1[Q] A 52 year old man with history of coronary artery disease is currently on sublingual nitroglycerin 0.5 mg, SOS, metoprolol 50 mg twice a day, aspirin 75 mg once a day, enalapril 5 mg once a day, for the last one year. The patient is now complaining of breathlessness and wheeze. Which one of the following drugs is most likely to be implicated for this new symptom ?

(a) Enalapril

(b) Metoprolol

(c) Nitroglycerin

(d) Aspirin

[ANS] b

[SOL]

Impotence, exacerbation of COPD and asthma, cardiovascular effects (bradycardia, AV block, HF), CNS effects (sedation, sleep alterations).

May mask the signs of hypoglycemia.

Metoprolol can cause dyslipidemia.

Propranolol can exacerbate vasospasm in vasospastic angina.

β-blockers (except the nonselective α- and β-antagonists carvedilol and labetalol) cause unopposed α1-agonism if given alone for pheochromocytoma or for cocaine toxicity (unsubstantiated).

Treat β-blocker overdose with saline, atropine, glucagon.

2[Q] A patient with ischaemic heart disease on regular follow-up has a resting heart rate of 90 beats/minute. The patient is taking metoprolol 50 mg twice a day. Which one of the following drugs may be added to his prescription if he also has signs of heart failure ?

(a) Ranolazine

(b) Diclofenac

(c) Prednisolone

(d) Ivabradine

[ANS] d

[SOL] **Ivabradine:**

* **Mechanism:** Acts on SA node, reducing heart rate via If inward current.
* **Dosage:** 2.5–7.5 mg twice daily.
* **Benefits:** Reduces hospitalization and mortality in heart failure due to moderate or severe left ventricular systolic impairment, most effective with high baseline heart rate.
* **Use Cases:** Suited for patients unable to take β-blockers or with persistent high heart rate despite β-blockade.
* **Limitation:** Ineffective in atrial fibrillation.

Ref: Davidson 24th edition pg407

3[Q] An 18 year old boy got frost bite of left feet after working in a snowy field for 5-6 hours. He complained of pain, numbness and limited moment of his toes. The skin appeared white and waxy. Which one of the following is contradicted as initial treatment ?

(a) Rewarming by immersion of feet in water bath at 40-44°C

(b) Massage

(c) Cleaning of injured area with soap

(d) Use of dressing

[ANS] b

[SOL]

**FROSTBITE Overview:**

Frostbite occurs due to severe cold exposure or contact with extremely cold objects, causing tissue damage through freezing and vasoconstriction. Typically affects distal extremities and exposed facial areas (ears, nose, chin, cheeks).

**Types of Frostbite:**

**Superficial Frostbite:**

* + Involves skin and subcutaneous tissue.
  + Symptoms: Pain, paresthesia, white and waxy skin.
  + After rewarming: Cyanosis, erythema, wheal-and-flare formation, edema, and superficial blisters.

**Deep Frostbite:**

* + Affects muscles, nerves, and deeper blood vessels.
  + Manifestations: Edema, vesicles, bullae, tissue necrosis, and potential gangrene.

**Initial Treatment:**

**Rewarming:**

* + Conducted in an environment preventing reexposure to freezing conditions.
  + Immersion in water bath (40°–44°C / 104°–111°F) is effective.
  + Contraindicated: Massage, ice water, extreme heat.

**Cleansing and Dressing:**

* + Cleanse the injured area with soap or antiseptic.
  + Apply sterile dressings.

**Analgesics and Antibiotics:**

* + Analgesics often required during rewarming.
  + Antibiotics used if infection is evident.

**Post-recovery Considerations:**

**Increased Sensitivity:**

* + Affected extremity may exhibit heightened sensitivity to cold after recovery.

**Note:** The efficacy of sympathetic blocking drugs is uncertain in frostbite management.

**Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg3634**

4[Q] Which of the following anti-coagulant agents can be administered orally?

1. Rivaroxaban

2. Fondaparinux

3. Apixaban

4. Dabigatran

Select the correct answer using the code given below:

(a) 1 and 3 only

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] c

[SOL] **Parenteral Anticoagulants:**

1. **Heparin:**
   * Traditional anticoagulant.
2. **Low-Molecular-Weight Heparin (LMWH):**
   * Similar to heparin but with specific molecular weight characteristics.
3. **Fondaparinux:**
   * Synthetic pentasaccharide, inhibits factor Xa.
4. **Lepirudin, Desirudin, Bivalirudin, Argatroban:**
   * Alternative parenteral anticoagulants with specific mechanisms.

**Oral Anticoagulants:**

1. **Warfarin:**
   * Traditional oral anticoagulant, vitamin K antagonist.
2. **Dabigatran Etexilate:**
   * Oral thrombin inhibitor.
3. **Rivaroxaban, Apixaban, Edoxaban:**
   * Oral factor Xa inhibitors.

Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg928

5[Q] Which of the following drugs may be associated with leg swelling?

1. Calcium channel blockers

2. NSAIDs

3. Glucocorticoids

4. Mineralocorticoids

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 2, 3 and 4 only

(c) 3 and 4 only

(d) 1, 2, 3 and 4

[ANS] d

[SOL]

6[Q] Which of the following produce loud S1 on cardiac auscultation ?

1. Anaemia

2. Pregnancy

3. Thyrotoxicosis

4. Mitral regurgitation

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2 and 3 only

[ANS] a

[SOL] The intensity of S1 on cardiac auscultation depends on the closure of mitral and tricuspid valves. Conditions that increase the rate of blood flow across the mitral and tricuspid valves or that bring the valves closer to the chest wall can produce a louder S1 sound. These conditions include pregnancy and thyrotoxicosis. Mitral regurgitation, on the other hand, may cause a soft or absent S1 sound.

7[Q] Which of the following are correct about Ivabradine ?

1. It may be of use in severe heart failure

2. It acts on SA node

3. It reduces heart rate

4. It is effective in atrial fibrillation

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2 and

(c) 1, 3 and 4

(d) 2 and 3

[ANS] a

[SOL] **Ivabradine:**

* **Mechanism:** Acts on SA node, reducing heart rate via If inward current.
* **Dosage:** 2.5–7.5 mg twice daily.
* **Benefits:** Reduces hospitalization and mortality in heart failure due to moderate or severe left ventricular systolic impairment, most effective with high baseline heart rate.
* **Use Cases:** Suited for patients unable to take β-blockers or with persistent high heart rate despite β-blockade.
* **Limitation:** Ineffective in atrial fibrillation.

Ref: Davidson 24th edition pg407

8[Q] Left atrial dilatation on X-ray chest is characterised by which of the following?

1. Straight left heart border

2. Rounding of left heart border

3. Double cardiac shadow

4. Widening of the angle of carina

Select the correct answer using the code given below :

(a) 1 and 3 only

(b) 1, 2 and 4

(c) 1,3 and 4

(d) 2,3 and 4

[ANS] c

[SOL] Left atrial dilatation on X-ray chest is characterized by widening of the angle of carina, Double cardiac shadow (DOUBLE DENSITY SIGN) and straightening of the left heart border.

9[Q] A 30 year old male is being evaluated for shortness of breath. On examination of the jugular venous pulse (JVP), there is a rise in the JVP on inspiration. Which one of the following is most likely diagnosis ?

(a) Constrictive pericarditis

(b) Atrial septal defect

(c) Aortic regurgitation

(d) Severe mitral stenosis

[ANS] a

[SOL] Kussmaul’s sign is defined by either a rise or a lack of fall of the JVP with inspiration and is classically associated with constrictive pericarditis, although it has been reported in patients with restrictive cardiomyopathy, massive pulmonary embolism, right ventricular infarction, and advanced left ventricular (LV) systolic heart failure. It is also a common, isolated finding in patients after cardiac surgery without other hemodynamic abnormalities.

Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg1858

10[Q] A 24 year old man presents with acute onset shortness of breath with precordial chest pain. ECG reveals ST elevation with upward concavity and PR segment depression in lead V2 to V6 and reciprocal changes in aVR. The most likely diagnosis is

(a) Anterior wall myocardial infarction

(b) Acute pericarditis

(c) Anterior wall aneurysm

(d) Aortic dissection

[ANS] b

[SOL]

**Electrocardiogram (ECG) in Acute Pericarditis:**

The ECG findings in acute pericarditis, particularly without massive effusion, are reflective of acute subepicardial inflammation and typically progress through distinct stages:

1. **Stage 1:**
   * Widespread elevation of ST segments, often with upward concavity.
   * Involves two or three standard limb leads and V2–V6.
   * Reciprocal depressions appear in aVR and sometimes V1.
   * Depression of the PR segment below the TP segment indicates atrial involvement.
   * Typically, no significant changes in QRS complexes are observed, unless a large pericardial effusion develops.
2. **Stage 2:**
   * ST segments return to normal after several days.
3. **Stage 3:**
   * T waves become inverted, occurring only after the normalization of ST segments.
4. **Stage 4:**
   * Weeks or months post-onset, the ECG returns to normal.

Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2020

11[Q] Which of the following are Controller Therapies in the management of acute asthma ?

1. Anticholinergics

2. Systemic glucocorticoids

3. Inhaled glucocorticoids

4. Omalizumab

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] d

[SOL]

Controller (Anti-Inflammatory/Antimediator) Therapies :

So-called “controller” therapies reduce asthma exacerbations and improve long-term control, decreasing the need for intermittent use of bronchodilator therapies

CONTROLLER THERAPIES

* Inhaled Corticosteroids
* Systemic Corticosteroids
* Leukotriene Modifiers

CysLT1 Antagonists : Montelukast and Zafirlukast

5-Lipoxygenase Inhibition :Zileuton

* Cromolyn sodium
* Anti-IgE : Omalizumab
* Anti-IL-5 : Antibodies that block IL-5 (mepolizumab, reslizumab) or its receptor (benralizumab)
* Anti–IL-4/13 : Dupilumab

**Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2156**

12[Q] Low pleural fluid glucose (< 60 mg%) may be observed in which of the following ?

1. Pyogenic pleural effusion

2. Rheumatoid pleuritis

3. Malignant pleural effusion

4. Hepatic hydrothorax

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1 and 2 only

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] a

[SOL] Low pleural fluid glucose (<60 mg/dL) can be observed in

* Bacterial infection
* Reumatoid pleuritis
* Malignancy

Ref: Harrison’s principles of INTERNAL MEDICINE 20th edition pg2197

13[Q] Which of the following are correct regarding Idiopathic Pulmonary Fibrosis?

1. Radiological pattern interstitial pneumonia

2. Finger clubbing

3. More common in elderly

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

[ANS] d

[SOL]

Idiopathic Pulmonary Fibrosis

**Clinical Features:**

* Typically presents in older adults; uncommon before 50 years.
* May be incidentally found through widespread CT scanning.
* Common symptoms include progressive breathlessness and a non-productive cough.
* Constitutional symptoms are unusual.
* Clinical findings include finger clubbing and late inspiratory crackles resembling Velcro.

**Investigations:**

* Chest X-ray reveals bilateral lower lobe and subpleural reticular shadowing.
* HRCT shows a patchy, predominantly peripheral, subpleural, and basal reticular pattern.
* Advanced disease may exhibit honeycombing cysts and traction bronchiectasis.
* HRCT has a high positive predictive value for IPF diagnosis; biopsy is seldom necessary.
* Pulmonary function tests show a restrictive defect, potentially preserved in concomitant emphysema.
* Bronchoscopy is rarely indicated; lung biopsy may be considered in cases of diagnostic uncertainty.

**Management:**

* Pirfenidone or nintedanib may be offered for vital capacity between 50% and 80% predicted.
* Medications can slow lung function decline but have limited impact on symptoms.
* Patients taking pirfenidone should avoid direct sunlight; nintedanib may cause diarrhea.
* Treatment should be discontinued if lung function declines by more than 10% in the first year.
* Medication for gastro-oesophageal reflux may improve cough.
* Smoking cessation is advised due to an increased risk of lung cancer.
* Influenza and pneumococcal vaccinations are recommended.
* Patients should be encouraged to exercise, participate in pulmonary rehabilitation, and consider lung transplantation if appropriate.

**Acute Exacerbations:**

* Optimal treatment is unknown; largely supportive.
* Broad-spectrum antibiotics may be combined with glucocorticoids and additional immunosuppression, but evidence is limited.

Ref: Davidson principles and practice of medicine 24th edition pg534

14[Q] Diagnostic work-up for suspected Bronchial asthma case of should reveal which of the following abnormalities?

1. Reduced FEV1/FVC

2. Increased functional residual volume

3. Reduced diffusion capacity

4. Increment in FEV1 in response to inhaled bronchodilators

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1 and 4 only

(d) 2, 3 and 4

[ANS] b

[SOL] **Lung Function Tests for bronchial asthma:**

1. **Simple Spirometry:**
   * Confirms airflow limitation.
   * Demonstrates reduced Forced Expiratory Volume in 1 second (FEV1), FEV1/FVC ratio, and Peak Expiratory Flow (PEF).
2. **Reversibility Testing:**
   * Reveals reversibility with a >12% and 200-mL increase in FEV1 15 minutes after inhaling a short-acting β2-agonist (SABA) like inhaled albuterol 400 μg.
   * In some cases, reversibility may be assessed through a 2–4 week trial of oral corticosteroids (OCS) like prednisone or prednisolone (30–40 mg daily).
3. **Diurnal Variations:**
   * Monitoring Peak Expiratory Flow (PEF) twice daily confirms diurnal variations in airflow obstruction.
4. **Flow-Volume Loops:**
   * Illustrate reduced peak flow and maximum expiratory flow.
5. **Whole Body Plethysmography:**
   * Rarely necessary but may be used.
   * Shows increased airway resistance.
   * May indicate increased total lung capacity and residual volume.
6. **Gas Diffusion:**
   * Measured by carbon monoxide transfer.
   * Typically normal, but some patients may exhibit a slight increase.

Ref: Harrison’s principles of INTERNAL MEDICINE 20th edition pg2154

15[Q] Which of the following conditions predispose to obstructive sleep apnea?

1. Hyperthyroidism

2. Acromegaly

3. Obesity

4. Use of alcohol/sedatives

Select the correct answer using the code given below:

(a) 2 and 3 only

(b) 1, 2 and 4

(c) 1,3 and 4

(d) 2,3 and 4

[ANS] d

[SOL]

**Risk Factors and Prevalence of Obstructive Sleep Apnea-Hypopnea Syndrome (OSAHS):**

1. **Major Risk Factors:**
   * Obesity: 40–60% of cases attributed to excess weight.
   * Male sex: Prevalence two- to fourfold higher among men.
   * Mandibular retrognathia and micrognathia.
   * Positive family history of OSAHS.
   * Genetic syndromes reducing upper airway patency (e.g., Down syndrome, Treacher-Collins syndrome).
   * Adenotonsillar hypertrophy (especially in children).
   * Menopause (in women).
   * Various endocrine syndromes (e.g., acromegaly, hypothyroidism).
2. **Impact of Obesity:**
   * Obese individuals have a fourfold or greater risk for OSAHS.
   * Obesity narrows the pharyngeal lumen and reduces chest wall compliance.
   * A 10% weight gain is associated with a >30% increase in Apnea-Hypopnea Index (AHI).
   * Even modest weight changes can influence the risk and severity of OSAHS.
3. **Sex Differences:**
   * Prevalence higher in men, influenced by android patterns of obesity and pharyngeal length.
   * Premenopausal women are relatively protected; increased prevalence after menopause.
4. **Craniofacial Morphology:**
   * Variations in craniofacial features increase OSAHS risk.
   * Nonobese patients may show evident hard-tissue structural contributions.
   * Features like retrognathia can impact therapeutic decisions.
5. **Genetic Factors:**
   * Strong genetic basis with significant familial aggregation and heritability.
   * First-degree relatives have a twofold higher odds ratio for OSAHS.
   * Several genetic variants associated with OSAHS prevalence and related traits.
6. **Age-Related Variations:**
   * Prevalence varies with age, ranging from 2 to 15% in middle-aged adults to >20% in the elderly.
   * Peak prevalence in children (3-8 years) due to lymphoid hypertrophy; declines with airway growth.
   * Resurgence in middle age and menopause, associated with increased obesity prevalence.
7. **Association with Other Conditions:**
   * High prevalence among patients with diabetes or hypertension.
   * Asians at increased risk at lower body mass index.
   * African Americans, especially children and young adults, have a higher risk.
8. **Underdiagnosis:**Majority of adults with OSAHS remain undiagnosed.

16[Q] Which of the following are correct with regard to acute fatty liver of pregnancy?

1. It is typically first trimester

2. It is more common in multiple pregnancies

3. Liver biopsy is rarely needed

4. Delivery of fetus is indicated

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 3 and 4

(c) 1 and 4 only

(d) 2, 3 and 4

[ANS] d

[SOL]Acute Fatty Liver of Pregnancy (AFLP):

* **Definition:** Rare and serious condition in pregnancy characterized by the accumulation of fat in liver cells, leading to dysfunction.
* **Onset:** Typically presents in the third trimester.
* **Symptoms:**
  + Vomiting
  + Abdominal pain
  + Jaundice (yellowing of skin and eyes)
  + Liver dysfunction
* **Risk Factors:**
  + More common in first pregnancies
  + Associated with multiple pregnancies (twins, triplets)
  + Higher incidence with male fetuses
* **Complications:**
  + Rarely progresses to fulminant liver failure
* **Diagnosis:**
  + Clinical features
  + Abnormal liver function tests (LFTs)
  + Fatty liver appearance on ultrasound
  + Liver biopsy rarely needed, may show microvascular steatosis
* **Association with LCHAD Deficiency:**
  + Link with an inherited deficiency of long-chain acyl-CoA dehydrogenase (LCHAD) in the baby
* **Management:**
  + Supportive care
  + Prompt delivery of the fetus
  + Delivery may need to be expedited in severe cases, even if premature

**Ref: Davidson principles and practice of medicine 24th edition pg1277**

17[Q] Which one of the following are markers of poor prognosis in acute pancreatitis?

1. Elderly individual

2. Increased white blood cell count

3. Low serum calcium

4. Hypercarbia

Select the correct answer using the code given below:

(a) 1,2 and 3

(b) 1, 2 and 4

(c) 1,3 and 4

(d) 2,3 and 4

[ANS] a

[SOL]**Glasgow Criteria for Prognosis in Acute Pancreatitis:**

* **Age:** > 55 years
* **P O2 (Partial Pressure of Oxygen):** < 8 kPa (60 mmHg)
* **White Blood Cell Count:** > 15 × 10^9/L
* **Albumin:** < 32 g/L (3.2 g/dL)
* **Serum Calcium:** < 2 mmol/L (8 mg/dL) (corrected)
* **Glucose:** > 10 mmol/L (180 mg/dL)
* **Urea:** > 16 mmol/L (45 mg/dL) (after rehydration)
* **Alanine Aminotransferase (ALT):** > 200 U/L
* **Lactate Dehydrogenase (LDH):** > 600 U/L

\*Severity and prognosis worsen as the number of these factors increases. More than three implies severe disease

**Ref: Davidson principles and practice of medicine 24th edition pg850**

18[Q] Which of the following are the common causes of acute pancreatitis?

