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## Question: 1

A neonate born prematurely via cesarean section at 28 weeks of gestation and weighing just over 1,000 g develops respiratory distress syndrome (RDS) soon after birth. The infant exhibits increasing respiratory difficulty related to progressive atelectasis in the first 6 hours after birth, leading to hypoxia and hypoventilation, and requires respiratory support and surfactant replacement therapy. This infant's chest x-ray reveals hazy lung fields with fuzzy heart borders and a "whiteout" appearance. This indicates which of the following complications?

- A. Bronchopulmonary dysplasia (BPD)
- B. Acute pulmonary edema
- C. Atelectasis
- D. Pneumonia

**Answer: B**

Explanation:

Correct answer: Acute pulmonary edema

Chest x-ray findings in RDS include reduced lung volume, air bronchograms, reticulogranularity, and lung opacification.

Acute pulmonary edema is a complication of RDS and is evidenced by hazy lung fields with fuzzy heart borders on chest x-ray films. This loss of visible heart borders with a "whiteout" appearance is from the diffuse lung opacification in RDS.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach, 9th Edition. Pg 787.

Core Curriculum for Neonatal Intensive Care Nursing, 6th Edition. Pg 228, 397.

## Question: 2

Placental pathology would be MOST important in the diagnosis and management of which of the following?

- A. *Listeria monocytogenes* infection
- B. Syphilis
- C. Preeclampsia
- D. GBS infection

**Answer: A**

Explanation:

Correct answer: *Listeria monocytogenes* infection

Placental pathology is important because placental microabscesses occur with *Listeria*. To prevent this unpleasant bacterial infection, pregnant women should avoid unpasteurized dairy products.

If *Listeria* infection is present in a neonate at the time of birth, the recommended therapy is IV ampicillin and IV gentamycin for 14-21 days.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach, 9th Edition. Pg 20, 24, 31, 698, 706.

### Question: 3

Criteria that indicate an infant may be successfully weaned from an incubator to an open crib include all the following, EXCEPT:

- A. Weight of at least 1,600 grams
- B. No medical complications
- C. Tolerating total parenteral nutrition (TPN)
- D. Five days of consistent weight gain

**Answer: C**

Explanation:

Correct answer: Tolerating total parenteral nutrition (TPN)

Weaning an infant from an incubator to an open crib is an important step in preparation for discharge.

Indicators that an infant may be ready to be weaned include the following:

- weight of 1,600 g or more
- five days of consistent weight gain
- an absence of medical complications
- tolerance of enteral feeds (not TPN feeds)

Weaning will likely occur over several days and involves properly dressing the infant and swaddling in a blanket. The incubator temperature is manually lowered, while the infant's temperature is continually monitored.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 150-152.

Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 96.

### Question: 4

To decrease the risk of contracting toxoplasmosis, a pregnant woman should avoid all the following, EXCEPT:

- A. Eating fruits or vegetables not peeled or washed thoroughly
- B. Exposure to raw or undercooked meats

- C. Consuming pasteurized milk
- D. Cat feces

**Answer: C**

Explanation:

Correct answer: Consuming pasteurized milk

Toxoplasmosis is an infection caused by the parasite *Toxoplasma gondii*, which is present in many warm-blooded animals but has only been found to reproduce in the guts of cats. Therefore, women should avoid unnecessary exposure to cat feces. Using gloves and wearing a mask when emptying the litter box can protect pregnant women if they must empty a litter box.

In addition, eating meat that is not fully cooked increases the risk of exposure since pork, beef, and lamb are most likely to carry this parasite. Washing fruits and vegetables thoroughly before eating them decreases the risk of infection. Even when peeling fruits or vegetables, they should still be rinsed. When a knife is used to cut them, the parasite is simply pushed further into the fruit or vegetable. After washing, they should be dried with a paper towel or clean dish towel to remove some bacteria and parasites.

Finally, a pregnant woman (or any woman attempting to become pregnant) should use hot, soapy water to wash her hands immediately after exposure to any infectious source, even after wearing gloves. Pregnant women should only consume pasteurized milk (and avoid raw milk), as raw milk can carry toxoplasmosis.

Reference:

Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 602.

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 697.

## Question: 5

A healthy term newborn requires how many kcal per kg per day for sufficient growth and development?

