Anesthesia Knowledge Test 24 (AKT-24) Practice (Sample)

Study Guide

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Questions

1. What therapy can be used for infants with neonatal myasthenia gravis to alleviate weakness?

A. Beta-blockers

B. Anticholinesterase therapy

C. Immunosuppressants

D. Corticosteroids

2. What does the acidemia in maternal blood result in?

A. Decreased oxygen delivery to the baby

B. Increased fetal heart rate

C. Enhanced oxygen uptake by the mother

D. Increased fetal blood pressure

3. Which combination of factors can reduce the risk of phlebitis in peripheral TPN?

A. A) High osmolar solutions

B. B) Adding heparin and hydrocortisone

C. C) Using a multilumen catheter

D. D) Shortening the infusion duration

4. Why does codeine increase respiratory depression risk in children?

A. Overdose from high dosages

B. Due to ultra-rapid metabolism in some children

C. Reactive airway disease

D. Age-related pharmacodynamics

5. What is the primary mechanism through which patients lose heat in an operating room?

A. Conduction

B. Evaporation

C. Radiation

D. Convection

6. What condition is associated with 20-30% difficult intubation due to subglottic narrowing?

- **A. Acromegaly**
- **B. Diabetes Mellitus**
- **C. Rheumatoid Arthritis**
- **D. Pierre Robin Syndrome**

7. What does PDA stand for in the context of coronary circulation?

- **A. Posterior descending artery**
- **B. Pulmonary diameter artery**
- **C. Pericardial diameter artery**
- **D. Posterior diastolic artery**

8. After how many months without apnea can a former premature infant proceed to elective outpatient surgery?

- **A. A) 1 month**
- **B. B) 3 months**
- **C. C) 6 months**
- **D. D) 12 months**

9. What muscles does the axillary nerve innervate?

- **A. Deltoid and teres major**
- **B. Biceps and triceps**
- **C. Deltoid, long head of triceps, and teres minor**
- **D. Latissimus dorsi and supraspinatus**

10. What is a consideration when measuring pain and nausea control during recovery?

- **A. Duration of anesthesia**
- **B. Number of dressing changes required**
- **C. Type of surgical intervention performed**
- **D. Patient's age and baseline health status**

Answers

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

Explanations

1. What therapy can be used for infants with neonatal myasthenia gravis to alleviate weakness?

A. Beta-blockers

B. Anticholinesterase therapy

C. Immunosuppressants

D. Corticosteroids

Infants with neonatal myasthenia gravis often experience muscle weakness due to the presence of maternal antibodies that interfere with neuromuscular transmission. Anticholinesterase therapy is an effective treatment for this condition. This therapy works by inhibiting the enzyme acetylcholinesterase, which breaks down acetylcholine in the neuromuscular junction. By preventing the breakdown of acetylcholine, this therapy increases the availability of acetylcholine, thereby enhancing neuromuscular transmission and improving muscle strength. In the context of treating neonatal myasthenia gravis, anticholinesterase drugs, such as neostigmine, are particularly beneficial. They can help alleviate the symptoms of weakness and provide significant relief for affected infants. Other treatment options, like beta-blockers and immunosuppressants, may not directly target the mechanism causing weakness in neonatal myasthenia gravis. Corticosteroids, while useful in the broader context of autoimmune disorders, may not be the first line of treatment in this specific case, particularly for acute management of muscle weakness in infants. Thus, anticholinesterase therapy is targeted and provides effective symptom relief in this scenario.

2. What does the acidemia in maternal blood result in?

A. Decreased oxygen delivery to the baby

B. Increased fetal heart rate

C. Enhanced oxygen uptake by the mother

D. Increased fetal blood pressure

Acidemia in maternal blood leads to a decreased pH level, which can significantly affect oxygen delivery to the fetus. The presence of acidemia can impair the affinity of hemoglobin for oxygen through a phenomenon known as the Bohr effect, where increased levels of carbon dioxide and hydrogen ions cause hemoglobin to release oxygen more readily. However, this impaired oxygen transport also means that less oxygen binds to maternal hemoglobin, ultimately reducing the oxygen available to be transferred to the fetus. The decreased oxygen delivery can have serious consequences for fetal health, as adequate oxygen is crucial for proper development and function of the fetal organs. This scenario underscores why maintaining maternal acid-base balance is essential for the well-being of both the mother and the fetus during pregnancy. While other choices may seem linked to fetal or maternal physiology, they do not directly reflect the primary effect of maternal acidemia on oxygen delivery to the fetus as clearly as the chosen response.

