

COMPREHENSIVE MOCK EXAM 3

Supplemental to: Pediatric Anesthesiology Board Review 2026-2027

Rasmus Broberg

American Board of Anesthesiology (ABA) Pediatric Anesthesiology Certification Exam — 200 questions, A-type single-best-answer with three options (A-C), domain-weighted per the official blueprint

Board-Review Questions

1. A 3-year-old scheduled for elective hernia repair has a new fever, productive cough, wheezing, and lethargy. Which plan is most appropriate?
 - A. Postpone elective anesthesia and evaluate the active lower-respiratory illness
 - B. Proceed after a preinduction bronchodilator if wheezing improves, despite the persistent fever and productive cough
 - C. Proceed with an inhalational technique that avoids tracheal intubation, because airway device choice removes the infection-related risk

2. A 2-year-old with viral croup has inspiratory stridor at rest and suprasternal retractions. Which treatment most directly improves upper-airway obstruction before anesthesia is considered?
 - A. Nebulized albuterol with humidified oxygen to reverse the presumed lower-airway bronchospasm
 - B. Humidified oxygen and observation alone, reserving corticosteroid and epinephrine therapy for recurrent symptoms
 - C. Nebulized epinephrine together with systemic corticosteroid therapy

3. During open fetal surgery, the maternal anesthetic must also support uterine relaxation. Which anesthetic consideration is particularly important?
 - A. Profound maternal hypotension is desirable because it reduces uterine blood flow and fetal movement
 - B. Fetal oxygenation is independent of maternal oxygenation and uterine blood flow once the uterus is opened
 - C. Maternal anesthetic management must preserve uteroplacental perfusion while providing sufficient uterine relaxation and fetal anesthesia

4. A 3-month-old infant is positioned supine for mask induction. With the head on a flat mattress, the chin is pushed toward the chest and mask ventilation is difficult. Which positioning change is most likely to improve upper-airway alignment?
 - A. Extend the neck maximally without supporting the shoulders or upper thorax

- B.** Place a small roll beneath the shoulders while keeping the head in a neutral position
- C.** Place a thick pillow directly beneath the occiput to increase neck flexion further

5. A 6-year-old with well-controlled asthma presents for elective surgery and has no current wheeze. Which medication plan is most appropriate?

- A.** Stop inhaled corticosteroids for several days because they increase perioperative bronchospasm
- B.** Continue usual asthma medications and consider a preoperative bronchodilator when clinically indicated
- C.** Withhold rescue bronchodilator therapy on the day of surgery so airway reactivity can be assessed during induction

6. A febrile 5-year-old has drooling, a muffled voice, tripod positioning, and rapidly progressive respiratory distress. Epiglottitis is suspected. What is the safest immediate airway strategy?

- A.** Obtain a lateral neck radiograph before airway intervention while the child remains upright and closely monitored
- B.** Attempt gentle bedside flexible laryngoscopy with topical anesthesia before moving to a controlled airway setting
- C.** Maintain spontaneous ventilation and secure the airway in a controlled setting with expert surgical airway backup

7. A fetus with a large neck mass is delivered by an ex utero intrapartum treatment procedure. What is the central anesthetic objective before the umbilical cord is clamped?

- A.** Clamp the umbilical cord immediately so placental circulation does not delay intubation
- B.** Maintain placental gas exchange while a secure fetal airway is established
- C.** Allow the uterus to contract firmly because uterine tone improves placental perfusion during airway manipulation

8. A child requires emergency surgery for life-threatening internal bleeding, but the parents cannot be reached. What is the most appropriate ethical and legal principle?

- A.** Seek emergency court authorization before operating, while continuing resuscitation despite ongoing life-threatening hemorrhage
- B.** Wait for hospital administration to appoint a temporary surrogate before anesthesia, even if the delay permits further deterioration
- C.** Provide immediately necessary treatment under emergency authority while continuing efforts to contact the legal decision-maker

9. A 9-year-old with Down syndrome and loud nightly snoring presents for dental surgery. Which additional history is most important?

- A.** History of recurrent otitis media and previous tympanostomy tube placement
- B.** Symptoms of obstructive sleep apnea and prior sleep-study or airway interventions
- C.** History of recurrent viral croup and prior bronchodilator treatment

10. During an unexpected period of apnea after induction, a healthy 6-month-old desaturates more rapidly than a healthy adult given the same preoxygenation strategy. Which physiologic difference contributes most to this finding?

