Membership of the Royal Colleges of Physicians (MRCP) Practice Exam (Sample)

Study Guide

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Questions

1. **Which of the following conditions is indicated by a hemoglobin A1c greater than 6.5%?**

   A. Normal glucose tolerance

   B. Prediabetes

   C. Diabetes mellitus

   D. Insulin resistance

2. **Which immunoglobulin is most likely responsible for hyperacute rejection after a donor kidney transplantation?**

   A. IgA

   B. IgD

   C. IgE

   D. IgG

3. **A 72-year-old man experienced sudden shortness of breath during dialysis. What is the most likely immunological diagnosis?**

   A. C1-esterase deficiency

   B. Hypocomplementaemic urticarial vasculitis

   C. Mast cell degranulation syndrome

   D. Type 1 hypersensitivity reaction

4. **What is the most likely cause of hypophosphataemia in a patient with increased serum calcium levels?**

   A. Decreased gastrointestinal absorption

   B. Increased bone resorption

   C. Intracellular shift of phosphate

   D. Reduced renal reabsorption of phosphate

5. **What is the most likely diagnosis for a man who presents with auditory hallucinations and social withdrawal?**

   A. Alcoholic hallucinosis

   B. Borderline personality disorder

   C. Paranoid schizophrenia

   D. Cannabis-induced psychosis

6. What drug is most likely to restore sinus rhythm in a patient with atrial fibrillation and a ventricular rate of 130 beats/min?

A. Adenosine

B. Bisoprolol

C. Esmolol

D. Flecainide

7. A 65-year-old man has a pituitary lesion with no hormone excess. What is the most likely clinical consequence of this finding?

A. anterior hypopituitarism

B. bitemporal hemianopia

C. none

D. pituitary apoplexy

8. What is the most appropriate initial treatment for a patient with generalized reddening of the skin and history of psoriasis?

A. Oral furosemide

B. Oral prednisolone

C. Topical coal tar solution

D. Topical white soft paraffin

9. What type of headache is often noted in patients with exertional or physical activity-related triggers?

A. Tension headache

B. Cluster headache

C. Cervicogenic headache

D. Exertional headache

10. A 23-year-old woman with primary infertility has mild facial hirsutism and varied menstrual cycles. What is the most likely diagnosis?

A. Endometriosis

B. Non-classical congenital adrenal hyperplasia

C. Polycystic ovary syndrome

D. Prolactinoma

Answers

1. C
2. D
3. D
4. A
5. D
6. A
7. C
8. B
9. D
10. C

Explanations

1. Which of the following conditions is indicated by a hemoglobin A1c greater than 6.5%?

A. Normal glucose tolerance

B. Prediabetes

C. Diabetes mellitus

D. Insulin resistance

A hemoglobin A1c level greater than 6.5% is used as a diagnostic criterion for diabetes mellitus. This measurement reflects the average blood glucose levels over the past two to three months, and a value at or above this threshold indicates that a person has diabetes. In the context of diagnosing diabetes, an A1c of 6.5% or higher suggests that the individual's blood sugar levels have been consistently elevated. This classification is grounded in guidelines established by organizations such as the American Diabetes Association, which consider an A1c level of 5.7% to less than 6.5% as indicative of prediabetes. Normal glucose tolerance is characterized by A1c values below 5.7%. Insulin resistance, while it can be a part of the pathophysiology of diabetes, does not have a specific A1c threshold and is not a standalone diagnosis associated with A1c levels. Thus, an A1c greater than 6.5% is a clear indication of diabetes mellitus, signaling the need for further evaluation and management of the individual's blood glucose levels.

2. Which immunoglobulin is most likely responsible for hyperacute rejection after a donor kidney transplantation?

A. IgA

B. IgD

C. IgE

D. IgG

In the context of hyperacute rejection following donor kidney transplantation, IgG is the main immunoglobulin involved. This type of rejection occurs within minutes to hours after transplantation and is primarily mediated by pre-existing antibodies against donor antigens, specifically those present on the endothelial cells of the transplanted organ. In many cases, the recipient may have been sensitized to the donor's HLA (human leukocyte antigen) antigens through previous transplants, blood transfusions, or pregnancies. When a kidney is transplanted, these pre-formed IgG antibodies bind to the donor's vascular endothelium, leading to complement activation, neutrophil recruitment, and rapid destruction of the graft. The involvement of IgG is significant because it is the most abundant immunoglobulin in serum and is known for its ability to cross the placenta and activate the complement system effectively. This makes it particularly potent in mediating immediate hypersensitivity reactions, such as hyperacute rejection. In contrast, IgA is primarily found in mucosal areas and body secretions, IgD is mainly found on the surface of B cells and plays a role in B cell activation, and IgE is associated with allergic reactions and responses to parasitic infections. None of these other antibodies typically participate

3. A 72-year-old man experienced sudden shortness of breath during dialysis. What is the most likely immunological diagnosis?

