BKAT Critical Care Practice Exam (Sample)

Study Guide

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Questions

1. What indicates ST elevation in ECG during an acute myocardial infarction?

A. Single lead elevation

B. Elevation in 2 or more contiguous leads

C. Inverted T wave

D. Normal sinus rhythm

2. When does Troponin I usually begin to rise after myocardial damage?

A. 1-2 hours

B. 3-12 hours

C. 12-24 hours

D. 24-36 hours

3. What is a common diuretic used to decrease preload?

A. Atenolol

B. Amrinone

C. Furosemide

D. Dopamine

4. Which protective measure should be taken for a patient with a high cervical injury?

A. Encourage deep breathing exercises

B. Protect neck/spine due to respiratory concerns

C. Reduce sedation levels

D. Lower the head of the bed

5. What is the onset time for NPH (intermediate insulin)?

A. 15 minutes

B. 30 minutes

C. 2-4 hours

D. 4-6 hours

6. What complication is associated with long bone fractures?

- **A. Rib fractures**
- **B. Fat emboli**
- **C. Spinal cord injury**
- **D. Pneumothorax**

7. What does 'failure to capture' in a pacemaker indicate?

- **A. The heart rate is excessively high**
- **B. The pacer is functioning correctly**
- **C. No depolarization occurs after a pacer spike**
- **D. The pacemaker needs to be replaced**

8. What is a common treatment option for an ischemic stroke if administered within 3 hours?

- **A. IV thrombolytic therapy**
- **B. Anticonvulsants**
- **C. Antihypertensive medication**
- **D. Osmotic diuretics**

9. What is a potential side effect of administering dopamine?

- **A. Increased appetite**
- **B. Bradycardia**
- **C. Tachycardia**
- **D. Hypotension**

10. What is the normal cardiac output (CO) range?

- **A. 2-4 L/min**
- **B. 4-8 L/min**
- **C. 8-10 L/min**
- **D. 1-3 L/min**

Answers

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

Explanations

1. What indicates ST elevation in ECG during an acute myocardial infarction?

A. Single lead elevation

B. Elevation in 2 or more contiguous leads

C. Inverted T wave

D. Normal sinus rhythm

The presence of ST elevation in two or more contiguous leads is a critical indicator of an acute myocardial infarction (AMI). In the context of an AMI, contiguous leads refer to leads that represent the same area of the heart, allowing for accurate identification of myocardial injury. When there is significant myocardial damage, such as that caused by ischemia, the ST segment on the ECG becomes elevated due to the altered electrical activity of the cardiac muscle. Elevations in contiguous leads strengthen the likelihood of diagnosing a specific anatomical region affected by the infarction. For instance, if leads II, III, and aVF show ST segment elevations, it indicates possible occlusion of the right coronary artery affecting the inferior wall of the heart. This pattern is essential for making timely clinical decisions regarding treatment interventions such as reperfusion therapy. In the case of isolated ST elevation in a single lead, it may not be indicative of AMI since it could be a benign variant or related to other conditions. Additionally, an inverted T wave typically signifies ischemia or strain but does not confirm myocardial injury or the presence of infarction. Normal sinus rhythm suggests a healthy cardiac conduction system and does not correlate with ST segment elevations indicative of a heart attack. Thus, identifying ST elevation in two

2. When does Troponin I usually begin to rise after myocardial damage?

A. 1-2 hours

B. 3-12 hours

C. 12-24 hours

D. 24-36 hours

Troponin I is a protein released into the bloodstream when the heart muscle is damaged, making it a key marker for diagnosing myocardial infarction (heart attack). The timeline for the rise of Troponin I levels can significantly assist clinicians in determining the timing of a myocardial injury. After myocardial damage, Troponin I typically begins to rise within approximately 3 to 12 hours. This timeframe is crucial for guiding clinical decisions, especially in acute settings. The elevation of Troponin I levels signals that myocardial injury or necrosis has occurred, allowing for timely intervention. Understanding this window helps in the handling of patients presenting with chest pain and assists in differentiating between acute coronary syndromes and other causes of chest discomfort. Detecting an increase in Troponin I after 3 hours provides enough information to support a diagnosis of myocardial injury while also helping in risk stratification and decision-making regarding further management, such as the need for urgent revascularization procedures. In contrast, options suggesting earlier or later rises do not align with the established biochemical response observed after myocardial injury, as the peak elevation typically occurs within 24 to 48 hours after the event.

