

AACN

*CCRN-Neonatal
Critical Care Nursing*



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Question: 1

A newborn with a congenital heart defect causing systemic to pulmonary shunting develops signs of cardiogenic shock. Which of the following are characteristics of cardiogenic shock?

- A. Decreased cardiac output, increased systemic vascular resistance, pulmonary edema, and right ventricular failure.
- B. Decreased cardiac output, peripheral edema, decreased systemic vascular resistance, and left ventricular failure.
- C. Decreased cardiac output, decreased systemic vascular resistance, pulmonary edema, and left ventricular failure.
- D. Increased cardiac output, increased systemic vascular resistance, peripheral edema, and right ventricular failure.

Answer: A

Explanation:

Cardiogenic shock causes increased preload and afterload and decreased contractility. Together, these result in decreased cardiac output and increased systemic vascular resistance to compensate. This increases afterload in the left ventricle, which fails to adequately pump blood as cardiac output and coronary and peripheral perfusion continue to decrease. Fluid builds up, causing pulmonary edema and right ventricular failure.

Question: 2

A neonate on mechanical ventilation develops a left pneumothorax with obvious tachypnea, displaced apical heartbeat, and unequal air exchange, requiring needle aspiration. What is the correct insertion site for the needle?

- A. Left anterior axillary line, second or third intercostal space.
- B. Left midsternal line, second or third intercostal space.
- C. Left midclavicular line, third or fourth intercostal space.
- D. Left midclavicular line, second or third intercostal space.

Answer: D

Explanation:

The correct needle insertion point for a needle aspiration to treat pneumothorax in a neonate

is on the left midclavicular line at the second or third intercostal space. The infant should be given oral sucrose, placed in supine position, given IV fentanyl 250 mcg over 2 to 3 minutes, and given a local anesthetic with 1% lidocaine. The needle is inserted directly into the intercostal space until air is aspirated in a syringe. The air is expelled through a stopcock. A chest tube may be inserted in the same space or at the anterior axillary line, fourth, fifth, or sixth intercostal space.

Question: 3

The nursing staff is preparing posters to explain handwashing and gowning procedures for family members to reduce the chance of cross-contamination in the NICU. Which of the following is the best type of poster?

- A. A poster with detailed text at 9th grade level and small sketches.
- B. A poster with large pictures and minimal text written at 6th grade level.
- C. A poster with pictures only.
- D. A poster with text only at adult reading level.

Answer: B

Explanation:

The best poster is one with large pictures so that family members can see what they need to do and minimal text at 6th-grade reading level. Readability (the grade level of material) is a concern because many patients and families may have limited English skills or low literacy, so pictures are important. The average American reads effectively at the 6th- to 8th-grade level (regardless of education achieved). Additionally, research indicates that even people with much higher reading skills learn medical and health information most effectively when the material is presented at the 6th- to 8th-grade readability level.

Question: 4

After insertion of an endotracheal tube (ETT), the nurse auscultates the infant for breath sounds and notes that the right lung is better ventilated than the left. What does this suggest?

- A. The ETT is positioned too high.
- B. The ETT is positioned too low.
- C. The ETT is in the stomach.
- D. The ETT is correctly positioned.

Answer: B

Explanation:

If the right lung is better ventilated than the left after insertion of an ETT, this suggests that the ETT is positioned too low. ETT placement should immediately be verified by auscultation and

radiograph, ultrasound, or disposable end-tidal carbon dioxide detectors. Esophageal intubation is indicated if no air exchange is detected bilaterally or if there is air sound over left upper abdomen. The tube may be too high if air sounds are diminished. An ETT may be inserted nasally or orally.

Question: 5

A premature neonate was maintained on mechanical ventilation for 3 weeks. Extubation was done with some difficulty, and the infant subsequently developed stridor, recurrent pneumonitis, and frequent choking. What complication of long-term intubation most likely explains these symptoms?

- A. Tracheal stenosis.
- B. Staphylococcus aureus infection.
- C. Pulmonic stenosis.
- D. Tracheobronchial fistula.

Answer: A

Explanation:

The difficulty extubating the infant and subsequent development of stridor, recurrent pneumonitis, and frequent choking are often associated with tracheal stenosis caused by pressure necrosis of the tissues from the intubation tube. Incidence of tracheal stenosis increases if the infant's mucosa becomes infected, so pathogens may have a role in the disorder. Treatment with balloon dilatation per endoscopy is often successful, although some infants require surgical repair.