A. C1-esterase deficiency

B. Hypocomplementaemic urticarial vasculitis

C. Mast cell degranulation syndrome

D. Type 1 hypersensitivity reaction

In the context of a 72-year-old man experiencing sudden shortness of breath during dialysis, the most likely immunological diagnosis relates to a Type 1 hypersensitivity reaction. This type of reaction is initiated by the rapid release of histamine and other mediators from mast cells and basophils upon exposure to an allergen, which can lead to symptoms like bronchospasm, vasodilation, and increased vascular permeability. During dialysis, various triggers—such as an allergic response to the substances used during dialysis, or an anaphylactic reaction to the dialysis material itself (like the dialyzer)—can provoke a Type 1 hypersensitivity. Symptoms may appear suddenly, often requiring immediate medical intervention to manage the respiratory distress and other manifestations of anaphylaxis. In this scenario, the features align well with an acute allergic response, leading to shortness of breath as a prominent symptom. This critical understanding allows healthcare professionals to focus on immediate supportive care, including the administration of epinephrine, if needed, while also seeking to identify and manage the underlying cause of the allergic reaction during dialysis.

4. What is the most likely cause of hypophosphataemia in a patient with increased serum calcium levels?

A. Decreased gastrointestinal absorption

B. Increased bone resorption

C. Intracellular shift of phosphate

D. Reduced renal reabsorption of phosphate

In the case of a patient with hypophosphataemia and elevated serum calcium levels, the most likely cause relates to the interplay between calcium and phosphate metabolism in the body. Increased serum calcium can lead to decreased gastrointestinal absorption of phosphate. This is because higher calcium levels can influence the activity of hormones such as parathyroid hormone and calcitonin, which affect how phosphate is absorbed in the intestines. When serum calcium is elevated, there is often an associated increase in vitamin D activation, which primarily increases calcium absorption but can paradoxically lead to reduced phosphate absorption as well, contributing to low phosphate levels in the serum. In contrast, other mechanisms that contribute to hypophosphataemia, such as increased bone resorption or renal handling of phosphate, would typically result in different clinical scenarios or laboratory findings, particularly if there was another underlying condition. An intracellular shift of phosphate can occur in conditions such as refeeding syndrome but is less common in the context of hypercalcaemia. Meanwhile, reduced renal reabsorption typically leads to hypophosphataemia but would not necessarily explain the coexistence with elevated serum calcium. Understanding these physiological relationships and regulatory mechanisms in mineral metabolism is crucial in interpreting laboratory findings and diagnosing underlying conditions.

5. What is the most likely diagnosis for a man who presents with auditory hallucinations and social withdrawal?

A. Alcoholic hallucinosis

B. Borderline personality disorder

C. Paranoid schizophrenia

D. Cannabis-induced psychosis

The symptoms of auditory hallucinations and social withdrawal strongly suggest a primary psychotic disorder, with paranoid schizophrenia being a prominent consideration. This condition is characterized by the presence of delusions, hallucinations, and social dysfunction. Auditory hallucinations, which involve hearing voices or sounds that others do not perceive, are a hallmark feature of schizophrenia and can significantly contribute to social withdrawal due to the distress and fear they may induce. While cannabis-induced psychosis can also present with similar symptoms, it typically requires a history of recent heavy cannabis use rather than standalone symptoms. Moreover, auditory hallucinations without a clear substance-induced context strongly point towards paranoid schizophrenia, given its more persistent nature and potential for long-term impact on an individual's social functioning. Additionally, alcoholic hallucinosis is linked to withdrawal from alcohol rather than being initiated spontaneously in a social context. Borderline personality disorder primarily involves interpersonal instability, emotional dysregulation, and identity disturbance, rather than classic psychotic features like hallucinations. Thus, the combination of auditory hallucinations and social withdrawal aligns more closely with the diagnostic criteria for paranoid schizophrenia, underscoring the severity and complexity of the disorder in the given clinical presentation.

6. What drug is most likely to restore sinus rhythm in a patient with atrial fibrillation and a ventricular rate of 130 beats/min?

A. Adenosine

B. Bisoprolol

C. Esmolol

D. Flecainide

The drug that is most likely to restore sinus rhythm in a patient with atrial fibrillation and a ventricular rate of 130 beats/min is adenosine. Adenosine works by temporarily blocking the atrioventricular (AV) node, which can interrupt the reentrant circuits that contribute to atrial fibrillation. This action can sometimes restore normal sinus rhythm quickly, especially when atrial fibrillation involves a rapid ventricular response. In situations of acute atrial fibrillation where rapid ventricular rates are present, adenosine can effectively terminate the arrhythmia in patients, especially if there is an underlying aspect of reentrant tachycardia. It is a rapidly acting agent that provides a quick clinical response, making it an ideal choice for acute management. The other options, while useful in the setting of atrial fibrillation, have different mechanisms and likely take longer to restore sinus rhythm. Beta-blockers like bisoprolol and esmolol are primarily used to control the heart rate rather than directly convert to sinus rhythm. Flecainide, as a class IC antiarrhythmic agent, may convert atrial fibrillation to sinus rhythm but requires careful consideration of the patient's structural heart disease status and might not act as rapidly as

7. A 65-year-old man has a pituitary lesion with no hormone excess. What is the most likely clinical consequence of this finding?