- A.** Higher oxygen consumption relative to body weight combined with a smaller functional residual capacity
- B.** Higher functional residual capacity relative to body weight with a lower alveolar ventilation requirement
- C.** Lower metabolic oxygen demand combined with a larger closing capacity than functional residual capacity

11. An 8-year-old with asthma develops wheezing and increased peak inspiratory pressure after tracheal intubation. Which ventilatory adjustment is most appropriate to reduce dynamic hyperinflation?

- A.** Increase respiratory rate substantially to normalize carbon dioxide as quickly as possible
- B.** Shorten expiratory time and raise tidal volume to overcome the increased airway resistance
- C.** Decrease respiratory rate and prolong expiratory time while accepting modest hypercapnia

- 12.** During fetal intervention, persistent fetal bradycardia develops. Which maternal factor should be corrected promptly because it can compromise fetal oxygen delivery?
- A.** A small increase in maternal hemoglobin concentration from hemoconcentration
 - B.** Mild maternal hyperoxia with preserved blood pressure
 - C.** Maternal hypotension that reduces uteroplacental perfusion
- 13.** A healthy 5-year-old drank clear apple juice 90 minutes before elective anesthesia. According to standard U.S. fasting guidance used for elective pediatric anesthesia, what is the usual minimum fasting interval for clear liquids?
- A.** Four hours
 - B.** Two hours
 - C.** Six hours
- 14.** A premature infant with bronchopulmonary dysplasia requires anesthesia. Which perioperative problem is most characteristic of this disease?
- A.** Predominantly restrictive lung disease with reduced compliance but little airway reactivity or pulmonary vascular involvement
 - B.** Predominantly pulmonary vascular disease with preserved parenchymal mechanics and little tendency toward chronic oxygen dependence
 - C.** Chronic heterogeneous lung disease with increased airway resistance, reduced compliance, and possible pulmonary hypertension
- 15.** A fetus receives direct intramuscular opioid and neuromuscular blocker during surgery while maternal general anesthesia continues. Why may direct fetal medication still be used?
- A.** Increase maternal anesthetic concentrations until fetal immobility is assured, relying on placental transfer rather than direct fetal medication
 - B.** Placental transfer of maternal drugs may not reliably provide adequate fetal analgesia and immobility for the procedure
 - C.** Use maternal intravenous opioid alone because fetal drug exposure through the placenta is sufficiently predictable for invasive fetal procedures

16. A 2-month-old infant receives a water-soluble medication whose apparent volume of distribution is substantially larger per kilogram than in adults. Which developmental feature best explains this difference?

- A.** A lower proportion of body water because neonatal adipose stores predominate at this age
- B.** A larger extracellular and total body water compartment as a fraction of body weight
- C.** A smaller extracellular fluid compartment with markedly increased plasma protein binding

17. A highly anxious 4-year-old has no contraindication to oral premedication. Which drug is commonly used to provide preoperative anxiolysis and anterograde amnesia?

- A.** Midazolam
- B.** Neostigmine
- C.** Ondansetron

18. A 12-year-old with cystic fibrosis presents for abdominal surgery. Which preoperative intervention is most likely to reduce pulmonary complications?

- A.** Continue airway-clearance therapy and optimize treatment of active pulmonary infection and bronchospasm
- B.** Withhold morning airway-clearance therapy to reduce coughing and secretions during induction
- C.** Restrict perioperative hydration to minimize pulmonary edema, even when secretions are thick and difficult to mobilize

19. A term neonate with congenital diaphragmatic hernia requires stabilization before repair. Which airway strategy is most appropriate?

- A.** Provide vigorous bag-mask ventilation to recruit the ipsilateral hypoplastic lung before intubation
- B.** Intubate without routine mask ventilation and use gentle pressure-limited ventilation with gastric decompression
- C.** Delay gastric decompression because an empty stomach worsens mediastinal shift in diaphragmatic hernia

20. Parents ask whether one of them may be present during inhalational induction of their 5-year-old. Which statement is most accurate?