- A. 70 to 90 kcal/kg/day
- B. 110 to 130 kcal/kg/day
- C. 80 to 100 kcal/kg/day
- D. 90 to 120 kcal/kg/day

**Answer: D**

Explanation:

Correct answer: 90 to 120 kcal/kg/day

Caloric requirements for near-term and term infants are 90 to 120 kcal/kg/day. Caloric requirements for preterm infants, including very-low-birth-weight (VLBW) and small-for-gestational-age (SGA) infants, are approximately 110 to 130 kcal/kg/day.

Parenteral requirements are about 20% lower, or approximately 80 to 90 kcal/kg/day.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 488-489.  
Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 155-156.

### Question: 6

Oxyhemoglobin saturation is the percentage of hemoglobin that is combined with oxygen. Many factors decrease the affinity of hemoglobin for oxygen, causing the oxygen-hemoglobin dissociation curve to shift to the right.

All the following factors cause this shift to the right, EXCEPT:

- A. Acidemia
- B. Fevers
- C. Hypercapnia
- D. Fetal hemoglobin

**Answer: D**

Explanation:

Correct answer: Fetal hemoglobin

Oxygen binding with hemoglobin increases as the partial pressure of oxygen increases. The oxygen-dissociation curve is a measure of the affinity that hemoglobin has for oxygen. Fetal hemoglobin increases the affinity of hemoglobin for oxygen, shifting the curve to the left; the affinity of fetal hemoglobin for oxygen is higher than adult hemoglobin. Approximately 70% of hemoglobin in term infants, and more in preterm infants, consists of fetal hemoglobin.

Fevers, acidemia, and hypercapnia decrease the affinity of hemoglobin for oxygen, thus shifting the curve to the right.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 190, 623.

Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 426, 427.

### Question: 7

Bronchopulmonary dysplasia (BPD) occurs predominantly in infants who are born under which circumstances?

- A. At or near term
- B. With preexisting lung disease
- C. Weighing less than 2500 g
- D. Prematurely

**Answer: D**

Explanation:

Correct answer: Prematurely

BPD is a disorder of primarily premature infants that is characterized by respiratory distress and impaired gas exchange. It is an iatrogenic disease caused by oxygen toxicity and barotrauma resulting from pressure ventilation. It can occur in infants with a family history, genetic susceptibility, and even mild or no initial lung disease in the first week after birth. However, it generally affects infants with severe lung disease complicated by an air leak, patent ductus arteriosus, and/or infection.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 772-774.

Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 406-407.

### Question: 8

A male infant was born at 28 weeks of gestation via cesarean section. Immediately following delivery, the infant developed respiratory distress and required supplemental oxygen therapy and mechanical ventilation. His chest x-ray shows a reduction in lung volume and expansion with diffuse atelectasis. What is the MOST likely cause of his respiratory distress?

- A. Bronchopulmonary dysplasia
- B. Transient tachypnea of the newborn
- C. Surfactant deficiency
- D. Pulmonary hypertension

**Answer: C**

Explanation:

Correct answer: Surfactant deficiency

Chest x-ray findings in an infant with surfactant-deficient respiratory distress syndrome include diffuse atelectasis, a reduction in lung volume, and decreased lung expansion.

Atelectasis increases lung density and results in visible outlines of air-filled bronchi against opaque lung tissue. Chest x-ray results also have a ground-glass appearance that represents areas of atelectatic respiratory alveoli adjacent to expanded or hyperexpanded respiratory units.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 787-788.

Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 396-399

### Question: 9

An encephalocele that is detected perinatally (in utero) suggests which of the following genitourinary tract abnormalities?

- A. Potter syndrome

- B. Congenital nephrotic syndrome
- C. Meckel-Gruber syndrome (polycystic kidneys)
- D. Diabetes insipidus

**Answer: C**

Explanation:

Correct answer: Meckel-Gruber syndrome (polycystic kidneys)

An encephalocele is a neural tube defect (failure of the neural tube to close completely during fetal development) characterized by a sac-like protrusion of the brain and the membranes that cover it through openings in the skull. This defect occurs in 1 per 10,000 live births. For 70% to 80% of infants, the lesion is located in the occipital region. While the precise mechanism for development is unclear, genetic factors may be causative. Meckel-Gruber syndrome (or Meckel's syndrome) and Walker-Warburg syndrome are the most commonly associated conditions.

Perinatal edema in a fetus and an enlarged placenta are associated with congenital nephrotic syndrome. Diabetes insipidus is often related to polyhydramnios, and Potter syndrome is often associated with arthrogryposis (joint contractures found throughout the body at birth).

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach, 9th Edition. Pg 891.

