening the gout symptoms.

Option D - All doses of aspirin have the same effect on uric acid levels: This option is incorrect. Aspirin's effect on uric acid levels varies depending on the dose. Higher doses (> 5 gm/day) decrease uric acid levels by inhibiting reabsorption, while lower doses (< 2 gm/day) can increase uric acid levels by inhibiting secretion, especially during an acute gout episode.

Solution for Question 9:

Correct Option A - Turbid or chalky white fluid, increased cell count (2000 - 6000 cells/mm3):

• Synovial (joint) aspiration is the investigation of choice to confirm the diagnosis of gout.

• The synovial fluid in gout typically appears turbid or chalky white due to the presence of monosodium urate crystals.

• Additionally, there is an increased cell count, ranging from 2000 to 6000 cells/mm3, indicating inflammation in the joint.

Parameter

Normal Findings

Non-Inflammatory

Inflammatory

Septic

Haemarthrosis

Colour

Colourless

Straw-like/Yellow

Yellow

Yellow/Green

Red/Xanthochromic

Clarity

Translucent

Cloudy

Cloudy/Opaque

Bloody/Variable

Viscosity

↑

↓

Variable

WBC Count

<2000 cells/mm³

200-2000 cells/mm³

2000-50,000 cells/mm³

>50,000 cells/mm³

Neutrophil Count

<25%

>50%

>75%

50-75%

Gram Stain

Negative

Positive

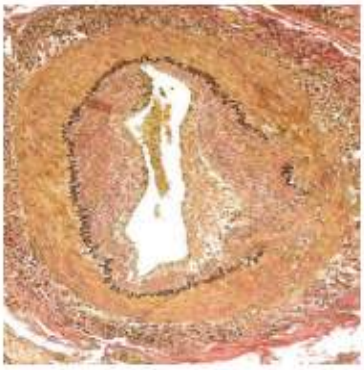
Crystals

Incorrect Options:

Option B, C, D: Synovial fluid aspiration will appear as turbid or chalky fluid in gout.

Vasculitis

1. A 70-year-old male presents to the clinic due to stiffness and pain in his shoulders and hips for the past few weeks. He feels fatigued, has a low-grade fever, and also complains of persistent throbbing right-sided headache and jaw pain. On physical examination, a nodular swelling along the temporal artery is noted. HPE image from his temporal artery biopsy is shown. What is the treatment of choice?



A. Nonsteroidal anti-inflammatory drugs (NSAIDs)

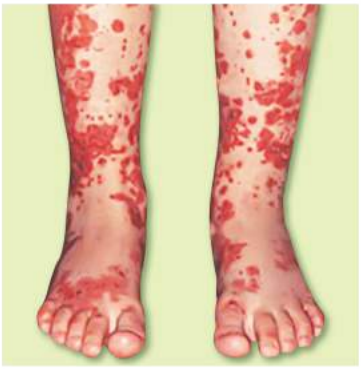
B. High-dose glucocorticoids (Steroids)

C. Disease-modifying antirheumatic drugs (DMARDs)

D. Acetaminophen (Paracetamol)

---

2. A 10-year-old child presents with a red raised rash on the buttocks and legs. The mother reports that the child also has joint pains, abdominal pain, and fresh blood in the stool yesterday. Laboratory investigations reveal elevated levels of IgA. What is the most likely diagnosis?



A. Henoch-Schonlein Purpura (HSP)

B. Idiopathic Thrombocytopenic Purpura (ITP)

C. Amyloidosis

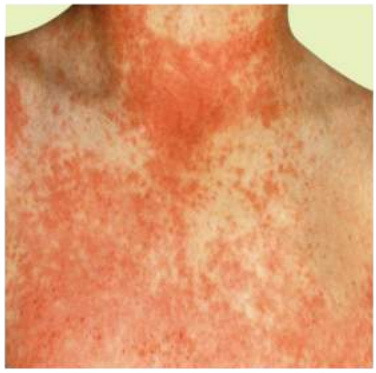
D. Berger's Disease

---

3. A 6-year-old child presents with a sore throat, fever, and a skin rash. Oral examination shows erythematous, enlarged tonsils. The skin rash is a blanching, papular rash that lacks confluence. Which of the following is the most likely diagnosis?

(or)

Which of the following causes erythematous enlarged tonsils and a blanching, papular skin rash that lacks confluence (shown in the image)?



A. Scarlet Fever

B. Kawasaki Disease

C. Measles

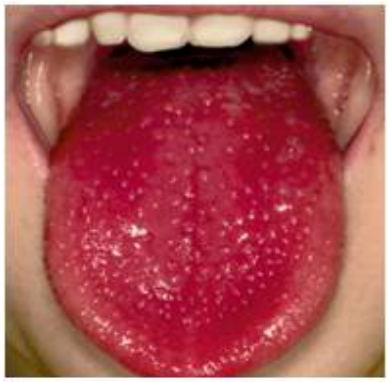
D. Hand, Foot, and Mouth Disease

---

4. A 3-year-old child is brought to the pediatric clinic with a high fever for the past five days. His parents noticed redness in the child's eyes and a rash on the body. On examination, the physician observes unilateral lymph node enlargement in the cervical region. The child's tongue appears to have a distinct appearance. What is the most likely diagnosis for this child's condition?

(or)

Which of the following is the most common vasculitis that leads to death in children?



A. Scarlet Fever

B. Kawasaki Disease (Mucocutaneous Lymph node Syndrome)

C. Measles

D. Rubella (German Measles)

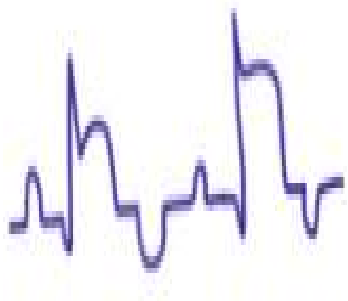
---

5. A 3-year-old child presents with persistent fever (>5 days), bilateral conjunctival injection, strawberry tongue, scarlet rash, and desquamation (peeling) of the skin on the palms and soles. The child also

complains of chest pain. On further evaluation, echocardiography reveals coronary artery vasculitis. The ECG findings are given below. What is the most appropriate treatment for this patient?

(or)

Which of the following is the most appropriate treatment for Kawasaki Disease?



A. Intravenous immunoglobulin (IVIG)

B. Percutaneous coronary intervention

C. Thrombolysis

D. Unfractionated heparin (UFH)

---

6. A 22-year-old female from India presents with symptoms of arm claudication and a significant difference in blood pressure between her left and right arms. On further evaluation, she is found to have renal artery stenosis. Which of the following is the most likely diagnosis?

(or)

Which of the following can cause a disparity of blood pressure between the left arm and right arm with associated renal artery stenosis?

A. Atherosclerosis of the renal artery

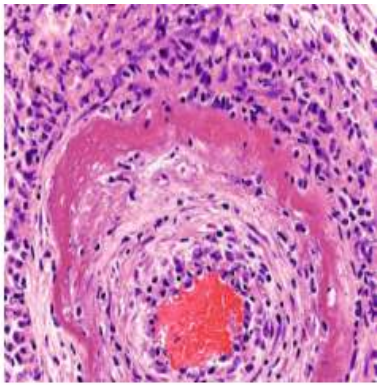
B. Fibromuscular dysplasia (FMD)

C. Takayasu arteritis

D. Coarctation of the aorta

---

7. A 45-year-old woman visits the clinic with complaints of abdominal pain, fever, and skin lesions. She reports experiencing muscle aches, joint pain, and fatigue for the past few weeks. On examination, palpable skin nodules, particularly on the lower extremities, are noted. The biopsy of a skin lesion is shown in the image. Which of the following statements about the patient's condition is incorrect?



A. It is associated with medium vessel involvement.

B. The most common vessel affected is the renal vessel.

C. The patient's condition is most likely Rheumatoid Arthritis.

D. The microscopic image cue shows segmental, transmural fibrinoid necrosis.

---

8. A 30-year-old female presents with recurrent episodes of epistaxis, sinusitis, and nasal ulcers. She also complains of hematuria and has lung lesions in the form of multiple cavities on chest imaging. Laboratory tests reveal the presence of c-ANCA antibodies. Which of the following is the most likely diagnosis?

(or)

Which of the following is associated with the presence of c-ANCA antibodies?

A. Granulomatosis with polyangiitis (Wegener's granulomatosis)

B. Microscopic polyangiitis

C. Polyarteritis nodosa

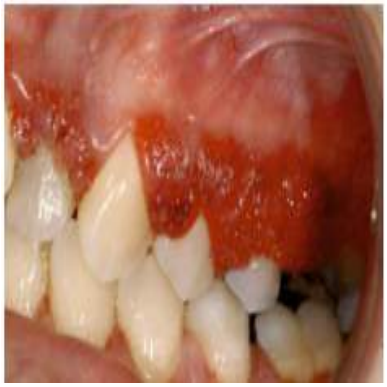
D. Churg-Strauss syndrome

---

9. A 30-year-old male presents to the rheumatology clinic with complaints of recurrent sinus infections, cough, and occasional coughing up of blood. He also reports experiencing joint pain and swelling in his knees and ankles. On examination, the physician notices small, red, and swollen gums with a characteristic appearance. Which organ system does the limited form of this condition involve?

(or)

Which organ system is involved in the limited form of Wegener's Granulomatosis?



A. Respiratory System

B. Musculoskeletal System

C. Gastrointestinal System

D. Nervous System

---

10. A 30-year-old male patient presents with recurrent painful oral aphthous ulcers, scrotal ulcers, and hypopyon in the eye. Upon further evaluation, the patient is found to be HLA B5 positive. Which of the following is the most likely diagnosis?

(or)

HLA B5 positivity is seen in which of the following?

A. Behcet's Disease

B. Crohn's Disease

C. Herpes Simplex Virus Infection

D. Systemic Lupus Erythematosus

---

11. A 52-year-old male patient presents to the clinic with complaints of joint pain, cough, and progressive fatigue over the past few weeks. On examination, you note purpura and petechiae on the patient's lower extremities. Laboratory investigations show elevated creatinine levels and a positive P-ANCA. Urinalysis reveals proteinuria and hematuria. What is the most likely diagnosis?

(or)

Which of the following is associated with p-ANCA?

A. Polyarteritis Nodosa (PAN)

B. Wegener's Granulomatosis (Granulomatosis with Polyangiitis)

C. Microscopic Polyangiitis (MPA)

D. Henoch-Schönlein Purpura (HSP)

---

12. A 62-year-old male with a history of poorly controlled hypertension presents to the emergency department with sudden, excruciating chest pain radiating to the back. His blood pressure is 190/110 mmHg, and he appears diaphoretic. An urgent CT angiogram is performed, which reveals a tear in the intima of the aorta near the aortic root and the ascending aorta. Based on the location of the tear, what

is the most likely classification of this aortic dissection?

(or)

If there is a tear in the intima of the aorta near the aortic root and the ascending aorta, what is the most likely classification of this aortic dissection?

A. Stanford A/DeBakey 1

B. Stanford A/DeBakey 2

C. Stanford B/DeBakey 3

D. Stanford C/DeBakey 4

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	1
Question 3	1
Question 4	2
Question 5	1
Question 6	3
Question 7	3
Question 8	1
Question 9	1
Question 10	1
Question 11	3
Question 12	1

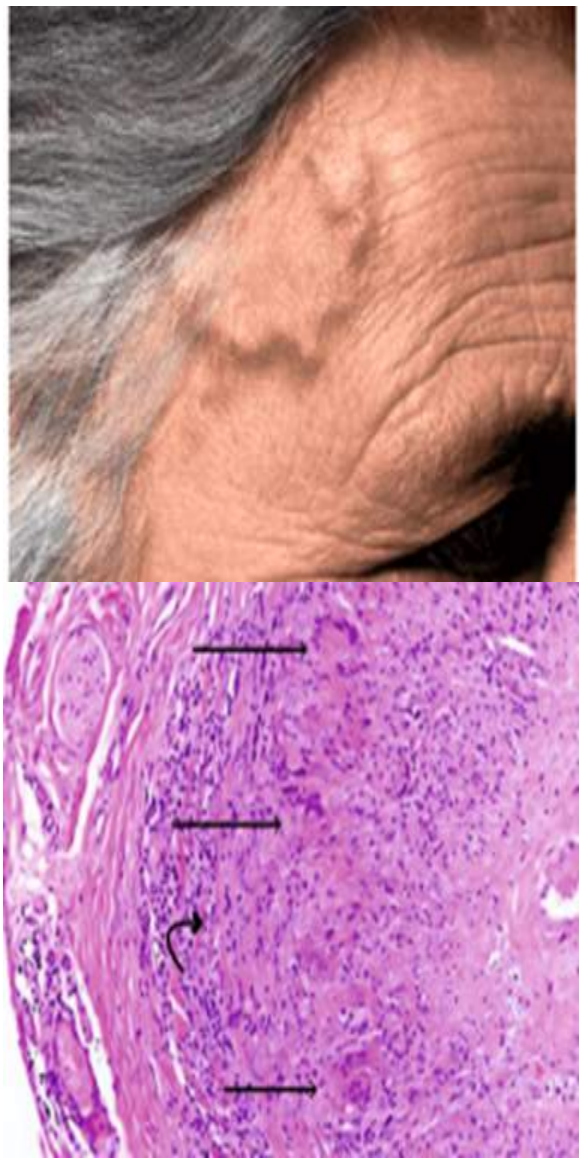
Solution for Question 1:

Correct Option B - High-dose glucocorticoids (Steroids):

• The above clinical scenario along with the biopsy image of fragmentation of internal elastic lamina, is diagnostic of Temporal Arteritis.

• Temporal Arteritis or Giant Cell Arteritis causes unilateral headache, temporal artery tenderness, and jaw claudication.

• Histology shows focal granulomatous inflammation with giant cells (black arrows in the image below).



• Polymyalgia rheumatica is an important association that manifests as pain and stiffness in proximal muscles (shoulders and hips), often with fever, and weight loss.

• The treatment of choice for Temporal Arteritis is high-dose systemic glucocorticoids. Treatment should begin with prednisone 40–60 mg/d for ~1 month, followed by a gradual tapering. When ocular signs and symptoms occur, consideration should be given to using methylprednisolone 1000 mg daily for 3 days to protect the remaining vision. Symptom recurrence during prednisone tapering develops in 60–85% of patients with giant cell arteritis, requiring a dosage increase.

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• When ocular signs and symptoms occur, consideration should be given to using methylprednisolone 1000 mg daily for 3 days to protect the remaining vision.

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• When ocular signs and symptoms occur, consideration should be given to using methylprednisolone 1000 mg daily for 3 days to protect the remaining vision.

• Symptom recurrence during prednisone tapering develops in 60–85% of patients with giant cell arteritis, requiring a dosage increase.

Incorrect Options:

Option A - Nonsteroidal anti-inflammatory drugs (NSAIDs): While NSAIDs are commonly used to relieve pain and inflammation, they are not the treatment of choice for Temporal Arteritis (Giant Cell Arteritis) with Polymyalgia Rheumatica. These conditions require more potent and specific therapy.

Option C - Disease-modifying antirheumatic drugs (DMARDs): DMARDs are typically used in the management of autoimmune conditions like rheumatoid arthritis. While Polymyalgia Rheumatica may have overlapping features with rheumatoid arthritis, DMARDs are not the primary treatment for Temporal Arteritis.

Option D - Acetaminophen (Paracetamol): Acetaminophen is an analgesic and antipyretic medication commonly used to manage pain and fever. However, it is not the treatment of choice for Temporal Arteritis (Giant Cell Arteritis) with Polymyalgia Rheumatica, as it does not address the underlying inflammatory process.

Solution for Question 2:

Correct Option A - Henoch-Schonlein Purpura (HSP):

• This child exhibits classic signs and symptoms of Henoch-Schonlein Purpura, or IgA vasculitis, a complex immune-mediated vasculitis characterized by the involvement of small blood vessels in various organ systems. It is the most common childhood systemic vasculitis.

• It primarily affects the small vessels of the joints, kidneys, gastrointestinal tract, skin, and, in rare instances, the central nervous system and lungs.

• Diagnostic Criteria - The presence of two of four criteria is required: Palpable purpura on buttocks/legs Bowel angina (abdominal pain with/without intussusception) Diagnostic biopsy showing histological changes Pediatric age group (age < 20 years at onset)

• Palpable purpura on buttocks/legs

• Bowel angina (abdominal pain with/without intussusception)

• Diagnostic biopsy showing histological changes

• Pediatric age group (age < 20 years at onset)

• It is often associated with IgA nephropathy.

• Diagnosis is clinical and skin biopsy specimens can be useful in confirming leukocytoclastic vasculitis with IgA and C3 deposition by immunofluorescence.

• Most children recover with supportive care only; unresponsive patients are treated with corticosteroids.

• Palpable purpura on buttocks/legs

• Bowel angina (abdominal pain with/without intussusception)

• Diagnostic biopsy showing histological changes

• Pediatric age group (age < 20 years at onset)

Incorrect Options:

Option B) - Idiopathic Thrombocytopenic Purpura (ITP): This condition presents with thrombocytopenia (low platelet count) and purpura. It does not typically involve gastrointestinal symptoms or joint pain. Elevated IgA levels are not associated with ITP.

Option C - Amyloidosis: Amyloidosis can present with pinch purpura, which is not seen in this case. Gastrointestinal symptoms are possible but joint pain is less likely. Elevated IgA levels are not typically associated with amyloidosis.

Option D - Berger's Disease: While elevated IgA levels are seen in Berger's disease (IgA nephropathy), it primarily affects the kidneys, leading to renal symptoms such as hematuria and proteinuria. Cutaneous involvement and gastrointestinal symptoms are not typical of Berger's disease.

Solution for Question 3:

Correct Option A - Scarlet Fever:

• The rash described in the clinical scenario is characteristic of scarlet fever.

• Scarlet fever manifests as a skin rash most commonly associated with bacterial pharyngitis in school-age and adolescent children.

• It is a blanching, papular rash that is classically described as a “sandpaper” rash. The lack of confluence of the lesions is the primary reason it feels like sandpaper.

• Streptococcus pyogenes group A is the causative bacteria, generating an endotoxin mainly responsible for the skin manifestation of the infection.

• Other clinical features: Pastia lines along flexural areas with mild desquamation Strawberry tongue Circumoral pallor Bilateral cervical lymphadenopathy

• Pastia lines along flexural areas with mild desquamation

• Strawberry tongue

• Circumoral pallor

• Bilateral cervical lymphadenopathy

• Treatment is with ampicillin.

• Pastia lines along flexural areas with mild desquamation

• Strawberry tongue

• Circumoral pallor

• Bilateral cervical lymphadenopathy

Incorrect Options:

Option B - Kawasaki Disease: Kawasaki Disease can present with a rash and fever, but it is typically associated with prolonged high fever, swollen lymph nodes, and specific mucocutaneous changes such as strawberry tongue. Enlarged, red tonsils are not specific to Kawasaki Disease.

Option C - Measles: Measles presents with a characteristic maculopapular rash that typically starts on the face and spreads to the rest of the body. A sore throat and enlarged tonsils can also be present, but the sandpaper-like rash described in the scenario is not typical of measles.

Option D - Hand, Foot, and Mouth Disease: Hand, Foot, and Mouth Disease is characterized by a rash on the hands, feet, and inside the mouth. Sore throat and fever can be present, but the sandpaper-like rash and enlarged tonsils described in the scenario are not typical of Hand, Foot, and Mouth Disease.

Solution for Question 4:

Correct Option B - Kawasaki Disease (Mucocutaneous Lymph node Syndrome):

• The clinical scenario is consistent with Kawasaki Disease. It is a vasculitis primarily affecting young children, typically under the age of 5 years.

• In addition to fever, four of the five criteria need to be present: Conjunctivitis Rashes Edema Lymphadenopathy (mostly unilateral & cervical region) Mucosal Involvement (Strawberry Tongue)

• Conjunctivitis

• Rashes

• Edema

• Lymphadenopathy (mostly unilateral & cervical region)

• Mucosal Involvement (Strawberry Tongue)

• Anti-endothelial cell antibodies are positive.

• Treatment: Intravenous immunoglobulin (IVIG) + Aspirin High-dose IV γ-globulin (2 g/kg as a single infusion over 10 h) together with aspirin (100 mg/kg/d for 14 days followed by 3–5 mg/kg per day for several weeks) has been shown to be effective in reducing the prevalence of coronary artery abnormalities when administered early in the course of the disease.

• High-dose IV γ-globulin (2 g/kg as a single infusion over 10 h) together with aspirin (100 mg/kg/d for 14 days followed by 3–5 mg/kg per day for several weeks) has been shown to be effective in reducing the prevalence of coronary artery abnormalities when administered early in the course of the disease.

• Complications include coronary microaneurysms, pericarditis, myocarditis, myocardial ischemia and infarction, and cardiomegaly.

• It is the most common vasculitis that leads to death in the affected age group.

• Conjunctivitis

• Rashes

• Edema

• Lymphadenopathy (mostly unilateral & cervical region)

• Mucosal Involvement (Strawberry Tongue)

• High-dose IV γ-globulin (2 g/kg as a single infusion over 10 h) together with aspirin (100 mg/kg/d for 14 days followed by 3–5 mg/kg per day for several weeks) has been shown to be effective in reducing the prevalence of coronary artery abnormalities when administered early in the course of the disease.

Incorrect Options:

Option A - Scarlet fever: Scarlet fever is caused by Group A
Streptococcus bacteria and typically presents with a sandpaper-like rash, fever, and sore throat. While it may cause changes in the tongue, it does not specifically present with "Strawberry Tongue," as seen in the image cue.

Option C - Measles: Measles, caused by the measles virus, is characterized by a high fever, cough, coryza, conjunctivitis, and a characteristic maculopapular rash that starts on the face and spreads downward. While it may cause changes in the oral mucosa, "Strawberry Tongue" is not a specific finding in measles.

Option D - Rubella (German Measles): Rubella is caused by the rubella virus and is usually a milder infection compared to measles. It presents with a rash that starts on the face and spreads to the trunk and extremities. Like measles, it may cause oral mucosal changes, but "Strawberry Tongue" is not a characteristic finding in rubella.

Solution for Question 5:

Correct Option A - Intravenous immunoglobulin (IVIG):

• Intravenous immunoglobulin (IVIG): Correct. IVIG is the most appropriate treatment for Kawasaki Disease, especially when coronary artery vasculitis is present. IVIG helps reduce inflammation and prevent coronary artery damage. It is the standard of care for Kawasaki Disease.

Incorrect Options:

Option B - Percutaneous coronary intervention: Percutaneous coronary intervention, which involves the use of stents or balloon angioplasty, is not the primary treatment for Kawasaki Disease. It is not indicated for the management of coronary artery vasculitis associated with the condition.

Option C - Thrombolysis: Thrombolysis, the use of medications to dissolve blood clots, is not the appropriate treatment for Kawasaki Disease. It is mainly used in the management of acute myocardial infarction caused by coronary artery blockages, which is not the primary concern in this scenario.

Option D - Unfractionated heparin (UFH): Unfractionated heparin (UFH), a blood thinner, is not the mainstay of treatment for Kawasaki Disease or coronary artery vasculitis associated with the condition. It is primarily used in other clinical situations, such as deep vein thrombosis or pulmonary embolism.

Solution for Question 6:

Correct Option C - Takayasu arteritis:

• In this scenario, the most likely diagnosis is Takayasu arteritis.

• Takayasu arteritis is a large-vessel vasculitis commonly affecting young females, particularly from India. It is associated with ostial narrowing of the major arteries, including the renal artery, which can lead to reduced renal blood flow and hypertension.

• Histologically, there is granulomatous thickening and narrowing of the aortic arch and proximal great vessels.

• Clinical features: Weak upper extremity pulses, blood pressure difference between left and right arms Arm claudication Fever, night sweats Arthritis, myalgias Skin nodules Ocular disturbances

• Weak upper extremity pulses, blood pressure difference between left and right arms

• Arm claudication

• Fever, night sweats

• Arthritis, myalgias

• Skin nodules

• Ocular disturbances

• Investigations: MR angiography is the investigation of choice, and helps stage the disease distribution. CT angiography can also be done.

• Initial treatment of symptomatic Takayasu arteritis begins with corticosteroids.

• Surgical revascularization is required in a few patients.

• Weak upper extremity pulses, blood pressure difference between left and right arms

• Arm claudication

• Fever, night sweats

• Arthritis, myalgias

• Skin nodules

• Ocular disturbances

Incorrect Options:

Option A - Atherosclerosis of the renal artery: While atherosclerosis can cause renal artery stenosis, it t ypically occurs in older individuals, especially those with a history of smoking. In atherosclerosis, the e ntire length of the blood vessel narrows, whereas in Takayasu arteritis, only the ostium narrows.

Option B - Fibromuscular dysplasia (FMD): FMD is another cause of renal artery stenosis, typically see n in young females living in the USA. It is characterized by abnormal cell growth within the arterial wall, leading to narrowing. However, in this scenario, the clinical features (arm claudication, significant bloo d pressure difference) and the patient's origin (India) are more suggestive of Takayasu arteritis.

Option D - Coarctation of the aorta: Coarctation of the aorta is a congenital heart defect characterized by narrowing of the aorta, typically near the insertion of the ductus arteriosus. It causes a difference in blood pressure between the arms and legs, with higher blood pressure in the arms. However, this cond ition is usually diagnosed in childhood or early adulthood and is not associated with renal artery stenosi s.

Solution for Question 7:

Correct Option C - The patient's condition is most likely Rheumatoid Arthritis:

• The clinical scenario and the microscopic image cue described are consistent with Polyarteritis Nodosa (PAN), not Rheumatoid Arthritis.

• Segmental, transmural fibrinoid necrosis on histopathological examination. Clinical manifestations related to organ system involvement in PAN: Renal - Renal failure, hypertension Musculoskeletal - Arthritis, arthralgia, myalgia PNS- Peripheral neuropathy, mononeuritis multiplex GIT- Abdominal pain, nausea and vomiting, bleeding, bowel infarction Skin - Rash, purpura, nodules, cutaneous infarcts, livedo reticularis, Raynaud’s phenomenon Cardiac - Congestive heart failure, myocardial infarction, pericarditis CNS- Cerebral vascular accident, altered mental status, seizures

• Clinical manifestations related to organ system involvement in PAN:

• Renal - Renal failure, hypertension

• Musculoskeletal - Arthritis, arthralgia, myalgia

• PNS- Peripheral neuropathy, mononeuritis multiplex

• GIT- Abdominal pain, nausea and vomiting, bleeding, bowel infarction

• Skin - Rash, purpura, nodules, cutaneous infarcts, livedo reticularis, Raynaud’s phenomenon

• Cardiac - Congestive heart failure, myocardial infarction, pericarditis

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• Skin - Rash, purpura, nodules, cutaneous infarcts, livedo reticularis, Raynaud’s phenomenon

• Cardiac - Congestive heart failure, myocardial infarction, pericarditis

• CNS- Cerebral vascular accident, altered mental status, seizures

Incorrect Options:

Option A - It is associated with medium vessel involvement: PAN is characterized by inflammation of m edium-sized vessels, leading to multiple organ involvement.

Option B - The most common vessel affected in PAN is the renal vessel: While PAN can affect various medium-sized vessels, the renal vessel is commonly involved. However, it does not cause glomerulone phritis.

Option D - The microscopic image cue shows segmental, transmural fibrinoid necrosis: The microscopi c image cue supports the diagnosis of PAN, as it shows the characteristic feature of segmental, transm ural fibrinoid necrosis seen in the affected medium-sized vessels.

Solution for Question 8:

Correct Option A - Granulomatosis with polyangiitis (Wegener's granulomatosis):

• The clinical presentation is highly suggestive of granulomatosis with polyangiitis.

• The presence of c-ANCA antibodies, specifically targeting proteinase-3, further supports this diagnosis.

Clinical Manifestations

Antibodies Involved

Treatment

• Epistaxis

• Sinusitis

• Nasal and tracheal ulceration

• Cavitary lung lesions

• Recurrent episodes of hemoptysis

• Hematuria

• c-ANCA

• Cytoplasmic antigen: Proteinase-3

• Proteinase-3

• Proteinase-3

1. Rituximab

2. Cyclophosphamide

3. Steroids

• Treatment is with corticosteroids in combination with rituximab or cyclophosphamide.

Incorrect Options:

Option B - Microscopic polyangiitis: Microscopic polyangiitis primarily affects the small blood vessels, in cluding the glomerular capillaries. It typically presents with glomerulonephritis, but it is not associated w ith sinusitis, nasal ulcers, or lung cavities.

Option C - Polyarteritis nodosa: Polyarteritis nodosa primarily affects medium-sized blood vessels and i s not typically associated with the upper respiratory tract involvement seen in this patient. It is also not associated with the presence of c-ANCA antibodies.

Option D - Churg-Strauss syndrome: Churg-Strauss syndrome is characterized by asthma, eosinophili a, and systemic vasculitis. Although it can involve the upper and lower respiratory tracts, the presence of nasal ulcers and lung cavities is not typical. Additionally, it is usually associated with a different type of ANCA antibody called p-ANCA.

Solution for Question 9:

Correct Option A - Respiratory System:

• The image shows strawberry gums, a charcateric of GPA.

• Wegener's Granulomatosis (GPA) is a type of vasculitis that typically involves multiple organ systems, including the respiratory system, kidneys, and blood vessels.

• However, in some cases, the disease may be limited to only one specific organ system.

• The limited form involves only the respiratory system, particularly the lungs, and is referred to as "Limited Wegener's Granulomatosis" or "Lung-limited GPA."

• In this limited form, the characteristic granulomatous inflammation is seen primarily in the respiratory tract, and other organ systems are unaffected.

Incorrect Options:

Option B - Musculoskeletal System: MSK involvement in the form of arthralgias is seen in small-vessel vasculitides such as IgA vasculitis, aka Henoch-Schonlein purpura, and mixed cryoglobulinemia.

Option C - Gastrointestinal System: Esophilic granulomatosis with polyangiitis and IgA vasculitis are s mall-vessel vasculitides involving the GI tract.

Option D - Nervous System: Esophilic granulomatosis with polyangiitis and mixed cryoglobulinemia inv olve peripheral nerves, often leading to wrist/foot drops.

Solution for Question 10:

Correct Option A - Behcet's Disease:

• The clinical presentation of recurrent painful oral aphthous ulcers, scrotal ulcers, and hypopyon, along with HLA B5 positivity, is highly suggestive of Behcet's Disease.

• It is a chronic inflammatory disorder that primarily affects populations in Arab countries, China, Turkey, and Mongolia.

Clinical Manifestations

Work Up

Arteries Involved

Treatment

1. Recurrent painful oral aphthous ulcers

2. Recurrent vulvul ulcers

3. Scrotal ulcers

4. Hypopyon (ocularmanifestation)

• Pathergy test (Type IV hypersensitivity reaction)

• HLA B5 positivity

• Pulmonary artery

• Brain blood vessels

• Topical steroids

• IV methylprednisolone

• azathioprine

Incorrect Options:

Option B - Crohn's Disease: Crohn's Disease is a type of inflammatory bowel disease that primarily aff ects the gastrointestinal tract. It can present with oral ulcers, but scrotal ulcers and hypopyon are not c haracteristic features of Crohn's Disease.

Option C - Herpes Simplex Virus Infection: While herpes simplex virus infection can cause oral ulcers, t he recurrent nature of the ulcers, along with the presence of scrotal ulcers and hypopyon, is not consist ent with herpes simplex virus infection alone.

Option D - Systemic Lupus Erythematosus: Systemic Lupus Erythematosus (SLE) is a multisystem aut oimmune disease that can present with various manifestations, including oral ulcers. However, the pre sence of scrotal ulcers and hypopyon in the eye is not typical of SLE.

Solution for Question 11:

Correct Option C - Microscopic Polyangiitis (MPA):

• MPA is a small vessel disorder without hepatitis B involvement.

• It commonly presents with pulmonary involvement, glomerulonephritis, and positive P-ANCA. The presence of leukocytoclastic vasculitis microscopically and the absence of granulomas further support this diagnosis.

Granulomas

Not observed, absence of granuloma formation

Microscopic Finding

Leukocytoclastic vasculitis

Inflammatory Cells

Presence of inflammatory cells (WBCs)

Broken Cells

Presence of broken cells in vessels

Lesion Stages

All lesions typically at the same stages

• Disease onset may be gradual, with initial symptoms of fever, weight loss, and musculoskeletal pain; however, it is often acute.

• Hemoptysis may be the first symptom of alveolar hemorrhage, which occurs in 12% of patients.

• Other manifestations include mononeuritis multiplex, gastrointestinal tract involvement, and cutaneous vasculitis.

Incorrect Options:

Option A - Polyarteritis Nodosa (PAN): PAN primarily involves medium to large vessels and is typically associated with hepatitis B infection. In this clinical scenario, there is no mention of hepatitis B involvement, and the patient presents with symptoms more consistent with small vessel involvement.

Option B - Wegener's Granulomatosis (Granulomatosis with Polyangiitis): Wegener's granulomatosis is characterized by granulomas formation, which is not observed in this patient. Additionally, granulomat osis with polyangiitis usually presents with upper and lower respiratory tract involvement, which is not mentioned in the scenario.

Option D - Henoch-Schönlein Purpura (HSP): HSP typically occurs in children and is characterized by palpable purpura, joint pain, abdominal pain, and renal involvement. While this patient presents with pu rpura, joint pain, and renal involvement, the age of the patient (52-year-old) is not typical for HSP.

Solution for Question 12:

Correct Option A - Stanford A/DeBakey 1:

• In this clinical scenario, the patient's sudden, severe chest pain radiating to the back, along with poorly controlled hypertension, raises suspicion for aortic dissection.

• The CT angiogram revealing a tear in the intima near the aortic root and the ascending aorta indicates involvement of both the ascending and descending aorta, classifying the aortic dissection as Stanford A/DeBakey 1.

Definition

Aortic dissection is a condition with tears in the intima (innermost layer) of the aorta.

Chronic Dissection

Can cause a "Double Barrel Aorta" with both true and false lumens.

Common Cause of Hypertension

Aortic dissection is one of the most common causes of hypertensive emergencies.

Stanford/DeBakey Classification

A system to categorize the affected areas of the aorta:

Stanford A/DeBakey 1

Involves both the ascending and descending aorta.

Stanford A/DeBakey 2

Involves only the ascending aorta.

Stanford B/DeBakey 3

Involves only the descending aorta.

Incorrect Options:

Option B - Stanford A/DeBakey 2: Involves only the ascending aorta. This option is not the correct ans wer because the CT angiogram indicated the tear involves both the ascending and descending aorta, which corresponds to Stanford A/DeBakey 1.

Option C - Stanford B/DeBakey 3: Involves only the descending aorta. This option is not the correct an swer as the CT angiogram showed the tear near the aortic root and the ascending aorta, indicating inv olvement of both the ascending and descending aorta, which corresponds to Stanford A/DeBakey 1.

Option D - Stanford C/DeBakey 4: There is no such classification.

Scleroderma

1. A 55-year-old male presents with red, violet, or purple discoloration of his toes upon exposure to heat. He also experiences itching all over his body during warm baths. Additionally, he reports occasional color changes in his lower limb extremities in response to cold temperatures. Which of the following conditions is most likely responsible for these symptoms?

(or)

Which of the following condition causes erythromelalgia, aquagenic pruritus and Raynaud's phenomenon?

A. Polycythemia vera

B. Deep vein thrombosis (DVT)

C. Systemic lupus erythematosus (SLE)

D. Peripheral artery disease (PAD)

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2. A 31-year-old woman presents with fatigue and difficulty swallowing for 8 weeks. She also complains of painful discoloration in her fingers and toes when exposed to cold weather. She has smoked one pack of cigarettes daily for 3 years. She appears younger than her stated age. Physical examination shows smooth, swollen fingers with small white calcifications on the fingertips of both hands. Which of the following features will definitely be seen in this patient?

(or)

Which of the following is most likely present in a woman with fatigue, dysphagia, painful finger discoloration when exposed to cold, small calcifications on fingertips?

A. Tetany

B. Swan neck deformity

C. Sclerodactyly

D. Oesophagal atresia

---

3. Which of the following is the treatment of choice for managing hypertension in a patient with features such as Raynaud's phenomenon, skin thickening, and dilated blood vessels presenting with a progressive increase in blood pressure and reduced glomerular filtration rate (GFR)?

(or)

Which of the following is the treatment of choice for scleroderma crisis?

A. Beta-blocker

B. Calcium channel blocker

C. Angiotensin-converting enzyme (ACE) inhibitor

D. Diuretic

---

4. A female patient presents with a malar rash, Raynaud's phenomenon, bilateral proximal interphalangeal and metacarpophalangeal pain, and wrist proximal muscle weakness. Laboratory investigations reveal a positive ANA (Antinuclear Antibody). Which of the following antibodies is

specifically associated with this condition?

(or)

Which of the following antibodies is specifically associated with Mixed Connective Tissue Disorder?

A. Anti-dsDNA (Double-stranded DNA) antibody

B. Anti-Ro (SSA) antibody

C. Anti-La (SSB) antibody

D. U1 RNP (Ribonucleoprotein) antibody

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5. A 25-year-old female presents with disfigurement of her face. Upon examination, there are areas of scarring and thickened skin without any history of injury. The patient does not exhibit any other significant symptoms. What is the most likely diagnosis?

(or)

Which of the following is the cause of idiopathic scarring of the face leading to disfigurement?

A. Systemic Scleroderma (dcSSc)

B. Limited Scleroderma (lcSSc)

C. Mixed Connective Tissue Disorder (MCTD)

D. Localized Scleroderma

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	3
Question 3	3
Question 4	4
Question 5	4

Solution for Question 1:

Correct Option A - Polycythemia vera:

• The clinical features described in the scenario are consistent with the diagnosis of Polycythemia vera.

• PV is a type of myeloproliferative neoplasm characterized by the excessive production of RBCs independently from normal regulatory mechanisms.

• This condition presents with elevated hemoglobin and hematocrit levels, along with the possibility of increased WBC and/or platelet counts.

• PV often presents with symptoms related to increased blood viscosity, such as venous or arterial thrombosis (e.g., DVT, MI, stroke), pruritus, erythromelalgia (burning pain in the hands or feet), facial redness, visual disturbances, and headaches.

• Laboratory investigations include a complete blood count with differential count, blood smear examination, testing for the JAK2 V617F mutation in blood samples, and measuring serum erythropoietin (EPO) levels.

• Bone marrow examination, including microscopy and cytogenetics analysis, to assess for characteristic features of PV.

Incorrect Options:

Option B - Deep vein thrombosis (DVT): DVT is characterized by the formation of blood clots in deep v eins, typically in the legs. It does not present with the specific symptoms of erythromelalgia, aquagenic pruritus, or Raynaud's phenomenon.

Option C - Systemic lupus erythematosus (SLE): SLE is an autoimmune disease that can affect multipl e organs and systems. While it may present with various symptoms, it is not specifically associated wit h the described symptoms of erythromelalgia, aquagenic pruritus, or Raynaud's phenomenon.

Option D - Peripheral artery disease (PAD): PAD involves narrowing or blockage of arteries, typically in the legs. It can cause symptoms such as leg pain, cramping, or decreased blood flow. However, it doe s not present with the specific features of erythromelalgia, aquagenic pruritus, or Raynaud's phenomen on.

Solution for Question 2:

Correct Option C - Sclerodactyly:

• The most likely diagnosis in this patient is limited scleroderma. The term scleroderma is used to describe the presence of thickened, hardened skin and is the hallmark feature of systemic sclerosis (SSc).

• SSc is a chronic multisystem disease characterized by widespread vascular dysfunction and progressive fibrosis of the skin and internal organs.

• CREST syndrome is a subtype of limited scleroderma and is a less severe form of scleroderma. C = Calcinosis cutis (clarifications on fingertips) R = Raynaud phenomenon E = Esophageal Dysmotility (presenting as dysphagia) S = Sclerodactyly (fibrotic thickening and tightening of the skin of fingers and hands) T = Telangiectasia

• C = Calcinosis cutis (clarifications on fingertips)

• R = Raynaud phenomenon

• E = Esophageal Dysmotility (presenting as dysphagia)

• S = Sclerodactyly (fibrotic thickening and tightening of the skin of fingers and hands)

• T = Telangiectasia

• The antibody specific to limited scleroderma is anti-centromere antibody.

• The disease follows a more benign course.

• C = Calcinosis cutis (clarifications on fingertips)

• R = Raynaud phenomenon

• E = Esophageal Dysmotility (presenting as dysphagia)

• S = Sclerodactyly (fibrotic thickening and tightening of the skin of fingers and hands)

• T = Telangiectasia

Incorrect Options:

Option A - Tetany:

• Tetany causes involuntary muscle contractions and overly stimulated peripheral nerves.

• It is caused by electrolyte imbalances.

Option B - Swan neck deformity:

• Swan-neck deformity is flexion of the base of the finger, an extension of the middle joint, and flexion of the outermost joint.

• The usual cause of this deformity is a weakness or tearing of a ligament on the palmer side of the middle joint of the finger.

• Rheumatoid arthritis can lead to swan neck deformities over time.

Option D - Esophageal atresia:

• Esophageal atresia is a congenital birth defect of the esophagus. It is not associated with limited scleroderma.

• CREST syndrome causes esophageal dysmotility in which foods and liquids do not easily pass down the esophagus.

• It causes strictures and narrowing of the esophagus and makes the muscle tissue weaker.

Solution for Question 3:

Correct Option C - Angiotensin-converting enzyme (ACE) inhibitor:

• This patient most likely developed a scleroderma renal crisis. It occurs as a life-threatening complication of SSc, typically within the first five years of disease onset.

• The main risk factor is diffuse skin involvement, especially if it progresses rapidly. Other risk factors include glucocorticoid use and autoantibodies against RNA polymerase III.

• Treatment: Immediate hospital admission is necessary. Goals include returning blood pressure to baseline within 72 hours. ACE inhibitors: Preferred for blood pressure control. Additional antihypertensive agents: May include dihydropyridine calcium channel blockers if needed. Monitoring response to therapy: Includes kidney function, electrolytes, and markers of hemolysis.

• Immediate hospital admission is necessary. Goals include returning blood pressure to baseline within 72 hours.

• ACE inhibitors: Preferred for blood pressure control.

• Additional antihypertensive agents: May include dihydropyridine calcium channel blockers if needed.

• Monitoring response to therapy: Includes kidney function, electrolytes, and markers of hemolysis.

• Kidney Transplantation: Option for patients with SRC who progress to end-stage kidney disease. Usually delayed until at least six months after dialysis initiation to allow for potential kidney function recovery.

• Option for patients with SRC who progress to end-stage kidney disease.

• Usually delayed until at least six months after dialysis initiation to allow for potential kidney function recovery.

• Immediate hospital admission is necessary. Goals include returning blood pressure to baseline within 72 hours.

• ACE inhibitors: Preferred for blood pressure control.

• Additional antihypertensive agents: May include dihydropyridine calcium channel blockers if needed.

• Monitoring response to therapy: Includes kidney function, electrolytes, and markers of hemolysis.

• Option for patients with SRC who progress to end-stage kidney disease.

• Usually delayed until at least six months after dialysis initiation to allow for potential kidney function recovery.

Incorrect Options:

Option A - Beta-blockers: Beta-blockers may be used in specific cases or in combination with other anti hypertensive medications but are not the preferred initial treatment in this scenario.

Option B - Calcium channel blockers: Calcium channel blockers are another class of antihypertensive medications commonly used in the management of hypertension but ACE inhibitors are considered the treatment of choice in patients with the given features.

Option D - Diuretics: Diuretics may be used to manage hypertension in certain cases but are not the pr eferred initial treatment for patients with the described features.

Solution for Question 4:

Correct Option D - U1 RNP (Ribonucleoprotein) antibody:

• Mixed connective tissue disease (MCTD) is a rare autoimmune disease diagnosed when a specific antibody known as anti-U1-ribonucleoprotein is present, and there are features of at least two connective tissue diseases, including SLE, systemic sclerosis, polymyositis, dermatomyositis, and rheumatoid arthritis.

• Positive ANA (Antinuclear Antibody) is a non-specific finding that can be seen in various autoimmune conditions, including MCTD, but the specific antibody associated with MCTD is U1 RNP.

• Initial symptoms of mixed connective tissue disease are usually non-specific and include arthralgia, malaise, myalgia, and low-grade fever. Almost any organ system can be affected by MCTD.

Incorrect Options:

Option A - Anti-dsDNA (Double-stranded DNA) antibody: It is associated with SLE.

Option B - Anti-Ro (SSA) antibody: Associated with Sjögren's disease, SLE, polymyositis, systemic scl erosis, subacute cutaneous lupus erythematosus, primary biliary cholangitis, and neonatal lupus syndr ome.

Option C - Anti-La (SSB) antibody: When co-existing with SS-A/Ro antibodies, relatively specific for Sjö gren's disease but also present in some SLE patients. When present alone, their clinical significance is uncertain.

Solution for Question 5:

Correct Option D - Localized Scleroderma/Morphea:

• Morphea, also known as localized scleroderma, is a relatively uncommon idiopathic inflammatory disorder characterized by the development of sclerotic plaques in the skin. It affects both adults and children and is more prevalent in females.

• Clinical presentation: Begins as inflammatory patches or plaques that evolve into firm, sclerotic lesions. These lesions may involve the dermis alone or extend into underlying tissues such as subcutaneous fat, muscle, or bone. Atrophic changes may persist after lesion resolution.

• Begins as inflammatory patches or plaques that evolve into firm, sclerotic lesions.

• These lesions may involve the dermis alone or extend into underlying tissues such as subcutaneous fat, muscle, or bone.

• Atrophic changes may persist after lesion resolution.

• Diagnosis is mainly clinical. Biopsy of lesions may be indicated only in uncertain cases.

• There are no morphea specific antibodies; however, positive ANA, anti-histone Ab, and SS DNA Ab are reported in some patients.

• This patient's facial disfigurement aligns with this diagnosis.

• Begins as inflammatory patches or plaques that evolve into firm, sclerotic lesions.

• These lesions may involve the dermis alone or extend into underlying tissues such as subcutaneous fat, muscle, or bone.

• Atrophic changes may persist after lesion resolution.

Incorrect Options:

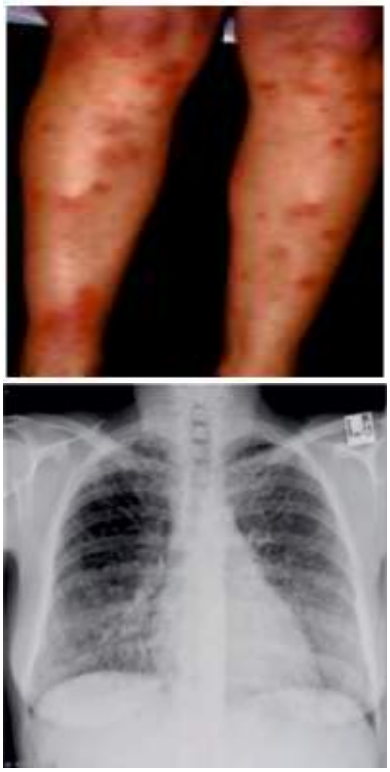
Option A - Systemic Scleroderma (dcSSc): Systemic scleroderma involves widespread skin involveme nt and can affect internal organs. In this scenario, the patient does not exhibit systemic symptoms, rulin g out systemic scleroderma.

Option B - Limited Scleroderma (lcSSc): Limited scleroderma typically presents with specific areas of s kin involvement, such as fingers, hands, face, or lower legs. However, the patient's symptoms are limit ed to disfigurement on the face without other systemic manifestations, suggesting localized scleroderm a/morphea rather than limited scleroderma.

Option C - Mixed Connective Tissue Disorder (MCTD): MCTD is a condition that shares features of mul tiple autoimmune disorders, including scleroderma, systemic lupus erythematosus, and polymyositis. H owever, the patient's presentation is primarily consistent with localized scleroderma/morphea rather tha n MCTD.

Sarcoidosis

1. A 45-year-old male presents with a two-month history of progressive cough, dyspnea on exertion, and night sweats. He also complains of weight loss. A chest X-ray is given in the image. Skin examination shows painful nodules on the shin. Further evaluation reveals elevated calcium levels in his blood work. What is the most likely diagnosis?



A. Tuberculosis (TB)

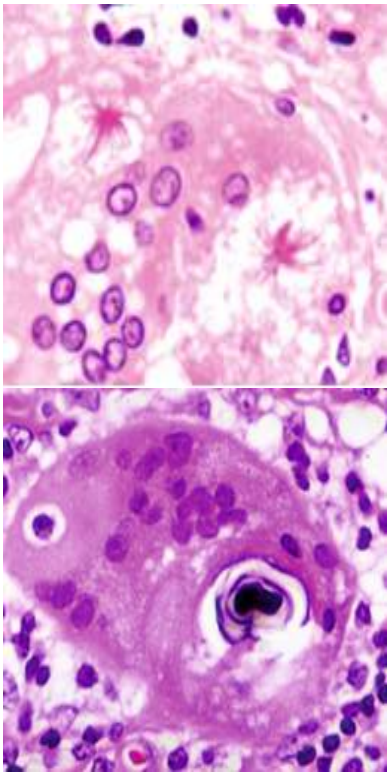
B. Lung Cancer

C. Sarcoidosis

D. Pulmonary Embolism

---

2. A 30-year-old female presents with a persistent dry cough, shortness of breath on exertion, and skin nodules on her shins. Chest X-ray reveals bilateral hilar lymphadenopathy with eggshell calcification. To confirm the suspected diagnosis, a transbronchial biopsy is performed. What are the characteristic findings are likely to be seen in this patient's blood examination?



A. ACE levels: Decreased CD4:CD8 ratio: Increased Calcium levels: No change

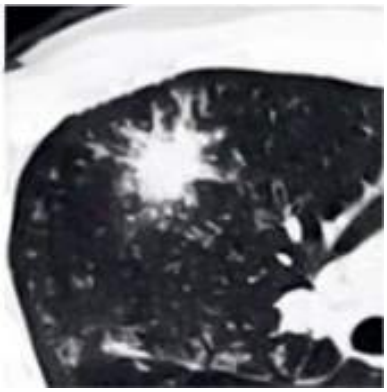
B. ACE levels: Increased CD4:CD8 ratio: Decreased Calcium levels: Increased

C. ACE levels: Increased CD4:CD8 ratio: Increased Calcium levels: Increased

D. ACE levels: Increased CD4:CD8 ratio: No change Calcium levels: Decreased

---

3. A 35-year-old male presents with a two-month history of a persistent dry cough, fatigue, and shortness of breath. Biopsy showed the presence of naked granulomas. HRCT of the chest and Gallium scan are given in the images. What is the first-line treatment for the most likely diagnosis?



A. Steroids

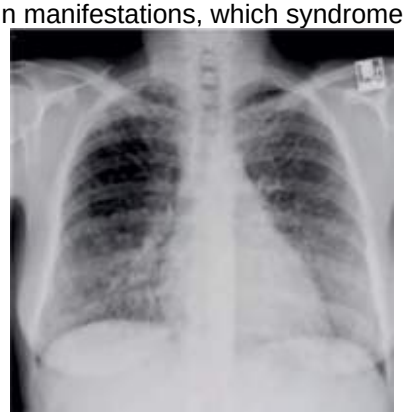
B. Hydroxychloroquine (HCQ)

C. Methotrexate

D. Azathioprine

---

4. A 35-year-old female presents with complaints of swollen and painful joints, along with a low-grade fever and tender, erythematous nodules on her shins. X-RAY examination is as shown below. Based on the clinical presentation and skin manifestations, which syndrome is the most likely diagnosis?



A. Behçet's Syndrome

B. Lofgren Syndrome

C. Reiter's Syndrome

D. Erythema Multiforme

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	3
Question 3	1

Question 4	2

Solution for Question 1:

Correct Option C - Sarcoidosis:

• The patient's clinical presentation aligns with sarcoidosis, a multisystem inflammatory disease characterized by non-caseating granuloma formation in various organs.

• The images given depict erythema nodosum (painful nodules on the shins) and pulmonary fibrosis (chest X-ray).

• Clinical features of sarcoidosis: Progressive cough, dyspnea, and stridor due to bilateral hilar lymphadenopathy Night sweats, weight loss Skin: Lupus Pernio and Erythema nodosum CNS: lymphocytic meningitis, optic neuritis, central diabetes insipidus Ocular: uveitis, Sicca Syndrome Parotid gland involvement can lead to facial diplegia Cardiac: tachyarrhythmias, ischemic heart disease, pulmonary artery hypertension Liver: granulomatous hepatitis Bone marrow: lymphopenia Endocrine: hypercalcemia due to 1-alpha hydroxylase enzyme in granulomas

• Progressive cough, dyspnea, and stridor due to bilateral hilar lymphadenopathy

• Night sweats, weight loss

• Skin: Lupus Pernio and Erythema nodosum

• CNS: lymphocytic meningitis, optic neuritis, central diabetes insipidus

• Ocular: uveitis, Sicca Syndrome

• Parotid gland involvement can lead to facial diplegia

• Cardiac: tachyarrhythmias, ischemic heart disease, pulmonary artery hypertension

• Liver: granulomatous hepatitis

• Bone marrow: lymphopenia

• Endocrine: hypercalcemia due to 1-alpha hydroxylase enzyme in granulomas

• Lofgren syndrome is a variant with erythema nodosum, bilateral hilar lymphadenopathy, and arthritis.

• Progressive cough, dyspnea, and stridor due to bilateral hilar lymphadenopathy

• Night sweats, weight loss

• Skin: Lupus Pernio and Erythema nodosum

• CNS: lymphocytic meningitis, optic neuritis, central diabetes insipidus

• Ocular: uveitis, Sicca Syndrome

• Parotid gland involvement can lead to facial diplegia

• Cardiac: tachyarrhythmias, ischemic heart disease, pulmonary artery hypertension

• Liver: granulomatous hepatitis

• Bone marrow: lymphopenia

• Endocrine: hypercalcemia due to 1-alpha hydroxylase enzyme in granulomas

Incorrect Options:

Option A - Tuberculosis (TB): TB may present with symptoms like cough, night sweats, weight loss, an d lung involvement. However, in sarcoidosis, non-caseating granulomas are formed, and specific skin

manifestations like Erythema Nodosum differentiate it from TB.

Option B - Lung Cancer: Lung cancer can present with cough, dyspnea, weight loss, and night sweats. However, the presence of bilateral hilar lymphadenopathy and painful shin nodules (Erythema Nodosu m) suggests a different diagnosis, like sarcoidosis.

Option D - Pulmonary Embolism: Pulmonary embolism is a condition where a blood clot blocks the pul monary artery. While it can cause dyspnea, it does not present with bilateral hilar lymphadenopathy or skin nodules.

Solution for Question 2:

Correct Option C - ACE levels: Increased CD4:CD8 ratio: Increased Calcium levels: Increased

• The above clinical findings, along with the biopsy showing asteroid and Schaumann bodies, point towards the diagnosis of sarcoidosis.

• Pathology: Non-caseating granulomas. Naked granulomas with no lymphocyte covering. Asteroid bodies (looks like stars) are seen within multinucleated giant cells (intracellular).

• Non-caseating granulomas.

• Naked granulomas with no lymphocyte covering.

• Asteroid bodies (looks like stars) are seen within multinucleated giant cells (intracellular).

• Due to increased CD4 levels, blood examination typically shows an elevated CD4:CD8 ratio, which can be up to 15:1 in sarcoidosis.

• ACE levels are often elevated, and calcium levels may also be raised due to the granulomatous production of 1-alpha hydroxylase enzyme, which leads to increased vitamin D synthesis.

• Non-caseating granulomas.

• Naked granulomas with no lymphocyte covering.

• Asteroid bodies (looks like stars) are seen within multinucleated giant cells (intracellular).

Incorrect Options:

Options A, B, and D: These are inaccurate and are not observed in patients with sarcoidosis.

Solution for Question 3:

Correct Option A - Steroids:

• The above explained clinical scenario along with the characteristic finding of galaxy sign on HRCT, panda sign on GALLIUM scan and the presence of naked granulomas on the biopsy points towards the diagnosis of sarcoidosis.

Steroids:

• Steroids are the first-line treatment for sarcoidosis, which is the likely diagnosis in this clinical scenario.

• The presence of bilateral hilar lymphadenopathy and eggshell calcification on the chest X-ray, along with naked granulomas on biopsy, are characteristic findings of sarcoidosis.

• The "galaxy sign" observed on HRCT further supports the diagnosis, as it is a characteristic radiological feature seen in sarcoidosis.

• Panda sign on GALLIUM scan also points towards sarcoidosis.

• Steroids are effective in reducing inflammation and granuloma formation, leading to symptom improvement in most patients with sarcoidosis.

Incorrect Options:

Option B - Hydroxychloroquine (HCQ): HCQ is a steroid-sparing agent used in sarcoidosis, but it is not the first-line treatment. It may be considered as an alternative when lymphopenia or other concerns limi t the use of steroids.

Option C - Methotrexate: Methotrexate is another steroid-sparing agent used in the management of sar coidosis. It may be considered in cases where steroids are not well-tolerated or fail to control the disea se.

Option D - Azathioprine: Azathioprine is a third option as a steroid-sparing agent in the treatment of sar coidosis. It can be considered when other treatment options are not suitable or effective.

Solution for Question 4:

Correct Option B - Lofgren Syndrome:

• Lofgren Syndrome (A variant of Sarcoidosis): The patient's clinical presentation aligns with Lofgren Syndrome, which is a variant of sarcoidosis. The presence of lymphadenopathy, joint pains (Ouch), fever, and erythema nodosum (EN) on the shins are characteristic features of Lofgren Syndrome.

Incorrect Options:

Option A - Behçet's Syndrome: Behçet's Syndrome can present with oral ulcers, genital ulcers, and ski n lesions. While joint pain may occur, it is not typically associated with bilateral hilar lymphadenopathy, which is a characteristic feature of Lofgren Syndrome.

Option C - Reiter's Syndrome (Reactive Arthritis): Reiter's Syndrome can present with joint inflammatio n, especially following an infection, but it is not associated with bilateral hilar lymphadenopathy or speci fic skin manifestations like erythema nodosum.

Option D - Erythema Multiforme: Erythema Multiforme is characterized by target-like skin lesions and mucous membrane involvement. It is not typically associated with bilateral hilar lymphadenopathy or joi nt pains seen in Lofgren Syndrome.

SLE

1. A 21-year-old female presents to the clinic with complaints of fatigue, weight loss, arthralgia, and an erythematous rash over cheeks and nose, sparing nasolabial folds. Which of the following statements is incorrect regarding the patient's likely diagnosis?

A. Renal failure is the most common cause of death in active SLE.

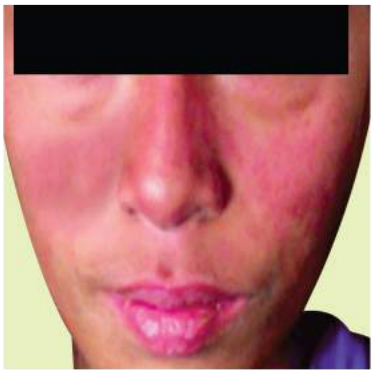
B. Infections become the leading cause of death if SLE is not active due to immunosuppressant use.

C. The female-to-male ratio in SLE is 9:1.

D. Klinefelter syndrome (47XXY) with SLE may exhibit less severe symptoms due to the presence of additional X chromosomes.

---

2. A 45-year-old female presents with fatigue, joint pain, and a rash on her face. On examination, she has an erythematous rash as shown in the image below. Laboratory tests reveal positive antinuclear antibodies (ANAs) and anti-dsDNA antibodies. Which of the following is the most likely diagnosis?



A. Rosacea

B. Seborrheic dermatitis

C. Systemic lupus erythematosus (SLE)

D. Allergic contact dermatitis

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3. A 19-year-old female recently diagnosed with SLE has been admitted to the hospital. She is being tested for various autoantibodies related to SLE. Which of the following statements about the specific autoantibodies in systemic lupus erythematosus (SLE) is incorrect?

(or)

Which of the following statements about the specific autoantibodies in systemic lupus erythematosus (SLE) is incorrect?

A. Anti-Smith antibody is highly specific for SLE

B. Anti-Ro (SS-A) antibody is associated with photosensitivity and can cause complete heart block in the fetus

C. Anti-dsDNA antibody correlates with disease activity in SLE and can be used to monitor response to treatment

D. Anti-Lupus Anticoagulant decreases the risk of nephritis in SLE.

---

4. A 53-year-old woman presents for a follow-up visit after having a high BP on her last visit. She was prescribed hydralazine, a β-blocker, and furosemide. She currently complains of fever, muscle aches, joint pain, and rash. A physical exam reveals a scaling erythematous facial rash. The physician orders an autoantibody panel: Antinuclear antibodies (ANA): Positive Anti-histone antibodies: Positive What is the most likely diagnosis?

(or)

What is the diagnosis for a woman using beta blocker, furosemide, and hydralazine for hypertension, presenting with an erythematous facial rash, and nonspecific systemic symptoms and positive anti-histone antibodies?

A. Systemic lupus erythematosus

B. Hydralazine-induced lupus erythematosus

C. β-blocker-induced systemic lupus erythematosus

D. Furosemide-induced systemic lupus erythematosus

---

5. A 35-year-old female presents with a history of recurrent abortions and absent fetal movements in her previous pregnancy. Workup reveals a positive VDRL test. Which of the following is the most likely diagnosis, and which antibody is the most specific for this condition?

(or)

Which of the following best explains the reason for recurrent abortions with a positive VDRL?

A. Systemic lupus erythematosus (SLE) - Anti-dsDNA antibody

B. Rheumatoid arthritis - Rheumatoid factor

C. Antiphospholipid antibody syndrome (APS) - Lupus anticoagulant

D. Sjogren's syndrome - Anti-SSA/Ro antibody

---

6. A 35-year-old female presents with fatigue and shortness of breath on exertion. On physical examination, a holosystolic murmur is heard at the apex. Echocardiography reveals mitral regurgitation. The patient has a history of systemic lupus erythematosus. Which of the following is the most likely cause of her mitral regurgitation?

(or)

Which of the following is the most likely cause of mitral regurgitation in SLE?

A. Infective endocarditis

B. Rheumatic heart disease

C. Libman-Sacks endocarditis

D. Mitral valve prolapse

---

7. A 28-year-old female presents with joint pain and swelling involving multiple joints. She also complains of low-grade fever. On examination, there is tenderness and soft tissue swelling in the affected joints. Which of the following features is most likely associated with synovitis in systemic lupus erythematosus (SLE)?

(or)

Which of the following features is most likely associated with synovitis in systemic lupus erythematosus (SLE)?

A. Symmetrical joint involvement, small and large joints affected, intermittent polyarthritis, non-erosive arthritis

B. Asymmetrical joint involvement, large joints predominantly affected, continuous polyarthritis, erosive arthritis

C. Unilateral joint involvement, small joints predominantly affected, intermittent monoarthritis, non-erosive arthritis

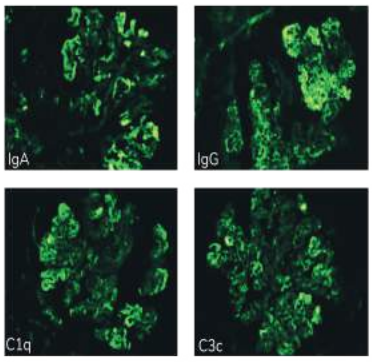
D. Bilateral joint involvement, large and small joints affected equally, continuous polyarthritis, erosive arthritis.

---

8. A 28-year-old female presents with complaints of cola-colored urine, hypertension, and worsening renal function. Laboratory investigations reveal hematuria with dysmorphic red blood cells, low C3 levels, and elevated creatinine and BUN. A renal biopsy is performed, and the immunofluorescence image is shown below. What is seen in the immunofluorescence image in this patient?

(or)

Which of the following is seen in the immunofluorescence image of renal biopsy in SLE?



A. IgG deposition - Lupus nephritis, characteristic feature: IgG, IgA, and IgM deposition

B. IgA deposition - IgA nephropathy, characteristic feature: IgA deposition

C. IgM deposition - Membranous nephropathy, characteristic feature: IgM deposition

D. IgG, IgA, and IgM deposition - Lupus nephritis, characteristic feature: Full house effect

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9. A 45-year-old male presents with a butterfly-shaped rash across his nose and cheeks, joint pain, and fatigue. On examination, he has oral ulcers and non-scarring hair loss. Laboratory tests reveal a positive ANA (Antinuclear Antibody) and low levels of complement proteins (C3 and C4). Which of the following sets of diagnostic criteria is most consistent with the patient's presentation?

(or)

Which of the following sets of diagnostic criteria is most consistent with the SLE?

A. Morning stiffness >1 hour, symmetric arthritis, positive rheumatoid factor, radiographic evidence of joint erosion

B. Elevated serum uric acid levels, tophi, acute episodes of monoarthritis

C. Intermittent arthritis, enthesitis, dactylitis, negative rheumatoid factor

D. Oral ulcers, non-scarring alopecia, positive ANA, low complement levels (C3 and C4)

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	3
Question 3	4
Question 4	2
Question 5	3
Question 6	3
Question 7	1
Question 8	4
Question 9	4

Solution for Question 1:

Correct Option D - Klinefelter syndrome (47XXY) with SLE may exhibit less severe symptoms due to th e presence of additional X chromosomes:

• This young patient with the characteristic malar rash (characterized by an erythematous flat or raised rash across the bridge of the nose and cheeks, which usually spares nasolabial folds) most likely has systemic lupus erythematosus.

• Genes on the X chromosome that influence SLE, such as TREX1, may play a role in gender predisposition, possibly because some genes on the second X in females are not silent. therefore people with XXY karyotype (Klinefelter syndrome) have a significantly increased risk for SLE.

• The severity of SLE is directly related to the number of X chromosomes.

• Having an extra X chromosome (47XXY) in Klinefelter syndrome can potentially contribute to increased severity.

Incorrect Options:

Option A - Renal failure is a common cause of death in active SLE: Glomerulonephritis leading to sever e persistent proteinuria, chronic renal failure, and end-stage renal disease remains one of the most sev ere complications of SLE and is associated with significant morbidity and mortality.

Option B -Infections can become the leading cause of death in non-active SLE due to immunosuppress ant use: SLE treatment consists of immunosuppressive drugs that inhibit the activity of the immune sys tem. Hydroxychloroquine is the mainstay and corticosteroids are often used for disease flare-ups. Long -term use of these drugs renders the patients immunosuppressed and predisposes them to infections, which are the leading cause of death in non-active SLE.

Option C -SLE primarily affects females with a ratio of 9:1 compared to males: SLE is characterized by a 9:1 female-to-male ratio of disease incidence, with an even higher female predominance during peak

reproductive years.

Solution for Question 2:

Correct Option C - Systemic lupus erythematosus (SLE):

• The patient's clinical presentation, including the malar rash involving the cheeks and the bridge of the nose, sparing the nasolabial folds, along with photosensitivity, persistent burning sensation, positive ANAs, and anti-dsDNA antibodies, strongly suggests SLE.

• Malar rash is a hallmark cutaneous manifestation of SLE, and the presence of other associated features supports this diagnosis.

Manifestations

Description

Musculoskeletal manifestation

Pain accompanied by fever

Hematological

Anemia

Skin manifestations

• Malar rash: Erythematous rash on cheeks involving the bridge of the nose, sparing nasolabial folds

• Butterfly rash: Erythematous rash on cheeks involving the bridge of the nose

• Photosensitivity: Burning sensation persists even after sun exposure and seeking shade

• Malar rash seen on malar eminence, erythematous with raised margin, also seen on hands and V of the neck

• Subacute cutaneous lupus erythematosus: Psoriasis-like lesions

• Discoid lupus: Circular lesion with erythematous periphery and scarring in the center

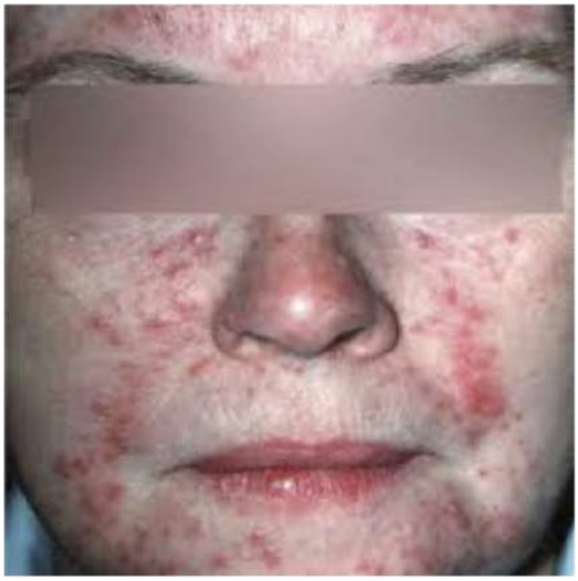
• Atrophic scarring seen in discoid lupus; may be confused with fungal infection, but lacks central clearing

Other Features

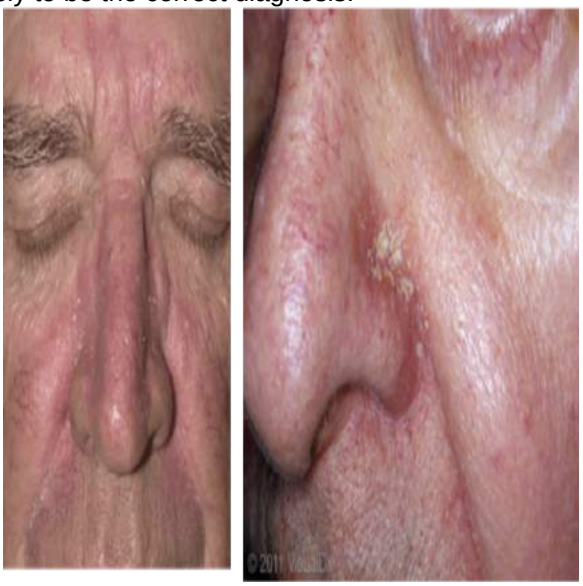
Non-scarring alopecia

Incorrect Options:

Option A - Rosacea: Rosacea is a chronic skin condition characterized by facial redness, small blood v essels visible on the skin, and often acne-like eruptions. While rosacea can cause a flushed appearanc e, it does not typically involve the characteristic malar rash seen in this patient. Therefore, this option is less likely to be the correct diagnosis.



Option B - Seborrheic dermatitis: Seborrheic dermatitis presents with red, itchy, and greasy skin lesion s, often affecting areas rich in sebaceous glands, including the scalp, face, and upper chest. However, the malar rash seen in this patient with involvement of the cheeks and bridge of the nose, along with its photosensitivity and persistence even after sun exposure, is not characteristic of seborrheic dermatitis. Hence, this option is unlikely to be the correct diagnosis.



Option D - Allergic contact dermatitis: Allergic contact dermatitis occurs when the skin comes into cont act with an allergen, resulting in an inflammatory reaction. While it can cause a localized rash, the char acteristic malar rash seen in this patient, along with systemic symptoms like fatigue and joint pain, poin ts away from allergic contact dermatitis as the primary diagnosis. Thus, this option is less likely to be th e correct diagnosis.

Solution for Question 3:

Correct Option D - Anti-Lupus Anticoagulant decreases the risk of nephritis in SLE:

• Anti-Lupus Anticoagulant is associated with an increased risk of thrombotic events, including nephritis, in SLE, rather than decreasing the risk

Autoantibody

Characteristics

ANA (Antinuclear Antibody)

• Highly sensitive (98% sensitivity)

• Present not only in SLE but also in scleroderma and Sjogren's syndrome

Anti-Smith Antibody

Most specific for SLE

Anti-dsDNA Antibody

• Correlates with disease activity

• Can be used to monitor SLE during pregnancy and response to steroid treatment

Anti-Ro (SS-A) Antibody

• Responsible for photosensitivity

• Can cause complete heart block in fetus (neonatal lupus)

• Also seen in Sjogren's syndrome

Anti-Lupus Anticoagulant

Increases the risk of nephritis

Anti-Histone Antibody

• Drug-induced lupus

• Prognosis is better

APLA (Antiphospholipid Antibody)

Associated with recurrent abortions and fetal complications in antiphospholipid antibody syndrome (APLA)

Anti-Erythrocyte Antibody

• Common cause of anemia in SLE (anemia of chronic disease)

• Autoimmune hemolytic anemia can also occur

Antiplatelet Antibody

Causes thrombocytopenia

Anti-Neuronal Antibody

Can cross the blood-brain barrier and cause cerebral edema

Anti-Glutamate Receptor Antibody

Anti-Ribosomal P Antibody

Associated with psychosis in SLE

Anti-ribonucleoprotein antibody (RNP)

Related to Mixed connective tissue disorder (MCTD).

Incorrect Options:

Option A - Anti-Smith antibody is highly specific for SLE: Anti-smith antibody is highly specific for SLE, making it a useful diagnostic marker.

Option B - Anti-Ro (SS-A) antibody is associated with photosensitivity and can cross the placenta, caus ing complete heart block in the fetus: The statement is correct.

Option C - Anti-dsDNA antibody correlates with disease activity in SLE and can be used to monitor res ponse to treatment: The levels of anti-dsDNA antibody tend to fluctuate with the disease course, and hi gher levels are often associated with increased disease activity. Monitoring anti-dsDNA antibody levels can be helpful in assessing the response to treatment and disease progression in SLE.

Solution for Question 4:

Correct Option B - Hydralazine-induced lupus erythematosus:

• Drug-induced lupus (DIL) is an autoimmune phenomenon where drug exposure leads to the development of systemic lupus erythematosus (SLE))-like clinical features.

• DIL is a clear example of an environmental trigger leading to the development of lupus in a genetically susceptible individual.

• It is common in whites, with less female predilection than in SLE.

• Causative agents include hydralazine (such as in this patient), procainamide, chlorpromazine, isoniazid, methyldopa, minocycline, penicillamine, and diltiazem.

• Pathophysiology: Different mechanisms are used to induce autoimmunity through lupus-inducing drugs. Some genetic risk factors, such as HLA-DR0301, HLA-DR4, and the complement C4 null allele, vary between agents. The acetylators with genetic deficiency of N-acetyltransferase are at a higher risk of DIL, especially procainamide and hydralazine.

• Different mechanisms are used to induce autoimmunity through lupus-inducing drugs.

• Some genetic risk factors, such as HLA-DR0301, HLA-DR4, and the complement C4 null allele, vary between agents.

• The acetylators with genetic deficiency of N-acetyltransferase are at a higher risk of DIL, especially procainamide and hydralazine.

• Positive ANA is nonspecific, but the sensitivity for DIL is 100%, so if ANA is negative, DIL can be ruled out.

• Anti-histone antibodies are more often involved.

• Different mechanisms are used to induce autoimmunity through lupus-inducing drugs.

• Some genetic risk factors, such as HLA-DR0301, HLA-DR4, and the complement C4 null allele, vary between agents.

• The acetylators with genetic deficiency of N-acetyltransferase are at a higher risk of DIL, especially procainamide and hydralazine.

Incorrect Options:

Option A - Systemic lupus erythematosus:

• 95% of patients develop arthralgia, myalgia, or arthritis in SLE.

• SLE is diagnosed by a physician using symptom assessments, X-rays, physical examinations, and lab tests.

• SLE can be difficult to diagnose because its early signs and symptoms are nonspecific and may seem like signs and symptoms of other diseases.

Option C - β-blocker-induced systemic lupus erythematosus:

• Keratinocytes possess adrenergic receptors, which have been reported as being exclusive of the β2-subtype.

• β2-adrenergic receptors are densest at the basal cells and decrease in number towards the stratum corneum, while intracellular calcium concentrations are lowest at the basal cells, increasing towards the stratum corneum, thus correlating with keratinocyte differentiation.

Option D - Furosemide-induced systemic lupus erythematosus:

• Moderate Potential Hazard, Moderate probability.

• Furosemide use has been associated with exacerbation or activation of systemic lupus erythematosus.

• Therapy with furosemide should be administered cautiously in patients with a history of lupus.

Solution for Question 5:

Correct Option C - Antiphospholipid antibody syndrome (APS) - Lupus anticoagulant:

• The clinical scenario described, including recurrent abortions, absent fetal movements, and a positive VDRL test, is highly suggestive of antiphospholipid antibody syndrome (APS).

• Patients who have certain antiphospholipid antibodies may have false positive VDRL test. This occurs because the aPL bind to the lipids in the test and make it come out positive.

• APS is characterized by the presence of lupus anticoagulant, along with other antibodies such as anti-cardiolipin antibody and anti-β2-glycoprotein antibody.

• The lupus anticoagulant is associated with an increased risk of thrombotic events and pregnancy complications.

Clinical Criteria

Lab Criteria

1. Vascular thrombosis

1. Anti-Cardiolipin IgG/IgM

2. Pregnancy Morbidity

2. Anti-beta-2 glycoprotein 1 (GP1)

3. Death of normal fetus at 3-10 weeks

3. Lupus anticoagulant (LAC)

4. Premature birth at ≤34 weeks due to preeclampsia

4. Medium to high titer

5. 3 consecutive abortions at <10 weeks

5. At least 2 times, 12 weeks apart

6. Placental insufficiency at <34 weeks

Based on these classification criteria, patients who have at least one positive clinical and one positive l aboratory criteria are considered to have a diagnosis of APS.

Incorrect Options:

Option A - Systemic lupus erythematosus (SLE) - Anti-dsDNA antibody: SLE is an autoimmune diseas e characterized by various manifestations, including lupus nephritis and lupus cerebritis. The presence of anti-dsDNA antibody is highly specific for SLE and correlates with disease activity.

Option B - Rheumatoid arthritis - Rheumatoid factor: Rheumatoid arthritis is an autoimmune disease th at primarily affects the joints. Rheumatoid factor is an antibody commonly found in the blood of individu als with rheumatoid arthritis, but it is not specific to this condition.

Option D - Sjogren's syndrome - Anti-SSA/Ro antibody: Sjogren's syndrome is an autoimmune disorde r that primarily affects the salivary glands and tear ducts. Anti-SSA/Ro antibody is commonly found in i ndividuals with Sjogren's syndrome but is not as specific as lupus anticoagulant in the diagnosis of AP S.

Solution for Question 6:

Correct Option C - Libman-Sacks endocarditis:

• Libman-Sacks endocarditis is a non-infectious form of endocarditis that occurs in patients with SLE.

• It is characterized by very small vegetations, histologically characterized by organized platelet-fibrin microthrombi surrounded by growing fibroblasts and macrophages.

• This condition predominantly affects the mitral valve. Malfunction of the chordae tendineae leads to mitral regurgitation.

Incorrect Options:

Option A - Infective endocarditis: Infective endocarditis is characterized by bacterial or fungal infection of the heart valves, leading to the formation of infective vegetations. It typically presents with fever, chill s, and a
new-onset heart murmur. In this scenario, the patient's mitral regurgitation is more likely due to a non-infectious cause related to her underlying autoimmune disease.

Option B - Rheumatic heart disease: Rheumatic heart disease is caused by rheumatic fever, a systemic inflammatory condition triggered by group A streptococcal infection. It primarily affects the he art valves, leading to scarring and deformities. While mitral regurgitation can occur in rheumatic heart d isease, the patient's history of SLE suggests a different etiology.

Option D - Mitral valve prolapse: Mitral valve prolapse is a condition in which the valve leaflets do not cl ose properly during systole, resulting in mitral regurgitation. It is a common finding and usually not asso ciated with systemic autoimmune diseases like SLE. Therefore, it is less likely to be the cause of mitral regurgitation in this patient with a history of SLE.

Solution for Question 7:

Correct Option A - Symmetrical joint involvement, small and large joints affected, intermittent polyarthrit is, non-erosive arthritis:

• Synovitis is the most common presentation of SLE.

• In SLE, synovitis typically manifests as symmetrical joint involvement, affecting both small and large joints.

• The arthritis is usually intermittent and non-erosive. These features help differentiate it from other forms of arthritis, such as rheumatoid arthritis, which may have asymmetrical involvement, predominantly affect large joints, and can be erosive.

• Unilateral joint involvement and intermittent monoarthritis are less characteristic of SLE-associated synovitis.

Incorrect Options:

Option B - Asymmetrical joint involvement, large joints predominantly affected, continuous polyarthritis, erosive arthritis: Rheumatoid arthritis, which may have asymmetrical involvement, predominantly affec t large joints, and can be erosive.

Option C - Unilateral joint involvement, small joints predominantly affected, intermittent monoarthritis, n on-erosive arthritis: Unilateral joint involvement and intermittent monoarthritis are less characteristic of SLE-associated synovitis.

Option D - Bilateral joint involvement, large and small joints affected equally, continuous polyarthritis, e rosive arthritis: It is less likely associated with SLE

Solution for Question 8:

Correct Option D - IgG, IgA, and IgM deposition -
Lupus nephritis, characteristic feature: Full house effect:

• Lupus nephritis results from the deposition of circulating immune complexes composed of primarily DNA and anti-DNA, which activate the complement cascade, leading to complement-mediated damage, leukocyte infiltration, activation of procoagulant factors, and release of various cytokines.

• The most common clinical sign of the renal disease is proteinuria, but hematuria, hypertension, varying degrees of renal failure, and active urine sediment with red blood cell casts can all be present.

• On immunofluorescence, the deposition of IgA, IgA, and IgM is visualized.

• The deposition of complement factors C3 and C1 is also evident (Full house effect).

Incorrect Options:

Option A - IgG deposition - Lupus nephritis, characteristic feature: IgG, IgA, and IgM deposition Lupus nephritis, characteristic feature: Full house effect: While IgG deposition is seen in lupus nephritis, it is n ot the only immunoglobulin involved. IgA and IgM depositions are also characteristic of lupus nephritis, leading to the full house effect.

Option B - IgA deposition - IgA nephropathy, characteristic feature: IgA deposition: IgA deposition is a s pecific feature of IgA nephropathy, not lupus nephritis. In IgA nephropathy, only IgA is deposited, not Ig

G or IgM.

Option C - IgM deposition -
Membranous nephropathy, characteristic feature: IgM deposition: IgM deposition is a characteristic feat ure of membranous nephropathy, not lupus nephritis. In membranous nephropathy, IgM is deposited al ong the glomerular basement membrane.

Solution for Question 9:

Correct Option D
- Oral ulcers, non-scarring alopecia, positive ANA, low complement levels (C3 and C4):

• These diagnostic criteria are consistent with systemic lupus erythematosus (SLE). The presence of a butterfly-shaped rash, oral ulcers, non-scarring hair loss, positive ANA, and low complement levels are all characteristics of SLE, making this the correct answer.

• Diagnostic Criteria:

• At least 4 features total, with at least 1 clinical and 1 immunological feature.

Clinical Features

Immunological Features

Malar rash (psoriatiform or discoid)

Direct Coombs test (positive in AIHA)

Discoid lupus erythematosus

Anti-Smith antibody

Serositis (pleuritis and pericarditis)

ANA (Antinuclear Antibody)

Oral aphthous ulcers

Lupus anticoagulant

Non-scarring alopecia

ELISA Anticardiolipin (may give false positive VDRL)

Synovitis (≥ 2 joints - intermittent polyarthritis)

Anti-β2 Glycoprotein

Brain involvement (cognitive defects, psychosis)

Low C3 and C4

Renal involvement (Lupus Nephritis or ESRD)

Anemia (Anemia of chronic disease, Autoimmune hemolytic anemia)

Latest ACR criteria for SLE in 2019:

• The 2019 criteria include Fever as a new addition.

• Renal biopsy carries the highest weightage of 10 points.

• A diagnosis of SLE is made if the total score is >10 with a positive ANA.

Incorrect Options:

Option A - Morning stiffness >1 hour, symmetric arthritis, positive rheumatoid factor, radiographic evide nce of joint erosion: These diagnostic criteria are consistent with rheumatoid arthritis, but they do not in clude the characteristic butterfly-shaped rash, oral ulcers, or non-scarring hair loss described in the sce nario. Therefore, this is not the correct answer.

Option B - Elevated serum uric acid levels, tophi, acute episodes of monoarthritis: These diagnostic crit eria are consistent with gout, but they do not include the characteristic butterfly-shaped rash, oral ulcer s, or non-scarring hair loss described in the scenario. Therefore, this is not the correct answer.

Option C - Intermittent arthritis, enthesitis, dactylitis, negative rheumatoid factor: These diagnostic criter ia are consistent with psoriatic arthritis, but they do not include the characteristic butterfly-shaped rash, oral ulcers, or non-scarring hair loss described in the scenario. Therefore, this is not the correct answer .

Previous Year Questions

1. Which condition necessitates the use of anti-nuclear antibodies for accurate diagnosis?

A. Scleroderma

B. Systemic lupus erythematosus

C. Drug induced lupus

D. Sjogren's syndrome

---

2. What could be the probable diagnosis for a 54-year-old female patient who visits you with symptoms of finger swelling, heartburn, and occasional joint pain? During examination, her hands appear shiny, tight, and thickened with non-pitting edema. Additionally, she has interstitial lung disease and tests positive for ANA antibodies, topoisomerase I antibodies, and Anti-RNA polymerase III antibodies.

A. Limited cutaneous systemic sclerosis

B. Diffuse cutaneous systemic sclerosis

C. Raynaud's phenomenon

D. Peutz-jeghers syndrome

---

3. A patient presents to you with fever, night sweats, ptosis, and bilateral facial nerve palsy. Investigations showed leukocytosis and bilateral hilar lymphadenopathy. Which of the following is the most likely diagnosis?

A. Sarcoidosis

B. Tuberculosis

C. Lymphoma

D. Hypersensitive pneumonitis

---

4. What is the most probable diagnosis for a young male patient who experiences drooping eyelids that worsens as the day progresses, along with increased fatigue towards the end of the day which improves with rest? Additionally, the patient notices a significant decrease in drooping when placing an ice pack over their eyes.

A. Myasthenia gravis

B. Huntington chorea

C. Amyotrophic lateral sclerosis

D. External ophthalmoplegia

---

5. What is the likely diagnosis for a 50-year-old woman who is experiencing challenges with activities such as climbing stairs, rising from a chair, and grooming her hair, along with the observation of violaceous redness on her upper eyelids?

A. Inclusion body myositis

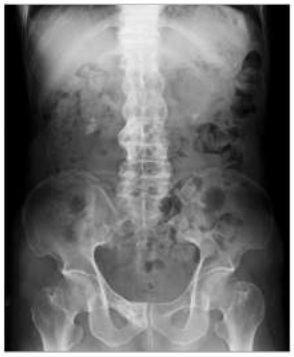
B. Dermatomyositis

C. Polymyositis

D. Scleroderma

---

6. A young man came to the medical OPD with complaints of early morning backache and stiffness, which improves on exercise, and persistent red eyes. On examination, lung expansion was less than 3 cm. X-ray is shown below. What is the most probable diagnosis?



A. Ankylosing spondylitis

B. Paget's disease

C. Healed tuberculosis

D. Osteopetrosis

---

7. A chronic alcoholic patient presents with acute pain and swelling of the left great toe. There is no history of trauma. Synovial fluid analysis shows elevated1 leukocytes. Lab investigations show normal serum uric acid levels. What is the most likely diagnosis?

A. Pseudogout

B. Acute gout

C. Reactive arthritis

D. Septic arthritis

---

8. Which of the following is not a first-line drug for the management of a patient with rheumatoid arthritis?

A. Sulfasalazine

B. Hydroxychloroquine

C. Methotrexate

D. Azathioprine

---

9. A young patient presents to the clinic with erythematous lesions over the exposed areas of the skin, like hands, arms, and chest. He also complains of arthralgia and breathlessness. Measuring which among the following antibodies will be useful in diagnosing the underlying conditions?

A. Antihistone antibodies

B. Anti-dsDNA antibodies

C. Anticentromere antibodies

D. Antinuclear antibodies

---

10. A 36-year-old woman presented with claudication in the forearm, transient loss of vision, and abdominal pain. Femoral pulses were weak. Fundus examination revealed retinal haemorrhages. What is the likely diagnosis?

A. Polyarteritis nodosa

B. Thromboangiitis obliterans

C. Takayasu arteritis

D. Microscopic polyangiitis

---

11. A woman presents with numbness of her fingertips. On examination, the skin over her face appears tightened. The antinuclear antibody (ANA) is found to be positive and immunofluorescence shows the nucleolar pattern. What is the likely diagnosis?

A. Systemic sclerosis

B. Sjogren's syndrome

C. Systemic lupus erythematosus

D. Rheumatoid arthritis

---

12. What should be the first-line treatment for a patient with giant cell arteritis?

A. Abatacept

B. Tocilizumab

C. Steroids

D. Aspirin

---

13. Which among the following is more common in limited cutaneous systemic sclerosis when compared to diffuse systemic sclerosis?

A. Esophageal dysmotility

B. Myopathy

C. Interstitial lung disease

D. Scleroderma renal crisis

---

14. Which of the following is true about polyarteritis nodosa?

A. Necrotising inflammation of large vessels

B. Patient has hypogammaglobulinemia

C. 90% is associated with ANCA positivity

D. 30% is associated with Hepatitis B

---

15. The slowing of conduction in multiple sclerosis is due to which of the following?

A. Gliosis

B. Loss of myelin sheath

C. Defect at node of Ranvier

D. Leaky Na+ channel

---

16. Which drugs are not used for a patient diagnosed with sarcoidosis?

A. Fludrocortisone

B. Hydroxychloroquine

C. Methotrexate

D. Prednisone

---

17. A patient presents with severe pain and swelling in his knee joint for 10 days. He also complains of pain and discomfort during urination. He says that he had diarrhea one month ago and he has been unwell since then. What is the most likely diagnosis?

A. Reactive arthritis

B. Enteropathic arthritis

C. Rheumatoid arthritis

D. Psoriatic arthritis

---

18. Which drug is the preferred choice for managing primary progressive multiple sclerosis?

A. Natalizumab

B. Ocrelizumab

C. Fingolimod

D. Alemtuzumab

---

19. A patient presented with sinusitis, ulcerative lesions on the nasopharynx, nodular lesions with cavitations of the lung, and renal failure. Which of the following is the most useful investigation for this patient?

A. Test for ANCA

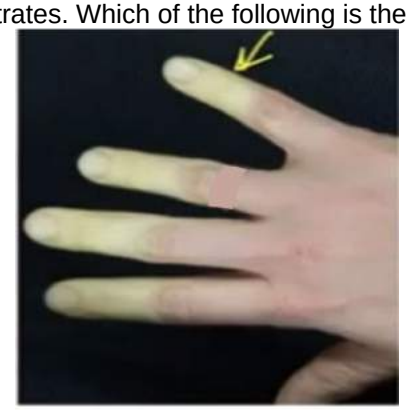
B. Biopsy to show granuloma

C. AFB staining of sputum

D. BAL

---

20. A 52 year old woman presented with changes in the hand as shown below. There is decreased motion in the small joints and loss of wrinkle lines on the facial skin. Her chest radiograph showed prominent bilateral lower lobe infiltrates. Which of the following is the most likely diagnosis?



A. Rheumatoid arthritis

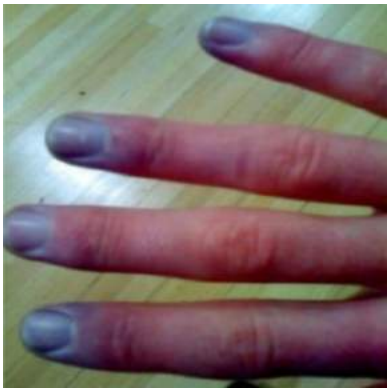
B. Scleroderma

C. Systemic lupus Erythematosus

D. Pneumonia

---

21. A 19 year old woman with no comorbidities presented with numbness and paraesthesia of the fingers along with the characteristic finding as shown in the image below. She has no other illnesses and she says these episodes occur when she is under excess stress or during cold climates. What is the most likely diagnosis?



A. Primary Raynaud's phenomenon

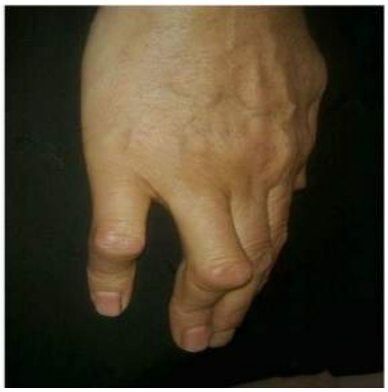
B. Secondary Raynaud's phenomenon

C. Cold sores

D. Sclerodema

---

22. Identify the deformity depicted in the image:



A. Swan neck deformity

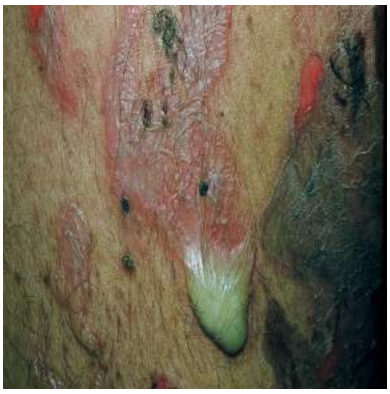
B. Boutonniere deformity

C. Z line deformity

D. Trigger finger

---

23. A patient presents with flaccid bullous lesions as shown in the image below involving the entire trunk and oral cavity. Acantholytic cells are seen on Tzank smear. What is the most probable diagnosis?



A. Pemphigus foliaceus

B. Pemphigus vulgaris

C. Dermatitis herpetiformis

D. Bullous pemphigoid

---

24. Which of the following condition leads to the development of wing beating tremor?

A. Wilson’s disease

B. Huntington’s chorea

C. Parkinsonism

D. Sydenham’s chorea

---

25. What condition is likely in a patient who presents to the hospital with symptoms of lethargy, increased sleep, and weight gain, and exhibits low plasma TSH concentration, low T3, and low T4 levels, but shows an increase in TSH levels after the administration of TRH?

A. Hyperthyroidism due to disease in the pituitary

B. Hypothyroidism due to disease in the pituitary

C. Hypothyroidism due to disease in the hypothalamus

D. Hyperthyroidism due to disease in the hypothalamus

---

26. The image shown below depicts a specific physical finding. Which of the following conditions is not associated with this finding?

A. Rheumatoid arthritis

B. Pregnancy

C. Liver cirrhosis

D. Hypoestrogenic state

---

27. A patient with rheumatoid arthritis has been treated with methotrexate and low-dose corticosteroids for the past 4 months. However, the disease is still progressing. What would be your recommendation for the further management of this patient?

A. Stop oral methotrexate and start parenteral methotrexate

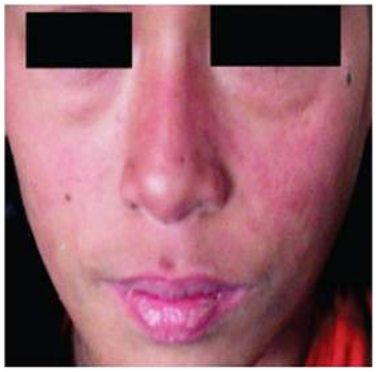
B. Add sulfasalazine and hydroxychloroquine

C. Continue corticosteroids and methotrexate

D. Start only anti-TNF alpha agents

---

28. A female patient presents with fever, oral ulcer, photosensitivity, and rashes on her face as shown below. What is the most likely diagnosis?



A. Dermatomyositis

B. Systemic lupus erythematosus

C. Rosacea

D. Melasma

---

29. What extra-articular manifestation is commonly observed in patients with rheumatoid arthritis?

A. Subcutaneous nodule

B. Sjogren’s syndrome

C. Felty’s syndrome

D. Vasculitis

---

30. What is the next recommended investigation to aid in diagnosing the condition of a patient who has cutaneous vasculitis, glomerulonephritis, and peripheral neuropathy?

A. ANCA

B. RA factor

C. HbsAg

D. MIF

---

31. Which of the following medications is not used in the treatment of rheumatoid arthritis?

A. Febuxostat

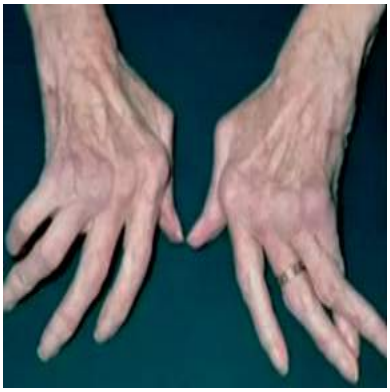
B. Leflunomide

C. Etanercept

D. Methotrexate

---

32. An elderly woman presents with a chronic history of pain in the small joints of hands with stiffness of joints in the early hours of the day. The image of the patient's hands is given below. What is the most likely diagnosis?



