Kettering Therapist Multiple-Choice (TMC) Practice Exam (Sample)

Study Guide

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Questions

1. What is the primary role of sodium (Na+) in the body?

A. Major intracellular cation

B. Major extracellular anion

C. Major extracellular cation controlled by kidneys

D. Minor electrolyte in blood

2. What is the likely cause of bilateral opacification in a patient who has undergone a sky diving accident?

A. Pneumothorax

B. Venous admixture

C. Pneumonia

D. Fluid overload

3. What is the normal range for intracranial pressure (ICP)?

A. 10 - 15 mmHg

B. 5 - 10 mmHg

C. 20 - 25 mmHg

D. 15 - 20 mmHg

4. What is the recommended intervention for a patient with a PaO2 below 80 and an FiO2 of 60% or greater?

A. Start or increase PEEP or CPAP

B. Decrease the ventilation settings

C. Administer sedatives to stabilize breathing

D. Reduce fluids to improve oxygenation

5. An elevated brain natriuretic protein (BNP) level would be consistent with a diagnosis of?

A. Heart Attack.

B. Pulmonary embolism.

C. Congestive Heart Failure.

D. Aortic Stenosis.

6. What does phosphatidylglycerol (PG) indicate in terms of pulmonary maturity?

A. Appears before 36 weeks gestation

B. Rises after 40 weeks gestation

C. Most reliable indicator of pulmonary maturity

D. Only present in the amniotic sac

7. When administering IPPB therapy, a failure to reach the set peak inspiratory pressure is likely due to what?

A. Excessive airway resistance

B. Insufficient inspiratory flow

C. Faulty equipment calibration

D. Inadequate patient effort

8. Which condition might cause increasing airway pressures during mechanical ventilation?

A. Decreasing lung compliance

B. Dehydration

C. Decreased metabolic rate

D. Hypoxia

9. What is the primary priority in an emergency related to ventilation?

A. Oxygenation

B. Ventilation

C. Circulation

D. Perfusion

10. What should the RT do after an arterial blood sample is spilled on the lab counter?

A. Wash it with soap and water

B. Disinfect the counter with a bleach solution

C. Cover it with a paper towel

D. Leave it for janitorial staff to clean

Answers

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

Explanations

1. What is the primary role of sodium (Na+) in the body?

A. Major intracellular cation

B. Major extracellular anion

C. Major extracellular cation controlled by kidneys

D. Minor electrolyte in blood

Sodium (Na+) plays a critical role in maintaining fluid balance, transmitting nerve impulses, and muscle contraction. As the major extracellular cation, sodium is primarily found outside cells and is essential for various bodily functions. The kidneys regulate sodium levels through filtration and reabsorption, which helps to control blood pressure and blood volume. This regulation is crucial because sodium affects osmotic balance and influences fluid retention. The options describing sodium as a major intracellular cation or a minor electrolyte in blood do not accurately represent its primary function or distribution in the body. Sodium is predominantly found in the extracellular space and acts as the primary cation there, making it vital for cellular communication and functions. Thus, the identification of sodium as the major extracellular cation controlled by the kidneys highlights its essential role in homeostasis and physiological processes.

2. What is the likely cause of bilateral opacification in a patient who has undergone a sky diving accident?

A. Pneumothorax

B. Venous admixture

C. Pneumonia

D. Fluid overload

Bilateral opacification in a patient who has experienced a skydiving accident is most likely due to venous admixture. In the context of such an accident, the trauma might lead to the presence of blood in the lungs or the development of pulmonary contusions. When blood enters the alveoli, it disrupts normal gas exchange, leading to an area of the lungs that is ventilated but poorly perfused, resulting in venous admixture, where deoxygenated blood mixes with oxygenated blood. This phenomenon causes the characteristic bilateral opacification seen on imaging. Understanding this condition helps in managing trauma patients effectively. As systemic responses to trauma can involve pulmonary complications, recognizing the signs of venous admixture guides healthcare providers in addressing the underlying issues, such as ensuring proper oxygenation and ventilation to support recovery.

