

Obstetric Analgesia & Anesthesia

Topic- based Uworld Questions

Block 1, 2, 7, 8



A 28-year-old primigravid woman at 40 weeks gestation is hospitalized for induction of labor. She has no chronic medical conditions, and her pregnancy has been uncomplicated. Intravaginal misoprostol is administered for cervical ripening followed by intravenous infusion of oxytocin. Progressive uterine contractions are achieved, and the fetal heart rate tracing is reassuring. Patient-controlled bupivacaine via an epidural catheter is started for pain control. Twenty minutes later, the patient experiences perioral numbness, a metallic taste in her mouth, and tinnitus. She also reports feelings of anxiety and palpitations but has no headache or visual disturbances. Blood pressure is 150/86 mm Hg and pulse is 110/min. Physical examination reveals normal deep tendon reflexes and no clonus. While being examined, the patient has a generalized tonic-clonic seizure. Which of the following is the most likely cause of this patient's seizure?

- A. Bupivacaine systemic toxicity
- B. Eclampsia
- C. Inadvertent spinal block
- D. Misoprostol adverse effect
- E. Oxytocin toxicity

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- A. Bupivacaine systemic toxicity (61%)
- B. Eclampsia (17%)
- C. Inadvertent spinal block (6%)
- D. Misoprostol adverse effect (1%)
- E. Oxytocin toxicity (12%)

Omitted

Correct answer
A



61%
Answered correctly



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Time Spent



06/07/2020
Last Updated

Explanation

During labor, **epidural analgesia** is the preferred method of pain control because it provides pain relief with minimal maternal and fetal sedation. The epidural catheter is normally inserted into the epidural space to deliver a controlled, low-concentration, slow release of **local anesthetic** (eg,



Explanation

During labor, **epidural analgesia** is the preferred method of pain control because it provides pain relief with minimal maternal and fetal sedation. The epidural catheter is normally inserted into the epidural space to deliver a controlled, low-concentration, slow release of **local anesthetic** (eg, **bupivacaine**).

However, the epidural catheter can sometimes be inadvertently inserted into the epidural vasculature, resulting in direct delivery of the anesthetic into the maternal circulation and rapid systemic drug absorption. This causes local anesthetic **systemic toxicity**, which initially blocks inhibitory neural pathways to cause symptoms of CNS overactivity (eg, **perioral numbness, metallic taste, tinnitus**). This CNS overactivity may develop into a **generalized tonic-clonic seizure**. Cardiovascular sympathetic activation (eg, tachycardia, hypertension) can follow with a risk of fulminant **cardiovascular collapse**.

Management of local anesthetic systemic toxicity is with drug cessation, benzodiazepines for seizure control, and supportive care.

(Choice B) Eclampsia is a common cause of intrapartum seizure and can present with hypertension. In contrast to this patient, those with eclampsia typically have headache, visual disturbances (eg, scotomata), and hyperreflexia with clonus.

(Choice C) An inadvertent spinal block can occur if the epidural catheter accidentally punctures the dura and local anesthetic is injected into the intrathecal space. This can cause a "high spinal" or total spinal anesthesia, a life-threatening complication that typically presents with hypotension and respiratory depression due to diaphragmatic paralysis.

(Choice D) Misoprostol, a synthetic prostaglandin, is more commonly associated with abdominal pain and diarrhea, which are not seen in this patient. It is not associated with seizures.

(Choice E) Oxytocin has a similar structure to antidiuretic hormone and can cause severe hyponatremia, cerebral edema, and seizures if administration is excessive or prolonged (eg, lengthy induction of labor). However, oxytocin toxicity does not typically cause perioral numbness or a metallic taste.

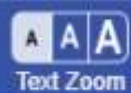
Educational objective:

Local anesthetic systemic toxicity, a potential complication of epidural analgesia, can cause CNS overactivity (eg, perioral numbness, metallic taste, tinnitus) and generalized tonic-clonic seizures.

