Air Methods Critical Care Practice Exam (Sample)

Study Guide

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Questions

1. Which of the following represents the typical range for chloride (Cl-) levels in mEq/L?

A. 85-95

B. 95-105

C. 105-115

D. 115-125

2. What does abruptio placentae refer to?

A. Premature separation of the placenta from the uterine wall

B. A condition where the placenta covers the cervix

C. An infection of the placental tissue

D. A complication caused by gestational diabetes

3. What does the formula EDV - ESV describe?

A. The calculation for Cardiac Output

B. The measurement of Stroke Volume

C. The assessment of daily fluid intake

D. The evaluation of oxygen saturation

4. During which rhythm might you find a rate of 20-40 bpm?

A. Ventricular Fibrillation

B. Idioventricular Rhythm

C. Junctional Escape Rhythm

D. 3rd Degree AV Block

5. What laboratory tests should be considered in the assessment of lower airway obstruction?

A. Complete blood count

B. Viral studies and ABG

C. Urinalysis

D. Bacterial culture

6. What is the recommended dose of dopamine infusion in adult ACLS?

A. 1-5 mcg/kg/min

B. 2-10 mcg/kg/min

C. 5-15 mcg/kg/min

D. 10-20 mcg/kg/min

7. What happens to Systemic Vascular Resistance (SVR) during septic shock?

A. Increases

B. Decreases

C. Remains the same

D. Fluctuates

8. What is the desired INR range for a patient on Coumadin?

A. 0.5-1.0

B. 0.9-1.2

C. 1.5-2.0

D. 2.0-3.0

9. What is the role of Factor 13 in clotting?

A. It helps in the production of red blood cells

B. It stabilizes fibrin clots

C. It activates platelets

D. It initiates coagulation cascade

10. How does the gravid uterus affect functional residual capacity (FRC) in pregnant patients?

A. It increases FRC

B. It decreases FRC

C. No effect on FRC

D. It stabilizes FRC

Answers

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

Explanations

1. Which of the following represents the typical range for chloride (Cl-) levels in mEq/L?

A. 85-95

B. 95-105

C. 105-115

D. 115-125

The typical range for chloride (Cl-) levels in mEq/L is best represented by the value of 95-105. Chloride is an important electrolyte in the body, playing a key role in maintaining fluid balance, acid-base balance, and the formation of gastric acid. The normal reference range for chloride levels generally falls within this spectrum, meaning values below or above this range could indicate potential metabolic disturbances or other health issues. When interpreting laboratory results, healthcare providers often rely on these established ranges. Chloride levels below 95 may suggest a hypochloremic state often seen in conditions such as prolonged vomiting or metabolic alkalosis. Conversely, levels above 105 could indicate hyperchloremia, which may occur in situations like dehydration or metabolic acidosis. Knowing the standard range allows clinicians to better assess a patient's electrolyte status and respond appropriately to any imbalances.

2. What does abruptio placentae refer to?

A. Premature separation of the placenta from the uterine wall

B. A condition where the placenta covers the cervix

C. An infection of the placental tissue

D. A complication caused by gestational diabetes

Abruptio placentae refers to the medical condition where there is a premature separation of the placenta from the uterine wall before delivery occurs. This separation can lead to significant maternal and fetal complications, including hemorrhage and fetal distress. Early recognition and management are crucial to mitigate risks, as it can cause disruption in oxygen supply and nutrients to the fetus. In this context, understanding the nature of abruptio placentae is essential for healthcare providers. It is a serious obstetric emergency that requires immediate intervention to ensure the safety of both mother and child. Other conditions like placenta previa, which involves the placenta covering the cervix, or infections of placental tissue, do not pertain to the definition of abruptio placentae, nor does gestational diabetes directly cause this condition. Each of these scenarios involves different risks and requires distinct management strategies in clinical practice.

