1. Question:

A patient undergoing surgery is administered succinylcholine for muscle relaxation. Shortly after administration, he develops hyperthermia, muscle rigidity, tremors, and tachycardia. What is the most appropriate treatment for this condition?

Option 1 :

Neostigmine

Option 2 :

Dantrolene sodium

Option 3 :

Atropine

Option 4 :

Midazolam

Correct option :2

Solutions :

Correct Answer: B) Dantrolene sodium

Explanation:

The clinical manifestations indicate **malignant hyperthermia,** a rare but life-threatening genetic disorder triggered by certain anesthetic agents, particularly **succinylcholine**. It is characterized by the rapid onset of hyperthermia, muscle rigidity, tachycardia, and metabolic acidosis following exposure to these triggering agents.

The first-line treatment and **specific antidote** for malignant hyperthermia is **Dantrolene sodium**. It works by inhibiting calcium release from the sarcoplasmic reticulum in skeletal muscle, effectively reducing the hypermetabolic state and preventing further temperature elevation. Immediate administration of Dantrolene is crucial to prevent severe complications and mortality.

Diagnosis of malignant hyperthermia

- Best screening test: **Creatine kinase test**
- Gold Standard Diagnostic test: **Halothane-Caffeine Test**

Treatment for malignant hyperthermia

PREPLADDER

1. Discontinue volatile anaesthetics and succinylcholine immediately. Notify the surgeon and call for assistance.
2. Hyperventilate the patient with 100% oxygen at a fresh flow rate of at least 10 L/min.
3. Mix **dantrolene sodium** with sterile distilled water and administer 2.5 mg/kg intravenously as soon as possible. Repeat every 5 to 10 minutes until symptoms improve, with a maximum total dose of 10 mg/kg.
4. Administer bicarbonate to address metabolic acidosis.
5. Implement cooling measures, such as lavage, cooling blankets, and cold intravenous fluids.
6. For severe hyperkalemia, administer dextrose (25–50 g IV) along with regular insulin (10–20 units IV for adults).
7. Provide antiarrhythmic medications as necessary.
8. Monitor end-tidal CO2 levels, electrolytes, blood gases, creatine kinase, serum myoglobin, core temperature, urinary output and colour, and coagulation status.

Neostigmine(Option A) is an acetylcholinesterase inhibitor used primarily to reverse non-depolarizing neuromuscular blockade at the end of surgery. It would treat the underlying pathophysiology of malignant hyperthermia and could potentially worsen symptoms by increasing acetylcholine at neuromuscular junctions. Neostigmine is contraindicated in this scenario as it may exacerbate the hypermetabolic crisis.

Atropine(Option C) is an anticholinergic medication that blocks muscarinic receptors. It would not treat malignant hyperthermia and might actually worsen the condition by inhibiting sweating and further elevating body temperature. Additionally, it could exacerbate the tachycardia already present in this patient.

Midazolam (Option D) is a benzodiazepine with sedative, anxiolytic, and amnestic properties. While it might provide some symptomatic relief through sedation, it does not address the underlying pathophysiology of malignant hyperthermia.

Reference :

1. Miller's Anaesthesia, 9th Edition, Page 1118, 1123, 1124, 1125
2. Morgan and Mikhail's Clinical Anaesthesia, 7th Edition, Page 2301, 2302

Learning Outcome :

PREPLADDER

2. Question:

A patient scheduled for elective hip surgery is currently taking aspirin, enalapril, a multivitamin, and metoprolol. The surgery is planned in 5 days. What is the appropriate perioperative management for this patient?

Option 1 :

Stop enalapril

Option 2 :

Stop aspirin to minimize perioperative bleeding risk

Option 3 :

Stop metoprolol to increase cardiac output

Option 4 :

Increase aspirin dosage for additional analgesic benefit

Correct option : 1

Solutions :

Correct Answer: A) Stop enalapril

Explanation:

ACE inhibitors such as **enalapril** should typically be **stopped 24 hours before elective surgery.** This recommendation is based on evidence that continuing ACE inhibitors perioperatively can lead to clinically **significant hypotension during anesthesia**, particularly when combined with the vasodilatory effects of anesthetic agents.

Medication discontinuation before surgery	
Drug	**Continued or stopped preoperatively**
Antithyroid	Continued
Antiepileptic	Continued
Antidepressants	Continued
Aspirin	Continued
Beta Blockers	Continued

PREPLADDER

Smoking	Stop at least 6-8 weeks prior
Steroid	Continued
Anticonvulsants	Continued
Monoamine Oxidase Inhibitors (MAOIs)	Discontinue 2-3 weeks before surgery
Oral Contraceptive Pill	Discontinue at least 6 weeks before
Herbal Supplements	Discontinue at least 2 weeks before surgery
ACE Inhibitors (Enalapril)	Stop 24 hours before surgery
Angiotensin II Receptor Blockers (ARBs) (Telmisartan)	Stop 24 hours before surgery
Calcium Channel Blockers (Amlodipine)	Continue

Stop aspirin to minimize perioperative bleeding risk (Option B) may be considered for neurosurgery or ocular procedures, but current guidelines generally recommend continuing aspirin for most orthopedic procedures including hip surgery. The modest increase in surgical bleeding with aspirin continuation is typically manageable and outweighed by the potential cardiovascular risks of discontinuation.

Stop metoprolol to increase cardiac output(Option C) would be inappropriate and potentially dangerous. Abrupt beta-blocker discontinuation perioperatively significantly increases the risk of sympathetic hyperactivity, tachycardia, hypertension, myocardial ischemia, and mortality.

Increasing aspirin dosage for additional analgesic benefit (Option D) has no supporting evidence of additional benefit and would unnecessarily increase bleeding risk.

Reference :

Morgan and Mikhail's Clinical Anesthesiology, 7th Edition, Page 1113, 999, 1167, 1153, and 1418

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2464262/

Learning Outcome :

3. Question:

What is the most common defect in a ventricular septal defect?

Option 1 :

Muscular defect

PRELADDER

Option 2 :

Membranous defect

Option 3 :

Non-development of the perimembranous part of the septum

Option 4 :

Incomplete fusion of the septum

Correct option : 2

Solutions :

Correct Answer: B) Membranous defect

Explanation

The most common defect in ventricular septal defect (VSD) is membranous defect.

Pathophysiology of VSD:

- The interventricular septum has two parts: **membranous and muscular**.
- VSD occurs due to **incomplete development or fusion of septal components** during embryonic cardiac formation.
- A unified classification system is used to describe VSDs.

Types of VSD:

- **Infundibular (Outlet) VSD**:
    - Location: Below semilunar valves (aortic and pulmonary), within the outlet septum of the right ventricle.
- **Perimembranous VSD:**
    - Location: Membranous septum, below crista supraventricularis.
    - Characteristics: **Most common (80% of cases),** may involve muscular septum, potential for spontaneous closure.
- **Inlet (Atrioventricular Canal) VSD:**
    - Location: Below the inlet valves (tricuspid and mitral), in the inlet portion of the right ventricle septum.
    - Characteristics: Represents 8% of all VSDs, more common in patients with Trisomy 21.

PREPLADDER

- **Muscular (Trabecular) VSD:**
    - Location: Muscular septum (apical, central, outlet regions).
    - Characteristics: Can present as multiple defects ("Swiss cheese"), more common in infants, the tendency to close spontaneously with age.

Gerbode Defects:

- A distinct defect with a direct connection between the left ventricle and right atrium.
- Type 1: True Gerbode, congenital deficiency in the membranous septum.
- Type 2: Subvalvular type, ventriculo-atrial shunting due to central VSD and tricuspid valve defect.
- Type 3: Combination of Type 1 and Type 2 characteristics.

Reference :

https://www.ncbi.nlm.nih.gov/books/NBK470330/

Learning Outcome :

4. Question:

A baby presents with the clinical features shown in the image, including characteristic perioral and perianal rash along with a history of diarrhea. Which of the following is the most likely deficiency responsible for this condition?

PRE LADDER

Option 1 :

Zinc Deficiency

Option 2 :

Niacin Deficiency

Option 3 :

Selenium Deficiency

Option 4 :

Magnesium Deficiency

Correct option :1

Solutions :

Answer: A) Zinc Deficiency

Explanation:

- **Characteristic rash:** The image likely shows **acrodermatitis enteropathica**, which presents with **perioral, perianal, and acral dermatitis**—a hallmark of **zinc deficiency**.
- **History of diarrhea:** Zinc plays a crucial role in **intestinal function and immunity**; its deficiency leads to chronic diarrhea.
- **Other symptoms of zinc deficiency:** Growth retardation, poor wound healing, alopecia, and immune dysfunction.

Zinc Deficiency & Acrodermatitis Enteropathica

Feature	Zinc Deficiency
Cause	Congenital (SLC39A4 mutation) or acquired (malnutrition, chronic diarrhea)

PRELADDER

Key Skin Features	Perioral, perianal, and acral dermatitis with erythematous, scaly plaques 
Other Symptoms	Growth retardation, diarrhea, alopecia, immune dysfunction
Diagnosis	Low serum zinc levels
Treatment	Zinc supplementation

Niacin Deficiency (Option B) is incorrect because niacin deficiency leads to **pellagra**, characterized by the "3 Ds"—**dermatitis, diarrhoea, and dementia**—but the rash is **photosensitive** and occurs in sun-exposed areas, not perioral/perianal.

Selenium Deficiency (Option C) is incorrect because selenium deficiency primarily affects the **cardiovascular system** (e.g., **Keshan disease**, causing cardiomyopathy) and does not cause a perioral/perianal rash.

Magnesium Deficiency (Option D) is incorrect because magnesium deficiency presents with **neuromuscular symptoms** (tetany, muscle cramps, seizures) rather than a characteristic rash.

Reference :

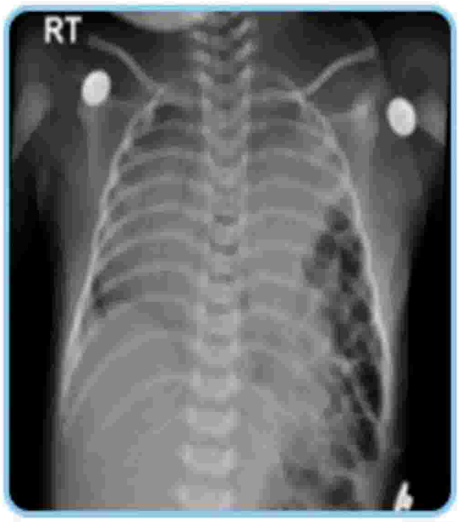
Vasudevan, 7th edition, Page 497, 522

Learning Outcome :

5. Question :

A newborn child is brought to the emergency department with respiratory difficulty. The doctor evaluated, and the child was found to have a posterolateral defect, as shown in the x-ray given. What is the diagnosis?

PREPLADDER



Option 1 :

Bochdalek hernia

Option 2 :

Morgagni hernia

Option 3 :

Hiatal hernia

Option 4 :

Traumatic diaphragmatic hernia

Correct option : 1

Solutions :

Correct Answer: A) Bochdalek hernia

Explanation:

The clinical features and X-ray show a congenital diaphragmatic hernia, and the most common type that appears in the posterolateral part on the left side is the **Bochdalek hernia**.

Diaphragmatic Hernia:

- It is a communication between the abdominal and thoracic cavities, which may or may not involve abdominal contents in the thorax.
- Aetiology: Rarely traumatic, usually congenital.
- Symptoms and Prognosis: Dependent on the location of the defect and associated anomalies.

PREPLADDER

Types of diaphragmatic hernia:

- **Hiatal hernia (Option C)**: Occurs at the esophageal hiatus.
- Paraesophageal Hernia: Near the esophageal hiatus.
- **Morgagni Hernia (Option B)**: Retro-sternal, occurring in the foramen of Morgagni (2–6% of CDH cases).
- **Bochdalek Hernia**: Occurs in the **posterolateral portion** of the diaphragm; **most common**, accounting for 90% of congenital diaphragmatic hernias (CDH). It occurs predominantly on the left side (80-90%).

Pathology and etiology:

- CDH involves a diaphragmatic defect and often leads to pulmonary hypoplasia.
- Pulmonary hypoplasia is due to both compression of the lungs and, in some cases, may precede the diaphragmatic defect.
- Pathological features include reduced pulmonary mass, abnormal alveolar septa, thickened alveoli, and biochemical imbalances such as surfactant deficiency.

Clinical Features:

- Symptoms include respiratory distress, tachypnea, cyanosis, and scaphoid abdomen.
- Infants may show delayed symptoms and present with vomiting or mild respiratory distress.

Diagnosis:

- CDH is often diagnosed **prenatally** via **ultrasound** (16-24 weeks) and **fetal MRI**.
- Key findings: polyhydramnios, chest mass, mediastinal shift, abdominal organs in the chest, and fetal hydrops.
- **After birth,** a **chest X-ray** confirms the diagnosis.

Treatment:

- **Initial Management:**
  - Birth in a tertiary care centre with expertise in CDH management is essential.
  - Immediate stabilization includes intubation, gastric decompression, and central venous and arterial access.
  - Goal oxygenation: preductal SpO2 ≥85%.
  - Gentle ventilation and permissive hypercapnia are recommended.
- **Ventilation Strategies:**
  - Conventional mechanical ventilation, HFOV, and ECMO are primary methods.

PREPLADDER

    - Permissive hypercapnia and low-pressure ventilation reduce lung injury.
    - Inhaled nitric oxide (iNO) may be used to manage pulmonary hypertension.
- **Extracorporeal Membrane Oxygenation (ECMO):**
    - ECMO is used when conventional ventilation fails.
    - The duration of ECMO may be longer in CDH infants than in other conditions.
- **Surgical Repair:**
    - Repair is typically done after stabilization (48 hours post-birth).
    - A subcostal approach is preferred, with a focus on primary repair if possible.
    - If primary repair is not feasible, synthetic patches (e.g., Gore-Tex) may be used.
    - Postoperative monitoring for complications like pulmonary hypertension, bleeding, and bowel obstruction is crucial.

Novel Strategies:

- **Fetal lung-to-head ratio (LHR)** on ultrasound is a reliable predictor of outcomes.
- Fetoscopic tracheal occlusion shows promise for severe cases, but more research is needed.

Traumatic diaphragmatic hernia (Option D)is not the likely diagnosis in the given scenario since there is no significant history of trauma that may indicate this diagnosis.

Reference :

Nelson Textbook of Pediatrics, 21st Edition, Page 894, 895, 2288

Learning Outcome :

6. Question :

Which electrolyte abnormality will lead to cardiac arrhythmia in patients with severe vomiting?

Option 1 :

Hypokalemia

Option 2 :

Hyponatremia

Option 3 :

Hyperkalemia

Option 4 :

Hypocalcemia

PREPLADDER

Correct option :1

Solutions :

Correct Answer: A) Hypokalemia

Explanation:

Severe vomiting leads to **hypokalaemia**, which is a major risk factor for **cardiac arrhythmias** due to its effect on **cardiac membrane potential and conduction**.

- **Mechanism:**
  - Vomiting causes **loss of gastric acid (HCl)** → metabolic alkalosis
  - **Alkalosis shifts potassium into cells** → worsens hypokalaemia
  - **Renal compensation increases potassium excretion** (due to increased bicarbonate delivery to the distal tubule)
  - **Low serum potassium disrupts cardiac repolarisation**, leading to arrhythmias
- **ECG changes in hypokalaemia:**
  - **Flattened T waves**
  - **U waves**
  - **Prolonged QT interval** → risk of **ventricular arrhythmias (e.g., Torsades de Pointes, ventricular tachycardia)**

Hyponatraemia (Option B) is incorrect because although vomiting can lead to hyponatraemia (due to volume loss and ADH secretion), it is **less likely to cause direct cardiac arrhythmias**.

Hyperkalaemia (Option C) is incorrect because vomiting typically leads to **potassium loss**, not hyperkalaemia. **Hyperkalaemia** is more commonly associated with **renal failure, acidosis, or tissue breakdown**.

Hypocalcaemia (Option D) is incorrect because hypocalcaemia causes **neuromuscular symptoms (tetany, Chvostek's sign, Trousseau's sign)** and **QT prolongation**, but it is **not the primary electrolyte abnormality** seen in vomiting-induced arrhythmias.

Reference :

OP Ghai Essential Pediatrics, 10th Edition, Page 64

Hypokalemia-Induced Arrhythmia: A Case Series and Literature Review - PMC

Learning Outcome :

7. Question :

A body brought for autopsy is cold and has developed rigor mortis in all 4 limbs and livor mortis at the back/fixed, but no signs of putrefaction. What will be the estimated time since death?

PRELADDER

Option 1 :

12-24 hrs

Option 2 :

6-12 hrs

Option 3 :

24-48 hrs

Option 4 :

36-48 hrs

Correct option :1

Solutions :

Correct Answer: A) 12–24 hours

Explanation:

The postmortem interval (PMI) estimation is based on a combination of **algor mortis**, **rigor mortis**, **livor mortis**, and **putrefaction** findings:

Findings in This Case:

Observation	**Interpretation**
Body cold to touch	Suggests death occurred **more than 8–12 hours** ago (body cools gradually)
Rigor mortis in all four limbs	Fully established rigor occurs **around 12 hours** post-death and lasts up to 24 hrs
Livor mortis fixed at the back	Lividity becomes **fixed after 6–12 hours**
No signs of putrefaction	Putrefaction usually begins **after 24–36 hours**, depending on environment

PREPLADDER

Given that:

- Rigor mortis is fully developed (**12 hours**),
- Livor mortis is fixed (**~8–12 hours**),
- No putrefaction is seen (<24–36 hours),

The most accurate estimate for **time since death is 12–24 hours.**

Livor Mortis

Feature	**Details**
Other names	Cadaveric lividity, postmortem staining, suggillations, vibices, "darkening of death"
Site	Superficial dermis (capillaries and venules)
Mechanism	Gravitational settling of deoxygenated blood → purple-blue skin discolouration in dependent areas
Onset	Begins in **30 minutes – 1 hour** after death
Fully developed by	~ **4 hours**
Fixation time	Becomes **fixed in 6–12 hours**
Confirmation of fixation	Apply pressure → if colour does not blanch, it is fixed
Primary lividity	Max intensity seen by **6–12 hours**
Secondary lividity	Lividity may shift if the body is moved within a few hours of death
Duration	Persists until putrefaction begins

PREPLADDER

Image	

The progression of rigor mortis can be divided into three main phases.

Phase	Description	Timeframe
Primary Relaxation	Muscles are flaccid; ATP levels are 100%. Sphincters relax, leading to the release of urine/feces.	0–1 hour after death
Rigor Mortis Onset	Begins as ATP falls to 85%; actin-myosin cross-linking causes stiffening. Appears in smaller muscles first (eyelids, jaw), progresses to limbs.	Begins 1–2 hrs; full by 12 hrs
Rigor Resolution	Due to proteolysis, rigidity dissipates. Rigor fades by **24–36 hours** depending on conditions.	12–36 hours after death

Position	Lividity Location
Supine	Back of head, neck, trunk, and limbs (excluding pressure areas)
Prone	Chest, face, front of limbs
Side	Dependent side
Head-down	Face and neck blackened
Vertical suspension	Legs, hands, external genitalia (glove and stocking pattern)
Drowning	Face, chest, hands, feet, calves

Conditions Where Livor Mortis May Be Absent:

- Severe **anaemia**

PREPLADDER

- **Massive blood loss**
- **Cachexia** (wasting diseases)
- Some infections like **lobar pneumonia**

Medicolegal Significance of Livor Mortis:

- Helps **estimate time since death**
- Indicates **body position at death**
- Suggests if the **body was moved postmortem**
- May hint at **cause of death** (e.g., cherry-red lividity in CO poisoning)

Reference :

Review of Forensic Medicine and Toxicology, Gautam Biswas, 3rd Edition, Page 140, 141

Essentials of forensic medicine & Toxicology, K.S. Narayan Reddy, 35th Edition, Page 114, 115, 117

Learning Outcome :

8. Question :

A 39-year-old patient with HIV and a CD4 count of 139 cells/μL presents with altered sensorium and impaired consciousness. CSF examination using an India ink preparation reveals a positive result. Which organism is most likely responsible?

Option 1:

Cryptococcus neoformans

Option 2:

Aspergillus fumigatus

Option 3:

Histoplasma capsulatum

Option 4 :

Candida albicans

Correct option : 1

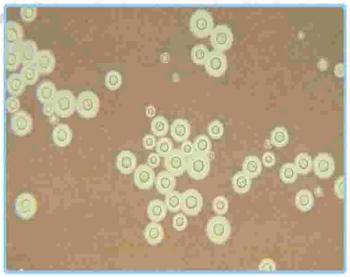
Solutions :

Correct Answer: A) Cryptococcus neoformans

PREPLADDER

Explanation: A patient with HIV and a CD4 count of 139 cells/μL, altered sensorium, and a positive India ink preparation of CSF points toward**Cryptococcus neoformans**, a common cause of opportunistic meningitis in immunocompromised individuals.

Clinical Features of Cryptococcosis	
Respiratory System	• Cryptococcus typically enters the body via inhalation and can cause pulmonary infection / pneumonitis - primary site of infection • Patients may present with cough, pleuritic chest pain, and respiratory distress. • Imaging shows a solitary pulmonary nodule • Dissemination of pulmonary infection leads to the involvement of other organs
Central Nervous System	**Meningitis:** Characterized by severe headaches, fever, **altered mental status**, **sensory and memory loss**, cranial nerve paresis and loss of vision It is the most serious type of cryptococcal infection
Skin	**Cutaneous Cryptococcosis:** Causes skin lesions, particularly in immunocompromised patients. Associated with C.neoformans var neoformans (serotype D)
Other Organs	Liver, spleen, and bones maybe involved in disseminated infections

Diagnosis of Cryptococcosis	
Microscopy	• **India ink:Demonstrates the capsule**, which appears as **clear space surrounding the round budding yeast cells**  • **Mucicarmine stain:** It stains the carminophilic cell wall of C. neoformans

PREPLADDER

Culture	• **Sabouraud Dextrose Agar**, forming smooth, mucoid, cream-coloured colonies. • **Niger seed agar** and **bird seed agar**: Demonstrates melanin production (brown colored colonies) due to phenol oxidase/laccase enzyme. • The ability to grow at **37°C** and **hydrolyse urea** differentiates C. neoformans from non-pathogenic cryptococci. 
Antigen detection tests	Demonstration of the capsular antigen by **Precipitation** and **Latex agglutinationtest**
Treatment	• Initial Treatment with **liposomal Amphotericin B** and **Flucytosine** • Maintenance Therapywith **Fluconazole** for 6-12 months, depending on immune status. • Monitoring: Regularly check CSF for fungal clearance, renal function, and electrolytes. • Management of Underlying Conditions: Optimize ART to reduce recurrence risk.

PREPLADDER

Reference :

Ananthanarayan and Paniker's Textbook of Microbiology, 10th Edition, Page 617, 618

Apurba S Sastry- Essentials Of Medical Microbiology, 3rd Edition, Page 740, 741

Learning Outcome :

9. Question :

A patient came to the hospital with muscle weakness, diarrhea, and bradycardia. He was diagnosed with organophosphate poisoning for which atropine was administered. After atropine administration, which of the following changes are not seen?

Option 1:

Bradycardia

Option 2:

Muscle weakness

Option 3:

Diaphoresis

Option 4 :

Nasal discharge

Correct option :1

Solutions :

Correct Answer: A) Bradycardia

Explanation:

Organophosphate (OP) poisoning causes **cholinergic overstimulation** by inhibiting **acetylcholinesterase**, leading to accumulation of **acetylcholine** at muscarinic and nicotinic receptors.

Atropine is a **muscarinic antagonist**, used to treat the **muscarinic symptoms** of OP poisoning.

OPC poisoning:

Symptoms	**Muscarinic:** Lethargy, Salivation, Diarrhea, Lacrimation, Urination, Miosis, Muscle weakness, Bronchorrhea, Bronchospasm, Bradycardia, Emesis (Mnemonic: DUMBBELLS)
	Nicotinic: Muscle weakness, Fasciculation, Areflexia, Muscle paralysis
	CNS: Headache, Tremor, Confusion, Slurred speech, Coma, Convulsion

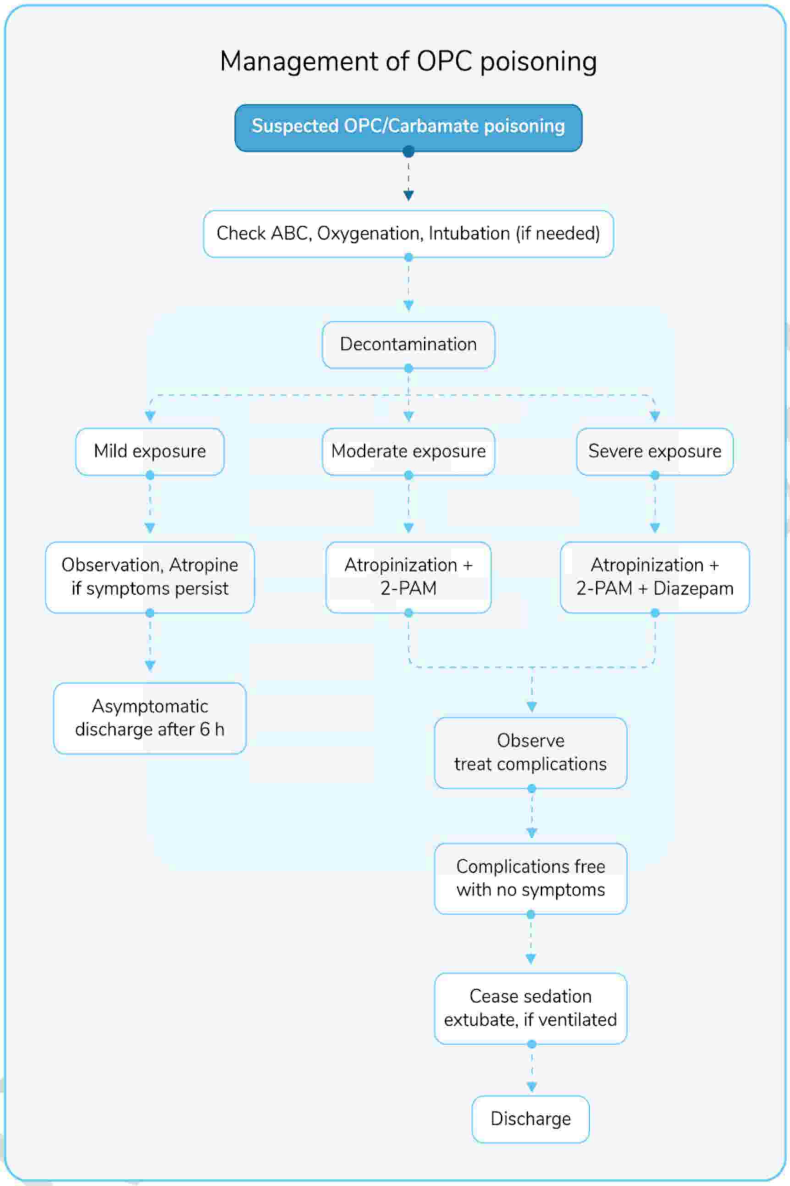
PREPLADDER

Laboratory Diagnosis	• **RBC/True Cholinesterase** (specific)
	• **Plasma/Pseudocholinesterase** (Most common)
	  • Falls rapidly with organophosphorus poisoning
	  • Inexpensive, sensitive)
	• **Atropine test**: If 2 mg of Atropine relieves symptoms, it confirms OP poisoning
	• **P-nitro phenol test** for confirmation.

Management	• Resuscitative measures (Airway-Breathing-Circulation)
	• Decontamination
	• Gastric lavage with 1:5000 KMnO4
	• Activated charcoal
	• **Atropine sulfate** (2-4 mg IV every 10-15 minutes until atropinization)
	• **Signs of atropinization:** Heart rate>80 beats/min, pupils no longer pinpoint, clear chest on auscultation with no wheeze, systolic BP>80mmHg, Dry axillae
	• Oximes (Pralidoxime) to decrease muscarinic and CNS symptoms
	  • removes phosphate group
	  • reduces atropine requirement

Cause of Death	Respiratory Muscle Paralysis (RMP)

PREPLADDER



Option	**Explanation**	**Seen after atropine?**
Bradycardia	Reversed by atropine (muscarinic blockade)	Not seen
Muscle weakness	Nicotinic effect; not reversed by atropine	Seen
Diaphoresis	Muscarinic effect; reversed by atropine	Seen before, improves
Nasal discharge	Muscarinic effect; reversed by atropine	Seen before, improves

Muscle weakness (option B): Remains because **atropine does not affect nicotinic receptors** at the neuromuscular junction.

Diaphoresis (option C): Caused by muscarinic stimulation → **improves** with atropine.

Nasal discharge (option D): Muscarinic effect → **improves** with atropine.

Reference :

Review of Forensic Medicine and Toxicology, Gautam Biswas, 3rd Edition, Page 597-600

Learning Outcome :

10.Question :

A child was brought to the casualty with complaints of vomiting and loose stools with a history of laxative use. On examination, arrhythmia is present. What will be the abnormality present?

Option 1 :

Hyponatremia

Option 2 :

Hypocalcemia

Option 3 :

Hypokalemia

Option 4 :

Hyperkalemia

Correct option :

Solutions :

Correct Answer: C) Hypokalemia

Explanation

Vomiting and loose stools, along with cardiac arrhythmia, point to the diagnosis of **hypokalemia.**

- Normal serum potassium level: 3.5-5.5 meq/L.
- **Hypokalemia** is defined as a serum potassium level below 3.5 mEq/L.
    - Mild hypokalemia: 3 - 3.5 mEq/L
    - Moderate hypokalemia: 2.5 - 3.0 mEq/L
    - Severe hypokalemia: <2.5 mEq/L

Etiology:

- Common causes of hypokalemia in children include:

PREPLADDER

- Gastrointestinal losses (diarrhoea, vomiting)
- Renal losses (diuretics, renal tubular disorders)
- Inadequate intake
- Transcellular shifts (e.g., insulin administration, beta-agonists)

Clinical features:

- Muscle weakness
- Fatigue
- Constipation
- **Cardiac arrhythmias (in severe cases)**
- Polyuria and polydipsia

Treatment:

- The treatment of hypokalemia depends on its severity and the presence of symptoms. In this case, with moderate hypokalemia and symptoms, intravenous replacement is appropriate
- **Potassium Supplementation:**

Indications for IV Potassium Supplementation:	• Symptomatic patients • Severe hypokalemia (<2.5 mEq/L) • Presence of ECG abnormalities • Unable to tolerate oral feeds.

IV Potassium Chloride Supplementation:	• **Dosage:** 0.5-1 mEq/kg per dose
	• **Administration:** IV infusion over 1-2 hours
	• **Infusion Rate:** Do not exceed 1 mEq/kg per hour
	• **Potassium Concentration:**
	  • Maximum of 60 mEq/L for peripheral lines
	  • Maximum of 80 mEq/L for central lines
	• Avoid using glucose-containing fluids to prevent insulin-mediated intracellular potassium shift.

PREPLADDER

Oral Potassium Supplementation:	• **Dosage:** 2-4 mEq/kg per day, divided into 3-4 doses
	• **Common Preparations:**
	  ○ Potassium chloride (10%; 20 mEq/15 mL)
	  ○ Potassium citrate (especially for renal tubular acidosis)
	• **Administration Tip:** Liquid preparations can be bitter; dilute with juice or water to improve taste.

- **Additional Management Considerations:**
  - Replace ongoing potassium losses
  - Ensure volume resuscitation with normal saline
  - Correct any associated hypomagnesemia
  - Treat underlying conditions (e.g., monogenic hypertension, Bartter syndrome, Gitelman syndrome)

Hyponatremia (Option A) can be caused due to GI losses but is not associated with cardiac arrhythmias.

Hypocalcemia (Option B) is not associated with arrhythmias but rather presents with prolonged QT intervals and congestive cardiac failure.

Hyperkalemia (Option D) is associated with cardiac arrhythmias but is not caused due to vomiting and diarrhoea.

Reference :

OP Ghai Essential Pediatrics, 10th Edition, Page 63, 64

Learning Outcome :

11.Question :

A patient is positive for HBsAg and anti-HBc IgM. What is the most likely diagnosis?

Option 1 :

Acute hepatitis

Option 2 :

Chronic hepatitis

Option 3 :

Recovery phase

PREPLADDER

Option 4 :

Vaccination

Correct option : 1

Solutions :

Correct Answer: A) Acute hepatitis

Explanation: A patient positive for HBsAg and anti-HBc IgM points toward **Acute hepatitis B.**

Stages and Associated Markers of Hepatitis B Virus (HBV):

HBsAg	HBeAg	Anti-HBc	Anti-HBs	Anti-HBe	Interpretation
+	+	IgM	-	-	**Acute HBV infection** Highly infectious
+	+	IgG	-	-	**Chronic HBV infection**, highly infectious **(Option B)**
+	-	IgG	-	-/+	Chronic HBV infection, low infectivity
-	-	IgG	-/+	-/+	**Recovery (Option C)**
-	-	IgM	-	-	Window period
-	-	-	+	-	**Post-vaccination (Option D)**

PREPLADDER

Reference :

Ananthanarayan and Panicker's Textbook of Microbiology, 10th Edition, Page 552

Apurba S Sastry Essentials of Medical Microbiology, 3rd Edition, Page 483

https://www.ncbi.nlm.nih.gov/books/NBK555945/

Learning Outcome :

12. Question :

A corneal wisp test was performed, and the corneal reflex was elicited. Which of the following nerves is responsible for the afferent limb of this reflex?

Option 1 :

Facial Nerve

Option 2 :

Trigeminal Nerve

Option 3 :

Oculomotor Nerve

Option 4 :

Abducens Nerve

Correct option : 2

Solutions :

The corneal reflex (blink reflex) is a protective response that involves both sensory (afferent) and motor (efferent) pathways:

- **Afferent limb (sensory input): Trigeminal nerve (CN V1 - Ophthalmic division)**
  - The cornea is innervated by the nasociliary branch of the ophthalmic division (V1) of the trigeminal nerve.
  - A light touch to the cornea (e.g., with a cotton wisp) stimulates sensory fibers, sending signals to the trigeminal sensory nucleus in the brainstem.
- **Efferent limb (motor response): Facial nerve (CN VII)**
  - The facial nerve (CN VII) innervates the orbicularis oculi muscle, which causes eyelid closure in response to the stimulus.

Reflex	Afferent Nerve	Efferent Nerve
Accommodation	II (Optic nerve)	III (Oculomotor nerve)
Corneal	V_1 (Ophthalmic, nasociliary branch)	Bilateral VII (Facial nerve, temporal branch - orbicularis oculi)
Cough	X (Vagus nerve)	X (Vagus nerve, also phrenic and spinal nerves)

PREPLADDER

Gag	IX (Glossopharyngeal nerve)	X (Vagus nerve)
Jaw Jerk	V_3 (Mandibular branch, sensory from masseter)	V_3 (Mandibular branch, motor to masseter)
Lacrimation	V_1 (Ophthalmic branch) (loss of reflex does not preclude emotional tears)	VII (Facial nerve)
Pupillary	II (Optic nerve)	III (Oculomotor nerve)

Facial Nerve (CN VII) (Option A): The facial nerve is responsible for the efferent limb (motor response), not the afferent limb. It causes eyelid closure by contracting the orbicularis oculi muscle.

Oculomotor Nerve (CN III) (Option C): CN III controls extraocular muscles and the levator palpebrae superioris (eyelid elevation), but it does not mediate the corneal reflex.

Abducens Nerve (CN VI) (Option D): CN VI controls the lateral rectus muscle for eye abduction but is not involved in the corneal reflex.

Reference :

https://www.ncbi.nlm.nih.gov/books/NBK534247/

Learning Outcome :

13.Question :

A patient undergoing general anesthesia develops left lung collapse following intubation. On auscultation, breath sounds are heard only on the right side. What is the most likely cause of this condition?

Option 1 :

Right endobronchial intubation

Option 2 :

Mucus secretions obstructing the endotracheal tub

Option 3 :

Pneumothorax on the left side due to positive pressure ventilation

Option 4 :

Bronchospasm

PREPLADDER

Correct option : 1

Solutions :

Correct Answer: A) Right endobronchial intubation

Explanation:

The physical finding of breath sounds heard only on the right side with absence on the left strongly supports this diagnosis of **right endobronchial intubation (right mainstem intubation)**. When an endotracheal tube is advanced too far, it typically enters the right mainstem bronchus **due to its more vertical orientation**compared to the left bronchus. This results in ventilation of only the right lung while the **left lung collapses** due to lack of ventilation.

Mucus secretions obstructing the endotracheal tube(Option B) would typically cause bilateral decreased air entry or generalized poor air movement rather than unilateral findings. If the tube were completely obstructed, there would be no or diminished breath sounds on both sides.

Pneumothorax on the left side due to positive pressure ventilation (Option C) could present with diminished breath sounds on the left but would typically have additional signs such as hypoxemia, hypotension, tracheal deviation toward the right, and hyperresonance to percussion on the left side.

Bronchospasm (Option D) typically presents with bilateral wheezing, prolonged expiration, and increased airway pressures. It would not cause a complete absence of breath sounds on one side with normal findings on the other.

Reference :

Morgan & Mikhail's Clinical Anesthesiology, 6th Edition, Page 317-319

Learning Outcome :

14.Question :

A patient presents with right-sided field defects in both eyes, but central vision remains unaffected. What is the most likely diagnosis?

Option 1 :

Homonymous Hemianopia with Macular Sparing

Option 2 :

Heteronymous Hemianopia with Central Sparing

Option 3 :

Optic Chiasm Lesion

Option 4 :

Optic Tract Lesion

PREPLADDER

Correct option : 1

Solutions :

- **Homonymous Hemianopia: T**his refers to the loss of the same side of the visual field in both eyes. In this case, the patient has a right-sided field defect in both eyes, which suggests a lesion in the contralateral visual pathway, most likely in the right occipital lobe or along the visual tract.
- **Macular Sparing:**
    - The macula (central vision) is often spared in cases of cortical lesions, such as those caused by a stroke in the Posterior Cerebral Artery (PCA) territory.
    - The macula receives a dual blood supply from both the PCA and the Middle Cerebral Artery (MCA).
    - If the PCA is affected (for example, in a PCA stroke), but collateral circulation from the MCA is maintained, the macular representation in the visual cortex can still receive enough blood supply to preserve central vision.
    - This phenomenon explains macular sparing in cortical lesions

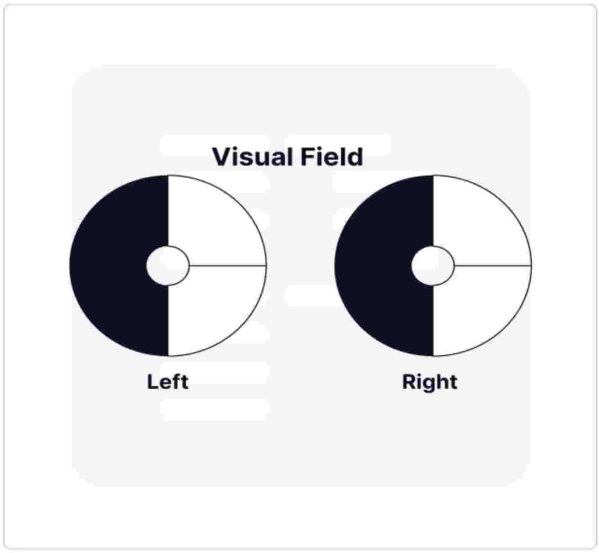
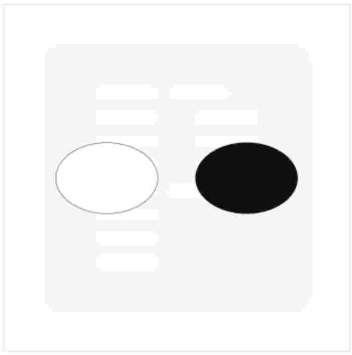
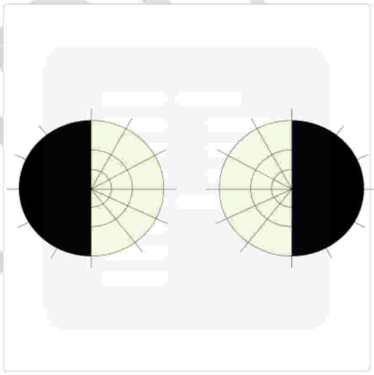
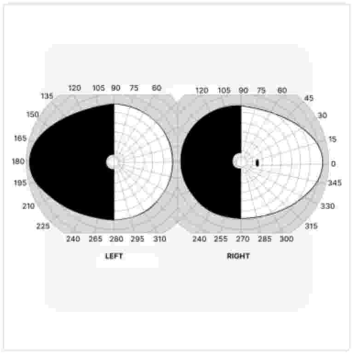
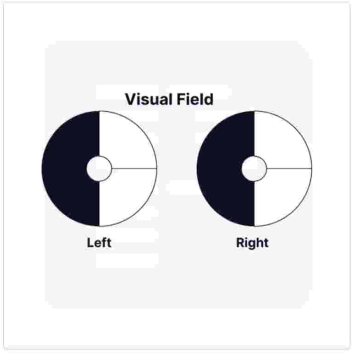
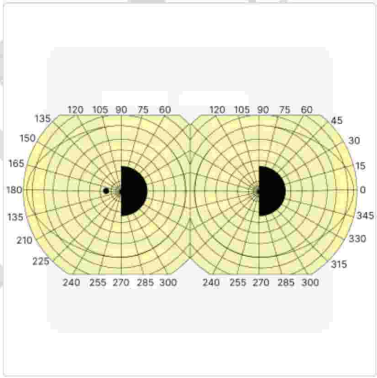


Fig: Homonymous hemianopia with macular sparing.

Visual Pathway Lesions and Defects		
Site of Lesion	**Fibers Affected**	**Field Defect**

Optic Nerve	Ipsilateral Temporal + Nasal Fibers	 **Anopia**
Optic Chiasma	Bilateral Nasal Fibers	 **Bitemporal Hemianopia (Heteronymous Hemianopia)**
• **Optic Tract** • **Lateral Geniculate Body (LGB Lesion)** • **Optic Radiation**	Ipsilateral Temporal Fibers + Contralateral Nasal Fibers	 **Homonymous Hemianopia**

PREPLADDER

Visual Cortex without the involvement of tip **(Post. Cerebral Artery)**	Ipsilateral Temporal Fibers + Contralateral Nasal Fibers except macular representation	 **Homonymous Hemianopia with Macular Sparing**
Tip of Visual Cortex **(Middle Cerebral Artery)**	Macular Representation of Ipsilateral Temporal and Contralateral Nasal Fibers.	 **Macular Homonymous Hemianopia**

Reference :

Parsons Diseases of the eye, 23rd Edition, Pg - 1184

Yanoff & Duker Ophthalmology, 5th edition, Pg - 913,919

Learning Outcome :

15.Question :

A neonate on examination has bilateral cataracts and, after investigations, is found to have a patent ductus arteriosus and salt & paper retinopathy. What is the most likely congenital infection?

PREPLADDER

Option 1 :

Rubella

Option 2 :

CMV

Option 3 :

Toxoplasma

Option 4 :

Varicella

Correct option : 1

Solutions :

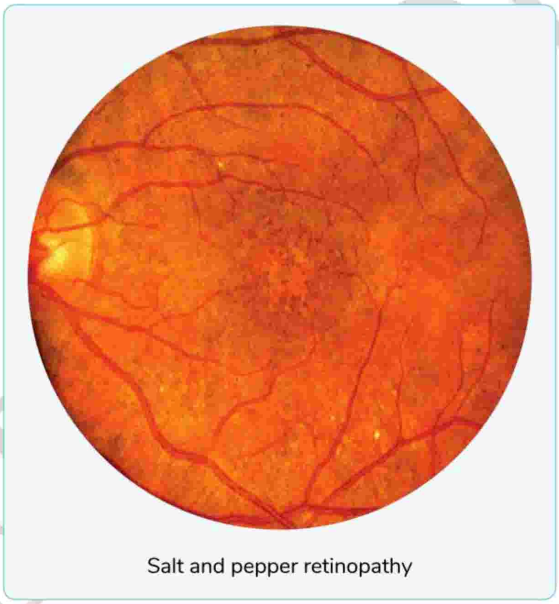
Correct Answer: A) Rubella

Explanation:

The patent ductus arteriosus, bilateral cataracts, and salt & pepper retinopathy are classical signs of **congenital rubella syndrome.**

Congenital Rubella	
• Rubella (German measles) is a mild disease in infants and children but can cause congenital rubella syndrome (CRS) if contracted during pregnancy. • The risk is highest in the first trimester, especially within the first 8 weeks.	
Pathogenesis	• Viremia is most intense from 10 to 17 days after infection. • Viral shedding is from day 10 of infection up to 2 weeks.
Risk of Defects by Gestational Age	• Highest in the first 12 weeks of gestation and decreases significantly thereafter, with defects being rare after 20 weeks.

PREPLADDER

Clinical features of congenital rubella syndrome	• Hearing loss (most common) • Vision problems (**cataracts**, glaucoma, **salt and pepperretinopathy**). • Cataracts are the most common ocular abnormality associated with congenital rubella.   Salt and pepper retinopathy • Heart defects (**patent ductus arteriosus** > pulmonary artery stenosis (right > left) > ventricular septal defect) • **Low birth weight** • Neurological issues (microcephaly, intellectual disabilities, encephalitis, behavioural issues)
Chronicity and Complications	• Chronic presence of the virus can cause ongoing damage • The risk of progressive rubella panencephalitis (PRP) years later is a rare complication. • Less common complications: Growth retardation, hepatitis, bone lesions. • Risk of diabetes and thyroid dysfunction

PREVIEW

Diagnosis	• Rubella IgM enzyme immunosorbent assay (detects antibodies) • Viral isolation (growing the virus from samples) • Polymerase chain reaction (PCR) (detects viral RNA)
Management	• No specific treatment for CRS; supportive care is key • Early intervention for complications (e.g., hearing loss) is crucial
Prevention	• Standard with droplet precaution in hospitalized cases • Rubella vaccination RA 27/3 live attenuated vaccine (MMR or MMRV with varicella) effectively prevents rubella and CRS • MMR vaccine has a 95% efficacy after one dose and 99% after two doses • Vaccination side effects: fever, rash, joint pain
Considerations for Pregnant Women	• **Immunoglobulin** may be considered if pregnancy is not terminated, though it does not guarantee prevention of fetal infection

Congenital CMV infection (Option B)is usually asymptomatic at birth. If symptomatic, these neonates present with jaundice, petechiae, hepatosplenomegaly, microcephaly, and chorioretinitis.

Congenital toxoplasmosis(Option C) caused by Toxoplasma gondii often presents with the classic triad of intracranial calcifications, hydrocephalus, and chorioretinitis

Congenital varicella (Option D) presents with cicatricial zigzag skin scarring in a dermatomal pattern, limb hypoplasia, microcephaly, seizures, mental retardation, chorioretinitis, microphthalmia, cataracts, etc.

Reference :

Nelson Textbook of Pediatrics, 21st Edition, Page 1676-1680

https://www.ncbi.nlm.nih.gov/books/NBK570627/

https://www.ncbi.nlm.nih.gov/books/NBK576396/

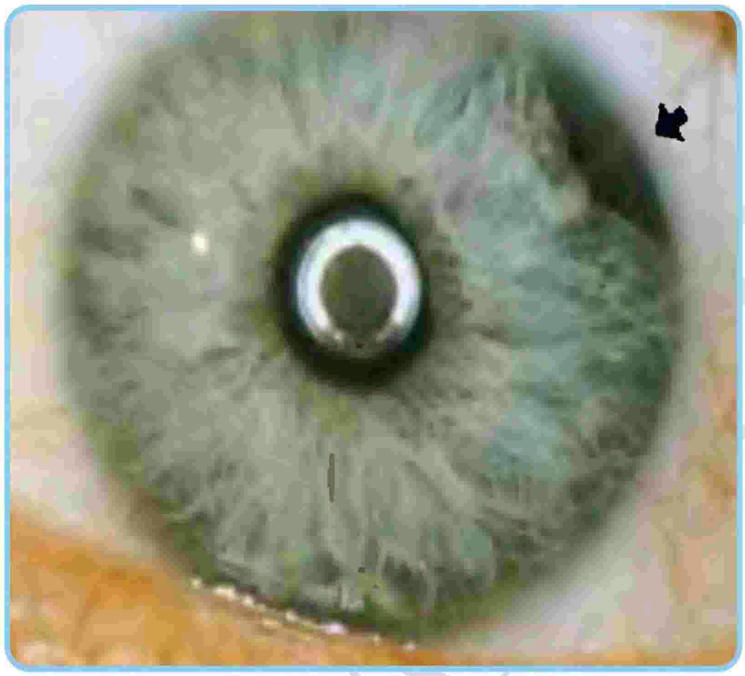
https://www.ncbi.nlm.nih.gov/books/NBK551502

Learning Outcome :

PREPLADDER

16.Question :

A patient sustained blunt trauma to the eye 6 months ago and now presents with blurring of vision. What is the most likely condition?



Option 1 :

Iridodialysis

Option 2 :

Ankyloblepharaon

Option 3 :

Vossius Ring

Option 4 :

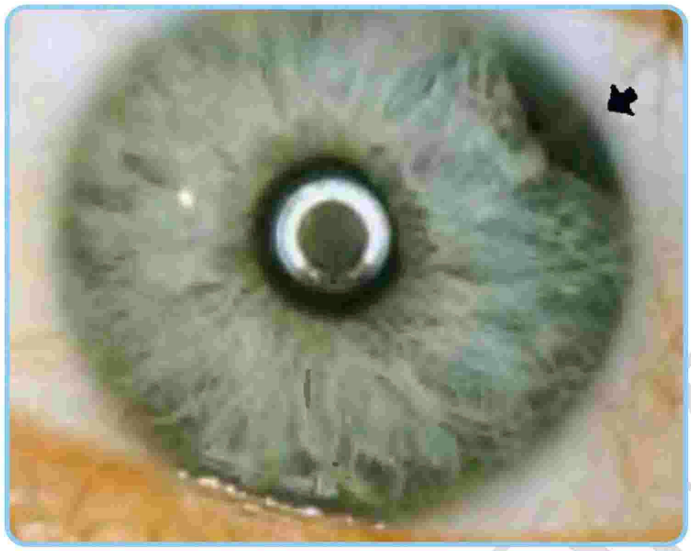
Cycloiriditis

Correct option :1

Solutions :

Iridodialysis is detachment of iris from its root at the ciliary body. It results in D shaped pupil and a lack biconvex area seen at the periphery.

PREPLADDER

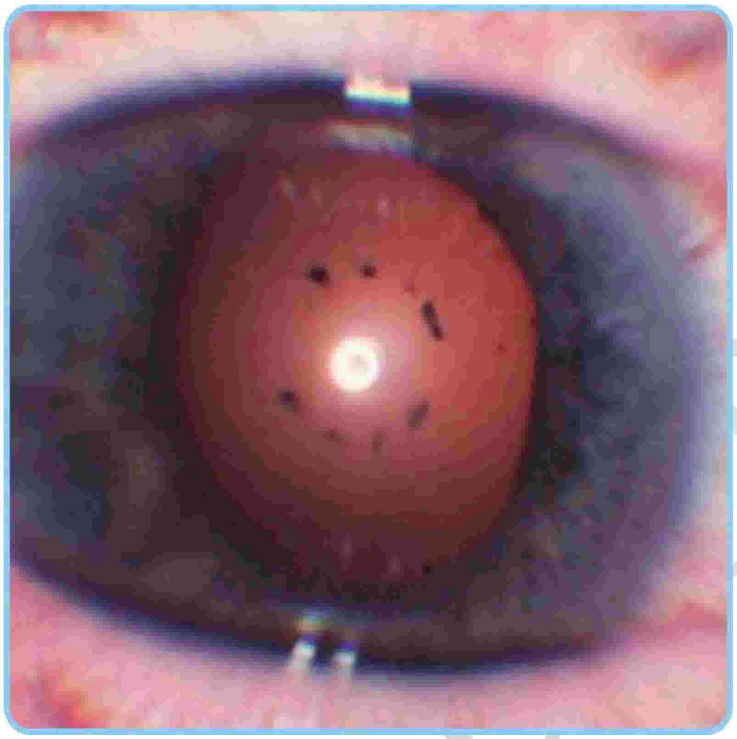


Blunt trauma (also known as non-penetrating or blunt force trauma)

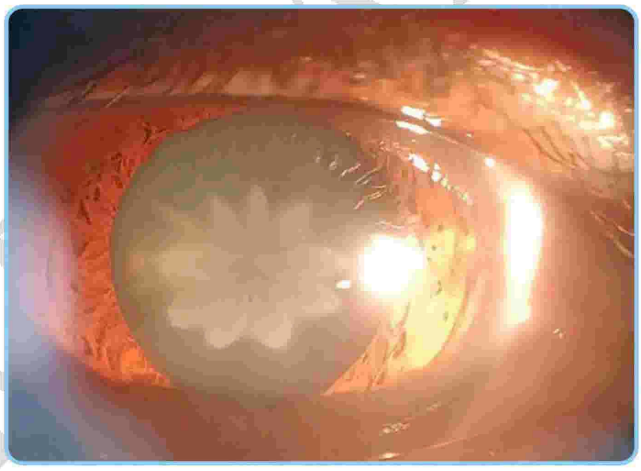
- **Cause:** A strong impact, a fall, or a physical assault with a blunt object, is most commonly the result of sports injuries and assaults.
- **Features:**
    - **Conjunctiva:** Subconjunctival hemorrhage

- **Cornea:** Abrasions, corneal edema, **Descemet's membrane tears.**
- **Hyphaema:** Blood in the anterior chamber leading to corneal staining.
- **Iris:** Iridodialysis (dehiscence of the iris from the ciliary body at its root), iris sphincter tear,
- **Ciliary body:** Ciliary body tear leading to angle recession.
- **Lens:**
- **Vossious Ring** (in the shape of the pupil) **(Option C)**

PDF READER

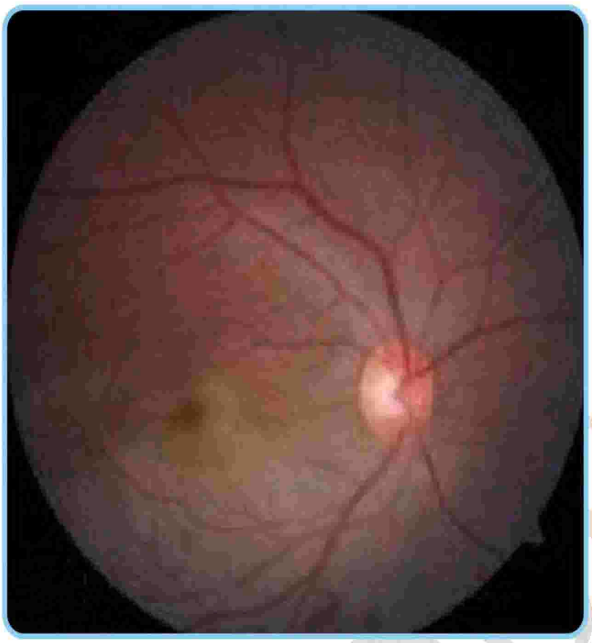


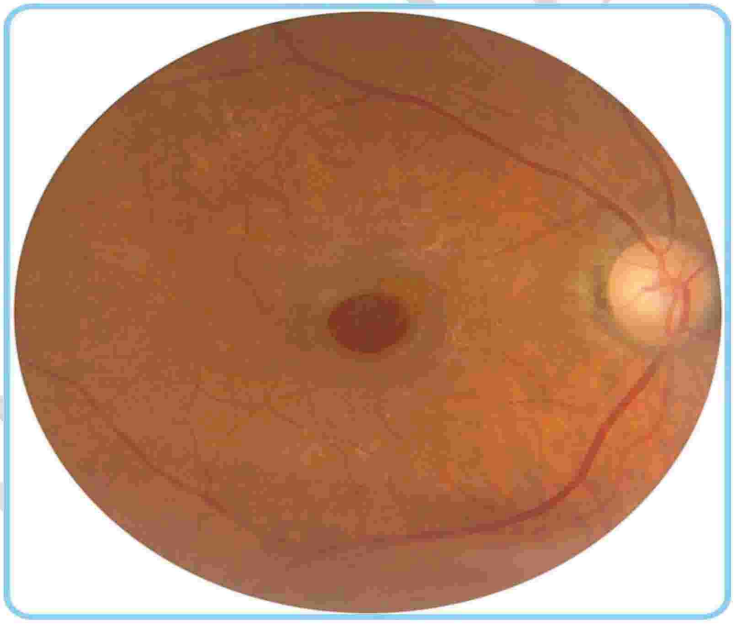
- **Rosette-Shaped Cataract** (flower-shaped opacity), subluxation of lens.