A 19-year-old woman, gravida 1 para 0, at 34 weeks gestation is admitted to the hospital for preeclampsia with severe features. She has no chronic medical conditions and takes no medications. On admission, temperature is 36.7 C (98.1 F), blood pressure is 170/110 mm Hg, pulse is 80/min, and respirations are 16/min. While administering the magnesium sulfate bolus, the fetal heart rate becomes persistently bradycardic to the 90s. The patient is rushed to the operating room for an emergency cesarean delivery and undergoes general anesthesia. Immediately after intubation, intraoperative temperature is 39.4 C (102.9 F), blood pressure is 180/110 mm Hg, pulse is 130/min, and respiratory rate is 30/min. The patient is markedly rigid and increasingly difficult to ventilate. Which of the following is the most likely cause of this patient's acute decompensation?

- A. Amniotic fluid embolism
- B. Eclamptic seizure
- C. Magnesium sulfate toxicity
- D. Malignant hyperthermia
- E. Neuroleptic malignant syndrome

Submit



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- A. Amniotic fluid embolism (1%)
- B. Eclamptic seizure (3%)
- C. Magnesium sulfate toxicity (4%)
- D. Malignant hyperthermia (83%)
- E. Neuroleptic malignant syndrome (6%)

Omitted

Correct answer
D



83%
Answered correctly



02 secs
Time Spent



04/12/2020
Last Updated

Explanation

Malignant hyperthermia

Malignant hyperthermia	
Epidemiology	<ul style="list-style-type: none"> Genetic mutation alters control of intracellular calcium Triggered by volatile anesthetics, succinylcholine, excessive heat
Manifestations	<ul style="list-style-type: none"> Masseter muscle/generalized rigidity Sinus tachycardia Hypercarbia resistant to increased minute ventilation Rhabdomyolysis Hyperkalemia Hyperthermia (late manifestation)
Treatment	<ul style="list-style-type: none"> Respiratory/ventilatory support Immediate cessation of causative anesthetic Dantrolene

This patient with preeclampsia with severe features was being managed appropriately (eg, magnesium sulfate) but developed fetal bradycardia requiring emergency cesarean delivery. Her acute decompensation following anesthetic induction is most likely due to **malignant hyperthermia** (MH), a rare but life-threatening condition likely due to a skeletal muscle receptor anomaly that results in excessive intracellular calcium accumulation upon **anesthesia exposure** (eg, anesthesia induction).

As a result of the calcium accumulation, patients with MH develop **sudden-onset muscle rigidity** (ie, prolonged muscle contraction) and resultant muscle hypermetabolism (eg, **fever, tachycardia**). In addition, MH causes hypercarbia and **tachypnea** (due to increased cellular metabolism), **difficulty ventilating**, and rhabdomyolysis (eg, myoglobinuria). Management is immediate cessation of the anesthetic, administration of **dantrolene** (a skeletal muscle relaxant), and supportive care (in addition to completing the emergency delivery as quickly and as safely as possible in this patient).

(Choice A) Amniotic fluid embolism (AFE) typically presents postpartum as acute cardiac or respiratory collapse and disseminated intravascular coagulopathy, possibly due to anaphylaxis from amniotic fluid entering maternal circulation. In contrast to this patient, AFE causes profound



Previous



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Full Screen



Tutorial



Lab Values



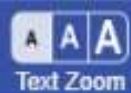
Notes



Calculator



Reverse Color



Text Zoom

(Choice A) Amniotic fluid embolism (AFE) typically presents postpartum as acute cardiac or respiratory collapse and disseminated intravascular coagulopathy, possibly due to anaphylaxis from amniotic fluid entering maternal circulation. In contrast to this patient, AFE causes profound hypotension (systolic <90 mm Hg).

(Choice B) Eclamptic seizures can occur in patients with preeclampsia with severe features. Although this patient has severe-range blood pressures (eg, systolic ≥ 160 mm Hg or diastolic ≥ 110 mm Hg), she has received magnesium sulfate for seizure prophylaxis. In addition, eclampsia does not cause fever or tachypnea, making this diagnosis less likely.

(Choice C) Magnesium sulfate is used for seizure prophylaxis in patients with preeclampsia, likely via membrane stabilization that raises the seizure threshold. Toxic doses can affect both skeletal muscle (decreased acetylcholine release) and cardiac muscle (prolonged conduction time); therefore, patients can develop marked muscle weakness, loss of deep tendon reflexes, respiratory depression (rather than tachypnea), and cardiac arrest.

(Choice E) Although neuroleptic malignant syndrome has a similar presentation to MH (eg, fever, muscle rigidity), it is triggered by neuroleptic agents (eg, haloperidol, promethazine) rather than anesthetics. In addition, neuroleptic malignant syndrome develops over the course of days, not minutes.

