Check Your Knowledge Answers

Chapter 14: Pediatric Advanced Life Support Essentials

1. C, Survival rates for out-of-hospital cardiac arrest are less than 10%.

2. E, Post-cardiac arrest care.

3. C, The CPR sequence is chest compressions, airway, breathing (C-A-B).

4. D, Provide chest compression at a rate of at least 100/min.

5. E, AEDs can be used in infants (<1 year old).

6. C, Continuous waveform capnography is recommended for intubated patients.

7. E, Amiodarone is recommended for use during VF or pulseless VT.

8. C, Calcium can be used for calcium channel blocker overdose, hypermagnesemia, hyperkalemia, and hypocalcemia.

Chapter 15: Preparedness for Pediatric Emergencies

1. D, Pediatric-specific patient care areas. The Society of Academic Emergency Medicine (SAEM) position statement said that although having a pediatric-specific patient care area is ideal, it is not mandatory. The American College of Emergency Physicians and American Academy of Pediatric guidelines addressed having pediatric coordinators, equipment, medications, quality improvement programs, and pediatric-specific policies.

2. A, Pediatric physician coordinators must be board certified in pediatrics or pediatric emergency medicine. The pediatric physician coordinator must meet the qualifications for credentialing by the hospital as a specialist in emergency medicine or pediatric emergency medicine or, in communities where these specialists do not exist, must meet qualifications for credentialing by the hospital as a specialist in pediatrics or family medicine. Therefore, the pediatric coordinator could be a general emergency physician or the emergency department director. In addition, the pediatric coordinator could be a staff physician with other roles.

3. C, Pediatric resuscitation. Although having a pediatric resuscitation/mock code program is extremely useful, it is not a specific policy. On the other hand, administrative policies, procedures, and protocol dealing with interfacility transfers, child maltreatment, pediatric triage, and death of a child in the emergency department should be in place.

4. C, The child should be triaged and treatment begun, pending contact with the parents. A child with a mild asthma attack should be triaged, and medical care begun. A child or adolescent should never have medical care delayed because of problems obtaining consent from a guardian.
Chapter 16: Metabolic Disease

1.D. Treatment with sodium bicarbonate.
2.B. Ambiguous genitalia.
3.D. Fluid restriction unless the patient is seizing or severely lethargic or comatose.
4.C. Rare in older children with DI and normal thirst mechanisms.
5.D. Lysosomal storage disorders.
6.A. Metabolic acidosis, hyperammonemia, hypoglycemia.
7.D. 25% dextrose (2 mL/kg) and normal saline (20 mL/kg).
8.A. Hemodialysis.

Chapter 17: Environmental Emergencies

1.B. Heat exhaustion. This child's symptoms are consistent with heat exhaustion. Heat cramps are manifested by severe cramps of heavily exercised muscles that occur after exercise. Usually, patients with heat cramps have been drinking large amounts of hypotonic fluids. Heat syncope is exhibited by syncopal episodes, which this child did not have. Patients with heat stroke usually have core temperature greater than 41°C and altered mental status. Often these children have an absence of sweating, although sweating might be present.
2.C. Administer intravenous (IV) normal saline at 20 mL/kg and obtain a complete blood cell count and electrolyte, BUN, and creatinine levels. The management of heat exhaustion includes placing the patient in a cool environment, starting fluids with normal saline to treat dehydration, and obtaining a panel of laboratory studies. Antipyretics are ineffective in patients with heat stroke and heat exhaustion. The use of ice water enemas or placing the patient in a tub of ice water can be appropriate therapies for management of heat stroke but are not needed in this case.
3.D. Warmed oxygen by endotracheal tube plus IV fluids heated to 40°C (104°F). The protection of the child's airway is warranted in this case, requiring intubation. However, warmed humidified oxygen alone is not the most effective way of increasing this child's core temperature. Warm blankets plus heat lamps are useful only for the mildest cases of hypothermia. Forced air rewarming devices have been effective in similar cases; however, they are not widely available and would not provide airway protection.
4.C. Signs of neurologic involvement. Paresthesia, weakness, diplopia, and bulbar signs are seen with coral snake envenomation. Pain and edema are minimal with coral snake envenomations but might not be present in “dry bites” of pit vipers. Unlike pit vipers, antivenin is recommended for any patient with documented coral snake bite because it is more difficult to monitor the progression of signs and symptoms.
Chapter 18: Toxicology

1. A, Ferrous sulfate. Iron ions are too small to be absorbed by activated charcoal. All other options are well absorbed and bound by charcoal and might benefit from multidose regimens.

