

# BCEN CPEN - Quiz Questions with Answers

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# Assessment

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Assessment

1.

A 15-year-old male presents to the emergency department (ED) with the sudden onset of severe, unilateral scrotal pain and tenderness, followed by scrotal swelling and edema. The patient denies any urinary symptoms, such as difficulty voiding or discharge. What is the most likely diagnosis?

**Testicular torsion**

Testicular tumor

Acute prostatitis

Priapism

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*Correct answer: Testicular torsion*

*This patient has testicular torsion, one of a few true urological emergencies. It involves twisting of the spermatic cord or testicle causing strangulation of the blood supply to the scrotum. It is most commonly seen in adolescents between 12 and 18 years, suspected to result from a period of rapid growth. The affected testis is usually firm, tender, and often in a horizontal rather than a vertical alignment. The presence of the cremasteric reflex is helpful in ruling out testicular torsion. If the torsion of the affected testicle is not corrected immediately, ischemia and necrosis will ensue.*

*Patients with a testicular tumor present with a change in testicular size over time but not necessarily with pain. Scrotal swelling with a testicular mass is firm and nontender. Priapism is also a urological emergency; it is a prolonged, painful erection without scrotal pain or swelling. Acute prostatitis is an inflammation of the prostate gland, which presents with sudden-onset dysuria and general malaise.*

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**2.**

You are triaging a 12-year-old male with an asthma exacerbation. The child has had 3 visits to the emergency department (ED) and 2 admissions in the last 6 months. What should you do?

**Assess the child's and the family's knowledge of asthma triggers**

Review the pathophysiology of asthma with the child and his family

Place a consultation with the social worker to assess for potential neglect

Inform your nurse manager of the child's recent readmissions for further direction

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*Correct answer: Assess the child's and the family's knowledge of asthma triggers*

*Medical non-compliance can result in frequent readmission and possible chronic disease complications. You should first assess the child's and his family's knowledge of disease triggers, their perception of the severity of the disease, and their level of social support. Based on this assessment, you should then reach out to your nurse manager and/or social worker for assistance with resource availability to rule out financial, transportation, or other barriers to receiving adequate treatment.*

*Reviewing the pathophysiology of asthma with the patient and his family may help with the facilitation of learning, but it will not help you determine the knowledge deficits and/or barriers to treatment. If you suspect neglect, the appropriate notifications must be made, but an assessment must occur first.*

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**3.**

A child presents to the emergency department (ED) with a peritonsillar abscess. Which of the following findings would not be indicative of this condition?

**Cough**

Halitosis

Fever

Dysphagia

*Correct answer: Cough*

*A peritonsillar abscess is a collection of purulent material (pus) around the tonsils that may lead to a deep tissue infection and airway patency complications if not diagnosed early and quickly. Signs and symptoms include deviation of the uvula toward the unaffected side, drooling and dysphagia, fever, halitosis (bad breath), muffled voice ("hot potato voice"), pain in the throat that radiates to the ear, swollen soft palate on the affected side, cervical lymphadenitis, and erythematous tonsils with exudates.*

*A cough is not a symptom of a peritonsillar abscess.*

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## 4.

You are caring for a newborn who has just been diagnosed with truncus arteriosus and are educating the parents about this condition. Which statement, if made by the mother, demonstrates she understood your teaching about this condition?

**"My baby's heart shares a single great artery that arises from both ventricles."**

"My baby has a bluish discoloration of the skin, which is referred to as cyanosis. This is expected with truncus arteriosus and is not concerning."

"The left side of my baby's heart is not fully developed."

"The positions of the great arteries of my baby's heart are reversed."

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*Correct answer: "My baby's heart shares a single great artery that arises from both ventricles."*

*Truncus arteriosus is a congenital heart defect characterized by one great artery arising from both the left and right ventricles (connecting the ventricles), overriding a ventricular septal defect (VSD). A coexisting VSD is present in more than 98% of cases. In a normal heart, there should be two separate arteries (pulmonary artery and aorta) with their own valves, instead of one truncal valve. This condition makes up 1% to 2% of all cardiac defects. Affected infants may present with cyanosis at birth, but this finding varies in intensity according to the amount of pulmonary blood flow.*

*Hypoplastic left heart syndrome (HLHS) is a congenital heart defect in which the left side of the heart is underdeveloped. Transposition of the great vessels is a congenital heart defect in which the great arteries are reversed (i.e., the pulmonary artery arises from the left ventricle, and the aorta arises from the right ventricle).*

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5.

For the placement of a peripherally inserted central catheter (PICC) in a neonate, the nurse should provide all the following interventions for pain relief, except:

**Skin-to-skin/kangaroo care**

Non-nutritive sucking (e.g., pacifier)

Swaddling, holding, and rocking

Opioid administration

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*Correct answer: Skin-to-skin/kangaroo care*

*Evidence-based pain management strategies for PICC line insertion include oral non-nutritive sucking or a sucrose pacifier, swaddling, holding and rocking, topical numbing medications at the site of insertion, such as EMLA cream or amethocaine gel, and opioid administration.*

*Kangaroo care is not recommended for PICC line insertion.*

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**6.**

A child in hemorrhagic shock will experience a drastic decrease in intravascular volume. This decrease leads to all the following, except:

**Decreased serum lactate**

Decreased serum creatinine

Anaerobic metabolism

Decreased central venous pressure (CVP)

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*Correct answer: Decreased serum lactate*

*During hemorrhagic shock, there is less intravascular volume, leading to decreased oxygen flow to the cells, anaerobic metabolism, and lactic acidosis (increased, not decreased, serum lactate). Serum creatinine is decreased, and CVP is also decreased with a low circulating volume secondary to hemorrhagic shock.*

*A decreased serum lactate (lactic acid) is an indicator that cells are receiving adequate oxygen flow and that volume replacement therapy is effective (i.e., circulating volume is increasing).*

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7.

Guidelines for assessing pain in an infant include all the following, except:

**Assess and document pain only when obtaining vital signs**

Assess pain after each potentially painful clinical intervention

Use standardized pain assessments with evidence of validity, reliability, and clinical utility

Reevaluate pain after interventions to assess their efficacy

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*Correct answer: Assess and document pain only when obtaining vital signs*

*Pain should be documented and assessed with vital signs every four to six hours or as indicated by pain scores and/or the infant's clinical condition. The other choices are accurate guidelines for assessing pain.*

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**8.**

A child suspected of having aortic stenosis (AS) is admitted to the PICU for a full diagnostic workup. Estimations of valvular gradients are used to determine the severity of the defect but may be falsely low if the patient has which condition?

**A low cardiac output (CO)**

A high cardiac output (CO)

Compromised left ventricular (LV) function

Associated cardiac lesions

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*Correct answer: A low cardiac output (CO)*

*AS is characterized by malformation of the aortic valve, which obstructs an ejection of blood from the LV. Associated cardiac lesions are common (PDA, VSD, or coarctation). The aortic valve is usually bicuspid with a single, fused commissure and an eccentrically placed orifice.*

*Valvular gradients can give some estimation of the degree of stenosis. This number may be misleading in instances of low CO in which output across the valve is already diminished, producing a falsely low gradient reading.*

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**9.**

Which of the following is the primary treatment concern in the management of pediatric head injury patients?

**Airway management**

Hemorrhage control

Fluid resuscitation

Blood sugar stabilization

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*Correct answer: Airway management*

*The most important intervention during the initial stabilization of any patient is the establishment of a functional patent airway. Some of the most common airway interventions used in the pediatric population include nasopharyngeal airways (NPAs), oropharyngeal airways (OPAs), laryngeal mask airways (LMAs), and endotracheal intubation (ETTs).*

*The primary concern in managing a trauma patient is ensuring a safe, effective airway.*

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**10.**

A two-week-old infant presents to the emergency department (ED) with feeding intolerance, constipation, and decreased activity with a weak cry. An initial laboratory workup reveals a potassium level of 4.5, elevated thyroid-stimulating hormone (TSH), and a sodium level of 139. You suspect which of the following conditions?

**Hypothyroidism**

Hyperthyroidism

Congenital adrenal hyperplasia

Adrenal insufficiency

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*Correct answer: Hypothyroidism*

*Hypothyroidism in a neonate presents with poor feeding, hypotonia, hypothermia, constipation, weight loss, and decreased activity. Lab results of hypothyroidism will reveal elevated TSH and low free T4. The potassium and sodium levels in this infant are within normal limits.*

*Treatment with levothyroxine should be started alongside consultation with pediatric endocrinology. Lack of treatment can lead to significant cognitive deficits.*

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**11.**

Waddell's triad is the combination of injuries that a child often sustains when struck by a vehicle. Which of the following is not part of this triad?

**Wrist injury**

Chest injury

Head injury

Femur fracture

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*Correct answer: Wrist injury*

*Waddell's triad is associated with high-velocity accidents, typically motor vehicle, auto-pedestrian, and bicycle collisions seen in pediatric patients. The triad includes injuries to the chest/abdomen, head, and femur.*

*When a child is struck by a vehicle's bumper, their leg is generally struck, leading to femur fractures. When a child is struck by the hood of a vehicle, their head, chest, and abdomen are usually injured. If the child is small enough, they will be run over when struck by the hood of a vehicle, as children can go under the vehicle after they are knocked down.*

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**12.**

At which stage of development are children most likely to believe that death is temporary?

**Preschoolers**

Toddlers

School-age children

Adolescents

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*Correct answer: Preschoolers*

*In the preschool group (ages 3-5 years), death is often viewed as reversible or temporary. Preschoolers may say that someone is "dead" without any understanding of the finality of death. Preschoolers may fear death as a separation from someone they love or a primary caregiver, being hurt or injured, or even a punishment for misbehavior(s).*

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**13.**

A pediatric patient is being prepped for cardiac catheterization to obtain a cardiac biopsy. Which allergies should the patient be assessed for prior to this procedure?

**Iodine or shellfish**

Penicillin

Opioid pain medications

Antiarrhythmic medications

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*Correct answer: Iodine or shellfish*

*Cardiac catheterization is an invasive procedure that can be used to diagnose a congenital heart defect, as well as repair certain congenital heart defects. It can also help identify rejection in a transplanted heart, aid in the diagnosis of infectious etiology or continued inflammatory response in myocarditis (both via a biopsy), and assess for cellular disease such as mitochondrial disease.*

*A catheter is inserted into the femoral artery and then threaded into the heart. Prior to the procedure, it is important to assess for any allergies to iodine or shellfish. An allergy to either of these increases the risk of an allergic reaction to the contrast dye used in the procedure.*

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**14.**

An infant is admitted to the PICU with an initial tracheoesophageal fistula (TEF) diagnosis. Which of the following statements by the nurse is most appropriate in assessing the parent's understanding of the child's current condition?

**"What is your understanding of the situation?"**

"What is the best way I can help you?"

"What questions can I answer for you?"

"Do you feel you have a thorough understanding of your child's disease process?"

