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**NCC**

# C-ELBW

*Care of the Extremely Low Birth Weight Neonate*

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## Question: 1142

A 28-day-old, 900-gram infant has been cared for in an incubator with humidity maintained at 85% for the first two weeks, then gradually weaned to 40%. The nurse notes that the infant's skin on the trunk is erythematous, peeling, and has multiple superficial fissures with localized serous oozing. What is the most appropriate skin care intervention?

- A. Applying a petrolatum-based ointment sparingly to the affected areas to support barrier function and minimize epidermal water loss.
- B. Scrubbing the skin daily with a 2% chlorhexidine solution to prevent bacterial colonization of the open epidermal fissures.
- C. Covering the entire trunk with a semi-permeable polyurethane adhesive dressing to completely seal the skin defects.

**Answer:** A

Explanation: The skin of an extremely low birth weight infant remains highly fragile and underdeveloped for several weeks after birth. When fissures and desquamation occur, applying a preservative-free, petrolatum-based emollient helps protect the compromised barrier, reduces transepidermal water loss, and promotes healing. Avoiding aggressive adhesives is essential to prevent epidermal stripping. Scrubbing with chlorhexidine is contraindicated, as it causes severe chemical burns and systemic toxicity through absorption across broken skin. Applying a large, semi-permeable adhesive dressing over friable, oozing skin is harmful because removing the dressing will cause severe epidermal stripping and worsen the skin injuries.

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## Question: 1143

Cardiac

Which of the following is a common cardiac complication seen in ELBW neonates?

- A. Coarctation of the aorta
- B. Ventricular septal defect
- C. Patent ductus arteriosus
- D. Atrial septal defect

**Answer:** C

Explanation: A common cardiac complication seen in ELBW neonates is patent ductus arteriosus (PDA). The ductus arteriosus is a fetal blood vessel that typically closes shortly after birth, but in ELBW infants, it may remain patent, leading to increased blood flow to the lungs and potential complications.

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## Question: 1144

An infant born at 24 weeks gestation has been exposed to frequent, uncoordinated care interventions during a 12-hour shift. At the end of the shift, the nurse notes that the infant is completely flaccid, unresponsive to touch, and has a flat heart rate tracing on the monitor with no variability, despite normal blood gas values. This presentation is most indicative of which neurobehavioral state?

- A. Structural injury to the ventral respiratory group within the lower medulla oblongata
- B. Advanced maturation of the central nervous system allowing deep, restorative sleep

C. Complete behavioral shutdown and exhaustion resulting from chronic sensory overstimulation

**Answer: C**

Explanation: When extremely low birth weight infants are subjected to chronic, uncoordinated overstimulation that exceeds their regulatory capacity, they may exhaust their energy reserves and experience a behavioral shutdown. In this state, the infant appears completely flaccid and unresponsive to stimuli, often accompanied by a flat heart rate tracing with low variability. This is a severe stress response indicating exhaustion, not deep sleep or advanced maturation. It also does not point to an isolated structural injury of the medulla unless supported by distinct focal neurological findings and clinical history.

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**Question: 1145**

A neonatal nurse practitioner is conducting a clinical study to evaluate the effect of early initiation of mother's own milk on the incidence of late-onset sepsis in infants under 1000 grams. The investigator calculates a specific statistical value to measure the strength of the association. The formula used to calculate the relative risk is:

$$\text{Relative Risk} = \frac{\text{Incidence of Sepsis in Exposed Group}}{\text{Incidence of Sepsis in Unexposed Group}}$$

The calculated relative risk is 0.45, with a 95% confidence interval of 0.30 to 0.68. How should the clinical team interpret these statistical findings?

- A. The use of mother's own milk is associated with a statistically significant 55% reduction in the risk of developing late-onset sepsis.
- B. The results are statistically insignificant because the confidence interval includes the number zero as a possible value.
- C. The study demonstrates that mother's own milk increases the risk of late-onset

sepsis by more than double, making it a dangerous intervention.