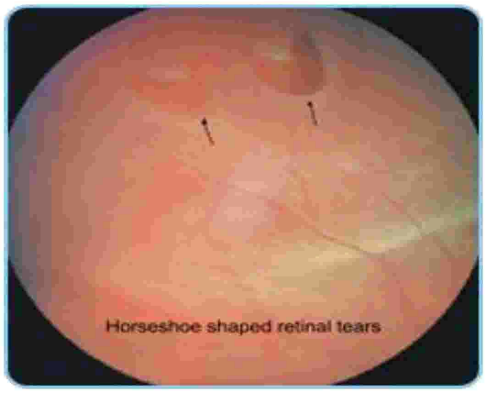
- **Globe rupture** (caused by severe blunt trauma, indicated by iris prolapse)
- **Vitreous haemorrhage**: Pigment cells **('tobacco dust')** can be seen floating in the anterior vitreous.
- **Choroidal rupture**
- **Retina: Commotio Retinae (also known as Berlin's edema)**, retinal dialysis (disinsertion from ora serrata), giant retinal Tear **(horseshoe shaped)**, macular hole.

PRIMER



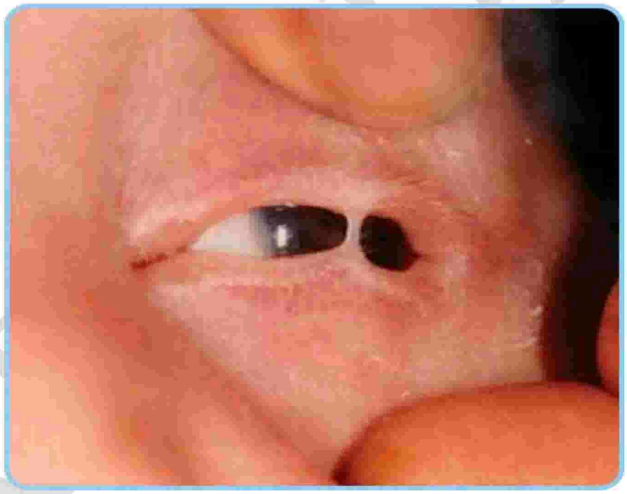


PROVIDER



- Injury to optic nerve
- Traumatic neuropathy with chorioretinal scarring (decreased visual acuity, visual field defect, afferent pupillary defect, color, and brightness).

Ankyloblepharon (Option B): This refers to the abnormal fusion of the eyelids, typically a congenital issue or sometimes a result of trauma leading to scarring of the eyelids.



Cycloiriditis (Option D): This is inflammation of the ciliary body and iris. While trauma can trigger this, it usually presents with pain, redness, and photophobia (sensitivity to light) in addition to blurred vision.

Reference :

Kanski's Clinical Ophthalmology, 10th Edition, Pages 914-921.

Learning Outcome :

PROVIDER

17.Question :

A farmer presents with fever and subconjunctival hemorrhage. The microscopic agglutination test turns to be positive. What is the diagnosis?

Option 1 :

Brucella

Option 2 :

Leptospira

Option 3 :

E coli

Option 4 :

Staph aureus

Correct option : 2

Solutions :

Correct Answer: B) Leptospira

Explanation: A farmer with fever and subconjunctival hemorrhage along with a positive microscopic agglutination test points toward**Leptospira infection (Leptospirosis).**

Leptospirosis:

Causative Agent	Leptospira interrogans (bacteria)
Transmission	• Zoonotic disease • **Indirect:** Contact with water, moist soil, or surfaces contaminated with animal urine. • **Direct:** Contact with urine or parturition products from infected animals.
Pathogenesis Phases	• **Septicemic Phase:** Entry through mucosa or skin, dissemination via bloodstream to organs. • **Immune Phase:** Antibodies develop, spirochetes disappear from blood; antigen-antibody complexes form, and renal colonization occurs.

PREPLADDER

Clinical Syndromes	• **Mild Anicteric Illness:** Seen in 90% of cases, flu-like symptoms with **fever**, headache, **conjunctival suffusion**, nausea, vomiting, and myalgia. • **Weil's Disease:** Severe icteric illness in 10% of cases; rapid progression, fatality rate of 5-15%.
Culture Media	• **Ellinghausen-McCullough-Johnson-Harris (EMJH)** medium is commonly used for culturing Leptospira species showing **Dinger's ring.**  • It is a semi-solid or liquid medium that supports the slow-growing leptospires, often requiring incubation for weeks. • **Specimen Sources:** Blood, urine, or cerebrospinal fluid (CSF) samples are often used, depending on the stage of infection. • Other culture media are **Korthoff and Fletcher.**

PREPADDER

Diagnosis	• **Microscopic Agglutination Test (MAT):** Considered the **gold standard for Leptospira detection**, MAT measures antibodies in serum samples. • The **Modified Faine's Criteria** used to aid in the diagnosis of leptospirosis, especially in endemic areas.This scoring system combines **clinical, epidemiological and laboratory data** to increase diagnostic accuracy. • **PCR (Polymerase Chain Reaction):** Provides a faster diagnosis by detecting leptospira DNA in blood or urine, especially effective in the early stage. • **ELISA**: Used for antibody detection and is helpful for confirming infection in the later stages.
Treatment	**Antibiotics**: Early antibiotic therapy is crucial and often involves: • **Doxycycline**: Typically used for mild cases and prophylaxis. • **Penicillin or Ampicillin:** Preferred for severe cases.

Brucella (Option A) causes undulant fever and hepatosplenomegaly but does not cause subconjunctival hemorrhage. The standard test is the serum agglutination test (SAT), not the microscopic agglutination test (MAT).
Escherichia coli (Option C) primarily causes gastrointestinal and urinary tract infections and is not associated with conjunctival hemorrhage, or a positive MAT.
Staphylococcus aureus (Option D) causes skin infections, pneumonia, and endocarditis but does not cause subconjunctival hemorrhage or a positive MAT, which is specific for Leptospira.

Reference :

Apurba S Sastry's Essentials of Microbiology, 3rd Edition, Page 320

https://pmc.ncbi.nlm.nih.gov/articles/PMC4995749/

Learning Outcome :

18.Question :

A patient presents with high blood pressure accompanied by a decrease in heart rate. What is the most likely physiological mechanism responsible for this response?

Option 1 :

Stimulation of baroreceptors

Option 2 :

Inhibition of baroreceptors

PREPLADDER

Option 3 :

Bezold-Jarisch reflex (J reflex)

Option 4 :

Stimulation of chemoreceptors

Correct option : 1

Solutions :

Answer: A) Stimulation of baroreceptors

Explanation:

The combination of **high blood pressure (hypertension) and bradycardia (low heart rate)** suggests activation of the **baroreceptor reflex**, a homeostatic mechanism that regulates blood pressure.

- **Mechanism:**
  - **Increased blood pressure** stretches **baroreceptors** in the **carotid sinus (CN IX) and aortic arch (CN X)**.
  - **Increased baroreceptor firing** signals the **medulla (nucleus tractus solitarius)**.
  - **Response:**
    - **Inhibition of sympathetic outflow → ↓ heart rate (bradycardia) and ↓ vasoconstriction**
    - **Activation of parasympathetic (vagal) tone** → further **↓ heart rate**

Baroreceptor Reflex

Aspect	Details
Mechanism	• Baroreceptors in the carotid sinus and the aortic arch detect BP changes • Increased BP stretches receptors, sending signals to medulla via glossopharyngeal and vagus nerves • Medulla inhibits vasoconstrictor center and stimulates vagal parasympathetic center
Actions	• Vasodilation of blood vessels • Decreased heart rate and contraction strength • Reduced BP due to lower peripheral resistance and cardiac output

PREPLADDER

Importance	• Maintains BP stability during activities like standing • Fastest acting • Tends to reset within 1-2 days for long-term regulation

This helps **counteract hypertension** and maintain homeostasis.

Inhibition of Baroreceptors (Option B) is incorrect because inhibition of baroreceptors occurs in **hypotension**, leading to **tachycardia and vasoconstriction** to restore blood pressure.

Bezold-Jarisch Reflex (Option C) is incorrect because this reflex causes **bradycardia and hypotension**, typically triggered by **ventricular ischemia or excessive vagal stimulation**, not hypertension.

Stimulation of Chemoreceptors (Option D) is incorrect because chemoreceptors (in the carotid bodies and medulla) primarily respond to **hypoxia, hypercapnia, or acidosis**, leading to **increased respiratory drive and sympathetic activation** (tachycardia), not bradycardia.

Reference :

Ganong's Review of Medical Physiology, 26th Edition, Page: 575, 576, 577,578, 579, 582, 583, 585, 586

Guyton and Hall Textbook of Medical Physiology, 14th Edition, Page 221, 222, 229, 236, 243, 244

Learning Outcome :

19.Question :

A 5-month-old baby is brought by the mother with complaints of the left upper eyelid moving up and down during breastfeeding or thumb sucking, which disappears when the baby is not being fed. What is the most likely diagnosis?

Option 1 :

Marcus Gunn Jaw-Winking Syndrome

Option 2 :

Lagophthalmos

Option 3 :

Myasthenia Gravis

PREPLADDER

Option 4 :

3rd CN palsy

Correct option :1

Solutions :

- **Marcus Gunn Jaw-Winking Syndrome** (also known as the jaw-winking reflex) is a congenital condition where there is an abnormal connection between the trigeminal nerve (supplying Lateral pterygoid) and the oculomotor nerve (supplying LPS).
- This results in the upper eyelid (ptosis) lifting when the jaw moves, such as during chewing, sucking, or other movements involving the jaw.
- The eye movement (or "winking") is typically unilateral and can occur during activities like breastfeeding or thumb-sucking, as in this case.
- This reflex is not present when the baby is not feeding, which is a key feature of this condition.

Congenital Ptosis: Associated with congenital weakness or maldevelopment of the levator palpebrae superioris (LPS) muscle.

Congenital ptosis probably results from a failure of neuronal migration or development with muscular sequelae secondary to this. A minority of patients have a family history.

Characteristic features:

- Drooping of one or both upper lids.
- Lid crease is either diminished or absent.
- Lid lag on downgaze due to tethering effect of abnormal LPS muscle.

Types of congenital ptosis:

1. Simple congenital ptosis:

- Unilateral or bilateral
- Non-progressive
- No fluctuation: Unlike myogenic ptosis, congenital ptosis does not worsen throughout the day or improve with rest.

2. Congenital ptosis with associated weakness of superior rectus muscle.

3. Blepharophimosis syndrome:

- Congenital ptosis
- Blepharophimosis

PREPLADDER

- Telecanthus
- Epicanthus inversus.

4. Congenital synkinetic ptosis (Marcus Gunn jaw-winking ptosis)

- Retraction of the ptotic lid with jaw movements due to stimulation of ipsilateral pterygoid muscle.
- It occurs due to trigemino-oculomotor synkinesis. The pathophysiology of Marcus Gunn Jaw winking phenomenon is a congenital misdirection of mandibular branch of trigeminal nerve, i.e., this synkinetic movement results from a congenital aberrant connection between motor branches of the trigeminal nerve controlling muscles of mastication and superior division of the oculomotor nerve controlling the levator palpebrae superioris.

Lagophthalmos (Option B): This condition is characterized by an inability to completely close the eyelids, usually due to facial nerve (VII) dysfunction or other causes of eyelid weakness.

Myasthenia Gravis (Option C): Myasthenia gravis typically presents with **fatigable weakness** of the muscles, including the eyelids (ptosis), which worsens with activity.

3rd CN Palsy (Option D): A third cranial nerve palsy typically causes **ptosis** (drooping of the eyelid) and **ocular motility issues** (like strabismus or limited eye movement).

Reference :

Kanski's Clinical Ophthalmology 9th edition page 77-78

Congenital ptosis

Learning Outcome :

20.Question :

A doctor asked the patient what her age is and she told him that she is married to an older man, and she has 2 kids of 15 and 18 years, and she is 39 years old. What is the disorder present?

Option 1 :

Derailment

Option 2 :

Circumstantial speech

Option 3 :

Flight of ideas

Option 4 :

Tangentiality

Correct option : 2

Solutions :

The patient was asked a direct question about her **age** but instead provided **excessive and unnecessary details** about her marriage and children before eventually reaching the point. This is characteristic of **circumstantial speech**, where the person **includes irrelevant details but eventually answers the question**.

Other Options:

Derailment (Option A): This refers to the **loosening of associations**, where the person's speech **lacks logical connection between ideas** and shifts randomly to unrelated topics. In this case, the response is still somewhat related to age, making derailment unlikely.

Flight of Ideas (Option C): Seen in **mania**, this involves **rapidly shifting from one topic to another**, often with **pressured speech** and little coherence. The patient's response does not exhibit this disorganized, racing thought pattern.
Tangentiality (Option D): In this disorder, the patient **never returns to the original question** and goes off on unrelated tangents. However, in **circumstantial speech**, the person eventually answers the question, which is seen in this case.

Reference :

Kaplan & Sadock's Synopsis of Psychiatry, 12th edition, Page no 1110

Learning Outcome

21.Question :

A patient has a history of a flying foreign body injury to the eye. Hemochromatosis is subsequently diagnosed. Which of the following substances is most likely involved in the deposition?

Option 1 :

Iron

PREPLADDER

Option 2 :

Aluminum

Option 3 :

Wood

Option 4 :

Glass

Correct option : 1

Solutions :

Hemochromatosis is a condition characterized by excessive iron accumulation in the body. In the context of a flying foreign body injury, if the foreign body were made of iron, it could lead to iron deposition in the affected tissues, contributing to the development of hemochromatosis.

Intraocular Foreign Bodies (IOFBs)	
Description	An IOFB can lodge in any part of the anterior or posterior segments, causing mechanical damage, infection, or toxic effects on intraocular structures.
Types	**Inert:** Glass, wood, plastic, rubber, gold, silver, platinum **Reactive:** Organic and Inorganic (iron causing siderosis, copper causing chalcosis).
Diagnosis	• History. • Examination (wound examination, foreign body location, associated signs such as lid laceration and anterior segment damage should be noted). • **CT (investigation of choice)** with axial and coronal cuts detects and localizes a metallic IOFB. • MRI is contraindicated (metallic IOFB).
Treatment	• Magnetic removal (metallic IOFB) • Forceps removal through pars plana vitrectomy • Prophylaxis against infection (topical/systemic antibiotics) • Conservative and supportive management (topical corticosteroids, analgesics, etc).

Modes of Damage:

PREPLADDER

1. **Mechanical Effects**
    - Depend on the size and velocity of the foreign body (FB).
2. **Introduction of Infection**
    - Metallic FB are usually sterile due to the heat generated on their emission.
    - Pieces of wood or stone carry a greater chance of infection, often leading to endophthalmitis.
3. **Reactions to a Foreign Body (FB)**
    - **Inert FB:** No reaction. **(Options C and D)**
    - **Lead & Aluminium:** Cause fibrosis **(Option B)**.
    - **Toxic Non-Metallic FB (Zinc, Copper, Mercury, Aluminium):** Incite suppuration.
    - **Siderosis (Iron FB - Degenerative Changes Due to Electrolytic Dissociation and Dissemination):**
        - **Earliest sign:** Deposition in the anterior capsule of the lens, appearing as a rusty ring (pathognomonic).
        - **Heterochromia iridis:** Hyperchromic.
        - **Visual loss:** Due to pigmentary retinal dystrophy.
        - **Secondary chronic glaucoma.**
        - **Diagnosis:** Prussian blue reaction.
    - **Chalcosis (Copper from Alloy Deposited on Membranous Structures):**
        - **Kayser-Fleischer Ring:** Deposition in Descemet's membrane (seen in Wilson's disease).
        - **Sunflower cataract.**
        - **No degenerative changes:** Visual prognosis is good.
    - **Caterpillar Hair:** Produces granulomatous iridocyclitis, known as **Ophthalmia Nodosa.**

Reference :

Yanoff and Duker Ophthalmology, 5th Edition, Pages 675-676.

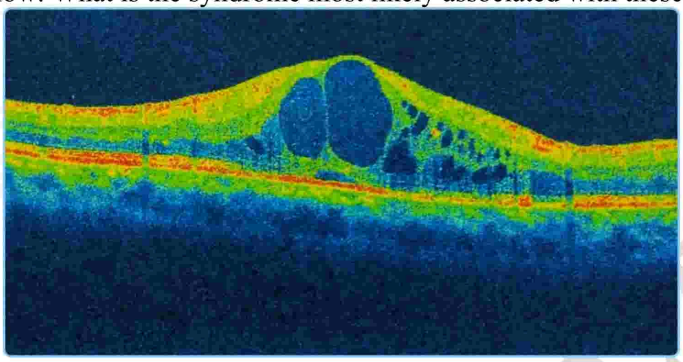
Kanski's Clinical Ophthalmology, 10th Edition, Pages 927-928.

Learning Outcome :

PREPLADDER

22.Question :

A patient presents with vision problems and has a history of cataract surgery. OCT finding is shown below. What is the syndrome most likely associated with these findings?



Option 1 :

Posner-Schlossman Syndrome

Option 2 :

Irvine-Gass Syndrome

Option 3 :

Central Serous Retinopathy

Option 4 :

Elschnig Pearls

Correct option : 2

Solutions :

- Irvine-Gass Syndrome, also known as cystoid macular edema (CME), is a condition commonly seen after cataract surgery.
- The OCT finding typically shows loss of foveal depression, cystoid spaces, and overall retinal thickening, which is indicative of this syndrome.

PREPLADDER

Cystoid Macular Edema (CME)

Etiology:

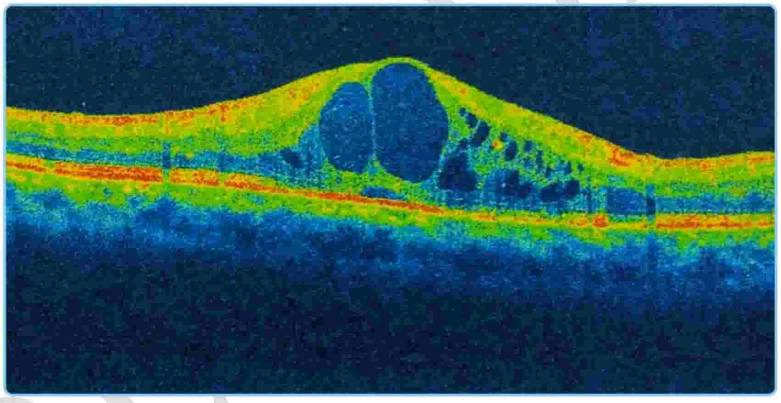
- **Ocular Treatment Complications:** Post-surgery (e.g., cataract extraction, retinal detachment surgery), ocular laser therapy, and topical ocular medications.
- **Retinal Vascular Disorders:** Diabetic retinopathy, central and branch retinal vein occlusion, retinal telangiectasia, and hypertensive retinopathy.
- **Intraocular Inflammations:** Pars planitis, uveitis.

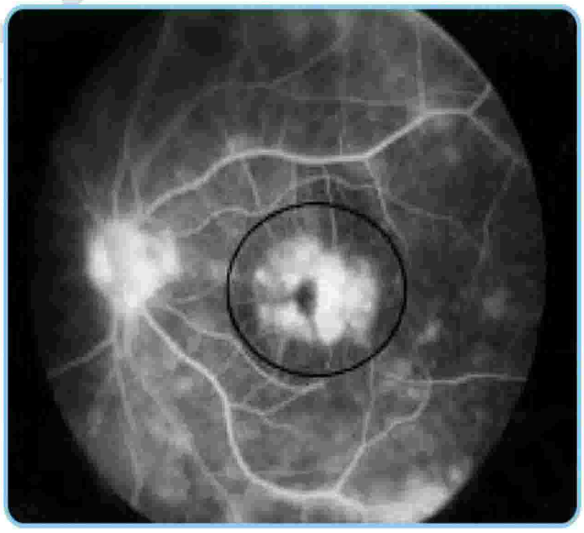
- **Retinitis pigmentosa.**
- **Vitreomacular Traction:** Associated with macular epiretinal membrane (ERM) and vitreomacular traction (VMT) syndrome.
- **Systemic Diseases:** Includes leukemia, chronic renal failure, and multiple myeloma.
- **Miscellaneous Causes:** niacin toxicity , PG analogues (risk factor for development of CME)

Clinical Features:

- **Visual Loss:** Initial minimal to moderate vision loss, potentially leading to permanent vision decrease if persistent.
- **Ophthalmoscopy:** Reveals loss of foveal contour, retinal thickening, a yellow spot at the fovea, and a **"honeycomb appearance" of the macula**.
- **Fluorescein Angiography:** Shows leakage and dye accumulation in the macular region, with a "flower petal appearance" in late frames.

Optical Coherence Tomography (OCT): Demonstrates loss of foveal depression, cystoid spaces, and overall retinal thickening.





PROVIDER

Complications:

- Long-standing CME may result in a **lamellar macular hole**.

Treatment:

- **Addressing the Cause:** Intravitreal anti-VEGF or photocoagulation for diabetic CME; discontinuing causative topical medications.
- **Topical NSAIDs:** Such as ketorolac, diclofenac, or profenac, are effective in preventing and treating CME.
- **Topical/Systemic Steroids:** Useful in established cases.
- **Systemic Carbonic Anhydrase Inhibitors (CAIs):** Oral acetazolamide may be beneficial, particularly in cases associated with retinitis pigmentosa.

Posner-Schlossman Syndrome (Option A): This involves high IOP and mild uveitis, but is not associated with macular edema as seen in Irvine-Gass Syndrome.

Central Serous Retinopathy (Option C): is characterized by "ink-blot" or "smoke-stack" leakage patterns on FFA, and neurosensory retinal and RPE detachment on OCT. CSR typically does not present with the cystoid pattern seen in CME.

Elschnig's Pearls (Option D): Clustered, vacuolated subcapsular epithelial cells along the posterior capsule.

DOWNLOADER

Reference :

AK Khurana Comprehensive Ophthalmology, 7th Edition, Pg. 303, 304, 305

Learning Outcome :

23.Question :

The cover-uncover test is performed to diagnose various eye conditions. Which of the following is not detected by this test?

Option 1 :

Latent Squint

Option 2 :

Manifest Squint

Option 3:

Lateral Nystagmus

Option 4 :

Amblyopia

Correct option : 4

Solutions :

Amblyopia, often called "lazy eye," is a condition where the vision in one eye is reduced because the brain favors the other eye. It can be caused by strabismus, but the cover-uncover test itself does not diagnose amblyopia

Cover-Uncover Test is used to differentiate between latent squint (heterophoria) and manifest squint (heterotopia).

- Cover test: Detects Heterotropia (Manifest Squint) **(Option B)**
- Uncover test: Detects Heterophoria (Latent Squint) **(Option A)**

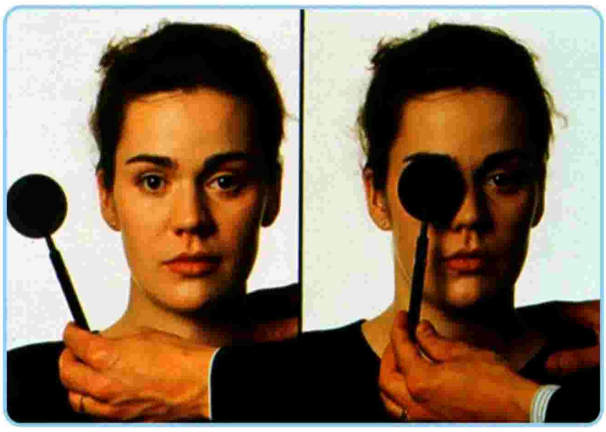
Cover-Uncover Test:

- The cover and uncover tests assess horizontal and vertical strabismus, but not torsional deviations. They also evaluate the ability of each eye to fixate on a target.

Cover Test:

- **Detects Tropias:** Measures constant deviations of the visual axis.
- **Procedure:**
    - Cover one eye with a paddle, thumb, or occluder.
    - Observe the uncovered eye for movement:

PREPLADDER



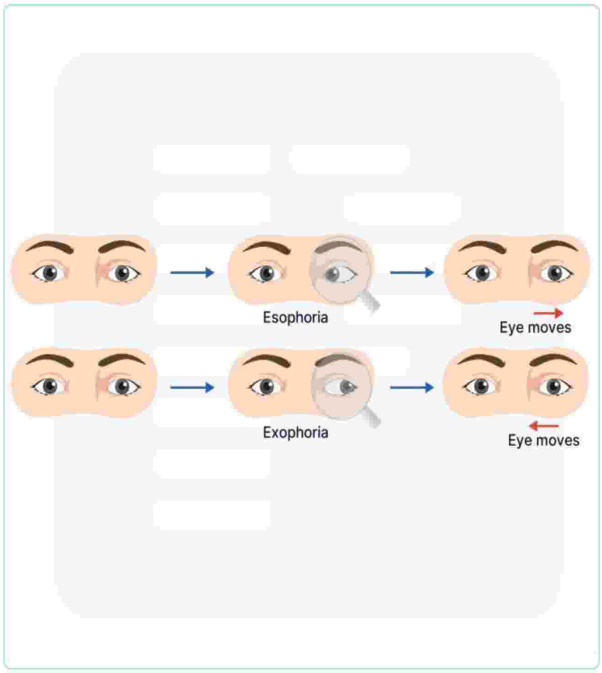
- Nasal movement: Exotropia
- Temporal movement: Esotropia
- Upward movement: Hypotropia
- Downward movement: Hypertropia

- For young children, use small toys instead of bright lights.
- Quantify the deviation with the simultaneous prism and cover test by introducing a prism before one eye until movement stops. Repeat with the prism before the other eye.

Uncover Test:

- Identifies **latent deviations or tropias.**
- **Procedure:**
    - Cover one eye and then observe the covered eye when the cover is removed.
    - If the eye reverts to fixation, it indicates a **phoria or intermittent tropia**.
    - If the eye remains deviated, it suggests a **tropia with fixation preference for the fellow eye.**

PREPLADDER



Alternate Cover Test: Detects phorias by dissociating the visual axes.

- Alternate covering each eye to maximize visual axis dissociation.
- Care must be taken to permit time for each eye to reside behind the cover (the cover must not be "fanned" before the eyes).
- Use prisms to quantify phorias or tropias. If measurements are unclear, estimate the midpoint between defined movements.

Lateral Nystagmus (Option C): Nystagmus is involuntary, rhythmic eye movements. The cover-uncover test might exacerbate nystagmus, though it is not the primary test for detecting it.

Reference :

Yanoff & Duker Ophthalmology, 5th edition, Pg - 1199,1200

Learning Outcome :

24.Question :

A 3-year-old child presents with epiphora, and probing reveals a soft block at 7 mm. What is the best treatment option for this condition?

Option 1 :

Endonasal Dacryocystorhinostomy (DCR)

Option 2 :

Conjunctival Dacryocystorhinostomy (DCR)

Option 3 :

External Dacryocystorhinostomy (DCR)

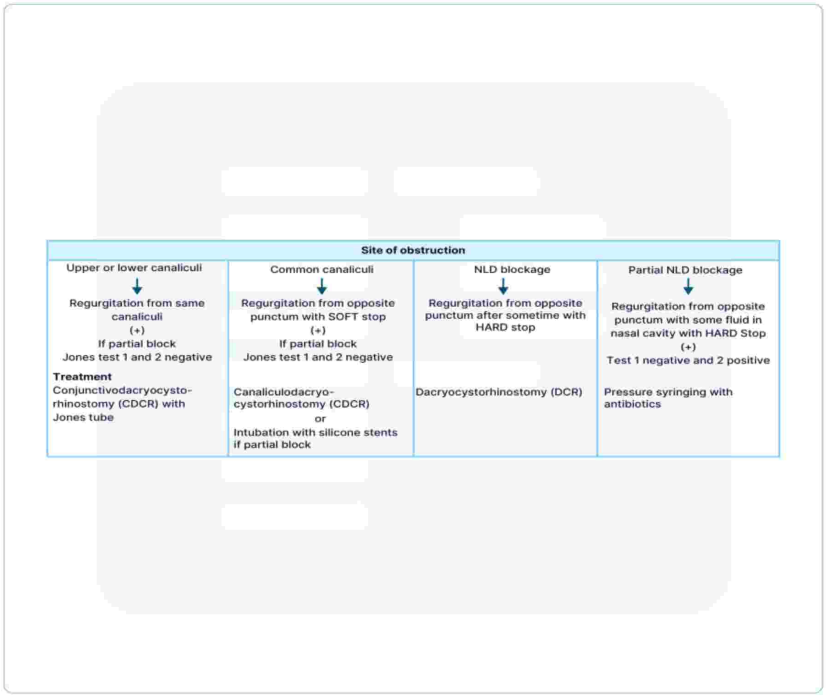
Option 4 :

Dacryocystectomy

Correct option : 2

Solutions :

- Epiphora (excessive tearing) and a **soft block** at 7 mm on probing indicate that the level of **obstruction is canalicular** (in the canaliculus, not the nasolacrimal duct).
- For canalicular obstruction, the preferred treatment is Conjunctival DCR (also known as **Lester Jones tube placement**). This procedure involves creating a bypass from the conjunctival sac to the nasal cavity using a glass tube (Lester Jones tube) to restore tear drainage.
- Conjunctival DCR is specifically designed for proximal obstructions (e.g., canalicular blocks), whereas Endonasal DCR or External DCR is used for distal obstructions (e.g., nasolacrimal duct blocks).



Endonasal Dacryocystorhinostomy (Option A): This is used for nasolacrimal duct obstructions, not for canalicular blockages.

External Dacryocystorhinostomy (Option C): This is more suitable for distal nasolacrimal duct obstructions and is not the first choice for canalicular obstructions.

Dacryocystectomy (Option D): This is a last-resort procedure used for chronic infections or tumors and is not indicated for a functional lacrimal system with a canalicular block.

Reference :

Parsons' Diseases of the Eye, 23rd Edition, Pg.1123,1124

Kanski's Clinical Ophthalmology 9th edition page 107, 108

Learning Outcome :

25.Question :

A patient presents with eyelid crusting and a thready sensation between the cornea and lids. What is the most likely diagnosis?

Option 1 :

Chronic Blepharitis

Option 2 :

Dry Eye Syndrome

Option 3 :

Meibomian Gland Dysfunction

Option 4 :

Conjunctivitis

Correct option :1

Solutions :

Chronic Blepharitis is an inflammation of the eyelid margins that can cause symptoms such as eyelid crusting and a thready sensation between the cornea and eyelids, often due to the accumulation of secretions along the lash line. The eyelids may feel gritty or have a foreign body sensation.

Bacterial blepharitis:

Definition	Chronic infection of the anterior part of the lid margin
Synonyms	• Chronic anterior blepharitis • Staphylococcal blepharitis

PREPLADDER

Causative Organisms	• **Most commonly Staphylococci (coagulase positive)** • Rarely Streptococci, Propionibacterium acnes, and Moraxella
Clinical Features	• Chronic irritation • Itching • Mild lacrimation • Gluing of cilia • Mild photophobia • Yellow crusts at the root of cilia • Small ulcers that bleed easily when crusts are removed • Red, thickened lid margins with dilated blood vessels • Mild papillary conjunctivitis and conjunctival hyperemia

Treatment	• Lid Hygiene:
	  ○ Warm compresses
	  ○ Cotton buds dipped in dilute baby shampoo or 3% sodium bicarbonate solution
	  ○ Avoid touching
	• Antibiotics
	• Topical Steroids
	• Ocular Lubricants

PREPLADDER

Dry Eye Syndrome (Option B): While dry eyes can cause a foreign body sensation, it typically does not cause eyelid crusting. Dry eye symptoms are more related to discomfort from insufficient tear production, but the crusting is not a hallmark feature.

Meibomian Gland Dysfunction (Option C): This condition can lead to dry eyes and eyelid discomfort due to insufficient oil production, but it doesn't usually cause eyelid crusting in the way that blepharitis does.

Conjunctivitis (Option D): Conjunctivitis (inflammation of the conjunctiva) causes symptoms such as redness, discharge, and itching

Reference :

Kanski's Clinical Ophthalmology 9th edition page 70-72

Learning Outcome :

26.Question :

An unvaccinated 5-year-old child of a migrant worker family was brought to the causality with fever and a characteristic skin rash. Upon eye examination, Bitot's spot was seen. What is the appropriate management?

Option 1 :

Isolate and give nutritional supply with vitamin A supplement

Option 2 :

Give measles vaccine and vitamin A supplement

Option 3 :

Institutional Isolation, nutritional management with vitamin A supplement

Option 4 :

Only measles vaccine

Correct option : 1

Solutions :

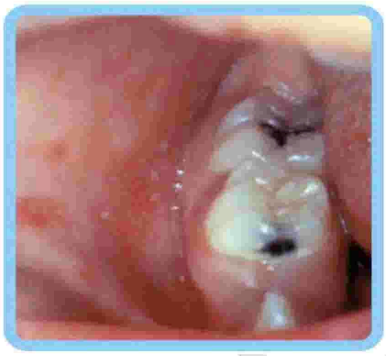
Correct Answer: A) Isolate and give nutritional supply with vitamin A supplement

Explanation:

The child has a fever and rash with cough and coryza with a non-immunised status which points to the diagnosis of measles. However, the presence of Bitot's spot also shows vitamin A deficiency. Hence, the management here is **isolation of the child, and nutritional management with vitamin A supplementation.**

Aspects	Description
Causative agent	Measles (rubeola) is a highly communicable childhood exanthematous illness caused by the measles virus, an **RNA virus** from the **Paramyxoviridae family.**
Transmission	Contact with droplet aerosols (through the respiratory tract or conjunctiva)
Pathogenesis	**Primary viremia** occurs, resulting in infection of the reticuloendothelial system, followed by **secondary viremia,** which results in systemic symptoms.
Incubation period	8-12 days

PREPLADDER

Period of infectivity	From 3 days before to 4 days after the rash onset.
Clinical manifestations	• Common in preschool children • **Prodromal phase: Fever** (before rash), rhinorrhea, conjunctival congestion and a **dry hacking cough**. • **Koplik spots**, pathognomonic for measles, appear on the 2nd or3rd day of illnessas grey-white, sand-like lesions with surrounding erythema on the buccal mucosa opposite the lower second molars. 
Rash	The erythematous maculopapular rash in measles appears on the 4th day, starting behind the ears, along the hairline, and posterior cheeks, then spreading to the rest of the body over the next 2-3 days.
Management	**Isolation**. **Symptomatic and conservative** (antipyretics, maintenance of hygiene, **ensuring adequate fluid and caloric intake**, and humidification).

Treatment of vitamin A deficiency:

Age Group	Treatment
Under 6 months	50,000 IU once daily on D1, D2, and 4 weeks later
6 to 12 months	100,000 IU once daily on D1, D2, and 4 weeks later
Over 1 year	200,000 IU once daily on D1, D2, and 4 weeks later

Giving a measles vaccine and vitamin A supplement (Option B) or only a measles vaccine (Option D)is not appropriate since the child is already suffering from measles.

PRELOADER

Institutional Isolation, nutritional management and vitamin A supplement (Option C): Institutional isolation is unnecessary in this case since the child does not have any general danger signs, respiratory distress or pneumonia.

Reference :

Nelson Textbook of Pediatrics, 21st Edition, Page 364, 1670-1675

O.P. Ghai Essential Pediatrics, 10th Edition,Page 101, 102, 230, 231, 232

WHO Treatment for Vit A Deficiency

RETINOL = VITAMIN A oral | MSF Medical Guideline

Learning Outcome :

27.Question :

A patient presents with proptosis that increases when bending down. What is the most likely diagnosis?

Option 1 :

Orbital Varices

Option 2 :

Thyroid Eye Disease

Option 3 :

Cavernous Sinus Thrombosis

Option 4 :

Orbital Cellulitis

Correct option : 1

Solutions :

Orbital Varices are abnormal dilations of veins in the orbit. They often present with proptosis (bulging of the eye) that can worsen with increased venous pressure, such as when the patient bends down or performs actions that increase intra-abdominal or intra-thoracic pressure.

Causes of intermittent proptosis:

- **Orbital varix**
- Periodic orbital oedema
- Recurrent orbital hemorrhage
- Highly vascular tumors

PREPLADDER

Orbital Varices	
Dilated venous channels in the orbit (part of the spectrum of developmental venous anomalies)	
Clinical features	Most cases are unilateral and the most frequent site is upper nasal. Slowly progressive **intermittent proptosis** which worsens with head position changes, bending forward, or Valsalva maneuver.
Pathology	May involve one large vessel or multiple ectatic veins with fibrotic walls. Thrombosed lumens can contain phleboliths from calcified thrombi.
Imaging	**CT** - serpiginous, dense structures that enlarge with Valsalva, **enhances with contrast** administration. **MRI** - T1 images show low isointense signal, T2 shows dark signal void from flowing blood. Enhancement with Gadolinium is marked, except in areas of thrombosis.
Treatment	**No treatment** needed for mild symptoms; **Surgical or embolization** options for severe cases.
Prognosis	**Good** unless large lesions compress the optic nerve, risking vision loss.

Thyroid Eye Disease (Option B): This condition typically causes bilateral proptosis due to inflammation and fibrosis of the extraocular muscles. While proptosis occurs, it does not usually worsen with bending down and is often associated with thyroid dysfunction. It has a more gradual onset compared to conditions like orbital varices.

Cavernous Sinus Thrombosis (Option C): This serious condition presents with painful proptosis, usually accompanied by headache, cranial nerve palsies, and vision changes. Proptosis does not typically worsen with bending down, and the condition is associated with acute symptoms and systemic signs of infection.

Orbital Cellulitis (Option D): This is an infection of the orbit, causing painful proptosis, redness, and swelling, often accompanied by fever. Pr

Reference :

Yanoff and Duker Ophthalmology, 5th edition, Page 1328

Kanski's Clinical ophthalmology, 9th edition, Page 135

PREPLADDER

Learning Outcome :

28.Question :

Which of the following describes the chloride ion exchange in red blood cells, where bicarbonate ions are exchanged for chloride ions to maintain electrical neutrality?

Option 1 :

Haldane effect

Option 2 :

Root effect

Option 3 :

Bohr effect

Option 4 :

Chloride shift

Correct option : 4

Solutions :

Answer: D) Chloride shift

Explanation:

The **chloride shift**, also known as the **Hamburger effect**, is the process by which **bicarbonate (HCO_3^-) exits red blood cells (RBCs) in exchange for chloride (Cl^-) ions**, maintaining **electrical neutrality**.

- **Mechanism:**
  - **In peripheral tissues**, CO_2 diffuses into RBCs and reacts with water, catalysed by **carbonic anhydrase**, forming **HCO_3^- and H^+**.
  - **HCO_3^- is transported out of the RBC** into the plasma via the **band 3 protein** in exchange for **Cl^-**.
  - This shift **maintains ionic balance** and facilitates **CO_2 transport in the blood**.
  - **In the lungs**, the process **reverses**, allowing CO_2 exhalation.

Chloride shift (Hamburger phenomenon) vs Reverse chloride shift:

PREPLADDER

Feature	Chloride shift	Reverse chloride shift
Location	Tissues	Lungs
Process	CO_2 enters RBCs, forming $H_2CO_3 \rightarrow H^+ + HCO_3^-$. HCO_3^- exits in exchange for Cl^-	CO_2 exits RBCs. HCO_3^- re-enters RBCs in exchange for Cl^-
Effect on RBCs	Chloride influx causes water influx, swelling RBCs	Chloride efflux balances HCO_3^- re-entry, CO_2 is released
Impact on haematocrit	Increases hematocrit due to RBC swelling	Primarily facilitates CO_2 release, indirectly affecting hematocrit

Haldane Effect (Option A) is incorrect because it describes **increased CO_2 binding to haemoglobin in deoxygenated blood**, enhancing **CO_2 transport**.

Root Effect (Option B): Incorrect because it refers to a **reduction in hemoglobin's O_2 carrying capacity in acidic conditions.**

Bohr Effect (Option C) is incorrect because it refers to **the effect of CO_2 and H^+ on oxygen affinity**, where **increased CO_2 lowers haemoglobin's oxygen affinity**, promoting **O_2 unloading in tissues**.

Reference :

Guyton and Hall Textbook of Medical Physiology, 14th edition, Page 528, 529

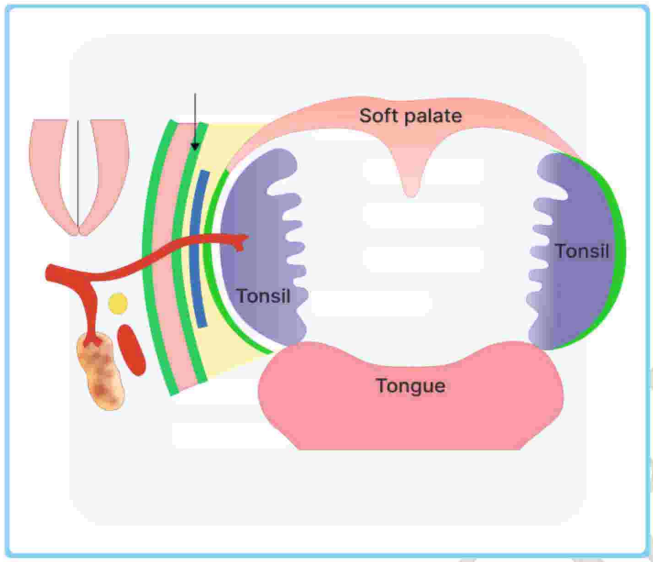
Ganong's Review of Medical Physiology, 26th Edition, Pages 632, 633

Learning Outcome :

29.Question :

Identify the structure marked in the image given below.

PREPLADDER



Option 1 :

Buccopharyngeal fascia

Option 2 :

Capsule

Option 3 :

Superior constrictor muscle

Option 4 :

Pharyngobasilar fascia

Correct option : 4

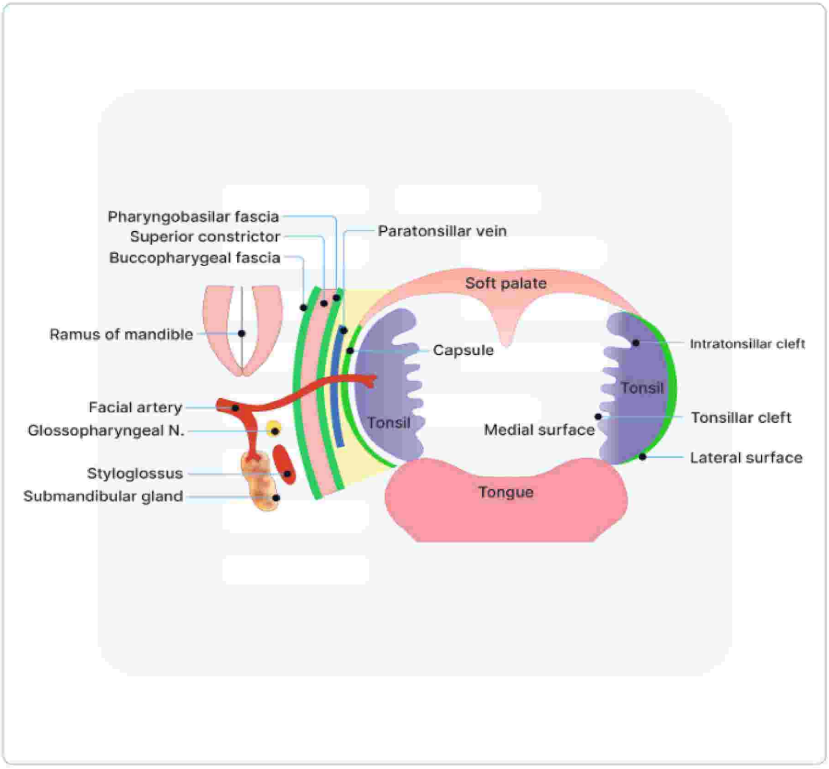
Solutions :

Correct Answer: D) Pharyngobasilar fascia

Explanation:

The arrow in the image points to the pharyngobasilar fascia.

PREPLADDER



Structures forming the Tonsillar bed	
Muscles forming the tonsillar bed	• Superior Constrictor Muscle • Styloglossus Muscle
Structures close to the tonsillar bed (outside the superior constrictor muscle)	• Facial Artery (Tonsillar Branch): Major blood supply to the tonsils, at risk for haemorrhage during surgery. • Paratonsillar Vein: Venous drainage of the tonsil, risk of bleeding during tonsillectomy. • Submandibular Salivary Gland • Posterior Belly of Digastric Muscle • Medial Pterygoid Muscle • Mandible • Glossopharyngeal Nerve: Provides sensory innervation to the tonsils.

PREPLAB

Reference :

Diseases of Ear, Nose, Throat, PL Dhingra, 8th Edition, Page 303, 304

Learning Outcome :

30.Question :

A patient presents with fever, neck rigidity, headache, vomiting, and petechial rashes on the lower limbs. What is the most likely causative organism?

Option 1 :

Neisseria meningitidis

Option 2 :

Clostridium perfringens

Option 3 :

Cryptococcus neoforman

Option 4 :

Clostridium difficile

Correct option :1

Solutions :

Correct Answer: A) Neisseria meningitidis

Explanation: The patient's clinical features of fever, neck rigidity, headache, vomiting, and petechial rashes on the lower limbs point toward **meningococcal meningitis** caused by **Neisseria meningitidis.**

ClinicalFeatures of Neisseria meningitidis:

- **Rashes:Non-blanching rash** (**petechial** or purpuric) develops in more than 80% of cases.
- **Septicemia:**
    - Attributed to endotoxin-induced endothelial injury.
    - Leads to increased vascular permeability and intravascular thrombosis.
- **Waterhouse-Friderichsen syndrome:**
    - Severe form of fulminant meningococcemia.

PREPLADDER

- Characterized by large purpuric rashes (purpura fulminans), shock, disseminated intravascular coagulation (DIC), bilateral adrenal hemorrhage, and multiorgan failure.

- **Pyogenic meningitis:**
  - Commonly affects young children (3-5 years of age).
  - Presentation includes **fever, vomiting, headache, and neck stiffness.**
  - Similar to other bacterial meningitis but with the **presence of rashes.**
- **Chronic meningococcemia:**
  - Rare condition.
  - Characterized by repeated episodes of petechial rashes, fever, arthritis, and splenomegaly.
- **Postmeningococcal reactive disease:**
  - Develops 4-10 days later due to immune complexes (capsular antigens and their antibodies).
  - Manifestations include arthritis, rash, iritis, pericarditis, polyserositis, and fever.

Lab Investigations of Neisseria meningitidis:

Investigation	Findings
Cerebrospinal Fluid (CSF) Analysis	
• **Appearance**	Cloudy or purulent
• **White Blood Cell Count (WBC)**	Elevated (pleocytosis), typically >1,000 cells/μL, with predominance of neutrophils
• **Protein**	Elevated
• **Glucose**	Decreased
• **Gram Stain**	Presence of gram-negative diplococci
• **Culture**	Growth of Neisseria meningitidis on chocolate agar or Thayer-Martin agar
• **Polymerase Chain Reaction (PCR)**	Detection of Neisseria meningitidis DNA
• **Latex Agglutination Test**	Positive for Neisseria meningitidis antigens
Blood Tests	

PREPLADDER

• **Culture**	Growth of Neisseria meningitidis
• **White Blood Cell Count**	Elevated leukocytosis with left shift

Clostridium perfringens (Option B)causes gas gangrene and food poisoning, not meningitis with petechial rash.

Cryptococcus neoformans (Option C)is typically seen in immunocompromised patients (e.g., HIV) and presents with chronic meningitis without petechial rash.

Clostridium difficile (Option D) causes antibiotic-associated diarrhea and pseudomembranous colitis, not meningitis

Reference :

Apurba Sastry's Essentials of Medical Microbiology, 2nd Edition, Page 693,694,697

Learning Outcome :

31.Question :

According to the American Heart Association (AHA), what is the 6th link added to the chain of survival?

Option 1 :

Rapid defibrillation

Option 2 :

Recovery and rehabilitation

Option 3 :

High-quality CPR

Option 4 :

Advanced airway management

Correct option : 2

Solutions :

Correct Answer: B) Recovery and rehabilitation

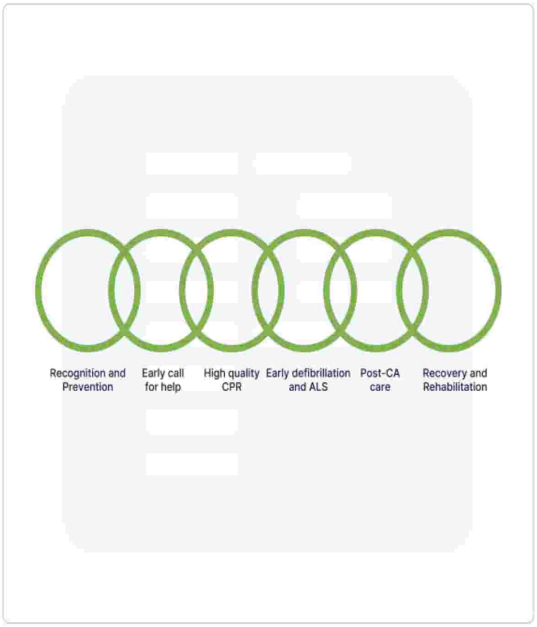
Explanation:

PREPLADDER

The **American Heart Association (AHA)** has expanded the **Chain of Survival** concept by adding a sixth link: **recovery and rehabilitation**. This addition reflects the growing recognition that survival extends **beyond the immediate resuscitation period**.

The complete AHA Chain of Survival now includes:

- Early recognition and activation of emergency response
- Early CPR with an emphasis on chest compressions
- Rapid defibrillation
- Advanced life support
- Post-cardiac arrest care
- Recovery/rehabilitation



Rapid defibrillation(Option A) is already included as the third link. Rapid defibrillation remains a critical component for improving survival in cardiac arrest, particularly for shockable rhythms like ventricular fibrillation and pulseless ventricular tachycardia.

High-quality CPR (Option C) constitutes the second link. The AHA emphasizes the importance of proper chest compression depth, rate, allowing full chest recoil, and minimizing interruptions in CPR to optimize outcomes.

Advanced airway management(Option D) is part of the fourth link (advanced life support) in the Chain of Survival. While airway management is an important component of resuscitation, the AHA guidelines emphasize that it should not interfere with or delay other critical interventions such as chest compressions and defibrillation.

Reference :

American Heart Association Guidelines for Cardiopulmonary Resuscitation, 2020 Edition, Page 42-44

https://pmc.ncbi.nlm.nih.gov/articles/PMC11234005/

Learning Outcome :

32.Question :

A lady presents to the hospital after having a fight with her husband. She reports that she is unable to speak However, all neurological and physical examinations are normal, and she does not seem concerned about her health status, What is the most likely diagnosis?

Option 1 :

Malingering

Option 2 :

La belle indifférence

Option 3 :

Adaptation

Option 4 :

Somatic symptom

Correct option : 2

Solutions :

Explanation:

The patient presents with an **inability to speak (mutism) after an emotional conflict** with her husband. Despite this, **neurological and physical examinations are normal**, and she **does not seem concerned about her symptoms**. This lack of distress about a serious symptom is known as **"La belle indifférence"**, which is often seen in **conversion disorder (functional neurological symptom disorder)**. It reflects an apparent indifference to significant neurological symptoms like paralysis, blindness, or mutism that have no medical cause.

Other Options:

Malingering (Option A): In malingering, the patient **intentionally fakes or exaggerates symptoms for external gain**, such as financial compensation or avoiding responsibilities. In this case, the patient does not appear to have an external motive.

PREPLADDER

Adaptation (Option C): Adaptation refers to a normal psychological adjustment to stress or changes in life. The patient's inability to speak suggests a **conversion disorder**, not a normal adaptive response.

Somatic symptom disorder (Option D): This condition involves **excessive distress and anxiety about physical symptoms**, often leading to frequent medical visits. However, the patient in this case **shows no concern about her condition**, which is characteristic of **La belle indifférence**.

Reference :

Kaplan & Sadock's Synopsis of Psychiatry, 12th edition, Pg 234

Learning Outcome :

33.Question :

A person came with the H/o thorn prick a week ago. A few days later, he developed ulcers along lymphatic drainage. Choose the correct organism.

Option 1 :

Coccidioides immitis

Option 2 :

Aspergillus flavus

Option 3 :

Sporothrix schenckii

Option 4 :

Trichophyton rubrum

Correct option : 3

Solutions :

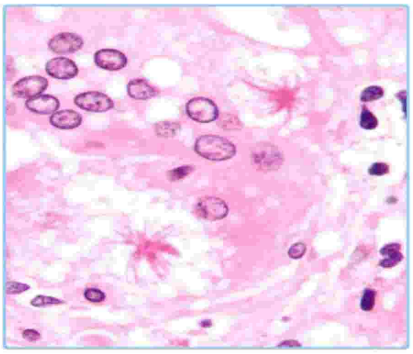
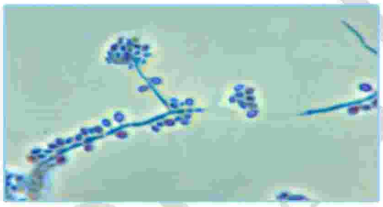
Correct Answer: C) Sporothrix schenckii

Explanation: The patient's history of a thorn prick followed by ulcerative lesions along lymphatic drainage suggests**sporotrichosis**, a subcutaneous fungal infection caused by **Sporothrix schenckii.**

PREPLADDER

Sporotrichosis	
Causative agent	Dimorphic fungus Sporothrix schenckii.
Epidemiology	Common in **gardeners**, forest workers, and manual labourers.
Route of Transmission	Minor trauma or **thorn prick.**
Clinical features	• Chronic infection affects cutaneous, subcutaneous, and **lymphatic tissue.** • Lesions form at sites of minor trauma or thorn pricks, starting as nodules. • Nodules **ulcerate** and necrose; infection **spreads through lymphatic channels.**  • **Lymphocutaneous sporotrichosis:** Secondary ulcers on lymph nodes; lymphatics become hardened and cord-like. • **Systemic dissemination:** Can affect bones, joints, and meninges.
Specimens	Aspiration from nodules and biopsy material.