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*Correct answer: "What is your understanding of the situation?"*

*The nurse can best approach this situation by asking open-ended questions to facilitate communication through clinical judgment, which is one of the eight nurse competencies as outlined in the Synergy Model for Patient Care. Clinical judgment involves reasoning and critical thinking skills.*

*Asking, "What is the best way I can help you?" and "What questions can I answer for you" are also open-ended questions but do not allow the nurse to assess the needs of the parents, nor do they allow the nurse to individualize information and fill in gaps in knowledge deficits. Asking if the parents understand the disease process elicits a simple yes or no answer, which does not give the nurse a thorough assessment of the parents' understanding.*

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**15.**

A seven-year-old child presents to the emergency department (ED) after being struck by a car while riding a bicycle. Assessment findings reveal a positive Kehr's sign with bruising to the left upper quadrant (LUQ) of the abdomen. You suspect which of the following injuries?

**Splenic**

Renal

Hepatic

Pancreatic

*Correct answer: Splenic*

*Splenic injuries are the most common abdominal injury in pediatrics and are graded on a scale of I to V depending on the severity of splenic trauma, with a grade V laceration usually requiring a splenectomy. With a splenic injury, the chief complaints are usually upper abdominal pain in the left quadrant, referred left shoulder pain (during abdominal palpation) known as Kehr's sign, and sometimes chest pain.*

*Renal injury presents with hematuria, abdominal pain, and flank hematomas. Hepatic injury presents with right referred shoulder pain. Pancreatic injury is not common in children due to the pancreas's location in the retroperitoneal space of the abdominal cavity.*

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**16.**

A child with diastolic left heart failure (HF) secondary to pediatric cardiomyopathy has developed pulmonary edema. When a nurse performs this patient's head-to-toe assessment, which of the following signs and symptoms would be an expected finding?

**Tachypnea and tachycardia**

Machine-like murmur

Muffled heart sounds

Jaundice

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*Correct answer: Tachypnea and tachycardia*

*Cardiomyopathy is myocardial dysfunction associated with mechanical and/or electrical problems with ventricular dilation or hypertrophy. Symptoms of cardiomyopathy reflect the variable degrees of HF. Tachycardia, tachypnea, increased work of breathing, diaphoresis, loss of appetite, feeding intolerance, poor weight gain, abdominal pain, and exercise intolerance are often seen.*

*A machine-like murmur is not associated with congestive heart failure (CHF). Jaundice is the result of liver dysfunction and, subsequently, elevated bilirubin levels. Muffled heart sounds are indicative of cardiac tamponade.*

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17.

A nurse is caring for a pediatric patient who begins to manifest signs of compensated shock. Which of the following assessment findings would the nurse anticipate?

Cool, clammy skin

Jaundice

Hypotension

Petechiae and ecchymosis

*Correct answer: Cool, clammy skin*

*Compensated shock is characterized by normal systolic blood pressure with clinical evidence of inadequate tissue perfusion. Cool, clammy skin is a response of the sympathetic nervous system causing vasoconstriction as a "fight or flight" mechanism. This is one of several compensatory mechanisms used by the body to maintain adequate oxygen delivery. Other signs of compensated shock include tachycardia, an increase in systemic vascular resistance (SVR), increased contractility of the heart muscle, and increased venous smooth muscle tone (boosting venous return to the heart and augmenting preload).*

*Jaundice, hypotension, petechiae, and ecchymosis are all signs of decompensated shock, as physiologic attempts to maintain systolic blood pressure, tissue perfusion, and oxygen delivery fail. Jaundice occurs when the liver is no longer able to filter and metabolize waste products, leading to an increase in bilirubin. Clotting factors are activated in uncompensated shock, which causes petechiae and ecchymosis. Hypotension results when perfusion can no longer be maintained.*

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**18.**

Your colleague explains that female pediatric patients are more sensitive to pain than male pediatric patients. Which of the following is true regarding this statement?

**This statement is based on incorrect stereotypes**

This statement is supported by research that is now considered outdated

This statement is the reverse of what is correct

This statement is correct but should be rephrased in a way that better reflects gender equity

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*Correct answer: This statement is based on incorrect stereotypes*

*Despite an increase in the emphasis on pain management in children over the last several years, some misconceptions about children and pain persist. Sensitivity to pain is not influenced by gender. This statement is incorrect and is not supported by past or current empirical research; it incorrectly propagates unsupported gender stereotypes.*

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**19.**

You are admitting a child to the emergency department (ED) on strict isolation precautions. As you are charting at the nurse's station, you observe a physician enter the child's room without personal protective equipment (PPE). Which of the following interventions is most appropriate?

**Ask the physician to exit the room and put on the appropriate PPE**

Report the incident to your nurse manager

Ensure the physician performs thorough hand hygiene after leaving the room

Suggest to the physician s/he change into a new set of scrubs after leaving the patient's room

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*Correct answer: Ask the physician to exit the room and put on the appropriate PPE*

*You should reinforce infection practices, advocating for other patients in the ED who are not contaminated.*

*Reporting the incident does not advocate for the other patients. Ensuring proper hand hygiene and suggesting the physician change scrubs are not appropriate interventions to decrease infection.*

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**20.**

A child with early stages of spinal shock is expected to have all the following assessment findings, except:

**Respiratory distress**

Warm, flushed skin

Capillary refill time <2 seconds

Hypotension

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*Correct answer: Respiratory distress*

*Spinal (neurogenic) shock is a distributive shock resulting in low systemic vascular resistance (SVR) and a generalized loss of vascular tone leading to severe vasodilation and hypotension. The sympathetic nervous system fails to increase heart rate, causing cardiac output and oxygen delivery to fall. In the initial stages, SVR decreases, and there is increased blood flow to the skin, also called warm-dry shock. This leads to warm, flushed skin and a capillary refill time of <2 seconds.*

*Respiratory distress is not an early sign of spinal shock.*

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**21.**

A pediatric intensive care unit (PICU) nurse is caring for a six-week-old infant with an unrepaired ventricular septal defect (VSD). Which of the following assessment findings would the nurse expect for this infant?

**Shortness of breath, pallor, systemic edema, and hepatomegaly**

Palpable brachial pulses but lower extremity pulses not palpable, and extremities cool to the touch

Feeding intolerance, diaphoresis, tachypnea, acrocyanosis, and lethargy

Decreased appetite, shortness of breath, and cyanosis

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*Correct answer: Shortness of breath, pallor, systemic edema, and hepatomegaly*

*A VSD is a birth defect characterized by an opening (or hole) in the septal wall, allowing communication between the right and left ventricles. VSDs account for up to 20% of all congenital heart defects and are more common in girls. Children are usually asymptomatic until at least 2 to 4 weeks of age when PVR falls. This drop in PVR allows shunting from the LV to the RV and creates pulmonary overcirculation. Signs and symptoms include shortness of breath, pallor, hepatomegaly, and systemic edema.*

*Coarctation of the aorta manifests with decreased or absent pulses in the lower extremities and cool lower extremities. Feeding intolerance, diaphoresis, tachypnea, acrocyanosis, and lethargy are associated with aortic stenosis. Transposition of the great arteries (TGA) reveals a patient with a decreased appetite, shortness of breath, and cyanosis.*

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**22.**

When teaching a caregiver to perform an aspect of patient care, a pediatric critical care nurse must recognize which of the following?

**The best learning occurs when the caregiver perceives a need to learn**

Caregivers are unaffected by the timing of teaching

Caregivers learn best if shown a complicated aspect of care in a single teaching session

Caregivers are unaffected by the purpose of a task

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*Correct answer: The best learning occurs when the caregiver perceives a need to learn*

*According to adult learning theory, establishing a perception of a need to learn prior to providing education is an important first step toward optimal educational efforts. Caregivers are affected by the timing of teaching and the purpose of a task, and they often need to be shown complex procedures over several teaching sessions before fully grasping information.*

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**23.**

A nurse is auscultating the lungs of a patient and notes inspiratory stridor. This finding is most consistent with which diagnosis?

**Laryngotracheomalacia**

Pneumonia

Asthma exacerbation

Exposure to second-hand smoke

*Correct answer: Laryngotracheomalacia*

*Stridor is noisy breathing caused by increased turbulence of airflow through a lumen and a sign of upper airway obstruction. Inspiratory stridor is related to the inward collapse of structures during inspiration. In children, laryngotracheomalacia and viral croup are the most common causes of inspiratory stridor. Postextubation endotracheal tube (ETT) trauma is another possible source of stridor.*

*Pneumonia, asthma exacerbations, and second-hand smoke exposure are not likely causes of inspiratory stridor.*

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**24.**

A nurse is caring for a two-year-old toddler who just underwent a diagnostic cardiac catheterization via the right groin. As part of the head-to-toe assessment, the nurse checks bilateral pedal pulses frequently to monitor for which complication?

**Thrombosis**

Hemorrhage

Stroke

Cardiac tamponade

*Correct answer: Thrombosis*

*Caring for a child post-cardiac catheterization includes checking bilateral pedal pulses to ensure they are present and equal; a loss of pulse or a decrease in pulse strength could indicate the formation of a potential blood clot (arterial or venous thrombosis).*

*Hemorrhage, stroke, and cardiac tamponade are also all potential complications of cardiac catheterization, but they are not monitored with a pulse assessment.*

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**25.**

A patient with a head injury and suspected damage to the hypothalamus will need which of the following vital signs to be closely monitored?

**Temperature**

Respiration

Blood pressure

Pulse

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*Correct answer: Temperature*

*Trauma to the hypothalamus or the spinal cord (which carries hypothalamic messages) results in severe alterations in temperature control and leads to temperature instability. The hypothalamus does not control respiration, blood pressure, or pulse.*

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**26.**

What is the Coombs test, or indirect antiglobulin test (DAT), used to detect?

**Autoimmune hemolytic anemia (AIHA)**

Any acute inflammatory response

IgG-positive antibodies in maternal and newborn blood

Human leukocyte (HLA) antigens

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*Correct answer: Autoimmune hemolytic anemia (AIHA)*

*The Coombs test, or DAT, is used to detect antibodies that act against the surface of the patient's RBCs, indicating a condition known as AIHA. In this condition, the RBCs are prematurely destroyed, so the body's RBC store is constantly being depleted, resulting in anemia. Clumping of RBCs occurs if the RBCs are coated with antibodies or complement. The greater the number of antibodies against the RBCs is, the more clumping will occur. Any clumping is read as a positive result using a scale of 1 to 4+. Coombs test differentiates types of hemolytic anemia and detects immune antibodies.*

*Indirect Coombs testing is a type of antibody screening that detects specific serum antibodies (IgG) to RBC antigens that are in the serum but not attached to the RBCs. It is used to detect IgG-positive antibodies in maternal blood and newborns and is performed before RBC transfusions to detect incompatibilities other than major ABO groups.*

*Erythrocyte sedimentation rate (ESR) is a nonspecific indicator of an acute inflammatory response and is often used in conjunction with other laboratory values to assess inflammation.*

*Histocompatibility testing identifies HLA antigens.*

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**27.**

In an infant, when does functional closure of the ductus arteriosus normally occur?