3. What does the formula EDV - ESV describe?

A. The calculation for Cardiac Output

B. The measurement of Stroke Volume

C. The assessment of daily fluid intake

D. The evaluation of oxygen saturation

The formula EDV - ESV is used to calculate Stroke Volume, which is the volume of blood pumped by the left ventricle of the heart with each heartbeat. EDV refers to End-Diastolic Volume, representing the total volume of blood in the ventricle at the end of diastole, just before the heart contracts. ESV stands for End-Systolic Volume, which is the volume of blood remaining in the ventricle after contraction. By subtracting the ESV from the EDV, you can determine how much blood the heart is able to eject with each contraction, hence quantifying Stroke Volume. Understanding Stroke Volume is critical in assessing cardiac function and can provide insights into various cardiovascular conditions. It is part of important calculations and concepts in critical care settings, especially for patients with compromised heart functions. Other listed choices relate to different physiological measurements or assessments and are not connected to the calculation derived from the EDV and ESV values.

4. During which rhythm might you find a rate of 20-40 bpm?

A. Ventricular Fibrillation

B. Idioventricular Rhythm

C. Junctional Escape Rhythm

D. 3rd Degree AV Block

An idioventricular rhythm is characterized by a ventricular rate typically ranging from 20 to 40 beats per minute. This rhythm occurs when the normal pacemaker of the heart (the sinoatrial node) fails to generate impulses, leading to the ventricles taking over as the primary pacemakers. The intrinsic rate of the ventricles is slower than that of the atria, which is why the heart rate is within this lower range. In this situation, the ventricles initiate contractions independently, often in response to a failure of higher pacemaker activity. It is a protective mechanism that can maintain some level of cardiac output during periods of significant cardiac distress or failure of the electrical conduction system. Understanding idioventricular rhythm is essential for recognizing the underlying cardiac pathophysiology and determining the appropriate treatment or intervention needed in critical care settings.

5. What laboratory tests should be considered in the assessment of lower airway obstruction?

A. Complete blood count

B. Viral studies and ABG

C. Urinalysis

D. Bacterial culture

The assessment of lower airway obstruction focuses on understanding the underlying causes and effects on respiratory function. Viral studies and arterial blood gas (ABG) analysis are particularly relevant in this context. Viral studies can help identify respiratory infections caused by viruses, which are common contributors to lower airway obstruction, especially in pediatric populations or during certain seasonal outbreaks. Conditions like asthma exacerbations or bronchiolitis can be triggered by viral infections, leading to compromised airway patency. Arterial blood gas analysis is a critical test when evaluating a patient with suspected lower airway obstruction. It provides valuable information about the patient's oxygenation status, carbon dioxide retention, and acid-base balance. In cases of significant obstruction, patients may exhibit hypoxemia (low oxygen levels) and hypercapnia (elevated carbon dioxide levels), both of which can guide treatment decisions and interventions. In contrast, other options like complete blood count, urinalysis, and bacterial cultures have less direct relevance to the acute assessment of lower airway obstruction. While a complete blood count can provide insights into potential infections, it does not specifically address the condition of the airways. Urinalysis is not useful in this context, as it evaluates renal function and hydration status rather than respiratory function. Bacterial

6. What is the recommended dose of dopamine infusion in adult ACLS?

A. 1-5 mcg/kg/min

B. 2-10 mcg/kg/min

C. 5-15 mcg/kg/min

D. 10-20 mcg/kg/min

Dopamine is a catecholamine used in the management of patients who show signs of hemodynamic instability, particularly in advanced cardiac life support (ACLS) scenarios. The recommended dose of dopamine infusion can vary based on the desired therapeutic effect. The correct choice reflects the dosage range that primarily focuses on providing increased cardiac output and improving renal perfusion. At doses of 2-10 mcg/kg/min, dopamine acts predominantly on beta-1 adrenergic receptors, leading to increased heart rate and myocardial contractility. This range is often employed in cases where support is needed for cardiac function, as it stimulates the heart to pump more effectively without significantly causing vasoconstriction. Understanding that specific dose ranges can impact the actions of dopamine is crucial for clinical practice, particularly in emergency situations. Below this range, the drug can have minimal effects, and above 10 mcg/kg/min, the alpha-adrenergic effects can become more pronounced, which could lead to increased systemic vascular resistance and potential complications. Therefore, the choice of 2-10 mcg/kg/min aligns with the goal of optimizing cardiac output and ensuring adequate organ perfusion in an adult patient experiencing shock or cardiac failure within the ACLS framework.