PREREADER

Diagnosis	**Microscopy:** • KOH mounts or histopathological sections stained by methenamine silver stain show **asteroid bodies (Splendore hoeppli phenomenon)**  • **Yeast phase: Cigar-shaped cells. (Option C)** **Culture:** Thin septate hyphae with flower-like clusters of small conidia; **pear-shaped conidia in rosette-like clusters** in mycelial phase.  **Serological tests:** Helpful for extracutaneous or systemic infections.
Treatment	Medications: • Itraconazole • Terbinafine • Amphotericin B: For disseminated infection Cryotherapy.

PREPLADDER

Coccidioides immitis (Option A) causes valley fever (coccidioidomycosis), primarily a respiratory illness, not associated with lymphatic ulcer spread.

Aspergillus flavus (Option B) causes invasive aspergillosis, primarily affecting immunocompromised individuals. It does not cause lymphatic ulcers following trauma. Instead, it is associated with lung infections and aflatoxin production (hepatotoxicity).

Trichophyton rubrum (Option D) is a dermatophyte that causes superficial fungal infections such as tinea, onychomycosis, and athlete's foot, not deep tissue involvement with lymphatic spread.

Reference :

Ananthanarayan & Paniker's Textbook of Microbiology, 6th Edition, Page 606,607, 610, 611, 612

Learning Outcome :

34.Question :

A 55-year-old man presents to the hospital with auditory hallucinations and inability to recognize his own family members. He reports his last alcohol intake was 48 hours ago. What is the most likely diagnosis?

Option 1 :

Delirium tremens

Option 2 :

Alcoholic hallucinosis

Option 3 :

Alcohol-induced psychosis

Option 4 :

Schizophrenia

Correct option : 1

Solutions :

The patient presents with **auditory hallucinations and confusion (inability to recognize family members) occurring 48 hours after his last alcohol intake**. This strongly suggests **delirium tremens (DTs)**, a severe form of **alcohol withdrawal syndrome** that typically occurs **48–96 hours** after stopping alcohol. DTs are characterized by **altered mental status (confusion, disorientation), hallucinations, autonomic instability (tachycardia, hypertension, fever), and severe agitation**.

Alcohol Withdrawal- Clinical features

Stage	Symptoms	Onset after last drink

PREPLADDER

Minor withdrawal	• Mild anxiety • Tremulousness • Nausea • Headache • Palpitations	6-12 hours
Alcoholic hallucinosis (Option B)	• Visual, auditory, or tactile hallucinations • Intact orientation • Normal vital signs	12-24 hours
Withdrawal seizures	• Generalized tonic-clonic seizures • Usually brief and self-limited • Also known as rum fits	24-48 hours
Delirium tremens	• Severe agitation • Confusion and disorientation • Hallucinations (often visual) • Autonomic hyperactivity (tachycardia, hypertension, fever) • Profound sweating • Tremors • Insomnia	48-96 hours

PREPLADDER

Other Options:

Alcohol-induced psychosis (Option C): This condition refers to **persistent psychotic symptoms (hallucinations, delusions) due to chronic alcohol use**, rather than withdrawal. The key difference is that alcohol-induced psychosis is **not associated with autonomic instability or withdrawal timing**.

Schizophrenia (Option D) is a **chronic psychiatric disorder** with persistent **hallucinations, delusions, and disorganized thought processes**. However, the **sudden onset following alcohol cessation** makes an alcohol-related withdrawal syndrome far more likely.

Reference :

Kaplan & Sadock's Synopsis of Psychiatry, 12th edition, Pg 654

Learning Outcome :

35.Question :

Which of the following factors causes a rightward shift in the oxygen-hemoglobin dissociation curve?

Option 1 :

Increase in CO_2

Option 2 :

Increase in O_2

Option 3 :

Decrease in CO_2

Option 4 :

Decrease in temperature

Correct option :1

Solutions :

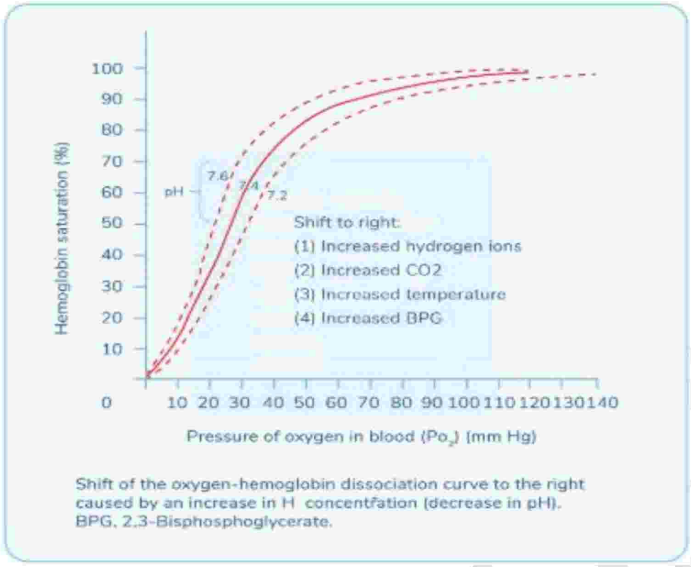
Correct Answer: A) Increase in CO_2

Explanation:

A **rightward shift** in the **oxygen-haemoglobin dissociation curve** means **reduced oxygen affinity**, facilitating **oxygen unloading to tissues**. This occurs in conditions where tissues require more oxygen, such as **exercise or metabolic activity**.

- **Factors causing a rightward shift (Bohr effect):**
  - ↑ **CO_2:** Increases **carbonic acid (H_2CO_3) formation**, lowering pH and promoting oxygen release.
  - ↑ **H^+ (↓ pH):** Acidic conditions reduce haemoglobin's oxygen affinity.
  - ↑ **Temperature:** Higher metabolic activity increases oxygen demand.
  - ↑ **2,3-BPG (DPG):** Enhances O_2 unloading by stabilising the **deoxygenated form** of haemoglobin.

PREPLADDER



Shift of the oxygen-hemoglobin dissociation curve to the right caused by an increase in H concentration (decrease in pH). BPG, 2,3-Bisphosphoglycerate.

Bohr Effect	A shift of the oxygen-hemoglobin dissociation curve to the right in response to increases in blood CO2 and H+ levels has a significant effect by enhancing the release of O2 from the blood in the tissues and enhancing oxygenation of the blood in the lungs
Mechanism	• Increase in CO_2: CO_2 diffuses from tissues into the blood, forming carbonic acid (H_2CO_3), dissociating into H+ and HCO_3-. This increase in H+ lowers blood pH. • Decrease in pH: Lower pH shifts the oxygen-haemoglobin dissociation curve to the right, causing haemoglobin to release O2 more readily.
Effects in Tissues	Higher CO2 and lower pH cause haemoglobin to release O2, delivering more O2 to metabolically active tissues.
Effects in Lungs	Expelling CO2 in the lungs decreases blood CO2 levels and increases pH, shifting the dissociation curve to the left and allowing haemoglobin to bind O2 more readily for transport.
Factors Influencing the Bohr Effect	• Increased CO2 concentration • Increased blood temperature • Increased 2,3-bisphosphoglycerate (BPG) concentration: BPG binds to haemoglobin, reducing its affinity for O2 and promoting O2 release.

Increase in O_2 (Option B) is incorrect because higher O_2 levels promote **oxygen binding** rather than a rightward shift.

PREPLADDER

Decrease in CO_2 (Option C) is incorrect because **low CO_2** leads to **higher pH**, causing a **leftward shift** (increased O_2 affinity, reduced unloading).

Decrease in Temperature (Option D) is incorrect because **low temperature stabilises haemoglobin's oxygen-binding state**, shifting the curve **leftward**.

Reference :

Ganong's Review of Medical Physiology, 26th Edition, Page 630-631

Guyton and Hall Textbook of Medical Physiology, 14th edition, Page 526

Learning Outcome :

Factors Influencing the Bohr Effect for the right side shift of curve :

- Increased CO2 concentration
- Increased blood temperature
- Increased 2,3-bisphosphoglycerate (BPG) concentration: BPG binds to haemoglobin, reducing its affinity for O2 and promoting O2 release.

36.Question :

In the jugular venous pressure (JVP) waveform, the "a" wave corresponds to:

Option 1 :

Right Atrial contraction

Option 2 :

Tricuspid valve bulging into Right atria

Option 3 :

Right Atrial relaxation

Option 4 :

Right atrial filling

Correct option :1

Solutions :

Correct Answer: A) Right Atrial contraction

Explanation:

The **"a" wave** in the **jugular venous pressure (JVP) waveform** corresponds to **right atrial contraction**.

PREPLADDER

- **Mechanism:**
    - During the right **atrial systole**, blood is pushed into the **right ventricle**, causing a transient increase in **right atrial pressure**, which is reflected as the **"a" wave** in the JVP.
    - This occurs **just before the first heart sound (S1)** and the **QRS complex** on ECG.

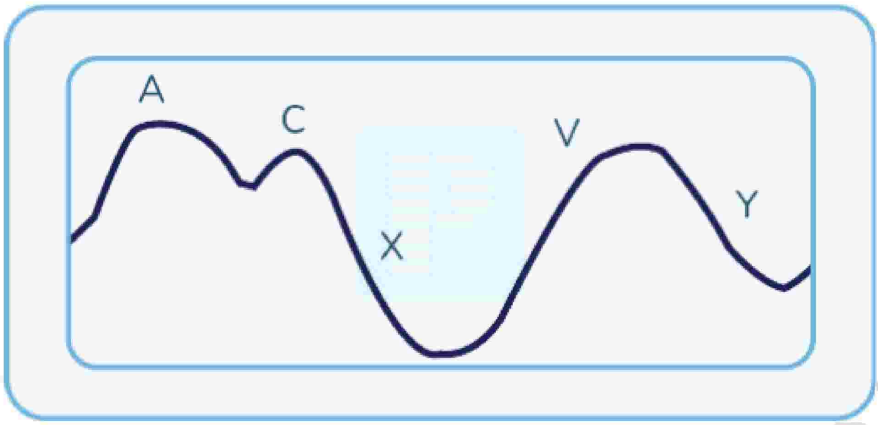
Jugular Venous Pressure (JVP) Waveform:

a wave	• Caused by atrial systole. • Atrial contraction results in a temporary halt in venous inflow. • Some blood flows back into the veins, causing a rise in venous pressure.
c wave	• Arises from the increase in atrial pressure during isovolumetric ventricular contraction. • Pressure is transmitted through the closed and bulging tricuspid valve.
x descent	• Ventricular systole pulls the tricuspid valve down
v wave	• Corresponds to the rise in atrial pressure as blood fills the atria. • Occurs during diastole while the tricuspid valve is still closed.
y descent	• Opening of tricuspid valve causing emptying of right atrium into ventricle

Respiration Influence:

- Venous pressure decreases during inspiration due to negative intrathoracic pressure.
- Venous pressure rises during expiration.

PREPLADDER



Tricuspid valve bulging into the right atria (Option B) is incorrect because this corresponds to the **"c" wave**, which occurs when the tricuspid valve bulges into the atrium during **isovolumetric ventricular contraction**.

Right atrial relaxation (Option C) is incorrect because this occurs after the **"a" wave** and corresponds to the **"x" descent** in the JVP waveform.

Right atrial filling (Option D) is incorrect because this corresponds to the **"v" wave**, which represents **venous return filling the right atrium against a closed tricuspid valve**.

Reference :

Ganong's Review of Medical Physiology, 26th Edition, Page: 531

Learning Outcome :

37.Question :

A 3-month-old child has a respiratory rate of 56/min with no chest indrawing and no danger signs. As per IMNCI what is the most appropriate diagnosis?

Option 1 :

Pneumonia

Option 2 :

Cold and cough

Option 3 :

Severe Pneumonia

Option 4 :

Allergy

PREPLADDER

Correct option :1

Solutions :

Correct Answer: A) Pneumonia

Explanation:

The fast breathing and no other danger signs represent **pneumonia** as per the IMNCI classification.

Assessment and Classification of the Sick Child (Age 2 Months Up to 5 Years)

- Initial Assessment: A thorough history from the mother is essential
- Check for General Danger Signs:

	Look	Action
• Able to drink or breastfeed? • Does the child vomit everything? • H/O convulsions during this illness?	• Lethargic or unconscious? • Currently convulsing?	• If any danger signs are present, the child needs URGENT attention.

- Assess Cough or Difficulty Breathing:
    - Ask: How long has the child had a cough or difficulty breathing?
    - Look, Listen, Feel: Count the breaths in one minute (use respiratory rate timers if available).
    - **Fast Breathing Criteria:**
        - **Age 2 months up to 12 months: Fast breathing is 50 breaths per minute or more.**
        - Age 12 months up to 5 years: Fast breathing is 40 breaths per minute or more.
- Look for chest indrawing
- Look and listen for stridor, wheeze
- Check for central cyanosis
- Check oxygen saturation
- Check the AVPU scale (Alert, Voice, Pain, Unresponsive)
- Assess for possible asthma/TB if wheezing with chest in-drawing or fast breathing is present.

PREPLADDER

Classify the condition:

Classification	Signs	Treatment
Severe Pneumonia or Very Severe Disease (Option C)	• Any general danger sign OR • Oxygen saturation <90% • Stridor in calm child • Central cyanosis • Convulsions • AVPU = V, P, or U	• Start oxygen therapy if saturation < 90%. • Administer Benzyl Penicillin & Gentamicin. • Give diazepam if convulsing. • Prevent low blood sugar. • Treat wheeze if present. • Urgent referral or admission.
Pneumonia (Option A)	• Chest indrawing in calm child OR • **Fast breathing** AND • **No signs of severe pneumonia**	• Administer Amoxicillin Dispersible Tablet. • Give Vitamin A. • Treat wheeze if present. • Follow up in 5 days • Advise on immediate return signs.
No Pneumonia: Cough or Cold	No signs of pneumonia or very severe disease	• Treat wheeze if present - salbutamol for 5 days • Advise on immediate return signs.

Options B and Dare incorrect.

Reference :

1. https://platform.who.int/docs/default-source/mca-documents/policy-documents/operational-guidance/KEN-CH-20-01-OPERATIONALGUIDANCE-2017-eng-IMNCI-Guidelines-Healthcare-Providers.pdf
2. Nelson Textbook of Pediatrics, 21st Edition, Page 2268
3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7090409/

PREPLADDER

Learning Outcome :

38.Question :

What is the mechanism of action of botulinum toxin?

Option 1 :

Inhibits acetylcholine release from the presynaptic terminal

Option 2 :

Inhibits acetylcholine reuptake

Option 3 :

Blocks the postsynaptic acetylcholine receptor

Option 4 :

Inhibits acetylcholinesterase

Correct option :1

Solutions :

Correct Answer: A) Inhibits acetylcholine release from the presynaptic terminal

Explanation:

Botulinum toxin prevents **acetylcholine (ACh) release** at the **neuromuscular junction**, leading to **flaccid paralysis**.

- **Mechanism of Action:**
  - **Botulinum toxin cleaves SNARE proteins (SNAP-25, synaptobrevin, syntaxin)**, which are essential for **vesicular fusion** with the presynaptic membrane.
  - This prevents **ACh-containing vesicles** from being released into the synaptic cleft.
  - Result: **Muscle paralysis** due to the lack of ACh stimulation at the **nicotinic receptors**.
- **Clinical Uses:**
  - **Botox (cosmetic use)**: Reduces wrinkles by relaxing muscles.
  - **Dystonias (e.g., cervical dystonia, blepharospasm)**
  - **Spasticity (e.g., cerebral palsy, stroke-related spasticity)**
  - **Hyperhidrosis (excessive sweating)**
- **Toxicity:**

PREPLADDER

- Causes **botulism**, presenting with **flaccid paralysis, ptosis, diplopia, dysphagia, and respiratory failure**.
- Common sources: **Improperly canned foods, honey (infant botulism)**.

Botulinum toxins:

- These are potent neurotoxins produced by Clostridium botulinum bacteria.
- There are several types, with types A, B, and E being toxic to humans.
- **Mechanism**: Botulinum toxins A and E cleave SNAP-25 (synaptosome-associated protein-25), and B cleave Synaptobrevin, which are presynaptic membrane proteins essential for releasing acetylcholine at the neuromuscular junction leading to Flaccid paralysis.

Inhibits acetylcholine reuptake (Option B) is incorrect because ACh is **not reuptaken**; it is degraded by **acetylcholinesterase** in the synapse.

Blocks the postsynaptic acetylcholine receptor (Option C) is incorrect because this describes the action of **curare and neuromuscular blockers (e.g., pancuronium, rocuronium)**.

Inhibits acetylcholinesterase (Option D) is incorrect because this describes the action of **acetylcholinesterase inhibitors (e.g., neostigmine, organophosphates)**, which **increase** ACh levels rather than decrease them.

Reference :

1. Ganong's Review of Medical Physiology, 26th edition, Page 124.
2. Tetanus and botulinum neurotoxins: mechanism of action and therapeutic uses - PMC

Learning Outcome :

39.Question :

A Tzanck smear prepared from a vesicle shows multinucleated giant cells. What is the diagnosis?

Option 1 :

HIV

Option 2 :

HSV

Option 3 :

HPV

Option 4 :

EBV

PREPLADDER

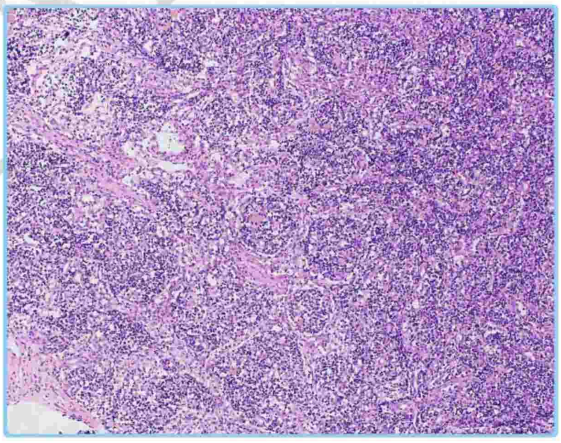
Correct option : 2

Solutions :

Correct Answer: B) HSV

Explanation: A Tzanck smear showing multinucleated giant cells is characteristic of **Herpes simplex virus (HSV) infections.**

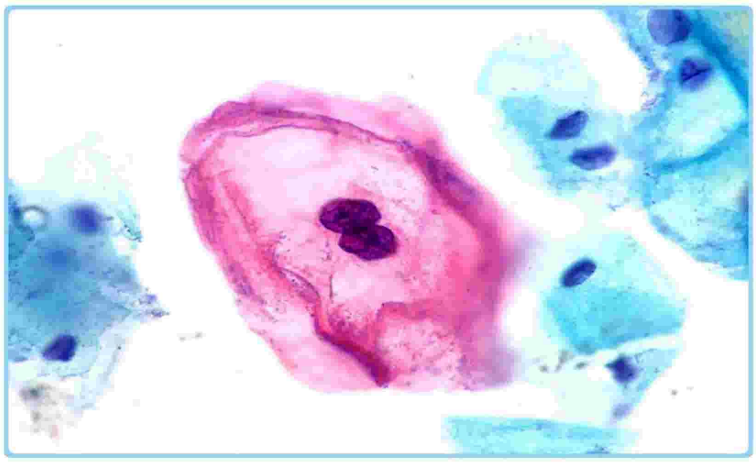
Microscopic Features of the Herpes Virus:

Herpes Simplex Virus: • **Tzanck smear: Multinucleated giant cells** with faceted nuclei and homogeneously stained 'ground-glass' chromatin (**Tzanck cells**). • Formation of **Lipschutz bodies (Cowdry type A).**	
HHV 8 (human herpes virus type 8): • **Castleman disease:** Onion skinning of lymphocytes and blood vessels, giving the appearance of **"Lollipop follicles"**.	

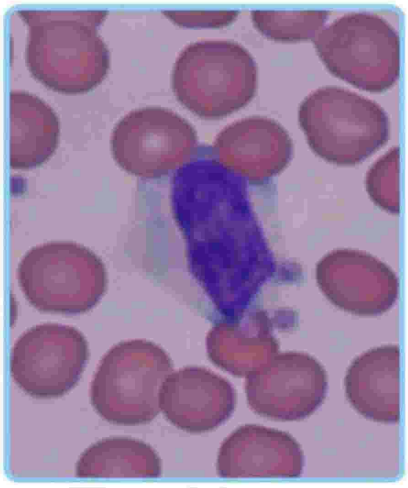
HIV (Option A) does not cause multinucleated giant cells on a Tzanck smear; it is diagnosed with serological tests (e.g., ELISA, Western blot) or PCR.

HPV (Option C) is associated with koilocytes (perinuclear halos in epithelial cells), not multinucleated giant cells.

PREPLADDER



EBV (Option D) is associated with Downey cells, which are atypical lymphocytes with a ballerina skirt appearance, seen in peripheral blood smears. Diagnosed using the Monospot test or serology, not a Tzanck smear.



Reference :

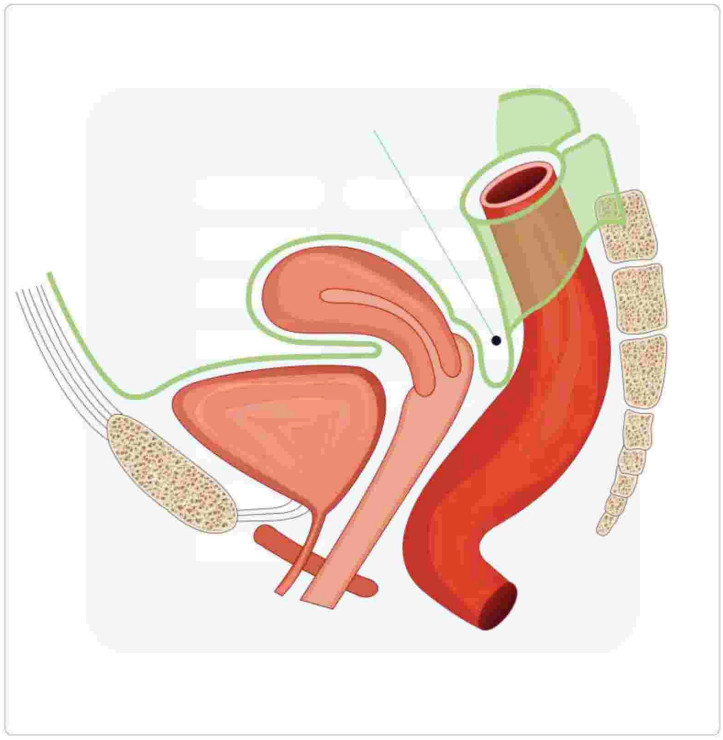
Ananthanarayan and Paniker's Textbook of Microbiology, 10th Edition, Page 476, 480, 482.

Learning Outcome :

40. Question :

Identify the marked area in the image given.

PREVIEW



Option 1 :

Morrison's pouch

Option 2 :

Vesicouterine pouch

Option 3 :

Pouch of Douglas

Option 4 :

Ischioanal Fossa

Correct option : 3

Solutions :

Correct Answer: C) Pouch of Douglas

Explanation:

- The marked area in the image is the **Pouch of Douglas.**

- The Pouch of Douglas, also known as the rectouterine pouch, is the lowest point of the peritoneal cavity in females.
- It is located between the posterior aspect of the uterus and the anterior aspect of the rectum.
- It is a common site for the accumulation of fluids, such as in the case of peritoneal infections or blood after pelvic surgeries.

Rectouterine pouch (Pouch of Douglas):

- Pouch between rectum posteriorly and uterus anteriorly
- Most dependent part of the abdominal cavity in standing
- Most dependent part of the abdomen in the lying down position is the hepatorenal pouch of Morrison

Morrison's pouch (Option A): This is the space between the liver and the right kidney. It is not located in the pelvic area but in the upper abdomen.

Vesicouterine pouch (Option B): This is located between the uterus and the bladder, higher in the pelvic cavity, and is not the same as the Pouch of Douglas.

Ischioanal Fossa (Option D) is a fat-filled space situated on either side of the anus, located just below the pelvic diaphragm, essentially acting as a cushion around the anal canal; it is considered part of the anal region and is sometimes referred to as the ischiorectal fossa.

Reference :

https://pmc.ncbi.nlm.nih.gov/articles/PMC5537103/

Learning Outcome :

41.Question :

A patient reports difficulty switching between movements and experiences uncontrollable hand movements. What is the most likely diagnosis?

Option 1 :

Dysdiadochokinesis

Option 2 :

Intentional Tremor

Option 3 :

Metamorphosis

PREPLADDER

Option 4 :

Resting Tremor

Correct option : 1

Solutions :

Correct Answer: A) Dysdiadochokinesis

Explanation:

The term **diadochokinesis** refers to the ability to perform **rapid alternating movements** (e.g., pronation/supination of the hands). **Difficulty switching between movements** suggests **dysdiadochokinesis (impaired diadochokinesis)**, which is commonly associated with **cerebellar dysfunction** seen in:

- **Cerebellar ataxia** (due to stroke, multiple sclerosis, or degenerative disorders)
- **Parkinson's disease** (along with bradykinesia and rigidity)

Clinical Features of Cerebellar Diseases

Hypotonia	Decreased muscle tone, often on the same side as the cerebellar lesion.
Ataxia	Uncoordinated movements, often leading to a "drunken" gait.
Dysdiadochokinesia	Inability to perform rapid alternating movements, such as flipping the hands back and forth.
Dysmetria (Past pointing)	Movements that overshoot or undershoot the intended target.
Intention tremor	Tremors occurring when moving toward a target
Dysarthria	Jumbled speech due to lack of coordination in the muscles involved in speech
Nystagmus	Rapid, tremulous eye movements
Rebound Phenomenon	Limb jerking back after resistance is suddenly removed
Decomposition of movement	Can't move multiple joints simultaneously.
No sensory deficit	Not typically present in cerebellar diseases.

PRELADDER

Intentional Tremor (Option B) is incorrect because **intention tremor** (seen in cerebellar lesions) appears during **voluntary movement**, worsening as the target is approached, rather than causing difficulty in alternating movements.

Metamorphosis (Option C) is incorrect because **metamorphopsia** refers to **visual distortions**, not movement abnormalities.

Resting Tremor (Option D) is incorrect because resting tremor is seen in **Parkinson's disease**, occurring at rest and improving with voluntary movement, rather than difficulty in switching movements.

Reference :

Guyton and Hall Textbook of Medical Physiology, 14th Edition, Page: 719, 720

Learning Outcome :

42. Question :

A neonate was born to a controlled gestational diabetes mother. At the time of birth, he was fine but 4 days later, he developed dyspnea with Spo2 80% at room air. What is the initial management?

Option 1 :

Give 21% to 30% O2

Option 2 :

Give 100% O2

Option 3 :

Give 50% O2

Option 4 :

Observation

Correct option : 2

Solutions :

Correct Answer: B) Give 100% O2

Explanation:

In this scenario, the child developed the symptoms after 4 days of birth, and the aetiology can be cardiac (cyanotic heart disease) or pulmonary. Hence, the best method is to give **100% oxygen to the neonate** to distinguish the cause.

If the saturation improves, the cause is respiratory, and if not, the cause is cardiogenic. This is called the **hyperoxia test.**

PREPLADDER

Hyperoxia test for distinguishing CCHD from pulmonary disease

- This is the initial method to differentiate congenital critical heart disease (CCHD) from pulmonary disease.
- **Procedure:**
    - Measure arterial blood gases (ABG) first at room air and then again after administering 100% oxygen for 10 minutes.
- **Expected results in CCHD:**
    - Neonates with CCHD usually fail to increase PaO2 above 100 mm Hg with 100% oxygen.
- **Expected Results in Pulmonary Disease:**
    - In pulmonary disease, PaO2 typically increases to ≥100 mm Hg when given 100% oxygen, as ventilation-perfusion mismatch is corrected.
- **Interpretation:**
    - A positive result (failure to increase PaO2) suggests a cardiac origin, warranting further cardiac evaluation to rule out CCHD.

Reference :

https://www.ncbi.nlm.nih.gov/books/NBK500001/

Learning Outcome :

43. Question :

MOA of botulinum toxin is

Option 1 :

Inhibits Elongation factor 2

Option 2 :

Inhibits the release of GABA

Option 3 :

Inhibits the release of Acetylcholine

Option 4 :

Increases cAMP

Correct option : 3

Solutions :

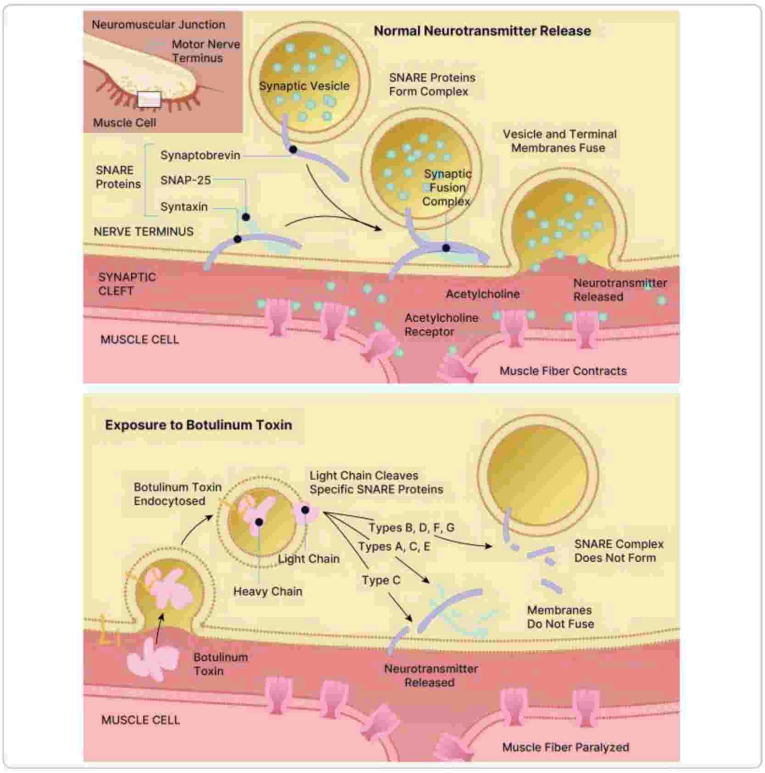
Correct Answer: C) Inhibits the release of acetylcholine

PREPLADDER

Explanation: The mechanism of action of botulinum toxin is**inhibition of acetylcholine release at the neuromuscular junction**.

Mechanism of Action of Botulinum Toxin:

Botulinum toxin binds to acetylcholine receptors at neuromuscular junctions, **preventing the release of acetylcholine**, which is essential for muscle contraction. This leads to flaccid paralysis, a hallmark of **botulism.**



Inhibits Elongation Factor 2 (Option A): This describes the MOA of Diphtheria toxin and Pseudomonas exotoxin A, which inhibit protein synthesis by ADP-ribosylation of Elongation Factor-2 (EF-2), leading to cell death.

Inhibits the release of GABA(Option B): This describes the action of Tetanus toxin, which blocks inhibitory neurotransmitters (GABA and glycine) in the spinal cord, causing spastic paralysis.

Increases cAMP (Option D): Toxins that increase cyclic AMP (cAMP) include cholera toxin and pertussis toxin, which cause fluid secretion (diarrhea) and immune modulation, respectively.

Reference :

Mahon Lehman Textbook of Diagnostic Microbiology, 6th Edition, Page 732

Apurba Sastry Essentials of Medical Microbiology, 3rd Edition, Page 397

Learning Outcome :

44. Question :

In a child presenting with diarrhoea, the following finding is noted. What is the likely micronutrient deficiency?

Option 1 :

Zinc

Option 2 :

Copper

Option 3 :

Vitamin A

Option 4 :

Vitamin C

Correct option : 1

Solutions :

Correct Answer: A) Zinc

PREPLADDER

Explanation:

The characteristic rash is acrodermatitis enteropathica, which occurs due to zinc deficiency.

Zinc:

- **Sources**:
  - Animal protein: liver, meat, fish, eggs, nuts.
  - Low in cereals, starch, plants, and legumes (high phytate content).
- **RDA**: Children: 3.5-5.0 mg/day
- **Causes of Zinc Deficiency**:
  - Increased demand in infants, children, adolescents, and pregnant/lactating women.
  - Malnutrition and malabsorption syndromes.
  - Chronic or recurrent diarrhoea.
  - Prolonged IV feeding without adequate zinc.
- **Clinical Features of Zinc Deficiency:**
  - Poor physical growth in children.
  - Delayed sexual maturation (hypogonadism) in adolescents.
  - Anaemia, anorexia, diarrhoea.
  - Alopecia, **dermatitis**, impaired immune function.
  - Poor wound healing, and skeletal abnormalities.
- **Acrodermatitis Enteropathica:**
  - Autosomal recessive disorder.
  - Severe zinc deficiency due to impaired intestinal absorption (ZIP4 protein defect).
  - Early infancy onset: **Vesiculobullous**, **dry, scaly skin lesions** (periorificial, **buttocks**, acral areas).
  - Associated with alopecia, eye changes, chronic diarrhoea, growth retardation, and stomatitis.
  - Treatment: 2-3 mg/kg/day oral zinc therapy.

PREPLADDER

- **Treatment**:
    - General deficiency: 0.5-1.0 mg elemental zinc/kg/day for several weeks/months
    - Malnourished children: 2-4 mg/kg/day for several weeks.

Copper (Option B)deficiency presents with anaemia and neutropenia. Acrodermatitis enteropathica is not associated with copper deficiency.

Vitamin A (Option C)deficiency typically presents with visual disturbances, such as night blindness, and may lead to an increased susceptibility to infections. It is not associated with the given rash in the scenario.

Vitamin C (Option D)deficiency in the early stages presents as irritability, loss of appetite, pain, fever, pain, leg tenderness. The later stages are associated with swelling, pseudoparalysis, subperiosteal haemorrhages, "rosary" beads at the costochondral junction, gum changes, anaemia, bleeding, and poor healing. This does not explain the rashes in the given scenario.

Reference :

1. OP Ghai Paediatrics, 10th Edition, Page 115, 116
2. Nelson Paediatrics, 21st Edition, Page 320, 3589

Learning Outcome :

45. Question :

A hypertensive patient’s lab results reveal hypernatremia, hypokalemia, and metabolic alkalosis. What is the most probable diagnosis?

Option 1 :

Conn's Syndrome

Option 2 :

Addison’s Disease

Option 3 :

Diabetes Insipidus

Option 4 :

Cushing's Disease

Correct option :1

Solutions :

Correct Answer: A) Conn's Syndrome

PREPLADDER

Explanation:

Conn's syndrome (Primary Hyperaldosteronism) is the most likely diagnosis in a **hypertensive** patient with:

- **Hypernatremia (↑ Na^+)** → due to excessive sodium retention.
- **Hypokalemia (↓ K^+)** → due to renal potassium wasting.
- **Metabolic alkalosis** → due to **increased H^+ excretion** in the kidneys.

Pathophysiology:

- **Aldosterone overproduction** (usually due to an **adrenal adenoma** or **bilateral adrenal hyperplasia**) leads to:
    - **↑ Na^+ reabsorption → Hypertension & Hypernatremia**
    - **↑ K^+ excretion → Hypokalemia**
    - **↑ H^+ excretion → Metabolic Alkalosis**

Addison's Disease (Option B) is incorrect because **Addison's disease (primary adrenal insufficiency)** presents with **hypotension, hyponatremia, hyperkalemia**, and **metabolic acidosis**, opposite to this case.

Diabetes Insipidus (Option C) is incorrect because **DI causes hypernatremia**, but it is due to **free water loss (polyuria, polydipsia)** rather than aldosterone excess. It is **not associated with hypokalemia or metabolic alkalosis**.

Cushing's Disease (Option D) is incorrect because while **Cushing's disease (excess ACTH and cortisol)** can cause **hypertension**, it does not primarily cause **hypokalemia and metabolic alkalosis**. However, severe cases with **ectopic ACTH production** (e.g., small-cell lung cancer) can cause **pseudo-Conn's syndrome** with a similar presentation.

Reference :

https://www.ncbi.nlm.nih.gov/books/NBK441960/

Learning Outcome :

46. Question :

While evaluating a 3-year-old with short stature, height is measured at 90cm and the lower segment is 45 cm. What is the likely diagnosis?

Option 1 :

Achondroplasia

Option 2 :

Congenital hypothyroidism

PREPLADDER

Option 3 :

Rickets

Option 4 :

Spondyloepiphyseal dysplasia

Correct option : 4

Solutions :

Correct Answer: D) Spondyloepiphyseal dysplasia

Explanation:

In the given scenario, the upper segment: lower segment ratio of the child is 1:1 signifying upper segment short stature which is seen in **spondyloepiphyseal dysplasia.**

The normal US: LS ratio for a 3-year-old child is 1.3: 1.

Here the height of the child is 90cm with LS = 45cm.

Hence the US = 45cm.

US: LS = 1:1.

This means that the upper segment is shorter than normal.

- **Spondyloepiphyseal dysplasia** causes short-trunk dwarfism involving the vertebrae and proximal epiphyseal centres.
- The distal epiphyses are spared in this condition.

Proportionate Short Stature	Conditions Causing Short Stature with US > LS	Conditions Causing Short Stature with US < LS
• Growth hormone deficiency • Genetic syndromes: Noonan syndrome, Prader-Willi syndrome, 3M syndrome • Environmental pollutants: Lead, calcium, hexachlorobenzene, polychlorinated biphenyl • Family history	• Achondroplasia **(Option A)** • Congenital hypothyroidism **(Option B)** • Turner syndrome • Diastrophic dysplasia • Rickets **(Option C)**	• **Spondyliepiphyseal dysplasia (Option D)** • Morquio syndrome

PREPLADDER

Reference :

O.P. Ghai Essential Pediatrics, 9th Edition, Page 34, 506

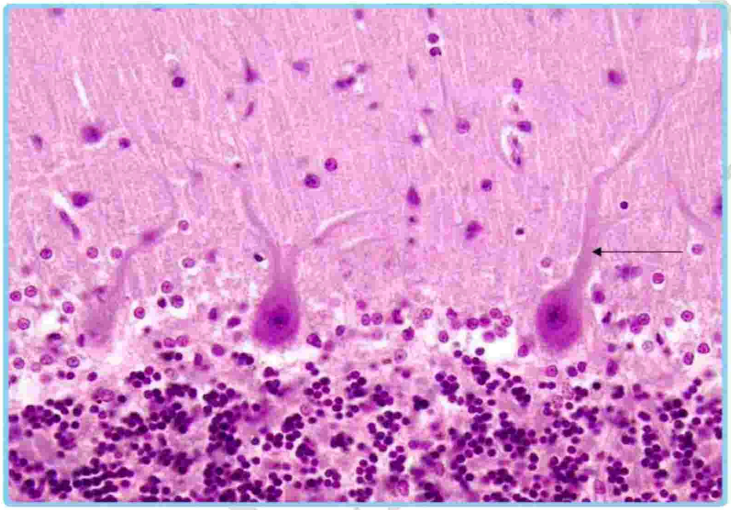
https://www.ncbi.nlm.nih.gov/books/NBK556031/

https://www.ncbi.nlm.nih.gov/books/NBK563282

Learning Outcome :

47. Question :

Histological section is given below. Identify the marked cell.



Option 1 :

Stellate cell

Option 2 :

Basket cell

Option 3 :

Purkinje cell

Option 4 :

Granular cell

Correct option : 3

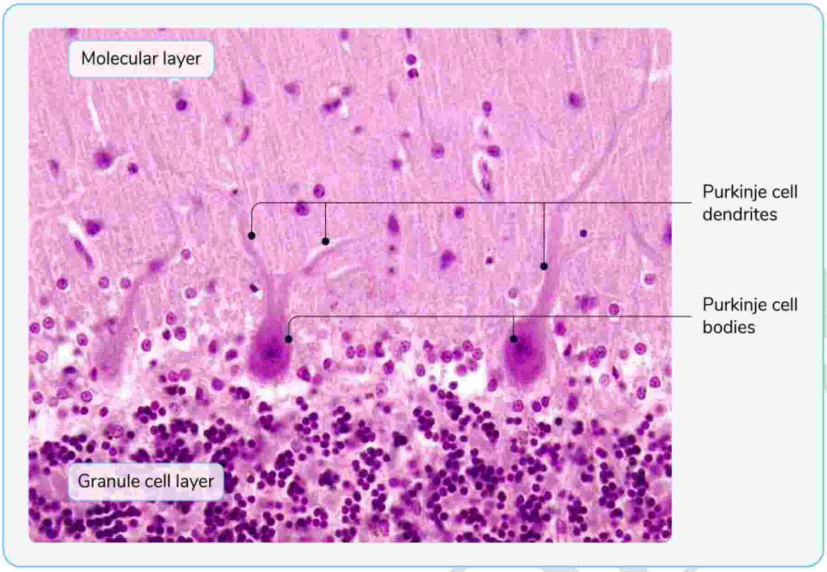
Solutions :

Correct Answer: C) Purkinje cell

Explanation:

PREPLADDER

The marked area in the image is **a Purkinje cell.**

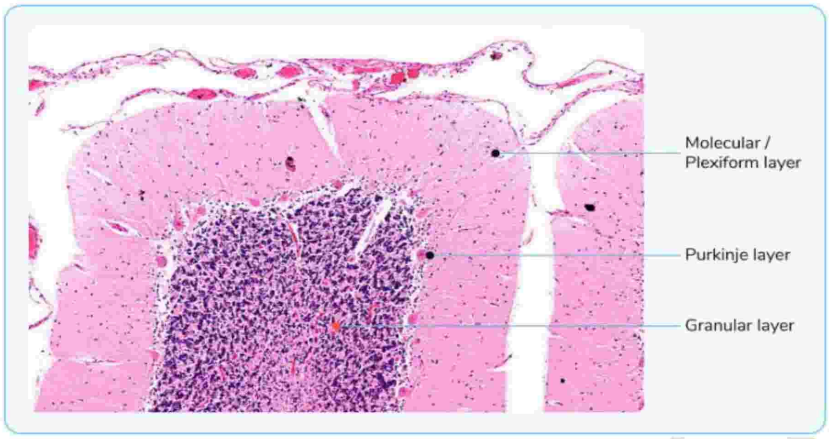


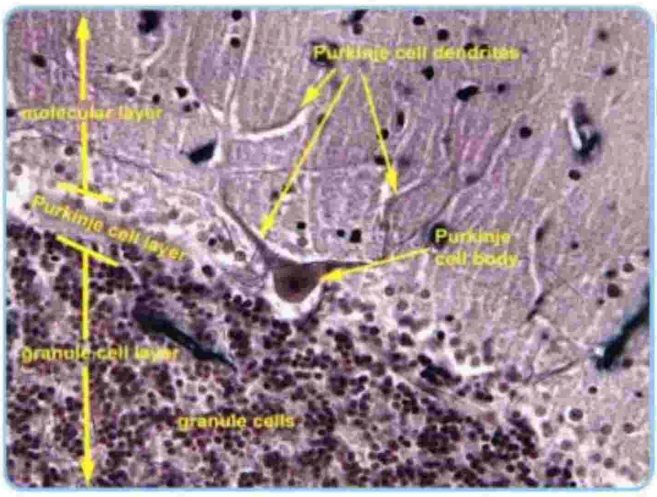
The cerebellar cortex consists of the following three distinct layers:

Layers of the cerebellar cortex		
Molecular (plexiform) layer **(Options A, B)**	**Purkinje cell layer**	**Granular layer** **(Option D)**
It primarily contains numerous dendritic branches from Purkinje cells, with relatively few widely spaced nerve cells.	It consists of a single row of large flask-shaped cells, the **Purkinje cells**.	The inner granular layer is made up of many closely packed small **granule cells**, along with a few larger **Golgi cells.**
These nerve cells are of two types: (a) Basket cells (b) Stellate cells.	The axons of Purkinje cells are the only output from the cerebellar cortex and have an **inhibitory** effect on the intracerebellar nuclei.	Golgi cells are **inhibitory** while the granular cells are **excitatory.**

Among the five types of intrinsic neurons (Basket cells, Stellate cells, Purkinje cells, Granule cells and Golgi cells)- All are inhibitory except granule cells.

PREPLADDER





Reference :

Gray's Anatomy, 42nd Edition, Page: 469, 471.

Textbook of Anatomy, Vishram Singh, Volume 3, 2nd Edition, Page: 377.

Learning Outcome :

48. Question :

A 35-year-old male presents to the emergency department with complaints of blurred vision, dizziness, and severe headache after ingesting an unknown quantity of homemade alcohol earlier in the day. On examination, he is disoriented. Laboratory tests reveal severe metabolic acidosis with a high anion gap. Which metabolite is primarily responsible for the toxicity in this case?

Option 1 :

Methanol

Option 2 :

Formic acid

Option 3 :

Formaldehyde

Option 4 :

Acetic acid

Correct option : 2

Solutions :

Answer: B) Formic acid

Explanation:

This patient's symptoms (**blurred vision, dizziness, severe headache, disorientation**) and **high anion gap metabolic acidosis** after ingesting homemade alcohol suggest **methanol poisoning**. Methanol is metabolized to **formic acid** (formate), which is the primary metabolite responsible for the toxicity, causing metabolic acidosis, optic neuropathy, and CNS depression. Methanol is the ingested substance, not a metabolite, so formic acid is the correct answer.

Methanol:

<table>
<tr><td colspan="2">Adulteration in Country liquor.
Solvent in industrial processes.
Antifreeze.</td></tr>
<tr><td>Mechanism of Action</td><td>Methanol ö Formaldehyde (oxidation by alcohol dehydrogenase).
Formaldehyde ö Formic acid (oxidation by aldehyde dehydrogenase).
Formic Acid ö Inhibition of Cytochrome c Oxidase ö Cellular Hypoxia and Metabolic Acidosis.</td></tr>
<tr><td>Features of Toxicity</td><td>CNS: Headache, dizziness, confusion, ataxia, seizures
Ocular: Blurred ("snowfield" vision).
Gastrointestinal: Nausea, vomiting, fruity breath and abdominal pain
Metabolic: Severe metabolic acidosis, elevated anion gap</td></tr>
</table>

PREPLADDER

Treatment	Mnemonic: **SHAFE** • **S**odium Bicarbonate to correct metabolic acidosis • **H**emodialysis to remove methanol and its metabolites • **A**ntidote: **F**omepizole or **E**thanol to inhibit ADH • **F**olinic acid or folic acid to enhance formate metabolism.

- **Methanol (Option A)** is incorrect because methanol itself is **not directly toxic**; its **metabolites (formic acid and formaldehyde)** cause the toxicity.
- **Formaldehyde (Option C)** is incorrect because formaldehyde is an intermediate metabolite but is rapidly converted to formic acid, which is **more toxic**.
- **Acetic Acid (Option D)** is incorrect because acetic acid is the metabolic product of **ethanol**, not methanol, and does **not cause significant toxicity**.

Reference :

1. Goodman & Gillman's pharmacological basis of Therapeutics, 14th edition, Page 167, 521
2. K D Tripathi, Essentials of Medical Pharmacology, 8th edition, Page 422

Learning Outcome

49. Question :

Which of the following amino acids primarily acts as a buffer in blood due to its ability to accept and donate protons at physiological pH?

Option 1 :

Histidine

Option 2 :

Arginine

Option 3 :

Tryptophan

Option 4 :

Tyrosine

Correct option :1

Solutions :

Answer: A) Histidine

PREPLADDER

Explanation:

- **Physiological pH & Buffering Role:**
  - Histidine has an **imidazole side chain** with a pKa of **~6.0**, which is close to physiological pH (7.4).
  - This allows it to **accept or donate protons**, making it an effective **buffer in blood**.
- **Role in Hemoglobin Buffering:**
  - Hemoglobin contains **histidine residues** that help maintain blood pH by binding or releasing H^+ ions.
  - This is essential in **the Bohr effect**, which regulates oxygen delivery.

Amino Acids as Buffers

Amino Acid	Buffering Ability	Reason
Histidine	Strong buffer	Imidazole group has pKa ~6.0, close to physiological pH
Arginine	Poor buffer	Guanidinium group has pKa ~12.5, too high to act as a buffer at pH 7.4
Tryptophan	Minimal buffering	Indole group is non-ionizable at physiological pH
Tyrosine	Minimal buffering	Phenol group has pKa ~10.1, too high to be effective

- **Arginine (Option B):** Incorrect because its **guanidinium group (pKa ~12.5) does not donate or accept protons at physiological pH.**
- **Tryptophan (Option C):** Incorrect because its **indole ring is not significantly ionizable at pH 7.4, so it lacks buffering ability.**
- **Tyrosine (Option D):** Incorrect because **its phenol group (pKa ~10.1) does not participate in blood buffering at physiological pH.**

Reference:

Harper's Biochemistry, 32nd edition pg 18,19, 20, 21.

Learning Outcome :

PRELADDER

50. Question :

During starvation, which of the following hormones is primarily produced to maintain blood glucose levels?

Option 1 :

Glucagon

Option 2 :

Insulin

Option 3 :

Amylase

Option 4 :

Somatostatin

Correct option : 1

Solutions :

Answer: A) Glucagon

Explanation:

- **Role of Glucagon in Starvation:**
  - During starvation, **glucagon** is the primary hormone that maintains blood glucose levels.
  - It promotes **gluconeogenesis** (glucose synthesis) and **glycogenolysis** (breakdown of glycogen) in the liver.
  - Increases **lipolysis** in adipose tissue, providing free fatty acids for energy.
- **Phases of Starvation:**
  - **Early fasting (first few hours):** Blood glucose is maintained by glycogenolysis.
  - **Prolonged fasting (after 24 hours):** Gluconeogenesis becomes the primary glucose source, with glucagon playing a key role.
  - **Later starvation (after 3-5 days):** Ketogenesis increases as an alternative fuel.

Hormonal Changes in Starvation

Hormone	Effect in Starvation
Glucagon	**Increases** to stimulate gluconeogenesis and glycogenolysis.
Insulin	**Decreases** to reduce glucose uptake by tissues.

PREPLADDER

Cortisol	**Increases** to promote protein catabolism for gluconeogenesis.
Epinephrine	**Increases** to enhance glycogen breakdown and lipolysis.
Growth Hormone (GH)	**Increases** to reduce glucose utilization and promote lipolysis.

- **Insulin (Option B):** Incorrect because **insulin decreases during starvation** to limit glucose uptake by tissues.
- **Amylase (Option C):** Incorrect because amylase is a digestive enzyme, not a hormone involved in blood glucose regulation.
- **Somatostatin (Option D):** Incorrect because somatostatin inhibits both insulin and glucagon but does not directly regulate blood glucose during starvation.

Reference :

Nelson Textbook of Paediatrics Edition 21, Page 778-781

Learning Outcome :

51. Question :

In paracetamol poisoning, N-acetylcysteine is administered as an antidote. How does it act to prevent toxicity?

Option 1 :

Inhibits the toxin

Option 2 :

Removes the toxin

Option 3 :

Restores glutathione levels

Option 4 :

Neutralizes liver enzymes

Correct option : 3

Solutions :

Answer: C) Restores glutathione levels

Explanation:

N-acetylcysteine (NAC) is the antidote for **paracetamol (acetaminophen) poisoning** and primarily works by **restoring glutathione levels** to prevent liver damage.

PREPLADDER

- **Mechanism of Paracetamol Toxicity:**
    - Paracetamol is metabolized by the liver into:
        - **Non-toxic metabolites (via sulfation & glucuronidation).**
        - **A toxic metabolite, NAPQI (N-acetyl-p-benzoquinone imine), via CYP450.**
    - Normally, **NAPQI is detoxified by glutathione (GSH)**.
    - In **overdose**, glutathione is **depleted**, allowing NAPQI to accumulate → **hepatic necrosis**.
- **How NAC Works:**
    - **Acts as a glutathione precursor**, replenishing GSH stores.
    - **Enhances non-toxic sulfation pathway** for paracetamol metabolism.
    - **Directly binds NAPQI** in high doses, reducing toxicity.

Management of Paracetamol poisoning	
Management Aspect	**Details**
Initial Treatment	• **Gastric Lavage** • Administer activated charcoal or cholestyramine (effective within 30 minutes of ingestion)
N-acetylcysteine (NAC) Therapy	• Initiate within **8 hours** of ingestion; may be partially effective up to **24–36 hours** post-overdose. • **Administration**: • IV: 140 mg/kg loading dose over 1 hour, followed by 70 mg/kg every 4 hours for 15–20 doses.
Mechanism of Action	• NAC acts as a sulfhydryl donor, replenishing glutathione. • Neutralizes toxic metabolites and prevents binding to cell proteins, reducing the severity of hepatic necrosis.

PREPLADDER

Liver Transplantation	• Considered in cases of **hepatic failure** (jaundice, coagulopathy, confusion). • **King's College Criteria** is used to predict the need for a liver transplant in patients with paracetamol-induced acute liver failure : • Arterial blood pH < 7.30 Or all of the following: • Prothrombin time (PT) > 100 seconds (INR > 6.5) • Serum creatinine > 300 µmol/L • Grade III or IV hepatic encephalopathy.

- **Inhibits the toxin (Option A)** is incorrect because NAC does not **inhibit NAPQI formation**, it helps **detoxify it**.
- **Removes the toxin (Option B)** is incorrect because NAC does not directly remove paracetamol or NAPQI from the body.
- **Neutralizes liver enzymes (Option D)** is incorrect because NAC does not **neutralize liver enzymes**, it **restores glutathione** to prevent hepatic injury.

Reference :

1. Harrison's Principles of Internal Medicine 21st edition Page 2588, 2589
2. https://litfl.com/liver-transplantation-for-paracetamol-toxicity/

Learning Outcome :

52. Question :

What is the primary mechanism behind tissue damage in long-standing diabetes?

Option 1 :

Insulin resistance

Option 2 :

Sorbitol accumulation

Option 3 :

Hyperglycemia

Option 4 :

Decreased insulin secretion

PREPLADDER

Correct option :3

Solutions :

Answer: C) Hyperglycemia

Explanation:

Hyperglycaemia is the primary mechanism behind **tissue damage in long-standing diabetes**. Chronic high blood glucose levels lead to various **pathophysiological changes**, including:

- **Advanced Glycation End Products (AGEs):** Hyperglycaemia causes non-enzymatic glycation of proteins and lipids, leading to **oxidative stress, inflammation, and vascular damage**.
- **Polyol Pathway Activation:** Excess glucose is converted into **sorbitol**, which accumulates in tissues (e.g., retina, nerves, kidneys), leading to **osmotic stress and oxidative damage**.
- **Protein Kinase C (PKC) Activation:** Promotes **vascular dysfunction, inflammation, and increased permeability**, contributing to complications like **diabetic retinopathy and nephropathy**.
- **Hexosamine Pathway Dysregulation:** Alters gene expression, promoting **vascular and renal damage**.

- **Insulin resistance (Option A)** is incorrect because it plays a role in **type 2 diabetes**, but the primary cause of tissue damage is **chronic hyperglycaemia**, not insulin resistance itself.