A. anterior hypopituitarism

B. bitemporal hemianopia

C. none

D. pituitary apoplexy

In the scenario presented, where a 65-year-old man has a pituitary lesion that does not result in hormone excess, the most likely clinical consequence is indeed the absence of significant symptoms or complications associated with hormone overproduction or pituitary dysfunction. Typically, pituitary lesions can secrete hormones, leading to conditions such as acromegaly, Cushing's disease, or prolactinoma when there is excess hormone production. However, in the absence of hormone excess, the lesion may remain asymptomatic, especially if it is small. Bitemporal hemianopia, which results from compression of the optic chiasm due to a mass effect from an expanding pituitary tumor, is generally associated with larger lesions that exert pressure on surrounding structures. Similarly, pituitary apoplexy involves sudden hemorrhage or infarction of the pituitary gland, which is not a consequence of a non-functioning lesion, but rather occurs in instances of significant growth or hormonal activity. Anterior hypopituitarism could occur if the lesion were to encroach on the pituitary stalk or if it were large enough to affect the surrounding pituitary tissue, but without any overt symptoms or hormone excess, this is less likely to be an immediate consequence. Thus,

8. What is the most appropriate initial treatment for a patient with generalized reddening of the skin and history of psoriasis?

A. Oral furosemide

B. Oral prednisolone

C. Topical coal tar solution

D. Topical white soft paraffin

In the context of a patient presenting with generalized reddening of the skin and a history of psoriasis, initiating treatment with oral prednisolone is appropriate. Psoriasis is an immune-mediated condition characterized by skin inflammation, and in cases where there is widespread involvement and significant symptoms, systemic corticosteroids like prednisolone can help rapidly reduce inflammation and control symptoms. Oral prednisolone works by dampening the immune response and reducing the production of pro-inflammatory cytokines, which are often implicated in psoriasis flares. This can be particularly effective for controlling acute exacerbations where the skin is extensively involved, leading to a potential improvement in the patient's overall condition. In contrast, other options may not be as effective in this scenario. Topical treatments like coal tar solution and white soft paraffin are more suitable for localized areas or chronic management rather than initial treatment for generalized rashes. Coal tar is typically used for its anti-inflammatory and keratolytic properties, but it may not provide the rapid relief needed in acute situations. Similarly, white soft paraffin can be beneficial as a moisturizer to prevent dryness and scaling in psoriasis but does not have the efficacy in treating inflammation. Overall, the choice of oral prednisolone aligns with the need for a prompt and effective

9. What type of headache is often noted in patients with exertional or physical activity-related triggers?

A. Tension headache

B. Cluster headache

C. Cervicogenic headache

D. Exertional headache

The correct answer is exertional headache, which is characterized by the onset of head pain associated with physical exertion or activity. This type of headache can occur during or after activities that elevate blood pressure or strain the body, such as vigorous exercise, heavy lifting, or even sexual activity. Exertional headaches tend to be benign but can be quite painful and often resolve with rest. They may be distinguished from other types of headaches because their onset is specifically linked to a physical trigger, making the correlation to exertion pivotal in diagnosis. Tension headaches typically arise from stress or muscle tension and do not have a direct association with physical activity as a trigger. Cluster headaches, known for their severe, unilateral pain and cyclical patterns, also do not primarily relate to exertional activities. Cervicogenic headaches, originating from disorders of the cervical spine, are likewise not specifically induced by physical exertion but rather from neck issues or posture. Thus, exertional headache stands out as the only type that is directly linked to physical activity-related triggers.

10. A 23-year-old woman with primary infertility has mild facial hirsutism and varied menstrual cycles. What is the most likely diagnosis?

A. Endometriosis

B. Non-classical congenital adrenal hyperplasia

C. Polycystic ovary syndrome

D. Prolactinoma

The symptoms presented—primary infertility, mild facial hirsutism, and varied menstrual cycles—are characteristic of Polycystic Ovary Syndrome (PCOS), making it the most likely diagnosis in this case. PCOS is a common endocrine disorder in women of reproductive age, which is often associated with insulin resistance and hyperandrogenism. The varied menstrual cycles suggest anovulation, which is typical in this condition due to hormonal imbalances. Facial hirsutism is another hallmark of hyperandrogenism, which is frequently seen in women with PCOS, resulting from elevated androgen levels. In contrast, other conditions listed do not align as closely with the combination of symptoms described. Endometriosis usually presents with pain and can cause infertility, but it typically does not feature hirsutism or irregular cycles to the same extent. Non-classical congenital adrenal hyperplasia could explain hirsutism and irregular cycles, but is less common and typically presents with more severe manifestations, alongside a family history of adrenal disorders. Prolactinoma primarily leads to ovulatory dysfunction and galactorrhea, rather than hirsutism or the symptoms linked to hyperandrogenism. Overall, the combination of infertility, hirsut