A. Rheumatoid Arthritis

B. Osteoarthritis

C. Complex Regional Pain Syndrome

D. Villonodular synovitis

---

33. A triad of asthma, systemic vasculitis and eosinophilia is seen in which of the following conditions?

A. Cryoglobulinemic vasculitis

B. Polyarteritis nodosa

C. Churg Strauss syndrome

D. Giant cell arteritis

---

34. Common neurological tumour in NF-2?

A. Vestibular Schwannoma

B. Optic glioma

C. Café-Au-Lait macules

D. Neurofibrosarcoma

---

35. All of the following characteristics are found in the pleural effusion fluid of a rheumatoid arthritis patient except:

A. RA factor

B. High glucose

C. Cholesterol crystals

D. High LDH

---

36. What is the probable diagnosis of a 45-year-old woman who complains of dryness in her mouth and eyes, and has positive anti-Ro and anti-La antibodies? The image below shows a positive test result with a score of less than 5 mm in 5 minutes without anesthesia.

A. Scleroderma

B. Dehydration

C. Lacrimal duct stones

D. Sjogren syndrome

---

37. A 29-year-old female patient presents with multiple oral and genital ulcers. The patient claims these ulcers resolve spontaneously and that she experiences such episodes at least four times a year. Ocular examination reveals features of anterior uveitis. What is the likely diagnosis?

A. Rheumatoid arthritis

B. Psoriatic arthritis

C. SLE

D. Behcet's disease

---

38. A 45-year-old presented with severe pain in the right leg below the knee. He had a history of restricted ambulation and prolonged bed rest due to severe back pain. He has no other comorbidities. On examination, the skin over his right calf appears shiny and taut. Additionally, tenderness and increased girth of the right calf are also noted. What is the most probable clinical diagnosis?

A. Cellulitis of the leg

B. Compartment syndrome

C. Deep vein thrombosis

D. Arterial claudication

---

39. What is the accurate description of marble Schonberg disease?

A. Osteopetrosis

B. Osteomalacia

C. Osteosclerosis

D. Osteonecrosis

---

40. What is the accurate statement regarding rheumatoid nodules?

A. Tender, located on extensor surface and seen with arthritis

B. Non tender, located on extensor surface and seen with arthritis

C. Non tender, located on flexor surface and seen with arthritis

D. Tender, located on flexor surface and seen with arthritis

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	2
Question 3	1
Question 4	1
Question 5	2
Question 6	1
Question 7	2
Question 8	4
Question 9	2
Question 10	3
Question 11	1
Question 12	3
Question 13	1
Question 14	4
Question 15	2
Question 16	1
Question 17	1
Question 18	2
Question 19	1
Question 20	2
Question 21	1
Question 22	2
Question 23	2
Question 24	1
Question 25	3
Question 26	4
Question 27	2

Question 28	2
Question 29	1
Question 30	1
Question 31	1
Question 32	1
Question 33	3
Question 34	1
Question 35	2
Question 36	4
Question 37	4
Question 38	3
Question 39	1
Question 40	2

Solution for Question 1:

Correct Option: B

• Anti-nuclear antibodies (ANAs) are autoantibodies that target components within the cell nucleus. They are important diagnostic markers for various autoimmune diseases, including systemic lupus erythematosus (SLE).

• SLE is a chronic autoimmune disease characterized by the presence of a wide range of autoantibodies, including ANAs. ANA testing is a valuable tool in the diagnosis of SLE, as it helps to detect the presence of these antibodies in the patient's blood. The most common ANA pattern seen in SLE is a homogeneous (diffuse) pattern, although other patterns can also be observed.

Incorrect Options:

Option A. Scleroderma: ANAs are also present in scleroderma, another autoimmune disease, but their presence is not specific for scleroderma alone. Additional antibodies such as anti-centromere antibodies (ACA) and anti-topoisomerase I (Scl-70) antibodies are more specific for scleroderma diagnosis.

Option C. Drug-induced lupus: Drug-induced lupus is a condition that can occur as a result of certain medications, and it shares some clinical features with SLE. However, ANAs are not typically required for the diagnosis of drug-induced lupus. The presence of ANAs in drug-induced lupus is less common and usually of lower titer compared to SLE.

Option D. Sjogren's syndrome: ANAs are present in the majority of patients with Sjogren's syndrome, an autoimmune disorder characterized by dry eyes and mouth. However, the hallmark autoantibodies in Sjogren's syndrome are anti-SSA (Ro) and anti-SSB (La) antibodies. These antibodies are more specific for the diagnosis of Sjogren's syndrome than ANAs alone.

Solution for Question 2:

Correct Option B: Diffuse cutaneous systemic sclerosis

• In the above case, along with the clinical presentation of swollen fingers, heartburn, and occasional joint pains, shiny and taut, thickened skin with non-pitting edema in the presence of ANA antibodies, topoisomerase I antibodies and anti-RNA polymerase III antibodies. It is most suggestive of Diffuse Cutaneous Systemic Sclerosis.

Incorrect Options:

Option A: Limited cutaneous systemic sclerosis is positive for anti-centromere antibody or ACA.

Option C: Raynaud's phenomenon is one of the characteristic presentations of diffuse cutaneous syste mic sclerosis. Some body parts, like the fingers and nose, feel numb and cool in response to cold temp eratures or stress.

Option D: Peutz-jeghers syndrome is an inherited condition that increases the risk of hamartomatous p olyps in the GIT and cancers in the GIT and that of the breast, testicles, and ovaries. Since there are n o polyps, PJS is unlikely to be the diagnosis.

Solution for Question 3:

Correct Option A - Sarcoidosis:

• The clinical presentation of fever, night sweats, bilateral facial nerve paralysis, and bilateral hilar lymphadenopathy are suggestive of a systemic inflammatory condition affecting multiple organs.

• Sarcoidosis is a multisystem granulomatous disorder that commonly presents with hilar lymphadenopathy besides other features of systemic involvement such as facial nerve palsy.

Incorrect Options:

Option B - Tuberculosis: It can display bilateral hilar lymphadenopathy and fever, but it is less likely to c ause facial nerve palsy.

Options C and D (Lymphoma & Hypersensitive pneumonitis) are incorrect.

Solution for Question 4:

Correct Option A - Myasthenia gravis:

• Myasthenia gravis is an autoimmune disorder that affects the neuromuscular junction, causing muscle weakness and fatigue. It is caused by antibodies that attack the acetylcholine receptors on the muscle, leading to a decrease in the number of available receptors and impaired nerve transmission. Ptosis, or drooping of the eyelid, is a common symptom. The ptosis tends to worsen through the day as more acetylcholine receptors are involved. Patients may also experience double vision, difficulty speaking or swallowing, and weakness in the limbs.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 5:

Correct Option B - Dermatomyositis:

• Based on the symptoms described the most likely diagnosis is Dermatomyositis.

• Dermatomyositis is an inflammatory myopathy that causes muscle weakness as well as skin involvement.

• It affects both children and adults, with a higher prevalence in middle-aged people.

• Dermatomyositis causes muscle weakness in the proximal muscles and can also affect the muscles of the neck and throat, making swallowing or speaking difficult.

Incorrect Options:

Option A - Inclusion body myositis: Inclusion body myositis is an inflammatory muscle disorder that causes muscle weakness and wasting. However, it usually affects older peopleand is associated with distal muscle weakness (e.g., finger flexors, quadriceps).

Option C - Polymyositis: Polymyositis is an autoimmune inflammatory muscle disease that causes muscle weakness in the proximal muscles. It is not commonly associated with the skin manifestations seen in dermatomyositis, such as violaceous erythema on the upper eyelids.

Option D - Scleroderma: Scleroderma, also known as systemic sclerosis, is a chronic autoimmune connective tissue disorder affecting the skin and various internal organs. While it can cause muscle weakness, it does not usually present with the typical skin changes seen in dermatomyositis, such as violaceous erythema of the upper eyelids. Skin thickening and fibrosis, involvement of multiple organ systems, and the presence of specific autoantibodies are all symptoms of scleroderma.

Solution for Question 6:

Correct Option A - Ankylosing spondylitis:

• In X-ray, the appearance of the Bamboo spine is seen, which is characteristic of Ankylosing spondylitis.

• Low backache and nocturnal pain that decreases with activity is also suggestive of Ankylosing spondylitis.

• Ankylosing spondylitis is an inflammatory disease of the axial spine. It begins in the early years of life when patients present with stiffness and pain in the spine, which gets relieved as the day progresses. The inflammation can cause fusion of the bones, thus leading to the appearance of the “bamboo spine”, as seen in the patient’s X-ray. If the fusion occurs at the thoracic vertebra level, it can lead to difficulty in chest movement, causing decreased chest expansion, as seen in the patient.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 7:

Correct Option B - Acute gout:

• Acute gout is a form of arthritis is characterized by severe pain, redness, and tenderness in joints, most often the big toe.

• When too much uric acid crystallizes and accumulates in the joints, it can result in pain and inflammation.

• The serum uric acid levels do not need to be raised for the uric acid to crystallize and deposit in the joints, but an increased serum uric acid level does predispose patients to this condition.

• Gout attacks can come suddenly and are often at night. Increased consumption of alcohol also facilitates the increased production of uric acid and its decreased excretion in urine, causing its accumulation.

• Thus, the most likely diagnosis for the patient is acute gout.

Incorrect Options:

Option A - Pseudogout: Pseudogout is a
condition that develops when tiny calcium pyrophosphate crystals gather in a joint and cause an immu ne system reaction. Any joint can have pseudogout. The knee, wrist, or large knuckles of the hand (me tacarpophalangeal joints) are the areas most likely to be affected, but they can also impact the hip, sho ulder, and spine. Pseudogout, unlike gout, hardly ever affects the big toe.

Option C - Reactive arthritis: An infection of the gastrointestinal or genitourinary system can cause reac tive arthritis, an inflammatory form of arthritis that develops days to weeks later.

Option D - Septic arthritis: Infectious arthritis is another name for septic arthritis, which is typically brou ght on by bacteria. This condition is an infection-related joint inflammation. Septic arthritis typically imp acts one sizable joint, like the knee or hip.

Solution for Question 8:

Correct Option D - Azathioprine:

• Azathioprine is not considered a first-line drug for the management of rheumatoid arthritis (RA). It is primarily used as an immunosuppressant in organ transplantation and certain autoimmune conditions but is not typically recommended as an initial treatment for RA due to it’s inconsistent efficacy and high toxicity.

Incorrect Options:

Option A - Sulfasalazine: Sulfasalazine is one of the disease-modifying antirheumatic drugs (DMARDs) commonly used in the treatment of RA. It helps reduce inflammation and joint damage and is consider ed a first-line treatment option for RA.

Option B - Hydroxychloroquine: Hydroxychloroquine is another DMARD used in the management of R A. It has anti-inflammatory properties and can help control symptoms and slow disease progression. It i s often prescribed as a first-line treatment option, especially in mild to moderate RA.

Option C - Methotrexate: Methotrexate is widely recognized as the first-line DMARD for the treatment o f RA. It is highly effective in reducing symptoms, preventing joint damage, and improving long-term out comes. Methotrexate is considered the anchor drug and is often prescribed as the initial treatment for most patients with RA.

Solution for Question 9:

Correct Option B - Anti-dsDNA antibodies:

• The likely diagnosis in this patient is systemic lupus erythematosus.

• Anti-dsDNA antibodies are specific to systemic lupus erythematosus (SLE), a chronic autoimmune disease. These antibodies target double-stranded DNA and are found in a significant number of patients with SLE. Their presence is highly specific to SLE and is associated with lupus nephritis (kidney involvement) and other manifestations of the disease.

Incorrect Options:

Option A - Antihistone antibodies: Antihistone antibodies are antibodies that target histones, proteins a ssociated with DNA in the nucleus. They are most commonly associated with drug-induced lupus, a co ndition that resembles SLE but is caused by certain medications. In this scenario, where the symptoms are suggestive of SLE, testing for antihistone antibodies would be less relevant.

Option C - Anticentromere antibodies: Anticentromere antibodies are associated with a distinct autoim mune disease called limited cutaneous systemic sclerosis, also known as CREST syndrome. This con dition primarily affects the skin, blood vessels, and internal organs. The symptoms and clinical features described in the patient are not consistent with CREST syndrome, making testing for anticentromere a ntibodies less useful in this case.

Option D - Antinuclear antibodies (ANA): Antinuclear antibodies target components within the cell nucle us and can be found in various autoimmune diseases, including SLE. While antinuclear antibodies are a useful screening test for autoimmune diseases, including SLE, they are not as specific to SLE as anti dsDNA antibodies.

Solution for Question 10:

Correct Option C - Takayasu arteritis:

• Takayasu arteritis is a large vessel vasculitis that affects the aorta and its major branches. It primarily affects young women and presents with symptoms related to the affected arteries. Common manifestations include weak or absent pulses, claudication, blood pressure differences between arms, and visual disturbances due to ocular artery involvement. The symptoms described in the case, including claudication, weak femoral pulses, transient loss of vision, and retinal hemorrhages, are highly suggestive of Takayasu arteritis. Therefore, Takayasu arteritis is the most likely diagnosis.

Incorrect Options:

Option A - Polyarteritis nodosa: Polyarteritis nodosa is a systemic vasculitis that primarily affects mediu m-sized arteries. It typically presents with constitutional symptoms such as fever, weight loss, and fatig ue. It can involve multiple organ systems, including the skin, joints, kidneys, and gastrointestinal tract. However, the symptoms described in the case, such as claudication, transient loss of vision, and retina l hemorrhages, are not characteristic of polyarteritis nodosa.

Option B
- Thromboangiitis obliterans: Thromboangiitis obliterans, also known as Buerger's disease, is a non-ath erosclerotic segmental inflammatory disease that affects small and medium-sized arteries and veins, p articularly in the extremities. It is strongly associated with tobacco smoking. The typical presentation in cludes claudication, digital ischemia (such as ulcers or gangrene), and Raynaud's phenomenon. While the symptoms of claudication and peripheral arterial involvement are present in the case, the involvem ent of the eyes (transient loss of vision, retinal hemorrhages) and abdominal pain make thromboangiitis

obliterans less likely.

Option D - Microscopic polyangiitis: Microscopic polyangiitis is a small vessel vasculitis that primarily affects capillaries, venules, and arterioles. It can involve multiple organ systems, including the kidneys, lungs, skin, and peripheral nerves. While it can present with systemic symptoms and renal involvement, the specific symptoms described in the case, such as claudication, transient loss of vision, and retinal hemorrhages, are not typical of microscopic polyangiitis.

Solution for Question 11:

Correct Option A - Systemic sclerosis (Scleroderma):

• Systemic sclerosis is an autoimmune connective tissue disorder characterized by excessive fibrosis and thickening of the skin and internal organs. It can present with Raynaud's phenomenon, which is often the initial symptom and can cause numbness of the fingertips. The tightening of the skin over the face, known as "scleroderma," is a characteristic feature of systemic sclerosis. The presence of a positive antinuclear antibody (ANA) with a nucleolar pattern on immunofluorescence testing is associated with systemic sclerosis. Therefore, systemic sclerosis is the likely diagnosis in this case.

Incorrect Options:

Option B - Sjogren's syndrome: Sjogren's syndrome is an autoimmune disorder that primarily affects the exocrine glands, leading to dryness of the eyes and mouth.

Option C - Systemic lupus erythematosus (SLE): SLE is a multisystem autoimmune disease that can affect various organs and tissues. It can present with a wide range of symptoms, including numbness and tingling in the extremities. However, the tightening of the face seen in systemic sclerosis and the nucleolar pattern on ANA immunofluorescence testing are not characteristic of SLE. Therefore, SLE is less likely to be the diagnosis in this case.

Option D - Rheumatoid arthritis: Rheumatoid arthritis primarily affects the joints, causing inflammation, pain, and stiffness. It does not typically involve numbness of the fingertips or the tightening of the face seen in systemic sclerosis. Additionally, the nucleolar pattern on ANA immunofluorescence testing is not associated with rheumatoid arthritis. Therefore, rheumatoid arthritis is less likely to be the diagnosis in this case.

Solution for Question 12:

Correct Option C - Steroids:

• Steroids, This option is the correct answer. Glucocorticoids (steroids) are the first-line treatment for GCA. They have been shown to be highly effective in reducing inflammation and preventing complications associated with GCA. The initial dosage of steroids is usually high, with gradual tapering based on clinical response and laboratory markers of inflammation.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 13:

Correct Option A - Esophageal dysmotility:

• In limited cutaneous systemic sclerosis, also known as limited scleroderma or CREST syndrome, esophageal dysmotility is more common compared to diffuse cutaneous systemic sclerosis. Limited cutaneous systemic sclerosis is characterized by skin involvement limited to the face, neck, and distal extremities, while diffuse cutaneous systemic sclerosis involves more widespread skin fibrosis.

Incorrect Options:

• Options B, C and D are more commonly associated with diffuse systemic sclerosis.

Solution for Question 14:

Correct Option D - 30% is associated with Hepatitis B:

• This statement is true. Approximately 30% of cases of polyarteritis nodosa are associated with chronic Hepatitis B infection. The immune response triggered by the Hepatitis B virus can cause immune complex deposition and subsequent inflammation in the arterial walls, leading to the development of PAN.

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 15:

Correct Option B - Loss of myelin sheath:

• This is the correct answer. Multiple sclerosis is a chronic autoimmune disorder characterized by the destruction of myelin, the protective covering of nerve fibers in the CNS. The loss of myelin disrupts the normal conduction of nerve impulses, resulting in a slowing of nerve transmission and the characteristic neurological symptoms seen in MS patients.

Incorrect Options:

• Options A, C, and D are incorrect.

Solution for Question 16:

Correct Option A - Fludrocortisone:

• Sarcoidosis is an inflammatory disorder most commonly seen in the lungs. Patients may exhibit symptoms like cough and dyspnoea, which are mostly treated with glucocorticoids. The first-line treatment is glucocorticoids with additional DMARDS like methotrexate, hydroxychloroquine, biologics like TNF alpha inhibitors, and Azathioprine.

• Fludrocortisone is a mineralocorticoid mainly used for Addison’s disease.

Incorrect Options:

• Options B, C and D are used in the management of patients with sarcoidosis.

Solution for Question 17:

Correct Option A - Reactive arthritis:

• In the above case, there is a history of knee swelling, urethritis, and diarrhea. It points towards the diagnosis of reactive arthritis. It is a post-infectious autoimmune disease. The most common systems affected would be the gastrointestinal or urinary tract.

Incorrect Options:

Option B - Enteropathic arthritis: Enteropathic arthritis Is a spondyloarthropathy that is associated with i nflammatory bowel diseases like Crohn’s and ulcerative colitis. It typically causes sacroiliitis and spond ylitis and involves peripheral joints.

Option C - Rheumatoid arthritis: Rheumatoid arthritis is seen in mostly young females and presents wit h painful tender joints. PIP and MCP are affected symmetrically in bilateral limbs. Patients experience morning stiffness and the hallmark feature is flexor tenosynovitis. Swan neck deformity and Boutonnièr e deformity is also seen.

Option D - Psoriatic arthritis: Psoriatic arthritis is associated with a chronic inflammatory skin disorder. Psoriasis causes Inflammatory arthritis and primarily affects the hands, feet, or spine.

Solution for Question 18:

Correct Option B - Ocrelizumab:

• Ocrelizumab is an approved medication for the treatment of both relapsing forms of multiple sclerosis (MS) and primary progressive MS. It is a monoclonal antibody that specifically targets CD20-positive B cells, leading to their depletion. Ocrelizumab has shown efficacy in reducing disease activity and slowing disability progression in patients with PPMS.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 19:

Correct Option A - Test for ANCA:

• The combination of sinusitis, ulcerative lesions on the nasopharynx, nodular lesions with cavitations of the lung, and renal failure raises suspicion for a condition known as granulomatosis with polyangiitis (GPA), formerly called Wegener’s granulomatosis. GPA is a systemic autoimmune vasculitis that primarily affects the small and medium-sized blood vessels, leading to inflammation and tissue damage.

• Testing for ANCA is crucial in evaluating patients with suspected GPA. ANCA, specifically the c-ANCA (cytoplasmic ANCA) subtype, is present in many GPA cases. The presence of c-ANCA,

directed against proteinase 3 (PR3) antibodies, supports the diagnosis of GPA. However, it’s important to note that a small percentage of GPA cases may be ANCA-negative.

Incorrect Options:

Option B - Biopsy to show granuloma: While granulomas can be seen in GPA, they are not always pre sent, and their absence does not exclude the diagnosis. Biopsy findings can provide supportive eviden ce but are not definitive on their own.

Option C - AFB staining of sputum: Acid-fast bacilli (AFB) staining is useful for detecting organisms suc h as Mycobacterium tuberculosis, which causes tuberculosis. However, the clinical presentation descri bed in the question is not suggestive of tuberculosis.

Option D - BAL (Bronchoalveolar Lavage): BAL can be helpful in evaluating lung involvement in GPA a nd identifying inflammatory cells, but it is not the most useful investigation for confirming the diagnosis. ANCA testing provides more specific information in this scenario.

Solution for Question 20:

Correct Option B - Scleroderma:

• Based on the given clinical presentation and findings, the most likely diagnosis in this case is Scleroderma.

• Scleroderma, also known as systemic sclerosis, is a chronic autoimmune disease characterized by fibrosis (hardening) of the skin and internal organs. The image in the vignette depicts Raynaud's phenomenon, which is seen in patients with scleroderma.

• Loss of wrinkle lines on the facial skin, known as the "mask-like" facies, is another clinical manifestation commonly seen in scleroderma. This occurs due to thickening and tightening of the skin.

• The prominent bilateral lower lobe infiltrates on the chest radiograph suggest pulmonary involvement, which is common in scleroderma. Pulmonary fibrosis, interstitial lung disease, and pulmonary hypertension are potential complications of scleroderma that can manifest as lung infiltrates.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 21:

Correct Option A - Primary Raynaud’s phenomenon:

• Based on the information provided, the most likely diagnosis for the 19-year-old woman is Primary Raynaud's phenomenon.

• Raynaud's phenomenon is characterized by episodic vasospasm of the digital arteries, leading to color changes, numbness, and paraesthesia of the fingers or toes. There are two main types: Primary Raynaud's phenomenon and Secondary Raynaud's phenomenon.

• Primary Raynaud's phenomenon: This occurs without an underlying cause or associated medical condition. It is usually triggered by cold temperatures or emotional stress. The color changes during an episode include pallor (white discoloration) followed by cyanosis (bluish discoloration) and then reactive

hyperemia (redness) as blood flow returns. The characteristic finding in Primary Raynaud's phenomenon is the absence of any underlying disease or abnormal laboratory findings.

Incorrect Options:

Option B - Secondary Raynaud's phenomenon: This occurs as a result of an underlying condition or di sease, such as autoimmune disorders (e.g., systemic sclerosis, lupus), connective tissue diseases, art erial diseases, or occupational exposure to certain chemicals or vibrations. In Secondary Raynaud's ph enomenon, the episodes are often more severe and may be associated with tissue damage or ulcerati on. Patients may also have abnormal laboratory findings or other signs and symptoms related to an un derlying autoimmune disorder.

Options C & D (Cold sores & Sclerodema) are incorrect.

Given the absence of any comorbidities or underlying diseases, the association of symptoms with cold temperatures or stress, and the characteristic color changes during episodes, the most likely diagnosis in this case is Primary Raynaud's phenomenon.

Solution for Question 22:

Correct Option B - Boutonniere deformity:

• This deformity involves flexion of the proximal interphalangeal joint and hyperextension of the distal interphalangeal joint of the finger, resulting in a finger with a bent appearance at the middle joint and extended at the end joint.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 23:

Correct Option B - Pemphigus vulgaris:

• Based on the provided information, if the patient is presenting with flaccid bullous lesions involving the entire trunk and oral cavity, along with the presence of acantholytic cells on Tzanck smear, the most probable diagnosis would be Pemphigus vulgaris.

• Pemphigus vulgaris is known to involve both the skin and mucous membranes, including the oral cavity. The presence of acantholytic cells in Tzanck smear is a characteristic finding in pemphigus vulgaris. However, a definitive diagnosis would require additional clinical evaluation, including a biopsy and direct immunofluorescence testing.

Incorrect Options:

Option A - Pemphigus foliaceus: Althougus pemphigus foliaceous may present with similar features it d oes not classically involve the mucous membranes.

Option C - Dermatitis herpetiformis: Dermatitis herpetiformis is a chronic, intensely itchy skin condition t hat is associated with celiac disease. It is characterized by clusters of small, intensely itchy vesicles an d papules on the extensor surfaces of the elbows, knees, and buttocks. It is caused by an autoimmune

reaction to gluten. A Tzanck smear is not typically used to diagnose dermatitis herpetiformis.

Option D - Bullous pemphigoid: Bullous pemphigoid is an autoimmune blistering disorder that primarily affects the elderly. It is characterized by tense bullae that typically occur on the flexural surfaces of the body, such as the armpits and groin. A
Tzanck smear is not typically used to diagnose bullous pemphigoid.

Solution for Question 24:

Correct Option A - Wilson’s disease:

• Wing beating tremor, also known as asterixis, refers to a flapping tremor of the hands and arms resembling a bird's wing flapping. It is associated with the presence of hepatic encephalopathy, which can occur in various conditions affecting the liver and central nervous system. Among the options provided, Wilson's disease is the most likely cause of wing beating tremor. Wilson's disease is a genetic disorder characterized by impaired copper metabolism, leading to copper accumulation in various organs, including the liver, brain, and cornea. The accumulation of copper in the brain can result in neurological symptoms, such as movement disorders. One of the characteristic movement disorders seen in Wilson's disease is a wing beating tremor.

Incorrect Options:

• Options B, C, and D are not characteristically associated with asterixis.

Solution for Question 25:

Correct Option C - Hypothyroidism due to disease in the hypothalamus:

• The patient presents with lethargy, increased sleep, and weight gain. These are classic symptoms of hypothyroidism, which is characterized by an underactive thyroid gland. The plasma TSH concentration is low, indicating a lack of stimulation to the thyroid gland. Additionally, both T3 and T4 levels are low, which are the thyroid hormones responsible for regulating metabolism.

• TRH (thyrotropin-releasing hormone) is typically administered to evaluate the function of the hypothalamus-pituitary-thyroid (HPT) axis. In this case, the administration of TRH results in an increase in TSH levels. This indicates that the pituitary gland is capable of responding to TRH by releasing TSH. This suggests a problem with the hypothalamus, which is responsible for producing TRH. Based on the given information, the most likely condition in this patient is Hypothyroidism due to disease in the hypothalamus.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 26:

Correct Option D - Hypoestrogenic state:

• In a hypoestrogenic state, such as menopause or certain medical conditions, the levels of estrogen in the body are reduced. Red hands or palmar erythema is not typically associated with a hypoestrogenic state.

• Palmar erythema is more commonly seen in conditions related to increased estrogen levels, such as pregnancy or hormonal disorders. In a hypoestrogenic state, the blood vessels in the skin may not be dilated as much, leading to a normal or pale appearance of the hands rather than redness.

Incorrect Options:

• Options A, B and C are associated with palmar erythema.

Solution for Question 27:

Correct Option B - Add sulfasalazine and hydroxychloroquine:

• When a patient with rheumatoid arthritis shows inadequate response to initial therapy with methotrexate and low-dose corticosteroids, the addition of other disease-modifying antirheumatic drugs (DMARDs) is often recommended. Sulfasalazine and hydroxychloroquine are commonly used DMARDs and can be added to the treatment regimen to improve disease control.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 28:

Correct Option B - Systemic lupus erythematosus:

• SLE is a chronic autoimmune disease that can affect multiple organs and systems, including the skin, joints, kidneys, heart, and lungs. The butterfly rash, also known as malar rash, is a hallmark feature of SLE and typically appears on the face over the cheeks and bridge of the nose.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 29:

Correct Option A - Subcutaneous nodule:

• Subcutaneous nodules are the most common extra-articular manifestation of rheumatoid arthritis.

• These nodules typically develop over bony prominences or pressure points and are often found on the extensor surfaces of the forearms and elbows.

Incorrect Options:

Option B - Sjogren's syndrome: While Sjogren's syndrome, an autoimmune disorder characterized by d ry eyes and dry mouth, can occur in patients with rheumatoid arthritis, it is not the most common extra-articular manifestation of the disease.

Option C - Felty's syndrome: Felty's syndrome is a rare complication of rheumatoid arthritis characteriz ed by the triad of rheumatoid arthritis, splenomegaly, and neutropenia. It occurs in a small percentage of patients with rheumatoid arthritis but is not the most common extra-articular manifestation.

Option D - Vasculitis: Vasculitis, inflammation of blood vessels, can occur in rheumatoid arthritis but is not the most common extra-articular manifestation. It is less common compared to subcutaneous nodul es.

Solution for Question 30:

Correct Option A - ANCA:

• The patient's presentation of cutaneous vasculitis, glomerulonephritis, and peripheral neuropathy is suggestive of small vessel vasculitis.

• ANCA testing is a valuable investigation in such case.

• ANCA is a group of autoantibodies that target neutrophil cytoplasmic antigens.

• Two main patterns of ANCA are recognized: cytoplasmic (c-ANCA) and perinuclear (p-ANCA).

• c-ANCA is typically associated with antibodies against proteinase 3 (PR3) and is seen in granulomatosis with polyangiitis (formerly known as Wegener's granulomatosis).

• p-ANCA is associated with antibodies against myeloperoxidase (MPO) and is seen in microscopic polyangiitis and eosinophilic granulomatosis with polyangiitis (formerly known as Churg-Strauss syndrome).

Incorrect Options:

Option B - RA factor (rheumatoid factor): Rheumatoid factor is an autoantibody commonly associated with rheumatoid arthritis (RA). While RA can involve multiple systems, including joints, it is not typically associated with cutaneous vasculitis, glomerulonephritis, and peripheral neuropathy. Therefore, perfor ming RA factor testing is unlikely to provide relevant diagnostic information in this case.

Option C - HbsAg (hepatitis B surface antigen): Hepatitis B infection can present with various clinical m anifestations, but cutaneous vasculitis, glomerulonephritis, and peripheral neuropathy are not commonl y associated with hepatitis B
infection. Therefore, testing for HbsAg is unlikely to help diagnose the underlying condition in this case.

Option D - MIF (migration inhibitory factor): Migration inhibitory factor is a pro-inflammatory cytokine th at has been implicated in various inflammatory conditions. However, it is not specific to any particular d isease or diagnostic entity. Testing for MIF alone would not provide sufficient diagnostic information to i dentify the underlying cause of the patient's presentation with cutaneous vasculitis, glomerulonephritis, and peripheral neuropathy.

Solution for Question 31:

Correct Option A - Febuxostat:

• Febuxostat is not used in the treatment of RA. It is a medication primarily used for the management of hyperuricemia (elevated levels of uric acid) in patients with gout. It works by inhibiting the enzyme xanthine oxidase, which is involved in the production of uric acid. While gout and RA are both inflammatory conditions, the use of febuxostat is not considered a standard treatment for RA.

Incorrect Options:

• Options B, C and D are used in the management of patients with rehumatoid arthritis.

Solution for Question 32:

Correct Option A - Rheumatoid Arthritis:

• In the given scenario, the patient is presenting with chronic pain in the small joints of the hands, along with stiffness of the joints in the early hours of the day. The image of the patient's hands is consistent with the characteristic findings seen in Rheumatoid Arthritis (RA).

• Rheumatoid Arthritis is a chronic autoimmune disease that primarily affects the joints. It typically presents with symmetrical involvement of the small joints, such as those in the hands and wrists. The characteristic features of RA include joint pain, swelling, and morning stiffness that lasts for at least one hour. The image provided shows the presence of joint swelling, deformities (such as ulnar deviation and swan neck deformity), and changes in the finger joints, which are commonly seen in RA.

Incorrect Options:

Option B - Osteoarthritis: Osteoarthritis is a degenerative joint disease characterized by the breakdown of joint cartilage. While it can also affect the small joints of the hands, the image and the clinical features described in the scenario are more indicative of Rheumatoid Arthritis. Osteoarthritis also does not present with symmetric involvement of joints unlike RA.

Option C - Complex Regional Pain Syndrome: Complex Regional Pain Syndrome, also known as Reflex Sympathetic Dystrophy, is a condition characterized by chronic pain, swelling, and changes in skin color and temperature in the affected limb. The presentation and image provided in the scenario are not consistent with Complex Regional Pain Syndrome.

Option D - Villonodular Synovitis: Villonodular Synovitis is a rare condition characterized by the proliferation of synovial tissue in joints, tendon sheaths, or bursae. While it can lead to joint pain and swelling, it typically presents with localized findings and is less likely to involve multiple small joints as seen in the image.

Solution for Question 33:

Correct Option C - Churg Strauss Syndrome:

• Churg Strauss syndrome, also known as eosinophilic granulomatosis with polyangiitis (EGPA), is a rare autoimmune condition characterized by a triad of symptoms including asthma, eosinophilia, and systemic vasculitis

• Features of EPGA are: Eosinophilic vasculitis that involves multiple organ systems Asthma Peripheral Eosinophilia Neuropathy Pulmonary infiltrates Paranasal sinus abnormalities

• Eosinophilic vasculitis that involves multiple organ systems

• Asthma

• Peripheral Eosinophilia

• Neuropathy

• Pulmonary infiltrates

• Paranasal sinus abnormalities

• Eosinophilic vasculitis that involves multiple organ systems

• Asthma

• Peripheral Eosinophilia

• Neuropathy

• Pulmonary infiltrates

• Paranasal sinus abnormalities

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 34:

Correct Option A - Vestibular Schwannoma:

• Bilateral Vestibular Schwannomas are most common tumor seen in patients with neurofibromatosis type 2.

Incorrect Options:

Option B - Optic glioma: Optic gliomas are tumors that affect the optic nerve. While they can be seen in other conditions such as neurofibromatosis type 1 (NF-1), they are not typically associated with NF-2.

Option C - Café-Au-Lait macules: Café-au-lait macules are pigmented skin lesions that can be seen in both NF-1 and NF-2. However, they are not tumors and do not specifically indicate the presence of a neurological tumor.

Option D - Neurofibrosarcoma: Neurofibrosarcoma is associated with neurofibromatosis type 1.

Solution for Question 35:

Correct Option B - High glucose:

• High glucose levels are typically not a characteristic feature of pleural effusion in rheumatoid arthritis. Elevated glucose levels in pleural fluid are commonly associated with conditions such as bacterial infections or malignancies. Rheumatoid effusion is usually associated with glucose <40 mg/dL.

Incorrect Options:

Option A - RA factor: RA factor (rheumatoid factor) is an autoantibody commonly found in the blood of i ndividuals with rheumatoid arthritis. It can also be detected in the pleural effusion fluid of RA patients.

Option C - Cholesterol crystals: Cholesterol crystals can be present in the pleural effusion fluid of rheu matoid arthritis patients. These crystals may form due to inflammation and the breakdown of cellular m embranes.

Option D - High LDH: High LDH (lactate dehydrogenase) levels are commonly seen in pleural effusions , including those associated with rheumatoid arthritis. LDH is an enzyme released from damaged or infl amed cells, and its elevation in the pleural fluid can indicate inflammation or tissue damage.

Solution for Question 36:

Correct Option D - Sjogren Syndrome:

• The above image is that of Schirmer’s test, and in the above case, the patient, a 45-year-old female patient, presents with dryness in the mouth and eyes. Schirmer’s was positive with a score of <5 mm in 5 minutes without anesthesia, indicating a tear deficiency The patient is also positive for anti-Ro and anti-La antibodies. The likely diagnosis in this case is Sjogren syndrome.

Incorrect Options:

Option A - Scleroderma: Scleroderma antibodies are anti-Scl-70 and anti-centromere.

Options B & C - Dehydration & Lacrimal duct stones: Dehydration & Lacrimal duct stones are unlikely s ince this patient tested positive for anti Ro and anti La antibodies which are characteristic of Sjogren sy ndrome.

Solution for Question 37:

Correct Option D - Behcet’s disease:

• Behcet's disease is a chronic autoimmune disorder characterized by recurrent oral and genital ulcers. It is a multi-systemic vasculitis that can affect blood vessels of all sizes. One of the common manifestations of Behcet's disease is uveitis.

Incorrect Options:

• Options A, B and C are incorrect and the presentation described in the vignette is more characteristic of Behcet's disease.

Solution for Question 38:

Correct Option C - Deep vein thrombosis:

• In the above case, a 45-year-old presented with severe pain in the right leg below the knee. He had a history of restricted ambulation and prolonged bed rest due to severe back pain. He has no other comorbidities. On examination of his right calf, discoloration, significantly increased girth and tenderness are noted. It is most suggestive of deep vein thrombosis due to immobilization.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 39:

Correct Option A - Osteopetrosis:

• Osteopetrosis (Marble Bone/Albers Schonberg disease): In osteopetrosis there is a defect in the normal process of bone resorption, resulting in excessive accumulation of dense, brittle bone tissue. This leads to increased bone density and reduced bone marrow space. The term "marble bone" refers to the appearance of the bones on imaging studies, which appear dense and resemble marble. Osteopetrosis can be inherited as an autosomal recessive or autosomal dominant condition and can manifest with various symptoms such as fractures, anemia, and impaired vision or hearing.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 40:

Correct Option B - Non tender, located on extensor surface and seen with arthritis:

• Rheumatoid nodules are subcutaneous nodules characteristic of rheumatoid arthritis. They are usually painless (non-tender) and are typically found over bony prominences, especially on the extensor surfaces of joints, such as the elbows. Rheumatoid nodules result from the accumulation of inflammatory cells and fibrous tissue and are a specific clinical manifestation of rheumatoid arthritis.

Incorrect Options:

Options A, C and D are incorrect.

Hepatitis

1. Match the following hepatic viruses with their respective diseases: 1. Hepatitis B virus a. Orthotopicliver transplant 2. Hepatitis E virus b. Co-infection 3. Hepatitis C virus c. Fulminant hepatic failure in pregnancy 4. Hepatitis D virus d. Transfusion-related hepatitis

1. Hepatitis B virus	a. Orthotopicliver transplant
2. Hepatitis E virus	b. Co-infection
3. Hepatitis C virus	c. Fulminant hepatic failure in pregnancy
4. Hepatitis D virus	d. Transfusion-related hepatitis

A. 1-c,2-a,3-b,4-d

B. 1-c,2-a,3-d,4-b

C. 1-d,2-c,3-a,4-b

D. 1-d,2-b,3-c,4-a

---

2. Which of the following is not a routinely done serological tests before blood transfusion?

A. HRP-2 dipstick

B. PCR HCV RNA

C. FTA-ABS

D. ELISA HIV

E. EIA-anti HAV antibody

---

3. A 50-year-old patient with decompensated cirrhosis presents with oliguria followed by anuria, raising suspicion of hepatorenal syndrome (HRS). The patient has refractory ascites, and light microscopy reveals normal glomeruli. Considering the pathophysiology of HRS, what role do vasodilatory prostaglandins play in maintaining renal perfusion, and how is their loss implicated in the development of pre-renal acute kidney injury in hepatorenal syndrome?

(or)

What role do vasodilatory prostaglandins play in maintaining renal perfusion in hepatorenal syndrome (HRS)?

A. Vasodilatory prostaglandins are upregulated, leading to splanchnic vasodilation and increased perfusion of glomeruli

B. The loss of vasodilatory prostaglandins in urine results in predominant renal vasoconstriction, causing impaired kidney perfusion

C. Damaged cirrhotic liver produces vasoconstrictor prostaglandins, contributing to decreased glomerular filtration rate

D. The absence of prostaglandins in hepatorenal syndrome has no impact on renal blood flow or glomerular filtration rate.

---

4. Match the following liver function tests with their corresponding diagnosis: 1. ↑Serum Bilirubin + ↑SGOT + ↑SGPT + (n)Alk. Phosphatase a. Hemolytic jaundice 2. ↑Bilirubin (conjugated) + (n) SGOT +

(n) SGPT + ↑Alk. Phosphatase b. Hepatocellular jaundice 3. ↑Bilirubin (unconjugated) + (n) SGOT + (n) SGPT + (n) Alk. Phosphatase c. Obstructive jaundice

1. ↑Serum Bilirubin + ↑SGOT + ↑SGPT + (n)Alk. Phosphatase	a. Hemolytic jaundice
2. ↑Bilirubin (conjugated) + (n) SGOT + (n) SGPT + ↑Alk. Phosphatase	b. Hepatocellular jaundice
3. ↑Bilirubin (unconjugated) + (n) SGOT + (n) SGPT + (n) Alk. Phosphatase	c. Obstructive jaundice

A. 1-c,2-a,3-b

B. 1-a,2-c,3-b

C. 1-b,2-c,3-a

D. 1-c,2-b,3-a

---

5. Match the readings of various serum markers with their respective diagnosis: 1. HBs Ag⊕ + IgM anti-HBc a. Gap period 2. Hbs Ag⊕ + IgG anti-HBc b. Vaccinated 3. Only IgM anti-HBcAg is present c. Acute Hepatitis B 4. Anti HbsAg > 10 IU/ml d. Recovery 5. IgG Anti Hbc e. Chronic Hepatitis B 6. Anti Hbs Ag(+), Anti Hbc Ig G(+) f. Low-level carrier

1. HBs Ag⊕ + IgM anti-HBc	a. Gap period
2. Hbs Ag⊕ + IgG anti-HBc	b. Vaccinated
3. Only IgM anti-HBcAg is present	c. Acute Hepatitis B
4. Anti HbsAg > 10 IU/ml	d. Recovery
5. IgG Anti Hbc	e. Chronic Hepatitis B
6. Anti Hbs Ag(+), Anti Hbc Ig G(+)	f. Low-level carrier

A. 1-a,2-c,3-e,4-b,5-d,6-f

B. 1-c,2-e,3-a,4-b,5-f,6-d

C. 1-b,2-f,3-a,4-d,5-c,6-e

D. 1-d,2-b,3-ie,4-f,5-c,6-a

---

6. Below are the various options showing the order of appearance of serum markers in Hepatitis B infection. Pick the correct answer.

A. HBs Ag → IgM → HBe Ag → Anti-Hbs Ag → Anti-HBe Ag

B. HBs Ag → HBe Ag → IgM → Anti-HBe Ag → Anti-Hbs Ag

C. HBs Ag → HBe Ag → IgM → Anti-Hbs Ag → Anti-HBe Ag

D. HBe Ag → HBs Ag → IgM → Anti-Hbs Ag → Anti-HBe Ag

---

7. A 55-year-old patient with a history of intravenous drug abuse presents with features of end-stage liver disease, including palmar erythema, Dupuytren's contracture, leukonychia, and clubbing. The patient's condition is attributed to chronic hepatitis infection. What is the most common reason for liver transplants in the world related to hepatitis?

(or)

What is the most common reason for liver transplants in the world related to hepatitis?

A. Acute liver failure

B. Hepatocellular carcinoma

C. Alcoholic cirrhosis

D. Hepatitis C-induced cirrhosis

---

8. A 30-year-old intravenous drug abuser presents with jaundice and is found to be positive for both HBsAg and IgM anti-HBcAg in February 2021. After relocating to a different workplace due to police monitoring, the patient acquires the delta virus in March 2021, confirmed by the presence of IgM anti-HDV Ag. What is the most likely consequence of this delta virus infection in terms of liver pathology?

(or)

What is the most likely consequence of delta virus infection in terms of liver pathology?

A. Chronic hepatitis

B. Cirrhosis

C. Fulminant hepatic failure (FHF)

D. Asymptomatic carrier state

---

9. Fine tremors are present in all of the following except.

A. Grave's disease

B. Anxiety neurosis

C. Fulminant hepatic failure

D. Pheochromocytoma

---

10. Which of the following is not a parameter used in the MELD score?

A. Serum bilirubin

B. Albumin

C. INR

D. Serum creatinine

---

11. Which of the following is not a parameter of the Child-Pugh score?

A. Albumin

B. Asterixis

C. Serum creatinine

D. Ascites

---

12. A 32-year-old patient with a history of autoimmune hepatitis experiences a sudden exacerbation of symptoms and a rise in liver enzyme levels. The patient denies any changes in medications or

exposure to infectious agents. Upon further inquiry, the patient reveals the recent initiation of a drug for acne management. Which of the following medications is most likely responsible for triggering the exacerbation of autoimmune hepatitis in this case?

(or)

Which of the following medications is most likely responsible for triggering the exacerbation of autoimmune hepatitis during acne therapy?

A. Penicillin

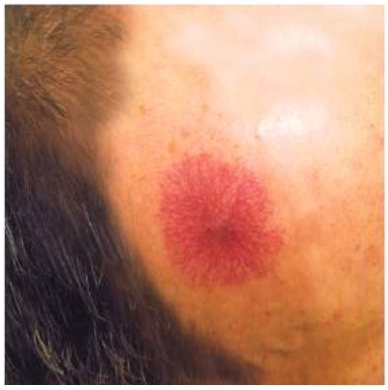
B. Prednisone

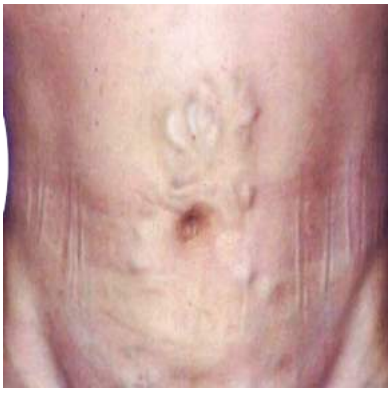
C. Minocycline

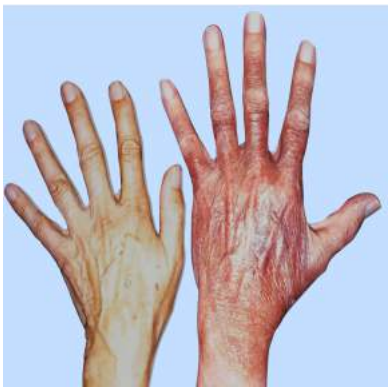
D. Propranolol

---

13. Below are the various physical findings in liver disorders. Match them accordingly. 1. a. Caput medusae 2. b. Hemochromatosis 3. c. Spider angioma

1.  a. Caput medusae

2.  b. Hemochromatosis

3.  c. Spider angioma

A. 1-c, 2-b, 3-b

B. 1-c, 2-a, 3-b

C. 1-b, 2-a, 3-d

D. 1-a, 2-c, 3-b

---

14. All of the following viruses are RNA viruses except?

A. Hepatitis A virus

B. Hepatitis B virus

C. Hepatitis C virus

D. Hepatitis D virus

---

15. Match the following diseases with their respective HLA 1) HLA B27 a) Rheumatoid arthritis 2) HLA DQ2 b) Sarcoidosis 3) HLA DR3 c) Ankylosing spondylitis 4) HLA B8 d) DM Type 1 5) HLA DR4 e) Celiac disease

1) HLA B27	a) Rheumatoid arthritis
2) HLA DQ2	b) Sarcoidosis
3) HLA DR3	c) Ankylosing spondylitis
4) HLA B8	d) DM Type 1
5) HLA DR4	e) Celiac disease

A. 1-a,2-d,3-b,4-e,5-c

B. 1b,-2-e,3-c,4-d,5-a

C. 1-c,2-e,3-d,4-b,5-a

D. 1-c2-a,3-d,4-b,5-e

---

16. Match the following 1) Anti-LKM 1 a) HDV 2) Anti-LKM 2 b) HCV 3) Anti-LKM 3 c) Drug-induced hepatitis

1) Anti-LKM 1	a) HDV
2) Anti-LKM 2	b) HCV

3) Anti-LKM 3 c) Drug-induced hepatitis

A. 1-a,2-c,3-b

B. 1-c,2-a,3-b

C. 1-b,2-c,3-a

D. 1-c,2-b,3-a

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	5
Question 3	2
Question 4	3
Question 5	2
Question 6	3
Question 7	4
Question 8	3
Question 9	3
Question 10	2
Question 11	3
Question 12	3
Question 13	2
Question 14	2
Question 15	3
Question 16	3

Solution for Question 1:

Correct Option C - 1-d,2-c,3-a,4-b:

1. Hepatitis B virus - can lead to Transfusion-related hepatitis

2. Hepatitis E virus- can lead to Fulminant hepatic failure in pregnancy Fulminant hepatic failure in nor mal people is caused by Hepatitis D virus

3. Hepatitis C virus is the most common cause of Orthotopic liver transplantation in patients with HCV-i nduced cirrhosis.

4. Hepatitis D virus can cause Coinfection/Superinfection with Hepatitis B

Incorrect Options:

Eliminated by the explanation of the above options.

Option A - 1-c,2-a,3-b,4-d

Option B - 1-c,2-a,3-d,4-b

Option D - 1-d,2-b,3-c,4-a

Solution for Question 2:

Correct Option E - EIA-anti HAV antibody:

• Investigation for Hepatitis A virus is not needed before blood transfusion

Incorrect Options:

These are used in serology tests before blood transfusion or any other medical intervention.

Option A - HRP-2 dip stick:

• Tests for malarial parasite

Option B - PCR HCV RNA:

• It is to detect Hepatitis C virus

Option C - FTA:

• ABS-To detect syphilis

Option D - ELISA HIV:

• To detect HIV

Solution for Question 3:

Correct Option B - The loss of vasodilatory prostaglandins in urine results in predominant renal vasoco nstriction, causing impaired kidney perfusion:

• In hepatorenal syndrome (HRS), there is an imbalance between vasoconstriction and vasodilation mechanisms in the body, leading to renal dysfunction. Vasodilatory prostaglandins, particularly prostaglandin E2 (PGE) and prostacyclin (PGI2), play a crucial role in maintaining renal blood flow and glomerular filtration rate. These prostaglandins are responsible for increasing renal blood flow and promoting glomerular filtration.

• In HRS, vasodilatory prostaglandins are lost in urine, primarily due to the damaged cirrhotic liver. This loss results in predominant renal vasoconstriction, causing impaired kidney perfusion and leading to pre-renal acute kidney injury. The upregulation of vasoconstrictor mechanisms, such as endothelin-1, further contributes to splanchnic vasodilation, shunting blood away from the kidneys and reducing perfusion of the glomeruli.

Incorrect Options:

• Options A, C, and D are incorrect because they do not accurately reflect the role of vasodilatory prostaglandins in the context of HRS and their impact on renal perfusion.

Solution for Question 4:

Correct Option C - 1-b,2-c,3-a:

Incorrect Options:

• Options A, B and D are incorrect. Refer to the explanation of the correct answer.

Solution for Question 5:

Correct Option B - 1-c,2-e,3-a,4-b,5-f,6-d:

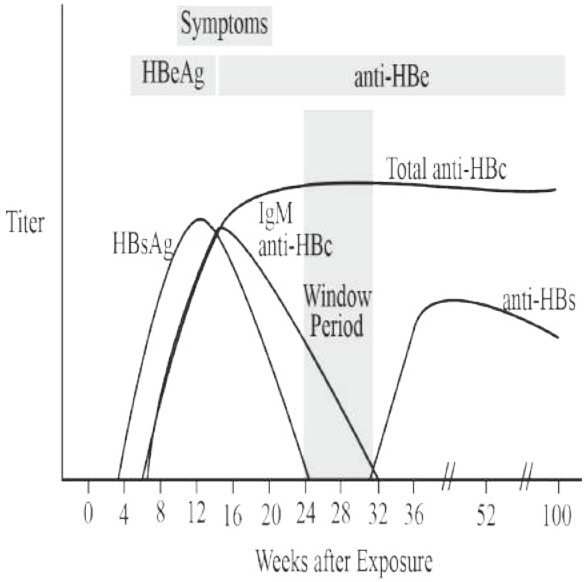
Incorrect Options:

• Options A, C and D are incorrect. Refer to the explanation of the correct answer.

Solution for Question 6:

Correct Option C - HBs Ag → HBe Ag → IgM → Anti-Hbs Ag → Anti-HBe Ag:

• The sequence of appearence of the markers in Hepatitis b virus is surface antigen(HBsAg) followed by antigen that represents the infectivity (HB eAg) and then antibody against core antigen (IgM) followed by antibody against the surface antigen (Anti-Hbs Ag) and then antibody against Hbe Ag(Anti-HBe Ag)



Incorrect Options:

Option A - HBs Ag → IgM → HBe Ag → Anti-Hbs Ag → Anti-HBe Ag

Option B - HBs Ag → HBe Ag → IgM → Anti-HBe Ag → Anti-Hbs Ag

Option D - HBe Ag → HBs Ag → IgM → Anti-Hbs Ag → Anti-HBe Ag

Solution for Question 7:

Correct Option D - Hepatitis C-induced cirrhosis:

• Chronic hepatitis C infection is a leading cause of end-stage liver disease (ESLD), and hepatitis C-induced cirrhosis is the most common reason for liver transplants globally. The patient's clinical features, such as palmar erythema, Dupuytren's contracture, leukonychia, and clubbing, are consistent with the advanced stages of cirrhosis caused by chronic hepatitis C. Liver transplantation is often required in cases of severe liver damage and failure associated with chronic hepatitis C infection.

Incorrect Options:

Option A - Acute liver failure:

• Acute liver failure refers to the rapid development of severe acute liver injury with impaired synthetic function and encephalopathy.

• While acute liver failure can be a reason for liver transplantation, it is not the most common reason globally.

Option B - Hepatocellular carcinoma:

• Hepatocellular carcinoma (HCC) is a primary liver cancer that can arise in the context of chronic liver disease, including cirrhosis.

• While HCC can lead to liver transplantation, it is not the most common reason globally.

Option C - Alcoholic cirrhosis:

• Cirrhosis caused by chronic alcohol consumption is a significant cause of end-stage liver disease.

• However, globally, hepatitis C-induced cirrhosis is more commonly associated with liver transplants than alcoholic cirrhosis.

Solution for Question 8:

Correct Option C - Fulminant hepatic failure (FHF):

• The patient's acquisition of the delta virus (HDV) infection is concerning for the development of fulminant hepatic failure (FHF). Hepatitis D is known to cause severe and rapidly progressing liver disease, especially in individuals co-infected with hepatitis B. Fulminant hepatic failure is characterized by a sudden and severe impairment of liver function, leading to life-threatening complications. The delta virus is considered the most common cause of fulminant hepatic failure, accounting for approximately 20% of cases.

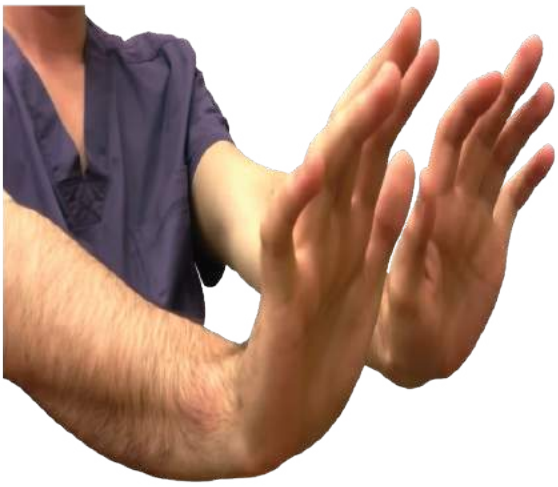
Incorrect Options:

• Chronic hepatitis and cirrhosis are potential outcomes of hepatitis D infection, but fulminant hepatic failure is the most immediate and critical consequence in this context. Asymptomatic carrier states are less common, especially in the setting of acute delta infection.

Solution for Question 9:

Correct Option C - Fulminant hepatic failure:

• Asterixis(Flapping tremors) are present in Fulminant hepatic failure



Incorrect Options:

Fine tremors are present in all the below options:

Option A - Grave's disease

Option B - Anxiety neurosis

Option D - Pheochromocytoma

Solution for Question 10:

Correct Option B - Albumin:

• Albumin is not a parameter in the MELD score

• It is measured in the Child-Pugh score.

Incorrect Options:

• All the below are the parameters used to measure in MELD score

Option A - Serum bilirubin

Option C - INR

Option D - Serum creatinine

Solution for Question 11:

Correct Option C - Serum creatinine:

• Serum creatine is not a part of the Child-pugh score

• It is measured as a part of the MELD score

Incorrect Options:

• All these are a part of the Child-pugh score.

Option A - Albumin

Option B - Asterixis

Option D - Ascites

Solution for Question 12:

Correct Option C - Minocycline:

• Minocycline, which is commonly used in the management of acne, has been associated with drug-induced autoimmune hepatitis. It can trigger an immune response against the liver, leading to an exacerbation of autoimmune hepatitis in susceptible individuals. This emphasizes the importance of monitoring liver function in patients receiving minocycline and considering alternative treatments in those with a history of autoimmune hepatitis.

Incorrect Options:

Option A - Penicillin: Penicillin is not typically associated with autoimmune hepatitis.

Option B - Prednisone: Prednisone is a corticosteroid and is often used in the treatment of autoimmune hepatitis to suppress the immune response and reduce inflammation.

Option D - Propranolol: Propranolol is a beta-blocker used primarily for cardiovascular conditions and i s not known to cause autoimmune hepatitis.

Solution for Question 13:

Correct Option B - 1-c, 2-a, 3-b:

Incorrect Options:

Option A - 1-c, 2-b, 3-b

Option C - 1-b, 2-a, 3-d

Option D - 1-a, 2-c, 3-b

Solution for Question 14:

Correct Option B - HBV is a DNA virus:

Incorrect Options:

Option A - HAV

Option C - HCV

Option D - HDV

• These viruses are RNA viruses.

Solution for Question 15:

Correct Option C - 1-c,2-e,3-d,4-b,5-a:

Incorrect Options:

Option A - 1-a,2-d,3-b,4-e,5-c

Option B - 1-b,-2-e,3-c,4-d,5-a

Option D -1-c,2-a,3-d,4-b,5-e

• Eliminated by the explanation of the above options.

Solution for Question 16:

Correct Option C - 1-b,2-c,3-a:

• 1) Anti-LKM 1-b)HCV

• 2)Anti-LKM 2-c)Drug-induced hepatitis

• 3)Anti-LKM 3-a)HDV

Incorrect Options:

Option A, B & D:

Refer to the explanation of Option C. Eliminated by the explanation of the above option.

Liver Cirrhosis & Complications

1. Cirrhosis is scarring (fibrosis) of the liver caused by long-term liver damage. The scar tissue prevents the liver from working properly. Cirrhosis is sometimes called an end-stage liver disease because it happens after other stages of damage from conditions that affect the liver, such as hepatitis. Which of the following is the most common cause of congestive splenomegaly?

(or)

Which of the following is the most common cause of congestive splenomegaly?

A. Chronic congestive cardiac failure

B. Cirrhosis

C. Hepatic vein occlusion

D. Stenosis of splenic vein

---

2. A cirrhotic patient presented with severe hematemesis and Hb level is 6 g/dL. Which of the following is the management of choice?

(or)

A cirrhotic patient presented with severe hematemesis and Hb level is 6 g/dL. Which of the following is the management of choice?

A. Whole blood transfusion

B. Colloids are preferred over crystalloids

C. Normal saline infusion

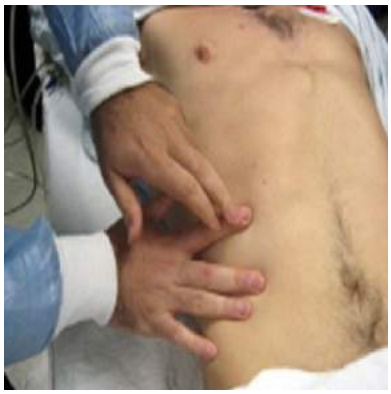
D. IV fluid with diuretics

---

3. Percussion is a method of tapping body parts with fingers, hands, or small instruments as part of a physical examination. It is done to determine: The size, consistency, and borders of body organs. Which one of the following statements is TRUE regarding the clinical sign being elicited in the given picture?

(or)

Which one of the following statements is TRUE regarding the clinical sign being elicited in the given picture?



A. This test helps to detect ascites

B. This test is for eliciting shifting dullness

C. The hand on the midline below the umbilicus will feel the vibrations in patients with ascites

D. All of the above statements are true

---

4. A patient with chronic liver disease, ascites and no bleeding varices presented with hematemesis and melena. What is the next step in management?

(or)

A patient with Chronic liver disease and ascites and no bleeding varices presented in a medical emergency. He presents with hematemesis and melena. What is the next step in management?

A. Inj. vitamin K

B. Inj. Tranexamic acid

C. FFP transfusion

D. Platelet transfusion

---

5. A 45 years old male patient who is a known case of acute hepatic failure presented with ascites. Ascitic fluid analysis shows an increased serum-ascites albumin gradient (SAAG) value. Which of the following conditions will cause an increased serum-ascites albumin gradient?

(or)

A 45 years old male patient who is a known case of acute hepatic failure presents with OPD with Ascites. Upon paracentesis Ascitic fluid is with increased SAAG. Which of the following condition will present this finding?

A. Tuberculosis

B. Congestive Heart Failure

C. Nephrotic syndrome

D. Pancreatitis

---

6. A 48-year-old alcoholic male who is a known case of cirrhosis presents to the Emergency department with complaints of abdominal pain, swelling, nausea, vomiting, and other difficulties. On examination, there was redness on the palms of the hands, yellowish discolouration of skin and sclera, and spider-like blood vessels on the skin. USG showed severe Ascites despite compliance with dietary sodium restrictions and administration of maximum doses of 400mg of spironolactone and 160 mg of furosemide per day. What will be the next best management for the given condition?

(or)

A 48-year-old male with cirrhosis presents with abdominal pain and swelling. USG showed severe ascites despite the administration of maximum doses of 400mg of spironolactone and 160 mg of furosemide per day. What will be the next best management for the given condition?

A. AV shunt

B. TIPS

C. Frusemide with Low volume paracentesis

D. Distal splenorenal shunt

---

7. Ascites is present when there is an accumulation of free fluid in the peritoneal cavity. Small amounts of ascites is asymptomatic, but with larger accumulations of fluid (> 1 L), there is abdominal distension, fullness in the fanks, shifting dullness on percussion and, when the ascites is marked, a fluid thrill/fluid wave. Ascites in cirrhosis of the liver are due to- 1. Portal hypertension 2. Hypoalbuminaemia 3. Inappropriate ADH secretion 4. Secondary hyper-aldosteronism

(or)

Which of the following is the cause of ascites in liver cirrhosis? 1. Portal hypertension 2. Hypoalbuminaemia 3. Inappropriate ADH secretion 4. Secondary hyper-aldosteronism

A. 1, 2 and 3 are correct

B. 1, 2 and 4 are correct

C. 2, 3, 4 are correct

D. 1, 3 and 4 are correct

---

8. A 55-year-old male patient presented in the Emergency with weakness, nausea and vomiting. On examination, there was jaundice, reduced alertness and poor concentration, progressing through behavioural abnormalities, such as restlessness and aggressive outbursts. He was found to have Ascites and hepatic failure on further workup. He stated that he had taken alcohol every day for the last 20 years. Which one of the following is NOT true about the Ascitic fluid on paracentesis?

(or)

Which one of the following is NOT true about ascitic fluid analysis?

A. SAAG> 1.1 is seen with portal hypertension

B. SAAG < 1.1 is seen with Nephrotic syndrome

C. Pseudo-chylous ascites is milky, contains fatand seen with hypertriglyceridemia

D. Black ascitic fluid is seen with pancreatic necrosis

---

9. A patient who is a known case of Decompensated Liver disease presented with easy fatigue, jaundice, bruising, recurrent variceal bleeding and refractory ascites. His serum albumin was <2.8g/dl, and prothrombin time >6 sec. Doctors advised him to have Liver transplantation because of progressive hepatic encephalopathy. He was approved for Liver transplantation and was put on the national transplant list for Liver transplantation. Which of the following is an absolute contraindication to liver transplantation?

(or)

Which of the following is an absolute contraindication to liver transplantation?

A. Age >70

B. Portal vein thrombosis

C. Severe obesity

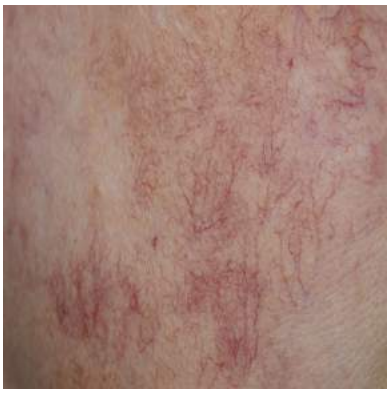
D. AIDS

---

10. Which of the following diseases can present with this given finding?

(or)

A patient presents to OPD with marks on the skin caused by enlarged blood vessels. Examination findings are flat or slightly raised red to purple dots on the skin that are similar to a small pimple. The dot has red to purple lines extending from the centre (that resemble spider legs). The clinical picture is shown in the following diagram. Identify which of the following diseases can present with this given finding.



A. Rheumatoid arthritis

B. Cirrhosis of the liver

C. Pregnancy

D. All of the above

---

11. A 60-year-old man with a known case of Hemochromatosis, cirrhosis, and portal hypertension was brought to ED with altered mental status. The attendant describes that the patient has been confused for the last 3 days, with no h/o melena or hematemesis. For chronic ascites, diet control and spironolactone are given regularly. He had an episode of variceal bleed in the past, for which he was put on propranolol, and no episodes have been seen since then. On examination, he is not well oriented to time and place but oriented to person. He is afebrile, vitals are stable, but ascites, and asterixis, are notable. His laboratory investigation shows haemoglobin of 10.1mg/dl, Creatinine of 1.4 mg.dl, and Blood urea nitrogen of 45 mg/dl. On paracentesis, clear fluid with 800 WBC (40% neutrophils) was seen. Which of the following is a false statement regarding this condition?

(or)

A 60-year-old man with cirrhosis presented with altered mental status. On examination, ascites and asterixis are notable. On paracentesis, clear fluid with 800 WBC (40% neutrophils) was seen. Which of the following is incorrect regarding this condition?

A. Ascites is preceded by infection

B. Clinical features are abdominal pain, fever, leucocytosis and altered mental status

C. Ascitic fluid protein of 1 gm/dl

D. Common organisms are Gram-negative organisms

---

12. You're the Psychiatric intern in a ward. Your favourite consultant asks you to join him for the morning rounds; you accept and go with him. Your consultant asks the fourth patient in 2nd-row CAGE Quess. In which of the following conditions do you think it is used?

(or)

In which of the following conditions do you think CAGE questions are used?

A. Alcohol Abuse

B. Depression

C. Suicidal intention

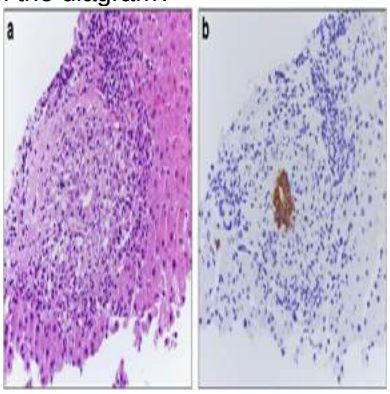
D. Coma

---

13. Which of the following is not true about the condition given in the diagram?

(or)

A patient presented with a history of bone and joint aches, fatigue (extreme tiredness), itchy skin, dry eyes and mouth and pain or discomfort in the upper right side of his tummy. Which of the following is not true about the condition given in the diagram?



A. Increase 5'- nucleotidase

B. Median age of presentation is 50 years

C. The most common cause of cholangitis in children

D. PBC is frequently associated with CREST syndrome.

---

14. A patient with acute liver failure shows marked confusion and gross disorientation. He is drowsy but responds to pain and voice stimuli. Which of the following is the Antibiotic of choice to prevent the given condition?

(or)

Which of the following is the antibiotic of choice to prevent the given in Hepatic encephalopathy?

A. Neomycin

B. Ampicillin

C. Metronidazole

D. Rifaximin

---

15. A 25-year-old male came to your OPD to quit alcohol consumption. He has drinks daily for the last 5 years. His consumption is 2-3 beers daily and around 8-10 beers on weekends. He never drinks & drives and never misses his work. But he had hung over in the office after weekends. In the last few months, he had reported a few blackouts due to binge drinking. Which laboratory tests will you perform

on this patient to identify heavy alcohol consumption?

(or)

Which laboratory tests will you perform on this patient to identify heavy alcohol consumption?

A. Carbohydrate deficient transferrin

B. 5-nucleotidase

C. SGPT raised

D. MCHC

---

16. A 38-year-old heavy drinker with Hepatitis B presented in medical OPD with complaints of jaundice, abdominal pain and 2 episodes of hematemesis. Relevant investigations were ordered and a diagnosis of DCLD was made. Which of the following is a characteristic feature of the cirrhotic liver in this patient?

(or)

Which of the following is a characteristic feature of the cirrhotic liver in this patient?

A. High serum albumin

B. Normocytic normochromic anaemia is present

C. Normal prothrombin time

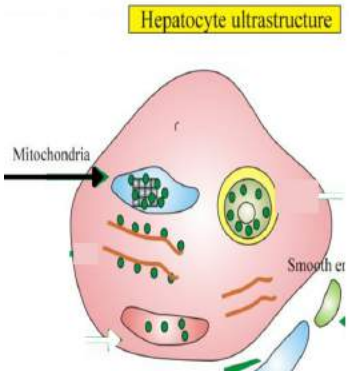
D. Low serum globulin

---

17. A 25-year-old male came to your OPD to quit alcohol consumption. He has drunk daily for the last 5 years. His consumption is 2-3 beers daily and around 8-10 beers on weekends. He never drinks & drives and never misses his work. But he had hung over in the office after weekends. In the last few months, he had reported a few blackouts due to binge drinking. His LFTs were deranged. Identify which of the following enzymes is secreted from the marked structure?

(or)

Identify which of the following enzymes is secreted from the marked structure.



A. SGOT

B. SGPT

C. GGT

D. All of the above

---

18. A lady with a history of hepatitis C infection presents with unintentional weight loss and weakness. Examination shows jaundice, splenomegaly, and caput medusae. Which of the following tests is the most specific for this patient's diagnosis?

(or)

A 45-year-old lady with a history of hepatitis C infection comes to the hospital because of unintentional weight loss and weakness. He has lost 6.8-kg (15 lbs) within the last 3 months. Physical examination shows jaundice, splenomegaly, and caput medusae. Which of the following tests is the most specific for this patient's diagnosis?

A. Alanine aminotransferase

B. Alkaline phosphatase

C. Aspartate aminotransferase

D. Blood urea nitrogen

---

19. Calculate child-pugh score total bilirubin 36 , serum albumin 30g/dl, PT INR 2 and mild ascites with no hepatic encephalopathy.

(or)

Calculate child-pugh score total bilirubin 36 , serum albumin 30g/dl, PT INR 2 and mild ascites with no hepatic encephalopathy.

A. Class A

B. Class B

C. Class C

D. Class D

---

20. An obese male patient who is a known case of diabetes has presented with OPD with increased serum ferritin levels. Upon further investigations, it is found that he is a case of Non- alcoholic fatty liver disease. Which of the following is the most common cause of Non- alcoholic fatty liver disease?

(or)

An obese man is diagnosed with non-alcoholic fatty liver disease. Which of the following is the most common cause of this condition?

A. Reye syndrome

B. Syndrome-X

C. Cardiac syndrome-X

D. Pregnancy

---

21. Which of the following signs will NOT be present in a 55-year-old male with severe refractory ascites, jaundice, abdominal distension, lower limb edema, spider naevi, and characteristic hand features of liver disease?

(or)

A 55-year-old male patient was found to have severe refractory Ascites and acute hepatic failure on workup. He also gives a history of nausea, vomiting, fatigue, easy bruising, poor mentation and restlessness. He states that he has taken alcohol every day for the last 20 years. Examination findings are jaundice, swollen abdomen, lower limb oedema, spider naevi etc. Hand examination showed some characteristic features of compensated liver disease. Which of the following signs of liver cell failure you won't expect in this patient?

A. Paper money skin

B. Clubbing

C. Dupuytren's contracture

D. Splinter haemorrhages

---

22. You're the intern in Gastro OPD. An alcoholic patient who had a history of recurrent variceal bleeding has come to the OPD now. He now complains of severe abdominal discomfort, fatigue, nausea and hematemesis. He also had jaundice, hepatosplenomegaly, oedema and reduced alertness. You have read the chapter regarding liver portal hypertension and its complications and took notes last night; the following is written in your notes. Identify the incorrect statement regarding portal hypertension.

(or)

Which of the following is an incorrect statement regarding portal hypertension?

A. Massive splenomegaly is seen in Banti's syndrome

B. Hepatic venous pressure gradient is > 10 mm Hg for clinically Significant Portal hypertension

C. Most common cause of portal hypertension is Alcoholic cirrhosis

D. Schistosomiasis is the pre-hepatic cause of portal hypertension

---

23. Cirrhosis is scarring (fibrosis) of the liver caused by long-term liver damage. The scar tissue prevents the liver from working properly. Cirrhosis is sometimes called an end-stage liver disease because it happens after other stages of damage from conditions that affect the liver, such as hepatitis. The gross morphologic appearance of a cirrhotic liver is categorised by the size of the parenchymal nodules: micronodular, macronodular, or mixed. It can lead to various metabolic complications in the body. Cirrhosis can lead to the development of?

(or)

Which of the following acid-base abnormalities can be seen in cirrhosis?

A. Metabolic alkalosis, chloride responsive

B. Metabolic alkalosis, chloride non-responsive

C. Hyperchloremic metabolic acidosis

D. Hypochloremic metabolic acidosis

---

24. A Sengstaken-Blakemore tube is a tube used in emergency medicine to stop bleeding in your stomach or oesophagus. The technique used to place the tube is called balloon tamponade. The bleeding is typically caused by gastric or oesophagal varices, which are veins that have swollen from obstructed blood flow. It is a red tube with three ports on one end and two balloons on the other. Which of the following statement is false regarding Sengstaken Blakemore tube?

(or)

Which of the following statements is incorrect regarding Sengstaken Blakemore tube?

A. Used to arrest acute variceal bleed

B. Gastric balloon should be inflated with 200 mL of air

C. Pressure in the oesophageal balloon is <40 mm Hg.

D. Endotracheal intubation prior to tube insertion reduces the risk of pulmonary aspiration

---

25. A 30 year old male presents with right upper quadrant discomfort, nausea, fatigue and vomiting. He also had yellowish discolouration of sclera and skin and moderate hepatomegaly. He denies any history of alcohol intake, whereas laboratory findings are contradictory with elevations of AST, ALT and GGT accompanied by hypertriglyceridemia and hyperbilirubinemia. Lab results show deranged levels of urea, bilirubin and PT ratio. His wife narrates that his husband is a chronic alcoholic, and to aid her statement; she shows his previous USG reports showing fatty liver Grade 3. Which of the following statements is incorrect regarding the diagnosis being made?

(or)

Which of the following statements is incorrect regarding the fatty liver grade 3 of this patient?

A. Liver function tests are normal in the stage of steatosis

B. Stellate cell-mediated fibrosis leads to cirrhosis

C. Direct oxidative injury occurs in the stage of hepatitis

D. Apoptosis and necrosis in the stage of hepatitis are facilitated by Transforming growth factor beta (TGF-β)

---

26. Which of the following is the correct statement regarding ascites?

(or)

Ascites is a condition in which fluid collects in spaces within your abdomen. As fluid collects in the abdomen, it can affect your lungs, kidneys, and other organs. The cause of ascites is identified based on the history, physical examination, laboratory tests, abdominal imaging, and ascitic fluid analysis. The diagnosis of ascites is suspected based on the patient history and physical examination and is usually confirmed by abdominal ultrasound. Read the following statements regarding Ascites and mark the correct statement?

A. Hemorrhagic ascites is diagnosed when RBC count > 1000/mm3

B. Spontaneous Bacterial Peritonitis is diagnosed when the Neutrophil count >500/mm3

C. Large-volume paracentesis is not indicated in SBP

D. USG can detect as little as 100 ml of peritoneal fluid

E. Norfloxacin is the DOC in SBP.

Correct Answers

Question	Correct Answer

Question 1	2
Question 2	1
Question 3	1
Question 4	3
Question 5	2
Question 6	2
Question 7	2
Question 8	3
Question 9	4
Question 10	4
Question 11	1
Question 12	1
Question 13	3
Question 14	4
Question 15	1
Question 16	2
Question 17	1
Question 18	1
Question 19	2
Question 20	2
Question 21	4
Question 22	4
Question 23	2
Question 24	2
Question 25	4
Question 26	F,F,T,T,F

Solution for Question 1:

Option B: Cirrhosis

• Splenomegaly is an enlargement of the spleen that often results from blood-borne infections. The red pulp expands as neutrophils accumulate in the spleen and encroaches on the lymphoid follicles. In congestive splenomegaly, obstruction of venous outflow from the spleen leads to an increase in the amount of red pulp. Initially, the red pulp is congested, but over time it becomes fibrotic. The main cause of congestive splenomegaly is cirrhosis of the liver.

Option A: Chronic congestive cardiac failure

• Heart failure — sometimes known as congestive heart failure — occurs when the heart muscle does not pump blood as well as it should. When this happens, blood often backs up, and fluid can build up in

the lungs, causing shortness of breath.

• Certain heart conditions, such as narrowed arteries in the heart (coronary artery disease) or high blood pressure, gradually leave the heart too weak or stiff to fill and pump blood properly.

• Proper treatment can improve the signs and symptoms of heart failure and may help some people live longer. Lifestyle changes — such as losing weight, exercising, reducing salt (sodium) in your diet and managing stress — can improve your quality of life. However, heart failure can be life-threatening. People with heart failure may have severe symptoms, and some may need a heart transplant or a ventricular assist device (VAD).

• One way to prevent heart failure is to prevent and control conditions that can cause it, such as coronary artery disease, high blood pressure, diabetes and obesity.

Option C: Hepatic vein occlusion

Hepatic vein obstruction is a blockage of the hepatic vein, which carries blood away from the liver.

Causes

Hepatic vein obstruction prevents blood from flowing out of the liver and back to the heart. This blockag e can cause liver damage. Obstruction of this vein can be caused by a
tumour or growth pressing on the vessel or by a clot in the vessel (hepatic vein thrombosis).

Most often, it is caused by conditions that make blood clots more likely to form, including:]

• Abnormal growth of cells in the bone marrow (myeloproliferative disorders)

• Cancers

• Chronic inflammatory or autoimmune diseases

• Infections

• Inherited (hereditary) or acquired problems with blood clotting

• Oral contraceptives

• Pregnancy

Hepatic vein blockage is the most common cause of Budd-Chiari syndrome.

Option D: Stenosis of splenic vein

• Splenic vein stenosis results in venous hypertension in the collateral pathways that carry splenic arterial blood to the veins in the stomach's upper half. In the gastric wall veins of the fundus, blood flow and pressure of the short gastric veins increase, and the submucosal structures consequently dilate, which produces gastric varices

Solution for Question 2:

Option A: Whole blood transfusion

• Two large-bore IV access lines are established. RBCs should be transfused with the goal of maintaining the hematocrit value of around 25%.

• A restrictive strategy of transfusing RBCs only when the Hb level drops < 7g/dL is followed.

Other options

Option B: Colloids are preferred over crystalloids

• Saline may be infused IV until packed RBCs are available for transfusion.

Option C: Normal saline infusion

• Saline may be infused IV until packed RBCs are available for transfusion.

Option D: IV fluid with diuretics

• Intravenous (IV) fluids with loop diuretics are the mainstay for the treatment of acute decompensated heart failure (ADHF). Activation of the renin-angiotensin system with diuresis can result in intravascular volume depletion despite total volume overload. Diuretic resistance and acute kidney injury can quickly ensue.

Solution for Question 3:

Option A: This test helps to detect ascites

The above picture shows the method of percussion for the abdominal examination.

• One technique for evaluating ascites is an assessment of shifting dullness.

• In the ascitic abdomen, gas-filled bowel loops float to the top while the ascitic fluid falls to the dependent portion of the abdomen. As a result, percussion notes are tympanitic over the bowel loops and dull over the surrounding fluid.

• With the patient lying on his back, map out these areas of dullness and tympany. Then, ask the patient to roll on his side and re-percuss. The ascites and, thus, dullness shift to the side the patient is lying on, while the tympanitic area shifts to the top.

Option B: This test is for eliciting shifting dullness

Shifting Dullness:

Option C: The hand on the midline below the umbilicus will feel the vibrations in patients with ascites

• In palpating the abdomen, one should first gently examine the abdominal wall with the fingertips. This will demonstrate the crunching feeling of crepitus of the abdominal wall, a sign of gas or fluid within the subcutaneous tissues. In addition, it will demonstrate any irregularities of the abdominal wall (such as lipomas or hernias) and give some idea as to areas of tenderness.

• Deep palpation of the abdomen is performed by placing a flat hand on the abdominal wall and applying firm, steady pressure. It may be helpful to use two-handed palpation, particularly in evaluating a mass.

• Here the upper hand is used to exert pressure, while the lower hand is used to feel. One should start deep palpation in the quadrant directly opposite any area of pain and carefully examine each quadrant. At each costal margin, it is helpful to have the patient inspired deeply to aid in the palpation of the liver, gallbladder, and spleen.

Option D: All of the above statements are true

• All statements are not true for this picture.

Solution for Question 4:

Option C: FFP transfusion

• Since this patient does not have varices, the cause of hematemesis in this patient is bleeding diathesis due to liver disease.

• Bleeding in such patients is treated with FFP in acute situations.

Option A: Inj. vitamin K

• In liver cirrhosis, the synthesis of vitamin K–dependent clotting factors is diminished because of a decrease in hepatic mass and under these circumstances, administration of parenteral vitamin K does not improve the clotting factor or thrombin or prothrombin time.

Option B: Inj. Tranexamic acid

• Tranexamic acid (TA) is an antifibrinolytic that may help control the bleeding in this setting, as it showed an unquestionable benefit in other indications. TA has previously been studied in both upper gastrointestinal haemorrhage from any causes and in liver transplantation of cirrhotic patients.

Option D: Platelet transfusion

• Studies have now found increased platelet activation in cirrhosis, resulting in thrombotic complications. Nonetheless, patients with a platelet count less than 50,000/mm3 frequently receive platelet transfusion under the current standards of care.

Solution for Question 5:

Option B: Congestive Heart Failure

• Congestive heart failure is caused by structural abnormalities of the heart, functional abnormalities, and other triggering factors

• The serum ascites albumin gradient (SAAG), which is based on the difference between the albumin level of serum and of ascitic fluid, may be used to assess the extent of ascites

• Ascitic fluid with increased SAAG (>1.1g/dl) is found in CHF.

Option A: Tuberculosis

• In patients with suspected TBP, ascitic fluid protein of > 25 g/L, SAAG of < 11 g/L and LDH of > 90 U/L have high sensitivity for the disease. With coexistent chronic liver disease, a lower protein level and higher SAAG are usually not helpful, but LDH > 90 U/L is a useful parameter for screening.

Option C: Nephrotic syndrome

• Nephrotic syndrome is a kidney disorder that causes your body to pass too much protein in your urine.

• Nephrotic syndrome is usually caused by damage to the clusters of small blood vessels in your kidneys that filter waste and excess water from your blood. The condition causes swelling, particularly in your feet and ankles, and increases the risk of other health problems.

• Treatment for nephrotic syndrome includes treating the condition causing it and taking medications. Nephrotic syndrome can increase your risk of infections and blood clots. Your doctor might recommend medications and dietary changes to prevent complications.

Option D: Pancreatitis

• Pancreatitis is inflammation of the pancreas. The pancreas is a long, flat gland that sits tucked behind the stomach in the upper abdomen. The pancreas produces enzymes that help digestion and hormones that help regulate the way your body processes sugar (glucose)

Solution for Question 6:

Option B: TIPS

The clinical scenario given is Refractory ascites.

Refractory ascites can be managed by:

• Trans-jugular intra-hepatic peritoneal shunt (TIPS)

• Serial large volume paracentesis (LVP) with albumin.

• TIPS > LVP in reducing the re-accumulation of ascites but is associated with an increased frequency of hepatic encephalopathy

Diagnostic criteria for refractory ascites

Ascites management

Option A: AV shunt

• The arterio-venous shunts are short vessel segments with a large inner diameter and a very thick muscular wall.

• The arteriovenous shunt (AVS) is the most commonly used vascular access in patients receiving regular hemodialysis. The AVS may have a significant hemodynamic impact on patients with heart failure.

Option C: Frusemide with Low volume paracentesis

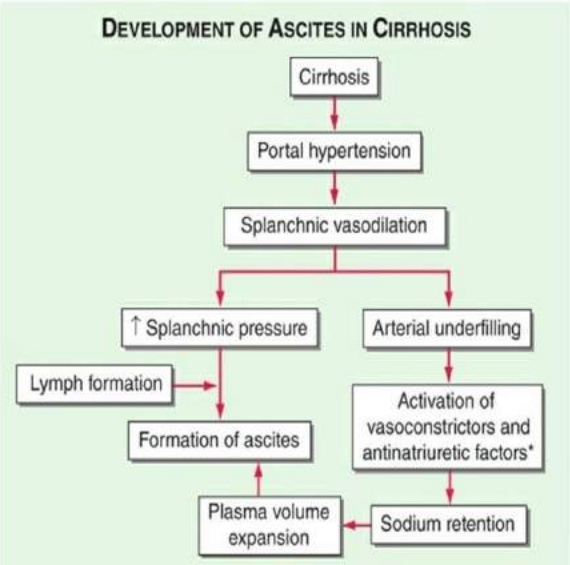
• Standard therapy for ascites includes a combination of dietary sodium restriction, oral spironolactone and furosemide, with large-volume paracentesis (LVP) if needed.

Option D: Distal splenorenal shunt

• The distal splenorenal shunt is performed in patients with portal venous thrombosis.

Solution for Question 7:

Option B: 1, 2 and 4 are correct



Pathogenesis

The presence of portal hypertension contributes to the development of ascites in patients who have cirr hosis

1) There is an increase in intrahepatic resistance, causing increased portal pressure,

2) There is also vasodilation of the splanchnic arterial system, which in turn results in an ↑ in portal venous inflow

3) Vasodilating factors such as nitric oxide are responsible for the vasodilatory effect. Both of these ab normalities result in increased production of splanchnic lymph.

4) These hemodynamic changes result in sodium retention by causing activation of the RAAS system with the development of hyperaldosteronism.

5) Increased aldosterone leading to sodium retention also contributes to the development of ascites. Fl uid accumulation and expansion of the extracellular fluid volume, which results in the formation of perip heral oedema and ascites.

6) Hypoalbuminemia and reduced plasma oncotic pressure also contribute to the loss of fluid from the vascular compartment into the peritoneal cavity. Hypoalbuminemia is due to decreased synthetic functi on in a cirrhotic liver.

Solution for Question 8:

Option C: Pseudo-chylous ascites is milky, contains fat and seen with hypertriglyceridemia

• Pseudo-chylous ascites is seen in TB. The fluid is milky white but does not contain fat.

• White, milky fluid indicates the presence of triglycerides in levels >200 mg/dL (and often >1000 mg/dL), which is the hallmark of chylous ascites.

• It results from the lymphatic disruption that may occur with trauma, cirrhosis, tumor, tuberculosis, or certain congenital abnormalities.

• Dark brown fluid can reflect a high bilirubin concentration and indicates biliary tract perforation.

• Black fluid may indicate the presence of pancreatic necrosis or metastatic melanoma.

Option A: SAAG> 1.1 is seen with portal hypertension

• SAAG is a better discriminator of portal hypertension than ascites.

• Patients with SAAG ≥ 1.1 gm/dL are considered as having high SAAG, indicating the presence of portal hypertension, while those with SAAG < 1.1 gm/dL are considered as having low SAAG, indicating the absence of portal hypertension.

Option B: SAAG < 1.1 is seen with Nephrotic syndrome

• A low gradient (SAAG < 1.1 g/dL) indicates nonportal hypertension and suggests a peritoneal cause of ascites.

• Low serum oncotic pressure can also cause low SAAG ascites.

• Testing for nephrotic syndrome and protein■losing enteropathy should be performed in patients with low SAAG ascites and suspicion of either one of these conditions.

Option D: Black ascitic fluid is seen with pancreatic necrosis

• Black ascites are a rare property of ascites.

• The differential diagnosis for black ascites can include metastatic melanoma, bowel perforation with leakage of fecal matter, fungal peritonitis, primary ovarian carcinoma, pancreatic ascites, and leakage of tattoo ink.

Solution for Question 9:

Option D: AIDS

• People with HIV often have problems that affect the liver. HIV can infect liver cells, and the virus can cause persistent inflammation—even when the viral load is undetectable—that can harm organs throughout the body. Certain HIV-positive patients may not be able to tolerate cART medications pre-liver transplantation due to poor liver synthetic function.

Option A: Age >70

• There is no standard age limit to be transplanted, provided that respiratory and cardiovascular function is adequate.

Option B: Portal vein thrombosis

• Previously, portal venous thrombosis (PVT) was an absolute contraindication for a liver transplant. Although this no longer holds, PVT still represents a significant technical challenge for surgeons and is associated with increased early mortality and graft failure following transplant.

Option C: Severe obesity

• Historically, obesity was considered a relative contraindication to transplantation, largely because of concerns about the technical feasibility and worse outcomes.

Solution for Question 10:

Option D: All of the above

• All these diseases have high estrogen levels in the body and thus manifest like this.

Option A: Rheumatoid arthritis

• Spider angiomas are usually benign but often can be suggestive of an underlying systemic disease such as cirrhosis or rheumatoid arthritis.

Option B: Cirrhosis of the liver

• Spider nevi correspond with a higher risk of mortality among patients with alcoholic liver disease. They also suggest a high likelihood of oesophagal varices and are indicative of the extent of hepatic fibrosis. The reported prevalence of spider angiomas in cirrhosis is 33%.

Option C: Pregnancy

• Spider angiomas are very common. They often occur in pregnant women and in people with liver disease.

Solution for Question 11:

Option A: Ascites is preceded by infection

• SBP- a severe complication of ascites characterized by spontaneous infection of the ascitic fluid without an intra-abdominal source.

• Fluid is a transudate due to cirrhosis protein is <2.5 g/dl.

• Patients with ascites may present with Fever Altered mental status Abdominal pain or discomfort Elevated WBC count

• Fever

• Altered mental status

• Abdominal pain or discomfort

• Elevated WBC count

• Bacterial translocation - gut flora traversing the intestine into mesenteric lymph nodes, leading to bacteremia and seeding of the ascitic fluid.

• MC organisms - E. coli and other gut bacteria.

• Absolute neutrophil count >250/mL. Bedside cultures should be obtained when ascitic fluid is tapped

• Diagnosis: Ascitic tap having neutrophil count >250/μL is diagnostic

• Treatment: Cefotaxime (best drug)

• Prophylaxis: Required in a patient with an episode(s) of SBP or who had recovered. Once-weekly dosing of antibiotics.

• Required in a patient with an episode(s) of SBP or who had recovered.

• Once-weekly dosing of antibiotics.

• Fever

• Altered mental status

• Abdominal pain or discomfort

• Elevated WBC count

• Required in a patient with an episode(s) of SBP or who had recovered.

• Once-weekly dosing of antibiotics.

Option B: Clinical features are abdominal pain, fever, leucocytosis and altered mental status

• Patients with ascites may present with Fever Altered mental status Abdominal pain or discomfort Elevated WBC count

• Fever

• Altered mental status

• Abdominal pain or discomfort

• Elevated WBC count

• Fever

• Altered mental status

• Abdominal pain or discomfort

• Elevated WBC count

Option C: Ascitic fluid protein of 1 gm/dl

• Fluid is a transudate due to cirrhosis protein is <2.5 g/dl.

Option D: Common organisms are Gram-negative organisms

• MC organisms - E. coli and other gut bacteria.

Solution for Question 12:

Option A: Alcohol Abuse

CAGE scale:

• It ranges from 0 to 4 depending on the number of problem drinking indicators endorsed, with higher scores reflecting more severe problem drinking patterns.

Acronym CAGE Quess:

C - Have you ever felt you ought to Cut down on your drinking?

A - Have people Annoyed you by criticizing your drinking?

G - Have you ever felt Guilty or bad about your drinking?

E - Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover (Eye-opener)?

One “yes” response should raise suspicion of an alcohol use problem, and more than one is a strong indication that abuse or dependence exists.

Option B: Depression

• Depression (also called major depressive disorder or clinical depression) is a common but serious mood disorder. It causes severe symptoms that affect how you feel, think, and handle daily activities, such as sleeping, eating, or working.

• To be diagnosed with depression, the symptoms must be present for at least two weeks.

• There are different types of depression, some of which develop due to specific circumstances.

• Major depression includes symptoms of depression most of the time for at least 2 weeks that typically interfere with one's ability to work, sleep, study, and eat.

• Persistent depressive disorder (also called dysthymia) often includes less severe symptoms of depression that last much longer, typically for at least 2 years.

• Perinatal depression occurs when a woman experiences major depression during pregnancy or after delivery (postpartum depression).

• The seasonal affective disorder comes and goes with the seasons, typically starting in late fall and early winter and going away during spring and summer.

• Depression with symptoms of psychosis, which is a severe form of depression where a person experiences psychosis symptoms, such as delusions (disturbing, false fixed beliefs) or hallucinations (hearing or seeing things that others do not see or hear).

Option C: Suicidal intention

• Suicidal ideations (SI), often called suicidal thoughts or ideas, is a broad term used to describe a range of contemplations, wishes, and preoccupations with death and suicide.

Option D: Coma

• Coma is a state of prolonged unconsciousness that can be caused by a variety of problems — traumatic head injury, stroke, brain tumour, drug or alcohol intoxication, or even an underlying illness, such as diabetes or an infection.

• Coma is a medical emergency. Swift action is needed to preserve life and brain function. Doctors normally order a series of blood tests and a brain scan to try to determine what's causing the coma so that proper treatment can begin.

• A coma seldom lasts longer than several weeks. People who are unconscious for a longer time might transition to a persistent vegetative state or brain death.

Solution for Question 13:

Option C: The most common cause of cholangitis in children

• The given slide shows Immunostaining of the portal tract highlighting the bile duct infiltrated with lymphocytes which signifies Primary biliary cirrhosis.

• Primary biliary cirrhosis now known as Primary biliary cholangitis is an autoimmune disorder that leads to the gradual destruction of intrahepatic bile ducts, resulting in periportal inflammation and cholestasis

• Primary biliary cholangitis is common among women of middle age.

Option A: Increase 5’- nucleotidase

Lab findings:

• ↑ Serum 5' nucleotidase activity

Option B: Median age of presentation is 50 years

• Mostly seen in females Age is 35-60 yrs.

Option D: PBC is frequently associated with CREST syndrome

• Associated with autoimmune disorders- CREST syndrome, Sicca syndrome, Autoimmune thyroiditis, Type-1 Diabetes mellitus and IgA deficiency.

Solution for Question 14:

Option D: Rifaximin

• The given clinical scenario is Hepatic encephalopathy.

• Treatment of hepatic encephalopathy: ANTIBIOTICS: Rifaximin at 550 mg twice daily has been very effective in treating encephalopathy

• ANTIBIOTICS: Rifaximin at 550 mg twice daily has been very effective in treating encephalopathy

• ANTIBIOTICS: Rifaximin at 550 mg twice daily has been very effective in treating encephalopathy

Option A: Neomycin

• This Antibiotic has no role in Hepatic encephalopathy.

Option B: Ampicillin

• This Antibiotic has no role in Hepatic encephalopathy.

Option C: Metronidazole

• This Antibiotic has no role in Hepatic encephalopathy.

Solution for Question 15:

Option A: Carbohydrate deficient transferrin

• Carbohydrate-deficient transferrin (CDT) is a biomarker for chronic alcohol intake of more than 60 g ethanol/d.

• It has been reported to be superior to conventional markers like gamma-glutamyltransferase (GGT) and mean corpuscular volume MCV).

Option B: 5-nucleotidase

• 5′-Nucleotidase (5′NT) is associated with the canalicular and sinusoidal plasma membranes. Its function is undefined.

• 5′NT is also found in the intestine, brain, heart, blood vessels, and endocrine pancreas.

• Serum levels of 5′NT are unaffected by sex or race, but age affects the level; values are lowest in children and increase gradually, reaching a plateau at approximately age 50 years.

Option C: SGPT raised

The most common diseases that cause abnormally high SGOT and SGPT are:

• Hepatitis A or B or C

• Chronic viral hepatitis,

• Cirrhosis of the liver (fibrosis of the liver because of prolonged inflammation of the liver),

• Liver damage from alcohol,

• Hemochromatosis (a genetic condition caused due to long-standing liver damage), and

• Reduced blood flow to the liver (from shock or heart failure).

Option D: MCHC

• MCHC is calculated by multiplying the haemoglobin result from the CBC panel by 100 and then dividing by the hematocrit result.

• The reference range for MCHC in adults is 33.4–35.5 grams per deciliter (g/dL).

• If your MCHC value is below 33.4 grams per deciliter, you have low MCHC. Low MCHC values occur if you have anaemia due to iron deficiency. It can also indicate thalassemia. This is an inherited blood disorder in which you have fewer red blood cells and less haemoglobin present in your body. Learn more about low MCHC and its possible causes.

• If your MCHC value is above 35.5 grams per deciliter, you have high MCHC.