2. C, Isopropanol. Although isopropanol can cause an elevated osmolar gap, it typically causes a state of respiratory alkalosis rather than an elevated anion gap metabolic acidosis. All of the other ingestions cause metabolic acidosis and an elevated anion gap.

3. B, Flumazenil. The benzodiazepine antagonist flumazenil should not be administered in poisoned, comatose patients with an unclear cause because its administration can induce seizure activity in mixed drug ingestions (e.g., tricyclic antidepressants) or induce life-threatening benzodiazepine withdrawal in long-term users. However, in the comatose child with a documented acute benzodiazepine overdose, this is an effective antidote and might prevent the child from requiring emergent intubation and subsequent ventilatory support.

4. D, The child’s age. Carbon monoxide poisoning should be considered in any child with nausea, vomiting, or headache, with or without altered sensorium, when there is no other obvious cause. Not infrequently, the child with occult carbon monoxide toxicity presents with a nonfebrile flulike illness and improves considerably while under care in the ED. Even when all individuals are exposed to similar amounts of carbon monoxide, children are often more severely affected. Concentrations of 20% often produce significant neurologic symptoms, but a single level might not correlate with clinical manifestations. A normal carboxyhemoglobin level at the time of admission does not exclude carbon monoxide poisoning if the history or physical findings suggest that condition to be present.

Chapter 19: Interface With Emergency Medical Services

1. C, Respiratory distress. Although seizures are a common reason for EMS response, this is more common in the younger age group. Respiratory distress can include obstructed airway, bronchiolitis, and asthma. These conditions can be seen in a variety of age groups and frequently result in an emergency medical services response. Although submersion, poisonings, and even rashes can result in an emergency medical services call, they are less common than respiratory problems.

2. D, They require frequent refreshing of pediatric knowledge and skills. Children make up 10% of ambulance transports. Critically ill or injured children are a small fraction of this 10%. Therefore, frequent refreshing of pediatric knowledge and skills is needed to improve out-of-hospital provider comfort with caring for these patients.

3. D, Manual defibrillation. A basic-level emergency medical technician (EMT-B) can provide assisted ventilation, cardiac compressions, immobilization, and transport. Only those with a special certification (EMT-D) can provide defibrillation with an automated external defibrillator only (not with a manual defibrillator).
4.D. Providing funding for issues pertaining to EMS for children. Most funding for EMS for children issues comes from the federal or state governments, not individuals. Physician involvement in EMS for children could include all of the other answers.

Chapter 20: Disaster Management

1.D. 72 hours. Disaster relief agencies, such as the Red Cross and the Federal Emergency Management Agency, recommend that families and critical businesses, such as hospitals, be prepared to be self-sufficient for the first 72 hours after a disaster. Federal relief resources (such as the military and National Disaster Medical Systems teams) take time to activate and mobilize. Travel into the affected area can also be difficult due to transportation system disruption. Relief resources might be available more quickly in anticipated disasters, such as hurricanes, because response teams are mobilized and staged outside the projected impact zone before the disaster strikes.

2.E. All of the above. All of the factors listed can adversely influence the health and behavior of children with traditional and nontraditional special health care needs, such as ventilator dependency, diabetes, dialysis, asthma, and behavioral and psychiatric disorders. Lack of power and refrigeration can affect life support systems and monitors and compromise medication efficacy. Environmental allergens might be unavoidable by asthmatic and atopic children in disrupted housing. Stress and the disruption of daily routines can cause children with behavioral or psychiatric disorders to decompensate.