**Answer:** A

Explanation: A relative risk less than 1.0 indicates that the exposure (mother's own milk) is protective against the outcome (late-onset sepsis). A relative risk of 0.45 means that infants receiving mother's milk have 45% of the risk of sepsis compared to the unexposed group, representing a 55% reduction in risk. Because the 95% confidence interval (0.30 to 0.68) does not include the value of 1.0 (which denotes no difference), the finding is statistically significant, supporting the clinical benefits of human milk in this vulnerable population.

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**Question: 1146**

An ELBW neonate is experiencing gastrointestinal complications, such as feeding intolerance and abdominal distension. Which of the following is the most common underlying cause?

- A. Necrotizing enterocolitis
- B. Intestinal perforation
- C. Gastroesophageal reflux disease

**Answer:** A

Explanation: Necrotizing enterocolitis (NEC) is the most common underlying cause of gastrointestinal complications, such as feeding intolerance and abdominal distension, in ELBW neonates. NEC is a serious and potentially life-threatening condition characterized by inflammation and necrosis of the intestinal tissue.

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## Question: 1147

During the application of an adhesive securement device for a central venous line in a 25-week ELBW infant, which chemical agent is contraindicated for skin preparation due to the high risk of systemic absorption, chemical dermatitis, and potential neurotoxicity?

- A. Isopropyl alcohol preparations and aqueous povidone-iodine solutions.
- B. Chlorhexidine gluconate solution in a concentration greater than 2%.
- C. Sterile normal saline solution combined with medical-grade adhesive removers.

**Answer:** A

Explanation: Isopropyl alcohol and povidone-iodine are contraindicated or must be used with extreme caution and completely removed with sterile water in ELBW infants. Their immature skin barrier allows for significant transcutaneous absorption; alcohol can cause severe chemical burns and systemic central nervous system depression, while iodine absorption can lead to transient hypothyroidism or thyroid dysfunction. Chlorhexidine gluconate under 2% is often used with caution in bundles, but alcohol and iodine represent the highest toxic risks.

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## Question: 1148

Which of the following is the primary goal of delivery room management for the ELBW neonate?

- A. Establish effective respirations
- B. Maintain thermoregulation
- C. Initiate enteral feeding

**Answer: A**

Explanation: The primary goal of delivery room management for the ELBW neonate is to establish effective respirations. Ensuring the neonate can effectively breathe on their own or with assistance is the most critical step in stabilizing the ELBW neonate in the delivery room.

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**Question: 1149**

An ELBW neonate in the NICU is at risk for intraventricular hemorrhage (IVH). Which of the following interventions is most effective in reducing the risk of IVH in this patient?

- A. Providing supplemental oxygen to maintain normal oxygen levels
- B. Maintaining strict blood pressure control
- C. Minimizing handling and environmental stimuli

**Answer: C**

Explanation: Minimizing handling and environmental stimuli is the most effective intervention in reducing the risk of intraventricular hemorrhage (IVH) in an ELBW neonate in the NICU. ELBW neonates have a fragile cerebrovascular system and are at high risk for IVH, which can be exacerbated by sudden changes in intracranial pressure or blood flow. Minimizing unnecessary handling, invasive procedures, and exposure to bright lights or loud noises can help maintain a stable physiological environment and reduce the risk of IVH. While maintaining strict blood pressure control and providing supplemental oxygen are also important, they are not as directly impactful on reducing the risk of IVH as minimizing environmental stressors.

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## Question: 1150

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An ELBW infant born at 24 weeks gestation is now on day of life 4. The infant weighs 580 grams and is receiving synchronized intermittent mandatory ventilation. Over the past 12 hours, the infant has developed widening pulse pressures (48 mmHg systolic, 18 mmHg diastolic), a hyperdynamic precordium, and a new grade III/VI continuous murmur at the upper left sternal border. The infant's oxygen requirement has increased from 25% to 45% to maintain target saturations. An echocardiogram confirms a large, hemodynamically significant patent ductus arteriosus (PDA) with left-to-right shunting, a left atrial-to-aortic root ratio (LA/Ao) of 1.6, and a ductal diameter of 2.5 mm. Which of the following pathophysiologic sequences explains the systemic effects observed in this infant?