Educational objective:

Malignant hyperthermia is a rare, life-threatening condition that presents after anesthetic induction with sudden-onset fever, tachycardia, tachypnea (eg, difficulty ventilating), and muscle rigidity. Treatment is immediate cessation of the anesthetic and administration of dantrolene.

References

- [Malignant hyperthermia: a review.](#)
- [Malignant hyperthermia.](#)

Obstetrics & Gynecology

Subject

Pregnancy, Childbirth & Puerperium

System

Malignant hyperthermia

Topic

A 32-year-old nulliparous woman starts to experience more painful contractions as she transitions into active labor. On admission, her blood pressure is 120/80 mm Hg. Fetal heart rate tracing shows a baseline of 130/min, moderate variability, positive accelerations, and no decelerations. Uterine contractions occur every 2-3 minutes. Cervical examination shows 6 cm dilation, 75% effacement, and 0 station. She requests epidural anesthesia for pain control. After induction of anesthesia, she begins to feel light-headed and her blood pressure is 90/55 mm Hg, heart rate is 120/min, and respirations are 12/min. The patient has normal strength and sensation of the upper extremities. What is the most probable cause of her hypotension?

- A. Depressed myocardial contractility
- B. Depression of brainstem activity
- C. Leakage of spinal fluid
- D. Progressive hypovolemia
- E. Vasodilation and venous pooling


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- A. Depressed myocardial contractility (3%)
- B. Depression of brainstem activity (10%)
- C. Leakage of spinal fluid (5%)
- D. Progressive hypovolemia (1%)
- E. Vasodilation and venous pooling (79%)

Omitted
Correct answer
E

 79%
Answered correctly

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Time Spent

 02/28/2020
Last Updated

Explanation

This patient is experiencing hypotension as a side effect of epidural anesthesia. Hypotension occurs in up to 10% of epidurals given during labor and can be easily prevented and treated. Continuous epidural analgesia involves infusion of a low concentration of a local anesthetic into the **epidural space** at the L2-L5 level, blocking nerves responsible for labor pain. It is a highly effective modality for pain relief in labor. Hypotension occurs when the sympathetic nerve fibers responsible for vascular tone are blocked, resulting in vasodilation (venous pooling), decreased venous



This patient is experiencing hypotension as a side effect of epidural anesthesia. Hypotension occurs in up to 10% of epidurals given during labor and can be easily prevented and treated. Continuous epidural analgesia involves infusion of a low concentration of a local anesthetic into the **epidural space** at the L2-L5 level, blocking nerves responsible for labor pain. It is a highly effective modality for pain relief in labor. Hypotension occurs when the sympathetic nerve fibers responsible for vascular tone are blocked, resulting in vasodilation (venous pooling), decreased venous return to the right side of the heart, and decreased cardiac output. Persistent, untreated hypotension can result in decreased placental perfusion and can lead to fetal acidosis. It can be prevented by aggressive intravenous fluid volume expansion prior to epidural placement. Treatment includes left uterine displacement (positioning patient on the left side) to improve venous return, additional intravenous fluid bolus, or vasopressor administration.

(Choice A) Acute depression of myocardial contractility develops during myocardial infarction and is usually accompanied by chest pain and dyspnea. Hypotension occurs secondary to cardiogenic shock. This patient has no symptoms of myocardial infarction and it is rare in a healthy 32-year-old.

(Choice B) Depression of cervical spinal cord and brainstem activity occurs when local anesthesia ascends toward the head, also known as a "high spinal" or "**total spinal**," a dangerous complication of epidural anesthesia. It may happen with intrathecal injection or overdose of the anesthetic. First signs include **hypotension, bradycardia, and respiratory difficulty**, and later, diaphragmatic paralysis and possibly cardiopulmonary arrest.

(Choice C) Leakage of cerebral spinal fluid may occur if the dura is inadvertently punctured during epidural placement. This results in leakage of spinal fluid and is known as a "wet tap." Patients may experience **postural headaches** that are worse with sitting up and improved with lying down after delivery. Hypotension is not characteristic.