Solution for Question 16:

Option B: Normocytic normochromic anaemia is present

• The most common type of anaemia encountered in liver cirrhosis is normocytic normochromic anaemia, attributable to the chronic inflammatory state

• However macrochromic anaemia could be seen in alcoholic liver cirrhosis

• Leukopenia and thrombocytopenia are also seen in liver cirrhosis

Option A: High serum albumin

• Serum albumin is low in liver cirrhosis.

• Human serum albumin is the most abundant plasma protein, and it regulates diverse body functions. In patients with advanced and decompensated cirrhosis, serum albumin levels are low because of a reduction in the hepatocyte mass due to disease and multiple therapeutic interventions

Option C: Normal prothrombin time

• Due to low factor 7 levels, PT is deranged.

• Prothrombin is a protein made by the liver. Prothrombin helps blood clot. The "prothrombin time" (PT) is one way of measuring how long it takes blood to form a clot, and it is measured in seconds (such as 13.2 seconds). A normal PT indicates that a normal amount of blood-clotting protein is available

Option D: Low serum globulin

• Gamma globulin is ↑ in liver cirrhosis.

• The characteristic abnormality in serum proteins in both acute and chronic liver disease is an elevation in γ-globulin. In acute hepatitis, the γ-globulin-levels are usually moderately elevated and the serum albumin is normal or only slightly depressed. As hepatitis subsides, the elevated γ-globulins gradually return to normal.

• Occasionally, hypergammaglobulinæmia persists or increases and may indicate a transition from acute to chronic hepatitis1. In chronic liver disease, particularly chronic hepatitis and advanced cirrhosis, the elevations in the γ-globulin concentrations are similar to or somewhat greater than those seen in acute hepatitis, but the percentage of the γ-globulin is considerably higher.

• This is due to hypoalbuminæmia resulting in total protein concentrations which are normal or low. Occasionally, particularly in chronic hepatitis, however, there is marked hypergammaglobulinæmia associated with elevations in the total serum protein

Solution for Question 17:

Option A: SGOT

The given picture is of hepatocytes, and the marked structure is Mitochondria:

• SGPT and SGOT are found in the cytoplasm of hepatocytes, whereas SGOT is also found in the mitochondria of hepatocytes.

• Aspartate aminotransferase (AST) is highest in the liver but can also be present in regions such as the heart, skeletal muscle, brain, and pancreas. AST is not specific and can be elevated due to cardiac infarction, muscular disease, pulmonary embolism, high protein intake, and many other conditions.

Option B: SGPT

• SGPT is found in the cytoplasm of hepatocytes

• Cirrhosis is characterized by fibrosis and disruption of normal liver architecture. ALT is believed to be more specific than AST in diagnosing hepatic pathology.

Option C: GGT

• GGT is a membrane enzyme found in hepatocytes and biliary epithelial cells.

• A gamma-glutamyl transferase (GGT) test measures the amount of GGT in the blood. GGT is an enzyme found throughout the body, but it is mostly found in the liver. When the liver is damaged, GGT may leak into the bloodstream. High levels of GGT in the blood may be a sign of liver disease or damage to the bile ducts. Bile ducts are tubes that carry bile in and out of the liver. Bile is a fluid made by the liver. It is important for digestion.

Option D: All of the above

• All enzymes mentioned in the options are produced from the different structures of hepatocytes

Solution for Question 18:

Option A: Alanine aminotransferase

• Cirrhosis is characterized by fibrosis and disruption of normal liver architecture. ALT is believed to be more specific than AST in diagnosing hepatic pathology.

• Aminotransferases are usually mildly to moderately elevated with aspartate aminotransferase (AST) greater than alanine aminotransferase (ALT)

Option B: Alkaline phosphatase

• Alkaline phosphatase is involved in the hydrolysis of organic phosphate esters at an alkaline pH, although its specific purpose is still unknown. Marked elevation of serum alkaline phosphatase is usually indicative of cholestasis, while moderate elevation can be seen in all types of liver disease.

Option C: Aspartate aminotransferase

• Aspartate aminotransferase (AST) is highest in the liver but can also be present in regions such as the heart, skeletal muscle, brain, and pancreas. AST is not specific and can be elevated due to cardiac infarction, muscular disease, pulmonary embolism, high protein intake, and many other conditions.

Option D: Blood urea nitrogen

• Blood urea nitrogen (BUN) levels are used to monitor kidney function. Liver disease can also be associated with elevated BUN levels, but this test is not very sensitive because liver damage may lead to decreased urea production

Solution for Question 19:

Answer Option B

• Score in total is 8

• Total bilirubin 36 = 2 , serum albumin 30g/dl = 2 , PT INR 2 = 2 and mild ascites =2 with no hepatic encephalopathy = 0.

Other options are incorrect

Solution for Question 20:

Option B: Syndrome-X

• A condition marked by extra fat around the abdomen, high levels of blood glucose (sugar) when not eating, high levels of triglycerides (a type of fat) in the blood, low levels of high-density lipoproteins (a type of protein that carries fats) in the blood, and high blood pressure.

• Also known as Metabolic syndrome is most commonly associated with NAFLD

• Abnormalities associates Syndrome X: Impaired fasting plasma glucose concentration Impaired glucose tolerance Increase plasma uric acid concentration Decrease renal uric acid concentration Increase plasma triglyceride concentration Increase renal sodium retention Increase blood pressure Polycystic ovary syndrome

• Impaired fasting plasma glucose concentration

• Impaired glucose tolerance

• Increase plasma uric acid concentration

• Decrease renal uric acid concentration

• Increase plasma triglyceride concentration

• Increase renal sodium retention

• Increase blood pressure

• Polycystic ovary syndrome

• Impaired fasting plasma glucose concentration

• Impaired glucose tolerance

• Increase plasma uric acid concentration

• Decrease renal uric acid concentration

• Increase plasma triglyceride concentration

• Increase renal sodium retention

• Increase blood pressure

• Polycystic ovary syndrome

Option A: Reye syndrome

• Reye's syndrome is a very rare disorder that can cause serious liver and brain damage. If it's not treated promptly, it may lead to permanent brain injury or death.

• Reye's syndrome mainly affects children and young adults under 20 years of age.

Option C: Cardiac syndrome-X

• Cardiac syndrome X (CSX) is characterized by typical or atypical anginal chest pain with no evidence of significant coronary vascular abnormalities visualized on an angiogram. It is viewed as a type of ischemic heart disease with occurrence most prevalent in perimenopausal and postmenopausal females. To avoid the high morbidity and complications associated with this condition requires prompt diagnosis and treatment. This activity reviews the evaluation and treatment of CSX and highlights the role of the interprofessional team in evaluating and treating patients with this condition

Objectives:

• Review the pathogenesis of cardiac syndrome X.

• Describe the treatment modalities of cardiac syndrome X.

• Identify the complications of cardiac syndrome X.

• Summarize interprofessional team strategies for improving care coordination and patient education in treating patients with cardiac syndrome X and improving outcomes.

Option D: Pregnancy

• The 5 pregnancy-related liver disorders—are acute fatty liver of pregnancy (AFLP), HELLP syndrome (hemolysis, elevated liver enzymes and low platelets), pre-eclamptic liver dysfunction, intrahepatic cholestasis of pregnancy (ICP) and hyperemesis gravidarum—occur in different gestational time periods. This review focuses on these pregnancy-related liver disorders.

Solution for Question 21:

ANSWER

Option D: Splinter haemorrhages

The given clinical scenario is Compensated liver disease.

• Splinter hemorrhages appear as longitudinal thin red-brown lines of variable length. Splinter hemorrhages are usually localized in the distal nail.

• Splinter hemorrhages are seen in: Infectious endocarditis Chronic glomerulonephritis Vasculitis Rheumatoid arthritis Malignant tumours Psoriasis

• Infectious endocarditis

• Chronic glomerulonephritis

• Vasculitis

• Rheumatoid arthritis

• Malignant tumours

• Psoriasis

Splinter hemorrhages are seen in:

• Infectious endocarditis

• Chronic glomerulonephritis

• Vasculitis

• Rheumatoid arthritis

• Malignant tumours

• Psoriasis

Infectious endocarditis

Chronic glomerulonephritis

Vasculitis

Rheumatoid arthritis

Malignant tumours

Psoriasis

• Splinter haemorrhages are not seen in CLD

Other options

Option A: Paper money skin

• Paper money skin is an atypical spider angioma, which manifests as numerous threadlike small blood vessels scattered randomly throughout the skin and disappears under pressure.

Option B: Clubbing

• Finger clubbing is a well-recognised sign of chronic liver disease, especially primary biliary cirrhosis and chronic active hepatitis. The proximal two-thirds of the nail plate turns powdery white with a ground-glass opacity, which may develop in patients with advanced cirrhosis.

Option C: Dupuytren's contracture

• Dupuytren's contracture is a disease of unknown aetiology. It has associations with various diseases. It has increased the incidence of alcoholic and non-alcoholic cirrhosis. Bilateral Dupuytren's contracture in cirrhosis of the liver is a rare finding.

Solution for Question 22:

Option D: Schistosomiasis is the pre-hepatic cause of portal hypertension

• Schistosomiasis is a parasitic disease historically known as bilharzia caused by the trematode of the genus Schistosoma.

• Schistosoma haematobium causes urogenital schistosomiasis.

• Clinical features include dysuria, painful hematuria, urinary obstruction, vaginal discharge, or pain/bleeding after intercourse. Gross hematuria typically occurs at the end of voiding, termed terminal hematuria

• Schistosomiasis is the hepatic but pre-sinusoidal cause of portal hypertension

Option A: Massive splenomegaly is seen in Banti's syndrome

• Banti syndrome is a disorder of the spleen, the large, gland-like organ in the upper left side of the abdomen that produces red blood cells before birth and, in newborns, removes and destroys aged red blood cells, and plays a role in fighting infection. There is an abnormal enlargement of the spleen.

Option B: Hepatic venous pressure gradient is > 10 mm Hg for clinically significant Portal hypertension

• The normal hepatic venous pressure gradient and free hepatic venous pressure are 5–6 mmHg. Clinically significant portal hypertension is present when the gradient exceeds 10 mmHg and the risk of variceal bleeding increases beyond a gradient of 12 mmHg.

Option C: MC cause of Portal hypertension is Alcoholic cirrhosis

• Portal hypertension is elevated pressure in your portal venous system. The portal vein is a major vein that leads to the liver. The most common cause of portal hypertension is cirrhosis (scarring) of the liver.

Solution for Question 23:

Option B: Metabolic alkalosis, chloride non-responsive

• Metabolic alkalosis is when the body's pH is >7.45.

• It is a increse in the serum HCO3.

• Significant hypokalemic metabolic alkalosis has been found to occur in some patients with cirrhosis.

Option A: Metabolic alkalosis, chloride responsive

• As spironolactone is used for ascites treatment, the metabolic alkalosis that develops, as a result, is not chloride responsive.

Option C: Hyperchloremic metabolic acidosis

• Hyperchloremic acidosis is caused by the loss of too much sodium bicarbonate from the body, which can happen with severe diarrhoea. Kidney disease (uremia, distal renal tubular acidosis or proximal renal tubular acidosis).

Option D: Hypochloremic metabolic acidosis

• Hypochloremia is usually caused by the excess use of loop diuretics, nasogastric suction, or vomiting. Metabolic alkalosis is usually present with hypochloremia. Vomiting causes loss of hydrochloric acid.

Solution for Question 24:

Option B: Gastric balloon should be inflated with 200 mL of air

• Endotracheal intubation prior to tube insertion reduces the risk of pulmonary aspiration.

• The tube should be passed through the mouth into the stomach.

• The gastric balloon should be inflated with 300mL of air, and gentle traction applied to compress the gastro-oesophageal junction.

Option A: Used to arrest acute variceal bleed

• The Sengstaken-Blakemore tube is a red tube used to stop or slow bleeding from the oesophagus and stomach.

Option C: Pressure in the oesophageal balloon is <40 mm Hg.

• Inflation of the oesophageal balloon is rarely required. If the oesophageal balloon needs to be used because of continued bleeding, pressure should be monitored with a sphygmomanometer (to maintain <40mmHg), and it should be deflated for about every 10 minutes to avoid oesophagal mucosal damage.

Option D: Endotracheal intubation prior to tube insertion reduces the risk of pulmonary aspiration

• Endotracheal intubation prior to tube insertion reduces the risk of pulmonary aspiration. The tube should be passed through the mouth into the stomach.

Solution for Question 25:

Option D: Apoptosis and necrosis in the stage of hepatitis is facilitated by Transforming growth factor b eta (TGF-β)

• Alcohol also affects the gut leading to dysbiosis and increased gut permeability, delivering pathogen-associated molecular patterns (PAMPs) such as lipopolysaccharide and bacterial DNA via the portal vein, which stimulate immune cells, leading to the release of tumour necrosis factor-alpha (TNF-α) and interleukin (IL)-1, IL-2 and IL-8.

• All of these cytokines have been implicated in the pathogenesis of liver fibrosis.

Option A: Liver function tests are normal in the stage of steatosis

• LFTs are usually normal in fatty liver disease. Abdominal imaging technology is used to diagnose the disease.

Option B: Stellate cell-mediated fibrosis leads to cirrhosis

• Activated Hepatic stellate cells transform into myofibroblast-like cells to promote fibrosis in response to liver injury or chronic inflammation, leading to cirrhosis and hepatocellular carcinoma.

Option C: Direct oxidative injury occurs in the stage of hepatitis

• The second stage of liver disease from alcohol is alcoholic hepatitis. Alcoholic hepatitis leads to inflammation of the liver, degeneration of liver cells, and fibrosis or the development of excessive amounts of scar tissue in the liver.

Solution for Question 26:

Option C: Large volume paracenetesis is not indicated in SBP

• Treatment of transudative ascites is based on restricting sodium intake, promoting urine output with diuretics and, if necessary, removing ascites directly by paracentesis. Exudative ascites due to malignancy is treated with paracentesis, but fluid replacement is generally not required. Large-volume paracentesis should not be done. The mainstay of treatment is antibiotic therapy.

Option D: USG can detect as little as 100 ml of peritoneal fluid

• Ascites are seen as an anechoic space on ultrasound. Ultrasound can quantify the volume of ascites and aid in the decision process for fluid drainage.

Option A: Hemorrhagic ascites is diagnosed when RBC count >1000/mm3

• Hemorrhagic ascites were defined as an ascitic fluid red blood cell (RBC) count ≥10,000/μl. We compared each patient with 3 age- and gender-matched controls (cirrhotic patients with ascites and an ascitic RBC count <10,000/μl)

Option B: Spontaneous Bacterial Peritonitis (SBP) is diagnosed when Neutrophil count >500/mm3

• The diagnosis of SBP is established based on positive ascitic fluid bacterial cultures and the detection of an elevated absolute fluid polymorphonuclear neutrophil (PMN) count in the ascites (>250/mm3) without an evident intra-abdominal surgically treatable source of infection.

Option E: Norfloxacin is the DOC in SBP.

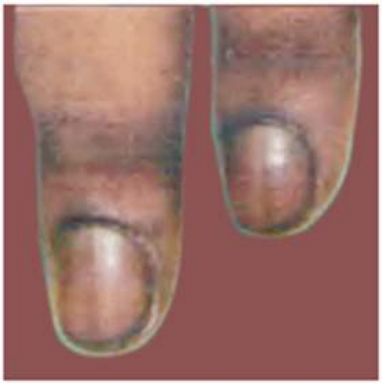
• Ciprofloxacin/ iv cefotaxime is the drug of choice in SBP.

Wilson's Disease & Hemachromatosis

1. A 40 years old male labourer by occupation presented to opd with the complaint of discolouration of nails. He also complains of decreased appetite, fatigue and backache. He has no history of serious illness and takes no medication. He drinks two alcoholic beverages daily and takes no medications. The nails show a typical appearance, as shown in the image below. All are possible diagnoses in these changes in nails except?

(or)

Which of the following is not a possible diagnosis of this patient based on nail changes?



A. Peutz-Jeghers syndrome

B. Addison disease

C. Cushing disease

D. Wilson's disease

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2. A 30-year-old man comes to the physician to evaluate a progressively worsening tremor in his hands, and multiple falls over the past 3 months. The tremor occurs both at rest and with movement. He also reports decreased concentration and a loss of interest in his normal activities over this time. He has no history of serious medical illness and takes no medications. He drinks two alcoholic beverages daily and does not use illicit drugs. Vital signs are within normal limits. Physical exam shows mild jaundice, a flapping tremor, and a broad-based gait. Aspartate aminotransferase is elevated. Which of the following is a possible diagnosis?

(or)

A man presents with a worsening tremor in his hands, along with decreased concentration and loss of interest. Physical exam shows mild jaundice, a flapping tremor, and a broad-based gait. Aspartate aminotransferase is elevated. Which of the following is a possible diagnosis?

A. Rheumatic Chorea

B. Westphal variant of Huntington's disease

C. Wilson disease

D. Hallervorden Spatz disease

---

3. Which of the following results would usually be seen in Menke’s kinky (Steely) hair disease?

(or)

A 7-month-old infant was brought to you with a history of hypotonia, seizures, failure to thrive & growth retardation. He is noted to have the appearance of the characteristic sparse, fragile, kinky hair and hypo-pigmented skin. Initial investigations revealed anaemia & neutropenia. A probable diagnosis of Menke's kinky (Steely) hair disease was made. Which of the following results would usually be seen in such patients?

A. Low copper levels

B. Low zinc levels

C. Low iron levels

D. Low ceruloplasmin levels

---

4. Which of the following conditions are associated with liver cirrhosis with portal hypertension? Cystic fibrosis Alpha 1 antitrypsin deficiency Wilson's disease Schistosomiasis

(or)

A 59-year-old man with a history of alcoholic cirrhosis is brought to the physician by his wife for a 1-week history of progressive abdominal distension and yellowing of the eyes. For the past month, he has been irritable, had difficulty falling asleep, became clumsy, and fallen frequently. Two months ago, he underwent banding for oesophagal varices after an episode of vomiting blood. His vital signs are within normal limits. Physical examination shows jaundice, multiple bruises, pedal oedema, gynecomastia, loss of pubic hair, and small, firm testes. There are multiple small vascular lesions on his chest and neck that blanch with pressure. His hands are erythematous and warm. A flapping tremor is seen when extending the forearms and wrist. Which of the following conditions are associated with liver cirrhosis with portal hypertension? Cystic fibrosis Alpha 1 antitrypsin deficiency Wilson's disease Schistosomiasis

A. 1, 2, 3 only

B. 3 & 4 only

C. 1, 2, 4 only

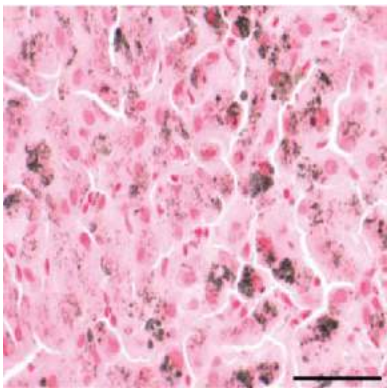
D. All of the above

---

5. A 15-year-old child presents with falling school grades and developing an abnormal posture. On examination, dystonia and increased muscle tone are noted. Resting tremors are also noted. Slit lamp examination shows the presence of the Kayser Fleischer ring. LFTs are elevated. Liver biopsy for copper will be stained by which of the following stain?

(or)

Liver biopsy for copper will be stained by which of the following stains?



A. Perl's stain

B. Rubeanic acid

C. Supravital stain

D. Schmorl’s method

---

6. A 22-year-old woman is evaluated for dark urine and abdominal distension. Examination shows a low-frequency tremor in her left hand. Liver enzymes are mildly raised. Abdominal ultrasonography shows an appearing nodular liver and an enlarged spleen. Which is the most likely diagnosis?

(or)

A 22-year-old woman is evaluated in the emergency for a 3-day history of dark urine and abdominal distension. On examination, she has a normal mental status; icterus is present, heart and lungs are normal. Her speech is slurred and monotonous. Examination shows a broad-based gait and a low-frequency tremor in her left hand. Lab findings include: Hematocrit: 26 Reticulocytes: 5% Platelets: 1.3 lakhs Alk. Phos: 30 units/L ALT: 110 units/L AST: 220 units/L Total bilirubin:13mg% (Direct:4 mg) HbsAg is positive Hepatitis ‘A’&’C’ are negative. The urine drug screen is negative. Abdominal ultrasonography shows a nodular appearing liver and an enlarged spleen. Which is the most likely diagnosis?

A. Acetaminophen intoxication

B. Acute viral hepatitis

C. Primary biliary cirrhosis

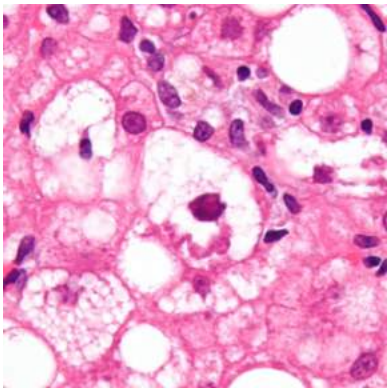
D. Wilson’s disease

---

7. A 40-year-old male chronic alcoholic presented with complaints of nausea and vomiting for the past 3 days. He also complained of right upper quadrant discomfort. Liver function tests revealed elevated levels of serum AST & ALT. Histopathological examination showed eosinophilic deposits in hepatocytes, as shown below. This characteristic histopathologic feature can be seen in all of the following conditions except?

(or)

A man complained of right upper quadrant discomfort. With elevated levels of serum AST & ALT. Histopathological examination showed eosinophilic deposits in hepatocytes, as shown below. In which of the following conditions this histopathologic feature is not seen?



A. Wilson’s disease

B. Indian childhood cirrhosis

C. Primary biliary cirrhosis

D. Hepatitis E

---

8. A 46-year-old female presented with progressive pain and stiffness in her hands. Her skin is very sensitive to sunlight. She has diabetes mellitus controlled with insulin. A diagnosis of is made. Which of the following features are not seen in Hemochromatosis?

(or)

A 46-year-old female presented to you with complaints of fatigue, progressive pain, and stiffness in her hands for the past 3 months. She used to play tennis but stopped 1 month ago because of difficulties holding the racket and her skin becoming “very sensitive to sunlight. She has diabetes mellitus controlled with insulin. She does not smoke or drink alcohol. Vital signs are within normal limits. Both hands' second and third metacarpophalangeal joints are tender to palpation, and the range of motion is limited. Hemochromatosis is diagnosed in this patient. All of the following features can be seen in such patients except:

A. CNS features

B. Bronze Pancreas

C. Hyperpigmentation

D. Restrictive cardiomyopathy

---

9. A 28-year-old male presented with complaints of 2 episodes of hematemesis associated with right upper quadrant pain. He has no significant past medical history. Direct visualization via upper endoscopy showed blood clots exiting the biliary tract, confirming the hemobilia diagnosis. Which of the following is the most common cause of the above diagnosis?

(or)

A 28-year-old male presented with complaints of 2 episodes of hematemesis. Direct visualization via upper endoscopy showed blood clots exiting the biliary tract, confirming the hemobilia diagnosis. Which of the following is the most common cause of the above diagnosis?

A. Trauma

B. Hemangioma

C. Rupture of hepatic artery aneurysm

D. Hepatitis

---

10. A 44-year-old male presented to you with a history of abdominal swelling. Over the last year, his family has also noticed his speech becoming slower. The patient does not smoke or drink alcohol. He takes no medications. Examination showed scleral icterus and some drooling. He is noted to have features of dysarthria & asymmetrical tremors. The liver is palpated 2 to 3 cm below the right costal margin, and the spleen is palpated 1 to 2 cm below the left costal margin. Slit-lamp examination showed Kayser Fleischer's ring. Which of the following drug is not useful in such patients?

(or)

Which of the following drugs is not useful in Wilson's disease?

A. Trientine

B. Calcium

C. Penicillamine

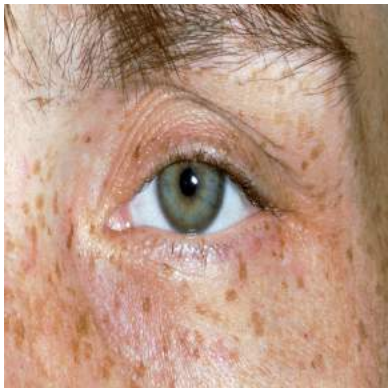
D. Zinc

---

11. A 15-year-old child has presented to you with a history of dystonia and poor school grades. His temperature is 37°C (98.6°F), his pulse is 70 beats/min, and his blood pressure is 120/80 mmHg. He is alert and oriented to person, place, and time. On examination, he is noticed to have slurred speech, tremors of hands, scleral icterus, abdominal swelling and an ataxic gait. The slit examination is shown below. Which is the initial investigation recommended for the patient?

(or)

The slit examination shows Kayser Fleischer's ring. Which is the initial investigation recommended for the patient?



A. Serum ceruloplasmin

B. Serum copper

C. 24-hour urinary copper

D. Liver biopsy

---

12. A 23-year-old woman comes to the emergency department complaining of tremors in her hands and slurred speech for the past four months. When he wakes up in the morning, his pillow is soaked in

saliva. His vital signs are within normal limits. Examination shows scleral icterus and a broad-based gait. Kayser-Fleischer's ring is noticed in his eye. He is diagnosed to have Wilson’s disease. Mark the incorrect statement regarding Leipzig criteria used in Wilson's disease.

(or)

Which of the following is incorrect regarding Leipzig criteria?

A. Mutational analysis of ATP 7B gene

B. Family history of the disease

C. Total score > 4-Diagnosis is established

D. Coombs negative hemolytic anaemia

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	3
Question 3	1
Question 4	1
Question 5	2
Question 6	4
Question 7	4
Question 8	1
Question 9	1
Question 10	2
Question 11	3
Question 12	2

Solution for Question 1:

Option D: Wilson’s disease

• In patients with Wilson's disease, the lunula of the nail takes on a blue colouration called the azure lunula.

• Excessive fluoride ingestion can turn nails brown or black. Hepatolenticular degeneration in Wilson’s disease leads to bluish discolouration of the lanula or base of fingernails. In Wilson's disease, the discolouration is most intense in the base and fades out proximally.

Systemic

Dermatological

Option A: Peutz-Jeghers syndrome.

• The most prominent cutaneous feature of Peutz-Jeghers syndrome is the appearance of pigmented spots, also called melanocytic macules.

• Bluish-black or dark brown, flat patches are seen around the mouth, lips, gums, inner lining of the mouth, eyes, hands and feet, fingers and toes, anus and genital areas.

• Pigmentation usually appears before 5 years of age and may fade after puberty.

Option B: Addison disease.

• In Addison's disease, the adrenal gland produces insufficient steroid hormones.

• Patients with Addison's disease experience hyperpigmentation of the skin, which turns their skin brown or black.

Option C: Cushing disease.

• Cushing's disease causes the overproduction of cortisol.

• Secondary hypercortisolism can cause hyperpigmentation of the skin.

Solution for Question 2:

Option C: Wilson’s disease

• Wilson’s disease occurs due to copper accumulation in the liver, basal ganglia, cornea and kidneys.

• The signs and symptoms of Wilson’s disease include

Option A: Rheumatic Chorea

• The signs and symptoms of rheumatic chorea include emotional lability and poor handwriting, hung-up reflexes, pronator signs, and darting tongue.

• Another differentiating feature is normal LFTs.

Option B: Westphal variant of Huntington's disease

• Juvenile Huntington's disease is also known as the Westphal variant of Huntington's disease.

• Huntington's disease is a neurodegenerative disorder of the CNS. It includes akinetic-rigid Parkinsonism-like symptoms, i.e. chorea, as well as dementia.

• LFTs are normal in this disease.

Option D: Hallervorden-Spatz disease

• Hallervorden-Spatz disease is a neurodegenerative disease causing Parkinsonism-like features, cognitive decline and retinal pigmentary changes.

Solution for Question 3:

Option A: Low copper levels.

• Menkes disease is an X-linked recessive disease that occurs due to a mutation in the ATP7A gene leading to defective Menkes protein.

• The defective Menkes protein causes abnormal absorption and transport of copper.

• Low copper levels lead to decreased lysyl oxidase activity, as copper is an essential enzyme cofactor.

• The decreased activity of lysyl oxidase causes defective collagen production, leading to various clinical features.

Clinical Features

• Progressive cerebral degeneration, growth retardation.

• Hypotonia, seizures.

• Hypo-pigmented skin and hair.

• Sparse, brittle, kinky hair.

• Scurvy-like bone changes.

• Anemia and neutropenia.

• Failure to thrive.

• Pili torti, trichorrhexis, and monilethrix may occur.

Other options

Option B: Low zinc levels

• Low zinc levels do not cause Menkes disease.

• Symptoms of low zinc levels include delayed wound healing, suppressed immunity, male hypogonadism, hair loss, and loss of taste and smell.

Option C: Low iron levels

• Low iron levels do not cause Menkes disease.

• It causes iron deficiency anaemia as fatigue, conjunctival pallor, koilonychia and pica.

Option D: Low ceruloplasmin levels

• Low ceruloplasmin is seen in Wilson's disease and not in Menkes disease.

Solution for Question 4:

Option A: 1, 2, 3 only.

Cystic fibrosis:

• Cystic fibrosis is caused by mutations in the CFTR gene, which encodes the CF transmembrane conductance regulator (CFTR) protein. These mutations result in defective chloride (Cl-) channels.

• The chloride channel is responsible for transporting Cl- from the cell into the lumen (secretion).

• Defective ATP-gated chloride channel $\rightarrow$ inability to transport intracellular Cl- across the cell membrane $\rightarrow$ reduced secretion of Cl- and H_2O $\rightarrow$ accumulation of intracellular Cl- $\rightarrow \uparrow$ Na+ reabsorption (via ENaC) $\rightarrow \uparrow$ H_2O reabsorption $\rightarrow$ formation of hyper viscous mucus $\rightarrow$ accumulation of secretions and blockage of small passages of affected organs $\rightarrow$ chronic inflammation and remodelling $\rightarrow$ organ damage.

• CFTR dysfunction in the exocrine pancreas and biliary tract can ultimately lead to CF-related liver disease (CFLD) and CF-related diabetes (CFRD).

• The exocrine complication of CF can include neonatal obstructive cholestasis, cholelithiasis, biliary cirrhosis, portal hypertension, and end-stage liver disease.

Alpha 1 antitrypsin deficiency:

• It is an inherited disorder that causes abnormal folding of the alpha-1- AT protein, resulting in the failure of secretion of that protein from the liver. These patients are at the greatest risk of developing chronic liver disease.

• Alpha-1 antitrypsin is a protease inhibitor synthesized in the liver and protects cells from breakdown by neutrophil elastase.

• Gene mutation induces a conformational change in the structure of AAT protein → dysfunctional (or absent) AAT. Effect on the liver: accumulation of AAT in hepatocellular endoplasmic reticulum → hepatocyte destruction → hepatitis and liver cirrhosis Effect on the lungs: deficient AAT → uninhibited neutrophil elastase activity → destruction of the pulmonary parenchyma → pan acinar emphysema.

• Effect on the liver: accumulation of AAT in hepatocellular endoplasmic reticulum → hepatocyte destruction → hepatitis and liver cirrhosis

• Effect on the lungs: deficient AAT → uninhibited neutrophil elastase activity → destruction of the pulmonary parenchyma → pan acinar emphysema.

• Effect on the liver: accumulation of AAT in hepatocellular endoplasmic reticulum → hepatocyte destruction → hepatitis and liver cirrhosis

• Effect on the lungs: deficient AAT → uninhibited neutrophil elastase activity → destruction of the pulmonary parenchyma → pan acinar emphysema.

Wilson’s disease:

• Wilson disease (hepatolenticular degeneration) is an autosomal recessive metabolic disorder in which impaired copper excretion causes copper to accumulate in the body.

• In its initial stages, Wilson's disease leads to copper deposits in the liver.

• The clinical features of hepatolenticular degeneration include cirrhosis, hepatomegaly, portal hypertension, jaundice and ascites.

Option B: 3 & 4 only

Schistostomiasis:

• Schistosomiasis is a parasitic disease caused by schistosomes, a type of trematode/fluke. Infection occurs when the skin comes in contact with parasite-infested water.

• Hepatic schistosomiasis can lead to hepatosplenomegaly and portal hypertension.

• However, schistosomiasis does not cause cirrhosis.

Option C: 1,2 & 4 only

• 1 & 2 cause cirrhosis as well as portal hypertension.

• Schistosomiasis does not cause this; however, it causes portal hypertension.

Option D: All of above

• 1, 2 and 3 cause cirrhosis and portal hypertension, whereas schistosomiasis only causes portal hypertension and does not cause cirrhosis.

Solution for Question 5:

Option B: Rubeanic acid.

• Wilson’s disease occurs due to excessive copper accumulation in the liver and various other tissues of the body.

• The patient presents with signs and symptoms of Wilson’s disease. The liver biopsy shows copper accumulation in the liver.

• Rubeanic acid and Rhodamine stains are utilized to detect the cytoplasmic accumulation of copper in the liver.

Other options

Option A: Perl's stain

• Perl's stain detect iron deposits in the body tissues such as bone marrow, spleen, liver and lungs.

Option C: Supravital stain

• Supravital staining is used in microscopy to observe the cells of living organisms. For example, the supravital stain of a blood smear to observe anemias.

• Supravital stain increases the visibility of elements under the microscope by increasing the refractive index.

Option D: Schmorl’s method

• Schmorl’s method detects melanin and uses the reducing properties of melanin to stain blue-green granules. It is also used to detect lipofuscin.

Solution for Question 6:

Option D: Wilson’s disease

• Wilson disease (hepatolenticular degeneration) is an autosomal recessive metabolic disorder in which impaired copper excretion causes Copper to accumulate in the body.

• Autosomal recessive mutations in the ATP7B gene cause the production of defective ATP7B protein. Reduced incorporation of Copper into apoceruloplasmin leads to decreased serum ceruloplasmin and reduced biliary copper excretion.

• Reduced incorporation of Copper into apoceruloplasmin leads to decreased serum ceruloplasmin and reduced biliary copper excretion.

• It results in free serum copper accumulating in the liver, cornea, CNS (basal ganglia, brain stem, cerebellum), kidneys, and enterocytes.

• In its initial stages, Wilson's disease leads to copper deposits in the liver. As the disease progresses, Copper accumulates in other organs, most importantly in the brain and cornea.

• Hepatic involvement in Wilson’s disease may range from elevated liver biochemical tests (although the alkaline phosphatase may be low) to cirrhosis and portal hypertension.

• The neurologic manifestations of Wilson's disease are related to basal ganglia dysfunction and include an akinetic-rigid syndrome similar to parkinsonism, dysarthria, dysphagia, incoordination, and spasticity.

• Psychiatric features include behavioral and personality changes and emotional lability and may precede characteristic neurologic features. The risk of depression is increased.

• The pathognomonic sign of the condition is the brownish or grey-green Kayser-Fleischer ring, which represents fine-pigmented granular deposits in the Descemet membrane in the cornea.

• In the above-mentioned clinical scenario, the patient has clinical findings of hepatosplenomegaly, slurred speech and tremors. These findings are consistent with Wilson's disease.

• Low hematocrit of 26% and increased reticulocyte count indicate the hemolysis of RBCs because of excess copper accumulation.

• This hemolysis leads to increased production of unconjugated bilirubin, and damaged hepatocytes also cause imperfect conjugation. Thus, causing jaundice due to increased unconjugated bilirubin.

• The liver enzymes are also mildly elevated, indicating hepatocyte damage.

• Moreover, the presence of nodular liver, portal hypertension and splenomegaly indicate chronic liver damage.

• Reduced incorporation of Copper into apoceruloplasmin leads to decreased serum ceruloplasmin and reduced biliary copper excretion.

Option A: Acetaminophen intoxication

• Acetaminophen intoxication also causes drug-induced hepatitis. Acetaminophen causes hepatotoxicity by the following mechanism:

• Exhaustion of hepatic metabolic pathways causes the formation of a toxic metabolite of acetaminophen, N-acetyl-p-benzoquinone imine (NAPQI).

• Glutathione initially inactivates NAPQI, but its reserves eventually deplete, leading to NAPQI build-up

• NAPQI build-up causes irreversible oxidative hepatocyte injury, ultimately leading to liver cell necrosis.

• Symptoms of acetaminophen toxicity include progressive liver damage (RUQ pain and tenderness and abnormal liver function tests).

• If acute liver failure does not develop, patients typically begin to recover within 2 weeks after ingestion.

• Moreover, it also causes acute kidney injury in 50% of the patients with liver damage.

Option B: Acute viral hepatitis

• The clinical presentation of acute viral hepatitis includes fever, malaise, myalgia, RUQ pain and tenderness, nodular liver and splenomegaly.

• However, liver enzyme elevation is markedly enlarged compared to those in Wilson's disease.

Option C: Primary biliary cirrhosis

• Primary biliary cirrhosis is an autoimmune disease which causes chronic, progressive liver disease characterized by the destruction of the intralobular bile ducts and hypercholesterolemia due to altered lipoprotein metabolism.

• Fatigue is usually the first symptom in patients presenting with this disease.

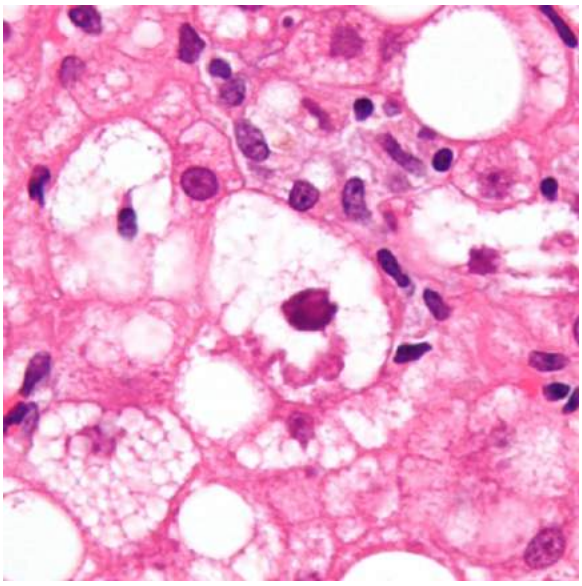
• Other symptoms include marked generalized pruritus, hepatomegaly, RUQ discomfort, splenomegaly, hyperpigmentation, jaundice, pale stool and dark urine.

Solution for Question 7:

ANSWER

Option D: Hepatitis E

Mallory Bodies:



• Mallory bodies are the inclusion bodes within the cytoplasm of hepatocyles that contain damaged intermediate filaments .

• Mallory bodies are highly eosinophilic and thus appear pink on H&E; stains.

• These are keratin filaments degraded by ubiquitination or bounded by heat shock proteins.

• Mallory bodies are most commonly seen in alcoholic liver disease. However, they are also seen in

• Mallory bodies are not seen in hepatitis E.

Other options

Option A: Wilson's disease

• Wilson's disease damages the hepatocytes due to copper accumulation in liver cells.

• The cytoplasm of damaged hepatocytes shows the presence of eosinophilic globular inclusions known as Mallory hyaline changes.

Option B: Indian childhood cirrhosis

• Indian childhood cirrhosis is a chronic liver disease that occurs in childhood. It occurs because of excessive copper deposits in the liver that lead to cirrhosis of the liver.

• It mainly occurs in children of age 3-5 years old. This condition has high mortality because of liver failure.

• It is characterized by Mallory-Denk bodies in the cytoplasm of liver cells in affected children.

Option C: Primary biliary cirrhosis

• Primary biliary cirrhosis occurs due to the destruction of intrahepatic biliary ducts. Mallory bodies are also seen in liver cells affected with primary biliary cirrhosis.

Solution for Question 8:

Option A: CNS features

Hemochromatosis:

• Hemochromatosis is characterized by excess iron deposition (or increased risk of excess deposition) in the body due to increased iron absorption.

• Increased iron absorption leads to iron overload as there is no physiologic method for iron excretion (except through menstrual bleeding).

• Iron overload in Hemochromatosis can be primary or secondary.

• Primary iron overload (primary/ hereditary Hemochromatosis) is caused by mutations in genes that regulate gastrointestinal iron absorption, resulting in iron over-absorption.

• Secondary iron overload (sometimes referred to as secondary Hemachromatosis) is caused by conditions affecting iron metabolism (e.g., chronic liver disease) or excessive iron ingestion or infusion (e.g., from repeated transfusions to treat beta - thelassemia major).

• The early manifestations include fatigue and arthralgia.

• Organs involved in Hemochromatosis are: Liver: Abdominal pain, hepatomegaly, cirrhosis, Increased risk of hepatocellular carcinoma (a common cause of death). Most patients find hepatomegaly on physical examination; splenomegaly and other complications of chronic liver disease, including ascites, oedema, and jaundice, may be present. Pancreas: signs of diabetes mellitus.
Skin: hyperpigmentation, bronze skin. Pituitary gland: hypogonadism, erectile dysfunction, testicular atrophy, loss of libido, amenorrhea. Joints: arthralgia (typically symmetrical arthropathy of the MCP joints II and III), chondrocalcinosis (accumulation of calcium pyrophosphate). Heart: restrictive cardiomyopathy, cardiac arrhythmias and congestive heart failure.

• Liver: Abdominal pain, hepatomegaly, cirrhosis, Increased risk of hepatocellular carcinoma (a common cause of death). Most patients find hepatomegaly on physical examination; splenomegaly and other complications of chronic liver disease, including ascites, oedema, and jaundice, may be present.

• Pancreas: signs of diabetes mellitus.

• Skin: hyperpigmentation, bronze skin.

• Pituitary gland: hypogonadism, erectile dysfunction, testicular atrophy, loss of libido, amenorrhea.

• Joints: arthralgia (typically symmetrical arthropathy of the MCP joints II and III), chondrocalcinosis (accumulation of calcium pyrophosphate).

• Heart: restrictive cardiomyopathy, cardiac arrhythmias and congestive heart failure.

• The clinical features of Hemochromatosis do not show any CNS features.

• Liver: Abdominal pain, hepatomegaly, cirrhosis, Increased risk of hepatocellular carcinoma (a common cause of death). Most patients find hepatomegaly on physical examination; splenomegaly and other complications of chronic liver disease, including ascites, oedema, and jaundice, may be present.

• Pancreas: signs of diabetes mellitus.

• Skin: hyperpigmentation, bronze skin.

• Pituitary gland: hypogonadism, erectile dysfunction, testicular atrophy, loss of libido, amenorrhea.

• Joints: arthralgia (typically symmetrical arthropathy of the MCP joints II and III), chondrocalcinosis (accumulation of calcium pyrophosphate).

• Heart: restrictive cardiomyopathy, cardiac arrhythmias and congestive heart failure.

• Ferritin is increased

• Liver biopsy stain used Perls Prussian blue stain shows the increased iron concentration in the liver, increased hepatic iron index >1.9

• Genetic study: HFE mutation analysis c282y/C282y C282Y/H63D

• Treatment: Phlebotomy Iron chelators – Deferoxamine

• Phlebotomy

• Iron chelators – Deferoxamine

• Phlebotomy

• Iron chelators – Deferoxamine

Option B: Bronze pancreas

• Hemochromatosis causes iron overload in the pancreas leading to diabetes mellitus and skin hyperpigmentation called bronze diabetes.

Option C: Hyperpigmentation

• Iron deposition in the skin in Hemochromatosis causes skin hyperpigmentation.

Option D: Restrictive cardiomyopathy

• Iron overload in the heart causes an increase in the size of the heart and thus leading to restrictive cardiomyopathy.

• Other cardiac findings in Hemochromatosis include cardiac arrhythmias and congestive cardiac failure.

Solution for Question 9:

Option A: Trauma

• Hemobilia is a rare but important cause of gastrointestinal haemorrhage and is defined as bleeding from/into the biliary tract.

• Hemobilia presents as a triad of biliary pain, obstructive jaundice and hematemesis/melena. This is also called Quincke’s triad.

• A vast majority of cases of hemobilia are caused by trauma that occurred during invasive procedures of the biliary tract, liver and pancreas.

• Causes of hemobilia are: Iatrogenic trauma- after cholecystectomy/ERCP/liver biopsy Accidental trauma Acalculous cholecystitis Hepatocellular Carcinoma>>Cholangiocarcinoma Inflammatory conditions ranging from ascariasis to PAN Vascular malformation Coagulopathy

• Iatrogenic trauma- after cholecystectomy/ERCP/liver biopsy

• Accidental trauma

• Acalculous cholecystitis

• Hepatocellular Carcinoma>>Cholangiocarcinoma

• Inflammatory conditions ranging from ascariasis to PAN

• Vascular malformation

• Coagulopathy

• The most common site where bleeding originates in Hemobilia is the liver > extra-hepatic biliary pathway > gallbladder > pancreas.

• Iatrogenic trauma- after cholecystectomy/ERCP/liver biopsy

• Accidental trauma

• Acalculous cholecystitis

• Hepatocellular Carcinoma>>Cholangiocarcinoma

• Inflammatory conditions ranging from ascariasis to PAN

• Vascular malformation

• Coagulopathy

Option B: Hemangioma

• Hemangioma is the most common benign liver tumour (venous malformation).

• Liver biopsy is contraindicated because of the risk of bleeding.

Option C: Rupture of hepatic artery aneurysm

• Hepatic artery aneurysms are a type of visceral arterial aneurysm. The clinical presentation varies from dull pain, obstructive jaundice or rarely gastrointestinal haemorrhage.

• They can rarely cause hemobilia when ruptured. However, iatrogenic trauma is a more common cause of hemobilia.

Option D: Hepatitis

• The most common complications of hepatitis include cirrhosis and hepatocellular carcinoma. However, hemobilia is not a complication of hepatitis.

Solution for Question 10:

Option B: Calcium

• The above clinical history & features are suggestive of Wilson's disease.

Management of Wilson disease

The first step in evaluating patients presenting with hepatic decompensation is establishing disease se verity, which can be estimated with the Nazer prognostic index.

• Patients with scores <7 can usually be managed with medical therapy.

• Patients with scores >9 should be considered immediately for liver transplantation.

• For scores between 7 and 9, clinical judgement is required in deciding whether to recommend transplantation or medical therapy.

For medical treatment of patients with hepatic decompensation, the recommended regimen is a

• Chelator (preferably trientine) plus zinc.

• However, calcium cannot be used as a chelator to remove excess Copper from body tissues.

• Initial neurologic therapy: Tetrathiomolybdate is emerging as the drug of choice because of its rapid control of free Copper, preservation of neurologic function, and low toxicity

• Pregnant patients should be treated with zinc or trientine throughout pregnancy but without tight copper control because a copper deficiency can be teratogenic.

• Anti-copper therapy must be lifelong.

Option A: Trientine

• The treatment of Wilson's disease is targeted at the removal of excess Copper from the body tissues. However, the chelation should be done gradually as rapid removal of Copper can exacerbate neurological symptoms.

• The most common chelators used to remove Copper are trientine plus zinc.

Option C: Penicillamine

• Penicillamine was previously the primary anti-copper treatment but now plays only a minor role because of its toxicity.

• The major adverse effects of penicillamine include allergy, diarrhoea, bone marrow suppression, agranulocytosis, thrombocytopenia, proteinuria, good pasture syndrome, peripheral sensory and motor neuropathies, tinnitus, anxiety, agitation, myasthenia gravis, dystonia and vasculitis.

• However, it can still be used as a chelator if trientine and zinc are not feasible.

Option D: Zinc

• Zinc can also be used as a chelator in treating Wilson's disease to remove excess Copper.

Solution for Question 11:

Option C: 24-hour urinary Copper

• The above clinical presentation is consistent with Wilson’s disease.

• The image shows Kayser-Fleischer's ring in the eye, which is the characteristic finding in Wilson's disease.

OCULAR SIGN:

• The classic Kayser-Fleischer ring is caused by copper deposition in Descemet’s membrane of the cornea. It is visible on direct inspection only when iris pigmentation is light, and copper deposition is heavy.

• It disappears with chelation therapy and may be found occasionally in patients with other chronic liver diseases, usually with a prominent cholestatic component such as PBC, PSC or familial cholestatic syndromes.

• Screening test:- The initial screening test for Wilson’s disease is 24-hour urinary Copper.

• Urine copper measurement is an important diagnostic tool.

• Symptomatic patients invariably have urine copper levels >1.6 μmol (>100 μg) per 24 hours.

• Conformational:- Liver biopsy

Treatment:

• Trientine - copper chelator

• Penicillamine - also a chelator but less used due to nephrotic side effects.

• Zinc- a competitive inhibitor of Copper in gut absorption.

• Zinc acetate is DOC for Wilson's disease.

Option A: Serum ceruloplasmin

• It should not be used for definitive diagnosis because they are normal in up to 10% of affected patients and reduced to 20% of carriers.

Option B: Serum Copper

• In healthy individuals, total body copper consists of ~ 10% free copper and ~ 90% ceruloplasmin-bound copper. As tests detect copper bound to ceruloplasmin, total serum copper concentrations decrease proportionately to serum ceruloplasmin levels.

• Increased free serum copper and decreased total serum copper are the diagnostic features of Wilson's disease, but this is not used as the initial screening test.

Option D: Liver biopsy

• The gold standard for diagnosis remains liver biopsy with quantitative copper assays. Affected patients have values >3.1 μmol/g (>200 μg/g [dry weight] of liver).

Solution for Question 12:

Option B: Family history of the disease

Leipzig criteria/ EASL criteria- Wilson Disease

• Kayser-Fleischer Ring

• Serum ceruloplasmin

• Coombs-negative hemolytic anaemia

• 24-hour urinary Copper

• Mutational analysis – ATP 7B

• Neurobehavioural symptoms

• Liver copper levels

A total score > 4 establishes the diagnosis of Wilson’s disease.

NAZER Index – for liver transplantation in Wilson disease.

• A family history of disease is not included in the Leipzig criteria for Wilson's disease.

Option A: Mutational analysis of ATP 7B gene

• Mutational analysis of the ATP-7B gene is included in the Leipzig criteria for Wilson's disease.

• Mutation in the ATP7B gene causes reduced copper excretion and accumulation of Copper in body tissues.

Option C: Total score > 4- Diagnosis is established

• If the total score of the Leipzig criteria is greater than 4, it confirms the diagnosis of Wilson's disease.

Option D: Coombs negative hemolytic anaemia

• Coombs-negative hemolytic anaemia is an important diagnostic feature of Wilson's disease, and it occurs because of the accumulation of Copper inside RBCs.

Hereditary Hyperbilirubinemia & Hepatic Encephalopathy

1. What is the reason for the increased bilirubin level in prehepatic jaundice?

(or)

What is the reason for the increased bilirubin level in prehepatic jaundice?

A. Decreased bilirubin production in the liver.

B. Liver dysfunction impairs bilirubin processing.

C. Bilirubin cannot be excreted from the liver.

D. Increased hemolysis of red blood cells.

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2. A twenty-six years old female presents to your clinic with complaints of abdominal pain, generalized weakness, and yellow discolouration of skin and eyes. She says she has had these symptoms for the past week, and they have been increasing in intensity. Physical examinations and testing are performed. Her urine analysis shows the absence of urobilinogen. Which of the following could be the possible cause of this patient’s condition?

(or)

A woman presents with abdominal pain, generalized weakness, and yellow discoloration of skin and eyes. Her urine analysis shows the absence of urobilinogen. Which of the following could be the possible cause of this patient’s condition?

A. Hemolysis

B. Hepatitis

C. Liver failure

D. Post hepatic obstruction

---

3. What is the likely diagnosis for a woman presenting with nausea, abdominal pain, positive jaundice on physical examination, alkaline phosphatase of 550 IU/L, aspartate aminotransferase of 75 IU/L, total serum bilirubin of 6.5 mg/dL, and conjugated bilirubin of 4.3 mg/dL?

(or)

A forty-year-old female presents to your clinic with a complaint of abdominal pain. She has had this pain for the past week. She also has been feeling nauseous. She says she isn't bothered about the pain, but her family forced her to visit the doctor as they say she's looking pale and yellow. Her physical examination is positive for jaundice. Multiple tests are performed. Her liver enzymes are; alkaline phosphatase 550 iu/l and aspartate aminotransferase 75 iu/l. Total serum bilirubin is 6.5mg/dl, and conjugated bilirubin is 4.3 mg/dl. What is the diagnosis of this patient?

A. Dubin Johnson syndrome

B. Obstructive jaundice

C. Viral hepatitis

D. Cholelithiasis

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4. A forty-two years old woman presented to your clinic with a history of recurrent jaundice. She also complains of losing her appetite despite not feeling nauseous. On examination, she is icteric. Routine liver function tests reveal elevated levels of serum bilirubin. Her liver enzymes are within the normal range. Prothrombin time is also normal. Serum bilirubin is predominantly unconjugated. Which of the following is the most likely diagnosis?

(or)

What is the most likely diagnosis for a woman presenting with a history of recurrent jaundice, elevated serum bilirubin, normal liver enzymes, and predominantly unconjugated bilirubin?

A. Gilbert's Syndrome

B. Dubin Johnson syndrome

C. Rotor syndrome

D. Hepatocellular necrosis

---

5. A young male wanting to join the army is found to have mild jaundice during his medical fitness examinations. He comes to your clinic for further evaluation. The patient has no complaints except for passing dark-coloured urine even though he drinks plenty of water. Further testing revealed a mild increase in his serum total bilirubin levels, with an increase in both conjugated and unconjugated bilirubin levels. His gallbladder can be visualized on oral cholecystography. A liver biopsy is taken, which shows no pigmentation. What is the diagnosis of this patient?

(or)

What is the likely diagnosis for a young male with mild jaundice, mild increase in serum total bilirubin levels, increase in both conjugated and unconjugated bilirubin levels, and a liver biopsy showing no pigmentation?

A. Rotor Syndrome

B. Dubin Johnson’s Syndrome

C. Crigler-Najjar Syndrome

D. Gilbert Syndrome

---

6. A forty-year-old male presents to your clinic with a complaint of fever and fatigue. He is a smoker and has smoked one pack daily for the past twenty years. But currently, he has a complete aversion to smoking. A physical examination is performed, which is positive for icterus. The liver is tender and enlarged. Liver function tests are shown below. Total bilirubin 17.5 mg/dl Direct bilirubin 5.5 mg/dl Aspartate aminotransferase 700 IU/l Alanine aminotransferase 900 IU/l Which investigations are required to rule out acute viral hepatitis?

(or)

A man presents with fever and fatigue. Examination shows icterus. The liver is tender and enlarged. Liver function tests show markedly raised aminotransferases. Which investigations are required to rule out acute viral hepatitis?

Total bilirubin	17.5 mg/dl
Direct bilirubin	5.5 mg/dl
Aspartate aminotransferase	700 IU/l
Alanine aminotransferase	900 IU/l

A. HBsAg, IgM anti HBc, Anti HCV, Anti HEV

B. Anti HAV, HBsAg, IgM Anti HBc, Anti HCV

C. HBAg, IgM anti HBc, Anti HDV, Anti HCV, Anti HEV

D. Anti HAV, IgM anti HBc, ANti HCV, Anti HEV

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7. A thirty years old G2P1L1 female presents to your clinic with the complaint of intermittent jaundice. He says she has had jaundice for the past four years, and it comes and goes on its own. She had episodes of jaundice during each pregnancy, which used to start in the late second trimester. In between pregnancies, there was minimal or no jaundice. Initial investigations show conjugated hyperbilirubinemia. Further investigations reveal that she has an MRP2 transporter defect. Which of the following is the most likely diagnosis?

(or)

A 31-year-old G2P1L1 female presents with intermittent jaundice. She had episodes of jaundice during each pregnancy. Investigations show conjugated hyperbilirubinemia and an MRP2 transporter defect. Which of the following is the most likely diagnosis?

A. Menke’s disease

B. Dubin Johnson syndrome

C. Familial intrahepatic cholestasis

D. Benign recurrent intrahepatic cholestasis

---

8. A sixty years old woman comes with recurrent epigastric pain associated with vomiting and abdominal distention. CT-abdomen findings revealed impacted gallstone suggestive of . At which location is the obstruction present in Bouveret syndrome?

(or)

A sixty years old woman comes to your clinic with complaints of recurrent epigastric pain for more than 6 months. Her abdominal pain had worsened over a period of 4 days and was associated with vomiting and abdominal distention. Initial investigations are done. CT-abdomen findings revealed impacted gallstone suggestive of Bouveret syndrome. In Bouveret syndrome, at which location is the obstruction?

A. Pylorus

B. Jejunum

C. Terminal ileum

D. Ileocaecal valve

---

9. Which of the following conditions is associated with conjugated hyperbilirubinemia?

(or)

A sixty-four years old male presents to your clinic with a history of fatigue and weight loss. His symptoms have progressively worsened. He says he experienced these symptoms a long time ago when he was diagnosed with the Hepatitis virus. Examination findings are positive for jaundice. Laboratory findings show an elevated total bilirubin level with a predominance of conjugated bilirubin. Which of the following conditions is associated with conjugated hyperbilirubinemia?

A. Cryoglobulinemia associated with hepatitis C

B. History of gout

C. Spherocytes in peripheral smear

D. Gallstone

---

10. A fifty years old male presents to your clinic with the complaint of abdominal pain. The patient leads a sedentary lifestyle but does not smoke or drink alcohol. He likes to eat out, and his diet consists of fried foods daily. On examination, his blood pressure is 140/90 mmHg, and his BMI is 32. Abdominal examination shows an enlarged, non-tender liver. The liver span, on light percussion, is 20 cm. An abdominal ultrasound is performed, which shows that his liver echogenicity is more than that of the renal cortex and spleen. What is the diagnosis for this patient?

(or)

A patient presents with abdominal pain. His BMI is 32. Abdominal examination shows an enlarged, non-tender liver. Ultrasound shows increased liver echogenicity. What is the diagnosis of this patient?

A. Marasmus

B. Metabolic Syndrome

C. Wilson disease

D. Nutmeg liver

---

11. A 74 year old male is brought to the emergency department by his son. The patient is somnolent but responds to voice commands. His son states that his father has been acting weird lately, and his behaviour has been very inappropriate. He gets aggressive occasionally and is tired and lethargic the rest of the while. Since then, he has become excessively drowsy now. He is a chronic patient of hepatitis C. In which grade of disease has the patient presented?

(or)

In which grade of disease has a 73-year-old male, presenting with drowsiness, lethargy, somnolence, responsiveness to voice commands, and inappropriate behavior, likely presented considering his chronic hepatitis C condition?

A. Grade 4

B. Grade 3

C. Grade 2

D. Grade 1

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12. A seventy-five years old male is brought to the emergency department in a state of semi-consciousness. His son states that he is a chronic patient of Hepatitis C and has been non-compliant with medications and his doctor appointment. On physical examination, he has signs of ascites, jaundice, pedal oedema and gynecomastia. Multiple red spots are noted on his abdomen with spider-like projections. The patient's son overhears some doctors talking about the Milan Criteria while discussing his father and wants to know what it is. What are the Milan Criteria used for?

(or)

In which of the following conditions the Milan Criteria are used?

A. Liver transplantation

B. Gastroesophageal reflux disease staging

C. Cirrhosis staging

D. Hepatic encephalopathy staging

---

13. A young female is brought to the emergency department in a semi-conscious, confused state. Her parents state that she has had a few episodes of bloody vomiting and has felt nauseous and tired for some time. After further probing, the parents cryingly admitted that she had made a suicide attempt and ingested multiple tablets of acetaminophen. Given the patient's symptoms, which of the following is the least likely to aggravate the patient's condition?

(or)

Which of the following factors is least likely to aggravate encephalopathy in a young female who has made a suicide attempt by ingesting multiple tablets of acetaminophen and is currently in a semi-conscious, confused state?

A. Hyperkalemia

B. Anemia

C. Hypothyroidism

D. Barbiturates

---

14. In which grade of hepatic encephalopathy has a 75-year-old male with alcoholic liver disease presented, exhibiting symptoms of lethargy, disorientation, flapping tremors in extended hands, and hypoactive deep tendon reflexes?

(or)

A seventy-four years old male is brought to your clinic. His son states that his father has been acting weird lately, and his behaviour has been very inappropriate. He gets aggressive from time to time, and he is tired and lethargic the rest of the while. He was diagnosed with alcoholic liver disease by his previous doctor, but he refused to go back to him because he told him to quit drinking. On examination, the patient is disoriented and has tremors in his hand, which, when extended, resemble a bird flapping its wings. His deep tendon reflexes are hypoactive. In which grade of disease has the patient presented?

A. Grade I

B. Grade IV

C. Grade III

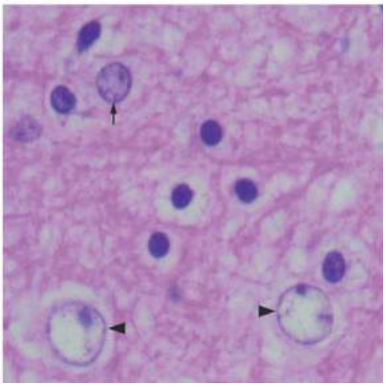
D. Grade II

---

15. A seventy-eight years old patient is brought to the emergency department by his daughter in a semi-conscious state. His daughter states that she found him like this after returning from work. The patient is a known case of hepatitis C and has not been feeling well for the past few days. He is only responsive to painful stimuli. The daughter states that he has also been having problems with concentration and seems to be confused for the past few days. Examinations and tests are performed to assess the patient. He is admitted for further care. A brain biopsy is performed, and the findings are shown below. What is the diagnosis of this patient?

(or)

The diagnosis for a 68-year-old patient with hepatitis C, presenting in a semi-conscious state, only responsive to painful stimuli, and brain biopsy revealing swollen astrocytes what is the diagnosis?



A. Hepatic encephalopathy

B. Alzheimer's

C. Parkinsonism

D. Binswanger disease

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16. A young female is brought as she ingested multiple tablets of acetaminophen. She has become completely unresponsive now. Which of the following is not advocated in the management of this patient?

(or)

A young female is brought unconscious to the emergency department. She is unresponsive even to pain stimuli. Her parents state that she has had a few episodes of bloody vomiting and has felt nauseous and tired for some time. After further probing, the parents cryingly admitted that she had made a suicide attempt and ingested multiple tablets of acetaminophen a few days back. Her condition has deteriorated over time, and she has now become completely unresponsive. Which of the following is not advocated in the management of this patient?

A. Oral Lactulose

B. Intravenous hydration

C. Protein diet restriction

D. If tests for blood in stool are positive, then give colonic washout

---

17. A twenty-five years old male is admitted to your hospital with Hepatitis A infection. His condition shows rapid deterioration, and he is shifted to the intensive care unit for acute liver failure. The patient now has an altered sleep pattern and changes in behaviour. He is mildly confused but responds to voice stimuli. All of the following drugs are used to treat this condition except?

(or)

Which of the following drugs cannot be used to treat a 25-year-old male with acute liver failure, altered sleep pattern, changes in behavior, and mild confusion but responds to voice stimuli?

A. L-ornithine L-aspartate (LOLA)

B. Rifaximin

C. Lactulose

D. Phenobarbitone

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18. In a case of metabolic encephalopathy, which one of the following manifestations would be seen in this patient?

(or)

A young female is admitted to your hospital for acute liver failure. She was diagnosed with viral hepatitis, and her symptoms have worsened. She now shows significant confusion and gross disorientation. She is drowsy but responds to voice and pain stimuli. If this is a case of metabolic encephalopathy, which one of the following manifestations would be seen in this patient?

A. Motor aphasia

B. Sensory aphasia

C. Conduction aphasia

D. Anomic aphasia

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19. A sixty-two years old male is brought to the emergency department with complaints of marked confusion and gross disorientation. He is a known case of Hepatitis C. The patient's family states that his condition has worsened over time, and on their last hospital visit, they were informed that he was going into liver failure. The patient is drowsy but responds to pain and voice stimuli. Which of the following is usually the earliest symptom of the given condition?

(or)

Which of the following is usually the earliest symptom of Hepatic Encephalopathy?

A. Change in sleep patterns

B. Asterixis

C. Electroencephalogram (EEG) changes

D. Disorientation

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	4
Question 3	2
Question 4	1
Question 5	1
Question 6	2
Question 7	2

Question 8	1
Question 9	1
Question 10	2
Question 11	2
Question 12	1
Question 13	1
Question 14	4
Question 15	1
Question 16	3
Question 17	4
Question 18	4
Question 19	1

Solution for Question 1:

Here are four options to consider:

Option 1: Decreased bilirubin production in the liver. Explanation: This is not the correct answer. In pre hepatic jaundice, the liver is functioning normally in terms of bilirubin production. The issue is primarily due to an increased breakdown of red blood cells, leading to an excess of unconjugated bilirubin.

Option 2: Liver dysfunction impairs bilirubin processing. Explanation: This is not the correct answer. In prehepatic jaundice, the liver itself is not dysfunctional; it's the excessive breakdown of red blood cells t hat results in increased unconjugated bilirubin levels. The liver's ability to process bilirubin is not impair ed.

Option 3: Bilirubin cannot be excreted from the liver. Explanation: This is not the correct answer. In pre hepatic jaundice, bilirubin can be produced and processed by the liver. However, the problem lies in th e increased production of unconjugated bilirubin due to hemolysis, and this bilirubin cannot be efficientl y excreted by the liver.

Option 4: Increased hemolysis of red blood cells. Explanation: This is the correct answer. In prehepatic jaundice, the main reason for increased bilirubin levels is the increased breakdown of red blood cells (hemolysis), which leads to an excess of unconjugated bilirubin in the bloodstream. The liver is not the primary cause of the problem, as it is still capable of processing bilirubin, but it cannot keep up with the excessive production due to hemolysis.

So, the correct answer is option 4: Increased hemolysis of red blood cells.

Solution for Question 2:

Option D: Post hepatic obstruction

• Following secretion into bile, conjugated bilirubin reaches the duodenum and passes down the gastrointestinal tract without reabsorption by the intestinal mucosa.

• Urobilinogen is formed by bacterial metabolism in the gut from conjugated bilirubin.

• Normal urobilinogen levels are 0-4 mg/24 hours.

• In obstructive jaundice, bile does not reach the gut. Hence urobilinogen cannot be formed.

• The absence of urobilinogen in urine indicates a posthepatic cause.

Option A: Hemolysis

• Urinary Urobilinogen is increased in haemolytic jaundice.

Option B: Hepatitis

• Urinary Urobilinogen is decreased in hepatitis.

Option C: Liver failure

• A patient with liver failure would have ascites, disorientation, confusion and tremors.

Solution for Question 3:

Option B: Obstructive jaundice

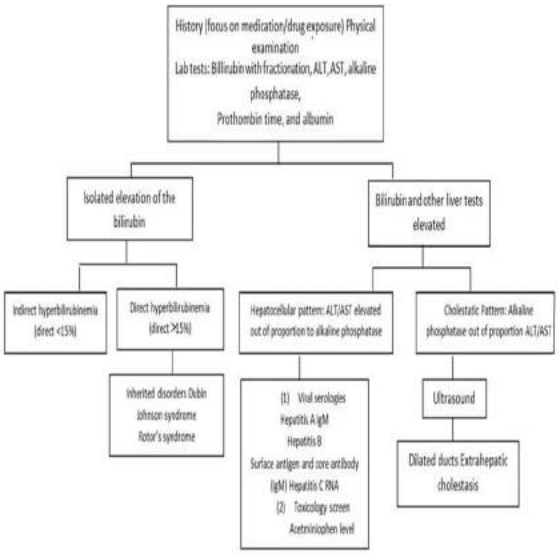
• Obstructive jaundice is a condition in which there is a blockage of bile flow out of the liver.

• Common causes include gallstones, narrowing of the bile duct and infections of the common bile duct.

• Symptoms include right upper quadrant pain, fever, nausea, vomiting and jaundice.

• Obstructive jaundice causes an increase in conjugated bilirubin.

• As alkaline phosphatase is elevated along with serum bilirubin, an ultrasound should be done to rule out the cause of obstructive jaundice.



The patient's laboratory findings are interpreted below:

Option A: Dubin Johnson syndrome

• Dubin Johnson and Rotor's syndrome would be suspected if there's an isolated increase in serum bilirubin and conjugated serum bilirubin is > 15% of total bilirubin.

Option C: Viral hepatitis

• In viral hepatitis, alanine transaminase and aspartate aminotransferase would be increased out of proportion to alkaline phosphatase.

Option D: Cholelithiasis

• Gallstones are a cause of obstructive jaundice when they get lodged in the common bile duct.

• The patient has obstructive jaundice, which may be due to gallstones.

Solution for Question 4:

Option A: Gilbert's Syndrome

• Gilbert Syndrome is caused by decreased bilirubin uridine diphosphate glucuronosyltransferase enzyme activity.

• This causes decreased conjugation of bilirubin, leading to increased levels of unconjugated bilirubin.

• Gilbert syndrome is usually asymptomatic; jaundice occurs in situations of stress.

• There is mild unconjugated hyperbilirubinemia but normal values for standard hepatic biochemical tests and normal hepatic histology other than a modest increase of lipofuscin pigment in some patients.

• Serum bilirubin concentrations are most often < 3 mg/dL.

Option B: Dubin Johnson syndrome

• Dubin Johnson syndrome is persistent non-hemolytic hyperbilirubinemia associated with lipochrome-like pigment in the liver cells

• Both Dubin Johnson syndrome and Rotor syndrome cause conjugated hyperbilirubinemia.

Option C: Rotor syndrome

• Rotor syndrome is an autosomal recessive disease and a rare cause of mixed direct (conjugated) and indirect (unconjugated) hyperbilirubinemia

• Both Dubin Johnson syndrome and Rotor syndrome cause conjugated hyperbilirubinemia.

Option D: Hepatocellular necrosis

• Acute, toxic injury to the liver with sudden and precipitous onset, marked elevations in serum aminotransferase levels, and early signs of hepatic (or other organ) dysfunction or failure despite minimal or no jaundice

• This would cause an increase in liver enzymes.

Solution for Question 5:

Option A: Rotor Syndrome

• Rotor syndrome is a mixed hyperbilirubinemia characterized by non-hemolytic jaundice caused by chronic elevation of mostly conjugated (direct) bilirubin due to impaired hepatic storage.

• It is usually asymptomatic, but patients may present with non-pruritic jaundice.

• It is a benign disorder and does not require any treatment.

• Rotor syndrome and Dubin Johnson Syndrome have plenty of similarities, and the difference are listed below:

Option B: Dubin Johnson’s Syndrome

• Dubin Johnson’s Syndrome and rotors syndrome share a lot of similarities.

• Both are mixed hyperbilirubinemias.

• The gallbladder is not visualized in Dubin Johnson’s Syndrome.

• The liver also shows pigmentation in Dubin Johnson’s Syndrome.

Option C: Crigler-Najjar Syndrome

• Crigler-Najjar Syndrome is characterized by an increase in unconjugated bilirubin levels only.

Option D: Gilbert Syndrome

• Gilbert Syndrome is characterized by an increase in unconjugated bilirubin levels only.

Solution for Question 6:

Option B: Anti HAV, HBsAg, IgM Anti HBc, Anti HCV

• The patient's history and findings suggest the diagnosis of viral hepatitis.

• LFT report shows elevated bilirubin with conjugated bilirubin >15% of total serum bilirubin. Aspartate aminotransferase and alanine aminotransferase elevation indicate a cytopathic effect of probably a virus.

• Acute hepatitis is characterized by acute liver inflammation or injury to hepatocytes resulting in elevated liver function indices.

• For the diagnosis of acute viral hepatitis, four serological tests should be performed; HbsAg IgM Anti-HBc IgM Anti- HAV Anti- HCV

• HbsAg

• IgM Anti- HBc

• IgM Anti- HAV

• Anti- HCV

• The absence of all of these serological markers is consistent with the diagnosis of non-A, non-B and non-C hepatitis.

• HbsAg

• IgM Anti- HBc

• IgM Anti- HAV

• Anti- HCV

Option A: HBsAg, IgM anti-HBc, Anti HCV, Anti HEV

• Anti-HEV assays are not routinely performed.

Option C: HBAg, IgM anti-HBc, Anti HDV, Anti HCV, Anti HEV

• Early diagnosis of acute infection may be hampered by a delay of up to 30–40 days in the appearance of anti-HDV.

Option D: Anti HAV, IgM anti-HBc, Anti HCV, Anti HEV

• Anti-HEV assays are not routinely performed.

Solution for Question 7:

Option B: Dubin Johnson syndrome

• Dubin-Johnson syndrome is an autosomal recessive disorder.

• It occurs due to a defect in the multidrug resistance-associated protein 2 (MRP2) protein.

• Multidrug resistance-associated protein 2 (MRP2), an ATP-dependent canalicular membrane transporter.

• This protein is encoded by a gene known as ABCC2 Gene, which is mutated in Dubin-Johnson syndrome.

• Dubin-Johnson syndrome is characterized by conjugated hyperbilirubinemia with mild jaundice.

• Triggering agents/conditions: Pregnancy, Oral contraceptive pills and illness.

• Kernicterus is absent, with a liver biopsy showing black pigmentation.

Option A: Menke’s disease

• Menkes disease is an X-linked recessive disorder,

• It is caused by mutations in genes coding for the copper-transport protein ATP7A.

• This leads to copper deficiency.

Option C: Familial intrahepatic cholestasis

• Familial intrahepatic cholestasis causes progressive liver disease, typically leading to liver failure.

• It is not associated with MRP-2 defect.

Option D: Benign recurrent intrahepatic cholestasis

• Episodes of liver dysfunction called cholestasis characterize benign recurrent intrahepatic cholestasis.

• It is not associated with MRP-2 defect.

Solution for Question 8:

Option A: Pylorus

• Bouveret syndrome is a rare complication of gallstones that presents with gastric outlet obstruction.

• This is secondary to an acquired fistula between the gallbladder and stomach or duodenum.

• Stones stuck in the digestive tract are usually greater than 2–2.5 cm in diameter.

• The impaction of the stone is in the pylorus or proximal duodenum.

• Clinical presentation is usually nausea, vomiting, and epigastric pain.

Option B: Jejunum

• Bouveret syndrome is due to the impaction of stone at the gastric outlet.

Option C: Terminal ileum

• Bouveret syndrome is due to the impaction of stone at the gastric outlet.

Option D: Ileocaecal valve

• Bouveret syndrome is due to the impaction of stone at the gastric outlet.

Solution for Question 9:

Option A: Cryoglobulinemia associated with hepatitis C

• Bilirubin is a product of haemoglobin metabolism.

• Heme is converted into biliverdin, which is reduced to unconjugated bilirubin.

• Unconjugated bilirubin is conjugated with glucuronate to form conjugated bilirubin.

• Conjugation of bilirubin happens in the liver.

• Hepatitis C Virus is a major cause of liver-related deaths and can cause B cell lymphoproliferative disorders such as mixed cryoglobulinemia.

• Cryoglobulinemia is a clonal expansion of rheumatoid factor-expressing B cells in the liver, lymph nodes and peripheral blood.

• This results in cryoglobulins in circulation.

• Cryoglobulinemia associated with hepatitis C is associated with a conjugated variety of hyperbilirubinemia.

Option B: History of gout

• Gout patients on treatment with probenecid cause a decrease in bilirubin uptake, resulting in elevated unconjugated bilirubin levels.

Option C: Spherocytes in peripheral smear

• Spherocytes cause hemolysis increasing unconjugated bilirubin.

Option D: Gallstone

• Gallstones, such as pigmentary stones, are associated with hemolysis, increasing unconjugated bilirubin.

• Gallstones may cause post-hepatic jaundice leading to conjugated hyperbilirubinemia, but the patient's history suggests the Hepatitis C virus.

Solution for Question 10:

Option B: Metabolic Syndrome

• The patient's history and findings suggest nonalcoholic fatty liver disease.

• Primary nonalcoholic fatty liver disease is associated with insulin resistance and metabolic syndrome.

• Metabolic syndrome is a combination of diabetes, hypertension and obesity.

• This causes a high risk of developing coronary heart disease and stroke.

• Metabolic syndrome is characterized by increased blood pressure, blood glucose levels, triglycerides, and being overweight or having too much fat around the weight.

Option A: Marasmus

• There is no hepatomegaly seen in marasmus.

Option C: Wilson disease

• Wilson's disease causes cirrhosis due to excessive copper.

Option D: Nutmeg liver

• Cardiac cirrhosis is a cause of the nutmeg liver.

Solution for Question 11:

Option B: Grade 3

• The patient's history and symptoms suggest that the patient is suffering from hepatic encephalopathy (HE).

• Hepatic encephalopathy is caused by an accumulation of toxic waste products in the body.

• These toxic products are usually cleared from the body by the liver.

• The West Haven criteria (WHC) are the most frequently used for grading HE

• This patient is in grade 3 hepatic encephalopathy.

• Grading of hepatic encephalopathy is shown below:

Grades of Hepatic Encephalopathy (West Haven Criteria)

Grades of Hepatic Encephalopathy (West Haven Criteria)		
Covert	Grade 1	Inattention, euphoria/ anxiety, **altered sleep pattern**, ↓attention span
Overt	Grade 2	Lethargy, behavior Δs, time disorientation, **asterixis,** personality Δs, hypoactive DTRs
	Grade 3	**Somnolence** to semistupor, responsive to stimuli, time & place disorientation, asterixis, hyperactive DTRs
	Grade 4	Coma

Option A: Grade 4

• Grade 4 hepatic encephalopathy is a state of coma.

• This person is responsive to stimuli.

Option C: Grade 2

• The patient was previously in grade 2 but has progressed to grade 3.

Option D: Grade 1

• The patient is not somnolent in grade 1

Solution for Question 12:

Option A: Liver transplantation

• This patient with chronic hepatitis C shows the signs of liver cirrhosis.

• Cirrhosis is an end-stage liver disease which causes permanent damage to the liver.

• Healthy liver tissue is replaced with scar tissue, impairing the liver from normal functioning.

• Milan criteria are used in patients with cirrhosis and hepatocellular carcinoma to check a patient's eligibility for liver transplantation.

• The Milan criteria state that a patient is selected for transplantation when they have: One lesion smaller than 5 cm. Up to 3 lesions smaller than 3 cm. No extrahepatic manifestations. No vascular invasion.

• One lesion smaller than 5 cm.

• Up to 3 lesions smaller than 3 cm.

• No extrahepatic manifestations.

• No vascular invasion.

• One lesion smaller than 5 cm.

• Up to 3 lesions smaller than 3 cm.

• No extrahepatic manifestations.

• No vascular invasion.

Option B: Gastroesophageal reflux disease staging

• Gastroesophageal reflux disease (GERD) is a chronic and progressive condition caused by stomach acid reflux into the oesophagus.

• GERD is classified into four stages, depending upon the severity of the condition.

• This patient has symptoms of liver disease, not GERD.

Option C: Cirrhosis staging

• The METAVIR, Knodell, and Ishak scores are used for grading liver fibrosis and cirrhosis.

Option D: Hepatic encephalopathy staging

• The West Haven criteria are used for staging hepatic encephalopathy.

Solution for Question 13:

Option A: Hyperkalemia

• The patient's symptoms and history suggest the diagnosis of acute liver failure due to excessive ingestion of acetaminophen.

• A sudden loss of liver function characterizes acute liver failure.

• The patient currently is in hepatic encephalopathy, characterized by a decline in mental function due to an accumulation of toxins normally cleared by the liver.

• Hypokalemia is seen with the excessive use of diuretics, leading to dehydration and aggravating hepatic encephalopathy.

• Hyperkalemia does not cause worsened hepatic encephalopathy.

• Hepatic encephalopathy is precipitated by: Gastrointestinal (GI) bleeding—increases the protein in the bowel and rapidly precipitates hepatic encephalopathy Constipation Alkalosis Potassium deficiency induced by diuretics Opioids, hypnotics, and sedatives Medications containing ammonium or amino compounds Paracentesis with consequent hypovolemia Hepatic or systemic infection Portosystemic shunts (including transjugular intrahepatic portosystemic shunts)

• Gastrointestinal (GI) bleeding—increases the protein in the bowel and rapidly precipitates hepatic encephalopathy

• Constipation

• Alkalosis

• Potassium deficiency induced by diuretics

• Opioids, hypnotics, and sedatives

• Medications containing ammonium or amino compounds

• Paracentesis with consequent hypovolemia

• Hepatic or systemic infection

• Portosystemic shunts (including transjugular intrahepatic portosystemic shunts)

• Gastrointestinal (GI) bleeding—increases the protein in the bowel and rapidly precipitates hepatic encephalopathy

• Constipation

• Alkalosis

• Potassium deficiency induced by diuretics

• Opioids, hypnotics, and sedatives

• Medications containing ammonium or amino compounds

• Paracentesis with consequent hypovolemia

• Hepatic or systemic infection

• Portosystemic shunts (including transjugular intrahepatic portosystemic shunts)

Option B: Anemia

• Anaemia associated with GI bleeding worsens hepatic encephalopathy.

Option C: Hypothyroidism

• Constipation in hypothyroidism will worsen hepatic encephalopathy by increasing bacterial load.

Option D: Barbiturates

• Drugs like barbiturates and antipsychotics worsen hepatic encephalopathy.

Solution for Question 14:

Option D: Grade II

• The patient's history and symptoms suggest that the patient is suffering from hepatic encephalopathy (HE).

• Hepatic encephalopathy is caused by an accumulation of toxic waste products in the body.

• These toxic products are usually cleared from the body by the liver.

• The West Haven criteria (WHC) are the most frequently used for grading HE

• This patient is in grade II hepatic encephalopathy.

• In grade II, the most intriguing finding is disorientation for a time combined, for example, with inappropriate behaviour and lethargy.

Grades of Hepatic Encephalopathy

(West Haven Criteria)

Cover

Grade 1

Inattention, euphoria / anxiety, altered sleep>↓attention span

Overt

Grade 2

Lethargy, behavior Ds, hypoactive DTRs

Grade 3

Somnolence to semistupor, responsive to stimuli, time &
place disorientation, asterixis, hyperactive DTRs

Grade 4

Coma

Option A: Grade I

• Grade I HE is characterized by anxiety, inattention and an altered sleep pattern.

• This patient is in grade II HE.

Option B: Grade IV

• Grade IV HE is an unarousable comatic state.

• This patient is in grade II HE.

Option C: Grade III

• Grade III HE is a somnolent/semi-conscious state with hyperactive deep tendon reflexes.

• This patient is in grade II HE.

Solution for Question 15:

Option A: Hepatic encephalopathy

• The image shows an Alzheimer's type II astrocyte.

• Hepatic failure and other situations associated with high blood ammonia, such as portosystemic shunts, precipitate the syndrome of hepatic encephalopathy (HE).

• HE is characterized by altered mental status due to liver failure, causing the accumulation of toxins in the body.

• Ammonia taken up by astrocytes is converted to osmotically active glutamine, causing cytotoxic astrocytic swelling.

• Swollen astrocytes in hepatic encephalopathy are called Alzheimer's type II astrocytes. Their nuclei are large and appear clear in H&E; stains. They are also seen in Wilson's disease.

Option B: Alzheimer's

• Alzheimer's type II astrocytes are not related to Alzheimer's disease.

• Alzheimer's disease is a neurodegenerative disorder characterized by cognitive and functional impairment.

• The patient's history is more suggestive of HE.

Option C: Parkinsonism

• Parkinsonism is a condition characterized by slow movement, rigidity and tremors.

• The patient's history is more suggestive of HE.

Option D: Binswanger disease

• Binswanger disease, also called subcortical vascular dementia, is a progressive neurological disorder characterized by widespread damage to the white matter of the brain.

• The patient's history is more suggestive of HE.

Solution for Question 16:

Option C: Protein diet restriction

• The patient presents with hepatic encephalopathy (HE) due to acute liver failure.

• Acute liver failure has occurred due to excess intake of acetaminophen.

• Acute liver failure is the sudden loss of liver functionality, causing the accumulation of toxins in the body.

• This leads to HE, characterized by mental status changes.

• Treatment of hepatic encephalopathy includes: In acute gastrointestinal bleeding, blood in the bowel should be promptly evacuated with laxatives (and enemas if necessary) to reduce the nitrogen load. Hydration and correction of electrolyte imbalance No role of protein restriction component in the treatment of HE. Subsequent work has suggested that limiting protein-calorie intake is not beneficial in patients with HE. Ammonia absorption can be decreased by administering lactulose, a non-absorbable disaccharide that acts as an osmotic laxative. Zinc supplementation is sometimes helpful. Rifaximin at 550 mg twice daily has been very effective in treating encephalopathy. L-ornithine L-aspartate (LOLA) stimulates the urea cycle, resulting in ammonia loss.

• In acute gastrointestinal bleeding, blood in the bowel should be promptly evacuated with laxatives (and enemas if necessary) to reduce the nitrogen load.

• Hydration and correction of electrolyte imbalance

• No role of protein restriction component in the treatment of HE. Subsequent work has suggested that limiting protein-calorie intake is not beneficial in patients with HE.

• Ammonia absorption can be decreased by administering lactulose, a non-absorbable disaccharide that acts as an osmotic laxative.

• Zinc supplementation is sometimes helpful.

• Rifaximin at 550 mg twice daily has been very effective in treating encephalopathy.

• L-ornithine L-aspartate (LOLA) stimulates the urea cycle, resulting in ammonia loss.

• In acute gastrointestinal bleeding, blood in the bowel should be promptly evacuated with laxatives (and enemas if necessary) to reduce the nitrogen load.

• Hydration and correction of electrolyte imbalance

• No role of protein restriction component in the treatment of HE. Subsequent work has suggested that limiting protein-calorie intake is not beneficial in patients with HE.

• Ammonia absorption can be decreased by administering lactulose, a non-absorbable disaccharide that acts as an osmotic laxative.

• Zinc supplementation is sometimes helpful.

• Rifaximin at 550 mg twice daily has been very effective in treating encephalopathy.

• L-ornithine L-aspartate (LOLA) stimulates the urea cycle, resulting in ammonia loss.

Option A: Oral Lactulose

• Lactulose is an osmotic laxative which decreases ammonia absorption.

• This is helpful in the management of HE.

Option B: Intravenous hydration

• Hydration is beneficial for HE patients.

Option D: If tests for blood in stool are positive, then give colonic washout

• Blood removal decreases nitrogen content in the body and is beneficial for HE.

Solution for Question 17:

Option D: Phenobarbitone

• Hepatitis A causes a mild to severe disease, which can lead to the development of acute liver failure.

• Acute liver failure is the sudden loss of liver functionality, causing the accumulation of toxins in the body.

• This leads to hepatic encephalopathy (HE), characterized by mental status changes.

• Treatment of hepatic encephalopathy includes; Management of the precipitating factors (bleeding, infection, hypokalemia, medications, dehydration). Hydration and correction of electrolyte imbalance are all that are necessary. Lactulose therapy. Antibiotics. Zinc supplementation. L-ornithine L-aspartate (LOLA).

• Management of the precipitating factors (bleeding, infection, hypokalemia, medications, dehydration).

• Hydration and correction of electrolyte imbalance are all that are necessary.

• Lactulose therapy.

• Antibiotics.

• Zinc supplementation.

• L-ornithine L-aspartate (LOLA).

• Phenobarbitone is a barbiturate anticonvulsant/hypnotic.

• Management of the precipitating factors (bleeding, infection, hypokalemia, medications, dehydration).

• Hydration and correction of electrolyte imbalance are all that are necessary.

• Lactulose therapy.

• Antibiotics.

• Zinc supplementation.

• L-ornithine L-aspartate (LOLA).

Option A: L-ornithine L-aspartate (LOLA)

• L-ornithine L-aspartate (LOLA) stimulates the urea cycle, resulting in ammonia loss.

• LOLA are substrates for glutamate transaminase. Their administration causes increased glutamate levels. Ammonia is subsequently used in converting glutamate to glutamine

Option B: Rifaximin

• Rifaximin at 550 mg twice daily has been very effective in treating encephalopathy.

Option C: Lactulose

• Lactulose is a non-absorbable disaccharide which results in colonic acidification.

• Catharsis ensues, contributing to eliminating nitrogenous products in the gut that are responsible for the development of encephalopathy.

Solution for Question 18:

Option D: Anomic aphasia

• Acute liver failure is the sudden loss of liver functionality, causing the accumulation of toxins in the body.

• Metabolic encephalopathy is a neurological disorder caused by systemic illness, diabetes, liver disease, renal failure and heart failure.

• Hepatic encephalopathy is a type of metabolic encephalopathy.

• Damage by ammonia or urea intoxication contributes to anomic aphasia, which is difficulty in naming objects.

Option A: Motor aphasia

• Motor aphasia is caused by damage to Broca's area.

Option B: Sensory aphasia

• Sensory aphasia is caused by damage to Wernicke's area.

Option C: Conduction aphasia

• Conduction aphasia is caused by damage to the arcus fasciculus.

Solution for Question 19:

Option A: Change in sleep patterns

• A history of chronic hepatitis and liver failure suggests the diagnosis of Hepatic Encephalopathy (HE).

• HE is defined as an alteration in mental status and cognitive function in the presence of liver failure.

• Earliest symptom - Change in sleep pattern.

• This is followed by a change in personality, irritability, and mental dullness.

• Further sequelae are confusion, disorientation, stupor and Coma.

• Physical findings include asterixis and fetor hepaticus.

• Earliest sign - Change in handwriting which is assessed by use of the Trail-making test. Normal connect the-dot time: 15–30 sec In hepatic encephalopathy patients: >30 sec

• Normal connect the-dot time: 15–30 sec

• In hepatic encephalopathy patients: >30 sec

• Normal connect the-dot time: 15–30 sec

• In hepatic encephalopathy patients: >30 sec

Option B: Asterixis

• Asterixis is seen in grade 2 HE.

Option C: Electroencephalogram (EEG) changes

• EEG changes are best appreciated with worsening disease.

Option D: Disorientation

• Disorientation is seen in grade 2 HE.

Budd Chiari Syndrome & Pancreatitis

1. A forty-five years old male is brought to the emergency department with complaints of unbearable abdominal pain for the past 24 hours associated with 3 episodes of vomiting. He also states that he has had a fever for the past 2 days and felt nauseous the whole time. Examinations and laboratory investigations were performed. Blood reports show elevated serum lipase. An abdominal ultrasound is performed, which indicates the presence of acute pancreatitis. Which of the following is not a cause of acute pancreatitis?

(or)

Which of the following is not a cause of acute pancreatitis?

A. Hypocalcaemia

B. Valproic acid therapy

C. Biliary tract disease

D. Blunt trauma

---

2. A forty-eight years old male patient presents to the emergency department with a sudden loss of vision and acute abdominal pain, mainly around the epigastric area radiating to the back. He has had a history of alcohol abuse for the past twenty years. Physical examination is performed, and he is found to be tachypnoeic and tachycardic. Laboratory investigations show elevated serum amylase and leucocytes. Given the patient's condition, what is the cause of this patient's vision loss?

(or)

A Man presents with a sudden loss of vision and acute abdominal pain. He has had a history of alcohol abuse. He has tachypnea and tachycardia. Labs show elevated serum amylase and leukocytes. What is the cause of this patient's vision loss?

A. Purtscher retinopathy

B. Hyperglycaemia

C. Hypoxia

D. Central Retinal Vein Occlusion

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3. A sixty-one years old male presents to your clinic with a history of loose stools for five years. He says he has passed 3–4 semisolid stools daily. The stools are oily in nature without mucus or blood. He also has associated dyspeptic symptoms, but there have been no episodes of frank abdominal pain. There is no significant loss of weight or anorexia. He has been a known case of diabetes mellitus for the past 15 years and chronic pulmonary obstructive disease for the past 5 years. He is a reformed smoker and drinks alcohol occasionally. There is no prior history of abdominal trauma or surgery. His clinical examination is unremarkable. Which of the following diagnostic test is most suitable for this patient?

(or)

A man presents with loose stools that are oily in nature without mucus or blood. He is a reformed smoker and drinks alcohol occasionally. His clinical examination is unremarkable. Which of the following diagnostic tests is most suitable for this patient?

A. Schilling test

B. Serum lipase

C. Serum amylase

D. Fecal elastase level

---

4. A forty-five years old male is brought to the emergency department with the complaint of unbearable abdominal pain for the past 24 hours. The pain is associated with fever and three episodes of vomiting. His medical history is positive for diabetes mellitus. He does not give any history of abdominal trauma. An abdominal ultrasound is performed, which shows the presence of acute pancreatitis. Which of the following will help you differentiate acute pancreatitis from diabetic ketoacidosis?

(or)

Which of the following will help you differentiate acute pancreatitis from diabetic ketoacidosis?

A. Serum amylase

B. Serum lipase

C. Decreased glucagon

D. Hyperglycemia

---

5. A forty-five years old male is brought to the emergency department with the complaint of unbearable abdominal pain for the past 24 hours. He had a party last night where he consumed a lot of alcohol. He has had several episodes of vomiting since last night and feels like he has a fever. Physical examinations and investigations are performed. CT scan of the abdomen is suggestive of acute pancreatitis. Which of the following is not included in the criteria to diagnose acute pancreatitis?

(or)

Which of the following is not included in the criteria to diagnose acute pancreatitis?

A. Threefold or greater elevation in serum lipase and amylase

B. Typical abdominal pain in the epigastrium that may radiate to the back

C. Confirmatory findings of acute pancreatitis on cross-sectional abdominal imaging

D. Core temperature greater than 38°C

---

6. A female presents with severe abdominal pain. Examination shows jaundice, tender hepatosplenomegaly, and mild ascites. What is the most likely diagnosis for this patient?

(or)

A twenty-five years old female presents to the emergency department with the complaint of severe abdominal pain. The pain is on the upper right side and is not associated with nausea or vomiting. Examination findings include jaundice, tender hepatosplenomegaly and mild ascites. She does not have a history of any illness or trauma. What is the probable diagnosis for this patient?

A. Budd –Chiari syndrome

B. Acute Viral hepatitis

C. Acute Pancreatitis

D. Acute cholecystitis

---

7. A young female presents to the emergency department with complaints of abdominal distention and swelling in her legs. She has had these symptoms for the past 2 weeks, which have gradually increased in intensity. She also states that she hasn't been feeling hungry and doesn't feel like eating anything. She has lost some weight because of that. Physical examination reveals that she is also jaundiced. You diagnose this as a case of Budd Chiari syndrome. The following is the least likely manifestation in an acute case of Budd Chiari syndrome?

(or)

Which of the following is the least likely manifestation in an acute case of Budd Chiari syndrome?

A. Enlarged tender liver

B. Ascites

C. Jaundice

D. Venous collaterals

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8. In the case of Budd Chiari syndrome, which vessel is most likely to be obstructed?

(or)

A young female is brought to the emergency department by her parents. She complains that her stomach and legs have been swollen for the past two weeks. Her parents state that even though her stomach has swollen, she hasn't been eating properly for the past couple of months and has lost considerable weight. They also say that her eyes seem to be of a yellowish colour even though she has no issues with her eyesight. An abdominal CT scan was performed, which showed a large amount of abdominal ascites, mild hepatosplenomegaly, and retroperitoneal lymphadenopathy. If this is a case of Budd Chiari syndrome, which vessel is most likely to be obstructed?

A. Inferior vena cava

B. Hepatic artery

C. Larger hepatic veins

D. Portal vein

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9. A twenty-four years old female comes to your clinic with a history of swelling of her legs and stomach and yellowing of her eyes and nails. She associated this with her sedentary lifestyle and only showed up to the clinic because now she has started to develop pain in the right side of her abdomen. The only medicines she takes are oral contraceptive pills. Her physical examination reveals an enlarged liver and jaundice. Further investigations and blood testing were performed, and you made a provisional diagnosis of Budd Chiari Syndrome. The concerned patient wants to know the cause of her disease. What is the cause of the disease in this patient?

(or)

A diagnosis of Budd Chiari Syndrome was made. What is the most likely cause of disease in this patient?

A. Polycythaemia

B. Oral contraceptive pills

C. Pregnancy

D. Hepatocellular carcinoma

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10. A sixteen years old male is brought to your clinic by her mother for recurrent episodes of severe abdominal pain. The pain was associated with fever and vomiting and resolved on its own after 2 days. He has had 2-3 such episodes over the last year. He was recently diagnosed with type 1 diabetes, but the pain episodes were not associated with hyperglycemia. After examinations and laboratory testing, a diagnosis of hereditary pancreatitis is made. Which of the following is not true regarding hereditary pancreatitis?

(or)

Which of the following is not true regarding hereditary pancreatitis?

A. Mutation of cationic trypsinogen gene

B. Autosomal recessive inheritance

C. Hereditary pancreatitis is associated with chromosome 7

D. Increased risk of pancreatic cancer

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11. All of the following are used for routine medical treatment of acute pancreatitis except?

(or)

A forty-eight years old male presents to the emergency department with acute abdominal pain. Pain is in the epigastric area and radiates to the back. He has 2-3 alcoholic drinks daily and yesterday had a party with his friends, in which he had a lot of alcohol. He is nauseous and has had a few episodes of vomiting since morning. On examination, he is tachypnoeic and tachycardic. Lab investigations show an elevated leucocyte count and elevated serum amylase and lipase. All of the following are used for routine medical treatment of the condition except?