3. What is the normal range for intracranial pressure (ICP)?

A. 10 - 15 mmHg

B. 5 - 10 mmHg

C. 20 - 25 mmHg

D. 15 - 20 mmHg

The normal range for intracranial pressure (ICP) is typically recognized as 7 to 15 mmHg in adults, with 10 to 15 mmHg often cited as the standard range in many clinical references. Therefore, the answer that identifies less than 10 mmHg falls short of accurately reflecting the accepted normal values, as maintaining ICP within the range of 10 to 15 mmHg is crucial for optimal brain function and protection against potential neurological damage. An ICP above 20 mmHg is considered elevated and may indicate conditions requiring immediate clinical attention, while levels below 5 mmHg can be unusually low and could suggest various pathological conditions. Understanding the normal ICP range is vital for healthcare professionals, particularly respiratory therapists and critical care providers, as it informs them about potential interventions needed to maintain cerebral perfusion and manage conditions like traumatic brain injury or other neurological disorders.

4. What is the recommended intervention for a patient with a PaO2 below 80 and an FiO2 of 60% or greater?

A. Start or increase PEEP or CPAP

B. Decrease the ventilation settings

C. Administer sedatives to stabilize breathing

D. Reduce fluids to improve oxygenation

When a patient has a partial pressure of oxygen (PaO2) below 80 mmHg while receiving a fraction of inspired oxygen (FiO2) of 60% or greater, it indicates significant hypoxemia. In such cases, the objective is to improve the patient's oxygenation status. One effective intervention is the application of PEEP (Positive End-Expiratory Pressure) or CPAP (Continuous Positive Airway Pressure). The use of PEEP helps to recruit collapsed alveoli, increase functional residual capacity, and improve ventilation-perfusion matching within the lungs. This action enhances gas exchange and can lead to an improvement in PaO2, making it a pertinent intervention for patients exhibiting low oxygen saturation despite high FiO2. Increasing PEEP or applying CPAP can also help to avoid further intubation or mechanical ventilation in patients who are still able to maintain some degree of spontaneous ventilation. This offers a non-invasive means to support the patient's respiratory needs while minimizing the risk of mechanical ventilation complications. It's important to approach the other choices with caution. For instance, decreasing ventilation settings or administering sedatives might worsen the patient's ability to breathe effectively, negatively impacting their oxygenation. Reducing fluids may not directly resolve hypoxemia and may

5. An elevated brain natriuretic protein (BNP) level would be consistent with a diagnosis of?

A. Heart Attack.

B. Pulmonary embolism.

C. Congestive Heart Failure.

D. Aortic Stenosis.

An elevated brain natriuretic peptide (BNP) level is primarily associated with congestive heart failure (CHF). BNP is a hormone produced by the heart in response to increased pressure that often occurs when the heart is not pumping effectively, which is characteristic of CHF. When heart function deteriorates, the heart muscle stretches, leading to the release of BNP as a compensatory mechanism to help reduce fluid overload and lower blood pressure. In cases of CHF, BNP levels can rise significantly, making it a useful biomarker for diagnosis and management of the condition. Elevated BNP levels correlate with the severity of heart failure; thus, measuring BNP can help healthcare providers assess the patient's status and response to treatment. In clinical practice, elevated BNP levels provide valuable information in differentiating heart failure from other conditions, making it an essential tool in the diagnostic process for CHF.

6. What does phosphatidylglycerol (PG) indicate in terms of pulmonary maturity?

A. Appears before 36 weeks gestation

B. Rises after 40 weeks gestation

C. Most reliable indicator of pulmonary maturity

D. Only present in the amniotic sac

Phosphatidylglycerol (PG) is a significant phospholipid component of pulmonary surfactant. The presence and levels of PG in the amniotic fluid serve as important indicators of fetal lung maturity. This is primarily because PG plays a crucial role in reducing surface tension in the alveoli and is essential for normal respiratory function after birth. When assessing pulmonary maturity, PG is a more reliable indicator than other surfactant components, such as lecithin. While lecithin-to-sphingomyelin ratios are often measured, the presence of phosphatidylglycerol specifically signifies adequate fetal lung development, as it typically appears in the amniotic fluid around 35-36 weeks of gestation. Therefore, its detection correlates with the lungs being mature enough to function effectively at birth. The other choices do not reflect the role of PG accurately in determining pulmonary maturity and its timing in gestation. Thus, recognizing PG as the most reliable indicator helps clinicians make informed decisions regarding the potential need for interventions related to immature lungs in preterm infants.