1. Gallstone

2. Alcohol

3. Post-ERCP

4. Campylobacter jejuni

(a) 1, 2 and 3

(b) 1,2 and 4

(c) 1,3 and 4

(d) 2, 3 and 4

[ANS] a

[SOL] **Causes of Acute Pancreatitis:**

Common (90% of cases)

* **Gallstones**
* **Alcohol**
* **Idiopathic causes**
* **Post-ERCP (Endoscopic Retrograde Cholangiopancreatography)**

Rare

* **Post-surgical (abdominal, cardiopulmonary bypass)**
* **Trauma**
* **Drugs (azathioprine/mercaptopurine, thiazide diuretics, sodium valproate)**
* **Metabolic (hypercalcaemia, hypertriglyceridaemia)**
* **Pancreas divisum**
* **Sphincter of Oddi dysfunction**
* **Infection (mumps, Coxsackie virus)**
* **Hereditary factors**
* **Renal failure**
* **Organ transplantation (kidney, liver)**
* **Severe hypothermia**
* **Petrochemical exposure**
* **Scorpion sting**

**Ref: Davidson principles and practice of medicine 24th edition pg851**

19[Q] Which of the following are aetiologies of haemochromatosis?

1. Thalassaemia

2. Anaemia of pyruvate kinase deficiency

3. Chronic cor pulmonale

4. Porphyria cutanea tarda

Select the correct answer using the code given below :

(a)1, 2 and 3

(b) 1, 2 and 4

(c) 1 and 4 only

(d) 2,3 and 4

[ANS] c

[SOL] **Aetiology of Haemochromatosis:**

Primary Haemochromatosis

* **HFE-associated haemochromatosis (Autosomal Recessive)**
* **Juvenile haemochromatosis (Hemojuvelin/Hepcidin Mutation, Autosomal Recessive)**
* **Transferrin Receptor 2 Deficiency (TFR2 Mutation, Autosomal Recessive)**
* **Ferroportin Disease (SLC40A1 Mutation, Autosomal Dominant)**

Secondary Iron Overload

* **Transfusional or Dietary Iron Overload**
* **Iron-Loading Anaemia (Thalassaemia, Sideroblastic Anaemia, Chronic Haemolytic Anaemias,)**
* **Liver Disease (ALD - Alcoholic Liver Disease, NAFLD - Non-Alcoholic Fatty Liver Disease, Hepatitis C)**

**Ref: Davidson principles and practice of medicine 24th edition pg906**

20[Q] Which of the following drugs are implicated in peptic ulcer disease, not caused by Helicobacter pylori and NSAIDs?

1. Clopidogrel

2. Glucocorticoids

3. Bisphosphonates

4. Colloidal bismuth subcitrate

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1 and 2 only

(c) 1, 3 and 4

(d) 2 and 4 only

[ANS] a

[SOL] Colloidal bismuth subcitrate can be used as treatment for ulcer.

21[Q] Which of the following are symptoms of irritable bowel syndrome?

1. Gas and flatulence

2. Abdominal pain

3. Blood in stools

4. Diarrhoea

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] b

[SOL]

**Irritable Bowel Syndrome (IBS):**

* **Key Symptoms:**
  + Recurrent abdominal pain
  + Altered bowel habit
* **Abdominal Pain:**
  + Colicky or cramping
  + Felt in the lower abdomen
  + Related to defecation
* **Bowel Habit Variability:**
  + Stratified by predominant bowel habit:
    - IBS with constipation (IBS-C)
    - IBS with diarrhea (IBS-D)
    - Mixed bowel habit (IBS-M)
    - Unsubtyped (IBS-U)
* **IBS-C:**
  + Infrequent, pellety stools
  + Associated with abdominal pain or proctalgia
* **IBS-D:**
  + Frequent defecation
  + Low-volume stools
  + Rarely nocturnal symptoms
* **Common Features:**
  + Passage of mucus is common
  + No rectal bleeding
  + No weight loss
  + Patients are constitutionally well
* **Diagnosis:**
  + Clinical in nature
  + Utilizes Rome IV criteria
  + Absence of alarm symptoms
  + Comprehensive history exploration (diet, medical, surgical, psychological)
  + Consideration of other functional gastrointestinal disorders
  + Associated non-gastrointestinal symptoms (migraine headaches, dyspareunia, interstitial cystitis)
  + Onset after gastroenteritis may suggest post-infectious IBS
* **Physical Examination:**
  + Generally unremarkable
  + Variable tenderness to palpation

**Investigations:**

* Limited laboratory tests performed, including:
  + Full blood count
  + Faecal calprotectin
  + C-reactive protein
  + Typically normal in IBS
* **Colonoscopy:**
  + Indicated in patients with alarm features
  + To exclude other diagnoses (colorectal cancer, inflammatory bowel disease)
* **Additional Investigations for Atypical Presentation:**
  + Diarrhea-predominant patients may require investigations to exclude:
    - Coeliac disease
    - Microscopic colitis
    - Lactose intolerance
    - Bile acid diarrhea
    - Thyrotoxicosis
    - Parasitic infection in relevant countries

**Ref: Davidson principles and practice of medicine 24th edition pg849**

22[Q] Vertical transmission of hepatitis B can be prevented by which of the following interventions?

1. Passive immunisation of infant at birth

2. Active immunisation of infant at birth

3. Antiviral therapy in the third trimester for mother with HBV-DNA level of > 2,00,000 IU/mL

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

[ANS] d

[SOL]

**Prophylaxis for Hepatitis B Virus (HBV) Exposure:**

Perinatal Exposure (Infants born to HBsAg-positive mothers):

* Single IM dose of HBIG (0.5 mL) immediately after birth.
* Followed by a complete course of three injections of recombinant hepatitis B vaccine within the first 12 hours of life.

Direct Percutaneous Inoculation or Transmucosal Exposure (e.g., accidental needle stick):

* Single IM dose of HBIG (0.06 mL/kg) as soon as possible after exposure.
* Followed by a complete course of hepatitis B vaccine to begin within the first week.

Pregnant Mothers with High-level HBV DNA (>2 × 10^5 IU/mL):

* Consider adding antiviral nucleoside analogues (e.g., pregnancy class B tenofovir) during the third trimester to reduce perinatal transmission.

Persons Exposed by Sexual Contact to a Patient with Acute Hepatitis B:

* Single IM dose of HBIG (0.06 mL/kg) within 14 days of exposure.
* Followed by a complete course of hepatitis B vaccine.

**Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2582**

23[Q] Which of the following are correct in respect of jaundice?

1. Patients complain of darkening of urine before they notice jaundice

2. Jaundice is usually detectable with a serum bilirubin level of over 1-8 mg/dl

3. In Gilbert syndrome, jaundice is more noticeable after fasting

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

[ANS] c

[SOL]

**Jaundice in Liver Disease:**

* **Hallmark Symptom:**
  + Jaundice is the hallmark symptom of liver disease and a reliable marker of severity.
* **Patient Perception:**
  + Patients often report darkening of urine before noticing scleral icterus.
* **Bilirubin Level and Jaundice Detection:**
  + Jaundice is rarely detectable with a bilirubin level <43 μmol/L (2.5 mg/dL).
* **Additional Features with Severe Cholestasis:**
  + Lightening of stool color
  + Steatorrhea
* **Jaundice Without Dark Urine:**
  + Indicates indirect (unconjugated) hyperbilirubinemia.
  + Typical of hemolytic anemia and genetic disorders of bilirubin conjugation.
* **Genetic Disorders:**
  + Common and benign: Gilbert syndrome
  + Rare and severe: Crigler-Najjar syndrome
* **Gilbert Syndrome:**
  + Affects up to 5% of the general population.
  + Jaundice is more noticeable after fasting and during stress.

**Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2548**

24[Q] Irritable bowel syndrome is favored by which of the following?

1. Worsening of symptoms by stress

2. Recurrent abdominal discomfort

3. Age more than 50 years at onset

4. Alternating diarrhea and constipation

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] b

[SOL] **Irritable Bowel Syndrome (IBS) overview:**

* **Prevalence:**
  + Estimated worldwide prevalence around 5%.
* **Characteristics:**
  + Recurrent abdominal pain associated with abnormal defecation.
  + Absence of structural abnormalities in the gut.
* **Impact:**
  + Accounts for frequent absenteeism from work.
  + Impairs the quality of life.
* **Demographics:**
  + Young women are affected more often than men.

**Pathophysiology:**

* **Factors Involved:**
  + Biopsychosocial factors, luminal factors (diet, gut microbiota).
* **Biopsychosocial Factors:**
  + Early learning difficulties or emotionally challenging interactions during childhood may contribute.
* **Psychological Aspects:**
  + Most patients in general practice do not have psychological problems.
  + About 50% of patients referred to the hospital may have psychiatric illnesses:
    - Anxiety
    - Depression
    - Somatization
    - Neurosis
    - Panic attacks

**Ref: Davidson principles and practice of medicine 24th edition pg849**

25[Q] The diagnosis of protein loosing enteropathy can be confirmed by:

(a) Hydrogen breath test

(b) Fecal clearance of alpha-1 trypsin

(c) Fecal 51Cr- labelled transthyretin level

(d) Fecal calprotectin level

[ANS] b

[SOL] **Protein-Losing Enteropathy:**

Protein-losing enteropathy is a term used to describe the condition characterized by excessive loss of protein into the gut lumen, leading to hypoproteinemia.

**Clinical Presentation:**

* **Peripheral Edema:** Patients present with peripheral edema.
* **Hypoproteinaemia:** Reduced serum albumin and immunoglobulins.
* **Normal Liver Function:** Typically, liver function is normal.
* **Absent Proteinuria:** Lack of proteinuria in urinalysis.

**Diagnosis:**

* **Confirmatory Tests:**
  + Measurement of faecal clearance of α1-antitrypsin.
  + 51Cr-labeled albumin after intravenous injection.

**Causes of Protein-Losing Enteropathy:**

With Lymphatic Obstruction:

* **Intestinal Lymphangiectasia**
* **Constrictive Pericarditis**
* **Lymphoma**
* **Whipple's Disease**

With Mucosal Erosions or Ulceration:

* **Crohn's Disease**
* **Ulcerative Colitis**
* **Radiation Damage**
* **Oesophageal, Gastric, or Colonic Cancer**
* **Lymphoma**

Without Mucosal Erosions or Ulceration:

* **Ménétrier’s Disease**
* **Bacterial Overgrowth**
* **Coeliac Disease**
* **Tropical Sprue**
* **Eosinophilic Gastroenteritis**
* **Systemic Lupus Erythematosus**

**Ref: Davidson principles and practice of medicine 24th edition pg824**

26[Q] RBC casts on urine analysis are seen in which of the following?

1. Glomerulonephritis

2. Intestitial nephritis

3. Vasculitis

4. Malignant hypertension

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1,3 and 4

(d) 2 and 3 only

[ANS] c

[SOL]

27[Q] Which of the following are correct regarding Essential Tremors?

1. It may present at any age

2. Head is almost never involved

3. Tremor may improve with a small amount of alcohol

Select the correct answer using the code given below :

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

[ANS] c

[SOL]

Essential tremor

**Prevalence:**

* + Essential tremor has a prevalence of about 300 per 100,000 people.

**Genetic Factors:**

* + Essential tremor may display a dominant pattern of inheritance, suggesting a genetic component. However, as of the information available, specific genes responsible for essential tremor have not been identified.

**Clinical Presentation:**

* + Essential tremor can present at any age and is characterized by a bilateral arm tremor with a frequency of 8–10 Hz.
  + The tremor is rarely present at rest but is typical with movement.
  + In some cases, the tremor may also affect the head and voice.

**Alcohol Responsiveness:**

* + Approximately 50% of patients experience improvement in tremors with the consumption of small amounts of alcohol.

**Diagnostic Challenges:**

* + There are no specific tests for essential tremor, and the diagnosis is often based on clinical features and the exclusion of other potential causes of tremors.
  + It's important to distinguish essential tremor from other tremor syndromes, including dystonic tremor.

**Treatment Options:**

* + Betablockers and primidone are mentioned as potential treatment options for essential tremor.
  + Deep Brain Stimulation (DBS) of the thalamus is noted as an effective treatment for severe cases. This involves the surgical implantation of electrodes to modulate abnormal brain activity causing the tremors.

**Ref: Davidson principles and practice of medicine 24th edition pg1169**

28[Q] Which of the following drugs may be associated with Parkinson’s disease?

1. Atypical anti-psychotic drugs

2. Lithium

3. MPTP (methyl-phenyl-tetrahydropyridine)

Select the correct answer using the code given below :

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

[ANS] d

[SOL] **Causes of parkinsonism:**

* **Idiopathic Parkinson’s Disease:**

This is the most common cause, accounting for at least 80% of cases. "Idiopathic" means that the cause is unknown.

* **Cerebrovascular Disease**
* **Drugs and Toxins:**

Antipsychotic drugs (both older and 'atypical')

Metoclopramide

Prochlorperazine

Tetrabenazine

Sodium valproate

Lithium, manganese

MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine).

* **Other Degenerative Diseases:**

Dementia with Lewy bodies

Progressive supranuclear palsy

Multiple system atrophy

Corticobasal degeneration

Alzheimer’s disease.

* **Genetic Causes:**

Huntington’s disease

Fragile X tremor ataxia syndrome

Dopa-responsive dystonia,

Spinocerebellar ataxias (particularly SCA 3)

Wilson’s disease.

* **Anoxic Brain Injury**

**Ref: Davidson principles and practice of medicine 24th edition pg1165**

29[Q] Which of the following are suggestive of Parkinson’s disease ?

1. Lead pipe rigidity

2. Cog wheel rigidity

3. Festinating gait

4. Romberg test positive

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1 and 2 only

(c) 1 and 3 only

(d) 2,3 and 4

[ANS] a

[SOL] **Physical signs in Parkinson’s disease**

**General:**

* Expressionless face (hypomimia)
* Soft, rapid, indistinct speech (dysphonia)
* Flexed (stooped) posture
* Impaired postural reflexes

**Gait:**

* Slow to start walking (failure of gait ignition)
* Rapid, short stride length, tendency to shorten (festination)
* Reduction of arm swing
* Impaired balance on turning

**Tremor:**

* Resting (3–4 Hz, moderate amplitude): most common
* Asymmetric, usually first in arm/hand ('pill rolling')
* May affect legs, jaw, and chin but not head
* Intermittent, present at rest, often briefly abolished by movement of limb, exacerbated by walking

**Postural Tremor (6–8 Hz, moderate amplitude):**

* Present immediately on stretching out arms

**Re-emergent Tremor (3–4 Hz, moderate amplitude):**

* Initially no tremor on stretching arms out, rest tremor re-emerges after a few seconds

**Rigidity:**

* Cogwheel type, mostly upper limbs (due to tremor superimposed on rigidity)
* Lead pipe type

**Akinesia (fundamental feature):**

* Slowness of movement
* Fatiguing and decrease in size of repetitive movements

**Normal Findings (if abnormal, consider other causes):**

* Power, deep tendon reflexes, plantar responses
* Eye movements
* Sensory and cerebellar examination

**Ref: Davidson principles and practice of medicine 24th edition pg1166**

30[Q] Which of the following are correct regarding Idiopathic Parkinson’s disease ?

1. Motor symptoms are always initially symmetrical

2. Non-motor symptoms include hyposmia and constipation

3. Cognition is spared in early disease

4. Speech may become softer and indistinct

Select the correct answer using the code given below:

(a) 2 and 3 only

(b) 1 and 4 only

(c) 1, 3 and 4

(d) 2,3 and 4

[ANS] d

[SOL] Clinical features of Idiopathic Parkinson’s disease

**Motor Symptoms:**

* Non-motor symptoms, such as hyposmia (reduction in sense of smell), anxiety/depression, constipation, and REM sleep behavioral disturbance (RBD), may precede typical motor features by many years.
* Patients rarely present at this early stage, and motor symptoms are almost always initially asymmetrical.
* Bradykinesia is the hallmark, leading to classic symptoms like micrographia (small handwriting), difficulty with tasks like tying shoelaces or buttoning clothes, and challenges in rolling over in bed.
* Tremor is an early feature but may not be present in at least 20% of people with PD. It is typically a unilateral rest tremor affecting limbs, jaw, and chin but not the head.
* Rigidity causes stiffness and a flexed posture. Falls tend not to occur until later in the disease.
* As PD advances, speech becomes softer and indistinct.
* Neurological examination reveals various abnormalities. Although features start as unilateral, gradual bilateral involvement occurs over time.

**Cognitive Function:**

* Cognition is usually spared in early PD. Impairment in cognition, if present, may suggest alternative diagnoses, such as dementia with Lewy bodies.

**Non-Motor Symptoms:**

* Non-motor symptoms may precede typical symptoms and become increasingly common and disabling as PD progresses.
* Cognitive impairment, including dementia, is a significant symptom, affecting quality of life. Estimates of dementia frequency range from 30% to 80%.
* Other non-motor symptoms include neuropsychiatric features (anxiety, depression, apathy, hallucinosis/psychosis), sleep disturbance and hypersomnolence, fatigue, pain, sphincter disturbance and constipation, sexual problems (erectile failure, loss of libido or hypersexuality), drooling, and weight loss.

**Ref: Davidson principles and practice of medicine 24th edition pg1166**

31[Q] Which of the following are correct with regard to Levodopa?

1. It is most effective for relieving tremors

2. Only a small portion of total drug reaches the brain

3. Nausea may be offset by domperidone

4. It may trigger hallucinations

Select the correct answer using the code given below:

(a) 1,2 and 3

(b) 1 and 4 only

(c) 1, 3 and 4

(d) 2,3 and 4

[ANS] d

[SOL] PARKINSON DRUG : LEVADOPA

**Peripheral Decarboxylation:** When administered orally, over 90% of levodopa is decarboxylated to dopamine in the peripheral tissues (gastrointestinal tract and blood vessels), leading to adverse effects. The small proportion that reaches the brain is responsible for therapeutic effects.

**Dopa Decarboxylase Inhibitors (DDIs):** To enhance levodopa's effectiveness and reduce peripheral side effects, it is often combined with dopa decarboxylase inhibitors such as carbidopa and benserazide. These inhibitors do not cross the blood–brain barrier, preventing unwanted decarboxylation in the brain.

**Effectiveness:** Levodopa is most effective for relieving akinesia (lack of voluntary muscle movement) and rigidity in PD. Its effectiveness on tremors may be less satisfactory, and it may not address all motor and non-motor symptoms.