**12 to 24 hours after birth**

5 to 7 days after birth

Unable to determine

Within 30 days of delivery

*Correct answer: 12 to 24 hours after birth*

*The ductus arteriosus is a structure that should be present in utero, as it permits blood flow to be diverted away from the high-resistance pulmonary circulation to the descending aorta and the low-resistance placental circulation. Patent ductus arteriosus (PDA) occurs when the vessel that normally connects the aorta and pulmonary artery in utero has failed to close at birth, which leads to a left-to-right shunting of blood. Blood flow to the lungs will be increased as a result of this abnormal shunting, which can cause pulmonary hypertension and eventually lead to left-sided heart failure (particularly if the PDA is large).*

*Closure normally occurs 12-24 hours after birth, which is initiated by a rise in the perivascular  $PO_2$  and a decrease in endogenous prostaglandin (producing functional closure).*

*Anatomic closure occurs between 2 and 3 weeks and is produced by fibrosis of the ductal tissue with permanent sealing of the lumen to produce the ligamentum arteriosum. Following anatomic closure, the ductus cannot be reopened.*

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**28.**

A concerned mother brings her two-week-old infant into the emergency department regarding a "lump" on her baby's head that, per her pediatrician, was a collection of blood between the skull bone and its covering. After a thorough assessment of the infant, who does not have any other symptoms and appears healthy, the nurse reiterates the doctor's explanation of the finding.

What is this condition called?

**Cephalohematoma**

Craniosynostosis

Subdural hematoma

Caput succedaneum

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*Correct answer: Cephalohematoma*

*Cephalohematoma is a collection of blood between the skull and the periosteum. It does not extend across cranial suture lines and can occur following a traumatic vaginal delivery (forceps- or vacuum-assisted). A cephalohematoma can take up to 3 weeks to resolve, depending on the size.*

*Caput succedaneum is swelling of the tissue from an increase in serous fluid over the presenting part of the fetal head caused by pressure during labor. Subdural hematoma (SDH) refers to bleeding between the dural and arachnoid membranes of the brain. Craniosynostosis is the premature closure of one or more cranial sutures.*

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**29.**

Which of the following is correct regarding pain management in an emergency setting?

**Antiemetic medications are not necessary prior to administering opioids**

Using opioids to treat abdominal pain will interfere with accurate diagnosis

Neonates do not require analgesic medications

Opioid-dependent patients do not require more pain medications than opioid-naive patients

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*Correct answer: Antiemetic medications are not necessary prior to administering opioids*

*The idea that antiemetic medications are necessary prior to administering opioids is a common pain management myth.*

*Other pain management myths include the following: using opioids to treat abdominal pain will interfere with an accurate diagnosis, neonates do not require analgesic medications, and opioid-dependent patients do not require more pain medications than opioid-naive patients.*

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**30.**

A child presents to the emergency department (ED) after blunt trauma to the temporal lobe causing a skull fracture. As the triage nurse on duty, you suspect which of the following head injuries?

**Epidural hematoma (EDH)**

Subdural hematoma (SDH)

Cerebral contusion

Subarachnoid hematoma (SAH)

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*Correct answer: Epidural hematoma (EDH)*

*Epidural hematomas are most often located in the temporal region and often result from tearing the middle meningeal vessels due to a temporal bone fracture. EDH presents with a period of lucidity lasting minutes to days, but results in a decreased level of consciousness (LOC), ipsilateral pupil dilation, and contralateral hemiparesis as blood accumulates in the extradural space (as the result of direct trauma near the temporal bone).*

*SDH results in nonspecific findings, including drowsiness, lethargy, and irritability. Seizures may occur, especially in children younger than three years of age. Tearing of bridging veins may occur with SDH, presenting with signs of increased intracranial pressure (ICP). Cerebral contusion findings depend on the location and severity of the injury, and the amount of cerebral edema that develops. SAH results in seizures or rapid development of increased ICP.*

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**31.**

A child is in the PICU for hypertension management. The nurse is monitoring the patient after the administration of propranolol (Inderal). Which assessment finding indicates a potential complication associated with this medication?

**Audible expiratory wheezes**

Blurred vision

Alterations in taste

Respiratory depression

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*Correct answer: Audible expiratory wheezes*

*Propranolol is a beta-blocker that reduces sympathetic excitation of the heart. It is used for the management of cardiac arrhythmias, myocardial infarction, tachyarrhythmias, and hypertension. Audible expiratory wheezes may indicate bronchospasm, a serious side effect of this medication.*

*Other side effects consist of laryngospasm, bone marrow suppression, bradycardia, and hypotension.*

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**32.**

Cardiogenic shock typically presents with which of the following symptoms in an older child?

**Exercise intolerance**

Pyrexia

Widened pulse pressure

Chest pain

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*Correct answer: Exercise intolerance*

*Cardiogenic shock is inadequate perfusion due to myocardial dysfunction; the heart is unable to supply adequate oxygenation to meet tissue needs. Common causes are congenital heart disease (CHD), myocarditis, arrhythmias, sepsis, cardiomyopathy, poisoning or drug toxicity, and myocardial injury. Feeding intolerance is a common presentation in infants, while exercise intolerance is typical in older children.*

*Other symptoms include extreme tachycardia, increased work of breathing progressing to respiratory distress, hepatomegaly, jugular vein distention (JVD), cyanosis (associated with cyanotic CHD), normal or low BP with a narrow pulse pressure, weak or absent peripheral pulses, and decreased level of consciousness.*

*Widened pulse pressure and pyrexia are early signs of septic shock. Chest pain could indicate cardiac tamponade or other cardiovascular conditions.*

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**33.**

Which of the following signs suggests patent ductus arteriosus (PDA) in a newborn?

**Bounding peripheral pulses**

Narrow pulse pressure

Profound cyanosis

Clubbed fingers and toes

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*Correct answer: Bounding peripheral pulses*

*Assessment findings of a newborn with PDA reveal a machine-like continuous murmur that is heard best at the left upper sternal border. Poor feeding, irritability, tachypnea, tachycardia, and poor weight gain are often present. The pulse pressure is wide (not narrow), and peripheral pulses may be strong and collapse suddenly because of low diastolic pressure resulting from ductal shunting of blood into the low-pressure pulmonary artery. This is referred to as a water-hammer pulse.*

*No cyanosis or clubbing of the digits is present in PDA.*

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**34.**

A pediatric nurse would not expect to observe pulsus paradoxus in which emergent situation?

**Acute bronchitis**

Pericarditis

Severe asthma

Hemorrhagic shock

*Correct answer: Acute bronchitis*

*Usually on inspiration, the body's normal physiologic response is a drop of less than 10 mm Hg in arterial systolic pressure. Pulsus paradoxus is an exaggerated fall (>10 mm Hg) of systolic blood pressure during normal inspiratory effort. This phenomenon has been reported with cardiac tamponade, significant asthma, croup (not acute bronchitis), pericardial effusion and pericarditis, cardiomyopathy, hypovolemia, and hemorrhagic shock.*

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**35.**

A child with multiple injuries from a motor vehicle crash presents to the emergency department (ED) with a left flail chest, a fractured left femur, and a grade III kidney laceration. Which assessment finding is the earliest sign of hypovolemic shock, following persistent tachycardia?

**Decreased pulse pressure**

Altered level of consciousness

Hypotension

Oliguria

*Correct answer: Decreased pulse pressure*

*Signs and symptoms of hypovolemic shock occur with acute bleeding and assessment changes are possible in a patient developing this condition. Persistent tachycardia, weak peripheral pulses, decreased pulse pressure (<25% of the systolic blood pressure), and cutaneous vasoconstriction are early signs of hypovolemic shock. The child may also present with pallor, cool skin, and a mottled skin tone.*

*Mental status is often normal or only slightly impaired in early hypovolemic shock. Oliguria, hypoxia, and acidosis are compensatory measures. Hypotension is a late sign of shock.*

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**36.**

A five-year-old child requires the placement of a chest tube for evacuation of a hemothorax. Which of the following is the best way to prepare this patient for the procedure?

**Use short and simple sentences, limiting descriptions to concrete explanations**

Show the child a chest tube and explain how it will feel

Explain in detail why the chest tube is needed and how it will work

Explain the procedure to the parents and ask them to relay this information to the child

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*Correct answer: Use short and simple sentences, limiting descriptions to concrete explanations*

*A child aged 3-5 is considered to be a preschooler. The nurse should recognize the developmental stages of this age group and explain in simple terms what a chest tube is, using limited descriptions and concrete explanations. The nurse may allow the child to inspect and touch the equipment as indicated and include the child frequently, making the experience as friendly and non-threatening as possible. The nurse should avoid using words like "cut," "take," "broken," or "put you to sleep."*

*The other options are indicated for older children. While it is acceptable to explain the procedure to the parents as well, they should not be primarily responsible for explaining the procedure to the child.*

---

**37.**

You are triaging a young child with a history of epilepsy who begins to experience symptoms of a tonic-clonic seizure. You are timing the seizure and note it has lasted 6 minutes. The patient is still actively seizing. What should you do?

**Activate the emergency response system**

Perform oropharynx suctioning

Place soft restraints on the patient to prevent injury

Keep the patient in a side-lying position and continue to monitor

*Correct answer: Activate the emergency response system*

*Tonic-clonic seizures (formerly referred to as grand mal seizures) involve a sudden loss of consciousness and organized muscle tone, accompanied by extensor muscle spasms, apnea or irregular respirations, and bilateral clonic movements. They should not last more than 1 to 3 minutes.*

*If the seizure lasts more than 5 minutes (does not resolve spontaneously and the patient is unresponsive to traditional treatment), the situation is considered a medical emergency and requires immediate intervention (to stop the seizure). This situation is known as status epilepticus.*

*Turning the patient to the side, suctioning the oropharynx as needed, and soft restraints safeguard the patient from injury. These interventions have likely already been done during the 6 minutes the patient was actively seizing. The emergency response system should be activated for immediate medical intervention at the 5+ minute mark.*

---

**38.**

A nurse is providing education to the parents of a child admitted to the PICU for Kawasaki disease (KD) regarding the purpose of administering intravenous immunoglobulin (IVIG). Which statement, if made by the mother, indicates an understanding of the nurse's teaching?

**"My child needs IVIG to decrease their risk of coronary artery disease."**

"The IVIG will fight the infection that is causing KD."

"The IVIG is necessary to minimize the spread of my child's rash."

"Because my child's spleen is enlarged, IVIG will help decrease their spleen size."