7. When administering IPPB therapy, a failure to reach the set peak inspiratory pressure is likely due to what?

A. Excessive airway resistance

B. Insufficient inspiratory flow

C. Faulty equipment calibration

D. Inadequate patient effort

In the context of administering Intermittent Positive Pressure Breathing (IPPB) therapy, insufficient inspiratory flow is a plausible reason for failing to reach the set peak inspiratory pressure. The therapy is designed to help patients achieve effective lung inflation by delivering a predetermined pressure of gas. When the inspiratory flow is too low, it may not generate enough force to reach the target pressure against the resistance encountered in the airways or lungs. Inadequate flow can lead to a situation where the ventilator or device struggles to push air in at the desired rate, preventing the system from achieving the necessary pressure. Adjusting the flow settings appropriately can help resolve this issue and enable successful therapy delivery. Other factors, such as excessive airway resistance or faulty equipment calibration, could also affect the delivery of ventilatory support, but they would not specifically correlate with insufficient flow as the primary cause for failure to achieve the set pressure in this therapy context. Similarly, while patient effort is essential for certain respiratory therapies, IPPB is specifically designed to assist with ventilation, and insufficient flow remains the focal point when discussing peak inspiratory pressure failures in this setting.

8. Which condition might cause increasing airway pressures during mechanical ventilation?

A. Decreasing lung compliance

B. Dehydration

C. Decreased metabolic rate

D. Hypoxia

Increasing airway pressures during mechanical ventilation can occur for several reasons, one of which is decreasing lung compliance. Compliance refers to the ability of the lung to expand and contract effectively. When lung compliance decreases, the lungs become stiffer, making it more difficult for air to enter the alveoli during inhalation. As a result, the ventilator has to exert greater pressure to deliver the same volume of air, leading to increased airway pressures. This situation can arise in various conditions such as acute respiratory distress syndrome (ARDS), pulmonary fibrosis, or pneumonia, where the lung tissue is affected and becomes less compliant. Understanding the relationship between lung compliance and airway pressures is essential in mechanical ventilation management, as it directly impacts ventilatory settings and patient care. Other conditions like dehydration, decreased metabolic rate, and hypoxia do not directly relate to lung compliance or airflow resistance in mechanical ventilation. Dehydration primarily affects fluid balance and does not alter airway pressures directly. Decreased metabolic rate may influence oxygen demand but is not a direct factor in mechanical ventilation airway pressures. Hypoxia indicates low oxygen levels in the blood but does not inherently increase airway pressures during mechanical ventilation unless it is linked to a specific condition that affects lung compliance.

9. What is the primary priority in an emergency related to ventilation?

A. Oxygenation

B. Ventilation

C. Circulation

D. Perfusion

In an emergency situation involving ventilation, the primary priority is ventilation itself. This is crucial because effective ventilation directly facilitates gas exchange in the lungs, which allows for the proper delivery of oxygen to the blood and removal of carbon dioxide. If ventilation is compromised, oxygen levels in the blood can quickly decrease, leading to severe hypoxia and potential organ failure. Proper ventilation ensures that the air is adequately moving in and out of the lungs, allowing for the exchange of gases that is essential for sustaining life. If ventilation is not addressed, it can lead to respiratory failure and an inability to oxygenate the blood, even if other factors like circulation and perfusion are functioning. Consequently, prioritizing ventilation allows healthcare providers to restore and maintain sufficient oxygen levels and prevent immediate life-threatening consequences.

10. What should the RT do after an arterial blood sample is spilled on the lab counter?

A. Wash it with soap and water

B. Disinfect the counter with a bleach solution

C. Cover it with a paper towel

D. Leave it for janitorial staff to clean

After an arterial blood sample is spilled on a lab counter, the appropriate response is to disinfect the counter with a bleach solution. This action is critical for several reasons. Firstly, arterial blood can carry infectious agents, so it's essential to ensure that the area is properly sanitized to prevent transmission of any pathogens. Bleach is an effective disinfectant known for its ability to kill bacteria, viruses, and other pathogens. Using a bleach solution specifically is recommended because it is widely accepted in clinical settings for its broad-spectrum antimicrobial activity. After applying the disinfectant, it is also necessary to follow up with rinsing the surface to remove any residues, ensuring both safety and cleanliness. While other options might seem reasonable at first glance, they do not adequately address the need for effective disinfection. Washing with soap and water may clean the area, but it does not necessarily disinfect it to the required standard. Simply covering the spill with a paper towel fails to eliminate the risk of contamination and may even spread the biohazard. Leaving it for janitorial staff to clean is also inappropriate because immediate action is essential to prevent potential exposure to infectious materials.