A. Ringers Lactate

B. Normal Saline

C. IV opiates

D. Gabexate mesilate

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12. A diagnosis of chronic pancreatitis is made. Which of the following vitamins is most likely deficient in this patient?

(or)

A fifty-seven years old man presents to your clinic with the complaint of weight loss and abdominal pain. The patient states that the abdominal pain has been present for a long time but comes and goes on its own. If he has a sudden acute pain attack, he leans forward, and the pain gets slightly better. He also complains of having greasy stools that have a very bad odour. Work up of the patient reveals a diagnosis of chronic pancreatitis. In patients with chronic pancreatitis, deficiency of which of the following vitamins is most likely?

A. Folic acid

B. Vitamin B2 (riboflavin)

C. Vitamin B6 (pyridoxine)

D. Vitamin D

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13. A forty year old male is brought to the emergency department by his neighbour. The patient complains of severe abdominal pain, which radiates to the back. The neighbour states that the patient is an alcoholic. The patient is admitted with the suspicion of acute pancreatitis. A few hours after admission, the patient starts vomiting and feels dizzy while standing. On examination, he has severe tenderness in the right upper quadrant of the abdomen and decreased bowel sounds. A bluish discolouration is noticed around his umbilicus. Further examinations would show which of the following findings.

(or)

A patient with acute pancreatitis suddenly starts vomiting and feels dizzy while standing a few hours after admission. He has decreased bowel sounds and a bluish discoloration around his umbilicus. Which of the following findings can be seen in this patient?

A. A CT of the abdomen is likely to show severe necrotizing pancreatitis

B. Abdominal plain film is likely to show pancreatic calcification

C. Concomitant appendicitis

D. A pancreatico-aortic fistula

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	1
Question 3	4
Question 4	2
Question 5	4
Question 6	1
Question 7	4
Question 8	3
Question 9	2
Question 10	2
Question 11	4
Question 12	4
Question 13	1

Solution for Question 1:

Option A: Hypocalcaemia

• Inflammation of the pancreas over a short period of time is known as acute pancreatitis.

• Acute pancreatitis commonly presents with fever, abdominal pain, nausea and vomiting.

• Elevated levels of serum pancreatic enzymes are used to diagnose acute pancreatitis.

• The causes of acute pancreatitis are listed below:

• Hypocalcemia does not cause acute pancreatitis.

Option B: Valproic acid therapy

• Acute pancreatitis is a potentially fatal complication of valproic acid therapy.

Option C: Biliary tract disease

• Biliary tract disease causes inflammation of the pancreas, resulting in pancreatitis.

Option D: Blunt trauma

• Blunt abdominal trauma is a cause of pancreatitis due to injury against the vertebral column.

Solution for Question 2:

Option A: Purtscher retinopathy

• The patient's history and findings suggest a diagnosis of acute pancreatitis.

• Inflammation of the pancreas over a short period of time is known as acute pancreatitis.

• Acute pancreatitis commonly presents with fever, abdominal pain, nausea and vomiting.

• Elevated levels of serum pancreatic enzymes are used to diagnose acute pancreatitis.

• Purtscher retinopathy is a relatively unusual complication of acute pancreatitis.

• It is manifested by a sudden and severe loss of vision.

• Fundoscopic findings include cotton-wool spots and haemorrhages confined to an area limited by the optic disc and macula.

• It is believed to be due to occlusion of the posterior retinal artery with aggregated granulocytes.

Option B: Hyperglycaemia

• Elevated levels of pancreatic enzymes and white blood cells suggest the diagnosis of acute pancreatitis.

• Even though hyperglycaemia can cause problems in the eyes, the patient's laboratory findings do not show any evidence of hyperglycaemia.

Option C: Hypoxia

• Even though the patient is tachypnoeic, acute pancreatitis causing retinopathy is the more likely cause of the patient's symptoms.

Option D: Central Retinal Vein Occlusion

• Even though central retinal vein occlusion can cause the patient's eye symptoms, acute pancreatitis causing retinopathy is the more likely cause of the patient's symptoms.

Solution for Question 3:

Option D: Faecal elastase level

• The patient's history suggests Steatorrhea.

• Steatorrhea is the increase in fat content in the stool.

• Bile acids, digestive enzymes and normal small intestinal mucosa are required for fat absorption.

• Any defects in bile acids, pancreatic digestive enzymes, or absorptive villi lead to steatorrhea.

• The faecal elastase-1 and small bowel biopsy are useful in evaluating patients with suspected pancreatic steatorrhea.

• A decreased faecal elastase level to <100 μg per gram of stool strongly suggests severe pancreatic exocrine insufficiency.

• The diagnostic test with the best sensitivity and specificity in chronic pancreatitis is the hormone stimulation test utilizing secretin. It becomes abnormal when > 60% of the pancreatic exocrine function has been lost.

• In contrast to acute pancreatitis, serum amylase and lipase levels are usually not strikingly elevated in chronic pancreatitis.

Option A: Schilling test

• The Schilling test is performed to check for vitamin b12 deficiency.

• Symptoms of b12 deficiency include jaundice, glossitis, mouth ulcers and paresthesia.

• The patient does not show any signs and symptoms of b12 deficiency.

Option B: Serum lipase

• Acute pancreatitis presents with abdominal pain, fever, nausea and vomiting.

• Serum lipase can be used to diagnose acute pancreatitis.

• The patient does not show any signs and symptoms of acute pancreatitis.

Option C: Serum amylase

• Acute pancreatitis presents with abdominal pain, fever, nausea and vomiting.

• Serum amylase can be used to diagnose acute pancreatitis.

• The patient does not show any signs and symptoms of acute pancreatitis.

Solution for Question 4:

Option B: Serum lipase

• The patient's history and findings lead to a diagnosis of acute pancreatitis.

• Sudden inflammation of the pancreas is called acute pancreatitis.

• Diabetes is a risk factor for developing acute pancreatitis.

• Diabetic ketoacidosis is often accompanied by abdominal pain and elevated total serum amylase levels, thus closely mimicking acute pancreatitis.

• However, the serum lipase level is not be elevated in diabetic ketoacidosis.

Option A: Serum amylase

• Serum amylase may be elevated in both acute pancreatitis and diabetic ketoacidosis.

Option C: Decreased glucagon

• Glucagon is a hormone released by the liver in states of low blood glucose.

• Low glucagon would not help differentiate between these two conditions.

Option D: Hyperglycemia

• Hyperglycemia is due to multiple factors, including decreased insulin release, increased glucagon release, and increased output of adrenal glucocorticoids and catecholamines.

• Hyperglycemia would not help differentiate between these two conditions.

Solution for Question 5:

Option D: Core temperature greater than 38°C

• Sudden inflammation of the pancreas is called acute pancreatitis.

• Gallstones and alcohol abuse are the major causes.

• Symptoms include abdominal pain, nausea, vomiting and fever.

• Diagnosis is established by two of the following three criteria: Typical abdominal pain in the epigastrium that may radiate to the back Threefold or greater elevation in serum lipase and amylase Confirmatory findings of acute pancreatitis on cross-sectional abdominal imaging

• Typical abdominal pain in the epigastrium that may radiate to the back

• Threefold or greater elevation in serum lipase and amylase

• Confirmatory findings of acute pancreatitis on cross-sectional abdominal imaging

• IV fluid resuscitation & IV analgesia with opiates are the main components of the first line of management in acute pancreatitis.

• A core temperature greater than 38°C is one of the criteria for assessing the severity of acute pancreatitis but not a diagnostic criterion.

• Typical abdominal pain in the epigastrium that may radiate to the back

• Threefold or greater elevation in serum lipase and amylase

• Confirmatory findings of acute pancreatitis on cross-sectional abdominal imaging

Option A: Threefold or greater elevation in serum lipase and amylase

• This is a criterion for diagnosing acute pancreatitis.

Option B: Typical abdominal pain in the epigastrium that may radiate to the back

• This is a criterion for diagnosing acute pancreatitis.

Option C: Confirmatory findings of acute pancreatitis on cross-sectional abdominal imaging

• This is a criterion for diagnosing acute pancreatitis.

Solution for Question 6:

Option A: Budd-Chiari Syndrome

• Budd-Chiari syndrome (BCS) is a very rare condition.

• This is caused by the occlusion of the hepatic veins draining the liver.

• BCS classically presents as a triad of abdominal pain, ascites, and liver enlargement.

• Primary Budd–Chiari syndrome (75%) is caused by hepatic vein thrombosis.

• Causes of primary BCS include: Polycythemia vera Pregnancy Postpartum state Use of oral contraceptives Paroxysmal nocturnal hemoglobinuria Hepatocellular carcinoma Lupus anticoagulants

• Polycythemia vera

• Pregnancy

• Postpartum state

• Use of oral contraceptives

• Paroxysmal nocturnal hemoglobinuria

• Hepatocellular carcinoma

• Lupus anticoagulants

• Secondary Budd–Chiari syndrome (25%) is due to compression of the hepatic vein by an outside structure.

• Polycythemia vera

• Pregnancy

• Postpartum state

• Use of oral contraceptives

• Paroxysmal nocturnal hemoglobinuria

• Hepatocellular carcinoma

• Lupus anticoagulants

Other options

Option B: Acute Viral Hepatitis

• Acute viral hepatitis is characterized by fever, fatigue, loss of appetite, nausea, vomiting and abdominal pain.

• The patient's symptoms and history suggest a diagnosis of Budd-Chiari Syndrome.

Option C: Acute Pancreatitis

• Acute pancreatitis is characterized by fever and epigastric pain radiating to the back.

• The patient's symptoms and history suggest a diagnosis of Budd-Chiari Syndrome.

Option D: Acute Cholecystitis

• Acute cholecystitis is characterized by fever, chills, and right-sided abdominal pain.

• The patient's symptoms and history suggest a diagnosis of Budd-Chiari Syndrome.

Solution for Question 7:

Option D: Venous collaterals

• Budd Chiari Syndrome (BCS) is a disease caused by the obstruction of hepatic veins.

• Obstruction of two or more major hepatic veins produces BCS.

• Obstruction of a single main hepatic vein by thrombosis is clinically silent.

• The most common cause of hepatic vein obstruction is thrombosis of the hepatic vein.

• BCS is characterized by right upper quadrant pain, ascites, and hepatomegaly.

• BCS can be fulminant, acute, chronic, or asymptomatic. Subacute is the most common form.

• Long-term blockage leads to the formation of venous collaterals around the occlusion.

• These are formed due to portal hypertension.

• Venous collaterals are only seen in chronic disease.

• These are not formed in acute forms.

Option A: Enlarged tender liver

• Liver enlargement occurs in acute settings of this disease.

Option B: Ascites

• Ascites occur in acute settings of this disease.

Option C: Jaundice

• Jaundice is one of the first findings in many liver diseases.

• Jaundice will be present in acute BCS.

Solution for Question 8:

Option C: Larger hepatic vein

• Budd-Chiari Syndrome (BCS) is a disease caused by the obstruction of hepatic veins.

• Obstruction of two or more major hepatic veins produces BCS.

• Obstruction of a single main hepatic vein by thrombosis is clinically silent.

• The most common cause of hepatic vein obstruction is thrombosis of the hepatic vein.

• BCS is characterized by right upper quadrant pain, ascites and hepatomegaly.

• Occlusion of hepatic veins results in centrilobular necrosis.

Option A: Inferior vena cava

• The inferior vena cava is obstructed in the inferior vena cava syndrome.

• The inferior vena cava may be obstructed as a late complication of untreated Budd Chiari syndrome.

Option B: Hepatic Artery

• The hepatic artery is not occluded in the Budd Chiari syndrome.

Option D: Portal vein

• Liver cirrhosis is the most common cause of portal vein thrombosis.

Solution for Question 9:

Option B: Oral contraceptive pills

• Budd-Chiari Syndrome (BCS) is a disease caused by the obstruction of hepatic veins.

• Primary Budd-Chiari syndrome is caused by thrombosis of the hepatic vein.

• Secondary Budd-Chiari syndrome is caused by compression of the hepatic vein by an outer structure (e.g. a tumour).

• Oral contraceptives cause a hypercoagulable state.

• Given the patient's history, this is the most likely cause.

Option A: Polycythaemia

• Polycythaemia is one of the causes of BCS.

• There is no mention of any abnormality in the patient’s blood tests, making this an unlikely cause.

• In the case of Polycythaemia, blood reports would show increased levels of haemoglobin.

Option C: Pregnancy

• Pregnancy, like oral contraceptive pills, does promote a hypercoagulable state.

• The patient states that she uses oral contraceptive pills, making pregnancy an unlikely cause.

Option D: Hepatocellular carcinoma

• Given the patient's age and history, this is an unlikely cause in this patient.

Solution for Question 10:

Option B: Autosomal recessive inheritance

• Hereditary pancreatitis is an autosomal dominant pattern.

• It is characterized by recurring attacks of severe abdominal pain.

• Hereditary pancreatitis has an early age of onset.

• The hereditary pancreatitis gene is located on chromosome 7.

• Mutations are in codons 29 (exon 2) and 122 (exon 3) of the cationic trypsinogen gene.

• Patients frequently develop pancreatic calcification, diabetes mellitus and steatorrhea.

• There is an increased incidence of pancreatic carcinoma with hereditary pancreatitis.

• Serum amylase and lipase levels may be elevated during acute attacks but are usually normal.

Option A: Mutation of cationic trypsinogen gene

• Mutations in hereditary pancreatitis are in codons 29 (exon 2) and 122 (exon 3) of the cationic trypsinogen gene.

Option C: Hereditary pancreatitis is associated with chromosome 7

• The hereditary pancreatitis gene is located on chromosome 7.

Option D: Increased risk of pancreatic cancer

• There is an increased incidence of pancreatic carcinoma with hereditary pancreatitis.

Solution for Question 11:

Option D: Gabexate mesilate

• Sudden inflammation of the pancreas is known as acute pancreatitis.

• This is characterized by the elevation of pancreatic enzymes in the blood.

• 85–90% of cases of acute pancreatitis are self-limited and subside spontaneously, usually within 3–7 days after initiation of treatment, and do not exhibit organ failure or local complications.

• The most important treatment intervention is aggressive intravenous fluid resuscitation (Ringer Lactate or Normal Saline).

• Intravenous narcotic analgesics (Opiates) are given to control abdominal pain.

• Supplemental oxygen is given via nasal cannula.

• Gabexate mesilate is a synthetic serine protease inhibitor that is not used for routine medical treatment of acute pancreatitis as it is not effective in preventing complications and mortality.

Other options

Option A: Ringers Lactate

• Normal saline or ringers lactate is used in the treatment of acute pancreatitis.

Option B: Normal Saline

• Normal saline or ringers lactate is used in the treatment of acute pancreatitis.

Option C: IV opiates

• Intravenous opiates are used in the treatment of acute pancreatitis.

Solution for Question 12:

Option D: Vitamin D

• Chronic pancreatitis is a progressive inflammation of the pancreas that affects the functions of the pancreas.

• Chronic pancreatitis may be asymptomatic for long periods of time.

• Symptoms include intermittent abdominal pain, nausea, vomiting, steatorrhea and weight loss.

• Causes of chronic pancreatitis include: Alcohol abuse Ductal obstruction (malignancy, stones, trauma), Genetics (cystic fibrosis, hereditary pancreatitis) Chemotherapy Autoimmune diseases such as systemic lupus erythematosus (SLE) or autoimmune pancreatitis

• Alcohol abuse

• Ductal obstruction (malignancy, stones, trauma),

• Genetics (cystic fibrosis, hereditary pancreatitis)

• Chemotherapy

• Autoimmune diseases such as systemic lupus erythematosus (SLE) or autoimmune pancreatitis

• A deficiency of fat-soluble vitamins (vitamins A, D, E, and K) can occur in chronic pancreatitis due to loss of exocrine pancreas function.

• Vitamin B12 (cobalamin), folic acid, vitamin B2 (riboflavin), and vitamin B6 (pyridoxine) are all water-soluble vitamins.

• It should be noted that most patients with chronic pancreatitis also are alcoholics and that alcoholics often have multiple nutritional deficiencies, including a lack of water-soluble vitamins.

• Alcohol abuse

• Ductal obstruction (malignancy, stones, trauma),

• Genetics (cystic fibrosis, hereditary pancreatitis)

• Chemotherapy

• Autoimmune diseases such as systemic lupus erythematosus (SLE) or autoimmune pancreatitis

Option A: Folic acid

• Folic acid is water soluble and is not deficient due to chronic pancreatitis.

Option B: Vitamin B2 (riboflavin)

• Vitamin B2 is water soluble and is not deficient due to chronic pancreatitis.

Option C: Vitamin B6 (pyridoxine)

• Vitamin B6 is water soluble and is not deficient due to chronic pancreatitis.

Solution for Question 13:

Option A: A CT of the abdomen is likely to show severe necrotizing pancreatitis

• Acute pancreatitis is an acute inflammation of the pancreas.

• Clinical findings include Low-grade fever Tachycardia Hypotension Severe abdominal pain of increasing intensity, which radiates to the back Absent bowel sounds Bluish discolouration in the periumbilical area (Cullen's sign) is due to hemoperitoneum. Blue-red-purple or green-brown discolouration of the flanks (Grey Turner’s sign)

• Low-grade fever

• Tachycardia

• Hypotension

• Severe abdominal pain of increasing intensity, which radiates to the back

• Absent bowel sounds

• Bluish discolouration in the periumbilical area (Cullen's sign) is due to hemoperitoneum.

• Blue-red-purple or green-brown discolouration of the flanks (Grey Turner’s sign)

• The Cullen's and Grey turner's signs indicate severe necrotizing pancreatitis with haemorrhage.

• Below is a CT scan image showing acute pancreatitis with necrosis

• Low-grade fever

• Tachycardia

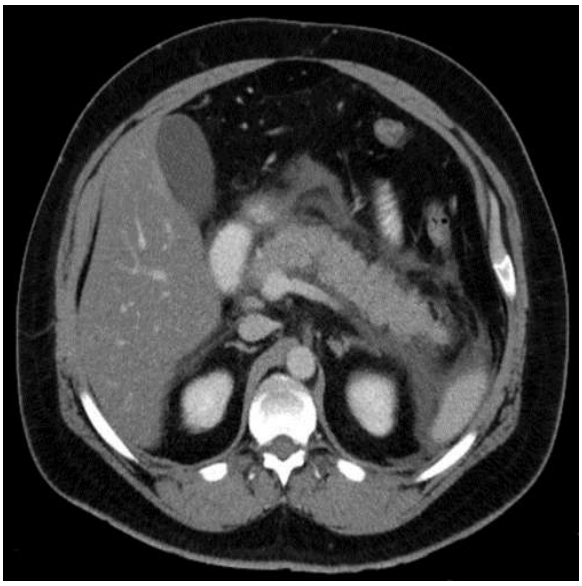
• Hypotension

• Severe abdominal pain of increasing intensity, which radiates to the back

• Absent bowel sounds

• Bluish discolouration in the periumbilical area (Cullen's sign) is due to hemoperitoneum.

• Blue-red-purple or green-brown discolouration of the flanks (Grey Turner’s sign)



Option B: Abdominal plain film is likely to show pancreatic calcification

• Pancreatic calcifications occur in chronic pancreatitis.

Option C: Concomitant appendicitis

• The patient's signs and symptoms are not suggestive of appendicitis.

Option D: A pancreatico-aortic fistula

• The patient's signs and symptoms are not suggestive of a pancreatico-aortic fistula.

Alcoholic Hepatitis,Hepatorenal Syndrome

1. Maximum dose of albumin that can be used to treat patients with hepatorenal syndrome.

A. 50 gm

B. 100 gm

C. 25 gm

D. 150 gm

---

2. Which of the following graphs correctly depicts chronic liver disease?

A.

B.

C.

D.

---

3. What is the screening test for Wilson's disease?

A. MRI head

B. Liver biopsy

C. 24-hr urinary copper

D. LFT

---

4. A 40-year-old male was brought to the emergency department with blood oozing from his mouth. He was hemodynamically unstable and had a history of binge alcohol drinking. He revealed that he had constipation for a long time accompanied by occasional discomfort and fresh blood in stools during defecation. Clinical examination showed positive Puddle sign. Identify the diagnosis in this patient and mark the right option with relevant statements. a) Investigation of choice is a CT scan of the abdomen b) Hepatic venous pressure gradient(HVPG) >5mmHg c) Overall the most common cause of hematemesis. d) Splenomegaly is the earliest finding. e) Esophageal varices occur when HVPG is >7mm Hg. f) Esophageal varices are managed by reducing the blood pressure with propranolol.

(or)

Identify the diagnosis in a patient with Hematemesis, hematochezia, positive puddles sign and mark the option with the right statements. a) Investigation of choice is a CT scan of the abdomen b) Hepatic venous pressure gradient(HVPG) >5mmHg c) Overall the most common cause of hematemesis. d) Splenomegaly is the earliest finding. e) Esophageal varices occur when HVPG is >7mm Hg. f) Esophageal varices are managed by reducing the blood pressure with propranolol.

A. b,d,f

B. a,d,e

C. a,c,e

D. b,c,f

---

5. Match the following sets of drugs used in the treatment of Wilson's disease accordingly. SET 1 1) Zinc acetate 2) Trientine 3) Tetrathiomolybdate SET 2 a) CNS manifestations b) Compensated cirrhosis c) Hepatic Decompensation

A. 1-c,2-b,3-a

B. 1-b,2-c,3-a

C. 1-a,2-b,3-c

D. 1-a,2-c,3-b

---

6. Match the following regarding Iron metabolism. 1) Divalent metal transporter a) Importer of iron from enterocyte into circulation. 2) Duodenal cyt B b) Converts Fe2+ into Fe3+ 3) Ferroportin c) Transport of iron into enterocytes 4) Ceruloplasmin d) The storage form of iron. 5) Transferrin e) Reduction of Fe3+ to Fe2+ 6) Ferritin f) Transport of Fe3+ to bone marrow.

1) Divalent metal transporter	a) Importer of iron from enterocyte into circulation.
2) Duodenal cyt B	b) Converts Fe2+ into Fe3+
3) Ferroportin	c) Transport of iron into enterocytes
4) Ceruloplasmin	d) The storage form of iron.
5) Transferrin	e) Reduction of Fe3+ to Fe2+
6) Ferritin	f) Transport of Fe3+ to bone marrow.

A. 1-c,2-e,3-a,4-b,5-f,6-d

B. 1-a,2-d,3-b,4-e,5-c,6-f

C. 1-f,2-c,3-e,4-b,5-d,6-a

D. 1-e,2-c,3-a,4-b,5-d,6-f

---

7. Most common gene mutation is involved in hereditary hemochromatosis?

A. HFE gene mutation

B. Hemojuvelin mutation

C. Transferrin mutation

D. Ferroportin mutation

---

8. Which of the following is the most common cause of acquired hemochromatosis?

A. Cirrhosis

B. Thalassemia

C. NASH

D. Hepatitis C

---

9. Match the following causes of portal hypertension with their respective affected anatomical regions. 1) Pre-Hepatic a) Schistosomiasis 2) Hepatic-presinusoidal b) Constrictive pericarditis 3) Hepatic-sinusoidal c) Banti syndrome 4) Hepatic-post sinusoidal d) Radiation 5) Post-Hepatic e)

Cirrhosis

1) Pre-Hepatic	a) Schistosomiasis
2) Hepatic-presinusoidal	b) Constrictive pericarditis
3) Hepatic-sinusoidal	c) Banti syndrome
4) Hepatic-post sinusoidal	d) Radiation
5) Post-Hepatic	e) Cirrhosis

A. 1-a,2-d,3-b,4-e,5-c

B. 1-a,2-d,3-e,4-c,5-b

C. 1-c,2-d,3-a,4-e,5-b

D. 1-c,2-a,3-e,4-d,5-b

---

10. A 40-year-old female patient came to the outpatient department with complaints of irregular periods, breathing difficulty, tiredness, and increased dark pigmentation of the skin for the past three months. She is a known case of diabetes type 1 for the past 5 years. She admitted that she recently experiences pain in the joints of her hand and occasional palpitations. Clinical examination showed hepatomegaly. Blood investigations revealed increased Sr. iron and TIBC. Identify diagnosis and mark the option with the appropriate statements. a) The most common symptom is skin pigmentation b) Liver biopsy is the investigation of choice c) The most common cause of death is liver failure d) The most common organ involved is the liver e) Jejunum is the site for this mineral absorption f) It is associated with hypogonadotropic hypogonadism

(or)

Identify the diagnosis in a female patient with irregular periods, palpitations, dyspnea, dark skin pigmentation, hepatomegaly, and increased values of serum iron and TIBC. Pick the option with appropriate statements. a) The most common symptom is skin pigmentation b) Liver biopsy is the investigation of choice c) The most common cause of death is liver failure d) The most common organ involved is the liver e) Jejunum is the site for this mineral absorption f) It is associated with hypogonadotropic hypogonadism

A. b,d,f

B. a,d,e

C. a,c,e

D. b,c,f

---

11. Which of the following is not a parameter used in PELD score?

A. Age

B. Albumin

C. Serum creatine

D. INR

---

12. Match the following clinical scenarios in portal hypertension with their respective choice of treatment. SET 1 SET 2 a) Non-bleeding esophageal varices 1) Peritoneal venous shunt b) Bleeding

esophageal varices 2) Esophageal variceal bleeding/Nadolol c) Recurrent bleed with Class A child-pugh score 3) TIPS d) Recurrent bleed with class B and C Child-pugh score 4) I.V octreotide and sclerotherapy with Ethanolamine oleate

SET 1	SET 2
a) Non-bleeding esophageal varices	1) Peritoneal venous shunt
b) Bleeding esophageal varices	2) Esophageal variceal bleeding/Nadolol
c) Recurrent bleed with Class A child-pugh score	3) TIPS
d) Recurrent bleed with class B and C Child-pugh score	4) I.V octreotide and sclerotherapy with Ethanolamine oleate

A. a-3,b-1,c-2,d-4

B. a-2,b-4,c-1,d-3

C. a-1,b-3,c-4,d-2

D. a-2,b-4,c-3,d-1

---

13. A 35-year-old female presented to the emergency department with a complaint of sudden onset pain in the right upper abdomen. Examination showed icterus and increased liver span. She is a known case of PCOS and was on oral contraceptive pillsfor a long time to regularize her menstrual bleeding. Lab investigations showed increased bilirubin and grossly elevated SGOT and SGPT. USG showed an enlarged caudate lobe of the liver. Identify the diagnosis and mark the option with appropriate statements. a) Jaundice is a part of the triad of clinical features b) It is a prehepatic cause c) Investigation of choice is Hepatic venography d) Balloon angioplasty is a part of the management of the chronic form of this disease e) Wilms tumor can be an association f) It causes centrilobular necrosis.

(or)

Frame a diagnosis in a patient with prolonged usage of ocps, sudden onset right upper quadrant pain, raised SGOT and SGPT, and enlarged caudate lobe of liver on USG. a) Jaundice is a part of the triad of clinical features b) It is a prehepatic cause c) Investigation of choice is Hepatic venography d) Balloon angioplasty is a part of the management of the chronic form of this disease e) Wilms tumor can be an association f) It causes centrilobular necrosis.

A. a, c, d

B. c, e, f

C. b, e, f

D. a, b, d

---

14. Match the following clinical scenarios with their appropriate choice of treatment. 1) Ascites a) Cefotaxime 2) Hepatopulmonary syndrome b) Albumin with octreotide 3) Refractory ascites c) Norfloxacin 4) Hepatic encephalopathy d) Spironolactone + furosemide 5) Spontaneous bacterial peritonitis e) Lactulose 6) To Prevent bacterial peritonitis f) Large volume paracentesis + albumin 7) Hepatorenal syndrome g) Oxygen supplementation

1) Ascites	a) Cefotaxime
2) Hepatopulmonary syndrome	b) Albumin with octreotide
3) Refractory ascites	c) Norfloxacin
4) Hepatic encephalopathy	d) Spironolactone + furosemide

5) Spontaneous bacterial peritonitis	e) Lactulose
6) To Prevent bacterial peritonitis	f) Large volume paracentesis + albumin
7) Hepatorenal syndrome	g) Oxygen supplementation

A. 1-a,2-e,3-b,4-f,5-c,6-g,7-d

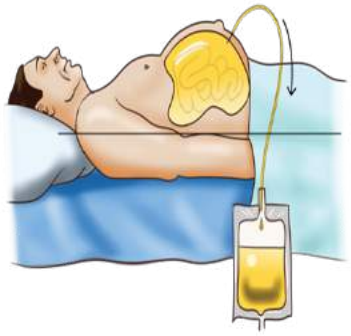
B. 1-e,2-c,3-a,4-b,5-d,6-f,7-g

C. 1-d,2-g,3-f,4-e,5-a,6-c,7-b

D. 1-g,2-e,3-f,4-d,5-b,6-c,7-a

---

15. Identify the procedure being done and mark the option with appropriate statements. a) >500ml fluid required for the puddles sign to be detectable b) Minimum amount of peritoneal fluid needed for the presentation to be clinically obvious is 1500 ml. c) Beta-blockers used for refractory episodes d) Site-4cm superior to ASIS to prevent inferior epigastric artery injury e) Black fluid is seen in biliary tract perforation f) Left side of the abdomen is preferred to avoid gut perforation on the right



A. a,d,e

B. a,c,e

C. b,c,f

D. b,d,f

---

16. Pick the option with correct statements regarding orthotopic liver transplantation. a) HLA matching is not mandatory b) Ideal time for cold ischemia with University of Wisconsin(UW) solution is 20hrs c) Lactobionate is one of the components used in the UW solution d) The right hepatic lobe of the donor adult is used for orthotopic transplantation in children.

A. b, c

B. a, c

C. a, d

D. b,d

---

17. A 40-year-old female patient comes to the outpatient department with complaints of constant fatigue, hair loss, and bone pain for the past two months. She denies a history of any irregular menstrual cycles. She constantly has an urge to drink water and reports severe itching, especially at

night. Clinical examination revealed hepatomegaly and icterus. Laboratory investigations reveal a positive AMA antibody. Identify the diagnosis and mark the option with relevant statements. a) Elevated LDL and reduced HDL in later stages b) Kayser - Fleischer Ring can be seen. c) USG is the investigation of choice. d) Raised PT, INR, and normal SGOT, SGPT, ALP e) Treatment of choice is liver transplant f) Macronodular cirrhosis is more common than micronodular cirrhosis.

(or)

Identify the diagnosis in a patient with fatigue, osteopenia, pruritus, dry mouth, hepatomegaly, and a positive AMA. Pick the option with the correct statements. a) Elevated LDL and reduced HDL in later stages b) Kayser - Fleischer Ring can be seen. c) USG is the investigation of choice. d) Raised PT, INR, and normal SGOT, SGPT, ALP e) Treatment of choice is liver transplant f) Macronodular cirrhosis is more common than micronodular cirrhosis.

A. a,b,e

B. b,d,e

C. c,d,f

D. c,e,f

---

18. Which of the following is not a part of SIRS (Systemic Inflammatory Respiratory Syndrome) criteria?

A. Tachypnea

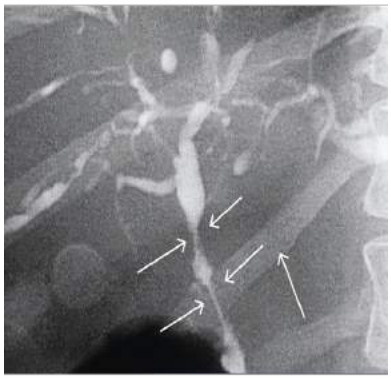
B. Tachycardia

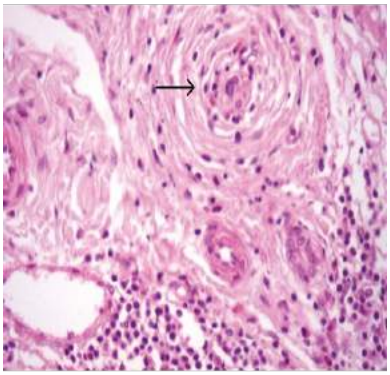
C. Hypotension

D. Leukocytosis

---

19. Using the images below, frame a diagnosis and mark the option with correct statements. a) Liver transplant is the mainstay of treatment b) Investigation of choice is ERCP c) Increased risk of malignancy. d) Elevated levels of IgM, Gamma GTP, and normal ALP e) P-ANCA is positive f) Albumin is elevated.





A. a,c,e

B. a,d,e

C. b,d,f

D. b,c,f

---

20. Which of the following statements regarding liver biopsy is true? a) Grading is done using METAVIR score b) Preferred site is midaxillary line 5th/6th intercoastal space c) Mandatory normal coagulogram before biopsy in cirrhotic patients d) Most accurate in assessing the severity of CLD

A. a,b,c

B. b,c,d

C. a,c,d

D. a,b,d

---

21. Which of the following options is the correct fibrotic stage according to the METAVIR score in a liver biopsy showing fibrosis with the expansion of portal zones and occasional bridging?

A. F1

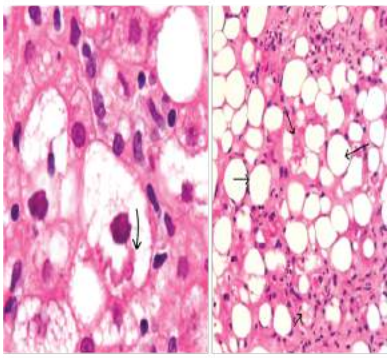
B. F2

C. F3

D. F4

---

22. The liver biopsy specimen of a deceased patient with chronic alcoholism and features of cirrhosis is being presented at a forensic pathology conference. The patient passed away during an episode of binge drinking. Histopathological examination of the specimen is shown below. Identify the diagnosis and mark the option with the correct statements. a) SGOT/SGPT ratio is the best test. b) The marker for heavy alcohol consumption is ALT c) Drug of choice is Prednisolone. d) 40-80gm per day of alcohol to develop this disease



A. b,d

B. b,c

C. a,d

D. a,c

---

23. Identify the ISHAK grade in a liver biopsy showing marked bridging with occasional nodules.

A. 0

B. 3

C. 5

D. 6

---

24. All of the following have Mallory-denk bodies except?

A. Indian childhood cirrhosis

B. Primary sclerosing cholangitis

C. Alcoholic hepatitis

D. Wilson disease.

---

25. Which of the following is not a part of the revised ICA-AKI criteria for the diagnosis of hepatorenal syndrome?

A. Serum Creatinine

B. Shock

C. FeNa

D. Absece of Parenchymal disease

---

26. Which of the following is not a parameter used in the Glasgow Alcoholic Hepatitis score?

A. Age

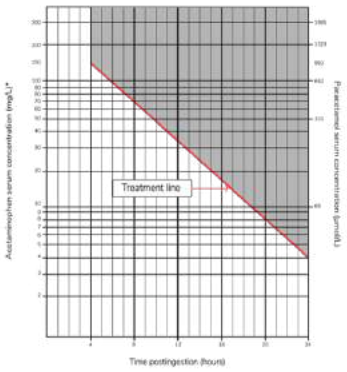
B. BUN

C. ALT

D. Bilirubin

---

27. Using the graph below, mark the option with relevant statements. a) A safe dose of PCM in an alcoholic is 3gm per day b) Blood PCM>300microgram/ml is associated with a high chance of liver damage c) Gastric lavage can be done within 2hr of PCM toxicity d) Orthotopic liver transplant in cases of> 48hrs of PCM toxicity e) Maximum dose of PCM in combination with opioids is 625mg. f) N-acetyl cysteine as an antidote in the first 8hrs of Toxicity



A. a,c,e

B. b,d,f

C. a,d,e

D. b,c,f

---

28. A 10-year-old boy presented to the outpatient department with his mother with a complaint of severe behavioral issues. She admitted that the boy throws severe temper tantrums, cries excessively, hits his classmates, and has unhygienic behavior despite repeated corrections. He has occasional redness and itching of the hands in the night. His medical history revealed multiple hospitalizations and medication for jaundice. Lab investigations showed anemia and an accidental eye examination revealed brown coloured deposits in the cornea. His LFT and RFT are deranged.Frame a diagnosis and mark the option with correct statements. a) It is due to the defect in the ATP 7A gene b) The liver is the most common organ affected c) Lindsay's nail is one of its signs d) Brown corneal deposits along with neurological manifestations are heavily diagnostic e) MRI head is the investigation of choice f) Associated with Parkinson's like features

(or)

Identify the diagnosis in a 10-year-old boy with behavioral issues, icterus, deranged LFT and RFT, and brown-colored deposits in the upper part of the cornea. Pick the option with appropriate statements. a) It is due to the defect in the ATP 7A gene b) The liver is the most common organ affected c) Lindsay's nail is one of its signs d) Brown corneal deposits along with neurological manifestations are heavily diagnostic e) MRI head is the investigation of choice f) Associated with Parkinson's like features

A. c,d,e

B. a,c,e

C. b,d,f

D. b,c,f

---

29. Match the following clinical lab readings with their respective diseases. 1) Albumin (↓), Globulin (↓) a) Plasmacytoma 2) Albumin (↓), Globulin (↑) b) Nephrotic syndrome 3) Albumin (n), Globulin (↑↑↑) c) Cirrhosis

1) Albumin (↓), Globulin (↓)	a) Plasmacytoma
2) Albumin (↓), Globulin (↑)	b) Nephrotic syndrome
3) Albumin (n), Globulin (↑↑↑)	c) Cirrhosis

A. 1-a,2-c,3-b

B. 1-b,2-a,3-c

C. 1-a,2-b,3-c

D. 1-b,2-c,3-a

---

30. Match the following 1) Gilbert syndrome a) Complete absence/Profound reduction of UDPGT (UDP-glucuronosyltransferase) 2) Crigler-Najjar syndrome b) Defect in OATP B1 3) Dubin johnson syndrome c) UDPGT (UDP-glucuronosyltransferase) activity is only 10-30% 4) Rotor syndrome d) Protein defect-MRCP 2

1) Gilbert syndrome	a) Complete absence/Profound reduction of UDPGT (UDP-glucuronosyltransferase)
2) Crigler-Najjar syndrome	b) Defect in OATP B1
3) Dubin johnson syndrome	c) UDPGT (UDP-glucuronosyltransferase) activity is only 10-30%
4) Rotor syndrome	d) Protein defect-MRCP 2

A. 1-c,2-a,3-b,4-d

B. 1-c,2-a,3-d,4-b

C. 1-d,2-b,3-c,4-a

D. 1-d,2-b,3-a,4-c

---

31. Which staining technique is used for the diagnosis of wilson's disease?

A. Auramine

B. Prussian blue

C. Rubeanic acid

D. Von Kossa stain

---

32. Match the following types of hereditary hemochromatosis with their respective genes. 1) Type 1 a) Transferrin receptor mutation 2) Type 2 b) HFE gene mutation 3) Type 3 c) Ferroportin mutation 4) Type 4 d) Hepcidin mutation

1) Type 1	a) Transferrin receptor mutation
2) Type 2	b) HFE gene mutation
3) Type 3	c) Ferroportin mutation
4) Type 4	d) Hepcidin mutation

A. 1-c,2-a,3-b,4-d

B. 1-b,2-d,3-a,4-c

C. 1-d,2-a,3-b,4-c

D. 1-a,2-c,3-b,4-d

---

33. Which of the following is not associated with platypnea?

A. Atrial myxoma

B. Mitral regurgitation

C. Emphysema

D. Hepatopulmonary syndrome

---

34. A 40-year-old male presented to the outpatient department with complaints of breathing difficulty. He is a chronic alcoholic and a known case of cirrhotic liver. He complained of respiratory discomfort especially in the morning while waking from the bed. Clinical examination revealed pallor and a fall in SPO2 to 78-80% while sitting upright from a sleeping position. Identify the diagnosis and mark the option with appropriate statements. a)Triad includes intrapulmonary shunting+platypnea+cirrhosis b) Fall in A-a gradient c) Investigation of choice is bubble contrast echocardiography d) Definitive management is orthotopic liver transplant e) Vasoconstriction of pulmonary blood vessels due to urinary loss of prostaglandins. f)Upright position causes SPO2 to fall by 10%

(or)

Which of the following statements are correct in a patient who presents with platypnea, cirrhotic liver, and a decrease in SPO2 below 80%? a)Triad includes intrapulmonary shunting+platypnea+cirrhosis b) Fall in A-a gradient c) Investigation of choice is bubble contrast echocardiography d) Definitive management is orthotopic liver transplant e) Vasoconstriction of pulmonary blood vessels due to urinary loss of prostaglandins. f)Upright position causes SPO2 to fall by 10%

A. a, c, d

B. a, e, d

C. b, e, f

D. b, c, f

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	3
Question 3	3
Question 4	1
Question 5	2
Question 6	1

Question 7	1
Question 8	4
Question 9	4
Question 10	1
Question 11	3
Question 12	2
Question 13	2
Question 14	3
Question 15	4
Question 16	2
Question 17	1
Question 18	3
Question 19	1
Question 20	3
Question 21	2
Question 22	4
Question 23	3
Question 24	2
Question 25	3
Question 26	3
Question 27	2
Question 28	3
Question 29	4
Question 30	2
Question 31	3
Question 32	2
Question 33	2
Question 34	1

Solution for Question 1:

Correct Option B - 100 gm:

• Volume expansion in patients with hepatorenal syndrome is done using Albumin. It is safer to do volume expansion with albumin. Dose: 1 g/kg Maximum dose that can be used is ~ 100 grams. Albumin contributes to an increase in oncotic pressure and reduces the amount of ascites in the patient. If we get the ascitic fluid back in the vascular compartment, there is a chance that kidney perfusion will increase and urine output will also increase

• It is safer to do volume expansion with albumin.

• Dose: 1 g/kg

• Maximum dose that can be used is ~ 100 grams.

• Albumin contributes to an increase in oncotic pressure and reduces the amount of ascites in the patient.

• If we get the ascitic fluid back in the vascular compartment, there is a chance that kidney perfusion will increase and urine output will also increase

• It is safer to do volume expansion with albumin.

• Dose: 1 g/kg

• Maximum dose that can be used is ~ 100 grams.

• Albumin contributes to an increase in oncotic pressure and reduces the amount of ascites in the patient.

• If we get the ascitic fluid back in the vascular compartment, there is a chance that kidney perfusion will increase and urine output will also increase

Incorrect Options:

Option A - 50 gm

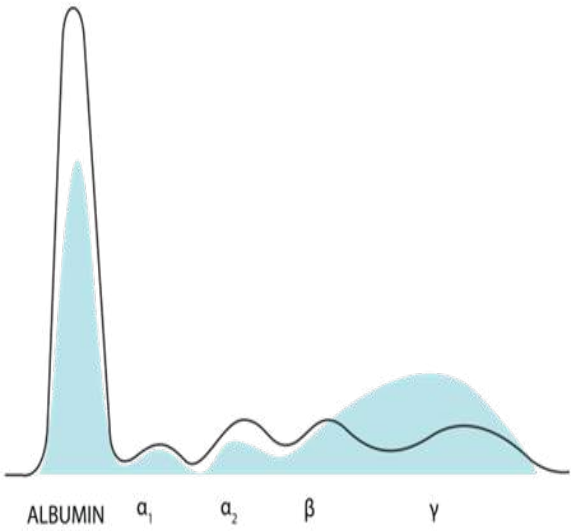
Option C - 25 gm

Option D - 150 gm

• A, C, and D are incorrect. Refer to the explanation of Option B.

Solution for Question 2:

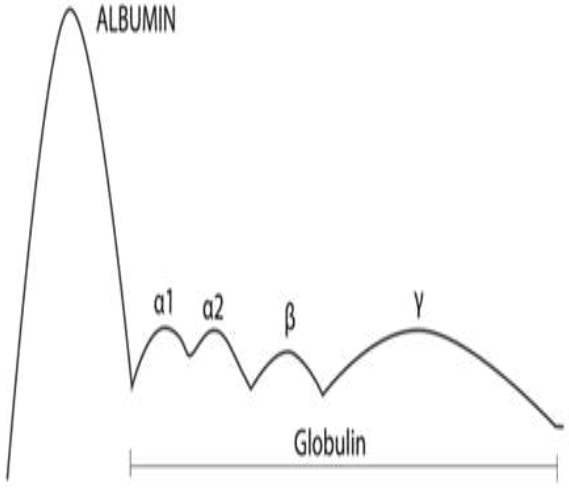
Correct Option C -



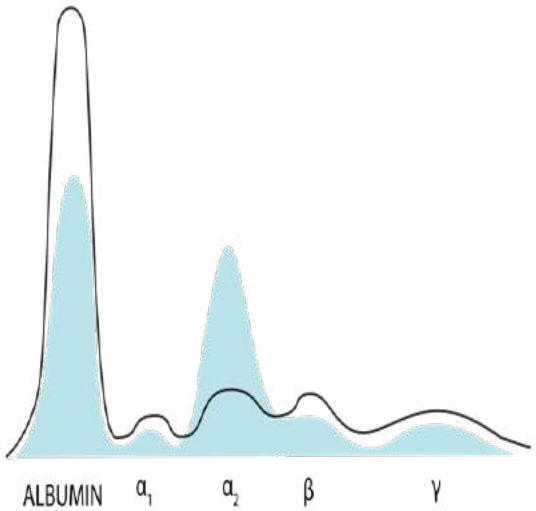
• In chronic liver disease, Albumin decreases, and γ Globulin is elevated.

Incorrect Options:

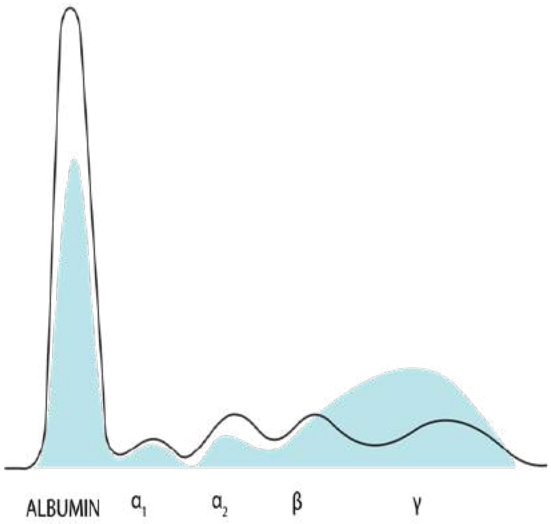
Options A, B, D



• Normal serum electrophoresis

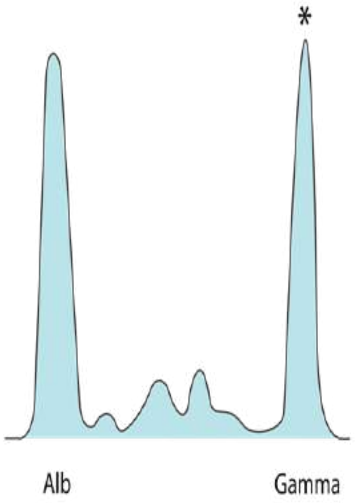


• In Nephrotic syndrome: Albumin decreases, γ Globulin decreases



• In chronic liver disease: Albumin decreases and γ Globulin is elevated.

• This is because catabolism of globulin occurs in the liver and if the liver is damaged this process does not occur.



• In multiple myeloma: There is a spike in the γ Globulin giving a characteristic church spire or M spike appearance.

Solution for Question 3:

Correct Option C - 24-hr urinary copper:

• Elevated more than 100 mcg/day.

Incorrect Options:

Option A - MRI head: It is not the screening test

Option B - Liver biopsy: It is the investigation of choice for Wilson disease

Option D - 24 hour urinary copper: It would be a more appropriate screening test for Wilson’s than LFT.

Solution for Question 4:

Correct Option A - b, d, f:

• The question stem describes a patient hematemesis(blood in vomitus), hematochezia(fresh blood in stools) and discomfort due to hemorrhoids (chronic constipation due to increased pressure in superior mesenteric vein).

• The patient is also a chronic alcoholic and has a positive puddle sign (ascites). This points towards a diagnosis of decompensated liver disease with PORTAL HYPERTENSION.

• b) Portal hypertension is defines as HVPG>5mmHg.

• d) Splenomegaly is the earliest finding.

• f) Esophageal varices are managed by reducing blood pressure with propranolol.

Incorrect Options:

Option B - a, d, e:

• a) Investigation of choice for portal hypertension is Doppler ultrasonography and not Ct scan of the abdomen

• e) Esophageal varices occur when HVPG >12mmHg and not 7mmHg

Option C - a, c, e:

• c) Overall the most common cause of hematemesis is Peptic ulcer disease.

• MCC of hematemesis along with splenomegaly is portal hypertension.

Option D - b, c, f: Refer to the explanation of other options.

Solution for Question 5:

Correct Option B - 1-b,2-c,3-a:

1) Zinc acetate-b)Compensated cirrhosis

2) Trientene-c) Hepatic Decompensation

3) Tetrathiomolybdate-a)CNS manifestations

Solution for Question 6:

Correct Option A - 1-c,2-e,3-a,4-b,5-f,6-d:

1) Divalent metal transporter - c) Transport of iron into enterocytes

2) Duodenal cyt B - e) Reduction of Fe3+ to Fe2+

3) Ferroportin - a) Importer of iron from enterocyte into circulation

4) Ceruloplasmin - b) Converts Fe2+ into Fe3+

5) Transferrin - f) Transport of Fe3+ to bone marrow

6) Ferritin - d) The storage form of iron

Incorrect Options - Refer to the explanation of the correct answer:

Option B - 1-a,2-d,3-b,4-e,5-c,6-f

Option C - 1-f,2-c,3-e,4-b,5-d,6-a

Option D - 1-e,2-c,3-a,4-b,5-d,6-f

Solution for Question 7:

Correct Option A - HFE gene mutation:

• Present on chromosome 6p, C282Y homozygosity (most common) involved in Hereditary hemochromatosis.

Incorrect Options - Refer to the explanation of the correct option.

Solution for Question 8:

Correct Option D - Hepatitis C

Incorrect Options A, B, D: Eliminated by the explanation of the above options.

Solution for Question 9:

Correct Option D - 1-c,2-a,3-e,4-d,5-b:

1) Pre-Hepatic-c)Banti syndrome

2) Hepatic-presinusoidal-a)Schistosomiasis

3) Hepatic-sinusoidal-e)Cirrhosis

4) Hepatic-post sinusoidal-d)Radiation

5) Post-Hepatic-b)Constrictive pericarditis

Incorrect Options:

Option A - 1-a,2-d,3-b,4-e,5-c:

Option B - 1-a,2-d,3-e,4-c,5-b:

Option C - 1-c,2-d,3-a,4-e,5-b:

Eliminated by the explanation of the above options.

Solution for Question 10:

Correct Option A - b,d,f:

• The diagnosis is Hemochromatosis

• Irregular periods which is due to hypogonadotropic hypogonadism,

• Dyspnea and palpitations (due to a probable heart involvement) , tiredness, dark skin pigmentation, Raised serum iron and TIBC, handpain (likely pain in her MCP joints)and diabetes all help in pointingtowards a diagnosis of hemochromatosis. b) Liver biopsy is the investigation of choice d) The most common organ involved is the liver f) It is associated with hypogonadotropic hypogonadism

• b) Liver biopsy is the investigation of choice

• d) The most common organ involved is the liver

• f) It is associated with hypogonadotropic hypogonadism

• b) Liver biopsy is the investigation of choice

• d) The most common organ involved is the liver

• f) It is associated with hypogonadotropic hypogonadism

Incorrect Options:

Option B - a, d, e:

• a) The most common symptom is arthritis>> skin pigmentation

• e) Duodenum is the site for iron absorption and not Jejunum

Option C - a, c, e:

• c) The Most common cause of death is heart failure>liver failure>HCC

Option D - b, c, f: eliminated by the explanation of the above options.

Solution for Question 11:

Correct Option C - Serum creatine:

• Serum creatinine is not a parameter in PELD score

• PELD SCORE (Pediatric End Stage Liver Disease)

Parameters are:

• Bilirubin

• INR

• Albumin

• Age

• Growth failure

Incorrect Options:

Option A - Age

Option B - Albumin

Option D - INR

• Options A, B and D are components of the PELD score.

Solution for Question 12:

Correct Option B - a-2, b-4, c-1, d-3:

• a) Non-bleeding esophageal varices– 2) Nadolol/Propanolol

• b) Bleeding esophageal varices– 4) I.V octreotide and sclerotherapy with Ethanolamine oleate

• c) Recurrent bleed with Class A child-pugh score– 1) Peritoneal venous shunt

• d) Recurrent bleed with class B and C Child-pugh score– 3) Tansjugular Intrahepatic Portosystemic shunt. TIPS

Incorrect Options:

Option A - a-3,b-1,c-2,d-4:

Option C - a-1,b-3,c-4,d-2:

Option D - a-2,b-4,c-3,d-1:

Eliminated by the explanation of the above option

Solution for Question 13:

Correct Option B - c, e, f:

• The diagnosis is Budd-Chiari syndrome

• Prolonged usage of ocp leads to hypercoagulable state.

• Right upper quadrant pain, with elevated bilirubin and SGOT, SGPT, and an enlarged caudate lobe due to a potential blocked hepatic vein because of thrombosis help in the diagnosis of Budd-Chiari syndrome.

• c) Investigation of choice is Hepatic venography

• e) Wilms tumor can be an association

• f) It causes centrilobular necrosis.

Incorrect Options:

Option A - a, c, d:

• a) RUQ pain, ascites, and hepatomegaly are the triad of clinical features and jaundice is not part of the triad.

• d) Balloon angioplasty is a part of the management of acute form of this disease according to EASL(European Association for the Study of Liver)

Option C - b, e, f:

• b) It is a posthepatic cause of portal hypertension.

Option B - a, b,

Solution for Question 14:

Correct Option C - 1-d,2-g,3-f,4-e,5-a,6-c,7-b:

• 1) Ascites -d) Spironolactone + furosemide

• 2) Hepatopulmonary syndrome-g) Oxygen supplementation

• 3) Refractory ascites-f) Large volume paracentesis + albumin

• 4) Hepatic encephalopathy-e) Lactulose

• 5) Spontaneous bacterial peritonitis-a) Cefotaxime

• 6) Prevent bacterial peritonitis-c) Norfloxacin

• 7) Hepatorenal syndrome-b) Albumin with octreotide

Incorrect Options:

Incorrect Options:

Option A - 1-a,2-e,3-b,4-f,5-c,6-g,7-d:

Option B - 1-e,2-c,3-a,4-b,5-d,6-f,7-g:

Option D - 1-g,2-e,3-f,4-d,5-b,6-c,7-a:

Refer to the explanation of the correct option.

Solution for Question 15:

Correct Option D - b, d, f:

• The image shows paracentesis that is done in ascites.

• b) Minimum amount of peritoneal fluid needed for the presentation to be clinically obvious is 1500 ml.

• d) Site for paracentesis-4cm superior to ASIS to prevent inferior epigastric artery injury

• f) Left side of the abdomen is preferred for paracentesis to avoid gut perforation on the right

Incorrect Options:

Option A - a, d, e:

• a) Puddles sign is detectable with >100ml fluid and not 500ml

• e) Black Ascitic fluid is seen in pancreatic necrosis due to hemorrhagic pancreatitis.

Option B - a, c, e:

• c) Beta-blockers are avoided in refractory ascites.

Option C - b, c, f:

• Refer to the explanation of the other options.

Solution for Question 16:

Correct Option -B - a, c:

• a: HLA matching is not mandatory, ABO typing is performed prior to orthotopic liver transplantation.

• c: Lactobionate and Raffinose are two important components used in the UW solution.

Incorrect Options:

Option A - b, c:

• b: The University of Wisconsin solution is an important component of the cold chain involved in liver transportation. The maximum permissible cold ischemia time is 20 hours whereas the ideal cold ischemia time is 12 hours with the UW solution.

Option C -a, d:

• d: The left lateral lobe of a donor adult is used in case of orthotopic liver transplant from donor adult to child.

Option D - b, d:

• Refer to the explanation of other options.

Solution for Question 17:

Correct Option A - a,b,e:

• Fatigue, osteopenia(bone pain), pruritus(itching), SICCA syndrome(dry mouth), Hepatomegaly and a positive AMA are diagnostic of PRIMARY BILIARY CHOLANGITIS.

• a)Elevated LDL and reduced HDL in later stages-Xanthomas

• b)Kayser - Fleischer Ring can be seen- as a rare manifestation.

• e)Treatment of choice is a liver transplant

Incorrect Options:

Option B - b,d,e:

• d)Raised PT, INR, and normal SGOT, SGPT(SGOT and SGPT can be elevated in certain patients) but ALP is raised 4x times its normal value

Option C - c,d,f:

• c)Liver biopsy is the investigation of choice not USG

• f)Micronodular cirrhosis is more common than macronodular cirrhosis.

Option D - c,e,f: Refer to the explanation of other options and the learning objective.

Solution for Question 18:

Correct Option - C Hypotension:

• Hypotension is a part of the criteria for septic shock and not SIRS (Systemic inflammatory response syndrome)

Incorrect Options:

Option A - Tachypnea

Option B - Tachycardia

Option D - Leukocytosis

• Option A, B & D are part of the criteria under SIRS

Solution for Question 19:

Correct Option A - a,c,e:

• The diagnosis is PRIMARY SCLEROSING CHOLANGITIS.

• The image shows multiple strictures in the extrahepatic biliary pathway giving a characteristic beaded appearance on ERCP

• Characteristic onion skin appearance of the bile duct on histopathological examinaation in the second image

• a) Liver transplant is the mainstay of treatment

• c) Increased risk of malignancy - PSC is assocated with an increased risk of cholangiocarcinoma. PSC is also associated with ulcerative colitis which in turn is considered a premalignant condition.

• e) P-ANCA is positive

Incorrect Options:

Option B - a,d,e:

• d)Elevated levels of IgM, Gamma GTP. ALP is not normal. It is by raised 4x

Option C - b,d,f:

• b)Investigation of choice is MRCP>ERCP.

Option D - b,c,f:

• f)Albumin is reduced not elevated.

Solution for Question 20:

Correct Option C - a,c,d:

• a: Grading is done using the METAVIR score. The METAVIR score is used to assess the extent of fibrosis in the liver biopsy sample.

• c: Mandatory normal coagulogram before biopsy in cirrhotic patients

• d: Most accurate in assessing the severity of CLD

Incorrect Options:

Option A - a,b,c:

• b: The preferred site for liver biopsy is the midaxillary line 7th/8th intercoastal space not 5th/6th.

Option A, B and D are incorrect. Refer to the explanation of the correct statements above.

Solution for Question 21:

Correct Option B - F2:

• F2- Fibrosis exists with the expansion of most portal zones, and occasional bridging

Incorrect Options:

Option A - F1

Option C - F3

Option D - F4

Solution for Question 22:

Correct Option C - a, c:

• The image shows ballooning of hepatocytes, Macro vesicular fat deposition and Neutrophilic infiltrate can be seen.

• History of alcoholism, features of cirrhosis and the findings on HPE point toward a possible diagnosis of alcoholic hepatitis.

• a)SGOT/SGPT ratio is the best test.

• c) The drug of choice is Prednisolone.

Incorrect Options:

Option A - b,d:

• b) The marker for heavy alcohol consumption is Gamma - glutamyl transpeptidase (GGT), not ALT.

• d)40-80gm per day of alcohol for fatty liver and 160gms per day for alcoholic hepatitis to develop.

Options B and C are incorrect. Refer to the explanation of other options.

Solution for Question 23:

Correct Option C - 5:

Incorrect Options:

Option A - 0

Option B - 3

Option D - 6

Solution for Question 24:

Correct Option B - Primary sclerosing cholangitis:

• Is not associated with Mallory Denk bodies

Incorrect Options:

Options A, C and D are associated with Mallory Denk bodies

Solution for Question 25:

Correct Option C - FeNa

• FeNa (Fraction excretion of sodium) is used in the workup of patients with hepatorenal syndrome but is not a part of the diagnostic criteria.

• Fe Na < 1%-Pre-renal AKI of Hepatorenal syndrome

• Fe Na>1%- Tubular damage.

Incorrect Options:

Option A - Serum Creatine

Option B - Shock

Option D - Parenchymal disease

• A, B, and D are a part of the revised criteria for diagnosis of Hepatorenal syndrome.

Solution for Question 26:

Correct Option C - ALT:

• ALT is not a parameter used to measure Glasgow Alcoholic Hepatitis score.

Incorrect Options:

Option A - Age:

Option B - BUN:

Option C - Bilirubin:

All the remaining are part of Glasgow Alcoholic Hepatitis score.

Solution for Question 27:

Correct Option B - b,d,f:

• Th graph mentioned above is Rumack Mathew line/normogram

• b)Blood PCM>300microgram/ml is associated with a high chance of liver damage

• d)Orthotopic liver transplant in cases of> 48hrs of PCM toxicity

• f)N-acetyl cysteine as an antidote in the first 8hrs of Toxicity

Incorrect Options:

Option A - a,c,e:

• a) A safe dose of PCM in an alcoholic is 2gm per day and not 3gm/day

• c)Gastric lavage is not effective even within half an hour.

• e) The maximum dose of PCM in combination with opioids is 325 mg not 625 mg.

Options B and D are incorrect. Refer to the explanation of the options

Solution for Question 28:

Correct Option C - b, d, f:

• The diagnosis is Wilsons disease

• Behavioral issues in child, repeated episodes of jaundice, KF ring(brownish ring in the cornea) and deranged LFT and RFT are diagnostic

• b) The liver is the most common organ affected in Wilsons

• d)KF(Kayser-Fleishcher) ring along with neurological manifestations are heavily diagnostic of Wilsons.

• f) It is associated with Parkinsons-like features

Incorrect Options:

Option A - c,d,e:

• c) Lindsay's nail is a sign of chronic renal failure and Wilsons disease shows azure nails

• e) Liver biopsy is the investigation of choice.

Option B - a,c,e:

• a)Wilsons disease is associated with defect in ATP 7B gene and ATP 7A gene defect is seen in Menkes disease.

Option D - b,c,f: Refer to the explanation of other options

Solution for Question 29:

Correct Option D - 1-b,2-c,3-a:

• 1) Albumin(↓), Globulin(↓)-b)Nephrotic syndrome

• 2) Albumin(↓), Globulin(↑)-c)Cirrhosis

• 3) Albumin(n), Globulin(↑↑↑)-a)Plasmacytoma

Incorrect Options:

Option A, B & C: Eliminated by the explanation of the above options

Solution for Question 30:

Correct Option B - 1-c,2-a,3-d,4-b:

• 1) Gilbert syndrome-is characterized by UDPGT (UDP-glucuronosyltransferase) activity which is only 10-30%

• 2) Crigler-Najjar syndrome-is defined as Complete absence/Profound reduction of UDPGT

• 3) Dubin johnson syndrome- has a Protein defect-MRCP 2

• 4) Rotor syndrome-is defined by Defect in OATP B1

Incorrect Options:

Solution for Question 31:

Correct Option C - Rubeanic acid:.

• Wilson's disease is due to a defect in copper excretion which leads to its accumulation and deposition in tissues.

• Rhodamine and Rubeanic acid are used as stains for copper

Incorrect Options:

Option A - Auramine: Used for fluorescence studies

Option B - Prussian blue: This is used for Iron deposits

Option D - Von Kossa stain: This is used for calcium deposits

Solution for Question 32:

Correct Option B - 1-b,2-d,3-a,4-c:

• 1) Type 1- b) HFE gene 6p, AR, C282 Y ,Homozygosity

• 2) Type 2- d) Hepcidin/Hemojuvelin mutation

• 3) Type 3- a) Transferrin receptor mutation

• 4) Type 4- c) Ferroportin mutation

Incorrect Options:

Option A, C & D: Eliminated by the explanation of the above options

Solution for Question 33:

Correct Option B - Mitral regurgitation:

• Mitral regurgitation is associated with orthopnea and not platypnea.

Incorrect Options:

Option A, C & D: All the below options are associated with platypnea.

Solution for Question 34:

Correct Option A - a, c,d:

• Platypnea, cirrhosis, fall in SPO2 (due to intrapulmonary shunting) are present in HEPATOPULMONARY SYNDROME.

• a)Triad of Hepatopulmonary syndrome includes intrapulmonary shunting+platypnea+cirrhosis

• c) Investigation of choice in hepatopulmonary syndrome is Bubble contrast echocardiography

• d) Definitive management is an orthotopic liver transplant

Incorrect Options:

Option B - a,e,d:

• e) Hepatorenal syndrome is associated with a reduction in systemic vascular resistance (splanchnic vessels) due to upregulation of NO synthesis by Endothelins produced by cirrhotic liver.

• Hepatopulmonary syndrome is characterized by dilated pulmonary blood vessels due to endothelins→NO→dilation of pulmonary vessels→intrapulmonary shunting.

Option C - b,e,f:

• b) Hepatopulmonary syndrome is associated with a rise in A-a gradient

• If the blood vessel diameter increases, A lot of RBCs farther away from the basement membrane might be passing through blood vessels without getting oxygenated.

• f)Upright position causes SPO2 to fall by 5% due to gravity which further causes dilation of pulmonary blood vessels.

Option D - b,c,f: Refer to the explanation of the other options.

Previous Year Questions

1. A 20-year-old male presented with a history of yellowing of the skin and eyes for 11 weeks, but he does not have any other symptoms. He had a viral infection 10 days ago and experienced a similar episode of yellowing 2 years ago for 2 weeks. Upon further questioning, he mentioned having long hours of basketball practice 2 years ago, which left him physically exhausted. His current blood tests show a serum bilirubin level of 2.4 mg/dL, with unconjugated bilirubin at 2.1 mg/dL and conjugated bilirubin at 0.3 mg/dL. His liver enzyme levels (AST and ALT) are normal. Based on these findings, what is the most likely diagnosis for this patient?

A. Dubin-Johnson syndrome

B. Crigler-Najjar type 1 syndrome

C. Gilbert syndrome

D. Rotor syndrome

---

2. A patient presents to the emergency department with a history of ingestion of ten tablets of paracetamol. He has developed oliguria and liver function tests show deranged values. Which of the following can be used in the management of this condition?

A. N-acetylcysteine

B. Dopamine

C. Ursodeoxycholic acid

D. Furosemide

---

3. A patient presents to you with a fever, jaundice, and malaise. What is the most likely diagnosis based on the serology reports given below? Anti-HBc (IgM): Positive HBsAg: Positive Anti-HBs: Negative Anti-HCV antibodies: Negative

A. Acute hepatitis B

B. Acute hepatitis C

C. Chronic hepatitis B

D. Chronic hepatitis C

---

4. A child presents to the emergency department with a history of ingestion of 10-20 ferrous sulphate tablets. Arterial blood gas revealed acidosis. Which of the following can be used in the management of this condition?

A. Deferoxamine

B. Activated charcoal

C. Dimercaprol

D. Penicillamine

---

5. A 20-year-old male presented with a 1 weak history of yellow skin and sclerae but is otherwise asymptomatic. He gives a history of viral upper respiratory infection 10 days ago, which resolved 2

days back. There is a history of a similar episode of icterus 2 years back when the patient had long hours of basketball practice. The current serum bilirubin is 2.4 mg/dl, unconjugated bilirubin is 2.1mg/dl, and conjugated bilirubin is 0.3mg/dl. Serum AST and ALT levels are normal. Which of the following is the most likely diagnosis?

A. Dubin-Johnson syndrome

B. Criggler-Najar type 1 syndrome

C. Gilbert syndrome

D. Rotor syndrome

---

6. Which of the following is not a component of Child-Pugh scoring?

A. Albumin

B. Bilirubin

C. Prothrombin Time

D. LFT

---

7. A 30-year-old male with chronic hepatitis B and HBeAg positivity presents for evaluation. The patient's viral load was 105 copies/ml and SGPT is found to be doubled. What is the appropriate management in this patient?

A. Lamivudine for 30+ weeks

B. Tenofovir for > 48 weeks

C. Pegylated interferon for 24 weeks

D. Combined pegylated interferon with lamivudine

---

8. Which benzodiazepine is suitable for the safe administration to a 40-year-old chronic alcoholic experiencing withdrawal symptoms, based on the liver function tests that indicated AST levels of 140 IU/L, ALT levels of 110 IU/L, and GGT levels of 500 IU/L?

A. Diazepam

B. Alprazolam

C. Clonazepam

D. Lorazepam

---

9. In methanol intoxication, which of the subsequent electrolyte abnormalities is observed?

A. Metabolic alkalosis with high anion gap

B. Metabolic acidosis with high anion gap

C. Metabolic acidosis with normal anion gap

D. Metabolic alkalosis with normal anion gap

---

10. In a male patient who is a chronic alcoholic, he has come in with abdominal distension, reduced urine output, and swelling in the feet (pedal edema). Upon examination, his serum creatinine level was found to be 1.6 mg/dL. What would be the appropriate course of action in managing this patient?

A. Methylprednisolone

B. Heparin

C. Torsemide

D. Octreotide plus albumin

---

11. For a patient with a serum bilirubin level of 2.5 mg/dl, serum albumin level of 3 g/dl, prothrombin time of 5 seconds (INR = 2), encephalopathy of grade 1, and mild ascites, what would be the child-Turcotte-Pugh class?

A. Class A

B. Class B

C. Class C

D. Class D

---

12. Which drug should be preferred for treating a 45-year-old individual with a history of chronic alcoholism, who has been admitted to the hospital with symptoms of fever and abdominal pain, and was previously diagnosed with liver cirrhosis two years ago, as indicated by a neutrophil count of 360 cells/microliter in the ascitic fluid?

A. Cefotaxime

B. Metronidazole

C. Amoxicillin

D. Vancomycin

---

13. A 53-year-old patient was brought to the emergency room with a history of alcohol abuse, altered sensorium, and rapid shallow breathing. His abdomen is distended with palpable hepatomegaly and splenomegaly and sclerae are icteric. The other examination findings are given below. Laboratory tests show that the AST: ALT ratio is 3:1. What is the most likely cause of this patient's presentation?

A. Alcoholic liver disease

B. Acute viral hepatitis

C. Autoimmune hepatitis

D. Acetaminophen poisoning

---

14. A 3-year-old boy has presented with multiple episodes of hematemesis. On admission, his vitals were stable, and splenomegaly was noted. The mother says that at birth, the boy had developed jaundice and an exchange transfusion procedure had been performed through the umbilicus after birth. The most likely cause of hematemesis is?

A. Portal vein thrombosis

B. Sinusoidal fibrosis

C. Hepatic sinusoidal obstruction

D. Budd chiari syndrome

---

15. Which among the following is incorrect?

A. Components of MELD (model for end stage liver disease) scoring system are creatinine, bilirubin, international normalized ratio (INR), serum sodium (mEq/L)

B. Components of CTP (Child Turcotte Pugh) score are albumin, bilirubin, INR, ascites and encephalopathy

C. Components of CTP (child Turcotte Pugh) are creatinine, bilirubin, international normalized ratio (INR)

D. MELD score is used to assess and prioritize patients awaiting liver transplantation

---

16. Cryoglobulinemia is associated with:

A. Hepatitis C

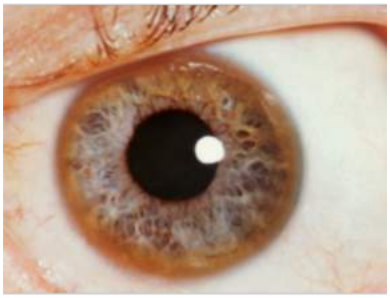
B. Ovarian cancer

C. Diabetes

D. Leukaemia

---

17. A child presents with hepatitis and progressive neurological degeneration. A picture of his eye has been provided below. Among the following options, what would be the initial step regarding the investigations done for this child's diagnosis?



A. Serum ceruloplasmin levels

B. Serum copper levels

C. Enzyme assay

D. Karyotyping

---

18. Which antiretroviral drug is not utilized in cases of concurrent HIV and hepatitis B infection?

A. Tenofovir

B. Abacavir

C. Lamivudine

D. Emtricitabine

---

19. A 40-year-old male chronic smoker presents to the AIIMS OPD with fever, fatigue, yellow-colored urine, and clay-colored stools. For the past few days, he has developed an aversion to cigarette smoking. On examination icterus was present. Liver function test results are given below: Total Bilirubin - 18.5 Direct Bilirubin — 7.5 SGOT - 723 SGPT-812 Which investigations would you advise to rule out acute viral hepatitis?

A. HBsAg, lgM antiHBC, AntiHCV, AntiHEV

B. AntiHAV, HBsAg, lgM antiHBc, AntiHCV

C. HBsAg, lgM antiHBc, AntiHDV, AntiHCV, Anti HEV

D. AntiHAV, lgM antiHBc, AntiHCV, AntiHEV

---

20. Which of the following is the most specific marker for alcoholism?

A. ALT

B. GGT

C. ALP

D. LDH

---

21. The following serological status is noted in a patient: HbsAg positive and HbeAg positive. Diagnosis is?

A. Carrier

B. Chronic viral hepatitis

C. Acute viral hepatitis with infectivity

D. Remote infection

---

22. Which of the following is the leading viral cause of End Stage Liver Disease?

A. HBV

B. HCV

C. HDV

D. HEV

---

23. Acute auto-graft rejection occurs within?

A. Few hours

B. < 10 days

C. < 6 months

D. >24 months

---

24. AFP is a tumour marker for which of the following?

A. Hepatocellular carcinoma

B. Renal cell carcinoma

C. Oncocytoma

D. Chordoma

---

25. Which of the following is considered a post-hepatic cause of portal hypertension?

A. Budd Chiari syndrome

B. Banti disease

C. Portal vein thrombosis

D. Schistosomiasis

---

26. What is the most appropriate next step in the evaluation of a 6-year-old patient who has been experiencing fever for the past 3 days and complains of pain in the right upper abdomen, and upon examination, tenderness is observed in the right upper quadrant?

A. USG

B. Serology

C. LFT

D. CT abdomen

---

27. What is not a characteristic feature of Wilson's disease?

A. Autosomal recessive disease

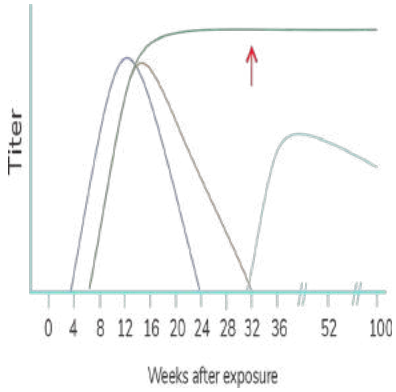
B. No free radical injury

C. ATP7B gene involved

D. Presents before age 40 with liver disease

---

28. A patient with acute hepatitis B has recovered from the infection. Identify the serological marker marked in the image:



A. Anti-HBc Ab

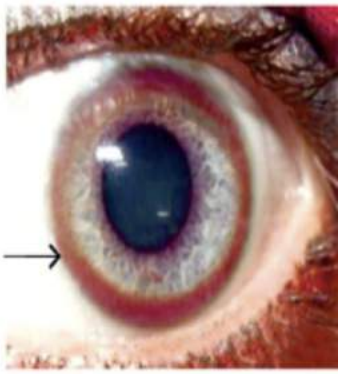
B. Anti-HBs Ab

C. Anti-HBe Ab

D. HBs Ag

---

29. A 30-year-old female presents with unsteady gait, forgetfulness, and labile moods. During a physical exam, the neurologist notices the findings shown in the image below. The most likely diagnosis is:



A. Neurofibromatosis 2

B. Wilson’s disease

C. Neurofibromatosis 1

D. Cataract

---

30. Which of the following is not a component of child pugh classification?

A. SGOT

B. Bilirubin

C. Albumin

D. Prothrombin time

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	1
Question 3	1
Question 4	1
Question 5	3
Question 6	4
Question 7	2
Question 8	4
Question 9	2
Question 10	4
Question 11	3
Question 12	1
Question 13	1
Question 14	1
Question 15	3
Question 16	1
Question 17	1
Question 18	2
Question 19	2
Question 20	2
Question 21	3
Question 22	2
Question 23	3
Question 24	1
Question 25	1
Question 26	1
Question 27	2
Question 28	1
Question 29	2
Question 30	1

Solution for Question 1:

Correct Option C:

• In the above patient there is presence of mild jaundice and it occurs under stressful circumstances. There is also an increase in unconjugated bilirubin whereas AST, ALT levels are normal which leads to the most probable diagnosis of Gilbert Syndrome.

Incorrect Options:

Option A: Dubin Johnson has conjugated hyperbilirubinemia and brown black melanin like deposition o n liver.

Option B: Crigler Najjar type 1 presents with kernicterus and neurological damage in babies.

Option D: Rotor is similar to Dubin Johnson syndrome but the presentation is mild and there is increas ed conjugated bilirubin and the liver does not have black coloured deposits.

Solution for Question 2:

Correct Option A - N-acetylcysteine:

• N-acetylcysteine (NAC) is used for paracetamol toxicity.

• It acts as a precursor of glutathione and replenishes the exhausted glutathione stores within the liver, further assisting in the metabolism of NAPQI (the toxic metabolite of paracetamol.

Incorrect Options:

Options B, C and D do not play a specific role in the management of paracetamol toxicity.

Solution for Question 3:

Correct Option A - Acute hepatitis B:

• The most likely diagnosis, based on the serology reports given, is acute hepatitis B.

• The presence of HBsAg (Hepatitis B surface antigen) and anti-HBc (IgM) antibodies are suggestive of acute hepatitis B.

• Anti-HBs (hepatitis B surface antibody) are negative, which suggests that the patient has not yet developed immunity to the bacterium.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 4:

Correct Option A - Deferoxamine:

• In this scenario, the child has ingested a likely toxic quantity of ferrous sulphate tablets, leading to acidosis.

• Ferrous sulfate is a form of iron supplement, and an overdose can bring about iron toxicity, which can cause multi-organ damage and even death if left untreated.

• The management of iron toxicity involves auxiliary care and chelation therapy. Deferoxamine is an example of an iron chelator.

• Therefore, the correct choice for the management concerning this condition is deferoxamine.

Incorrect Options:

Options B, C and D are incorrect.

Solution for Question 5:

Correct Option C - Gilbert syndrome:

• Based on the given history and laboratory findings, the most likely diagnosis is Gilbert syndrome. The patient's age, male gender, and history of recent viral infection suggest an acute episode of unconjugated hyperbilirubinemia, which is common in Gilbert syndrome. The normal levels of serum AST and ALT exclude the possibility of liver injury or hepatitis. The elevated levels of unconjugated bilirubin and normal levels of conjugated bilirubin are consistent with the diagnosis of Gilbert syndrome.

• Gilbert syndrome is a common genetic disorder that causes mild unconjugated hyperbilirubinemia due to reduced activity of UDPGT enzyme. It is usually asymptomatic, but patients may present with intermittent episodes of mild jaundice triggered by fasting, dehydration, and stress. In Gilbert syndrome, serum levels of unconjugated bilirubin are elevated, while conjugated bilirubin levels are usually normal. Serum AST and ALT levels are also normal.

Incorrect Options:

Option A - Dubin-Johnson syndrome: Dubin-Johnson syndrome is a rare genetic disorder that causes c hronic conjugated hyperbilirubinemia (increased levels of bilirubin conjugated with glucuronic acid) due to impaired excretion of bilirubin from hepatocytes. It is usually asymptomatic, but patients may presen t with mild jaundice and dark urine. In Dubin-Johnson syndrome, serum levels of both conjugated and unconjugated bilirubin are elevated. Serum AST and ALT levels may also be elevated.

Option B - Criggler-Najar type 1 syndrome: Criggler-Najar type 1 syndrome is another rare genetic diso rder that causes severe unconjugated hyperbilirubinemia due to impaired activity of uridine diphosphat e glucuronyl transferase (UDPGT) enzyme. The condition is characterized by recurrent episodes of jau ndice and kernicterus (a type of brain damage caused by bilirubin deposition in the brain) in infancy. In Criggler-Najar type 1 syndrome, serum levels of unconjugated bilirubin are significantly elevated, while conjugated bilirubin levels are usually normal.

Option D - Rotor syndrome: Rotor syndrome is a rare genetic disorder that causes chronic conjugated hyperbilirubinemia due to impaired uptake and storage of bilirubin in hepatocytes. It is usually asympto matic, but patients may present with mild jaundice and dark urine. In Rotor syndrome, serum levels of c onjugated bilirubin are elevated, while unconjugated bilirubin levels are usually normal. Serum AST an d ALT levels may also be elevated.

Solution for Question 6:

Correct Option D - LFT:

• Liver Function Tests are not included in the components of the Child-Pugh scoring.

• The Child-Pugh scoring system is a way to assess the severity of chronic liver disease and predict prognosis. It includes components such as albumin, bilirubin, and prothrombin time, which directly reflect liver function.

• Liver Function Tests (LFTs), which typically include enzymes like ALT (alanine aminotransferase) and AST (aspartate aminotransferase), are not part of the Child-Pugh scoring system, as they are more focused on assessing liver injury and inflammation rather than the functional reserve of the liver, which is the primary concern in cirrhosis assessment.

Incorrect Options:

Options A, B and C are components of the Child-Pugh scoring system.

Solution for Question 7:

Correct Option B - Tenofovir for > 48 weeks:

• According to the vignette, the patient has chronic hepatitis B and HBeAg positivity, which indicates an active infection.

• As the patient has been diagnosed with chronic hepatitis B, with a viral load of more than 105 copies/ml and a doubled SGPT, the patient should be started on treatment.

• The treatment of chronic hepatitis includes treatment with antivirals like Tenofovir for 52 weeks (48 weeks+) or pegylated interferon for 48 weeks. The pegylated interferons and the antivirals are not preferably combined.

Incorrect Options:

Option A - Lamivudine for 30+ weeks: Lamivudine is no longer preferred in the management of chronic hepatitis B.

Option C - Pegylated interferon for 24 weeks: Pegylated interferons are administered for 48-52 weeks in clinical practice and not for 24 weeks. Oral Tenofovir for 48 weeks is a more appropriate treatment option.

Option D
- Combined pegylated interferon with lamivudine: Pegylated interferon along with lamivudine is not a recommended combination in clinical use.

Solution for Question 8:

Correct Option D - Lorazepam:

• Lorazepam is not extensively metabolized by the liver, and its clearance is less affected by liver dysfunction compared to other benzodiazepines. It has a shorter half-life than diazepam, making it a suitable option for managing alcohol withdrawal symptoms in patients with liver disease. Lorazepam is commonly used in clinical practice for this purpose.

Incorrect Options:

Option A, B and C
are extensively metabolized by the liver and are not recommended in patients with liver disease.

Solution for Question 9:

Correct Option B - Metabolic acidosis with high anion gap:

• Metabolic acidosis with high anion gap. Methanol intoxication leads to the formation of toxic metabolites, including formic acid, which causes metabolic acidosis. The acidosis results from the accumulation of formic acid and its metabolites, leading to an increased anion gap.

Incorrect Options:

Option A, C and D are incorrect

Solution for Question 10:

Correct Option D - Octreotide plus albumin:

• The correct answer is octreotide plus albumin. Octreotide is a synthetic analogue of somatostatin, a hormone that inhibits the release of various substances in the body. When combined with albumin, it can help manage hepatorenal syndrome (HRS), a condition characterized by renal dysfunction in patients with advanced liver disease. HRS occurs due to severe vasoconstriction of the renal blood vessels, leading to reduced renal blood flow and impaired kidney function. Octreotide helps alleviate vasoconstriction, while albumin improves intravascular volume and renal perfusion.

Incorrect Options:

Options A, B and C are incorrect.

Solution for Question 11:

Correct Option C - Class C:

• The Child-Turcotte-Pugh (CTP) classification is used to assess the severity of liver disease and predict prognosis in patients with cirrhosis. It takes into account five clinical parameters: serum bilirubin level, serum albumin level, prothrombin time (or INR), presence or absence of hepatic encephalopathy, and severity of ascites. Serum bilirubin level of 2.5 mg/dl - 2 points Serum albumin level of 3 g/dl - 2 points Prothrombin time of 5 seconds (INR = 2) - 2 points encephalopathy of grade 1 - 2 points Mild ascites - 2 points

• Serum bilirubin level of 2.5 mg/dl - 2 points

• Serum albumin level of 3 g/dl - 2 points

• Prothrombin time of 5 seconds (INR = 2) - 2 points

• encephalopathy of grade 1 - 2 points

• Mild ascites - 2 points

• Bilirubin (2 point) + Albumin (2 point) + INR (2 point) + Encephalopathy (2 points) + Ascites (2 point) = 10 points

• Based on the total points, the patient falls into Class c of the Child-Turcotte-Pugh classification.

• The patient's clinical parameters correspond to Class c in the Child-Turcotte-Pugh classification, indicating moderate severity of liver disease.

Incorrect Options:

Option A - Class A: Class A in the Child-Turcotte-Pugh classification corresponds to a score of 5-6 points. Since this patient scored 10 points, they do not fall into Class C.

Option B - Class B: Class B in the Child-Turcotte-Pugh classification corresponds to a score of 7 - 9 points. Since this patient scored 10 points, they do not fall into Class C.

Option D - Class D: Class D is not a category in the Child-Turcotte-Pugh classification

Solution for Question 12:

Correct Option A - Cefotaxime:

• A third-generation cephalosporin such as Cefotaxime is the drug of choice in patients with spontaneous bacterial peritonitis

Incorrect Options:

Options B, C and D are incorrect.

Solution for Question 13:

Correct Option A - Alcoholic liver disease:

• Based on the given clinical presentation and laboratory findings, the most likely cause of this patient's presentation is Alcoholic liver disease.

• The key findings that point towards alcoholic liver disease, in this case, are the history of alcohol abuse and the presence of hepatomegaly, splenomegaly, and icteric sclerae. The laboratory test result indicating an AST: ALT ratio of 3:1 is also supportive of alcoholic liver disease.

• Alcoholic liver disease is a progressive condition that occurs due to chronic and excessive alcohol consumption. It can manifest as a spectrum of liver diseases, including fatty liver, alcoholic hepatitis, and cirrhosis. The characteristic features include hepatomegaly, splenomegaly, and jaundice.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 14:

Correct Option - A - Portal vein thrombosis:

• The most likely cause of hematemesis in this 3-year-old boy with a history of neonatal jaundice and an exchange transfusion procedure is portal vein thrombosis. Portal vein thrombosis occurs when there is a blood clot formation within the portal vein, which is responsible for carrying blood from the gastrointestinal tract, spleen, and pancreas to the liver. This condition can lead to increased pressure in the portal vein system, known as portal hypertension, and can cause various complications, including gastrointestinal bleeding. In this case, the boy's history of neonatal jaundice and exchange transfusion procedure suggests an increased risk of thrombosis formation. The exchange transfusion itself, performed through the umbilicus, may have contributed to the development of a thrombus. The presence of splenomegaly (enlarged spleen) indicates increased pressure within the portal vein system, which can occur due to portal vein thrombosis. The elevated pressure causes the development of collateral blood vessels, such as esophageal varices, which are prone to bleeding and can result in hematemesis (vomiting blood).

• Portal vein thrombosis occurs when there is a blood clot formation within the portal vein, which is responsible for carrying blood from the gastrointestinal tract, spleen, and pancreas to the liver. This condition can lead to increased pressure in the portal vein system, known as portal hypertension, and can cause various complications, including gastrointestinal bleeding.

• In this case, the boy's history of neonatal jaundice and exchange transfusion procedure suggests an increased risk of thrombosis formation. The exchange transfusion itself, performed through the umbilicus, may have contributed to the development of a thrombus.

• The presence of splenomegaly (enlarged spleen) indicates increased pressure within the portal vein system, which can occur due to portal vein thrombosis. The elevated pressure causes the development of collateral blood vessels, such as esophageal varices, which are prone to bleeding and can result in hematemesis (vomiting blood).

• Portal vein thrombosis occurs when there is a blood clot formation within the portal vein, which is responsible for carrying blood from the gastrointestinal tract, spleen, and pancreas to the liver. This condition can lead to increased pressure in the portal vein system, known as portal hypertension, and can cause various complications, including gastrointestinal bleeding.

• In this case, the boy's history of neonatal jaundice and exchange transfusion procedure suggests an increased risk of thrombosis formation. The exchange transfusion itself, performed through the umbilicus, may have contributed to the development of a thrombus.

• The presence of splenomegaly (enlarged spleen) indicates increased pressure within the portal vein system, which can occur due to portal vein thrombosis. The elevated pressure causes the development of collateral blood vessels, such as esophageal varices, which are prone to bleeding and can result in hematemesis (vomiting blood).

Incorrect Options:

Option B, C & D - Sinusoidal fibrosis, Hepatic sinusoidal obstruction & Budd chiari syndrome: Sinusoid al fibrosis and hepatic sinusoidal obstruction are not typically associated with hematemesis in this clinic al scenario. Budd-Chiari syndrome, on the other hand, involves obstruction of the hepatic veins, impairi ng blood outflow from the liver, and is less likely in this case.

Therefore, based on the given information, the most likely cause of hematemesis in this 3-year-old boy is portal vein thrombosis.

Solution for Question 15:

Correct Option C - Components of CTP (Child-Turcotte-Pugh) are creatinine, bilirubin, international nor malized ratio (INR):

• The components of the CTP score are not creatinine, but rather albumin, bilirubin, INR, ascites, and encephalopathy.

Incorrect Options:

Option A - Components of MELD (Model for End-Stage Liver Disease) scoring system are creatinine, b ilirubin, international normalized ratio (INR), serum sodium (mEq/L): The MELD score is a scoring syst em used to assess the severity of liver disease and predict prognosis. It includes the components ment ioned, which are used to calculate the MELD score.

Option B - Components of CTP (Child-Turcotte-Pugh) score are albumin, bilirubin, INR, ascites, encep halopathy: The CTP score is a scoring system used to assess the severity of liver disease and predict prognosis in patients with cirrhosis. The components mentioned are used to calculate the CTP score.

Option D - MELD score is used to assess and prioritize patients awaiting liver transplantation: The MEL D score is commonly used to assess the severity of liver disease and prioritize patients on the liver tran splant waiting list. It helps determine the urgency of transplantation based on the calculated MELD scor e.

Solution for Question 16:

Correct Option A - Hepatitis C:

• Cryoglobulinemia refers to the presence of abnormal proteins called cryoglobulins in the blood.

• These cryoglobulins can precipitate and cause inflammation in small blood vessels, leading to various symptoms and complications.

• Cryoglobunimea is associated with Hepatitis C infections.

Incorrect Options:

• Cryoglobulinemia is not associated with Options B, C and D. hence these options are incorrect.

Solution for Question 17:

Correct Option A - Serum ceruloplasmin levels:

• The clinical presentation of hepatitis and progressive neurological degeneration, along with the presence of Kayser-Fleischer (KF) rings in the eyes, is highly suggestive of Wilson's disease, an autosomal recessive disorder characterized by impaired hepatic copper transport leading to copper accumulation in various organs, including the liver, brain, and eyes. This leads to the characteristic KF rings seen on ocular examination.

• The initial step in the diagnostic workup of a suspected case of Wilson's disease is to measure serum ceruloplasmin levels. Ceruloplasmin is a copper-binding protein synthesized in the liver, and low levels of ceruloplasmin are commonly observed in Wilson's disease due to impaired copper incorporation into the protein.

Incorrect Options:

• Options B, C, and D are incorrect. Serum ceruloplasmin is a more appropriate diagnostic test in this scenario.

Solution for Question 18:

Correct Option B - Abacavir:

• Abacavir is primarily used for the treatment of HIV but is not effective against hepatitis B. Therefore, it is not typically used in the management of HIV and hepatitis B co-infection.

Incorrect Options:

Option A - Tenofovir: Tenofovir is an antiretroviral drug that is commonly used in the treatment of both HIV and hepatitis B. It is effective against both viruses and is often included in the antiretroviral regime n for individuals with HIV and hepatitis B co-infection.

Option C - Lamivudine: Lamivudine is an antiretroviral drug that is effective against both HIV and hepat itis B. It is frequently used in the treatment of individuals with HIV and hepatitis B co-infection.

Option D - Emtricitabine: Emtricitabine is another antiretroviral drug that is effective against both HIV a nd hepatitis B. It is commonly included in the treatment regimen for individuals with co-infection.

Solution for Question 19:

Correct Option B - AntiHAV, HBsAg, lgM antiHBc, AntiHCV:

• In the given clinical scenario, the patient presents with fever, fatigue, yellow-colored urine (suggestive of jaundice), clay-colored stools, and icterus. These symptoms and signs are consistent with a diagnosis of acute viral hepatitis.

• The liver function test results indicate elevated levels of total bilirubin, direct bilirubin, SGOT (aspartate aminotransferase), and SGPT (alanine aminotransferase). These findings further support the suspicion of acute viral hepatitis.

• To determine the specific etiology of acute viral hepatitis, appropriate serological tests are necessary. The recommended investigations for ruling out acute viral hepatitis include: AntiHAV (IgM antibody against hepatitis A virus): Hepatitis A virus (HAV) infection is characterized by the presence of IgM antibodies against HAV during the acute phase of the infection. HBsAg (Hepatitis B surface antigen): HBsAg is a marker of current hepatitis B virus (HBV) infection. Its presence indicates ongoing viral replication and infectivity. IgM antiHBc (IgM antibody against hepatitis B core antigen): IgM antiHBc appears during the acute phase of hepatitis B infection and is a marker of recent HBV infection. AntiHCV (Antibodies against hepatitis C virus): AntiHCV antibodies are tested to detect hepatitis C virus infection.

• AntiHAV (IgM antibody against hepatitis A virus): Hepatitis A virus (HAV) infection is characterized by the presence of IgM antibodies against HAV during the acute phase of the infection.

• HBsAg (Hepatitis B surface antigen): HBsAg is a marker of current hepatitis B virus (HBV) infection. Its presence indicates ongoing viral replication and infectivity.

• IgM antiHBc (IgM antibody against hepatitis B core antigen): IgM antiHBc appears during the acute phase of hepatitis B infection and is a marker of recent HBV infection.

• AntiHCV (Antibodies against hepatitis C virus): AntiHCV antibodies are tested to detect hepatitis C virus infection.

• The correct answer, option B, includes these specific serological tests (AntiHAV, HBsAg, IgM antiHBc, AntiHCV) that are necessary to evaluate and rule out acute viral hepatitis.

• AntiHAV (IgM antibody against hepatitis A virus): Hepatitis A virus (HAV) infection is characterized by the presence of IgM antibodies against HAV during the acute phase of the infection.

• HBsAg (Hepatitis B surface antigen): HBsAg is a marker of current hepatitis B virus (HBV) infection. Its presence indicates ongoing viral replication and infectivity.

• IgM antiHBc (IgM antibody against hepatitis B core antigen): IgM antiHBc appears during the acute phase of hepatitis B infection and is a marker of recent HBV infection.

• AntiHCV (Antibodies against hepatitis C virus): AntiHCV antibodies are tested to detect hepatitis C virus infection.

Incorrect Options:

• Options A, C, and D are incorrect.

Solution for Question 20:

Correct Option B - GGT:

• GGT is considered the most specific marker for alcoholism among the given options. GGT is particularly sensitive to alcohol consumption, and elevated levels of GGT are commonly seen in individuals who abuse alcohol or have alcohol use disorder. Monitoring GGT levels can be useful in assessing alcohol-related liver damage and evaluating the response to treatment for alcoholism.

Incorrect Options:

Option A - ALT (Alanine aminotransferase): ALT is a liver enzyme that is often used as a marker of live r damage. While elevated ALT levels can be seen in alcohol-related liver disease, it is not as specific to alcoholism as GGT.

Options C & D (ALP & LDH) are not specific markers for alcohol consumption and are incorrect.

Solution for Question 21:

Correct Option C - Acute viral hepatitis with infectivity:

• When a patient is positive for both HbsAg (hepatitis B surface antigen) and HbeAg (hepatitis B e antigen), it indicates an active and replicating hepatitis B virus (HBV) infection. HbsAg is a marker of HBV infection, and HbeAg is a marker of viral replication and infectivity.

• Therefore, a patient who is HbsAg positive and HbeAg positive is likely experiencing an acute phase of viral hepatitis with high infectivity, indicating active viral replication and the potential for transmission to others. This is commonly seen in acute hepatitis B infections.

Incorrect Options:

Options A, B and D are incorrect.

Solution for Question 22:

Correct Option B - HCV:

• HCV is the leading viral cause of End Stage Liver Disease. Hence, it is also the most common cause of orthotopic liver transplant worldwide.

Incorrect Options:

Options A, C and D are incorrect.

Solution for Question 23:

Correct Option: C - < 6 months:

• Acute auto-graft rejection typically occurs within the first 6 months following transplantation. In the case of autografts, where the transplant involves using the patient's own tissues, the immune response is generally less severe compared to allografts (grafts from another individual). However, rejection can still occur, and it is typically observed within the first 6 months after the transplantation.

Incorrect Options:

Options A, B and D are incorrect.