3. What is a common diuretic used to decrease preload?

A. Atenolol

B. Amrinone

C. Furosemide

D. Dopamine

Furosemide is a commonly used loop diuretic that primarily functions to decrease preload by promoting diuresis (increased urine production). It achieves this by inhibiting the reabsorption of sodium and chloride in the ascending limb of the loop of Henle in the nephron, leading to increased excretion of water, sodium, and chloride. This reduction in blood volume ultimately decreases the return of blood to the heart (preload), which can be particularly beneficial in the management of conditions such as heart failure and fluid overload. The therapeutic use of furosemide is especially important in critical care settings where managing fluid status is paramount. By effectively lowering preload, furosemide can help reduce pulmonary congestion and improve symptoms in patients with heart failure, thereby enhancing the overall hemodynamic status. The other medications listed serve different purposes; Atenolol is a beta-blocker used primarily for managing hypertension and heart rate, Amrinone is a phosphodiesterase inhibitor that increases contractility and promotes vasodilation, and Dopamine, while it can influence renal perfusion, is mainly used for managing low blood pressure and does not have a direct diuretic effect like furosemide.

4. Which protective measure should be taken for a patient with a high cervical injury?

A. Encourage deep breathing exercises

B. Protect neck/spine due to respiratory concerns

C. Reduce sedation levels

D. Lower the head of the bed

For a patient with a high cervical injury, protecting the neck and spine is crucial due to the potential impact on respiratory function and spinal stability. High cervical injuries can significantly affect the phrenic nerve, which controls the diaphragm, leading to respiratory compromise. Maintaining spinal alignment and minimizing any movement is vital to avoid exacerbating any injury or compromising respiratory capacity further. By prioritizing the protection of the neck and spine, caregivers can help prevent additional trauma, support potential recovery, and maintain physiologic stability. This measure directly addresses the unique risks associated with high cervical spine injuries, where even minor movements can have severe consequences. Other options, while they may be relevant in different contexts, do not specifically address the immediate protective needs of a patient with such a significant injury. For instance, encouraging deep breathing exercises may be beneficial in certain situations but can pose risks if the patient's spinal stability is not ensured. Similarly, adjusting sedation levels or changing the position of the head of the bed might not prioritize the essential need for spinal immobilization in this context.

5. What is the onset time for NPH (intermediate insulin)?

A. 15 minutes

B. 30 minutes

C. 2-4 hours

D. 4-6 hours

NPH insulin, or Neutral Protamine Hagedorn insulin, is classified as an intermediate-acting insulin. Its onset of action typically occurs within a time frame of 2 to 4 hours after subcutaneous injection. This characteristic is crucial for managing blood glucose levels in individuals with diabetes, as it reflects the period during which insulin is actively lowering blood glucose. The 2 to 4-hour onset specifically allows for some versatility in its use, often aligning it with meal timings and basal insulin needs throughout the day. Understanding the pharmacodynamic properties of NPH is essential for effective diabetes management, as it helps predict when the insulin effect will begin, allowing healthcare providers and patients to make informed decisions about meal planning and additional insulin dosing. Other options suggesting onset times of 15 minutes or 30 minutes reflect the rapid-acting insulins, and the 4 to 6 hours timeframe does not align with the pharmacokinetics of NPH insulin. Thus, the correct understanding of NPH's onset time is fundamental in ensuring its appropriate application in clinical practice.

6. What complication is associated with long bone fractures?

A. Rib fractures

B. Fat emboli

C. Spinal cord injury

D. Pneumothorax

Long bone fractures can lead to the complication of fat emboli, a serious condition that arises when fat globules enter the bloodstream. This can occur particularly with fractures of the long bones because these bones have a central medullary cavity filled with fat. When the bone is fractured, the integrity of this cavity is lost, allowing fat to leak into the bloodstream. Once in circulation, these fat globules can travel to the lungs, brain, and other organs, leading to respiratory distress and neurological symptoms. The clinical presentation of fat embolism syndrome usually occurs 1 to 3 days after the injury and may include symptoms such as shortness of breath, petechial rash, and altered mental status. Early recognition and management are critical to improve outcomes for affected patients. This association with long bone fractures is well-documented in trauma literature and underscores the importance of monitoring for signs of fat embolism in patients with such injuries.