Core Curriculum for Neonatal Intensive Care Nursing, 6th Edition. Pg 635.

## Question: 10

A NICU nurse is caring for an infant with a lethal condition who is dying. The nurse has received orders from the physician to continue providing resuscitative care to the infant. The nurse believes palliative care would be more humane and significantly ease the infant's suffering but continues to provide care. What does this situation demonstrate?

- A. Moral distress
- B. Ethical dilemma
- C. Professional dilemma
- D. Conscientious objection

**Answer: A**

Explanation:

Correct answer: Moral distress

Moral distress occurs when conflict exists between personal values and a treatment being given.

An ethical dilemma is a situation in which the ethically correct action must be decided. A professional dilemma is an ethical problem that requires an individual to choose a particular course of action.

Conscientious objection is a term used in cases in which one's ethics or integrity is being violated, and the case is transferred to another professional as a response to the moral distress experienced by the care provider.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 1180.  
Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 717-718.

### Question: 11

When is a palliative care consultation NOT indicated in the NICU?

- A. When an infant has a life-threatening condition or is dying despite life-sustaining interventions
- B. When there is a question about pain or symptom management specific to comfort and end-of-life
- C. When an infant is born at 24 weeks of gestational age
- D. When there is a question about comfort or support

**Answer: C**

Explanation:

Correct answer: When an infant is born at 24 weeks of gestational age

Palliative care is recommended for newborns who are born before 23 weeks of gestation. This measure would not be indicated simply because an infant is born at 24 weeks of gestational age. However, palliative care may be especially important when an infant is on the threshold of viability and is gravely ill, has an uncertain outcome, or is dying despite appropriately applied intensive care measures. This form of care focuses on comprehensive, compassionate comfort and support for infants and their families.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 1181.

Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 342, 386.

### Question: 12

In comparing the psychosocial adjustments of parents in the NICU, which of the following statements is ACCURATE?

- A. Mothers have more successful adjustments related to work, sexual relations, and social environments than fathers
- B. Fathers report the entire NICU experience and its aftermath is more stressful than mothers do
- C. Fathers have been found to be more anxious, hostile, and depressed than mothers
- D. Parents need communication, empathy, and support to cope with the stressful experience of the NICU

**Answer: D**

Explanation:

Correct answer: Parents need communication, empathy, and support to cope with the stressful experience of the NICU

NICU parents may experience increased levels of emotional distress, and all parents need communication, empathy, and support for the stressful experience they are encountering. However, mothers have been found to be more anxious, hostile, and depressed than fathers, with poorer adjustments to work, sexual relationships, social environments, and psychological distress. Similarly, mothers found the NICU experience and its aftermath more stressful than fathers did.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 1072.

### Question: 13

Screening of pregnant women for group B streptococcus (GBS) is recommended at which time?

- A. 26 to 28 weeks of gestation
- B. 35 to 37 weeks of gestation
- C. 32 to 34 weeks of gestation
- D. 30 to 32 weeks of gestation

**Answer: B**

Explanation:

Correct answer: 35 to 37 weeks of gestation

The ACOG Committee on Obstetric Practice now recommends "universal vaginal or rectal group B streptococci screening of pregnant women" at 35 to 37 weeks of gestation and the use of intrapartum prophylactic IV antibiotics in GBS positive women to prevent transmission to infants during delivery. Treatment for women with a positive culture, GBS bacteriuria during the current pregnancy, or a previously GBS-infected infant is usually penicillin.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 32, 701.

Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 600-601.

### Question: 14

An infant is admitted to the NICU after being delivered emergently via cesarean section. The infant is intubated for severe respiratory distress, and the nurse observes a clonic seizure while performing routine care, approximately 12 hours after delivery.

Which of the following BEST characterizes a clonic seizure?

- A. Fast jerking movements with limb involvement
- B. Rhythmic jerking movements lasting 1-3 seconds that slow during the seizure event
- C. Random or roving eye movements with a protruding tongue and apnea
- D. Sudden stiffness or tension in the muscles in the arms, legs or trunk lasting approximately 15-20 seconds

**Answer: B**

Explanation:

Correct answer: Rhythmic jerking movements lasting 1-3 seconds that slow during the seizure event  
A clonic-type seizure is characterized by rhythmic jerking movements (1-3 per second) that slow during the seizure. Focal clonic and multifocal clonic seizures are the most likely types of seizure activity to be associated with an electrocerebral seizure pattern on EEG. Initial treatment involves stopping seizure activity with a loading dose of an antiepileptic medication, preventing further seizures with maintenance doses of medication, minimizing side effects of seizure therapy, and correcting underlying treatable conditions.