Solution for Question 24:

Correct Option A - Hepatocellular carcinoma:

• AFP (Alpha-fetoprotein) is a tumor marker primarily associated with hepatocellular carcinoma (HCC), which is the most common type of liver cancer. Elevated levels of AFP in the blood can indicate the presence of HCC. It is important to note that AFP is not specific to HCC and can also be elevated in other conditions such as certain germ cell tumors and liver cirrhosis. However, in the context of the given options, HCC is the most relevant association with AFP.

Incorrect Options:

Options B, C and D are incorrect.

Solution for Question 25:

Correct Option A - Budd Chiari syndrome:

• Budd-Chiari syndrome: Budd-Chiari syndrome is a post-hepatic cause of portal hypertension. It is characterized by the obstruction or narrowing of the hepatic veins, which impairs the blood flow out of

the liver.

Incorrect Options:

Option B - Banti disease: Banti disease, also known as non-cirrhotic portal fibrosis, is a condition characterized by fibrosis and obstruction of the intrahepatic portal veins. It is considered a pre-hepatic cause of portal hypertension.

Option C - Portal vein thrombosis: Portal vein thrombosis refers to the formation of a blood clot within t he portal vein, which can lead to impaired blood flow and increased pressure in the portal system. It is a pre-hepatic cause of portal hypertension.

Option D - Schistosomiasis: Schistosomiasis is considered a presinusoidal hepatic cause of portal hypertension.

Solution for Question 26:

Correct Option A - USG (Ultrasonography):

• Ultrasonography is a non-invasive imaging modality that can help visualize the liver, gallbladder, and other abdominal structures.

• It can provide valuable information about the presence of any abnormalities such as hepatomegaly, gallstones, or signs of inflammation in the right upper quadrant.

• The ultrasound pulses echo off tissues with different reflection properties and are returned to the probe, which records and displays them as an image.

• Several modes of ultrasound are used in medical imaging: A-mode B-mode M-mode

• A-mode

• B-mode

• M-mode

• A-mode

• B-mode

• M-mode

Incorrect Options:

Option B - Serology: Serological tests are blood tests used to detect specific antibodies or antigens in t he blood. While serology can be helpful in certain situations, such as identifying specific infections or a utoimmune conditions, it may not be the initial investigation of choice in this scenario.

Option C - LFT (Liver Function Tests): Liver function tests, including SGOT and SGPT, assess liver en zymes to evaluate liver function. While these tests can provide information about liver health, they may not be the most appropriate initial investigation to assess the cause of pain in the right hypochondrium.

Option D - CT abdomen (Computed Tomography): CT abdomen is a cross-sectional imaging technique that provides detailed images of abdominal structures. While it can be useful in certain cases, such as when a more detailed evaluation is required, it may not be the initial investigation of choice in a 6-year-old patient due to concerns about radiation exposure and it being a more expensive diagnostic test.

Solution for Question 27:

Correct Option B - No Free radical injury:

• This statement is incorrect. Free radical injury due to an excess of copper ions is seen in patients with Wilson's disease.

Incorrect Options:

Options A, C, and D are features of Wilson's disease.

Solution for Question 28:

Correct Option A - Anti-HBc Ab:

• Anti-HBc antibody refers to antibodies against the core antigen of the hepatitis B virus (HBV). The presence of anti-HBc antibodies indicates past or ongoing infection with HBV.

Incorrect Options:

Option B - Anti-HBs Ab: This option refers to antibodies against the surface antigen of HBV. Anti-HBs a ntibodies develop after successful vaccination against HBV or as a result of resolving a previous HBV infection.

Option C - Anti-HBe Ab: Anti-HBe antibodies target the e antigen of HBV. The presence of anti-HBe antibodies typically indicates a transition from the acute phase of HBV infection to the recovery phase.

Option D - HBs Ag: This stands for hepatitis B surface antigen, which is a protein present on the surface of HBV. The presence of HBsAg indicates an active HBV infection.

Solution for Question 29:

Correct Option B - Wilson’s disease:

• The above image shows fine pigmented and granular deposits, suggesting Wilson’s disease. These are Kayser-Fleischer rings due to copper deposits in the descemet’s membrane.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 30:

Correct Option A - SGOT:

• Child-Pugh classification is a scoring system used to assess the severity of liver disease and to predict the prognosis in patients with chronic liver disease, particularly cirrhosis.

• SGOT (serum glutamic-oxaloacetic transaminase) or AST (aspartate aminotransferase) is not included in the Child-Pugh classification.

Incorrect Options:

• Options B, C and D are components of Child Pugh classification.

Obstructive Sleep Apnea & Cystic Fibrosis

1. Match the following drugs used in cystic fibrosis: 1) DNAase daily aerosol spray a) Reduces chances of colonization of bacteria 2) N-acetyl cysteine followed by β-2 agonist nebulization b) Improves chloride conductance 3) Nebulized 7% hypertonic saline c) Vibrations help to mobilize secretions 4) Nebulized tobramycin and aztreonam d) Decreases viscosity of sputum 5) Handheld oscillometric device e) For Burkholderia cepacia infection 6) Meropenem f) Causes vigorous cough and expectorate 7) Ivacaftor g) Draws water into periciliary mucus

1) DNAase daily aerosol spray	a) Reduces chances of colonization of bacteria
2) N-acetyl cysteine followed by β-2 agonist nebulization	b) Improves chloride conductance
3) Nebulized 7% hypertonic saline	c) Vibrations help to mobilize secretions
4) Nebulized tobramycin and aztreonam	d) Decreases viscosity of sputum
5) Handheld oscillometric device	e) For Burkholderia cepacia infection
6) Meropenem	f) Causes vigorous cough and expectorate
7) Ivacaftor	g) Draws water into periciliary mucus

A. 1-a, 2-e, 3-b, 4-g, 5-c, 6-f, 7-d

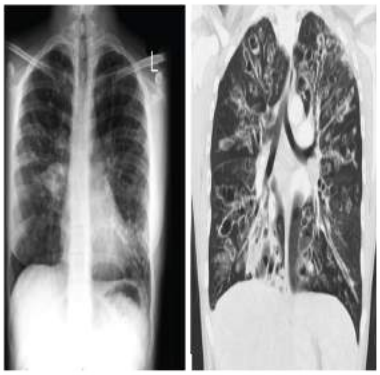
B. 1-g, 2-e, 3-c, 4-a, 5-b, 6-d, 7-f

C. 1-d, 2-a, 3-g, 4-b, 5-c, 6-e, 7-f

D. 1-d, 2-f, 3-g, 4-a, 5-c, 6-e, 7-b

---

2. A 30-year-old male patient came to the outpatient department with complaints of productive cough and episodes of difficulty breathing for a very long time and unrelieved with over the counter medication. He consulted many doctors but the condition seems to recur. Clinical examination shows hyper-resonant lungs and edema and the sputum culture showed colonies of Staphylococcus aureus and Pseudomonas aeruginosa. A chest X-ray was taken which is shown below. A review of medical records revealed abnormal sperm cells in his semen analysis. Frame a diagnosis and pick the option with correct statements. a) It is also known as exocrinopathy b) It is an autosomal dominant condition c) Most common mutation is F508 deletion d) Associated with chromosome 9 e) It is accompanied by disturbed mobility of HCO3 ions and H20 f) The protein located in 1480 AA sequence is affected



A. a, c, d and f

B. a, c, e and f

C. b, d and f

D. b, c, e and f

---

3. A 30-year-old male attends the OPD with a complaint of increased daytime sleepiness and issues in his marriage due to his disturbed sexual function. His wife revealed that she also has sleep disturbances at night due to her husband's snoring and grunting. The patient has a BMI of 35. Polysomnography showed sharp inspiratory uptake, a sequential plateau wave, and then a scooped-out pattern of breathing. Identify the diagnosis and pick the option that helps in its diagnosis.

A. Apnea for <10 seconds associated with a 2% decrease in SaO2

B. Apnea for >10 seconds associated with a 3% decrease in SaO2

C. Hypopnea with <30% decrease in airflow for >10 seconds

D. Hypopnea with <30% decrease in airflow for <10 seconds

---

4. Which of the following parameters are assessed in polysomnography?

A. Electroculography

B. Electroencephalogram

C. Limb activity and position

D. All of the above

---

5. Which of the following is not a risk factor for obstructive sleep apnea?

A. Hypothyroidism

B. Turner syndrome

C. Menopause

D. Micrognathia

---

6. What is the treatment of choice for obstructive sleep apnea?

A. Weight loss

B. Change in sleeping position

C. Continuous Positive Airway Pressure (CPAP)

D. Upper airway device

---

7. Which of the following gene mutations is associated with congenital central hypoventilation syndrome?

A. FOXP3

B. PHOX 2B

C. PHEX

D. IPEX

---

8. What breathing pattern is observed in obstructive sleep apnea syndrome?

A. Kussmaul breathing

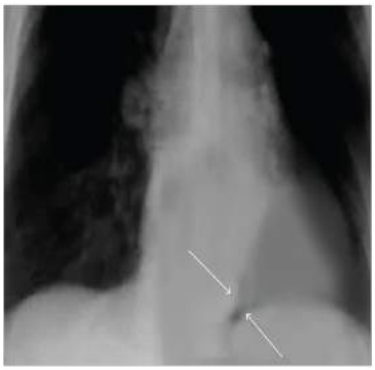
B. Cheyne-Stokes breathing

C. Biot's breathing

D. Ataxic breathing

---

9. Using the radiograph below, identify the sign and condition it is associated with.



A. Continous diaphragm sign-Pneumothorax

B. Signet ring sing- Bronchiectasis

C. Naclerio’s V sign-Pneumomediastinum

D. Spinnaker sail sign-Pneumonia

---

10. All of the following are included in WELLs criteria except?

A. Homan Sign

B. Cancers

C. Blood in sputum

D. Prior use of oral contraceptive pills

---

11. Which of the following is the most accurate test for cystic fibrosis?

A. Sweat chloride test

B. Transepithelial nasal potential test

C. DNA testing

D. Pulmonary function testing

---

12. A sweat chloride test is > 60 mEq/L. Match the following: 1) False positive results a) Anorexia nervosa 2) False negative results b) Addison's disease c) Malnutrition d) Congenital adrenal hyperplasia e) Edema

1) False positive results a) Anorexia nervosa

2) False negative results	b) Addison's disease
	c) Malnutrition
	d) Congenital adrenal hyperplasia
	e) Edema

A. 1 - b and c; 2 - a, d and e

B. 1 - a, b and d; 2 - c and e

C. 1 - c and e; 2 - a, b and d

D. 1 - c, d and e; 2 - a and b

---

13. A 10-year-old boy was presented to the OPD with a complaint of lethargy and loss of appetite. A general examination showed that the boy was underweight, and had pallor and icterus. His history revealed multiple antibiotic therapies for his chronic cough and diarrhea. Clinical examination revealed Splenomegaly, a barrel-shaped chest, and atypical salt crystals on the child's skin. Various blood tests were done to rule out the diagnosis. A particular Sweat chloride test revealed a positive enhanced level but was deemed equivocal by the physician. The doctor asked for a review report of the same after one week. The tests yielded similar results. What is the next best investigation to be done in this medical condition?

A. Pulmonary function test

B. DNA testing

C. Transepithelial nasal potential test

D. Serum ELISA for fecal elastase test.

---

14. Metabolic disorder found in Cystic fibrosis?

A. Hyperchloremic Hypokalemic Metabolic alkalosis

B. Hypochloremic Hypokalemic Metabolic acidosis

C. Hypochloremic Hyperkalemic Metabolic alkalosis

D. Hypochloremic Hypokalemic Metabolic alkalosis

---

15. Identify the condition in a patient with poor mucociliary clearance due to a defective Dyenin arm and find the option that is not included in its triad.

A. Situs inversus

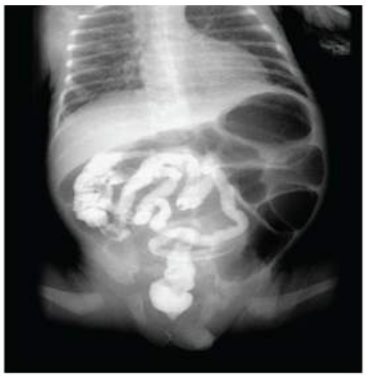
B. Male infertility

C. Recurrent pneumonia

D. Recurrent sinusitis.

---

16. Using the image below, Guess the diagnosis in this neonate and pick the option with the investigation of choice.



A. Double-contrast barium enema technique

B. Omnipaque contrast enema technique

C. Gastrograffin enema

D. Barium meal follow-through

---

17. In a newborn with abdominal distension and delayed passage of meconium, the clinical presentation suggests meconium ileus, which is associated with cystic fibrosis. What is the investigation of choice to confirm the diagnosis in this scenario?

(or)

What is the investigation of choice to confirm Meconium ileus a/w cystic fibrosis?

A. Abdominal ultrasound

B. Gastrografin enema

C. Meconium analysis

D. Small bowel biopsy

---

18. In a patient with cystic fibrosis, the increased loss of sodium and chloride in sweat causes activation of the Renin-Angiotensin-Aldosterone System (RAAS). What role does aldosterone play in the development of metabolic alkalosis in this context?

(or)

What role does aldosterone play in the development of metabolic alkalosis in cystic fibrosis?

A. Aldosterone induces metabolic acidosis by promoting hydrogen ion retention in the kidneys

B. Aldosterone directly inhibits bicarbonate reabsorption in the renal tubules, leading to metabolic alkalosis

C. Aldosterone enhances chloride reabsorption in the kidneys, resulting in hypokalemic metabolic alkalosis

D. Aldosterone increases bicarbonate reabsorption in the renal tubules, contributing to metabolic alkalosis.

---

19. In a sleep study, a patient is observed to have a decrease in airflow by more than 30% for more than 10 seconds, accompanied by a 3% decrease in arterial oxygen saturation (SaO2) and cortical

arousal. What term is used to define this respiratory event?

A. Apnea

B. Bradypnea

C. Hypopnea

D. Tachypnea

---

20. A 45-year-old patient undergoes a sleep study to evaluate the severity of sleep-disordered breathing. The results indicate a total of 30 apneic or hypopneic episodes throughout the night, and the patient's total sleep duration is 6 hours. What is the Apnea Hypopnea Index (AHI) for this patient?

A. 2.5

B. 5

C. 10

D. 15

---

21. A 50-year-old patient reports persistent daytime sleepiness and fatigue. After completing the Epworth Sleepiness Questionnaire, the score is found to be 10. According to the guidelines for a sleep study, what is the recommended course of action based on the Epworth Sleepiness Questionnaire score?

(or)

What is the recommended course of action if the Epworth Sleepiness Questionnaire score is 10?

A. No further action is required; the patient's score is within the normal range

B. Refer the patient for medical consultation and recommend a polysomnography

C. Suggest lifestyle modifications to improve sleep hygiene without further evaluation

D. Prescribe medications to manage daytime sleepiness directly without additional testing.

---

22. A 20-year-old patient presents with a history of absent responses to hypoxia or hypercapnia, and the clinical evaluation suggests Central Hypoventilation Syndrome, also known as the ONDINE curse. What genetic condition is primarily involved in the pathogenesis of Central Hypoventilation Syndrome?

(or)

What genetic condition is primarily involved in the pathogenesis of Central Hypoventilation Syndrome?

A. SCN1A gene mutation

B. PHOX2B gene mutation

C. CFTR gene mutation

D. HBB gene mutation

---

23. When do you use CPAP for patients with OSA?

A. >15 hypopneic episodes or >5 apneic episodes per hour

B. >5 hypopneic episodes or >15 apneic episodes per hour

C. >10 hypopneic episodes or >15 apneic episodes per hour

D. >15 hypopneic episodes or >10 apneic episodes per hour

---

24. How to prevent lung colonization in patients with Cystic fibrosis?

A. N-acetyl cysteine

B. Nebulised tobramycin

C. Meropenem

D. Inhalational steroids

Correct Answers

Question	Correct Answer
Question 1	4
Question 2	2
Question 3	2
Question 4	4
Question 5	2
Question 6	3
Question 7	2
Question 8	2
Question 9	3
Question 10	4
Question 11	3
Question 12	2
Question 13	3
Question 14	4
Question 15	2
Question 16	3
Question 17	2
Question 18	3
Question 19	3
Question 20	2
Question 21	2
Question 22	2
Question 23	1

Question 24	2

Solution for Question 1:

Correct option: D - 1-d, 2-f, 3-g, 4-a, 5-c, 6-e, 7-b

• Option A, B & C are incorrect options.

Solution for Question 2:

Correct option: B - a, c, e and f

The patient in this stem presents with chronic cough with purulent sputum and sputum culture showing evidence of Staphylococcus aureus and Pseudomonas aeruginosa. Lung imaging is showing evidence of tram-track sign (secondary to bronchiectasis). The patient also has abnormal sperm cells in semen analysis. The likely diagnosis is cystic fibrosis.

• a) It is also known as exocrinopathy

• c) Most common mutation is F508 deletion - Phenylalanine present at the 508th position is deleted

• e) It is accompanied by disturbed mobility of HCO3 ions and H20

• f) The protein located in 1480 AA sequence is affected

Incorrect options

Option A - a, c, d and f

• d) Associated with chromosome 7 and not chromosome 9

Option C - b, d and f

• b) It is an autosomal recessive condition and not autosomal dominant

Option D - b, c, e and f: Refer to above explanation

Solution for Question 3:

Correct option: B - Apnea for >10 seconds associated with a 3% decrease in SaO2

• Day time sleepiness, yawning, irritability and sexual dysfunction with snoring and grunting are symptoms of obstructive sleep apnea

• Patient with OSA is morbidly obese with BMI >30

• Polysomnography of an OSA patient shows sharp inspiratory uptake, a sequential plateau wave, and then a scooped-out pattern of breathing

Incorrect options: A, C and D

Apnea: Absent breathing effort for >10 seconds

• Associated with a 3% decrease in SaO2

• Cortical arousal (on EEG pattern changes)

Hypopnea:

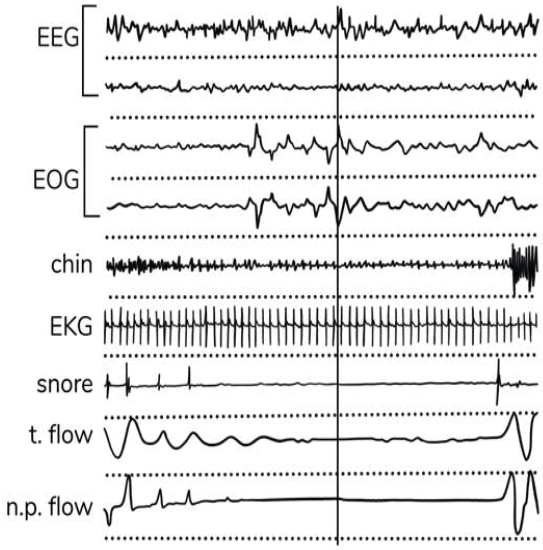
• >30% decrease in airflow for >10 seconds

• Associated with a 3% decrease in SaO2

• Cortical arousal

Solution for Question 4:

Correct option: D - All of the above



• The image above shows polysomnography

• In OSA: EEG, EOG, EMG, ECG, SpO2, nasal airflow, chest and abdominal movements are measured

Solution for Question 5:

Correct option: B - Turner syndrome: It is not a risk factor of OSA

Incorrect options: A, C and D
- Hypothyroidism, Menopause and Micrognathia are the risk factors of OSA

OSA - Risk factor:

• Narrowing of pharyngeal inlet due to fat deposition

• Decreased chest wall compliance which decreases the caudal traction required for patency of the upper airway

• Tongue disproportionate to the size of the mandible

• Tongue falls backward during the REM phase of sleep

Avoid alcohol within 3 hours of bedtime: Alcohol impairs pharyngeal muscle activity

Solution for Question 6:

Correct option: C - Continuous Positive Airway Pressure (CPAP)

Incorrect options: A, B and D - Weight loss, Change in sleeping position &
Upper airway device: These are not the treatment of choice in patients with OSA

OSA - Treatment:

• CPAP works as a mechanical splint to hold the airway open and maintains airway patency during sleep

• Advice CPAP if >15 hypopneic episodes per hour or >5 apneic episodes per hour

Solution for Question 7:

Correct option: B
- PHOX 2B: PHOX 2B gene mutation is associated with congenital central hypoventilation syndrome

Incorrect options:

• Option A: FOXP3: FOXP3 gene mutation is associated with IPEX syndrome (immune dysregulation, polyendocrinopathy, enteropathy, X-linked)

• Option C: PHEX: PHEX gene mutation is associated with hypophosphatemic rickets

• Option D: IPEX: It is not a gene but a syndrome (immune dysregulation, polyendocrinopathy, enteropathy, X-linked)

Central Hypoventilation Syndrome:

• Also known as Ondine's curse

• PHOX 2B gene mutation is associated with congenital central hypoventilation syndrome

• Patient has an absent response to hypoxia or hypercapnia

• Central sensors that respond to hypoxia do not work properly

• Management NIPPV (non-invasive positive pressure ventilation) Phrenic nerve / Diaphragm pacing (New Technique): Not done for OSA

• NIPPV (non-invasive positive pressure ventilation)

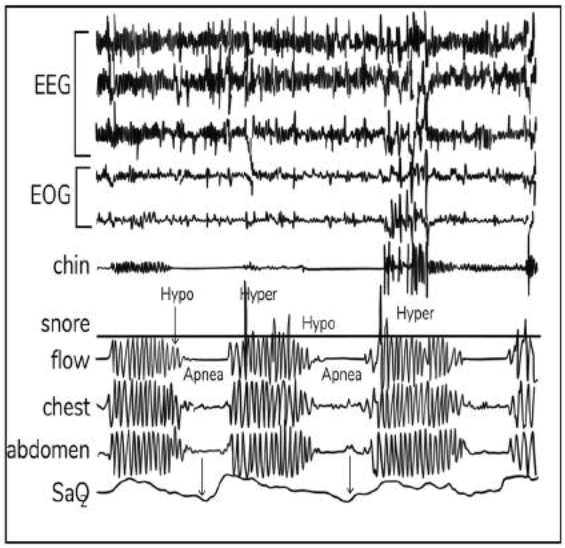
• Phrenic nerve / Diaphragm pacing (New Technique): Not done for OSA

• NIPPV (non-invasive positive pressure ventilation)

• Phrenic nerve / Diaphragm pacing (New Technique): Not done for OSA

Solution for Question 8:

Correct option: B - Cheyne-Stokes breathing: Hypoventilation then apnea followed by hyperventilation f ollowed by hypoventilation then apnea and again hyperventilation



Incorrect options:

Option A: Kussmaul breathing: Seen in diabetic ketoacidosis

Option C and D: Biot's breathing and Ataxic breathing: Seen in neurological disorders

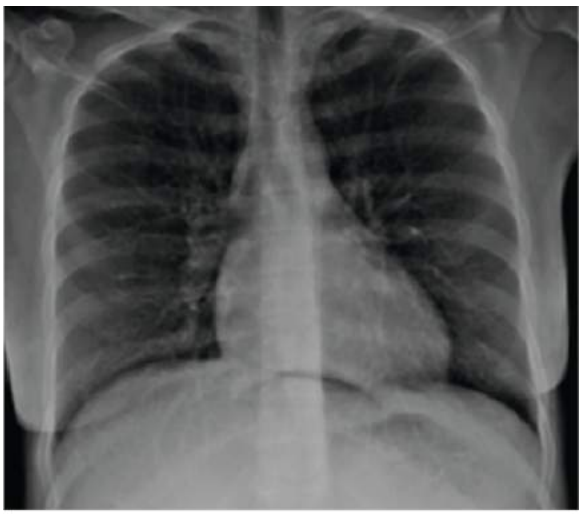
Solution for Question 9:

Correct Option C- Naclerio’s V sign-Pneumomediastinum:

• Lucent band of gas extending along the descending aorta and an intersecting band of gas that extends along medial left hemi- diaphragm together forming a ‘V shape’. This sign is seen in patients with pneumomediastinum.

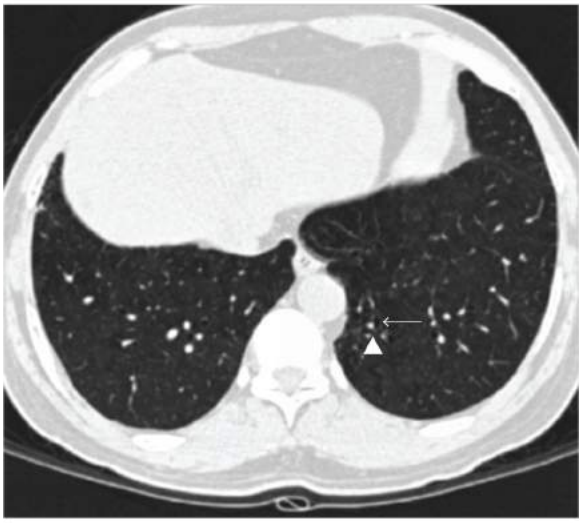
Incorrect Options

Option A- Continuous diaphragm sign: It is seen in patients with pneumomediastimum.

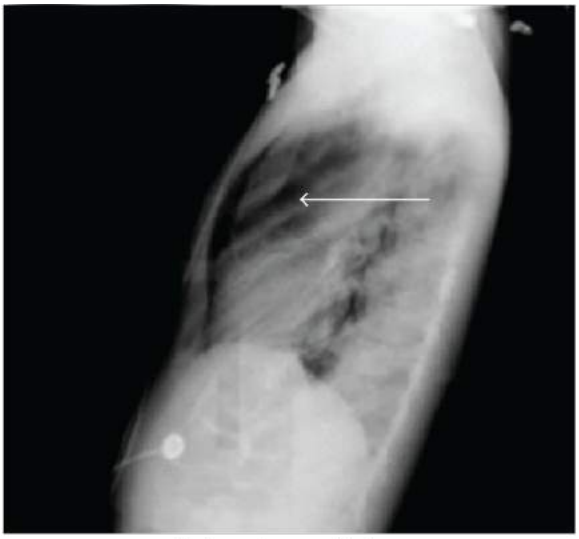


Continuous diaphragm sign

Option B- Signet ring sign: is seen in bronchiectasis.



Options D- Spinnaker’s sail sign: is seen in patients with pneumonia



Spinnaker sail sign

Solution for Question 10:

Correct Option D- Prior use of oral contraceptive pills: is not a part of WELLS criteria

Incorrect Options A,B & C (Homan Sign, Cancers & Blood in sputum): These are part of wells criteria

Solution for Question 11:

Correct option: C - DNA testing: CFTR mutation: Positive of at least 2 mutations

Incorrect options: Option A, B and D

CF - Tests:

• Pilocarpine iontophoresis method is used

• Sweat Cl- > 60 mEq/L (should come positive 2 times for diagnosis)

Solution for Question 12:

Correct option: B - 1 - a, b and d; 2 - c and e

Incorrect options: Option A, C and D

Sweat chloride test:

• Sweat Cl- > 60 mEq/L (should come positive 2 times for diagnosis)

• False positive results in: Anorexia Nervosa Addison's Disease Congenital adrenal hyperplasia Nephrogenic diabetes insipidus

• Anorexia Nervosa

• Addison's Disease

• Congenital adrenal hyperplasia

• Nephrogenic diabetes insipidus

• False negative results in: Malnutrition Edema

• Malnutrition

• Edema

• Anorexia Nervosa

• Addison's Disease

• Congenital adrenal hyperplasia

• Nephrogenic diabetes insipidus

• Malnutrition

• Edema

Solution for Question 13:

Correct Option C- Transepithelial nasal potential test:

• Salt crystals which is due to sweat gland dysfunction, GIT symptoms, splenomegaly, repeated respiratory infections and barrel shaped chest and a clue of sweat chloride test helps in the diagnosis of cystic fibrosis.

• Trans Epithelial Nasal Potential Test is the next best investigation done when there is a case of equivocal test chloride report as in this patient, to confirm diagnosis..

• DNA testing is done after transepithelial nasal potential test. Fecal elastase can be used to diagnose any malabsorption syndromes and PFT can evaluate current extent of pulmonary functions..

Incorrect Options

Options A- Pulmonary function test:

Option B- DNA test is the most accurate test for CF

Option D- Fecal Elastase level (Serum ELISA) is done to identify the malabsorption component of the d isease

The above options refer to the explanation of Option C.

Solution for Question 14:

Correct Option D- Hypochloremic Hypokalemic Metabolic alkalosis:

Sweat gland in cystic fibrosis

• Sodium and chloride Reabsorption both inhibited.

• It called salty baby syndrome

• Increased Na/Cl loss causes RAAS activation

• ↑ Aldosterone in kidney

• Aldosterone action in the kidney: This leads to Hypochloremic Hypokalemic Metabolic Alkalosis

Incorrect Options:

Option A- Hyperchloremic Hypokalemic Metabolic alkalosis:

Option B- Hypochloremic Hypokalemic Metabolic acidosis:

Option C- Hypochloremic Hyperkalemic Metabolic alkalosis:

Refer to the above explanation.

Solution for Question 15:

Correct Option B- Male infertility:

• The condition with a defective dyenin arm that leads to poor mucociliary clearance is Kartagener syndrome.

• Infertility is never a part of the triad of Kartagener syndrome

Kartagener syndrome Triad:

Incorrect Options:

Option A- Situs inversus:

Option C- Recurrent pneumonia:

Option D- Recurrent sinusitis:

Refer to the above explanation

Solution for Question 16:

Correct Option C- Gastrograffin enema:

• Meconium ileus-is the likely diagnosis. It which is one of the manifestation of cystic fibrosis

• Abdominal distension & delayed Passage of meconium(Normal < 48 hours)

• Investigation of choice: GASTROGRAFFIN enema

• Treatment of choice: GASTROGRAFFIN ENEMA

• As it Softens the stool

Incorrect Options:

Option A- Double-contrast barium enema technique:

Option B- Omnipaque contrast enema technique:

Option D- Barium meal follow-through:

Refer to the above explanations

Solution for Question 17:

Correct Option B - Gastrografin enema:

• In a newborn presenting with abdominal distension and delayed passage of meconium, meconium ileus is a concern, especially in the context of cystic fibrosis (CF). Meconium ileus is strongly associated with CF. Gastrografin enema is the investigation of choice to confirm the diagnosis of meconium ileus. It involves instilling a water-soluble contrast medium into the bowel through the rectum, which can help visualize the obstruction and guide further management. This investigation is particularly useful as it can both diagnose and treat meconium ileus by softening the stool and facilitating its passage.

Incorrect Options:

Option A - Abdominal ultrasound: While abdominal ultrasound may provide some information, it is not t he investigation of choice for diagnosing meconium ileus. It may be used as an adjunctive imaging mo dality to assess for complications or associated findings.

Option C - Meconium analysis: Meconium analysis can provide information about the composition of th e stool and may reveal evidence of obstruction or underlying conditions. However, it is not typically the initial investigation used to diagnose meconium ileus.

Option D - Small bowel biopsy: Small bowel biopsy may be indicated in certain cases, especially if ther e is suspicion for other gastrointestinal disorders or if meconium ileus is not clearly evident. However, it is not the primary investigation used to diagnose meconium ileus.

Solution for Question 18:

Correct Option C - Aldosterone enhances chloride reabsorption in the kidneys, resulting in hypokalemic metabolic alkalosis:

• In cystic fibrosis, increased sodium and chloride loss in sweat activate the Renin-Angiotensin-Aldosterone System (RAAS).

• Aldosterone, a hormone released by the adrenal glands in response to RAAS activation, enhances the reabsorption of chloride in the kidneys.

• The increased reabsorption of chloride is associated with the loss of hydrogen ions and potassium in the urine, leading to hypokalemia (low potassium levels) and metabolic alkalosis (elevated blood pH).

• Therefore, the correct option is C, as aldosterone contributes to hypokalemic metabolic alkalosis in cystic fibrosis.

Incorrect Options:

• Options A,B and D are incorrect as explained in the above explanation.

Solution for Question 19:

Correct Option C - Hypopnea:

• Hypopnea is defined as a decrease in airflow by more than 30% for more than 10 seconds, accompanied by a 3% decrease in arterial oxygen saturation (SaO2) and cortical arousal. This respiratory event represents a partial reduction in airflow, leading to disruptions in normal breathing patterns during sleep.

Incorrect Options:

Option A - Apnea: Apnea refers to a complete cessation of airflow for at least 10 seconds during sleep.

Option B - Bradypnea: Bradypnea is a term typically used to describe an abnormally slow respiratory ra te, but it does not specifically relate to the observed characteristics in the given scenario.

Option D - Tachypnea: Tachypnea refers to an abnormally rapid respiratory rate, which is not in line wit h the observed features described in the question.

Solution for Question 20:

• The Apnea-Hypopnea Index (AHI) is calculated by dividing the total number of apneic and hypopneic episodes observed during a sleep study by the total number of hours of sleep.

• This calculation provides a measure of the average number of apneas and hypopneas per hour of sleep, allowing for the assessment of the severity of sleep-disordered breathing, particularly obstructive sleep apnea (OSA).

• In this case, the patient experienced 30 episodes during 6 hours of sleep.

$$AHI = \frac{\text{Total number of apneic or hypopneic episodes}}{\text{Number of hours of sleep}}$$

$$AHI = \frac{30}{6} = 5$$

So, the Apnea Hypopnea Index (AHI) for this patient is 5.

Incorrect Options:

• Other options are incorrect, as explained by the equation.

Solution for Question 21:

Correct Option B - Refer the patient for medical consultation and recommend a polysomnography:

• A score of 10 on the Epworth Sleepiness Questionnaire indicates excessive daytime sleepiness. According to guidelines, a score greater than 8 suggests the need for further evaluation. In this case, the recommended course of action is to refer the patient for medical consultation and consider a polysomnography to assess the possibility of sleep disorders contributing to the symptoms.

Incorrect Options:

Option A - No further action is required; the patient's score is within the normal range: This option is inc orrect because a score of 10 on the Epworth Sleepiness Questionnaire is considered higher than the r ecommended threshold (8 or more). It suggests excessive daytime sleepiness, indicating a need for further evaluation.

Option C - Suggest lifestyle modifications to improve sleep hygiene without further evaluation: This opti on is incorrect because a score of 10 on the questionnaire indicates a significant level of daytime sleepi ness. While lifestyle modifications may be beneficial, they are not sufficient in this case, and further eva luation is warranted.

Option D - Prescribe medications to manage daytime sleepiness directly without additional testing: This option is incorrect because prescribing medications without a proper diagnosis or evaluation through p olysomnography may not address the underlying cause of the daytime sleepiness. It is essential to ide ntify potential sleep disorders before initiating specific treatments.

Solution for Question 22:

Correct Option B - PHOX2B gene mutation:

• Central Hypoventilation Syndrome, also known as the ONDINE curse, is a genetic condition primarily involving a mutation in the PHOX2B gene. This gene plays a crucial role in the development of the autonomic nervous system, including the control of respiration. Patients with Central Hypoventilation Syndrome may exhibit absent or inadequate responses to hypoxia or hypercapnia, leading to hypoventilation, particularly during sleep.

Incorrect Options:

Option A
- SCN1A gene mutation: SCN1A mutations are associated with conditions such as Dravet syndrome, a severe form of epilepsy. This gene is not related to Central Hypoventilation Syndrome.

Option C - CFTR gene mutation: CFTR gene mutations are associated with cystic fibrosis, a genetic di sorder affecting the respiratory, digestive, and reproductive systems. CFTR mutations are not implicate d in Central Hypoventilation Syndrome.

Option D - HBB gene mutation: HBB gene mutations are associated with hemoglobinopathies, such as sickle cell disease and thalassemia. This gene is not related to Central Hypoventilation Syndrome.

Solution for Question 23:

Correct Option A - >15 hypopneic episodes or >5 apneic episodes per hour:

• CPAP is the treatment of choice for individuals with Obstructive sleep apnea. It is used in individuals with >15 hypopneic episodes or >5 apneic episodes per hour.

• However, CPAP usage also has some disadvantages- Sometimes when a user is wearing a CPAP machine, they will swallow air in the middle of the night. This can lead to uncomfortable bloating and gas. Therefore, there’s a potential need for antacid use.

Incorrect Options:

• Options B, C and D are incorrect according to the explanation.

Solution for Question 24:

Correct Option B - Nebulised tobramycin:

• Patients suffering with cystic fibrosis are predisposed to developing several opportunistic infections such as Pseudomonas, S. aureus, Burkholderia etc.

• Nebulized tobramycin and aztreonam reduces the chances of lung colonization in these patients.

Incorrect Options:

Option A - N-acetyl cysteine: It is used as a mucolyitc in CF

Option C - Meropenem: It is the antibiotic of choice in treating Pseudomonas infections in CF

Option D
- Inhalational steroids: It is the treatment of choice for Allergic bronchopulmonary aspergillosis.

Pulmonary Embolism & Fat Embolism

1. A 55-year-old patient presents with an acute onset of chest pain and dyspnea. The physician suspects it is a case of pulmonary embolism. The patient is hemodynamically stable. Which investigation is the initial imaging modality of choice in the given clinical scenario?

(or)

A 55-year-old patient is diagnosed with a case of pulmonary embolism. The patient is hemodynamically stable. Which investigation is the initial imaging modality of choice in pulmonary embolism?

A. CTPA

B. V/P scan

C. HRCT

D. FAST

---

2. A man presents to the emergency department with difficulty breathing. He developed syncope, hypotension, and tachycardia on the way. His tongue deviated to the left side on protrusion. An elevated level of D-dimer (16.5 mg/mL) is noted. What is the most appropriate next investigation to be done for this patient?

A. MRI chest

B. Bubble contrast echocardiography

C. CT scan chest

D. Impedance plethysmography

---

3. Pick the option with the correct statements regarding the treatment of pulmonary embolism a. Primary therapy is pneumatic compression stockings b. Secondary prevention can be done by using anticoagulation or IVC filters c. The target aPTT of 30–40 seconds is required for unfractionated heparin therapy d. Warfarin and oral anticoagulants are to be started early e. Enoxaparin and Fondaparinux require no monitoring f. Heparin-induced thrombocytopenia induced by unfractionated heparin is controlled by bivalirudin

A. b, e and f

B. a, e and d

C. a, c and d

D. a, e and f

---

4. Which of the following diseases is not traditionally ruled out with a triple rule out CT chest?

A. Pulmonary Embolism

B. Acute aortic syndrome

C. Acute coronary syndrome

D. SVC syndrome

---

5. Match the following options under 1. Massive pulmonary embolism and 2. Sub-massive pulmonary embolism a. BP is reduced b. Normal chest x-ray c. ECG: S1 Q3 T3 d. BP is normal e. Right ventricle hypokinesia f. Hampton hump on chest x-ray g. ECG shows sinus tachycardia h. Right ventricular dilatation

A. 1 - b, d, g and h; 2 - a, c, e and f

B. 1 - a, d, e and h; 2 - b, c, f and g

C. 1 - b, c, f and g; 2 - a, d, e and h

D. 1 - a, c, e and f; 2 - b, d, g and h

---

6. All of the following signs are seen in a radiograph of a patient with pulmonary embolism, except

A. Palla's sign

B. Spinnaker sail sign

C. Hampton hump sign

D. Westermark sign

---

7. A 35-year-old male patient presented to the emergency department with complaints of confusion, and breathing difficulty since the past hour. Examination showed petechiae all over the body, oxygen saturation of 75% and heart rate of 120 beats per minute.The patient underwent surgical repair of his fractured tibia four days ago. The patient’s chest X-ray revealed mild infiltrates in the lungs along with some opacities.Identify the diagnosis, and pick the option which is least likely to cause this condition?

A. Total parental nutrition

B. Caissons disease

C. Cardiovascular surgery

D. Acute pancreatitis

---

8. All of the following are major criteria under Gurd and Wilson's criteria for the diagnosis of fat embolism, except

A. Type 1 respiratory failure

B. Petechiae

C. Coma

D. Kidney dysfunction

---

9. In a patient presenting with recurrent deep vein thrombosis, which congenital hypercoagulable state is most commonly associated with unopposed activity of factor V, leading to a procoagulant state?

A. Protein C deficiency

B. Antithrombin III deficiency

C. Factor V Leiden mutation

D. Factor XII deficiency

---

10. In a patient suspected of having a pulmonary embolism (PE), which radiographic sign indicates focal oligemia due to emboli lodged in the right descending pulmonary artery?

A. Palla sign

B. Hampton hump

C. Westermark sign

D. S1Q3T3 pattern

---

11. In a patient with pulmonary embolism (PTE), which of the following changes is typically observed in the left ventricle?

A. Increase in left ventricular cavity size

B. Increase in left ventricular end-diastolic volume (EDV)

C. Decrease in left ventricular cavity size

D. Decrease in left ventricular systolic volume (SV)

---

12. In a patient suspected of having a pulmonary embolism (PE), which sign is suggestive of deep vein thrombosis when present along with other symptoms?

A. Murphy's sign

B. McBurney's sign

C. Blumberg's sign

D. Homan's sign

---

13. In a patient presenting with suspected sub-massive pulmonary thromboembolism (PTE), which of the following findings is most likely to be observed on echocardiography?

A. Right ventricular dilation without left ventricular compromise

B. Left ventricular dilation without right ventricular involvement

C. Equal dilation of both right and left ventricles

D. Absence of ventricular dilation due to the small size of pulmonary emboli

---

14. Which of the following ECG findings is most indicative of Pulmonary Embolism (PE) in a patient presenting with acute respiratory distress and chest pain?

A. Deep S wave in lead I

B. Deep Q wave in lead III

C. Inverted T wave in lead III

D. Tall R wave in lead V1

---

15. A 55-year-old patient is diagnosed with pulmonary embolism and requires anticoagulation therapy. Which of the following medications requires monitoring of activated partial thromboplastin time (aPTT)?

(or)

Which of the following medications requires monitoring of activated partial thromboplastin time (aPTT)?

A. Unfractioned heparin

B. Enoxaparin

C. Fondaparinux

D. Novel oral anticoagulants

---

16. A 68-year-old patient has been diagnosed with pulmonary embolism and requires anticoagulation therapy with warfarin. However, due to the delayed onset of action of warfarin, the patient needs to be bridged with another anticoagulant for the first few days. Which of the following options best explains the rationale for bridging therapy in this scenario?

(or)

Which of the following options best explains the rationale for bridging therapy in Warfarin?

A. To prevent heparin-induced thrombocytopenia

B. To achieve a more stable anticoagulant effect

C. To reduce the risk of bleeding complications

D. To avoid interactions with concomitant medications

---

17. A 55-year-old patient with a history of venous thromboembolism is at risk for developing massive pulmonary thromboembolism (PTE). Which intervention best exemplifies primary prevention in this scenario?

(or)

Which intervention best exemplifies primary prevention in massive pulmonary thromboembolism?

A. Alteplase therapy

B. Catheter-directed thrombolysis

C. Pneumatic compression stockings

D. Anticoagulation with unfractionated heparin

---

18. A 20-year-old male presents to the emergency department after being involved in a motorcycle accident resulting in a fractured femoral shaft. He undergoes surgery for the fracture, and within 12 to 72 hours postoperatively, he develops sudden onset dyspnea, altered sensorium, and petechiae that are predominantly found in the axillary region compared to the rest of his body. Based on the clinical presentation, which of the following is the most likely diagnosis?

(or)

What will be the diagnosis in a patient with fractured femoral shaft who developed sudden altered sensorium, sudden onset dyspnea and petechiae that are predominantly found in the axillary region compared to the rest of his body?

A. Acute respiratory distress syndrome (ARDS)

B. Pulmonary embolism (PE)

C. Fat embolism syndrome (FES)

D. Disseminated intravascular coagulation (DIC)

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	2
Question 3	1
Question 4	4
Question 5	4
Question 6	2
Question 7	3
Question 8	4
Question 9	3
Question 10	3
Question 11	3
Question 12	4
Question 13	1
Question 14	3
Question 15	1
Question 16	2
Question 17	3
Question 18	3

Solution for Question 1:

Correct option: A - CTPA

• Computed Tomography Pulmonary Angiography (CTPA) is the initial imaging modality of choice for stable patients with a suspected pulmonary embolism

• Pulmonary angiography is the gold standard investigations that show emboli directly, but it is an invasive procedure

• CT is noninvasive, cheaper, and widely available

• D-dimer is the screening investigation in patients with suspected pulmonary embolism

Incorrect option: B, C and D

Option B: V/P scan

• A V/P scan is the less commonly used method of investigation in pulmonary embolism

Option C: HRCT

• CT is noninvasive, cheaper, and widely available

• Hence, it is the most diagnostic investigation of choice, so HRCT will not be done

Option D: FAST

• FAST is used for patients with trauma and not for pulmonary embolism

Solution for Question 2:

Correct option: B - Bubble contrast echocardiography

The clinical features and elevated D-dimer points towards paradoxical embolism

• When a thrombus travels through an intracardiac defect and enters the systemic circulation, a condition known as paradoxical embolism ensues

• Patients may present with symptoms such as chest pain, headaches, cold extremities, or mesenteric ischemia

• A cerebrovascular episode is another possible symptom

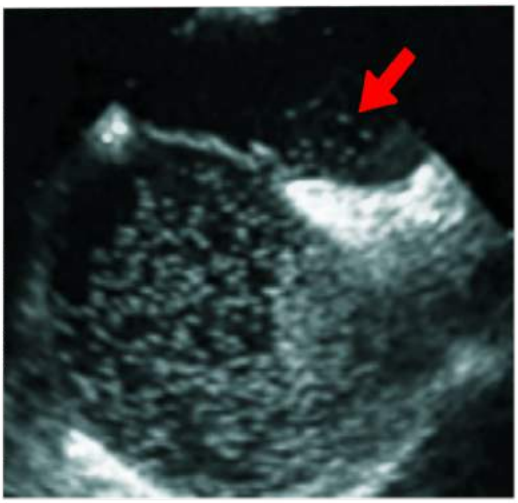
• A left-to-right shunt called a patent foramen ovale (PFO) can be seen between the septum primum and the septum secundum

• Coughing, squatting, or defecating are parts of valsalva maneuvers that have the potential to momentarily elevate the pressure in the right atrium

• This can result in a transitory reversal of the shunt and the transfer of possible thrombi into the systemic circulation

• For diagnosis, bubble contrast echocardiography is performed

• It can help in diagnosing a patent foramen ovale or an arterial septal defect



Bubble contrast Echo

Incorrect options: A, C and D

Option A: MRI chest

• MRI chest is not the most appropriate investigation in this case, as it will be of less help in diagnosing a patent foramen ovale or an arterial septal defect

Option C: CT scan chest

• CT scan chest is not the most appropriate investigation in this case, as it will be of less help in diagnosing a patent foramen ovale or an arterial septal defect

Option D: Impedance plethysmography

• Impedance plethysmography is not the most appropriate investigation in this case, as it will be of less help in diagnosing a patent foramen ovale or an arterial septal defect

Solution for Question 3:

Correct Option: A - b, e and f:

• b - Secondary prevention can be done by using anticoagulation or IVC filters

• e - Enoxaparin and Fondaparinux require no monitoring

• f - Heparin-induced thrombocytopenia induced by unfractionated heparin is controlled by bivalirudin

Incorrect options: B, C and D

Option B: a, e and d:

• a - Primary therapy is by pharmaco mechanical (alteplase + catheter-directed thrombolysis) approach and not by pneumatic compression stockings

• d - Warfarin takes 5 days to work so can not be started early - For the first 5 days UFH / Enoxaparin/ Fondaparinux can be given parenterally with warfarin

Option C: a, c and d:

• c - The target aPTT is 60-80 seconds with unfractionated heparin (normal reference range for aPTT in healthy adults is 30-40 seconds)

Option D: a, e and f - Refer to the above explanation

Solution for Question 4:

Correct Option D- SVC syndrome: SVC syndrome is not traditionally evaluated with a triple rule out CT scan.It is an investigation ordered in the setting of acute chest pain to evaluate the thoracic aortic, coro nary and pulmonary arteries.

Triple rule-out CT Chest can be used to evaluate.

• Pulmonary Embolism

• Acute aortic syndrome

• Acute coronary syndrome

Incorrect Options A,B &C; (Pulmonary Embolism, Acute aortic syndrome &
Acute coronary syndrome: These are part of the triad

Solution for Question 5:

Correct Option: D - 1 - a, c, e and f; 2 - b, d, g and h

1. Massive pulmonary embolism

2. Sub-massive pulmonary embolism

a. BP is reduced

c. ECG: S1 Q3 T3

e. Right ventricle hypokinesia

f. Hampton hump on chest x-ray

b. Normal chest x-ray

d. BP is normal

g. ECG shows sinus tachycardia

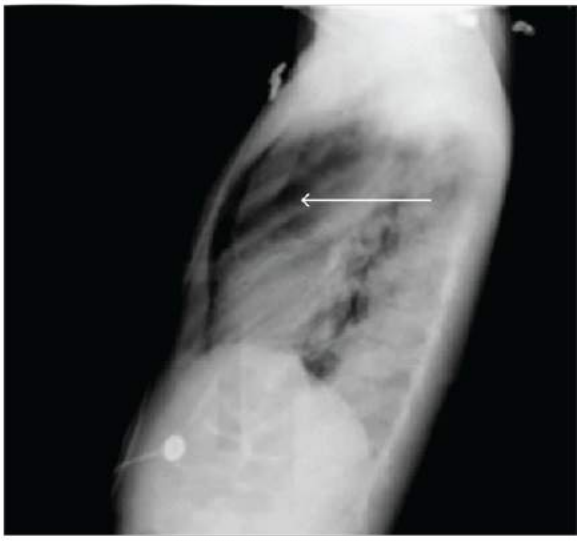
h. Right ventricular dilatation

Incorrect options: A, B and C - Refer to the above explanation and learning outcome

Solution for Question 6:

Correct Option: B - Spinnaker sail sign:

• It is seen in pneumomediastinum



Spinnaker sail sign

Incorrect options: A, C and D

Option A: Palla's sign - There is blockage by dislodged emboli on the pulmonary artery, which presents dilated to the proximal emboli, commonly seen in the right descending pulmonary artery

Option C: Hampton hump sign - Wedge-shaped infarction with apical sparing due to collaterals

Option D: Westermark sign - Due to focal oligemia resulting in a collapse of vessels distal to the occlusion

Solution for Question 7:

Correct Option C- Cardiovascular surgery: is not typically a cause for fat embolism:

• In a patient presenting with breathing difficulty, confusion, tachycardia, and diffuse petechia following long bone trauma, the likely diagnosis is fat embolism.

Incorrect Options:

Options A, B, and D (Total parental nutrition, Caissons disease & Acute pancreatitis): These are associated with an increased risk of fat embolism.

Solution for Question 8:

Correct option: D - Kidney dysfunction

• Kidney dysfunction comes under minor criteria of GURD

• The patient is having type I respiratory failure because of hyperventilation

• Retinal artery (breach in column)

• Petechiae

• Anuria

• Oliguria

Incorrect options: A, B and C - Type 1
respiratory failure, Petechiae and Coma - These are part of major Gurd and Wilson's criteria

Solution for Question 9:

Correct Option C - Factor V Leiden mutation:

• Factor V Leiden mutation is the most common congenital hypercoagulable state. This mutation results in a procoagulant state where factor V is resistant to inactivation by protein C, leading to increased thrombin generation and a higher risk of thrombosis. This mutation is a significant risk factor for recurrent deep vein thrombosis and is often identified in patients with a personal or family history of venous thromboembolism

Incorrect Options:

Option A - Protein C deficiency: Protein C deficiency leads to decreased ability to regulate blood clottin g, but it is not associated with unopposed activity of factor V.

Option B - Antithrombin III deficiency: Antithrombin III deficiency results in impaired inhibition of thrombi n and other clotting factors, but it does not involve factor V specifically.

Option D - Factor XII deficiency: Factor XII deficiency is a rare disorder and is not commonly associate d with recurrent deep vein thrombosis or unopposed factor V activity.

Solution for Question 10:

Correct Option C - Westermark sign:

• In a patient suspected of having a pulmonary embolism (PE), the Westermark sign on chest X-ray indicates focal oligemia due to emboli lodged in the right descending pulmonary artery. This sign manifests as a decreased vascular marking distal to the occlusion, resulting in a prominent area of reduced vascularity in one lung compared to the other. It is characterized by a radiolucent area representing pulmonary oligemia proximal to the embolism site.

Incorrect Options:

Option A - Palla sign: This sign refers to the blockage by dislodged emboli in the pulmonary artery, cau sing dilation proximal to the emboli. It is commonly seen in the right descending pulmonary artery.

Option B - Hampton hump: This sign refers to a wedge-shaped area of pulmonary infarction typically s een on chest X-ray. It results from peripheral embolization leading to pulmonary infarction.

Option D - S1Q3T3 pattern: This ECG pattern is characterized by the presence of S waves in lead I, Q waves in lead III, and T wave inversion in lead III. While it can suggest acute cor pulmonale associated with massive pulmonary embolism, it is not a radiographic sign seen on chest X-ray.

Solution for Question 11:

Correct Option C - Decrease in left ventricular cavity size:

• In pulmonary embolism (PTE), the sudden increase in pulmonary vascular resistance due to obstruction of the pulmonary arteries can lead to acute right ventricular (RV) strain and failure. As a result, the right ventricle dilates while the left ventricular (LV) cavity size decreases. This decrease in LV cavity size is caused by a decrease in left ventricular end-diastolic volume (EDV) due to reduced filling secondary to impaired RV function and interventricular septal deviation towards the left ventricle. This scenario typically results in a decrease in left ventricular systolic volume (SV) and blood pressure. Therefore, option C is the correct choice.

Incorrect Options:

Option A - Increase in left ventricular cavity size: This is not typically observed in pulmonary embolism. The RV strain and failure lead to a decrease in LV cavity size rather than an increase.

Option B - Increase in left ventricular end-diastolic volume (EDV): Pulmonary embolism causes a decrease in LV EDV due to reduced filling, rather than an increase.

Option D - Decrease in left ventricular systolic volume (SV): This is a consequence of the decrease in L V cavity size and EDV in pulmonary embolism, leading to reduced stroke volume and subsequent decr ease in cardiac output.

Solution for Question 12:

Correct Option D - Homan's sign:

• Homan's sign is a clinical sign suggestive of deep vein thrombosis (DVT). It is elicited by dorsiflexing the patient's ankle while their knee is flexed. A positive Homan's sign is indicated by pain in the calf upon dorsiflexion. However, it's essential to note that Homan's sign alone is not highly specific for DVT and must be considered along with other clinical findings and diagnostic tests for accurate diagnosis.

Incorrect Options:

Option A - Murphy's sign: Associated with acute cholecystitis, where pain is elicited upon inspiration wh ile palpating the gallbladder.

Option B - McBurney's sign: Indicates appendicitis, where there's tenderness at McBurney's point (loca ted one-third of the distance from the anterior superior iliac spine to the umbilicus).

Option C - Blumberg's sign: Also known as rebound tenderness, it's indicative of peritonitis. Pain occur s upon sudden release of pressure on the abdomen after palpation.

Solution for Question 13:

Correct Option A - Right ventricular dilation without left ventricular compromise:

• In sub-massive pulmonary thromboembolism (PTE), multiple small pulmonary emboli block small arteries in the pulmonary artery, causing mild distension of the right ventricle without affecting the left ventricle. This condition is characterized by right ventricular dilation without left ventricular compromise. It's seen in about 65% of cases of PTE. Blood pressure tends to remain normal in patients with sub-massive PTE.

Incorrect Options:

Option B - Left ventricular dilation without right ventricular involvement: This scenario is less likely in sub-massive PTE, as the primary effect is on the right side of the heart.

Option C - Equal dilation of both right and left ventricles: While it's possible for both ventricles to dilate in some cases, it's less characteristic of sub-massive PTE.

Option D
- Absence of ventricular dilation due to the small size of pulmonary emboli: Ventricular dilation is a common finding in PTE, even with small emboli, especially when there are multiple emboli causing blockages in the pulmonary artery. Thus, the absence of ventricular dilation would be unexpected in suspected sub-massive PTE.

Solution for Question 14:

Correct Option C - Inverted T wave in lead III:

• Pulmonary embolism (PE) can lead to acute right heart strain due to increased pressure in the pulmonary circulation. This strain can manifest as electrocardiogram (ECG) changes, particularly in the right-sided leads. Inverted T wave in lead III is a common ECG finding suggestive of acute right heart strain associated with PE. This finding is known as S1Q3T3 pattern, which includes a large S wave in lead I, a Q wave and T wave inversion in lead III. These changes reflect acute right ventricular strain and are consistent with PE.

Incorrect Options:

Option A - Deep S wave in lead I: This may be seen in some cases of PE due to right ventricular overload, but it is not as specific as other ECG changes.

Option B - Deep Q wave in lead III: Deep Q wave in lead III, along with inverted T wave and large S wave in lead I, is part of the S1Q3T3 pattern suggestive of acute right heart strain, but it is not as specific as the inverted T wave in lead III.

Option D - Tall R wave in lead V1: This finding is not typically associated with acute PE. Tall R waves in lead V1 may be seen in conditions like right ventricular hypertrophy but are not specific to PE.

Solution for Question 15:

Correct Option

Option A -Unfractioned heparin

• Unfractioned Heparin is an anticoagulant medication commonly administered parenterally (intravenously or subcutaneously) for various indications, including the prevention and treatment of thromboembolic disorders such as deep vein thrombosis (DVT) and pulmonary embolism (PE).

• It acts by potentiating the activity of antithrombin III, thereby inhibiting the activity of thrombin and factor Xa in the coagulation cascade.

Incorrect Options:

Option B - Enoxaparin:Enoxaparin is a low molecular weight heparin (LMWH) that is administered subc utaneously and does not require monitoring of aPTT. However, it is given parenterally and is commonly used for the initial treatment of pulmonary embolism. Unlike unfractionated heparin (UFH), enoxaparin has a predictable anticoagulant effect, and monitoring is not routinely necessary.

Option C - Fondaparinux: Fondaparinux is a synthetic factor Xa inhibitor administered subcutaneously and does not require monitoring of aPTT. Similar to enoxaparin, it is used for initial treatment of pulmon ary embolism. However, it differs in its mechanism of action, targeting factor Xa specifically.

Option D - Novel oral anticoagulants: Novel oral anticoagulants, such as dabigatran and betrixaban, ar e direct oral anticoagulants (DOACs) that do not require parenteral administration or routine monitoring of coagulation parameters like aPTT or INR. They act by directly inhibiting specific coagulation factors, such as thrombin or factor Xa, and are often used as alternatives to warfarin for long-term anticoagulat ion therapy.

Solution for Question 16:

Correct Option B - To achieve a more stable anticoagulant effect:

• When initiating warfarin therapy, it takes several days to achieve a therapeutic level due to its delayed onset of action. During this time, there is a risk of thrombus progression or recurrence of thromboembolic events. Bridging with another anticoagulant, such as unfractionated heparin (UFH), low-molecular-weight heparin (LMWH), or fondaparinux, helps provide immediate anticoagulation until warfarin reaches its therapeutic level. This approach ensures a more stable and continuous anticoagulant effect, reducing the risk of thrombotic complications.

Incorrect Options:

• Other answers are incorrect as explained.

Solution for Question 17:

Correct Option C - Pneumatic compression stockings:

• Primary prevention aims to prevent the occurrence of a condition or complication before it happens.

• In this case, the patient is at risk for developing massive PTE due to a history of venous thromboembolism. Using pneumatic compression stockings is a form of mechanical prophylaxis to prevent the formation of deep vein thrombosis (DVT), which can subsequently lead to pulmonary embolism.

• Pneumatic compression stockings exert pressure on the legs, helping to prevent blood stasis and reducing the risk of DVT formation, particularly in patients with a history of venous thromboembolism.

Incorrect Options:

• Options A and B involve thrombolytic therapy, which is typically used in the treatment of acute PTE rather than primary prevention.

• Option D, anticoagulation with unfractionated heparin, is more commonly used as a secondary prevention strategy or for the treatment of existing thromboembolic events rather than primary prevention.

Solution for Question 18:

Correct Option C - Fat embolism syndrome (FES):

• The clinical presentation of sudden onset dyspnea, altered sensorium, and petechiae predominantly in the axillary region following a femoral shaft fracture surgery strongly suggests fat embolism syndrome (FES). Fat embolism occurs when fat globules enter the systemic circulation, often after traumatic long bone fractures or orthopedic procedures. These fat globules can occlude pulmonary and cerebral microvasculature, leading to respiratory and neurological symptoms, respectively. Petechiae, particularly in the axillary region, are a classic finding in FES due to fat emboli impacting in the small blood vessels of the skin.

Incorrect Options:

• Other differential diagnoses, such as ARDS, PE, and DIC, may present with similar symptoms but are less likely given the specific clinical scenario described. ARDS typically develops later and is characterized by diffuse lung inflammation, PE typically presents with chest pain and hypoxemia, and DIC often presents with bleeding manifestations alongside thrombosis.

Emphysema & Bronchiectasis

1. A 42-year-old woman has been diagnosed with bronchiectasis. What is the investigation of choice for bronchiectasis?

A. HRCT

B. Spiral CT

C. Bronchoscopy

D. Pulmonary angiography

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2. A 29-year-old married male presents to the clinic with the complaint of recurrent chronic cough with expectoration for the past 10-12 years. On auscultation, bilateral wheeze and right basal crackles are audible, with heart sounds best heard on the right side of the chest. CT chest revealed dextrocardia, and nodular opacities in bilateral lung fields suggest bronchiectasis. He also gives a history of not having children despite being married for the last 4 years. Which of the following could be the probable cause of infertility in patients with the above syndrome?

A. Oligospermia

B. Blockage of epididymis

C. Asthenospermia

D. Undescended testis

---

3. A patient was diagnosed with allergic bronchopulmonary aspergillosis (ABPA). Which of the following findings will not be present in the patient?

(or)

A 28-year-old male patient was diagnosed with allergic bronchopulmonary aspergillosis (ABPA). Which of the following findings will not be present in the patient?

A. Peripheral eosinophilia

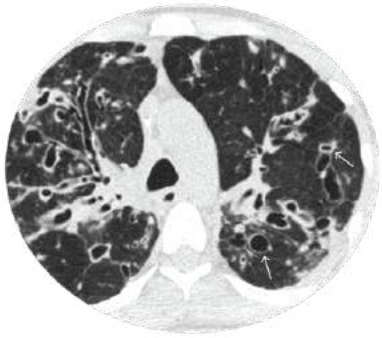
B. Bronchiectasis

C. Pulmonary infiltrates

D. Thin sputum casts

---

4. A 35-year-old male patient comes to the outpatient department with complaints of breathing difficulty, cough accompanied by excess amount of watery sputum for the past two months. His medical history and prescriptions revealed that he is an HIV patient and is on antiretroviral therapy. Examination showed low BMI, clubbing, and crepts on auscultation and an FEV1/FEC less than 0.7. A sputum exam revealed copious mucopurulent discharge . Using the radiograph below, frame a diagnosis and mark the option with the most common histopathological type and investigation of choice.



A. Cylindrical-CT

B. Tubular-Chest x-ray

C. Varicose-MRI

D. Saccular-CT

---

5. Which of the following causes of bronchiectasis traditionally involves the upper lobes?

A. Kartagener syndrome

B. Interstitial lung disease

C. Scleroderma

D. Tuberculosis

---

6. All of the following causes traction bronchiectasis except?

A. Radiation

B. Scleroderma

C. Sarcoidoisis

D. Idiopathic pulmonary fibrosis

---

7. A 35-year-old patient with a history of asthma presents with recurrent episodes of cough, wheezing, and increased dyspnea. The patient's serum IgE levels are elevated, and sputum examination reveals fungal hyphae. A high-resolution computed tomography (HRCT) scan of the chest is performed to further evaluate the respiratory findings. What characteristic finding is expected on the HRCT scan in this patient?

(or)

What characteristic finding is expected on the HRCT scan in Allergic Bronchopulmonary Aspergillosis (ABPA)?

A. Peripheral consolidations

B. Ground-glass opacities

C. Subpleural blebs

D. Central bronchiectasis

---

8. A 40-year-old patient presents with symptoms of chronic obstructive pulmonary disease (COPD), including chronic cough, wheezing, and shortness of breath. The patient has a history of liver cirrhosis. Upon further evaluation, it is discovered that the patient has impaired neutralization of elastase from macrophages, leading to bronchiectasis. What is the underlying deficiency or dysfunction in this patient's condition?

(or)

Which of the following affect the neutralization of elastase and is associated with the development of bronchiectasis?

A. Deficiency of surfactant proteins

B. Dysfunction of cilia

C. Alpha-1 antitrypsin deficiency

D. Immunoglobulin deficiency

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	3
Question 3	4
Question 4	1
Question 5	4
Question 6	2
Question 7	4
Question 8	3

Solution for Question 1:

Option A: HRCT

• The investigation of choice for diagnosing bronchiectasis is HRCT (High-Resolution Computed Tomography): It can identify focal areas of air trapping as an indicator of small airway disease (mosaic attenuation) Airway dilatation can be gauged when seen in cross-section Luminal diameter >1.5 times the adjacent vessel is indicative of bronchiectasis

• It can identify focal areas of air trapping as an indicator of small airway disease (mosaic attenuation)

• Airway dilatation can be gauged when seen in cross-section

• Luminal diameter >1.5 times the adjacent vessel is indicative of bronchiectasis

• Chest x-ray may be abnormal and shows the presence of increased pulmonary markings, ring-like structures, atelectasis, dilated and thickened airways (tram lines), and mucus plugging (finger-in-glove)

• However, chest x-ray may be normal, even in bronchiectasis

• It can identify focal areas of air trapping as an indicator of small airway disease (mosaic attenuation)

• Airway dilatation can be gauged when seen in cross-section

• Luminal diameter >1.5 times the adjacent vessel is indicative of bronchiectasis

Option B: Spiral CT

• Spiral CT is preferred for pulmonary embolism

Option C: Bronchoscopy

• Bronchoscopy is a technique used to visualize the insides of the airway to diagnose lung disease

• It may also be used for therapeutic purposes

Option D: Pulmonary angiography

• Pulmonary angiography is done for lung sequestration and is the gold standard for pulmonary embolism

Solution for Question 2:

Option C: Asthenospermia

• This patient’s clinical history & features are highly suggestive of Kartagener's syndrome.

• It is a rare ciliopathic, autosomal recessive genetic disorder that affects the cilia in the lungs and other organs.

• It is a subset of primary ciliary dyskinesia. 50% of patients with primary ciliary dyskinesia have Kartagener syndrome.

• Around 90% of individuals with kartageners have ultrastructural defects affecting protein(s) in the outer or inner dynein arms.

• Kartagener syndrome is described as the triad of Situs Inversus. Bronchiectasis. Either nasal polyps or recurrent sinusitis.

• Situs Inversus.

• Bronchiectasis.

• Either nasal polyps or recurrent sinusitis.

• Other features include telecanthus, infertility in males, and subfertility in females.

• Asthenospermia or poor sperm motility is due to missing dynein arms, which is the basic defect of Kartagener’s syndrome.

• Symptoms of Kartagener’s syndrome include: Respiratory distress in neonates Recurrent respiratory tract infections Bronchiectasis, situs inversus Infertility and heterotaxy in approximately 50%

• Respiratory distress in neonates

• Recurrent respiratory tract infections

• Bronchiectasis, situs inversus

• Infertility and heterotaxy in approximately 50%

• It is sometimes diagnosed at birth or most often discovered in early childhood.

• There is no cure for Kartagener’s syndrome.

• Situs Inversus.

• Bronchiectasis.

• Either nasal polyps or recurrent sinusitis.

• Respiratory distress in neonates

• Recurrent respiratory tract infections

• Bronchiectasis, situs inversus

• Infertility and heterotaxy in approximately 50%

Option A: Oligospermia

• Oligospermia refers to low sperm count.

• It can be due to infection, genetics, hormones, environmental toxins, etc.

• Kartagener syndrome most commonly affects sperm motility.

Option B: Blockage of the epididymis

• Blockage of the epididymis can be due to infection, inflammation, scrotal trauma, and genetics.

• It is seen in young syndrome, a rare inherited syndrome similar to Kartagener syndrome.

Option D: Undescended testis

• It is also known as cryptorchidism.

• It is not associated with Kartagener syndrome.

Solution for Question 3:

Option D - Thin sputum casts:

• Aspergillus is a fungus commonly found in soil, dust, water, and decaying vegetation.

• The fungus forms spores that can be inhaled and cause bronchial colonization, which can result in disease, but this disease is more common in immunocompromised patients.

• Allergic bronchopulmonary aspergillosis (ABPA) is a form of allergic pulmonary disease characterized by a hypersensitivity reaction to Aspergillus fumigatus.

• Cough and shortness of breath are the most common symptoms of ABPA. Other symptoms include fever, bronchospasm, airway obstruction, hemoptysis, thick brown mucus plugs, etc.

Major criteria to diagnose ABPA are:

• IgE level greater than 1000 IU/ml

• Specific IgE against A. fumigatus

In addition to the above criteria, two out of three minor criteria must be present:

• IgG antibodies against A. fumiagtus

• Pulmonary opacities on chest x-ray

• Peripheral eosinophilia is more than 500 cells/μl

• The radiologic features include consolidation, tram track appearances due to mucus plugs in dilated bronchi or permanent bronchiectasis or fibrosis.

• Ultimately, bronchial wall damage results in bronchiectasis, typically central bronchiectasis.

Option A - Peripheral eosinophilia:

• Peripheral eosinophilia is one of the minor criteria associated with ABPA

Option B - Bronchiectasis:

• Central bronchiectasis is characteristic

Option C - Pulmonary infiltrates:

• Pulmonary opacities disappear and appear in different areas of the lungs over a while as transient pulmonary infiltrates

Solution for Question 4:

Correct Option A- Cylindrical CT: Cylindrical type is the most common type and -CT is the investigation of choice.

• The diagnosis is BRONCHIECTASIS

• Breathing difficulty, cough accompanied by bronchorrhea, in a patient in an immunocompromised state and examination showing clubbing, ad crepitations on auscultation with FEV1/FEC < 0.7 helps in the diagnosis of bronchiectasis.

• The CT shows dilated bronchi→ further confirming the diagnosis.

Incorrect Options:

Option B- Tubular-Chest x-ray: Tubular is another name for the cylindrical subtype but it is incorrectly p aired with Chest X ray as the investigation of choice.

Option C & D- (Varicose-MRI &
Saccular-CT): are also histological types but not the most common type.

Solution for Question 5:

Correct option: D (Tuberculosis): Tuberculosis is typically associated with upper lobe bronchiectasis

Lobes of lung involved in bronchiectasis

Upper lobe bronchiectasis:

Middle lobe bronchiectasis:

Lower lobe bronchiectasis: Usually seen in people with recurrent microaspiration

Solution for Question 6:

Correct option: B (Scleroderma): Scleroderma does not cause traction bronchiectasis

Incorrect choices: Options A, C, and D can cause traction bronchiectasis.

Traction bronchiectasis: traction bronchiectasis is a type of bronchiectasis where airways become dilated due to scarring or fibrosis in the surrounding lung tissue. There is a distortion of the airways, which will hamper the ventilation and reduces the clearance of the lungs.

Causes of traction bronchiectasis:

Solution for Question 7:

Correct Option D - Central bronchiectasis:

• The clinical presentation, elevated serum IgE levels, and the presence of fungal hyphae in sputum suggest Allergic Bronchopulmonary Aspergillosis (ABPA). On high-resolution computed tomography (HRCT) of the chest in patients with ABPA, central bronchiectasis is a characteristic finding. This refers to the dilation and distortion of the bronchi in the central or mid-lung zones.

Incorrect Options:

Option A (Peripheral consolidations) and Option B (Ground-glass opacities) are not typical findings in ABPA. Peripheral consolidations are often associated with other conditions, and ground-glass opacities are seen in various lung diseases but are not specific to ABPA.

Option C - Subpleural blebs: It is not a typical feature of ABPA on HRCT. Subpleural blebs are more commonly associated with conditions like spontaneous pneumothorax rather than ABPA.

Solution for Question 8:

Correct Option C - Alpha-1 antitrypsin deficiency:

• Alpha-1 antitrypsin (AAT) is a protease inhibitor that plays a crucial role in neutralizing elastase, an enzyme released by macrophages. In individuals with alpha-1 antitrypsin deficiency, there is a lack of functional AAT, leading to the unopposed activity of elastase. This imbalance can result in damage to the lung tissue, contributing to the development of bronchiectasis and panacinar emphysema.

Incorrect Options:

Option A - Deficiency of surfactant proteins: Is not related to impaired neutralization of elastase; surfactant proteins are primarily involved in maintaining lung compliance and preventing alveolar collapse.

Option B - Dysfunction of cilia: It is not directly related to the impaired neutralization of elastase by alpha-1 antitrypsin.

Option D - Immunoglobulin deficiency: It does not specifically affect the neutralization of elastase and is not associated with the development of bronchiectasis in the context described.

Bronchial Asthma & COPD

1. Which of the following criteria will not require assisted ventilation in an asthmatic patient?

(or)

Which of the following criteria will not require assisted ventilation in an asthmatic patient?

A. PEFR 50-60% of predicted value

B. Rising $PaCO_2$> 6 kPa (45 mmHg)

C. Diminishing level of consciousness

D. Falling PaO_2< 8 kPa (60 mmHg)

---

2. Which of the following drugs or techniques is used in an adverse event following type 2 brittle asthma?

(or)

A 32-year-old man comes to the emergency department with an acute asthma exacerbation. The patient has a 9-year history of asthma, for which he uses an inhaler containing a combination of inhaled corticosteroid (ICS) and long-acting β-agonist (LABA) as needed. For the past 2 years, he has been using this combination inhaler about 2 times per week. The patient has seasonal allergies to ragweed and is also allergic to peanuts. The patient does not use tobacco, alcohol, or illicit drugs. His family history is significant for asthma in his grandfather. Which of the following drugs or techniques is used in an adverse event following type 2 brittle asthma?

A. β-adrenergic agonist

B. Allergy desensitization

C. Ipratropium bromide

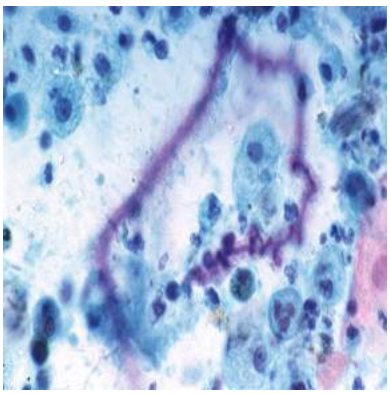
D. Subcutaneous epinephrine

---

3. A patient has had a persistent cough and difficulty breathing on exertion for the past 2 months. Prominent wheezing is present. A sputum examination showed the following finding. What is the most likely diagnosis?

(or)

A 14-year-old male patient who has been having persistent coughing and difficulty breathing for the past 2 months attends the OPD. On chest auscultation, wheezing is present. Blood cell counts, serum electrolyte levels, and chest x-ray is normal. A sputum examination was done, showing the following finding. What is the most likely diagnosis?



A. Tuberculous cavity

B. Asthma

C. Chronic bronchitis

D. Bronchiectasis

---

4. An increased Reid index is classically associated with which of the following conditions?

A. Chronic bronchitis

B. Emphysema

C. Bronchiectasis

D. Interstitial lung disease

---

5. A man comes with increasing shortness of breath, especially on exertion. History of smoking. Oxygen saturation of 85% in room air at rest. The chest is barrel-shaped. Breath sounds are diminished throughout, and the expiratory phase is prolonged. Which of the following decreases mortality in this patient?

A. Influenza and pneumococcal vaccination

B. Bronchodilators

C. Long-term oxygen therapy(LTOT)

D. Mucolytics

---

6. Which of the following is used in the treatment of cough-variant asthma?

A. Low dose ICS once a day

B. LABA once at night

C. SABA twice daily

D. Antitussive lozenges when required

---

7. A 59-year-old man with a history of chronic obstructive pulmonary disease (COPD) comes to the emergency department with gradually worsening shortness of breath and wheezing for the past several days. On examination, FEV1/ FVC < 0.7 and FEV1 <30% predicted. Which GOLD group category is

this patient in?

A. Group 1

B. Group 2

C. Group 3

D. Group 4

---

8. An 18-year-old male with a history of cystic fibrosis. While attending a class, he suddenly begins to cough up large volumes of bright red blood. He was admitted to a nearby hospital in the emergency department. Which of the following vessel is most likely to bleed and results in hemoptysis in this patient?

(or)

A cystic fibrosis patient. While attending a class, he suddenly begins to cough up large volumes of bright red blood. Which of the following vessel is most likely to bleed and results in hemoptysis in this patient?

A. Bronchial arteries

B. Alveolar capillaries

C. Gastric varices

D. Pulmonary artery

---

9. Which of the following is associated with the most severe form of alpha-1 antitrypsin deficiency?

A. PI M allele

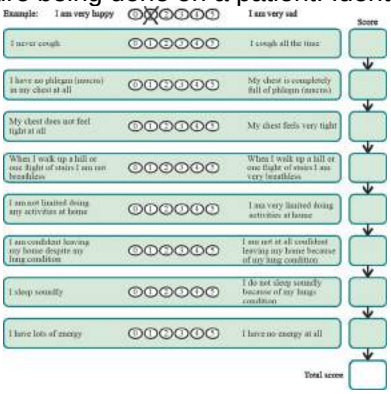
B. PI S allele

C. PI Z allele

D. PI P allele

---

10. The image shows a questionnaire being done on a patient. Identify the disease for which it is done.



A. Bronchial asthma

B. COPD

C. Obstructive sleep apnea

D. Tuberculosis

---

11. The BODE index, which is used to predict the mortality of COPD patients, includes all of the following except

A. BMI

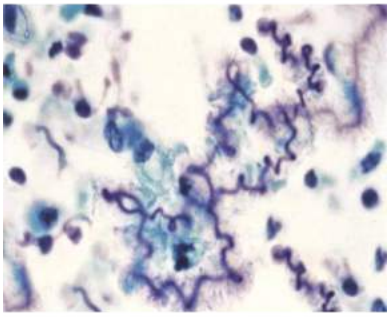
B. HRCT

C. FEV1

D. 6 minute walk distance

---

12. A 25-year-old male patient presented to the emergency department with complaints of severe breathing difficulty. The patient could only speak a few words. The patient got up from a supine position and sat on the bed in a tripod position. The patient has tachycardia and tachypnea. Auscultation revealed loud ronchi, and the sputum was sent for examination as shown below. The spirometry value was found to be FEV1 of 30% of predicted with a PaO2 of 58 mmHg. The patient states that he had such similar episodes in the past. Diagnose the disease and pick the option with the appropriate management.



A. Air-driven nebulization with salbutamol

B. Elective intubation with assisted controlled mechanical ventilation

C. Low-dose inhaled corticosteroids (ICS) with formoterol (LABA)

D. IV hydrocortisone + salbutamol nebulization

---

13. A 30-year-old female was accompanied by her friend to the emergency department with a complaint saying that she suddenly started feeling drowsy and had breathing difficulty. The patient has a history of similar episodes in the past, according to her friend. She has tachypnea and bradycardia and appears drowsy and unable to talk or answer any questions. Examination revealed FEV of 20%, PaO2 of 50 mmHg, and pCO2 > 46 mmHg. Diagnose the condition and mark the option with appropriate management.

A. Elective intubation is recommended with SIMV with pressure support + Permissive hypercapnia

B. Elective intubation is recommended with volume limit assist control ventilation + Permissive hypocapnia

C. Elective intubation is recommended with assisted controlled mechanical ventilation + Permissive hypercapnia

D. Elective intubation is recommended with assisted controlled mechanical ventilation + Permissive hypocapnia

---

14. Match the following controller medication with their respective stages of asthma and FEV1 values 1) Asthma attacks less than two days a week+ FEV1 more than 80% a) Low dose ICS+formetrol on daily basis 2) Asthma attacks more than two days a week+FEV1 more than 82% b) Low dose ICS+formetrol(as needed) 3) Daily asthma attacks+FEV1 of 70% c) High dose ICS + LABA with add on therapies 4) Asthma attacks throughout the day+FEV1 of 50% d) Low dose ICS on daily basis

1) Asthma attacks less than two days a week+ FEV1 more than 80%	a) Low dose ICS+formetrol on daily basis
2) Asthma attacks more than two days a week+FEV1 more than 82%	b) Low dose ICS+formetrol(as needed)
3) Daily asthma attacks+FEV1 of 70%	c) High dose ICS + LABA with add on therapies
4) Asthma attacks throughout the day+FEV1 of 50%	d) Low dose ICS on daily basis

A. 1-d,2-b,3-c,4-a

B. 1-b,2-d,3-a,4-c

C. 1-c,2-a,3-d,4-b

D. 1-c,2-a,3-b,4-d

---

15. Match the following sets with 1) types of asthma with 2) their respective management? SET 1 SET 2 1) Acute asthma 2) Severe acute asthma 3) Immitent respiratory arrest 4) Brittle asthma a) Intubation with ACMV b) Epi-PEN c) Low dose ICS+LABA d) Nebulization with salbutamol + I.V. hydrocortisone

SET 2

e asthma3) Immitent respiratory arrest4) Brittle asthma	a) Intubation with ACMVb) Epi-PENc) Low dose ICS+LABAd) Nebulization with s

A. 1-c,2-a,3-b,4-d

B. 1-d,2-b,3-c,4-a

C. 1-a,2-c,3-b,4-d

D. 1-c,2-d,3-a,4-b

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16. A 30-year-old female reports that she walks slower than her peers, even on a flat surface, because of breathlessness. Mark the option with the appropriate mMRC grading.

A. Grade 1

B. Grade 2

C. Grade 3

D. Grade 4

---

17. Match the following options: 1. Emphysema a. Tall thin smoker 2. Chronic bronchitis b. Normal DLCO c. Hyperinflation seen on chest x-ray d. Type 2 respiratory failure e. Obese smoker f. Type 1 respiratory failure g. Increased bronchovascular markings seen on chest x-ray h. Reduced DLCO

1. Emphysema	a. Tall thin smoker
2. Chronic bronchitis	b. Normal DLCO

c. Hyperinflation seen on chest x-ray

d. Type 2 respiratory failure

e. Obese smoker

f. Type 1 respiratory failure

g. Increased bronchovascular markings seen on chest x-ray

h. Reduced DLCO

A. 1 - a, d, g and h; 2 - b, c, e and f

B. 1 - a, c, f and h; 2 - b, d, e and g

C. 1 - b, c, e and f; 2 - a, d, g and h

D. 1 - b, d, e and g; 2 - a, c, f and h

---

18. Which of the following is not a contraindication for non invasive ventilation?

A. Myocardial infarction

B. Bilateral pneumonia

C. Hemodynamic instability

D. Unresponsive patient

---

19. In the diagnosis of bronchial asthma, which of the following changes in Forced Expiratory Volume in 1 second (FEV1) is considered diagnostic for bronchial asthma?

A. A decrease of 5% in FEV1

B. An increase of 10% in FEV1

C. A decrease of >12% or 200 mL from baseline in FEV1

D. No change in FEV1 after bronchodilator administration

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20. A 30-year-old patient with a history of asthma has been using salbutamol (SABA) as the sole treatment for symptom relief. However, recent updates in the GINA guidelines suggest a change in the approach to asthma management. What is the primary concern associated with relying solely on SABA for asthma treatment, as highlighted in the updated guidelines?

A. Reduced efficacy in providing quick relief of asthma symptoms

B. Increased risk of asthma-related death and urgent healthcare

C. Poor adherence to medication in patients with infrequent symptoms

D. Higher incidence of exacerbations in children aged 6-11 years

---

21. A 42-year-old patient with severe type 2 asthma has been experiencing persistent symptoms despite standard asthma management. Which of the following medications is specifically indicated for use as an add-on treatment in severe type 2 asthma?

A. Tiotropium

B. Omalizumab

C. Mepolizumab

D. Dupilumab

---

22. A 35-year-old patient with a history of asthma presents to the emergency department with worsening symptoms. On examination, the patient's FEV1 is measured at 50% of the predicted value. Arterial blood gas analysis reveals a PaO2 level of 65 mmHg. Based on these findings, how would you classify the current asthma exacerbation?

A. Mild exacerbation

B. Moderate exacerbation

C. Severe exacerbation

D. The classification cannot be determined from the provided information.

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23. In a patient presenting with chronic dyspnea and a long history of smoking, a physical examination reveals paradoxical inward movement of the ribcage during inspiration. Which of the following options best describes this characteristic finding, known as the "Hoover sign," commonly observed in patients with chronic bronchitis?

(or)

Which of the following options best describes the "Hoover sign," commonly observed in patients with chronic bronchitis?

A. Paradoxical elevation of the diaphragm during inspiration

B. Paradoxical expansion of the chest wall during expiration

C. Paradoxical inward movement of the ribcage during inspiration

D. Paradoxical bulging of the intercostal spaces during coughing

---

24. In a patient with chronic bronchitis and a history of smoking cessation attempts, which medication acts as an $\alpha 4\ \beta 2$ partial agonist of nicotine receptors to aid in nicotine deaddiction?

A. Nicotine buccal spray

B. Bupropion

C. Varenicline

D. Video-assisted thoracoscopic surgery

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25. A 65-year-old patient presents to the clinic with complaints of worsening shortness of breath and chronic cough. Spirometry results show an FEV1/FVC ratio of less than 0.7. However, the FEV1 percentage is measured at 45%. Based on the GOLD classification of COPD, how would you categorize the severity of this patient's condition?

A. Mild COPD

B. Moderate COPD

C. Severe COPD

D. Very Severe COPD

---

26. In a patient experiencing a severe exacerbation of COPD, which of the following FEV1 values is an indication to initiate Non-Invasive Ventilation (NIV) therapy?

A. FEV1 < 20%

B. FEV1 < 40%

C. FEV1 < 60%

D. FEV1 < 80%

---

27. In patients with COPD, which of the following biomarkers indicates disease severity and serves as an indication to start Inhaled Corticosteroids (ICS)?

A. Neutrophil count > 500

B. Eosinophil count > 300

C. Lymphocyte count > 400

D. Basophil count > 100

---

28. A 45-year-old patient reports a smoking history of 20 cigarettes per day for the past 25 years. What is the patient's pack-year history?

A. 25 pack-years

B. 50 pack-years

C. 75 pack-years

D. 65 pack-years

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	4
Question 3	2
Question 4	1
Question 5	3
Question 6	1
Question 7	4
Question 8	1
Question 9	3
Question 10	2

Question 11	2
Question 12	4
Question 13	3
Question 14	2
Question 15	4
Question 16	2
Question 17	2
Question 18	2
Question 19	3
Question 20	2
Question 21	4
Question 22	2
Question 23	3
Question 24	3
Question 25	3
Question 26	2
Question 27	2
Question 28	1

Solution for Question 1:

Correct Option: A - PEFR 50-60% of predicted value

• Peak expiratory flow rate (PEFR) is the volume of air forcefully expelled from the lungs in one quick exhalation and is a reliable indicator of ventilation adequacy as well as airflow obstruction

• The normal peak flow value can range from person to person and is dependent upon factors such as sex, age, and height

• PEFR of 50-60% indicates moderate asthma, and there is no need for assisted ventilation

• Continuously deteriorating PEFR requires assisted ventilation

• Life-threatening situations and impending respiratory failure require immediate monitoring and therapy

• The patient should be referred to the intensive care unit for intubation and ventilation if they have acute severe or life-threatening asthma that is failing to respond to therapy indicated by: Deteriorating PEF Worsening hypoxemia Normal or rising PaCO2 Poor respiratory effort Exhaustion or confusion

• Deteriorating PEF

• Worsening hypoxemia

• Normal or rising PaCO2

• Poor respiratory effort

• Exhaustion or confusion

Incorrect options: Option B, C and D

Option B: Rising $PaCO_2$ > 6 kPa (45 mmHg)

• Acute asthma normally causes respiratory alkalosis (i.e., high pH, low $PaCO_2$) due to increased respiratory drive

• An elevated or even (inappropriately) normal $PaCO_2$ is concerning for respiratory failure due to respiratory muscle fatigue and requires immediate endotracheal intubation and assisted ventilation

Option C: Diminishing level of consciousness

• A diminished level of consciousness is an indication for immediately assisted ventilation in asthma exacerbation in order to secure respiration

Option D: Falling PaO_2 < 8 kPa (60 mmHg)

• Falling PaO_2 < 8 kPa (60 mmHg) is an indication of severe acute asthma and requires intubation & ventilation

Solution for Question 2:

Correct option: D - Subcutaneous epinephrine

• Type 2 brittle asthma are symptom-free patients developing sudden onset acute attacks of asthma requiring mechanical ventilation or even death

• These patients should ideally keep an auto-injector of epinephrine

• Type 1 brittle asthma is characterized by > 40% variation in PEFR for >50% of the time

• It is managed with long-acting β-agonists (LABA) + high-dose inhaled corticosteroids and oral steroids

• Long-term continuous subcutaneous infusion of β-2 agonists like terbutaline is also given in type 1 brittle asthma

Management of type 2 brittle asthma:

• These patients are difficult to manage as they do not respond well to corticosteroids and the worsening of asthma does not reverse well with inhaled bronchodilators

• The most effective therapy is subcutaneous epinephrine, which suggests that the worsening is likely to be a localized airway anaphylactic reaction with edema

Incorrect options: A, B and C

Option A: β-adrenergic agonist

• LABA improve asthma control and reduce exacerbations when added to ICS, which allows asthma to be controlled at lower doses of corticosteroids

• LABA can be used for type 1 brittle asthma but not for type 2 as the worsening of asthma does not reverse with inhaled bronchodilators in these patients

Option B: Allergy desensitization

• Allergy desensitization is an adjunctive controller treatment that can benefit a minority of patients with asthma and rhinitis driven by a specific aeroallergen (e.g., immunotherapy with house dust mite proteins)

• It is less effective for patients, such as this one, who have seasonal allergies but experience persistent asthma symptoms

• In the absence of appropriate asthma control, allergen challenges may cause asthma to worsen

Option C: Ipratropium bromide

• Long-acting antimuscarinic agents (e.g., tiotropium) are indicated for step-up therapy in patients with poorly controlled persistent asthma, despite scheduled high-dose ICS-formoterol

• They have no role in type 2 brittle asthma

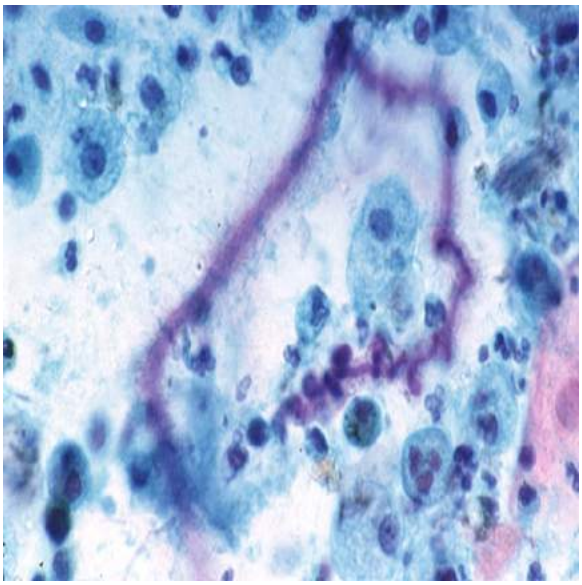
Solution for Question 3:

Correct Option: B - Asthma:

• The patient presentation is most consistent with asthma

• Curschmann’s spirals refer to the spiral-shaped mucus plugs from the subepithelial mucous gland ducts of the bronchi, seen in the airways of asthmatics

• They are often seen in association with Creola bodies and Charcot-Leyden crystals



Incorrect Options:

Options : A, C and D - They are not associated with Curschmann's spirals on sputum examination

Solution for Question 4:

Correct option: A - Chronic bronchitis

• Chronic bronchitis occurs due to irritant-induced airway mucosal inflammation, respiratory epithelium metaplasia, and mucus hypersecretion

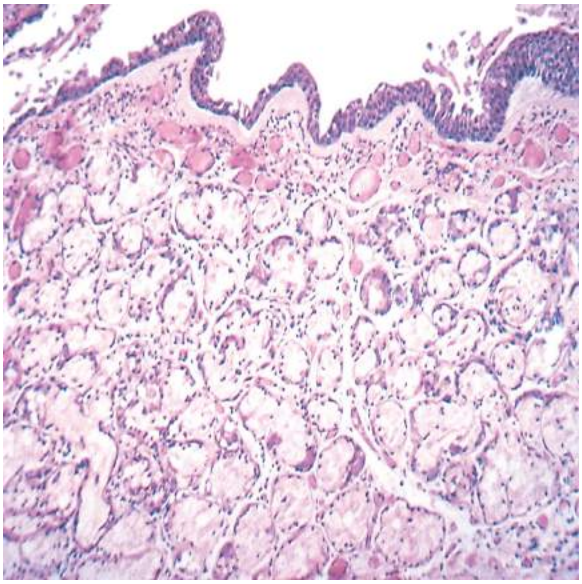
• It is defined as a productive cough for ≥ 3 months over 2 consecutive years (not due to other causes) with or without airflow limitation

• The diagnostic feature of chronic bronchitis in the trachea and larger bronchi is an enlargement of the mucus-secreting gland

• The magnitude of the increase in size is assessed by the ratio of the thickness of the submucosal gland layer to that of the bronchial wall, called the Reid index

• The normal Reid index is 0.4

• Chronic smoking causes submucosal gland hypertrophy and hyperplasia, which leads to a Reid Index of > 0.5, indicating chronic bronchitis



Incorrect options: B, C and D - Reid index is used to measure the bronchial smooth muscles hypertrop hy and hyperplasia in chronic bronchitis, not for the fibrosis of the alveolar walls in ILD, or destruction o f alveolar walls or bronchioles in emphysema and bronchiectasis

Solution for Question 5:

Correct option: C - Long-term oxygen therapy (LTOT)

The given clinical scenario is a case of COPD with low SaO2

• In COPD, non-uniform ventilation and ventilation-perfusion mismatching lead to localized vasoconstriction

• Supplemental oxygen abolishes this constriction, leading to an improved ventilation/perfusion ratio

• High-flow oxygen is not tolerated as it leads to crusting, dryness, and epistaxis

• Smoking cessation, LTOT, and lung reduction surgery decrease the mortality in COPD patients

• LTOT has demonstrated prolonged survival and improved quality of life in patients with COPD with significant chronic hypoxemia

• The criteria for initiating LTOT in such patients include: pO2 of <7.3 kPa pO2 of 7.3 - 8 kPa and one of the following: Secondary polycythemia, peripheral edema, or pulmonary hypertension

• pO2 of <7.3 kPa

• pO2 of 7.3 - 8 kPa and one of the following: Secondary polycythemia, peripheral edema, or pulmonary hypertension

• pO2 of <7.3 kPa

• pO2 of 7.3 - 8 kPa and one of the following: Secondary polycythemia, peripheral edema, or pulmonary hypertension

Incorrect options: A, B and D

Option A: Influenza and pneumococcal vaccination

• Influenza and pneumococcus vaccination is important and may help decrease the rate of COPD exacerbations

• Significant mortality benefit has not been clearly and consistently demonstrated in studies

Option B: Bronchodilators

• Bronchodilators (antimuscarinic and β-2 agonists) use in long-term management but not decreases mortality

• Short-acting β-agonists such as salbuterol have a quick onset of action and improve symptoms as well as lung function in the short term in patients with COPD

• They have not been shown to decrease mortality

Option D: Mucolytics

• Mucoactive agents (e.g., N-acetylcysteine) may have some symptomatic benefit in patients with COPD who have bothersome sputum production, but there is no evidence of survival benefit with the use of these agents

Solution for Question 6:

Correct option: A - Low dose ICS once a day

Incorrect options: B, C and D

Option B: LABA once at night

• Long-acting β-2 agonists (LABA) are long-term bronchodilators used with inhaled steroids on a daily basis to manage chronic asthma and not specifically for CVA

Option C: SABA twice daily

• Short-acting β-2 agonists, such as albuterol, are used to relieve asthma symptoms during an attack or before intense exercise

• They are not used in the daily treatment of asthma and specifically CVA

Option D: Antitussive lozenges when required

• No studies have shown any association between antitussive lozenges and cough-variant asthma

• It can temporarily suppress the cough but not the use as a treatment for CVA

Solution for Question 7:

Correct option: D - Group 4

GOLD Stage	Severity	Spirometry
I	Mild	$FEV_1/FVC < 0.7$ and $FEV_1 \geq 80\%$ predicted
II	Moderate	$FEV_1/FVC < 0.7$ and $FEV_1 \geq 50\%$ but $< 80\%$ predicted
III	Severe	$FEV_1/FVC < 0.7$ and $FEV_1 \geq 30\%$ but $< 50\%$ predicted
IV	Very severe	$FEV_1/FVC < 0.7$ and $FEV_1 < 30\%$ predicted

Incorrect options: A, B and C

Solution for Question 8:

Option A: Bronchial arteries

• Hemoptysis is a common feature in patients with bronchiectasis and cystic fibrosis due to chronic inflammation and anatomical abnormalities that bring the bronchial arteries closer to the mucosal surface.