**Controlled-Release Versions:** Controlled-release versions of levodopa exist but are typically reserved for overnight use due to their variable bioavailability, making them challenging for daytime use.

**Adverse Effects:** Adverse effects of levodopa include postural hypotension, nausea, vomiting, and the potential for hallucinations. Domperidone may be prescribed to offset nausea and vomiting, but its use is limited due to the risk of prolonged QTc interval and arrhythmia.

**Progression of PD:** As PD progresses, the response to levodopa may become less predictable, leading to motor fluctuations. End-of-dose deterioration is attributed to the progressive loss of dopamine storage capacity in the brain.

**Motor Complications:** Motor complications associated with levodopa use include dyskinesia (involuntary movements), wearing-off effects, and more complex fluctuations involving alternating periods of parkinsonism and improved mobility with dyskinesias.

**Management of Motor Complications:** Managing motor complications can be challenging. Approaches may include adjusting the dose or frequency of levodopa, adding a COMT inhibitor, incorporating dopamine agonists, continuous infusion of apomorphine, intraintestinal levodopa via a percutaneous endoscopic jejunostomy, or deep brain stimulator implantation.

**Ref: Davidson principles and practice of medicine 24th edition pg1167**

32[Q] Which of the following factors are risk factors for Stroke?

1. Sickle cell disease

2. Cigarette smoking

3. Hypofibrinogenaemia

4. Atrial fibrillation

Select the correct answer using the code given below :

(a) 1 and 2 only

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2 and 4 only

[ANS] b

[SOL]**Fixed Risk Factors:**

* Age
* Sex (Male > Female)
* Previous Vascular Event (Myocardial infarction, Stroke, Peripheral vascular disease)
* Genetic Mutations (e.g., CADASIL - Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy)
* Sickle Cell Disease

**Modifiable Risk Factors:**

* Blood Pressure
* Cigarette Smoking
* High LDL Cholesterol
* Diabetes Mellitus
* Atrial Fibrillation
* Chronic Kidney Disease
* Excessive Alcohol Intake
* Oestrogen-Containing Drugs (Oral contraceptive pill, Hormone replacement therapy)
* Polycythaemia
* Drugs (e.g., Cocaine)
* Heart Disease (Congestive Cardiac Failure, Infective Endocarditis)

**Ref: Davidson principles and practice of medicine 24th edition pg1207**

33[Q] Which of the following are correct in respect of Myasthenia gravis ?

1. Symptoms worsen towards end of the day

2. There may be difficulty in chewing and swallowing

3. Acetylcholine receptors in the pre-junctional membrane are involved

4. Penicillamine may precipitate similar illness

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1 and 3 only

(d) 2 and 4 only

[ANS] b

[SOL]

Myasthenia Gravis:

Pathophysiology:

- Autoimmune disease.

- Caused by antibodies (most commonly to acetylcholine receptors) in the post-junctional membrane of the neuromuscular junction.

- Results in blockage of neuromuscular transmission, complement-mediated inflammatory response, and damage to the end plate.

- About 80% of cases involve acetylcholine receptor antibodies, while 15% (mainly late-onset cases) may have a thymoma.

- Other antibodies, like those to muscle-specific kinase (MuSK), can produce a similar clinical picture.

- Triggers may include certain drugs (e.g., penicillamine), while others (aminoglycosides, quinolones) can exacerbate neuromuscular blockade.

Clinical Features:

- Typically presents between ages 15 and 50 years.

- Female preponderance in younger patients; males more commonly affected in older patients.

- Relapsing and remitting course.

- Fatigable muscle weakness, worsens with muscle use.

- Symptoms often affect ocular, facial, and bulbar muscles.

- Initial symptoms may include intermittent ptosis or diplopia.

- Weakness of chewing, swallowing, speaking, or limb movement may also occur.

- Weakness worsens towards the end of the day or following exercise.

- No sensory signs or signs of central nervous system involvement.

- Respiratory muscles may be affected, leading to respiratory failure.

- Subtypes include ocular myasthenia and generalized myasthenia.

Investigations:

- Serological testing for acetylcholine receptor antibodies.

- If seronegative, further testing for MuSK antibodies.

- Neurophysiological assessment, including repetitive stimulation during nerve conduction studies.

- Thoracic CT or MRI to exclude thymoma.

- Screening for associated autoimmune disorders, especially thyroid disease.

- The Tensilon test (intravenous injection of edrophonium bromide) in cases of diagnostic doubt.

- Structural imaging (e.g., MRI of brainstem) to exclude alternative diagnoses.

Management:

- Goals: Maximize acetylcholine activity, limit immunological attack on motor end plates.

- Anticholinesterase drug: Pyridostigmine.

- Muscarinic side-effects controlled by propantheline.

- Myasthenic crisis (bulbar and respiratory failure) requires prompt acute immunotherapy (intravenous immunoglobulin, plasma exchange), along with long-term immunosuppressive therapy.

- Supportive respiratory care and involvement of intensive care teams during crisis.

- Thymoma management involves joint oncology and thoracic surgery input.

- Prognosis varies; remissions may occur spontaneously.

- Thymectomy may benefit younger seropositive patients with generalized disease.

- Rapid progression more than 5 years after onset is uncommon.

- Some medications, like aminoglycoside antibiotics, can worsen myasthenia gravis.

**Ref: Davidson principles and practice of medicine 24th edition pg1195**

34[Q] Which of the following are the tests for functional assessment of encephalopathy?

1. Flapping tremors

2. Number connection test

3. Constructional apraxia

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

[ANS] d

[SOL]

35[Q] Which one of the following is correct regarding blood components in clinical practice?

(a) ABO blood group antigens are polypeptide chains on the surface of RBCs

(b) Platelets can be stored for up to 35 days

(c) Hemolytic disease of the newborn occurs when the mother’s IgA anti-RhD antibodies cross the placenta and lyse fetal RBCs

(d) Transfusion-associated GVHD can be prevented by prior irradiation of transfused blood

[ANS] d

[SOL]

**ABO Blood Groups:**

* Antigens: Oligosaccharide chains projecting from the red cell surface.
* ABO gene encodes glycosyltransferase, with three common alleles: A, B, and O.
* O allele results in an inactive enzyme, leaving the H antigen unmodified.
* A and B alleles encode enzymes attaching different sugars to the chain.
* Individuals tolerant to their own ABO antigens but can mount an immune response to foreign ABO antigens.

**ABO-Incompatible Red Cell Transfusion:**

* Incompatible transfusion can lead to IgM anti-A, anti-B, or anti-AB binding to transfused red cells.
* Activates complement pathway, causing intravascular hemolysis.
* Anaphylatoxins and inflammatory mediators released, leading to inflammation, increased vascular permeability, hypotension, and potential complications.
* About 20%-30% cause some morbidity; 5%-10% contribute to patient death.

**Rhesus D Blood Group and Hemolytic Disease of the Newborn (HDN):**

* About 15% of European populations are RhD-negative.
* RhD-negative individuals don't produce substantial anti-RhD antibodies.
* RhD-negative pregnant women exposed to RhD-positive fetal cells may produce antibodies causing HDN in subsequent pregnancies.
* Anti-RhD immunoglobulin (anti-D) can prevent RhD sensitization in RhD-negative pregnant women.

**Other Immunological Complications of Transfusion:**

* Transfusion-Associated Lung Injury (TRALI) and Transfusion-Associated Graft-Versus-Host Disease (TA GVHD) are rare but serious complications.
* TA GVHD occurs when there's sharing of an HLA haplotype between donor and recipient, leading to acute GVHD.
* Prevention involves gamma or X-ray irradiation of blood components to prevent lymphocyte proliferation.

**Ref: Davidson principles and practice of medicine 24th edition pg941**

36[Q] Which one of the following is an oral direct Thrombin inhibitor ?

Select the correct answer using the

(a) Apixaban

(b) Rivaroxaban

(c) Dabigatran

(d) Argatroban

[ANS] c

[SOL]

Dabigatran is an oral direct thrombin inhibitor.

Apixaban and Rivaroxaban are oral factor Xa inhibitors

Argatroban is an intravenous direct thrombin inhibitor.

37[Q] Which of the following are correct with regard to metformin?

1. The maximum tolerated dose is 2000 mg/day

2. Lactic acidosis is the adverse effect of metformin

3. It may lower the blood levels of Vitamin B12 level

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

[ANS] d

[SOL]

Biguanides, Metformin:

* Mechanism of Action:
  + Reduces hepatic glucose production.
  + Improves peripheral glucose utilization.
  + Activates AMP-dependent protein kinase.
  + Enters cells through organic cation transporters.
* Hepatic Glucose Production:
  + Antagonizes glucagon's ability to generate cAMP in hepatocytes.
  + Reduces fasting plasma glucose (FPG) and insulin levels.
* Benefits:
  + Improves lipid profile.
  + Promotes modest weight loss.
  + Associated with reduced microvascular and possibly macrovascular complications with long-term use.
* Formulation:
  + Extended-release form available with potentially fewer gastrointestinal side effects.
* Dosage and Administration:
  + Initial dose should be low, escalated every 1–2 weeks based on self-monitoring of blood glucose (SMBG) measurements.
  + Maximal tolerated dose: 2000 mg daily.
* Combination Therapy:
  + Effective as monotherapy.
  + Can be used in combination with other oral agents or insulin.
* Toxicity:
  + Major toxicity: Lactic acidosis (very rare).
  + Vitamin B12 levels may be lower during metformin treatment and should be monitored.
* Contraindications:
  + Moderate renal insufficiency (glomerular filtration rate [GFR] <45 mL/min).
  + Acidosis.
  + Unstable congestive heart failure (CHF).
  + Liver disease.
  + Severe hypoxemia.

**Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg3110**

38[Q] Which of the following statements are correct regarding short stature?

1. Linear bone growth pituitary dependent

2. Normal bone age in a child with short stature suggests hormonal disorder

3. Final height in boys can be estimated by adding 6.5cm to mid-parental height

4. Replacement therapy with recombinant GH restores growth velocity in GH-deficient children

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 3 and 4 only

[ANS] c

[SOL]

**DISORDERS OF GROWTH AND DEVELOPMENT: Skeletal Maturation and Somatic Growth**

**Growth Plate Stimuli:**

* Dependent on hormonal stimuli: GH, IGF-I, sex steroids, thyroid hormones, paracrine growth factors, and cytokines.
* Requires caloric energy, amino acids, vitamins, and trace metals.

**Effect of Malnutrition:**

* Impairs chondrocyte activity.
* Increases GH resistance.
* Reduces circulating IGF-I and IGF binding protein (IGBP)-3 levels.

**Linear Bone Growth:**

* Very high in infancy (pituitary-dependent).
* Mean growth velocity ~6 cm/year in later childhood.
* Peak growth rates during midpuberty (bone age 12 in girls, 13 in boys).
* Secondary sexual development causes progressive epiphyseal growth plate closure.
* Delayed bone age in true GH deficiency or GH receptor defects.

**Short Stature:**

* Constitutive intrinsic growth defects or acquired extrinsic factors.
* Delayed bone age in short stature suggests hormonal or systemic disorder.
* Normal bone age in a short child more likely due to genetic cartilage dysplasia or growth plate disorder.

**GH Deficiency in Children:**

* Characterized by short stature, micropenis, increased fat, high-pitched voice, and propensity to hypoglycemia.
* Familial modes of inheritance (autosomal dominant, recessive, or X-linked).
* About 10% have mutations in the GH-N gene.
* Idiopathic GH deficiency (IGHD) diagnosis after known molecular defects excluded.

**GHRH Receptor Mutations:**

* Recessive mutations in severe proportionate dwarfism.
* Associated with low basal GH levels not stimulated by exogenous GHRH, GHRP, or insulin-induced hypoglycemia.
* Importance of GHRH receptor for somatotrope cell proliferation and hormonal responsiveness.

**GH Insensitivity:**

* Caused by defects of GH receptor structure or signaling.
* Homozygous or heterozygous mutations associated with partial or complete GH insensitivity and growth failure (Laron syndrome).
* Diagnosis based on normal or high GH levels, decreased GH-binding protein (GHBP), and low IGF-I levels.
* Rarely, defective IGF-I, IGF-I receptor, or IGF-I signaling defects encountered.
* STAT5B mutations result in immunodeficiency and abrogated GH signaling.

**Nutritional Short Stature:**

* Caloric deprivation, malnutrition, uncontrolled diabetes, and chronic renal failure.
* Conditions stimulate proinflammatory cytokines, exacerbating GH-mediated signal transduction block.
* Features: acquired short stature, normal or elevated GH, low IGF-I levels.

**Psychosocial Short Stature:**

* Emotional and social deprivation leads to growth retardation.
* Features: delayed speech, discordant hyperphagia, attenuated response to administered GH.
* Nurturing environment restores growth rates.

**Presentation and Diagnosis:**

* Short stature evaluated comprehensively if height >3 SD below the mean for age or if growth rate decelerated.
* Skeletal maturation assessed by measuring radiologic bone age, based on wrist bone growth plate fusion.
* Final height prediction using standardized scales (Bayley-Pinneau or Tanner-Whitehouse) or estimated by adding 6.5 cm (boys) or subtracting 6.5 cm (girls) from midparental height.

**Laboratory Investigation:**

* GH deficiency assessed by examining response to provocative stimuli (exercise, insulin-induced hypoglycemia, pharmacologic tests).
* Random GH measurements not distinguish normal children from those with true GH deficiency.
* Adequate adrenal and thyroid hormone replacement assured before testing.
* Age- and sex-matched IGF-I levels not sufficiently sensitive or specific; useful to confirm GH deficiency.
* Pituitary MRI may reveal pituitary mass lesions or structural defects.
* Molecular analyses for known mutations undertaken when the cause of short stature remains cryptic or when additional clinical features suggest a genetic cause.

**Treatment:**

* Replacement therapy with recombinant GH (0.02–0.05 mg/kg per day SC) restores growth velocity in GH-deficient children to ~10 cm/year.
* If pituitary insufficiency documented, correct other associated hormone deficits, especially adrenal steroids.
* GH treatment moderately effective for accelerating growth rates in children with Turner syndrome and chronic renal failure.
* In patients with GH insensitivity and growth retardation due to mutations of the GH receptor, treatment with IGF-I bypasses the dysfunction

**Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2899**

39[Q] Which one of the following drugs used to treat Diabetes mellitus is least likely to cause hypoglycemia?

(a) Insulin

(b) Glimepiride

(c) Sitagliptin

(d) Repaglinide

[ANS] c

[SOL]

40[Q] Which of the following is a differential diagnosis of Hypocalcemia?

1. Hypomagnesaemia

2. Chronic alcoholism

3. Pseudohypoparathyroidism

4. Paget’s disease

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1 and 2 only

(c) 3 and 4 only

(d) 2, 3 and 4

[ANS] a

[SOL]

41[Q] Which of the following are for the treatment of Hirsutism?

1. Amiloride

2. Oestrogen

3. Finasteride

4. Spironolactone

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 3 and 4 only

(d) 2, 3 and 4

[ANS] d

[SOL]

42[Q] Which of the following is long-acting insulin?

(a) Aspart

(b) Glargine

(c) Lispro

(d) Regular

[ANS] b

[SOL]

* Rapid-acting insulin analogues: lispro, aspart, glulisine, fiasp
* Short-acting: soluble (regular)
* Intermediate acting: isophane (NPH), lente
* Long-acting insulin analogues: glargine, detemir, degludec

**Ref: Davidson principles and practice of medicine 24th edition pg739**

43[Q] A 15 year girl presents to the hospital with severe abdominal pain, vomiting and cold extremities. She has tachycardia and hypotension. Lab investigations show blood glucose 400 mg/dL, blood pH 6.9, urine ketones +++ and serum creatinine of 1-4 mg/dL. She is promptly administered IV fluids and insulin. After 4 hours, she complains of inability to lift her limbs. What is the next step to be considered in her management?

(a) Intravenous normal saline

(b) Intravenous sodium bicarbonate

(c) Urine sample for ketones

(d) Potassium repletion

[ANS] d

[SOL] The patient is likely experiencing diabetic ketoacidosis (DKA). The symptoms of inability to lift her limbs are suggestive of hypokalemia, which can occur in DKA .

MANAGEMENT OF DKA

**Confirm Diagnosis:**

* + Elevated plasma glucose
  + Positive serum ketones
  + Metabolic acidosis

**Admit to Hospital:**

* + Consider intensive care setting if pH <7.00 or unconscious.

**Assessment:**

* + Serum electrolytes (K+, Na+, Mg2+, Cl–, bicarbonate, phosphate)
  + Acid-base status—pH, HCO3–, PCO2, β-hydroxybutyrate
  + Renal function (creatinine, urine output)

**Fluid Replacement:**

* + 2–3 L of 0.9% saline over the first 1–3 hours
  + Subsequently, adjust fluid composition based on plasma glucose levels.
  + Change to 5% glucose and 0.45% saline at 150–250 mL/h when plasma glucose reaches 250 mg/dL (13.9 mmol/L).

**Administer Short-Acting Regular Insulin:**

* + IV (0.1 units/kg)
  + Then 0.1 units/kg per hour by continuous IV infusion
  + Increase two- to threefold if no response by 2–4 hours.
  + If the initial serum potassium is <3.3 mmol/L (3.3 meq/L), do not administer insulin until the potassium is corrected.

**Assess Patient:**

* + Identify precipitating factors (noncompliance, infection, trauma, pregnancy, infarction, cocaine).
  + Initiate appropriate workup for precipitating event (cultures, CXR, ECG).

**Monitoring:**

* + Measure capillary glucose every 1–2 hours
  + Measure electrolytes (especially K+, bicarbonate, phosphate) and anion gap every 4 hours for the first 24 hours.

**Vital Signs and Fluid Balance Monitoring:**

* + Monitor blood pressure, pulse, respirations, mental status, fluid intake and output every 1–4 hours.

**Replace K+:**

* + 10 meq/h when plasma K+ <5.0–5.2 meq/L (or 20–30 meq/L of infusion fluid), ECG normal, urine flow, and normal creatinine documented.
  + Administer 40–80 meq/h when plasma K+ <3.5 meq/L or if bicarbonate is given.
  + If the initial serum potassium is >5.2 mmol/L (5.2 meq/L), do not supplement K+ until the potassium is corrected.

1. **Continue Treatment:**
   * Follow guidelines until the patient is stable, glucose goal is 8.3–11.1 mmol/L (150–200 mg/dL), and acidosis is resolved.
   * Insulin infusion may be decreased to 0.02–0.1 units/kg per hour.
2. **Administer Long-Acting Insulin:**
   * As soon as the patient is eating.
   * Allow for a 2–4 hour overlap in insulin infusion and SC long-acting insulin injection.

**Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg3116**

44[Q] Composition of oral rehydration solution (WHO) is

(a) Na-90 m mol/L, K-20 m mol/L, Cl-80 m mol/L, Energy—54 kca/L

(b) Na-80 m mol/L, K-20 m mol/L, Cl-70 m mol/L, Energy—54 kca/L

(c) Na-90 m mol/L, K-40 m mol/L, Cl-80 m mol/L, Energy—27 kca/L

(d) Na-80 m mol/L, K-20 m mol/L, Cl-70 m mol/L, Energy—54 kca/L

[ANS] a

[SOL]

Na-90 m mol/L, K-20 m mol/L, Cl-80 m mol/L, Energy—54 kca/L

**Ref: Davidson principles and practice of medicine 24th edition pg274**

45[Q] Which of the following are correct regarding tuberculous meningitis?

1. Acid-Fast Bacilli are infrequently seen on direct smear of CSF

2. CSF culture for MTB is the gold standard for diagnosis

3. Xpert MTB/RIF assay is preferred initial diagnostic option

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

[ANS] d

[SOL]

**CSF features in Tuberculous Meningitis:**

* **Opening Pressure:**
  + Elevated opening pressure is a classic finding.
* **Cellular Composition (Pleocytosis):**
  + Lymphocytic pleocytosis: 10–500 cells/μL.
* **Protein Concentration:**
  + Elevated protein concentration in the range of 1–5 g/L.
* **Glucose Concentration:**
  + Decreased glucose concentration in the range of 1.1–2.2 mmol/L (20–40 mg/dL).
* **Clinical Presentation:**
  + Symptoms like unrelenting headache, stiff neck, fatigue, night sweats, and fever.
  + Presence of CSF lymphocytic pleocytosis and mildly decreased glucose concentration is highly suspicious for tuberculous meningitis.
* **CSF Collection for Diagnosis:**
  + The last tube of fluid collected during lumbar puncture (LP) is preferred for a smear for acid-fast bacilli (AFB).
  + AFB can be best demonstrated in a smear of a pellicle or cobweb-like clot if present.
* **Diagnostic Tests:**
  + Positive smears are reported in 10–40% of cases in adults.
  + Cultures of CSF take 4–8 weeks and are positive in ~50% of adults.
  + Culture remains the gold standard for diagnosing tuberculous meningitis.
  + PCR for M. tuberculosis DNA in CSF is recommended, but sensitivity and specificity have not been clearly defined.
  + The CDC recommends nucleic acid amplification tests for pulmonary tuberculosis diagnosis.
  + WHO recommends additional nucleic acid amplification tests (NAATs), specifically Xpert MT/RIF Ultra, in addition to smear and culture studies.
  + Brain imaging may reveal hydrocephalus, basal meningeal enhancement, and/or intracranial tuberculoma.

**Ref: Davidson principles and practice of medicine 24th edition pg1174**

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg1109****

46[Q] Which one of the following subcutaneous preparations is used for the treatment of osteoporosis?

(a) Denosumab

(b) Alendronate

(c) Zoledronic acid

(d) Raloxifene

[ANS] a

[SOL] Denosumab is a subcutaneous preparation that is used for the treatment of osteoporosis. It is a monoclonal antibody that inhibits osteoclast activity, leading to increased bone mineral density and reduced fracture risk. Alendronate and zoledronic acid are both bisphosphonates that are typically administered orally or intravenously. Raloxifene is a selective estrogen receptor modulator (SERM) that is also administered orally.

47[Q] Which of the following are correct with regard to osteoporosis ?

1. It does not cause symptoms until a fracture occurs

2. Vertebra fracture can present with loss of height, in absence pain

3. Smoking is protective

4. It sometimes presents incidentally with radiological osteopenia

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] b

[SOL]

**Osteoporosis:**

* **Definition:**
  + Osteoporosis is a condition characterized by decreased bone strength, leading to an increased risk of fractures.
  + World Health Organization (WHO) defines it as a bone density falling 2.5 standard deviations below the mean for young healthy adults (T-score of –2.5).
* **Clinical Assessment:**
  + Absolute fracture risk is assessed, incorporating factors such as bone mineral density (BMD), age, gender, and other clinical risk factors.
* **Epidemiology:**
  + Prevalent in the United States, affecting over 10 million individuals.
  + More than 40 million individuals have bone mass levels putting them at increased risk.
* **Fracture Risk:**
  + Lifetime osteoporotic fracture risk is about 50% for a 50-year-old woman and 20% for a 50-year-old man.
* **Vertebral Fractures:**
  + "Silent" vertebral fractures, when asymptomatic, are a sign of skeletal fragility, identified incidentally during radiography for other purposes.
* **Characteristics of Osteoporosis:**
  + Often asymptomatic until a fracture occurs.
  + Vertebral fractures can present with loss of height even in the absence of pain.
  + Smoking is not protective against osteoporosis.
  + Osteoporosis can sometimes present incidentally with radiological osteopenia, especially when detecting silent vertebral fractures during other imaging procedures.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg3191****

48[Q] Which of the following are correct with regard to Ankylosing spondylitis ?

1. Bamboo spine may be seen

2. Early morning back pain is rare

3. Uveitis is most common extra-articular feature

4. It is more common in males

Select the correct answer using the code given below:

(a) 1, 2, and 3

(b) 1, 2, and 4

(c) 1, 3, and 4

(d) 2, 3, and 4

[ANS] c

[SOL]

**Inflammatory Back Pain and Stiffness:**

* + Cardinal feature of axial spondyloarthritis (axSpA).
  + Morning stiffness and low back pain radiating to the buttocks or posterior thighs.
  + Symptoms worsen with inactivity and improve with movement.

**Musculoskeletal Symptoms:**

* + Entheses involvement, leading to episodic musculoskeletal symptoms.
  + Persistent symptoms may present as widespread pain, sometimes confused with fibromyalgia.
  + Fatigue is a common accompanying symptom.

**Historical Clues:**

* + History of psoriasis (current, previous, or in a first-degree relative).
  + History of inflammatory bowel symptoms (current or previous).

**Physical Signs:**

* + Reduced range of lumbar spine movements in all directions.
  + Pain upon sacroiliac stressing.
  + High enthesitis index.
  + Entheses commonly affected include Achilles’ insertion, plantar fascia origin, patellar ligament entheses, gluteus medius insertion at the greater trochanter, and tendon attachments at humeral epicondyles.

**Extra-articular Features:**

* + Acute anterior uveitis is the most common extra-articular feature, occasionally preceding joint disease.

**Clinical Questionnaires:**

* + Utilization of validated clinical questionnaires, such as BASDAI, BASFI, and ASDAS-CRP, to assess disease activity and functional status.

**Spinal Changes:**

* + Spinal fusion development over many years.
  + Varied extent; usually does not cause a gross flexion deformity.
  + Some patients may develop marked kyphosis of the dorsal and cervical spine, potentially interfering with forward vision.
  + Associated with fixed flexion contractures of hips or knees in some cases.

**Osteoporosis:**

* + Common complication, particularly affecting the spine.
  + Increased risk of vertebral fractures.

Investigations:

**Imaging:**

* + Ultrasound or MRI of entheses.
  + MRI of sacroiliac joints and spine.
  + X-rays in advanced cases (AS) show irregularity, loss of cortical margins, joint space changes, sclerosis, and fusion.
  + Lateral thoracolumbar spine X-rays may show anterior 'squaring' of vertebrae, bridging syndesmophytes, and a 'bamboo' spine in advanced disease.
  + Erosive changes in symphysis pubis, ischial tuberosities, and peripheral joints.

**Laboratory Tests:**

* + Raised ESR and CRP (though these can be normal).
  + Anemia.
  + Positive HLA-B27.

**Additional Screening:**

* + Faecal calprotectin as a useful screening test for associated inflammatory bowel disease.

**DXA Scanning or Vertebral Quantitative CT:**

* + Important for fragility fracture assessment, especially due to common osteoporosis in axSpA.

**Ref: Davidson principles and practice of medicine 24th edition pg1033**

49[Q] Carpel Tunnel Syndrome is associated with which of the following features ?

1. Pain and tingling in hands at night

2. Weakness of thumb abduction

3. Loss of sensation over lateral half of the palm

4. Atrophy of hypothenar eminence

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1,3 and 4

(d) 2, 3 and 4

[ANS] a

[SOL]

**Median Neuropathy - Carpal Tunnel Syndrome (CTS):**

**Definition and Pathophysiology:**

* Compression of the median nerve in the carpal tunnel at the wrist.
* Median nerve courses under the transverse carpal ligament as it enters the hand through the carpal tunnel.

**Clinical Presentation:**

* **Symptoms:** Numbness and paresthesias variably in the thumb, index, middle, and half of the ring finger.
* Paresthesias may extend into the forearm or upper arm and can be isolated to specific fingers.
* Pain in the hand, forearm, and proximal arm is common.

**Diagnosis:**

* **Signs:** Decreased sensation in the median nerve distribution; Tinel sign (tingling sensation with percussion over the wrist); Phalen sign (tingling with wrist flexion for 30–60 s); weakness of thumb opposition and abduction.
* **Electrodiagnosis (EDx):** Shows slowing of sensory and, to a lesser extent, motor median potentials across the wrist.
* **Ultrasound:** Can reveal focal swelling of the median nerve at the wrist.

**Treatment Options:**

* **Avoidance:** Avoid precipitating activities.
* **Systemic Control:** Manage underlying systemic-associated conditions if present.
* **Medications:** Nonsteroidal anti-inflammatory medications.
* **Splints:** Neutral (volar) position wrist splints, especially for nighttime use.
* **Injections:** Glucocorticoid/anesthetic injection into the carpal tunnel.
* **Surgical Decompression:** Involves dividing the transverse carpal ligament; considered if poor response to nonsurgical treatments, presence of thenar muscle atrophy or weakness, and significant denervation potentials on EMG.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg3191****

50[Q] Which of the following can be used to monitor disease activity in rheumatoid arthritis ?

1. Pain (visual analogue scale)

2. X-Ray of hands and wrists

3. DAS 28 score

4. ESR

Select the correct answer using the code given below :

(a) 1, 2, 3 and 4

(b) 1, 2 and 4

(c) 1,3 and 4

(d) 2,3 and 4

[ANS] c

[SOL]

Investigations and monitoring of rheumatoid arthritis

**To Establish Diagnosis:**

* Clinical criteria
* Erythrocyte sedimentation rate and C-reactive protein
* Ultrasound or magnetic resonance imaging
* Rheumatoid factor and anti-citrullinated peptide antibodies

**To Monitor Disease Activity and Drug Efficacy:**

* Pain (visual analogue scale)
* Early morning stiffness (minutes)
* Joint tenderness
* Joint swelling
* DAS28
* Erythrocyte sedimentation rate and C-reactive protein

**To Monitor Disease Damage:**

* X-rays
* Functional assessment

**To Monitor Drug Safety:**

* Urinalysis
* Full blood count
* Chest X-ray
* Urea and creatinine
* Liver function tests

**Ref: Davidson principles and practice of medicine 24th edition pg1030**

51[Q] Which one associated of the following HIV infections is least likely with CD4 count > 100 cells/mm?

(a) Cerebral toxoplasmosis

(b) Tuberculosis

(c) Herpes zoster

(d) Pneumocystis jirovecii pneumonia

[ANS] a

[SOL]

CD4 count and risk of common HIV-associated diseases

**< 500 cells/mm3:**

* Tuberculosis
* Bacterial pneumonia
* Herpes zoster
* Oropharyngeal candidiasis
* Non-typhoid salmonellosis
* Kaposi's sarcoma
* Non-Hodgkin lymphoma
* HIV-associated idiopathic thrombocytopenic purpura

**< 200 cells/mm3:**

* Pneumocystis jirovecii pneumonia
* Chronic herpes simplex ulcers
* Oesophageal candidiasis
* Cystoisospora belli (syn. Isospora belli) diarrhoea
* HIV wasting syndrome
* HIV-associated dementia
* Peripheral neuropathy
* Endemic mycoses

**< 100 cells/mm3:**

* Cerebral toxoplasmosis
* Cryptococcal meningitis
* Cryptosporidiosis and microsporidiosis
* Primary CNS lymphoma
* Cytomegalovirus
* Disseminated Mycobacterium avium complex (MAC)
* Progressive multifocal leucoencephalopathy

**Ref: Davidson principles and practice of medicine 24th edition pg356**

52[Q] Tests for graphesthesia and stereognosis are used clinically to assess

(a) Cortical sensation

(b) Posterior column

(c) Cerebellar function

(d) Lateral spinothalamic tract

[ANS] a

[SOL]

**Cortical Sensation and Parietal Lobes:**

* **Definition:** Cortical sensation is mediated by the parietal lobes and involves the integration of primary sensory modalities.
* **Testing Significance:** Testing cortical sensation is meaningful only when primary sensation is intact.
* **Double Simultaneous Stimulation:**
  + **Purpose:** Useful as a screening test for cortical function.
  + **Procedure:** With the patient's eyes closed, the examiner lightly touches one or both hands and asks the patient to identify the stimuli.
  + **Implication of Parietal Lobe Lesion:** In the presence of a parietal lobe lesion, the patient may be unable to identify the stimulus on the contralateral side when both hands are touched.
* **Other Modalities Involving Parietal Cortex:**
  + **Two-Point Discrimination:** Discrimination of two closely placed stimuli as separate.
  + **Stereognosis:** Identification of an object by touch and manipulation alone.
  + **Graphesthesia:** Identification of numbers or letters written on the skin surface.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg3281****

53[Q] A blast victim is brought to the emergency. Victim is unconscious. BP is 80/50 mm Hg. Pulse is 110 per minute and thready and SpO, is 70%. Victim has rapid shallow breathing and signs of external blood loss are present. JVP is raised and heart sounds are absent on auscultation. Which one of the following is the next single most immediate step in the management, after securing airway, breathing and circulation ?

(a) Chest X-ray PA and lateral view

(b) Urgent needle throacostomy

(c) Urgent pericardiocentesis

(d) Blood for cross match followed by blood transfusion

[ANS] c

[SOL]

**Cardiac Tamponade: Key Points**

* **Definition:** Accumulation of fluid in the pericardial space causing serious obstruction to blood inflow into the ventricles, potentially fatal if not promptly treated.
* **Common Causes:**
  + Idiopathic pericarditis
  + Pericarditis secondary to neoplastic disease, tuberculosis, bleeding from aortic dissection, cardiac operation, trauma, or anticoagulant therapy.
* **Beck's Triad (Principal Features):**
  + Hypotension
  + Soft or absent heart sounds
  + Jugular venous distention with prominent x (early systolic) descent but absent y (early diastolic) descent.
* **Fluid Quantity for Tamponade:**
  + Can be as small as 200 mL (rapid development) or >2000 mL (slowly developing effusions).
* **Diagnosis:**
  + Echocardiography is crucial for prompt diagnosis.
  + Doppler ultrasound shows increased tricuspid and pulmonic valve flow velocities during inspiration, with decreased pulmonic vein, mitral, and aortic flow velocities.
  + Late diastolic inward motion (collapse) of the right ventricular free wall and right atrium.
  + Transesophageal echocardiography, CT, or cardiac MRI may be needed for a detailed diagnosis.
* **Paradoxical Pulse:**
  + 10 mmHg inspiratory decline in systolic arterial pressure.
  + Result of inspiratory enlargement of the right ventricle causing leftward bulging of the interventricular septum.
* **Management (Pericardiocentesis):**
  + Lifesaving procedure if tamponade is suspected.
  + Should be carried out promptly, preferably under echocardiographic guidance.
  + Intrapericardial pressure may be measured before fluid withdrawal.
  + Small catheter left in place for continued drainage if needed.
* **Caution:**
  + Immediate treatment is crucial as untreated tamponade can be rapidly fatal.
  + High index of suspicion needed, especially when sudden cardiac silhouette enlargement, hypotension, and elevated jugular venous pressure are observed.
* **Pericardial Fluid Analysis:**
  + Exudative and/or bloody fluid may indicate neoplasm, renal failure, cardiac injury, or tuberculosis.
  + Analyze for red and white blood cells, cytology for neoplastic cells, and obtain cultures.
  + Polymerase chain reaction for Mycobacterium tuberculosis DNA may support the diagnosis of tuberculous pericarditis.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2021****

54[Q] A 21 year young female was brought to Emergency Department with history of unknown substance ingestion. She was having vomiting, profuse diarrhoea, bronchorrhoea and excessive sweating. On examination miosis and muscular fasciculations were present. What is the most likely diagnosis?

(a) Corrosive substance poisoning

(b) Aluminium phosphide poisoning

(c) Zinc phosphide poisoning

(d) Organophosphorus poisoning

[ANS] d

[SOL]

**Organophosphate Poisoning: Mechanism and Clinical Management**

**Mechanism of Toxicity:**

* **Acetylcholinesterase (AChE) Inactivation:** OP compounds lead to the inactivation of acetylcholinesterase.
* **Accumulation of Acetylcholine (ACh):** Results in the accumulation of acetylcholine in cholinergic synapses.
* **Reactivation and Ageing:** Spontaneous hydrolysis allows enzyme reactivation initially, but "ageing" process occurs, preventing further enzyme reactivation.
* **Rate of Ageing:** Determines toxicity; more rapid with dimethyl compounds than diethyl compounds, especially rapid with nerve agents like soman.

**Clinical Features and Management:**

1. **Acute Cholinergic Syndrome:**
   * **Onset:** Within a few minutes of exposure.
   * **Features:** Nicotinic or muscarinic manifestations, vomiting, diarrhea, bronchoconstriction, bronchorrhoea, salivation, sweating, miosis, muscular fasciculations, flaccid paralysis.
   * **Complications:** Respiratory failure, ataxia, coma, convulsions, cardiac abnormalities.
   * **Management:**
     + Clear airway, assess breathing and circulation.
     + Administer high-flow oxygen and obtain intravenous access.
     + External decontamination, gastric lavage, or activated charcoal if early presentation.
     + Atropine administration to reverse cholinergic effects.
     + Oxime (pralidoxime chloride or obidoxime) recommended if available.
     + Magnesium sulfate and ventilatory support may be considered.
2. **Intermediate Syndrome:**
   * **Onset:** 1–4 days after exposure.
   * **Features:** Weakness spreading from ocular muscles to head, neck, proximal limbs, and respiratory muscles.
   * **Complications:** Ventilatory failure.
   * **Management:** Supportive care, including airway and ventilation maintenance.
3. **Organophosphate-induced Delayed Polyneuropathy (OPIDN):**
   * **Onset:** 2–3 weeks after exposure.
   * **Features:** Mixed sensory/motor polyneuropathy, muscle cramps, numbness, paraesthesiae, flaccid paralysis of lower and upper limbs, foot and wrist drop, high-stepping gait, paraplegia.
   * **Complications:** Incomplete recovery, limited functional recovery.
   * **Management:** No specific therapy; physiotherapy for limiting deformity caused by muscle wasting.