- A. Right ventricular hypertrophy develops rapidly due to downstream pulmonary hypoperfusion and low vascular pressures.
- B. Pulmonary overcirculation reduces systemic perfusion, causing a "steal" phenomenon that impairs organ perfusion.
- C. Increased systemic vascular resistance leads to a right-to-left shunt, causing severe coronary artery ischemia.

**Answer: B**

Explanation: A large, hemodynamically significant patent ductus arteriosus (PDA) in an ELBW infant leads to a substantial left-to-right shunt due to the rapid decline in pulmonary vascular resistance after birth. This results in pulmonary overcirculation and a concomitant systemic "steal" phenomenon, where blood is diverted from the systemic circulation into the low-pressure pulmonary bed during both systole and diastole. The systemic hypoperfusion causes wide pulse pressures, a bounding pulse, and places abdominal and cerebral organs at risk for ischemic injury. This physiology does not increase systemic vascular resistance or cause a right-to-left shunt under normal circumstances. Right ventricular hypertrophy is not an acute consequence of

a large left-to-right shunting PDA in the first week of life; instead, it causes left atrial and left ventricular volume overload, as reflected in the elevated left atrial-to-aortic root ratio.

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### Question: 1151

An ELBW neonate is born to a mother with preeclampsia. Which of the following is the most important consideration for the nurse in the perinatal management of this neonate?

- A. Monitoring the neonate for signs of respiratory distress
- B. Assessing the neonate for any congenital abnormalities
- C. Providing immediate respiratory support and stabilization
- D. Evaluating the neonate's growth and development trajectories

**Answer:** C

Explanation: The most important consideration for the nurse in the perinatal management of an ELBW neonate born to a mother with preeclampsia is providing immediate respiratory support and stabilization. Preeclampsia can lead to placental insufficiency and fetal distress, which can compromise the neonate's respiratory function at birth. Ensuring the neonate receives appropriate respiratory support and stabilization in the delivery room is the top priority to prevent further complications.

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### Question: 1152

A 24-week gestation neonate is diagnosed with bronchopulmonary dysplasia (BPD). Which nursing intervention is most effective in preventing further lung injury?

- A. Administer diuretics as prescribed
- B. Ensure adequate nutrition
- C. Minimize mechanical ventilation

**Answer: C**

Explanation: Minimizing mechanical ventilation is crucial in preventing further lung injury in neonates with BPD. Mechanical ventilation can cause barotrauma and volutrauma, exacerbating lung damage. While diuretics and adequate nutrition are important for overall health, reducing mechanical ventilation is a targeted approach to protect lung function.

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**Question: 1153**

Which of the following is the most important factor in determining the need for therapeutic hypothermia in the ELBW neonate with hypoxic-ischemic encephalopathy?

- A. Gestational age
- B. Birth weight
- C. Severity of encephalopathy

**Answer: C**

Explanation: The severity of hypoxic-ischemic encephalopathy is the most important factor in determining the need for therapeutic hypothermia in the ELBW neonate. The degree of brain injury, as assessed through clinical and neurological evaluation, is the primary criterion for initiating this neuroprotective intervention.

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## Question: 1154

During the initial stabilization of an ELBW neonate in the delivery room, which of the following is the most important step in establishing effective ventilation?

- A. Initiating mechanical ventilation
- B. Clearing the airway
- C. Providing continuous positive airway pressure (CPAP)
- D. Administering surfactant

**Answer:** B

Explanation: Clearing the airway is the most important initial step in establishing effective ventilation for an ELBW neonate. This ensures that the airway is open and allows for the delivery of oxygen and ventilation support.

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## Question: 1155

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A 26-week gestation ELBW infant is now 3 weeks old and remains intubated. The infant has developed signs of a hemodynamically significant patent ductus arteriosus that failed to close after two courses of cyclooxygenase inhibitors. The infant is exhibiting signs of systemic hypoperfusion, oliguria (urine output  $0.6 \text{ mL/kg/h}$ ), and increasing ventilator requirements. Surgical or catheter-based ligation is being considered. Which of the following long-term outcomes or complications is most heavily associated with surgical ligation of a PDA in ELBW infants compared to conservative or medical management?