- A.** Use parental presence routinely as the primary anxiolytic strategy because benefit is largely independent of parental anxiety
- B.** Parental presence can help selected children but is not a substitute for individualized preparation or anxiolysis
- C.** Prefer pharmacologic premedication alone because parental presence rarely adds benefit once a sedative has been selected

21. A 9-year-old with a large anterior mediastinal mass becomes dyspneic when supine. Which anesthetic plan best reduces the risk of catastrophic airway or cardiovascular collapse?

- A.** Preserve spontaneous ventilation and avoid deep anesthesia or muscle relaxation until a secure strategy is established
- B.** Induce deep anesthesia rapidly and administer neuromuscular blockade before assessing positional symptoms
- C.** Use high positive-pressure ventilation immediately because airway obstruction from mediastinal masses improves with paralysis

22. A neonate with a distal tracheoesophageal fistula develops progressive abdominal distention during positive-pressure ventilation. What is the most likely mechanism?

- A.** Place the tracheal tube proximal to the fistula and use higher inspiratory pressures to maintain ventilation
- B.** Ventilating gas is passing through the tracheal fistula into the stomach
- C.** Use a larger tidal volume through the tube because gastric distention primarily reflects swallowed air rather than fistula flow

23. A 4-month-old infant and a 10-year-old child are anesthetized with sevoflurane. Which statement best describes the age-related minimum alveolar concentration pattern for volatile anesthetics?

- A.** MAC is relatively high in infancy and then generally decreases with increasing age
- B.** MAC is lowest in infancy and rises steadily through adolescence and adulthood

C. MAC remains essentially identical from the neonatal period through late adulthood

24. A 10-year-old with autism becomes distressed by unfamiliar staff and loud noises. Which perioperative approach is most likely to help?

A. Use repeated forced exposure to monitors before establishing rapport so the child becomes desensitized immediately

B. Avoid caregiver input because familiar routines increase perioperative anxiety in autism

C. Use an individualized plan with predictable routines, caregiver input, and reduction of sensory triggers

25. A 6-year-old undergoes thoracoscopic surgery requiring lung isolation. Which device is often useful when a conventional double-lumen tube is too large for the child?

A. A large adult double-lumen tube inserted despite an external diameter larger than the glottis

B. A nasopharyngeal airway advanced into a mainstem bronchus as the lung-isolation device

C. A bronchial blocker placed through or alongside a single-lumen tracheal tube

26. A 6-week-old with pyloric stenosis remains lethargic after fluid resuscitation. Chloride is 91 mEq/L and bicarbonate is 33 mEq/L. What should be done before pyloromyotomy?

A. Proceed once urine output returns after volume replacement even though chloride depletion and alkalosis remain

B. Continue correction of chloride depletion and metabolic alkalosis before anesthesia

C. Treat the alkalosis mainly with acetazolamide and proceed without completing chloride and volume repletion

27. A child with an anterior mediastinal mass cannot tolerate lying flat and has airway compression on imaging. Which preoperative finding most increases anesthetic concern?

A. Orthopnea or positional symptoms suggesting dynamic airway or cardiovascular compression

B. Mild tracheal narrowing on imaging in a child who is comfortable supine and has no exercise limitation

C. A small posterior mediastinal lesion without positional symptoms, central airway compression, or vascular involvement

28. A neonate receives a drug that is primarily cleared by glomerular filtration. Compared with an older child, which pharmacokinetic effect is most expected if dosing is not adjusted?

- A.** No change in elimination because glomerular filtration reaches adult values at birth
- B.** A longer elimination half-life because renal filtration and clearance are immature
- C.** A shorter elimination half-life because neonatal renal blood flow is proportionally greater

29. A preterm infant has respiratory distress syndrome shortly after birth. Deficiency of pulmonary surfactant most directly causes which physiologic change?

- A.** Decreased alveolar surface tension with excessive compliance and severe air trapping
- B.** Increased alveolar surface tension with reduced compliance and a tendency toward atelectasis
- C.** Selective increase in anatomic dead space without any effect on alveolar stability

30. A premature neonate with gastroschisis is placed under a radiant warmer with the exposed bowel covered. Why are fluid requirements often greater than routine neonatal maintenance?