• These blood vessels are presently closer to air space, because of which even a smaller degree of inflammation in these areas can lead to the rupture of vessels into the airway.

• Bronchial arteries are under systemic pressure; thus, they are prone to large amounts of bleeding.

Option B: Alveolar capillaries

• The lungs have a dual blood supply from the pulmonary arteries and the bronchial arteries.

• The latter arises as a rule from the aorta and is the source of 90% of the cases of hemoptysis.

• Bleeding into the alveolar spaces of the lungs characterizes the syndrome of diffuse alveolar hemorrhage (DAH) and is due to disruption of the alveolar-capillary basement membrane.

Option C: Gastric varices

• Gastric varices (GV) are a bunch of vessels in the mucosa/submucosa of the stomach and part of a complex collection of vascular shunts between the portal and systemic circulation that develop in the setting of portal hypertension due to any etiology with or without cirrhosis.

• The increased pressure and portal blood flow in the portosystemic circulation due to the above factors lead to gastric varices causing elevated intra-variceal pressure and wall tension, increasing the risk of variceal rupture leading to a life-threatening GI bleed, not hemoptysis.

Option D: Pulmonary artery

• The pulmonary arteries function to transport deoxygenated blood from the right side of the heart to the lungs for oxygenation. These vessels serve as the conduit between the right side of the heart and the lungs.

• Pulmonary artery (PA) rupture is an unusual but often lethal complication associated with pulmonary artery catheterization. [1,2] Management of PA rupture may include lung isolation in patients requiring intubation to protect the contralateral lung and to decrease bleeding in the affected lung.

• They are not responsible for hemoptysis in cystic fibrosis or COPD

Solution for Question 9:

Correct option: C - Pi Z allele

α-1 antitrypsin deficiency:

• α-1 antitrypsin deficiency - Panacinar emphysema

• Defect in SERPINA 1 / PI on chromosome 14 M allele: Normal S allele: Reduced levels Z allele: Severely reduced levels

• M allele: Normal

• S allele: Reduced levels

• Z allele: Severely reduced levels

• Individuals with two Z alleles or one Z and one null allele are referred to as PiZ - Most common form of severe α-1 antitrypsin deficiency

• M allele: Normal

• S allele: Reduced levels

• Z allele: Severely reduced levels

Incorrect options: A, B & D - Refer to the above explanation

Solution for Question 10:

Correct option: B - COPD

• COPD Assessment Test (CAT) is the questionnaire described in the vignette. It is a patient completed questionnaire that is used to assess the impact of COPD on the patient's life.

Incorrect options: A, C and D - Refer to the explanation of option B

Solution for Question 11:

Correct option: B - HRCT

BODE (Body mass index, airflow Obstruction, Dyspnea, and Exercise) index:

Incorrect options: A, C and D

Solution for Question 12:

Correct option: D - IV hydrocortisone + salbutamol nebulization

• The diagnosis is bronchial asthma

• The image shows Curschmann's spirals found in the sputum of asthmatic patients

• FEV1 of 30% of expected with PaO2 of 70mmHg = Severe acute asthma

• IV hydrocortisone + salbutamol nebulization helps in relieving the symptoms

Incorrect options: A, B and C

Option A - Air-driven nebulization with salbutamol: Air-driven nebulization can lead to ventilation-perfusion mismatch

Option B - Elective intubation with assisted controlled mechanical ventilation: This is done in imminent respiratory failure

Option C - Low dose inhaled corticosteroids (ICS) with formoterol (LABA): This is a basic controller or prevention medication and would be inadequate in this scenario

Solution for Question 13:

Correct option: C
- Elective intubation is recommended with assisted controlled mechanical ventilation + Permissive hypercapnia

• Drowsiness, breathing difficulty, not answering any of the questions put forth by the doctor, accompanied by tachypnea and bradycardia, and an FEV of 20%, a PaO2 of 50 mmHg, and a pCO2 > 46% help in the diagnosis of imminent respiratory failure caused by bronchial asthma

• ACMV ensures a backup minute ventilation in the absence of an intact respiratory drive and allows for synchronization of the ventilator cycle with the patient's inspiratory effort

• Permissive hypercapnia aims to minimize lung damage during mechanical ventilation

Incorrect options:

Option A - Elective intubation is recommended with SIMV with pressure support + Permissive hypercapnia: SIMV (Synchronized Intermittent Mandatory Ventilation) modality is not used here

Option B and D - Elective intubation is recommended with volume limit assist control ventilation + Permissive hypocapnia and Elective intubation is recommended with assisted controlled mechanical ventilation + Permissive hypocapnia: These options describe permissive hypocapnea: Permissive hypercapnia rather than hypocapnia is followed

Solution for Question 14:

Correct Option B - 1-b,2-d,3-a,4-c:

• 1) Asthma attacks less than two days a week+ FEV1 more than 80%- -b) Low dose ICS + formetrol (as needed)

• 2) Asthma attacks more than two days a week+FEV1 more than 82% - d) Low dose ICS on daily basis

• 3) Daily asthma attacks+FEV1 of 70% - a)Low dose ICS + formetrol on daily basis

• 4) Asthma attacks throughout the day+FEV1 of 50% - c) High dose ICS + LABA with add on therapies

Incorrect Options:

Option A,C & D - Refer to the above options

Solution for Question 15:

Correct Option D - 1-c,2-d,3-a,4-b:

SET 1

• 1) Acute asthma-requires Low dose ICS+LABA

• 2) Severe acute asthma- can be treated by Nebulization with salbutamol+I.V. hydrocortisone

• 3) Immitent respiratory arrest-is managed by Intubation with ACMV

• 4) Brittle asthma-requires Epi-PEN

Incorrect Options:

Option A, B, & C: Refer to the above explanations

Solution for Question 16:

Correct option: B - Grade 2

Incorrect options: A, C and D - Refer to the explanation of option B

Solution for Question 17:

Correct option: B - 1 - a, c, f and h; 2 - b, d, e and g

Incorrect options: A, C & D - Refer to the above explanation

Solution for Question 18:

Correct Option B - Bilateral pneumonia:

• Is not a contraindication for NIV use

Incorrect Options:

Option A, B and D: These are contraindications for the use of non invasive

Solution for Question 19:

Correct Option C - A decrease of >12% or 200 mL from baseline in FEV1:

• The main diagnostic criteria for bronchial asthma involve the reversibility of airflow obstruction demonstrated by spirometry.

• In patients with asthma, the baseline curve for the inspiration part remains the same, but there is marked concavity in the expiration part due to difficulty pushing out air during expiration.

• After administering a bronchodilator like salbutamol, the test is repeated in 10-15 minutes. In cases of asthma, there is a significant reduction in concavity.

• The diagnostic change in FEV1 for bronchial asthma is considered when there is a decrease of >12% or 200 mL from the baseline value of FEV1 after bronchodilator administration.

Incorrect Options:

Option A - A decrease of 5% in FEV1: This criterion is not sufficient for the diagnosis of bronchial asth ma. The diagnostic threshold is >12% or 200 mL.

Option B - An increase of 10% in FEV1: An increase in FEV1 is not a diagnostic criterion for bronchial asthma; the focus is on a decrease in FEV1.

Option D - No change in FEV1 after bronchodilator administration: Lack of improvement or no change i n FEV1 after bronchodilator administration would not be consistent with the expected response in bron chial asthma.

Solution for Question 20:

Correct Option B - Increased risk of asthma-related death and urgent healthcare:

• Recent updates in the GINA (Global Initiative for Asthma) guidelines no longer recommend the use of SABA (Short-Acting Beta-Agonist) as the only treatment for asthma in adults. Studies have shown that patients treated only with salbutamol (SABA) are found to have a higher incidence of asthma-related death and urgent healthcare. While SABAs are effective for providing quick relief of asthma symptoms, relying solely on them poses risks to patients, emphasizing the importance of comprehensive asthma management strategies, including controller medications.

Incorrect Options:

Option A - Reduced efficacy in providing quick relief of asthma symptoms: This statement is not aligne d with the explanation provided. SABAs are generally effective for quick relief of asthma symptoms. Th e primary concern with using SABA alone is related to long-term outcomes, not immediate symptom rel ief.

Option C - Poor adherence to medication in patients with infrequent symptoms: Adherence issues are not the primary concern highlighted in the updated guidelines. The focus is on the increased risk of ast hma-related death and urgent healthcare when relying solely on SABA, irrespective of adherence.

Option D - Higher incidence of exacerbations in children aged 6-11 years: The guidelines mention poss ible controller options for children aged 6-11 years, such as using inhaled corticosteroids (ICS) alongsi de SABA. However, the primary concern mentioned in the updates is not about exacerbations in this a ge group but rather the risk associated with using SABA alone in adults.

Solution for Question 21:

Correct Option D - Dupilumab:

• Dupilumab is an add-on treatment indicated for severe type 2 asthma. It functions as an anti-IL–4/4R, targeting the interleukin-4 receptor, which plays a role in the type 2 inflammatory pathway associated with severe asthma. This medication is specifically designed for patients with persistent symptoms despite standard asthma management.

Incorrect Options:

Option A - Tiotropium: Tiotropium is a long-acting anticholinergic bronchodilator (LAMA) that is used in the treatment of chronic obstructive pulmonary disease (COPD) but is not a primary add-on treatment for severe type 2 asthma.

Option B - Omalizumab: Omalizumab is an anti-IgE monoclonal antibody used in severe allergic asthm a. While it is effective in type 2 asthma, it targets IgE rather than IL–4/4R.

Option C - Mepolizumab: Mepolizumab is an anti-IL-5 monoclonal antibody indicated for severe eosino philic asthma. It primarily targets the IL-5 pathway, which is associated with eosinophilic inflammation i n asthma.

Solution for Question 22:

Correct Option B - Moderate exacerbation:

• Mild exacerbation: FEV1 > 70%, PaO2 Normal

• Moderate exacerbation: FEV1 40-69%, PaO2 > 60 mmHg

• Severe exacerbation: FEV1 < 40%, PaO2 > 60 mmHg

In this case, the patient's FEV1 is 50%, falling within the range for a moderate exacerbation. Additionall y, the PaO2 is greater than 60 mmHg. Therefore, the classification of the current asthma exacerbation i s moderate.

Incorrect Options:

• Other options are incorrect according to explanation.

Solution for Question 23:

Correct Option C - Paradoxical inward movement of the ribcage during inspiration:

• The "Hoover sign" is a characteristic finding observed in patients with emphysema. It refers to the paradoxical inward movement of the lower ribcage during inspiration instead of the expected outward expansion. This phenomenon occurs due to the loss of elastic recoil in emphysematous lungs, leading to decreased lung volume and ineffective chest wall expansion during inspiration.

Incorrect Options:

Option A - Paradoxical elevation of the diaphragm during inspiration: This option describes the opposit e phenomenon known as paradoxical diaphragmatic movement, which is not typically associated with c hronic bronchitis.

Option B - Paradoxical expansion of the chest wall during expiration: This option does not accurately d escribe the Hoover sign. In chronic bronchitis, the chest wall tends to collapse inward during inspiration rather than expanding paradoxically during expiration.

Option D - Paradoxical bulging of the intercostal spaces during coughing: This option describes an unr elated phenomenon and is not associated with the Hoover sign seen in chronic bronchitis.

Solution for Question 24:

Correct Option C - Varenicline:

• Varenicline is a medication used to aid in smoking cessation by acting as a partial agonist of the $\alpha 4\ \beta 2$ nicotinic acetylcholine receptor, which helps reduce nicotine cravings and withdrawal symptoms. It works by both reducing the rewarding effects of nicotine and reducing the severity of withdrawal symptoms. This makes it an effective option for individuals trying to quit smoking.

Incorrect Options:

Option A - Nicotine buccal spray: This is a form of nicotine replacement therapy that delivers nicotine di rectly into the bloodstream through the lining of the mouth, helping to reduce withdrawal symptoms duri ng smoking cessation.

Option B - Bupropion: Bupropion is an antidepressant medication that is also used as an aid for smokin g cessation. It works by reducing the desire to smoke and decreasing withdrawal symptoms.

Option D - Video-assisted thoracoscopic surgery: This surgical procedure, known as bullectomy, involv es removing large air spaces (bullae) that have developed in the lungs, typically in patients with severe emphysema. It is not directly related to smoking cessation or nicotine addiction treatment.

Solution for Question 25:

Correct Option C - Severe COPD:

• According to the GOLD (Global Initiative for Chronic Obstructive Lung Disease) classification of COPD, severity is categorized based on the post-bronchodilator FEV1 (forced expiratory volume in 1 second) percentage predicted and the FEV1/FVC (forced vital capacity) ratio.

• Severe COPD is defined by an FEV1/FVC ratio less than 0.7 and an FEV1 between 30% and 49% of the predicted value.

• In this case, the patient's FEV1 percentage is measured at 45%, falling within the range for severe COPD.

Incorrect Options:

• Other options are incorrect as explained.

Solution for Question 26:

Correct Option B - FEV1 < 40%:

• During a severe exacerbation of COPD, the initiation of Non-Invasive Ventilation (NIV) therapy is indicated when the FEV1 (Forced Expiratory Volume in 1 second) falls below 30-50% of the predicted normal value. This signifies a significant impairment in lung function, indicating the need for ventilatory support to assist with respiratory effort and gas exchange.

Incorrect Options:

Option A - FEV1 < 20%: This level of FEV1 reduction is extremely severe and generally indicative of very severe COPD. However, NIV therapy is usually indicated at a slightly higher FEV1 threshold of <30-50%.

Option C - FEV1 < 60%: While this level of FEV1 reduction indicates moderate to severe COPD, it does not meet the criteria for initiating NIV therapy during an exacerbation, as the threshold is typically set lower at <30-50%.

Option D - FEV1 < 80%: This level of FEV1 reduction is indicative of mild to moderate COPD and does not meet the criteria for initiating NIV therapy during an exacerbation.

Solution for Question 27:

Correct Option B - Eosinophil count > 300:

• Eosinophil count greater than 300 cells/μL is considered a biomarker of disease severity in COPD and indicates a higher risk of exacerbations. It serves as an indication to start Inhaled Corticosteroids (ICS), which can help reduce exacerbations and improve outcomes in these patients.

Incorrect Options:

• Neutrophil count > 500, lymphocyte count > 400, and basophil count > 100 are not commonly used as biomarkers of disease severity in COPD and are not specific indicators for initiating ICS therapy.

Solution for Question 28:

Correct Option A - 25 pack-years:

• To calculate pack-years, we multiply the number of cigarette packs smoked per day by the number of years smoked, and then divide by 20.

Given:

Number of cigarettes smoked per day = 20

Number of years smoked = 25

Pack-years = (Number of cigarettes/day × years) / 20

= (20 × 25) / 20

= 25

So, the correct answer is:

A. 25 pack-years

Incorrect Options:

• Other options are incorrect according to the explanation

Acute Respiratory Distrress Syndrome & Respiratory Failure

1. Match the following conditions with their respective types of respiratory failure 1. ARDS a. Respiratory failure type 2 2. Status asthmaticus b. Respiratory failure type 4 3. Peri-operative atelectasis c. Respiratory failure type 1 4. Cardiogenic shock d. Respiratory failure type 3

1. ARDS	a. Respiratory failure type 2
2. Status asthmaticus	b. Respiratory failure type 4
3. Peri-operative atelectasis	c. Respiratory failure type 1
4. Cardiogenic shock	d. Respiratory failure type 3

A. 1-d, 2-a, 3-c, 4-b

B. 1-a, 2-d, 3-b, 4-c

C. 1-c, 2-a, 3-d, 4-b

D. 1-a, 2-c, 3-b, 4-b

---

2. In a patient presenting with respiratory distress and cardiogenic shock, which type of respiratory failure is primarily caused by underperfusion of respiratory muscles?

A. Type 1 respiratory failure

B. Type 2 respiratory failure

C. Type 3 respiratory failure

D. Type 4 respiratory failure

---

3. In a postoperative patient, which type of respiratory failure is primarily attributed to perioperative atelectasis and inadequate analgesia?

A. Type 1 respiratory failure

B. Type 2 respiratory failure

C. Type 3 respiratory failure

D. Type 4 respiratory failure

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	4
Question 3	3

Solution for Question 1:

Correct option: C - 1-c, 2-a, 3-d, 4-b

1. ARDS

c. Respiratory failure type 1

2. Status asthmaticus

a. Respiratory failure type 2

3. Peri-operative atelectasis

d. Respiratory failure type 3

4. Cardiogenic shock

b. Respiratory failure type 4

Respiratory Failure

Respiratory Failure

Examples

Management

Type I

ARDS, CHF

• Low volume ventilation

• Prone position and neuromuscular blockage

Type II

Status asthmaticus, acute exacerbation of COPD

• Tight fitting face mask (NIV)

• ET tube with IPPV - If due to diaphragmatic paralysis

Type III

Peri-operative atelectasis

• O2 supplementation

• Chest physiotherapy

Type IV

Decreased perfusion of respiratory muscles

• ET tube with IPPV

Incorrect options: A, B and D - Refer to the above explanation

Solution for Question 2:

Correct Option D - Type 4 respiratory failure:

• Type 4 respiratory failure, also known as respiratory muscle pump failure, occurs due to underperfusion of respiratory muscles, particularly in conditions such as cardiogenic shock. In cardiogenic shock, decreased cardiac output leads to inadequate perfusion of respiratory muscles, resulting in respiratory distress. Management involves addressing the underlying cause of shock, such as with interventions like Impella or inotropes, and providing respiratory support with interventions like endotracheal intubation and intermittent positive pressure ventilation.

Incorrect Options:

Option A - Type 1 respiratory failure: Characterized by low arterial oxygen levels (hypoxemia) with nor mal or low arterial carbon dioxide levels (normocapnia or hypocapnia). It is typically seen in conditions causing impaired gas exchange, such as pneumonia or pulmonary edema.

Option B - Type 2 respiratory failure: Characterized by low arterial oxygen levels (hypoxemia) along wit h high arterial carbon dioxide levels (hypercapnia). It is commonly associated with conditions causing v entilatory failure, such as severe COPD or neuromuscular diseases.

Option C - Type 3 respiratory failure: Due to Peri-op atelectasis

Solution for Question 3:

Correct Option C - Type 3 respiratory failure:

• Type 3 respiratory failure is caused by perioperative atelectasis, which commonly occurs in obese or elderly patients under general anesthesia. Atelectasis leads to decreased functional residual capacity (FRC) and collapse of basal lung segments, resulting in decreased oxygen saturation. Additionally, inadequate analgesia can cause patients to hyperventilate, leading to carbon dioxide washout and respiratory alkalosis. These factors collectively contribute to type 3 respiratory failure.

Incorrect Options:

Option A - Type 1 respiratory failure: Characterized by low oxygen levels (hypoxemia) with normal or lo w carbon dioxide levels. It is often caused by impaired gas exchange in the lungs, such as in pneumoni a or pulmonary edema.

Option B - Type 2 respiratory failure: Characterized by low oxygen levels (hypoxemia) along with high c arbon dioxide levels (hypercapnia). It is typically seen in conditions causing ventilatory failure, such as neuromuscular disorders or drug overdose.

Option D - Type 4
respiratory failure: This type of respiratory failure, not mentioned in the context, is primarily due to a de crease in oxygen levels (hypoxemia) secondary to circulatory failure or shock, as seen in cardiogenic s hock or severe sepsis.

Tuberculosis

1. A 67-year-old man presented to the OPD with complaints of chronic cough and fatigue for 2 weeks. He was recently diagnosed with pulmonary tuberculosis and treated with a four-drug anti-tuberculous treatment. The patient stated he had had small amounts of blood-streaked sputum for the past 2 weeks, but immediately before coming to the emergency department, he had coughed up a large volume of blood, estimated to be greater than 250 ml of fresh blood. The procedure of choice for controlling massive hemoptysis in this case is?

(or)

The procedure of choice for controlling massive hemoptysis in this case is?

A. Balloon catheter tamponade

B. Rigid bronchoscopy and photocoagulation

C. Bronchial artery embolization

D. Flexible bronchoscopy and cautery

---

2. Match the following nomenclature with their respective lesion sites in tuberculosis 1. Puhl's lesion a. Inactive supraclavicular lesion 2. Assman focus b. TB meningitis 3. Weigerts focus c. Active supraclavicular lesion 4. Rich focus d. Infraclavicular lesion 5. Simonds focus e. Liver 6. Simon focus f. Pulmonary vein

1. Puhl's lesion	a. Inactive supraclavicular lesion
2. Assman focus	b. TB meningitis
3. Weigerts focus	c. Active supraclavicular lesion
4. Rich focus	d. Infraclavicular lesion
5. Simonds focus	e. Liver
6. Simon focus	f. Pulmonary vein

A. 1-c, 2-d, 3-f, 4-b, 5-e, 6-a

B. 1-a, 2-d, 3-b, 4-e, 5-c, 6-f

C. 1-f, 2-c, 3-e, 4-b, 5-d, 6-a

D. 1-e, 2-c, 3-a, 4-b, 5-d, 6-f

---

3. Most common site for Extrapulmonary TB?

A. Pleura

B. Lymph node

C. Abdominal TB

D. Genito-urinary TB

---

4. All of the following are indications for CBNAAT except?

A. Smear negative, X-ray positive.

B. Extra-pulmonary TB

C. Smear negative, X-Ray unavailable.

D. Smear Positive, X-Ray negative

---

5. What is the treatment for a cold abscess?

A. Anti tubercular therapy

B. Incision and drainage

C. Anti tubercular therapy with antigravity drainage

D. Antibiotics

---

6. What is a ranke complex?

A. A Ghon focus with ipsilateral mediastinal lymphadenopathy

B. A calcified Gohn complex

C. A caseating granuloma

D. A primary calcification

---

7. Where is a Rassmusens aneurysm found?

A. Pulmonary artery

B. Bronchial artery

C. Abdominal aorta

D. Pulmonary vein

---

8. Snowstorm appearance on chest x-ray is seen in all these except?

A. Miliary TB

B. Silicosis

C. Hemosiderosis

D. Sarcoidosis

---

9. Which of the following is the correct order of most common to least common sites of extrapulmonary tuberculosis?

A. Lymph node> pleura> genitourinary tract

B. Pleura> genitourinary tract>lymph node

C. Genitourinary tract>lymph node> pleura

D. Genitourinary tract>pleura>lymph node

---

10. All of the following are pleural fluid findings seen in pleural tuberculosis except

A. Lymphocyte predominance

B. Decreased glucose levels

C. Elevated protein levels

D. Decreased levels of Adenosine deaminase (ADA)

---

11. XDR tb is resistant to all of the following drugs except?

A. Rifampin

B. Fluroquinolone

C. Kanamycin

D. Clofazimine

---

12. All of the following drugs are used in the treatment of HIV TB except

A. Rifampicin

B. Rifabutin

C. Isoniazid

D. Ethambutol

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	1
Question 3	2
Question 4	4
Question 5	3
Question 6	2
Question 7	1
Question 8	4
Question 9	1
Question 10	4
Question 11	4
Question 12	1

Solution for Question 1:

Correct option: C - Bronchial artery embolization

• In massive hemoptysis, the source of bleeding is the bronchial artery - Bronchial Artery Embolization (BAE) is the procedure of choice to control massive hemoptysis

• BAE utilizes X-rays to examine the bronchial arteries

• When the bleeding site is identified, all abnormal bronchial arteries to that region are embolized

• This method is especially helpful in cases of massive hemoptysis (bleeding > 240 to 300 mL/24 hours)

Incorrect options: A, B and D

Option A: Balloon catheter tamponade

• Balloon tamponade usually uses balloons inserted into the oesophagus, stomach, or uterus and inflated to alleviate bleeding - It is of no use in cases of massive hemoptysis

Option B: Rigid bronchoscopy and photocoagulation

• Rigid bronchoscopy and photocoagulation are more suitable for diagnosing and treating airway disorders

• They can play a small role in massive hemoptysis

Option D: Flexible bronchoscopy and cautery

• Flexible bronchoscopy can be either a diagnostic procedure or a therapeutic procedure

• It is not a method that is surgically appropriate for the treatment of massive hemoptysis

Solution for Question 2:

Correct option: A - 1-c, 2-d, 3-f, 4-b, 5-e, 6-a

1. Puhl's lesion

c. Active supraclavicular lesion

2. Assman focus

d. Infraclavicular lesion

3. Weigerts focus

f. Pulmonary vein

4. Rich focus

b. TB meningitis

5. Simonds focus

e. Liver

6. Simon focus

a. Inactive supraclavicular lesion

Incorrect Options: Option B, C and D - Refer to the above explanation

Solution for Question 3:

Correct Option B - Lymph node:

• Lymph node is the most common site for extrapulmonary TB

Incorrect Options:

Solution for Question 4:

Correct Option D - Smear Positive, X-Ray negative:

• A patient with a positive sputum smear for acid fast bacilli is considered to be a case of microbiologically confirmed tuberculosis and does not require further testing with CBNAAT/GENE Xpert.

Smear + CXR+

Smear + CXR +

Smear – CXR +

Smear –

CXR: Not available clinical suspicion

Microbiological confirmed TB

CBNAAT

PLHIV/MDR TB Suspicion

Solution for Question 5:

Correct Option - Option C:

• Anti tubercular therapy (given for 6 months) along with antigravity drainage is the choice of treatment for cold abscess

Incorrect Options:

Option A - Anti tubercular therapy: Anti tubercular therapy alone isn't sufficient in treating cold abscess

Option B - Incision and drainage: Incision and drainage should not be done for a cold abscess because it contains live bacteria that can cause fistula formation.

Option D - Antibiotics: Antibiotics are not indicated for the treatment of cold abscess

Solution for Question 6:

Correct Option B - A calcified Gohn complex:

• A Ghon complex with calcifications (option B) is known as a Ranke complex.

Incorrect Options:

• A tuberculous caseating granuloma (option c) is called a Ghon focus

• A Ghon focus with ipsilateral mediastinal lymphadenopathy (option A) is called a Ghon complex.

• Ranke Complex is not a primary calcification

Solution for Question 7:

Correct Option A - Pulmonary artery:

• Rasmussen’s aneurysm is an inflammatory pseudo-aneurysmal dilatation of a branch of the pulmonary artery adjacent to the tubercular cavity.

Incorrect Options:

option B - Bronchial artery: Rasmussen’s aneurysm does not occur in the bronchial arteries as they ha ve less connective tissue.

Option C - Abdominal aorta: Rasmussen’s aneurysm does not occur in the abdominal aorta.

Option D - Pulmonary vein: Rasmussen’s aneurysm does not occur in the pulmonary veins.

Solution for Question 8:

Correct Option D - Sarcoidosis:

• Sarcoidosis on chest x ray, has findings of bilateral hilar lymphadenopathy, not snowstorm appearance

Incorrect Options:

Options A, B, and C: All of these are differentials for snowstorm appearance

Solution for Question 9:

Correct Option A - Lymph node> pleura> genitourinary tract:

• Option A represents the correct order of most common to least common sites of extrapulmonary tuberculosis.

Incorrect Options:

• Option B, C and D are incorrect as explained.

Solution for Question 10:

Correct Option D - Decreased levels of Adenosine deaminase (ADA):

• Adenosine deaminase levels are elevated in pleural tuberculosis, not decreased. The elevated levels act as a screening test for diagnosis of pleural TB.

Incorrect Options:

Options A, B and C: These are the pleural fluid findings in Pleural Tb

Solution for Question 11:

Correct Option D - Clofazimine:

• Clofazimine is used in the treatment of XDR tb.

Incorrect Options:

• Options A, B and C- XDR tb is resistant to all the above drugs

Solution for Question 12:

Correct Option A - Rifampicin:

• Rifampicin when used with protease inhibitors like ritonavir, indinavir can cause a drug interaction, so rifabutin is used instead of rifampicin.(options A&B;)

Incorrect Options:

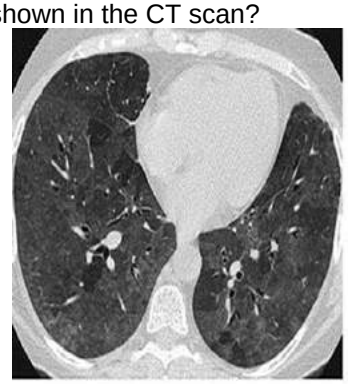
Options B, C and D: All the above drugs are used in the treatment of HIV TB.

Pneumoconiosis & Interstitial Lung Disease

1. A 38-year-old female patient presents to the OPD with a productive cough and dyspnoea. The CT chest of the patient is given below. Which of the following findings is shown in the CT scan?

(or)

Which of the following findings is shown in the CT scan?



A. Ground glass pattern

B. Honeycomb pattern

C. Crazy pavement pattern

D. Normal Scan

---

2. A 37-year-old male diagnosed with Sjogren syndrome presents to the clinic complaining of progressive shortness of breath. Further evaluation revealed an interstitial lung disease. Which subtype of interstitial lung disease is seen in patients with Sjogren syndrome?

(or)

Which subtype of interstitial lung disease is seen in patients with Sjogren syndrome?

A. Usual interstitial pneumonia

B. Non-specific interstitial pneumonia

C. Acute interstitial pneumonia

D. Cryptogenic organising pneumonia

---

3. A 55-year-old female patient presents with breathlessness on exertion and a dry cough for a month. On chest examination, there are fine inspiratory crackles. HRCT shows a bilateral, subpleural and basilar honeycombing pattern. Which pattern is expected in the pulmonary function tests of this patient?

(or)

A patient presents with breathlessness on exertion and a dry cough for a month. On chest examination, there are fine inspiratory crackles. HRCT shows a bilateral, subpleural, and basilar honeycombing pattern. Which pattern is expected in the pulmonary function tests of this patient?

A. FEV1/FVC ratio increased, and DLCO increased

B. FEV1/FVC ratio increased, and DLCO decreased

C. FEV1/FVC ratio decreased, and DLCO decreased

D. FEV1/FVC ratio decreased, and DLCO increased

---

4. All of the following conditions lead to nonspecific interstitial pneumonitis except?

A. Scleroderma

B. Polymyositis

C. Rheumatoid arthritis

D. Dermatomyositis

---

5. Match the following 1. Asbestosis a. Hay 2. Silicosis b. Sugar cane dust 3. Farmer's lung c. Cement 4. Bagassosis d. Cotton dust 5. Byssinosis e. Glass industry

1. Asbestosis	a. Hay
2. Silicosis	b. Sugar cane dust
3. Farmer's lung	c. Cement
4. Bagassosis	d. Cotton dust
5. Byssinosis	e. Glass industry

A. 1-a, 2-d, 3-b, 4-e, 5-c

B. 1-c, 2-e, 3-a, 4-b, 5-d

C. 1-c, 2-e, 3-b, 4-d, 5-a

D. 1-d, 2-b, 3-a, 4-c, 5-e

---

6. Match the interstitial lung diseases with their respective management a. Idiopathic pulmonary fibrosis 1. Steroids b. Non-specific interstitial pneumonitis 2. Pirfenidone + Nintedanib c. Connective tissue disorders 3. Prednisolone + Mycophenolate + Rituximab

a. Idiopathic pulmonary fibrosis	1. Steroids
b. Non-specific interstitial pneumonitis	2. Pirfenidone + Nintedanib
c. Connective tissue disorders	3. Prednisolone + Mycophenolate + Rituximab

A. a-1, b-2, c-3

B. a-2, b-3, c-1

C. a-1, b-3, c-2

D. a-3, b-2, c-1

---

7. Which of the following ILDs is not strongly associated with Smoking?

A. Desquamative interstitial pneumonia

B. Respiratory Bronchiolitis

C. Langerhans Cell Histiocytosis

D. Lymphangioleiomyomatosis

---

8. Which of the following is a drug which when used for a long period can cause Interstitial lung disease?

A. Amiodarone

B. Methylprednisolone

C. Streptomycin

D. Labetalol

---

9. Which of the following is the fungus that is directly involved in Farmer's lung?

A. Thermophilic Actinomycetes.

B. Ascomycetes

C. Candida

D. Basidiomycetes

---

10. Which of the following is the treatment of choice in Pulmonary Alveolar proteinosis?

A. Whole lung lavage

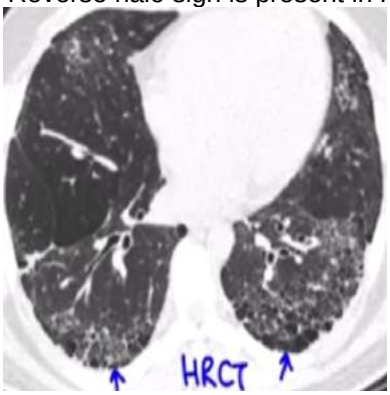
B. Lung Transplantation

C. Steroids

D. Prednisolone with Mycophenolate with Rituximab

---

11. Identify the condition where the Reverse halo sign is present in HRCT in the image given below.



A. Cryptogenic Organizing pneumonia

B. Aspergillus infection

C. Tuberculosis

D. Meningitis

---

12. All are correct about the pathophysiology of Pulmonary alveolar proteinosis except?

A. Type 2 Pneumocytes produce DPPC (Dipalmitoyl phosphatidylcholine) with surfactant Proteins

B. (Granulocyte-Macrophage colony-stimulating factor) produced by alveolar macrophages clears surfactant.

C. Clearance of surfactant decreased due to increased bioactivity of GM-CSF

D. Accumulation of surfactant in alveoli and later develops Pulmonary fibrosis

---

13. A 60-year-old male child was brought to the clinic with shortness of breath, dry cough, and hemoptysis for 3 days. On examination, cyanosis and clubbing, Cor Pulmonale were present.HRCT shows the honeycomb pattern. Which of the following is the diagnosis?

(or)

Which of the following is the diagnosis of the condition characterized by shortness of breath, dry cough, hemoptysis cyanosis, clubbing, Cor Pulmonale on examination, and honeycombing pattern on HRCT?

A. Interstitial Lung disease

B. Tuberculosis

C. Silicosis

D. Pneumonia

---

14. A 30-year-old patient came to the clinic with complaints of breathlessness on exertion, fatigue, and fever for 3 days. On examination by the Physician, the patient had chunky gelatinous sputum plugs. The doctor then advised Chest Xray and HRCT which showed a "Bat-wing" appearance of lung infiltrates and a “Crazy pavement" pattern respectively. Bronchoalveolar lavage was taken which showed the Presence of PAS-positive Lipoproteinaceous material .Which of the following is the diagnosis of this condition?

(or)

Which of the following is the diagnosis of the condition characterized bybreathlessness on exertion, fatigue, and fever, "Bat-wing" appearance of lung infiltrates, and “Crazy pavement" pattern on Chest x-ray and HRCT respectively?

A. Pulmonary alveolar proteinosis

B. Tuberculosis

C. Interstitial Lung disease

D. Asbestosis

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	2
Question 3	2

Question 4	3
Question 5	2
Question 6	2
Question 7	4
Question 8	1
Question 9	1
Question 10	1
Question 11	1
Question 12	3
Question 13	1
Question 14	1

Solution for Question 1:

Option A: Ground glass pattern

• Ground-glass opacity (GGO) is a non-specific term defined the as the presence of a hazy increase in lung density on high-resolution computed tomography (HRCT) that is not associated with obscuration of the underlying vessels or bronchial walls; if vessels are obscured, the term "consolidation" is preferred.

• GGO is produced by filling the alveolar gaps (by cells or fluid) or the thickening of the alveolar walls or interstitium.

• It represents the presence of various lung disorders, such as alveolar collapse, interstitial thickening, or air-space disease.

• GGO is difficult to identify radiographically, especially in moderate instances, because the differential diagnosis of GGO mostly relies on HRCT.

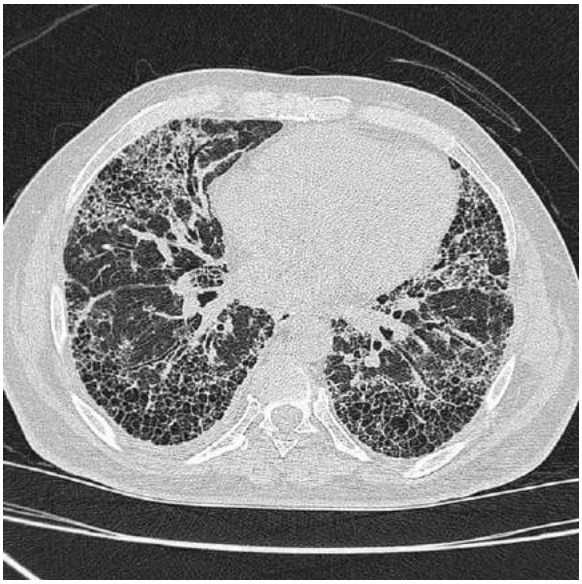
Option B: Honeycomb pattern

• The term "honeycomb lung" refers to the appearance of variously sized cysts on a backdrop of heavily scarred lung tissue.

• Microscopically, there are increased air spaces surrounded by fibrosis and hyperplastic or bronchiolar-type epithelium.

• These alterations, however, are generic and common in various end-stage interstitial lung illnesses (ILDs).

• In Usual Interstitial Pneumonitis, a honeycomb pattern is seen on HRCT along with traction bronchiectasis and ground-glass opacities.



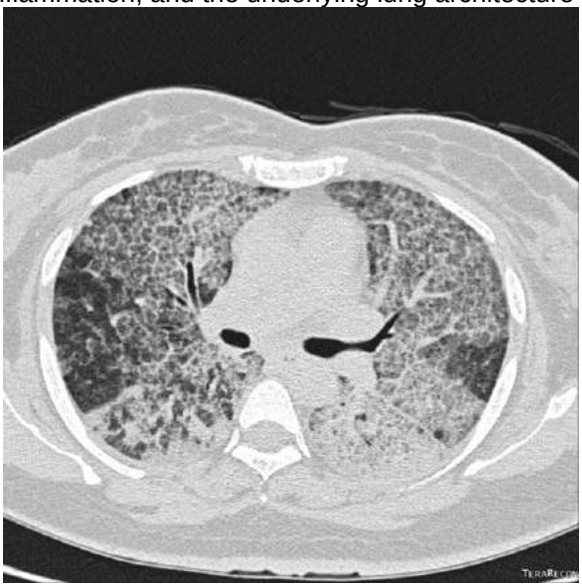
Option C: Crazy pavement pattern

• In pulmonary alveolar proteinosis, the X-ray shows bilateral, diffuse opacities, and the high-resolution computerized tomography (HRCT) shows a crazy-paving pattern.

• Pulmonary alveolar proteinosis (PAP) is caused by impaired surfactant clearance that leads to its accumulation in the alveoli.

• It produces chunky, gelatinous sputum stains with periodic-acid Schiff (PAS) stains.

• There is little or no lung inflammation, and the underlying lung architecture is preserved.



Option D: Normal Scan

• It is not a normal CT scan as haziness in the lung fields can be observed instead of air which is usually black on CT.

Solution for Question 2:

Correct option: B - Non-specific interstitial pneumonia

• Fibrotic non-specific interstitial pneumonia (NSIP) is the most common subtype of interstitial lung disease (ILD) seen in patients with Sjogren syndrome

• NSIP is also the most common subtype of ILD seen in patients with connective tissue disorders

• NSIP is more common in females and males

• NSIP has a good prognosis

Incorrect options: A, C and D

Option A: Usual interstitial pneumonia

• Usual interstitial pneumonitis is found in idiopathic pulmonary fibrosis

Option C: Acute interstitial pneumonia

• Acute interstitial pneumonitis, also known as Hamman-Rich syndrome, presents as an acute respiratory distress syndrome-like illness

Option D: Cryptogenic organising pneumonia

• Cryptogenic organising pneumonia has an unknown etiology

Solution for Question 3:

Option B: FEV1/FVC ratio increased, and DLCO decreased

• The given clinical scenario is a case of Interstitial lung disease.

• In pulmonary function testing (PFT), airway narrowing, lung volume, and gas exchange capacity are quantified and compared with normal values adjusted for age, gender, and height.

• Most forms of interstitial lung disease will show a restrictive pattern on PFT, i.e. FEV1/FVC ratio increased and DLCO decreased.

Option A: FEV1/FVC ratio increased, and DLCO normal

• Increased FEV1/FVC ratio shows a restrictive pattern of pulmonary function tests

• A normal DLCO indicates an extrinsic issue such as obesity or neuromuscular disease like myasthenia gravis.

Option C: FEV1/FVC ratio decreased, and DLCO decreased

• Decreased FEV1/FVC ratio shows an obstructive pattern of pulmonary function tests.

• Decreased DLCO points towards emphysema.

Option D: FEV1/FVC ratio decreased, and DLCO normal

• Decreased FEV1/FVC ratio shows an obstructive pattern of pulmonary function tests.

• Normal DLCO points towards asthma or COPD.

Solution for Question 4:

Correct Option C - Rheumatoid arthritis:

• Causes Usual Interstitial Pneumonitis (UIP).

Incorrect Options:

Option A, B & C: Are associated with nonspecific interstitial pneumonitis histologically

Solution for Question 5:

Correct option: B - 1-c, 2-e, 3-a, 4-b, 5-d

1. Asbestosis

c. Cement

2. Silicosis

e. Glass industry

3. Farmer's lung

a. Hay

4. Bagassosis

b. Sugar cane dust

5. Byssinosis

d. Cotton dust

Incorrect options: A, C & D - Refer to the above explanation

Solution for Question 6:

Correct option: B - a-2, b-3, c-1

Incorrect options: A, C & D - Refer to the above explanation

Solution for Question 7:

Correct option D - Lymphangioleiomyomatosis:

• This Interstitial lung disease is not strongly associated with Smoking

Incorrect Options:

Options A, B, C:

• These are the Interstitial lung diseases strongly associated with smoking

Solution for Question 8:

Correct Option A - Amiodarone:

• Amiodarone is a drug that when used for long periods can cause Interstitial lung disease

Incorrect Options:

Options B, C, D:

• These drugs do not cause Interstitial lung disease

Solution for Question 9:

Correct Option A -Thermophilic actinomycetes:

• The fungus that is involved in Farmer's lung is Thermophilic Actinomycetes.

Incorrect Options:

Options B, C, D:

• These are not the fungi associated with Farmer's lung

Solution for Question 10:

Correct Option A - Whole lung lavage

• Whole lung lavage is the treatment option for Pulmonary alveolar proteinosis

Incorrect Options

Options B, C, D:

• These are not the treatment options for Pulmonary alveolar proteinosis

Solution for Question 11:

Correct option A - Cryptogenic Organizing pneumonia

• Cryptogenic Organizing pneumonia is a condition where a reverse halo sign is seen in HRCT

Incorrect Options:

Options B, C, D:

• These are not the conditions where the reverse halo sign is seen

Solution for Question 12:

Correct Option C - Clearance of surfactant is decreased due to increased bioactivity of GM-CSF

• This is incorrect about the pathophysiology of Pulmonary alveolar proteinosis

• The correct statement is that the clearance of surfactant is decreased due to decreased bioactivity of GM-CSF

Incorrect Options:

Options A, B, D:

• These are correct about the pathophysiology of Pulmonary alveolar proteinosis

Solution for Question 13:

Correct Option A - Interstitial Lung disease

• The condition described in the question is Interstitial Lung disease

• It is characterized by shortness of breath, dry cough, and hemoptysis

• On examination, cyanosis and clubbing, Cor Pulmonale are present

• HRCT showed a combing pattern, Reverse Halo Sign, and Traction Bronchiectasis

Incorrect Options:

Options B, C, D:

• These are not the diagnoses of the above-described scenario

Solution for Question 14:

Correct Option A - Pulmonary alveolar proteinosis:

• The condition in the scenario is Pulmonary alveolar proteinosis

• It is characterized by breathlessness on exertion, fatigue, and fever, chunky gelatinous sputum plugs.

• Chest Xray and HRCT showed a "Bat-wing" appearance of lung infiltrates and a “Crazy pavement" pattern respectively

• PFT (Pulmonary function tests): Restrictive pattern (FEV / 1 FVC is Normal or increased)

• The investigation of choice is BAL (Bronchoalveolar lavage): Presence of PAS-positive Lipoproteinaceous material

Incorrect Options:

Options B, C, D:

• These are not the diagnoses of the above-described scenario

Pneumothorax & Pleural Effusion

1. A 45-year-old male with a history of obstructive sleep apnea (OSA), hyperlipidemia, hypertension, diabetes, and 10 days of progressively increasing dyspnea with exertion presented. Thoracocentesis was performed after a chest scan revealed a significant left pleural effusion. Which of the following is not part of the criteria used to distinguish between exudate and transudate?

(or)

Which of the following is not part of the criteria used to distinguish between exudate and transudate?

A. Pleural fluid protein/serum protein ratio > 0.5

B. Pleural fluid lactate dehydrogenase (LDH)/serum LDH ratio > 0.6

C. Pleural fluid LDH level > two-thirds the upper limit of the laboratory's reference range of serum LDH

D. Pleural fluid sugar < 2/3rd of blood sugar

---

2. A 24-year-old smoker presented to the emergency department with a non-productive cough, shortness of breath, and sudden onset pleuritic pain on the right side of the chest. On physical examination, the patient is afebrile and vitally stable. A chest examination showed diminished breath sounds on the right hemithorax. The physician ordered a chest X-ray, and a subsequent diagnosis of primary spontaneous pneumothorax (PSP) was made. Which of the following should be the appropriate management step for the above-mentioned case?

A. Intermittent positive pressure ventilation (IPPV)

B. Closed drainage

C. Simple needle aspiration

D. Thoracotomy

---

3. Which of the following is not a feature of tension pneumothorax?

A. Respiratory alkalosis

B. Decreased cardiac output

C. Decreased venous return

D. Absent breath sounds

---

4. Minimum Amount of fluid in the pleural cavity required for clinical detection is?

A. 100ml

B. 200ml

C. 300ml

D. 500ml

---

5. Which of the following causes increased hydrostatic pressure, leading to pleural effusion?

A. Cirrhosis

B. Congestive heart failure

C. Protein-losing enteropathy

D. Nephrotic syndrome

---

6. Which of the following is not part of Light's criteria?

A. Pleural fluid protein > 0.5 times of serum protein

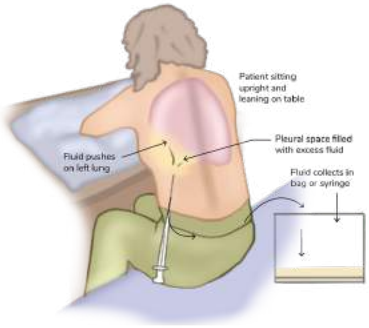
B. Pleural fluid LDH > 0.6 times of serum LDH

C. Pleural fluid LDH > 2/3 times upper reference limit of serum LDH

D. Pleural fluid sugar < 60 mg%

---

7. Identify the procedure being done and mark the option that has the appropriate site for treating pleural effusion



A. 8th ICS mid-scapular line

B. 6th ICS mid-axillary line

C. 5th ICS mid-scapular line

D. 8th ICS mid-axillary line

---

8. All of the following conditions have pleural fluid glucose levels equal to plasma, except

A. Tuberculosis

B. Pancreatitis

C. Empyema

D. Uncomplicated para pneumonia

Correct Answers

Question	Correct Answer
Question 1	4

Question 2	3
Question 3	1
Question 4	3
Question 5	2
Question 6	4
Question 7	1
Question 8	3

Solution for Question 1:

Correct option: D - Pleural fluid sugar < 2/3rd of blood sugar

• Pleural fluid protein > 0.5 times of serum protein

• Pleural fluid LDH > 0.6 times of serum LDH

• Pleural fluid LDH > 2/3 times upper reference limit of serum LDH

• Ideally any 1 of 3 present is sufficient for diagnosis of exudative pleural effusion However, in about 25% of cases light's criteria may misdiagnose transudate as exudate

• However, in about 25% of cases light's criteria may misdiagnose transudate as exudate

• However, in about 25% of cases light's criteria may misdiagnose transudate as exudate

Incorrect options: A, B and C

Option A: Pleural fluid protein/serum protein ratio > 0.5

• A pleural fluid protein / serum protein > 0.5 is a Light's criterion for exudative effusion

• Most exudative effusions are caused by pulmonary embolism, malignancy, TB, and pneumonia

Option B: Pleural fluid lactate dehydrogenase (LDH)/serum LDH ratio > 0.6

• Effusion lactate dehydrogenase (LDH)/serum LDH ratio > 0.6 is a Light's criterion for exudative effusion

• An enzyme called lactate dehydrogenase (LDH) is often found inside body cells

• Cellular damage causes LDH to flow out and mix with the effusion

Option C: Effusion LDH level >
two-thirds of the upper limit of the laboratory's reference range of serum LDH

• Effusion LDH level > two-thirds of the upper limit of the laboratory's reference range of serum LDH is a Light's criterion for exudative effusion

• LDH leaks from damaged cells and combines with the effusion

• A high LDH value in the effusion is a sign of damaged cells, which usually result from an exudative process

Solution for Question 2:

Correct option: C - Simple needle aspiration

• Primary spontaneous pneumothorax (PSP), a pneumothorax without underlying lung illness, is more common in young, slim males

• Pleural blebs or bullae that have burst are the typical culprits

• Most PSP cases are confirmed by an upright posteroanterior chest radiograph, which can accurately determine the size of the pneumothorax

• Needle aspiration should be performed on patients who have a primary spontaneous pneumothorax for the first time, who are hemodynamically stable, have a large pneumothorax (> 2-3 centimetres of air on a chest X-ray or > 15% of the hemithorax), have a progressive pneumothorax, or who are symptomatic with chest pain or dyspnea

• The patient can be discharged once the treatment is successful (< 2 millimetres of air in the chest X-ray and an improvement in the breathing pattern), with follow-up from 2 to 4 weeks

Incorrect options: A, B and D

Option A: Intermittent positive pressure ventilation (IPPV)

• Intermittent positive pressure ventilation (IPPV) is considered if the patient's respiratory status is in peril, is likely to become so, or when respiratory failure affects other bodily systems

Option B: Closed drainage

• A chest tube is often employed when a pneumothorax cannot be resolved with needle aspiration

Option D: Thoracotomy

• Surgery is indicated when an initial episode of PSP returns and causes chronic air leaks or a collapsed lung following the insertion of pleural drainage

• Video-assisted thoracoscopic surgery (VATS) for primary spontaneous pneumothorax has replaced open thoracotomy

Solution for Question 3:

Correct option: A - Respiratory alkalosis

• A tension pneumothorax is a serious condition caused by trapped air in the pleural space under positive pressure, displacing mediastinal structures and impairing cardiovascular function

• The most prevalent causes of iatrogenic pneumothorax are chest trauma, transthoracic needle aspiration, and central venous catheters

• In extreme situations, the increased pressure might compress the heart, contralateral lung, and vascular structures, resulting in hemodynamic instability

• In pneumothorax, the physiologic compensation consisting of hyperventilation and chest expansion is failed, resulting in respiratory acidosis

Incorrect options: B, C and D

Option B: Decreased cardiac output

• The increasing accumulation of air in the pleural space results in ipsilateral full lung collapse and impingement on the mediastinum, with the heart shifting to the uninvolved side

• It reduces cardiac output by restricting ventricular filling

Option C: Decreased venous return

• Hemodynamic instability can result from increased pressure compressing the vasculature, the opposing lung, and the heart

• It is attributed to decreased venous return and poor heart filling

• Along with these effects, hypoxemia causes pulmonary vasoconstriction and raises pulmonary vascular resistance

Option D: Absent breath sounds

• Pneumothorax is indicated by diminished or missing breath sounds on the ipsilateral side, decreased tactile fremitus, hyper-resonant percussion sounds, and potential asymmetrical lung expansion on lung auscultation

Solution for Question 4:

Correct Option C - 300ml:

• Is the minimum amount of fluid in the pleural cavity for clinical detection.

Incorrect Options:

Solution for Question 5:

Correct Option: B - Congestive heart failure

• Hydrostatic pressure will drive the fluid out of the vascular space/capillaries while oncotic pressure will hold the fluid back in the intravascular compartment

• Any condition causing an increase in hydrostatic pressure or decrease in oncotic pressure would lead to excess pleural fluid accumulation in the pleural space

• Conditions causing an increase in hydrostatic pressure: CHF (most common) Constrictive pericarditis Valvular lesions

• CHF (most common)

• Constrictive pericarditis

• Valvular lesions

• CHF (most common)

• Constrictive pericarditis

• Valvular lesions

Incorrect Options: A, C and D: They are associated with decrease in oncotic pressure due to low produ ction or increased loss of proteins

Solution for Question 6:

Correct option: D - Pleural fluid sugar < 60 mg%

• Pleural fluid protein > 0.5 times of serum protein

• Pleural fluid LDH > 0.6 times of serum LDH

• Pleural fluid LDH > 2/3 times upper reference limit of serum LDH

Incorrect options: A, B and C - Refer to the above explanation

Solution for Question 7:

Correct option: A - 8th ICS mid-scapular line

• Preferred site for thoracentesis: 8th ICS in the mid-scapular line

Incorrect options: B, C and D - Refer to the above explanation

Solution for Question 8:

Correct option: C - Empyema

Etiology or type of effusion

Gross appearance

White Blood Cell Count (Cells/mcL)

Red blood Cell Count (Cells/mcL)

Glucose

Comments

Malignancy

Turbid to bloody: Occasionally serous

1000 to 100,000 M

100 to several hundred thousand

Equal to serum levels: <60 mg/dl in 15% of cases

Eosinophilia uncommon: Positive result on cytologic examination

Uncomplicated

para pneumonia

Clear to turbid

5000-25,000 P

< 5000

Equal to serum levels

Tube thoracostomy unnecessary

Empyema

Turbid to purulent

25,000 –100,000 P

<5000

Less than serum levels: Often very low

Drainage necessary: Putrid odor suggests anaerobic infection

Tuberculosis

Serous to

serosanguineous

5000 – 10,000 M

<10,000

Equal to serum levels: Occasionally 60mg/dL

Protein > 4.0g/dL (may exceed 5g/dL) eosinophils cells (>5%) make diagnosis unlikely

Rheumatoid

Turbid: Greenish yellow

1000-20,000 M or P

<1000

< 40 mg/dL

Secondary empyema common: High LD, low compliment, high rheumatoid factor, cholesterol crystal ar e characteristic

Pulmonary

infarction

Serous to grossly bloody

1000- 50,000 M or P

100-100,000

Variable findings: No pathognomonic features

Esophageal

rupture

Turbid to purulent red-brown

<5000 to 50,000 P

1000 – 10,000

Usually, low

High amylase level (salivary origin): Pneumothorax in 25% cases: effusion usually on left side: pH <6.0 strongly suggests diagnosis

Pancreatitis

Turbid to serosanguineous

1000 – 50,000 P

Equals to serum

Usually left-sided: High amylase level

• P = Polymorphonuclear neutrophils

• M = Monocytes

Incorrect options: A, B and D - Refer to the above explanation

ABG Interpretation

1. A young male had an episode of sudden breathing difficulty and collapsed when he visited a hill station. He is a known case of bronchial asthma. He was rushed to the ER, and the doctor diagnosed it as severe acute asthma. Arterial blood gas investigation reveals: pH = 7.24 PaCO2 = 60 mmHg PaO2 = 65 mmHg HCO3 = 24 mEq/L What is the diagnosis?

A. Uncompensated respiratory acidosis

B. Compensated respiratory acidosis

C. Uncompensated respiratory alkalosis

D. Compensated respiratory alkalosis

---

2. A 35-yar-old male was rushed to the hospital with complaints of drowsiness, confusion and mild shortness of breath in the night. ABG analysis shows pH 7.20, PCO2 of 70, PO2 of 65, HCO3 of 24,. What is the diagnosis?

A. Uncompensated respiratory acidosis

B. Compensated respiratory acidosis

C. Uncompensated respiratory alkalosis

D. Compensated respiratory alkalosis

---

3. A 50-year-old female came to the hospital complaining of respiratory difficulty. She was subsequently diagnosed with Chronic bronchitis. ABG shows a pH of 7.35, PCO2 of 55, HCO3 of 30,.What is the Acid-Base disorder?

A. Fully compensated respiratory acidosis

B. Uncompensated respiratory acidosis

C. Partially compensated respiratory alkalosis

D. Fully compensated respiratory alkalosis

---

4. A 50-year-old male presents to the emergency department with a complaint of severe breathing difficulty. The patient looks cyanosed. ABG values show: pH = 7.31 PaCO2 = 75 mmHg HCO3 = 30 mEq/L What is the diagnosis?

A. Fully compensated respiratory acidosis

B. Partially compensated respiratory acidosis

C. Partially compensated respiratory alkalosis

D. Fully compensated respiratory alkalosis

---

5. A 23-year-old female patient who was about to give her university exam started having a panic attack and was hyperventilating. She started feeling dizzy and was rushed to the hospital. ABG analysis shows pH of 7.49, PCO2 of 28, and HCO3 of 24mEq/L,. What is the diagnosis?

A. Uncompensated respiratory acidosis

B. Compensated respiratory acidosis

C. Uncompensated respiratory alkalosis

D. Compensated respiratory alkalosis

---

6. A 30-year-old man who has been studying the ecological changes at Mount Everest base camp for the past 2 weeks gets a blood gas analysis done. His ABG analysis shows: pH = 7.51 PCO2 = 25 mmHg HCO3 = 19 mEq/L What is the diagnosis?

A. Uncompensated respiratory acidosis

B. Partially compensated respiratory acidosis

C. Uncompensated respiratory alkalosis

D. Partially compensated respiratory alkalosis

---

7. Identify the disorder with Arterial blood gas values of pH 7.48, PCO2 of 30, and HCO3 of 21mEq/L.

A. Uncompensated respiratory acidosis

B. Partially Compensated respiratory acidosis

C. Partially compensated respiratory alkalosis

D. UnCompensated respiratory alkalosis

---

8. A 50-year-old female was rushed to the hospital with complaints of dizziness and shortness of breath. The patient is a known case of DM type 2 but neglected medications for the past three days due to a busy schedule. Examination showed tachypnea and tachycardia. ABG analysis shows a pH of 7.28, PCO2 of 35mmHg and HCO3 of 14mEq/L. What is the diagnosis?

A. Uncompensated Metabolic acidosis

B. Compensated Metabolic acidosis

C. Uncompensated respiratory alkalosis

D. Compensated respiratory alkalosis

---

9. A 40-year-old male who is a known case of chronic kidney disease complains of breathing difficulty and lethargy for the past 5 days. ABG analysis shows a pH of 7.38, PCO2 of 29mmHg, and HCO3 of 18mEq/L. What is the diagnosis?

A. Uncompensated Metabolic acidosis

B. Compensated Metabolic acidosis

C. Uncompensated respiratory alkalosis

D. Compensated respiratory alkalosis

---

10. ABG analysis shows pH 7.30, PCO2 30mmHg,, HCO3 20mEq/L,. What is the diagnosis?

A. Partially compensated Metabolic acidosis

B. Fully Compensated Metabolic acidosis

C. Uncompensated respiratory alkalosis

D. Compensated respiratory alkalosis

---

11. A 50-year-old male who is a known case of HTN, DM and heart failure on medications has an ABG analysis. ABG analysis shows pH 7.38, PCO2 of 30mmHg, and HCO3 of 18mEq/L. What is the diagnosis?

A. Partially compensated Metabolic acidosis

B. Fully Compensated Metabolic acidosis

C. Uncompensated respiratory alkalosis

D. Compensated respiratory alkalosis

---

12. ABG analysis shows pH 7.50, PCO2 of 40mmHg, and HCO3 of 32mEq/L. What is the diagnosis?

A. Partially compensated Metabolic acidosis

B. Compensated respiratory acidosis

C. Uncompensated metabolic alkalosis

D. Compensated metabolic alkalosis

---

13. ABG analysis shows pH 7.47, PCO2 of 47mmHg,, and HCO3 of 33mEq/L,. What is the diagnosis?

A. Partially compensated respiratory acidosis

B. Fully Compensated respiratory acidosis

C. Partially compensated metabolic alkalosis

D. Fully Compensated metabolic alkalosis

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	1
Question 3	1
Question 4	2
Question 5	3
Question 6	4
Question 7	3
Question 8	1
Question 9	2
Question 10	1

Question 11	2
Question 12	3
Question 13	3

Solution for Question 1:

Correct Option A - Uncompensated respiratory acidosis:

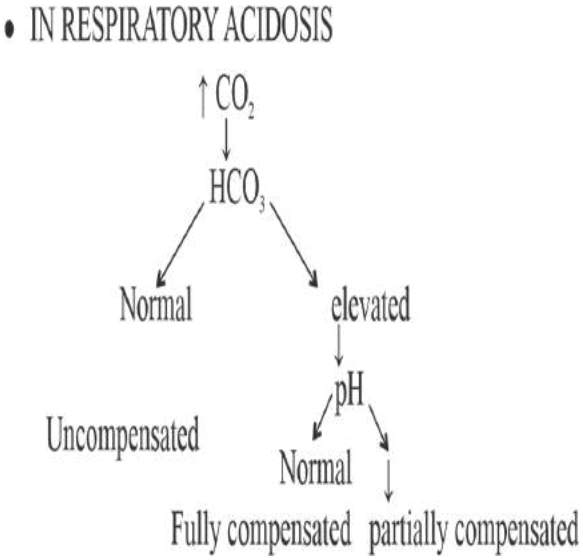
ABG - Normal parameters:

• pH: 7.35-7.45

• PaO2: 60 - 100 mmHg

• PaCO2: 35 - 45 mmHg

• HCO3: 22 to 26 mEq/L



In this question:

• pH: 7.24 = Acidic

• PaCO2 = 60 mmHg = Elevated

• HCO3 = 24 mEq/L = Normal

Incorrect options: B, C and D - Refer to the above explanation

Solution for Question 2:

Correct Option A - Uncompensated respiratory acidosis:

Normal parameters of ABG-

• pH- 7.35-7.45

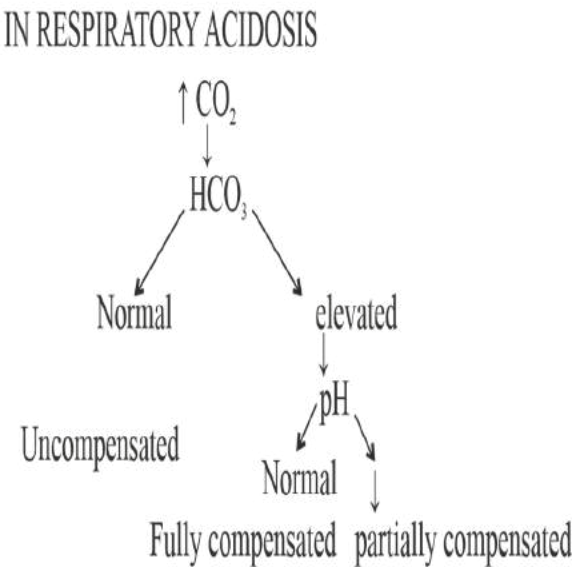
• pO2: 60-100mmHg

• pCO2: 35-45mmHg

• HCO3: 22-26mEq

• Anion gap; Na-(Cl+HCO3): 6-12 mEq/L

• Always look for pH ,pCO2 and HCO3 first



• In acute compensation- 10 mm Hg increase in pCO2 : 1 mEq increase in HCO3

• pH: 7.20 (acidotic)

• PCO2 – 70 (elevated)

• HCO3 – 24: (normal) Here AG (anion gap) = 137-(100+27)= 10 meq

• pH is below 7.35 hence this is an acidosis

• PCO2 is elevated (above 45mmHg)pointing towards a respiratory component to the acidosis

• HCO3 is normal hence there is no metabolic alkalosis or acidosis

• Therefore this is a case of Uncompensated Respiratory Acidosis

pH: 7.20 (acidotic)

PCO2 – 70 (elevated)

HCO3 – 24: (normal)

Here AG (anion gap) = 137-(100+27)= 10 meq

Incorrect Options:

Option B, C & D:

• Refer to the above explanation

Solution for Question 3:

Correct Option A - Fully Compensated respiratory acidosis:

Normal parameters of ABG-

• pH-7.35-7.45

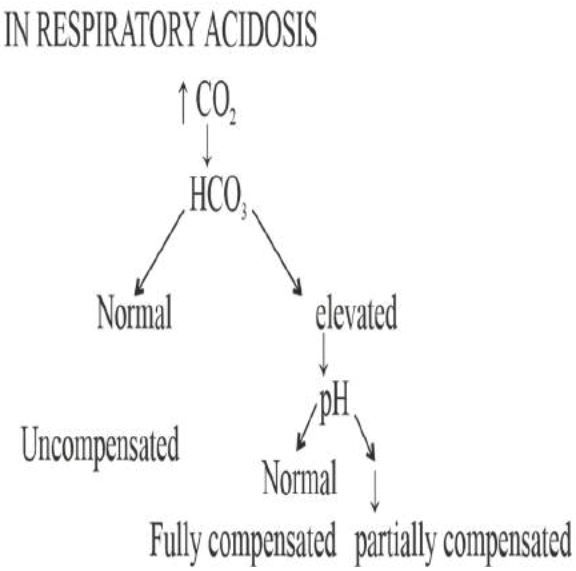
• pO2-60-100

• pCO2-35-45mmHg

• HCO3-22-26mEq

• Anion gap-Na-(Cl+HCO3)

• Always look for pH, pCO2 and HCO3 first



• In acute compensation- 10 mm Hg increase in pCO2: 1 mEq increase in HCO3

• In chronic compensation for respiratory acidosis: 10 mm Hg increase in pCO2 : 3-4 mEq/L increase in HCO3 pH: 7.35 -NORMAL PCO2 – 55(elevated) HCO3 – 30: elevated

• pH: 7.35 -NORMAL

• PCO2 – 55(elevated)

• HCO3 – 30: elevated

• pH normal. This indicates that either there is no acid-base disorder, or there is a disorder that has been fully compensated.

• PCO2 is elevated (above 45mmHg)pointing towards a respiratory acidosis

• HCO3 is increased (above 26mEq/L) poiting towards a metabloic alkalosis

• The history is of Chronic bronchitis. Which can lead to a primary respiratory acidosis

• Expected rise in HCO3 in chronic respiratory acidosis is 3-4mEq per 10mmHG increase in CO2

• Hence increase should be 3-4mEq (CO2 rise is 10mmHg above 45mmHg)

• 26+4= 30 which is this patient’s HCO3

• Therefore this is a case of Respiratory Acidosis fully compensated by metabolic alkalosis

• Chronic bronchitis leads to build of CO2 and increase in hydrogen ions with a compensatory absorption of bicarbonate in the PCT leads to the diagnosis of RESPIRATORY ACIDOSIS

• Since the HCO3 levels are elevated and normal ph -it is a fully Compensated respiratory acidosis

• pH: 7.35 -NORMAL

• PCO2 – 55(elevated)

• HCO3 – 30: elevated

Incorrect Options:

Option B, C & D: Refer to the above explanation

Solution for Question 4:

Correct option: B - Partially compensated respiratory acidosis

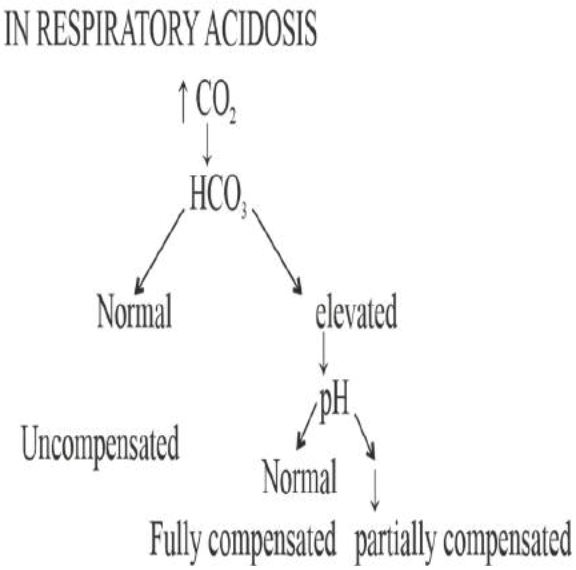
ABG - Normal parameters:

• pH: 7.35-7.45

• PaO2: 60 - 100 mmHg

• PaCO2: 35 - 45 mmHg

• HCO3: 22 to 26 mEq/L



In this question:

• pH: 7.31 = Acidic

• PaCO2 = 75 mmHg = Elevated

• HCO3 = 30 mEq/L = Elevated

Incorrect options: A, C and D - Refer to the above explanation

Solution for Question 5:

Correct Option C - Uncompensated respiratory alkalosis:

Normal parameters of ABG-

• pH-7.35-7.45

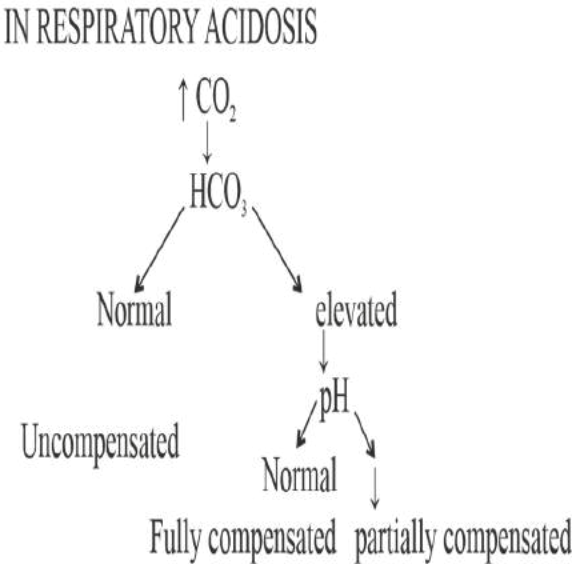
• pO2-60-100

• pCO2-35-45mmHg

• HCO3-22-26mEq

• Anion gap-Na-(Cl+HCO3)

• Always look for pH, pCO2 and HCO3 first



• Acute compensation- For 10 mm Hg decrease in pCO2 : HCO3 decreases by 2mEq pH: 7.49-alkalosis PCO2 – 28(reduced) HCO3 – 24(normal) pH is above 7.35 hence this is an alkalosis PCO2 is reduced (below 35mmHg)pointing towards a respiratory component to the alkalosis HCO3 is normal hence there is no compensatory acidosis Therefore this is a case of Uncompensated Respiratory Alkalosis

• pH: 7.49-alkalosis

• PCO2 – 28(reduced)

• HCO3 – 24(normal)

• pH is above 7.35 hence this is an alkalosis

• PCO2 is reduced (below 35mmHg)pointing towards a respiratory component to the alkalosis

• HCO3 is normal hence there is no compensatory acidosis

• Therefore this is a case of Uncompensated Respiratory Alkalosis

• Taking history into account. Hyperventilation causes CO2 washout which is the main cause of respiratory alkalosis.

• The acute change in pH has not allowed the kidneys enough time to excrete HCO3 to compensate for the alkalosis.

• pH: 7.49-alkalosis

• PCO2 – 28(reduced)

• HCO3 – 24(normal)

• pH is above 7.35 hence this is an alkalosis

• PCO2 is reduced (below 35mmHg)pointing towards a respiratory component to the alkalosis

• HCO3 is normal hence there is no compensatory acidosis

• Therefore this is a case of Uncompensated Respiratory Alkalosis

Solution for Question 6:

Correct option: D - Partially compensated respiratory alkalosis

ABG - Normal parameters:

• pH: 7.35-7.45

• PaO2: 60 - 100 mmHg

• PaCO2: 35 - 45 mmHg

• HCO3: 22 to 26 mEq/L

In this question:

• pH: 7.51 = Alkalosis

• PaCO2 = 25 mmHg = Decreased

• HCO3 = 19 mEq/L = Decreased - Compensation is taking place

This is a case of acclimitization. Exposure to high altitudes causes chronic hyperventilation due to low PO2 at high altitudes. Hyperventilation causes CO2 washout and respiratory alkalosis. A few days later , renal compensation starts taking place, and there will be compensatory metabolic alkalosis.

Solution for Question 7:

Correct Option C - Partially Compensated respiratory alkalosis:

Normal parameters of ABG-

• pH-7.35-7.45

• pO2-60-100

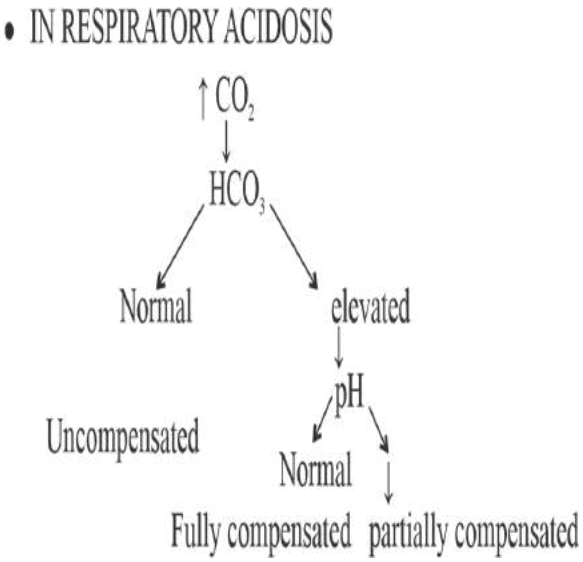
• pCO2-35-45mmHg

• HCO3-22-26mEq

• Anion gap-Na-(Cl+HCO3)

• Always look for pH ,pCO2 and HCO3 first

• In Respiratory Acidosis



• Acute compensation- For 10 mm Hg decrease in pCO2 : HCO3 decreases by 2mEq pH: 7.48-Alkalotic PCO2 – 30(reduced) HCO3 – 21(reduced) pH is above 7.35 hence this is an alkalosis PCO2 is reduced (below 35mmHg)pointing towards a respiratory component to the alkalosis HCO3 is reduced. Therefore there is a compensatory alkalosis

• pH: 7.48-Alkalotic

• PCO2 – 30(reduced)

• HCO3 – 21(reduced)

• pH is above 7.35 hence this is an alkalosis

• PCO2 is reduced (below 35mmHg)pointing towards a respiratory component to the alkalosis

• HCO3 is reduced. Therefore there is a compensatory alkalosis

• Since pH is alkalotic in spite of compensation,

• This is a case of Partially Compensated Respiratory Alkalosis

• pH: 7.48-Alkalotic

• PCO2 – 30(reduced)

• HCO3 – 21(reduced)

• pH is above 7.35 hence this is an alkalosis

• PCO2 is reduced (below 35mmHg)pointing towards a respiratory component to the alkalosis

• HCO3 is reduced. Therefore there is a compensatory alkalosis

Solution for Question 8:

Correct Option A - Uncompensated metabolic acidosis:

Normal parameters of ABG-

• pH-7.35-7.45

• pO2-60-100

• pCO2-35-45mmHg

• HCO3-22-26mEq

• Anion gap-Na-(Cl+HCO3)

• Always look for pH ,pCO2 and HCO3 first

• pH: 7.28-acidotic

• PCO2 – 35(normal)

• HCO3 – 14(reduced)-

• pH is low hence this is a case of acidosis

• PCO2 is normal. Hence a respiratory cause is unlikely.

• HCO3 is reduced. Hence this is a case of Metabolic Acidosis

• Since there are no compensatory CO2 changes,

• This is an ABG of Uncompensated Metabolic Acidosis

• Looking at the history given. This is a diabetic patient who has been off medications. The ensuing hyperglycemia can lead to Diabetic Ketoacidosis which is likely the cause of this patient's metabolic acidosis.

• Note: DKA is more commonly associated with Type 1 DM but it can be present in severe insulin-requiring Type 2 DM as well.

Looking at the history given. This is a diabetic patient who has been off medications. The ensuing hype rglycemia can lead to Diabetic Ketoacidosis which is likely the cause of this patient's metabolic acidosis .

Note: DKA is more commonly associated with Type 1
DM but it can be present in severe insulin-requiring Type 2 DM as well.

Solution for Question 9:

Correct Option 2 - Compensated metabolic acidosis:

Normal parameters of ABG-

• pH-7.35-7.45

• pO2-60-100

• pCO2-35-45mmHg
• HCO3-22-26mEq
• Anion gap-Na-(Cl+HCO3)
• For compensation or not always look for pH after solving the problem
• Always look for pH ,pCO2 and HCO3 first

• pH: 7.38-Normal
• PCO2 – 29(reduced)
• HCO3 – 18(reduced)-
• pH is normal hence there is either a compensated disorder or no acid-base disorder.
• The history of CKD and the pH on the lower side of normal favours a disgnosis of acidosis.
• PCO2 is reduced. This would not cause an acidosis
• HCO3 is reduced. Hence this is a case of Metabolic Acidosis
• Considering there is reduced PCO2 there is a compensatory respiratory alkalosis.
• pH is normal hence this is a compensated Metabolic Acidosis

Solution for Question 10:

Correct Option A - Partially compensated Metabolic acidosis:

Normal parameters of ABG-
• pH-7.35-7.45
• pO2-60-100
• pCO2-35-45mmHg
• HCO3-22-26mEq
• Anion gap-Na-(Cl+HCO3)
• Always look for pH ,pCO2 and HCO3 first

• pH: 7.30-acidotic
• PCO2 – 30(reduced)
• HCO3 – 20(reduced)
• pH is low hence this is a case of acidosis
• PCO2 is reduced. This would not cause acidosis.
• HCO3 is reduced. Hence this is a case of Metabolic Acidosis
• Since there is reduced CO2, there is compensatory respiratory alkalosis
• pH has not normalised despite compensatory respiratory alkalosis

• Hence this is an ABG of Partially Compensated Metabolic Acidosis

Solution for Question 11:

Correct Option B - Fully Compensated metabolic acidosis:

Normal parameters of ABG-

• pH-7.35-7.45

• pO2-60-100

• pCO2-35-45mmHg

• HCO3-22-26mEq

• Anion gap-Na-(Cl+HCO3)

• Always look for pH ,pCO2 and HCO3 first

• pH: 7.38-normal

• PCO2 – 30(reduced)

• HCO3 – 18(reduced)

• pH is normal hence this either a case of compensated acid-base disorder or a normal ABG

• If abnormal, the lower end of normal range pH suggests an acidotic disorder

• PCO2 is reduced. This would not cause acidosis.

• HCO3 is reduced. Hence this is likley a case of Metabolic Acidosis

• Since there is reduced CO2, there is compensatory respiratory alkalosis

• pH has normalised with compensatory respiratory alkalosis

• Hence this is an ABG of Compensated Metabolic Acidosis

Solution for Question 12:

Correct Option C - Uncompensated metabolic alkalosis:

Normal parameters of ABG-

• pH-7.35-7.45

• pO2-60-100mmHg

• pCO2-35-45mmHg

• HCO3-22-26mEq/L

• Anion gap-Na-(Cl+HCO3)

• pH: 7.50-alkalotic

• PCO2 – 40(normal)
• HCO3 – 32(increased)
• pH is high hence this is a case of alkalosis
• PCO2 is normal. This would likely not contribute to alkalosis.
• HCO3 is raised. Hence this is a case of Metabolic Alkalosis
• Since there is normal CO2, there is no compensatory respiratory acidosis
• Hence this is an ABG of Uncompensated Metabolic Alkalosis

Solution for Question 13:

Correct Option C - Partially Compensated metabolic alkalosis:

Normal parameters of ABG-

• pH-7.35-7.45
• pO2-60-100
• pCO2-35-45mmHg
• HCO3-22-26mEq
• Anion gap-Na-(Cl+HCO3)

• pH: 7.47-alkalotic
• PCO2 – 47(increasedl)
• HCO3 – 33(increased)
• pH is high hence this is a case of alkalosis
• PCO2 is raised. This would not lead to alkalosis.
• HCO3 is raised. Hence this is a case of Metabolic Alkalosis
• Since there is raised PCO2, there is compensatory respiratory acidosis
• pH has not normalised despite compensatory respiratory acidosis
• Hence this is an ABG of Partially Compensated Metabolic Alkalosis

Pulmonary Function Tests

1. A coal mine worker develops progressively worsening breathlessness and cough with expectoration. Spirometry values are: Forced expiratory volume (FEV1) = 1.4 L/min Functional vital capacity (FVC) = 2.8L/min What could be the cause?

A. Silicosis

B. Hypersensitivity pneumonitis

C. COPD

D. Idiopathic pulmonary fibrosis

---

2. The diffusion capacity of the lung is decreased in all of the following conditions, except?

A. Interstitial lung disease

B. Goodpasture syndrome

C. Pneumocystis jirovecii

D. Primary pulmonary hypertension

---

3. A 62-year-old retired teacher has progressive dyspnea and a chronic cough. He has been smoking cigarettes for 40 years, one pack per day. The following pattern is seen in pulmonary function tests: FEV1 (Forced expiratory volume in the first second)= 1.3 L FVC (Forced vital capacity)= 3.1 L The pattern is suggestive of which of the following?

(or)

A patient has progressive dyspnea and a chronic cough. History of smoking. Pulmonary function tests: FEV1 (Forced expiratory volume in the first second)= 1.3 L FVC (Forced vital capacity)= 3.1 L The pattern is suggestive of which of the following?

A. Normal lung function

B. Restrictive lung disease

C. Obstructive lung disease

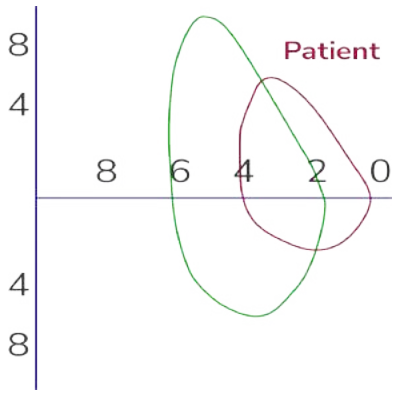
D. None of the above

---

4. A man presents with mild shortness of breath. A chest radiograph revealed bi-basilar reticular markings. What is the probable diagnosis in a patient with the below-given flow volume curve after spirometry?

(or)

A 48-year-old man presents with mild shortness of breath. A chest radiograph revealed bi-basilar reticular markings. What is the probable diagnosis in a patient with the below-given flow volume curve after spirometry?



A. Emphysema

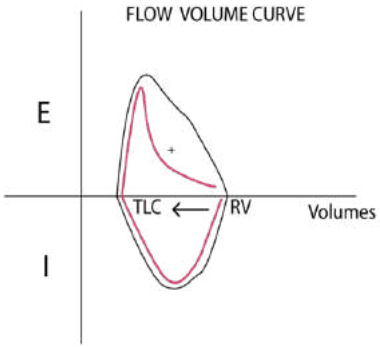
B. Interstitial lung disease

C. Bronchial asthma

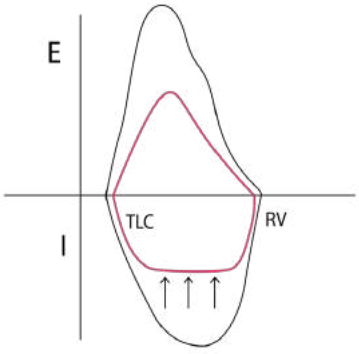
D. Endobronchial neoplasm

---

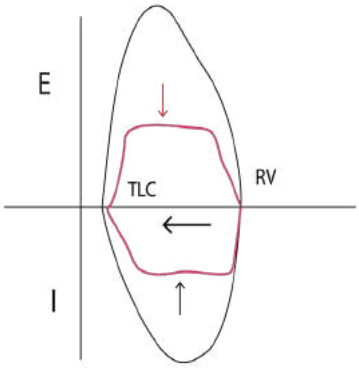
5. Match the following flow volume curves with their respective diseases 1. a. Idiopathic pulmonary fibrosis 2. b. Asthma 3. c. Tracheal stenosis 4. d. Retrosternal goiter



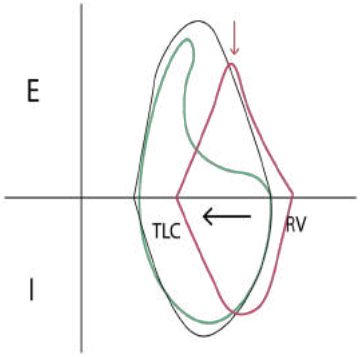
1. a. Idiopathic pulmonary fibrosis



2. b. Asthma

3. 

c. Tracheal stenosis

4. 

d. Retrosternal goiter

A. 1-d, 2-b, 3-c, 4-a

B. 1-b, 2-d, 3-c, 4-a

C. 1-c, 2-a, 3-b, 4-d

D. 1-a, 2-c, 3-b, 4-d

---

6. All of the following conditions are associated with reduced diffusing capacity of the lungs for carbon monoxide(DLCO) except?

A. Pulmonary hemorrhage

B. COPD

C. Pulmonary arterial HTN

D. Anemia

---

7. Match the following statements regarding pulmonary function tests under 1. Obstructive lung disease and 2. Restrictive lung disease a. Increased TLC b. Increased FEV1 /FVC c. Reduced timed vital capacity d. Reduced FRC e. Reduced TLC f. Increased FRC g. Increased timed vital capacity h. Reduced FEV1 /FVC

A. 1 - a, c, f and h; 2 - b, d, e and g

B. 1 - b, d, e and g; 2 - a, c, f and h

C. 1 - a, d, f and g; 2 - b, c, e and h

D. 1 - b, c, e and h; 2 - a, d, f and g

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	2
Question 3	3
Question 4	2
Question 5	2
Question 6	1
Question 7	1

Solution for Question 1:

Correct option: C - COPD

• The FEV1/FVC ratio of the patient is 0.5 - Indicates obstructive airway disease

• Coal workers' pneumoconiosis with effects of coal dust on alveolar macrophages leading to the development of chronic bronchitis and COPD

Incorrect options: A, B and D

Option A: Silicosis

• Silicosis is a type of restrictive lung disease

• In restrictive lung diseases, FEV1/FVC ratio increases

Option B: Hypersensitivity pneumonitis

• Spirometry often reveals a restrictive pattern and a significantly reduced forced expiratory volume due to small airway involvement

Option D: Idiopathic pulmonary fibrosis

• Idiopathic pulmonary fibrosis is a rare, progressive illness of the respiratory system characterized by the thickening and stiffening of lung tissue associated with scar tissue formation

• It is characterized by a progressive and irreversible decline in lung function and demonstrates a restrictive lung disease pattern in which the FEV1/FVC ratio increases

Solution for Question 2:

Correct option: B - Goodpasture syndrome

• DLCO is increased in Goodpasture syndrome since the basement membrane is damaged, thereby increasing the chances of diffusion of carbon monoxide (CO) across a lesser number of anatomical layers

Incorrect options: A, C and D

Option A: Interstitial lung disease

• DLCO is decreased in interstitial lung disease since progressive fibrosis in the interstitium limits CO diffusion across anatomical layers

Option C: Pneumocystis jirovecii

• DLCO is decreased in pneumocystis jirovecii infection because alveoli are filled with and damaged by proteinaceous material, consequently increasing alveolar-capillary injury and surfactant abnormalities

Option D: Primary pulmonary hypertension

• DLCO is decreased in pulmonary artery hypertension since the fibrosis in pulmonary vessels will reduce the diffusion of CO across the anatomical layers

Solution for Question 3:

Option C: Obstructive lung disease

Obstructive lung disease:

• In the given scenario, FEV1 (Forced expiratory volume in the first second) is reduced due to obstruction of air escaping from the lungs.

• Thus, FEV1/ FVC =1.3/3.1=40% is also reduced, which is the hallmark of obstructive lung disease.

Option A: Normal lung function

• The normal FEV1/FVC ratio is > 80%.

• In this question, a ratio of FEV1/FVC=1.3/3.1 is about 40%, and it is consistent with obstructive lung disease patterns.

Option B: Restrictive lung disease

Restrictive lung disease:

• FEV1 and FVC are equally reduced due to fibrosis or other lung pathologies.

• Thus, FEV1/FVC ratio is normal or even increased.

Option D: None of the above

• The scenario described above is consistent with constructive lung disease due to a reduced FEV1/FVC ratio.

Solution for Question 4:

Correct option: B - Interstitial lung disease

The probable diagnosis in this patient based on the restrictive pattern in the flow volume curve is interst itial lung disease

Features of the flow volume curve above

• TLC: Decreased

• Vital capacity: Decreased

• Residual volume: Decreased

• The flow volume curve is shifted to the right side (normally it is present in the center)

• All the above features are seen in the restrictive type of lung disease flow volume curve

Incorrect options: A, C and D

Option A: Emphysema

• The flow volume curve shown above is for restrictive lung disease

• However, emphysema shows a pattern of obstructive lung disease

Option C: Bronchial asthma

• The flow volume curve shown above is for restrictive lung disease

• However, bronchial asthma shows a pattern of obstructive lung disease

Option D: Endobronchial neoplasm

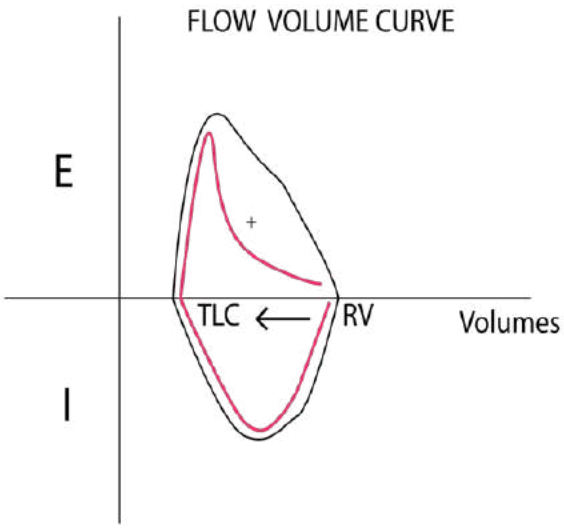
• The flow volume curve shown above is for restrictive lung disease

• However, endobronchial neoplasm shows a pattern of obstructive lung disease

Solution for Question 5:

Correct option: B - 1-b, 2-d, 3-c, 4-a

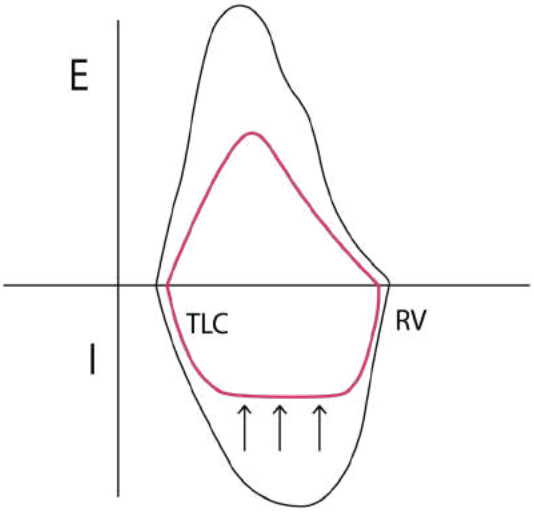
1.



b. Asthma

• Prolonged expiration (scooped out concavity)

2.



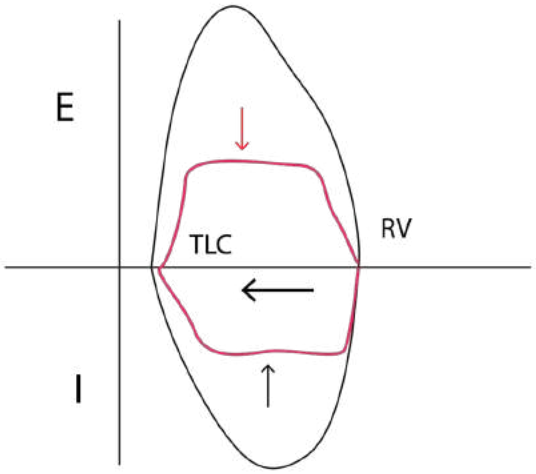
d. Retrosternal goiter

• Extra thoracic variable obstructive airway disease

• On inspiration: Compression of airway

• On expiration: Relief of air compression

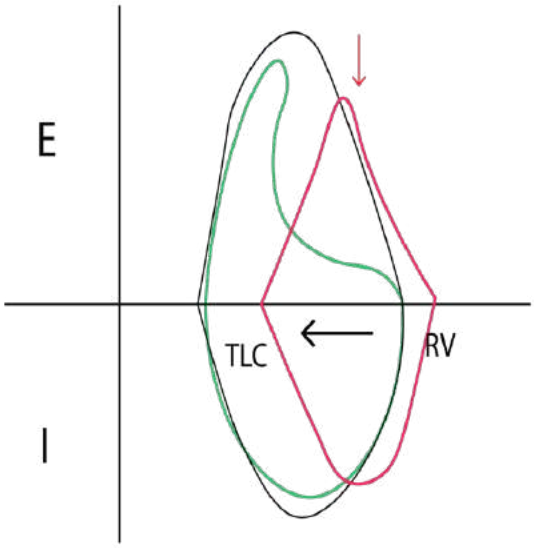
3.



c. Tracheal stenosis

• Intra thoracic fixed obstruction

4.



a. Idiopathic pulmonary fibrosis

• Shift of curve

• Beanie cap appearance

Incorrect options: A, C and D - Refer to the above explanation

Solution for Question 6:

Correct Option A - Pulmonary hemorrhage leads to increased DLCO:

• Causes of increased DLCO: Good pasture syndrome Pulmonary hemorrhage CHF Polycythemia

• Good pasture syndrome

• Pulmonary hemorrhage

• CHF

• Polycythemia

• Good pasture syndrome

• Pulmonary hemorrhage

• CHF

• Polycythemia

Incorrect Options:

Option B, C & D: Leads to reduced DLCO

Solution for Question 7:

Correct option: A - 1 - a, c, f and h; 2 - b, d, e and g

1. Obstructive lung disease

2. Restrictive lung disease

a. Increased TLC

c. Reduced timed vital capacity

f. Increased FRC

h. Reduced FEV1 /FVC

b. Increased FEV1 /FVC

d. Reduced FRC

e. Reduced TLC

g. Increased timed vital capacity

Bronchopneumonia

1. Which associations are correctly paired with their clinical scenarios and associated pathogens? Aspiration pneumonia: Streptococcus pyogenes Heavy alcohol use: Klebsiella pneumoniae Poor dental hygiene: Chlamydia and Klebsiella pneumoniae Structural lung disease: Burkholderia

A. 1 and 2

B. 2 and 4

C. 3 and 4

D. 1 and 3

---

2. A 65-year-old male patient presents to the clinic complaining of a dry, productive cough with rusty-coloured sputum, fever, and chills for 4 days. Respiratory examination revealed tachypnea with dullness to percussion in the left lower lobe. The CURB-65 is used to assess the severity of this patient. Which of the following is not associated with CURB 65?

(or)

Which of the following is not associated with CURB 65?

A. Age≥ 65 years

B. RR > 30/min

C. SBP > 90 mmHg

D. BUN level >7 mmol/L

---

3. Which of the following is not a chest x-ray finding in a case of Staphylococcus pneumonia?

(or)

Which of the following is not a chest x-ray finding in a case of Staphylococcus pneumonia?

A. Pneumatocoele

B. Hilar lymphadenopathy

C. Empyema

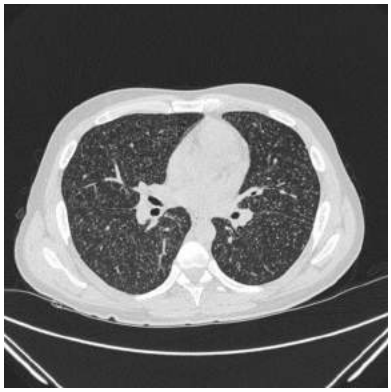
D. Absent air bronchogram

---

4. A 35-year-old man presents to the emergency department with the complaint of shortness of breath, a productive cough with yellow sputum, and daily fevers associated with drenching sweats for two weeks. He also states that he has lost around 20 pounds during this period. A CT scan is done for the following, with the image given below. All are the differential diagnosis of the condition shown in the CT chest, except?

(or)

All are the differential diagnosis of the condition shown in the CT chest, except?



A. Hemosiderosis

B. Tropical pulmonary eosinophilia

C. Collagen vascular disorders

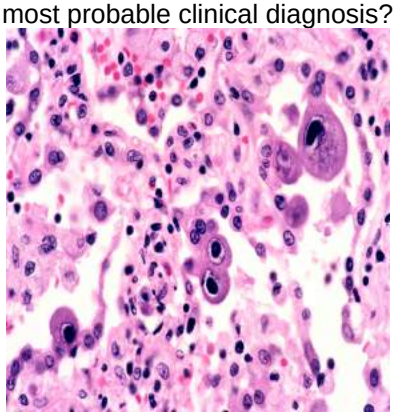
D. Diffuse pulmonary lymphangioleiomyomatosis

---

5. A 55-year-old man presents to the clinic with fever and breathlessness for 3 days. He has a known diagnosis of HIV infection. He denies any history of travel or exposure to any ill person. A lung biopsy from the lesion is shown in the image. What is the most probable clinical diagnosis?