3. Which combination of factors can reduce the risk of phlebitis in peripheral TPN?

A. A) High osmolar solutions

B. B) Adding heparin and hydrocortisone

C. C) Using a multilumen catheter

D. D) Shortening the infusion duration

The combination of adding heparin and hydrocortisone to peripheral total parenteral nutrition (TPN) can help reduce the risk of phlebitis through their pharmacological actions. Heparin is an anticoagulant that can help prevent clot formation around the catheter and within the vein, reducing irritation and inflammation that can lead to phlebitis. Hydrocortisone, a corticosteroid, may also have an anti-inflammatory effect, which can reduce the local inflammatory response at the infusion site. Both agents working together can significantly mitigate the venous irritation and inflammatory response associated with high osmolar solutions often found in TPN formulations. In comparison, high osmolar solutions, while commonly used in TPN, can actually contribute to increased risk of phlebitis due to their irritative potential on the endothelial lining of veins. The use of multilumen catheters does not inherently reduce the risk of phlebitis; rather, they can complicate care and may still lead to similar risks depending on how they are managed. Finally, shortening the infusion duration could potentially limit exposure to the irritative solutions but is not the most effective strategy for minimizing phlebitis compared to the protective effects of pharmacological agents like hepar

4. Why does codeine increase respiratory depression risk in children?

A. Overdose from high dosages

B. Due to ultra-rapid metabolism in some children

C. Reactive airway disease

D. Age-related pharmacodynamics

The increased risk of respiratory depression in children taking codeine is primarily due to ultra-rapid metabolism in some individuals. Certain genetic variations affect the metabolism of codeine. In ultra-rapid metabolizers, the enzyme CYP2D6 converts codeine into its active form, morphine, much more efficiently and quickly than in normal metabolizers. This can lead to elevated levels of morphine in the system, resulting in an increased risk of sedation and respiratory depression. This phenomenon is particularly concerning in children, as their respiratory systems are still maturing, making them more susceptible to the side effects of opioids. When prescribing codeine, it is important to consider genetic differences that may affect drug metabolism, and awareness of this increased risk in specific populations is crucial for patient safety.

5. What is the primary mechanism through which patients lose heat in an operating room?

A. Conduction

B. Evaporation

C. Radiation

D. Convection

In an operating room, the primary mechanism through which patients lose heat is radiation. Radiation involves the transfer of heat in the form of infrared energy, which can occur without direct contact between surfaces. In a typical surgical environment, the patient loses body heat to cooler surrounding surfaces, such as lights, walls, and instruments, through radiative heat loss. This process can significantly impact a patient's body temperature, particularly since the operating room environment is usually kept cooler for the benefit of the surgical team and to reduce the risk of infection. While conduction, evaporation, and convection also contribute to heat loss, they play smaller roles relative to radiation in this specific context. Conduction involves direct contact, such as a patient lying on a cold table, but its effect is usually less significant than radiation. Evaporation occurs due to moisture loss from the skin and respiratory tract but is dependent on factors like humidity levels. Convection involves air movement, which can carry heat away from the skin surface but is generally less dominant than radiation in the operating room setting. Understanding these mechanisms is crucial for managing a patient's temperature and preventing unintended hypothermia during surgery.

6. What condition is associated with 20-30% difficult intubation due to subglottic narrowing?

A. Acromegaly

B. Diabetes Mellitus

C. Rheumatoid Arthritis

D. Pierre Robin Syndrome

Acromegaly is associated with a 20-30% incidence of difficult intubation primarily due to anatomical changes resulting from excessive growth hormone, which leads to subglottic narrowing among other potential airway distortions. In acromegaly, patients experience soft tissue enlargement, particularly in the face and neck, which can cause airway obstruction or make visualization of the airway more challenging during intubation. This condition generates particular concern for anesthesiologists, as the altered anatomy may necessitate specialized approaches to intubation, such as the use of fiberoptic intubation techniques or alternative airway management strategies. In contrast, while diabetes mellitus may present with associated complications, notably in terms of vascular and neurological issues, it does not typically lead to the same degree of anatomical changes affecting the airway. Rheumatoid arthritis can lead to cervical spine issues and temporomandibular joint problems but is not as directly linked with subglottic narrowing. Pierre Robin syndrome, although associated with airway complications due to micrognathia and a retrognathic mandible, is not specifically characterized by the 20-30% rate of difficult intubation due to subglottic narrowing as seen in acromegaly.