- A.** Exposed inflamed bowel causes large evaporative and third-space fluid losses
- B.** Gastroschisis causes obligatory water retention because the kidneys stop filtering during the neonatal period
- C.** The abdominal wall defect prevents any insensible water loss from the bowel surface

31. A child with spina bifida has undergone many prior urologic procedures. Which precaution is appropriate even if no prior reaction is documented?

- A.** Use standard latex-containing equipment if there has been no prior clinical reaction, because asymptomatic sensitization is unlikely to matter
- B.** Use a latex-safe environment because repeated exposure increases the risk of sensitization
- C.** Premedicate with antihistamine and corticosteroid and continue routine latex exposure, assuming this prevents an IgE-mediated reaction

32. A child with severe unilateral pneumonia is placed in the lateral decubitus position while breathing spontaneously. Which position generally favors oxygenation when feasible?

- A.** Keep both lungs nondependent by using steep Trendelenburg positioning to eliminate perfusion gradients
- B.** Place the healthier lung dependent so perfusion is directed toward the better-ventilated lung
- C.** Place the diseased lung dependent because gravity preferentially ventilates the nondependent lung

33. A neonate with an omphalocele is being evaluated before repair. Which associated abnormality should be actively sought?

- A.** Congenital cardiac anomalies and other syndromic malformations
- B.** Associated renal anomalies and baseline renal function
- C.** Associated intestinal obstruction and preoperative electrolyte abnormalities

34. A 2-year-old with uncomplicated gastroesophageal reflux is scheduled for elective surgery. Which statement is most appropriate?

- A.** Use a rapid-sequence induction whenever reflux symptoms are present, even when gastric emptying and fasting are otherwise reassuring
- B.** Prefer a supraglottic airway because it is thought to reduce regurgitation more effectively than a cuffed tracheal tube
- C.** Assess aspiration risk from the overall clinical picture rather than assuming every child with reflux requires rapid-sequence induction

35. A 2-month-old infant receives bupivacaine for a regional technique. Which developmental factor increases the fraction of unbound local anesthetic in plasma compared with an older child?

- A.** Lower concentrations of alpha-1-acid glycoprotein and other binding proteins
- B.** Higher concentrations of alpha-1-acid glycoprotein in young infants, producing more avid binding of amide local anesthetics
- C.** More mature renal clearance in infancy, which lowers the free plasma fraction before hepatic metabolism becomes relevant

36. A 14-year-old is developmentally capable of understanding a planned elective anesthetic. Which communication approach is most appropriate?

- A.** Explain the plan in age-appropriate language and seek the adolescent's assent in addition to parental permission
- B.** Rely on parental permission and provide the adolescent only the minimum information needed for cooperation
- C.** Treat the adolescent's assent as legal authorization and allow the parent no further role in an elective decision

37. A 7-month-old with bronchiolitis has diffuse wheezing and hyperinflation. Which anesthetic concern is most important if urgent surgery cannot be delayed?

- A.** Bronchiolitis usually produces isolated restrictive physiology without increased airway resistance
- B.** Airway reactivity and prolonged expiration increase the risk of bronchospasm and gas trapping
- C.** Positive-pressure ventilation abolishes small-airway obstruction, so postoperative respiratory risk is minimal

38. A neonate with myelomeningocele is scheduled for closure. Which perioperative allergy risk is increased by repeated exposure to medical products in this population?

- A.** Latex sensitization and potentially severe latex allergy
- B.** Cross-reactive hypersensitivity to commonly used amide local anesthetics
- C.** Chlorhexidine sensitization related to repeated prior procedural exposure

39. A healthy 8-year-old is scheduled for a minor outpatient procedure and has a normal history and examination. Which preoperative laboratory strategy is most appropriate?

- A.** Obtain a screening complete blood count because clinically silent anemia is common before minor ambulatory procedures
- B.** Obtain screening coagulation studies because a negative personal and family bleeding history has limited predictive value

C. Order tests selectively when the history, examination, or planned procedure creates a specific indication

40. A 5-year-old child requires a brief painful procedure. Remifentanyl is chosen because rapid recovery is important. Which property best explains its very short context-sensitive effect?