7. What does 'failure to capture' in a pacemaker indicate?

A. The heart rate is excessively high

B. The pacer is functioning correctly

C. No depolarization occurs after a pacer spike

D. The pacemaker needs to be replaced

'Failure to capture' in a pacemaker indicates that there is a lack of depolarization occurring after a pacemaker spike. This means that although the pacemaker is delivering an electrical impulse to stimulate the heart, the heart muscle is not responding to that impulse as it should. This can result in missed heartbeats or an overall ineffective pacing of the heart. In a properly functioning pacemaker, each electrical impulse generated should lead to the depolarization of the myocardial cells, which is necessary for the heart to contract and generate a heartbeat. When failure to capture occurs, it signifies a disconnect between the electrical activity initiated by the pacemaker and the mechanical response of the heart, which is a critical situation that may require immediate medical intervention to address the underlying issue. This situation is different from other scenarios such as excessively high heart rates, which do not pertain to the pacemaker's efficiency, or an indication that the pacemaker is functioning correctly, which would imply that every pacemaker output is successfully capturing myocardial depolarization. Additionally, asserting that a pacemaker needs to be replaced may be premature without first determining the cause of the failure to capture, as it might be related to issues such as lead dislodgement or the need for reprogram

8. What is a common treatment option for an ischemic stroke if administered within 3 hours?

A. IV thrombolytic therapy

B. Anticonvulsants

C. Antihypertensive medication

D. Osmotic diuretics

The use of intravenous thrombolytic therapy is a critical and commonly implemented treatment for ischemic stroke when administered within a three-hour window from the onset of symptoms. The primary agent used for this therapy is tPA (tissue Plasminogen Activator), which acts to dissolve the blood clots obstructing blood flow to the brain, thereby restoring circulation and minimizing brain damage. Administering thrombolytics within this crucial time frame has been shown to significantly improve outcomes, reducing morbidity and mortality associated with ischemic strokes. The efficacy of this treatment diminishes with time, emphasizing the importance of prompt medical attention. In contrast, the other options do not serve as primary treatments for acute ischemic stroke. Anticonvulsants may be employed to manage seizure activity that could arise post-stroke but do not address the underlying issue of the stroke itself. Antihypertensive medications may be necessary to manage blood pressure but are not a direct intervention for restoring cerebral perfusion. Osmotic diuretics can be useful in cases of increased intracranial pressure but don't directly treat the ischemic event. Hence, the prompt administration of IV thrombolytic therapy within the defined time frame is the most appropriate and effective response for treating an ischemic stroke

9. What is a potential side effect of administering dopamine?

A. Increased appetite

B. Bradycardia

C. Tachycardia

D. Hypotension

Dopamine is a catecholamine used in critical care for its dose-dependent effects on heart rate and blood pressure. Administering dopamine can lead to tachycardia, which is an increased heart rate. This occurs because dopamine stimulates beta-adrenergic receptors, particularly at moderate to high doses, leading to increased myocardial contractility and heart rate. The mechanism of action involves dopamine's influence on the sympathetic nervous system, which increases the excitability of the heart and can trigger a faster heart rate as a compensatory response. Additionally, the vasodilatory effects at lower doses can contribute to a reflex tachycardia due to decreased vascular resistance. Understanding the side effects of pharmacological agents like dopamine is critical for safe administration and monitoring in a critical care environment. While other options may seem plausible, they do not align with the common pharmacological effects of dopamine administration.

10. What is the normal cardiac output (CO) range?

A. 2-4 L/min

B. 4-8 L/min

C. 8-10 L/min

D. 1-3 L/min

The normal range for cardiac output (CO), which reflects the amount of blood the heart pumps in one minute, is typically between 4 to 8 liters per minute in a resting adult. This range can vary based on factors such as body size, age, and physical conditioning. Cardiac output is a critical parameter in assessing cardiovascular health and is influenced by heart rate and stroke volume; therefore, understanding this range is vital for evaluating patients in critical care settings. In clinical practice, values that fall below 4 L/min may indicate hypoperfusion or heart failure, while values above 8 L/min may suggest conditions such as anemia, sepsis, or hyperthyroidism where the heart is working harder to meet increased metabolic demands. Thus, the given correct answer highlights the average expected cardiac output for a healthy individual.