(or)

A known case of HIV presented with fever and breathlessness for 3 days. A lung biopsy from the lesion is shown in the image. What is the most probable clinical diagnosis?



A. CMV pneumonia

B. Cryptogenic organizing pneumonia

C. Small cell cancer of lung

D. TB

---

6. A 31-year-old male presents to the clinic with fever, productive cough, hemoptysis, and breathlessness. The X-ray revealed evidence of total right upper lobe consolidation. Sputum microscopy, culture, and blood culture confirmed Friedlander's bacillus as the etiology of this severe community-acquired pneumonia. Friedlander Pneumonia refers to pneumonia caused by?

(or)

Friedlander Pneumonia refers to pneumonia caused by?

A. Klebsiella

B. Streptococcus Pneumonia

C. Haemophilus Influenzae

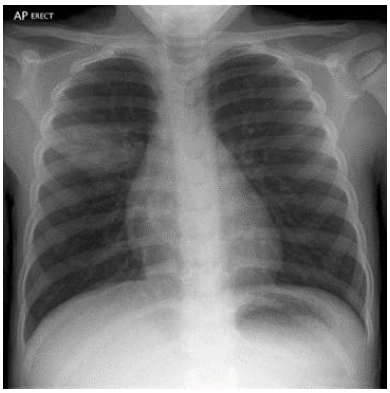
D. Staphylococcus

---

7. A 50-year-old patient presents to the clinic with a complaint of high fever, chills, and cough for 2 weeks. He also complains of chest pain. He has a smoking history, and his brother died of lung cancer 1 year ago. He reports no history of recent travel. An x-ray image is given below. Based on the symptoms and findings, what is the most likely diagnosis?

(or)

A patient presents with a complaint of high fever, chills, and cough for 2 weeks. He also complains of chest pain. An x-ray image is given below. Based on the symptoms and findings, what is the most likely diagnosis?



A. Round pneumonia

B. Lung abscess

C. Asbestosis coin lesion

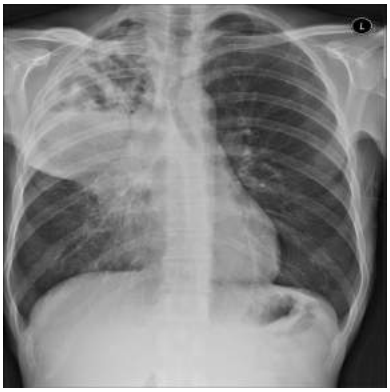
D. Pulmonary hamartoma

---

8. A 40-year-old male smoker presents with two weeks history of chest pain, breathlessness, and productive cough. He also states he used to be an IV drug user. An x-ray was done, showing the following findings. All are recommended for treatment in this patient except?

(or)

A smoker presents with two weeks history of chest pain, breathlessness, and productive cough. He also states he used to be an IV drug user. An x-ray was done, showing the following findings. All are recommended for treatment in this patient except?



A. Moxifloxacin

B. Clindamycin

C. Amoxicillin- clavulanate

D. Metronidazole

---

9. Which of the following is correct regarding pulmonary anthrax presentation?

(or)

A 60-year-old male presents to the clinic with the complaint of mild fever, dyspnoea, non-bloody sputum, anorexia, loss of appetite, and myalgia. He lives in a rural area and has a history of keeping animals, including some sheep and goats, infected with anthrax. Which of the following is correct regarding pulmonary anthrax presentation?

A. Lobar pneumonia

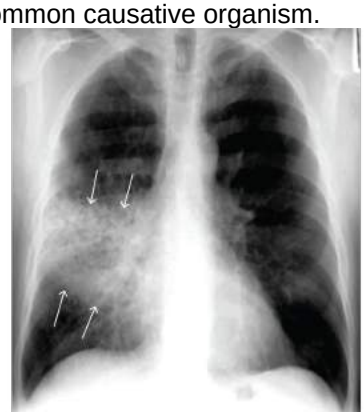
B. Broncho pneumonia

C. Atypical pneumonia

D. Haemorrhagic mediastinitis

---

10. A 55-year-old male patient presented to the emergency department in a collapsed state. The ECG showed features of myocardial infarction and the patient was treated for the same. His recent history revealed medical therapy for fever, cough, and shortness of breath. The notes of the previous physician showed an increased respiratory rate, dullness on percussion, subcostal retraction, and bronchial breathing accompanied by crackles on auscultation. Using the radiograph below, identify the diagnosis and pick the option with the most common causative organism.



A. Pseudomonas

B. Pneumococcus

C. ABPA

D. Klebsiella

---

11. Which of the following organisms is not associated with walking pneumonia?

A. Mycoplasma pneumoniae

B. Legionella pneumophila

C. Chlamydia pneumoniae

D. Pneumococcal pneumonia

---

12. The CURB 65 criteria includes all of the following except?

A. Blood urea nitrogen

B. Heart rate

C. Blood pressure

D. Age

---

13. Which of the following is not considered a risk factor for early deterioration in community-acquired pneumonia

A. Reduced albumin and platelets

B. Reduced neutrophils and sodium

C. High Erythocyte Sedimentation Rate

D. pH<7.3 and RR>30/min

---

14. Match the following clinical scenarios in SET 1 with their respective organisms in SET 2 SET 1 SET 2 MDR organism associated with ventilator associated pneumonia Alcohol and Red Currant Jelly sputum Alcoholic and drug overdose manifest with decreased airway defense Most common organism associated with community acquired pneumonia COPD & smokers Structural lung disease, a. Anaerobes Causing Pneumonia b. Pseudomonas c. H. influenzae d. Klebsiella pneumonia e. Burkholderia cepacia f. Pneumococcus

with decreased airway defenseMost common organism associated with community acquired pneumoniaCOPD & smokersStructural lung di

A. 1-a,2-d,3-b,4-e,5-c,6-f

B. 1-e,2-c,3-a,4-b,5-d,6-f

C. 1-f,2-c,3-e,4,b,5-d,6-a

D. 1-b,2-d,3-a,4-f,5-c,6-e

---

15. In a patient receiving mechanical ventilation, which of the following pathogens is most commonly associated with multidrug-resistant (MDR) ventilator-associated pneumonia (VAP)?

A. Streptococcus pneumoniae

B. Pseudomonas aeruginosa

C. Staphylococcus aureus

D. Klebsiella pneumoniae

---

16. What is the drug of choice for treating atypical pneumonia caused by Mycoplasma pneumoniae?

A. Ciprofloxacin

B. Amoxicillin

C. Doxycycline

D. Azithromycin

---

17. A 60-year-old patient with pneumonia presents to the emergency department with confusion, a respiratory rate of 35 breaths per minute, and a blood pressure of 100/70 mm Hg. The patient's BUN level is within normal limits. Based on the CURB-65 scoring system, how should the treatment be initiated for this patient?

(or)

How should the treatment be initiated for a patient with CURB score 2?

A. Outpatient basis treatment

B. Inpatient basis treatment

C. ICU basis treatment

D. Observation without any treatment

---

18. A 65-year-old patient presents to the emergency department with severe pneumonia. Further evaluation reveals Legionella pneumonia. Which of the following interventions should be prioritized for this patient?

(or)

Which of the following interventions should be prioritized for a patient with Legionella pneumonia?

A. Initiation of antiviral therapy

B. Administration of bronchodilators

C. Intravenous hydration and antibiotic therapy

D. Observation without any treatment

---

19. A 45-year-old patient presents to the clinic with symptoms of fever, cough, and shortness of breath. The patient works at a pet store and reports recent contact with birds. Given this exposure history, what pathogen should be considered as a potential cause of the pneumonia?

(or)

What pathogen should be considered as a potential cause of the pneumonia developed after contact with birds?

A. Chlamydia psittaci

B. Legionella pneumophila

C. Streptococcus pneumoniae

D. Haemophilus influenzae

---

20. In a patient admitted to the ICU with severe symptoms suggestive of community-acquired pneumonia (CAP) and a CURB-65 score of 3, which organism is most commonly associated with the infection?

A. Pneumococcus

B. Mycoplasma pneumoniae

C. Hemophilus influenzae

D. Pneumocystis jiroveci

---

21. In a patient diagnosed with ventilator-associated pneumonia (VAP), which medication is considered the drug of choice for treatment?

A. Ceftriaxone

B. Levofloxacin

C. Vancomycin

D. Piperacillin with Tazobactam

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	3
Question 3	2
Question 4	4
Question 5	1
Question 6	1
Question 7	1
Question 8	4
Question 9	4
Question 10	2
Question 11	4

Question 12	2
Question 13	3
Question 14	4
Question 15	2
Question 16	4
Question 17	2
Question 18	3
Question 19	1
Question 20	1
Question 21	4

Solution for Question 1:

Option B: 2, 4

• Aspiration pneumonia occurs in a depressed level of consciousness, and the commonest organism is oral anaerobes and gram-negative bacteria.

• Heavy alcohol use also leads to a depressed level of consciousness; therefore, oral anaerobes are an important cause of pneumonia in such patients.

• Poor dental hygiene leads to Streptococcus mutans contributing to dental caries.

• In structural lung disease, e.g. cystic fibrosis, bronchiectasis Pseudomonas and Burkholderia are common causative organisms.

Other options

Option A: 1 and 2

• Streptococcus pyogens is a gram-positive bacteria.

• It is most commonly associated with self-resolving infections of the skin and oropharynx and is the leading cause of pharyngitis in children and adolescents.

• Klebsiella pneumonia is associated with community-acquired pneumonia in heavy alcohol use; however, this is very rare.

Option C: 3 and 4

• Poor dental hygiene is associated with an anaerobic organism, e.g. clostridium, Bacteroides, fusobacterium etc., and in structural lung diseases, infections with organisms such as pseudomonas and staphylococcus aureus are common.

Option D: 1 and 3

• Aspiration pneumonia is associated with oral anaerobes and gram-negative bacteria.

• Poor dental hygiene is associated with anaerobic organisms, e.g. clostridium, Bacteroides, fusobacterium etc.

Solution for Question 2:

Correct option: C - SBP > 90 mmHg

• CURB-65 is a severity score to predict mortality in community-acquired pneumonia

• CURB-65 criteria: C - Confusion U - BUN >7 mmol/L (>19 mg/dL) R - > 30/min B - BP = Systolic < 90 mmHg or diastolic < 60 mmHg 65 - Age > 65 years

• C - Confusion

• U - BUN >7 mmol/L (>19 mg/dL)

• R - > 30/min

• B - BP = Systolic < 90 mmHg or diastolic < 60 mmHg

• 65 - Age > 65 years

• C - Confusion

• U - BUN >7 mmol/L (>19 mg/dL)

• R - > 30/min

• B - BP = Systolic < 90 mmHg or diastolic < 60 mmHg

• 65 - Age > 65 years

CURB - 65	Clinical Feature	Points
C	Confusion	1
U	Urea > 7 mmol/L	1
R	RR ≥ 30	1
B	SBP ≤ 9- mm Hg OR DBP ≤ 60 mmHg	1
65	Age > 65	1

CURB - 65	Risk Group	30 - day mortality	Management
0-1	1	1.5%	Low risk, consider home treatment
2	2	9.2%	Probably admission vs close outpatient management
3-5	3	22%	Admission, manage as severe

Incorrect options: A, B and D - Refer to the above explanation

Solution for Question 3:

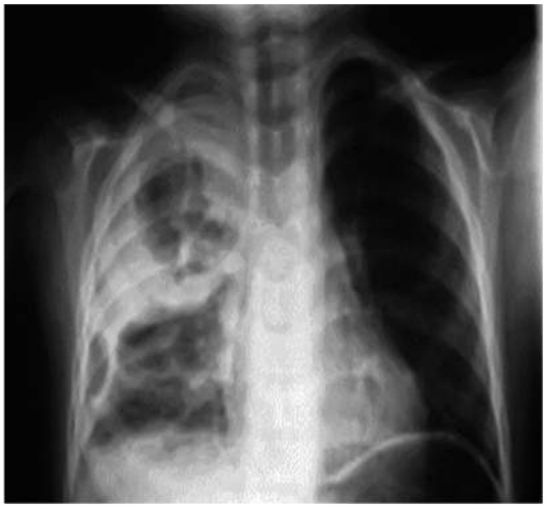
Correct option: B - Hilar lymphadenopathy

• 80% of patients infected with Staphylococcus aureus develop pleural effusion and empyema

• The radiographic finding of Staphylococcus aureus depends on the stage of the disease

• The chest x-ray may show multiple consolidations, which are very common and are associated with pleural effusion or pneumothorax

• Pneumatoceles (air-filled cavities) are seen and are present for a long period in those patients who remain asymptomatic for a prolonged period



• The above chest x-ray demonstrates right-sided pneumonia with extensive consolidation (white shadow) and a large, rounded pneumatocele.

• Hilar lymphadenopathy, which is the bilateral enlargement of the lymph nodes of the pulmonary hila, can occur as a result of sarcoidosis, tuberculosis, etc.

Incorrect options: A, C and D

Option A: Pneumatocele

• Pneumatoceles are thin-walled air cysts that are found in intrapulmonary parenchyma

• It is found in staphylococcal pneumonia

• It can also be found after trauma, burn, or chemical injury to the lung

Option C: Empyema

• Empyema is pus in the pleural space

Option D: Absent air bronchogram

• It is the phenomenon of air-filled bronchi

• It is not seen in staphylococcus pneumonia

Solution for Question 4:

Correct option: D - Diffuse pulmonary lymphangioleiomyomatosis

• The CT chest shows miliary mottling

• Miliary mottlings are opacities or pulmonary nodules between 1 and 4 mm in size in bilateral lung fields found on chest radiographs

• The cause of military mottling is divided into febrile and afebrile causes

Diffuse pulmonary lymphangioleiomyomatosis:

• It is a rare, progressive interstitial lung disease that affects premenopausal women and presents with emphysema, recurrent pneumothorax, and chylous pleural effusion

• A high-resolution CT scan demonstrates multiple small, thin-walled cysts surrounded by normal lungs without zonal predominance

• It is treated with sirolimus

Incorrect options: A, B and C

Option A: Hemosiderosis

• Hemosiderosis is the excessive accumulation of iron deposits in various organ tissues

• Pulmonary hemosiderosis is characterized by intra-alveolar bleeding that can manifest as a cough

• It is associated with miliary mottling

Option B: Tropical pulmonary eosinophilia

• It is a hyperresponsive pulmonary syndrome in response to microfilariae trapped within the lung tissue

• It is associated with miliary mottling

Option C: Collagen vascular disorders

• These are autoimmune diseases such as rheumatoid arthritis, SLE, etc

• It is associated with miliary mottling

Solution for Question 5:

Correct option: A - CMV pneumonia

• The histopathological image demonstrates cells in the alveoli of the lungs with prominent basophilic nuclear inclusions with a clear halo and smaller basophilic cytoplasmic inclusions - seen in CMV

• Cytomegalovirus (CMV) is a double-stranded DNA virus member of the group of herpes-type viruses

• It is transmitted through fluid body secretions (saliva, urine, blood, tears)

• In healthy adults (immunocompetent patients), the infection is asymptomatic or will cause a mild mononucleosis syndrome characterized by low-grade fevers, malaise, lymphocytosis, and liver enzyme dysfunction

• However, immunocompromised patients, e.g., transplant recipients, HIV/AIDS patients, malignancies, etc., are at an increased risk for infection

• In such patients, it can result in the dysfunction of any organ system, increasing mortality and morbidity rate

• CMV pneumonia presents with respiratory distress, shortness of breath, cough, fever, fatigue, and loss of appetite with diffuse interstitial infiltrates on chest radiography

• The diagnosis is established with serology, sputum or bronchoalveolar fluid lavage culture, and histologic findings on a lung biopsy

Incorrect options: B, C and D

Option B: Cryptogenic organizing pneumonia

• Cryptogenic organizing pneumonia is a presentation of interstitial lung disease and presents gradually

Option C: Small cell cancer of the lung

• Small cell lung cancer presents chronic cough, hemoptysis, chest pain, and hoarseness or wheezing

• The presenting patient is more frequently a male > 70 years and a current or former smoker

• The histologic image demonstrates small, round, oval cells with a high nuclear-to-cytoplasmic ratio

Option D: Tuberculosis

• Patients with tuberculosis have a history of weight loss, cough, and hemoptysis

• Histologic images reveal multiple small cells with scant cytoplasm, ill-defined borders, and finely granular nuclear chromatin

Solution for Question 6:

Option A: Klebsiella

• Klebsiella Pneumonia is also known as Friedlander Pneumonia, which refers to pneumonia caused by the organism Klebsiella pneumoaie, a gram-negative rod-shaped bacillus.

• The prevalence of this disease is higher in older adults and alcoholics, and those immunocompromised patients.

• It is transmitted through person-to-person contact but can also contaminate ventilators, ureters, or IV catheters.

• It is a severe form of community-acquired pneumonia with a predilection for the upper lobes of the lung.

• The most common symptoms include fever, chills, cough, chest pain, shortness of breath, and mucus production, which is thick reddish brown due to blood; it is known as currant jelly sputum.

• Klebsiella pnemoniae can also cause urinary tract infection, intraabdominal infection, meningitis, cellulitis, endocarditis, etc.

• Radiography demonstrates cavitatory pneumonia with a bulging/fissure sign due to pus in the interlobar space.

• Treatment is by antibiotics like IV ceftriaxone and IV amikacin.

Option B: Streptococcus Pneumoniae

• S.Pneumoniae is the major cause of community-acquired pneumonia and meningitis in children and adults.

• It is not referred to as Friedlander Pneumonia.

Option C: Haemophilus Influenzae

• It can cause Pneumonia, epiglottitis, meningitis, cellulitis etc.

• However, it is not referred to as Friedlander Pneumonia.

Option D: Staphylococcus

• It is the leading cause of skin and soft tissue infections, e.g., abscesses, furuncles, etc.

• It is not referred to as Friedlander Pneumonia.

Solution for Question 7:

Option A: Round Pneumonia

• Given x-ray suggests a diagnosis of round pneumonia.

• Round pneumonia refers to round or oval densities on chest x-ray.

• 90% of the population who present with round Pneumonia belong to the pediatric population, it is relatively uncommon in adults, but it can still occur.

• Streptococcus pneumonaie and H. influenza are the most common pathogen causing this disease in children.

• In adults, Q fever and Legionella micdadei are common causes.

• Besides infectious causes of atelectasis, congenital bronchopulmonary sequestration may also result in round pneumonia.

• The pathogenesis is unclear; early in the course, the inflammation is confined to the intra-alveolar channels.

• Patients with round pneumonia present with acute or subacute symptoms of pneumonia.

• Symptoms can be mild and mimic a viral infection or bronchitis.

• Symptoms may include fever, cough, and chills.

• Radiologic findings demonstrate round or oval densities or coin-like lesions, and the borders may be smooth or lobulated.

• They mostly occur in the superior segment of lower lobes, and 98% are solitary.

Option B: Lung abscess

• Lung abscess will demonstrate air-fluid level with pus settling at the bottom on radiography.

Option C: Asbestosis coin lesion

• Asbestosis coin lesion will present with occupational history.

Option D: Pulmonary hamartoma

• Pulmonary Hamartoma will demonstrate popcorn appearance on chest x-ray.

Solution for Question 8:

Option D: Metronidazole

• The given x-ray shows right upper zone consolidation with cavitating features and gas-fluid level, confirming the lung abscess diagnosis.

• A lung abscess is defined as a microbial infection of the lung that results in necrosis of the pulmonary tissue with the formation of cavities that contain necrotic debris or fluid caused by microbial infection.

• It is a type of liquefaction necrosis.

• It is most commonly caused by aspiration of anaerobes which may occur in alcoholics or those individuals with altered levels of consciousness.

• Other causes of an abscess include a preexisting condition such as obstruction or bronchiectasis.

• The most common anaerobes are peptostreptococcus species, Bacteroides species, fusobacterium species, and microaerophilic streptococci.

• Symptoms of a lung abscess may include fever, chest pain, cough, night sweats, weight loss, loss of appetite, fatigue, etc.

Treatment of lung abscess includes:

• Clindamycin - 600 mg IV TDS (three times daily).

• When the fever disappears and there is clinical improvement, start with oral 300 mg QID (four times a day).

• IV-administered β-lactam/β-lactamase combination.

• When stable, start oral amoxicillin-clavulanate.

• Treatment duration is 3-4 weeks but can be as long as 14 weeks.

• Metronidazole alone is never recommended in the treatment of lung abscesses.

• It is effective against anaerobic organisms, but the streptococci (Microaerophilic) will be spared, which are often the component of flora causing lung abscesses.

Option A: Moxifloxacin

• Moxifloxacin 400 mg/d Per oral is as effective and well tolerated as ampicillin-sulbactam and can be used to treat lung abscesses.

Option B: Clindamycin

• Clindamycin - 600 mg IV TDS (three times daily) treats lung abscesses.

Option D: Amoxicillin- clavulanate

• It is used especially for those organisms that produce beta-lactamase, e.g., Bacteroides species and fusobacterium species.

Solution for Question 9:

Option D: Haemorrhagic mediastinitis

• This patient’s clinical presentation is highly suggestive of pulmonary anthrax.

• Anthrax is a zoonotic occupational disease caused by a rod-shaped, aerobic gram-positive spore-forming organism called Bacillus anthracis.

It is divided into the following depending on how anthrax enters the body.

• Cutaneous anthrax (most common)

• Inhalation of anthrax (most lethal)

• Gastrointestinal anthrax

• Injection anthrax

• Inhalation anthrax or pulmonary anthrax results from inhalation of anthrax spores.

• This disease is more common in slaughterhouses, wool mills, or when working with infected animals or contaminated animal products.

• the following inhalation, the spores germinate inside the macrophages, then migrate to lymph nodes, where the bacteria multiply.

• The bacillus produces two toxins, oedema toxin (ET) and lethal toxin (LT).

• The oedema toxin causes massive local oedema, and the lethal toxin causes a massive release of cytokines from macrophages, resulting in sudden death.

• Pulmonary anthrax begins as a flu-like illness, but it gradually progresses and can result in coma and death.

The complications of pulmonary anthrax include

• hemorrhagic mediastinitis

• fulminant GI bleeding

• meningitis

• shock.

Option A: Lobar pneumonia

• Streptococcus pneumonaie is the most common cause of lobar pneumonia.

• It is characterized by inflammatory exudate within the intra alveolar space resulting in consolidation involving an entire lobe.

Option B: Bronchopneumonia

• Streptococcus pneumonaie and Haemophilus influenzae are the most common cause of bronchopneumonia.

Option C: Atypical Pneumonia

• Also called walking pneumonia because of its mild course of the disease.

• It is most commonly caused by mycoplasma pneumoaie

Solution for Question 10:

Correct Option B- Pnemococcus:

• The diagnosis is pneumonia.

• The history of myocardial infarction is important because of pneumolysin → the toxins released by pneumococcus→ which activate platelets resulting in platelet plug in coronary vessels → to MI.

• Patients typically present with fever, cough and shortness of breath. An increased respiratory rate, dullness on percussion, subcostal retraction, and bronchial breathing accompanied by crackles on auscultation are some of the clues in the question for the diagnosis of pneumonia.

• The chest radiograph shows lobar pneumonia.

• Pneumococcus is the leading cause of ventilator associated pneumonia, community acquired and lobar pneumonia.

Incorrect Options - A, C and D (Pseudomonas, ABPA &
Klebsiella): These are incorrect. Pneumococcus is the most common cause of lobar pneumonia.

Solution for Question 11:

Correct Option D- Pneumococcal pneumonia:

• Walking pneumonia is also called atypical pneumonia and pneumococcus is not a causative organism of atypical pneumonia.

Incorrect Options A, B, C (Mycoplasma pneumoniae, Legionella pneumophila & Chlamydia pneumonia e): All these organisms cause walking pneumonia.

Solution for Question 12:

Correct Option B- Heart rate: Heart rate is not a part of the CURB-65 criteria

• CURB-65 is used to predict mortality in patients with pneumonia and assess the need for hospitalization.

Confusion

1 point

BUN ≥7 mmol/L

Respiratory rate >30 / min

BP <90/60 mm Hg

Age >65 years

Score

Mortality

Rx

0

1.5%

OPD Basis

1-2

9.2%

IPD basis

22%

ICU basis

Incorrect Options A,C &D-; (Blood urea nitrogen, Blood pressure & Age): These are part of the CURB65 criteria.

Solution for Question 13:

Correct Option C- High Erythocyte Sedimentation Rate: High ESR is not typically considered a risk for earyl deterioration in patients with community acquired pneumonia.

Risk Factors For Early Deterioration of CAP(Community acquired pneumonia)

• Multilobar infiltrates

• SpO2 < 90%

• pH<7.3

• Confusion

• RR>30/min

• Decreased albumin

• Decreased neutrophils

• Decreased platelets

• Decreased sodium

• Sugar low

Incorrect Options-A,B & D (Reduced albumin and platelets, Reduced neutrophils and sodium & pH<7.3 and RR>30/min): These are risk factors for early deterioration in patients with community acquired pneumonia.

Solution for Question 14:

Correct option D- 1-b,2-d,3-a,4-f,5-c,6-e:

Incorrect Options: A,B,C- (A 1-a,2-d,3-b,4-e,5-c,6-f, B.1-e,2-c,3-a,4-b,5-d,6-f, & C.1-f,2-c,3-e,4,b,5-d,6-a: Refer to the above explanation.

Solution for Question 15:

Correct Option B - Pseudomonas aeruginosa:

• Ventilator-associated pneumonia (VAP) is a serious complication in patients receiving mechanical ventilation. Among the pathogens causing VAP, Pseudomonas aeruginosa is frequently associated with multidrug-resistant (MDR) infections, particularly in intensive care unit (ICU) settings. Pseudomonas aeruginosa is notorious for its ability to develop resistance to multiple antibiotics, posing challenges in its management. Therefore, when VAP is suspected, especially in patients with risk factors for MDR pathogens such as prolonged hospitalization or prior antibiotic exposure, empirical antibiotic therapy should cover Pseudomonas aeruginosa until culture and sensitivity results are

available.

Incorrect Options:

Option A - Streptococcus pneumoniae: Streptococcus pneumoniae is a common cause of community-acquired pneumonia but is less frequently implicated in VAP, particularly cases of multidrug resistance.

Option C - Staphylococcus aureus: Staphylococcus aureus, including methicillin-resistant Staphylococcus aureus (MRSA), is another important pathogen in VAP, especially in healthcare-associated settings. While it can be multidrug-resistant, it is not as commonly associated with MDR VAP as Pseudomonas aeruginosa.

Option D - Klebsiella pneumoniae: Klebsiella pneumoniae is a gram-negative bacterium frequently associated with healthcare-associated infections, including pneumonia. It can exhibit multidrug resistance, particularly in the form of extended-spectrum beta-lactamase (ESBL) production. While it is an important pathogen in VAP, it is not the most commonly associated with MDR VAP compared to Pseudomonas aeruginosa.

Solution for Question 16:

Correct Option D - Azithromycin:

• Mycoplasma pneumoniae is a common cause of atypical pneumonia, often referred to as "walking pneumonia" due to its mild symptoms. Azithromycin is the drug of choice for treating Mycoplasma pneumoniae infection due to its efficacy and favorable pharmacokinetic profile. Azithromycin is a macrolide antibiotic that effectively targets Mycoplasma pneumoniae and is preferred over other antibiotics due to its once-daily dosing regimen and high tissue penetration.

Incorrect Options:

Option A - Ciprofloxacin: Ciprofloxacin is a fluoroquinolone antibiotic commonly used to treat bacterial infections, but it is not the preferred choice for treating Mycoplasma pneumoniae. Macrolides like azithromycin or tetracyclines like doxycycline are more effective against Mycoplasma pneumoniae.

Option B - Amoxicillin: Amoxicillin is a penicillin antibiotic primarily used to treat bacterial infections. However, it is not effective against atypical pathogens like Mycoplasma pneumoniae. Azithromycin or doxycycline are preferred choices for treating atypical pneumonia caused by Mycoplasma pneumoniae.

Option C - Doxycycline: Doxycycline is a tetracycline antibiotic that is effective against a wide range of bacterial infections, including atypical pathogens like Mycoplasma pneumoniae. While it is an alternative treatment option for atypical pneumonia, azithromycin is typically preferred due to its more favorable dosing regimen and side effect profile.

Solution for Question 17:

Correct Option B - Inpatient basis treatment:

• According to the CURB-65 scoring system, which helps assess the severity of pneumonia, this patient has a score of 2. The presence of confusion, a respiratory rate > 30/min, and an age > 65 years each contribute 1 point to the score. A CURB-65 score of 1 or 2 indicates the need for inpatient (IPD) basis

treatment. In this case, the patient's score of 2 suggests that hospitalization is warranted for appropriate management and monitoring of pneumonia symptoms and complications.

Incorrect Options:

Option A - Outpatient basis treatment: Reserved for patients with a CURB-65 score of 0, indicating low severity and suitability for outpatient management.

Option C - ICU basis treatment: Typically recommended for patients with a CURB-65 score of 3 or more, indicating severe pneumonia requiring intensive care unit (ICU) level of care.

Option D - Observation without any treatment: Not suitable for this patient as they have a CURB-65 score indicating the need for hospitalization and appropriate treatment.

Solution for Question 18:

Correct Option C - Intravenous hydration and antibiotic therapy:

• Legionella pneumonia, caused by Legionella pneumophila bacteria, is a severe form of pneumonia that requires prompt and appropriate treatment. Antibiotics are the cornerstone of therapy for Legionella pneumonia. The preferred antibiotics include macrolides (such as azithromycin) or respiratory fluoroquinolones (such as levofloxacin). Intravenous hydration is also essential to maintain adequate fluid balance and prevent dehydration, especially in severe cases of pneumonia.

Incorrect Options:

• Antiviral therapy is not indicated for Legionella pneumonia, as it is a bacterial infection, not a viral one. Bronchodilators are primarily used in the management of conditions such as asthma and chronic obstructive pulmonary disease (COPD) but are not the mainstay of treatment for Legionella pneumonia. Observation without treatment is not appropriate for severe pneumonia, including Legionella pneumonia, as it can lead to complications and worsened outcomes.

Solution for Question 19:

Correct Option A - Chlamydia psittaci:

• Given the patient's recent contact with birds, particularly in a pet store setting, the potential pathogen to consider causing pneumonia is Chlamydia psittaci. This bacterium is commonly associated with psittacosis, a zoonotic infection transmitted from infected birds to humans. Symptoms typically include fever, cough, and shortness of breath. Prompt recognition and treatment with antibiotics such as tetracyclines or macrolides are essential for managing this infection.

Incorrect Options:

Option B - Legionella pneumophila: While Legionella pneumophila can also cause pneumonia, it is typi cally associated with water sources such as contaminated air conditioning systems or hot tubs, rather t han bird exposure.

Option C - Streptococcus pneumoniae: Streptococcus pneumoniae is a common cause of community-acquired pneumonia but is not directly linked to bird exposure. It is more prevalent in general communit y settings and among individuals with certain risk factors like age or underlying medical conditions.

Option D - Haemophilus influenzae: Haemophilus influenzae can cause pneumonia, especially in indivi duals with chronic lung disease or weakened immune systems. However, it is not typically associated with bird exposure-related pneumonia, as seen with Chlamydia psittaci.

Solution for Question 20:

Correct Option A - Pneumococcus:

• Community-acquired pneumonia (CAP) is commonly associated with various organisms, but Streptococcus pneumoniae, also known as pneumococcus, is the most frequent causative agent. Patients with severe symptoms requiring ICU admission, as indicated by a CURB-65 score of 3, are often infected with pneumococcus. This bacterium is a leading cause of CAP, especially in cases requiring intensive care due to the severity of symptoms.

Incorrect Options:

Option B - Mycoplasma pneumoniae: Mycoplasma pneumoniae is a common cause of atypical pneum onia, but it is less frequently associated with severe CAP requiring ICU admission.

Option C - Hemophilus influenzae: While Hemophilus influenzae can cause pneumonia, it is not as co mmonly associated with severe CAP requiring ICU admission compared to pneumococcus.

Option D - Pneumocystis jiroveci: Pneumocystis jiroveci pneumonia (PCP) is typically seen in immunoc ompromised individuals, especially those with AIDS and low CD4 counts. It is less likely to be the caus e of CAP in patients admitted to the ICU with severe symptoms and a
CURB-65 score of 3, unless the patient is immunocompromised.

Solution for Question 21:

Correct Option D - Piperacillin with Tazobactam:

• Ventilator-associated pneumonia (VAP) is often caused by multidrug-resistant (MDR) pathogens such as Pseudomonas aeruginosa and Acinetobacter baumannii. Piperacillin with Tazobactam is a broad-spectrum antibiotic combination that provides coverage against these MDR organisms, making it the drug of choice for treating VAP caused by these pathogens.

Incorrect Options:

Option A - Ceftriaxone: While ceftriaxone is a commonly used antibiotic for treating community-acquire d pneumonia, it may not provide adequate coverage against the MDR pathogens often associated with VAP.

Option B - Levofloxacin: Levofloxacin is a fluoroquinolone antibiotic with broad-spectrum activity. While it may be effective against some VAP pathogens, it may not provide sufficient coverage against MDR organisms like Pseudomonas aeruginosa and Acinetobacter baumannii.

Option C - Vancomycin: Vancomycin is primarily used to treat infections caused by Gram-positive orga nisms such as methicillin-resistant Staphylococcus aureus (MRSA). It is not the drug of choice for treati ng VAP caused by MDR Gram-negative bacteria.

Previous Year Questions

1. A 30-year-old man came with complaints of fever and cough for 3 days. On examination, SPO2 is 98% RA, BP=110/70 mm Hg. Chest-x ray shows diffuse consolidation on both lungs. Nasopharyngeal swab shows Rhinovirus. Which antibiotics are suitable for this patient?

A. Ceftazidime + Azithromycin

B. Ceftriaxone

C. Ceftriaxone + Levofloxacin

D. Piptaz + Ciprofloxacin

---

2. Blast lung is also known as?

A. COPD

B. Alveolar haemorrhage

C. Pulmonary edema

D. ARDS

---

3. Which one of the following is a direct cause of Acute Respiratory Distress Syndrome (ARDS)?

A. Pneumonia

B. Fat embolism syndrome following femur shaft fracture

C. Sepsis

D. Transfusion-related lung injury

---

4. According to the Berlin definition, which of the following is not a characteristic of moderate ARDS?

A. 200 < PaO2/FiO2 =<300mm/Hg with PEEP Is moderate

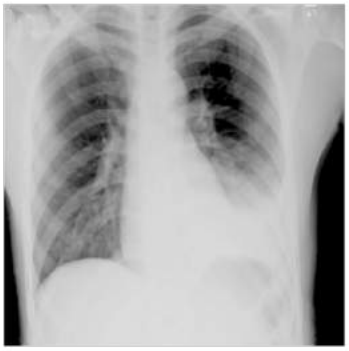
B. Bilateral interstitial infiltrates

C. Symptom onset within a week

D. No cardiac failure in echocardiography

---

5. What should be the subsequent course of action for this patient, who is intubated and has undergone an X-ray as depicted in the radiograph?



A. Suction

B. Chest physiotherapy

C. Start antibiotics and send and samples for culture

D. Ultrasound-guided aspiration

---

6. The patient being discussed has come in for medical evaluation following an injury to the chest. During the examination, the presence of crepitus is detected. Based on these findings, what is the likely clinical diagnosis?

A. Subcutaneous emphysema

B. Gas gangrene

C. Acute tubular necrosis

D. Hyperbaric decompression sickness

---

7. What is the likely diagnosis for a 56-year-old woman who had a heart attack 2 years ago and is currently experiencing a cough and difficulty breathing while walking short distances? Physical examination revealed dullness upon percussion and reduced breath sounds on the right side. A chest x-ray indicated the presence of moderate pleural effusion. Thoracocentesis, guided by ultrasound, was performed and the laboratory results are provided below. Pleural fluid findings: Appearance: turbid pH: 7.1 Protein: 3.2 g/dL Lactate dehydrogenase: 80, U/L (normal serum LDH- 50-150 U/L) Pleural fluid protein/serum protein ratio: 0.34 Pleural fluid LDH /serum LDH: 0.3 Glucose: 54 mg/dL WBC count: 4000 cells/µL with >50% lymphocytes Adenosine deaminase: 30 U/L AFB smear microscopy: negative Gram staining and microscopy: no organisms, no pus cells

A. Parapneumonic pleural effusion

B. Malignant pleural effusion

C. Congestive heart failure

D. Tubercular pleural effusion

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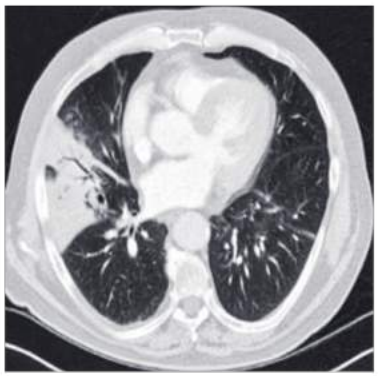
8. A 35-year-old female patient presents to you with fever, breathlessness, and cough with expectoration. A CT scan was done which is shown below. What is the most likely diagnosis?



A. Consolidation with air bronchogram

B. Mediastinal mass

C. Pleural effusion

D. Diaphragmatic hernia

---

9. Which drugs are ineffective against multidrug-resistant (MDR) tuberculosis?

A. Isoniazid, rifampicin, and fluoroquinolone

B. Fluoroquinolones

C. Isoniazid and rifampicin

D. Isoniazid, rifampicin, and kanamycin

---

10. A male patient with a history of chronic smoking presents with the complaint of dysphagia. Out of the following, which type of lung cancer is most likely to be found in this patient?

A. Squamous cell carcinoma

B. Adenocarcinoma

C. Large cell carcinoma

D. Bronchogenic carcinoma

---

11. A patient presents with chronic complaints of a productive cough in the morning. The expectoration is yellow, foul smelling and increases on turning from left to right side. Which of the following lung diseases is likely to be present?

A. Lung cancer

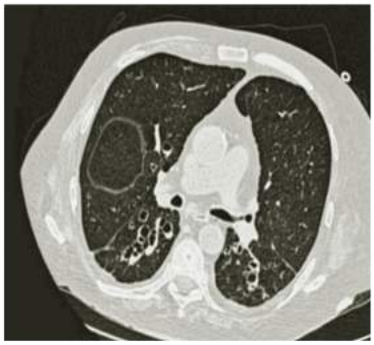
B. Bronchiectasis

C. Bronchial asthma

D. Pulmonary embolism

---

12. What is the diagnosis based on the image given below?



A. Pulmonary tuberculosis

B. Chronic obstructive pulmonary disease

C. Bronchial asthma

D. Bronchiectasis

---

13. Which of the following statements is accurate regarding the condition of cryptic tuberculosis, in relation to a 65-year-old male who presented with unexplained fever and prolonged respiratory distress despite receiving appropriate treatment?

A. Positive skin tuberculin test and negative chest X-ray

B. Positive skin tuberculin test and positive chest X-ray

C. Negative skin tuberculin test and negative chest X-ray

D. Negative skin tuberculin test and positive chest X-ray

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14. In which medical condition is a ground-glass appearance observed on high-resolution computed tomography (HRCT)?

A. Asbestosis

B. Silicosis

C. Anthracosis

D. Bagassosis

---

15. What can be identified as a contributing factor to the occurrence of exudative pleural effusion?

A. Heart failure

B. Liver failure

C. Rheumatoid arthritis

D. Nephrotic syndrome

---

16. Which microorganism is responsible for the symptoms observed in a 70-year-old patient with a history of smoking, presenting with high-grade fever, cough, confusion, and diarrhea? The patient's chest X-ray shows infiltrates in both lower lung fields, while sputum gram stain does not detect any

organisms. Additionally, laboratory results show abnormal levels of Na (126mEq/L), AST (62), ALT (56), RBS (112 mg/dl), and serum bilirubin (0.8mg%), as well as a positive HIV test.

A. Streptococcus

B. Legionella

C. Pneumocystis jeroveci

D. Klebsiella

---

17. What would be the most appropriate course of action for managing a 45-year-old patient, who has been smoking a pack of cigarettes daily for the last 15 years, and is now presenting with hemoptysis? The chest X-ray reveals a 3cm mass in the upper lobe near the lung apex.

A. Bronchoscopy

B. CT-guided biopsy

C. Sputum cytology

D. Sputum for AFB

---

18. Which of the following is not a feature of Gaisböck syndrome?

A. Hypotension

B. Erythrocytosis

C. Normal leukocyte counts

D. Obesity

---

19. Which of the following is the initial probable diagnosis for a 5-year-old child who has been experiencing recurring respiratory infections with thickened sputum, bronchial wall thickening observed on a chest X-ray, and has had steatorrhea since birth?

A. Hyaline membrane disease

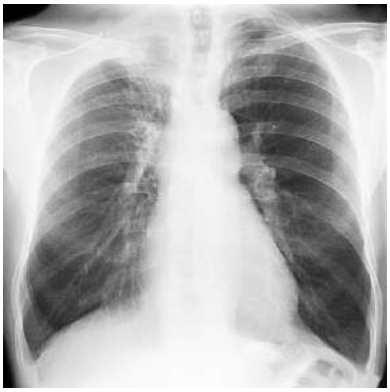
B. Cystic fibrosis

C. Alpha 1 anti-trypsin deficiency

D. Malabsorption syndrome

---

20. A 65-year-old chronic smoker came to the medicine outpatient department with complaints of upper chest discomfort and drooping of an eyelid. He also complained of pain radiating to the upper arm and a tingling sensation in the 4th and 5th digits of his left hand. The chest X-ray is given below. Which of the following is the most likely diagnosis?



A. Pancoast tumour

B. Upper lobe pneumonia

C. Superior vena cava obstruction

D. Aspergilloma

---

21. What should be the next appropriate action in the management of an elderly male who has been on prolonged bed rest and is now experiencing symptoms of breathlessness and chest pain?

A. CT pulmonary angiogram

B. ECG

C. CT thorax

D. Echocardiography

---

22. A chronic cigarette smoker has now joined a construction company. His pulmonary function test results are given below. What is the most likely diagnosis for this patient? Initial lung volumes were: FEV1-0.9L FVC-1.9L FEV1/FVC-0.4 After bronchodilation: FEV1-1.9L FVC-3.9L FEV1/FVC-0.4

A. Vascular disease with bronchodilator reversibility

B. Restrictive lung disease with bronchodilator reversibility

C. Restrictive lung disease without bronchodilator reversibility

D. Obstructive disease with bronchodilator reversibility

---

23. Which location in the abdomen is most frequently affected by tuberculosis?

A. Rectum

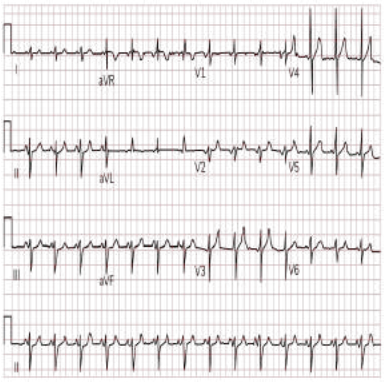
B. Colon

C. Small intestine

D. Ileocecal junction

---

24. What does the given ECG show?



A. P-pulmonale

B. Ventricular bigeminy

C. Electrical alternans

D. Improper calibration

---

25. A 65-year-old female patient weighing 60 kg is on mechanical ventilation for ARDS secondary to urosepsis. The respiratory parameters are as follows: tidal volume – 360 mL; frequency – 30 breaths/min; PEEP - 5 cm of H2O; and FiO2-90%. The arterial blood gas findings are as follows; paO2-50 mmHg; paCO2-38 mmHg; and pH-7.38. What is the next step?

A. Reduce FiO2

B. Increase tidal volume

C. Increase respiratory rate

D. Increase PEEP

---

26. An increased anion gap is seen in:

A. Respiratory acidosis

B. Respiratory alkalosis

C. Metabolic acidosis

D. Metabolic alkalosis

---

27. Hamman sign is seen in:

A. Pneumoperitoneum

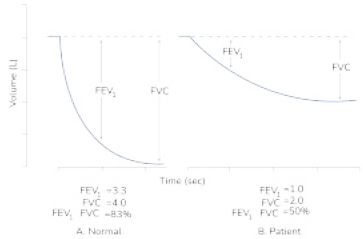
B. Pneumopericardium

C. Pneumomediastinum

D. Hydropneumothorax

---

28. The given image shows a normal graph on the left and the patient’s graph on the right. Which of the following diagnosis can be inferred from the graph?



A. Chest wall neuromuscular disease

B. Sarcoidosis

C. Idiopathic pulmonary fibrosis

D. Bronchiectasis

---

29. A 40-year-old man presents with daytime sleepiness and impaired concentration and memory. On examination his BMI is 41 kg/m2, BP is 160/100 mm Hg. His awake ABG analysis is given: PaO2= 66mm Hg, PaCO2= 50 mm Hg, HCO3= 28 mEq/L. What is the most likely diagnosis?

A. Obstructive sleep apnea

B. Narcolepsy

C. Obesity hypo-ventilation syndrome

D. Central sleep apnea

---

30. Which membrane channel is mainly affected in Cystic fibrosis?

A. Sodium

B. Chloride

C. Calcium

D. Potassium

---

31. A 68-year-old man presents with cough with yellowish sputum. Auscultation revealed bronchial breath sounds. He is hemodynamically stable and not confused. On examination, his respiratory rate is 20/min and blood pressure is 110/70 mmHg. Lab reports show urea levels of 44 mg/dL. What is the next best step in the management of this patient?

A. Given antibiotics and send the patient home

B. Admit to ICU without mechanical ventilation

C. Admit to ICU with invasive mechanical ventilation

D. Consider admission in a non ICU setting

---

32. What might be the potential reason for the occurrence of carpo-pedal spasm in a woman experiencing hyperventilation due to hysteria?

A. Respiratory acidosis

B. Metabolic acidosis

C. Respiratory alkalosis

D. Metabolic alkalosis

---

33. What is the probable diagnosis for a patient who has been experiencing fever, coughing at night, difficulty breathing, and wheezing for a duration of 4 weeks, along with an absolute eosinophil count exceeding 5000/microliter and a miliary pattern observed on the chest x-ray?

A. Bronchial asthma

B. Miliary tuberculosis

C. Tropical pulmonary eosinophilia

D. Hypersensitivity pneumonitis

---

34. A 10-year-old child with AIDS presented with fever and a productive cough. On auscultation, bronchial breath sounds and crepitations were heard in the right infra-scapular region. Chest x-ray showed right lower lobe consolidation. The CD4 count was 55 cells/mm3. What is the most likely causative organism for this condition?

A. Pneumocystis jirovecii

B. Streptococcus pneumonia

C. Staphylococcus aureus

D. Mycoplasma

---

35. N95 respirator is used for:

A. Droplet precautions

B. Airborne precautions

C. Contact precautions

D. All of the above

---

36. Which of the following statements accurately describes the initial management of a 60-year-old male patient, previously diagnosed with COPD, who is currently experiencing an acute exacerbation and has been admitted to the ICU?

A. Non-invasive PPV should be given

B. Invasive PPV should be given

C. Oxygen is not indicated

D. Permissive hypoapnia is allowed

---

37. In a patient with suspected metabolic acidosis, which of the following arterial blood gas (ABG) findings is most likely to be observed?

A. Increased pH, decreased bicarbonate (HCO3-)

B. Decreased pH, increased bicarbonate (HCO3-)

C. Decreased pH, decreased bicarbonate (HCO3-)

D. Increased pH, increased bicarbonate (HCO3-)

---

38. What should be the next course of action for a 20-year-old male who arrives at the emergency department with difficulty breathing and low blood pressure after experiencing an injury? The patient exhibits subcutaneous emphysema and there is no air movement observed in the right lung.

A. Start IV fluids with large bore cannula

B. Needle decompression into the 5th intercostal space anterior to the midaxillary line

C. Take the patient to the ICU and intubate him

D. Start positive pressure ventilation

---

39. A 55-year-old male presented with tachypnea and mental confusion. His blood sugar is 350mg/dl, pH-7.2, HCO3-10, pCO2-30. What is the metabolic abnormality?

A. Metabolic alkalosis

B. Metabolic acidosis

C. Respiratory alkalosis

D. Respiratory acidosis

---

40. Which among the following is not a part of Well's score?

A. Heart Rate

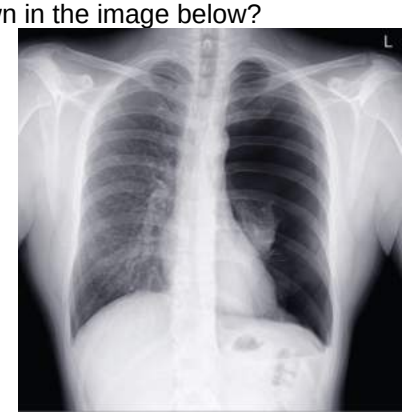
B. Respiratory rate

C. Hemoptysis

D. Clinical sign of DVT

---

41. Which of the following is shown in the image below?



A. Pleural effusion

B. Pneumothorax

C. Consolidation

D. Cavity

---

42. A 60 year old man with a history of COPD presents with sudden onset increased shortness of breath. His ABG analysis reveals pH – 7.24; pCO2 – 60 mm Hg, pO2 – 52 mmHg, HCO3 – 27 mmol/L. What is the most appropriate treatment form the following:

A. Endotracheal intubation

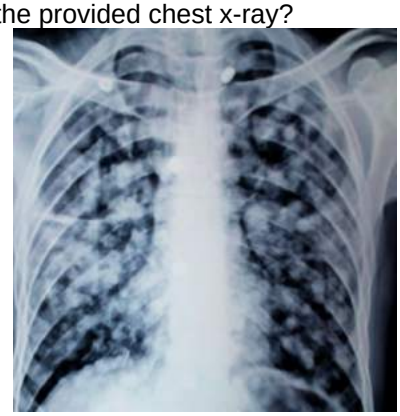
B. Invasive positive pressure ventilation

C. Non-invasive positive pressure ventilation (NIPPV)

D. Lung volume reduction surgery

---

43. What is the diagnosis for a 72-year-old male who is experiencing weight loss, reduced appetite, and iron deficiency anemia, based on the provided chest x-ray?



A. Lung metastasis

B. Bronchogenic carcinoma

C. Miliary tuberculosis

D. Mesothelioma

---

44. A 55 year old shipbuilding worker presents with dyspnea.He has been working in this industry for the past 25 years. Which is the most specific malignancy that we can expect in this patient?

A. Bronchogenic carcinoma

B. Malignant mesothelioma

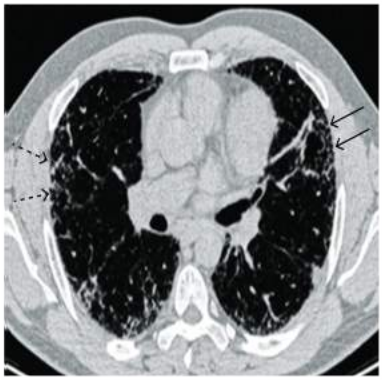
C. Small cell carcinoma of lung

D. Squamous cell carcinoma of lung

---

45. A 60-year-old male patient comes to your clinic with an 8-month history of shortness of breath and non-productive cough. He has smoked half a pack of cigarettes for the past 30 years. On physical

examination, clubbing is seen and fine crackles are heard on both sides during inspiration. You perform pulmonary function tests and it shows an FEV1/FVC ratio of 92%. The CT scan of the chest is shown below. What is the most probable diagnosis?



A. Bronchial asthma

B. Pulmonary fibrosis

C. Pulmonary tuberculosis

D. Chronic obstructive pulmonary disease

---

46. In patients affected by COVID-19, which pattern is frequently observed in chest CT scans?

A. Interlobular septal thickening

B. Air bronchograms

C. Ground glass opacity

D. Crazy paving pattern

---

47. A patient was admitted to the ICU 48 hours after an accident in which he sustained a fracture of the femur. The oxygen saturation in the rebreathing unit was 100% but his SpO2 remained at 60%. The patient is in a state of confusion. Diffuse petechiae are noted on examination. Chest radiograph showed lung fields to be clear. What is the most likely diagnosis?

A. Pulmonary embolism

B. Fat embolism

C. ARDS

D. Occult pneumothorax

---

48. Which of the following imaging tests should be performed to confirm a diagnosis of pulmonary embolism in a patient?

A. Doppler echocardiography

B. CT pulmonary angiography

C. Ventilation perfusion scan of lungs

D. MR pulmonary angiography

---

49. In the management of a 35-year-old female patient with class II pulmonary hypertension who has obtained a negative vasoreactive test, which of the following options is employed in the subsequent step?

A. Iloprost

B. Ambrisentan

C. Nifedipine

D. Epoprostenol

---

50. What is the recommended course of action for a newly diagnosed HIV patient who is experiencing symptoms of fever, cough, and haemoptysis, and whose sputum sample has revealed the presence of acid-fast bacilli?

A. Start ART if CD4<200

B. Start ART and then ATT after 2 weeks

C. Start ATT and then ART after 2 weeks

D. Start ATT and ART simultaneously

---

51. What could be the potential cause when a patient presents with hypoxemia but a normal alveolar-arterial oxygen gradient?

A. Right to left shunt

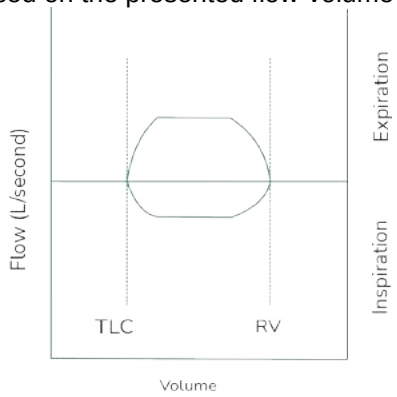
B. Ventilation/perfusion mismatch

C. Hypoventilation

D. Alveolar membrane damage

---

52. What is the likely diagnosis based on the presented flow-volume loop.



A. Variable small airway obstruction

B. Fixed central airway obstruction

C. Variable intrathoracic obstruction

D. Variable extrathoracic obstruction

---

53. Acid-base imbalance is suspected in a patient. Which of the following would you use to determine it? 1. Arterial pH 2. Venous pH 3. Venous pO2 4. Venous pCO2

A. 1,2

B. 1,2,3

C. 1,2,4

D. 1,2,3,4

---

54. Which of the following findings from a pleural fluid aspirate will suggest an exudative pleural effusion? Normal values Total S. Protein: 6-8 gm% S.LDH: 140-280 IU S. glucose: 140-200

A. Pleural: Serum protein ratio > 0.5, pleural: Serum LDH ratio > 0.6 or pleural LDH > 2/3

B. Pleural fluid protein = 4.5 gm% and glucose = 30 mg%

C. Pleural fluid LDH = 90IU and glucose = 30 mg%

D. Pleural fluid protein = 3.5gm% and glucose = 90 mg%

---

55. A 45-year-old female presents to the emergency department with the following arterial blood gas (ABG) results: pH 7.55, PaCO2 40 mmHg, HCO3- 32 mEq/L. Which of the following conditions is most likely responsible for these findings?

A. Metabolic acidosis

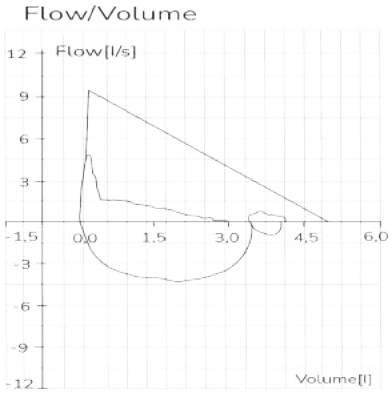
B. Metabolic alkalosis

C. Respiratory acidosis

D. Respiratory alkalosis

---

56. The flow - volume curve of a patient after spirometry is given below. The most likely diagnosis in this patient is:



A. Asbestosis

B. COPD

C. Myasthenia gravis

D. Vocal cord paralysis

---

57. Addison's disease is characterized by all of the following symptoms except?

A. Hyperglycemia

B. Hyponatremia

C. Hyperkalemia

D. Hypotension

---

58. Which of the following pneumoconiosis is associated with an increased incidence of tuberculosis?

A. Asbestosis

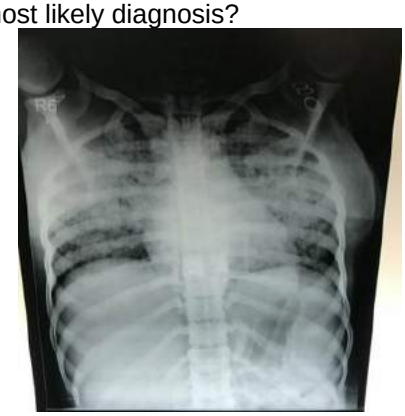
B. Silicosis

C. Coal worker’s pneumoniosis

D. Berryliosis

---

59. A patient with a history of fever for the past 4 days and new onset of breathlessness was admitted to ICU as he was deteriorating. He was unresponsive to the incremental flow rate of oxygen and his oxygen saturation was progressively decreasing. A chest x-ray was ordered and the findings are shown in the image below. What is the most likely diagnosis?



A. Atelectasis

B. Mediastinitis

C. Pulmonary fibrosis

D. ARDS

---

60. A 55-year-old patient presented with chronic projectile vomiting and weight loss. What is the expected metabolic abnormality to be seen here?

A. Hypokalemic hypochloremic metabolic alkalosis with hyponatremia

B. Hypokalemic hypochloremic metabolic acidosis with hypernatremia

C. Hypokalemic hypochloremic metabolic alkalosis with hypercalcemia

D. Hypokalemic hypochloremic metabolic acidosis with hyponatremia

---

61. What should be the subsequent course of action in managing a patient aged 60, who is a diagnosed COPD patient, admitted to the ICU, and currently receiving 2 liters of oxygen therapy, but is observed to be hypoventilating with an arterial blood gas analysis revealing a pH level of 7.33 and pCO2 levels of 64 mmHg?

A. Non-invasive PPV should be given

B. Invasive PPV should be given

C. Increase the oxygen flow rate

D. Intubate and start on ventilator

---

62. A patient with no comorbidities presents with electrolyte values as shown below. The patient had a normal ECG. What is the preferred treatment for this patient among the options given below? Serum K+: 3.0mmol/L

A. Calcium gluconate

B. Sodium bicarbonate

C. Potklor

D. Insulin with dextrose

---

63. For which types of cancers is prophylactic cranial radiation administered?

A. Lung cancer

B. Liver cancer

C. Prostate cancer

D. Breast cancer

---

64. What is the most effective diagnostic test for a 50-year-old individual who is a chronic smoker and is experiencing mild, repeated episodes of coughing up blood without any accompanying symptoms of fever or weight loss? The chest x-ray shows no abnormalities, and the sputum test is negative for Acid-Fast Bacilli (AFB).

A. MRI

B. CT

C. Fiberoptic bronchoscopy

D. Bronchography

---

65. Nasal polyps are commonly associated with which of the following?

A. Intrinsic asthma

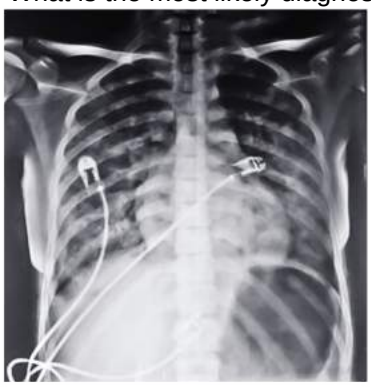
B. Brittle asthma

C. Extrinsic asthma

D. Exercise - induced asthma

---

66. A 30-year-old HIV positive man presents with fever for 3 weeks, dry cough an significant weight loss. His chest x-ray is given below. What is the most likely diagnosis?



A. Staphylococcal pneumonia

B. Pneumococcal pneumonia

C. Tuberculosis

D. Pneumocystis jirovecii pneumonia

---

67. On performing a pulmonary function test, reduction in FEV1/FVC is characteristic of:

A. Restrictive disease

B. Obstructive disease

C. Normal lung function

D. Interstitial lung disease

---

68. Which of the subsequent options is not typically observed in allergic bronchopulmonary aspergillosis?

A. Low serum IgE levels

B. Cough

C. Wheezing

D. Central bronchiectasis

---

69. Which of the following options best represents 'very severe COPD' according to the GOLD criteria?

A. FEV1/FVC <0.7 and FEV1<30%

B. FEV1/FVC <0.7 and FEV1<70%

C. FEV1/FVC <0.7 and FEV1<50%

D. Both a and c

---

70. What is the cause of infertility in individuals with Kartagener's syndrome?

A. Oligospermia

B. Asthenospermia

C. Undescended testes

D. Epididymis obstruction

---

71. Among the following choices, which organism is the most probable cause of ventilator-associated pneumonia?

A. Clostridium

B. Klebsiella

C. Acinetobacter

D. Hemophilus

---

72. Which of the following drugs is commonly used for treating community-acquired pneumonia in the outpatient setting?

A. Vancomycin

B. Ceftriaxone

C. Azithromycin

D. Streptomycin

---

73. A 45-year patient working in a factory for the past 20 years presents with breathlessness. HRCT chest shows pleural thickening and fibrosis. Diagnosis is?

A. Asbestosis

B. Coal worker pneumoconiosis

C. Silicosis

D. Berylliosis

---

74. Which of the following is a causative agent of Farmer's Lung?

A. Thermophilic Actinomycetes

B. Aspergillus Fumigatus

C. Actinobacter

D. Aspergillus Flavus

---

75. Which of the following is associated with metastasis to the brain?

A. Lung cancer

B. Hepatocellular carcinoma

C. Prostate cancer

D. Breast cancer

---

76. Which of the following is false about Mycoplasma pneumoniae?

A. Responds well to amoxiclav

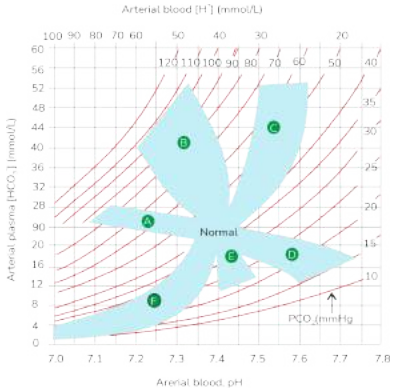
B. Antibodies are useful in diagnosis

C. Chest X-ray shows bilateral infiltrates

D. Can be cultured in a cell-free medium

---

77. In the given acid-base nomogram diagram, areas marked A and D indicated which of the following conditions?



A. Chronic respiratory acidosis, acute metabolic alkalosis

B. Acute metabolic alkalosis, acute respiratory acidosis

C. Acute respiratory acidosis, acute respiratory alkalosis

D. Acute respiratory acidosis, acute metabolic alkalosis

---

78. What is the most common pulmonary manifestation of SLE?

A. Shrinking lung syndrome

B. Pleuritis

C. Intra alveolar hemorrhage

D. Interstitial inflammation

---

79. What is the most common presentation of inhalational anthrax?

A. Atypical pneumonia

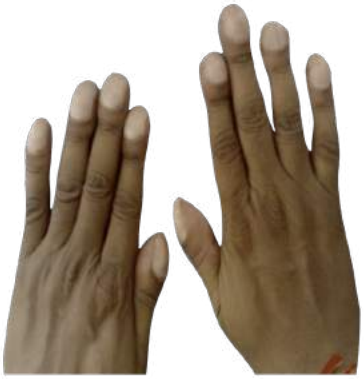
B. Haemorrhagic mediastinitis

C. Lung abscess

D. Broncho-pulmonary pneumonia

---

80. A 30-year-old man presented the findings shown in the given image. What is this physical finding called?



A. Spoon-shaped nails

B. Raynaud's phenomenon

C. Pallor

D. Clubbing

---

81. Which of the following agents is most likely causing the condition in a 60-year-old woman, who had a kidney transplant 2 months ago, and is now experiencing a high fever, severe difficulty in breathing, and a dry cough with a hacking sound? Chest x-ray shows widespread interstitial infiltrates in both lungs, and urine examination reveals the presence of cells with an 'owl-eye' appearance.

A. Adenovirus

B. Cytomegalovirus

C. Influenza virus

D. Respiratory syncytial

---

82. Which of the following features are true about Allergic Broncho Pulmonary Aspergillosis? Distal bronchiectasis Serum precipitins to Aspergillus Increased lgE Levels Seen in asthmatics

A. 1,2,3 only

B. 2,3,4 only

C. 1,3,4 only

D. All of the above

---

83. Why is COVID-19 a major global concern despite influenza spreading faster than COVID-19?

A. Median incubation period is more in influenza

B. Reproductive number for COVID-19 is 2-2.5

C. Serial interval is 5-6 days in influenza

D. Reproductive number for Influenza is higher

---

84. In good pasture syndrome, which organ is involved apart from lung?

A. Kidney

B. Liver

C. Spleen

D. Heart

---

85. What is the clinical diagnosis for a patient who experiences sudden and severe respiratory distress after undergoing internal jugular vein catheterization?

A. Pneumothorax

B. Sepsis

C. ARDS

D. Infective endarteritis

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	4
Question 3	1
Question 4	1
Question 5	4
Question 6	1
Question 7	3
Question 8	1
Question 9	3
Question 10	1
Question 11	2
Question 12	4
Question 13	3
Question 14	2
Question 15	3
Question 16	2
Question 17	2
Question 18	1
Question 19	2
Question 20	1

Question 21	1
Question 22	4
Question 23	4
Question 24	1
Question 25	4
Question 26	3
Question 27	3
Question 28	4
Question 29	3
Question 30	2
Question 31	4
Question 32	3
Question 33	3
Question 34	2
Question 35	2
Question 36	1
Question 37	3
Question 38	2
Question 39	2
Question 40	2
Question 41	2
Question 42	3
Question 43	1
Question 44	2
Question 45	2
Question 46	3
Question 47	2
Question 48	2
Question 49	2
Question 50	3
Question 51	3
Question 52	2
Question 53	1
Question 54	1
Question 55	2

Question 56	2
Question 57	1
Question 58	2
Question 59	4
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Question 62	3
Question 63	1
Question 64	2
Question 65	1
Question 66	4
Question 67	2
Question 68	1
Question 69	1
Question 70	2
Question 71	3
Question 72	3
Question 73	1
Question 74	1
Question 75	1
Question 76	1
Question 77	3
Question 78	2
Question 79	2
Question 80	4
Question 81	2
Question 82	2
Question 83	2
Question 84	1
Question 85	1

Solution for Question 1:

Correct Option A - Ceftazidime + Azithromycin:

• Ceftazidime is a third-generation cephalosporin commonly used for severe infections, particularly those caused by Gram-negative bacteria.

• Azithromycin is a macrolide antibiotic effective against a broad range of respiratory pathogens as in the question that suggests a secondary bacterial infection

Incorrect Options:

Option B - Ceftriaxone: Ceftriaxone is a broad-spectrum antibiotic often used for various bacterial infections. However, since the patient's nasopharyngeal swab showed Rhinovirus, which is a viral infection, ceftriaxone alone would not be an appropriate treatment choice. Antibiotics should be reserved for bacterial infections or when there is a strong suspicion of a concurrent bacterial infection.

Option C - Ceftriaxone + Levofloxacin: Similar to option B, combining ceftriaxone with levofloxacin, another broad-spectrum antibiotic, would not be suitable for a viral infection like Rhinovirus. Using antibiotics unnecessarily can contribute to antibiotic resistance and should be avoided in viral infections.

Option D - Piptaz + Ciprofloxacin: Piptaz (piperacillin/tazobactam) is a combination antibiotic effective against a wide range of bacterial infections. Ciprofloxacin is a fluoroquinolone antibiotic. However, as mentioned earlier, the patient's infection is caused by Rhinovirus, a viral pathogen. Therefore, this combination of antibiotics would not be appropriate for treating a viral infection.

Solution for Question 2:

Correct Option D - ARDS:

• blast lung is closely associated with ARDS (Acute Respiratory Distress Syndrome). ARDS is a severe lung condition that can occur after trauma, including blast injuries. It is characterized by the sudden onset of severe respiratory distress, with symptoms such as difficulty breathing, rapid breathing, and low oxygen levels. ARDS can be caused by various factors, including trauma, sepsis, pneumonia, or inhalation of harmful substances.

Incorrect Options:

Option A
- COPD: Blast lung is not known as COPD. COPD (Chronic Obstructive Pulmonary Disease) is a chronic lung disease that is typically caused by long-term exposure to irritants, such as cigarette smoke, and is characterized by airflow limitation

Option B - Alveolar haemorrhage: Blast lung is not known as alveolar hemorrhage either. Alveolar hemorrhage refers to bleeding in the alveoli, the small air sacs in the lungs. It can be caused by various conditions, such as autoimmune diseases, vasculitis, or infections.

Option C - Pulmonary edema: Pulmonary edema is also not another name for blast lung. Pulmonary edema occurs when fluid accumulates in the lungs, usually due to increased pressure in the blood vessels or damage to the lung tissue. It can result from heart problems, kidney disease, or severe infections, among other causes.

Solution for Question 3:

Correct Option A - Pneumonia:

• Pneumonia is an infection of the lungs that primarily affects the alveoli.

• Severe pneumonia can cause respiratory distress which directly leads to ARDS.

• Pneumonia is considered a parenchymal lung disease.

• Both Pneumonia > Sepsis are the leading causes of ARDS

Incorrect Options:

Option B - Fat embolism syndrome following femur shaft fracture: Fat embolism syndrome occurs whe n fat globules are released into the bloodstream, typically following long bone fractures. These fat glob ules can obstruct blood vessels in the lungs, leading to inflammation and lung injury. Fat embolism syn drome can cause ARDS at the blood-lung interface.

Option C - Sepsis: Sepsis is a systemic inflammatory response to infection that can lead to organ dysfu nction. In severe cases, sepsis can cause ARDS, as the inflammatory response affects the blood-lung i nterface and results in lung injury.

Option D - Transfusion-related lung injury: Transfusion-related lung injury (TRALI) occurs when donor antibodies or other components in blood products trigger an immune response, leading to lung injury. T RALI can cause ARDS at the blood-lung interface.

Solution for Question 4:

Correct Option A - 200 < PaO2/FiO2 =<300mm/Hg with PEEP Is moderate:

• According to the Berlin definition, moderate ARDS is defined by a PaO2/FiO2 ratio of 100-200 mmHg. A

• PaO2/FiO2 ratio of 200-300 mmHg would fall into the mild ARDS category.

Incorrect Options:

Option B - Bilateral interstitial infiltrates: This statement is correct.

Option C - Symptom onset within a week: This statement is correct.

Option D - No cardiac failure in echocardiography: This statement is correct.

Solution for Question 5:

Correct Option D - Ultrasound-guided aspiration:

• If the patient's X-ray reveals a significant amount of fluid or an airway obstruction, and the patient is intubated, ultrasound-guided aspiration may be a reasonable next step. This procedure involves using ultrasound guidance to identify the site of fluid accumulation or obstruction and performing an aspiration to relieve the obstruction or drain the fluid. It is often done to improve respiratory function and prevent complications associated with airway obstruction or fluid accumulation.

Incorrect Options:

Option A - Suction: Suctioning is a routine procedure used to clear the airway of secretions or foreign material. While suctioning may be necessary for some intubated patients, it is not a specific next step b ased solely on the information provided in the question. The appropriateness of suctioning would depe nd on the patient's clinical condition and the presence of indications for suctioning.

Option B - Chest physiotherapy: Chest physiotherapy techniques, such as postural drainage, percussion, and vibration, are often used to help mobilize secretions and improve airway clearance. While these techniques may be beneficial in certain cases, they are not specific next steps based solely on the information provided in the question. The decision to perform chest physiotherapy would depend on the patient's clinical condition and the need for airway clearance.

Option C - Start antibiotics and send samples for culture: Initiating antibiotics and obtaining cultures may be appropriate in certain situations, such as suspected or confirmed respiratory infection. However, the decision to start antibiotics and send samples for culture should be based on a comprehensive evaluation of the patient's clinical presentation, including signs and symptoms of infection. It cannot be determined solely based on the information of an X-ray finding.

Solution for Question 6:

Correct Option A - Subcutaneous emphysema:

• Chest Trauma: The patient has presented after chest trauma, indicating that there has been an injury to the chest area. Chest trauma can cause various injuries, including damage to the respiratory structures.

• Crepitus refers to the sensation of crackling or crunching felt under the skin. It occurs when air or gas escapes from the damaged respiratory or gastrointestinal tract and dissects through the subcutaneous tissues. The presence of crepitus is a characteristic finding in subcutaneous emphysema.

• The description of the image-based question mentioning the face of the man showing edema is not directly related to the diagnosis of subcutaneous emphysema. Edema refers to the swelling caused by an accumulation of fluid in the tissues, and it can have various causes. However, it is not a specific feature of subcutaneous emphysema.

Incorrect Options:

Option B - Gas gangrene: Gas gangrene is a severe and potentially life-threatening infection caused by certain bacteria, such as Clostridium species. It is characterized by the rapid spread of infection, tissue destruction, and gas production within the affected tissues. Gas gangrene is not directly related to chest trauma or the presence of crepitus, so it is an incorrect option in this case.

Option C - Acute tubular necrosis: Acute tubular necrosis (ATN) is a type of kidney injury that can occur due to various causes, such as ischemia, toxins, or infections. It involves damage to the renal tubules, leading to impaired kidney function. ATN is not directly related to chest trauma or the presence of crepitus, so it is an incorrect option in this scenario.

Option D - Hyperbaric decompression sickness: Hyperbaric decompression sickness, commonly known as "the bends," is a condition that can occur in scuba divers when they ascend too quickly, leading to the formation of gas bubbles in the bloodstream. It primarily affects divers and is not directly related to chest trauma or the presence of crepitus. Therefore, it is an incorrect option in this context.

Solution for Question 7:

Correct Option C: Congestive heart failure

• The above case with the given clinical findings is suggestive of the diagnosis of congestive heart failure. The effusion is transudative in nature here according to Light’s criteria.

Incorrect Options:

Option A: Parapneumonic pleural effusion has increased in WBCs, especially neutrophils and the appe arance is cloudy.

Option B: Malignant pleural effusion is exudative in nature.

Option D: Tubercular pleural effusion is exudative in nature.

Solution for Question 8:

Correct Option A - Consolidation with air bronchogram:

• Consolidation with air bronchogram refers to a radiological finding on chest imaging, where a locale of lung parenchyma shows up more opaque due to accumulation of fluid or inflammatory exudate, with unmistakable air-filled bronchi inside it.

• Causes can be bacterial or viral pneumonia, bronchiectasis, pulmonary hemorrhage, or other inflammatory lung diseases.

• The CT scan reveals consolidation with an air bronchogram, which is a classic finding in pneumonia. The patient moreover presents with fever, breathlessness, and cough with expectoration, which are indications of pneumonia.

Incorrect Options:

Option B - Mediastinal mass: A mediastinal mass is an anomalous development or tumor found within t he mediastinum, the area between the lungs within the chest. The CT scan would show a well-defined mass within the mediastinum. The side effects would depend on the size of the mass.

Option C - Pleural effusion: Pleural effusion is a buildup of liquid between the layers of tissue that line t he lungs and chest wall. The CT scan would appear as a collection of fluid around the lungs.

Option D - Diaphragmatic hernia: A diaphragmatic hernia may be a defect within the diaphragm that pe rmits organs from the abdomen to move into the chest depth. The CT scan would clearly demonstrate t he presence of abdominal organs in the chest.

Solution for Question 9:

Correct Option C - Isoniazid and rifampicin:

• Multidrug-resistant (MDR) tuberculosis shows resistance to isoniazid and rifampicin, which are the two most effective first-line anti-TB drugs. Therefore, the correct answer is (c) isoniazid and rifampicin.

Incorrect Options:

Options A & B: Isoniazid, rifampicin, and fluoroquinolone & Fluoroquinolones: Fluoroquinolones are se cond-line anti-TB drugs that are used to treat MDR-TB together with different drugs. MDR-TB does sho w resistance to isoniazid and rifampicin but not to fluoroquinolones.

Option D - Isoniazid, rifampicin, and kanamycin: Kanamycin is a second-line anti-TB drug used in the tr eatment of MDR-TB. MDR-TB does show resistance to isoniazid and rifampicin but not to kanamycin.

Solution for Question 10:

Correct Option A - Squamous cell carcinoma:

• Dysphagia can be caused by various conditions, including cancer of the esophagus or lung. However, lung cancer is more commonly associated with dysphagia when it involves the upper part of the lung or the lymph nodes around the trachea, which can press on the esophagus and interfere with swallowing. Given that the patient in question has a history of chronic smoking, squamous cell carcinoma is the most likely type of lung cancer to be found. This is because squamous cell carcinoma is strongly associated with smoking and tends to develop in the central part of the lung, near the bronchus.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 11:

Correct Option B - Bronchiectasis:

• Bronchiectasis is a chronic respiratory condition characterized by permanent dilation and thickening of the bronchial walls, leading to impaired airway mucus clearance. This can result in persistent coughing, often accompanied by sputum production, which can worsen on changing body position.

• Here, the cough increases on turning from left to right side, known as the "dependent lung" phenomenon. This occurs because when the patient turns onto the affected side, the mucus collects in the dependent part of the lung and triggers a cough.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 12:

Correct Option D - Bronchiectasis:

• Bronchiectasis is a condition characterized by permanent and abnormal dilatation of the bronchi and bronchioles, which results in impaired airway clearance and chronic infections. Imaging studies can confirm the diagnosis of bronchiectasis.

• The CT findings in bronchiectasis may include: Bronchial dilatation: The most important finding in bronchiectasis is bronchial dilatation, which may be cylindrical or varicose in shape. The dilatation may be segmental or involve entire lobes or lung segments. Thickening of bronchial walls. Mucus plugging: Mucus accumulation in the bronchi can lead to obstruction and recurrent infections. CT may show the presence of bronchial secretions or mucus plugging. Atelectasis: Due to chronic inflammation and obstruction, there may be areas of atelectasis or collapse of lung tissue. Ground-glass opacities: These are areas of hazy increased attenuation on CT, often due to inflammation or edema. Air trapping: Bronchiectasis can lead to impaired airway clearance and air trapping, which may be seen as hyperinflation of the lungs. Bronchial wall irregularity: In severe cases of bronchiectasis, the bronchial walls may appear irregular and nodular, with loss of normal architecture.

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• Bronchial wall irregularity: In severe cases of bronchiectasis, the bronchial walls may appear irregular and nodular, with loss of normal architecture.

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 13:

Correct Option C - Negative skin tuberculin test and negative chest X-ray:

• Cryptic tuberculosis refers to a form of tuberculosis that is difficult to diagnose because it may not show typical findings on chest X-ray or sputum smear examination. Negative skin tuberculin test (absence of a hypersensitivity response to Mycobacterium tuberculosis) and Negative chest X-ray (lacking typical signs of tuberculosis) can be seen in patients with cryptic tuberculosis.

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Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 14:

Correct Option B - Silicosis:

• The ground-glass appearance on high-resolution computed tomography (HRCT) refers to an imaging pattern in which the lung parenchyma appears hazy, like ground glass, due to partial filling of the air spaces with fluid, inflammatory cells, or fibrosis.

• Silicosis is a progressive lung disease caused by inhalation of crystalline silica dust, commonly seen in occupations such as mining, quarrying, and sandblasting.

• In the early stages, HRCT may show ground-glass opacities

• As the disease progresses, nodular opacities called silicotic nodules develop, typically with an upper lung zone predominance. These nodules may calcify over time, resulting in eggshell calcifications.

Incorrect Options:

Option A - Asbestosis: Asbestosis is a chronic lung disease caused by the inhalation of asbestos fibers . The fibers lead to chronic inflammation and scarring of lung tissue. On HRCT, the characteristic findin gs in asbestosis include linear opacities that typically have a subpleural and lower lung zone predomin ance. These opacities may appear as fine reticular lines, thick bands, or honeycombing.

Option C - Anthracosis: Anthracosis, or coal workers' pneumoconiosis, is a lung disease caused by the inhalation and deposition of coal dust particles. The primary HRCT finding in anthracosis is the presen ce of small, rounded opacities, often referred to as coal macules or coal nodules found in the upper lun g zones and can resemble small dots or clusters.

Option D - Bagassosis: Bagassosis is an acute hypersensitivity pneumonitis caused by the inhalation o f moldy bagasse, HRCT findings in bagassosis can vary but may include ground-glass opacities. Centri lobular nodules, which are small nodules around the central airways, can also be seen. Additionally, air trapping may be observed, indicating small airway involvement.

Solution for Question 15:

Correct Option C - Rheumatoid arthritis:

• Rheumatoid arthritis is an autoimmune disease characterized by chronic inflammation, primarily affecting the joints.

• However, the inflammation associated with rheumatoid arthritis can extend beyond the joints and involve other tissues, including the pleura.

• Inflammation of the pleura can cause damage to the blood vessels in the pleural membrane, leading to increased vascular permeability and the leakage of fluid, proteins, and immune cells into the pleural space.

Incorrect Options:

Option A & B
(Heart failure & Liver failure) are characteristically associated with transudative pleural effusion.

Option D - Nephrotic syndrome: Characterized by increased permeability of the glomerular filtration bar rier, resulting in the loss of large amounts of protein in the urine. the fluid accumulation typically occurs in the lower extremities (peripheral edema) rather than in the pleural cavity. Pleural effusion is not a typical feature of nephrotic syndrome.

Solution for Question 16:

Correct Option B - Legionella:

• Legionella cause a severe form of pneumonia known as Legionnaires' disease. Legionella is a strict aerobe, poorly stained with gram stain and infection acquired through inhalation of aerosols.

• Immunocompromised individuals are at increaed risk

• The characteristic symptoms include high-grade fever, cough, confusion,diarrhoea and bilateral infiltrates seen on chest X-ray and hyponatremia and elevated liver enzymes.

Incorrect Options:

Option A - Streptococcus: Streptococcus pneumoniae is a
common cause of community-acquired pneumonia, but it typically presents with a productive cough wit h rust-colored sputum. In this case, the sputum gram stain did not detect any organisms, making Strept ococcus less likely.

Option C - Pneumocystis jiroveci: is a fungal pathogen that causes pneumonia, particularly in immunoc ompromised individuals, such as those with HIV/AIDS. While the patient in question is HIV positive, the symptoms described and chest X-ray findings of bilateral infiltrates are not specific to Pneumocystis jir oveci pneumonia.

Option D - Klebsiella: Klebsiella causes pneumonia in individuals with a
history of alcoholism or COPD. While the patient has a smoking history, the clinical presentation (includ ing confusion and diarrhea) is inconsistent with Klebsiella pneumoniae infection. Additionally, the abse nce of organisms on sputum gram stain makes Klebsiella less likely.

Solution for Question 17:

Correct Option B - CT-guided biopsy:

• CT-guided biopsy is a minimally invasive procedure where a radiologist uses CT imaging to guide the insertion of a needle into the lung mass to obtain a tissue sample for analysis.

• This method allows for direct sampling of the suspicious area, even if it is located peripherally or near the apex of the lung.

• It provides a more accurate diagnosis by providing histopathological information about the nature of the mass, including whether it is cancerous or benign.

Incorrect Options:

Option A - Bronchoscopy: While bronchoscopy can be useful in evaluating central lesions or endobron chial tumors, it may not be effective for evaluating peripheral lung masses, especially those located ne ar the apex.. Therefore, bronchoscopy may not be the best initial step for evaluation.

Option C - Sputum cytology: It has limited sensitivity for detecting peripheral lung masses, especially s maller ones. In this case, the patient has a
3 cm mass near the apex of the lung, and sputum cytology is unlikely to provide a definitive diagnosis.

Option D - Sputum for AFB: While TB can cause hemoptysis, the appearance of a
3cm upper lobe mass near the apex on chest X-ray is inconsistent with the typical presentation of TB.

Solution for Question 18:

Correct Option A - Hypotension:

• Hypotension, is not typically associated with Gaisböck syndrome.

• Gaisböck syndrome occurs in patients with chronic obstructive pulmonary disease (COPD). In these individuals, the primary cause of polycythemia is chronic hypoxemia The body responds to chronic hypoxemia by producing more erythropoietin As a result, the number of red blood cells increases, leading to erythrocytosis. Hypotension is not typically observed. In fact, patients with COPD-related erythrocytosis often have high blood pressure due to the underlying respiratory disease.

• In these individuals, the primary cause of polycythemia is chronic hypoxemia

• The body responds to chronic hypoxemia by producing more erythropoietin

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• Hypotension is not typically observed. In fact, patients with COPD-related erythrocytosis often have high blood pressure due to the underlying respiratory disease.

Incorrect Options:

Option B - Erythrocytosis: Erythrocytosis is a defining feature of Gaisböck syndrome.

Option C - Normal leukocyte counts: Normal leukocyte counts are typically seen in Gaisböck syndrome . While the total blood volume increases due to an increase in red blood cells, white blood cells, and pl atelets, the white blood cell count is usually within the normal range.

Option D - Obesity: Obesity is a feature of Gaisböck syndrome

Solution for Question 19:

Correct Option B - Cystic fibrosis:

• Cystic fibrosis (CF) is a genetic disorder that primarily affects the lungs and digestive system.

• Recurrent respiratory infections, thickened sputum, and bronchial wall thickening as seen on a chest X-ray are all symptoms of cystic fibrosis.

• Steatorrhea since birth is indicative of pancreatic insufficiency, a common manifestation of CF.

Incorrect Options:

Option A - Hyaline membrane disease: The presence of a
hyaline membrane in the lungs characterises hyaline membrane disease, a
respiratory condition that primarily affects premature infants.

Option C and D - Alpha 1 anti-trypsin deficiency & Malabsorption syndrome: Child's steatorrhea sugge sting malabsorption, the presence of recurrent respiratory infections and bronchial wall thickening mak es CF a more likely differential diagnosis.

Solution for Question 20:

Correct Option A - Pancoast tumour:

• Pancoast tumor is a relatively uncommon primary lung cancer forming in the lung apex and invading the surrounding soft tissues.

• This is a tumor that is difficult to treat because of its proximity and frequent metastasis to adjacent structures such as the subclavian vessels, lymphatic system, brachial plexus, spine, second and third ribs, stellate ganglion, and the sympathetic nervous system.

• Its proximity to the above-mentioned structures causes the symptoms seen in the patient- pain radiating to the upper arm and a tingling sensation in the 4th and 5th digits of his left hand.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 21:

Correct Option A - CT pulmonary angiogram:

• History of bed rest from months in elder individualis and symptoms of brethlessness and chest pain points toward pulmonary embolism

• Elderly with best rest are prone to develop deep vein thrombus which can lead to pulmonary embolism

• Therefore next best investigation in this patient would be CT pulmonary angiography

• CT pulmonary angiogram (CTPA) is used to check for pulmonary embolism or blood clots in the lungs' arteries. A contrast dye is injected into an arm vein, where it travels through the lungs' blood vessels while CT scans are taken.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 22:

Correct Option D - Obstructive disease with bronchodilator reversibility:

• In people with asthma or chronic obstructive pulmonary disease (COPD), bronchodilator reversibility test is commonly used. The purpose of the test is to determine whether the subject's airflow has improved as a result of taking the bronchodilator medication. The given pulmonary function test results indicate a diagnosis of obstructive lung disease with bronchodilator reversibility as the FEV1/FVC is less than 0.7 so it is an obstructive disease and after bronchodilation there is an increase of >12% in FEV1 hence it is reversible. Improved lung volumes after bronchodilation indicate a response to the bronchodilator which is a feature of COPD.

Incorrect Options:

Option A - Vascular disease with bronchodilator reversibility: Vascular disease does not typically prese nt with bronchodilator reversibility, so this option is unlikely.

Option B - Restrictive lung disease with bronchodilator reversibility: Restrictive lung diseases are chara cterized by reduced lung volumes, but the given lung volumes do not suggest restriction. Additionally, i mproved lung volumes after bronchodilation indicate a
response to the bronchodilator, which is not typically seen in restrictive lung diseases.

Option C - Restrictive lung disease without bronchodilator reversibility: The lung volumes provided do n ot indicate restriction. Additionally, the lack of improvement in lung volumes after bronchodilation contr adicts this option.

Solution for Question 23:

Correct Option D - Ileocecal junction:

• The ileocecal junction refers to the area where the small intestine (ileum) meets the large intestine (cecum).

• It is a common site for the development of tuberculosis infection in the abdomen.

• Tuberculosis is an infectious disease caused by Mycobacterium tuberculosis, and it can affect various organs and systems in the body, including the gastrointestinal tract.

Incorrect Options:

Option A, B and C - Rectum, Colon & Small intestine:

• Although tuberculosis can affect the rectum, colon and the small intestine, the ileocaecal junction is the most common site.

Solution for Question 24:

Correct Option A - P-pulmonale:

• In the given ECG, P-wave amplitude ≥2.5 mm in leads II, III, and aVF.

• P-wave axis deviation towards the right side indicates P-pulmonale.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 25:

Correct Option D - Increase PEEP:

• In the given scenario, the patient is experiencing ARDS (Acute Respiratory Distress Syndrome) secondary to urosepsis and is on mechanical ventilation. The arterial blood gas (ABG) results show a low paO2 level of 50 mmHg, indicating hypoxemia.To improve oxygenation in ARDS, the next step would be to increase the positive end-expiratory pressure (PEEP). PEEP helps to recruit collapsed alveoli, improve lung compliance, and maintain alveolar patency. By increasing PEEP, it helps to open

up more lung units, improve oxygenation, and increase functional residual capacity (FRC).

Incorrect Options:

Option A - Reduce FiO2: The FiO2 is already set at 90% to provide a high concentration of oxygen to t he patient. Further reducing FiO2 may compromise oxygenation and worsen hypoxemia.

Option B - Increase tidal volume: Increasing tidal volume can lead to increased risk of ventilator-induce d lung injury (VILI) and barotrauma. It is generally recommended to use lower tidal volumes (around 6 mL/kg of ideal body weight) in ARDS to minimize complications.

Option C - Increase respiratory rate: Increasing the respiratory rate may improve minute ventilation but does not directly address the issue of hypoxemia. It is not the ideal intervention to improve oxygenation in ARDS.

Solution for Question 26:

Correct Option C - Metabolic acidosis:

• Metabolic acidosis occurs when there is an excess of acid or a loss of bicarbonate (HCO3-) in the body, leading to a decrease in the bicarbonate concentration and a decrease in pH.

• This decrease is compensated by an increase in chloride ions, resulting in an increased anion gap.

Incorrect Options:

• Options A, B and D are not associated with an increased anion gap.

Solution for Question 27:

Correct Option C - Pneumomediastinum:

• Hamman's sign is heard during auscultation of the chest and is associated with a specific condition called pneumomediastinum.

• It refers to the crunching or crackling sound synchronous with the heartbeat, known as crepitus, caused by air within the mediastinum.

• The sound is best heard along the left sternal border.

Incorrect Options:

• Option A, B and D are not associated with the Hamman's sign.

Solution for Question 28:

Correct Option D - Bronchiectasis:

• Bronchiectasis is characterized by permanent dilation and thickening of the bronchial walls.

• Obstructive ventilatory impairment may be observed, leading to a reduced FEV1 and an decreased FVC, resulting in a decreased FEV1/FVC ratio.

• The volume/time graph may show a reduced peak expiratory flow rate and prolonged expiration.

Incorrect Options:

Option A - Chest wall neuromuscular disease: Decreased respiratory muscle strength and endurance c an lead to reduced FEV1 and FVC values but FEV1/FVC ratio is normal or increased.

Option B - Sarcoidosis: Pulmonary involvement in sarcoidosis can lead to restrictive lung disease. Both FEV1 and FVC may be reduced, but the FEV1/FVC ratio remains normal or even increased.

Option C - Idiopathic pulmonary fibrosis: Idiopathic pulmonary fibrosis is characterized by progressive s carring of lung tissue. It typically presents as a
restrictive lung disease. Both FEV1 and FVC may be reduced proportionally, maintaining a
normal or near-normal FEV1/FVC ratio. The volume/time graph may show reduced lung volumes and a flattened slope during inspiration and expiration.

Solution for Question 29:

Correct Option C - Obesity hypoventilation syndrome:

• OHS is defined by raised 'awake' arterial pressure of carbon dioxide levels in patients with obesity in whom alternative causes of hypercapnia and hypoventilation have been excluded.

• This is caused due to obesity causing a restriction in lung filling. This causes hypoventilation.

• In this patient with hypercapnia while awake, with compensatory metabolic alkalosis, the diagnosis is likely OHS.

Incorrect Options:

Option A - Obstructive sleep apnea:

• Obstructive sleep apnea (OSA) is a disorder that is characterized by obstructive apneas and hypopneas due to repetitive collapse of the upper airway during sleep.

• While most patients with OHS will have Obstructive sleep apnea(90%) the clinical features here point to a diagnosis of OHS.

• The clinical features against OSA include hypercapnia and hyoxemia in an awake individual.

• OSA patients will demonstrate hyoxemia only while asleep and not while awake.

• Therefore even though this patient is likely to have OSA, OHS is the better answer given the scenario and clinical information provided.

Option B - Narcolepsy:

• Narcolepsy is characterized by excessive daytime sleepiness, sudden loss of muscle tone (cataplexy), and disrupted sleep patterns. While impaired concentration and memory can be seen in narcolepsy. ABG is normal.

Option D - Central sleep apnea:

• Central sleep apnea is a condition in which there is a lack of respiratory effort during sleep, leading to pauses in breathing. It is different from obstructive sleep apnea, where the airway is physically blocked. Impaired concentration and memory can occur in central sleep apnea. The most likely diagnosis in this case is Obesity hypoventilation syndrome (OHS) due to the combination of obesity (BMI 41 kg/m2), daytime sleepiness, impaired concentration, and the ABG results showing elevated PaCO2 (50 mm

Hg).

Solution for Question 30:

Correct Option B - Chloride (Cl):

• The defect in cystic fibrosis is specifically associated with the CFTR chloride channel. Mutations in the CFTR gene result in a defective or absent CFTR protein, impairing the movement of chloride ions across cell membranes. This disruption of chloride transport leads to the characteristic features of CF, including the production of thick and sticky mucus in various organs.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 31:

Correct Option D - Consider admission in a non ICU setting:

• The correct answer is to consider admission in a non-ICU setting. The patient's presentation with cough, yellowish sputum, and bronchial breath sounds indicates a lower respiratory tract infection, which may require further evaluation and management. However, since the patient is hemodynamically stable and not confused, and their respiratory rate and blood pressure are within normal limits, admission to a non-ICU setting would be an appropriate initial step.

CURB-65 Score for Assessing Severity of Community-Acquired Pneumonia:

Criteria

Score

Confusion

1 point

Urea > 7 mmol/L

Respiratory rate ≥ 30 breaths/min

Blood pressure (systolic < 90 mmHg or diastolic ≤ 60 mmHg)

Age ≥ 65 years

Interpretation:

• 0 points: Low risk (consider home treatment)

• 1-2 points: Intermediate risk (consider hospitalization or close monitoring)

• ≥ 3 points: High risk (consider hospitalization and further evaluation)

As the score is 1, we keep the patient in a non-icu hospital setting.

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 32:

Correct Option C - Respiratory alkalosis:

• Respiratory alkalosis occurs when there is a decrease in carbon dioxide (CO_2) levels in the blood, leading to an increase in alkalinity. It can be caused by hyperventilation, anxiety, or high-altitude exposure. Hyperventilation causes excessive elimination of carbon dioxide, leading to a decrease in blood CO_2 levels. This results in respiratory alkalosis. Symptoms may include lightheadedness, dizziness, tingling sensations, and carpo-pedal spasms. In this case, the patient's hyperventilation and subsequent carpo-pedal spasms suggest respiratory alkalosis as the likely cause.

Incorrect Options:

• In a hyperventilating patient, Options A, B and D are unlikely.

Solution for Question 33:

Correct Option C - Tropical pulmonary eosinophilia:

• Tropical pulmonary eosinophilia (TPE) is a hypersensitivity reaction to filarial parasites (Wuchereria bancrofti or Brugia malayi) and their products. It is more commonly seen in individuals living in endemic areas. Symptoms include fever, nocturnal cough, breathlessness, wheezing, and an increased eosinophil count (>500/µL). The miliary pattern on chest X-ray is typical of TPE.

• Therefore, the diagnosis is TPE.

Incorrect Options:

Option A - Bronchial asthma:

• Bronchial asthma is a chronic respiratory condition characterized by inflammation and narrowing of the airways, leading to symptoms such as wheezing, coughing (often nocturnal), breathlessness, and occasionally fever.

• However, the presence of a miliary pattern on chest X-ray is not typical of bronchial asthma. Therefore, bronchial asthma is less likely to be the diagnosis in this case.

Option B - Miliary tuberculosis:

• Miliary tuberculosis is a severe form of tuberculosis (TB) in which the infection spreads throughout the body, including the lungs. It is characterized by the dissemination of tiny, millimeter-sized lesions throughout various organs, including the lungs, giving a miliary pattern on chest X-ray.