Question: 6

If a newborn's stroke volume is about 5 mL, what is the average pulse required to ensure adequate cardiac output?

- A. 100 bpm.
- B. 145 bpm.
- C. 180 bpm.
- D. 195 bpm.

Answer: B

Explanation:

A newborn requires a cardiac output of about 800 mL/min, but the stroke volume is usually only about 5 mL because of the small size, so a heart rate of about 145 bpm is needed to ensure adequate output. A period of apnea is usually followed by decreased heart rate and oxygen saturation. Heart rates will vary depending on whether the neonate is awake, sleeping, or active.
< 1 week: At rest, 100 to 180; asleep, 80 to 160; active/sick, < 220.
1 to 2 weeks: At rest, 100 to 220; asleep, 80 to 200; active/sick, < 220

Question: 7

A neonate suffered perinatal asphyxia and developed moderate hypoxic-ischemic encephalopathy (HIE) with neurological dysfunction, including seizures. Which treatment may be used to increase cerebral blood flow?

- A. Phenobarbital.
- B. Calcium channel blocker.
- C. Allopurinol.
- D. Heparin.

Answer: B

Explanation:

Calcium channel blockers may increase cerebral blood flow with ischemia caused by HIE. Other treatments include phenobarbital for seizures. Allopurinol (40 mg/kg) 4 hours after birth reduces mortality rates. HIE results when oxygen supply to the brain is impaired. HIE is classified as mild, moderate, or severe, depending on the degree of ischemia and symptoms. Mild HIE usually resolves in 3 to 4 days and moderate HIE in 1 to 2 weeks, but permanent brain damage can occur with severe HIE.

Question: 8

Evidence-based guidelines are being developed for insertion and care of peripherally inserted central catheters (PICCs) to reduce infection rates. The most reliable information derives from which of the following?

- A. Opinion of the medical director.
- B. Staff observations.
- C. Review of literature, focusing on research studies with critical analysis.
- D. Reports of best practices at another hospital.

Answer: C

Explanation:

The most reliable information derives from an evidence review that includes review of literature, critical analysis of studies, and summarizing of results, including pooled meta-analysis. Recommendations based on personal experience from a number of experts may be utilized, especially if there is inadequate evidence based on review, but this subjective evidence should be acknowledged because people may be biased. Considering best practices may be helpful but does not take the place of evidence review.

Question: 9

After emergent treatment for a pneumothorax, a neonate has a chest tube inserted and attached to a 3-chamber Pleur-Evac system. Which chamber or chambers control the vacuum necessary to create suction?

- A. Chambers 1 and 3.
- B. Chamber 1.
- C. Chamber 2.
- D. Chamber 3.

Answer: C

Explanation:

Chamber 2 creates a vacuum to allow suction. The first chamber is the collection chamber where the air and/or fluid are drained from the pleural space. Bubbling in this chamber is the result of air being pumped out of the pleural space and is expected. The second chamber is the water seal chamber where the water, in an amount prescribed by the physician, is placed to create the vacuum necessary to pull the fluid and/or air out of the pleural space. The level of water affects the amount of pressure and should be carefully monitored to make sure it remains at the ordered level. The third chamber is the suction chamber, which is responsible for the suction that creates the pressure, removing the air from the pleural space.

Question: 10

A woman with placenta previa delivers a neonate at near term. Which of the following neonatal conditions is an increased risk with placenta previa?

- A. Asphyxia.
- B. Congenital anomalies.
- C. Cerebral hemorrhage.
- D. Neural tube defects.

Answer: B

Explanation:

Placenta previa puts the neonate at increased risk for congenital anomalies of the CNS and cardiac, respiratory, and gastrointestinal systems. Placenta previa is also associated with poor growth and anemia. Implantation of the placenta is over or near the internal cervical os. Placenta previa may also cause premature birth with associated neonatal complications of prematurity. Women with placenta previa have increased incidences of hemorrhage in the third trimester.

Question: 11

A postoperative neonate is assessed for pain using the CRIES tool. This tool requires supplemental oxygen as needed to maintain oxygen saturation at which of the following levels?

- A. 94%,
- B. > 95%,
- C. 96%.
- D. 97%.