**Diagnostic Confirmation:**

* Measurement of plasma or red blood cell cholinesterase activity.
* Plasma cholinesterase is reduced more rapidly but less specific than red cell cholinesterase.

**Important Note:**

* Antidote use should not be delayed pending diagnostic results.
* Monitoring and supportive care are essential during the acute cholinergic phase.
* Recovery may take weeks, and substantial functional recovery can occur after 1–2 years.

**Ref: Davidson principles and practice of medicine 24th edition pg232**

55[Q] A young female of 22 year old presented to the medical emergency with complaints of nausea, vomiting, abdominal pain, diarrhea, and convulsions along with methemoglobinemia. What is the likely diagnosis?

(a) Aluminum phosphide poisoning

(b) Zinc phosphide poisoning

(c) Copper sulfate poisoning

(d) Lead poisoning

[ANS] c

[SOL]

Copper sulfate, also known as cupric sulfate or copper(II) sulfate, is indeed used as a fungicide. However, it is important to note that it can be toxic if ingested. The clinical features of copper sulfate toxicity include a range of symptoms and complications:

**Gastrointestinal Effects:**

* + Nausea
  + Vomiting
  + Abdominal pain
  + Diarrhea
  + Corrosive effects on the gastrointestinal tract

**Systemic Effects:**

* + Renal failure
  + Liver failure
  + Methemoglobinemia (a condition where an abnormal amount of methemoglobin, a form of hemoglobin, is produced)
  + Hemolysis (destruction of red blood cells)
  + Rhabdomyolysis (breakdown of muscle tissue)
  + Convulsions
  + Coma

The discoloration of secretions to a blue or green color is characteristic of copper poisoning.

**Treatment:**

* **Gastrointestinal Decontamination**
* **Supportive Care**
* **Methylthioninium Chloride (Methylene Blue)**
* **Chelation Therapy**

**Ref: Davidson principles and practice of medicine 24th edition pg235**

56[Q] Which of the following are the components of the SOFA (Sequential Organ Failure Assessment) ?

1. Serum bilirubin

2. Platelet count

3. Leuococyte count

4. Serum Creatinine

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] b

[SOL] Components of the SOFA

**Respiration (PaO2/FiO2)**

**Coagulation (Platelets)**

**Liver (Bilirubin):**

**Cardiovascular (MAP - Mean Arterial Pressure):**

**Central Nervous System (Glasgow Coma Scale):**

**Renal (Creatinine or Urine Output):**

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2217****

57[Q] Purtscher’s retinopathy may be associated with

(a) Acute fulminant hepatic failure

(b) Acute pancreatitis

(c) Acute peritonitis

(d) Acute cholecystitis

[ANS] b

[SOL]**Complications associated with acute pancreatitis:**

Local Complications

* Pancreatic/Peripancreatic Fluid Collections:
  + Acute Necrotic Collection (sterile or infected)
  + Walled-off Necrosis (sterile or infected)
  + Pancreatic Pseudocyst
* Disruption of Pancreatic Duct:
  + Involves the main pancreatic duct or secondary branches
* Pancreatic Ascites:
  + Accumulation of fluid in the peritoneal cavity due to pancreatic leakage
* Chylous Ascites:
  + Resulting from the disruption of lymphatic ducts
* Involvement of Contiguous Organs:
  + Necrotizing pancreatitis may extend to adjacent organs, such as colon perforation
* Splanchnic Thromboses:
  + Involves splenic vein, superior mesenteric vein, and/or portal vein
* Bowel Infarction/Perforation:
  + Resulting from vascular complications
* Gastric Outlet Obstruction:
  + Due to inflammation affecting the stomach
* Biliary Obstruction:
  + Jaundice may occur due to compression or inflammation around the bile ducts

Systemic Complications

* Pulmonary:
  + Pleural Effusion
  + Atelectasis
  + Mediastinal Fluid
  + Pneumonitis
  + Acute Respiratory Distress Syndrome (ARDS)
  + Hypoxemia (may go unrecognized)
* Cardiovascular:
  + Hypotension
  + Hypovolemia
  + Nonspecific ST-T changes in the electrocardiogram mimicking myocardial infarction
  + Pericardial Effusion
* Hematologic:
  + Disseminated Intravascular Coagulation (DIC)
  + Gastrointestinal Hemorrhage (peptic ulcer disease, erosive gastritis, hemorrhagic pancreatic necrosis)
  + Variceal Hemorrhage secondary to splanchnic thrombosis
* Renal:
  + Oliguria (<300 mL/day)
  + Azotemia
  + Renal Artery and/or Renal Vein Thrombosis
  + Acute Tubular Necrosis
* Metabolic:
  + Hyperglycemia
  + Hypertriglyceridemia
  + Hypocalcemia
  + Encephalopathy
  + Sudden blindness (Purtscher’s retinopathy)
* Central Nervous System:
  + Psychosis
  + Fat Emboli
  + Fat Necrosis
* Subcutaneous Tissues:
  + Erythematous Nodules

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2664****

58[Q] Which of the following may constitute the characteristic triad of Zollinger-Ellison syndrome ?

1. Severe peptic ulceration

2. Gastric acid hyposecretion

3. Gastrinoma

4. Pancreatic Neuro-endocrine tumor

Select the correct answer using the code given below :

(a) 1 and 3 only

(b) 2, 3 and 4

(c) 1,3 and 4

(d) 1, 2 and 4

[ANS] c

[SOL]   
Zollinger–Ellison Syndrome

* Rare disorder characterized by gastric acid hypersecretion and severe peptic ulceration.
* Caused by a gastrin-secreting neuroendocrine tumor (gastrinoma).

**Epidemiology:**

* Accounts for about 0.1% of all cases of duodenal ulceration.
* Occurs in either sex at any age, most common between 30 and 50 years.

**Pathophysiology:**

* Elevated gastrin stimulates acid secretion, increasing parietal cell mass three- to sixfold.
* Excessive acid output may reach upper small intestine, reducing luminal pH to 2 or less.
* Pancreatic lipase inactivated, bile acids precipitated, leading to diarrhea and steatorrhea.
* Around 90% of tumors occur in pancreatic head or proximal duodenal wall.
* 20-60% of patients have multiple endocrine neoplasia (MEN) type 1.

**Clinical Features:**

* Severe and multiple peptic ulcers in unusual sites (post-bulbar duodenum, jejunum, or esophagus).
* Poor response to standard ulcer therapy.
* Short history, common bleeding, and perforations.
* Diarrhea in one-third or more of patients, sometimes a presenting feature.

**Investigations:**

* Serum gastrin levels grossly elevated (10- to 1000-fold).
* Secretin injection causes paradoxical increase in gastrin in Zollinger–Ellison syndrome.
* Tumor localization and staging with CT, EUS, somatostatin receptor scintigraphy, and gallium DOTATATE PET scanning.

**Management:**

* Resection for unifocal tumors; surgery not always suitable for multifocal or metastatic disease.
* High-dose PPI therapy for healing ulcers and alleviating diarrhea.
* Somatostatin analog therapy may reduce gastrin secretion and have an anti-tumor effect.
* Genetic screening for MEN 1 recommended for all patients.
* Overall 5-year survival is 60%-75%.

**Ref: Davidson principles and practice of medicine 24th edition pg817**

59[Q] In a healthy young adult, what proportion of sleep time is comprised Rapid Eye Movement (REM) sleep?

(a) 5-10%

(b) 20-25%

(c) 45-50%

(d) 70-75%

[ANS] b

[SOL]

**Normal Nocturnal Sleep in Adults:**

* Sleep typically progresses through NREM stages N1–N3 within 45–60 minutes after sleep onset.
* NREM stage N3 (slow-wave sleep) predominates in the first third of the night, constituting 15–25% of total sleep time in young adults.
* The first REM sleep episode usually occurs in the second hour of sleep.
* NREM and REM sleep alternate through the night in an ultradian sleep cycle with an average period of 90–110 minutes.

**Sleep in Healthy Young Adults:**

* REM sleep constitutes 20–25% of total sleep.
* NREM stages N1 and N2 constitute 50–60% of total sleep.

**Impact of Age on Sleep State Organization:**

* N3 sleep is most intense during childhood, decreasing with puberty and across the second and third decades of life.
* In older adults, N3 sleep may be absent, and the remaining NREM sleep becomes more fragmented with frequent awakenings.
* Age affects the proportion of REM sleep, with a sharp decline after infancy.

**Effects of Sleep Deprivation:**

* Sleep deprivation increases the rapidity of sleep onset and the intensity and amount of slow-wave sleep.
* REM sleep pressure may increase after sleep deprivation, leading to earlier occurrences of REM sleep.

**Cognitive Performance and Sleep Deprivation:**

* Sleep deprivation degrades cognitive performance, especially in tasks requiring continual vigilance.
* Older people are less vulnerable to neurobehavioral performance impairment induced by acute sleep deprivation but find it more challenging to obtain recovery sleep after staying awake all night.

**Sleep Disorders and Sleep Fragmentation:**

* Several disorders can cause sleep fragmentation, emphasizing the importance of having sufficient sleep opportunity before diagnostic polysomnograms.

**Health Consequences of Inadequate Sleep:**

* Inadequate sleep in humans is associated with various health issues, including glucose intolerance contributing to diabetes, obesity, metabolic syndrome, impaired immune responses, accelerated atherosclerosis, increased risk of cardiac disease, cognitive impairment, Alzheimer's disease, and stroke.

****Ref: Harrison’s principles of INTERNAL MEDICINE 20th edition pg205****

60[Q] Which of the following drugs can cause Idiopathic Intra cranial Hypertension?

1. Tetracycline

2. Retinoid

3. Vitamin A

4. Sulfonamides

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 2, 3 and 4

(c) 1, 3 and 4

(d) 1, 2 and 4

[ANS] a

[SOL] **Idiopathic Intracranial Hypertension (IIH):**

**Epidemiology:**

* Typically occurs in young women with high BMI (Body Mass Index).
* Annual incidence is around 3 per 100,000.

**Etiology:**

* Occurs in the absence of a structural lesion, hydrocephalus, or other identifiable cause.
* The exact cause is uncertain, but there is an association with obesity in females, possibly leading to a defect in cerebrospinal fluid (CSF) reabsorption by the arachnoid villi.
* Certain drugs may be associated with IIH, including tetracycline, vitamin A, and retinoid derivatives.

**Clinical Features:**

* Usual presentation is with headaches, sometimes accompanied by diplopia and visual disturbances.
* Visual disturbances often involve transient obscurations of vision associated with changes in posture.
* Clinical examination typically reveals papilledema but may show little else.
* False localizing cranial nerve palsies, usually affecting the 6th nerve, may be present.
* Accurate recording of visual fields is important for future monitoring.

**Investigations:**

* Brain imaging is necessary to exclude structural or other causes (e.g., cerebral venous sinus thrombosis).
* Ventricles are typically normal in size or small (‘slit’ ventricles).
* Lumbar puncture can confirm the diagnosis by showing raised normal CSF constituents at increased pressure (usually > 30 cmH2O).

**Management:**

* Management can be challenging, and there is no specific evidence-based treatment.
* Weight loss in overweight patients may be beneficial if achievable.
* Acetazolamide or topiramate may help lower intracranial pressure, with the latter potentially aiding weight loss in some patients.
* Repeated lumbar puncture is an effective treatment for headaches but may be technically difficult in obese individuals and poorly tolerated.
* Patients failing to respond, especially when chronic papilledema threatens vision, may require optic nerve sheath fenestration or a lumbo-peritoneal shunt.

**Ref: Davidson principles and practice of medicine 24th edition pg1186**

61[Q] As per the Gell and Coombs classification, Farmer’s lung is which type of hypersensitivity disease ?

(a) Type-I

(b) Type-II

(c) Type-III

(d) Type-IV

[ANS] c

[SOL]

Type I Immediate hypersensitivity

Type II Antibodymediated

Type III Immune complexmediated

Type IV Delayed type

**Ref: Davidson principles and practice of medicine 24th edition pg78**

62[Q] Hormonal regulation of salt and water balance in a nephron occurs at

(a) Proximal Convoluted Tubule (PCT)

(b) Loop of Henle

(c) Distal Convoluted Tubule (DCT)

(d) Collecting Ducts

[ANS] d

[SOL]

**Collecting Duct:**

The collecting duct plays a crucial role in modulating the final composition of urine, contributing to reabsorption of approximately 4–5% of filtered sodium (Na+). It is divided into two major segments: the cortical collecting duct and the inner medullary collecting duct.

**Cortical Collecting Duct:**

* Reabsorbs filtered Na+.
* Important for hormonal regulation of salt and water balance.
* Contains high-resistance epithelia with principal cells (main water-reabsorbing, Na+-reabsorbing, and K+-secreting cells) and type A and B intercalated cells.
* Principal cells express aldosterone-sensitive epithelial Na+ channels (ENaC), regulated by aldosterone.
* Aldosterone stimulates Na+ reabsorption and K+ secretion in principal cells.
* Mutations in ENaC can lead to conditions like Liddle's syndrome with hypokalemia, hypertension, and metabolic alkalosis.
* Potassium-sparing diuretics like amiloride and triamterene block ENaC.
* Principal cells secrete K+ through an apical membrane potassium channel.

**Inner Medullary Collecting Duct:**

* Similar to principal cells of the cortical collecting duct.
* Reabsorbs Na+ and secretes K+.
* Inhibited by natriuretic peptides (atrial natriuretic peptide or renal natriuretic peptide) in response to volume expansion, leading to natriuresis.
* Transports urea out of the lumen, contributing to the hypertonicity of the medullary interstitium.
* Urea is recycled by diffusing into the descending and ascending limbs of the loop of Henle.

**Vasopressin Regulation:**

* Cells in both collecting duct segments express vasopressin-regulated water channels (aquaporin-2 on apical membrane).
* Vasopressin binds to the V2 receptor on basolateral membrane, triggering a signaling cascade that promotes water permeability, water reabsorption, and concentrated urine production.
* In the absence of vasopressin, collecting duct cells are water impermeable, and urine remains dilute.

**Intercalated Cells:**

* Type A intercalated cells mediate acid secretion and bicarbonate reabsorption.
* Type B intercalated cells mediate bicarbonate secretion and acid reabsorption.
* Active H+ transport and Cl−/HCO3 − exchange are involved in acid-base balance.
* Aldosterone influences the number of H+-ATPase pumps, contributing to metabolic alkalosis in some cases.

**Adaptations in Acid-Base Balance:**

* Type A intercalated cells secrete excess H+ in acidemia.
* Type B intercalated cells predominate in states of bicarbonate excess with alkalemia.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2293****

63[Q] Which one of the following parameters suggests pre-renal azotemia ?

(a) Renal tubular epithelial cell casts

(b) Glomerular casts in urine sediment

(c) Hyaline casts in urine sediment

(d) Fractional excretion of sodium >1%

[ANS] c

[SOL]

**Prerenal Azotemia:**

* **Tubules:** Intact.
* **Urine Characteristics:**
  + Concentrated (>500 mosmol).
  + Avid Na retention (urine Na concentration <20 mmol/L).
  + Low FENa (<1%).
  + Elevated UCr/PCr (>40%).
* **Contrast with ATN:**
  + FENa typically >1% in ATN, or <1% in milder cases.
  + UCr/PCr <1% in milder ATN, differentiating from prerenal.
* **Urine Sediment:**
  + Prerenal: Usually normal or hyaline/granular casts.
  + ATN: Presence of cellular debris, tubular epithelial casts, dark (muddy brown) granular casts.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg334****

64[Q] Most common cause Chronic Kidney Disease (CKD) is

(a) Hypertension associated CKD

(b) Autosomal Dominant Polycystic Kidney Disease(ADPKD)

(c) Diabetic nephropathy

(d) Glomerulonephritis

[ANS] c

[SOL]

**Chronic Kidney Disease (CKD):**

**Prevalence:**

* **Stages 1 and 2 CKD:** Estimated in at least 6% of the adult population in the United States.
* **Stages 3 and 4 CKD:** Additional 4.5% of the U.S. population is estimated to have these stages.

**Leading Cause:**

* **Diabetic Nephropathy:** Most frequent cause of CKD , often associated with type 2 diabetes mellitus.

**Association with Hypertension:**

* **Hypertension:** Commonly observed in patients with newly diagnosed CKD, and it is often attributed as a contributing factor.

**Underlying Glomerulopathy:**

* **Subclinical Glomerulopathy:** Some CKD cases, initially attributed to hypertension, may have a subclinical primary glomerulopathy, like focal segmental or global glomerulosclerosis.

**Systemic Vascular Disease:**

* **Nephrosclerosis and Hypertension:** In some cases, progressive nephrosclerosis and hypertension are linked to a systemic vascular disease affecting large and small vessels in other organs such as the heart and brain.
* **Common in Older Patients:** Especially prevalent in older patients, and chronic kidney ischemia may be underdiagnosed as a cause of CKD in this population.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2312****

65[Q] Which of the following statements regarding contrast induced nephrotoxicity are correct?

1. Diabetes Mellitus is a risk factor.

2. N-acetylcysteine can fully reverse the renal injury.

3. Hydration is necessary.

4. Omit Metformin if nephrotoxicity occurs.

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 2, 3 and 4

(d) 1, 3 and 4

[ANS] d

[SOL]

**Contrast Nephrotoxicity:**

* **Definition:** Acute deterioration in renal function within 48 hours of IV radiographic contrast media administration.
* **Risk Factors:**
  + Pre-existing renal impairment (eGFR <45 mL/min/1.73m²).
  + Use of ionic contrast media and repetitive dosing in short time periods.
  + Conditions such as diabetes mellitus and myeloma.
* **Prevention:**
  + Hydration with free oral fluids and IV isotonic saline (500 mL, then 250 mL/hr during the procedure).
  + Withholding NSAIDs.
  + Omitting metformin for 48 hrs post-procedure in moderate or high-risk patients.
  + Consideration of alternative imaging methods if risks are high (eGFR <30 mL/min/1.73m²), but proceed if benefits outweigh the risk.

**Ref: Davidson principles and practice of medicine 24th edition pg565**

66[Q] Which component of auto-regulation of glomerular filtration acts on efferent arteriole?

(a) Autonomous myogenic reflex

(b) Tubuloglomerular feedback

(c) Angiotensin II mediated vasoconstriction

(d) None of the above

[ANS] c

[SOL]

**Autoregulation of Glomerular Filtration:**

**Non-linear Relationship with Renal Artery Pressure:**

* + Glomerular filtration is influenced by renal artery pressure, but the relationship is not linear across the physiological blood pressure range.

**Autoregulation Mechanisms:**

* + Autoregulation of glomerular filtration involves three major factors that modulate afferent or efferent arteriolar tone.