• Symptoms can include fever, cough, breathlessness, and weight loss. The elevated absolute eosinophil count is not typical of miliary tuberculosis. Therefore, miliary tuberculosis is less likely to be the diagnosis in this case.

Option D - Hypersensitivity pneumonitis:

• Hypersensitivity pneumonitis (HP), also known as extrinsic allergic alveolitis, is an immune-mediated lung disease caused by the inhalation of various organic substances such as dust, molds, or animal proteins. Symptoms typically include fever, cough (often nocturnal), breathlessness, and wheezing. The absolute eosinophil count can be elevated in some cases. However, the presence of a miliary pattern on chest X-ray is not typical of HP. Therefore, HP is less likely to be the diagnosis in this case.

Solution for Question 34:

Correct Option B - Streptococcus pneumonia:

• Streptococcus pneumoniae is a bacterium and a common cause of bacterial pneumonia in both immunocompetent and immunocompromised individuals. In the context of a child with AIDS, a low CD4 count, fever, productive cough, and consolidation on chest X-ray, Streptococcus pneumoniae is the most common and likely causative organism. It can cause lobar pneumonia, as indicated by the right lower lobe consolidation on the chest X-ray.

Incorrect Options:

Option A - Pneumocystis jirovecii: Pneumocystis jirovecii is a fungus that commonly causes pneumonia in immunocompromised individuals, especially those with AIDS. It typically presents with non-productive cough, shortness of breath, and bilateral diffuse infiltrates on chest X-ray. While Pneumocystis jirovecii pneumonia (PJP) is a common opportunistic infection in patients with AIDS, the clinical presentation described in the scenario, including fever, productive cough, and unilateral consolidation, is not typical of PJP. Therefore, Pneumocystis jirovecii is not the most likely causative organism in this case.

Option C - Staphylococcus aureus: Staphylococcus aureus is another bacterium that can cause pneumonia in immunocompromised individuals, including those with AIDS. It is known for causing severe infections, including necrotizing pneumonia. While Staphylococcus aureus can be a potential pathogen, S.pneumoniae is more commonly associated with this presentation.

Option D - Mycoplasma: Mycoplasma pneumoniae is an atypical bacterium that can cause pneumonia, particularly in children and young adults. It often presents with a milder respiratory illness, including a persistent cough, headache, and sore throat. The chest X-ray findings typically show patchy infiltrates rather than lobar consolidation. Although Mycoplasma can cause pneumonia, it is not the most likely causative organism in this case, given the clinical presentation and imaging findings.

Solution for Question 35:

Correct Option B - Airborne precautions:

• Airborne infections are one of the five modes of transmission of diseases. N95 masks protect from most diseases that arise through airborne transmission.

Incorrect options:

Option A - Droplet precautions: N95 masks do not provide complete protection from droplet spread infection. The expelled droplets can cause infection on coming in contact with even the skin or conjunctiva.

Option C - Contact precautions: Using an N95 respirator alone is not essential to preventing diseases that could be transmitted through contact with a patient.

Option D - All of the above: N95 alone does not protect from diseases requiring contact and droplet precautions. So this option is incorrect.

Solution for Question 36:

Correct Option A - Non-invasive PPV should be given:

• In the initial management of a patient with an acute exacerbation of chronic obstructive pulmonary disease (COPD), non-invasive positive pressure ventilation (NIPPV) is a recommended intervention. NIPPV involves the application of positive pressure through a mask or nasal prongs to assist with breathing, improve oxygenation, and alleviate respiratory distress.

Incorrect Options:

Option B - Invasive PPV should be given: Invasive positive pressure ventilation (IPPV) involves intubati ng the patient and providing mechanical ventilation through an endotracheal tube. In the initial manage ment of an acute exacerbation of COPD, NIPPV is preferred over IPPV, as it can often effectively impr ove oxygenation and ventilation without the need for invasive procedures.

Option C - Oxygen is not indicated: Oxygen therapy is a
mainstay in the management of patients with COPD exacerbation

Option D - Permissive hypercapnia and not 'hypocapnia' is allowed: Permissive hypercapnia refers to a ventilation strategy where a higher than normal level of carbon dioxide (hypercapnia) is tolerated to avo id potential lung injury caused by high ventilatory pressures.

Solution for Question 37:

Correct Option C - Decreased pH, decreased bicarbonate (HCO3-)

• Metabolic acidosis is a condition characterized by a decrease in blood pH and a decrease in bicarbonate (HCO3-) levels.

• Metabolic Acidosis: This type of acid-base imbalance occurs when there is an excess of acid in the body or a loss of bicarbonate. Causes include conditions such as diabetic ketoacidosis, lactic acidosis, renal failure, and ingestion of certain toxins.

• Therefore, in a patient with metabolic acidosis, you would expect to see an ABG with a decreased pH and a decreased bicarbonate level. This combination indicates the presence of a metabolic acidosis.

Incorrect Options:

• Option A, B and D are incorrect.

Solution for Question 38:

Correct Option B - Needle decompression into the 5th intercostal space anterior to the midaxillary line:

• Needle decompression into the 5th intercostal space anterior to the midaxillary line: This is the correct next step in managing the patient. The clinical presentation, including respiratory distress, hypotension, subcutaneous emphysema, and absent air entry on the affected side, is highly suggestive of a tension pneumothorax. Needle decompression is an emergency procedure performed to release the trapped air in the pleural space, providing immediate relief and improving the patient's respiratory and hemodynamic status. It involves inserting a large-bore needle (such as an 18-gauge) into the 5th intercostal space in the anterior axillary line to decompress the pleural cavity.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 39:

Correct Option B - Metabolic acidosis:

• Metabolic acidosis is characterized by a decrease in pH and bicarbonate (HCO3-) levels in the blood. In this case, the low pH of 7.2 and low HCO3- level of 10 indicate an acidotic state.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 40:

Correct Option B - Respiratory rate:

• It is not a component of the Wells score.

Incorrect Options:

Option A - Heart Rate: It is a component of the Wells score

Option C - Hemoptysis: It is a component of the Wells score

Option D - Clinical sign of DVT: It is a component of the Wells score

Solution for Question 41:

Correct Option B - Pneumothorax:

• The given image is an X-ray of the lungs/thorax of a patient with left sided pneumothorax. In Pneumothorax, air collects in the pleural cavity. Air can enter the pleural cavity when a small opening occurs on the chest wall. An X-Ray of Pneumothorax can be identified by: Deep sulcus sign White pleural line Absent lung markings

• Deep sulcus sign

• White pleural line

• Absent lung markings

• Deep sulcus sign

• White pleural line

• Absent lung markings

Incorrect Options:

• Options A, C and D are incorrect

Solution for Question 42:

Correct Option C - Non-invasive positive pressure ventilation (NIPPV):

• Non-invasive positive pressure ventilation is the right choice.

• Here, the arterial blood gas analysis shows that the patient was in respiratory acidosis, which is due to an increase in carbon dioxide. this condition can be managed by administering Non-Invasive Positive Pressure Ventilation through BiPaP and CPaP

Incorrect Options:

• Options A, B and D are incorrect and not indicated in this patient at present. NIPPV would be the most appropriate choice of treatment at this juncture.

Solution for Question 43:

Correct Option A - Lung metastasis

• Lung metastasis is the correct answer. The radiological imaging reveals Canon Ball Metastasis of the lung likely secondary to malignancies such as Renal Cell Carcinoma . The image shows large, multiple, well-circumscribed, round pulmonary mets that look like cannon balls, hence the name.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 44:

Correct Option B - Malignant mesothelioma:

• It is a tumor of mesothelial cells. It is the most specific malignancy seen in asbestosis.

Incorrect Options:

Option A - Bronchogenic carcinoma: While bronchogenic carcinoma is the most common lung maligna ncy, it is not the most specific malignancy associated with asbestos exposure (shipbuilding $\rightarrow$ asbestos exposure)

Options C and D are incorrect.

Solution for Question 45:

Correct Option B - Pulmonary fibrosis:

• In the above case, the patient presents with shortness of breath and has a history of chronic smoking, clubbing, and bilateral crackling sounds on auscultation. The most probable diagnosis is that of pulmonary fibrosis. The image also shows honeycombing and traction bronchiectasis which are characteristic CT findings seen in patients with pulmonary fibrosis.

Incorrect Options:

• Options A, C and D are incorrect and do not present the features described above.

Solution for Question 46:

Correct Option C - Ground glass opacity:

• Ground Glass Opacities are the earliest investigative manifestation in COVID 19.

• GGOs are hazy areas with slightly increased density without obscuration of underlying bronchial and vascular margins.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 47:

Correct Option B - Fat embolism:

• In the above case, there is the presence of respiratory insufficiency, altered mental status, and diffuse petechial rash after fracture of the femur. This indicates that the most probable diagnosis is that of fat embolism.

Incorrect Options:

• Options A, C and D are incorrect and the presentation is more characteristic of fat embolism.

Solution for Question 48:

Correct Option B - CT pulmonary angiography:

• The most important imaging test for pulmonary embolism is CT pulmonary angiography. It can be used to confirm a diagnosis of PE in suspected patients.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 49:

Correct Option B - Ambrisentan:

• In a patient with class II pulmonary hypertension who has a negative vasoreactive test, the next step of management would typically involve the use of specific pulmonary arterial hypertension (PAH)

medications.

• Among the options provided, the most appropriate choice for the next step of management in this scenario would be option b. Ambrisentan is a selective endothelin receptor antagonist that is commonly used in the treatment of pulmonary arterial hypertension. It helps to improve exercise capacity and delay disease progression in PAH patients. It acts by blocking the effects of endothelin, a substance that promotes vasoconstriction and cell proliferation in the pulmonary arteries.

Incorrect Options:

Option A - Iloprost: Iloprost is a prostacyclin analogue that can be administered intravenously or inhale d. It is often used in more advanced stages of PAH or in patients who do not respond adequately to oth er therapies.

Option C - Nifedipine: Nifedipine is a calcium channel blocker that can help to relax and dilate blood ve ssels. While calcium channel blockers can be effective in some cases of PAH, they are generally reser ved for patients who demonstrate a positive response during a vasoreactive test.

Option D - Epoprostenol: Epoprostenol is a prostacyclin that is administered continuously via intraveno us infusion. It is typically used in severe cases of PAH or in patients who do not respond to other thera pies.

Solution for Question 50:

Correct Option C - Start ATT and then ART after 2 weeks:

• In this scenario, the presence of acid-fast bacilli in the sputum sample suggests a potential co-infection with tuberculosis (TB). It is common for individuals with HIV to develop TB due to their weakened immune systems.

• The recommended approach in managing HIV-TB co-infection is to initiate ATT first and then after 2 weeks ART. This approach is based on evidence showing improved outcomes and reduced mortality rates.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 51:

Correct Option C - Hypoventilation:

• In a patient with hypoxemia and a normal alveolar-arterial oxygen gradient, hypoventilation is the likely cause. Hypoventilation refers to inadequate ventilation of the alveoli, leading to a reduced exchange of oxygen and carbon dioxide. This can result from various factors such as respiratory muscle weakness, central nervous system depression, or mechanical abnormalities of the chest wall.

Incorrect Options:

Option A - Right-to-left shunt: A right-to-left shunt refers to the mixing of oxygenated and deoxygenated blood, bypassing the normal oxygenation process in the lungs. It results in hypoxemia, but it would typi cally be associated with an increased alveolar-arterial oxygen gradient rather than a normal gradient.

Option B - Ventilation/perfusion (V/Q) mismatch: V/Q mismatch occurs when there is a mismatch betw een the ventilation of the alveoli and the perfusion of blood to the capillaries surrounding the alveoli. It c an lead to hypoxemia, and depending on the severity, it may cause an increased alveolar-arterial oxyg en gradient.

Option D - Alveolar membrane damage: Damage to the alveolar membrane, such as in conditions like pulmonary fibrosis or acute respiratory distress syndrome (ARDS), can impair the diffusion of oxygen fr om the alveoli into the bloodstream. This would typically result in an increased alveolar-arterial oxygen gradient rather than a normal gradient.

Solution for Question 52:

Correct Option B - Fixed central airway obstruction:

• Fixed central airway obstruction refers to a condition where there is a persistent and constant narrowing or blockage of the central airways within the lungs. This obstruction occurs at a fixed or unchanging location and does not vary with breathing or changes in lung volume. Various factors, including tumors, strictures, foreign bodies, or scarring within the central airways can cause it. It leads to impaired airflow and can result in symptoms such as shortness of breath, wheezing, and coughing.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 53:

Correct Option A - 1, 2:

• To determine acid-base imbalances in a patient, the following parameters can be used: Arterial pH: Arterial blood gas (ABG) analysis measures arterial pH, which reflects the acidity or alkalinity of the blood. It is a direct indicator of acid-base status. Venous pH: Venous blood gas (VBG) analysis can also provide information about pH levels in venous blood. While arterial pH is the gold standard, venous pH can be used as an alternative in certain clinical situations when arterial blood sampling is challenging or not readily available.

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• Venous pH: Venous blood gas (VBG) analysis can also provide information about pH levels in venous blood. While arterial pH is the gold standard, venous pH can be used as an alternative in certain clinical situations when arterial blood sampling is challenging or not readily available.

• These two parameters can help determine a patient's acid-base imbalance.

• Arterial pH: Arterial blood gas (ABG) analysis measures arterial pH, which reflects the acidity or alkalinity of the blood. It is a direct indicator of acid-base status.

• Venous pH: Venous blood gas (VBG) analysis can also provide information about pH levels in venous blood. While arterial pH is the gold standard, venous pH can be used as an alternative in certain clinical situations when arterial blood sampling is challenging or not readily available.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 54:

Correct Option A - Pleural: Serum protein ratio > 0.5, pleural: Serum LDH ratio > 0.6 or pleural LDH > 2/3:

• An effusion with any of the following characteristics is classified as an exudate; pleural: Serum protein ratio > 0.5, pleural: Serum LDH ratio > 0.6 or pleural LDH > 2/3 of the upper limit of normal for the serum. This is known as Light's criteria.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 55:

Correct Option B - Metabolic alkalosis:

• Based on the given ABG results, the most likely condition responsible for the findings is metabolic alkalosis (Option B).

• The pH is elevated (>7.45) and the bicarbonate (HCO3-) level is increased (32 mEq/L), indicating a primary metabolic alkalosis.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 56:

Correct Option B - COPD (Chronic Obstructive Pulmonary Disease):

• The vignette depicts the characteristic flow volume loop seen in patients with COPD. Patients with COPD have the following lung volume changes which are responsible for this pattern: Increased residual volume Increased total lung capacity Decreased PEFR

• Increased residual volume

• Increased total lung capacity

• Decreased PEFR

• Increased residual volume

• Increased total lung capacity

• Decreased PEFR

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 57:

Correct Option A - Hyperglycemia:

• Hyperglycemia, or high blood sugar levels, is not typically associated with Addison's disease. In fact, individuals with Addison's disease may experience hypoglycemia (low blood sugar) due to the inadequate production of cortisol, a hormone involved in regulating blood sugar levels.

Incorrect Options:

Option B - Hyponatremia: Hyponatremia refers to low levels of sodium in the blood. It is commonly obs erved in Addison's disease because insufficient levels of aldosterone, a hormone produced by the adre nal glands, can lead to sodium loss. Thus, hyponatremia is associated with Addison's disease.

Option C - Hyperkalemia: Hyperkalemia refers to high levels of potassium in the blood. It is a characteri stic feature of Addison's disease. Inadequate levels of aldosterone can impair the excretion of potassiu m by the kidneys, leading to its accumulation in the bloodstream.

Option D - Hypotension: Hypotension, or low blood pressure, is commonly observed in Addison's disea se. The insufficient production of adrenal hormones, including cortisol and aldosterone, can result in flu id and electrolyte imbalances, leading to decreased blood volume and hypotension.

Solution for Question 58:

Correct Option B - Silicosis:

• Among the given options, the pneumoconiosis associated with an increased incidence of tuberculosis is "Silicosis."

• Silicosis is a lung disease caused by the inhalation of crystalline silica particles. It commonly affects individuals working in occupations such as mining, sandblasting, and stone cutting. Silicosis can impair the immune system and increase the risk of developing tuberculosis. The presence of silica particles in the lungs can create an environment conducive to Mycobacterium tuberculosis infection and growth.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 59:

Correct Option D - ARDS:

• Based on the provided information and the chest X-ray findings, the most likely diagnosis for the patient is Acute Respiratory Distress Syndrome (ARDS).

• ARDS is a severe lung condition characterized by widespread inflammation and damage to the alveoli (air sacs) in the lungs. It can be triggered by various factors, including infection, sepsis, trauma, or

inhalation injury. The key features of ARDS include acute onset of severe hypoxemia (low oxygen levels) that is refractory to supplemental oxygen, bilateral pulmonary infiltrates on imaging (such as the chest X-ray), and impaired lung compliance.

Incorrect Options:

Option A - Atelectasis: Atelectasis refers to the collapse or incomplete expansion of lung tissue. It can r esult from blockage of the airways, compression of the lung, or surfactant deficiency. While atelectasis can cause localized or segmental lung collapse, it typically does not lead to widespread bilateral infiltrat es and severe hypoxemia as seen in the patient's presentation.

Option B - Mediastinitis: Mediastinitis refers to inflammation or infection of the mediastinum, which is th e area between the lungs. It is usually caused by an infection that spreads from the nearby structures o r as a complication of a surgical procedure. While mediastinitis can cause respiratory symptoms, it wou ld not explain the diffuse infiltrates seen on the chest X-ray or the severe hypoxemia.

Option C - Pulmonary fibrosis: Pulmonary fibrosis is a chronic lung condition characterized by the form ation of scar tissue in the lungs, leading to progressive and irreversible lung damage. It typically presen ts with a gradual onset of symptoms, such as shortness of breath and cough, and the chest X-ray findi ngs would show a reticular or honeycomb pattern. The acute onset, severe hypoxemia, and diffuse infil trates seen in the chest X-ray are not consistent with pulmonary fibrosis

Solution for Question 60:

Correct Option A - Hypokalemic hypochloremic metabolic alkalosis with hyponatremia:

• Based on the provided information of chronic projectile vomiting and weight loss in a 55-year-old patient, the expected metabolic abnormality is Hypokalemic hypochloremic metabolic alkalosis with hyponatremia. Chronic vomiting can lead to loss of gastric acid (hydrochloric acid) and chloride ions (hypochloremia). This loss of acid and chloride results in metabolic alkalosis. Additionally, prolonged vomiting can lead to loss of potassium (hypokalemia) through gastric secretions. Hyponatremia (low sodium levels) may occur as a result of fluid and electrolyte imbalances caused by vomiting.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 61:

Correct Option A - Non-invasive PPV should be given:

• In patients with exacerbations of COPD who present with acute respiratory failure and hypoventilation, NIPPV is considered the initial treatment of choice. NIPPV delivers positive pressure ventilation via a mask or similar interface without the need for endotracheal intubation. It helps to improve ventilation, oxygenation, and alleviate respiratory distress by assisting the patient's breathing effort.

Incorrect Options:

Option B & D - Invasive PPV should be given &
Intubate and start on ventilator: Invasive positive pressure ventilation (intubation and starting on a venti

lator) is generally reserved for cases where NIPPV fails or is contraindicated. It is associated with pote ntial risks and complications, and therefore, NIPPV is preferred as the initial intervention in this scenari o.

Option C - Increase the oxygen flow rate: Increasing the oxygen flow rate alone would not adequately a ddress the underlying issue of hypoventilation and high pCO2 levels. It may improve oxygenation temp orarily, but it does not address the ventilation problem and the resulting respiratory acidosis.

Solution for Question 62:

Correct Option C - Potklor:

• Hypokalemia is when the amount of potassium in your blood is too low. Normal levels of potassium for an adult range from 3.5 to 5.2 mEq/L (3.5 to 5.2 mmol/L). Anything lower than 3 mEq/L (3 mmol/L) may be considered severe hypokalemia. The preferred treatment for a patient with a serum potassium level of 3.0 mmol/L and no comorbidities, along with a normal ECG, would be PotChlor (Oral potassium chloride). It can help restore potassium levels to a normal range and alleviate the symptoms associated with hypokalemia.

Incorrect Options:

Option A - Calcium gluconate: Calcium gluconate is not the preferred treatment for hypokalemia. Calci um gluconate is used to treat conditions such as hyperkalemia (high potassium levels) or to counteract the effects of calcium channel blocker overdose. It does not directly address low potassium levels.

Option B - Sodium bicarbonate: Sodium bicarbonate is not the preferred treatment for hypokalemia. So dium bicarbonate is used to treat Metabolic acidosis.

Option D - Insulin with dextrose: Insulin with dextrose is used in the treatment of hyperkalemia, not hyp okalemia. Insulin with dextrose helps shift potassium from the extracellular space into the cells, thereby lowering blood potassium levels. However, in this case, the patient's potassium level is low, so insulin with dextrose is not appropriate

Solution for Question 63:

Correct Option: A, D

Prophylactic cranial radiation (PCR) is given for the management of brain metastases in certain types o f cancers. The correct answer from the given options is "Lung cancer" and "Breast cancer."

• Lung cancer: Prophylactic cranial radiation is commonly used in patients with small cell lung cancer (SCLC) who are at high risk of developing brain metastases. SCLC has a strong tendency to spread to the brain, and PCR is given to reduce the risk of metastatic disease in the brain.

• Breast cancer: Prophylactic cranial radiation may be considered in certain cases of breast cancer. It is typically recommended for patients with breast cancer who have a high risk of developing brain metastases, such as those with aggressive subtypes like HER2-positive or triple-negative breast cancer.

Incorrect Options

Option B: Liver cancer: Prophylactic cranial radiation is not routinely used for liver cancer. Liver cancer, also known as hepatocellular carcinoma (HCC), has a
different pattern of spread, and brain metastases are relatively uncommon in this cancer.

Option C: Prostate cancer: Prophylactic cranial radiation is generally not used for prostate cancer. Pros tate cancer tends to metastasize to the bones, and brain metastases are relatively rare in this cancer.

Solution for Question 64:

Correct Option B - CT:

• In the given scenario, a 50-year-old chronic smoker with mild recurrent hemoptysis and normal chest X-ray, CT scan (computed tomography) is the most useful diagnostic investigation. CT scan provides detailed imaging of the lungs and can help identify subtle abnormalities that may not be visible on a chest X-ray. It can detect small nodules, bronchial wall thickening, or other structural changes in the lungs that could be contributing to the hemoptysis. CT scan is commonly used in the evaluation of hemoptysis, especially when the chest X-ray is normal or inconclusive.

Incorrect Options:

• Options A, C, and D are incorrect. CT scan is a more appropriate, non invasive, diagnostic next step in the management of this patient.

Solution for Question 65:

Correct Option A - Intrinsic asthma:

• Nasal polyps are commonly associated with intrinsic asthma. Intrinsic asthma, also known as non-allergic or non-atopic asthma, is characterized by asthma symptoms that are not triggered by specific allergens. It can be caused by factors such as respiratory infections, irritants, exercise, cold air, stress, or certain medications. Nasal polyps are frequently seen in individuals with intrinsic asthma, suggesting a connection between these two conditions.

Incorrect Options:

• Options B, C and D are incorrect and are not characteristically associated with nasal polyps.

Solution for Question 66:

Correct Option D - Pneumocystis jirovecii pneumonia (PJP):

• Pneumocystis jirovecii pneumonia (formerly known as Pneumocystis carinii pneumonia) is a fungal infection that commonly affects individuals with weakened immune systems, such as those with HIV/AIDS. The presentation of fever, dry cough, significant weight loss, and chest X-ray findings of diffuse interstitial infiltrates and symmetrical perihilar involvement are highly suggestive of PJP.

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 67:

Correct Option B - Obstructive disease:

• In obstructive lung diseases, the airways become narrowed or obstructed, making it difficult for air to flow out during expiration.

• The reduction in the FEV1/FVC ratio is a characteristic finding in obstructive lung diseases.

• The FEV1 decreases more than the FVC, leading to a decreased FEV1/FVC ratio.

• This reduction indicates impaired airflow during expiration, resulting in increased residual volume in the lungs.

• Examples of obstructive lung diseases include asthma, chronic obstructive pulmonary disease (COPD), and bronchiectasis.

Incorrect Options:

Option A - Restrictive disease:

• In restrictive lung diseases, the expansion of lung tissue is limited, resulting in reduced lung volumes.

• Restrictive lung diseases typically do not cause a significant reduction in the FEV1/FVC ratio.

• Instead, both FEV1 and FVC are proportionally reduced, maintaining a relatively normal FEV1/FVC ratio or even slightly increased.

• Examples of restrictive lung diseases include pulmonary fibrosis, interstitial lung disease, and chest wall deformities.

Option C - Normal lung function:

• Reduction in the FEV1/FVC ratio is not characteristic of normal lung function.

Option D - Interstitial lung disease:

• Interstitial lung disease is a form of restrictive lung disease. FEV1/FVC might be normal or slightly elevated in these patients.

Solution for Question 68:

Correct Option A - Low serum IgE levels:

• Low serum IgE levels are incorrect. Elevated levels of serum IgE are a characteristic feature of allergic bronchopulmonary aspergillosis. IgE-mediated hypersensitivity to Aspergillus antigens leads to the production of specific IgE antibodies, resulting in an increased serum IgE level.

Incorrect Options:

Option B - Cough: Cough is a common symptom of allergic bronchopulmonary aspergillosis. It is typica lly productive and may be associated with the production of brownish sputum plugs.

Option C - Wheezing: Wheezing is a common finding in allergic bronchopulmonary aspergillosis. It is c aused by the airway inflammation and narrowing resulting from the immune response to Aspergillus an tigens.

Option D - Central bronchiectasis: Centeal bronchiectasis is a common feature of allergic bronchopulm onary aspergillosis (ABPA). It is characterized by the dilation and thickening of the airways in the distal portions of the lungs.

Solution for Question 69:

Correct Option A - FEV1/FVC <0.7 and FEV1<30%:

• The Gold's criteria for very severe COPD is: FEV1/FVC <0.7 and FEV1 <30%

• GOLD Classification for COPD:

Mild COPD

FEV1/ FVC<0.7

FEV1≥80%

Moderate COPD

FEV1/ FVC <0.7

FEV1 = 50-80%

Severe COPD

FEV1 = 30-50%

Very sever COPD

FEV1 <30%

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 70:

Correct Option B - Asthenospermia:

• Kartagener's syndrome, also known as primary ciliary dyskinesia (PCD), is a rare genetic disorder that affects the structure and function of cilia. Cilia are hair-like structures present on the surface of cells, including cells in the respiratory tract and reproductive organs. In Kartagener's syndrome, there is a defect in the structure and/or function of cilia, leading to various clinical manifestations, including respiratory problems and infertility.

• In the context of infertility in Kartagener's syndrome, the most likely cause is asthenospermia, which refers to reduced or absent sperm motility. Cilia play a crucial role in sperm motility, as they provide the propulsive force needed for sperm movement within the female reproductive tract. In Kartagener's syndrome, the defective ciliary function can result in impaired sperm motility, leading to reduced fertility.

Incorrect Options:

• Options A, C and D are not specific features of Kartagener's syndrome and are incorrect.

Solution for Question 71:

Correct Option C - Acinetobacter:

• Ventilator-associated pneumonia (VAP) is a type of pneumonia that occurs in patients who are on mechanical ventilation. It is typically acquired during the hospital stay and is often caused by bacterial pathogens. Among the options provided, Acinetobacter is the most likely causative organism of VAP.

• Acinetobacter is a gram-negative bacterium that is known for its ability to survive on environmental surfaces and medical equipment. It can colonize the respiratory tract of ventilated patients and has the potential to cause serious infections, including pneumonia. Acinetobacter infections are often associated with healthcare settings, especially intensive care units (ICUs).

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 72:

Correct Option C - Azithromycin:

• Community-acquired pneumonia (CAP) refers to pneumonia that is acquired outside of healthcare facilities. In the outpatient setting, the most common pathogens causing CAP are typically atypical bacteria, such as Mycoplasma pneumoniae and Chlamydophila pneumoniae, as well as certain respiratory viruses. Azithromycin, a macrolide antibiotic, is commonly used as an empiric treatment option for CAP in the outpatient setting.

• Azithromycin has several advantages that make it suitable for outpatient management of CAP. It has excellent activity against atypical pathogens, including Mycoplasma pneumoniae and Chlamydophila pneumoniae. It also has a long half-life, allowing for once-daily dosing, which enhances patient compliance.

Incorrect Options:

Option A - Vancomycin: Vancomycin is an antibiotic primarily used for the treatment of Gram-positive b acterial infections, particularly those caused by methicillin-resistant Staphylococcus aureus (MRSA). It i s not typically used as an initial empiric treatment for community-acquired pneumonia in the outpatient setting.

Option B - Ceftriaxone: Ceftriaxone is a broad-spectrum cephalosporin antibiotic commonly used for th e treatment of various bacterial infections. While it may be used for the treatment of CAP in specific ca ses, such as when there is a concern for more resistant pathogens or in patients with specific risk facto rs, it is not the first-line treatment choice in most cases of outpatient CAP.

Option D - Streptomycin: Streptomycin is an aminoglycoside antibiotic that has activity against certain Gram-negative bacteria. However, it is not commonly used as a
first-line treatment for community-acquired pneumonia, especially in the outpatient setting.

Solution for Question 73:

Correct Option A - Asbestosis:

• Asbestosis is a lung disease caused by long-term exposure to asbestos fibers. In this condition, asbestos fibers cause inflammation and scarring of the lung tissue, leading to breathing difficulties and other respiratory symptoms.

• The given clinical scenario of a 45-year-old patient with a history of working in a factory for 20 years and presenting with breathlessness is suggestive of an occupational lung disease. The HRCT chest findings of pleural thickening and fibrosis further support the diagnosis.

Incorrect Options:

Option B - Coal worker pneumoconiosis: This is a lung disease caused by inhalation of coal dust. It is characterized by the deposition of coal dust particles in the lungs, leading to inflammation and scarring. However, the presentation in the given scenario is not consistent with coal worker pneumoconiosis.

Option C - Silicosis: Silicosis is a lung disease caused by inhalation of crystalline silica particles. It commonly affects individuals working in industries such as mining, construction, and sandblasting. The characteristic HRCT findings in silicosis include multiple small nodules in the upper lung zones. Pleural thickening and fibrosis are not typical features of silicosis.

Option D - Berylliosis: Berylliosis is a lung disease caused by exposure to beryllium, commonly found in certain industries such as aerospace, electronics, and dental laboratories. It can lead to granulomatous inflammation in the lungs. The clinical presentation and HRCT findings described in the scenario are not consistent with berylliosis.

Solution for Question 74:

Correct Option A - Thermophilic Actinomycetes:

• Farmer's Lung, also known as hypersensitivity pneumonitis, is an allergic lung disease caused by the inhalation of various organic dust particles. Thermophilic Actinomycetes, which are bacteria-like microorganisms commonly found in moldy hay, straw, and grain, are one of the causative agents of Farmer's Lung. When individuals sensitized to these microorganisms inhale the dust containing them, an immune response is triggered, leading to inflammation and lung damage.

Incorrect Options:

• Options B, C and D are not associated with Farmer's lung.

Solution for Question 75:

Correct Option A - Lung cancer:

• Lung cancer is the most common primary cancer that metastasizes to the brain. The lungs are a common site for the development of cancerous cells, and when these cells spread to other parts of the body, including the brain, they can form brain metastases.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 76:

Correct Option A - Responds well to amoxiclav:

• Mycoplasma pneumonia is caused by the bacterium Mycoplasma pneumoniae, and it is typically treated with antibiotics such as macrolides (e.g., azithromycin) or tetracyclines (e.g., doxycycline). Amoxiclav, which is a combination of amoxicillin and clavulanic acid, is not considered a first-line treatment for Mycoplasma pneumonia. Therefore, the statement that mycoplasma pneumonia responds well to amoxiclav is false.

Incorrect Options:

Option B - Antibodies are useful in diagnosis: Antibodies are indeed useful in the diagnosis of Mycoplasma pneumonia. Serologic testing, such as the detection of specific antibodies (IgM and IgG) against Mycoplasma pneumoniae, can be helpful in confirming the diagnosis. These antibodies can be detected using tests like enzyme-linked immunosorbent assay (ELISA) or complement fixation tests.

Option C - Chest X-ray shows bilateral infiltrates: Chest X-ray findings in Mycoplasma pneumonia can vary, but bilateral infiltrates are commonly seen. Infiltrates may appear as patchy or diffuse opacities in both lungs. However, it is important to note that chest X-ray findings alone cannot definitively diagnose Mycoplasma pneumonia and should be correlated with clinical symptoms and other diagnostic tests.

Option D - Can be cultured in a cell-free medium: Mycoplasma pneumoniae is a unique bacterium that lacks a cell wall and requires a specialized cell-free medium for culture. It cannot be grown on conventional culture media. The absence of a cell wall makes it resistant to certain antibiotics that target cell wall synthesis, such as penicillins and cephalosporins.

Solution for Question 77:

Correct Option C - Acute respiratory acidosis, acute respiratory alkalosis:

• A - Acute respiratory acidosis: Acute respiratory acidosis occurs when there is an increase in the partial pressure of carbon dioxide ($PaCO_2$) in the blood due to inadequate ventilation. This can be caused by conditions such as pneumonia, pulmonary edema, or airway obstruction.

• D - Acute respiratory alkalosis: Acute respiratory alkalosis occurs when there is a decrease in $PaCO_2$ in the blood due to excessive ventilation. It can be caused by hyperventilation due to anxiety, fever, or high altitude.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 78:

Correct Option B - Pleuritis:

• Pleuritis, inflammation of the pleura (the membranes lining the lungs and chest cavity), is the most common pulmonary manifestation of SLE. It can cause chest pain, pleural effusion (accumulation of fluid in the pleural space), and a characteristic friction rub on auscultation.

Incorrect Options:

Option A - Shrinking lung syndrome: Shrinking lung syndrome is a rare complication of systemic lupus erythematosus (SLE) characterized by progressive dyspnea and restrictive lung function. However, it is not the most common pulmonary manifestation of SLE.

Option C - Intra-alveolar hemorrhage: Intra-alveolar hemorrhage refers to bleeding into the air sacs of t he lungs. While it can occur in SLE, it is less common compared to pleuritis.

Option D - Interstitial inflammation: Interstitial inflammation refers to inflammation of the lung interstitiu m, which is the tissue between the air sacs. While interstitial lung disease can occur in SLE, it is not th e most common pulmonary manifestation.

Solution for Question 79:

Correct Option B - Haemorrhagic mediastinitis:

• This is the most common presentation of inhalational anthrax. It is characterized by severe chest pain, shortness of breath, and mediastinal widening on imaging. Hemorrhagic mediastinitis refers to the presence of bleeding and inflammation in the mediastinum, the area between the lungs.

Incorrect Options:

Option A - Atypical pneumonia: This is not the most common presentation of inhalational anthrax. Whil e respiratory symptoms can occur, they are not typically indicative of a typical pneumonia.

Option C - Lung abscess: Although lung abscess can occur in some cases of inhalational anthrax, it is not the most common presentation. Lung abscesses are localized collections of pus within the lung par enchyma.

Option D - Broncho-pulmonary pneumonia: While pneumonia can occur in inhalational anthrax, it typic ally presents as a severe form with features of haemorrhagic mediastinitis rather than a typical broncho-pulmonary pneumonia.

Solution for Question 80:

Correct Option D - Clubbing:

• The above image is that of clubbing, which is a selective bulbous enlargement of the distal segments of the fingers and toes due to the proliferation of connective tissues.

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 81:

Correct Option B - Cytomegalovirus:

• In the above case, owl’s eye intranuclear inclusion bodies are seen in cytomegalovirus infection. CMV infection is a significant cause of mortality after an allogeneic transplant, especially in renal transplant patients.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 82:

Correct Option B - 2,3,4 only:

• Distal bronchiectasis: This feature is not typically associated with Allergic Broncho Pulmonary Aspergilloma (ABPA). Distal bronchiectasis is more commonly seen in other conditions such as cystic fibrosis. In ABPA, Central Bronchiectasis is seen.

• Serum precipitins to Aspergillus: This is a characteristic feature of ABPA. Individuals with ABPA often have detectable serum precipitins (specific antibodies) against Aspergillus.

• Increased IgE levels: ABPA is characterized by an elevated level of IgE (immunoglobulin E) in the blood. This is a result of the allergic response to Aspergillus antigens.

• Seen in asthmatics: ABPA is frequently associated with asthma. It is estimated that about 10% of individuals with asthma may develop ABPA.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 83:

Correct Option B - Reproductive number for COVID-19 is 2-2.5:

• The reproductive number (R0) represents the average number of people that an infected individual will infect. The estimated R0 for COVID-19 is around 2-2.5, which means that each infected person, on average, can transmit the virus to 2-2.5 others. This indicates the potential for sustained transmission and makes COVID-19 highly contagious.

Incorrect Options:

Option A - Median incubation period is more in influenza: The median incubation period of COVID-19 is generally longer compared to influenza. Influenza typically has a shorter incubation period, ranging from 1-4 days, while COVID-19 has a median incubation period of around 5-6 days.

Option C - Serial interval is 5-6 days in influenza: The serial interval refers to the time between the onset of symptoms in one infected individual and the onset of symptoms in the secondary infected individual. Influenza typically has a shorter serial interval, usually around 2-3 days, indicating a relatively rapid spread of the virus from person to person.

Option D - Reproductive number for Influenza is more: The reproductive number for influenza is generally lower compared to COVID-19. While the exact R0 for different influenza strains can vary, it is typically lower than the estimated R0 for COVID-19. This means that COVID-19 has a

higher potential for transmission within a susceptible population compared to influenza.

Solution for Question 84:

Correct Option A - Kidney:

• Goodpasture syndrome is an autoimmune disease characterized by the presence of autoantibodies that target the basement membrane in the lungs and kidneys. These autoantibodies primarily bind to the type IV collagen present in the alveolar basement membrane of the lungs and the glomerular basement membrane of the kidneys.

• The binding of autoantibodies to the glomerular basement membrane in the kidneys leads to the activation of an immune response and subsequent inflammation. This inflammatory response can cause damage to the kidney tissue and impair its function.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 85:

Correct Option A - Pneumothorax:

• The sudden-onset severe respiratory distress following the placement of an internal jugular vein catheter is highly suggestive of pneumothorax, which is the presence of air in the pleural space surrounding the lungs. When air accumulates in the pleural space, it can cause the lung to collapse partially or completely, leading to respiratory distress, chest pain, and other symptoms.

Incorrect Options:

• Options B, C and D are incorrect.

Fever of Unknown Origin

1. A 35-year-old male came to the outpatient department with a complaint of fever for the past four days. The patient is a butcher by Profession handling rabbit meat. The temperature was found to be 99 degrees Fahrenheit, and his heart rate was 65/min. Further clinical examination showed swellings in the axillary region, which was axillary lymphadenopathy. Frame a diagnosis and pick the option with the organism that is not related to it.

(or)

Find the organism that is not associated with FAGET sign in a patient who is a professional rabbit meat butcher.

A. Scrub typhus

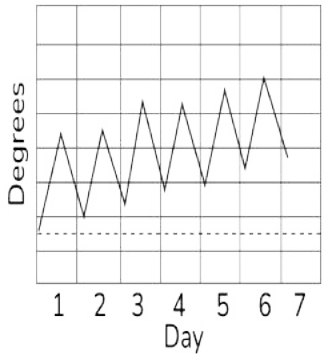
B. Eikenella

C. Legionella

D. Coxiella brunetti

---

2. Identify the pattern of fever being demonstrated in the graph?



A. Sustained fever

B. Remittent fever

C. Intermittent fever

D. Relapsing fever

---

3. A 50-year- old male patient complains of a fever of 38 degree centigrade for the past one month. She denied any travel, food infection, or pets at home.She is a known case of diabetes and hypertension. Investigations showed increased CRP with other normal values. The doctor finds no potential diagnostic clues for fever. What should be the next step in management?

A. FDG PET

B. Exclude manipulation of thermometer

C. Scintigraphy

D. Cryoglobulins

Correct Answers

Question	Correct Answer
Question 1	2
Question 2	2
Question 3	2

Solution for Question 1:

Correct Option B - Eikenella:

• Eikenella correndens belong to gram negative HACEK group of organisms

• The question hints of Patient handling rabbit meat (the tick bites the person, leading to bacteria entering the body of the hunter and axillary lymphadenopathy

• Normally For every 1 F rise of temperature above 100 F- PR increases >10 bpm

• But the question shows Hyperthermia with bradycardia-Faget sign which is exclusively seen in Tick borne infections(Tularemia)

Incorrect Options:

• Option A, C, D are all gram negative organisms associated with Tick-borne infections

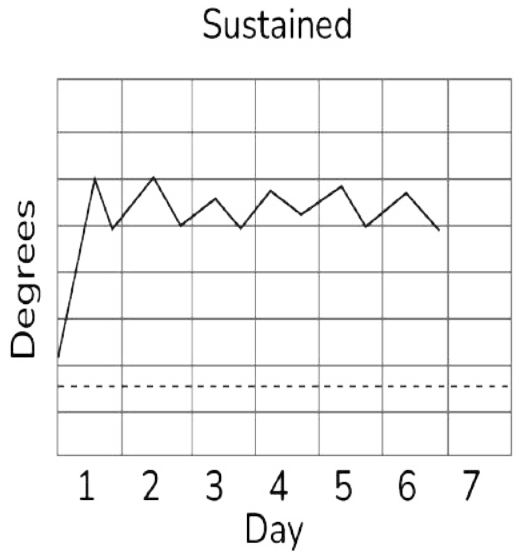
Solution for Question 2:

Correct Option B - Remittent fever:

• Fever never touches the baseline

Incorrect Options:

Option A - Sustained fever:

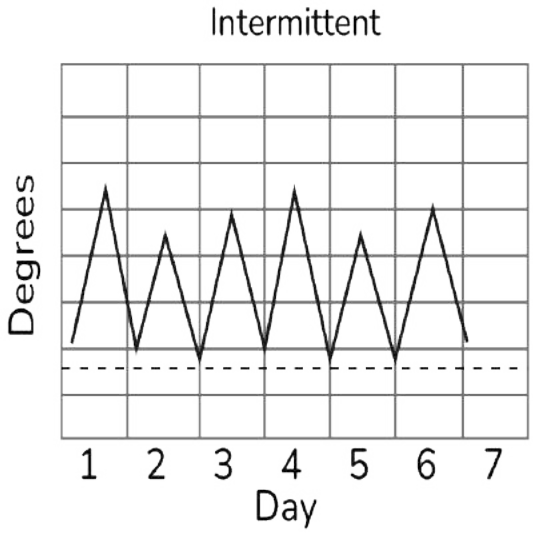


• Sustained fever-Continuous fever or sustained fever

• Never touches the Baseline,

• Diurnal Fluctuation < 1° F

Option C - Intermittent fever:

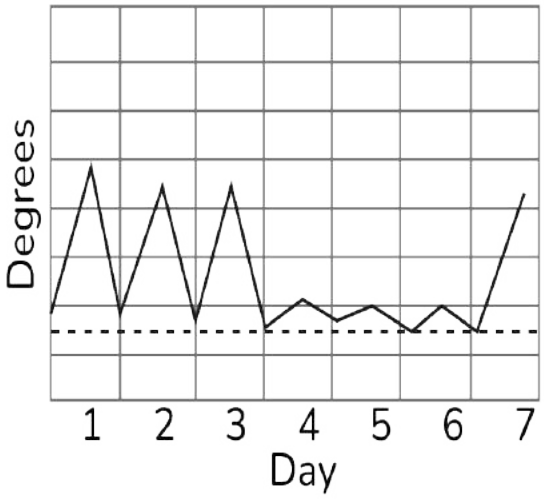


• Touches the baseline,

• Diurnal variation >1°F

• example, Malaria.

Option D - Relapsing fever:



• Fever relapses(reappears) after an interval of 3 days.

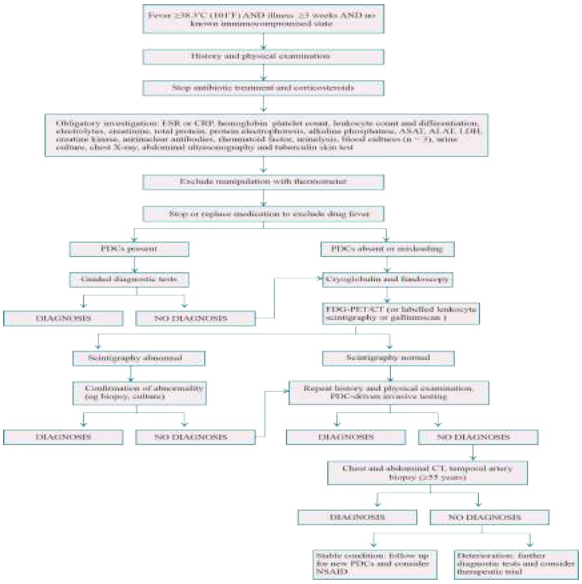
• example, Borrelia recurrentis, Rat Bite Fever

Solution for Question 3:

Correct Option B - Exclude manipulation with thermometer:

• This is a classic case of pyrexia of unknown fever

• The question denies of any travel or food infection and a history of fever for the past month with no potential diagnostic clues helps in pointing out to Pyrexia of unknown fever.



Incorrect Options:

Option A, C, D: Refer to the above explanation.

Aspergillosis,COVID,Dengue

1. A 25-year-old male came to the Outpatient department with history of fever for 3 days.He admitted that he had multiple episodes of vomiting and restlessness. Lab investigations revealed elevated HCT ,platelet count of 70,000/mcL ,a positive IgM for dengue virus..He was admitted to the inpatient department for further treatment.The HCT seemed to be elevated despite maximum fluid resuscitation. What is the next step in management?

A. Packed red blood cells

B. Fresh frozen plasma

C. Albumin

D. Vaccination

---

2. A 30-year-old male presented to the outpatient department with complaints of extreme cough and cold for the past 5 days, not relieved by over-the-counter medications. He admitted that he gradually lost his appetite, taste, and smell sensation. He started to have mild breathing difficulty. Clinical examination revealed Spo2 of 90% on room air and RR of 25/minute. Lab tests revealed raised ferritin, CRP, and D-dimer values, and a positive RT-PCR test for SARS-COV-2. A chest X ray was taken and is shown below. What is the most appropriate treatment in this patient?

A. Stage 1-Home care

B. Stage 2-Non rebreathing face mask

C. Stage 3-High flow nasal cannula

D. Stage 3-Non invasive ventilation

---

3. Which of the following is not a part of the lung protective strategy in a 40-year-old obese diabetic male who was found positive for COVID and admitted to the ICU ?

A. Prone position with FiO2 > 0.6

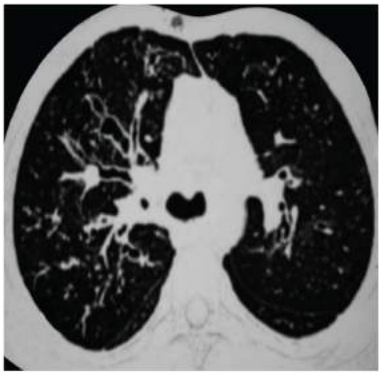
B. Low tidal volume

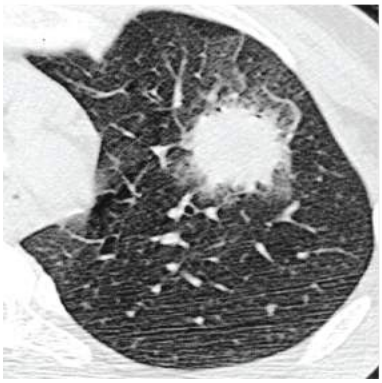
C. Low PEEP

D. NM blockage

---

4. A 30-year-old male who is a known case of HIV infection came to the outpatient department with a complaint of fever, excessive cough accompanied by thick sputum, breathing difficulty, and occasional bouts of blood during cough from the past one week.. Lab investigations show elevated eosinophil count and IgE levels of 1500 ng/ml. The chest X-ray findings are inconclusive and HRCT was recommended and is shown below. Identify the infection and the causative organism.





A. Aspergillus fumigatus

B. Aspergillus Flavus

C. Thermophilic actinomycetes

D. Aspergillus niger

Correct Answers

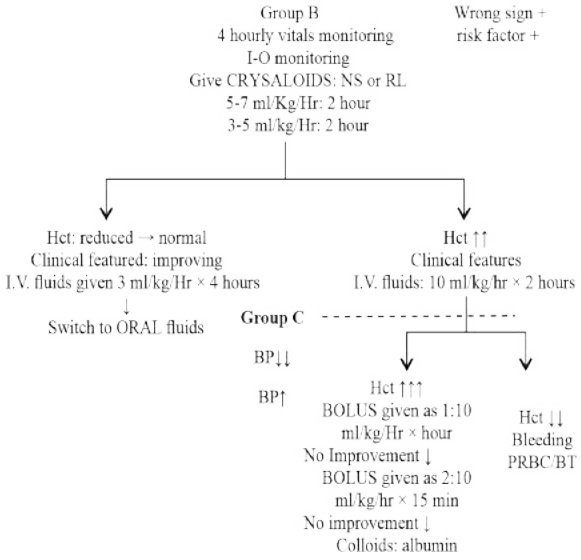
Question	Correct Answer
Question 1	3
Question 2	2
Question 3	3
Question 4	1

Solution for Question 1:

Correct Option C - Albumin:

• Albumin (colloids) is the next step in management:

• The question clearly indicates the HCT remains same despite maximum fluid resuscitation- group c (severe dengue)



Incorrect Options:

Option A, B: Refer to the above explanation

Option D - Vaccination:

• It can be given but ineffective during acute phase of dengue.

Solution for Question 2:

Correct Option B - Stage 2-Non rebreathing face mask:

• Loss of smell(anosmia) and taste sensation with hypoxia (SPO2) but with very mild external symptoms which indicates happy hypoxia

• Elevated D-dimer, ferritin,CRP, and a positive RT-PCR indicates COVID

• Happy hypoxia and RR>.24 indicates stage 2 of COVID

• This indicates a moderate case that requires admission and a non-rebreathing mask with prone positioning.

Incorrect Options:

Option A - Stage 1-Home care:

• Stage 1-Home care-stage 1 doesn't affect spo2 or RR values

Option C - Stage 3-High flow nasal cannula:

• Stage 3-High flow nasal cannula-this stage has spo2<90% and RR >30/min

Option D - Stage 3-Non invasive ventilation:

• Stage 3-Non-invasive ventilation- Refer to the above explanation.

Solution for Question 3:

Correct Option C - Low PEEP:

• Low PEEP is not practiced as a part of lung protective strategy in COVID

Incorrect Options:

Option ,A, B, D:

• Follow the lung protective technique.

Solution for Question 4:

Correct Option A - Aspergillus fumigatus:

• Central bronchiectasis

• The patient is immunocompromised which gives space for a lot of opportunistic infections

• The features in the question like cough with thick sputum, hemoptysis, dyspnea and elevated levels of eosinophils, and IgE with halo sign and hyper attenuated airway showing chronic bronchiectasis on HRCT helps in the diagnosis of Allergic Bronchopulmonary Aspergillosis

• The causative organism is a)Aspergillus fumigatus- Central bronchiectasis is a part of Rosenberg – Patterson criteria used for its diagnosis.

Incorrect Options:

Option B - Aspergillus Flavus:

• A.flavus causes sinusitis and releases aflatoxin and causes HCC and hemoptysis is not a part of the criteria

Option C - Thermophilic actinomycetes:

• Seen in bagassosis

Option D - Aspergillus niger:

• It causes angioinvasive infection and cavity formation.

AIDS,Nipah Virus,Zika Virus

1. Which of the following routes of transmission has a 95% chance of getting infected with HIV

A. Blood transfusion

B. Unprotected Sexual intercourse

C. Needle stick injury

D. Needle sharing

---

2. Which of the following is not a part of the CDC definition for AIDS

A.)Cryptococcus neoformans meningitis

B. Cerebral toxoplasmosis:

C. Burkitt's lymphoma present in < 50 years of age

D. Progressive multifocal leuco-encephalopathy

---

3. Match the following regarding tests used in HIV infection 1. Most sensitive test for HIV a. Nucleic acid amplification test 2. Most specific test for HIV b. PCR-HIV DNA 3. Best test for early diagnosis of HIV infection c. Enzyme immunoassay 4. Best test for vertical transmission of HIV d. Western blot

1. Most sensitive test for HIV	a. Nucleic acid amplification test
2. Most specific test for HIV	b. PCR-HIV DNA
3. Best test for early diagnosis of HIV infection	c. Enzyme immunoassay
4. Best test for vertical transmission of HIV	d. Western blot

A. 1-c, 2-d, 3-a, 4-b

B. 1-a, 2-c, 3-b, 4-d

C. 1-d, 2-b, 3-c, 4-a

D. 1-c, 2-a, 3-b, 4-d

---

4. What is the next step in the investigation of a patient with a positive-HIV-1 enzyme immunoassay but an indeterminate HIV-1 western blot

A. Diagnose as HIV-1 infection

B. Check for HIV-2 infection through EIA

C. Repeat the test after 4-6 weeks

D. Check for HIV-2 on western blot

---

5. Match the following opportunistic infections in HIV with their respective treatment options: 1. Toxoplasmosis with encephalitis a. trimoxazole 2. Cryptococcus Coccidioides b. Valcyclovir 3. Pneumocystis jiroveci c. Clarithromycin + Ethambutol + Rifabutin 4. CMV d. Pyrimethamine + Sulfadiazine + Leucovorin 5. Mycobacterium Avium Intercellulare e. Nitazoxanide 6. Cryptosporidium diarrhea f. Fluconazole

1. Toxoplasmosis with encephalitis	a. trimoxazole
2. Cryptococcus Coccidioides	b. Valcyclovir
3. Pneumocystis jiroveci	c. Clarithromycin + Ethambutol + Rifabutin
4. CMV	d. Pyrimethamine + Sulfadiazine + Leucovorin
5. Mycobacterium Avium Intercellulare	e. Nitazoxanide
6. Cryptosporidium diarrhea	f. Fluconazole

A. 1-a, 2-d, 3-b, 4-e, 5-c, 6-f

B. 1-d, 2-f, 3-a, 4-b, 5-c, 6-e

C. 1-f, 2-c, 3-e, 4-b, 5-d, 6-a

D. 1-e, 2-c, 3-a, 4-b, 5-d, 6-f

---

6. Which of the following is an appropriate treatment for oral candidiasis?

A. Fluconazole

B. Acyclovir

C. Clarithromycin

D. Cotrimoxazole

---

7. All of the following drugs belong to Non-Nucleoside Reverse Transcriptase Inhibitors except?

A. Nevirapine

B. Tenofovir Alafenamide

C. Efavirenz

D. Delavirdine

---

8. Which of the following side-effects is common with protease inhibitors?

A. Anemia

B. Hepatotoxity

C. Lipodystrophy

D. Perpheral neuropathy

---

9. Which of the following has the highest incidence of transmission?

A. HBV

B. Syphilis

C. HCV

D. HIV

---

10. A 30-year-old male who is a fruit business owner presented to the Outpatient department with complaints of fever, fatigue, breathing difficulty, and confusion for the last four days. . He admitted that the fever did not relieve on antibiotics for two days. The patient started seizing during the examination and was treated accordingly.Further lab investigation shows positive IgM antibodies for a henipavirus virus and MRI brain showed multiple hyperdensities. What is the drug being developed (in phase 1 trial) to prevent further brain damage in these cases?

A. M 102.4

B. M 104.2

C. M 102.2

D. M 101.1

---

11. What is the investigation of choice for Zika virus?

A. Blood RT-PCR

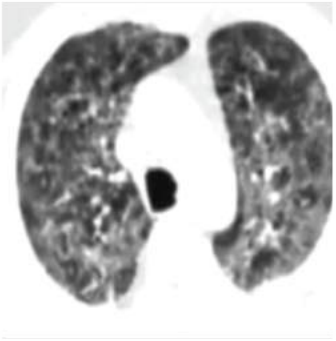
B. ELISA IgM

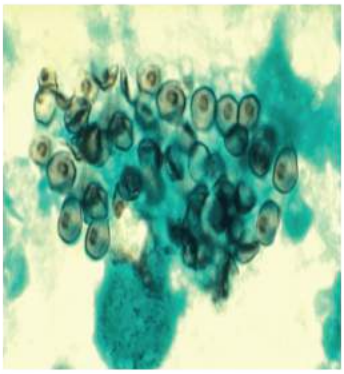
C. Urine triplex-PCR

D. Lumbar puncture

---

12. A 40-year-old male, who is a known case of AIDScame to the hospital with complaints of frequent episodes of fever, cough, and breathing difficulty. His history revealed that he is on anti-retroviral therapy. A bronchoalveolar lavage was examined with GMS stain and is shown below. The chest x-ray showed perihilar infiltrates and HRCT was done, which is shown below. LDH is elevated with deranged SpO2 and a CD4 count <200 cells/mm^3 of blood.What is the drug of choice for this patient?





A. Clindamycin

B. IV Trimethoprim-Sulfamethoxazole

C. Clotrimazole

D. IV pentamidine

Correct Answers

Question	Correct Answer
Question 1	1
Question 2	3
Question 3	1
Question 4	3
Question 5	2
Question 6	1
Question 7	2
Question 8	3
Question 9	1
Question 10	1
Question 11	3
Question 12	2

Solution for Question 1:

Correct Option A - Blood transfusion:

• Unprotected Receptive Anal Intercourse (URAI): 1:30

• Unprotected Vaginal Intercourse: 1:10,000

• Insertive Anal act: 1:1000

• Fellatio with ejaculation: 1:1000

• Needle Stick Injury: 1:300

• Needle Sharing: 1:150

• Blood transfusion-infected blood: 95% chances for transmission of HIV.

Incorrect Options:

Option B, C, D: These Options are incorrect

Solution for Question 2:

Correct Options C - Burkitt's lymphoma present in < 50 years of age:

• Burkitts lymphoma present in < 50yrs is not a part of the CDC definition for AIDS.

Incorrect Options:

• Option A, B, D: These are included in the CDC definition for AIDS

Solution for Question 3:

Correct Option A - 1-c, 2-d, 3-a, 4-b:

1. Most sensitive test for HIV

c. Enzyme immunoassay

2. Most specific test for HIV

d. Western blot

3. Best test for early diagnosis of HIV infection

a. Nucleic acid amplification test

4. Best test for vertical transmission of HIV

b. PCR-HIV DNA

Incorrect Option:

Option B, C, D:

• Refer to above explanation

Solution for Question 4:

Correct Option C - Repeat the test after 4-6 weeks:

• One needs to Repeat the test after 4-6 weeks if patient has positive-HIV-1 enzyme immunoassay but an indeterminate HIV-1 western blot

Incorrect Options:

Option A, B, D:

• Refer to the above explanation

Solution for Question 5:

Correct Option B - 1-d, 2-f, 3-a, 4-b, 5-c, 6-e:

1. Toxoplasmosis with encephalitis

d. Pyrimethamine + Sulfadiazine + Leucovorin

2. Cryptococcus Coccidioides

f. Fluconazole

3. Pneumocystis jiroveci

a. trimoxazole

4. CMV

b. Valcyclovir

5. Mycobacterium Avium Intercellulare

c. Clarithromycin + Ethambutol + Rifabutin

6. Cryptosporidium diarrhea

e. Nitazoxanide

Incorrect Options:

Option A, C, D:

• Refer to the below explanation

Solution for Question 6:

Correct Option A - Fluconazole:

• Diagnosis: Oral candidiasis

• Candidiasis is caused by mucocutaneous infection by a fungal pathogen called candida albicans.

• It results in white plaques over the mucosa of the oral cavity, pharynx or esophagus. It is usually seen only in patients who are immunocompromised.

• Characteristically these plaques can be easily scraped off which differentiates it from other oral lesions like leukoplakia

• Drug of choice for mucocutaneous candidiasis is fluconazole which can be given orally.

Incorrect Options:

Option B - Acyclovir:

• This is an antiviral drug used to treat Varicella, herpes zoster, herpes simplex and CMV It is ineffective in fungal infections

Option C - Clarithromycin:

• Antibiotic used to treat various bacterial infections such as mycobacterium Avium Complex, pertussis, group A streptococcus. It is not effective in fungal infections

Option D - Cotrimoxazole:

• This is Trimethoprim-sulfamethoxazole combination antibiotic. A few indications include toxoplasmosis, brucellosis, etc. It is not effective against fungal infections.

Solution for Question 7:

Correct Option B - Tenofovir Alafenamide:

• Tenofovir Alafenamide belongs to the class of Nucleotide Reverse transcriptase inhibitors

Incorrect Options:

Options A, C, D: It belongs to NNRTI

Solution for Question 8:

Correct Option C - Lipodystrophy:

• Lipodystrophy is a common side effect with the usage of preotease inhibitors.

Incorrect Options:

Option A - Anemia:

• Seen with NRTI (zidovudine)

Option B - Hepatotoxity:

• Seen with NNRTI and protease inhibitors

Option D - Perpheral neuropath:

• Seen with NRTI

Solution for Question 9:

Correct Option A - HBV:

Incorrect Option: B, C, D

Solution for Question 10:

Correct Option A - M 102.4:

• A fruit vendor with confusion (altered sensorium),seizures which started immediately within a few days of fever and positive IgM antibodies for Hendra virus(also called NIPAH virus) and MRI brain showing minute multiple hyperintensities (punctate) suggest an infection infection by NIPAH virus.

• M 102.4: currently in Phase 1 trial-Monoclonal Ab against Henipa virus G protein: used to prevent further damage to the brain by blocking the receptor engagement.

Incorrect Option:

Option B, C, D

Solution for Question 11:

Correct Option C - Urine triplex-PCR:

• Investigation of choice for Zika virus: Urine Assay- Urine Triplex PCR-(rRT – PCR) (Combination of Real-time and Reverse Transcriptase PCR)

Incorrect Option:

Option A, B, D: Refer to the above explanations.

Solution for Question 12:

Correct Option B - IV Trimethoprim-Sulfamethoxazole:

• The patient has HIV infection with a CD4 count <200 cells/mm^3

• Perihilar infiltrates on chest x-ray,d ground glass opacities on HRCT, and the BAL sample stained with Gomori methenamine stain showing multiple black color cysts proves the presence of Pneumocystis Jiroveci.

• Trimethoprim-Sulfamethoxazole is the drug of choice for this infection.

Incorrect Options:

Option A, C, D:

• These are used as a part of treatment regime but not the drug of choice

Previous Year Questions

1. Which one of the following is not transmitted during the perinatal period?

A. CMV

B. Rubella

C. Meningitis

D. Hepatitis B

---

2. A patient diagnosed to be retro-positive was started on highly active antiretroviral therapy (HAART). Which of the following can be used to monitor treatment efficacy?

A. CD4+ T cell count

B. Viral load

C. p24 antigen

D. Viral serotype

---

3. What is the drug of choice for Legionnaire's disease?

A. Vancomycin

B. Azithromycin

C. Streptomycin

D. Erythromycin

---

4. What is the likely diagnosis for a patient who has been experiencing fever and neck stiffness for 11 days? Their lumbar puncture results showed predominantly lymphocytes, with a sugar level of 50mg and protein level of 3000mg/dl. Gram-staining was negative. Additionally, their chest X-ray revealed upper lobe involvement and enlarged hilar lymph nodes.

A. Tuberculous meningitis

B. Bacterial meningitis

C. Fungal meningitis

D. Viral meningitis

---

5. A 45-year-old HIV-positive male complained of persistent cough, weight loss, and neck stiffness. He has skin lesions that appear as umbilicated papules and nodules predominantly on the face, trunk, and upper extremities.Physical examination also reveals neck rigidity. Chest x-ray showed multiple bilateral nodular infiltrates. His sputum CBNAAT for tuberculosis was negative, and he has a CD4 count of 20. What is the probable diagnosis?

A. HIV with disseminated histoplasmosis

B. HIV with disseminated cryptococcosis

C. HIV with molluscum contagiosum

D. HIV with tuberculosis

---

6. A patient arrives at the hospital with symptoms of fever and chills. A fever profile test is conducted, which rules out malaria and dengue as the cause. However, the rK39 test comes back positive. What is the preferred treatment for this condition?

A. Amphotericin B

B. Griseofulvin

C. Dapsone

D. Hydroxychloroquine

---

7. A patient, who is a known case of HIV with a CD4 count of 200 cells/cu.mm, presents with 5 days of cough and high-grade fever without chills and rigors. There is no history of diarrhoea, vomiting, or nuchal rigidity. The chest x-ray is normal. What treatment will you give?

A. Amoxicillin-clavulanic acid + Azithromycin

B. Amphotericin B

C. Co-trimoxazole only

D. Antitubercular treatment

---

8. Which antibiotic can be administered to a patient with diabetes who develops a urinary tract infection (UTI) that is further complicated by hypotension unresponsive to intravenous fluids?

A. Piperacillin - Tazobactam

B. Amoxicillin - Clavulanate

C. Ceftriaxone

D. Nitrofurantoin

---

9. Which of the following is NOT a potential complication in a 40-year-old man who presents with a 15-day history of fever and 1-day history of altered sensorium, and is diagnosed with Plasmodium falciparum through a rapid diagnostic test?

A. Blood glucose <40 mg/dL

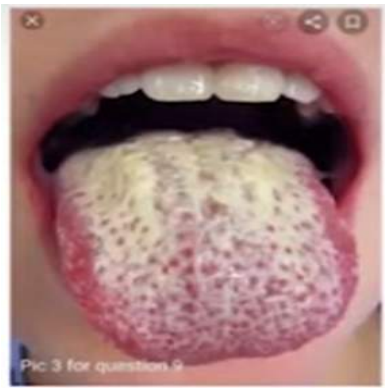
B. Arterial pH >7.2

C. Serum creatinine -5.2

D. Unarousable coma

---

10. An HIV positive patient presented with a whitish plaque in the mouth and esophagus as shown in the image below. Most likely diagnosis is:



A. Oral leukoplokia

B. Hairy cell leukemia

C. Oral candidiasis

D. Oral cancer

---

11. Identify the correct ‘organism and drug to which it is intrinsically resistant’ pair.

A. Aspergillus niger - Voriconazole

B. Aspergillus fumigatus - Micafungin

C. Candida albicans - Amphotericin B

D. Candida Krusei - Fluconazole

---

12. During the discharge of a COVID patient treated with steroids and remdesivir, which of the following will you inform him about? Repeat RT-PCR after 7 days of discharge Watch for the persistence of Anosmia Watch for headache and nasal discharge Monitor glucose levels Watch for Sinusitis symptoms

A. 1, 3 and 4

B. 2, 3 and 4

C. 2, 3, 4 and 5

D. 1,2,3,4 and 5

---

13. A 19-year-old male, chronic smoker, presented with fever, a painful lump over his left cheek just below the ear, and difficulty in swallowing or talking. The patient also complained of mild testicular pain. What is the most likely diagnosis?

A. Cervical tuberculosis

B. Diphtheria

C. Mumps

D. Lymphoma

---

14. What is the most probable diagnosis for a 40-year-old man whose lab reports indicate positive IgG Anti-HBc and negative HBsAg?

A. Recovering from hepatitis B

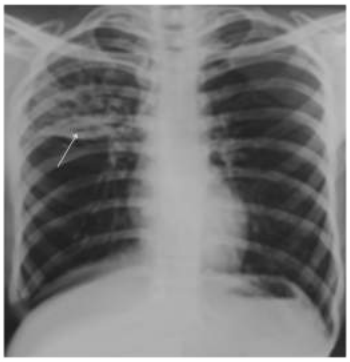
B. Hepatitis B in the remote past

C. Immunization with HBsAg

D. Both B & C

---

15. A 46 year old chronic alcoholic male presents to the OPD with fever, headache, shortness of breath, chest pain, and productive cough with red currant jelly sputum for the last two days. On examination, there was bronchial breathing on the right side, increased vocal fremitus, increased vocal resonance, and a dull note on percussion. The patient's plain radiograph is shown below. Which is the most likely causative agent?



A. Streptococcus pneumoniae

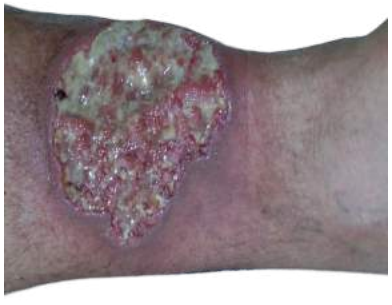
B. Klebsiella pneumoniae

C. Pseudomonas aeruginosa

D. Haemophilus influenza

---

16. A patient with inflammatory bowel disease presents with the following lesion. What is the most likely diagnosis?



A. Erythema nodosum

B. Pyoderma gangrenosum

C. Diabetic ulcer

D. Venous ulcer

---

17. All of the following are AIDS defining illnesses except:

A. Encephalopathy attributed to HIV

B. Invasive cervical cancer

C. Mycobacterium tuberculosis of any site

D. Oral candidiasis

---

18. What is the approximate time interval between HIV infection & manifestation of AIDS in an untreated patient?

A. 7.5-years

B. 10 years

C. 12 years

D. 5 years

---

19. Which diagnostic test is preferred for detecting HIV in a newborn delivered by an HIV-positive mother?

A. HIV DNA PCR

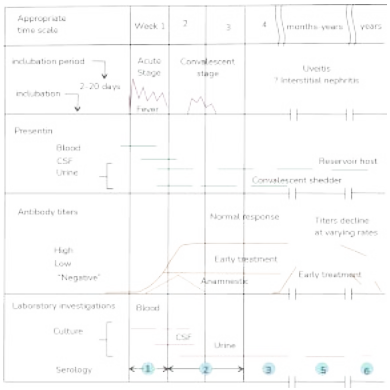
B. Cord blood ELISA

C. Western blot

D. Third generation ELISA

---

20. Following is a graphic representation of a patient admitted in the medicine ward with a fever. What could be the possible diagnosis?



A. Cerebral malaria

B. Brucellosis

C. Leptospirosis

D. Typhoid

---

21. You are posted as an intern in the emergency department. A 67-year-old man is brought to you with complaints of chest pain. He has tested positive for COVID. Which of the following features will prompt you to get this patient admitted to a dedicated COVID health center? A. Respiratory rate of 30/min B. SpO2 88% C. Multiple comorbidities D. Chest pain E. Age

A. A & B only

B. A, B, C & E only

C. A, B, & C only

D. None of the above

---

22. A 23-year-old medical student developed epistaxis that resolved spontaneously. He has been afebrile for the last 24 hours, and his platelet count is 14,000/µL. His BP is 110/70 mmHg and there is a 28% rise in haematocrit. What should be the management? Give 4 units of platelets Give plenty of oral fluids Give IV fluids Keep under observation Discharge the patient

A. 1 and 2

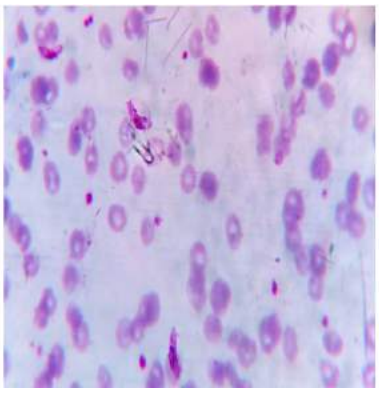
B. 1,2 and 4

C. 2,3 and 4

D. 2 and 5

---

23. Comment on the diagnosis?



A. Malaria

B. Hereditary spherocytosis

C. G6PD Deficiency

D. Thalassemia

---

24. A 40-year-old male presents with abdominal pain and progressive weight loss for 2 months. He has been suffering from migratory arthropathy for three years. There is no history of any chronic medical conditions. He is taking corticosteroids to help with the arthropathy. Endoscopic investigation shows dark staining of the duodenal mucosa. Histological examination of the biopsy reveals PAS-positive macrophages, leading to a diagnosis of a rare multisystem disease. Which of the following statements

is true regarding this patient's disorder? Caused by a protozoa Tropheryma whipplei PAS-positive macrophages in the lamina propria of the small intestine Culture-negative endocarditis is a common cardiac presentation Treated with IV Ceftriaxone

A. 1, 2 and 4 are true

B. 2, 3 and 4 are true

C. 1, 2 and 3 are true

D. 1 and 2 are true

---

25. A new vaccine which was launched in 2018 in Thailand with the name CYD-TDV. In which of the following condition it is used?

A. Dengue

B. Malaria

C. Yellow fever

D. Japanese encephalitis

---

26. Which of the following is the most common cause of infection post-solid organ transplantation?

A. Cytomegalovirus

B. Varicella zoster virus

C. Epstein – Barr virus

D. Herpes simplex virus

---

27. A veterinary surgeon presents with complaints of fever, muscle pain, joint pain, fatigue, and weight loss for the past few weeks. On further inquiry, he says that his fever persists for weeks before it resolves, only to be followed by a relapse. You obtain his blood sample and inoculate it on the medium given below to isolate the suspected organism. Which of the following is the most likely organism?

A. Burkholderia

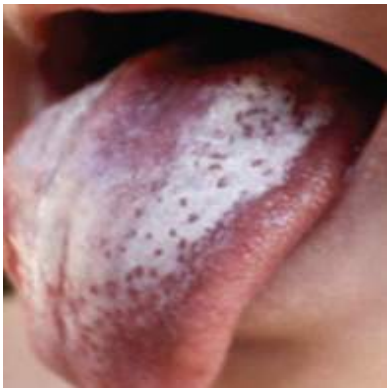
B. Brucella

C. Mycobacterium

D. Coxiella

---

28. An HIV-positive patient presents with the following finding. What is the diagnosis & WHO clinical stage of HIV?



A. Oral candidiasis & WHO stage 2

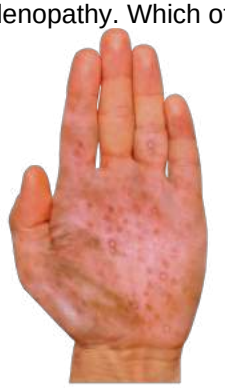
B. Oral hairy leukoplakia & WHO Stage 3

C. Oral candidiasis & WHO stage 3

D. Oral hairy leukoplakia & WHO stage 2

---

29. As seen below, A 49-year-old man presents with flu-like symptoms and a palmoplantar rash. On examination, he has epitrochlear lymphadenopathy. Which of the following is the likely diagnosis?



A. Primary syphilis

B. Secondary syphilis

C. Pyoderma gangrenosum

D. Steven Johnson syndrome

---

30. What is the diagnosis for a 6-year-old patient who presents with a mild fever persisting for 7 days, enlarged cervical lymph nodes, and a palpable spleen tip, and subsequently develops a widespread rash after administration of ampicillin?

A. Infectious mononucleosis

B. Scarlet fever

C. Kawasaki

D. Hodgkin's lymphoma

---

31. What is the most likely diagnosis for a 65-year-old man who is experiencing chronic pain in his hand, knees, and hips, with increased pain in the hands during writing or typing? Additionally, he has morning stiffness in his joints that lasts for about 30 minutes. On examination, Heberden's and Bouchard's nodes are visible in the hands, and an X-ray of the knee shows narrowed joint space with osteophytes.

A. Osteoporosis

B. Osteoarthritis

C. Rheumatoid arthritis

D. Bone tumor

---

32. What is the most common presentation of inhalational anthrax?

A. Atypical pneumonia

B. Haemorrhagic mediastinitis

C. Lung abscess

D. Broncho-pulmonary pneumonia

---

33. A CSF examination in a patient with signs of meningeal irritation shows lymphocytosis with normal sugar and elevated protein. What is the most likely diagnosis?

A. Pyogenic meningitis

B. Viral meningitis

C. Tubercular meningitis

D. Fungal meningitis

Correct Answers

Question	Correct Answer
Question 1	3
Question 2	2
Question 3	2
Question 4	1
Question 5	2
Question 6	1
Question 7	3
Question 8	1
Question 9	2

Question 10	3
Question 11	4
Question 12	3
Question 13	3
Question 14	2
Question 15	2
Question 16	2
Question 17	4
Question 18	2
Question 19	1
Question 20	3
Question 21	2
Question 22	3
Question 23	1
Question 24	2
Question 25	1
Question 26	1
Question 27	2
Question 28	3
Question 29	2
Question 30	1
Question 31	2
Question 32	2
Question 33	2

Solution for Question 1:

Correct Options C - Meningitis:

• Meningitis is one of the infections that is not transmitted perinatally therefore this option is ruled out.

Incorrect Options:

Options A - CMV (Cytomegalovirus): CMV can be transmitted from a pregnant woman to her fetus during pregnancy, making it a perinatally transmitted infection. It is one of the most common causes of congenital infection. Therefore, CMV is transmitted perinatally.

Options B - Rubella: Rubella, also known as German measles, can be transmitted from a pregnant woman to her fetus.

Options D - Hepatitis B: Hepatitis B can be transmitted from an infected mother to her baby during childbirth. This is considered a perinatal transmission route for hepatitis B. Babies born to mothers with hepatitis B

are at high risk of developing chronic hepatitis B infection. Therefore, hepatitis B is transmitted perinatally

Solution for Question 2:

Correct Option B - Viral load:

• Viral load is the amount of HIV present in the blood of a patient with HIV AIDS.

• Highly active antiretroviral therapy (HAART) is a treatment for HIV that incorporates a combination of drugs that target distinctive stages of the HIV life cycle, subsequently lessening the viral load.

Incorrect Options:

Option A - CD4 T cell count:

• CD4 Tcell count is nit used to assess treatment efficacy since it is slower to respond to HAART and changes in viral load can be picked up earlier.

Options C and D are incorrect.

Solution for Question 3:

Correct Option B - Azithromycin:

• Legionnaire's disease is a severe form of pneumonia caused by the bacterium Legionella pneumophila. Treatment typically involves antibiotics, and the drug of choice for Legionnaire's disease is Azithromycin. Azithromycin is a macrolide antibiotic that has activity against Legionella pneumophila.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 4:

Correct Option A - Tuberculous meningitis:

• Tuberculous meningitis is a form of meningitis caused by the bacteria Mycobacterium tuberculosis.

• It commonly affects the membranes surrounding the brain and spinal cord. The clinical presentation , along with the findings from the lumbar puncture (lymphocytes predominantly, low sugar, high protein) and the chest X-ray are all consistent with the diagnosis of tuberculous meningitis.

• The negative Gram-staining indicates that the causative agent is not a typical bacterial infection.

Incorrect Options:

• Options B, C and D are incorrect.

Solution for Question 5:

Correct Option B - HIV with disseminated cryptococcosis:

• According to the vignette, the patient is an HIV-positive man with a CD4 count of 20, a negative CBNAAT for tuberculosis and features of meningitis. He has an opportunistic infection that has respiratory, dermatological, and neurological manifestations.

• Disseminated cryptococcosis likely explains this patient's symptoms.

Incorrect Options:

Option A - HIV with disseminated histoplasmosis: Patients with disseminated histoplasmosis present wi th respiratory and skin lesions like those of cryptococcosis, but the presence of meningeal involvement and the CD4 count make a diagnosis of cryptococcosis more likely.

Option C - HIV with molluscum contagiosum: Patients with molluscum contagiosum present with flesh-colored umbilicated papules or nodules only. They do not cause systemic involvement like that seen in the patient.

Option D - HIV with tuberculosis: The patient has tested negative for tuberculosis via CBNAAT, a highly sensitive and specific test for tuberculosis, making tuberculosis a highly unlikely reason for causing the patient’s condition.

Solution for Question 6:

Correct Option A - Amphotericin B:

• The given scenario is suggestive of Kala azar, and Amphotericin B is the drug of choice. K39 is an epitope present on amastigotes of Leishmania spp that cause visceral leishmaniasis. Dipstick tests that test for the recombinant K39(rK39) protein are available for the rapid diagnosis of Kala Azar.

• Amphotericin B is the correct answer for the treatment of visceral leishmaniasis (kala-azar). Visceral leishmaniasis is caused by the parasite Leishmania donovani and is transmitted by sandflies. Amphotericin B is the treatment of choice for this disease due to its high efficacy against Leishmania parasites.

Incorrect Options:

• Options B, C, and D are incorrect.

Solution for Question 7:

Correct Option C - Co-trimoxazole only:

• Co-trimoxazole treatment is recommended for patients with HIV who present with symptoms of a respiratory tract infection and a CD4 count of less than 200 cells/cu.mm. Co-trimoxazole, a combination of sulfamethoxazole and trimethoprim, is commonly used in AIDS patients with cough due to its effectiveness against Pneumocystis jirovecii pneumonia (PJP). PJP is an opportunistic infection that affects individuals with weakened immune systems, such as those with advanced HIV/AIDS.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 8:

Correct Option A - Piperacillin-Tazobactam:

• In a patient with diabetes who develops a complicated urinary tract infection (UTI) and associated hypotension resistant to IV fluids suggests that the patient is in septic shock. The choice of antibiotics should take into consideration the likely causative organisms and their susceptibility patterns.

• Piperacillin-Tazobactam is a broad-spectrum antibiotic that covers a wide range of gram-negative and gram-positive bacteria, including many common pathogens associated with complicated UTIs.

• It also has good activity against some antibiotic-resistant bacteria.

• The combination of piperacillin and tazobactam helps to overcome beta-lactamase-mediated resistance.

Incorrect Options:

Option B - Amoxicillin-Clavulanate: While amoxicillin-clavulanate is effective against many common uri nary pathogens, it may not provide adequate coverage for the spectrum of bacteria typically associated with complicated UTIs, especially in patients with severe infection and hypotension.

Option C - Ceftriaxone: Although Ceftriaxone can be used in the management of patients with complica ted UTI, drugs like piperacillin-tazobactam offer wider coverage against organisms such as pseudomon as.

Option D - Nitrofurantoin: Nitrofurantoin is commonly used for uncomplicated lower urinary tract infectio ns. However, it is generally not recommended for complicated UTIs, such as those associated with sys temic symptoms and hypotension, as it may not achieve adequate tissue levels or cover the spectrum of bacteria involved.

Solution for Question 9:

Correct Option B - Arterial pH >7.2:

• Arterial pH >7.2 (alkalosis) is not a complication associated with Plasmodium falciparum infection. It is important to note that severe malaria caused by P. falciparum can trigger metabolic acidosis in which the arterial pH is less than 7.2.

Incorrect Options:

Option A - Blood glucose <40 mg/dL: Hypoglycemia (blood glucose <40 mg/dL) can be a complication of severe malaria, particularly in cases of P. falciparum infection. The parasite's impact on the liver and the increased metabolic demands of the infection can lead to low blood sugar levels.

Option C - Serum creatinine -5.2: The presence of serum creatinine levels of -5.2 (indicating a significant decrease in renal clearance) suggests acute kidney injury (AKI). AKI is a potential complicati on of severe malaria, including P. falciparum infection. Malaria-associated AKI can result from various f actors, such as decreased blood flow to the kidneys, direct parasite-mediated damage, or immune-me diated injury.

Option D - Unarousable coma: Unarousable coma is a severe neurological manifestation and a potenti al complication of malaria caused by P. falciparum. Cerebral malaria, characterized by impaired consci ousness and coma, is a severe complication that can occur in P. falciparum infection.

Solution for Question 10:

Correct Option C - Oral candidiasis:

• Oral Candidiasis is the likely diagnosis in these patients. In patients with HIV, there is decrease in the number of T cells making them more susceptible to infections with such agents.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 11:

Correct Option D - Candida Krusei - Fluconazole:

• In the given organism-drug combinations, Candida krusei is known to have intrinsic resistance to fluconazole, an antifungal medication commonly used to treat fungal infections. Echinocandins, such as caspofungin, micafungin, and anidulafungin, are usually the drugs of choice for treating C. krusei infections. Alternatives, drugs such as voriconazole or amphotericin B, may also be considered

Incorrect Options:

• Options A, B and C are incorrect.

Solution for Question 12:

Correct Option C - 2, 3, 4 and 5:

• Once a patient is discharged after being treated with steroids and remdesivir for COVID-19 infection, the patient must be informed to watch for headache, nasal discharge, and other symptoms of sinusitis. Headache and nasal discharge can be symptoms associated with COVID-19 or other conditions such as mucormycosis. It is important to inform the patient to be vigilant for these symptoms and seek medical attention if they develop or worsen.

• Monitoring glucose levels is important because steroids, such as dexamethasone, commonly used in the treatment of COVID-19, can cause elevated blood glucose levels. Patients should be advised to monitor their glucose levels regularly, especially if they have pre-existing diabetes or are at risk of developing steroid-induced diabetes.

• Anosmia can persist in a patient after the resolution of other symptoms of COVID-19. Patients must be counseled regarding it.

Incorrect Options:

• Repeating RT-PCR for COVID-19 after 7 days is not necessary. Hence options A, B, and D are incorrect.

Solution for Question 13:

Correct Option C - Mumps:

• Based on the symptoms described, the most likely diagnosis for this 19-year-old male with fever, a painful lump below the left ear, difficulty swallowing or talking, and mild testicular pain is parotitis and orchitis due to mumps.

Incorrect Options:

• Options A, B and D are incorrect.

Solution for Question 14:

Correct Option B - Hepatitis B in the remote past:

• Based on the given lab reports, the most likely diagnosis in this case is Hepatitis B in the remote past.

• IgG Anti-HBc refers to the presence of antibodies against the core antigen of the hepatitis B virus (HBV). The positive result indicates a previous exposure to the hepatitis B virus. HBsAg (Hepatitis B surface antigen) is a marker for acute or chronic HBV infection. A negative HBsAg result suggests that the individual is not currently infected with HBV.

• Based on these lab findings, the most likely interpretation is that the patient has resolved a past Hepatitis B infection. The presence of IgG Anti-HBc indicates a prior exposure to the virus, and the absence of HBsAg indicates that the infection is no longer active.

• Therefore, the most likely diagnosis is Hepatitis B in the remote past, indicating a previous infection that the patient has successfully cleared.

Incorrect Options:

• Options A, C and D are incorrect.

Solution for Question 15:

Correct Option B - Klebsiella pneumoniae:

• Based on the symptoms and examination findings described, the most likely causative agent in this case is Klebsiella pneumoniae.

• The patient in the vignette is an alcoholic with a productive cough with red currant jelly sputum and features of lobar pneumonia. The likely causative agent in such cases is Klebsiella.

Incorrect Options:

Option A - Streptococcus pneumoniae: Streptococcus pneumoniae is a common causative agent of community-acquired pneumonia, but it typically presents with a more acute onset and is associated with rust-colored sputum. It is less commonly associated with the clinical findings described in this case.

Options C and D are incorrect.

Solution for Question 16:

Correct Option B - Pyoderma gangrenosum:

• The most likely diagnosis in this case would be Pyoderma gangrenosum.

• Pyoderma gangrenosum is a rare, inflammatory skin condition characterized by the development of painful, ulcerative lesions. It can occur in patients with inflammatory bowel disease, and the lower limbs are a common site of involvement. The ulcers typically have undermined borders and may have a necrotic or purulent appearance.

Incorrect Options:

Options A, C and D are incorrect.

Solution for Question 17:

Correct Option D - Oral candidiasis:

• Oral candidiasis, also known as thrush, is a fungal infection caused by Candida species. While oral candidiasis is commonly seen in individuals with HIV/AIDS, it is not considered an AIDS-defining illness. It is a relatively common opportunistic infection that can occur in people with weakened immune systems, including those with HIV/AIDS, but its presence does not meet the criteria for defining the diagnosis of AIDS.

Incorrect Options:

Options A, B and C are considered AIDS defining illnesses.

Solution for Question 18:

Correct Option B - 10 years:

• 10 years: The approximate time interval between HIV infection and the manifestation of AIDS can vary significantly among individuals.

• During this time, individuals infected with HIV may remain asymptomatic or experience mild symptoms.

• As the disease progresses, the immune system becomes progressively weakened, leading to the development of opportunistic infections and other AIDS-related complications.

Incorrect Options:

Option A - 7.5 years: This option underestimates the typical time interval between HIV infection and the manifestation of AIDS. It is important to note that the progression from HIV infection to AIDS can be influenced by various factors, including individual differences, viral factors, and access to healthcare and antiretroviral therapy.

Option C - 12 years: This option overestimates the typical time interval between HIV infection and the manifestation of AIDS. While some individuals may experience a longer latency period, the average duration is generally shorter than 12 years.

Option D - 5 years: This option significantly underestimates the typical time interval between HIV infection and the development of AIDS. In most cases, it takes longer than 5 years for HIV infection to progress to AIDS.

Solution for Question 19:

Correct Option A - HIV DNA PCR:

• HIV DNA PCR (Polymerase Chain Reaction) is the correct diagnostic test of choice for HIV in a baby born to an HIV-infected mother. This test detects the presence of HIV DNA in the baby's blood, providing early and accurate diagnosis of HIV infection. It is highly sensitive and can detect HIV infection as early as a few weeks after birth.

Incorrect Options:

Options B, C and D are incorrect.

Solution for Question 20:

Correct Option C - Leptospirosis:

• Leptospirosis is a bacterial infection caused by the bacteria of the genus Leptospira. It is commonly transmitted to humans through contact with water, soil, or food contaminated with the urine of infected animals. Leptospirosis can present with symptoms such as fever, headache, muscle aches, and can progress to more severe manifestations, including liver and kidney involvement.

• The graphical representation in the vignette gives us the following information: Over time, this disease can lead to complications such as uveitis and interstitial nephritis. CSF is a reservoir for the causative organism and it is shed through urine.

• Over time, this disease can lead to complications such as uveitis and interstitial nephritis.

• CSF is a reservoir for the causative organism and it is shed through urine.

• These findings point towards a diagnosis of leptospirosis.

• Over time, this disease can lead to complications such as uveitis and interstitial nephritis.

• CSF is a reservoir for the causative organism and it is shed through urine.

Incorrect Options:

Options A, B and D are incorrect.

Solution for Question 21:

Correct Option B - A, B, C and E:

• Tachypnea, low oxygen saturation, the presence of multiple comorbidities, and age(60 or above) would prompt the consideration for admission in dedicated COVID care center.

Incorrect Options:

Options A, C and D are incorrect.

Solution for Question 22:

Correct Option C - 2, 3 and 4:

• The likely diagnosis in this patient with fever(resolving), thrombocytopenia, and improving hematocrit is Dengue. The appropriate management at this stage would be plenty of oral fluids and IV fluids to ensure adequate hydration. In this patient, since his epistaxis resolved spontaneously and the hematocrit is improving, he needs to be kept inpatient for observation.

Incorrect Options:

Option A - 1 and 2: 1. Give 4 units of platelets: While the patient has a low platelet count, giving 4 units of platelets is not the recommended initial management in this scenario. The platelet count of 14,000/µL indicates thrombocytopenia, but it is important to assess the patient's clinical condition, bleeding risk, and associated factors before initiating platelet transfusion. Transfusion decisions are typically guided by the presence of bleeding symptoms or active bleeding and not solely based on the platelet count.

Option B - 1, 2 and 4 : is incorrect

Option D - 2 and 5: 5. Discharge the patient: Discharging the patient without proper evaluation and management would not be appropriate in this case. Given the low platelet count and the previous episode of epistaxis, close monitoring, hydration, and further evaluation are necessary to ensure the patient's safety and manage potential complications.

Solution for Question 23:

Correct Option A - Malaria:

• The presence of banana-shaped gametocytes on histopathological examination is highly indicative of malaria caused by Plasmodium falciparum.

Incorrect Options:

Options B, C and D are incorrect.

Solution for Question 24:

Correct Option B - 2, 3 and 4 are true:

• 2. PAS-positive macrophages in the lamina propria of the small intestine: The presence of PAS-positive macrophages in the lamina propria of the small intestine is indicative of Whipple's disease. PAS stands for periodic acid-Schiff stain, which is used to detect polysaccharides like glycoproteins, which are seen in the macrophages in this condition.

• 3. Culture-negative endocarditis is a common cardiac presentation: Whipple's disease can involve various organs, including the heart. Endocarditis is a known cardiac presentation of the disease. Importantly, it is often culture-negative, meaning that the causative bacteria cannot be readily grown in laboratory cultures.

• 4. Treated with IV Ceftriaxone: Whipple's disease is treated with a combination of antibiotics, typically including intravenous ceftriaxone as one of the key agents. Other antibiotics, such as trimethoprim-sulfamethoxazole (TMP-SMX), can also be used. Treatment is generally prolonged, lasting several weeks to months

Incorrect Options:

Option A - 1, 2 and 4 are true: This incorrect option as statement 1 is false

• Caused by a Protozoa Tropheryma whipplei: Whipple's disease is caused by the bacterium Tropheryma whipplei, not a protozoa. Tropheryma whipplei is a gram-positive bacterium that infects various tissues and organs, leading to the multisystem manifestations observed in Whipple's disease.

Options C and D are incorrect.

Solution for Question 25:

Correct Option A - Dengue:

• This is the correct option. CYD-TDV is a vaccine used for the prevention of dengue fever. It is designed to protect against all four serotypes of the dengue virus. The vaccine was launched in 2018 in Thailand under the trade name CYD-TDV (Dengvaxia). Therefore, option A is correct.

Incorrect Options:

Options B, C, and D are incorrect.

Solution for Question 26:

Correct Option A - Cytomegalovirus (CMV):

• CMV is a common viral infection that can cause significant complications in solid organ transplant recipients. It can affect multiple organ systems and lead to pneumonia, hepatitis, gastrointestinal disease, and other manifestations.

Incorrect Options:

• Cytomegalovirus is more commonly seen in patients post solid organ transplantation, hence options B, C and D are incorrect.

Solution for Question 27:

Correct Option B - Brucella:

• The culture medium shown above is the image of Castenada biphasic medium. The most probable diagnosis is that of Brucellosis which is caused by Brucella.

Incorrect Options:

Option A - Burkholderia: Ashdown’s medium is used for Burkholderia.

Option C - Mycobacterium: Lowenstein Jensen medium is used for Mycobacterium.

Option D - Coxiella: Castenada biphasic medium is not used for Coxiella.

Solution for Question 28:

Correct Option C - Oral candidiasis & WHO stage 3:

• The lesion shown in the picture is that of oral candidiasis. According to WHO, oral candidiasis or thrush is categorized as clinical stage 3. These occur in patients with CD4+ T cell counts of <200 cells/mm3.

Incorrect Options:

Options A, B, and D are incorrect.

Solution for Question 29:

Correct Option B - Secondary syphilis:

• The patient above, a 49-year-old man, presents with flu-like symptoms, and a palmoplantar rash. On examination, he has epitrochlear lymphadenopathy. The most likely diagnosis is that of secondary syphilis.

Incorrect Options:

Options A, C and D are incorrect.

Solution for Question 30:

Correct Option A - Infectious mononucleosis:

• The clinical presentation described is consistent with infectious mononucleosis, also known as glandular fever. It is commonly caused by the Epstein-Barr virus (EBV). The symptoms include fever, lymphadenopathy (enlarged lymph nodes), hepatosplenomegaly (enlarged liver and spleen), and a characteristic rash that can occur after the administration of certain antibiotics like ampicillin.

Incorrect Options:

Options B, C and D are incorrect.

Solution for Question 31:

Correct Option B - Osteoarthritis:

• The above vignette describes the classic presentation of osteoarthritis.

Incorrect Options:

Option A - Osteoporosis: Heberden’s and Bouchard’s nodes are not seen in osteoporosis.

Option C - Rheumatoid arthritis: Rheumatoid arthritis shows Boutonniere deformity and swan neck def ormity of the hand.

Option D - Bone tumor: The clinical presentation is unlikely of a bone tumor.

Solution for Question 32:

Correct Option B - Hemorrhagic mediastinitis:

• This is the most common presentation of inhalational anthrax. It is characterized by severe chest pain, shortness of breath, and mediastinal widening on imaging. Hemorrhagic mediastinitis refers to the presence of bleeding and inflammation in the mediastinum, the area between the lungs.

Incorrect Options:

Options A, C and D are incorrect.

Solution for Question 33:

Correct Option B - Viral meningitis:

• CSF examination showing normal sugars with lymphocytosis indicates viral meningitis.

• Other CSF examination findings in viral meningitis: Increased CSF pressure 50-500 lymphocytes Normal sugars Elevated protein levels The gross physical appearance of CSF is normal or turbid

• Increased CSF pressure

• 50-500 lymphocytes

• Normal sugars

• Elevated protein levels

• The gross physical appearance of CSF is normal or turbid

• Increased CSF pressure

• 50-500 lymphocytes

• Normal sugars

• Elevated protein levels

• The gross physical appearance of CSF is normal or turbid

Incorrect Options:

Option A - Pyogenic meningitis:

• CSF examination shows >1000 PMN and reduced sugars.

Option C - Tubercular meningitis

• CSF examination shows 100-1000 lymphocytes and reduced sugars.

Option D - Fungal meningitis:

• CSF examination shows 10-200 lymphocytes and reduced sugars.