3.A. An objective triage system helps to optimize patient classification and resource allocation. An objective triage system that guides decision-making based on the physiologic state of each patient helps to eliminate emotional influences and ensure that resources are allocated to work toward the survival of the greatest number of patients, regardless of age. Triage personnel should process patients as they encounter them, rather than inefficiently looking for a particular type of patient. Children should be triaged as objectively as adults and not automatically given a higher subjective value by overtriaging them. In the mass casualty incident setting, patients of any age in full cardiopulmonary arrest have little chance of salvage; resuscitation should be attempted only if it is certain that critical resources are not being withheld from more salvageable patients.

4.E. All of the above. Hospital disaster plans should be risk specific and consider incidents that occur inside the hospital and those that occur in the community. An explicit command structure helps to control and coordinate a hospital’s response to a disaster and maintains consistency from incident to incident, despite staff turnover. Critical incident stress management, both proactive and reactive, will assist staff members in dealing with the disaster and help to sustain the efficient functioning of the hospital after a disaster.
Chapter 21: Preparedness for Acts of Nuclear, Biological, and Chemical Terrorism

1. B. Anthrax.
2. A. Patients experience an ascending paralysis.
3. A. Lesions begin on the torso and spread out from there.
4. E. Hypersalivation.
5. A. The heart.

Chapter 22: Primary Care Orthopedic Issues

1. C. Most cases resolve spontaneously as the child grows. Intoeing is usually a benign process that resolves spontaneously as the child grows. The cause is related to age and development. Treatment with braces or corrective shoes is not usually needed. Most cases are considered to be physiologic and not pathologic.
2. B. Metatarsus adductus. Metatarsus adductus is a curving of the foot producing a C-shaped bend to the lateral border of the foot. Internal tibial torsion usually presents at walking age and is a normal rotational change of the tibia. Excessive femoral anteversion usually presents in children between 3 and 7 years of age and is diagnosed by excessive inward rotation compared with external rotation while internally and externally rotating the hips when the child is prone or supine with the hips extended. Blount disease is a condition that results in excessive bowleggedness and can present in infants or adolescents.
3. C. The lateral malleolus is on average 20° posterior to the medial malleolus at maturity. In 95% of children, internal tibial torsion will resolve by the time they are 7 to 8 years old. The average mean tibial torsion is 5° at birth and increases to 15° to 20° at maturity. Treatment of internal tibial torsion with cables and specialized shoes has not been shown to hasten resolution of the malrotation.
4. A. Tall stature. Small size, excessive weight for height, significant asymmetry, severe deformity, palpable metaphyseal beaking, knee pain, and knee instability are typical findings on physical examination of patients with Blount disease.

Chapter 23: Medical-Legal Considerations

1. A. College graduation. Nearly all college graduates are 18 years or older, so this is not a criterion for being an emancipated minor. All the others can qualify a minor as being emancipated depending on statute (which varies among the states).
2. C. Most parents prefer to be present. Studies have failed to demonstrate lower procedural success rates; however, these results might be confounded by other factors. Children might cry more when parents are present for the reason listed in A, but this has not been proved in any studies to date. It is clear that most parents prefer to be present, and whether this
hinders or helps care for the child is not clear.

3.E. There is no written DNR order, but the parents communicate “do not resuscitate” orally. The circumstances in choice E clearly indicate that the parents do not want their child to be resuscitated. This should be just as valid as a paper document. All the other items are issues that make a DNR order difficult to carry out in an emergency. Resuscitation care must be started immediately to improve the probability of success; therefore, the decision to initiate resuscitation is not afforded the luxury of time and discussion.