**Factors Modulating Arteriolar Tone:**

* + **Autonomous Vasoreactive (Myogenic) Reflex:**
    - A first line of defense against fluctuations in renal blood flow.
    - Acute changes in renal perfusion pressure trigger reflex constriction or dilatation of the afferent arteriole in response to rising or falling pressure.
    - Protects the glomerular capillary from sudden changes in systolic pressure.
  + **Tubuloglomerular Feedback (TGF):**
    - Involved in autoregulation by modulating afferent arteriolar tone based on feedback from the tubular fluid.
  + **Angiotensin II–Mediated Vasoconstriction:**
    - Affects efferent arteriolar tone.
    - Plays a role in maintaining glomerular filtration pressure.

**Purpose of Autoregulation:**

* + To maintain a relatively stable glomerular filtration rate (GFR) despite changes in systemic blood pressure.

**Protective Mechanism:**

* + The myogenic reflex acts as a protective mechanism to prevent sudden and potentially damaging changes in the glomerular capillary pressure.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg2288****

67[Q] Which of the following are consequences of nephrotic syndrome ?

1. Increased lipoprotein synthesis

2. Low serum globulin levels

3. Increased serum aldosterone levels

4. Increased serum Antithrombin III levels

Select the correct answer using the code given below :

(a)1, 2 and 3

(b) 1, 2 and 4

(c) 1,3 and 4

(d)2 and 3 only

[ANS] a

[SOL]

**Consequences of the nephrotic syndrome**

**Mechanisms:**

1. **Hypoalbuminemia:**
   * **Cause:** Urinary protein losses exceeding liver synthetic capacity.
   * **Consequence:** Reduced oncotic pressure.
2. **Avid Sodium Retention:**
   * **Cause:** Secondary hyperaldosteronism and poorly characterized intrarenal mechanisms.
   * **Consequence:** Edema.
3. **Hypercholesterolemia:**
   * **Cause:** Non-specific increase in liver lipoprotein synthesis due to low oncotic pressure.
   * **Consequence:** Increased risk of atherosclerosis.
4. **Hypercoagulability:**
   * **Cause:** Loss of coagulation inhibitors, elevated procoagulant factors.
   * **Consequence:** Elevated risk of venous thromboembolism.
5. **Infection Susceptibility:**
   * **Cause:** Hypogammaglobulinemia from urinary immunoglobulin loss.
   * **Consequence:** Increased vulnerability to pneumococcal and meningococcal infections.

**Ref: Davidson principles and practice of medicine 24th edition pg572**

68[Q] Sickle cell syndromes are caused by a mutation in the B-globin gene. Which one of the following correctly describes the change?

(a) Sixth amino acid-glutamic acid is replaced by valine.

(b) Twenty-sixth amino acid-glutamic acid is replaced by lysine.

(c) Sixth amino acid-glutamic acid is replaced by lysine

(d) Ninety eighth amino acid-valine is replaced by methionine.

[ANS] a

[SOL]

**Sickle-Cell Anaemia: Overview**

**Genetic Basis:**

* **Mutation:** Single glutamic acid to valine substitution at position 6 of the beta globin polypeptide chain.
* **Inheritance:** Autosomal recessive trait.

**Clinical Manifestations:**

1. **Sickle-Cell Disease (SS):**
   * **Genotype:** Homozygotes (SS).
   * **Hemoglobin Produced:** Abnormal beta chains resulting in Hemoglobin S (HbS).
   * **Clinical Syndrome:** Sickle-cell disease.
2. **Sickle-Cell Trait (AS):**
   * **Genotype:** Heterozygotes (AS).
   * **Hemoglobin Produced:** Mixture of normal and abnormal beta chains producing normal HbA and HbS.
   * **Clinical Condition:** Sickle-cell trait.
   * **Previous Belief:** Considered asymptomatic, but associated with an increased risk of sudden and cardiovascular death in young adults.

**Ref: Davidson principles and practice of medicine 24th edition pg960**

69[Q] In which of the following a high reticulocyte production index is seen?

1. Sickle cell disease

2. Vitamin B-12 deficiency

3. Glucose 6 phosphate dehydrogenase deficiency

4. Blood loss

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] c

[SOL] Reticulocytes are immature red blood cells that still contain some ribosomal RNA. A high RPI indicates an increased production of red blood cells, which can occur in response to blood loss, hemolysis, or ineffective erythropoiesis. Glucose 6 phosphate dehydrogenase deficiency post hemolysis can have high RPI. In Sickle cell disease due to ineffective erythropoiesis can have high RPI.

70[Q] Which one of the following combinations of drugs can be used for treatment of relapsed myeloma ?

(a) Infliximab, Methotrexate, Dexamethasone

(b) Lenalidomide, Bortezomib, Dexamethasone

(c) Rituximab, Vincristine, Cytarabine

(d) Methotrexate, Doxorubicin, Prednisone

[ANS] b

[SOL] **Treatment Landscape for Relapsed/Refractory Multiple Myeloma:**

**1. Second-Generation Proteasome Inhibitors:**

* **Agents:** Carfilzomib, ixazomib.
* **Use:** Effective in relapsed myeloma, even in cases refractory to lenalidomide and bortezomib.
* **Administration:** Ixazomib is an oral proteasome inhibitor.

**2. Immunomodulatory Agents:**

* **Agents:** Lenalidomide, pomalidomide.
* **Use:** Lenalidomide and pomalidomide are employed in relapsed myeloma treatment.

**3. Monoclonal Antibodies:**

* **Daratumumab:**
  + **Target:** CD38.
  + **Use:** Achieves high response rates; effective as a single agent and in combination with bortezomib, dexamethasone, or lenalidomide and dexamethasone.
* **Isatuximab:**
  + **Target:** CD38.
  + **Use:** Effective in combination with pomalidomide or carfilzomib and dexamethasone.
* **Elotuzumab:**
  + **Target:** SLAMF7.
  + **Use:** Shows significant activity in combination with lenalidomide and dexamethasone.

**4. Histone Deacetylase Inhibitor:**

* **Agent:** Panobinostat.
* **Use:** Approved in combination with bortezomib and dexamethasone for relapsed refractory myeloma.

**5. Novel Agents:**

* **Selinexor:**
  + **Mechanism:** Exportin inhibitor.
  + **Use:** Effective in relapsed/refractory myeloma.
* **Melflufen:**
  + **Mechanism:** Alkylating agent conjugated to a peptide.
  + **Use:** Approved for relapsed/refractory myeloma.

**6. BCMA-Targeted Therapies:**

* **Belantamab:**
  + **Type:** Anti-BCMA antibody-drug conjugate.
  + **Use:** Achieves responses in relapsed/refractory myeloma; notable for ophthalmologic toxicity.
* **Ide-cel (Idecabtagene Vicleucel):**
  + **Type:** Anti-BCMA CAR T-cell therapy.
  + **Use:** Approved beyond fourth-line therapy; shows high response rates.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg875****

71[Q] Which of the following can be used in the initial management of heparin induced thrombocytopenia ?

1. Fondaparinux

2. Rivaroxaban

3. Lepirudin

4. Warfarin

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1,3 and 4

(d) 2, 3 and 4

[ANS] a

[SOL]

**Heparin-Induced Thrombocytopenia (HIT): Overview and Management**

**Pathophysiology:**

* **Trigger:** Antibodies against neoantigens on PF4 exposed when heparin binds.
* **Antibody Type:** Usually IgG isotype.
* **Mechanism:** Antibodies bind to heparin-PF4 complex and platelet Fc receptors, activating platelets and generating prothrombotic platelet microparticles.
* **Prothrombotic Effect:** Microparticles express anionic phospholipids, bind clotting factors, and promote thrombin generation.

**Clinical Features:**

* **Onset:** Typically 5–14 days after heparin initiation (can be earlier if heparin received in the past 3 months).
* **Platelet Count Criteria:** Platelet count <100,000/μL or 50% decrease from pretreatment value.
* **Prevalence:** More common in surgical patients, females, and associated with thrombosis (venous more common than arterial).

**Diagnosis:**

* **Enzyme-Linked Assays:** Detect antibodies against heparin-PF4 complexes (sensitive but not specific).
* **Serotonin Release Assay:** Most specific diagnostic test; measures serotonin release induced by patient serum with added heparin.

**Management:**

1. **Stop Heparin:**
   * In suspected or documented HIT.
2. **Alternative Anticoagulant:**
   * **Parenteral Direct Thrombin Inhibitors:** Argatroban, bivalirudin.
   * **Factor Xa Inhibitors:** Fondaparinux, rivaroxaban.
3. **Monitoring and Transition:**
   * **Monitoring:** Assess platelet count and monitor for thrombosis.
   * **Transition to Oral Anticoagulant:** When platelet count normalizes, consider low-dose warfarin or direct oral anticoagulant.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg930****

72[Q] Red cell protoporphyrin levels will be raised in which of the following conditions ?

1. Absolute iron deficiency

2. Relative iron deficiency

3. Lead poisoning

Select the correct answer using the code given below :

(a) 1 and 3 only

(b) 1 and 2 only

(c) 2 and 3 only

(d) 1, 2 and 3

[ANS] a

[SOL] **Red Cell Protoporphyrin**

* **Overview:**
  + Protoporphyrin is a critical intermediate in heme synthesis.
  + Impaired heme synthesis leads to protoporphyrin accumulation within red cells.
* **Significance:**
  + Reflects inadequate iron supply to erythroid precursors for hemoglobin synthesis.
* **Normal Values:**
  + Normal: <30 μg/dL of red cells.
* **Iron Deficiency:**
  + Elevated levels: >100 μg/dL.
  + Indicates insufficient iron support for erythropoiesis.
* **Common Causes of Increased Levels:**
  + Absolute or relative iron deficiency.
  + Lead poisoning.
* **Clinical Implications:**
  + Monitoring red cell protoporphyrin aids in diagnosing conditions affecting heme synthesis and iron availability.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg751****

73[Q] Negative Iron Balance is the first stage in the progression to Iron Deficiency Anaemia. Which of the following laboratory investigations will be found deranged in this stage, thereby pointing to early iron-store depletion?

1. Bone Marrow Iron Stores

2. Percent transferrin saturation

3. Serum ferritin

4. Total Iron Binding Capacity

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1,3 and 4

(d) 2, 3 and 4

[ANS] c

[SOL]

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg749****

74[Q] Which of the following drugs carry a definite risk of causing clinical haemolysis in persons suffering from Glucose-6 phosphate dehydrogenase deficiency ?

1. Primaquine

2. Dapsone

3. Cotrimoxazole

4. Nitrofurantoin

Select the correct answer using the code given below :

(a) 1,3 and 4

(b) 1 and 2 only

(c) 2, 3 and 4 only

(d) 1, 2, 3 and 4

[ANS] d

[SOL]

Glucose-6-phosphate dehydrogenase deficiency

Clinical features

Clinical Features:

1. **Acute Drug-Induced Hemolysis:**
   * Triggered by certain drugs such as analgesics (aspirin, phenacetin), antimalarials (primaquine, quinine, chloroquine, pyrimethamine), antibiotics (sulphonamides, nitrofurantoin, ciprofloxacin), and other medications (quinidine, probenecid, vitamin K, dapsone).
2. **Chronic Compensated Hemolysis:**
   * A long-term, ongoing destruction of red blood cells without overt symptoms in between acute episodes.
3. **Infection or Acute Illness:**
   * Hemolysis may be triggered during times of infection or acute illness.
4. **Neonatal Jaundice:**
   * Neonates with G6PD deficiency may exhibit jaundice, particularly if they have the B enzyme variant.
5. **Favism:**
   * Acute hemolysis can occur after the ingestion of broad beans (Vicia fava).

Laboratory Features:

**Non-Spherocytic Intravascular Hemolysis:**

* + Destruction of red blood cells within blood vessels.

**Blood Film Findings:**

* + **Bite Cells:** Red cells with a 'bite' of membrane missing.
  + **Blister Cells:** Red cells with surface blistering of the membrane.
  + **Irregularly Shaped Small Cells:** Abnormal shapes of red blood cells.
  + **Polychromasia:** Reflecting increased reticulocyte count.
  + **Denatured Hemoglobin:** Visible as Heinz bodies within the red cell cytoplasm with a supravital stain like methyl violet.

**G6PD Level Assessment:**

* + **Indirect Assessment:** Screening methods that usually depend on the decreased ability to reduce dyes.
  + **Direct Assessment:** In those with low screening values, direct assessment of G6PD is made.

**Ref: Davidson principles and practice of medicine 24th edition pg958**

75[Q] A 40 year old male presented with complaints of generalised weakness, weight loss, abdominal discomfort and decreased appetite. On examination Splenomegaly (massive) was present. On investigation it was found that haemoglobin was 7:0 g/dL, platelet count- 8 lakh per cubic mm, WBC 90000 per cubic mm. Most probably this is the case of

(a) Chronic lymphocytic leukemia

(b) Chronic myeloid leukemia

(c) Acute lymphoblastic leukemia

(d) Acute myeloid leukemia

[ANS] b

[SOL]

Chronic Myeloid Leukemia (CML)

Molecular Basis:

* **Philadelphia Chromosome (Ph):**
  + Chromosome 22 is shortened due to a reciprocal translocation with chromosome 9.
  + Break in the BCR (Breakpoint Cluster Region) on chromosome 22.
  + ABL oncogene from chromosome 9 fuses with the BCR, forming the BCR-ABL fusion gene.
  + Codes for a 210 kDa protein with tyrosine kinase activity, acting as an oncogene influencing cellular proliferation, differentiation, and survival.
  + Target for effective tyrosine kinase inhibitor (TKI) therapy.

Natural History:

1. **Chronic Phase:**
   * Responsive to treatment, easily controlled.
   * Originally lasting 3–5 years, now prolonged with TKI therapy, leading to a near-normal life expectancy.
2. **Accelerated Phase:**
   * Disease control becomes more difficult.
3. **Blast Crisis:**
   * Transformation into acute leukemia (myeloblastic 70%, lymphoblastic 30%).
   * Relatively refractory to treatment, major cause of death.
   * Survival depends on the timing of blast crisis.

Clinical Features:

* **Symptoms at Presentation:**
  + Lethargy, weight loss, abdominal discomfort, gout, sweating.
  + 25% of patients are asymptomatic at diagnosis.
* **Physical Examination:**
  + Splenomegaly in 90%, occasionally massive.
  + Hepatomegaly in about 50%.
  + Unusual lymphadenopathy.
* **Splenomegaly Complications:**
  + Friction rub in splenic infarction cases.

Investigations:

* **Blood Parameters:**
  + Variable FBC results, normocytic normochromic anemia common.
  + Leucocyte count varies (10 to 600 × 10^9/L).
  + High platelet count in about one-third of patients.
  + Blood film shows granulocyte precursors, with neutrophils and myelocytes predominant.
  + Eosinophils, basophils, and nucleated red cells are common.
* **Disease Progression:**
  + Accelerated phase shows an increase in primitive cells.
  + Blast transformation characterized by a dramatic increase in circulating blasts.
* **Bone Marrow Examination:**
  + Confirms the diagnosis and phase.
  + Chromosome analysis shows the presence of the Ph chromosome.
  + RNA analysis demonstrates the presence of the BCR-ABL gene product.
* **Biochemical Markers:**
  + Elevated blood LDH.
  + High uric acid due to increased cell breakdown.

**Ref: Davidson principles and practice of medicine 24th edition pg967**

76[Q] Which of the following are risk factors for type 2 diabetes mellitus?

1. Family history of diabetes

2. Underweight

3. Physical inactivity

4. Polycystic ovary syndrome

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] c

[SOL]

**Criteria for Screening Type 2 Diabetes Mellitus in Adults:**

1. **Consider Testing in Overweight or Obese Individuals:**
   * BMI ≥25 kg/m² (≥23 kg/m² in Asian Americans or other ethnically relevant definitions).
   * Risk Factors:
     + Family history of diabetes (parent or sibling with type 2 diabetes).
     + Race/Ethnicity: African American, Latino, Native American, Asian American, Pacific Islander.
     + Hypertension (blood pressure ≥140/90 mmHg).
     + HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or triglyceride level >250 mg/dL (2.82 mmol/L).
     + Polycystic ovary syndrome or acanthosis nigricans.
     + History of cardiovascular disease.
     + Physical inactivity.
     + Other conditions associated with insulin resistance (severe obesity, acanthosis nigricans).
2. **Annual Screening for Individuals with Identified IFG, IGT, or Hemoglobin A1c of 5.7–6.4%:**
   * Individuals with previously identified impaired fasting glucose (IFG), impaired glucose tolerance (IGT), or a hemoglobin A1c in the range of 5.7–6.4% should be screened annually.
3. **Screening Frequency for Women with Gestational Diabetes Mellitus (GDM):**
   * Women who had gestational diabetes should be screened at least every 3 years.
4. **Initiate Testing at 45 Years of Age and Repeat Every 3 Years for Other Individuals**
5. **Screening for Individuals with HIV**

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg3097****

77[Q] Which of the following with regard to gestational diabetes mellitus (GDM) are correct?

1. Most women revert to normal glucose tolerance postpartum

2. Children born to a GDM mother have no increased risk of diabetes mellitus later in life

3. Glucose intolerance develops during the second and third trimesters

4. Insulin resistance is related to metabolic changes of pregnancy

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] c

[SOL]

Diabetes Mellitus (DM) and Reproductive Health:

Reproductive Capacity:

* **Men and Women with DM:**
  + Reproductive capacity appears to be normal in both men and women with diabetes.
* **Menstrual Cycles in Women with DM:**
  + Menstrual cycles may be associated with alterations in glycemic control in women with diabetes.

Pregnancy and Gestational Diabetes Mellitus (GDM):

* **Insulin Resistance in Pregnancy:**
  + Pregnancy is associated with marked insulin resistance, often leading to the diagnosis of gestational diabetes mellitus (GDM).
* **Effects of Hyperglycemia during Pregnancy:**
  + Hyperglycemia from the maternal circulation may stimulate insulin secretion in the fetus.
  + Anabolic and growth effects of insulin may result in macrosomia (large baby).
  + Glucose, at high levels, is a teratogen to the developing fetus.
* **Incidence of GDM:**
  + GDM complicates ~7% (range 1–14%) of pregnancies.
  + Higher incidence in certain ethnic groups (blacks, Latinas) with an increased risk of type 2 DM.
* **Screening Recommendations:**
  + Screen for glucose intolerance between weeks 24 and 28 of pregnancy in women not known to have diabetes.
* **Therapy for GDM:**
  + Involves Medical Nutrition Therapy (MNT) and insulin if hyperglycemia persists.
  + Oral glucose-lowering agents not approved for use during pregnancy, but metformin or glyburide have shown efficacy.
* **Postpartum Outcomes:**
  + Morbidity and mortality rates for the mother and fetus are not significantly different from the nondiabetic population.