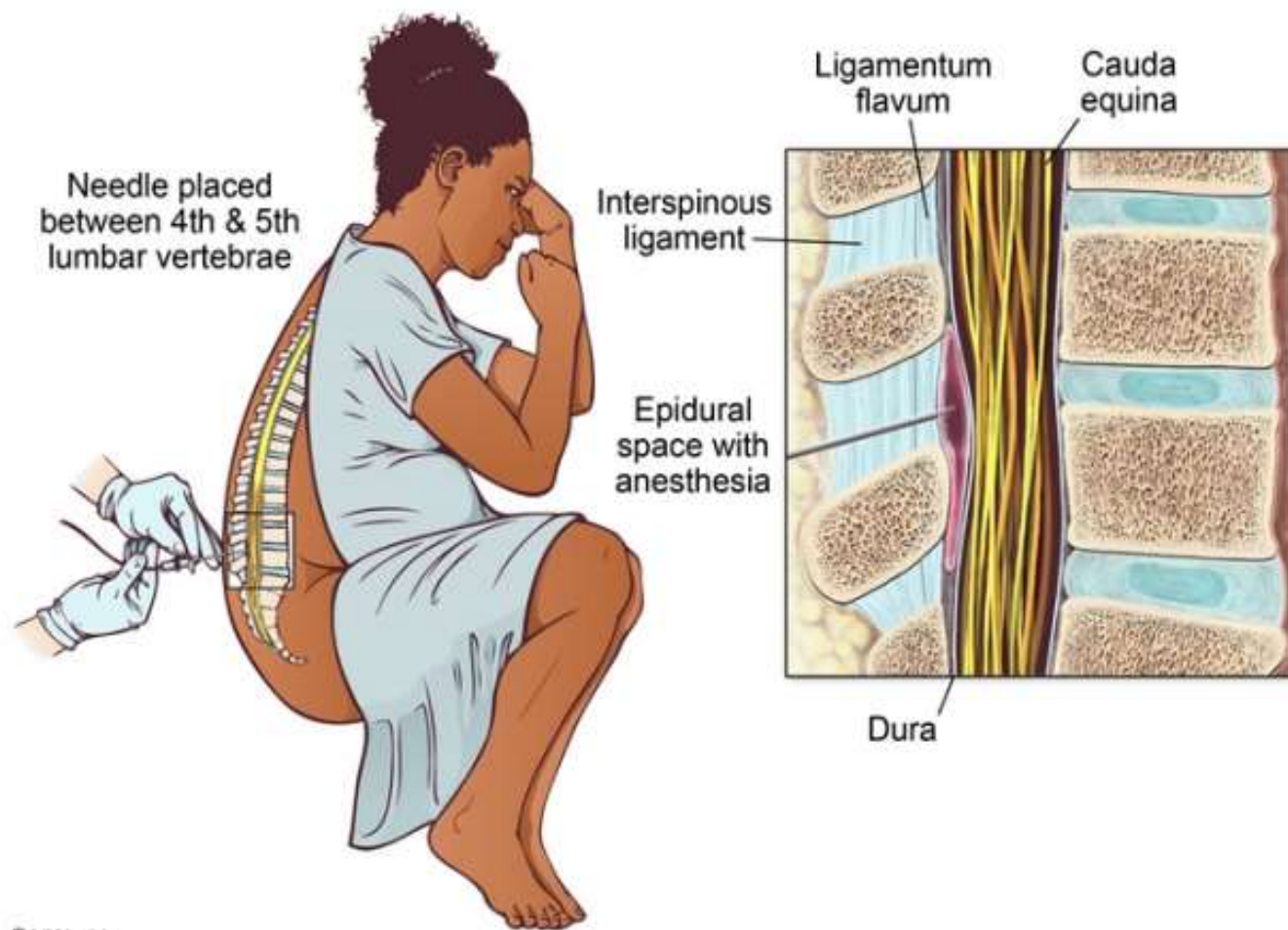
(Choice D) Progressive hypovolemia may be secondary to ongoing fluid and blood loss or electrolyte abnormalities. In an otherwise healthy obstetric patient, volume depletion or electrolyte abnormalities are uncommon. Hemorrhage may accompany obstetric complications such as uterine rupture, abruptio placenta, or placenta previa but is uncommon and is typically accompanied by vaginal bleeding with or without abdominal pain.

Educational objective:

Hypotension is a common side effect of epidural anesthesia. The cause of hypotension is blood redistribution to the lower extremities and venous

Exhibit Display

Lumbar epidural puncture



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