4.C. An obese boy presents to his primary care physician with limping associated with thigh and knee pain. Radiographs of his knee are ordered, and the results are normal. An erythrocyte sedimentation rate and C-reactive protein level, measured to determine osteomyelitis, are normal. He is given a diagnosis of a knee strain and instructed to rest his knee. One week later, his pain worsens after walking down the stairs. He presents to the ED, where radiographs of his hip demonstrate a severely slipped femoral capital epiphysis. An orthopedic surgeon is consulted, and the boy is hospitalized for bedrest, traction, and surgical pinning. He develops avascular necrosis of the femoral head and a prolonged disability. Choices A and D have good outcomes so there is no basis to sue. Choice B has a bad outcome with long-term complications, but the standard of medical care was met in which an advanced imaging study was used and a surgical consultant’s clinical evaluation and judgment did not initially justify surgical intervention. Choice C has a bad outcome and an error of omission in the patient’s care in that radiographs of the child’s hip were not obtained during the initial evaluation.

Chapter 24: Imaging Decision-Making Strategies and Considerations

1.D. All of the above.
2.A, CT.
3.E. All of the above.
4.E. All of the above.
5.E. Each has its pros and cons, so they should be done in a stepwise fashion.
6.B, CT radiation exposure levels can be adjusted to minimize exposure.

Chapter 25: Office Procedures

1.A, Can be treated in the physician’s office or emergency department. A paronychia is an infection that involves the soft tissue folds of the fingernail or toenail, not the deep tissue spaces. It is typically painful and can usually be treated by lifting the lateral nail fold off the nail, allowing the pus to drain, or by piercing the area of maximal swelling with an 18-gauge needle or a scalpel. Nail removal is usually not necessary. This procedure is well suited to the physician’s office or emergency department, usually requiring only a digital block to achieve adequate anesthesia.
Chapter 26: Critical Procedures

1.D. Measures ventilation. The impedance pneumograph measures chest wall movement and can be used as a surrogate marker for respiratory effort. It uses the external electrocardiographic leads and can be affected by patient movement. However, it does not directly measure air flow. In a patient with upper airway obstruction, the chest wall can be moving while ventilation is poor. Therefore, intermittent auscultation is important.

2.C. Jaw-thrust maneuver is preferred for trauma patients. Because the chin-lift maneuver involves movement of the neck, it should not be used in trauma patients. This caveat extends to those who have normal cervical spine radiographs but cannot be assessed clinically (eg, unconscious patients). A small number of such patients have fractures or cord injury even though their radiography results are normal. Nasal airways can be used in patients who are either conscious or unconscious. On the other hand, only those who are unconscious can tolerate oral airways.

3.B. Handling the tooth by the root surface. Avulsion of a permanent tooth requires reimplantation as soon as possible; even a 30-minute delay might preclude successful reimplantation. Hold the tooth by the crown, avoiding trauma to the root surface and periodontal ligament. After reimplantation, it is important to prevent further trauma that could avulse the tooth or change its position. The use of a periodontal pack or sutures can help stabilize the tooth.

4.E. All of the above. Wound preparation for closure with tissue adhesive must be as meticulous as that for closure with sutures. Inadequate wound cleansing can lead to wound infection. Inadequate hemostasis can lead to hemorrhage within the wound. Sutures provide circumferential tension and facilitate hemostasis within the ligature loop. Tissue adhesive does not facilitate hemostasis. Inadequate immobilization can lead to dripping of tissue adhesive onto unintended areas, causing gluing of body parts (like eyelids) or seeping of tissue adhesive into the wound (eg, when a wound is “glued open”).
mandate immediate pericardiocentesis. However, the presence of cardiac tamponade is an indication for immediate pericardiocentesis. Pericardiocentesis is an invasive procedure. It has been associated with several complications, including injury to the coronary arteries and pneumothorax.

4.E. All of the above. Because the muscles of the forearm and lower leg are enclosed within fascial sheaths and are surrounded by bones and other muscles, significant injury to these areas can result in localized edema significant enough to compromise circulation. Unless the situation is corrected promptly, permanent ischemic injury can occur. Although the six P's (pain, poikilothermia, paresthesia, paresis, pulselessness, and pallor) are described as the classic signs of compartment syndrome, only pain and paresthesia occur early. Pulselessness and pallor are signs of arterial embolization. By the time pulselessness and/or pallor occurs in a compartment syndrome, irreversible infarction is likely. Significant muscle tenderness in the absence of an underlying fracture or serious contusion is another worrisome sign.