Future Risks and Post-Delivery Outcomes:

* **Increased Risk for Future Type 2 DM:**
  + Individuals who develop GDM are at a marked increased risk of developing type 2 DM in the future.
* **Post-Delivery Outcomes:**
  + Most individuals with GDM revert to normal glucose tolerance after delivery.
  + Some may continue to have overt diabetes or impaired glucose tolerance post-delivery.
* **Risk for Offspring:**
  + Children of women with GDM are at risk for obesity, glucose intolerance, and increased risk of diabetes in adolescence.

Pregnancy Planning and Management in Individuals with Known DM:

* **Meticulous Planning and Treatment:**
  + Individuals with known DM planning pregnancy require meticulous planning and adherence to strict treatment regimens.
* **Intensive Insulin Therapy:**
  + Intensive insulin therapy and near-normalization of HbA1c (<6.5%) are essential during pregnancy planning.
* **Preconception Glycemic Control:**
  + Consideration for insulin infusion and Continuous Glucose Monitoring (CGM) devices to improve glycemic control before conception.
* **Risk Reduction during Preconception:**
  + Normal blood glucose during preconception and throughout fetal organ development is crucial.
  + Frequent monitoring of HbA1c every 2 months throughout gestation.
* **Maintenance of HbA1c <6.0–6.5%:**
  + Reduces the incidence and severity of fetal macrosomia and neonatal hypoglycemia related to fetal hyperinsulinism driven by elevated maternal glucose.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg3119****

78[Q] A Thyroid Function Test report shows the following results:

TSH-Undetectable

T3-Raised

T4-Raised.

Which one of the following will be the most likely interpretation on the basis of the above report?

(a) Hypothyroidism secondary pituitary disease

(b) Transient thyroiditis in evolution

(c) Primary thyrotoxicosis

(d) Overtreatment of hypothyroidism with Liothyronine.

[ANS] a

[SOL]

**Ref: Davidson principles and practice of medicine 24th edition pg967**

79[Q] Which of the following biochemical abnormality is seen in severe hypertriglyceridemia?

(a) Psuedohyponatremia

(b) Metabolic alkalosis

(c) Hyperuricemia

(d) Hyperkalemia

[ANS] a

[SOL]

Pseudohyponatremia is a condition in which the measured serum sodium appears low, but the actual sodium content in the body is normal. This discrepancy is often due to changes in the composition of the plasma, where water is diluted by substances other than sodium. The two common causes of pseudohyponatremia are extreme hyperlipidemia and/or hyperproteinemia.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg344****

80[Q] Which of the following statements are correct about treatment with vit D supplement ?

1. Serum calcium levels improve earlier than serum PTH levels

2. Patients should be closely observed with serial vitamin D levels in blood as vitamin D toxicity occurs frequently

3. Vitamin D supplementation should always be in conjunction with calcium supplementation.

4. Nephrolithiasis is a known complication

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2. and 4

(c) 1,3 and 4

(d) 2,3 and 4

[ANS] c

[SOL]

81[Q] The first line investigation for diagnostic evaluation of patients with hypercalcemia is

(a) 24 hour urinary calcium excretion

(b) Serum phosphate levels

(c) Serum iPTH levels

(d) Serum vitamin D levels

[ANS] c

[SOL] The first line investigation for diagnostic evaluation of patients with hypercalcemia is to measure serum intact parathyroid hormone (iPTH) levels. Elevated iPTH levels suggest primary hyperparathyroidism, while low or undetectable iPTH levels suggest other causes of hypercalcemia such as malignancy or granulomatous disease

82[Q] Consider the following conditions:

1. Kaposi’s sarcoma

2. Lymphoma

3. Tuberculosis

4. Persistent generalized lymphadenopathy

Which of the above are causes of lymphadenopathy in an HIV positive patient?

(a) 1 and 3 only

(b) 2 and 3 only

(c) 1, 2, and 4 only

(d) 1, 2, 3, and 4

[ANS] d

[SOL]

**Causes of Lymphadenopathy in HIV:**

* + Malignancy: Kaposi's sarcoma
  + Infections: Tuberculosis

**Tuberculous Lymph Nodes:**

* + Tuberculous lymph nodes can exhibit matted appearance and may become fluctuant due to extensive caseous necrosis.
  + Inexperienced clinicians may mistakenly perform incision and drainage when aspiration is sufficient.

**Symmetrical Generalized Lymphadenopathy:**

* + Disseminated tuberculosis can lead to symmetrical generalized lymphadenopathy.

**Lymphoma Presentation:**

* + Lymphoma typically presents with large, firm, and asymmetric nodes.
  + Rapid enlargement, asymmetric enlargement, or lymphadenopathy associated with constitutional symptoms warrants further investigation.

**Diagnostic Approach:**

* + Lymph node needle aspiration is recommended.
  + A portion of the sample should be sent for Mycobacterium tuberculosis PCR (or AAFB microscopy if PCR is unavailable).
  + Another portion should be fixed on a slide and sent for cytology.
  + In case caseous liquid is aspirated, it should be sent for mycobacterial culture or PCR.

**Ref: Davidson principles and practice of medicine 24th edition pg356**

83[Q] A patient receiving chemotherapy develops neutropenia. He presents with fever, cough, expectoration, chest pain and hemoptysis. His CT scan of chest reveals nodular infiltrates with halo sign and crescent sign. The most useful drug for treating him is

(a) Colistin

(b) Granulocyte Macrophage Colony

(c) Voriconazole

(d) Piperacillin-tazobactam

[ANS] c

[SOL]

**Criteria for the diagnosis of probable invasive pulmonary aspergillosis**

**Host Factors:**

* + Recent history of neutropenia (<0.5 × 10^9/L for ≥10 days) temporally related to the onset of fungal disease.
  + Recipient of allogeneic stem cell transplant.
  + Prolonged use of glucocorticoids (average minimum 0.3 mg/kg daily prednisolone or equivalent) for >3 weeks (excluding allergic bronchopulmonary aspergillosis).
  + Treatment with other recognized T-cell immune suppressants, such as ciclosporin, tumor necrosis factor alpha-blockers, specific monoclonal antibodies (e.g., alemtuzumab), or nucleoside analogs during the last 90 days.
  + Inherited severe immune deficiency, e.g., chronic granulomatous disease or severe combined immune deficiency.

**Clinical Criteria:**

* + The presence of one of the following on CT:
    - Dense, well-circumscribed lesion(s) with or without a halo sign.
    - Air crescent sign.
    - Cavity.
  + Tracheobronchitis: Tracheobronchial ulceration, nodule, pseudomembrane, plaque, or eschar seen on bronchoscopy.

**Mycological Criteria:**

* + Mould in sputum, BAL (Bronchoalveolar Lavage) fluid, or bronchial brush, indicated by one of the following:
    - Recovery of fungal elements indicating a mould of Aspergillus.
    - Recovery by culture of a mould of Aspergillus.
  + Indirect tests (detection of antigen or cell wall constituents):
    - Galactomannan antigen in plasma, serum, or BAL fluid.
    - β-1,3-glucan detected in serum (detects other species of fungi, as well as Aspergillus).

**Ref: Davidson principles and practice of medicine 24th edition pg527**

84[Q] A patient undergoes splenectomy after an accident. He will require oral prophylaxis against which of the following organisms?

(a) Staphylococcus aureus

(b) Escherichia coli

(c) Streptococcus pneumoniae

(d) Pneumocystis jirovecii

[ANS] c

[SOL]

**Management of the splenectomised patient**

**Pre-Surgery Vaccination:**

* + Administer pneumococcal, Haemophilus influenzae type B, meningococcal group C, and influenza vaccines at least 2-3 weeks before elective splenectomy.
  + Vaccination should still be given after emergency surgery, although it may be less effective.

**Post-Surgery Vaccination:**

* + Pneumococcal re-immunization should be given at least every 5 years.
  + Annual influenza vaccination is recommended.
  + Document and maintain a record of the patient's vaccination status.

**Prophylactic Antibiotics:**

* + Prescribe life-long prophylactic penicillin V (500 mg twice daily).
  + In penicillin-allergic patients, consider using a macrolide antibiotic.

**Patient Education:**

* + Educate patients about the risks of infection and the importance of prophylactic measures.
  + Emphasize the need for adherence to prescribed medications.

**Medical Alert Identification:**

* + Advise patients to carry a card or wear a bracelet indicating their splenectomy status to alert healthcare professionals about the increased risk of overwhelming sepsis.

**Infection Management:**

* + In case of suspected sepsis, resuscitate the patient and administer intravenous antibiotics.
  + Antibiotics should cover common pathogens like pneumococcus, Haemophilus, and meningococcus, based on local resistance patterns.

**Specific Considerations:**

* + Highlight the increased risk of cerebral malaria in case of infection.
  + Promptly treat animal bites with local disinfection and antibiotics to prevent serious soft tissue infection and sepsis

**Ref: Davidson principles and practice of medicine 24th edition pg957**

85[Q] A 30-year-old male recently diagnosed with HIV presented with odynophagia. He was started on a proton-pump inhibitor, and an upper GI endoscopy was done. There were serpiginous ulcers in normal surrounding mucosa in the distal esophagus. The most likely diagnosis is

(a) Herpes simplex esophagitis

(b) Gastroesophageal reflux disease

(c) Cytomegalovirus esophagitis

(d) Candida esophagitis

[ANS] c

[SOL]

86[Q] Which one of the following statements regarding post gonococcal urethritis (PGU) is correct?

(a) Neisseria gonorrhoeae is the most frequent cause of PGU in men

(b) PGU refers to non-gonococcal urethritis in men treated earlier with a single dose of penicillin

(c) Combination therapy with azithromycin leads to resistant and should be avoided.

(d) PGU usually occurs within one week after treatment of non-gonococcal urethritis.

[ANS] b

[SOL]

87[Q] Which one of the following treatments is considered the gold standard for brucellosis in adults?

(a) Streptomycin and Doxycycline

(b) Azithromycin and Rifampin

(c) Trimethoprim and Sulfamethoxazole

(d) Amikacin and Ciprofloxacin

[ANS] a

[SOL]

**Treatment of brucellosis**

The gold standard for the treatment of brucellosis in adults involves IM streptomycin (0.75–1 g daily for 14–21 days) along with doxycycline (100 mg twice daily for 6 weeks). However, relapse rates of 5%–10% have been observed in both clinical trials and observational studies with this regimen. An alternative treatment, and the current World Health Organization recommendation, is rifampin (600–900 mg/d) combined with doxycycline (100 mg twice daily) for 6 weeks. The relapse/failure rate under trial conditions is approximately 10%, but it can exceed 20% in many non-trial situations. This discrepancy may be attributed to reduced doxycycline levels and increased clearance rates when administered concomitantly with rifampin.

****Ref: Harrison’s principles of INTERNAL MEDICINE 21th edition pg1313****

88[Q] Which one of the following has the highest risk of human immunodeficiency virus (HIV) transmission after a single exposure to an HIV infected source?

(a) Vaginal delivery

(b) Vaginal intercourse

(c) Blood transfusion

(d) Percutaneous needle stick injury

[ANS] c

[SOL]

89[Q] Consider the following statements with regard to vitamin C:

1. It is heat stable.

2. Normal platelets are poor in ascorbate

3. Perifollicular hyperkeratosis is a clinical sign of scurvy.

4. Infants fed exclusively on boiled milk are vitamin C deficient.

Which of the above statements are correct?

(a) 1 and 2

(b) 2 and 3

(c) 1 and 4

(d) 3 and 4

[ANS] d

[SOL]

90[Q] Which of the following statements are correct in respect of vitamin D?

1. Skin exposure to sunlight is the main source

2. Deficiency of vitamin D causes distal muscle weakness

3. Vitamin D synthesis decreases in winter, as one moves away from equator

4. Body store accumulated during summer is consumed during winter

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] c

[SOL]

91[Q] Which of the following are used in the treatment of Acne vulgaris?

1. Topical benzoyl peroxide

2. Topical antibiotics clindamycin

3. Oral isotretinoin

4. Oral ivermectin

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] a

[SOL]

**ACNE VULGARIS TREATMENT**

**Mild to Moderate Disease:**

**Topical Therapy:**

* + Comedones are treated with topical benzoyl peroxide or retinoids.
  + Azelaic acid, with antimicrobial and anticomedogenic action, may be used.
  + Topical retinoids like all-trans retinoic acid and adapalene are employed for mild to moderate comedonal acne.

**Inflammatory Acne:**

* + Topical antibiotics such as erythromycin or clindamycin are used for mild inflammatory acne.
  + Systemic tetracycline is prescribed for moderate inflammatory acne for 3–6 months.
  + Oxytetracycline, lymecycline, doxycycline, or erythromycin may be alternatives.

**Hormonal Treatment:**

* + Oestrogen-containing oral contraceptives can be used in women, providing a small reduction in sebum production.
  + Combined oestrogen and anti-androgen contraceptives are useful, especially in women with acne and hirsutism.

**Referral for Isotretinoin:**

* + If there is inadequate response after 6 months of combined systemic and topical approaches, referral for isotretinoin is considered.

**Moderate to Severe Disease:**

**Isotretinoin (13-cis-retinoic acid):**

* + Used for moderate to severe acne not responding adequately to other therapies.
  + Oral isotretinoin at 0.5–1 mg/kg over 4 months.
  + Has multifactorial mechanisms of action, reducing sebum excretion, hypercornification, P. acnes colonization, and inflammation.
  + Requires thorough screening and monitoring, especially due to teratogenicity and possible mood disturbance.

**Combination with Glucocorticoid:**

* + Short-term combination with systemic glucocorticoid may be needed to minimize the risk of acne flare in severe cases.

**Other Treatments for Scarring:**

* + Intralesional injections, incision, and drainage are used for inflamed acne nodules or cysts.
  + Preventative measures for scarring include adequate treatment of active acne.
  + Treatments for scarring include intralesional glucocorticoid, silicone dressings, carbon dioxide laser, microdermabrasion, chemical peeling, and local excision.

**Psychological Impact:**

* + The psychological impact of acne is significant and should be considered in management decisions.

**Dietary Association:**

* + No convincing evidence supports a causal association between diet and acne.

**Ref: Davidson principles and practice of medicine 24th edition pg1094**

92[Q] Which one of the following is a cause of scarring alopecia?

(a) Androgenic alopecia

(b) Alopecia Areata

(c) Syphilis

(d) Radiotherapy

[ANS] d

[SOL] Scarring alopecia is a type of hair loss that occurs when the hair follicles are replaced with scar tissue. Radiotherapy is a known cause of scarring alopecia because it damages the hair follicles, which can lead to permanent hair loss.

93[Q] Which of the following are used as mood stabilizers for the treatment of bipolar disorder?

1. Valproic acid

2. Lamotrigine

3. Carbamazepine

4. Propranolol

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] a

[SOL]

**Bipolar disorder**

**Epidemiology:**

* + Bipolar disorder is characterized by episodic disturbances with periods of depressed and elevated mood.
  + Elevated mood is termed hypomania (mild or short-lived) or mania (severe or chronic).
  + Lifetime risk is approximately 1%–2%, with onset usually in the twenties and an equal prevalence in men and women.

**Pathogenesis:**

* + Bipolar disorder has a strong hereditary component (approximately 70%).
  + Relatives of patients have an increased incidence of both bipolar and unipolar affective disorder.
  + Genome-wide association studies have identified over a hundred genetic variants of small effect.
  + Life events such as physical illness, sleep deprivation, and certain medications (e.g., steroids) may trigger episodes.

**Diagnosis:**

* + Diagnosis is based on clear evidence of episodes of depression and mania.
  + Hypomanic or manic episodes are often preceded or followed by an episode of depression.
  + Psychotic symptoms may occur in both depressive and manic phases, termed affective psychosis.
  + Patients with symptoms of both bipolar disorder and schizophrenia may be diagnosed with schizoaffective disorder.

**Management:**

* + Depression is treated similarly to unipolar depression. If antidepressants are prescribed, they should be combined with a mood-stabilizing drug to prevent inducing mania.
  + Manic episodes and psychotic symptoms often respond well to antipsychotic drugs.
  + Prophylaxis to prevent recurrent episodes involves mood-stabilizing agents like lithium, sodium valproate, lamotrigine, olanzapine, quetiapine, and risperidone.
  + Lithium is the drug of first choice but requires regular blood monitoring due to its narrow therapeutic range and potential toxic effects.
  + Anticonvulsants and some antipsychotic drugs can be used as second-line alternatives to lithium.

**Prognosis:**

* + The relapse rate of bipolar disorder is high, with patients potentially well between episodes.
  + After one episode, the annual average risk of relapse is about 10%–15%, doubling after more than three episodes.
  + There is an increased lifetime risk of suicide (5%–10%).

**Ref: Davidson principles and practice of medicine 24th edition pg1254**

94[Q] An elderly alcoholic man who mainly eats a diet of maize and maize products presents with complaints of chronic diarrhea, severe sunburn-like lesions tension on exposed parts and acute delirium. He is admitted. What is the likely diagnosis and its treatment?

(a) Celiac disease, Gluten-free diet

(b) Vitamin B12 deficiency, Parenteral B12 therapy

(c) Pellagra, Niacin therapy

(d) Whipple’s disease, Doxycycline + Trimethoprim

[ANS] c

[SOL]

**Niacin (vitamin B3 ) Deficiency – pellagra**

**Causes of Pellagra:**

* + Pellagra was historically common among individuals who relied heavily on maize, which contains niacytin, an unusable form of niacin.
  + It can develop in as little as 8 weeks in individuals with severe niacin and tryptophan deficiency in their diets.
  + Pellagra persists in parts of Africa and is observed in alcohol misusers and individuals with chronic small intestinal diseases in developed countries.

**Contributing Conditions:**

* + Hartnup disease, a genetic disorder impairing amino acid absorption, including tryptophan, can lead to pellagra.
  + Pellagra is occasionally seen in carcinoid syndrome when there is excessive production of serotonin from tryptophan.

**Three Ds of Pellagra:**

* + Dermatitis: Characterized by erythema resembling severe sunburn, particularly on sun-exposed parts like limbs. Casal's necklace is a characteristic neck rash.
  + Diarrhea: Accompanied by anorexia, nausea, glossitis, and dysphagia due to non-infective inflammation throughout the gastrointestinal tract.
  + Dementia: Severe deficiency can lead to acute delirium and, if untreated, progress to dementia.

**Treatment:**

* + Nicotinamide is used for treatment, with a recommended dose of 100 mg three times daily orally or parenterally.
  + Rapid improvement is usually observed within 24 hours, including a reduction in erythema, cessation of diarrhea, and improved mental state.

**Toxicity of Niacin:**

* + Excessive niacin intake may lead to reversible hepatotoxicity.
  + Doses of nicotinic acid above 200 mg a day, used as a lipid-lowering agent, can cause vasodilatory symptoms like flushing and/or hypotension.