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*Correct answer: "My child needs IVIG to decrease their risk of coronary artery disease."*

*Anti-inflammatory agents will reduce inflammation and decrease the incidence of coronary abnormalities. High-dose aspirin therapy with IVIG is the recommended initial treatment for KD, with the primary goal of coronary disease prevention. Repeat doses of IVIG or pulse steroids are used if treatment fails and symptoms persist.*

*A polymorphous rash, lymphadenopathy, and splenomegaly are expected clinical manifestations of KD. IVIG therapy is not indicated to reduce the incidence of these findings.*

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**39.**

Which of the following laboratory values should the nurse assess first when caring for a child with acute kidney injury (AKI)?

**Blood sodium level**

Blood glucose level

Blood urea nitrogen

Hemoglobin level

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*Correct answer: Blood sodium level*

*The initial assessment of a child with AKI includes an evaluation of urine and serum electrolytes. Injury to the kidneys causes a decreased ability of the kidneys to concentrate urine. Sodium and water restrictions may result in hyponatremia and low urine sodium.*

*In prerenal failure, there is no actual nephron damage, and the kidneys respond well to treatment for symptoms of decreased urine output, electrolyte abnormalities, or both. In true intrinsic acute tubular necrosis (ATN), actual nephron damage has occurred, and the response to therapy to treat the underlying problem is variable. Hypervolemia may indicate a need for dialysis or continuous renal replacement therapy (CRRT).*

---

**40.**

Which of the following best describes pulsus paradoxus?

**A decrease in systolic blood pressure of at least 10 mm Hg during inspiration**

A decrease in systolic blood pressure of at least 10 mm Hg during expiration

A decrease in diastolic blood pressure of at least 10 mm Hg during inspiration

A decrease in diastolic blood pressure of at least 10 mm Hg during expiration

---

*Correct answer: A decrease in systolic blood pressure of at least 10 mm Hg during inspiration*

*Pulsus paradoxus is an exaggeration of the normal physiologic response to inspiration; it describes a decrease in arterial systolic pressure of at least 10 mm Hg during a normal inspiratory effort. This condition is commonly seen in pericardial tamponade. It can also be found in pericardial effusion, hypovolemia, significant asthma, or shock. It is caused when increased intrathoracic pressure associated with inspiration further exacerbates compression of the myocardium.*

---

**41.**

Among hospitalized pediatric patients, which age group is most likely to view illness as a punishment for bad behavior?

**Preschoolers**

School-age children

Adolescents

Toddlers

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*Correct answer: Preschoolers*

*Hospitalization of preschoolers interrupts and challenges children at a time when they are learning to control their bodies and the environment around them. To gain control, they may refuse food and not cooperate with caregivers. They hold onto security items and may regress to the toddler stage during hospitalization for an illness.*

*Preschoolers may project feelings of sadness, anger, or guilt onto others; view illness as a punishment for misdeeds and/or bad behavior; and not understand how their caregivers could not have protected them from this illness. They may withdraw from interaction with others if they are angry, sad, or in pain. Preschoolers may be able to express their anxieties through dramatic play and drawing.*

---

**42.**

A PICU nurse is caring for an infant who has just undergone palliative surgery to repair an aortic coarctation. During the head-to-toe assessment, the nurse should expect the infant's lower extremity pulses to be which of the following?

**Stronger than preoperative baseline findings**

Diminished or absent

Weak and thready

Bounding

---

*Correct answer: Stronger than preoperative baseline findings*

*In coarctation of the aorta, a narrowed, thickened aorta causes elevation of pressure proximally and decreased pressure distally. Because of this, pulses are decreased or absent in the lower extremities prior to surgical repair of the congenital defect (CHD). Coarctation occurs in about 8% to 10% of CHD cases and is more common in males than in females.*

*After surgical repair of this condition, the infant's lower extremity pulses (femoral and/or pedal) should be stronger than preoperative baseline findings due to improved blood flow to the lower body.*

---

**43.**

What is the most commonly used indicator of kidney function in a pediatric patient with acute kidney injury (AKI)?

**Serum creatinine**

Blood urea nitrogen (BUN)

Urine specific gravity

Urine output

*Correct answer: Serum creatinine*

*Serum creatinine is the most commonly used indicator of overall kidney function; a failure of serum creatinine to decrease after appropriate interventions have been implemented (i.e., fluid resuscitation) or a persistent rise suggests continued impairment of renal function.*

*BUN is an indirect measure of kidney function. Renal insufficiency is suspected if BUN is elevated. Urine specific gravity indicates hydration status. If urine output is  $<0.5$  mL/kg/hr for 16 or more consecutive hours, AKI has occurred. If urine output is  $<0.5$  mL/kg/hr for 24 hours or  $<0.3$  mL/kg/hr for 12 hours, it would define acute kidney failure.*

---

**44.**

What features characterize the process of grief?

**Dynamic and fluid**

Static and rigid

Universal and orderly

Linearly

*Correct answer: Dynamic and fluid*

*When a child dies, parental grief is the subjective, individualized response to a hideous loss. The impact is long-lasting and life-altering. Although the stages of grief are often recognizable, the full process is dynamic and fluid rather than static and rigid.*

*Each person experiences the process of grief uniquely and at an individual pace; a bereaved person often moves in and out of these phases at various times in the grief process. Symptoms of one phase may overlap with another, and time limits should not be imposed on the individual for the completion of this painful process.*

---

**45.**

You are caring for a 10-year-old male admitted to the emergency department for metabolic derangement consistent with tumor lysis syndrome (TLS) secondary to newly diagnosed cancer. As you review your patient's laboratory data, which of the following would not be expected with this condition?

**Hypercalcemia**

Hyperuricemia

Hyperkalemia

Hyperphosphatemia

---

*Correct answer: Hypercalcemia*

*TLS is the most common pediatric oncology emergency, characterized by metabolic derangement secondary to the release of intercellular contents from tumor cells into the bloodstream. The classic triad includes:*

- *hyperuricemia (most common finding)*
- *hyperkalemia*
- *hyperphosphatemia*

*Hypocalcemia (not hypercalcemia) may also be observed. TLS is most commonly associated with cancers that have a high tumor burden, such as non-Hodgkin's lymphoma (NHL), Burkitt lymphoma, and acute lymphoblastic leukemia (ALL).*

---

**46.**

Which of the following statements is accurate regarding pain and pain relief in the pediatric population?

**Infants manifest responses to invasive procedures more intensely than adults**

A child who is not crying is not in pain

Potent medications such as analgesics and anesthetics are dangerous to a critically ill child

Pain is a highly subjective experience that is difficult to assess objectively for nonverbal infants and children

---

*Correct answer: Infants manifest responses to invasive procedures more intensely than adults*

*Infants exhibit physiologic, hormonal, behavioral, and metabolic responses to invasive procedures (e.g., heel and intravenous stick, intubation, lumbar puncture, chest or nasogastric tube placement) that are similar to, but more intense than, adult responses.*

*Just because a child does not cry does not mean they are not in pain; children express pain in varying ways at different ages. New methods, techniques, and devices for monitoring infants' responses to drugs should enable all children to be safely anesthetized and medicated while maintaining a stable condition. Many pain assessment scales are available to assess nonverbal infants and children. In addition, pediatric patients exhibit a wide variety of behavioral indicators that objectively demonstrate pain.*

---

**47.**

A child presents to the emergency department (ED) with a spinal cord injury. Which of the following assessment findings indicates the child is in the early stages of neurogenic shock?

**Hypotension and bradycardia**

Hypotension and tachycardia

Hyperthermia and bradycardia

Hypothermia and tachycardia

---

*Correct answer: Hypotension and bradycardia*

*Neurogenic shock is a form of distributive shock in which blood volume is inappropriately distributed, leading to inadequate organ and tissue perfusion. The most common causes of neurogenic shock are head and spinal injury. A generalized loss of vascular tone leads to severe vasodilation and hypotension. The sympathetic nervous system fails to increase heart rate, leading to decreasing cardiac output (CO) and oxygen delivery. Preload and afterload are decreased, hypotension occurs, the heart rate slows, and pulse pressure widens.*

*Atropine may be necessary for severe cases of bradycardia. Vasopressors may be helpful for hypotension to increase vasoconstriction.*

---

**48.**

A nurse is providing discharge teaching to an eight-year-old boy and his parents. The boy was admitted with newly diagnosed asthma. After reviewing the early warning signs of an asthma attack, the nurse asks the patient to list some of the signs and symptoms.

Which of the following, if verbalized by the patient, would indicate a need for further teaching?

**Cyanosis**

Easy fatigue with physical activity

Wheezing with activity

Nighttime coughing

---

*Correct answer: Cyanosis*

*Early warning signs that an asthma attack is imminent include easy fatigue with physical activity, wheezing with activity, nighttime coughing, and reduced peak-flow-meter readings.*

*Cyanosis, chest retractions, and no relief after taking a short-acting bronchodilator inhaler indicate an active asthma attack that requires medical attention. The patient and caregivers should be able to differentiate between these conditions.*

---

**49.**

The FACES Pain Scale is best suited for which hospitalized pediatric patient?

**A preschool-aged child who speaks a foreign language**

A toddler with a cognitive impairment

A six-month-old infant

A 14-day-old neonate

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*Correct answer: A preschool-aged child who speaks a foreign language*

*The FACES Pain Scale is best suited for nonverbal patients who are interactive and/or children who cannot count. It is ideally utilized for three- to seven-year-old children to aid in their self-report of pain.*

*The FLACC (face, legs, activity, cry, and consolability) scale is used for preverbal or nonverbal patients who cannot self-report their pain intensity. Target populations include younger children (infant through 7 years) and those with cognitive impairment(s) or developmental delay. It is a subjective scale on which each item receives a score. Neonates (birth to 28 days) do best with the N-PASS or CRIES pain assessment scales, which rely on behavioral responses to pain.*

---

**50.**

Which of the following opioids is the most commonly used pharmacologic treatment for pain management for neonates?

**Morphine**

Fentanyl

Sufentanil citrate

Meperidine

*Correct answer: Morphine*

*Intravenous (IV) opioids remain the most common class of analgesics administered in the neonatal setting. Morphine is the most commonly used opioid but may cause hypotension in dehydrated patients or when used at higher doses. It provides more sedation than fentanyl. Morphine should be used with caution for preterm infants between 23 and 26 weeks of gestation and those with preexisting hypotension. Fentanyl is the preferred drug in many ICUs because of its cardiovascular stability and ability to decrease pulmonary vascular resistance. It can, however, lead to chest wall rigidity and decreased lung compliance if administered too quickly. Because it is 80 to 100 times more potent than morphine, it must be administered with extreme caution.*

*Sufentanil is 10 times more potent than fentanyl and significantly more expensive. It is shorter acting and can have even greater effects on lung and chest wall compliance. Meperidine is not recommended for preterm or term neonates. Its active metabolite (normeperidine) accumulates in tissues and causes CNS stimulation, in addition to lowering the seizure threshold level.*

---

**51.**

What is the initial stage of grief?