- **Sorbitol accumulation (Option B)** is incorrect because while the **polyol pathway** contributes to complications like **diabetic neuropathy and cataracts**, it is **not the sole mechanism** behind widespread tissue damage.

- **Decreased insulin secretion (Option D)** is incorrect because it leads to **hyperglycaemia**, but **it is the high glucose levels** that drive long-term tissue damage, not insulin deficiency directly.

Reference :

1. https://pmc.ncbi.nlm.nih.gov/articles/PMC6679814/
2. https://pmc.ncbi.nlm.nih.gov/articles/PMC2996922/
3. https://pubmed.ncbi.nlm.nih.gov/19489690/

PREPLADDER

Learning Outcome :

53. Question :

Which antihypertensive drug is contraindicated in pregnancy?

Option 1 :

Methyldopa

Option 2 :

Enalapril

Option 3 :

Labetalol

Option 4 :

Nifedipine

Correct option : 2

Solutions :

Explanation:

Enalapril, an **angiotensin-converting enzyme (ACE) inhibitor**, is **contraindicated in pregnancy** due to its **teratogenic effects on fetal development**.

- **Risks in Pregnancy (Especially 2nd & 3rd Trimester):**
  - **Fetal renal dysgenesis → Oligohydramnios → Pulmonary hypoplasia**
  - **Hypocalvaria (skull hypoplasia)**
  - **Fetal growth restriction**
  - **Neonatal renal failure and anuria**
- **Why ACE Inhibitors Are Harmful in Pregnancy:**
  - ACE inhibitors block the **renin-angiotensin-aldosterone system (RAAS)**, which is **essential for fetal kidney development**.
  - This results in **reduced amniotic fluid (oligohydramnios)**, leading to **Potter sequence** (lung hypoplasia, limb deformities).

Adverse effects of ACEI:

Adverse Effect	Description
Hypotension	Decrease in blood pressure, especially upon initiation of therapy or with dosage increases.

PREPLADDER

Hyperkalemia	Increased serum potassium levels due to reduced aldosterone secretion.
Cough	Persistent dry cough, possibly due to bradykinin buildup in the lungs.
Angioedema	Due to increased bradykinin levels, swelling of deeper layers of skin, particularly around the eyes and lips, can be life-threatening.
Rashes/Urticaria	Skin reactions like rashes or hives occur in a small percentage of users.
Dysgeusia	Reversible taste changes are more common with captopril.
Rare Effects	Granulocytopenia (low white blood cells) and proteinuria (excess protein in urine) are more concerning in patients with kidney disease.
Acute Renal Failure	Possible in patients with bilateral renal artery stenosis due to decreased kidney filtration.
Fetal Effects	ACE inhibitors are contraindicated during pregnancy due to potential harm to the fetus, including fetal renal damage due to inhibition of the fetal renin-angiotensin system.

- **Methyldopa (Option A)**: **Preferred for chronic hypertension** (centrally acting α_2-agonist).
- **Labetalol (Option C)**: **Used in hypertensive emergencies and preeclampsia** (combined α- & β-blocker).
- **Nifedipine (Option D)**: **Safe for hypertension and preeclampsia** (calcium channel blocker).

Reference :

K D Tripathi, Essentials of Medical Pharmacology, 8th edition, Page 531

Learning Outcome :

54. Question :

A patient presents with a history of vomiting. Arterial blood gas analysis reveals the following:

- pH**:** 7.5
- pCO_2**:** 48 mm Hg
- HCO_3^-**:** 30 mm Hg

PREPLADDER

What is the most likely acid-base abnormality?

Option 1 :

Metabolic alkalosis

Option 2 :

Metabolic acidosis

Option 3 :

Respiratory acidosis

Option 4 :

Respiratory alkalosis

Correct option : 1

Solutions :

Answer: A) Metabolic alkalosis

Explanation:

The arterial blood gas (ABG) values indicate:

- **pH: 7.5 (Alkalosis)**
- **pCO_2: 48 mmHg (Elevated)**
- **HCO_3^-: 30 mEq/L (Elevated)**

These findings suggest a **primary metabolic alkalosis with respiratory compensation**.

- **Primary Mechanism:** Vomiting leads to **loss of gastric HCl**, causing an increase in **bicarbonate (HCO_3^-)** and resulting in metabolic alkalosis.
- **Compensatory Mechanism:** The body attempts to retain **CO_2** via **hypoventilation** (elevated pCO_2) to counteract the alkalosis.
- **Metabolic Acidosis (Option B)** is incorrect because metabolic acidosis would present with a **low pH (<7.35)** and a **low HCO_3^-**, which is not the case here.
- **Respiratory Acidosis (Option C)** is incorrect because respiratory acidosis is characterized by **low pH** and **high pCO_2**, but in this case, the pH is elevated.
- **Respiratory Alkalosis (Option D)** is incorrect because respiratory alkalosis involves **low pCO_2** due to hyperventilation, whereas this patient has **elevated pCO_2** as a compensatory response.

Reference :

Ghai Textbook of Paediatrics Edition 10, Page 71, 72, 73, 74

PREPLADDER

Learning Outcome :

55. Question :

The development of cataracts in patients with Diabetes Mellitus is primarily due to the accumulation of which of the following substances in the lens?

Option 1 :

Sorbitol

Option 2 :

Dulcitol

Option 3 :

Mannitol

Option 4 :

Galactitol

Correct option : 1

Solutions :

Answer: A) Sorbitol

Explanation:

Sorbitol accumulation in the lens is the primary cause of **diabetic cataracts**. In **diabetes mellitus**, chronic hyperglycaemia leads to the activation of the **polyol pathway**, where:

1. **Glucose is converted to sorbitol** by **aldose reductase**.
2. Sorbitol is **slowly metabolised to fructose** by **sorbitol dehydrogenase**.
3. In the lens, **sorbitol accumulates**, causing:
    - **Osmotic stress** → water influx → lens swelling
    - **Oxidative stress** → protein damage → cataract formation

Diabetic cataracts typically present as **snowflake cataracts** in younger individuals or as **accelerated senile cataracts**.

- **Dulcitol (Option B)** is incorrect because **dulcitol (galactitol)** accumulates in **galactosemia**, not diabetes. It causes **galactose-induced cataracts** due to **galactokinase or GALT deficiency**.
- **Mannitol (Option C)** is incorrect because mannitol is an **exogenous osmotic diuretic** and does not accumulate in the lens.
- **Galactitol (Option D)** is incorrect because it is **another name for dulcitol**, and its accumulation is linked to **galactosemia**, not diabetes.

PREPLADDER

Reference :

1. https://pmc.ncbi.nlm.nih.gov/articles/PMC2903955/
2. https://pmc.ncbi.nlm.nih.gov/articles/PMC11556822/

Learning Outcome :

56. Question :

A child presents with micrognathia and low-set ears. These clinical features are commonly associated with which type of genetic abnormality?

Option 1 :

Deletion

Option 2 :

Translocation

Option 3 :

Amplification

Option 4 :

Inversion

Correct option :1

Solutions :

Answer: A) Deletion

Explanation:

Deletion is the most common genetic abnormality associated with **micrognathia (small jaw) and low-set ears**. These features are commonly seen in **chromosomal deletion syndromes**, such as:

- **Cri-du-chat syndrome (5p deletion)**
  - **Micrognathia, low-set ears, high-pitched cry ("cat-like cry")**
  - Intellectual disability and growth delay
- **DiGeorge syndrome (22q11.2 deletion)**
  - **Micrognathia, low-set ears, conotruncal heart defects (e.g., TOF)**
  - Thymic hypoplasia → **immunodeficiency**
- **Treacher Collins syndrome (TCOF1 gene mutation, chromosomal microdeletion)**

PREPLADDER

    - **Micrognathia, low-set ears, facial hypoplasia**
    - Conductive hearing loss

- **Translocation (Option B)** is incorrect because translocations usually cause genetic disorders by **gene fusion or misregulation**, often leading to **cancers (e.g., CML t(9;22))**, rather than micrognathia and low-set ears.
- **Amplification (Option C)** is incorrect because gene amplification is associated with **oncogenesis (e.g., HER2 in breast cancer, N-MYC in neuroblastoma)**, not structural anomalies.
- **Inversion (Option D)** is incorrect because chromosomal inversions **rarely** lead to **major congenital anomalies**, unless a critical gene is disrupted.

Reference :

https://pubmed.ncbi.nlm.nih.gov/31509347/

Learning Outcome :

57. Question :

Which of the following tests is most appropriate for diagnosing this condition?

Option 1 :

Nikolsky Test

Option 2 :

Asboe-Hansen test

Option 3 :

Grattage Test

Option 4 :

Tzanck Smear

Correct option :3

Solutions :

Grattage Test is used to diagnose **psoriasis**, a condition characterized by **scaly plaques** on the skin. In this test, gentle scraping of the lesion leads to **removal of scales** in a characteristic manner, revealing a shiny, thin membrane (Auspitz sign) and pinpoint bleeding.

Other Options:

Nikolsky Test (Option A): Used to diagnose conditions like **pemphigus vulgaris** and **toxic epidermal necrolysis**. It involves applying lateral pressure to the skin, which causes the epidermis to slough off.

Asboe-Hansen Test (Option B): Also known as the **bulla spread sign**, it helps diagnose **pemphigus vulgaris** by checking if pressure on a blister spreads it to adjacent skin.
Tzanck Smear(Option D): Used to diagnose **herpes infections** by detecting multinucleated giant cells in skin lesions.

Reference :

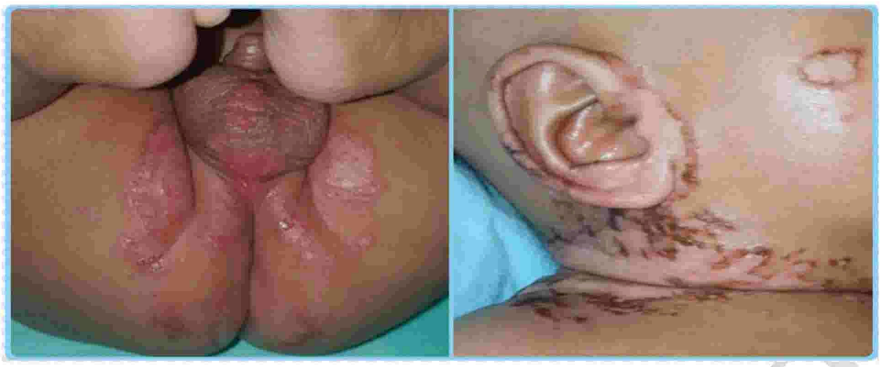
Neena Khanna, Textbook of Dermatology, 7th Edition, Page no: 124

Learning Outcome :

58. Question :

A baby presents with chronic diarrhea and a rash resembling acrodermatitis on the skin. Based on the clinical picture, what is the most likely deficiency?

PREPLADDER



Option 1 :

Zinc deficiency

Option 2 :

Selenium deficiency

Option 3 :

Niacin deficiency

Option 4 :

Magnesium deficiency

Correct option : 1

Solutions :

Zinc deficiency can lead to **acrodermatitis enteropathica**, a rare genetic disorder that presents with:

- **Chronic diarrhea**
- **Periorificial and acral dermatitis** (rash around the mouth, hands, feet, and perineal area)
- **Alopecia**
- **Failure to thrive and immune dysfunction**

It occurs due to **impaired zinc absorption** and can also be seen in cases of inadequate dietary intake or prolonged parenteral nutrition without zinc supplementation.

Other Options:

Selenium deficiency (Option B) : Causes **cardiomyopathy (Keshan disease)** and **muscle weakness**, but not chronic diarrhea or acrodermatitis.

Niacin deficiency (Option C): Leads to **pellagra**, which is characterized by the "3 D's"—**diarrhea, dermatitis, and dementia**—but the rash is typically **photosensitive**, unlike

PREPLADDER

acrodermatitis.
Magnesium deficiency(Option D): Presents with **neuromuscular symptoms** like tetany, seizures, and arrhythmias rather than a characteristic rash and chronic diarrhea.

Reference :

Rook's Textbook of Dermatology 9th edition - page 41.1, 63.16, 63.25

https://www.ncbi.nlm.nih.gov/books/NBK493187/#article-28798.s7

Learning Outcome :

59. Question :

Which of the following methods is used to measure fetal anemia?

Option 1 :

Umbilical artery Doppler

Option 2 :

Cord blood sampling

Option 3 :

Chorionic villus sampling

Option 4 :

Peak systolic velocity in the fetal middle cerebral artery (MCA)

Correct option : 4

Solutions :

- **Non-invasive method for detecting fetal anemia:**
    - **MCA peak systolic velocity (MCA-PSV)** is the **gold standard** for detecting fetal anemia, especially in cases of **Rh isoimmunization or parvovirus B19 infection**.
- **Principle:**
- In fetal anemia, the **blood viscosity decreases**, leading to **increased blood flow velocity** in the **MCA** due to compensatory mechanisms.
- **Doppler ultrasound measurement:**
    - MCA-PSV is measured using **Doppler ultrasonography** and compared with **MoM (multiples of the median) values** to determine anemia severity.

Assessment of Fetal Anemia

PREPLADDER

Method	Utility	Invasiveness
MCA-PSV Doppler (Correct Answer)	Gold standard for **non-invasive** detection of fetal anemia	Non-invasive
Umbilical artery Doppler	Assesses **placental insufficiency** (not fetal anemia)	Non-invasive
Cord blood sampling (PUBS - Percutaneous Umbilical Blood Sampling)	Directly measures **fetal hemoglobin and hematocrit** but has high risk of complications	Invasive
Chorionic villus sampling (CVS)	Used for **genetic testing** in the first trimester, not fetal anemia	Invasive

Umbilical artery Doppler (Option A) is incorrect because it primarily assesses placental insufficiency and fetal hypoxia rather than fetal anaemia.

Cord blood sampling (Option B) is incorrect because, although it provides direct measurement of fetal haemoglobin, it is invasive and associated with procedure-related risks.
Chorionic villus sampling (Option C) is incorrect because it is used for early genetic testing, not for evaluating fetal anaemia.

Reference :

https://pubmed.ncbi.nlm.nih.gov/18226612/

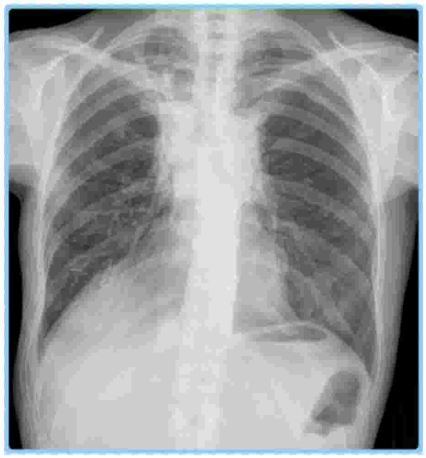
https://pmc.ncbi.nlm.nih.gov/articles/PMC5533518/

Learning Outcome

60. Question :

A patient with a history of breast cancer underwent Cobalt-60 radiotherapy. She now presents with respiratory distress, and imaging shows haziness in the left lung. What is the most likely diagnosis?

PREPLADDER



Option 1 :

Radiation Pneumonitis

Option 2 :

Recurrence of Breast Cancer

Option 3 :

Pulmonary Embolism

Option 4 :

Infective Pneumonia

Correct option :1

Solutions :

- **History of Cobalt-60 Radiotherapy:**
  - The patient has undergone **radiotherapy for breast cancer**, which is a known risk factor for **radiation pneumonitis**.
- **Symptoms of Respiratory Distress:**
  - **Radiation pneumonitis** typically presents **weeks to months after radiotherapy** with **dyspnea, dry cough, and low-grade fever**.
- **Imaging Findings (Haziness in Left Lung):**
  - Chest X-ray or CT often shows **hazy opacities in the irradiated lung field**, which is characteristic of radiation-induced lung injury.

Radiation Pneumonitis

Feature	Details

PREPLADDER

Cause	Radiation damage to lung tissue, commonly from **breast, lung, or esophageal cancer radiotherapy**
Onset	**4-12 weeks** post-radiotherapy
Symptoms	Dry cough, dyspnea, low-grade fever, chest pain
Imaging	Hazy opacities in the **irradiated lung field** (CT: ground-glass opacities, consolidation)
Treatment	**Corticosteroids (prednisone), supportive care**

Recurrence of Breast Cancer (Option B): Incorrect because recurrence usually presents with **lung nodules** or **pleural effusion**, not diffuse haziness.

Pulmonary Embolism (Option C): Incorrect because PE typically presents with **sudden pleuritic chest pain**, **clear lung fields on X-ray**, and **wedge-shaped infarcts on CT pulmonary angiography**.

Infective Pneumonia (Option D): Incorrect because pneumonia usually presents with **fever, productive cough**, and **lobar consolidation**, whereas radiation pneumonitis causes non-infective lung inflammation.

Reference :

Perez & Brady's Principles and Practice of Radiation Oncology, 7th edition- Pdf Page 96, 571, 572.

Learning Outcome :

61. Question :

It is shoulder dystocia when the anterior shoulder is delivered after what time of head delivery?

Option 1 :

15 sec

Option 2 :

30 sec

Option 3 :

45 sec

Option 4 :

60 sec

PREPLADDER

Correct option : 4

Solutions :

Shoulder dystocia occurs when the anterior (common) or posterior (rare) shoulder impacts the maternal symphysis pubis or sacral promontory.

- **ACOG Definition:** Shoulder dystocia requires maneuvers beyond gentle traction to deliver the shoulders.
- **Spong et al. Criteria:** Head-to-body delivery time **>60 seconds** or the need for ancillary obstetric maneuvers (McRoberts, suprapubic pressure, rotational maneuvers, or hands' and knees' positioning).

Key Indicator:Turtle sign (fetal head retracting against the perineum), often due to umbilical cord compression, making it an obstetric emergency.

Risk Factors:

- History of shoulder dystocia
- Macrosomia (>4.5 kg), Diabetes, Obesity (BMI >30)
- Induced labor, Prolonged/Arrested labor
- Postmaturity, Multiparity, Mid-pelvic instrumental delivery
- Fetal ascites, Anencephaly

Complications:

Maternal Complications	Neonatal Complications

• **Soft tissue injuries**: Lacerations of the bladder, urethra, vagina, anal sphincter, or rectum
• **Nerve injury**: Lateral femoral cutaneous neuropathy
• **Postpartum hemorrhage**
• **Pelvic injury**: Symphyseal separation
• **Uterine rupture**
	• **Fetal death**
	• **Hypoxic-ischemic encephalopathy (HIE)**
	• **Fractures**: Clavicle or humerus
	• **Neurologic injuries**:
	  • Brachial plexus injury
	  • Diaphragmatic paralysis
	  • Facial nerve injury
	  • Horner syndrome (ptosis, miosis, anhidrosis)

Management of Shoulder dystocia:

1. **Avoid fundal pressure** (worsens impaction).

PREPLADDER

2. **Perform maneuvers sequentially:**
    - **McRoberts maneuver**: Involves hyperflexing and abducting the maternal thighs onto the abdomen, which rotates the symphysis pubis upward, straightens the sacrum, and increases the pelvic outlet, facilitating shoulder delivery.
    - **Suprapubic pressure**: Applied downward and laterally; it helps reduce the bisacromial diameter and rotates the anterior shoulder toward the oblique pelvic diameter, facilitating shoulder descent.
    - **Wood's corkscrew maneuver**: Involves rotating the posterior shoulder 180° to the anterior using two fingers in the posterior vagina while applying simultaneous suprapubic pressure to aid entry into the pelvis.
    - **Delivery of posterior arm**: The operator introduces a hand into the vagina, sweeps the posterior arm across the chest, and delivers it with gentle traction, reducing the shoulder width but potentially causing fractures.
    - **All-Fours (Gaskin) maneuver**: The mother is placed on all fours, which increases the pelvic dimensions and allows the fetal position to shift, making it easier to apply downward traction to free the impacted shoulder.
3. **Last-resort interventions** (if all fail):
    - **Cleidotomy:** Deliberate fracture of the clavicle using finger pressure or scissors to reduce shoulder width, performed in extreme cases when other maneuvers fail.
    - **Zavanelli maneuver**: Involves pushing the fetal head back into the uterus followed by emergency C-section, used as a last resort when vaginal delivery is impossible.
    - **Symphysiotomy:** To widen the pelvis. Rarely done, in extreme cases where all other options fail

Reference :

Williams Textbook of Obstetrics, 26th Edition, Pages 501, 502, 503

Learning Outcome :

62. Question :

A patient presents with a neck mass and laboratory findings of increased T4 and decreased TSH. The patient has a history of I-131 ablation therapy. Which of the following is a likely side effect of the treatment?

Option 1 :

Acute Thyroiditis

Option 2 :

Hypothyroidism

PREPLADDER

Option 3 :

Hyperthyroidism

Option 4 :

Thyroid Storm

Correct option :2

Solutions :

Answer: B) Hypothyroidism

- **I-131 ablation therapy** is commonly used for **Graves' disease, toxic nodules, or thyroid cancer**.
- It **destroys thyroid tissue**, leading to a **progressive decline in thyroid hormone production**, resulting in **hypothyroidism** over time.
- Patients often require **lifelong thyroid hormone replacement therapy (levothyroxine)**.

.

Side Effects of I-131 Therapy

Side Effect	Mechanism	Common in
Hypothyroidism (Correct Answer)	Destruction of thyroid tissue → ↓ **T4**, ↑ **TSH**	Most patients post-I-131 therapy
Acute Thyroiditis	Radiation-induced inflammation → temporary **thyroid pain, swelling**	Early post-treatment phase
Hyperthyroidism	**Thyrotoxic phase** due to sudden hormone release from damaged cells	Rare, transient
Thyroid Storm	Massive release of thyroid hormones **(life-threatening)**	Very rare, usually in untreated Graves'

Acute Thyroiditis (Option A) is incorrect because although I-131 therapy can cause **radiation thyroiditis**, this is a transient inflammatory reaction rather than a long-term side effect.

Hyperthyroidism (Option C): While a transient "flare" of hyperthyroidism can occur shortly after I-131 treatment due to the release of pre-formed hormones from damaged cells, it is not the primary long-term side effect

Thyroid Storm (Option D) is incorrect because thyroid storm is a severe, life-threatening hyperthyroid crisis typically seen in **untreated or inadequately treated hyperthyroidism**, not a direct consequence of I-131 therapy.

PREPLADDER

Reference :

https://www.ncbi.nlm.nih.gov/books/NBK555978/

https://jnm.snmjournals.org/content/49/12/2012

Learning Outcome :

63.Question :

A 27-year-old woman presents with irregular periods, acne & excessive hair growth. What is the first line management?

Option 1 :

Metformin

Option 2 :

Lifestyle modifications

Option 3 :

OCPs

Option 4 :

Clomiphene citrate

Correct option : 2

Solutions :

The given scenario is suggestive of **PCOS,** which is characterized by menstrual irregularities, hyperandrogenism, and polycystic ovaries on ultrasound. The **first-line management** of PCOS is **lifestyle modifications**, including weight loss, diet, and exercise. Even a 5% reduction in body weight can significantly improve hormonal balance, insulin sensitivity, ovulation, and metabolic outcomes.

Polycystic Ovary Syndrome (PCOS) Management:

Goals of Treatment: Managing menstrual irregularities, hirsutism, acne, infertility, and preventing long-term risks like metabolic syndrome.

1. Lifestyle Modifications

(First-line treatment for all PCOS patients)

- **Weight loss(>5% of body weight)** improves hormonal balance, increases SHBG, and reduces insulin & testosterone levels.
- **Smoking cessation** lowers DHEA & androgen levels while increasing estrogen levels.

PREPLADDER

2. Menstrual Cycle Regulation & Androgen Suppression

Treatment	Mechanism	Benefits
OCPs (First-line for menstrual regulation & hirsutism) (Option C)	Estrogen increases SHBG, reducing free testosterone; Progestogen suppresses LH & androgen production	Regulates cycles, reduces acne & hirsutism
Anti-androgenic OCPs (Preferred)	Cyproterone acetate or Drospirenone	Best for hirsutism & acne
Spironolactone + OCPs	Blocks androgen receptors	Reduces hirsutism & acne
Eflornithine Cream (Topical)	Inhibits hair growth	Used for facial hirsutism

3. Acne Management

- **Topical clindamycin (1%) or erythromycin (2%)** for mild cases.
- **Isotretinoin** for severe acne (teratogenic, avoid in pregnancy).

4. Ovulation Induction & Fertility Treatment

Drug	Mechanism	Benefits	Side Effects
Letrozole (Preferred Over Clomiphene Citrate)	Aromatase inhibitor	No anti-estrogenic effects on endometrium & cervix → higher pregnancy rates, monofollicular stimulation, no ovarian hyperstimulation syndrome (OHSS)	Drowsiness
Clomiphene Citrate (Option D)	Selective estrogen receptor modulator	Induces ovulation in 80%, conception in 40-45%	Anti-estrogenic effects on endometrium & cervix lower fertility, OHSS in <1%
Tamoxifen (Resistant Cases)	Estrogen receptor modulator	Used when Clomiphene fails (80-160 mg for 5 days)	–

PREPLADDER

Dexamethasone (Adjunct)	Lowers adrenal androgens	Improves ovulation outcomes	–

5. Insulin Sensitizers (For insulin resistance & metabolic issues)

Drug	Mechanism	Benefits and side effects
Metformin (Option A)	Improves insulin sensitivity, reduces hepatic glucose production, lowers testosterone levels	Benefits: Increases ovulation (70-80%), conception (30-40%). S/E: GI disturbances, lactic acidosis, avoid in liver/kidney disease
N-acetylcysteine (NAC) + Micronutrients	Lowers homocysteine, improves insulin resistance	Alternative to Metformin in some cases
Acarbose (Alternative to Metformin)	Delays glucose absorption	Used if Metformin is contraindicated

6. Surgery is reserved for cases where:

- Medical therapy fails
- Ovarian hyperstimulation occurs
- Infertility persists despite treatment
- Recurrent pregnancy losses

Procedure: **Laparoscopic ovarian drilling (LOD)** using laser or unipolar electrocautery, targeting **no more than four cysts per ovary.** This helps restore the endocrine balance and improves fertility for 6-12 months. However, pelvic adhesions from surgery may reduce fertility, which can be minimized using hydroflotation techniques.

Reference :

Shaw's Textbook of Gynecology, 17th Edition, Pages 314-318

Learning Outcome :

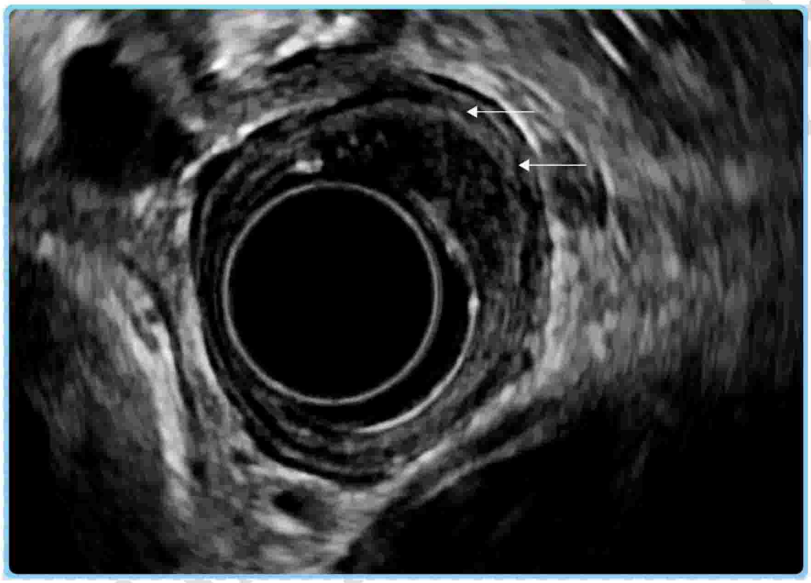
- First-line treatment: Lifestyle modifications (weight loss, smoking cessation).
- Hirsutism & Acne: Anti-androgenic OCPs, Spironolactone, Eflornithine cream, Acne treatments.

PREPLADDER

- Ovulation induction: Letrozole (preferred), Clomiphene, Tamoxifen (resistant cases).
- Insulin resistance: Metformin, NAC, Acarbose (if Metformin is contraindicated).
- Surgery: Laparoscopic ovarian drilling is done in cases where medical therapy fails, infertility persists, or hyperstimulation occurs.
- Long-term risks: Metabolic syndrome, diabetes, infertility.

64. Question :

Which of the following is a primary use of this imaging modality?



Option 1 :

Staging of esophageal cancer

Option 2 :

Evaluation of gastroesophageal reflux disease (GERD)

Option 3 :

Identifying the cause of dysphagia

Option 4 :

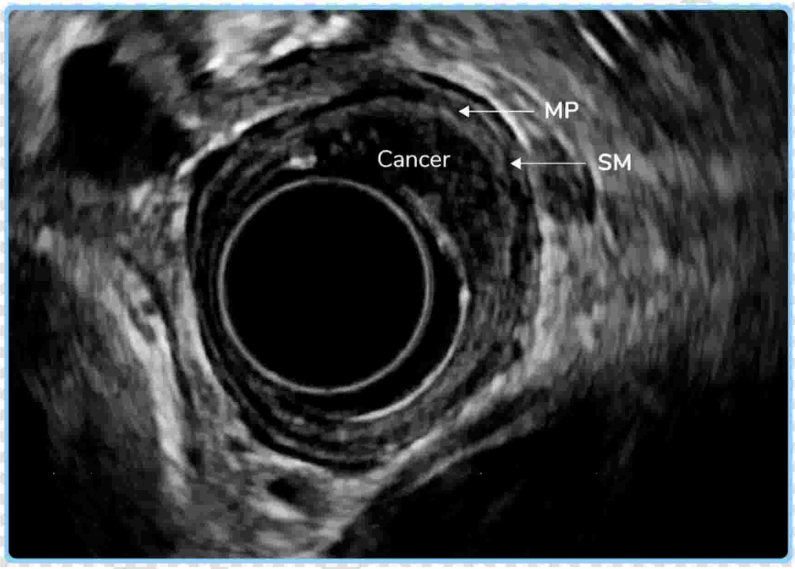
Assessing cardiac and aortic pathology

PREP

Correct option : 1

Solutions :

- **Endoscopic ultrasound (EUS)** is a high-resolution imaging modality that combines endoscopy with ultrasonography to provide detailed images of the gastrointestinal (GI) wall and adjacent structures.
- It is primarily used for **staging esophageal cancer**, allowing assessment of:
    - **Depth of tumor invasion (T stage)**
    - **Involvement of regional lymph nodes (N stage)**
    - **Adjacent mediastinal structures**
- EUS-guided **fine-needle aspiration (FNA)** can help in obtaining tissue samples from suspicious lymph nodes for accurate staging.



Applications of Endoscopic Ultrasound (EUS)

Application	Primary Use
Staging of esophageal cancer (Correct Answer)	Evaluates tumor depth and lymph node involvement
Pancreatic lesions	Detects and biopsies pancreatic cysts, tumors, or chronic pancreatitis
Subepithelial GI tumors	Differentiates between leiomyomas, GISTs, and neuroendocrine tumors
Biliary pathology	Detects choledocholithiasis and bile duct strictures

Rectal cancer staging	Determines depth of invasion and lymph node involvement

Evaluation of GERD (Option B): Incorrect because **GERD is typically assessed with pH monitoring, manometry, or upper endoscopy**, not EUS.

Identifying the cause of dysphagia (Option C): Incorrect because **barium swallow or esophagogastroduodenoscopy (EGD)** are first-line tests; EUS is used mainly for **cancer staging** or assessing **submucosal lesions**.

Assessing cardiac and aortic pathology (Option D): Incorrect because **transesophageal echocardiography (TEE), not EUS**, is preferred for cardiac/aortic evaluation.

Reference :

Bailey & Love's Short Practice of Surgery (28th Edition), Page:1135,1136,1137,1138,1139

Learning Outcome :

65. Question :

What is the hormonal check for pregnancy at home?

Option 1 :

Beta-HCG

Option 2 :

Estrogen

Option 3 :

Progesterone

Option 4 :

HPL

Correct option : 1

Solutions :

The **beta subunit of human chorionic gonadotropin (β-hCG)** is the earliest detectable hormone in pregnancy and is used in home pregnancy tests.

hCG is secreted by the syncytiotrophoblast after implantation, which occurs 5-6 days post-ovulation, and can be **detected in urine by 10 days post-ovulation.** Levels peak around 8-10 weeks of gestation and then plateau. hCG maintains the corpus luteum, ensuring continued progesterone production until the placenta takes over.

PREPLADDER

Estrogen (Option B)is essential for **pregnancy maintenance** but is not used for pregnancy detection. The placenta lacks 17-hydroxylase and depends on fetal adrenal precursors (DHEA-S) to synthesize estrogen. It plays a role in uterine growth, blood flow regulation, and fetal development, but cannot confirm pregnancy at home.

Progesterone (Option C)is crucial for**pregnancy maintenance** and is produced by the corpus luteum until 10 weeks, after which the placenta takes over. It helps maintain the endometrium, suppresses the maternal immune response to fetal antigens, and prevents preterm labor. However, progesterone levels alone are not a reliable pregnancy test.

Human Placental Lactogen (hPL) (Option D)is secreted by the placenta and plays a role in maternal metabolism, enhancing **insulin resistance** to ensure glucose availability for the fetus. It also **stimulates lipolysis and protein metabolism**. While important in pregnancy, hPL is not used for pregnancy detection.

Reference :

William's Textbook of Obstetrics, 26th edition, Page 176

https://pmc.ncbi.nlm.nih.gov/articles/PMC3640235/

Learning Outcome :

ENDOCRINE CHANGES IN PREGNANCY		
INCREASE	**DECREASE**	**UNCHANGED**

PREPLADDER

• Prolactin • Growth Hormone • ACTH • Cortisol • Aldosterone • Testosterone • Calcitriol • Thyroid-binding globulin (TBG) • Total T4 • Total T3 • hCG • Human Placental Lactogen (hPL) • Insulin • PTH • Calcitonin	• FSH • LH • DHEAS (Dehydro epiandrostero ne sulfate)	• Free T3 • Free T4 • Vasopressin (ADH)

PREPLADDER

66. Question :

What is the investigation shown in the image?

Option 1 :

Intravenous Pyelogram (IVP)

Option 2 :

Retrograde Pyelogram

Option 3 :

Computed Tomography (CT) Urography

Option 4 :

Magnetic Resonance Urography

Correct option : 1

Solutions :

- **The image shows a contrast-enhanced study of the urinary tract**- with opacification of the renal calyces, pelvis, ureters, and bladder, which is characteristic of IVP.
- **IVP is a traditional imaging modality where intravenous contrast is used to outline the urinary system on serial X-rays.**
- **Used for detecting urinary tract obstructions, stones, and structural anomalies.**

Intravenous Pyelogram (IVP)

Feature	**Intravenous Pyelogram (IVP)**
Modality	X-ray with IV contrast
Indications	Urinary stones, hydronephrosis, congenital anomalies
Procedure	Contrast injected → serial X-rays taken at intervals
Findings	Normal renal function, filling defects, delayed excretion

Retrograde Pyelogram (Option B): Incorrect because **contrast is introduced via a ureteric catheter, not IV**, and it primarily evaluates the lower urinary tract.

CT Urography (Option C): Incorrect because **CT urography provides cross-sectional images with better resolution and 3D reconstruction, unlike IVP, which is a plain X-ray-based study.**

Magnetic Resonance Urography (Option D): Incorrect because **MR urography is non-ionizing, uses T2-weighted sequences, and does not show contrast excretion in real-time like IVP.**

PREPLADDER

Reference :

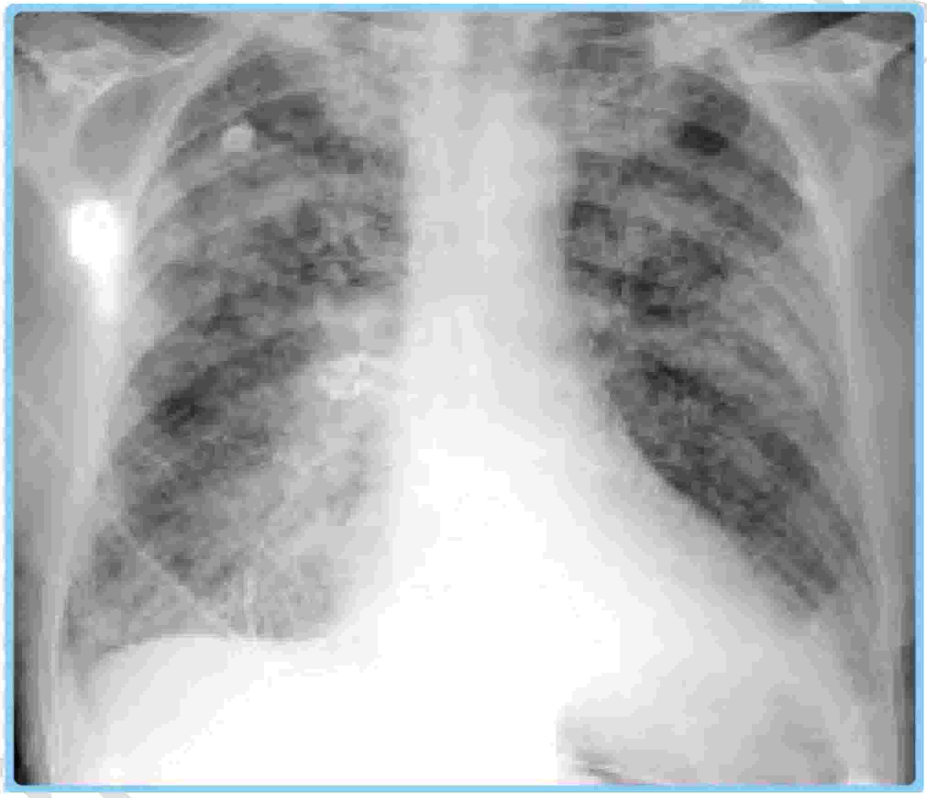
Grainger & Allison's Diagnostic Radiology 7th edition • Page no: 758, 760

Bailey & Love's Short Practice of Surgery - 28th Edition • Page no: 1467

Learning Outcome :

67. Question :

What is the most likely diagnosis?



Option 1 :

Pulmonary oedema

Option 2 :

Hydrothorax

Option 3 :

Pleural effusion

Option 4 :

Pulmonary fibrosis

Correct option :1

Solutions :

The provided chest X-ray appears to show **bilateral diffuse alveolar opacities**, which are characteristic of **pulmonary edema**.

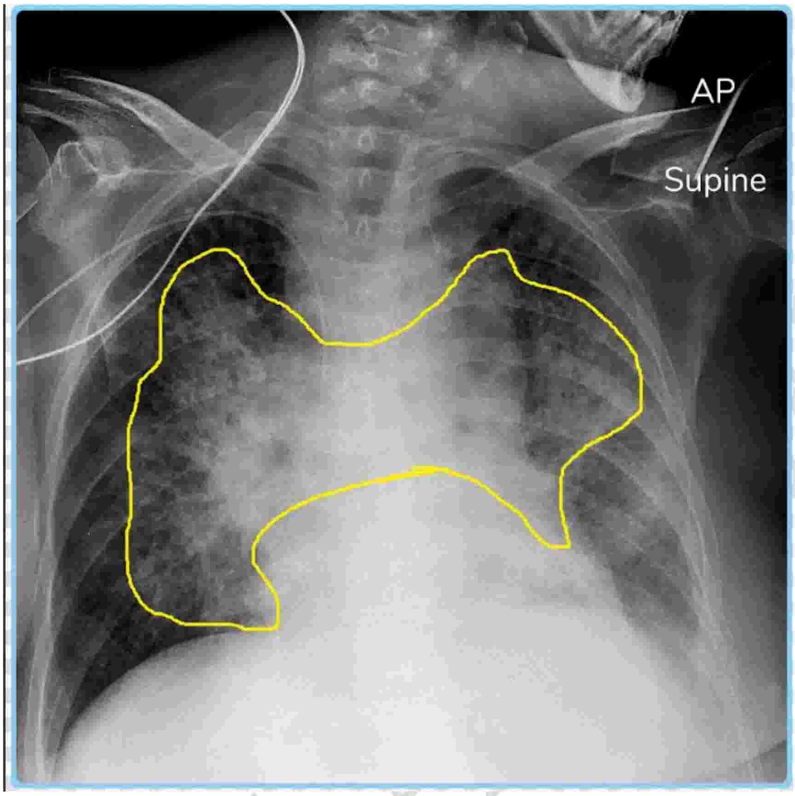
1. **Diffuse bilateral infiltrates** in a **butterfly or bat-wing pattern** are seen, which suggests pulmonary edema.
2. **Engorgement of pulmonary vessels** and **Kerley B lines** (septal lines) are often present.
3. The presence of a **central distribution of opacities sparing the periphery** is highly suggestive.
4. Cardiogenic pulmonary oedema often shows **an enlarged cardiac silhouette**, indicating heart failure as the underlying cause.

Pulmonary Edema

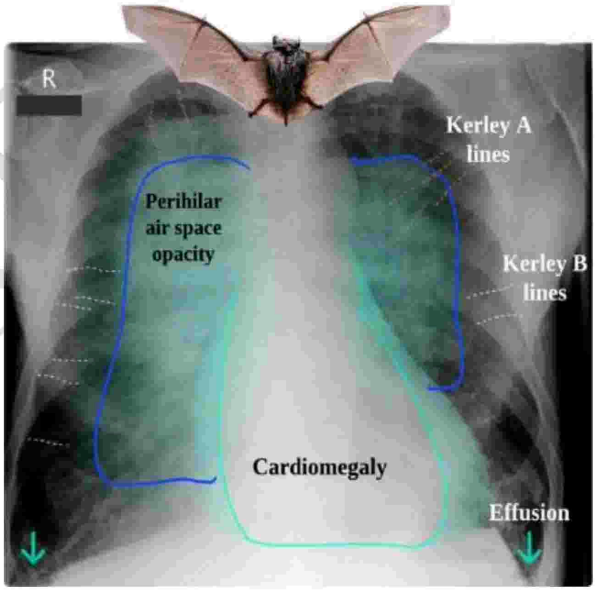
Feature	**Cardiogenic Pulmonary Edema**	**Non-Cardiogenic Pulmonary Edema**
Cause	Left heart failure, volume overload	ARDS, infections, sepsis, toxins
X-ray Findings	**A-A**lveolar oedema (Bat wings) **B-**Kerley **B** lines **C-C**ardiomegaly **D-D**ilated Upper lobe vessels **E-**Pleural **E**ffusion	Diffuse alveolar infiltrates, normal heart size
Symptoms	Dyspnea, orthopnea, pink frothy sputum	Severe hypoxia, respiratory distress
Treatment	Diuretics, nitrates, and oxygen treat CHF	Oxygen, and ventilatory support, treat the underlying cause

PREPLADDER

Xray findings of Cardiogenic pulmonary edema:



Chest X-ray showing Batwing appearance due to Alveolar edema



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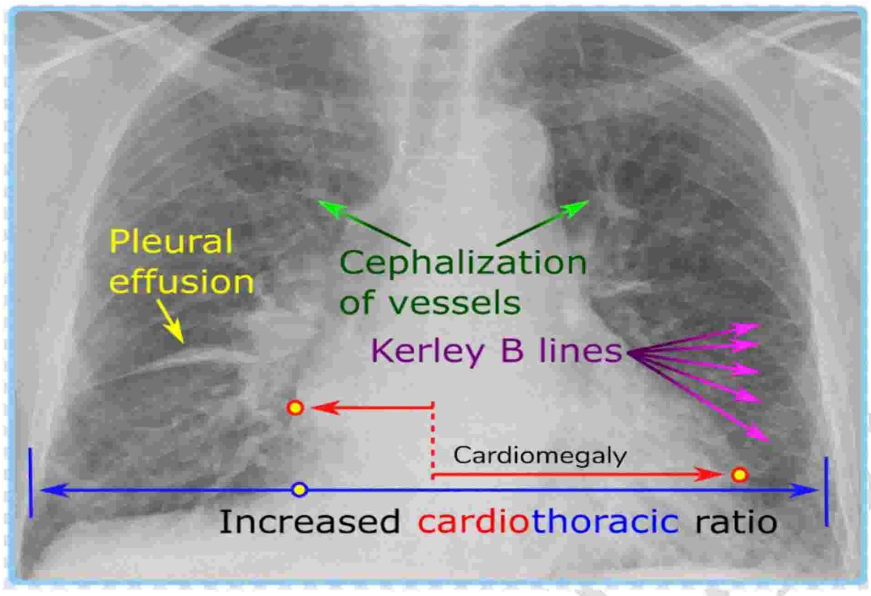


Chest X-ray showing Kerley B lines, Cardiomegaly, Dilated vessels of upper lobe and mild pleural effusion.

Hydrothorax (Option B): Incorrect because **hydrothorax refers to fluid in the pleural space** (pleural effusion due to CHF, liver disease), which appears as a **blunted costophrenic angle** and **fluid meniscus**, not diffuse infiltrates.

Pleural Effusion (Option C): Incorrect because pleural effusion appears as **homogeneous opacity with meniscus sign** rather than diffuse alveolar opacities.

Pulmonary Fibrosis (Option D): Incorrect because pulmonary fibrosis presents as **reticular opacities, honeycombing, and reduced lung volumes**, unlike the alveolar pattern seen here.

Reference :

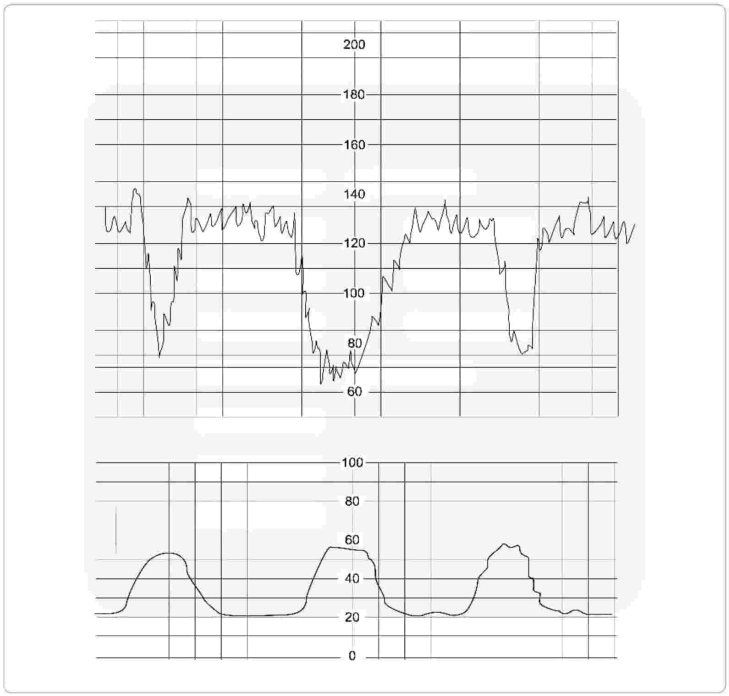
Grainger and Allison's Textbook of Diagnostic Radiology. 7th edition. Page. 251- 256

Learning Outcome :

68. Question :

Identify the CTG pattern?

PREPADDA



Option 1 :

Early deceleration

Option 2 :

Late decelarations

Option 3 :

Variable

Option 4 :

Normal

Correct option :

1

Solutions :

The given CTG image shows **early deceleration**.

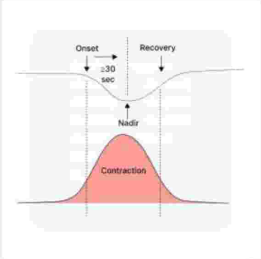
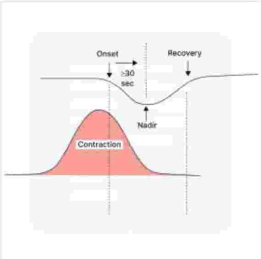
Early decelerations are characterized by a **gradual decrease and return of fetal heart rate (FHR) that mirrors uterine contractions**. The onset, nadir (lowest point), and recovery of the deceleration coincide with the beginning, peak, and end of the contraction. This pattern is typically benign and results from **fetal head compression**, commonly observed during active labor.

PREPLACER

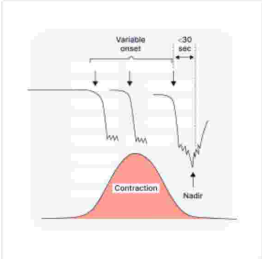
Interpretation of CTG :

- **Baseline FHR:** Average FHR between contractions (110-160 bpm). Abnormal ranges indicate fetal distress.
- **Baseline Variability:** Fluctuations in baseline FHR reflect nervous system balance. Reduced variability may indicate hypoxia, acidosis, or other factors.
- **Accelerations:** Transient FHR increases with fetal movement, indicating a healthy fetus with intact neurohormonal and cardiovascular function.
- **Decelerations:** Transient FHR decreases below baseline.

Types of Decelerations:

Type	Characteristics	Cause	
Early Decelerations	Gradual decline and recovery of FHR that coincide with the onset and recovery of the contraction. The nadir of the deceleration occurs **≥30 seconds** after onset. The nadir of the deceleration occurs **≥30 seconds** after onset.	Fetal head compression	Gradual decrease mirroring contractions. 
Late Decelerations	Gradual decline in FHR that begins **at or after** the contraction's peak and recovers after the contraction ends. The nadir occurs **≥30 seconds** after onset.	Fetal hypoxia, uteroplacental insufficiency	Begin after contraction peak, uniform U-shaped. 

PRELADER

Variable Decelerations	Abrupt FHR drop (≥15 bpm) with onset varying between contractions. Onset-to-nadir <30 sec, duration ≥15 sec but <2 min.	Umbilical cord compression	Abrupt, irregular, "V" or "W" shapes. 

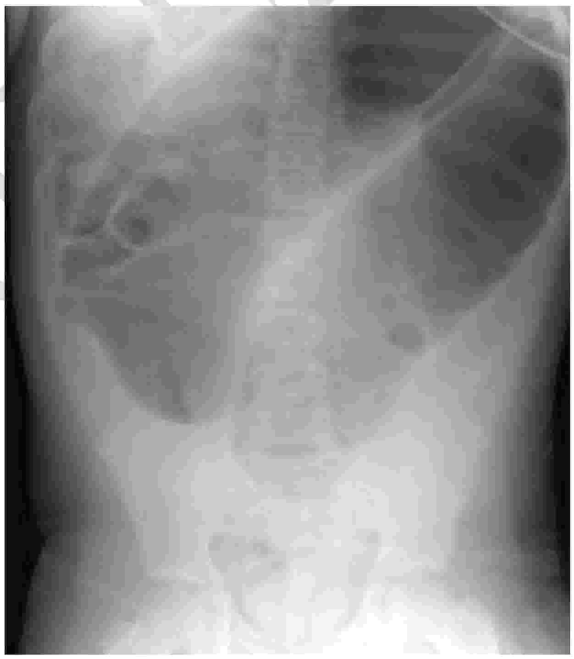
Reference :

William's Textbook of Obstetrics, 26th edition, Pages 451-453

Learning Outcome :

69. Question :

A 70-year-old patient presents with absolute constipation and abdominal distension. And the X-ray abdomen is given below. What is the most likely diagnosis?



Option 1 :

Caecal Volvulus

PREPLADDER

Option 2 :

Sigmoid Volvulus

Option 3 :

Intestinal Obstruction

Option 4 :

Small Bowel Volvulus

Correct option : 2

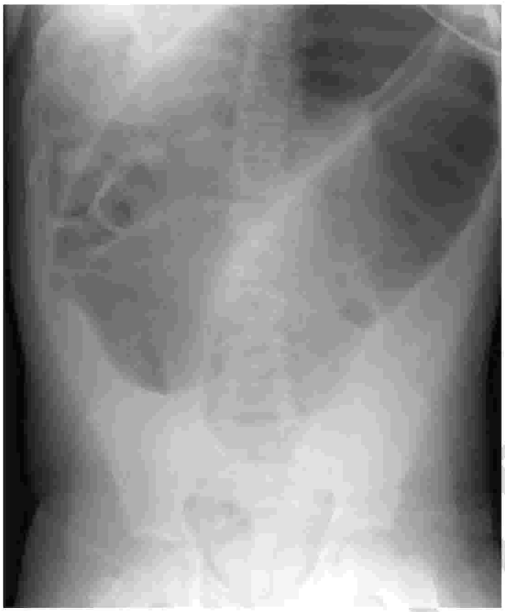
Solutions :

- **X-ray shows a characteristic "coffee bean sign"**- a large, dilated loop of bowel with an inverted U-shape, which is highly suggestive of sigmoid volvulus.
- **Clinical presentation of absolute constipation and abdominal distension** is typical of large bowel obstruction.
- **Sigmoid volvulus is common in elderly patients, especially those with chronic constipation, neurological disorders, or bed-ridden status.**
- **The transition point is usually at the sigmoid colon, without gas in the rectum.**

Sigmoid Volvulus

Feature	**Sigmoid Volvulus**
Etiology	Chronic constipation, long redundant sigmoid colon
Radiological Sign	Coffee bean sign on X-ray, bird's beak sign on contrast enema
Symptoms	Abdominal distension, pain, absolute constipation, vomiting
Treatment	Endoscopic detorsion (if no gangrene), surgery for recurrent cases

PREPLADDER



Caecal Volvulus (Option A): Incorrect because **caecal volvulus shows a kidney-shaped distended caecum** displaced to the upper abdomen, often with small bowel dilatation.

Intestinal Obstruction (Option C): Incorrect because **intestinal obstruction is a broad term** that includes various causes, whereas the X-ray here is specific for sigmoid volvulus.

Small Bowel Volvulus (Option D): Incorrect because **small bowel volvulus presents with central dilated loops with air-fluid levels** rather than the classical coffee bean sign.

Reference :

Bailey & Love's Short Practice of Surgery- 28th Edition, Page 1293, 1380, 1383, 1385, 1390

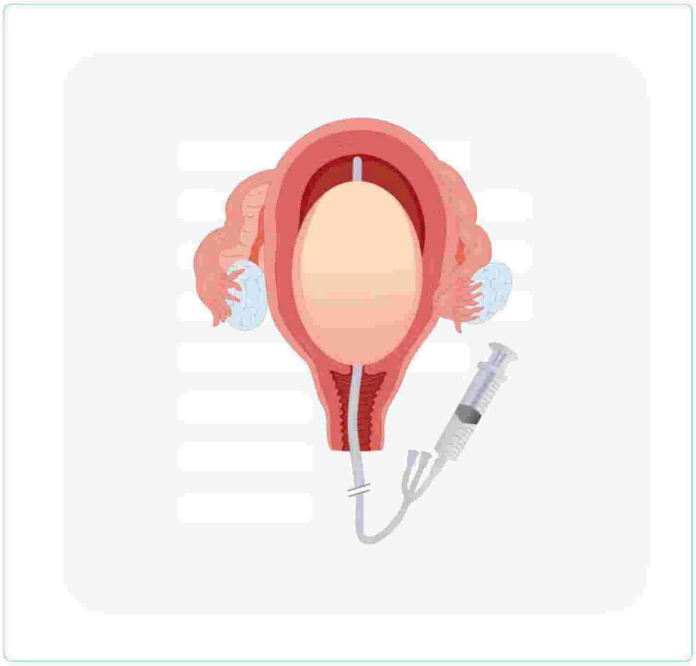
SRB's Manual of Surgery- 6th Edition, Page 922, 923.