7. What does PDA stand for in the context of coronary circulation?

A. Posterior descending artery

B. Pulmonary diameter artery

C. Pericardial diameter artery

D. Posterior diastolic artery

In the context of coronary circulation, PDA stands for Posterior Descending Artery. This artery is a crucial vessel that supplies blood to the posterior part of the heart, particularly the inferior wall of the left ventricle and part of the interventricular septum. Understanding the role of the PDA is vital in the evaluation of coronary artery disease and myocardial perfusion. The posterior descending artery is typically a branch of the right coronary artery in right-dominant coronary systems, which is the case in the majority of individuals. Its importance can also be highlighted in conditions such as inferior myocardial infarctions, where blockage of the PDA can lead to specific complications and clinical manifestations. The other terms presented, such as pulmonary diameter artery, pericardial diameter artery, and posterior diastolic artery, do not correspond to recognized vessels in the context of coronary anatomy and circulation. Thus, recognizing PDA as the Posterior Descending Artery is essential for understanding coronary anatomy and related pathologies.

8. After how many months without apnea can a former premature infant proceed to elective outpatient surgery?

A. A) 1 month

B. B) 3 months

C. C) 6 months

D. D) 12 months

For former premature infants, the guidelines generally recommend that they should be free of apnea for at least six months before proceeding with elective outpatient surgery. This is because these infants are at a higher risk for apnea, particularly if they were born very prematurely. The risk of apnea decreases significantly as they mature and grow, so waiting for this period allows for further neurological and physiological development, minimizing the likelihood of complications during anesthesia and surgery. Choosing six months provides a safe buffer period during which clinicians can be more confident that the infant's respiratory stability has improved compared to shorter timeframes, making it the appropriate interval for proceeding to elective procedures.

9. What muscles does the axillary nerve innervate?

A. Deltoid and teres major

B. Biceps and triceps

C. Deltoid, long head of triceps, and teres minor

D. Latissimus dorsi and supraspinatus

The axillary nerve innervates the deltoid muscle and the teres minor muscle, which are critical for shoulder function. The deltoid is responsible for arm abduction, flexion, and extension, while the teres minor contributes to the lateral rotation of the arm. The long head of the triceps, although primarily innervated by the radial nerve, is in close proximity and often mentioned in discussions about shoulder landmark innervations. However, the axillary nerve specifically does not innervate the long head of the triceps. This combination of muscles reflects the axillary nerve's role in both the movement and stability of the shoulder joint, making the choice that includes the deltoid, teres minor, and noting the long head of the triceps relevant in the context of anatomical discussions. Understanding this innervation is crucial for diagnosing and managing injuries or conditions affecting the shoulder region, particularly when considering how axillary nerve damage can lead to weakened shoulder movement.

10. What is a consideration when measuring pain and nausea control during recovery?

A. Duration of anesthesia

B. Number of dressing changes required

C. Type of surgical intervention performed

D. Patient's age and baseline health status

When assessing pain and nausea control during recovery from anesthesia, the patient's age and baseline health status is a crucial consideration. Older patients or those with pre-existing health conditions may experience variations in their responses to pain and nausea, influenced by factors such as altered metabolism, differing pain thresholds, or pre-operative medication use. This demographic information can help tailor postoperative care to mitigate discomfort more effectively. In addition, understanding the baseline health status helps anesthesia providers anticipate potential complications and adjust pain management protocols to ensure that recovery is as smooth as possible. In contrast, while the duration of anesthesia, the number of dressing changes, and the type of surgical intervention performed can all impact recovery, none are as directly significant when considering individual pain management strategies in relation to the diverse responses based on patient-specific characteristics like age and health status.