Answer: B

Explanation:

CRIES is an effective tool for evaluation postoperative pain in neonates and requires maintaining oxygen saturation greater than 95%. A score of at least 4 indicates pain:

Characteristic 0 1 2

C | Crying No cry, or High-pitched High-pitched
normal cry crying but can | crying and cannot
be consoled. be consoled.

R | Requires O₂ No oxygen Oxygen Oxygen required.

(To keep O₂ required. required. (> 30% below
saturation at (< 30% below | baseline)

95%) baseline)

I | Increased VS HR and BP HR and BP HR and BP
(HR, BP) unchanged increase < 20%. | increase > 20%.
or below
baseline.

E | Expression No grimace. | Grimace. Grimace and non-
audible grunt

S | Sleeplessness Continuous] | Awakens Constantly awake.
y sleeping. frequently.

Question: 12

A neonate has had frequent blood draws to monitor electrolyte and glucose levels. Phlebotomy has caused anemia of prematurity (AOP), although the infant is not acutely hypoxemic. Which initial treatment is indicated:

- A. Recombinant human erythropoietin (rHuEPO).
- B. Fresh frozen platelets (FFP).
- C. Packed red blood cells (PRBC).
- D. Platelets.

Answer: A

Explanation:

rHuEPO is indicated to stimulate erythropoiesis in phlebotomy-related AOP. Infants with signs of hypoxemia (poor feeding, tachypnea, tachycardia, pallor) may require transfusions. AOP represents a pathologic exaggeration of the normal decrease in hematocrit that occurs in every newborn. Other causes include:

e Decreased RBC production because the premature neonate's response to erythropoietin (EPO), the main stimulus for RBC production, has not matured. Lowest hemoglobin (Hgb) levels are usually at 2 to 3 months of age.

* Premature RBCs have a shortened lifespan when compared with the full-term neonate's because of decreased levels of intracellular ATP and enzyme activity.

Question: 13

What is the best approach to ensure collaboration between the parents of a seriously ill neonate and the medical staff?

- A. Provide printed guidelines outlining parents' rights and responsibilities.
- B. Tell the family what their rights are in relation to care.
- C. Advise the family that they should devise a list of concerns.
- D. Sit down with the family and ask what they want.

Answer: D

Explanation:

Including parents in planning for an infant takes time initially, but sitting down and asking the parents, "What do you want?" and using the Synergy Model to evaluate the infant's (and parents') characteristics can provide valuable information that saves time in the long run and facilitates planning and expenditure of resources. Nurses and others on the health care team must always remember that the point of collaborating is to improve patient care, so the patient and patient's family must remain central to all planning.

Question: 14

A neonate with hypoxia is receiving noninvasive positive pressure ventilation. Which of the following provides a steady stream of pressurized air with increased pressure during inspiration?

- A. Bilevel positive airway pressure (BiPAP).
- B. Continuous positive airway pressure (CPAP).
- C. Free flow (blow-by) oxygen.
- D. Oxygen per high-flow nasal cannula.

Answer: A

Explanation:

BiPAP (similar to CPAP) provides a steady stream of pressurized air but senses inspiratory effort and increases pressure during inspiration. CPAP provides a steady stream of pressurized air throughout both inspiration and expiration. Free-flow oxygen is administered to the neonate by the use of either a mask hooked up to an oxygen source or by the use of the oxygen tubing to direct and concentrate the oxygen at the infant's airway. Free-flow oxygen should be administered at a rate of 5 L/min. Oxygen per high-flow nasal cannula (1.5 to 2 L/min) can result in positive pressure, depending on the size of catheter and the flow rate.

Question: 15

A premature neonate is receiving enteral feedings. Which of the following is most important in reducing the risk of necrotizing enterocolitis (NEC)?

- A. Increasing feeding volume slowly at no more than 20 mL/kg/day.
- B. Using breast milk in enteral feedings.
- C. Using hyperosmolar feedings.
- D. Administering immunoglobulins.

Answer: A

Explanation:

More than 90% of NEC occurs in infant receiving enteral feedings, especially if volume of feedings is increased more than 20 mL/kg/day, so feeding tolerance should be carefully monitored. Other risk factors include intestinal ischemia and bacterial colonization. Breast milk may have protective immunoglobulins, but some infants who receive enteral feedings with breast milk get NEC. NEC is also associated with the use of hyperosmolar feedings. Administering immunoglobulins and Bifidobacterium may give some protective effect.