Learning Outcome :

70.Question :

Spot the image.

PREPLADDER



Option 1 :

Balloon Tamponade

Option 2 :

Umbrella pack

Option 3 :

Parachute pack

Option 4 :

Cervical ablation

Correct option : 1

Solutions :

The given image depicts a Balloon Tamponade.

Balloon tamponade is a first-line intervention for **postpartum hemorrhage (PPH)**, particularly in **uterine atony**. Devices like the **Bakri balloon, Sengstaken-Blakemore tube, or Foley catheter** are inserted into the uterus and inflated with sterile fluid to provide direct mechanical compression of bleeding vessels. It is also useful in surgical or traumatic pelvic hemorrhage to prevent excessive blood loss.

An **umbrella pack (Option B)** is a surgical packing technique for severe pelvic hemorrhage, mainly used after **hysterectomy, placenta accreta spectrum, or trauma-related pelvic**

PREPLADDER

bleeding. A plastic bag filled with gauze rolls is inserted transabdominally, with a stalk exiting vaginally. Mild traction is applied using a fluid bag, allowing continuous compression—functioning like an umbrella expanding within the pelvis to tamponade bleeding.

A **parachute pack (Option C)** is a variation of the **umbrella pack,**primarily used in diffuse pelvic bleeding, especially after peripartum hysterectomy, placenta percreta, or coagulopathy. It consists of radiopaque vaginal packing enclosed in a sterile bag, with IV tubing weighted with a saline bag applying downward pressure, resembling a parachute's controlled descent. This technique is a **last-resort measure in PPH** or uncontrolled pelvic bleeding.

Cervical ablation (Option D) treats **cervical dysplasia or precancerous lesions** using cryotherapy, laser, or LEEP. It plays no role in postpartum hemorrhage or pelvic bleeding control.

Reference :

Williams Obstetrics 26th edition. Pg. 737, 742

Learning Outcome

71. Question :

A 20-year-old male patient presented with localized pain, which is gradual in onset and worsened over time. X-ray showed the following finding. What is the diagnosis?

Option 1 :

Osteosarcoma

Option 2 :

Ewing sarcoma

Option 3 :

Chondrosarcoma

Option 4 :

Gout

Correct option : 1

Solutions :

Osteosarcoma is a common primary bone tumor that often presents in adolescents and young adults with localized pain that worsens over time. It is typically seen in the metaphysis of long bones, and the X-ray findings often show a characteristic "sunburst" pattern or Codman's triangle.

Osteogenic Sarcoma (Osteosarcoma):

- **Most common primary malignant bone tumor** of non-hematopoietic origin/ solid malignant bone tumor.
- Age group: Bimodal age distribution peaking in adolescence (10–14 years) and again in the seventh decade.
- Gender: Males >> Female

PREPLADDER

Pathology:

- Origin: It arises from mesenchymal cells.
- Common site: From the metaphysis or meta-diaphysis.
- Order of frequency: Lower-end of the femur > upper-end of the tibia > upper-end of the humerus.

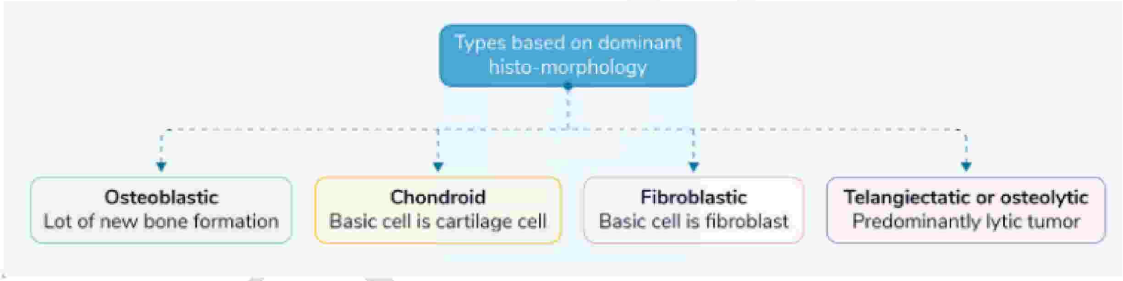
Types based on clinical setting

Primary osteosarcoma

- No known pre-malignant conditions related to it.
- Age group: 15-25 years

Secondary osteosarcoma

- Pre-malignant conditions are often associated with it.
- Paget's disease, multiple enchondromatosis, fibrous dysplasia, irradiation to bones, multiple osteochondroma.
- Older age group.



- All osteosarcomas are aggressive and metastasize widely through the **hematogenous** route, **typically to the lungs.**
- Despite its aggressiveness, it seldom penetrates the epiphyseal plate.

Histopathology: Anaplastic mesenchymal parenchyma with tumor cells surrounded by osteoid.

Clinical manifestation:

- Worsening pain and swelling, particularly night pain.
- Pathological fracture is rare.
- **On examination:**
    - Shiny skin with prominent veins over swelling.
    - Poorly defined, warm, and tender swelling.
    - Adjacent joint movement may be limited due to swelling.
    - The tumor may compress neurovascular structures, causing symptoms.

PRE

- Usually reactive enlargement of regional lymph nodes.

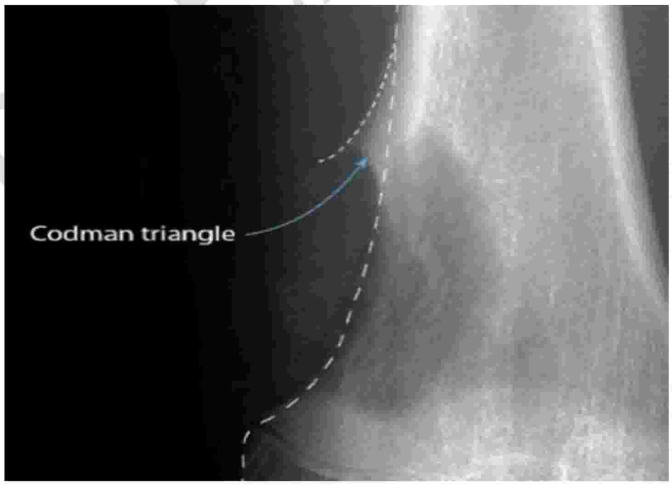
- Associated syndromes with osteosarcoma development:
  - Li–Fraumeni (p53 tumor suppressor gene mutation)
  - Hereditary retinoblastoma syndromes
  - Rothmund–Thomson syndrome

X-ray findings of osteosarcoma:

- Area of irregular destruction in the metaphysis. The cortex overlying the lesion is eroded.

Sun-ray appearance (aggressive periostitis): As the tumor grows into the overlying soft tissues new bone is laid down centrifugally along the blood vessels within the tumor.

- **Codman's triangle:** Elevation of periosteum by the growing tumor in the form of a triangle. **(Option C)**



CT scan is primarily used to assist with biopsy and disease staging.

PREPLADDER

Treatment

Combination of therapy:

- Surgical amputation is the treatment of choice- complete removal of the tumor must be ensured. Limb-salvage procedures have become possible and popular.
- Radiotherapy
- Chemotherapy
    - Doxorubicin
    - Cisplatin
    - Ifosfamide
    - Methotrexate
- **Follow-up:** Every 6-8 weeks. Evidence of recurrence of the primary tumor or appearance of the secondary (usually in the chest) is diagnosed early and treated.

Option B: Ewing sarcoma

- Typically occurs in children and adolescents.
- More common in the **diaphysis** of long bones (e.g., femur, pelvis).
- X-ray shows an **onion-skin (lamellated) periosteal reaction** and **moth-eaten appearance** due to aggressive bone destruction.
- Associated with **t(11;22) translocation**.

Option C: Chondrosarcoma

- More common in older adults (>40 years).
- Arises in the **pelvis, femur, or proximal humerus**.
- X-ray shows a **rings and arcs (popcorn) calcification pattern** due to cartilaginous matrix production.

Option D: Gout

- A metabolic disorder causing **monosodium urate crystal deposition**.
- Typically affects the **1st metatarsophalangeal joint (podagra)** but can involve other joints.

X-ray findings include **punched-out erosions with overhanging edges (rat-bite lesions)**, not the characteristic periosteal reactions seen in osteosarcoma.

Reference :

Apley and Solomon's System of Orthopaedics and Trauma, 10th Edition, Page 206

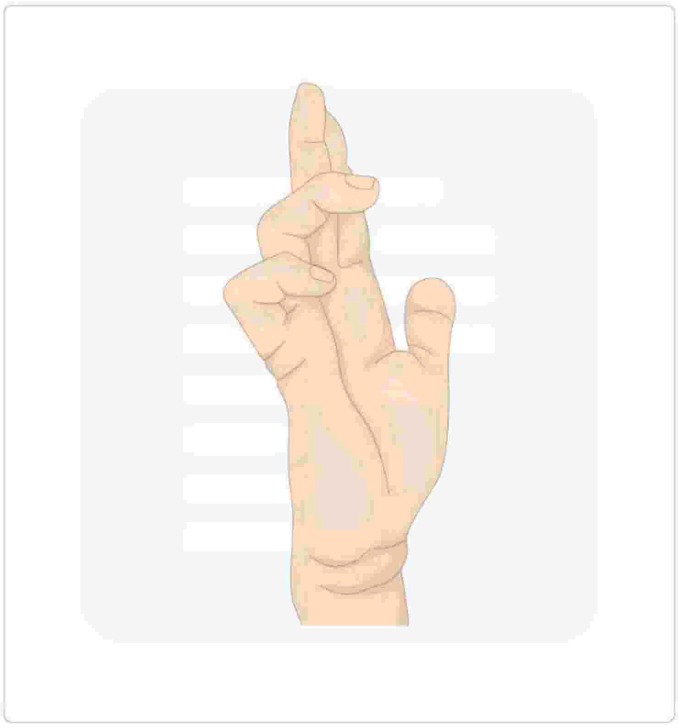
PREPLADDER

https://www.ncbi.nlm.nih.gov/books/NBK549868/

Learning Outcome :

72. Question :

Which nerve will be involved in the following finding on rest?



Option 1 :

Ulnar

Option 2 :

Median

Option 3 :

Musculocutaneous

Option 4 :

None

Correct option : 1

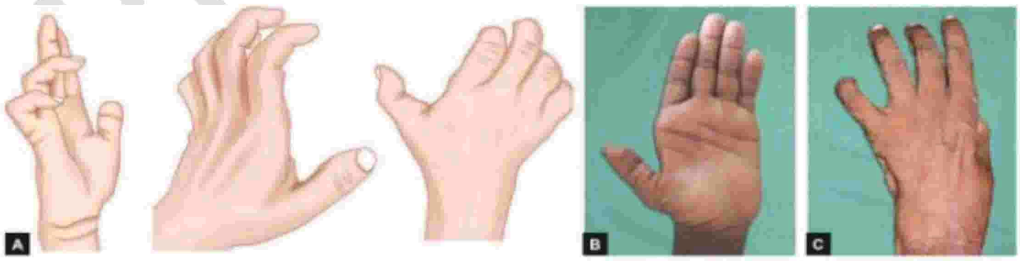
Solutions :

The image depicts "Ulnar Claw Hand," which occurs due to ulnar nerve injury. This deformity is characterized by:

- Hyperextension at the MCP joints
- Flexion at the PIP and DIP joints
- More pronounced in the 4th and 5th fingers

Deformities in ulnar nerve injury:

Partial claw hand:	• **Clawing:** Hyperextension of the metacarpophalangeal joints and flexion of interphalangeal joints. • Clawing is seen in 2 medial fingers only. • Seen in **pure ulnar nerve injury**. • Also known as the true claw hand.
Complete claw hand:	• Clawing of all 4 fingers. • Seen in combined **median + ulnar** nerve palsy
Tardy ulnar nerve palsy:	• Slow-onset (over years) ulnar nerve palsy. • Seen with cubitus valgus deformity seen in lateral epicondyle humerus fracture.
Other deformities:	• Wasting of hypothenar muscles & intrinsic muscles of the hand. • Hollow inter-metacarpal spaces in hand.



Figs 25.8A to C: (A) (1) Ulnar clawing, (2) Total clawing, and (3) Wasting of intermetacarpal spaces; (B) Hypothenar muscle wasting (Clinical photo); (C) Intermetacarpal spaces (Clinical photo)

Ulnar paradox:

- The higher the lesion, the less severe the deformity.

PREPLADDER

- **Reason:** Long finger flexors are paralyzed and loss of finger flexion makes the deformity less obvious.

Treatment of Ulnar claw hand:

Static procedure (removal)	• Zancolli Lasso procedure
Dynamic procedures (tendon transfer)	• Modified Bunnel technique • Brand's operation • Fowler's operation

Median nerve (Option B):

- Injury causes "Hand of Benediction" (inability to flex the 2nd and 3rd digits when attempting to make a fist).
- Loss of thumb opposition (ape hand deformity) in severe cases.

Musculocutaneous nerve (Option C):

- Primarily affects elbow flexion (biceps, brachialis).
- No significant hand deformities.

None (Option D):

- Incorrect, as this is a clear case of ulnar nerve injury.

Reference :

Apley and Solomon's System of Orthopedics and Trauma, 10th edition, Page 296-297

Campbell textbook of orthopedics, 14th edition - Page No. 3306-3308

Learning Outcome :

73. Question :

Identify the instrument:

PREPLADDER

Option 1 :

Bohler braun splint

Option 2 :

Thomas splint

Option 3 :

Volkmann splint

Option 4 :

Cramer wire

Correct option : 1

Solutions :

Bohler Braun Splint:

Structure & Mechanism:

- **Heavy metallic frame with four pulleys for traction:**
    1. Prevents foot drop.
    2. Applies traction in the line of the femur.

PREPLADDER

3. Traction in the supracondylar area of the femur.
4. Traction in the line of the leg.

Indications:

- Comminuted trochanteric fractures of the femur.
- Fracture shaft of the femur & supracondylar fractures.
- Occasionally used for tibial and fibular fractures.

Precaution:

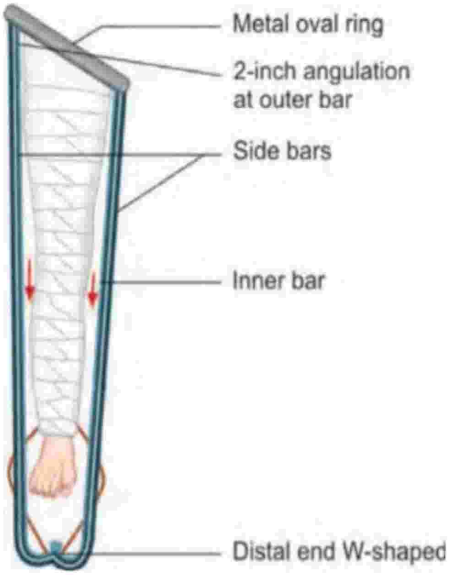
- Support should be given at the fracture site, not the knee joint to prevent angulation (especially in supracondylar fractures).

Problems:

1. Difficult nursing care.
2. Heavy and cumbersome.
3. Risk of recumbent complications (bedsores, pneumonia, renal calculi).

Thomas splint (Option B):

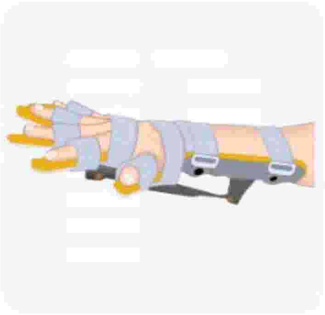
- Used primarily for femoral shaft fractures.
- Features a ring at the proximal end to support the thigh.



Volkmann splint (Option C):

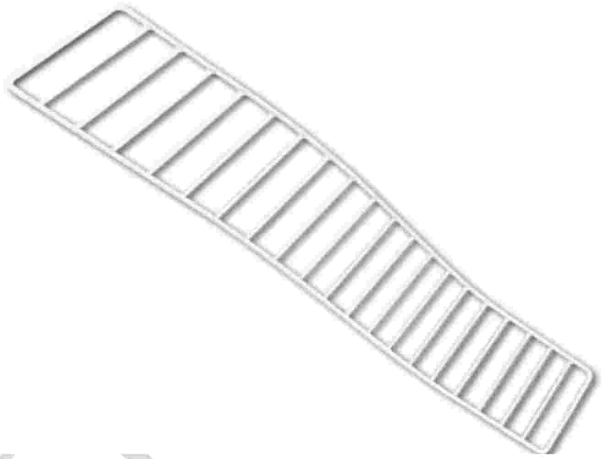
- Used for forearm fractures and immobilization of the wrist/elbow.
- Prevents contractures (e.g., Volkmann's ischemic contracture).

PREP LADDER



Cramer wire (Option D):

- A malleable metal splint used for temporary immobilization of fractures.
- Shaped according to limb contours.



Reference :

Textbook of Orthopaedics by John Ebnezar 5th Ed, Page, 61

Learning Outcome :

74. Question :

Which gene mutation is most commonly associated with Burkitt's lymphoma?

Option 1 :

C-myc

Option 2 :

P-21

Option 3 :

Rb

Option 4 :

p53

Correct option :1

Solutions :

Burkitt's lymphoma is a highly aggressive B-cell non-Hodgkin lymphoma that is strongly associated with a translocation involving the C-myc oncogene.

Burkitt's lymphoma.

- Burkitt's lymphoma is a highly aggressive B-cell non-Hodgkin lymphoma associated with the translocations of the MYC gene on chromosome 8, t(8:14).
- It has three primary subtypes:

1. **Endemic Burkitt's lymphoma:** Commonly affects children in malaria-endemic areas of Africa, often presenting with tumours in the jaw or facial bones.
2. **Sporadic Burkitt's lymphoma:** More frequently seen in non-endemic regions and usually involving the ileocaecal region and peritoneum.
3. **Immunodeficiency-associated Burkitt's lymphoma:** Found in patients with conditions such as HIV/AIDS or other forms of immunodeficiency.

P-21 (Option B):
P-21 (CDKN1A) is a **cyclin-dependent kinase inhibitor** that regulates the cell cycle by inhibiting cyclin-CDK complexes. It plays a role in cell cycle arrest but is not primarily associated with Burkitt's lymphoma.

Rb (Option C):
The **Retinoblastoma (Rb) gene** is a tumor suppressor that controls the G1/S checkpoint of the cell cycle. Its mutations are primarily associated with **retinoblastoma and osteosarcoma**, not Burkitt's lymphoma.

p53 (Option D):
The **p53 gene (TP53)** is a tumor suppressor involved in DNA repair and apoptosis. While TP53 mutations are found in various cancers, they are not the characteristic mutation seen in Burkitt's lymphoma.

Reference :

Robbin's Pathology, 10th edition, pg 601-602

PREPLADDER

Learning Outcome :

Burkitt's lymphoma has three primary subtypes, and almost all cases of Burkitt lymphoma are latently infected with Epstein-Barr virus (EBV)

1. 100% of endemic cases
2. 20% of sporadic cases
3. 25% of HIV-associated cases

75. Question :

What is the early sign of pregnancy on TVS?

Option 1 :

G sac

Option 2 :

Yolk sac

Option 3 :

Cardiac activity

Option 4 :

Fetal pole

Correct option :1

Solutions :

The gestational sac is the first visible structure on TVS, appearing at around 4.5 to 5 weeks of gestation.

Transvaginal sonography (TVS):

- Establish gestational age and confirm pregnancy location.
- More sensitive than Transabdominal sonography.
- **Structure identification:**

Structure	**Timing**
Gestational sac (1st sonographic evidence of pregnancy)	4-5 weeks
Yolk sac **(Option B)**	5.5 weeks

PREPLADDER

Fetal pole and cardiac activity **(Options C and D)**	5-6 weeks

- Intrauterine Pregnancy indicators:
    - **Eccentric implantation** of normal gestational sac in endometrium (pseudosac is seen in the midline).
    - **Intradecidual sign:** Anechoic center surrounded by a single echogenic rim

Double decidual sign: Two concentric echogenic rings surrounding the gestational sac.

Reference :

Williams obstetrics, 24th edition, Page 177

Learning Outcome :

76. Question :

A child presents with a right transverse palmar crease, a cardiac defect, survival into childhood, and mild intellectual impairment. What is the chromosomal abnormality most likely associated with these findings?

Option 1 :

Tetralogy

Option 2 :

Haploid

Option 3 :

Monosomy

Option 4 :

Mosaicism

Correct option :4

Solutions :

- The child's features (transverse palmar crease, cardiac defect, mild intellectual impairment) suggest Down syndrome (Trisomy 21).
- Mosaicism (1% of cases) occurs due to a post-zygotic mitotic error, leading to a mixture of normal and trisomy 21 cells.
    - This results in a milder phenotype with better cognitive and physical outcomes compared to full trisomy 21.

PREPLADDER

Down Syndrome (Trisomy 21):

Key Features:

- **Facial & Physical Features:** Flat facies, epicanthal folds, single palmar crease, incurved 5th finger, wide gap between 1st & 2nd toes.
- **GI & Cardiac Anomalies:** Duodenal atresia, Hirschsprung disease, congenital heart defects (e.g., ASD, AVSD).
- **Neurological & Hematological Risks:**
    - Intellectual disability (most common genetic cause).
    - Early-onset Alzheimer's disease (chromosome 21 codes for APP).
    - Increased risk of AML (<5 years) & ALL (>5 years).
- **Ophthalmologic:** Brushfield spots (whitish spots on the iris periphery).

Genetic Causes:

- **95% cases:** Meiotic nondisjunction, most often in meiosis I, linked to advanced maternal age.
- **4% cases:** Robertsonian translocation, typically t(14;21).
- **1% cases:** Mosaicism (post-zygotic mitotic error).

Diagnosis:

- **Prenatal Screening:**
    - **First-trimester USG:** ↑ nuchal translucency, hypoplastic nasal bone.
    - **Serum Markers:**
        - ↑ hCG, ↑ Inhibin A
        - ↓ AFP, ↓ Estriol

Other Associations:

- Umbilical hernia (incomplete umbilical ring closure).
- **Mnemonic: "5 A's":**
    1. Advanced maternal age
    2. Atresia (duodenal)
    3. Atrioventricular septal defect
    4. Alzheimer's disease (early-onset)
    5. AML/ALL

Tetralogy (Option A):
This likely refers to Tetralogy of Fallot (TOF), a congenital heart defect. While TOF is seen in some syndromes (e.g., DiGeorge syndrome/22q11.2 deletion), it is not the defining chromosomal abnormality here.

PREPLADDER

Haploid (Option B):
Haploidy refers to a single set of chromosomes (23, n), which is not compatible with survival.

Monosomy (Option C):
Monosomy refers to the loss of an entire chromosome, such as Turner syndrome (45,X)

Reference :

https://pmc.ncbi.nlm.nih.gov/articles/PMC8428796/

Learning Outcome :

77. Question :

Which is the nodal ministry of disaster management?

Option 1 :

Ministry of Health and Family Welfare

Option 2 :

Ministry of Home Affairs

Option 3 :

Ministry of Human Resource and Development

Option 4 :

Ministry of Education

Correct option :2

Solutions :

Disaster management in India is overseen by the **Ministry of Home Affairs (MHA)** through the **National Disaster Management Authority (NDMA)**. The MHA is responsible for formulating policies, coordinating responses, and ensuring preparedness for disasters.

The NDMA, established by the Disaster Management Act (2005), prepares national-level disaster management plans and coordinates disaster management efforts across India. It plays a key role in disaster response and mitigation at the national level.

Disaster Management Act (2005):

- Established the National Disaster Management Authority (NDMA) and State Disaster Management Authorities (SDMAs).
- Provides a legal framework for disaster management in India.

PREPLADDER

National Disaster Management Authority (NDMA): • Prepares national-level disaster management plans and oversees their execution. • Key agency for disaster management coordination in India.
National Institute of Disaster Management: • Located in New Delhi, it focuses on capacity building, training, and research. • Aims to strengthen national disaster response capabilities.
Role of State Governments: • Direct responsibility for executing relief efforts post-disaster. • Supported by the Union government through the Calamity Relief Fund (3:1 contribution ratio).
Ministry of Home Affairs (MHA): (Option B) • Nodal ministry for overall coordination of disaster management. • Chaired by the Prime Minister, it oversees disaster response at the national level.
National Crisis Management Committee (NCMC) and Cabinet Committee on Security (CCS): • Involved in high-level decision-making for disaster management in India.
Emergency Medical Relief Wing: • Operates under the Ministry of Health and Family Welfare, coordinates health-related activities during disasters.

Ministry of Health and Family Welfare (Option A) is incorrect because while it plays a crucial role in handling public health emergencies (e.g., disease outbreaks), it is not the nodal ministry for overall disaster management.

Ministry of Human Resource and Development (Option C) is incorrect because it primarily deals with education and skill development, not disaster management.

Ministry of Education (Option D) is incorrect because it focuses on educational policies and institutions rather than disaster response and management.

Reference :

Park's Textbook of Preventive and Social Medicine, 27th edition, page 928, 929

PREPLADDER

Learning Outcome :

78.Question :

An elderly man presents with an ulcerative lesion at the inner canthus of his eye with pearly margins. On microscopic examination, it shows a palisading arrangement of cells. Identify the lesion:

Option 1 :

Squamous cell carcinoma

Option 2 :

Basal cell carcinoma

Option 3 :

Keratoacanthoma

Option 4 :

Melanocytic melanoma

Correct option : 2

Solutions :

Correct answer: B) Basal cell carcinoma

Explanation:

- The ulcerative lesion at the inner canthus of the eye with pearly margins is highly suggestive of basal cell carcinoma (BCC).
- The microscopic finding of palisading cell arrangement (tumor cells lining up in a row at the periphery) is a classic histopathological feature of BCC.

Basal cell carcinoma

- Aka rodent ulcer
- BCC is a slow-growing, locally invasive tumor and it rarely metastasizes.
- It arises from pluripotent cells within the basal layer of the epidermis or follicular structures.

Clinical Features:

- It presents initially small, scaly plaque
- Slow progressive course of peripheral extension
- Develops into nodular-ulcerative lesions, it has a thread-like margin, telangiectasia and it bleeds on touch.

PREPLADDER

Site: Face, Around eyes, Nose

Histopathology: peripheral palisading of tumour cells (shown in the image), the cells resemble cells of **stratum basale** that have grown into the dermis. This cluster of cells is surrounded at the **periphery by perpendicularly arranged cells**. It also has a well-organized stroma surrounding it.

Treatment

- Medical: Imiquimod, 5-FU,Intralesional interferon α-2b
- Hedgehog pathway inhibitors:(Vismodegib)
- Surgical:
    - Mohs micrographic surgery is done in recurrent BCCs.

Squamous cell carcinoma (SCC) (Option A): SCC presents with keratin pearls, intercellular bridges, and more aggressive behavior, usually affecting the lower lip and sun-exposed areas.

Keratoacanthoma (Option C): A rapidly growing, dome-shaped lesion with a central keratin plug, often resolving spontaneously.

Melanocytic melanoma (OptionD): Characterized by atypical melanocytes, pagetoid spread, and high metastatic potential, often pigmented and not classically ulcerative with pearly margins.

Reference :

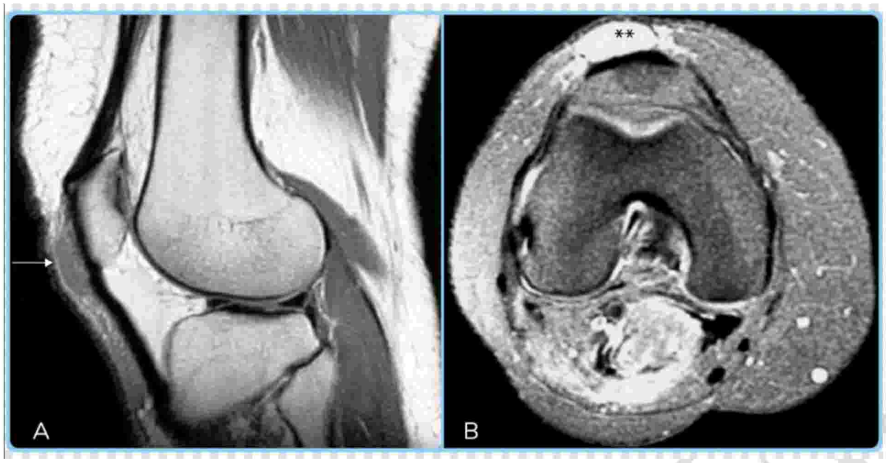
Rooks textbook of dermatology, 9th edition page no.141.4-141.6

Learning Outcome :

79. Question :

A 42-year-old woman laborer presented with visible, soft, and fluctuating swelling in front of the knee, over the patella and some discomfort or difficulty with knee movement, MRI findings are given below. What is the diagnosis?

PREPLADLER



Option 1 :

Housemaid's knee

Option 2 :

Subdermal abscess

Option 3 :

Gout

Option 4 :

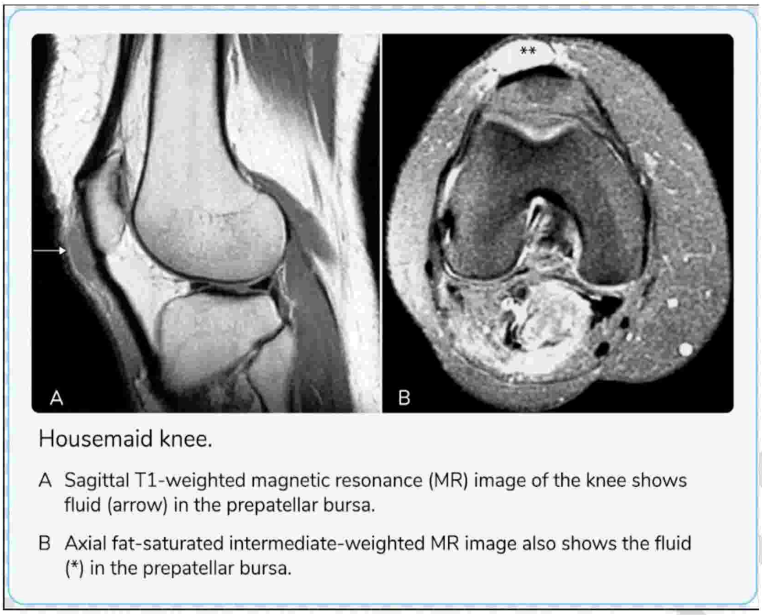
Rheumatoid arthritis

Correct option :1

Solutions :

- Housemaid's knee refers to prepatellar bursitis, which is the inflammation of the prepatellar bursa, a fluid-filled sac in front of the knee. This condition is often seen in people who kneel frequently, such as laborers, leading to repetitive trauma or pressure over the knee.
- The soft, fluctuating swelling over the patella is a classic sign of this condition, and discomfort or difficulty with knee movement is common.
- The MRI findings would likely show fluid accumulation in the prepatellar bursa, supporting this diagnosis.

PREPLADDER



Housemaid knee.

A Sagittal T1-weighted magnetic resonance (MR) image of the knee shows fluid (arrow) in the prepatellar bursa.

B Axial fat-saturated intermediate-weighted MR image also shows the fluid (*) in the prepatellar bursa.

Bursa Around Knee:

- **Suprapatellar bursa:** Deep to quadriceps femoris. Communicates with knee joint.
- **Prepatellar bursa:** Lies over the superficial surface of patella.
- **Housemaid's knee –** Prepatellar bursitis.
- **Infrapatellar bursa:** Lies over patellar ligament.
- **Clergyman's knee –** Infrapatellar bursitis.
- **Anserine bursa:** Lies between tibial collateral ligament and tendons of sartorius, gracilis, and semitendinosus.

Subdermal abscess (Option B): A subdermal abscess would present as a localized, tender, and often red swelling, with a more pronounced risk of infection and pus accumulation. It would not present with a fluctuating swelling without infection.

Gout (Option C): Gout typically affects the big toe (podagra), and the knee joint involvement would present with intense pain, redness, and swelling, not a fluctuating swelling over the patella
Rheumatoid arthritis (Option D): Rheumatoid arthritis affects the joints symmetrically and is associated with systemic symptoms like fatigue and morning stiffness. It would typically cause joint deformities and stiffness rather than a localized swelling in front of the knee.

Reference :

https://www.ncbi.nlm.nih.gov/books/NBK557508/

Learning Outcome :

80. Question :

A total of 60 patients were diagnosed with COVID-19. Out of which,12 cases of deaths were reported. Calculate the Case fatality rate?

PREPLADDER

Option 1 :

20%

Option 2 :

30%

Option 3 :

40%

Option 4 :

10%

Correct option :1

Solutions :

The **Case Fatality Rate (CFR)** is calculated using the formula:

CFR% = (No. of deaths / Total diagnosed cases) x 100

Substituting the given values:

CFR = (12 / 60)×100 = 20%

It is calculated as the ratio of deaths to cases, without specifying a time interval, using the formula:

$$\text{CFR} = \frac{\text{Total number of deaths due to a particular disease}}{\text{Total number of cases due to the same disease}} \times 100$$

- CFR is a proportion, not a rate.
- CFR is typically used for acute infectious diseases (e.g., food poisoning, cholera, measles) but is less useful for chronic diseases due to the long and variable period from onset to death.
- The CFR for the same disease can vary across different epidemics due to agent, host, and environmental changes.
- CSR (Case survival rate) = 100-CFR

	Definition

PREPLADDER

Virulence	The degree of severity or harmfulness of a disease, measuring the proportion of severe or fatal cases.
Infectivity	The ability of a pathogen to establish an infection and spread among a population.
Pathogenicity	The ability of a microorganism to cause disease determines whether an infection will manifest as an illness.
Transmissibility (Communicability)	The ability of a disease to be transmitted from one host to another indicates how easily it spreads. This is measured by the secondary attack rate.

Reference :

Park's Textbook of Preventive and Social Medicine, 27th Edition, Page 66

Learning Outcome :

81.Question :

A girl presents with microcephaly and a high-pitched cry. Which of the following is the most likely chromosomal abnormality?

Option 1 :

Deletion

Option 2 :

Isochromosome

Option 3 :

Trisomy

Option 4 :

Mosaicism

Correct option :1

Solutions :

Microcephaly and a **high-pitched cry ("cat-like cry")** are classic features of **Cri-du-chat syndrome**, caused by a **deletion on the short arm of chromosome 5 (5p−)**

PREPLADDER

Cri-du-chat Syndrome (5p Deletion):

- **Cause:** Congenital deletion of the short arm of chromosome 5 (5p−).
- **Key Features:**
  - Microcephaly
  - **Hypotonia**
  - High-pitched "cat-like" cry
  - Moderate to severe intellectual disability
  - Epicanthal folds
  - Cardiac abnormalities (e.g., VSD)
- **Genotype:** 46, XX or XY, 5p−

Isochromosome (Option B): Isochromosome formation involves duplication of one chromosome arm (e.g., Turner syndrome, i(Xq)) but does not cause a high-pitched cry.

Trisomy (Option C): Trisomies (e.g., Trisomy 21, 18, 13) may cause microcephaly, but they typically have different facial dysmorphisms and no cat-like cry.

Mosaicism (Option D): Mosaicism leads to variable phenotypes, but it is not the primary cause of Cri-du-chat syndrome.

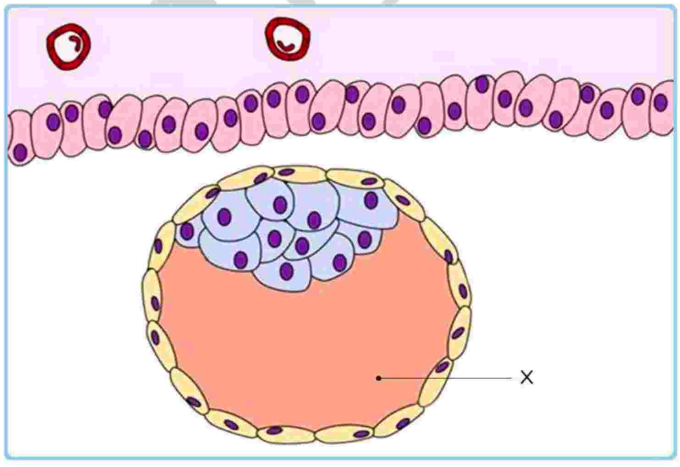
Reference :

https://www.ncbi.nlm.nih.gov/books/NBK482460/#:~:text

Learning Outcome :

82. Question :

What stage of embryonic development is shown in the following image?



DEEPLADDER

Option 1 :

Morula

Option 2 :

Ova

Option 3 :

Blastocyst

Option 4 :

Gastrula

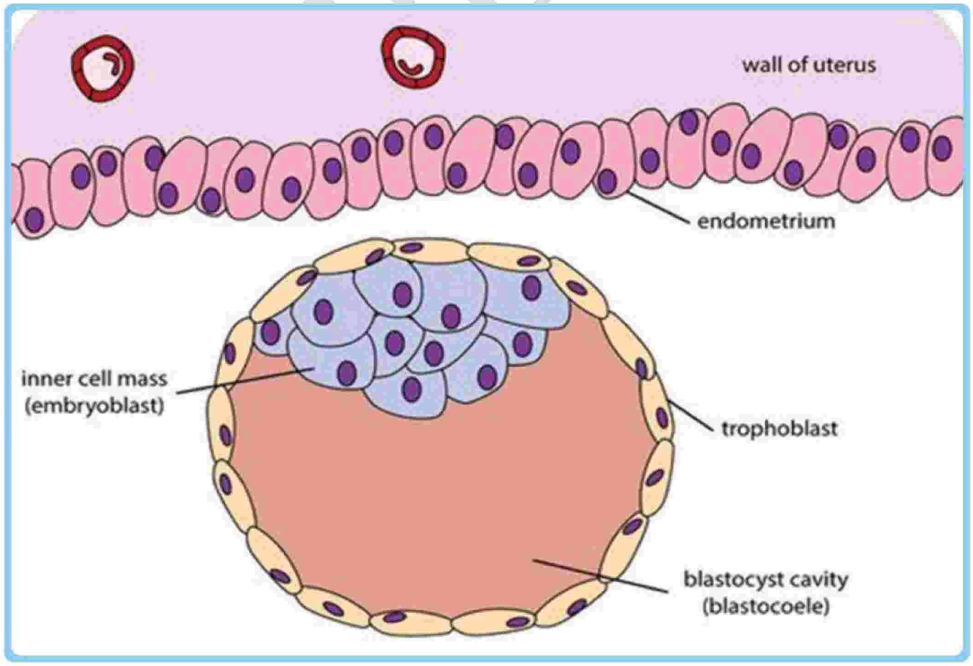
Correct option : 3

Solutions :

The first week of embryonic development begins with fertilization and progresses through cleavage, morula, and blastocyst formation, ending with the initial stages of implantation.

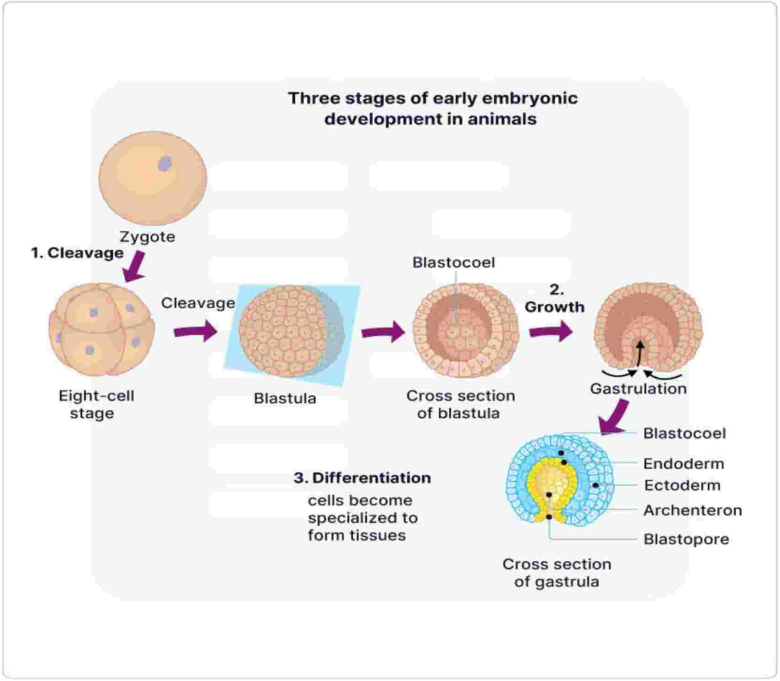
The given image represents a **blastocyst**, characterized by:

- A fluid-filled cavity **(blastocoel)**.
- An **outer trophoblast layer** (forms the placenta).
- An **inner cell mass** (forms the embryo).



PLADDER

DAY	EVENT
Day 0	Fertilization: The sperm fertilizes the egg in the fallopian tube, forming a zygote (single diploid cell)
Day 1	Two cell stage
Day 2	Four cell stage
Day 3	Twelve cell stage
Day 4	**Morula Formation:** The zygote becomes a solid ball of **16-32 cells. (Option A)**
Day 5	**Blastocyst Formation:** The morula continues to divide and develops a blastocoel, trophoblast, and inner cell mass
Day 6&7	**Implantation begins:** Blastocyst attaches to the endometrial lining of the uterus and trophoblast begins to invade the uterine wall to start implantation.
Day 14–21	**Gastrulation begins:** The inner cell mass differentiates into three germ layers (ectoderm, mesoderm, and endoderm), forming the **gastrula. (Option D)**



Ova (Option B): The unfertilized **egg cell (ovum)** before fertilization. It contains haploid genetic material and is surrounded by the zona pellucida.

Reference :

Langman's Medical Embryology, 14th edition, Pages 34,44, 59, 94

Learning Outcome :

83. Question :

A 9-month-old baby was admitted in the ICU with history of recurrent sinusitis and otitis media by staph aureus. Laboratory examination showed decreased serum IgA, IgG, IgM, IgE, and plasma B cells. Which of the following is the condition is described here?

Option 1 :

Ataxia telangiectasia

Option 2 :

Chronic granulomatosis disease

Option 3 :

Bruton syndrome

Option 4 :

Di George syndrome

Correct option : 3

Solutions :

The correct answer is **Bruton Syndrome** (X-linked agammaglobulinemia). The clinical presentation of a 9-month-old with **recurrent bacterial infections (sinusitis, otitis media) due to** Staph aureus**, low serum immunoglobulin levels, and absence of plasma B cells** is characteristic of **Bruton Syndrome (X-linked agammaglobulinemia).**

Bruton Syndrome is a primary immunodeficiency disorder caused by mutations in the **BTK (Bruton tyrosine kinase) gene**. This results in a failure of **B-cell maturation**, leading to a deficiency of mature B cells and, consequently, low levels of **all immunoglobulins (IgA, IgG, IgM, and IgE)** in the serum.

Features:

1. **Recurrent bacterial infections** – especially with encapsulated organisms like Staphylococcus aureus, Streptococcus pneumoniae, and Haemophilus influenzae.
2. **Sinopulmonary infections** – recurrent sinusitis and otitis media are common.
3. **Absence of mature B cells in peripheral blood** – leading to a lack of plasma cells, which are responsible for antibody production.
4. **Onset after maternal antibody wanes** – Symptoms usually appear around **6 months of age**, when the maternal IgG (passed through the placenta) is depleted.

PREPLADDER

5. **Low levels of IgA, IgG, IgM, and IgE** – due to defective B-cell development.

Incorrect options:

Ataxia Telangiectasia (Option A): Presents with ataxia, telangiectasias, and immunodeficiency (especially IgA deficiency), but it does not cause a complete absence of B cells and all immunoglobulins.

Chronic Granulomatous Disease (CGD)(Option B): Causes recurrent infections, but it is due to a defect in neutrophil function (NADPH oxidase deficiency) rather than low immunoglobulin levels.

DiGeorge Syndrome (Option D): Caused by **22q11.2 deletion**, leading to thymic hypoplasia and **T-cell deficiency** rather than B-cell deficiency. It is more associated with viral and fungal infections rather than recurrent bacterial infections like in Bruton Syndrome.

Reference :

https://www.ncbi.nlm.nih.gov/books/NBK448170/

Learning Outcome :

84. Question :

In a normal distribution, the mean value is 82, the SD is 1.5. Calculate the range of two standard deviations?

Option 1 :

79-85

Option 2 :

60-68

Option 3 :

50-57

Option 4 :

40-49

Correct option :1

Solutions :

In a normal distribution, **two standard deviations (±2 SD)** from the mean cover approximately **95.4%** of the data. The range is calculated as follows:

Calculation of Two Standard Deviations Range:

Lower limit:
$= \text{Mean} - (2 \times \text{SD})$
$= 82 - (2 \times 1.5)$

PREPLADDER

= 82 − 3
= **79**

Upper limit:
= Mean + (2 × SD)
= 82 + (2 × 1.5)
= 82 + 3
= **85**

Range of two standard deviations: 79–85

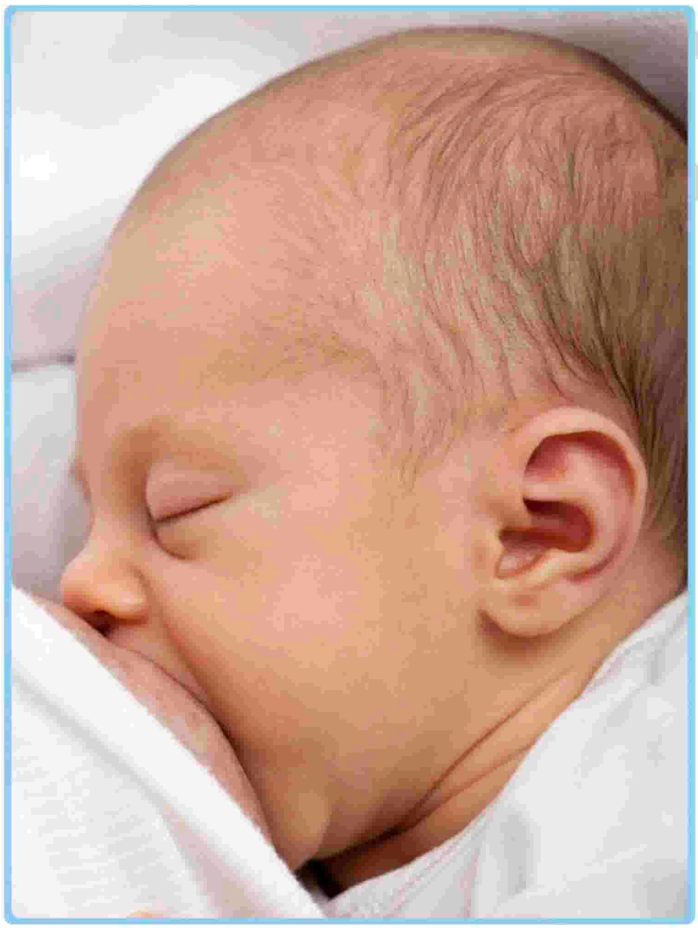
Reference :

Park's Textbook of Preventive and Social Medicine, 27th Edition, Page 976

Learning Outcome :

85. Question :

Hormone responsible?



Option 1 :

Oxytocin

Option 2 :

TSH

Option 3 :

GH

Option 4 :

FSH

Correct option :1

Solutions :

Breastfeeding is regulated by two key hormones:

- **Prolactin:** Stimulates milk production and maintains lactation.
- **Oxytocin:** Triggers the **milk ejection reflex (let-down reflex)** by contracting myoepithelial cells, facilitating milk flow through the ducts.

TSH (Option B): Regulates thyroid function, not involved in lactation.

GH (Option C): Promotes growth but does not influence breastfeeding.
FSH (Option D): Controls ovarian follicle development, unrelated to lactation.

Reference :

DC Dutta's Textbook of Obstetrics, 9th Edition, Pg.45,141

Learning Outcome :

86. Question :

Which of the following conditions is associated with Hollman miller's sign in the CT image given below?

Option 1 :

Juvenile nasopharyngeal angiofibroma

Option 2 :

Maxillary sinusitis

PREPLADDER

Option 3 :

Nasal polyp

Option 4 :

Rhinosporidiosis

Correct option :1

Solutions :

Holman-Miller sign (also called the **antral sign**) refers to the **anterior bowing of the posterior wall of the maxillary sinus** seen on **CT imaging**. This is a classic radiological feature of **Juvenile Nasopharyngeal Angiofibroma (JNA)**.

Investigations of Juvenile nasopharyngeal angiofibroma (JNA)	
Contrast-Enhanced CT Scan	• **Investigation of choice**; shows tumor size, location, and bony involvement. • Pathognomonic sign: Holman-Miller sign (bowing of maxillary wall).
Magnetic Resonance Imaging (MRI)	Evaluates soft tissue and intracranial extension, differentiates between extradural and intradural spread.
Digital Subtraction Angiography (DSA)	Visualizes tumor vascularity, identifies feeding vessels and aids in preoperative embolization to reduce surgical blood loss.
Nasopharyngoscopy	Provides a direct view of the tumor, but biopsy is generally avoided due to high bleeding risk.
Audiometry	Assesses hearing loss caused by Eustachian tube obstruction; establishes baseline and monitors post-treatment hearing.
Biopsy	Biopsy is **contraindicated** due to risk of profuse bleeding.

Other Options:

Maxillary sinusitis (Option B): Causes mucosal thickening and fluid collection but does not produce bony bowing.

Nasal polyp (Option C): Soft tissue lesion without bony remodeling or aggressive expansion.

PREPLADDER

Rhinosporidiosis (Option D): Fungal infection causing **friable polypoid masses** but does not cause the **Holman-Miller sign**.

Reference :

Diseases of Ear, Nose, Throat - PL Dhingra, 8th edition, Pg 790

Learning Outcome :

87. Question :

A child presents with recurrent Staphylococcus infections. Laboratory examination shows very low levels of immunoglobulins (G, A, M, E), and a low quantity of B cells. There is a normal reaction to environmental antigens on the skin. What is the most likely diagnosis?

Option 1 :

Bruton's agammaglobulinemia

Option 2 :

DiGeorge syndrome

Option 3 :

Hyper IgM syndrome

Option 4 :

Common variable immunodeficiency

Correct option :1

Solutions :

- Bruton's X-linked Agammaglobulinemia (XLA) is caused by a BTK gene mutation, leading to B cell maturation failure and very low levels of all immunoglobulins (IgG, IgA, IgM, IgE).
- It presents in infancy (after 6 months) with recurrent bacterial infections, especially with Staphylococcus and encapsulated bacteria.
- B cells are absent or very low, but T-cell function remains normal, explaining the normal skin reaction to environmental antigens.

Bruton's agammaglobulinemia or hypogammaglobulinemia:

- **X-linked recessive**, most commonly seen in **boys**.
- **Pathophysiology:**
    - Failure of pre-B cells to differentiate into immature B cells in the bone marrow - due to **the absence of Bruton's tyrosine kinase (BTK) enzyme.**

PREPLADDER

- As a result, there is a total absence of B cells and plasma cells in the circulation, with depressed serum levels of all classes of immunoglobulins.
- However, Pre-B cells are found in normal numbers in bone marrow and the T cell-mediated responses are also normal.
- The B cell maturation stops at pre-B cell stage; after the synthesis of heavy-chain without forming the light chains.
- Hence the cytoplasm of pre-B cell may have incomplete immunoglobulins

- **Clinical features:**
  - Recurrent bacterial infections.
  - Infections do not develop until **6 months** of age (when maternal antibodies are no longer active).
- **On examination:**
  - Tonsils may be difficult to visualize.
  - Cervical/inguinal lymph nodes may not be palpable.
- **Laboratory findings and other features:**
  - Marked reduction or absence of B cells in the peripheral circulation.
  - Immunoglobulin levels (IgG, IgM, and IgA) are low or undetectable.
  - Plasma cells are absent throughout the body.
  - T-cell-mediated reactions are normal.
- **Management:**
  - Immunoglobulin replacement therapy.
  - Antibiotics to treat infections.
  - **Live vaccines are contraindicated**

DiGeorge Syndrome (Option B): DiGeorge syndrome results from **22q11.2 deletion**, leading to **T-cell deficiency due to thymic hypoplasia**, whereas this case has a **B-cell deficiency**.

Hyper IgM Syndrome (Option C): Characterized by **high IgM with low IgG, IgA, and IgE** due to a **CD40L mutation**, but this case shows **low levels of all immunoglobulins**.

Common Variable Immunodeficiency (Option D): CVID also causes **low immunoglobulins**, but it typically presents **later in life (teens or adulthood)**, whereas XLA appears in **infancy**.

Reference

1. Robbins & Cotran Pathologic Basis of Disease, 10th Edition, Page 243, 244, 245
2. Harrison's Principles of Internal Medicine, 21st Edition, Page 2716, 2717
3. Davidson's Principles and Practice of Medicine, 24th Edition, Page 78
4. Essentials of Medical Microbiology, Apurba S Sastry, 3rd Edition, Page 209
5. https://www.ncbi.nlm.nih.gov/books/NBK549865/

PREPLADDER

Learning Outcome :

88. Question :

Which vaccine is contraindicated in pregnancy?

Option 1 :

Influenza

Option 2 :

Varicella

Option 3 :

Rabies

Option 4 :

TDaP

Correct option :2

Solutions :

Vaccination during pregnancy is crucial for maternal and fetal health, but certain vaccines are contraindicated due to potential risks. Live-virus vaccines (like **varicella vaccine**) pose a theoretical risk of fetal transmission and should be avoided during pregnancy.

Live Vaccines Contraindicated in Pregnancy:

- **Varicella**
- Measles, Mumps, Rubella (MMR)
- Yellow Fever
- Polio (Oral)
- Smallpox

These vaccines should be administered **at least one month before conception**, and pregnancy should be avoided during this period. However, accidental administration is not an indication for pregnancy termination.

Safe Vaccines in Pregnancy:

- **Toxoid-based vaccines** (e.g., **TDaP**, Tetanus)

Killed/Inactivated vaccines (e.g., **Influenza, Rabies, Hepatitis A & B,** Pneumococcus, Meningococcus)

PREPLADDER

Reference :

Williams Obstetrics, 26th Edition, Pages 166, 167

Learning Outcome :

89. Question :

A patient with CSOM was presented to the OPD with seizures. On examination and evaluation, homonymous hemianopia and epilepsy were present. Identify the condition with the CT scan given below?

Option 1 :

Temporal abscess

Option 2 :

Cerebellar abscess

Option 3 :

Extradural abscess

Option 4 :

Meningitis

PREPRINT

Correct option :1

Solutions :

The patient has **Chronic Suppurative Otitis Media (CSOM)** and presents with **seizures, homonymous hemianopia, and epilepsy**, and the CT finding (ring-enhancing lesion), is suggestive of **a temporal lobe abscess** is a known complication of **CSOM** due to the direct spread of infection via:

- **Tegmen tympani dehiscence** (erosion of the thin bony plate between the middle ear and the brain).
- **Hematogenous spread**.

Seizures and epilepsy occur due to **cortical irritation** from the abscess.

Homonymous hemianopia suggests **involvement of the optic radiations**, which pass through the **temporal lobe (Meyer's loop)**.

Other Options:

Cerebellar abscess(Option B): More commonly presents with **ataxia, nystagmus, and vertigo**, not homonymous hemianopia.