**Ref: Davidson principles and practice of medicine 24th edition pg776**

95[Q] Which one of the following is an indication for self-injectable adrenaline (epinephrine)?

(a) Anaphylaxis to allergens that are difficult to avoid

(b) Cardiogenic shock

(c) Pheochromocytoma

(d) Complete heart block

[ANS] a

[SOL] Self-injectable adrenaline (epinephrine) is indicated for the emergency treatment of anaphylaxis, particularly when caused by allergens that are difficult to avoid.

96[Q] Which of the following statements with regard to arterio-venous fistula in a dialysis patient is correct?

1. Distension and thickening of the vessel wall occur

2. Formed up to a year before dialysis is contemplated

3. Leg veins are usually preferred

4. Synthetic graft may be used if fistula formation is not possible

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] b

[SOL]

**Haemodialysis in ESRD**

**Vascular Access for Hemodialysis:**

* + Arteriovenous fistula (AVF) is the preferred method for vascular access, usually created in the forearm up to a year before dialysis is needed.
  + After 4–6 weeks, arterialization occurs, allowing the insertion of large-bore needles for hemodialysis.

**Preservation of Arm Veins:**

* + Preservation of arm veins is crucial in patients with progressive renal disease for future hemodialysis needs.
  + If AVF creation is not possible, synthetic polytetrafluoroethylene (PTFE) grafts or central venous catheters may be used for short-term access.

**Screening and Vaccination:**

* + Patients starting dialysis are screened for hepatitis B, hepatitis C, and HIV.
  + Vaccination against hepatitis B is administered if the patient is not immune.

**Dialysis Procedure:**

* + Hemodialysis is typically performed for 3–5 hours three times weekly, either at home or in an outpatient dialysis unit.
  + The frequency and intensity of dialysis are adjusted to achieve a urea reduction ratio of over 65%, as lower levels are associated with increased mortality.

**Improvement in Symptoms:**

* + Most patients experience an improvement in symptoms during the first 6 weeks of treatment.

**Options to Increase Dialysis Intensity:**

* + Escalating the number of standard sessions to four or more per week.
  + Performing short, frequent dialysis sessions of 2–3 hours 5–7 times per week.
  + Nocturnal hemodialysis, using low blood-pump speeds for approximately 8 hours overnight 5–6 times per week.
  + Including a filtration component (hemodiafiltration) to achieve greater clearance of larger molecules.

**Benefits of More Frequent and Nocturnal Dialysis:**

* + Improved fluid balance and phosphate control.
  + Improvement in left ventricular mass.
  + Potential improvement in mortality, although this has not been robustly demonstrated.

**Ref: Davidson principles and practice of medicine 24th edition pg595**

[Q] An infant was born at 30 weeks of gestation and weighs 1-2 kg at birth. Which of the following is the recommended initial feeding method?

(a) Intravenous fluids only

(b) Feeding by spoon and katori

(c) Breastfeeding

(d) Orogastric feeding

[ANS] d

[SOL] For an infant born at 30 weeks of gestation and weighing 1-2 kg at birth, the recommended initial feeding method is (d) Orogastric feeding. This involves passing a small feeding tube through the baby's mouth or nose into the stomach to provide milk or formula.

97[Q] A newborn delivered at 32 weeks gestation is started on spoon feeds after birth. On feeding with a spoon, the baby demonstrates some spilling and coughing. What is the next step in management?

(a) Oragastric or nasogastric tube feeding

(b) Intravenous fluid therapy

(c) Gastrostomy tube feeding

(d) Breastfeeding

[ANS] a

[SOL] A newborn delivered at 32 weeks gestation is premature and may have difficulty with feeding and coordination of sucking and swallowing. Spilling and coughing while feeding are signs of feeding difficulties and can lead to aspiration pneumonia. Therefore, the next step in management should be orogastric or nasogastric tube feeding, which is a safe and effective way to provide nutrition while reducing the risk of aspiration. Once the baby's feeding and coordination improve, the baby can transition to spoon feeding or breastfeeding.

[Q] ByA child speaks bisyllables like Ma-Ma and Ba-Ba. He is able to sit without support and looks at the source of sound diagonally. His likely age is

(a) 4 months

(b) 6 months

(c) 8 months

(d) 10 months

[ANS] d

[SOL] At around 6 months of age, infants begin to babble, producing repeated sounds such as "ma-ma" and "ba-ba" by 9 months. By 9 months of age, most infants are able to sit without support and can localize the source of a sound by looking at it diagonally by 10 month.

[Q] After sustaining a head injury, an 18 month old child displays eye opening only to pain, moans on painful stimuli and withdraws to painful stimuli. What is the modified Glasgow Coma Scale Score in this child?

(a) 6

(b) 8

(c) 10

(d) 12

[ANS] b

[SOL] The modified Glasgow Coma Scale (GCS) is used in infants and young children. It evaluates eye opening, best motor response, and verbal response. In this case, the child has eye opening only to pain (score of 2), moans on painful stimuli (score of 2), and withdraws to painful stimuli (score of 4) for a total GCS score of 8.

[Q] Which of the following are reversible causes of electromechanical ciation seen in pulseless activity?

1. Pericardial tamponade

2. Pulmonary thrombo-embolism

3. Hyperthermia

4. Hypokalemia

Select the correct answer using the code given below:

(a) 1,2 and 3

(b) 1,2 and 4

(c) 1,3 and 4

(d) 2,3 and 4

[ANS] b

[SOL] The mnemonic for reversible causes of pulseless electrical activity (PEA) is "H's and T's". The "H's" include hypoxia, hypovolemia, hydrogen ion (acidosis), hypokalemia or hyperkalemia, and hypothermia. The "T's" include tension pneumothorax, tamponade (cardiac), thrombosis (pulmonary), thrombosis (coronary), and toxins.

[Q] A 3-day old newborn presents with jaundice since birth. Examination reveals pallor and hepatosplenomegaly. The newborn also has a cephalhematoma. Which one of the following is the most important indicator to the diagnosis of pathologic jaundice ?

(a) Pallor

(b) Hepatosplenomegaly

(c) Clinical jaundice since birth

(d) Cephalhematoma

[ANS] c

[SOL] Pathological jaundice is the type of jaundice which occurs within the first 24 hours of life or persists beyond 14 days of life. In this case, the newborn presents with jaundice since birth, which is the most important indicator to the diagnosis of pathological jaundice. Pallor, hepatosplenomegaly, and cephalhematoma are not specific for pathological jaundice.

[Q] What is the diagnosis of autistic spectrum disorder primarily based on?

(a) Clinical criteria only

(b) Clinical criteria and genetic studies only

(c) Clinical criteria and MRI brain only

(d) Clinical criteria genetic studies and MRI brain

[ANS] a

[SOL] The diagnosis of autism spectrum disorder (ASD) is primarily based on clinical criteria, including observation of the child's behavior and developmental history. Although genetic studies and brain imaging, such as MRI, may provide additional information, they are not used as the primary method for diagnosis.

[Q] According to the National AIDS Control Program, which one of the following drugs is given to newborns born to HIV-positive mothers to prevent mother to child transmission of HIV infection?

(a) Nevirapine

(b) Stavudine

(c)Indinavir

(d) Ritonavir

[ANS] a

[SOL] According to the National AIDS Control Program, nevirapine is given to newborns born to HIV-positive mothers within 72 hours of birth to prevent mother-to-child transmission of HIV infection. It is given as a single dose of 2 mg/kg body weight. This strategy has been shown to significantly reduce the risk of transmission from mother to child. Stavudine, indinavir, and ritonavir are antiretroviral drugs used in the treatment of HIV infection but are not used for prophylaxis in newborns.

[Q] Which one of the following statements is correct in context of human breast milk ?

(a) The concentration of lactose is 5g/dL

(b) The protein content is higher than that in animal milk

(c) Human milk does not contain taurine and cysteine like animal milk and formula milk

(d) Human milk contains omega 2 and omega 6 (very long chain) fatty acids

[ANS] d

[SOL] The concentration of lactose in human breast milk is around 7 g/dL. This is higher than the concentration of lactose in cow's milk (around 4.8 g/dL). The protein content in human milk is lower than in animal milk, with the exception of whey protein, which is higher in human milk. Taurine and cysteine are present in human milk, but in lower concentrations compared to animal milk and formula milk. Human milk contains both omega-3 and omega-6 fatty acids, including some very long chain fatty acids, which are important for brain development.

[Q] Which of the following are age appropriate language milestones in a normally developing 2 year old child ?

1. Vocabulary of 50-100 words

2. Uses pronouns

3. Occasional repeating of words

4. Stating his name when asked

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1 and 3 only

(d) 2, 3 and 4

[ANS] a

[SOL] By 2 years of age, a child should have a vocabulary of 50-100 words and be able to use simple phrases and pronouns. Repeating words and naming objects and body parts should be common. The child should be able to state his or her name when asked by around 3 years.

[Q] Which of the following tools are used for developmental screening ?

1. Denver-II

2. Ages and Stages Questionnaire

3. Parents Evaluation of Developmental Status

4. Bayley Scale for Infant and Toddler Development

Select the correct answer using the code given below :

(a) 1, 2, 3 and 4

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] a

[SOL] The Denver-II, Ages and Stages Questionnaire, Parents Evaluation of Developmental Status, and Bayley Scale for Infant and Toddler Development are all tools used to assess a child’s development

[Q] According to King’s College criteria, which of the following are the indicators for referring to liver transplantation following acetaminophen toxicity?

1. Transaminase levels > 4000 IU/L

2. Acidemia (Serum pH < 7.3) after adequate fluid resuscitation

3. Coagulopathy (INR > 6)

4. Renal dysfunction (creatinine > 3-4 mg/dL)

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] d

[SOL] According to King's College Criteria, patients with acetaminophen toxicity and the following criteria should be referred for liver transplantation: (1) arterial pH < 7.3 or (2) prothrombin time > 100 seconds or international normalized ratio (INR) > 6.5 or (3) serum creatinine > 3.4 mg/dL despite adequate fluid resuscitation or (4) grade III or IV hepatic encephalopathy.

[Q] Which one of the following statements is correct about intra-dermal fractional Inactivated Polio Vaccine (fIPV) with respect to intramuscular (I/M)IPV ?

(a) fIPV is one-tenth of the I/M dose of IPV

(b) fIPV is one-fifth of the I/M dose of IPV

(c) fIPV is half of the I/M dose of IPV

(d) fIPV is three-fourth of the I/M dose of IPV

[ANS] b

[SOL] The statement "fIPV is one-fifth of the I/M dose of IPV" is correct. Intra-dermal fractional Inactivated Polio Vaccine (fIPV) is a dose-sparing strategy that can be used to increase coverage in mass vaccination campaigns. It involves administering one-fifth of the intramuscular (I/M) dose of IPV into the dermis of the skin, which is a more immunogenic site. This allows for more efficient use of IPV and helps to extend global IPV supplies.

[Q] Which one of the following statement is correct regarding the Government of India program ‘Home-based care of the young child’?

(a) It was started in 2014

(b) The grassroots health worker is the Anganwadi worker

(c) The grassroots health makes 6 home visits

(d) The infant is monitored from 3 months to 15 months of age

[ANS] d

[SOL] The correct statement regarding the Government of India program ‘Home-based care of the young child’ is that the grassroots health worker is the ASHA (Accredited Social Health Activist) worker (b). The program was launched in 2018 as part of National Health Mission and POSHAN Abhiyan for promotion of health and nutrition of young children (3-15 months), for reducing child morbidity and mortality and for promotion of growth and Early Childhood Development¹. Under HBYC, ASHA provides incentivized five home visits on 3rd, 6th, 9th, 12th and 15th months.

[Q] In a child with high anion gap metabolic acidosis, poisoning with which of the following may be suspected?

(a) Iron

(b) Digoxin

(c) Rifampicin

(d) Beta blockers

[ANS] a

[SOL] MUDPILERS is a mnemonic that is often used to remember the common causes of high anion gap metabolic acidosis. It stands for:

- M: Methanol

- U: Uremia (due to renal failure)

- D: Diabetic ketoacidosis

- P: Paraldehyde or Phenformin

- I: Iron tablets or Isoniazid

- L: Lactic acidosis

- E: Ethylene glycol (found in antifreeze)

- R: Rhabdomyolysis

- S: Salicylates (aspirin)

[Q] Which one of the following is a "Danger Sign" for a newborn baby?

(a) Temperature between 36.0°C and 36.5°C

(b) Respiratory rate more than 60/min

(c) Heart rate of 120/min

(d) Weight loss of 8% within the first week of life

[ANS] b

[SOL] A respiratory rate of more than 60 breaths per minute is considered a “Danger Sign” for a newborn baby

[Q] The codes given below represent specific types of permanent teeth:

1. Central and lateral incisors

2. Canines

3. Premolars

4. Molars

The eruption of which of the following combinations will indicate menarche in girls?

(a) 1 and 2

(b) 2 and 3

(c) 3 and 4

(d) none

[ANS] d

[SOL] According to a study conducted on 470 female students aged 10-13 years, no correlation could be found between attainment of menarche and eruption status of the permanent second molars. So, none of the given options (a), (b), (c),would indicate menarche in girls.

[Q] Urinary alkalinisation is used for enhancing excretion of which of the following poisonings?

(a) Phenobarbitone

(b) Alprazolam

(c) Phenytoin

(d) Lithium

[ANS] d

[SOL] Urinary alkalinisation is a technique used to enhance the elimination of weak acids, such as salicylates and lithium, from the body by increasing their solubility in alkaline urine. Lithium is an alkali metal that is used to treat bipolar disorder. In cases of lithium poisoning, urinary alkalinisation can be used to increase the excretion of lithium and prevent its accumulation in the body. Phenobarbitone, alprazolam, and phenytoin are not weak acids and are not eliminated by urinary alkalinisation.

[Q] A 4-year-old child is brought with a history of ingestion of 1g of paracetamol two hours back. What should be the initial management?

(a) Induced vomiting

(b) Gastric lavage

(c) Oral N-acetylcysteine

(d) Alkaline diuresis

[ANS] c

[SOL] In the case of paracetamol poisoning, the initial management should be oral N-acetylcysteine (NAC) administration. NAC is an antidote that can prevent liver damage caused by paracetamol toxicity if given within 8-10 hours of ingestion. Induced vomiting and gastric lavage are not recommended as they may increase the risk of aspiration and are not effective in removing the paracetamol already absorbed. Alkaline diuresis is not indicated in paracetamol poisoning.

[Q] Which of the following is the antidote to reverse the muscarinic effects of organophosphate toxicity?

(a) Pralidoxime aldoxime methiodide (PAM)

(b) Atropine

(c) Adrenaline

(d) N-acetylcysteine

[ANS] b

[SOL] Atropine is the antidote used to reverse the muscarinic effects of organophosphate toxicity. Organophosphates inhibit the enzyme acetylcholinesterase, leading to an accumulation of acetylcholine and overstimulation of muscarinic receptors. Atropine is a muscarinic antagonist that competitively blocks the effects of acetylcholine at the muscarinic receptors, thereby reducing the symptoms of organophosphate toxicity. Pralidoxime (option a) is another antidote used to reactivate acetylcholinesterase but does not directly reverse the muscarinic effects. Adrenaline (option c) and N-acetylcysteine (option d) are not effective in reversing muscarinic effects of organophosphate toxicity.

[Q] A 7 year old child is brought to the emergency with seizures and drowsiness. The child had been receiving some drugs for fever for the past two days. Child is found to be cyanosed with an oxygen saturation of 40% and unresponsive to oxygen therapy. Blood gas analysis reveals a normal PaQ,. Which drug intake may have caused the above condition ?

(a) Chloroquine

(b) Amoxycillin-Clavulanic acid

(c) Paracetamol

(d) Mefenamic acid

[ANS] a

[SOL] The symptoms described in the scenario, including seizures, drowsiness, cyanosis, and unresponsiveness to oxygen therapy, are suggestive of methemoglobinemia. Methemoglobinemia is a condition where the iron in hemoglobin is converted to the ferric state (Fe3+) instead of the normal ferrous state (Fe2+), reducing the oxygen-carrying capacity of blood. Among the given options, chloroquine (option a) is known to cause methemoglobinemia as a side effect. Chloroquine is an antimalarial drug that can induce the formation of methemoglobin.

[Q] Autism Spectrum Disorder is characterized by which of the following?

1. Onset before 3 years of age

2. Impaired verbal communication

3. Stereotypic and behavioral patterns

4. Tangential speech

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

[ANS] a

[SOL] Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that is characterized by persistent deficits in social communication and social interaction, as well as restricted, repetitive patterns of behavior, interests, or activities. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for ASD includes the following:

1. Persistent deficits in social communication and social interaction across multiple contexts

2. Restricted, repetitive patterns of behavior, interests, or activities

3. Symptoms present early in the developmental period

Therefore, options (a), (b), and (c) are partially correct, but option (d) is incorrect because impaired verbal communication is one of the core features of ASD.

[Q] Which vaccines are stored in the top rack of the main refrigerator compartment at a temperature of 4—10°C?

(a) DPT, Hepatitis B, Measles, MMR vaccines

(b) DPT, TT, Hepatitis A vaccine

(c) BCG, DPT and Typhoid

(d) BCG, Measles and MMR vaccines

[ANS] d

[SOL]

* The cold chain is a system of storing and transporting vaccines at recommended temperatures from the point of manufacture to the point of use.
* Maintenance of appropriate temperature is critical to the viability and potency of a vaccine.
* Vaccines must be stored at different temperatures depending on their type.
* Vaccines that must not be frozen include:
  + Hepatitis A
  + Hib
  + Whole cell killed typhoid vaccine
* Vaccines that can be frozen without harm include:
  + BCG (especially after reconstitution)
  + OPV
  + Measles
* Vaccines should be stored in the following locations:
  + OPV vials in the freezer compartment (0 to -4°C)
  + BCG, measles, and MMR in the top rack of the main compartment (4-10°C)
  + Other vaccines like DPT, DT, TT, hepatitis A, and typhoid in the middle racks of the main compartment
  + Hepatitis B, varicella, and diluents in the lower racks of the main compartment

I

[Q] Identification of ‘4Ds’ is a key element of which National Health Programme?

(a) IMNCI (Integrated Management of Childhood and Neonatal illness)

(b) ICDS (Integrated Child Development Scheme)

(c) RBSK (Rashtriya Bal Swasthya Karyakram)

(d) JSSK (Janani Karyakram) Shishu Suraksha

[ANS] c

[SOL] The identification of '4Ds' (Defects at birth, Deficiencies, Diseases, and Developmental delays) is a key element of the Rashtriya Bal Swasthya Karyakram (RBSK). RBSK is a national health programme in India that aims to provide comprehensive healthcare to children under the age of 18, focusing on early detection and management of health issues. The programme provides screening and early intervention services for the 4Ds, including disabilities.