- A.** Rapid hydrolysis by nonspecific blood and tissue esterases
- B.** Slow hepatic CYP metabolism followed by formation of an active long-lived metabolite
- C.** Exclusive renal excretion of unchanged drug with minimal tissue distribution

41. A child with severe upper-airway obstruction is breathing spontaneously. Which sign most strongly suggests impending fatigue rather than improvement?

- A.** A louder inspiratory noise with preserved alertness and stable oxygenation
- B.** Decreasing air movement with a quieter chest despite persistent retractions and altered mental status
- C.** Improved interaction with reduced work of breathing after airway therapy

42. A premature neonate with necrotizing enterocolitis and pneumoperitoneum is taken for emergency laparotomy. Which induction problem is most likely?

- A.** Expect sympathetic vasoconstriction to preserve blood pressure during induction despite the septic abdominal process
- B.** Use routine neonatal maintenance fluid initially because third-space losses are expected to remain modest before bowel resection
- C.** Severe intravascular depletion and sepsis can cause profound hypotension with anesthetic induction

43. A mature 15-year-old understands a planned elective procedure and objects while the parent consents. Which ethical principle is most relevant?

- A.** Seek the adolescent's assent and take a capable minor's objection seriously while considering legal authority and urgency

B. Defer discussion to the parents and proceed with their permission without exploring the adolescent's understanding or objection

C. Allow the adolescent to make the final legal decision independently of the parent even though no mature-minor exception has been established

44. A child with restrictive thoracic disease requires positive-pressure ventilation. Which strategy is most consistent with lung-protective ventilation?

A. Use larger tidal volumes with minimal PEEP to recruit stiff lungs while keeping the respiratory rate low

B. Use zero PEEP with a higher respiratory rate because end-expiratory pressure is more likely than volume to cause overdistention

C. Use modest tidal volumes and the lowest pressures that achieve acceptable gas exchange while avoiding overdistention

45. A premature infant with bronchopulmonary dysplasia and home oxygen dependence presents for hernia repair. Which postoperative concern is increased?

A. Apnea, oxygen requirement, and respiratory decompensation after anesthesia

B. Plan discharge after a brief uncomplicated PACU period if no apnea is observed during the first postoperative hour

C. Limit supplemental oxygen in recovery to avoid oxidative injury, even when the infant normally requires oxygen at home

46. Which child is at greatest baseline risk for anesthesia-related perioperative critical events?

A. A healthy adolescent undergoing a brief elective diagnostic procedure

B. A healthy school-age child undergoing elective superficial surgery

C. A young infant with significant systemic disease undergoing emergency surgery

47. A 7-year-old child develops marked bradycardia during a dexmedetomidine infusion but remains well perfused. Which pharmacologic action is primarily responsible for the sedative and sympatholytic effects of this drug?

- A.** Central alpha-2 adrenergic agonism that reduces sympathetic outflow
- B.** Peripheral beta-1 adrenergic agonism that increases sinoatrial node automaticity
- C.** GABA-A receptor antagonism that increases cortical excitation and catecholamine release

48. Immediately after birth, which change most directly promotes functional closure of the ductus arteriosus in a normal term neonate?

- A.** Increasing pulmonary vascular resistance that reverses flow through the ductus toward the pulmonary artery
- B.** Rising arterial oxygen tension together with falling circulating prostaglandin activity
- C.** Falling arterial oxygen tension together with increased prostaglandin E1 concentration

49. A neonate with persistent pulmonary hypertension develops hypoxemia despite adequate ventilation. Which physiologic change most directly worsens right-to-left shunting?

- A.** A reduction in pulmonary vascular resistance after improved oxygenation and alkalinization
- B.** An acute increase in pulmonary vascular resistance from hypoxia, acidosis, or agitation
- C.** An increase in systemic vascular resistance that improves the pressure gradient for systemic perfusion

50. An obese 12-year-old with severe OSA presents for ambulatory surgery. Which postoperative concern should most influence planning?