- A. Accelerated alveolarization and a dramatic reduction in the overall incidence of chronic lung disease.

- B.** An increased risk of neurodevelopmental impairment, vocal cord paralysis, and post-ligation cardiac syndrome.
- C.** Permanent structural damage to the aortic valve leaflets due to altered flow dynamics across the arch.

**Answer: B**

Explanation: Surgical ligation of a patent ductus arteriosus (PDA) in ELBW infants has been associated in multiple large observational cohorts with an increased risk of long-term neurodevelopmental impairment, vocal cord paralysis (due to recurrent laryngeal nerve injury), and post-ligation cardiac syndrome. Post-ligation cardiac syndrome is characterized by acute systemic hypotension and myocardial dysfunction resulting from a sudden increase in left ventricular afterload when the low-resistance pulmonary shunt is closed. Surgical ligation does not accelerate alveolarization or reduce chronic lung disease; in fact, many studies suggest it is an independent risk factor for increased bronchopulmonary dysplasia. It does not cause structural damage to the aortic valve leaflets, as the surgery is extra-cardiac and involves placing a clip or suture around the ductus arteriosus itself, well away from the aortic valve.

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### **Question: 1156**

Which of the following is the most important factor in determining the gestational age of an ELBW neonate?

- A.** Date of last menstrual period
- B.** Newborn physical and neurological examination
- C.** Ultrasound measurements

**Answer: B**

Explanation: The newborn physical and neurological examination is the most important factor in determining the gestational age of an ELBW neonate. This assessment, which evaluates the neonate's physical and neurological development, provides the most accurate estimate of gestational age.

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**Question: 1157**

A NICU nurse is assessing a 25-week neonate's response to environmental stimuli. The infant exhibits a high-pitched cry and increased muscle tone. What is the most effective nursing intervention to address these signs of stress?

- A. Place the infant in a prone position on a firm surface
- B. Provide a pacifier and swaddle the infant snugly
- C. Increase the ambient temperature in the incubator

**Answer: B**

Explanation: Providing a pacifier and swaddling the infant snugly can help soothe the infant and reduce signs of stress. Increasing the ambient temperature may not address the infant's stress response, and placing the infant in a prone position without proper support can be unsafe.

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**Question: 1158**

A 5-day-old, 700-gram infant has a serum creatinine that has risen from 0.8 mg/dL at birth to 1.6 mg/dL. The urine output over the last 24 hours is 0.3 mL/kg/hour. The infant's fluid balance calculation reveals a net positive fluid balance of 45 mL over

48 hours. Which mechanism best explains the renal function changes in this ELBW neonate?

- A. Low glomerular filtration rate due to incomplete nephrogenesis and a high renal vascular resistance, leading to acute kidney injury.
- B. High glomerular filtration rate with a secondary tubular obstruction from uric acid crystals causing post-renal anuria.
- C. Normal physiological maturation of the nephrons where creatinine naturally rises during the first week of life before stabilizing.

**Answer:** A

Explanation: Nephrogenesis is incomplete in infants born before 34 weeks of gestation, with extremely low birth weight infants having a significantly reduced number of functioning nephrons. At birth, their baseline glomerular filtration rate (GFR) is very low, and renal vascular resistance is high. A doubling of serum creatinine from birth to day 5 accompanied by oliguria (urine output less than 0.5 mL/kg/hour) and significant fluid retention is diagnostic of acute kidney injury (AKI). Serum creatinine during the first 48 hours reflects maternal creatinine levels; a true rise after day 2 indicates a decline in neonatal renal function, not a normal physiological maturation. A high GFR with tubular obstruction is incorrect, as the GFR is low, and post-renal obstruction from uric acid is an uncommon cause of early neonatal AKI compared to prerenal or intrinsic acute tubular necrosis.