Tonic seizures are characterized by posturing (sudden stiffness or tension in the muscles of the arms, legs, or trunk).

Subtle seizures are characterized by abnormal behavioral, autonomic, or motor activities that do not result from the other three seizure classifications. They are more prominent in premature infants, prompting roving eye movement, a protruding tongue, and apnea.

Myoclonic seizures involve faster jerking than clonic seizures with flexor muscle (limb) involvement.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach, 9th Edition. Pg 952-953.

Core Curriculum for Neonatal Intensive Care Nursing, 6th Edition. Pg 647-649.

### Question: 15

A pregnant woman has a shortened cervix and is experiencing significant contractions. She is admitted to the labor and delivery unit and given a dose of prophylactic antenatal steroids to decrease the risk of respiratory distress syndrome (RDS) in her infant. Fortunately, her labor was halted with the use of tocolytics. Three weeks later, her membranes rupture, and delivery is imminent.

The American College of Obstetricians and Gynecologists (ACOG) recommends a repeat course of antenatal steroids if the fetus is younger than:

- A. 37 weeks of gestation
- B. 36 weeks of gestation
- C. 34 weeks of gestation
- D. 32 weeks of gestation

**Answer: C**

Explanation:

Correct answer: 34 weeks of gestation

Antenatal corticosteroid treatment of women at risk for preterm delivery between 24 and 34 weeks of gestation has been shown to be effective and safe in enhancing fetal lung maturity and reducing neonatal mortality.

The ACOG recommends a repeat course of antenatal steroids if the fetus is younger than 34 weeks of gestation and the previous course of antenatal steroids was administered more than 14 days earlier.

Reference:

## Question: 16

What is the MOST common diagnosis for neonatal seizures?

- A. Hypoxic-ischemic encephalopathy (HIE)
- B. Intracranial hemorrhage (ICH)
- C. Meningitis secondary to bacterial infection
- D. Withdrawal from maternal drugs

**Answer: A**

Explanation:

Correct answer: Hypoxic-ischemic encephalopathy (HIE)

A seizure is a symptom of neurologic dysfunction, not a specific disease entity. Seizures may be associated with many disorders that directly or indirectly affect the brain by altering its electrochemical stability. Seizures often occur in response to hypoxia during a perinatal event; hypoxic ischemia is the most common diagnosis, accounting for 60% of neonatal seizures.

Infections make up 12% of cases, ICH makes up 15% of cases, and withdrawal from maternal drugs is an uncommon cause of seizures but occasionally occurs (jitteriness is more commonly seen in drug withdrawal).

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach, 9th Edition. Pg 948-949.

Core Curriculum for Neonatal Intensive Care Nursing, 6th Edition. Pg 647.

## Question: 17

Administration of surfactant to an infant with respiratory distress syndrome (RDS) leads to all the following, EXCEPT:

- A. Reduction in pulmonary vascular resistance (PVR)
- B. Reduction in surface tension
- C. Improvement in gas exchange
- D. Decreased need for high levels of supplemental oxygen

**Answer: A**

Explanation:

Correct answer: Reduction in pulmonary vascular resistance (PVR)

Surfactant administration leads to the following:

- reduction in surface tension
  - dramatic and rapid improvement in gas exchange
  - decreased need for high levels of supplemental oxygen and ventilatory support
  - less barotrauma
  - improved chest x-ray findings because of improved lung compliance and lung volume
- Treatment of persistent pulmonary hypertension of the newborn (PPHN) focuses on reducing PVR by pulmonary vasodilation and increasing SVR by maintaining adequate oxygenation.
- Reference:
- Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 788-789.
- Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 398-399.

### Question: 18

Which nerves are affected by Klumpke's palsy, a type of brachial nerve paralysis in newborns that results from a difficult delivery?

- A. Cervical nerve VII (C7) to thoracic nerve I (T1)
- B. Thoracic nerve II (T2) to thoracic nerve IV (T4)
- C. Cervical nerve IV (C4) to cervical nerve VIII (C8)
- D. Thoracic nerve I (T1) to thoracic nerve III (T3)

**Answer: A**

Explanation:

Correct answer: Cervical nerve VII (C7) to thoracic nerve I (T1)

Klumpke's palsy, a type of plexus injury that results from lateral traction on the shoulder (as with vertex deliveries) or the head (as with breech deliveries), is rare for newborns. It involves only the distal upper extremity (lower arm and hand), whereas the muscles in the proximal extremity are normal.