**Denial**

Anger

Bargaining

Depression

*Correct answer: Denial*

*Feelings of shock, disbelief, and rejection of tragic news are generally immediate responses to grief. This immediate denial of the situation protects the individual from the shocking reality of loss by postponing the full effect of reality until their psyche can handle it. During this initial stage of grief, people experience overwhelming feelings of being stunned and surprised, often manifesting as emotional numbness, flat affect, or immobility.*

*Anger follows denial or emotional numbness, then comes bargaining, followed by depression and withdrawal. Acceptance is the resolution stage of the grief process, which is characterized by emotional detachment of life's meaning from the lost relationship and reestablishing independent meaning.*

---

**52.**

A child who has sustained multiple trauma injuries has arrived at the emergency department (ED). After ensuring a patent airway, which of the following assessments takes priority?

**Respiratory assessment**

Neurologic assessment

Identify and control hemorrhage

Assessment of laboratory values

---

*Correct answer: Respiratory assessment*

*The initial assessment of the multiple injured child includes primary and secondary assessments. In the primary assessment, life-threatening injuries are detected and treated. The mnemonic ABCD is used and is as follows:*

- **A:** Airway and cervical spine assessment; ensure airway patency
  - **B:** Respiratory assessment; characteristics of respirations, breath sounds, check for skin/mucous membrane color
  - **C:** Circulatory assessment: identify/control hemorrhage, blood pressure, pulse, capillary refill
  - **D:** Neurologic assessment; check neurologic status, level of consciousness, pupillary response
-

**53.**

A nurse is caring for a 17-year-old patient with appendicitis who is scheduled for a laparoscopic appendectomy. The patient voices concern about the surgical procedure and is fearful of anesthesia. How should the nurse address these concerns initially?

**Ask the patient to discuss what they currently know about the planned surgery**

Tell the patient that preoperative fear is normal

Explain any possible discomfort or pain that could result from the surgery

Give detailed explanations about the processes involved in the surgery

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*Correct answer: Ask the patient to discuss what they currently know about the procedure*

*Most children experience some fear and anxiety when hospitalized. Fears may be reality-based, related to past experiences, or the result of an active imagination. The information the patient may have gotten could be incorrect, or the child could have heard comments that are scary or out of context.*

*First, ask the teenager what they currently know about the planned surgical procedure to guide the remainder of the conversation. If the nurse has a baseline of what information the teenager currently knows, they can add information as needed or correct any misinformation to help alleviate the patient's stress.*

---

**54.**

A nurse is caring for an eight-year-old child with sickle cell disease (SCD) who was admitted for a vaso-occlusive crisis. Upon discharge, the nurse discusses precipitating factors related to this complication with the parents.

Which factor, if identified by the parents, indicates a need for further teaching?

**Prolonged exposure to heat**

Infection

Stress

Trauma

---

*Correct answer: Prolonged exposure to heat*

*Vaso-occlusive crisis (pain crisis) is one of the most debilitating complications for SCD patients. SCD describes a genetic mutation that leads to crescent or sickle-shaped red blood cells when oxygen saturation drops. Pain crises may involve any organ system and are characterized by obstruction of small arterioles by sickled RBCs, leading to tissue ischemia, organ dysfunction, and extreme pain.*

*Onset is variable with unpredictable frequency, intensity, duration, and severity. Precipitating factors include infection, stress, dehydration, fever, hypoxia, trauma, or general stress. Exposure to cold—not heat—can lead to a pain crisis. The parents of a child with SCD should encourage a fluid intake of 1.5 to 2 times the daily requirement to prevent dehydration.*

---

**55.**

A nurse reviews the laboratory values of a child in their care and notes a serum calcium level of 12.5 mg/dL. Which symptom would indicate a need for the nurse to call the physician for treatment orders?

**Muscle weakness**

Increased gastric motility

Peaked T waves on a 12-lead ECG

Muscle spasms

---

*Correct answer: Muscle weakness*

*A normal serum calcium value is 9 to 11 mg/dL. Hypercalcemia can cause bone pain, muscle weakness, and depression. Therefore, if a patient with a high calcium level begins to manifest symptoms, such as muscle weakness, the nurse will need to notify the physician and request orders to treat this patient.*

*The other choices are not symptoms of hypercalcemia.*

---

**56.**

What is the most commonly injured solid organ in children?

**The spleen**

The liver

The pancreas

The kidney

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*Correct answer: The spleen*

*The most commonly injured organ in a child with blunt abdominal injury is the spleen due to the lack of protection by the rib cage and the elasticity of the supportive ligaments. Splenic injuries are graded on a scale from I to V depending on the severity of the trauma, with grade V lacerations usually requiring a splenectomy.*

*The liver is second to the spleen as a major source of hemorrhage and is the most common source of lethal hemorrhage. The kidney is the third most common solid organ injured in pediatric abdominal trauma. The pancreas is infrequently injured, with a classic presentation of compression by bicycle handlebars in which the child flips over the bike and is impaled in the epigastrium by the handlebars.*

---

**57.**

A nurse is auscultating the lungs of an infant who has just been intubated for severe respiratory distress and notes continuous low-pitched, rattling sounds during both inspiration and expiration. The sounds are more pronounced on expiration.

The nurse documents this adventitious breath sound as which of the following?

**Rhonchi**

Rales

Wheezes

Crackles

*Correct answer: Rhonchi*

*Rhonchi are abnormal sounds superimposed on normal breath sounds. They often have a low-pitched moan that sounds more prominent on exhalation. Rhonchi are caused by blockages to the main airways from mucus, lesions, or foreign bodies, and improve or resolve with coughing or suctioning.*

*Wheezes are high and squeaky (usually heard on exhalation, reactive airway), while rhonchi are low and dull. Crackles and rales can be used interchangeably and are the sounds heard in a lung field that has fluid in the small airways.*

---

**58.**

A child has been admitted to the emergency department (ED), and a diagnosis of grade 3 subarachnoid hemorrhage (SAH) has been made, according to the Hunt and Hess classification scale. What does this mean?

**The child is drowsy and confused, with a mild focal neurologic deficit**

The child has a mild headache and slight nuchal rigidity

The child has a severe headache, nuchal rigidity, and cranial nerve palsy

The patient is comatose with decerebrate posturing

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*Correct answer: The child is drowsy and confused, with a mild focal neurologic deficit*

*The Hunt and Hess scale is a prognostic tool that is utilized in making decisions for treating the patient with SAH. It uses the patient's presenting symptoms as a predictor of outcomes, with higher scores correlating with higher mortality.*

- *Grade 1: Asymptomatic, mild headache, slight nuchal rigidity*
  - *Grade 2: Moderate to severe headache, nuchal rigidity, no neurologic deficit other than cranial nerve palsy*
  - *Grade 3: Drowsiness, confusion, mild focal neurologic deficit*
  - *Grade 4: Stupor, moderate to severe hemiparesis*
  - *Grade 5: Coma, decerebrate posturing*
-

**59.**

When developing a plan of care for a hospitalized adolescent male, a pediatric nurse must take into account this patient's psychosocial needs. Based on the psychosocial development of the adolescent, the care plan should not focus on which of the following?

**Giving the adolescent permission to initiate conversation**

Respecting privacy and avoiding unnecessary physical exposure

Giving the choice of whether they want their parents to be present

Facilitating visits with peers when possible

---

*Correct answer: Giving the adolescent permission to initiate conversation*

*While it is important to allow an adolescent patient to make choices whenever possible and ask questions, teens who must be hospitalized will not likely know how to initiate conversation around their current illness. They often prefer the discussion to be led by the healthcare provider (with plenty of room for questions and concerns).*

*The nurse should respect the adolescent's desire for privacy and avoid unnecessary physical exposure, explain every care step, and encourage teens to discuss their concerns. These patients should be included in decision-making regarding their health and illness and should be taught about normal physical and sexual development. Friends are most important to teens, so visits with peers should be facilitated whenever possible.*

---

**60.**

A full-term infant is born at home and rushed into the emergency department immediately following delivery, secondary to respiratory distress. Upon auscultation of the lungs, the nurse hears peristaltic sounds over the chest. What does this finding indicate?

**Diaphragmatic hernia**

Pneumomediastinum

Atelectasis

Pneumonia

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*Correct answer: Diaphragmatic hernia*

*Peristaltic sounds heard in the chest may be caused by a congenital diaphragmatic hernia, as many of the intestines (bowel) and/or abdominal organs have herniated into the chest (thoracic cavity). The abdomen appears scaphoid, and the anteroposterior diameter of the chest may enlarge as the bowel distends with air. Breath sounds are diminished or absent on the affected side, and the mediastinum may be displaced toward the contralateral side.*

*Hyperresonance suggests a pneumomediastinum (air in the mediastinum). Decreased resonance is a result of reduced aeration (e.g., atelectasis, pneumonia, or respiratory distress syndrome).*

---

**61.**

A pediatric intensive care unit (PICU) nurse is caring for a six-month-old female infant hospitalized with hydrocephalus who has just undergone surgery for a ventriculoperitoneal (VP) shunt placement. The nurse performs a head-to-toe assessment of the infant and determines she is in pain.

Which of the following is not a common behavioral indicator of pain in an infant?

**Oxygen desaturation**

High-pitched cry

Facial grimacing

Decreased level of activity

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*Correct answer: Oxygen desaturation*

*Expression of pain through behavior is often an infant's primary means of communicating pain. Crying (high-pitched, tense, or irregular), changes in arousal state (increased or decreased level of activity), and facial grimacing are the most robust pain behaviors in infants experiencing pain. In addition, infants may withdraw from stimuli and exhibit changes in vital signs (increased heart rate, respiratory rate, and blood pressure).*

*Although physiologic changes (e.g., decreased oxygen saturation) may occur with pain, they are not the most specific and reliable indicators of infant pain and should alert the nurse to other potential underlying pathologies.*

---

**62.**

A 10-year-old male is admitted to the emergency department with severe mid-epigastric pain felt in the back, nausea, vomiting, and fever. The nurse observes a bluish discoloration of the flanks. What is this finding called?

**Turner's sign**

Cullen's sign

Homan's sign

McBurney's sign

*Correct answer: Turner's sign*

*Classic symptoms of acute pancreatitis (AP) in children are abdominal pain that is typically most intense in the epigastrium, nausea, vomiting, fever, and weight loss (due to loss of appetite). Back and flank (side of the abdomen) pain are also common because the pancreas sits retroperitoneally. Moving and eating often intensify the pain.*

*A bluish discoloration (ecchymosis or bruising) around the umbilicus (Cullen's sign) or on the flanks (Turner's sign) signifies hemorrhagic pancreatitis.*

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**63.**

Which of the following behaviors portrays developmental activities in a 13-year-old child?

**Going with a group of friends to the movies**

Volunteering at a local food shelter

Exploring career opportunities

Reading an exciting book

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*Correct answer: Going with a group of friends to the movies*

*During their adolescent years (12-18 years), teens are often searching for a sense of self and personal identity. They are becoming more independent, and socialization is the most important aspect of life at this age in many Western cultures. As they begin to examine their identity, a teen's peer group will be of the greatest significance and will become a major source of the child's self-esteem. Therefore, spending time with friends best exemplifies developmentally appropriate activities.*

---

**64.**

The FLACC pain assessment scale is best suited for which hospitalized pediatric patient group?