Extradural abscess(Option C): Causes **localized pain, fever, and sinus tenderness**, but does not typically lead to seizures or hemianopia.

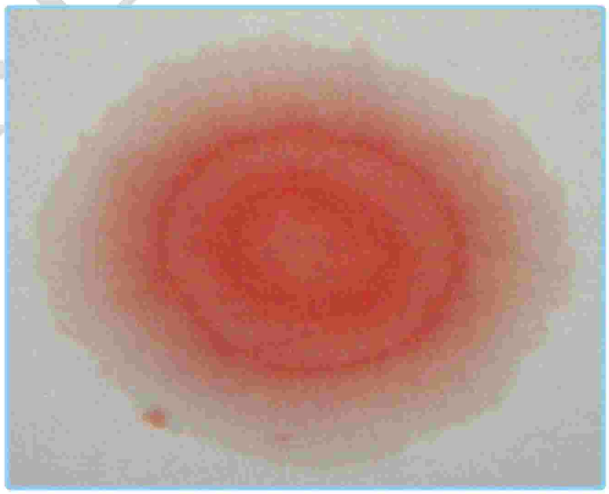
Meningitis (Option D): Presents with **fever, neck stiffness, altered mental status**, but does not usually cause **focal neurological deficits like homonymous hemianopia**.

Reference :

Learning Outcome :

90. Question :

Identify the sign given in the image below:



PREPLADDER

Option 1 :

Beta 2 transferrin sign

Option 2 :

Double target sign

Option 3 :

Handkerchief sign

Option 4 :

Tear drop sign

Correct option :2

Solutions :

Correct Answer:B) Double target sign

Explanation:

The **Double Ring Sign**, also called the **Halo Sign**, is a bedside test used to detect **CSF leakage** in cases of **CSF rhinorrhea or otorrhea** (leakage of cerebrospinal fluid from the nose or ear).

When a **fluid sample (suspected to be mixed with CSF)** is placed on a **filter paper or gauze**, it forms:

1. **An inner dark red ring** (blood)
2. **An outer clear ring** (CSF)

This occurs because **CSF is less dense and spreads outward**, forming a **halo or double ring pattern** around the blood.

Investigations for CSF Rhinorrhea

- **Handkerchief test (Halo sign) (Option C):** Simple bedside test; CSF forms clear halo around blood spot.
- **Beta-2 transferrin (Option A):** Gold standard biochemical test; highly specific for CSF.
- **High-Resolution CT (HRCT):** Identifies bony defects in skull base.
- **CT Cisternography:** Contrast-enhanced; precise localization of active CSF leaks.
- **MRI Cisternography:** Non-invasive; useful for identifying meningoceles/encephaloceles.
- **Fluorescein Test:** Intrathecal dye injection; helps in intraoperative leak localization.

Other Options:

The **Teardrop Sign (Option D):** on imaging refers to a **triangular-shaped soft tissue mass** often seen in **orbital trauma** or **orbital floor fractures**, indicating herniation of orbital contents.

PREPLADDER

Reference :

Diseases of Ear, Nose, Throat - PL Dhingra, 8th edition, Pg 567

Learning Outcome :

91. Question :

Which of the following vaccines is C/I in pregnancy?

Option 1 :

Influenza

Option 2 :

Varicella

Option 3 :

Rabies

Option 4 :

TDaP

Correct option :2

Solutions :

Live attenuated vaccines, including the varicella vaccine, are contraindicated in pregnancy due to the potential risk of fetal infection and congenital varicella syndrome. Pregnant women should be vaccinated **before conception or postpartum if not previously immunised**.

Immunization against chickenpox:

Passive immunization

PREPLADDER

Varicella zoster immunoglobulin (VZIG)

VZIG is given within 72 hours of exposure and is recommended for the prevention of chickenpox in exposed individuals like:

- HIV/AIDS or immunocompromised persons
- Immunosuppressive therapy patients
- Congenital cellular immunodeficiency
- Pregnant females, early neonates, premature infants or low birth weights
- Given to neonates if their mothers get chickenpox 5 days before or 2 days after delivery.

Dose: 12.5 units/kg with a maximum of 625 units, repeat the dose in 3 weeks if the high-risk patient remains exposed.

Active immunization

Vaccine	Live vaccine
Dose	0.5 ml subcutaneous route.
Schedule	Given in 2 doses, it is recommended for all. • If given < 13 years, the duration between two dosages should be 1-3 months • For >13 years, the duration between two doses is 4-6 weeks
Combination Vaccine	Chickenpox vaccine can be given as MMRV– measles mumps rubella varicella. • MMRV– administered to 9 months to 12 years of age • Two doses schedule with an interval of 4 weeks • However, it is preferred that the second dose be administered 6 weeks to 3 months after the first dose or at 4-6 years of age.
Post Exposure Prophylaxis	This can be done if there is known exposure to varicella virus; the vaccine should be given within 5 days of exposure.
Pregnancy	Vaccine is contraindicated

PREPLADDER

Influenza (Option A) is incorrect because the **inactivated influenza vaccine is recommended during pregnancy** to protect both the mother and the newborn from complications. However, the **live attenuated influenza vaccine (LAIV) is contraindicated**.

Rabies (Option C) is incorrect because the rabies **vaccine (both pre- and post-exposure prophylaxis) is safe in pregnancy**, as rabies infection is fatal, and prevention is crucial.

TDaP (Option D) is incorrect because the **Tetanus, Diphtheria, and Pertussis (TDaP) vaccine is recommended in every pregnancy (preferably between 27-36 weeks)** to provide passive immunity to the newborn against pertussis.

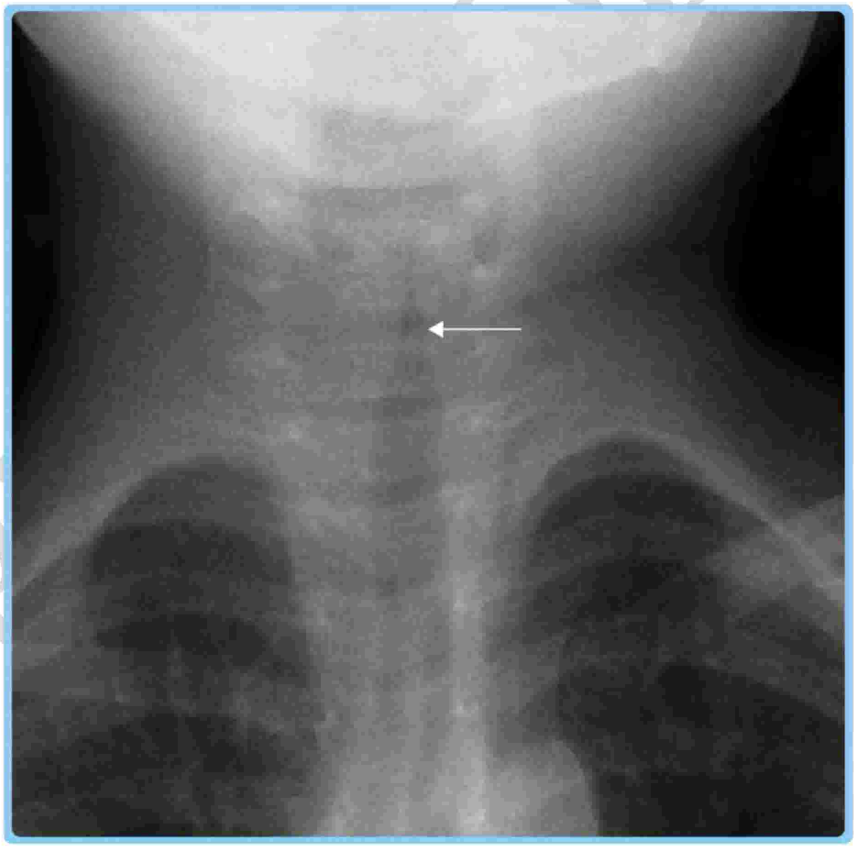
Reference :

Park's Textbook of Preventive and Social Medicine, 27th edition, Page 163

Learning Outcome :

92. Question :

A patient was presented to the OPD with a sudden onset of shortness of breath. Identify the condition with the radiological image given below.



Option 1 :

Epiglottitis

Option 2 :

Laryngotracheobronchitis

Option 3 :

Bronchitis

Option 4 :

Laryngomalacia

Correct option :2

Solutions :

The patient presents with **sudden onset of shortness of breath**, which is a common symptom of **respiratory distress** in children or adults. The **radiological image** shows the **"Steeple Sign"** or a **narrowing of the subglottic airway**, which is characteristic of **Laryngotracheobronchitis** (commonly referred to as **Croup**).

Other Options:

Epiglottitis (Option A): Characterized by **supraglottic narrowing**, often with a **thumbprint sign** on imaging, and presents with **severe respiratory distress** and **drooling**.

Laryngomalacia(Option D): A **congenital condition** causing **floppy epiglottis**, leading to **stridor** but typically diagnosed clinically, not with acute symptoms and not showing "steeple sign."

Bronchitis (Option C): Does not typically cause **subglottic narrowing**; it involves inflammation of the **bronchi** and is usually seen in **older children/adults** with **productive cough**.

Reference :

Diseases of Ear, Nose, Throat - PL Dhingra, 8th edition, Pg 456

Learning Outcome :

93. Question :

75% of iatrogenic ureteric injuries are due to gynaecological procedures. Which hysterectomy route has the least risk of ureteric injury?

Option 1 :

Laparoscopic

Option 2 :

Abdominal

PRELADDER

Option 3 :

Vaginal

Option 4 :

Robotic

Correct option :3

Solutions :

The least risk of ureteric injury is associated with vaginal hysterectomy.

- The order of risk of ureteric injury is: Vaginal < Abdominal < Laparoscopic.

Aspect	Vaginal hysterectomy	Abdominal hysterectomy
Indications	Small uterus, minimal pelvic pathology, pelvic organ descent.	Large pelvic masses, adhesions, oophorectomy, cancer staging, complex cases.
Recovery Time	Faster recovery and shorter hospital stay.	Longer recovery, longer hospital stay, increased postoperative pain.
Postoperative Pain	Lower postoperative pain.	Higher postoperative pain and risk of wound infection.
Operating Time	Shorter operating time compared to the abdominal approach.	Longer operating time than vaginal or laparoscopic approaches.
Injury Risk	**Lower urinary tract injury risk.**	Higher risk of urinary tract injury. **(Option B)** **Lower bladder injury risk.**
Complexity	Requires less technical expertise.	Requires higher technical expertise, especially in complex cases.
Access to Organs	Limited access to concurrent procedures.	Greater access to pelvic organs, ovaries, and upper abdomen for cancer staging or additional surgeries.
Suitability for Larger Uterus	Not ideal for large uteri or complex conditions.	Preferred for large uteri or complex conditions.

PREPLADDER

Cancer Risk	Preferred for non-cancer cases.	Caution with laparoscopic power morcellation in potential cancer cases.
Risks of Infection	Lower risk of infection.	Higher risk of postoperative fever and wound infection.

Laparoscopic (Option A) hysterectomy is associated with a higher risk of ureteral injury compared to abdominal or vaginal approaches. The risk arises due to the need for greater manipulation and access during the procedure, which can increase the likelihood of inadvertent damage to the ureters

Robotic (Option D) hysterectomy**:** Even though this is a minimally invasive surgery, it still poses a higher risk of ureter injury than vaginal hysterectomy.

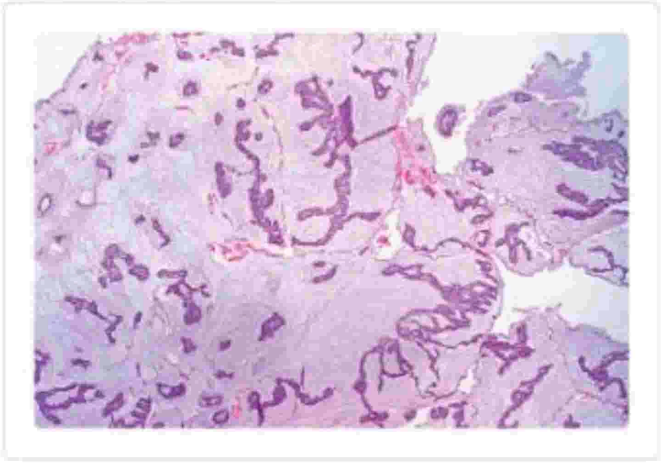
Reference :

https://www.semanticscholar.org/paper/OUTCOME-OF-URETERIC-INJURIES-IN-ABDOMINAL-AND-Sankareswari-GhurunaathT./3316e63e51bec0bc75a1543090bdb0aacc637bb1

Learning Outcome :

94. Question :

A 50 year old female presented with a breast mass that was operated and the microscopic examination in given. What is the diagnosis?



Option 1 :

Lobular carcinoma breast

PREPLADDER

Option 2 :

Medullary carcinoma

Option 3 :

Mucinous carcinoma breast

Option 4 :

Phylloids tumour

Correct option :3

Solutions :

- Mucinous carcinoma, also known as **colloid carcinoma**, is a rare subtype of **invasive ductal carcinoma** of the breast, typically occurring in **postmenopausal women**.
- It is characterized by tumor cells floating in abundant extracellular mucin, which is a hallmark feature seen on microscopic examination.
- Clinically, it presents as a **slow-growing, well-circumscribed breast mass**, often with a favorable prognosis due to its lower likelihood of metastasis compared to other invasive breast cancers.

Lobular Carcinoma of the Breast **(Option B):** Lobular carcinoma is characterized histologically by single-file infiltration of tumor cells due to loss of E-cadherin expression. It typically presents with a diffuse, ill-defined mass rather than a well-circumscribed mucinous appearance.

Medullary Carcinoma **(Option C):** Medullary carcinoma is a rare subtype of breast cancer that is associated with lymphoplasmacytic infiltration, poorly differentiated cells, and a syncytial growth pattern. It lacks the mucin pools seen in mucinous carcinoma.

Phyllodes Tumor **(Option D):** Phyllodes tumors are **fibroepithelial neoplasms** that can be benign, borderline, or malignant. Histologically, they show **leaf-like stromal projections** with **stromal overgrowth**, which differentiates them from mucinous carcinoma. Unlike mucinous carcinoma, they do not have mucin-filled spaces.

Reference :

Robbins Basic Pathology, 11th Edition, Page no: 345

Learning Outcome :

95. Question :

A post menopausal women presents with irregular bleeding, endometrium biopsy shows endometrial hyperplasia without atypia. What is the likely management?

PREPLADDER

Option 1 :

OCP

Option 2 :

Estradiol

Option 3 :

LNG-IUS

Option 4 :

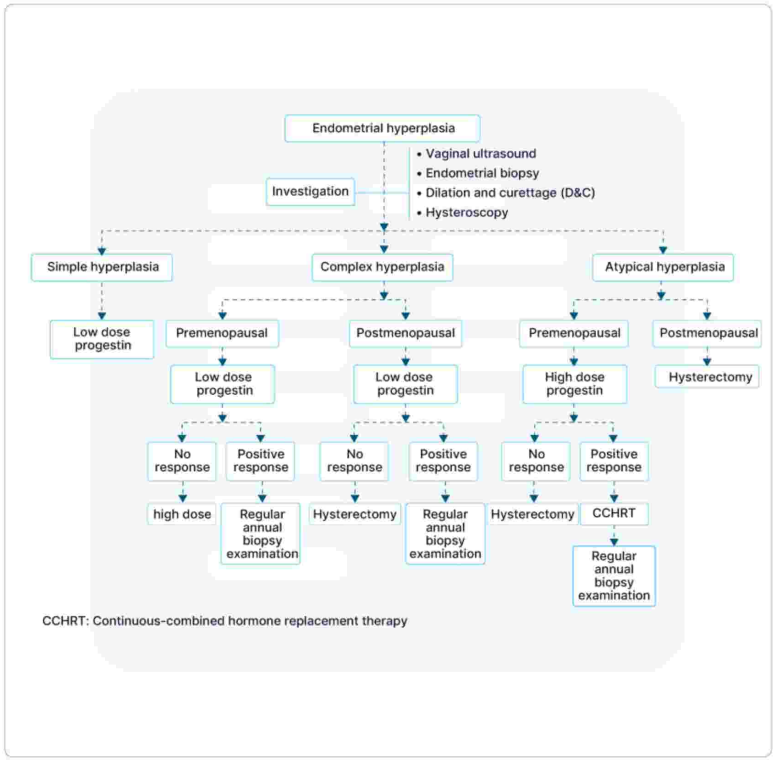
Danazol

Correct option : 3

Solutions :

Endometrial hyperplasia without atypia is a benign condition with a low risk of progression to endometrial cancer.

- In postmenopausal women, first-line management typically involves **progestin therapy**, either systemically or via the **Levonorgestrel Intrauterine System (LNG-IUS).**
- If there is no response to medical management or recurrent symptoms, **hysterectomy** is considered.



ADDER

CCHRT: Continuous-combined hormone replacement therapy

OCPs (Option A) contain estrogen and progestin, but estrogen can worsen hyperplasia. They are not suitable for postmenopausal women due to the risk of disease progression.

Estradiol (Option B): Unopposed estrogen therapy stimulates endometrial proliferation, **exacerbating hyperplasia** and increasing cancer risk. It is strictly avoided in this condition.

Danazol (Option D): Danazol, an androgenic agent, has significant side effects and is less effective than progestin therapy, making it an outdated choice.

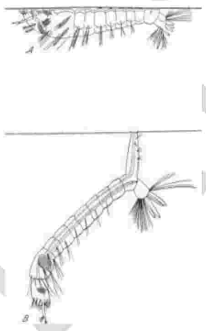
Reference :

https://www.researchgate.net/publication/282872506_Therapeutic_Options_for_Management_of_Endometrial_Hyperplasia_An_Update

Learning Outcome :

96. Question :

Identify A and B in the image of the mosquito larvae given



Option 1 :

A-Culex, B-Aedes

Option 2 :

A-Anopheles, B-Culex

Option 3 :

A-Culex, B-Anopheles

Option 4 :

A-Anopheles, B-Mansonia

Correct option :2

PREPLADDER

Solutions :

Answer: B) A-Anopheles, B-Culex

Explanation:

Mosquito larvae can be identified based on their **resting position in water** and **breathing structures (siphon presence/absence).**

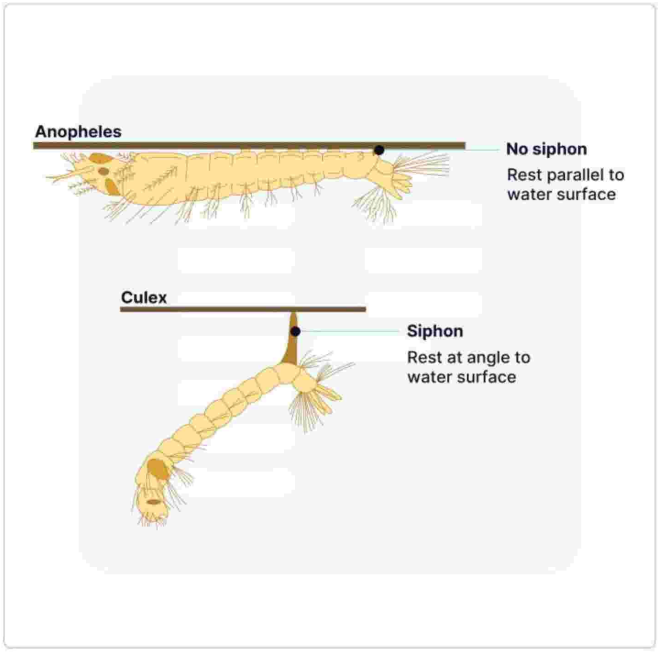
- **Anopheles Larvae (A):**
  - Resting position: Horizontally parallel to the water surface (no siphon).
  - Breathing: Uses spiracles on the body instead of a siphon.
  - Movement: Wriggles in a zigzag motion.
  - Disease Transmission: Malaria (Plasmodium spp.).
- **Culex Larvae (B):**
  - Resting position: At an angle (45°) to the water surface (has a siphon).
  - Breathing: Uses a long siphon tube for air intake.
  - Movement: Swims in a jerky motion.
  - Disease Transmission: Filariasis (Wuchereria bancrofti), Japanese Encephalitis.

	Anopheles	**Culex**	**Aedes**	**Mansonoides**
Larvae	• **No siphon tube** • Rests parallel to water surface	• Longer siphon tubes • Rests at an angle to water surface	• Shorter siphon tubes • Rests at an angle to water surface	
Eggs	• Lays singly • **Boat shaped** • **Lateral floats**	Lays in clusters (100-250 in a single cluster)	• Lays singly • **Cigar shaped**	• Lays in clusters • **Star-shaped**
Habitat	Exophilic: outside house	Exophilic: day Endophilic: night	Endophilic: inside house	Exophilic

Images of mosquito larvae:

Images of mosquito larvae:

PREPLADDER



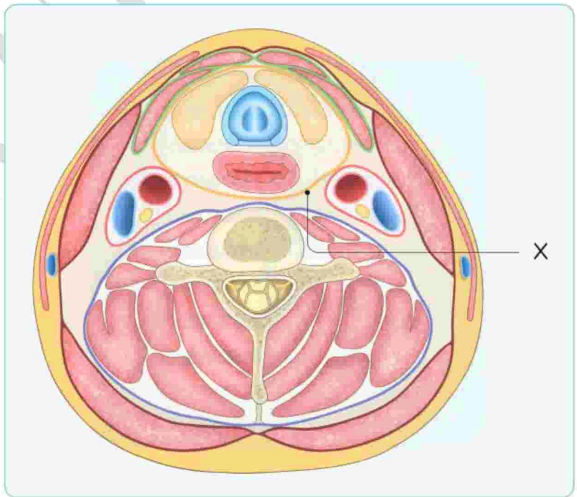
Reference :

Park's Textbook of Preventive and Social Medicine, 27th edition, Page 900, 901

Learning Outcome :

97. Question :

Identify the structure given in the image below



PREPLADDER

Option 1 :

Buccopharyngeal fascia

Option 2 :

Prevertebral fascia

Option 3 :

Pharyngobasilar fascia

Option 4 :

Alar fascia

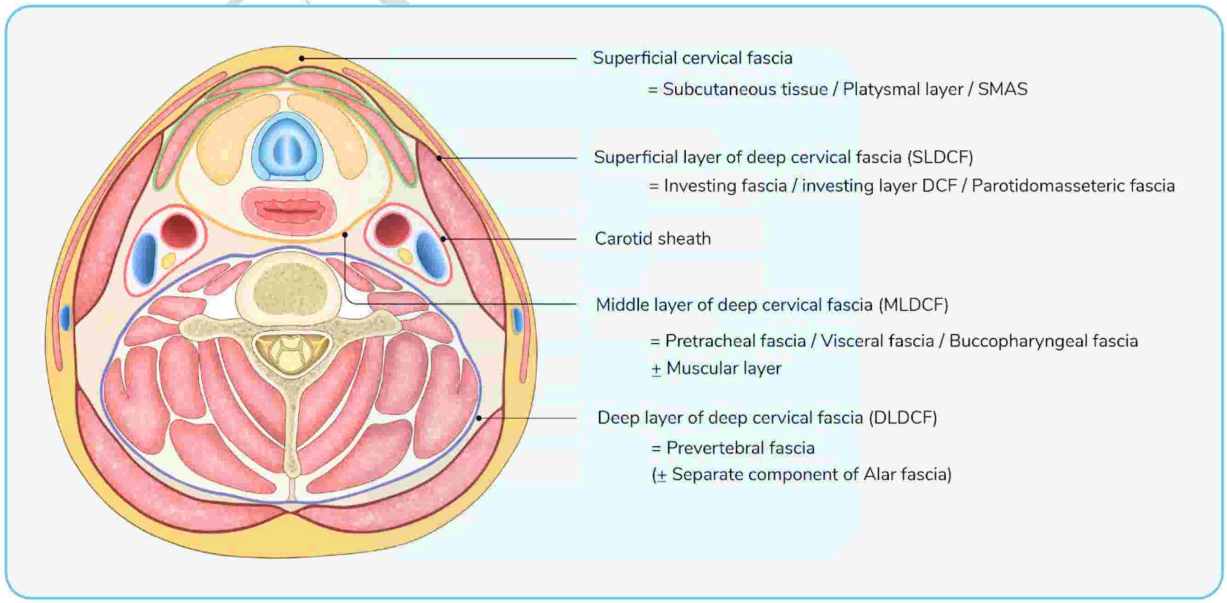
Correct option :1

Solutions :

The **Buccopharyngeal fascia** is a **thin connective tissue layer** that covers the **outer surface of the pharynx and esophagus**. It is part of the **deep cervical fascia** and plays a key role in supporting the **pharyngeal wall** and separating it from adjacent structures. It **encloses the pharyngeal constrictor muscles** and extends from the **base of the skull** down to the **esophagus**.

It is **continuous with the pretracheal fascia anteriorly** and **blends with the adventitia of the esophagus inferiorly**.

This fascia contains the **pharyngeal venous plexus** and forms an important anatomical barrier between the **pharynx and the retropharyngeal space**.



PLADDER

Other Options:

Prevertebral fascia(Option B): Covers the **vertebral column and associated muscles** (not the pharynx).

Pharyngobasilar fascia (Option C): Lies **deep to the pharyngeal muscles** and helps **attach the pharynx to the skull base**.

Alar fascia (Option D): A **thin layer** between the **buccopharyngeal and prevertebral fasciae**, forming part of the **retropharyngeal space**.

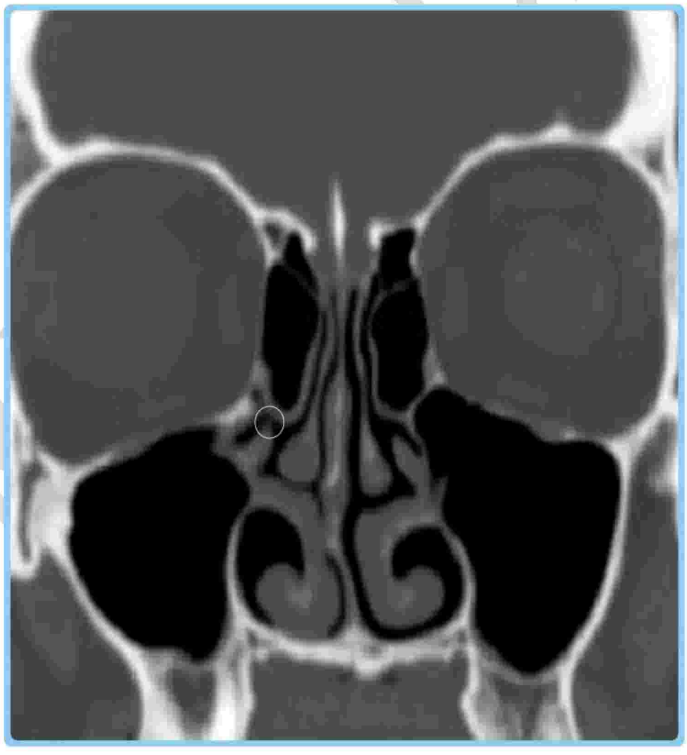
Reference :

Diseases of Ear, Nose, Throat - PL Dhingra, 8th edition, Pg 654

Learning Outcome :

Question :

Which of the following is shown in the image below (circled)?



Option 1 :

Columella

Option 2 :

Osteomeatal complex

Option 3 :

Nasal valve

Option 4 :

Crest of maxilla

Correct option : 2

Solutions :

The **Osteomeatal Complex (OMC)** is a key anatomical region in the **lateral wall of the nasal cavity**, where the drainage pathways of the **frontal, maxillary, and anterior ethmoidal sinuses** converge. It plays a crucial role in **sinus ventilation and drainage**.

It is the **common drainage pathway** for the **anterior ethmoid, maxillary, and frontal sinuses** into the **middle meatus**. Obstruction of the **OMC** can lead to **chronic rhinosinusitis**.

It is an important region in **functional endoscopic sinus surgery (FESS)**.

Other Options:

Columella (Option A): The **fleshy, midline structure** that separates the **nostrils**.

Nasal Valve (Option C): The **narrowest part of the nasal airway**, important for regulating airflow.

Crest of Maxilla (Option D): A **bony ridge on the maxilla** where the **nasal septum attaches**.

Reference :

Diseases of Ear, Nose, Throat - PL Dhingra, 8th edition, Pg 435

Learning Outcome :

Question :

Which of the following CVS changes are not seen in pregnancy?

Option 1 :

Soft Systolic murmur

Option 2 :

Diastolic murmur

Option 3 :

S3

PREPLADDER

Option 4 :

Loud S1 splitting

Correct option : 2

Solutions :

A **diastolic murmur**is not seen in pregnancy.

The presence of a diastolic murmur is not a normal physiological cardiac change in pregnancy.

Cardiovascular adaptations are commonly observed in pregnancy:

- The apex beat is shifted to the 4th intercostal space about 2.5 cm outside the midclavicular line.
- A **systolic murmur (Option A)** may be audible in the apical or pulmonary area. This is due to decreased blood viscosity and increased blood flow in the great vessels.
- **Mammary murmur:** A continuous hissing murmur may be audible over the tricuspid area in the left second and third intercostal spa-ces due to increased blood flow through the internal mammary vessels.
- Doppler echocardiography shows an increase in the left ventricular end-diastolic diameters. The left and right atrial diameters also increase.
- In pregnancy, there is often an exaggerated **splitting of the first heart sound (S1) (Option D)**, but no definite changes in the aortic and pulmonary elements of the second heart sound (S2).
- A **third heart sound (S3) (Option C)**due to rapid diastolic filling and rarely a fourth heart sound may be auscultated.
- Systemic vascular resistance decreases as progesterone is a smooth muscle relaxant, leading to vasodilation and decreased BP.

Hemodynamic changes during pregnancy	
Parameters	**Change**
Cardiac output (L/min)	Increases +40%
Stroke volume (ml)	Increases +27%
Heart rate (per minute)	Increases +17%
Blood pressure	An unaffected or mid-pregnancy drop of diastolic pressure by 5-10 mm Hg

PREPLADDER

Venous pressure	Increases +100%
Colloid oncotic pressure (mmHg)	Decreases -14%
Systemic vascular resistance (SVR)	Decreases -21%
Pulmonary vascular resistance (PVR)	Decreases -34%

Reference :

Williams Obstetrics, 26th Edition, Page: 62, 63, 64, 65

Learning Outcome :

Question :

Which factor is most useful for distinguishing Acute Kidney Injury (AKI) from Chronic Kidney Disease (CKD)?

Option 1 :

Creatinine levels

Option 2 :

Albumin levels

Option 3 :

Urinary output

Option 4 :

Blood urea nitrogen (BUN)

Correct option : 2

Solutions :

Albumin levels serve as a reliable differentiating factor between AKI and CKD.

In CKD, there is typically **persistent hypoalbuminemia** due to chronic protein loss and malnutrition, whereas in AKI **albumin levels often remain normal or only slightly decreased** unless there is significant proteinuria. The chronic nature of CKD leads to sustained protein loss

PREPLADDER

through damaged glomeruli and reduced protein synthesis, resulting in consistent loss of albumin of ≥30 mg/24 hours.

Disease	Diagnostic Criteria

Chronic Kidney Disease	• Chronic kidney disease is defined as the presence of an abnormality in kidney structure or function persisting for more than 3 months.
	• This includes 1 or more of the following:
	  • GFR less than 60 mL/min
	  • **Albuminuria** (ie, urine albumin ≥30 mg/24 hours or urine albumin-to-creatinine ratio [ACR] ≥30 mg/g)
	  • Abnormalities in urine sediment, histology or imaging suggestive of kidney damage
	  • Renal tubular disorders
	  • History of kidney transplantation.
	• Evaluation for the etiology of CKD should be guided by a patient's clinical history, physical examination, and urinary findings.

Acute Kidney Injury	• Increase in serum creatinine by 0.3 mg/dL or more (26.5 μmol/L or more) within 48 hours. • Increase in serum creatinine to 1.5 times or more than the baseline of the prior 7 days. • Urine volume less than 0.5 mL/kg/h for at least 6 hours.

Creatinine levels(Option A): As creatinine is elevated in both conditions, it cannot reliably distinguish between AKI and CKD. Although the rate of rise may differ, this alone is not diagnostic. Albumin is a better indicator which is more specific for CKD.

Urinary output(Option C): Changes in urinary output can occur in both AKI and CKD, making it an unreliable distinguishing factor. While oliguria is more common in AKI, it can also occur in advanced CKD due to reduced GFR. Additionally, some patients with either condition may maintain normal urine output despite significant kidney dysfunction.
Blood urea nitrogen (BUN)(Option D): BUN levels increase in both AKI and CKD and are influenced by multiple factors including protein intake, catabolic state, and volume status.

Reference:

Harrison's Principles of Internal Medicine, 21st Edition, Page 2296, 2305-2309

PREPLADDER

Learning Outcome :

101. Question :

Which of the following is the formula for sensitivity?

Option 1 :

TP/(TP+FP)x100

Option 2 :

TP/(TP+FN)x100

Option 3 :

TN/(TN+FP)x100

Option 4 :

TN/(TN+FN)x100

Correct option :2

Solutions :

Sensitivity is a test's ability to **correctly identify individuals who have the disease (true positive rate).** It is expressed as the proportion of true positives (those who have the disease) among all individuals who have the disease.

Formula:

$$\text{Sensitivity} = \frac{\text{True Positives}}{\text{True Positives} + \text{False Negatives}}$$

Importance: High sensitivity is crucial for screening tests to ensure that most diseased individuals are identified and can receive further diagnostic testing or treatment.

TP / (TP + FP) × 100 (Option A) is incorrect because this formula represents **Positive Predictive Value (PPV)**, not sensitivity.

TN / (TN + FP) × 100 (Option C) is incorrect because this formula represents **Specificity**, which measures the ability of a test to correctly identify **healthy individuals (true negatives)**.

TN / (TN + FN) × 100 (Option D) is incorrect as this does not correspond to any standard diagnostic accuracy measure.

NEETLADDER

Reference :

1. Park's Textbook of Preventive and Social Medicine, 27th edition, Page.155
2. IAPSM textbook of Community medicine, 2nd edition, Page.134

Learning Outcome :

102. Question :

Identify the type of cartilage?

Option 1 :

Hyaline cartilage

Option 2 :

Elastic cartilage

Option 3 :

Fibro cartilage

Option 4 :

Calcified cartilage

PREVIEW

Correct option :1

Solutions :

Hyaline cartilage is the most common type of cartilage in the body. It is characterized by:

- **Glassy, bluish-white appearance** in fresh tissue.
- **Chondrocytes within lacunae**, embedded in an abundant **extracellular matrix (ECM)** rich in **type II collagen**.
- **Lack of blood vessels and nerves** (receives nutrients via diffusion

Elastic cartilage (Option B): Contains elastic fibers along with type II collagen, making it more flexible. Found in the ear (auricle), epiglottis, and larynx.

Fibro cartilage (Option C): Contains type I and type II collagen, making it stronger and more rigid. It is found in intervertebral discs, pubic symphysis, and menisci of the knee. Lacks perichondrium (unlike hyaline and elastic cartilage).

Calcified cartilage (Option D): Hyaline cartilage that has undergone **calcification**, commonly seen in **aging cartilage and bone development**. Present in **endochondral ossification zones**.

Reference :

Robbins Basic Pathology, 11th Edition, Page no: 876

Learning Outcome :

103. Question :

In the context of mitral stenosis, which clinical feature is typically observed?

Option 1 :

Loud S1

Option 2 :

Absent S1

Option 3 :

S3 gallop

Option 4 :

Muffled heart sounds

Correct option : 1

Solutions :

PREPLADDER

A **loud S1** is a **hallmark finding in mitral stenosis** due to the **abrupt closure of the thickened and calcified mitral valve leaflets**. This increased intensity occurs because the mitral valve remains relatively mobile in its early stages despite being thickened, and the high pressure gradient between the left atrium and ventricle causes **sudden, forceful closure of the valve leaflets**.

Mitral Stenosis: Clinical Findings	
Causes	• Rheumatic fever (predominant cause) • Congenital mitral valve disorders • Severe mitral annular calcification with leaflet involvement • SLE, RA • Myxoma • Large valve vegetations
Pathophysiology	• Normal mitral valve area: 4-6 cm^2 • Significant obstruction when area < 2 cm^2 • Severe obstruction when area < 1.5 cm^2 • Elevated LA pressure required to maintain normal cardiac output • Development of pulmonary hypertension • Reduced cardiac output during exertion
Symptoms	• Exertional dyspnea • Orthopnea • Paroxysmal nocturnal dyspnea • Hemoptysis • Right-sided heart failure symptoms in advanced cases

PREPLADDER

Physical Examination	• **Loud S1**
	• Opening snap after A2
	• Mid-diastolic rumbling murmur with presystolic accentuation
	  • Best heard at apex
	  • With bell of stethoscope
	  • Left lateral position
	• Signs of pulmonary hypertension
	  • Loud P2
	  • Right ventricular heave
	• Irregular pulse (if atrial fibrillation present)

Diagnostic Tests	• ECG
	  • Left atrial enlargement
	  • Right ventricular hypertrophy in advanced cases
	  • Atrial fibrillation may be present
	• Chest X-ray
	  • Straightening of upper left heart border
	  • Double density sign
	  • Kerley B lines
	  • Pulmonary vascular congestion
	• Echocardiogram
	  • Valve area measurement
	  • Transvalvular gradient
	  • Assessment of leaflet mobility and calcification
	  • Evaluation of associated lesions

PREPLADDER

Absent S1(Option B): S1 is not absent in mitral stenosis; rather, it is characteristically accentuated. The absence of S1 is more commonly associated with conditions like severe mitral regurgitation where there is incomplete closure of the mitral valve.

S3 gallop (Option C): An S3 gallop is typically associated with volume overload conditions and ventricular dysfunction, particularly in heart failure with reduced ejection fraction. It is not a finding in mitral stenosis.

Muffled heart sounds(Option D): Muffled heart sounds are typically associated with conditions such as pericardial effusion or obesity, not mitral stenosis. In mitral stenosis, heart sounds are usually well-heard, with the characteristic loud S1 and opening snap.

Reference :

Harrison's Principles of Internal Medicine, 21st Edition, Page 1991-1993

Learning Outcome :

104. Question :

In a study based in Delhi, doctors followed 100 people who did exercise for a year and later they checked who all had developed coronary heart disease. Which type of study is this?

Option 1 :

Case Control Study

Option 2 :

Prospective Study

Option 3 :

Cross Sectional Study

Option 4 :

Cohort study

Correct option :

4

Solutions :

A **group of people (cohort) who exercised was followed over time** to determine the incidence of coronary heart disease. Cohort studies are **observational, longitudinal studies** that track individuals based on an exposure (exercise) and then assess the development of an outcome (heart disease).

A cohort study follows a group of individuals over time to see who develops cirrhosis and compares the incidence between those who consume alcohol and those who do not. This design can establish a temporal relationship and directly measure the risk of developing cirrhosis, making it the most appropriate choice for this investigation.

Cohort studies are a type of observational study design that follows a group of people (a cohort) over time to assess the outcomes of exposure to certain risk factors or interventions.

Indications to conduct a cohort study:

- Exposure Assessment
- Incidence Calculation
- Time Relationship
- Rare Exposures
- Multiple Outcomes

PREPLADDER

- Long Latency Period
- Natural Course

Case-Control Study (Option A) is incorrect because **case-control studies start with outcomes (disease status) and look back retrospectively to identify exposures**. This study is **prospective**, not retrospective.

Prospective Study (Option B) is incorrect because while a cohort study can be prospective, the correct classification is "cohort study." "Prospective study" is a broader term and does not specifically define the study design.

Cross-Sectional Study (Option C) is incorrect because cross-sectional studies **analyze exposure and outcome at a single point in time**, whereas this study follows participants over a year

Reference :

Park's Textbook of Preventive Medicine, 27th Edition, Page 83

Learning Outcome :

105. Question :

Which of the following is associated with a Graham-Steel murmur?

Option 1 :

Ventricular septal defect (VSD)

Option 2 :

Hypertrophic obstructive cardiomyopathy (HOCM)

Option 3 :

Pulmonary regurgitation

Option 4 :

Aortic regurgitation

Correct option : 3

Solutions :

The Graham-Steel murmur indicates **pulmonary regurgitation** secondary to pulmonary hypertension. This **early diastolic decrescendo murmur** is heard best at the left upper sternal border (pulmonic area) and is caused by the backward flow of blood from the pulmonary artery into the right ventricle during diastole.

It is specifically associated with **pulmonary hypertension,** which causes dilation of the pulmonary artery and subsequent incompetence of the pulmonary valve.

PREPLADDER

Cardiac Murmurs and Their Characteristics

Common Pathological Murmurs

Condition	Murmur Characteristics
Mitral Stenosis	Low-pitched diastolic murmur with an opening snap, best heard at the apex
Aortic Stenosis	Crescendo-decrescendo systolic ejection murmur, radiates to carotids, best heard at the right upper sternal border
Patent Ductus Arteriosus (PDA)	Continuous, machine-like murmur, best heard at the left infraclavicular area
Hypertrophic Cardiomyopathy (HOCM) (Option B)	Harsh systolic murmur with a crescendo-decrescendo pattern, best heard at the left sternal border, increases with Valsalva maneuver
Mitral Regurgitation (MR)	Holosystolic murmur, best heard at the apex, radiates to the axilla
Aortic Regurgitation (AR)	Early diastolic decrescendo murmur, best heard at the left sternal border
Ventricular Septal Defect (VSD) (Option A)	Harsh holosystolic murmur, best heard at the left lower sternal border (LLSB)
Atrial Septal Defect (ASD)	Systolic ejection murmur, best heard at the left upper sternal border (LUSB), with fixed, widely split S2
Tricuspid Regurgitation (TR)	Holosystolic murmur, best heard at the left lower sternal border, **increases with inspiration (Carvallo's sign)**

Special Murmurs & Their Associations

Murmur	Cause & Characteristics
Graham-Steel Murmur (Pulmonary Regurgitation due to Pulmonary Hypertension)	Early diastolic decrescendo murmur, best heard at the left upper sternal border, caused by pulmonary valve incompetence due to pulmonary hypertension
Austin Flint Murmur (Severe Aortic Regurgitation) (Option D)	Low-pitched, rumbling diastolic murmur, best heard at the apex, due to turbulent flow in the left ventricle compressing the mitral valve

PREPLADDER

Mammary Murmur (Physiologic in Pregnancy)	Continuous hissing murmur, heard over the left second and third intercostal spaces, caused by increased blood flow through internal mammary vessels

Reference :

Harrison's Principles of Internal Medicine, 21st Edition, Page 1992

Learning Outcome :

106. Question :

Which of the following is the fIPV dose schedule under the National Immunization Schedule?

Option 1 :

6 weeks, 10 weeks, 14 weeks

Option 2 :

At birth, 6 weeks, 10 weeks, 14 weeks, 16-24 months, 5 years

Option 3 :

6 weeks, 14 weeks, 9 months

Option 4 :

6 weeks, 10 weeks, 12 weeks

Correct option : 3

Solutions :

Fractional Inactivated Polio Vaccine (fIPV) is administered **intradermally** at **6 weeks and 14 weeks** as part of the routine immunisation schedule. Additionally, **a booster dose is given at 9 months.**

Differences between IPV and OPV:

Characteristic	IPV (salk type)	OPV (sabin type)
Type of vaccine	Killed formalised virus	Live attenuated virus
Mode of administration	S/C or IM (0.5 mL)	Oral (2 drops)

PREPLADDER

Type of immunity	Only humoral	Humoral and intestinal
Prevention of	Paralysis	Paralysis + Intestinal re-infection
Control of epidemics	Not useful	Effective
Storage & transport	Less stringent conditions	Requires sub-zero temperatures
Shelf life	Longer	Short
VAPP (Vaccine Associated Paralytic Polio)	Zero incidences	1 per 1 million vaccines

- Schedule of OPV: 6 weeks, 10 weeks, 14 weeks, 16-24 months, 5 years; 2 oral drops
- Schedule of **fIPV** (fractional IPV): **6 and 14 weeks; 0.1 ml ID Right upper arm.**
  fIPV: 1/5th of the full dose.
- From 1 January 2023, the third dose of IPV is introduced into the NIS, which is administered at 9 completed months of age: 0.1 ml ID Left upper arm (as the MR vaccine is administered in the right upper arm).

6 weeks, 10 weeks, 14 weeks (Option A) is incorrect because fIPV is given at **6 and 14 weeks**, not at 10 weeks.

At birth, 6 weeks, 10 weeks, 14 weeks, 16-24 months, 5 years (Option B) is incorrect because this schedule includes OPV doses and does not match the fIPV schedule, which is **6 weeks, 14 weeks, and a booster at 9 months**.

6 weeks, 10 weeks, 12 weeks (Option D) is incorrect because fIPV is not given at 10 and 12 weeks. The correct schedule is **6 weeks and 14 weeks**, with a booster at **9 months**.

Reference :

Park, 27th Edition, Page 24

Learning Outcome :

107. Question :

A patient with a history of throat infection presents with a water hammer pulse. What is the most likely diagnosis?

Option 1 :

Rheumatic fever with aortic regurgitation

PREPLADDER

Option 2 :

Infective endocarditis

Option 3 :

Mitral stenosis

Option 4 :

Aortic stenosis

Correct option :1

Solutions :

The **water hammer pulse**, also known as**Corrigan's pulse**, is a characteristic finding in **aortic regurgitation**. The history of throat infection suggests a **previous streptococcal infection leading to rheumatic fever**, which commonly affects the **aortic valve**.

A water hammer pulse is characterized by a **rapid upstroke and collapse of the pulse** due to the backward flow of blood from the aorta into the left ventricle during diastole.

Types of pulses

Type of Pulse	Conditions Associated
Water-Hammer (Collapsing) Pulse	• **Aortic regurgitation** • Patent ductus arteriosus • Hyperdynamic circulation (e.g., fever, anemia) • Severe mitral regurgitation and aortic regurgitation
Pulsus Parvus et Tardus	• Aortic stenosis • Severe peripheral artery disease
Pulsus Bisferiens (Collapsing + Slow Rising)	• Aortic regurgitation • Hypertrophic obstructive cardiomyopathy • Severe mitral regurgitation and aortic regurgitation

PREPLADDER

Pulsus Alternans	• Left ventricular failure • Dilated cardiomyopathy • Severe coronary artery disease • Hypertrophic obstructive cardiomyopathy
Dicrotic Pulse	• Severe sepsis • Shock (especially septic shock) • Low cardiac output states
Jerky Pulse	• Severe aortic stenosis • Hyperdynamic circulation
Pulsus Paradoxus	• Cardiac tamponade • Constrictive pericarditis • Severe asthma or COPD • Airway obstruction • Superior vena cava obstruction
Bounding Pulse	• Aortic regurgitation • Hyperthyroidism • Paget's disease • Fever (hyperdynamic circulation)
Pulsus Bigeminus	• Ventricular ectopic beats • Severe arrhythmias • Myocardial infarction
Pulsus Tardus	• Aortic stenosis • Severe peripheral artery disease

PREPLADDER

Infective endocarditis(Option B): While infective endocarditis can affect the aortic valve and lead to regurgitation, lack of characteristic findings such as fever, peripheral embolic phenomena, or Roth spots makes this diagnosis less likely. Additionally, the history of throat infection followed by cardiac manifestations is more suggestive of rheumatic fever.

Mitral stenosis (Option C): Mitral stenosis typically presents with a small, low-volume pulse rather than a water hammer pulse.

Aortic stenosis(Option D): Aortic stenosis is characterized by a slow-rising, low-amplitude pulse **(pulsus parvus et tardus)**.

Reference :

Harrison's Principles of Internal Medicine, 21st Edition, Page: 1818,1819

Learning Outcome :

108. Question :

Which of the following is the management of a HIV positive patient with multiple dog bites ?

Option 1 :

Rabies vaccine + wound management

Option 2 :

Immunoglobulin only

Option 3 :

Wound management

Option 4 :

Rabies vaccine + Immunoglobulin + Wound management

Correct option : 4

Solutions :

An **HIV-positive patient is considered immunocompromised**, and multiple dog bites are classified as **Category III exposure**, which requires **both rabies vaccine and rabies immunoglobulin (RIG) along with proper wound management**. Immunocompromised individuals may have a **delayed or inadequate immune response**, making **RIG essential** for passive immunity.

Management of rabies wound:

Category	Exposure	Management
Class I	Licks and touch on intact skin (skin integrity not broken)	• Local wound management: soap, running water, iodine tincture for 15-20 min.
Class II	Abrasion, laceration (skin integrity broken)	• Local wound management • Immediate Rabies vaccination

PREPLADDER

Class III	Bleeding, licks on mucosa/ broken skin, deep tissue injury, all wild animal or bat bite	• Wound management (avoid suturing) • Rabies vaccination • Rabies immunoglobulin

Rabies vaccine + wound management (Option A) is incorrect because **RIG is mandatory in Category III exposures**, especially in immunocompromised individuals like those with HIV.

Immunoglobulin only (Option B) is incorrect because **RIG alone does not provide long-term immunity**; the rabies vaccine is essential to stimulate an active immune response.

Wound management (Option C) is incorrect because while wound care is critical, it alone does not provide protection against rabies, which is **fatal once symptoms appear**.

Reference :

Park's Textbook of Preventive and Social Medicine 27th Edition Pg: 324 - 327

Learning Outcome :

109. Question :

The CSF findings in bacterial meningitis would include which of the following?

Option 1 :

Elevated protein and decreased glucose

Option 2 :

Normal white blood cell count

Option 3 :

Decreased protein and elevated glucose

Option 4 :

Elevated WBC count with normal glucose

Correct option : 1

Solutions :

In **bacterial meningitis**, there is characteristic **elevation of CSF protein** due to blood-brain barrier disruption and **decreased CSF glucose** due to increased glucose utilization by bacteria and white blood cells. The typical CSF glucose level in bacterial meningitis is less than 40% of

PREPLADDER

serum glucose. The protein elevation is typically marked, often greater than 100 mg/dL, reflecting **significant inflammation and blood-brain barrier dysfunction**.

CSF Findings in various types of meningitis:

Type	Opening Pressure	Predominant Cell Type	Protein	Glucose	Gross Appearance
Bacterial Meningitis	Elevated	Polymorphonuclear Neutrophils (PMNs)	**Elevated**	**Decreased**	Turbid
Fungal/Tubercular Meningitis	Elevated	Lymphocytes	Elevated	Decreased	Straw-colored (TB meningitis)
Viral Meningitis	Normal or Slightly Elevated	Lymphocytes	Normal or Slightly Elevated	Normal	Normal or Turbid

Reference :

1. Harrison's Principles of Internal Medicine, 21st Edition, Page 975, 1104, 1105
2. Davidson's Principles and Practice of Medicine, 24th Edition, Page 1119, 1120

Learning Outcome :

Question :110

A person's father had colon cancer. He had bloody stool. So,he just came for a check-up. Before he had not undergone any screening. He was recommended to do a colonoscopy for screening. Screening is which level of prevention?

Option 1 :

Primordial

Option 2 :

Primary

Option 3 :

Secondary

PREPLADDER

Option 4 :

Tertiary

Correct option : 3

Solutions :

Secondary prevention focuses on early detection and treatment of diseases to prevent complications. Colonoscopy is a screening tool used to detect colon cancer at an early, asymptomatic stage, allowing for timely intervention. Since the person has no prior screening but is at high risk due to family history, this falls under secondary prevention.

Levels of prevention	Definition
Primordial	• Prevention of establishment of risk factors. • It aims to discourage people from adopting harmful habits. • Avoiding smoking
Primary	• Health promotion and specific protection. • Prevention of onset of disease in a high-risk group/individual. • It aims to protect the health of those who are at risk. • Reduces the incidence of the disease. • Quit smoking
Secondary	• Disease progression can be prevented at an early stage (Disease is reversible). • It aims to reduce the prevalence of the disease by early identification and prompt treatment of diseases, and it also prevents complications. • Screening for diabetes.
Tertiary	• Prevention or limitation of impairment and disability in a diseased patient who has developed complications due to the disease and the disease has become irreversible. • It aims to minimize a patient's suffering and maximize potential years of useful life. • Disability limitation and rehabilitation.

PREPLADDER

Quaternary	• Prevention of the risk of overmedicalization of a patient or population. • Aims to prevent prescription of unnecessary medications and invasive medical interventions.

Primordial (Option A) is incorrect because primordial prevention aims to **prevent the emergence of risk factors** by addressing social and environmental determinants, which is not applicable here.

Primary (Option B) is incorrect because primary prevention focuses on **preventing disease before it occurs** through interventions like vaccination, lifestyle modifications, or dietary changes. Screening tests do not fall under primary prevention.

Tertiary (Option D) is incorrect because tertiary prevention involves **managing existing disease to prevent complications or disability**, which applies to patients already diagnosed with colon cancer, not those undergoing screening.

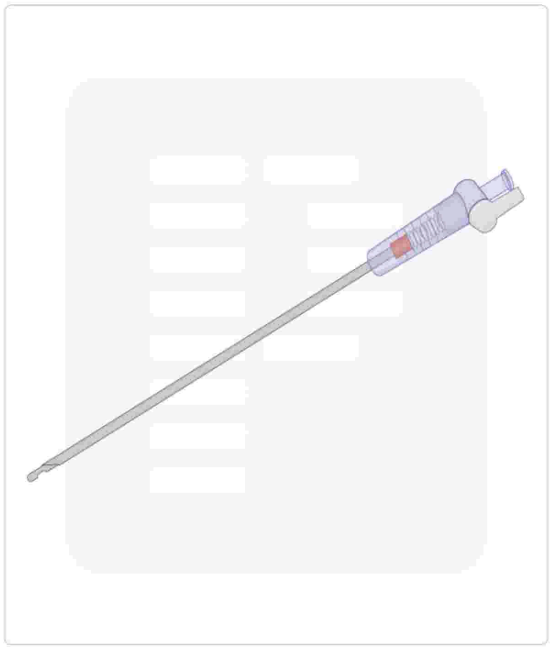
Reference :

Park's Textbook of Preventive and Social Medicine, 27th edition, Pg 48, 49

Learning Outcome :

111.Question :

Identify the given instrument.



Option 1 :

Veress needle

Option 2 :

Hasson's cannula

Option 3 :

Jamshidi needle

Option 4 :

3 mm Trocar

Correct option :1

Solutions :

Answer: A) Veress needle

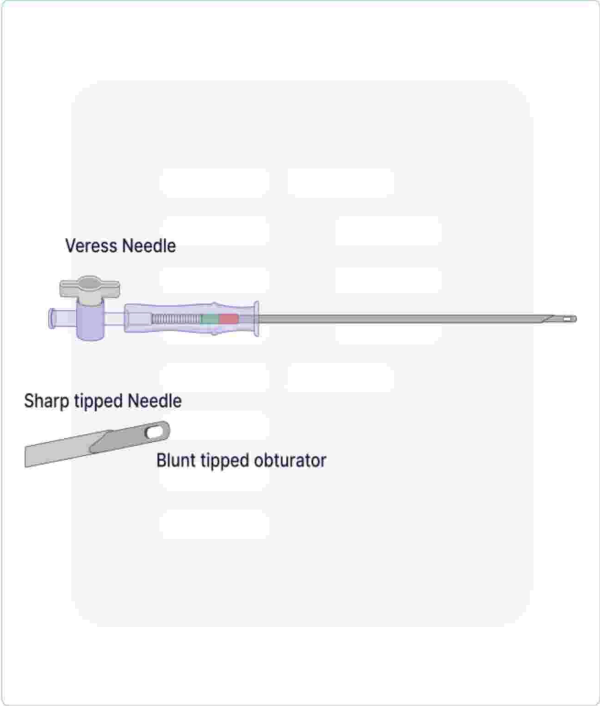
Explanation:

- **Function:** The Veress needle is used for creating pneumoperitoneum in laparoscopic surgery.
- **Structure:** It has a spring-loaded blunt stylet that retracts upon entering the peritoneal cavity.
- **Use:** It allows insufflation of CO_2 for laparoscopic procedures.
- **Alternative Methods:** Hasson's technique is used for open laparoscopy instead.