7. What happens to Systemic Vascular Resistance (SVR) during septic shock?

A. Increases

B. Decreases

C. Remains the same

D. Fluctuates

During septic shock, Systemic Vascular Resistance (SVR) decreases due to the widespread vasodilation caused by the release of inflammatory mediators such as cytokines. In septic shock, the body undergoes a profound response to infection, leading to **vasodilation in the systemic circulation. This response is primarily driven by the release of substances such as nitric oxide and prostaglandins which promote the relaxation of vascular smooth muscle. As a result of this vasodilation, the vessels become larger, allowing for greater blood flow and decreased resistance to blood flow through the systemic circulation. This decrease in SVR is a hallmark of septic shock and is critical to understand in the context of the pathophysiology underlying the condition, as it impacts blood pressure and organ perfusion. Maintaining an awareness of SVR in septic patients can inform treatment strategies aimed at restoring hemodynamic stability.**

8. What is the desired INR range for a patient on Coumadin?

A. 0.5-1.0

B. 0.9-1.2

C. 1.5-2.0

D. 2.0-3.0

The desired INR (International Normalized Ratio) range for a patient on Coumadin (warfarin) is typically between 2.0 and 3.0, depending on the clinical situation. This range is intended to provide effective anticoagulation, reducing the risk of blood clots while minimizing the risk of excessive bleeding. Patients with certain conditions, such as atrial fibrillation or those who have had a heart valve replacement, often benefit from this INR range because it effectively balances the therapeutic effects of anticoagulation. When the INR is below this range, there is a higher risk of thrombosis, whereas an INR above this range can significantly increase the risk of bleeding complications. Although some settings, such as treatment for superficial venous thrombosis or post-surgical patients, might aim for slightly lower INR values, the standard goal for most indications involving Coumadin administration is indeed within the 2.0 to 3.0 range.

9. What is the role of Factor 13 in clotting?

A. It helps in the production of red blood cells

B. It stabilizes fibrin clots

C. It activates platelets

D. It initiates coagulation cascade

Factor 13 plays a crucial role in the coagulation process by stabilizing fibrin clots. Once fibrin is formed during the clotting cascade, Factor 13 is activated (by thrombin) and cross-links the fibrin molecules, which strengthens the clot and prevents it from being easily broken down. This stabilization is vital for maintaining hemostasis, especially in preventing excessive bleeding and ensuring that the clot remains intact until tissue repair occurs. The integrity of the clot ensures that it can effectively function as a barrier to blood loss while allowing the healing process to take place within the injury site.

10. How does the gravid uterus affect functional residual capacity (FRC) in pregnant patients?

A. It increases FRC

B. It decreases FRC

C. No effect on FRC

D. It stabilizes FRC

During pregnancy, the enlarging uterus significantly influences the respiratory system, particularly the functional residual capacity (FRC). The functional residual capacity is the volume of air present in the lungs after a normal exhalation, which allows for adequate gas exchange between breaths. As the gravid uterus expands, it exerts upward pressure on the diaphragm, which reduces the vertical dimension of the thoracic cavity. This mechanical restriction limits the expansion of the lungs, thereby leading to a decrease in FRC. The reduced space for lung inflation causes the lungs to have less reserve volume available, which can impact ventilation and, consequently, oxygenation. Understanding this physiological change is crucial for the management and care of pregnant patients, especially in critical care settings where respiratory function can be impacted significantly. The decreased FRC can predispose these patients to complications such as hypoxemia, making awareness and monitoring essential in clinical practice.