**A six-month-old infant**

An eight-year-old child

A 13-year-old adolescent

A five-day-old neonate

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*Correct answer: A six-month-old infant*

*An accurate assessment of a critically ill or injured child's pain is vital for appropriate pain intervention. Pain assessment scales are useful to quantify and supplement the nurse's observations.*

*The FLACC pain scale is most commonly used for patients from 2 months through 7 years of age (nonverbal or preverbal patients), who are otherwise unable to self-report their level of pain. This scale uses the following five categories:*

- **F:** Faces
- **L:** Legs
- **A:** Activity
- **C:** Consolability
- **C:** Cry

*FLACC uses a rating scale of 0 to 2 for each category. The total score will be 0-10, from no pain to severe pain, based on the patient's response in each category.*

---

**65.**

You are triaging a seven-year-old female who presents to the emergency department (ED) for acute asphyxia caused by smoke inhalation from a house fire. You anticipate which of the following assessment findings?

**Neurologic dysfunction**

Tachypnea

Cyanosis

Cardiovascular collapse

*Correct answer: Neurologic dysfunction*

*Smoke inhalation leads to cerebral hypoxemia and neurologic dysfunction, such as disorientation and confusion. Patients with asphyxia may experience cyanosis and tachypnea as a result of damage to the lung parenchyma, but these symptoms are not a direct result of asphyxia. Cardiovascular collapse is a manifestation of fluid shifts from burn injuries, not asphyxia.*

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# Multi-System Considerations

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Multi-System Considerations

66.

In what phase of Kawasaki disease will a child manifest red lips, tongue, palms, and soles?

**Acute phase**

Subacute phase

Convalescent phase

Refractory phase

---

*Correct answer: Acute phase*

*Kawasaki disease is the systemic inflammation of the blood vessels in the body (vasculitis). Early fever and multisystem vasculitis (particularly in the coronary arteries) are followed by pancarditis with inflammation of the conduction system, myocardium, pericardium, and endocardium. The cause of this disease is unknown. However, it may be due to an exaggerated immune response to an infection in a susceptible child.*

*There are three phases of this disease: the acute phase, the subacute phase, and the convalescent phase. The acute phase (days 1-10) presents with a high fever, conjunctivitis, indurative edema, diffuse red-purple discoloration of the palms/soles, a strawberry tongue, reddened fissured lips, skin rash, and cervical lymph node enlargement.*

*The refractory phase is a stage of shock and is not associated with Kawasaki disease.*

---

**67.**

A child presents to the emergency department after being bitten by a snake with signs and symptoms indicative of acute rhabdomyolysis, including myalgia, myoglobinuria, and weakness.

Which of the following laboratory tests is the most sensitive finding and is diagnostic for this condition?

**Creatine phosphokinase (CPK)**

Serum creatinine

Blood urea nitrogen (BUN)

Urinary albumin

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*Correct answer: Creatine phosphokinase (CPK)*

*Rhabdomyolysis is a syndrome characterized by muscle necrosis and the release of intracellular muscle constituents, including myoglobin, potassium, phosphorus, and enzymes into circulation. Rhabdomyolysis may be caused by severe trauma and crush injuries, as well as metabolic myopathies, hypoxia/ischemia, certain licit and illicit drugs, congestive heart failure, malignant hyperthermia, and snake bites.*

*Clinical features are typically sufficient to recognize this condition, including weakness, pain, tenderness, swelling, tea-colored urine, kidney dysfunction, fever, and leukocytosis. It can be recognized clinically by urinalysis with a dipstick that is strongly positive for heme and urine sediment with few or no red cells.*

*A more sensitive and diagnostic finding is an elevated CPK. Creatinine kinase peaks at 12 to 36 hours after muscle injury, and acute rhabdomyolysis is seen with levels exceeding 5,000 IU/L.*

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**68.**

To determine brain death in a child, apnea testing must be performed in conjunction with a clinical examination, following disconnection from the ventilator. What is a positive apnea test?

**Absence of respiratory effort, PaCO<sub>2</sub> 20 mm Hg above baseline and >60 mm Hg**

Absence of respiratory effort, PaCO<sub>2</sub> 30 mm Hg above baseline and >70 mm Hg

Absence of respiratory effort, PaCO<sub>2</sub> 10 mm Hg above baseline and >50 mm Hg

Absence of respiratory effort, PaCO<sub>2</sub> 40 mm Hg above baseline and >80 mm Hg

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*Correct answer: Absence of respiratory effort, PaCO<sub>2</sub> 20 mm Hg above baseline and >60 mm Hg*

*To determine brain death, a physical examination should demonstrate that coma and apnea coexist. Apnea testing must be performed with the clinical examination, and the patient must have a complete absence of respiratory effort with standardized apnea testing.*

*Following disconnection from the ventilator, allow at least 5-10 minutes for PaCO<sub>2</sub> to increase. A positive apnea test involves a PaCO<sub>2</sub> that is 20 mm Hg above the baseline and >60 mm Hg.*

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**69.**

You are performing an electrocardiogram (ECG) on a two-year-old with suspected hemolytic uremic syndrome (HUS). Which of the following ECG findings would you expect from this patient?

**Tall, peaked T waves**

ST-segment elevation

Narrow QRS complexes

Shortened PR interval

---

*Correct answer: Tall, peaked T waves*

*HUS leads to acute kidney injury (AKI) and hyperkalemia. Hyperkalemia presents on ECG with tall, peaked T waves, ST-segment depression, widened QRS complexes, prolonged PR interval, ventricular arrhythmias, asystole, and cardiac arrest.*

---

**70.**

Which of the following factors does not place a patient at an increased risk of a fatal reaction from anaphylaxis?

**Delay in administering antihistamines**

Being a teenager

History of asthma

Delay in administering epinephrine

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*Correct answer: Delay in administering antihistamines*

*Anaphylaxis can be a life-threatening event and should be treated with parenteral epinephrine. Antihistamines are considered second-line treatment but should not replace the use of epinephrine (first-line treatment).*

*Risk factors for fatal anaphylaxis include being a teenager, having asthma, and experiencing a delay in administering epinephrine. A lapse in the use of antihistamines is not associated with mortality.*

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**71.**

Which of the following statements is accurate regarding the use of inotropic agents?

**Inotropic agents may be indicated in cases of septic shock**

A dobutamine infusion is contraindicated in patients with cardiogenic shock

Milrinone administration requires less invasive monitoring than other inotropic agents

Inotropic agents should be administered prior to fluid resuscitation

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*Correct answer: Inotropic agents may be indicated in cases of septic shock*

*Inotropic agents are primarily used in the setting of shock. These agents increase the contraction force of the myocardium and may cause peripheral vasoconstriction or vasodilation, depending on the medication. Dopamine is used for most types of shock and has variable dose-dependent effects.*

*Dobutamine is not ideal in a hypotensive patient due to decreased systemic vascular resistance (SVR) and blood pressure, but it may be ideal for a normotensive child in cardiogenic shock. Milirone may cause hypotension and vasodilation, which requires monitoring that is typically done via an arterial line. Fluid resuscitation should be initiated before and during the use of inotropic agents.*

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**72.**

What is the primary focus of rhabdomyolysis treatment for a pediatric patient?

**Prevention of acute renal failure**

Prevention of severe dehydration

Prevention of extreme pyrexia and subsequent sequelae

Prevention of infection leading to sepsis

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*Correct answer: Prevention of acute renal failure*

*Rhabdomyolysis is characterized by muscle breakdown, necrosis, and the subsequent release of intracellular muscle constituents into the circulation; it is a dangerous complication for multi-trauma victims. Although signs and symptoms are nonspecific, the classic triad includes muscle pain and cramping, weakness, and dark, reddish-brown urine. Laboratory findings reveal a marked elevation in CK and other serum muscle enzymes. Early complications may include hyperkalemia, hypocalcemia, hepatic inflammation, and cardiac arrhythmias.*

*Acute renal failure (ARF) occurs in up to 15% of rhabdomyolysis cases, and it is the most serious of complications since it relates highly to morbidity and mortality. Therefore, nursing implications and treatment should be focused primarily on the prevention of ARF. Treating dehydration and pyrexia are appropriate interventions but secondary treatment measures to ARF prevention. Rhabdomyolysis does not generally result in infection.*

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**73.**

A child is admitted in septic shock related to a gram-negative bacterial infection. Which of the following findings is expected for this patient?

**Peripheral edema**

Increased white blood cells (WBCs) with a shift to the right

Decreased partial pressure of oxygen (PaO<sub>2</sub>)

Hypokalemia

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*Correct answer: Peripheral edema*

*A bacterial infection stimulates a systemic immune and inflammatory response requiring mature functional neutrophils and other immune cells to fight the invading pathogens. Inflammation causes the capillary beds to be leaky, so the patient will be edematous as fluid shifts to the interstitial space, leading to peripheral edema.*

*WBCs are increased with a shift to the left in septic shock. Respiratory symptoms develop only when shock progresses. Hypokalemia is not associated with septic shock.*

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**74.**

Which of the following strategies is most effective in reducing the incidence of central-line-associated bloodstream infections (CLABSIs) in children less than two years of age?

**Maintaining a central cart with supplies**

Use of the internal jugular as a preferred insertion site

Use of antibiotic-impregnated catheters

Use of chlorhexidine for antisepsis before insertion

*Correct answer: Maintaining a central cart with supplies*

*Keeping a cart stocked with supplies optimizes the use of proper tools, thus decreasing the risk of infection.*

*The internal jugular is contraindicated as an insertion site and may increase the risk of infection. The use of antibiotic-impregnated catheters may be effective in certain patients (particularly pediatric burn patients) but not all patients. Chlorhexidine for antisepsis before insertion is harmful in neonates and is approved for use in children over two years of age. Strict adherence to hospital and nationally established CLABSI-prevention bundles is imperative when managing patients with central venous catheters.*

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**75.**

A nurse is caring for a pediatric patient in septic shock after they sustained third-degree burns from an apartment fire. The nurse suspects the patient is experiencing acute disseminated intravascular coagulation (DIC) disorder.

Which of the following laboratory results is indicative of DIC?

**Decreased platelet counts**

Increased fibrinogen levels

Decreased D-dimer levels

Shortened prothrombin (PT) and partial thromboplastin times (PTT)

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*Correct answer: Decreased platelet counts*

*DIC is a life-threatening bleeding disorder resulting from the activation of the body's coagulation cascade. It is always the result of another disease or condition (e.g., shock, infection, severe tissue damage, and cancer) and leads to uncontrolled bleeding secondary to a decrease in clotting factors and platelets.*

*Platelet count is decreased in approximately 50% of patients secondary to platelet consumption. PT and PTT are prolonged, fibrinogen levels are decreased, and fibrinogen degradation products (FDPs) and D-dimer levels are elevated.*

*Treating the underlying cause is essential for addressing DIC.*

---

**76.**

A pediatric critical care nurse is caring for an 11-year-old male experiencing rhabdomyolysis from acute renal failure. When formulating a plan of care for this patient, the nurse would not consider which intervention?