The lower part of the plexus—C7 to T1—is involved.

Reference:

Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 642.

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 945-946.

### Question: 19

Which of the following statements is TRUE about the effects of malnutrition on neonates?

- A. Inadequate early nutrition may have irreversible effects on later neurodevelopmental outcomes.
- B. During the last trimester of gestation, the rapidly growing fetal gastrointestinal tract dictates most nutritional requirements.
- C. One strategy to improve nutrition for extremely low-birth-weight (ELBW) infants is to initiate parenteral nutrition at 24 hours.

D. Preterm delivery interrupts the nutritional supply and abruptly results in an anabolic state, which, if prolonged, may alter growth potential.

**Answer: A**

Explanation:

Correct answer: Inadequate early nutrition may have irreversible effects on later neurodevelopmental outcomes.

During the last trimester of gestation, rapid fetal growth takes place with active transplacental transport of most nutritional substrates. Preterm delivery interrupts the nutritional supply and abruptly results in a catabolic state, which, if prolonged, may alter growth potential. Reestablishment of an anabolic state and maintenance of micronutrient sufficiency are necessary.

The rapidly growing fetal brain is responsible for much of the nutritional requirements, and insufficient early nutrition may have irreversible effects on later neurodevelopmental outcomes. Initiating parenteral nutrition within the first hours after birth is one strategy to improve nutrition for ELBW infants.

Reference:

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 29-30.

Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 167-169.

## Question: 20

When an infant has suspected syphilis, which of the following tests is mandatory for diagnosis?

- A. Long bone x-ray examination
- B. VDRL (venereal disease research laboratory) tests on CSF
- C. FTA-ABS (fluorescent treponemal antibody absorption) IgM test
- D. RPR (rapid plasma reagin) test

**Answer: B**

Explanation:

Correct answer: VDRL (venereal disease research laboratory) tests on CSF

VDRL tests on CSF are mandatory for all infants with suspected congenital syphilis. An infant exposed to syphilis may be asymptomatic initially or show involvement in virtually all organ systems. Clinical manifestations include hepatitis, pneumonitis, bone marrow failure, myocarditis, meningitis, nephrotic syndrome, rhinitis, a rash of the palms and soles, and pseudoparalysis of an extremity.

RPR tests are useful for screening, but not mandatory in diagnosis. Long bone x-ray examination showing metaphysitis or periostitis may help in diagnosis but is not mandatory. An FTA-ABS IgM test is unreliable in diagnosis, as false-positive results may occur.

Reference:

Core Curriculum for Neonatal Intensive Care Nursing 6th Edition. Pg 607-608.

Merenstein & Gardner's Handbook of Neonatal Intensive Care: An Interprofessional Approach 9th Edition. Pg 696-697.

## Question: 21

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 after load and decreased contractility. Together, these result in decreased cardiac output and increased systemic vascular resistance to compensate. This increases after load 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: 22

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 2-3 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: 23

The nursing staff is preparing posters to explain hand washing 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: 24

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: 25

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: 26

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 100-180: asleep, 80-160: active/sick, 220
- 1-2 weeks: At rest, 100-220; asleep, 80-200; active/sick, 220

### Question: 27

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 3-4 days and moderate HIE in 1-2 weeks, but permanent brain damage can occur with severe HIE.

### Question: 28

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: 29

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: 30

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: 31

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
<b>C</b>	Crying	No cry, or normal cry	High-pitched crying but can be consoled.	High-pitched crying and cannot be consoled.
<b>R</b>	Requires O <sub>2</sub> (To keep O <sub>2</sub> saturation at 95%)	No oxygen required.	Oxygen required. (< 30% below baseline)	Oxygen required. (> 30% below baseline)
<b>I</b>	Increased VS (HR, BP)	HR and BP unchanged or below baseline.	HR and BP increase < 20%.	HR and BP increase > 20%.
<b>E</b>	Expression	No grimace.	Grimace.	Grimace and non-audible grunt
<b>S</b>	Sleeplessness	Continuously sleeping.	Awakens frequently.	Constantly awake.

### Question: 32

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:

- 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 2-3 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: 33

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 infants (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 patients family must remain central to all planning.

### Question: 34

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 (1.5-2.0 L/min) can result in positive pressure, depending on the size of catheter and the flow rate.

### Question: 35

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.

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