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### **Question: 1159**

A 2-day-old ELBW neonate demonstrates signs of necrotizing enterocolitis (NEC). Which finding would most strongly support this diagnosis?

- A. Normal bowel sounds
- B. Abdominal distension and feeding intolerance

C. Hematocrit of 45%

**Answer: B**

Explanation: Abdominal distension and feeding intolerance are classic signs of NEC in neonates. These symptoms indicate potential bowel ischemia and inflammation, which are critical in diagnosing this serious condition.

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### Question: 1160

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A 24-hour-old, 650-gram neonate born at 24 weeks of gestation is on synchronized intermittent mandatory ventilation with a peak inspiratory pressure of 22 cmH<sub>2</sub>O, positive end-expiratory pressure of 5 cmH<sub>2</sub>O, and a fraction of inspired oxygen of 0.45. The arterial blood gas reveals: pH 7.18,  $\text{SpCO}_2$  { 62 mmHg} \$,  $\text{SpO}_2$  { 38 mmHg} \$, and  $\text{HCO}_3^-$  { 21 mEq/L} \$. What is the most appropriate initial respiratory management strategy?

- A. Administering a rescue dose of exogenous surfactant and optimizing the positive end-expiratory pressure to improve lung recruitment.
- B. Increasing the peak inspiratory pressure to 28 cmH<sub>2</sub>O and increasing the ventilator rate to correct the respiratory acidosis.
- C. Transitioning immediately to high-frequency oscillatory ventilation with a very high mean airway pressure to maximize alveolar inflation.

**Answer: A**

Explanation: The blood gas demonstrates mixed respiratory and metabolic acidosis with severe hypoxemia, indicating lung collapse, atelectasis, and ventilation-perfusion mismatch typical of respiratory distress syndrome. In a 24-hour-old, 650-gram infant, giving rescue surfactant is highly effective at improving lung

compliance and oxygenation by reducing alveolar surface tension. Optimizing the positive end-expiratory pressure helps recruit collapsed alveoli and stabilizes the functional residual capacity, which directly addresses the hypoxemia and helps lower the  $\text{SpCO}_2$ . Substantially increasing the peak inspiratory pressure to 28 cmH<sub>2</sub>O on a conventional ventilator risks severe volutrauma and barotrauma to the fragile preterm airways, increasing the risk of air leaks and bronchopulmonary dysplasia. Immediate transition to high-frequency ventilation with high pressures is unnecessary before attempting surfactant rescue and optimizing end-expiratory pressure, as high mean airway pressures can impair venous return and compromise cardiac output.

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**Question: 1161**

An extremely low birth weight neonate exhibits increased spontaneous motor activity, irritability, and poor state regulation. These findings most likely indicate:

- A. Neurodevelopmental delay
- B. Intraventricular hemorrhage
- C. Hypoglycemia

**Answer: B**

Explanation: Increased spontaneous motor activity, irritability, and poor state regulation are signs of intraventricular hemorrhage, a common and serious complication in extremely low birth weight neonates.

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**Question: 1162**

A neonate with a birth weight of 900 g is diagnosed with retinopathy of prematurity (ROP). What is the most critical factor to monitor to prevent progression of ROP?

- A. Oxygen saturation levels
- B. Hemoglobin levels
- C. Blood glucose levels

**Answer:** A

Explanation: Monitoring oxygen saturation levels is critical in preventing the progression of retinopathy of prematurity. Fluctuations in oxygen levels can significantly impact the development of ROP. While blood glucose and hemoglobin levels are important in overall care, oxygen management is directly related to ROP outcomes.

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### Question: 1163

An ELBW neonate develops severe apnea and bradycardia. Which of the following is the most appropriate first-line intervention?

- A. Initiating vasopressor support
- B. Providing positive pressure ventilation
- C. Administering caffeine citrate
- D. Performing chest compressions

**Answer:** B

Explanation: Providing positive pressure ventilation is the most appropriate first-line intervention for an ELBW neonate with severe apnea and bradycardia. This intervention helps to support respiratory function and stabilize the neonate's vital sign.

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