Veress Needle

Feature	Description
Purpose	Creates pneumoperitoneum for laparoscopy
Mechanism	Spring-loaded blunt stylet for safety
Insertion Site	Commonly at the umbilicus
Alternative	Hasson's open technique

PREPLADDER



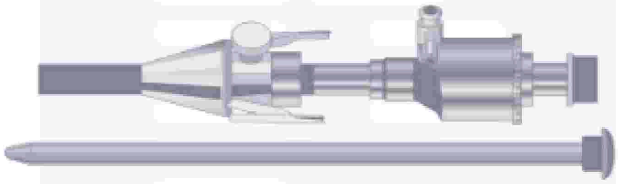
Pneumoperitoneum in Laparoscopy

Aspect	Details
Definition	Artificial creation of gas insufflation in the peritoneal cavity to facilitate laparoscopic surgery.
Common Gas Used	Carbon dioxide (CO_2) due to its rapid absorption, non-combustibility, and high solubility in blood.
Techniques	**Closed technique**: Uses Veress needle for insufflation. **Open technique**: Uses Hasson's cannula without prior insufflation.
Insufflation Pressure	10-15 mmHg (optimal for maintaining surgical space while minimizing complications).
Complications	**Gas-related**: Hypercapnia, acidosis, gas embolism. **Entry-related**: Bowel injury, vascular injury, preperitoneal insufflation.

PRELADDER

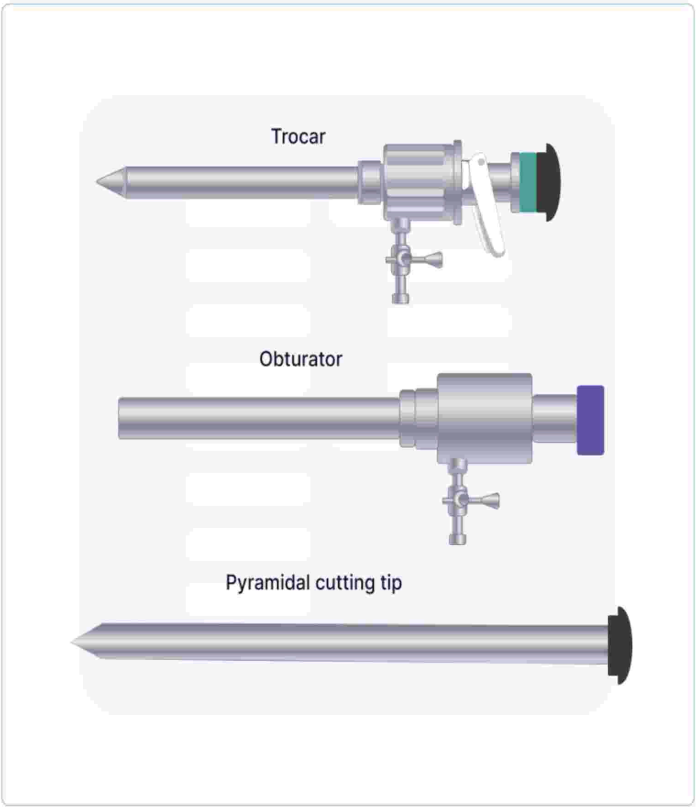
Prevention of Complications	Correct needle placement confirmation (aspiration test, saline drop test). Slow controlled insufflation. Monitoring end-tidal CO_2 levels.

Hasson's cannula (Option B): Incorrect because it is used in the open technique of laparoscopy, not for closed insufflation.



Jamshidi needle (Option C): Incorrect because it is used for bone marrow aspiration, not laparoscopic entry.

3 mm Trocar (Option D): Incorrect because it is a port for inserting laparoscopic instruments, not for initial insufflation.



Reference :

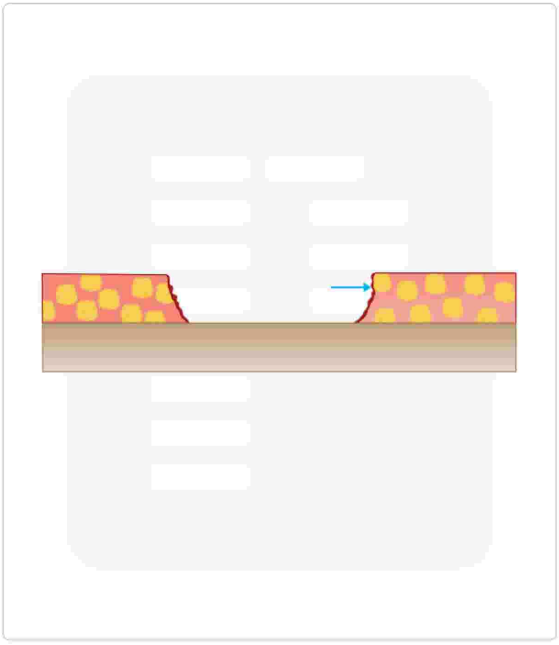
1. Bailey & Love's Short Practice of Surgery, Ed 28, Pg 102, 103
2. SRB's Surgical Operations, Text and Atlas, Edition 1, Pg. 550,551
3. https://pmc.ncbi.nlm.nih.gov/articles/PMC7881279/

Learning Outcome :

112. Question :

The given image is of an ulcer, identify the marked structure?

PREPLADER



Option 1 :

Margin

Option 2 :

Edge

Option 3 :

Floor

Option 4 :

Base

Correct option :2

Solutions :

Answer: B) Edge

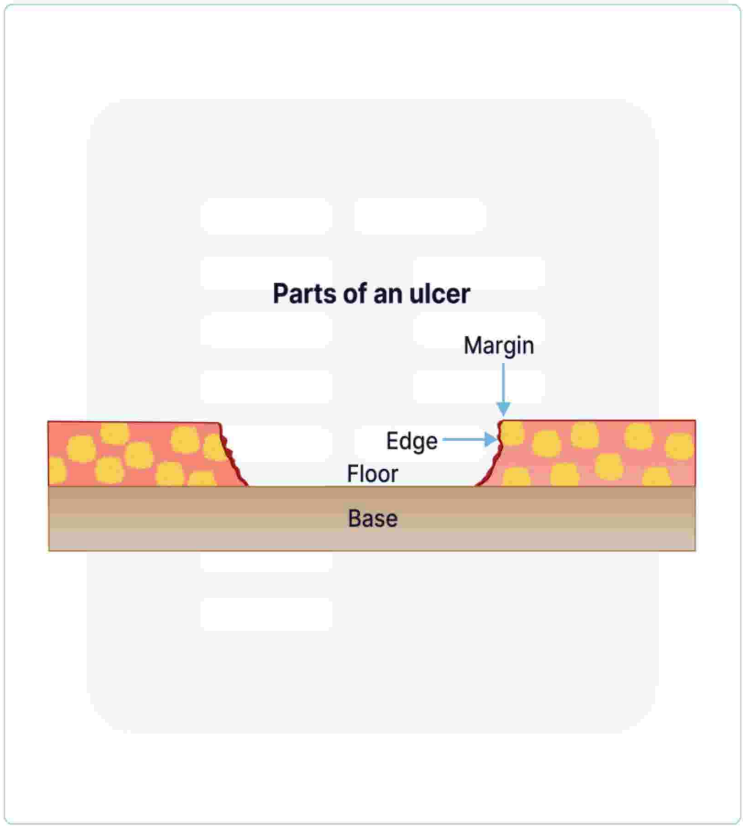
Explanation:

- **Ulcers** have distinct anatomical parts: **margin, edge, floor, and base**.
- The **edge** is the transition zone between the margin and the floor of the ulcer.
- If the image shows a **raised, rolled, undermined, or punched-out border**, it indicates the **edge** of the ulcer.

PREPLADDER

Parts of an Ulcer

Part	Description
Margin (Option A ruled out)	Outer limit of the ulcer, usually blending into the surrounding skin/mucosa.
Edge	The border between the margin and the ulcer floor, may be raised (malignant), undermined (tuberculous), or punched-out (syphilitic).
Floor (Option C ruled out)	The exposed surface inside the ulcer, may contain slough, granulation tissue, or necrosis.
Base (Option D ruled out)	The structure beneath the ulcer, which can be soft tissue, bone, or a vessel.



Reference :

SRB's Manual of Surgery, 6th Edition, Page 15

Learning Outcome :

113) Question ID : 852685

Question :

What is the recommended treatment for nephrotic syndrome in children?

Option 1 :

Steroids

Option 2 :

Steroids and cyclophosphamide

Option 3 :

Cyclophosphamide

Option 4 :

ACE inhibitors

Correct option :1

Solutions :

Steroids are the first-line treatment for nephrotic syndrome, particularly in **minimal change disease,** which is the **most common cause in children**. Corticosteroids work by reducing inflammation and suppressing the immune response that leads to proteinuria. The typical initial treatment consists of oral prednisone, with most patients showing a response within 4-8 weeks of therapy.

Feature	Steroid-Responsive Nephrotic Syndrome	Steroid-Resistant Nephrotic Syndrome

PREPLADDER

Definition	Nephrotic syndrome that responds well to corticosteroid treatment.	Nephrotic syndrome that does not improve despite adequate corticosteroid treatment (e.g., prednisolone at 2 mg/kg/day for 6 weeks). **Types:** • **Initial Steroid Resistance:** Lack of response from the onset. • **Late Steroid Resistance:** Resistance develops after initial response.
Common Type	**Minimal Change Nephrotic Syndrome (MCNS)** accounts for about 80% of cases in children.	It is often associated with **Focal Segmental Glomerulosclerosis (FSGS)** or genetic mutations affecting podocytes.
Diagnosis	Diagnosed without kidney biopsy; characterised by heavy proteinuria, low serum albumin, and no significant glomerular damage.	Further investigation (e.g., kidney biopsy) is required to determine the underlying cause.
Management	**Responds to high-dose corticosteroids (e.g., prednisolone),** leading to remission of proteinuria and oedema within 10-14 days.	Treatment may include immunosuppressive agents, calcineurin inhibitors, or other therapies, as corticosteroids are often ineffective.

Steroids and cyclophosphamide(Option B): While this combination may be used in steroid-resistant cases or specific types of nephrotic syndrome, it is not the first-line treatment for nephrotic syndrome in children, which is mainly due to Minimal change disease. The addition of cyclophosphamide is reserved for cases that fail to respond to steroids alone or have frequent relapses. Also, the potential toxicity of cyclophosphamide makes it unsuitable as an initial therapy.

Cyclophosphamide(Option C): Using cyclophosphamide alone is not the recommended initial treatment for nephrotic syndrome in children. It is typically used as a second-line agent in steroid-resistant cases or specific pathological variants.

ACE inhibitors(Option D): While ACE inhibitors can help reduce proteinuria and are often used as adjunctive therapy, they are not the primary treatment for nephrotic syndrome. They are typically used in conjunction with immunosuppressive therapy, which is the mainstay for treating the underlying cause of nephrotic syndrome.

PRELADER

Reference :

OP Ghai, Essential Pediatrics, 10th Edition, Page 500, 503

Learning Outcome :

114. Question :

A 33-year-old male presents with **sudden onset acute abdominal pain**, **constipation for 1 day**, **persistent hiccups**, and **occasional vomiting**. An abdominal X-ray was performed. Identify the pathology.

PREVIEW ORDER

Option 1 :

Sigmoid volvulus

Option 2 :

Caecal volvulus

Option 3:

Intussusception

Option 4 :

Dynamic obstruction

Correct option :1

Solutions :

Answer: A) Sigmoid Volvulus

Explanation:

- **Clinical Features Suggest Bowel Obstruction:**
  - **Acute abdominal pain** and **constipation** are classic features.
  - **Persistent hiccups** suggest diaphragmatic irritation due to massive bowel distension.
  - **Vomiting** occurs as obstruction progresses.
- **X-ray Findings:**
  - **Massively dilated sigmoid colon** with a characteristic **"coffee bean" or "omega loop" sign**.
  - **Few or no air-fluid levels**, differentiating it from a small bowel obstruction.
  - **Absence of significant small bowel dilatation**, favoring sigmoid over caecal volvulus.
- **Management:**
  - **Initial:** Sigmoidoscopic detorsion.
  - **Definitive:** Elective sigmoidectomy to prevent recurrence.
  - **Emergency:** If gangrene or perforation is suspected, **immediate surgery is required**.

Volvulus Types & Features

Feature	Sigmoid Volvulus	Caecal Volvulus
Cause	Twisting of sigmoid colon on its mesentery	Twisting of caecum & ascending colon
X-ray Sign	"Coffee bean" or "Omega loop" sign	"Comma" or "Kidney bean" sign
Bowel Dilatation	Sigmoid colon massively distended	Dilated caecum, displaced medially
Management	Endoscopic detorsion or surgery	Surgery (right hemicolectomy if gangrenous)

PREPLADDER

Caecal Volvulus (Option B): incorrect because caecal volvulus typically shows a **comma-shaped distended caecum in the right abdomen**, unlike the **coffee bean sign of sigmoid volvulus**.

Intussusception (Option C): incorrect because intussusception presents with a **target sign on ultrasound**, rather than massive colonic dilation on X-ray.

Dynamic Obstruction (Option D): incorrect because sigmoid volvulus is a **mechanical obstruction** rather than a functional or paralytic one.

Reference :

1. Bailey & Love's Short Practice of Surgery- 28th Edition, Page 1293, 1380, 1383, 1385, 1390
2. SRB's Manual of Surgery- 6th Edition, Page 922, 923.

Learning Outcome :

115. Question :

During laparoscopic surgery, where shouldn't the trocar be inserted?

Option 1 :

Superior epigastric artery

Option 2 :

Inferior epigastric artery

Option 3 :

Abdominal aorta

Option 4 :

Both A and B

Correct option :4

Solutions :

Answer: D) Both A and B (Superior & Inferior Epigastric Arteries)

Explanation:

- **Trocar placement during laparoscopic surgery** requires careful consideration to avoid injury to major blood vessels, including both the **superior and inferior epigastric arteries**.
- **Inferior epigastric artery (IEA):** Located on the posterior aspect of the rectus sheath, **arising from the external iliac artery**, it is at risk when inserting trocars in the lower abdominal wall.

PREPLADDER

- **Superior epigastric artery (SEA):** A continuation of the **internal thoracic artery**, it supplies the upper abdominal wall and is at risk in **upper trocar insertions**.
- **Both arteries run within the rectus sheath**, making them relevant in **trocar placement at different levels** of the anterior abdominal wall.

Trocar Placement & Epigastric Arteries:

Trocar Site	At Risk Artery	Precautions
Umbilical (Primary)	Minimal risk	Insert at linea alba
Supraumbilical (Upper Trocar)	**Superior Epigastric Artery**	Avoid midline rectus sheath
Infraumbilical/Midclavicular	**Inferior Epigastric Artery**	Insert lateral to rectus muscle
Palmar's Point (LUQ Trocar)	Minimal risk	Used in difficult access cases

Superior Epigastric Artery (Option A):Incorrect alone because it is only at risk in **upper abdominal trocar placement**.

Inferior Epigastric Artery (Option B):Incorrect alone because **both superior and inferior epigastric arteries are at risk depending on trocar position**.

Abdominal Aorta (Option C):Incorrect because the aorta is a deep retroperitoneal structure, **not directly relevant to trocar insertion**.

Reference :

1. Bailey & Love's Short Practice of Surgery, Ed 28, Pg 102, 103
2. SRB's Surgical Operations, Text and Atlas, Edition 1, Pg. 550,551
3. https://pmc.ncbi.nlm.nih.gov/articles/PMC4664217/
4. https://pmc.ncbi.nlm.nih.gov/articles/PMC5206834/

Learning Outcome :

116. Question :

A patient with diffuse severely contaminated peritonitis underwent laparotomy and was left open after surgery. Which of the following might help?

PREPLADDER

Option 1 :

VAC

Option 2 :

Normal saline soaked gauze

Option 3 :

Prefer closure after laparotomy

Option 4 :

Antibiotic soaked gauze

Correct option :1

Solutions :

Answer: A) VAC (Vacuum-Assisted Closure)

Explanation:

- **Vacuum-Assisted Closure (VAC)** is an effective method for managing **open abdomen cases** after laparotomy in **severe, contaminated peritonitis**.
- It helps by:
    - **Reducing edema** and improving perfusion.
    - **Removing infectious material** through negative pressure therapy.
    - **Facilitating faster wound healing** by promoting granulation tissue formation.
    - **Preventing abdominal compartment syndrome**, which can occur if primary closure is forced in a swollen abdomen.

Open Abdomen Management in Contaminated Peritonitis

Management Option	Effectiveness in Open Abdomen	Key Considerations
VAC Therapy	**Highly effective**	Reduces infection, removes fluids, aids healing
Normal Saline Soaked Gauze	Temporary benefit	Keeps wound moist but does not actively remove exudates
Primary Closure After Laparotomy	**Not preferred in contamination**	Risk of abdominal compartment syndrome & infection

PREPLADDER

Antibiotic-Soaked Gauze	Limited benefit	Does not provide negative pressure drainage

Normal Saline Soaked Gauze (Option B):Incorrect because it only provides a moist environment but does not actively help with infection control or wound healing.

Prefer Closure After Laparotomy (Option C):Incorrect because immediate closure is not ideal in **diffuse contamination**, as it increases the risk of **abdominal compartment syndrome and sepsis**.

Antibiotic Soaked Gauze (Option D):Incorrect because while it may help prevent infection, it does not provide **negative pressure therapy** needed for wound contraction and fluid removal.

Reference :

1. SRB's Manual of Surgery, 6th Edition, Page 319-322
2. https://pubmed.ncbi.nlm.nih.gov/30949740/

Learning Outcome :

117. Question :

A patient presents to the emergency department with confusion. On examination, he opens his eyes to pain, shows abnormal flexion to pain, and is disoriented in speech. What is his Glasgow Coma Scale (GCS) score?

Option 1 :

11

Option 2 :

12

Option 3 :

10

Option 4 :

9

Correct option :4

PREPLADDER

Solutions :

Answer: D) 9

Explanation:

The **Glasgow Coma Scale (GCS)** is calculated based on **three components**:

Response Category	Patient's Response	Score
Eye Opening (E)	To pain	**2**
Verbal Response (V)	Confused	**4**
Motor Response (M)	Flexion withdrawal from pain	**3**
Total GCS Score	**2 + 4 + 3 = 9**	

Glasgow Coma Scale (GCS) Components

Category	Score	Description
Eye Opening (E)	4	Spontaneous
	3	To voice
	2	To pain
	1	None
Verbal Response (V)	5	Oriented
	4	Confused
	3	Inappropriate words
	2	Incomprehensible sounds
	1	None
Motor Response (M)	6	Obeys commands
	5	Localizes pain

PREPLADDER

	4	Withdraws from pain
	3	Flexion (abnormal)
	2	Extension (abnormal)
	1	None

Reference :

1. Bailey & Love's Short Practice of Surgery, 28th Edition, Page 357,361
2. https://www.glasgowcomascale.org/what-is-gcs-p/
3. https://www.ncbi.nlm.nih.gov/books/NBK513298/

Learning Outcome :

118. Question :

A patient diagnosed with Cryptococcal meningitis. What is the treatment?

Option 1 :

Flucytosine

Option 2 :

Fluconazole

Option 3 :

L.Amp

Option 4 :

Flucytosine + L.Amp

Correct option :4

Solutions :

Correct Answer: D) Flucytosine + L.Amp

Explanation: The treatment for Cryptococcal meningitis is**Flucytosine + Liposomal Amphotericin B (L.Amp).**

Fungal Meningitis:

PREPLADDER

Causes	• **Cryptococcus neoformans** (most common) • Candida • Histoplasma • Blastomyces • Coccidioides • Sporothrix
Risk factors	Immunocompromised patients
Clinical features	• Headache • Altered mental status, lethargy • Fever • Neck stiffness • Nausea and vomiting.
Investigations	• **Lumbar Puncture:** Low glucose and high protein levels. White cell count can be normal or higher than 20 microL and have a lymphocyte predominance. • India ink stain shows encapsulated yeast cells. • CSF ELISA for CRAG (Cryptococcal Antigen).
Treatment	• **LAMB** (Liposomal Amphotericin-B) and **5-Fluorocytosine** (Flucytosine) for 2 weeks • **Fluconazole** is given subsequently for 8-10 weeks.

PRELADDER

Reference :

Harrison's Principles of Internal Medicine, 21st Edition, Page 1109

Davidson's Principles and Practice of Medicine, 24th Edition, Page 1118

https://www.ncbi.nlm.nih.gov/books/NBK525986/#article-20152.s9

Learning Outcome :

119. Question :

What is the usual method of collecting a sample of urine to detect UTI?

Option 1 :

Early morning sample

Option 2 :

Midstream catch

Option 3 :

Supra pubic catheter

Option 4 :

Starting stream collection

Correct option :2

Solutions :

Correct Answer: B) Midstream catch

Explanation:

In a toilet-trained child, the usual method of collecting urine for evaluation of urinary tract infection is **midstream catch**.

This is preferred since it poses the least risk of contamination and is easy and non-invasive.

Methods of Urine Sample Collection:

- **Midstream Sample (Toilet-Trained Children):**
  - Suitable for most toilet-trained children.
  - Clean the introitus before collecting the sample.
- Voided Sample (Uncircumcised Males):
  - Prepuce must be retracted to avoid contamination.
  - Non-retractable prepuce can lead to unreliable, contaminated samples.
- Catheterized or Suprapubic Aspiration (Children Not Toilet-Trained):
  - Preferred methods for children under 2 years old.
- Adhesive Collection Bag:
  - Can be used in children not toilet-trained if the skin is disinfected.
  - Useful for negative urinalysis or culture; has a 99% negative predictive value.
  - Not recommended if immediate treatment is planned due to high contamination risk.
- **Suprapubic Aspirate**: **(Option C)**

PREPLADDER

- Rarely needed; generally not recommended unless there are specific concerns.

Contamination Concerns:

- Bagged Specimen: Positive cultures can result from contamination, especially in females and uncircumcised males.
- Contamination Risk: A high rate of contamination may occur, especially with mixed organisms.

The **early morning sample (Option A)** is for evaluating proteinuria and not UTI.

Starting stream collection (Option D)is not preferred as this can contain commensals that might give incorrect results.

Reference :

Nelson Paediatrics, 21st Edition, Page 2792

Learning Outcome :

120. Question :

Which of the following is the correct arrangement about the levels of health care?

Option 1 :

1- Medical colleges and hospitals are primary level, 2- CHC is secondary level, 3- Sub Centre and PHC are tertiary

Option 2 :

1- Sub Centre and PHC are primary level, 2- CHC is secondary level, 3- Medical colleges and hospitals are tertiary

Option 3 :

1- CHC is primary level, 2- Sub Centre and PHC are secondary level, 3- Medical colleges and hospitals are tertiary

Option 4 :

1- PHC is primary level, 2- Sub Centre is secondary level, 3- Medical colleges and hospitals are tertiary

Correct option :2

Solutions :

The healthcare system is divided into three levels:

1. **Primary level:Sub Centres (SCs) and Primary Health Centres (PHCs)**
    - First point of contact for healthcare

PREPLADDER

- Focuses on **preventive, promotive, and basic curative services**

2. **Secondary level:Community Health Centres (CHCs) and District Hospitals**
    - Provides **specialist services** like general surgery, paediatrics, and obstetrics
    - Functions as a referral centre for PHCs
3. **Tertiary level:Medical Colleges and Specialty Hospitals**
    - Provides **advanced care** with multi-speciality and super-speciality services
    - Handles **complex and critical cases** referred from lower levels

Option A: Incorrect because **Medical Colleges and Hospitals are tertiary level**, not primary.

Option C: Incorrect because **CHCs belong to the secondary level, not primary**, and **Sub Centres & PHCs are at the primary level, not secondary**.

Option D: Incorrect because **Sub Centres are part of primary healthcare, not secondary**.

Reference :

Health systems in India - PMC

Learning Outcome :

121. Question :

In a child presenting with a beaded appearance in the chest with the following X-ray, what is the diagnosis?

LADDER

Option 1 :

Scurvy

Option 2 :

Rickets

Option 3 :

Beri Beri

Option 4 :

Pellagra

Correct option : 2

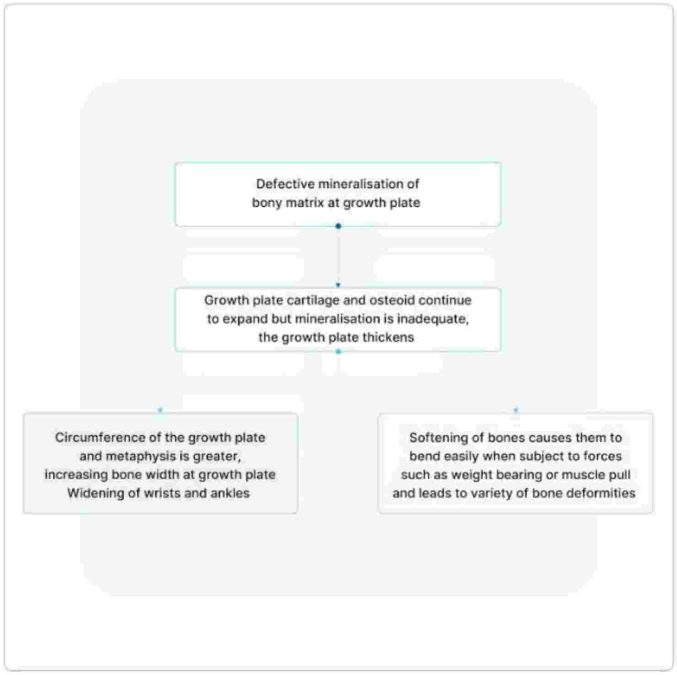
Solutions :

Correct Answer: B) Rickets

Explanation:

The radiograph showing metaphyseal fraying and cupping and the clinical presentation of a beaded appearance on the chest (rachitic rosary) are characteristic features of **rickets**caused due to vitamin D deficiency.

Pathophysiology of Rickets:



ADDER

Clinical Features of Rickets:

- **General:**
  - Failure to thrive (malnutrition)
  - Listlessness
  - Protruding abdomen
  - Muscle weakness (especially proximal)
  - Hypocalcemic dilated cardiomyopathy
  - Fractures (pathologic, minimal trauma)
  - Increased intracranial pressure
- **Head:**
  - Craniotabes: Softening of cranial bones
  - Frontal bossing
  - Delayed fontanel closure (usually closed by 2 yr)
  - Delayed dentition
  - Craniosynostosis
- **Hypocalcemic Symptoms:**
  - Tetany
  - Seizures
  - Stridor caused by laryngeal spasm
- **Chest:**
  - Rachitic rosary: Due to widening of the costochondral junction
  - Harrison groove: Horizontal depression along the lower anterior chest due to pulling of softened ribs by the diaphragm during inspiration
  - Respiratory infections and atelectasis
- **Back:**
  - Scoliosis
  - Kyphosis
  - Lordosis
- **Extremities:**
  - Enlargement of wrists and ankles: Due to growth plate widening
  - Valgus or varus deformities
  - Windswept deformity (valgus deformity of one leg with varus deformity of other leg)
  - Anterior bowing of tibia and femur
  - Coxa vara

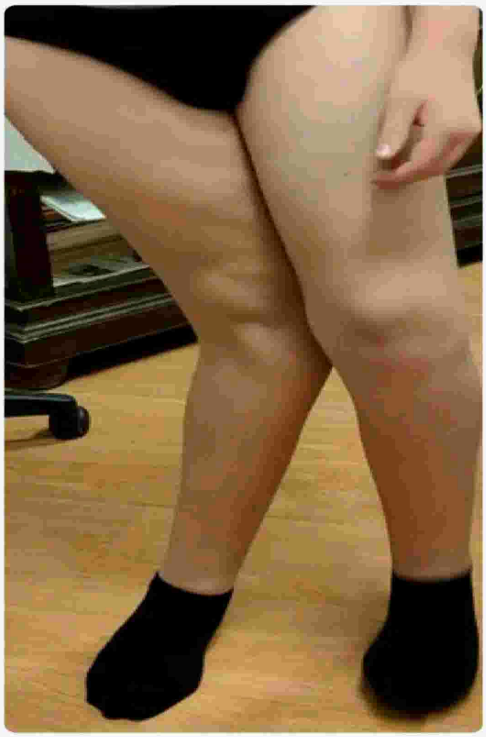
PREPLADDER

Rachitic rosary in a child in rickets

Hand and forearm of a young child with rickets show prominence above the wrist

PREVIEW

Anterolateral bowing of legs and prominent malleoli in a child with rickets



Windswept deformity of legs in rickets

Treatment of Nutritional Rickets:

1. Vitamin D Supplementation:

- **Stoss Therapy:**

- Administer 300,000-600,000 IU of vitamin D orally or intramuscularly over 1 day (2-4 doses).
- Vitamin D_3 is preferred due to its longer half-life.
- Ideal for patients with questionable adherence.

- **Alternative Strategy:** Daily Vitamin D minimum dose of 2,000 IU/day for at least 3 months.
- **Follow-Up:** Both strategies should follow up with 400 IU/day (<1 year old) or 600 IU/day (>1 year old).

2. Calcium Supplementation: Provide oral calcium (30-75 mg/kg/day, maximum 500 mg).

3. Phosphorus Supplementation

4. Monitoring: Radiological improvement (white line of healing in the metaphyses) should be visible within 4 weeks.

Healing of the growth plate following Vitamin D therapy

Age	Daily dose of vitamin D3 for 12 weeks	Alternative intermittent dose regimen	Daily calcium supplementation	Daily maintenance dose (follow-up)
<6 months	2000 IU	Not recommended	30-75 mg/kg/day	400 IU
6-12 months	2000 IU	The equivalent of 2000 IU/ day may be given on a weekly or monthly basis	30-75 mg/kg/day	400 IU

>12 months	3000IU	60,000 IU every 2 weeks for 5 doses	30-75 mg/kg/day (up to 500 mg)	600 IU

Scurvy (Option A) is caused due to vitamin C deficiency and presents with irritability, leg swelling, gum bleeding, and elevated prothrombin time.

Beriberi (Option C)is caused due to the deficiency of vitamin B1 (thiamine) that can lead to symptoms such as lethargy, restlessness, developmental delay, and abdominal distention. Late symptoms like peripheral neuritis, decreased reflexes, loss of vibration sense, muscle tenderness, heart failure, oedema, cardiomegaly, etc.

Pellagra (Option D)is due to niacin (vitamin B3) deficiency leading to dementia, diarrhoea, and dermatitis

Reference :

Nelson Textbook of Pediatrics, 21st Edition, Page 380

OP Ghai Essential Pediatrics, 10th Edition, Page 106

Learning Outcome :

122. Question :

Which of the following is the most common cause of bloody nipple discharge?

Option 1 :

Breast cancer

Option 2 :

Fibroadenoma

Option 3 :

Intraductal papilloma

Option 4 :

Duct Ectasia

Correct option :3

Solutions :

Correct Answer: C) Intraductal papilloma

Explanation:

Intraductal papilloma:

PREPLADDER

- A benign tumor that forms in a milk duct in the breast.
- It is the most common cause of bloody nipple discharge.
-

Symptoms: The most common cause of Nipple discharge (often clear or bloody), a palpable lump near the nipple.

Causes:

- Age (35-55 years)
- Longtime exposure to estrogen
- Family history of breast cancer

Diagnosis:

- Clinical breast examination
- Imaging: Mammography and ultrasound
- Biopsy to rule out malignancy.

Treatment: Surgical removal of the papilloma and the affected duct and monitoring for any signs of recurrence.

Nipple Discharge

Type of Nipple Discharge	Causes
Bloody	• Intraductal Papilloma (Most Common) • Breast Carcinoma • Duct Ectasia
Serous	• Fibrocystic Disease (Most Common) • Breast Carcinoma • Duct Ectasia
Greenish/Blackish	• Duct Ectasia
Milk (Galactorrhea)	• Physiological (e.g., Pregnancy, Lactation) • Hyperprolactinemia (e.g., Pituitary Adenoma, Hypothyroidism) • Medications (e.g., Antipsychotics, Antidepressants, Oral Contraceptives)

PREPLADDER

Purulent	• Breast Abscess • Mastitis

Breast cancer (Option A): Both ductal carcinoma in situ (DCIS) and invasive ductal carcinoma can present with bloody discharge.

- However, this is not the most common cause as compared to intraductal papilloma.

Fibroadenoma (Option B): Benign breast tumors that are most common in young women.

- They are usually painless, firm, and mobile lumps within the breast.
- Fibroadenomas do not typically cause bloody nipple discharge

Duct ectasia (Option D): Inflammation and dilation of the ducts, which can sometimes cause bloody discharge.

- However, this is not the most common cause as compared to intraductal papilloma.

Reference :

1. Bailey & Love's Short Practice of Surgery, 28th Edition, Page 924.
2. SRB's Manual of Surgery, 6th Edition, Page 556

Learning Outcome :

123. Question :

A 23-year-old female visited the clinician with a solitary thyroid nodule and was advised for thyroid function tests where Tsh level is 27.3mU/L, T3 is 1.24 ng/ml, and T4 is 4.87 microgram/ml. Which of the following manifestations is true regarding the condition?

Option 1 :

Heat intolerance

Option 2 :

Tachycardia

Option 3 :

Diarrhea

Option 4 :

Weight gain

PREPLADDER

Correct option : 4

Solutions :

Correct Answer: D) Weight gain

Explanation:

- The patient's thyroid function tests show elevated TSH with normal T3 and T4 levels, indicating primary hypothyroidism.
- Weight Gain is consistent with hypothyroidism due to reduced metabolic rate.
- Heat Intolerance **(Option A)**, Tachycardia **(Option B**), and Diarrhea (**Option C**) are more common in **hyperthyroidism**, not hypothyroidism.

Hypothyroidism	Hyperthyroidism
Decreased metabolic rate	Increased metabolic rate
Weight gain, puffiness, dry skin	Weight loss
Decreased appetite	Increased appetite
Bradycardia	Tachycardia
Cold intolerance	Heat intolerance
Constipation	Diarrhea
Menorrhagia	Amenorrhea, infertility
Cardiomegaly, pericardial effusion.	Cardiovascular complications such as atrial fibrillation, cardiomyopathy, and Congestive heart failure.
Altered mental status, coma	-

PREPLADDER

Reference :

Sabiston's Textbook of Surgery, 21st Edition, Pages 884, 886

Learning Outcome :

- **In hypothyroidism:**
    - TSH ↑ and, T3,T4 values ↓
    - **Most common cause:** Hashimoto's thyroiditis (Developed countries) & Iodine Deficiency - Both are primary causes of hypothyroidism.
    - Other causes:
        - Drug-induced hypothyroidism (Amiodarone)
        - Food goitrogens like Cabbage, cassava.
        - Sheehan syndrome
        - Sarcoidosis
        - Hemochromatosis
        - Simmonds's disease
        - Non functioning pituitary adenoma
        - Cranial radiation

- **In hyperthyroidism:**
    - TSH ↓ and T3, T4 values ↑
    - **Most common cause:**Graves disease. (primary cause of hypothyroidism)
    - Other causes:
        - Toxic Multinodular Goiter
        - Toxic adenoma
        - Activating mutation of TSH receptor
        - Pituitary adenoma
        - Jod Basedow effect
        - Struma ovarii
        - Gestational Trophoblastic Neoplasia
        - Thyrotoxicosis factitia

PREPLADDER

124. Question :

A 34-year-old male undergoes an open appendectomy for acute appendicitis. The choice of incision was McBurney's incision. Postoperatively, after a few days, he presents with pain and bulging in the right lower quadrant, which is diagnosed as an indirect inguinal hernia. Which nerve injury during the appendectomy is most likely responsible for this complication?

Option 1:

Ilioinguinal nerve

Option 2 :

Femoral nerve

Option 3 :

Genitofemoral nerve

Option 4 :

Pudendal nerve

Correct option :1

Solutions :

Correct Answer: A) Ilioinguinal nerve

Explanation:

The complications associated with appendectomy are listed below:

Complication	Description
1. Wound infection	The **MC postoperative complication** involves infection at the surgical site.
2. Intraabdominal abscess	Collection of pus within the abdominal cavity, typically due to infection.
3. Ileus	Temporary cessation of bowel function, leading to abdominal distension and discomfort.
4. Venous thrombosis leading to embolism	Formation of blood clots in the veins, which can travel to the lungs or other parts of the body.
5. Portal pyaemia (Pylephlebitis)	Infection and thrombosis of the portal vein, a rare but serious complication.

PREPLADDER

6. Adhesive intestinal obstruction	Formation of scar tissue causing bowel obstruction; **MC late complication**
7. Fecal fistula	Leakage from the appendiceal stump.
8. Nerve injury	Injury to the Ilioinguinal nerve and iliohypogastric nerve

Reference :

SRB Manual of Surgery Edition 6th Pg. 935

Learning Outcome :

125. Question :

A 60 y/o male suddenly experiences an intense headache, described as the worst headache of his life, followed by vomiting and photophobia. O/E he has neck stiffness and a dilated pupil on the right side. A CT scan reveals bleeding in the subarachnoid space. Which of the following is the most common cause of this condition?

Option 1 :

Hypertension

Option 2 :

Intracranial aneurysm

Option 3 :

Arteriovenous malformation (AVM)

Option 4 :

Brain tumour

Correct option :2

Solutions :

Correct Answer: B) Intracranial aneurysm

Explanation:

The clinical scenario described is highly indicative of a subarachnoid haemorrhage (SAH), which is characterized by the sudden onset of a severe headache, vomiting, photophobia, neck stiffness, and neurological signs such as a dilated pupil.

PREPLADDER

- The most common cause of subarachnoid haemorrhage (SAH) is the rupture of an **intracranial aneurysm**, responsible for about 50% of cases.

Subarachnoid Haemorrhage (SAH)
Intracranial haemorrhage into the subarachnoid space, typically originating from the basal cisterns. It may occur spontaneously or following **trauma** (Trauma > Spontaneous)

Causes of spontaneous SAH:

- Intracranial aneurysms: **The most common cause**
- Hypertension: Contributing to the formation and rupture of aneurysms.
- Arteriovenous (A-V) malformations
- Blood dyscrasias
- Anticoagulant drugs: Increasing the risk of bleeding.
- Brain tumours (malignant): Causing vessel erosion or rupture.

Clinical Features:

- Sudden onset: **Severe headache** with vomiting.
- **Raised intracranial pressure**: Signs like photophobia and neck stiffness.
- **Focal neurological deficits:** Hemiplegia, dysphasia.
- **Eye changes:** Ptosis, dilated pupil, abnormal eye movements.
- Sudden loss of consciousness
- Rebleeding risk: Occurs in 40% of patients within 6-8 weeks, often fatal.

Investigations:

- Imaging:
    - CT scan: **Primary** imaging modality.
    - Angiography: Carotid and vertebral angiogram to identify aneurysms or vascular malformations.
- Lumbar puncture: Performed to differentiate from **meningitis**; done cautiously due to risk of **coning.**

Management:

- Surgical interventions:
    - **Clipping or wrapping of aneurysm.**
    - **Craniotomy:** Followed by necessary procedures.
    - Ligation of the common carotid artery: Risk of hemiplegia.
    - **Therapeutic embolization**: To block abnormal blood vessels.
- Excision of vascular malformations.

PREPLADDER

Reference :

1. SRB's Manual of surgery, 6th edition, Pages 1083,1084
2. Bailey and Love Short manual of surgery, 28th Edition, Pages 708-711

126. Question :

A 45-year-old male patient was brought to the emergency department following a road traffic accident.O/E, he had multiple injuries all over his body and was found to be in class III hemorrhagic shock. The percentage of blood loss would be between:

Option 1 :

5-15%

Option 2 :

30-40%

Option 3 :

>40%

Option 4 :

15-30%

Correct option : 2

Solutions :

Correct Answer: B) 30-40%

Explanation:

The percentage of blood loss in class III hemorrhagic shock is **30-40%.**

Parameter	Class I (Compensated Shock)	Class II (Hypoxemia)	Class III	Class IV (Refractory Shock)
Blood Loss	Up to 15% **(Option A)**	15-30% **(Option D)**	30-40% **(Option B)**	More than 40% **(Option C)**

PREPLADDER

Mechanism	Compensatory mechanisms maintain cardiac output.	Generalized vasoconstriction.	Decompensated shock.	Refractory shock.
Heart Rate	<100/min	100-120/min	120-140/min	>140/min
Blood Pressure	Normal	Hypotension	Marked hypotension	Profound hypotension
Respiratory Rate	Normal	Tachypnea	Tachypnea	Tachypnea
Urine Output	>30 ml/hour	20-30 ml/hour	5-15 ml/hour	No urine output
Mental Status	Alert, normal	Anxious, mildly agitated	Confused, altered mental status	Comatose, lethargic

Reference :

1. SRB's Manual of Surgery, 6th Edition, Pages 105, 106, 107
2. Bailey & Love's Short Practice of Surgery, 28th Edition, Pages 13, 14

Learning Outcome :

127. Question :

KAT G mutation associated with:

Option 1 :

Isoniazid

Option 2 :

Rifampicin

Option 3 :

Levofloxacin

Option 4 :

Ethambutol

PREPLADDER

Correct option : 1

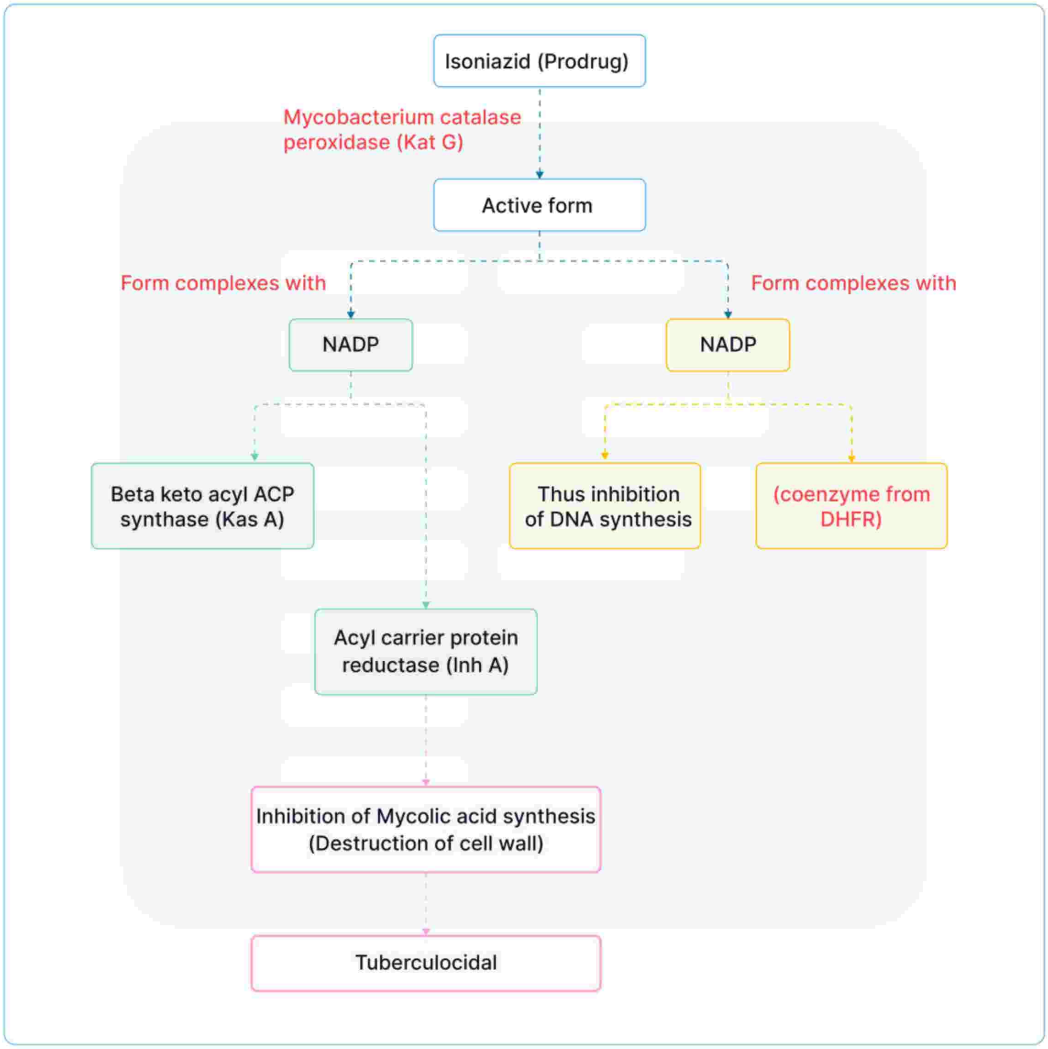
Solutions :

Correct Answer: A) Isoniazid

Explanation: The katG mutation causes **Isoniazid resistance** by preventing its activation inside Mycobacterium tuberculosis, making the drug ineffective.

Mechanisms of Isoniazid Resistance	
KatG gene mutation	**INH** is a prodrug, converted to the active form by catalase-peroxidase produced by the Kat G gene. The mutated catalase enzyme does not form the active drug
KasA gene mutation	Component of cell wall mycolic acid
InhA gene overexpression	Causes cross-resistance to Ethionamide (second-line drug)

PREPLADDER



Rifampicin (Option B) resistance is associated with mutations in the rpoB gene (RNA polymerase β-subunit), not KAT G.

Levofloxacin (Option C)resistance is linked to mutations in the gyrA and gyrB genes, which encode DNA gyrase, a key enzyme for bacterial DNA replication.

Ethambutol (Option D)resistance is associated with mutations in the embB gene, which affects arabinosyl transferase, an enzyme involved in mycobacterial cell wall synthesis.

Reference :

KD Tripathi Essentials of Medical Pharmacology, 8th Edition, Page 816-818

Learning Outcome :

128. Question :

A 20-year-old male presents to the outpatient department with a swelling on his wrist. He reports **fluctuation in size**, **mild numbness in the hand**, and **occasional pain**. What is the most likely diagnosis?

Option 1 :

Lipoma

Option 2 :

Ganglion cyst

Option 3 :

Dermoid cyst

Option 4 :

Hematoma

Correct option : 2

Solutions :

Answer: B) Ganglion cyst

Explanation:

The clinical presentation and image are characteristic of a **ganglion cyst**, which is the most common soft tissue swelling of the wrist.

Supporting features:

- **Location**: Commonly over the dorsal aspect of the wrist (as seen in image)
- **Fluctuation in size**: Classic feature due to cyst fluid dynamics
- **Mild numbness**: Can occur if the cyst compresses nearby nerves
- **Occasional pain**: Especially with wrist movement or pressure

Differentiating Wrist Masses:

Condition	Characteristics	Pain	Fluctuation in Size	Numbness
Lipoma	Soft, mobile, subcutaneous fat mass	No	No	No
Ganglion cyst	Fluid-filled, over joint or tendon sheath, translucent	Occasional	Yes	Rare
Dermoid cyst	Congenital, contains ectodermal elements (hair/sebum)	Rare	Rare	**Yes**
Hematoma	Post-trauma, discoloured, self-resolving	Yes (initially)	No	No

Lipoma (Option A): Typically soft, non-fluctuant, and slow-growing; not commonly associated with wrist joints or changes in size with activity.

Dermoid cyst (Option C): Usually congenital, midline, and more common in children; contains ectodermal elements, and rarely found over the wrist joint.

Hematoma (Option D): Usually follows trauma, appears bruised or discoloured, and resolves over time; not fluctuant or recurrent like this.

PREPLADDER

Reference :

1. https://www.ncbi.nlm.nih.gov/books/NBK470168/
2. https://www.ncbi.nlm.nih.gov/books/NBK507906/
3. https://pmc.ncbi.nlm.nih.gov/articles/PMC6258973/
4. https://www.ncbi.nlm.nih.gov/medgen/5484

Learning Outcome :

129. Question :

A **1.5-month-old male infant** presents to the outpatient department with **vomiting after feeding** and **failure to thrive**. On examination, a **firm, olive-shaped mass** is palpated in the **upper abdomen**. What is the most likely diagnosis?

Option 1 :

Subacute Intestinal Obstruction

Option 2 :

Pyloric Stenosis

Option 3 :

GERD

Option 4 :

Esophageal Atresia

130. Question :

A newborn male presents with urinary retention, lethargy and a distended bladder. Antenatal ultrasound showed a "keyhole sign" with a thickened bladder wall. Which of the following is the most likely diagnosis?

Option 1 :

Hypospadias

Option 2 :

Vesicoureteral reflux

Option 3 :

Posterior urethral valves

PREPLADDER

Option 4 :

Neurogenic bladder

Correct option : 3

Solutions :

Correct Answer: **C) Posterior urethral valves**

Explanation

Posterior urethral valves are characterized by membranous folds in the posterior urethra leading to urinary obstruction, which matches the "keyhole sign" on ultrasound and the postnatal symptoms of urinary retention and lethargy.

Posterior urethral valves	
Definition	Urinary tract obstruction in male infants from membranous folds in the posterior urethra.
Complications	Chronic kidney disease, pulmonary hypoplasia from oligohydramnios.
Classification	Type I: Posterior urethral folds Type II: Membranes at bladder neck Type III: Round membrane at verumontanum
Etiology	Congenital, unclear embryological origin.
Pathophysiology	Increased bladder pressure → hypertrophy, vesicoureteric reflux, renal damage
Diagnostic Tools	Ultrasound, VCUG (voiding cystourethrogram) and Renal scintigraphy.
Antenatal Diagnosis	Ultrasound: Dilated bladder ("keyhole sign"), thickened walls.
Postnatal Symptoms	Urinary retention, infections, lethargy, respiratory distress.
Management	• Antenatal: Vesicostomy, fetal valve ablation • Postnatal: Stabilization, cystoscopic ablation
Prognosis	Depends on severity; long-term care needed for CKD, bladder dysfunction, recurrent UTIs.

PREPLADDER

- Hypospadias involves an abnormal urethral opening and does not present with the obstructive symptoms described, such as a distended bladder and urinary retention. **(Option A)**
- Vesicoureteral reflux can occur secondary to posterior urethral valves but is not the primary condition associated with the described ultrasound findings and symptoms. **(Option B)**
- Neurogenic bladder results from nerve damage affecting bladder function, but it is not typically associated with the "keyhole sign" seen in posterior urethral valves. **(Option D)**

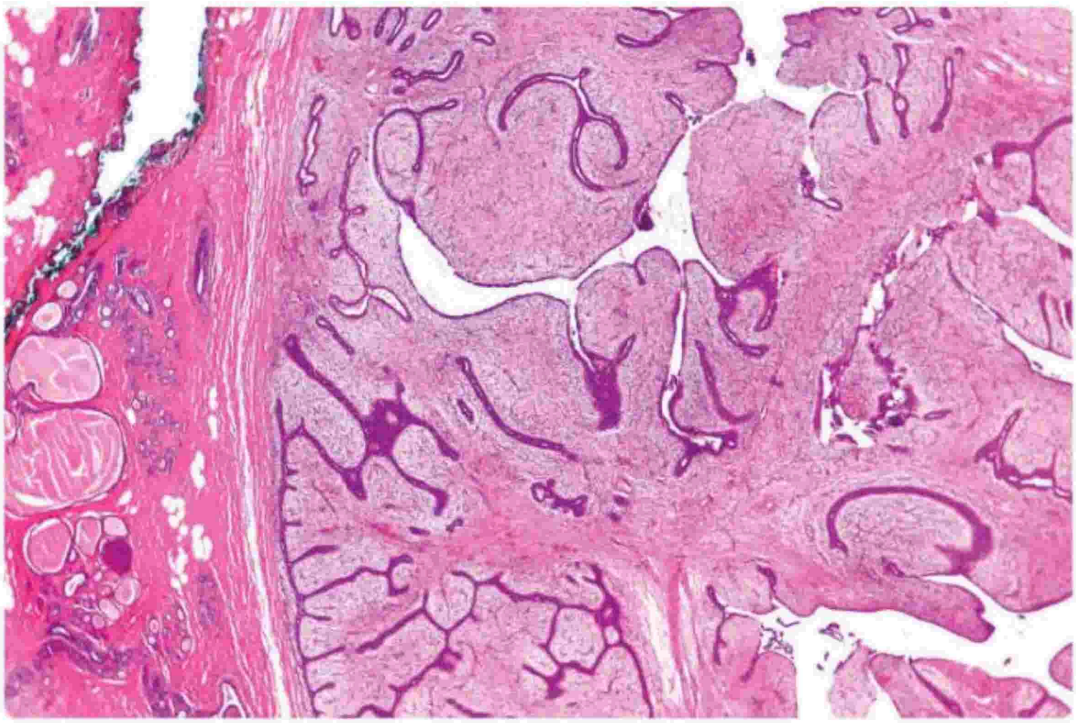
Reference :

1. Bailey and Love's Short Practice of Surgery, 28th Edition, Pages 1538,1539
2. https://www.ncbi.nlm.nih.gov/books/NBK560881/

Learning Outcome :

131. Question :

A **30-year-old female** presents to the OPD with a **3 cm breast lump** in the **upper medial quadrant**. The lump has an **uneven, bosselated surface**, and the **overlying skin is mildly ulcerated**. Microscopic examination reveals the given findings. What is the most likely diagnosis?



Option 1 :

Phyllodes tumor

Option 2 :

Galactocele

Option 3 :

Fibroadenoma

Option 4 :

Paget's disease

Correct option : 1

Solutions :

Answer: A) Phyllodes Tumor

Explanation:

- **Phyllodes tumors** are **fibroepithelial breast tumors** that exhibit **stromal overgrowth and a leaf-like architecture** on histology.
- They often present as **large, bosselated (lobulated) masses** with **rapid growth**.
- **Ulceration of overlying skin** suggests an aggressive nature, which is common in **borderline or malignant phyllodes tumors**.
- **Histopathology confirms the diagnosis** by showing **stromal hypercellularity and cleft-like spaces resembling leaf-like structures**.

Phyllodes Tumor

Feature	Description
Age Group	30-50 years
Growth	Rapid, large lobulated mass
Surface	Uneven, bosselated
Histology	Stromal overgrowth, leaf-like pattern
Treatment	Wide local excision / mastectomy

Galactocele (Option B):Incorrect because it occurs in **lactating women** due to **ductal obstruction**, presenting as a **smooth, cystic mass** without ulceration.

PREPLADDER

Fibroadenoma (Option C):Incorrect because it is a **well-defined, mobile mass** with **smooth surface**, lacking ulceration and stromal overgrowth.

Paget's Disease (Option D):Incorrect because it involves the **nipple-areolar complex**, with **eczematous changes**, and is associated with **underlying ductal carcinoma**.