**Maintaining NPO (nothing by mouth) status**

Ensuring proper fluid resuscitation

Giving electrolyte replacement

Placing a Foley catheter and closely monitoring output

*Correct answer: Maintaining NPO (nothing by mouth) status*

*The manifestations and complications of rhabdomyolysis result from muscle cell death, with the release of intracellular muscle constituents (particularly, myoglobin, potassium, phosphorous, and enzymes) into the bloodstream. This condition can be caused directly by muscle injury or indirectly by various medical conditions.*

*Some nursing considerations are to ensure proper fluid resuscitation, record the patient's intake and output (the patient will need a Foley catheter to monitor output status), monitor serum electrolytes and laboratory values (serum creatinine kinase, bicarbonate, electrolytes, kidney function, etc), replace electrolytes as ordered, monitor for signs of compartment syndrome, and offer discharge planning on prevention.*

*Desired outcomes for this patient include maintaining adequate hydration and normal electrolyte levels, implementing a proper diet, and using caution when exercising to avoid further skeletal muscle breakdown.*

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**77.**

Which hypersensitivity reaction releases enzymes that cause the destruction of tissues?

**Type III**

Type I

Type II

Type IV

*Correct answer: Type III*

*Type III hypersensitivity reactions, otherwise known as immune-complex reactions, result in local edema, neutrophil attraction, and degradative lysosomal enzymes that cause tissue injury. They are triggered by the formation of antigen-antibody complexes that activate the complement cascade and are deposited in blood vessels or healthy tissue. Examples include serum sickness and glomerulonephritis, among others.*

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**78.**

A nurse is caring for a child with severe vomiting and diarrhea secondary to chemotherapy treatment. The child is at risk for developing which of the following acid-base disorders?

**Metabolic acidosis**

Metabolic alkalosis

Respiratory acidosis

Respiratory alkalosis

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*Correct answer: Metabolic acidosis*

*In an effort to achieve an acid-base balance, the lungs regulate carbon dioxide, and the kidneys regulate bicarbonate. With normal digestion, metabolic acids are produced. But, intestinal secretions high in bicarbonate are lost through diarrhea and vomiting; this decrease in the patient's bicarbonate level creates the actual base deficit of metabolic acidosis.*

*The other options are unlikely to occur in a patient with vomiting and diarrhea.*

---

**79.**

Diagnostic criteria for Kawasaki disease (KD) include which of the following?

**Fever persisting for at least 5 days plus the presence of four or more of the five principal features**

Fever persisting for at least 4 days plus the presence of 3 or more of the 5 principal features

Fever persisting for at least 5 days plus the presence of 2 or more of the 5 principal features

Fever persisting for at least 4 days plus the presence of 4 or more of the 5 principal features

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*Correct answer: Fever persisting for at least 5 days plus the presence of four or more of the five principal features*

*KD is microvasculitis of the medium-sized muscular arteries. It is most likely a disease of the immune system triggered by an infectious event. Multisystem vasculitis (particularly in the coronary arteries) is followed by pancarditis with inflammation of the conduction system, myocardium, pericardium, and endocardium. Myocarditis develops within 3 to 4 weeks and is associated with white blood cell infiltration, elevated platelet counts, and edema of the conduction system and myocardial muscle.*

*Diagnostic criteria include a fever that persists for at least 5 days, plus the presence of four or more of the following five principal features:*

- *polymorphous exanthema of the trunk*
  - *swollen lymph nodes*
  - *strawberry tongue, diffuse injection of the oral mucosa, erythema, and cracking of lips*
  - *edema and erythema of the hands and feet (acute phase) with membranous desquamation of fingertips (convalescent phase)*
  - *bilateral conjunctival injection of the eyes without exudate*
-

**80.**

A child presents to the emergency department (ED) after falling through ice on a frozen lake. After receiving several normal saline boluses, the child is intubated and mechanically ventilated in the field and is now on epinephrine and dopamine drips. The child continues to be hypotensive secondary to which of the following pathophysiologic factors?

**Decreased venous return**

Decreased pulmonary vascular resistance (PVR)

Decreased systemic vascular resistance (SVR)

Decreased intrathoracic pressure

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*Correct answer: Decreased venous return*

*After drowning, patients require positive pressure ventilation (PPV) caused by increased (not decreased) intrathoracic pressure, leading to decreased venous return. Cardiac pathophysiologic changes associated with submersion injury are the consequence of hypoxia and acidosis. Hypoxemia produces hypoxic-ischemic cardiovascular injury, resulting in decreased cardiac output, elevated right and left heart filling pressures, increased PVR, and increased SVR.*

---

**81.**

Which statement is correct about the uncompensated phase of shock?

**A classic sign is an increase in capillary permeability**

This phase of shock results in irreversible injury, bradycardia, and profound hypotension

The body attempts to use hormonal, neural, and biochemical responses in this phase of shock

Vasoconstriction results in cool, pale, or mottled and diaphoretic skin

---

*Correct answer: A classic sign is an increase in capillary permeability*

*Uncompensated shock is the result of the body's compensatory mechanisms failing and causing multisystem organ failure. During the compensatory stage (before uncompensated shock occurs), the body can adapt for a period, so major organs do not show failure. The body attempts to use hormonal, neural, and biochemical responses to compensate, and vasoconstriction results in cool, pale, or mottled and diaphoretic skin.*

*The cascade of physiologic changes in uncompensated shock includes the loss of autoregulation in the microcirculation, leading to an increase in capillary permeability, third spacing, and decreased venous return. Mental status deteriorates as the brain becomes hypoxic, and acute renal failure occurs. Finally, if dynamic treatment is not received or is unsuccessful, the patient moves into the final phase of shock, which is the refractory phase. This phase is marked by unmanageable and irreversible injury, bradycardia, profound hypotension, organ failure, and ultimately death.*

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**82.**

What is the most common clinical manifestation of systemic anaphylaxis?

**Hives**

Gastrointestinal upset

Airway obstruction

Edema of the lips and face

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*Correct answer: Hives*

*Clinical signs and symptoms typically occur within minutes of exposure to the antigen and are the result of the action of inflammatory mediators on surrounding tissues and blood vessels. An initial mild reaction can rapidly progress to life-threatening symptoms. The most common assessment finding is hives (urticaria), followed by angioedema.*

*Respiratory compromise and cardiovascular collapse are of the greatest concern but are less common. Gastrointestinal upset is experienced by a smaller percentage of individuals during an anaphylaxis episode.*

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**83.**

A pediatric nurse is providing discharge instructions to the caregivers of a child with Kawasaki disease (KD). Which of the following symptoms, if exhibited by the child, should warrant an immediate call to the child's pediatrician?

**Fever**

Joint pain

Irritability

Desquamation of the hands and feet

*Correct answer: Fever*

*KD is microvasculitis of medium-sized muscular arteries. This rare disease causes inflammation of the blood vessels throughout the body and is likely a disease of the immune system triggered by an infectious event. It is more prevalent in children of Japanese ancestry and in those younger than five years of age.*

*Upon discharge of a child with KD, their caregivers should be instructed to check the temperature of the child every 6 hours for the first 48 hours following the last fever and then daily until the follow-up visit. A new fever could indicate a recurrent episode of KD and should warrant an immediate return to the hospital.*

*Irritability is a hallmark finding in a child with KD, and parents should be advised that this symptom can last for up to two months following the acute phase of the disease. Temporary joint pain and other manifestations of arthritis may occur and persist for several weeks. ROM exercises and warm baths will help reduce these symptoms and minimize discomfort. Skin peeling is an expected finding. Parents should be informed that the peeling itself is not painful, but the new skin underneath may be red and sore.*

---

**84.**

Most anaphylaxis cases treated in the emergency department (ED) involve symptoms related to which organ system?

**Skin**

Heart

Lungs

Brain

*Correct answer: Skin*

*Anaphylaxis is considered an allergic reaction and may become life-threatening if it progresses to a multi-system response called anaphylactic shock. The majority of anaphylaxis cases involve symptoms related to the skin, including hives and a rash.*

*Signs that may indicate a system-wide reaction include dyspnea, wheezing, coughing, itching, bronchospasm, hypotension, and tachycardia.*

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**85.**

A critical care nurse is discharging a four-year-old male patient who was admitted for a type I anaphylactic hypersensitivity reaction. When providing discharge teaching to the parents, the nurse explains which of the following foods should be avoided, as it is a potential trigger for a sensitized individual?

**Grains**

Fish

Milk

Coconut oil

*Correct answer: Grains*

*In some individuals, foods can trigger a severe anaphylactic reaction, causing serious, life-threatening signs and symptoms including constriction of the airways, esophageal swelling, tachycardia, dizziness, loss of consciousness, and shock. This reaction is triggered in response to exposure to an environmental antigen and is mediated by IgE antibodies that bind to specific receptors on the surface of mast cells and basophils.*

*Grains are often implicated in anaphylactic reactions. Once the patient has been stabilized, testing for allergies and sensitivities should be performed.*

---

**86.**

A child who is in septic shock begins to demonstrate signs of decompensation. Which of the following assessment findings does the nurse anticipate?

**Hypotension**

Cool, pale, moist skin

Pupillary dilation

Decreased level of consciousness (LOC)

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*Correct answer: Hypotension*

*Decompensated (uncompensated) shock occurs when the body's physiologic attempts to maintain blood pressure, tissue perfusion, and oxygen delivery fail, leading to multisystem organ failure. Hypotension is a late sign resulting from compensated failure because organ perfusion can no longer be maintained.*

*The other choices reflect the compensated phase of shock. Cool, pale, moist (diaphoretic) skin is a response of the sympathetic nervous system causing vasoconstriction. Decreased LOC is indicated by restlessness, confusion, and lethargy. Pupils may dilate in this phase as well.*

---

**87.**

Which of the following agents is not indicated as a method of providing pediatric procedural sedation while closing a wound?

**Lidocaine**

Ketamine

Midazolam

Chloral hydrate

*Correct answer: Lidocaine*

*Lidocaine is an analgesic drug used to dull sensation, not to provide sedation. Lidocaine is often used to provide local anesthetic during wound closure.*

*Ketamine, midazolam, and chloral hydrate are used to provide procedural sedation for pediatric patients.*

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**88.**

What are the principal antibodies involved in type II hypersensitivity reactions?