Question: 16

A neonate develops a stable tachyarrhythmia

- a. Which first action is most appropriate?
- A. Give a synchronized electrical cardioversion at 0.5 to 2.0 Joules/kg.
- B. Give asynchronous cardioversion.
- C. Try esophageal pacing.
- D. Apply ice to the neonate's face to trigger the diving response.

Answer: D

Explanation:

Apply ice to the neonate's face to trigger the diving response to slow the heart rate. The vagal maneuver increases parasympathetic input to the heart and slows the rate. If unsuccessful, try adenosine, digoxin, or propranolol. Use synchronized cardioversion at 0.5 to 2.0 Joules/kg for unstable arrhythmia with narrow QRS complex. Treat a stable arrhythmia with wide QRS complex initially with esophageal pacing. If unresponsive, try procainamide and lidocaine, flecainide, and asynchronous cardioversion if necessary.

Question: 17

New policies are being instituted in the NICU, based on evidence-based research. Some of the staff members are vocally resistant to the changes. What is the most appropriate action for the unit supervisor?

- A. Advise staff that complaining is counterproductive.
- B. Provide honest information about the reasons for the changes and how the changes will affect the staff, including positives.
- C. Suggest that staff vote on whether to implement the changes.
- D. File a report with Human Resources about those complaining.

Answer: B

Explanation:

When instituting changes, the best approach is to provide honest information about the reasons for changes and how staff will be affected. Resistance to change is common for many people, so coordinating collaborative processes requires anticipating resistance and taking steps to achieve cooperation. Resistance often relates to concerns about job loss, increased responsibilities, and general denial or lack of understanding and frustration. The nurse should be empathetic and patient, allowing people to express their opinions and encouraging their participation.

Question: 18

An infant has been treated with a CoolCap® for brain cooling (hypothermia) for 70 hours and is being rewarmed. What is the correct rate of rewarming?

- A. 0.5°C/hr.
- B. 1°C/hr
- C. 1.5°C/hr.
- D. 2°C/hr.

Answer: A

Explanation:

Both the CoolCap and body cooling devices used for cooling therapy require rewarming at the rate of 0.5°C/hr. Duration of cooling for both types of devices is usually 72 hours. The CoolCap

requires 2 hours to reach target core temperature while the body cooling device requires 1.5 hours. The target core site for the CoolCap is the rectum while the target core site for body cooling is the esophagus.

Question: 19

A neonate with bronchopulmonary dysplasia is receiving high-frequency jet ventilation (HFJV). Which assessment is best used to determine airway patency and effectiveness of ventilation?

- A. Auscultation of the lungs.
- B. Heart and respiratory rate.
- C. Chest wall vibration.
- D. Oxygen saturation level.

Answer: C

Explanation:

Assessment of chest wall vibrations is the best indicator that the airway is patent and HFJV settings are appropriate for effective ventilation. Chest wall vibrations may decrease if the ETT is not patent or a pneumothorax occurs. The vibrations may cause interference with monitoring devices for heart rate and respirations. HFJV directs a high velocity stream of air into the lungs in a long spiraling spike that forces carbon dioxide against the walls, penetrating dead space and providing gas exchange by using small tidal volumes of 1-3 ml/kg, much smaller than with conventional mechanical ventilation. Inspiration is controlled while expiration is passive, but the rate of respiration is up to 11 per second ("panting" respirations).

Question: 20

A premature neonate has developed acute renal failure (ARF). There is a proportionate rise in the BUN/creatinine ratio with creatinine concentration 1.8 mg/dL. What finding in the urinalysis suggests an intrinsic cause for the ARF rather than prerenal or postrenal?

- A. White blood cells.
- B. Red blood cells.
- C. Protein, tubular cells, and casts.
- D. Mucous and red blood cells.

Answer: C

Explanation:

Protein, tubular cells, and casts are usually found in the urine with intrinsic acute renal failure. This occurs when the kidneys themselves have an abnormality and may be the result of a "prerenal" insult. A common condition is acute tubular necrosis precipitated by shock, perinatal

asphyxia, drugs, or a prolonged prerenal state. Prerenal or functional renal failure (accounting for 50% of ARF in neonates) is usually caused by renal hypoperfusion, also called prerenal azotemia, from shock, dehydration, myocardial failure, or severe hypoxia. The kidneys themselves are normal. Postrenal or obstructive renal failure occurs when an obstruction exists in the urinary system distal to the kidneys.

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