Reference :

Robbins & Cotran Pathologic Basis of Disease, 10th Edition, Page No.1062-63.

Learning Outcome :

132. Question :

A patient with dilated tortuous veins of the leg presented to the OPD and is diagnosed with varicose vein of grade C4a. What is the best preferred treatment?

Option 1 :

Compression

Option 2 :

Endothermal ablation

Option 3 :

Non endothermal non tumescent ablation

Option 4 :

Open surgery

Correct option : 2

Solutions :

Answer: B) Endothermal ablation

Explanation:

- **Grade C4a varicose veins** (as per CEAP classification) indicate **skin changes such as pigmentation or eczema** due to chronic venous insufficiency.
- **Endothermal ablation (radiofrequency or laser) is the first-line treatment** for symptomatic varicose veins.
- It is **minimally invasive, effective, and has faster recovery compared to open surgery**.

CEAP Classification & Treatment of Varicose Veins

CEAP Class	Clinical Features	Preferred Treatment

PREPLADDER

C0	No visible/palpable signs	No treatment needed
C1	Telangiectasias or reticular veins	Conservative (compression)
C2	Varicose veins	Compression, ablation, or surgery
C3	Edema	Endothermal ablation
C4a	Pigmentation/eczema	**Endothermal ablation**
C4b	Lipodermatosclerosis or atrophie blanche	Endothermal or open surgery
C5	Healed venous ulcer	Endothermal ablation + ulcer care
C6	Active venous ulcer	Multimodal therapy

Compression (Option A):Incorrect because while compression stockings help relieve symptoms, they do **not treat the underlying venous reflux**.

Non-endothermal non-tumescent ablation (Option C):Incorrect because options like cyanoacrylate glue or mechanochemical ablation are **alternative treatments but not first-line**.

Open surgery (Option D):Incorrect because surgical vein stripping is now reserved for cases where **endothermal ablation is not feasible**.

Reference :

1. Sabiston Textbook of Surgery, 21st Edition, Page 1814
2. Bailey and Love's Short Practice of Surgery, 28th Edition, Page 1030
3. CEAP

Learning Outcome :

133. Question :

In a follow-up case of prostate cancer, what do we need to check?

Option 1 :

Alkaline phosphatase

Option 2 :

PSA

PREPLADDER

Option 3 :

Testosterone

Option 4 :

Acid phosphatase

Correct option : 2

Solutions :

Answer: B) PSA

Explanation:

- **Prostate-Specific Antigen (PSA):**
  - PSA is the most **sensitive marker** for **monitoring prostate cancer** progression and recurrence.
  - Serial PSA measurements help assess **treatment response** and **early detection of relapse**.
- **Role in Follow-Up:**
  - **After radical prostatectomy:** A rising PSA suggests **biochemical recurrence**.
  - **During androgen deprivation therapy (ADT):** Persistent or rising PSA indicates **treatment resistance**.
  - **Post-radiotherapy:** A gradual PSA rise may suggest **local or metastatic progression**.

Follow-Up in Prostate Cancer

Parameter	Significance in Prostate Cancer Follow-Up
PSA (Prostate-Specific Antigen)	Most important marker; rising levels indicate recurrence or metastasis
Alkaline Phosphatase (ALP)	Marker for **bone metastases**, but not routinely used for follow-up
Acid Phosphatase (PAP)	Older marker, now largely replaced by PSA
Testosterone	Checked in hormone-sensitive cases on ADT to confirm **castrate levels**

Alkaline Phosphatase (Option A): Incorrect because it is primarily used to **detect bone metastases**, not routine follow-up.

Testosterone (Option C): Incorrect because it is only relevant in patients on **androgen deprivation therapy (ADT)** to confirm castration levels.

PREPLADDER

Acid Phosphatase (Option D): Incorrect because **Prostatic Acid Phosphatase (PAP)** is an outdated marker, now replaced by PSA.

Reference :

Bailey and Love Short practice of surgery,28e, pg 1532, 1533, 1534, 1535.

Learning Outcome :

134. Question :

A 38 Y/o woman presents with complaints of heavy menstrual bleeding, pelvic discomfort, and frequent urination. On physical examination, her uterus is found to be irregularly enlarged. Which of the following is the most likely diagnosis?

Option 1 :

Endometriosis

Option 2 :

Ovarian cyst

Option 3 :

Leiomyoma

Option 4 :

Polycystic ovary syndrome (PCOS)

Correct option : 3

Solutions :

Correct Answer: C) Leiomyoma

Explanation:

This patient's symptoms of **heavy menstrual bleeding**, **pelvic discomfort**, **frequent urination**, and an **irregularly enlarged uterus** are most consistent with a diagnosis of **leiomyoma**, also known as **fibroids**.

Leiomyoma:

Leiomyomas are benign smooth muscle neoplasms that originate in myometrium.

Clinical features:

- Asymptomatic (75%) - mostly an incidental finding
- Abnormal uterine bleeding(AUB)(30%): Menorrhagia,metrorrhagia
- Dysmenorrhea, dyspareunia
- Subfertility
- Pressure symptoms

PREPLADDER

- Bladder symptoms: increased frequency or retention of urine
- Rectal symptoms: constipation

- Lower abdominal or pelvic pain or heaviness
- Irregularly enlarged lower abdomen.

Endometriosis (Option A) also presents with pelvic pain and abnormal menstrual bleeding but an irregularly enlarged uterus is not seen.

An ovarian cyst (Option B) most commonly, is asymptomatic but increases the risk of ovarian torsion and **presents with an adnexal mass** but not an enlarged uterus.

Polycystic ovarian syndrome (Option D) is usually seen in obese women and presents with irregular menstrual bleeding along with hormonal symptoms such as hirsutism and acne.

Reference :

Williams Gynaecology, 4th Edition, Pages 205, 206

Learning Outcome :

135. Question :

A 25-year-old female presents with irregular menstrual cycles, acne, and excessive hair growth. An ultrasound reveals multiple ovarian cysts. What is the most likely diagnosis?

Option 1 :

Polycystic Ovary Syndrome (PCOS)

Option 2 :

Endometriosis

Option 3 :

Hypothyroidism

Option 4 :

Ovarian hyperstimulation syndrome (OHSS)

Correct option : 1

Solutions :

Correct Answer: A) Polycystic Ovary Syndrome (PCOS)

Explanation:

PREPLADDER

Polycystic Ovary Syndrome (PCOS), also known as Stein-Leventhal syndrome, is a heterogeneous, multisystem endocrinopathy in women of reproductive age with ovarian expression of various metabolic disturbances.

Components of PCOS:

- Increased androgens
- Ovulatory dysfunction
- Polycystic ovaries

Clinical features:

- Usually present in young women
- Central obesity (BMI > 30kg/cm^2), waistline> 88cm.
- Oligomenorrhea, amenorrhoea
- Infertility
- Hirsutism
- Acanthosis nigricans due to insulin resistance

Endometriosis (Option B) involves the growth of endometrial tissue outside the uterus and presents with pelvic pain, dysmenorrhea and infertility.

- While it can cause irregular menstrual cycles, it does not typically cause acne, hirsutism, or multiple ovarian cysts.

Hypothyroidism (Option C) can cause menstrual irregularities, weight gain, and fatigue.

- However, it does not commonly present with acne, hirsutism, or multiple ovarian cysts.

Ovarian hyperstimulation syndrome (OHSS) (Option D):

- This condition can occur as a complication of Assisted Reproductive Technology (ART), particularly in individuals who have undergone ovulation induction with medication.
- The ultrasound may reveal multiple ovarian cysts, but the clinical presentation is typically characterized by acute abdominal pain rather than irregular menstrual cycles, acne, or hirsutism.

Reference :

Shaws textbook of Gynaecology, 17th Edition, Page 315

Learning Outcome :

136. Question :

A 25-year-old female presents with complaints of a yellowish-green, foul-smelling vaginal discharge. She reports painful urination and pain during intercourse & no itching. On speculum examination, her vulva and vaginal walls appear inflamed. What is the causative agent?

PREPLADDER

Option 1 :

Trichomonas vaginalis

Option 2 :

Candida albicans

Option 3 :

Gardnerella vaginalis

Option 4 :

Neisseria gonorrhoeae

Correct option : 1

Solutions :

Correct Answer: A) Trichomonas vaginalis

Explanation:

Trichomonas vaginitis is the **most common** cause of vaginitis in women of reproductive age.

Symptoms include :

- Sudden, profuse, yellowish-green, frothy, foul-smelling discharge
- Irritation and itching in and around the vaginal opening
- Painful urination
- Pain during intercourse
- Recurrent infections
- Inflamed vulva
- Inflamed vaginal walls with small, punctate hemorrhages ("strawberry cervix")

Candida albicans (Option B):

- Characterized by a scanty, white, curdy vaginal discharge
- Intense vulvovaginal itching present leading to erosions causing splash dysuria and dyspareunia

Gardnerella vaginalis (Option C):

- Characterized by a foul-smelling, thin, gray-white, or green-yellow vaginal discharge
- Absence of itching, dysuria, or dyspareunia

Neisseria gonorhhea (Option D):

- It does not typically cause vaginitis alone.
- It can cause cervicitis, whose symptoms can overlap with that of vaginitis.

Reference :

PREPLADDER

DC Dutta Textbook of Gynaecology, 8th Edition, Pages 135, 125, 126

Learning Outcome :

Most common causes of vaginitis:

- Trichomonas vaginalis
- Candidal vaginitis
- Gardnerella vaginalis

137. Question :

A 35-year-old female patient presents to the clinic for evaluation of her fertility status. She has been trying to conceive for over a year without success. Which of the following is the single best test for assessing her ovarian reserve?

Option 1 :

Follicle-stimulating hormone (FSH) on day 3

Option 2 :

Estradiol on day 3

Option 3 :

Anti-Müllerian hormone (AMH)

Option 4 :

Serum inhibin levels on day 5

Correct option : 3

Solutions :

Correct Answer: C) Anti-Müllerian hormone (AMH)

Explanation:

- Anti-Müllerian hormone (AMH) levels **correlate with the number of antral follicles** in the ovaries and provide a direct measure of ovarian reserve.
- AMH is **less variable throughout the menstrual cycle** and is considered the most reliable single test for assessing ovarian reserve.

Tests for Ovarian Reserve:

Test Name	Description	Key Points

PREPLADDER

Anti-Müllerian Hormone (AMH)	A hormone produced by ovarian antral follicles.	• Blood test reflecting the remaining quantity of eggs. • **Not affected by the menstrual cycle.** • **The single best test for assessing her ovarian reserve**
Antral Follicle Count (AFC)	Ultrasound count of the small follicles (antral follicles) within the ovaries.	• Direct visual assessment. • Can vary with the cycle. • Baseline assessment and monitoring.
Follicle-stimulating hormone (FSH)	Measures the level of FSH, which stimulates the growth of ovarian follicles.	• Blood test done on day 3 of the menstrual cycle. • Initial screening of ovarian function.
Estradiol (E2)	Measures the level of estradiol, an estrogen produced by growing follicles.	• Blood test done on day 3 of the menstrual cycle. • High levels can mask high FSH levels, so they are used in conjunction with FSH.
Inhibin B	Measures the level of inhibin B, which reflects the number of antral follicles.	• Blood test on day 5 of the menstrual cycle.
Clomiphene Citrate Challenge Test (CCCT)	Measures FSH and estradiol before and after taking clomiphene citrate.	• Two blood tests: day 3 and day 10. • Higher FSH levels on day 10 indicate lower reserve. • Used for detailed functional assessment.

PRELADDER

Follicle-stimulating hormone (FSH) on day 3 (Option A):

- Elevated levels of FSH on the third day of the menstrual cycle can indicate diminished ovarian reserve.
- However, FSH levels can **fluctuate** and be influenced by various factors, making it a less reliable single test.

Estradiol on day 3 (Option B):

- Elevated estradiol levels on the third day of the menstrual cycle can suggest a diminished ovarian reserve.
- However, like FSH, **estradiol levels can be variable and influenced by other factors.**

Serum inhibin levels on day 5 (Option D):

- Inhibin B levels can reflect the size and function of the ovarian follicle pool, **but they can be more variable and less consistent than AMH.**

Reference :

1. Williams Gynecology, 4th Edition, Pages 436, 437.
2. Shaw's Textbook of Gynaecology, 17th Edition, Page 225

Learning Outcome :

138. Question :

A 28-year-old pregnant woman at 33 weeks gestation presents for a routine prenatal visit. She reports decreased fetal movements over the past two days. She has a history of gestational diabetes, and her pregnancy has been otherwise uneventful. The doctor decides to perform antepartum fetal surveillance. Which of the following is the most appropriate initial test to assess the fetal well-being in this scenario?

Option 1 :

Amniotic fluid index

Option 2 :

Biophysical profile

Contraction Stress test

Non Stress test

Option 3 :

Contraction Stress test

Option 4 :

Non Stress test

Correct option : 4

Solutions :

Correct Answer: D) Non Stress test

Explanation:

PREPLADDER

- The NST is a non-invasive, quick, and reliable method to assess fetal heart rate response to fetal movements, which is crucial given the reported decrease in fetal movements.
- During an NST, the mother is placed in a comfortable position, and external monitors are attached to her abdomen to record the fetal heart rate and any fetal movements for 20 minutes.
- A reactive NST (presence of accelerations in fetal heart rate with movements) indicates good fetal health, while a non-reactive NST (lack of sufficient accelerations) may necessitate further testing or intervention.

Antepartum fetal surveillance:

Fetal movement	Maternal observation and recording of fetal movements to assess fetal well-being and activity levels.
Non-stress test (NST)	Monitors fetal heart rate acceleration in response to fetal movements to assess fetal well-being.
Biophysical profile (BPP) **(Option B ruled out)**	Assesses fetal well-being based on fetal heart rate accelerations, fetal movements, muscle tone, breathing movements, and amniotic fluid volume
Doppler velocimetry	Uses ultrasound to assess blood flow in fetal vessels like umbilical artery,middle cerebral artery (MCA), and ductus venosus aiding in the evaluation of fetal well-being and placental function
Amniotic fluid index (AFI) **(Option A ruled out)**	Measures the depth of amniotic fluid to assess fetal well-being and detect potential complications like oligohydramnios or polyhydramnios
Contraction stress test (CST) **(Option C ruled out)**	Evaluates fetal heart rate response to uterine contractions to assess fetal well-being and uteroplacental function under controlled stress conditions.

PREPLADDER

BPP, CST, AFI are not the initial tests that are performed as they are either invasive (**CST)** or time consuming (**BPP**) or do not properly tell us about fetal movements (**AFI**).

Reference :

Williams Obstetrics, 26th Edition, Pages 386-391

Learning Outcome :

139. Question :

During the active management of the third stage of labor, which intervention is recommended to prevent postpartum hemorrhage primarily due to uterine atony?

Option 1 :

Immediate administration of 20 units of undiluted oxytocin intravenously

Option 2 :

Oxytocin 10 units IM with crowning

Option 3 :

Vigorous fundal massage combined with a uterotonic agent

Option 4 :

Controlled cord traction with immediate removal of the placenta

Correct option : 3

Solutions :

Correct Answer: C) Vigorous fundal massage combined with a uterotonic agent

Explanation:

- Vigorous fundal massage helps to maintain uterine tone and prevent uterine atony, a common cause of postpartum hemorrhage.
- Combining it with a uterotonic agent like oxytocin further enhances uterine contraction, reducing the risk of excessive bleeding.

Active Management of the Third Stage of Labor (AMTSL) for PPH

Uterine Massage	• Always palpate the uterine fundus after placental delivery. • Vigorous fundal massage, combined with a uterotonic agent, is recommended to prevent PPH due to uterine atony. • During immediate PPH, perform uterine massage while evaluating for other bleeding sources and administering uterotonic agents.

PREPLADDER

Oxytocin	• Recommended by WHO as a first-line prophylactic treatment for postpartum hemorrhage. • Administer 20 units of oxytocin in 1,000 mL of crystalloid solution intravenously at 10 mL/min for a dose of 200 mU/min. • Never administer oxytocin as an undiluted bolus due to risks of severe hypotension or cardiac arrhythmias.**(Option A)** • Intravenous oxytocin is also a first-line treatment for uterine atony. • Oxytocin 10 units can be given IM with the delivery of the anterior shoulder **(Option B)**
Delayed Cord Clamping/Controlled Cord Traction (CCT)	• If placental separation is evident, perform expression via fundal pressure or controlled cord traction. • If the placenta is not separated, perform manual removal under general anaesthesia. • Delivery of the placenta by cord traction before placental separation especially in an atonic uterus may cause uterine inversion. **(Option D)**

PREPLADDER

Reference :

Williams Obstetrics, 26th Edition, Pages 733-739

Learning Outcome :

Prevention of PPH:

- Oxytocin is DOC
- Prophylactic IM/IV oxytocin (5-10 units) after delivery of anterior part of the shoulders

140. Question :

Which of the following is the most likely abnormality in a patient of recurrent vomiting with pH 7.5, pCO2 48mm Hg, and HCO3- 33?

Option 1 :

Metabolic acidosis

Option 2 :

Metabolic alkalosis

Option 3 :

Respiratory acidosis

Option 4 :

Respiratory alkalosis

Correct option : 2

Solutions :

The clinical manifestations indicate **metabolic alkalosis secondary to recurrent vomiting**. The **elevated pH (7.5)**, **elevated HCO3- (33 mEq/L)**, and **elevated pCO2 (48 mmHg)** are consistent with **metabolic alkalosis with appropriate respiratory compensation**. The vomiting causes loss of H+ ions from the stomach, leading to increased serum bicarbonate concentration.

Metabolic Alkalosis:	• Metabolic alkalosis is characterized by an **increase in arterial pH**, **elevated serum bicarbonate [HCO3−], and increased PaCO2** due to **compensatory hypoventilation.** • Often presents with **hypochloremia** and **hypokalemia**. • Occurs as a mixed disorder with respiratory or metabolic acidosis or alkalosis.

PREPLADDER

Causes:	• **Exogenous Bicarbonate Loads**
	  • Acute alkali administration
	  • Milk-alkali syndrome
	• **Effective ECFV Contraction (Normotension, K+ Deficiency, Secondary Hyperreninemic Hyperaldosteronism)**
	  • Gastrointestinal Origin: Vomiting, gastric aspiration, congenital chloridorrhea, gastrocystoplasty, villous adenoma
	  • Renal Origin: Diuretic use (thiazides, loop diuretics), posthypercapnic state, hypercalcemia/hypoparathyroidism, recovery from acidosis, non-resorbable anions (e.g., penicillin), Mg^{2+} deficiency, K^+ depletion, Bartter's syndrome, Gitelman's syndrome
	• **ECFV Expansion, Hypertension, K+ Deficiency, and Mineralocorticoid Excess**
	  • High Renin: Renal artery stenosis, accelerated hypertension, renin-secreting tumor, estrogen therapy
	  • Low Renin: Primary aldosteronism (adenoma, hyperplasia, carcinoma), adrenal enzyme defects (11β-hydroxylase, 17α-hydroxylase deficiency), Cushing's syndrome, substances like licorice, carbenoxolone
	  • Genetic Sodium Channel Mutation (Liddle's Syndrome)
	  • Gain-of-function mutation in the distal convoluted tubule, causing ECFV expansion, hypertension, K^+ deficiency, and hypo-reninemic-hypoaldosteronism

Clinical Features:	• Neurological: Mental confusion, obtundation, potential seizures • Peripheral Nervous System: Paresthesias, muscle cramps, tetany (similar to hypocalcemia effects) • Cardiovascular: Aggravation of arrhythmias, particularly in COPD patients
Electrolyte Imbalances:	• Potassium (K^+): Hypokalemia, especially in cases involving secondary hyperaldosteronism or diuretic use. • Chloride (Cl^-): Hypochloremia, frequently accompanying alkalosis, especially in cases of vomiting or diuretic use. • Calcium (Ca^{2+}): Symptoms may mimic hypocalcemia despite normal levels.

PREPLADDER

Metabolic acidosis(Option A): Metabolic acidosis is characterized by a decreased pH and decreased HCO3- level, which is opposite to the findings in this case. Additionally, vomiting typically causes alkalosis, not acidosis.

Respiratory acidosis(Option C): Respiratory acidosis is characterized by an elevated pCO2 and decreased pH, neither of which is present in this case. Also, the clinical context of vomiting supports metabolic rather than respiratory disorders.

Respiratory alkalosis(Option D): Respiratory alkalosis is characterized by a decreased pCO2 and elevated pH. The elevated pCO2, in this case, rules out respiratory alkalosis. Furthermore, the history of vomiting points to a metabolic rather than respiratory cause.

Reference :

1. Harrison's Principles of Internal Medicine, 21st Edition, Page 365-367
2. Arterial Blood Gases - Physiopedia

Learning Outcome :

141. Question :

A patient presents with unilateral throbbing pain, photophobia, nausea, and vomiting. The symptoms improve after taking sumatriptan. What is the most likely diagnosis?

Option 1 :

Migraine

Option 2 :

Tension headache

Option 3 :

Cluster headache

Option 4 :

Sinus headache

Correct option : 1

Solutions :

The clinical manifestations indicate **classic migraine headache**.

The combination of **throbbing pain, photophobia, nausea, and vomiting** represents the typical presentation of migraine. The positive response to sumatriptan, a selective 5-HT1B/1D receptor agonist specifically used for migraine treatment, further confirms the diagnosis. These medications work by constricting cranial blood vessels and inhibiting neurogenic inflammation.

PREPLADDER

Clinical Features of Migraine	
Premonitory (Prodromal) Phase	• Neck discomfort • Cognitive impairment (brain "fog") • Mood changes • Fatigue • Yawning/sleepiness • Increased urination and thirst • Food cravings
Aura	• Neurologic disturbances (e.g., visual disturbances like scintillating scotoma) • Due to Cerebral vasoconstriction. Therefore prevention is by Vasodilators.

Headache Phase	• Pain
	• Nausea/vomiting
	• Sensory sensitivities:
	  • Photophobia (sensitivity to light)
	  • Phonophobia (sensitivity to sound)
	  • Osmophobia (sensitivity to smells)
	  • Allodynia (pain from non-painful stimuli)
	  • Vertigo
	• Due to cerebral vasodilation. So treatment is Vasoconstrictors

Postdrome	• Tiredness • Weariness • Impaired concentration

Diagnostic Classification:

Simplified Diagnostic Criteria for Migraine by International Headache Society

PREPLADDER

Repeated attacks of headache lasting 4–72h in patients with a normal physical examination, no other reasonable cause for the headache, and:	
At least 2 of the following features:	**Plus at least 1 of the following features:**
• **Unilateral pain** • **Throbbing pain** • Aggravation by movement • Moderate or severe intensity	• **Nausea/vomiting** • **Photophobia and phonophobia**

Tension headache (Option B): Tension headaches typically present with bilateral, pressing or tightening pain without associated symptoms like photophobia, nausea, or vomiting. They do not typically respond to triptans. The pain is usually described as a band-like pressure rather than throbbing.

Cluster headache(Option C): Cluster headaches are characterized by severe unilateral pain around the eye, with autonomic symptoms such as lacrimation, rhinorrhea, and conjunctival injection. While triptans can be effective, the absence of these distinctive autonomic features makes this diagnosis unlikely. Additionally, cluster headaches typically occur in cyclical patterns.

Sinus headache(Option D): Sinus headaches are typically associated with nasal congestion, purulent drainage and facial pressure. They do not typically present with photophobia or respond to triptans. The pain is usually worse with bending forward and improves with decongestants or antibiotics if bacterial sinusitis is present.

Reference :

Harrison's Principles of Internal Medicine, 21st Edition, Page 3361

Learning Outcome :

142. Question :

Which of the following is not a food adulteration disease?

Option 1 :

Lathyrism

Option 2 :

Fluorosis

Option 3 :

Dropsy

PREPLADDER

Option 4 :

Aflatoxicosis

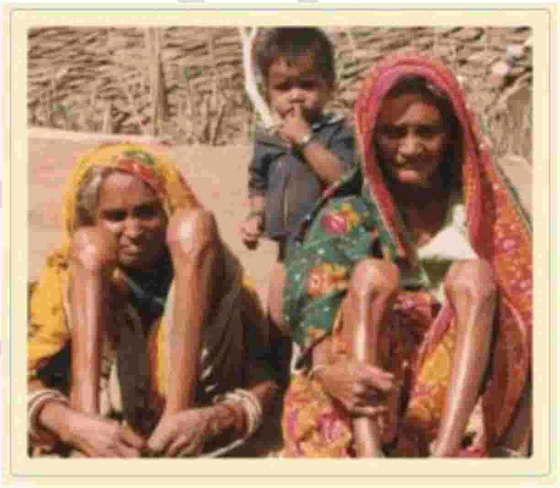
Correct option : 2

Solutions :

Fluorosis is caused by excessive fluoride intake, primarily through drinking water, not by food adulteration. It leads to **dental and skeletal fluorosis** due to long-term fluoride accumulation.

Fluorine content in water	**Related symptoms**
<0.5mg/L	Dental caries 
>1.5mg/L	Dental fluorosis 

PREPLACER

3-6mg/L	Skeletal fluorosis 
>10mg/L	Crippling fluorosis 

Lathyrism (Option A) is incorrect because it is caused by consumption of **Lathyrus sativus (Khesari dal), which contains neurotoxic β-oxalyl-L-α,β-diaminopropionic acid (β-ODAP)**. This leads to **spastic paraparesis** and is a known **food adulteration disease**.

Dropsy (Option C) is incorrect because it results from **contamination of mustard oil with Argemone mexicana seeds**, leading to **epidemic dropsy**, characterised by **oedema, cardiac failure, and glaucoma**.

Aflatoxicosis (Option D) is incorrect because it is caused by ingestion of **aflatoxins**, which are **fungal toxins (produced by Aspergillus species) contaminating stored grains, nuts, and milk**, leading to **liver damage and hepatocellular carcinoma**.

PREPLADDER

Reference :

1. Park's Textbook of Preventive and Social Medicine, 27th edition, Pg.739.
2. Effect of Fluoride Concentration in Drinking Water on Dental Fluorosis in Southwest Saudi Arabia - PMC

Learning Outcome :

143. Question :

A patient with a history of pneumonia develops pleural effusion. What is the expected finding in the pleural analysis for parapneumonic effusion?

Option 1 :

Pleural protein/plasma protein ratio less than 0.5

Option 2 :

Pleural LDH less than 2/3rd of plasma LDH

Option 3 :

Pleural pH less than 7.2

Option 4 :

Pleural LDH less than 0.6 of plasma LDH

Correct option : 3

Solutions :

A pleural pH of less than 7.2 is a key diagnostic indicator of **complicated parapneumonic effusion,** an **exudative pleural effusion** associated with pneumonia.This acidic pH develops due to increased glucose metabolism by bacteria and inflammatory cells in the pleural space, resulting in lactic acid accumulation. A low pleural fluid pH is an important indication for chest tube drainage.

Light's Criteria for Differentiating Exudative and Transudative Effusions:

- **Exudative** Effusion: Meets at least **one** of the following criteria
- **Transudative** Effusion: Meets **none** of the criteria

1. Pleural protein /serum protein >0.5 **(Option A ruled out)**
2. Pleural LDH /serum LDH >0.6 **(Option C ruled out)**
3. Pleural LDH > ⅔ upper normal serum limit LDH **(Option B ruled out)**

PREPLADDER

Parapneumonic effusion		
Definition:	• A parapneumonic effusion is a pleural effusion that occurs in association with bacterial pneumonia, lung abscess, or bronchiectasis. • These effusions develop in about 40-60% of patients with bacterial pneumonia.	

Types:	• Parapneumonic effusions can be categorized into three stages: simple (uncomplicated), complicated, and empyema.
	  • **Simple parapneumonic effusions**, the pleural fluid is sterile and can resolve with antibiotic therapy alone.
	  • **Complicated parapneumonic effusions** contain bacteria and require drainage in addition to antibiotics.
	  • **Empyema** represents the most advanced stage where frank pus is present in the pleural space.	

Diagnostic Criteria:	**Simple Parapneumonic Effusion**	• Appearance: Serous • PMN++, sterile fluid (negative bacterial culture) • pH >7.3, LDH <500 U/L, glucose >80 mg/dL • Fluid-glucose: serum-glucose >0.5
	Complicated Parapneumonic Effusion	• Appearance: Turbid • PMN++, bacterial culture may be + or - • **pH <7.1,** LDH >1000 U/L, glucose <40 mg/dL • Fluid-glucose: serum-glucose <0.5
	Empyema	• Appearance: Pus • PMN++, bacterial culture positive or negative • pH <7.1, LDH >1000 U/L, glucose <40 mg/dL • Fluid-glucose: serum-glucose <0.5

PREPLADDER

Management:	• Drain with antibiotics; small-bore drains (10-14 gauge) are often preferable. Consider thoracoscopic decortication if these fail.

Reference :

1. Harrison's Principles of Internal Medicine, 21st Edition, Page 2198,2199.
2. Davidson's Principles and Practice of Medicine, 24th Edition, Page 563.
3. Pleural effusion

Learning Outcome :

144. Question :

A 22-year-old male presents with pain and swelling over the distal radius. X-ray shows an expansile lytic lesion in the metaphysis. Fine needle aspiration (FNA) reveals a bloody aspirate with hemosiderin-laden macrophages. What is the most likely diagnosis?

Option 1 :

Giant cell tumor

Option 2 :

Aneurysmal bone cyst

Option 3 :

Osteosarcoma

Option 4 :

Chondroblastoma

Correct option : 2

Solutions :

Correct Answer: B) Aneurysmal bone cyst

Explanation:

- An aneurysmal bone cyst (ABC) is often characterized by an expansile, lytic lesion, and its **FNA** typically yields a **bloody aspirate due to the cystic, vascular nature of the lesion**.
- **Hemosiderin-laden macrophages** are commonly seen due to prior hemorrhage within the cyst.

PREPLADDER

Giant cell tumor (GCT) (Option A) can also present as an **expansile lytic lesion,** but it usually involves the epiphysis **without such a significant cystic, vascular component or bloody aspirate on FNA.**

	Aneurysmal Bone Cyst (ABC)	Giant Cell Tumor (GCT)
Age	Primarily affects children and teenagers	Most common in young adults (15-35 years)
Gender	Equal distribution between males and females	More common in females (Female: Male ratio 1.5:1)
Location	**Metaphyses** of long bones (femur, tibia, humerus), spine	**Epiphyses** of long bones (lower end of femur, upper end of tibia)
Symptoms	**Pain and swelling**; spinal lesions may cause neurological issues	**Swelling without pain**; late stages show joint limitation and pathological fracture
Histology	• FNAC: **Hemosiderin +** • Blood-filled cystic spaces separated by fibrous septae	• FNAC: **No hemosiderin** • Abundant giant cells with multiple nuclei (>150), spindle cells indicating malignancy
Radiology	Osteolytic lesion, multiple septations and fluid-fluid levels on MRI	Thin septa with **soap-bubble appearance** on X-ray, cortex thin and expanded, no periosteal reaction
Treatment	Curettage, debridement, and in some cases radiation (cautiously)	Surgical excision with PMMA or bone grafting; Denosumab and bisphosphonates as adjunct therapy

Osteosarcoma (Option C): Itis a malignant tumor that presents with mixed lytic-sclerotic lesions and periosteal reactions rather than a purely lytic, expansile lesion with a bloody aspirate.

Chondroblastoma (Option D): Itis a rare benign tumor that affects the epiphysis, usually seen in younger patients, but it does not typically show a bloody aspirate or hemosiderin deposits on FNA.

PRELADER

Reference :

1. Apley and Solomon's System of Orthopaedics and Trauma, 10th Edition, Pages 198, 199, 201, 202.
2. Textbook of Orthopedics- John Ebnezar, 5th Edition, Pages 608, 609.

Learning Outcome :

145. Question :

A 65-year-old male with chronic stable angina presents with worsening chest pain during routine activities. His current medications include aspirin, clopidogrel, metoprolol, and atorvastatin, but his symptoms persist. ECG shows ST-segment depression in V5-V6, and coronary angiography reveals 80% stenosis of the left anterior descending (LAD) artery. What is the most appropriate intervention?

Option 1 :

Increase the dose of beta-blockers

Option 2 :

Add ranolazine to medical therapy

Option 3 :

Percutaneous coronary intervention (PCI) with drug-eluting stent (DES)

Option 4 :

Refer for coronary artery bypass grafting (CABG)

Correct option : 3

Solutions :

Correct answer: C) Percutaneous coronary intervention (PCI) with drug-eluting stent (DES)

Explanation:

- The patient has significant stenosis (80% in the LAD) and persistent anginal symptoms despite optimal medical therapy.
- **PCI with a drug-eluting stent (DES)** is the most appropriate intervention in this scenario, as **it restores blood flow** and relieves symptoms.
- DES is preferred due to its **lower risk of restenosis** compared to bare-metal stents.

Medical management

Medication Class	Function/Mechanism	Indications	Side Effects/ Contraindication

PREPLADDER

Nitrates Sublingual nitroglycerin (0.4 or 0.6 mg) Long-acting forms (oral, transdermal)	• Systemic venodilation • Reduces LV end-diastolic volume and pressure • Releases nitric oxide (NO) to relax vascular smooth muscle	• Angina relief • Preemptive use before activities • Improves exercise tolerance	• **Tolerance** development • Headaches, dizziness
Beta-Blocker (Option A)	• Reduces heart rate, arterial pressure, and myocardial contractility • Improves survival post-MI	• Angina relief • **Reduces mortality** and reinfarction rates	• **Asthma** • AV conduction disturbances • Severe bradycardia
Calcium Channel Blockers	• Coronary vasodilators • Reduces myocardial oxygen demand and arterial pressure • Dihydropyridines (e.g., amlodipine) and non-dihydropyridines (e.g., verapamil)	• Angina treatment when beta blockers are ineffective • Variant angina	• Bradyarrhythmias • May aggravate LV failure
Antiplatelet Drugs	• **Aspirin**: inhibits platelet activation • **Clopidogrel 75mg**: blocks platelet aggregation	• Reduces coronary events in high-risk populations • Stent placement	• Risk of bleeding • Gastrointestinal issues, allergies

Other Therapies:

- **Ranolazine**: **Inhibits late sodium current**, minimizing Na and Ca overload in ischemic myocytes. **(Option B)**

PREPLADDER

- **SGLT2 Inhibitors**: Provide **cardiovascular** and **renal protection**, promoting weight loss and reducing plasma volume; beneficial in IHD patients.
- **Nicorandil**: Opens **ATP-sensitive potassium** channels.
- **Ivabradine**: Reduces heart rate in patients with IHD and LV dysfunction.

Percutaneous Coronary Intervention (PCI) (Option C)

PCI involves balloon dilatation and stenting for symptomatic IHD with suitable stenoses in epicardial coronary arteries.
• **Indications**:
  • Symptom-limiting angina despite optimal medical therapy.
  • Evidence of ischemia during stress tests.
• **Post-PCI Management**:
  • **Aspirin** is administered indefinitely, and P2Y12 antagonists for 1-3 months.
  • Current-generation **drug-eluting stents** reduce restenosis but require prolonged dual antiplatelet therapy (DAPT).

Coronary Artery Bypass Grafting (CABG) (Option D)

Involves bypassing obstructive lesions using **internal mammary arteries**, **radial arteries**, or **saphenous veins**.
• **Indications**:
  • Safe with low mortality in patients without serious comorbidities and normal LV function.
  • Effective for patients with **left main coronary artery stenosis**, **multivessel disease**, or **impaired LV function**.
• **Outcomes**:
  • Angina relief in ~90% of patients after complete revascularization.
  • Long-term survival benefits in specific populations, particularly those with **diabetes** or **impaired LV function**.

PREPLADDER

Reference :

Harrison's Principles of Internal Medicine, 21st Edition, Pages 2041-2045

Learning Outcome :

- Single or two-vessel disease with normal LV function typically undergoes PCI.
- Patients with three-vessel disease, impaired LV function, or diabetes should be considered for CABG.

146. Question :

A 72 y/o woman presents with severe chest pain and shortness of breath after a stressful argument. She is post-menopausal with no history of heart disease. O/E, she is slightly tachycardic with normal blood pressure. An echocardiogram shows left ventricular ballooning during systole, and cardiac enzymes are minimally elevated. What is the most likely diagnosis?

Option 1 :

Hypertensive Heart Disease

Option 2 :

Takotsubo Cardiomyopathy

Option 3 :

Coronary Artery Disease

Option 4 :

Pulmonary Embolism

Correct option : 2

Solutions :

Correct Answer: B) Takotsubo Cardiomyopathy

Explanation:

- Takotsubo cardiomyopathy, also known as broken heart syndrome, is characterized by transient left ventricular dysfunction **often triggered by emotional or physical stress**.
- The patient's recent stressful event, post-menopausal status, ballooning of the left ventricle, and minimal elevation of cardiac enzymes align perfectly with this diagnosis.

Takotsubo cardiomyopathy (Gebrochenes-Herz syndrome)	
About	• Takotsubo cardiomyopathy, also known as broken-heart syndrome or stress-induced cardiomyopathy, is a non-ischemic condition primarily affecting post-menopausal women. • It features temporary left ventricular dysfunction that resembles a heart attack but with minimal cardiac enzyme release and no significant obstructive coronary artery disease. • The name "Takotsubo" is derived from Japanese, meaning octopus trap, reflecting the ballooning shape of the left ventricle during contraction.

PRELADDER

Pathophysiology	• **Catecholamine Hypothesis:** Elevated catecholamines (norepinephrine, epinephrine, dopamine) indicate stress-induced sympathetic overdrive, leading to microvascular spasms and myocardial injury. • **Microvascular Dysfunction:** Impaired function is suggested by abnormalities in coronary flow reserve and microvascular resistance. • **Inflammation:** Imaging may show myocardial oedema, necrosis, and fibrosis, with conditions like myocarditis and autoimmune diseases potentially triggering TC. • **Estrogen Deficiency:** Exaggerated vasoconstriction and increased sympathetic activity in post-menopausal women contribute to TC.

Clinical features	• Takotsubo cardiomyopathy often mimics acute coronary syndrome.(MI)
	• **Common Triggers:**
	  • **Emotional Stress:** Events like the unexpected death of a loved one, domestic abuse, or financial loss.
	  • **Physical Stress:** Serious medical diagnoses or natural disasters.
	• **Symptoms:** Chest pain, dyspnea, and syncope. Some patients may have signs of heart failure, such as tachyarrhythmias or bradyarrhythmias.
	• A late-peaking systolic murmur may be present due to LVOTO.
	• About 10% of patients may develop cardiogenic shock.

Hypertensive Heart Disease (Option A):

- Caused by chronic high blood pressure, leading to left ventricular hypertrophy.
- This patient's history does not indicate long-standing hypertension.

Coronary Artery Disease (Option C):

- Involves plaque buildup in coronary arteries, causing reduced blood flow.
- The absence of obstructive disease on angiography and minimal enzyme release suggests this is unlikely.

Pulmonary Embolism (Option D):

- Occurs when a blood clot blocks a pulmonary artery, leading to sudden shortness of breath and chest pain. History of long term immobilization/ DVT is present.
- The patient's findings indicate a cardiac issue, not a pulmonary one.

PREPADDER

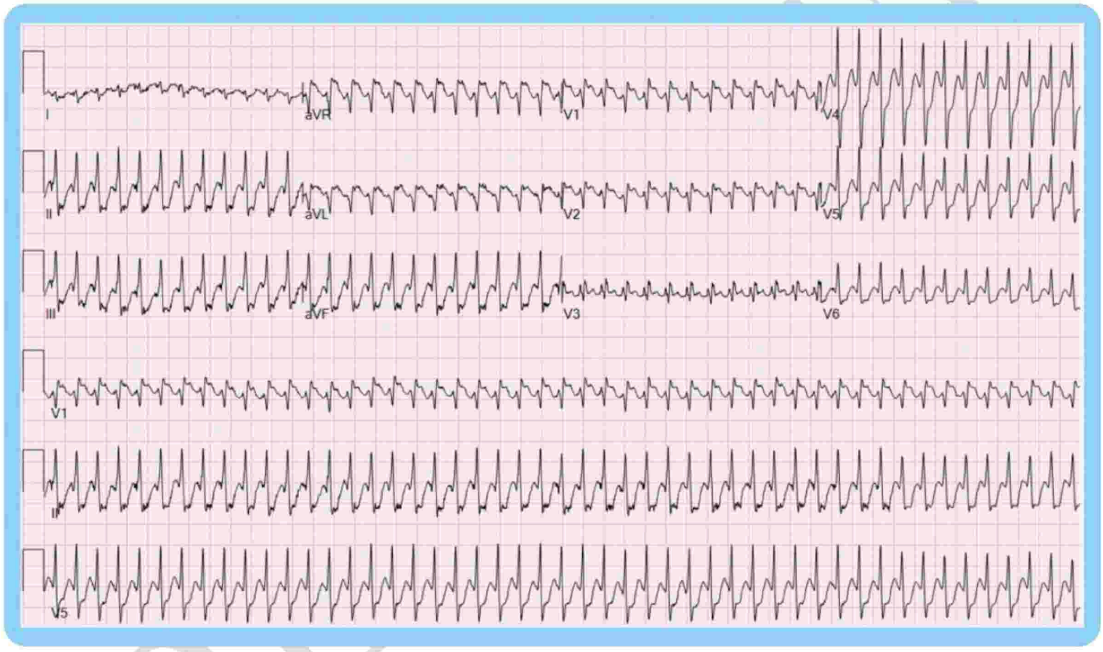
Reference :

1. Harrison’s Principles of Internal Medicine, 21st Edition, Page 1966
2. Takotsubo Cardiomyopathy - StatPearls - NCBI Bookshelf

Learning Outcome :

147. Question :

A 68-year-old male patient with a history of hypertension presents to the emergency department in acute distress. He is diaphoretic, tachycardic, and complains of severe chest pain. His ECG is given below. Given the patient's condition, what is the most appropriate immediate management for this patient?



Option 1 :

Amiodarone

Option 2 :

Radiofrequency catheter ablation

Option 3 :

Digoxin

Option 4 :

Synchronized cardioversion

Correct option : 4

Solutions :

Correct Answer: D) Synchronized cardioversion

Explanation:

The patient's clinical presentation of acute distress, diaphoresis, tachycardia, and severe chest pain, along with the ECG showing **saw-tooth flutter waves** indicative of **atrial flutter**, suggests he is hemodynamically unstable.

- This necessitates immediate synchronized cardioversion to restore normal sinus rhythm and stabilize his condition.

Atrial Flutter	
Features	• Atrial flutter is characterized by a large re-entry circuit, usually within the right atrium, encircling the tricuspid annulus originating from the cavotricuspid isthmus. • The atrial rate is approximately **300 beats per minute**. • It is typically associated with 2:1, 3:1, or 4:1 AV block, resulting in ventricular rates of 150, 100, or 75 beats per minute.
ECG Features	• The ECG shows **saw-tooth flutter waves**, often referred to as **"F-waves."** • With a 2:1 AV block, flutter waves may be buried in QRS complexes and T waves, making them difficult to identify.
Diagnosis	• Atrial flutter should be suspected in narrow-complex tachycardia at a rate of 150 beats per minute. • Carotid sinus pressure or intravenous adenosine may help reveal flutter waves by temporarily increasing the degree of AV block.

PREPLADDER

Management	**1. Rhythm Control:**
	• **Acute Management:**
	  • Hemodynamically **Unstable** Patients: Synchronized cardioversion.
	  • **Stable** Patients:
	  • Electrical cardioversion (if no intracardiac thrombus).
	  • Pharmacological cardioversion:
	  • Antiarrhythmic drugs:
	  • Amiodarone
	  • Class IA: Procainamide, Quinidine, Disopyramide
	  • Class IC: Flecainide, Propafenone
	  • Calcium Channel Blockers: Verapamil, Diltiazem
	  • Beta-Blockers: Metoprolol, Carvedilol, Esmolol
	• **Long-Term Management:**
	  • Radiofrequency catheter ablation of the cavotricuspid isthmus.
	2. Rate Control:
	• First-Line Agents:
	  • Calcium Channel Blockers (e.g., Verapamil, Diltiazem)
	  • Beta-Blockers (e.g., Metoprolol, Carvedilol, Esmolol)
	  • Digoxin (use cautiously due to toxicity).
	• Goal: Heart rate < 110 beats per minute.
	3. Anticoagulation:
	• Assess stroke risk using the CHADS2-VASC score:
	• Anticoagulation Recommendations:
	  • 2 or more points: Strong recommendation for anticoagulation.
	  • 1 point: Consider either aspirin or full anticoagulation.

PREPLADDER

Reference :

1. Harrison's Principles of Internal Medicine, 21st Edition, Page 1899-1902
2. Davidson's Principles and Practice of Medicine, 24th Edition, Page 470
3. Atrial Flutter - StatPearls - NCBI Bookshelf

Learning Outcome :

148. Question :

A 62-year-old woman with a history of chronic obstructive pulmonary disease (COPD) presents with increased breathlessness, cough, and sputum production over the last two days. She appears distressed and has a respiratory rate of 28 breaths per minute. Her oxygen saturation is 88% on room air. Which of the following management strategies is most appropriate for her immediate treatment?

Option 1 :

Initiate high-flow oxygen therapy to maintain oxygen saturation above 95%

Option 2 :

Start nebulised bronchodilator therapy with salbutamol and ipratropium

Option 3 :

Begin intravenous glucocorticoids immediately

Option 4 :

Order a chest X-ray before any treatment is provided

Correct option : 2

Solutions :

Correct Answer: B) Start nebulised bronchodilator therapy with salbutamol and ipratropium

Explanation:

- **Nebulised bronchodilator therapy with salbutamol and ipratropium** is the most appropriate immediate treatment for this patient experiencing an acute exacerbation of COPD.
- This therapy helps relieve bronchospasm and improve airflow, which is critical given her increased breathlessness and distress.

Treatment of Acute Exacerbation of COPD:

Initial Management and Assessment:

- **Symptoms:** Increased breathlessness, cough, sputum production; deterioration in lung function and health status.
- **Triggers:** Usually bacterial or viral infections, or changes in air quality.
- **Home management:** Increased bronchodilator therapy, short course of oral glucocorticoids, and possibly antibiotics.
- **Hospital referral indicators:**
    - Cyanosis

PREPLADDER

- Peripheral oedema
- Altered consciousness

- **Comprehensive assessment upon admission:**
  - Level of consciousness (response to commands, ability to cough)
  - Signs of CO2 retention (warm peripheries, bounding pulse, flapping tremor)
  - Airway obstruction assessment (wheeze, prolonged expiration)
  - Signs of cor pulmonale (peripheral oedema, raised JVP)
  - Background functional status and quality of life
  - Precipitating causes (e.g., infection, environmental factors)

Investigations:

Investigation	Purpose/Findings
Arterial blood gases	Assess severity of hypoxaemia, hypercapnia, acidaemia; guide oxygen therapy and ventilation.
Chest X-ray	Identify complications such as pneumonia, pneumothorax, or pleural effusion. **(Option D ruled out)**

Management Strategies:

Management	Details
Oxygen Therapy	• Administer **controlled oxygen at 24% or 28%** to maintain PaO2 > 8 kPa (60 mmHg) or SaO2 > 90%. **(Option A ruled out)** • Regular arterial blood gas monitoring to adjust therapy.
Bronchodilators	• Use nebulised short-acting β2-agonists (e.g., salbutamol, terbutaline) with anticholinergics (e.g., ipratropium). • If oxygen sensitivity is a concern, use compressed air for nebulisation.
Glucocorticoids	• Administer oral prednisolone (30 mg for 10 days) to reduce symptoms and improve lung function.Reduces frequency and severity of exacerbations. • Consider osteoporosis prophylaxis for repeated courses.

PREPLADDER

Antibiotic Therapy	• Indicated for increased sputum purulence, volume, or breathlessness. • Use simple regimens (aminopenicillin, tetracycline, macrolide); co-amoxiclav in areas with β-lactamase organisms.
Non-Invasive Ventilation (NIV)	• Safe for mild to moderate respiratory acidosis; helps reduce intubation need and mortality. • Not suitable for patients unable to protect their airway.
Mechanical Ventilation	• Consider if there is a reversible cause, no prior respiratory failure, or if NIV has failed/contraindicated. • Decisions should involve the patient, family, and GP.
Additional Therapy	• Diuretics for peripheral oedema. • Limited evidence for intravenous aminophylline; consider arrhythmia risk. • Doxapram may be used short-term for low respiratory rates.

Discharge and Follow-Up:

- **Discharge criteria:**
  - Clinically stable on maintenance medication.
  - Off nebulised therapy for at least 24 hours.
  - PEF reaches 75% of predicted or personal best.
- **Post-exacerbation follow-up:**
  - Identify and avoid trigger factors.
  - Provide asthma education and a written self-management plan.

Begin intravenous glucocorticoids immediately (Option C) is not the first-line treatment in the acute setting; while glucocorticoids are important in managing exacerbations, nebulised bronchodilators are prioritised for immediate relief of symptoms.

Reference :

Davidson's Principles and Practice of Medicine, 24th Edition, Page 577, 578

PREPLADDER

Learning Outcome :

149. Question :

A 55-year-old woman with a history of type 2 diabetes presents for a routine follow-up. Her serum creatinine and potassium levels are normal, but she has microalbuminuria and an HbA1c of 8%. Her blood pressure and pulse are within normal limits, and she is currently on metformin for diabetes management. What should be the next step in her management?

Option 1 :

Begin a thiazide diuretic

Option 2 :

Start insulin therapy

Option 3 :

Stop Metformin and start a different OHA

Option 4 :

Start an ACE inhibitor

Correct option : 4

Solutions :

Correct Answer: D) Start an ACE inhibitor.

Explanation:

Starting ACE inhibitors early in the progression of diabetic nephropathy, particularly with the presence of microalbuminuria, has demonstrated **significant benefits in reducing the risk of kidney failure and cardiovascular events**.

PREPLADDER

Management of Diabetic nephropathy	

Oral Hypoglycemic agents (OHAs)	• **SGLT2 inhibitors** lower the risk of cardiovascular events and renal failure; they are also recently approved for HFpEF.
	• For HbA1C < 9.5%, OHAs can be used
	• **Metformin** is **withheld** if **eGFR is < 30 mL/min/1.73 m2 (Option C)**, and drugs safe in renal failure can be used like
	  • Glipizide
	  • Linagliptin
	  • Repaglinide

Insulin	80% of the calculated dose is started if **HbA1C > 9.5% (Option B)**
Antihypertensives	• In the presence of microalbuminuria, ACEi and ARBs have shown evidence to slow the progression of nephropathy if started in early stages. • In hypertension, for BP > 130/90, ACEi or ARBs are preferred • If BP is still not under control, **Calcium channel blocker (CCB)** can be added • **Thiazide diuretic** - in the presence of oedema **(Option A)** • If eGFR <30 ml/min, then the diuretic used - **Metolazone.** • ACEi/ARB comes with a side effect of hyperkalemia; hence, regular monitoring of potassium is necessary. • In the presence of **hyperkalemia**, ACEi/ARB is replaced by CCB • **Alpha blocker (Prazosin)** - hyperkalemia in ESRD.

PREPLADDER

For Hyperkalemia	**K Binding resins** (Bind to potassium in the gastrointestinal tract and promote its excretion) • Sodium polystyrene sulfonate • Patiromer • Sodium zirconate
Renal Transplant	**If eGFR is < 20 mL/min/1.73m2.**

Reference :

1. Davidson's Principles and Practice of Medicine, 24th Edition, Page 746
2. Harrison's Principles of Internal Medicine, 21st Edition, Volume I, Page 2316, 2344, 2345, 3124

Learning Outcome :

150. Question :

A 38-year-old male presents with a one-week history of fever, headache, retro-orbital pain, and myalgia. Skin examination reveals multiple purpura and petechiae on the left shoulder, trunk, and legs. Similar cases have been reported linked to increased incidence of mosquito breeding. What is the most common neurological complication associated with this condition?

Option 1 :

Encephalopathy

Option 2 :

Guillain-Barré Syndrome

Option 3 :

Stroke

Option 4 :

Encephalitis

Correct option : 1

Solutions :

Correct Answer: A) Encephalopathy

Explanation:

PREPLADDER

- The clinical presentation including fever, headache, retro-orbital pain, myalgia, and the presence of purpura and petechiae, suggests a viral infection consistent with **dengue fever.**
- The association with increased mosquito breeding further supports this diagnosis.
- **Encephalopathy** is the most common neurological complication associated with this condition.

Dengue complications

Neurological	• **Dengue encephalopathy** is **most commonly encountered neurological complication** of dengue virus
	  • linked primarily to dengue hemorrhagic fever and dengue shock syndrome
	  • EEG may show abnormalities such as burst suppression and seizures
	  • CSF profiles typically remain normal.
	  • Neuroimaging can be normal or reveal diffuse cerebral edema.
	• **Encephalitis**
	• **GBS**
	• **Stroke**

Cardiomyopathy	• Dengue virus-induced dilated cardiomyopathy should always be considered if a dengue fever patient has refractory shock and signs and symptoms of congestive heart failure.
Hepatic injury	• Liver involvement in dengue is a crucial feature • The effect ranges from an asymptomatic rise in liver enzymes to the development of ALF • The **most common atypical manifestation** reported was hepatitis
Pneumonia	• Staphylococcus pneumonia is an important accompanying problem seen in dengue patient • co-infection between dengue and influenza can result in exacerbation of pneumonia
Orchitis	• Orchitis usually occurs together with epididymitis • Commonly seen in men between 14 and 35 years of age.

PREPLADDER

Dengue Hemorrhagic Fever	All of the following:
	• Acute onset of fever
	• 2-7 days duration
	• Hemorrhagic manifestations
	  • Positive tourniquet test/Petechiae
	  • Ecchymosis
	  • Purpura/Bleeding from mucosa, GIT, Injection sites, etc
	• Platelet count ≤ 100,000 cells/cu.mm.
	• Plasma leakage
	  • Rising hematocrit
	  • Hemoconcentration >20%
	  • Pleural effusion, ascites/Hypoproteinemia)

Dengue Shock Syndrome	• DHF criteria plus Signs of Shock • Tachycardia/Cool extremities/Weak pulse/Lethargy/Restlessness • Pulse pressure <20 mm Hg with increased Diastolic pressure (e.g. 100/80) • Hypotension (Systolic <80 mm Hg for age <5 years/80-90 mm Hg for older child and adults)

PREPLADDER

Reference :

1. Davidson's Principles and Practice of Medicine, 24th Edition, Page 243
2. https://link.springer.com/article/10.1007/s11910-022-01213-7
3. https://journals.lww.com/annals-of-medicine-and-surgery/fulltext/2023/02000/acute_liver_failure_in_a_young_patient_with_dengue.46.aspx#:~:text=Hepatic%20encephalopathy%20is%20usually%20corrected,prevent%20hepatotoxic%20injury23%2C24.
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5. https://pmc.ncbi.nlm.nih.gov/articles/PMC4352732/#:~:text=Dengue%20fever%20can%20have%20varied,antivirals%2C%20immunosuppressants%2C%20and%20steroids.
6. https://journals.lww.com/kleu/fulltext/2016/09030/dengue_fever_presenting_as_epididymo_orchitis.15.aspx

Learning Outcome