**IgM and IgG**

No antibody component

IgD and IgA

IgE and IgG

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*Correct answer: IgM and IgG*

*Tissue-specific hypersensitivities (also known as a type II reaction) are triggered by the presence of an antigen found only on a cell or tissue. They are mediated by antibodies (mainly IgM, but also IgG) through two different mechanisms (complement and Fc receptors on phagocytes), resulting in the destruction of the antibody-coated cell with consequences dependent on the cell that is destroyed (RBC, WBC, or platelet). Examples include ABO and Rh incompatibilities and drug-induced thrombocytopenia.*

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**89.**

A pediatric intensive care unit (PICU) nurse is caring for a nine-year-old male patient who has just received a kidney transplant. The patient's blood pressure is 100/50, and his white blood cell (WBC) count is 19,000/mm<sup>3</sup>. The nurse suspects the patient is developing septic shock.

Which of the following findings would not indicate compensated shock?

**Oliguria**

Clammy, moist skin

Tachycardia

Increased SVR and vasoconstriction

*Correct answer: Oliguria*

*In early or compensated stages of septic shock, there is normal systolic blood pressure with clinical evidence of inadequate tissue perfusion; the body uses a myriad of compensatory mechanisms to maintain adequate oxygen delivery. The patient will be tachycardic; as the heart rate increases, the ventricular filling and emptying times shorten, compromising stroke volume (SV) and cardiac output (CO). Systemic vascular resistance (SVR) increases, and the vessels constrict, resulting in cool and diaphoretic, pale, or mottled skin with delayed capillary filling time. With this increase in SVR, blood pressure (BP) and oxygen delivery can be maintained for a time. If SVR begins to fall and CO is decreased, oxygen delivery decreases, and BP will fall.*

*Hypotension, altered LOC, and oliguria are late signs (decompensated) of septic shock. This stage is identified when physiologic attempts to maintain systolic BP, tissue perfusion, and oxygen delivery. Oliguria indicates that the kidneys are starting to fail.*

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**90.**

Which of the following statements is accurate regarding the evidence-based treatment of pediatric sepsis?

**Initial fluid resuscitation with a crystalloid solution is the best choice for septic shock**

Administering sodium bicarbonate is recommended for all infants with lactic acidemia

Initiating an insulin infusion is recommended to maintain tight glucose control

Gastric feeding is contraindicated for septic infants; IV gluconate or total parenteral nutrition (TPN) is preferred for nutritional intake

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*Correct answer: Initial fluid resuscitation with a crystalloid solution is the best choice for septic shock*

*An aggressive approach is taken for a child with septic shock who is hypovolemic. Fluid resuscitation can reverse the shock state and increase the odds of survival. Treat hypovolemia with a large volume of isotonic crystalloid solution (normal saline, lactated Ringer's solution) for acute volume expansion. In addition, provide adequate ventilatory support, transfuse for blood loss, correct metabolic and electrolyte abnormalities, treat hypotension, and initiate antibiotic therapy.*

*There is no evidence to support the use of bicarbonate for infants with lactic acidemia with a pH of greater than or equal to 7.15. Insulin can only be used if indicated. Tight glucose control has not been shown to improve outcomes and can increase the risk of hypoglycemia. Oral or enteral feedings should be administered as tolerated for infants with sepsis.*

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**91.**

Which of the following factors will negatively impact the oxyhemoglobin dissociation curve by shifting it to the right?

**Hyperthermia**

Hypothermia

Metabolic alkalosis

Respiratory alkalosis

*Correct answer: Hyperthermia*

*The oxyhemoglobin dissociation curve indicates the relationship between the oxygen saturation ( $SaO_2$ ) of hemoglobin (Hgb) and the partial pressure of arterial oxygen ( $PaO_2$ ) within the body.*

*An elevated temperature shifts the oxyhemoglobin dissociation curve to the right, decreasing Hgb's affinity for oxygen for a given  $PaO_2$  value and causing the  $SaO_2$  value to decrease below normal. Hemoglobin releases oxygen to the tissues more readily in an effort to keep tissues adequately perfused because oxygen demand is higher than normal.*

*Hypothermia and an increase in serum pH levels (alkalosis states) are factors associated with a left shift to the curve. A shift to the left reflects hemoglobin's increased affinity for oxygen.*

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**92.**

A child you are caring for in the emergency department (ED) becomes hypotensive during a transfusion of packed red blood cells (PRBCs). You suspect a transfusion reaction. You immediately stop the transfusion and implement which of the following priority interventions?

**Infusion of a normal saline bolus**

Return the unused blood to the blood bank

Obtain a complete blood count (CBC)

Infusion of a dopamine drip

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*Correct answer: Infusion of a normal saline bolus*

*Hypotension may occur in a febrile nonhemolytic transfusion reaction, an allergic reaction, a transfusion-related acute lung injury (TRALI), or anaphylaxis. Immediate infusion of a normal saline bolus will best support the patient's airway, breathing, and circulation.*

*Severe cases of transfusion reactions may require a dopamine drip to support circulation, but the immediate action is to infuse a normal saline bolus. The unused blood may need to be returned to the blood bank, and a CBC may be performed later. The priority, however, is bolusing the patient with normal saline.*

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**93.**

What are the primary medications used to treat Kawasaki disease?

**Intravenous immunoglobulin (IVIG) and aspirin**

Intravenous (IV) antibiotics and diuretics

Intravenous (IV) vasopressin and respiratory treatments with inhaled albuterol and Pulmicort

Intravenous corticosteroids and Ofirmev

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*Correct answer: Intravenous immunoglobulin (IVIG) and aspirin*

*Kawasaki disease is the systemic inflammation of the blood vessels in the body (vasculitis). Early fever and multisystem vasculitis (particularly in the coronary arteries) are followed by pancarditis with inflammation of the conduction system, myocardium, pericardium, and endocardium. The cause of this disease is unknown. However, it may be due to an exaggerated immune response to an infection in a susceptible child.*

*Goals and patient management target reducing the risk of coronary artery aneurysm formation and preventing emboli from elevated platelet counts. Anti-inflammatory agents will reduce inflammation and decrease the incidence of coronary abnormalities. High-dose aspirin therapy with IVIG is used for treatment. Repeat doses of IVIG or pulse steroids are used if treatment fails and symptoms persist.*

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**94.**

Which of the following cerebrospinal fluid (CSF) analysis findings in a child could indicate viral meningitis?

**Predominance of lymphocytes**

Low protein

Glucose at about 30% of serum levels

Low opening pressure

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*Correct answer: Predominance of lymphocytes*

*CSF results in aseptic or viral meningitis demonstrate the following:*

- *Slightly elevated white blood cell (WBC) count, predominantly lymphocytes*
  - *Normal or slightly increased protein content*
  - *Normal glucose content (approximately 40% of serum levels)*
  - *Negative results from Gram stain or culture for bacteria*
  - *Elevated opening pressure (a nearly universal finding for meningitis)*
-

**95.**

Which of the following statements is accurate regarding cellulitis?

**Insect bites, burn injuries, or abrasions can provoke a skin injury that leads to cellulitis**

Tissue necrosis is a common complication of cellulitis

Cellulitis often occurs spontaneously without any identifiable skin wound

The chest and abdomen are common locations for cellulitis to occur

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*Correct answer: Insect bites, burn injuries, or abrasions can provoke a skin injury that leads to cellulitis*

*Cellulitis is an acute infection of the subcutaneous tissue and skin. Cellulitis often occurs following trauma to the skin (skin wound). This trauma can be from an insect bite, surgical incision, abrasion, or other cutaneous trauma, allowing the bacteria to enter the skin to cause acute infection.*

*The clinical presentation includes a warm, red, painful, edematous area with sharply demarcated borders, local lymphangitis, and lymphadenitis. Rarely, tissue necrosis occurs. Cellulitis occurs most often on the extremities (not the chest or abdomen).*

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**96.**

Which of the following is a disease condition associated with type IV hypersensitivity?

**Graft rejection**

Drug-induced thrombocytopenia

Anaphylaxis

Glomerulonephritis

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*Correct answer: Graft rejection*

*A type IV (delayed hypersensitivity) reaction is triggered by the recognition of an antigen and mediated by activated T lymphocytes and the release of lymphokines. This stimulates macrophages to phagocytize foreign invaders—as well as some normal tissue—and results in a delayed onset.*

*There is no antibody component in type IV hypersensitivity reactions; it is strictly a cellular reaction. Examples include contact sensitivities such as poison ivy and dermatitis, tuberculin reactions, and graft rejections, among others.*

*Drug-induced thrombocytopenia is a type II (tissue-specific) hypersensitivity. Anaphylaxis is a type I (anaphylactic) reaction. Glomerulonephritis is a type III (immune complex) hypersensitivity reaction.*

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**97.**

What is an example of a type III hypersensitivity reaction?

**Serum sickness**

Asthma

ABO incompatibility

Poison ivy

*Correct answer: Serum sickness*

*The classic clinical syndrome of serum sickness is caused by the immunization of a human by nonhuman serum proteins and subsequent illness due to the formation of immune complexes. Serum sickness is a classic example of "type III" or immune complex-mediated hypersensitivity disease. The reaction requires the presence of the antigen, alongside antibodies directed against the antigen, leading to the formation of antigen-antibody or immune complexes, which are later deposited in blood vessels or healthy tissue.*

*Asthma is an example of a type I anaphylactic reaction. ABO incompatibility is a type II or tissue-specific hypersensitivity. Poison ivy is a type IV delayed hypersensitivity reaction.*

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**98.**

A nurse is admitting a pediatric patient to the PICU who is in septic shock after sustaining third-degree burns from an apartment fire. The nurse anticipates administering which of the following treatments first?

**Normal saline (NS) bolus**

Intravenous (IV) antibiotics

Intravenous (IV) corticosteroids

Intravenous (IV) vasopressors

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*Correct answer: Normal saline (NS) bolus*

*Circulation and perfusion are priorities, so IV fluids will be initiated immediately to replace volume in the case of septic shock.*

*Vasoactive medications are then used to increase the SVR and decrease the dilation of the blood vessels. After blood cultures are obtained, broad-spectrum antibiotics are given without delay. Steroids are given to treat septic shock that results in adrenal insufficiency and refractory hypotension.*

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**99.**

An infant in septic shock is started on dobutamine (Dobutrex) at 5 mcg/kg/min as a continuous intravenous (IV) infusion. The infant begins to experience ventricular tachycardia and becomes slightly hypotensive. Which of the following nursing interventions is appropriate at this time?

**Decrease the dobutamine dosage and reevaluate**

Initiate a low-dose intravenous (IV) sedative

Administer a beta-blocker to slow the heart rate

Initiate cardioversion

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*Correct answer: Decrease the dobutamine dosage and reevaluate*

*Dobutamine is a direct-acting inotropic agent, increasing cardiac contractility, coronary blood flow, and heart rate (HR) while exerting limited effects on the vasculature. Cardiac output increases, depending on myocardial catecholamine stores. Tachycardia is a known side effect of dobutamine infusion; if it is noted, dobutamine should be decreased, and the patient's HR should be reassessed.*

*Giving a beta-blocker will negate the effects of dobutamine. A sedative is inappropriate at this time. With the initiation of dobutamine therapy, the nurse should watch for tachycardia, as this is not uncommon. Cardioversion is not initially appropriate in this scenario.*

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