- A.** Use a deep extubation to reduce coughing because airway reactivity is a greater concern than postoperative pharyngeal collapse
- B.** Use standard weight-based opioid dosing with routine ambulatory monitoring because treated OSA does not alter opioid sensitivity
- C.** Upper-airway obstruction and opioid-induced ventilatory impairment may persist after apparently routine emergence

51. A healthy child requires routine maintenance crystalloid during surgery. Which fluid is generally preferred?

- A.** Use 0.45% saline with dextrose as the default maintenance solution to reproduce traditional pediatric maintenance therapy
- B.** An isotonic balanced crystalloid rather than a markedly hypotonic solution
- C.** Use dextrose in water for short procedures because isotonic sodium loads are generally unnecessary in healthy children

52. A neonate with ductal-dependent systemic blood flow becomes acidotic and poorly perfused as the ductus closes. Which infusion is most appropriate while definitive management is arranged?

- A.** Prostaglandin E1 to maintain or reopen ductal patency
- B.** Adenosine to produce sustained dilation of the ductus arteriosus
- C.** Indomethacin to constrict the ductus and reduce systemic steal

53. An ex-27-week premature infant is now 46 weeks postmenstrual age and is scheduled for outpatient hernia repair. Which complication most influences postoperative disposition?

- A.** Risk of residual ductal patency causing postoperative systemic steal after volatile anesthesia
- B.** Risk of perioperative malignant hyperthermia attributable to a history of prematurity itself
- C.** Risk of postoperative apnea and bradycardia related to prematurity and postmenstrual age

54. A child with a history of congenital long-QT syndrome is receiving several perioperative medications. Which antiemetic deserves particular caution because it can further prolong the QT interval?

- A.** Aprepitant
- B.** Ondansetron
- C.** Dexamethasone

55. A premature neonate is undergoing a long operation and has limited glycogen stores. Which metabolic parameter deserves periodic assessment?

- A.** Serial serum sodium measurement as the primary surrogate for depletion of neonatal glycogen stores

- B.** Urine ketone testing as an adequate substitute for direct glucose measurement during prolonged neonatal fasting
- C.** Blood glucose because both hypoglycemia and excessive glucose administration can be harmful

56. A child has a large unrepaired ventricular septal defect with a substantial left-to-right shunt. Which anesthetic change is most likely to increase pulmonary overcirculation?

- A.** A simultaneous proportional increase in pulmonary and systemic vascular resistance with no change in their ratio
- B.** A marked increase in pulmonary vascular resistance with unchanged systemic vascular resistance
- C.** A marked decrease in pulmonary vascular resistance while systemic vascular resistance is maintained

57. A neonate with high-output heart failure is diagnosed with a vein of Galen malformation. What is the principal cardiovascular mechanism?

- A.** Obstruction to pulmonary venous return from the malformation, producing left atrial hypertension without a major arteriovenous shunt
- B.** A large cerebral arteriovenous shunt creates excessive venous return and cardiac output demand
- C.** Critical left ventricular outflow obstruction caused by compression from the intracranial vascular lesion

58. A medication error reaches a child but causes no apparent injury. Which quality-improvement response is most appropriate?

- A.** Report and analyze the event to identify system contributors and reduce the chance of recurrence
- B.** Use targeted individual retraining as the main response because the medication error caused no measurable harm
- C.** Defer formal reporting until a similar event recurs, using recurrence to identify which errors merit systems analysis

59. A 6-kg infant receives rapid transfusion of several units of older stored red blood cells and develops peaked T waves. Which complication should be suspected?

- A.** Severe hypokalemia because erythrocytes rapidly remove potassium from plasma during storage
- B.** Hyperkalemia from the potassium load in stored blood
- C.** Isolated respiratory alkalosis because transfusion does not affect serum potassium

60. A child with an undrained pneumothorax requires emergency anesthesia. Which inhaled adjunct is best avoided because it can rapidly enlarge a closed gas space?

- A.** Helium-oxygen mixture
- B.** Nitrous oxide
- C.** Low-dose sevoflurane

61. A 4-year-old with unrepaired tetralogy of Fallot develops an acute hypercyanotic spell during induction. Which immediate intervention is most appropriate?

- A.** Reduce systemic vascular resistance rapidly to encourage more right-to-left flow across the ventricular septal defect
- B.** Hyperventilate aggressively while allowing venous return to fall because preload worsens right ventricular outflow obstruction
- C.** Increase systemic vascular resistance and preload while reducing infundibular spasm and agitation

62. A neonate with congenital lobar emphysema requires thoracotomy. Which induction strategy is preferred before the chest is opened?

- A.** Apply very high PEEP because positive pressure reliably decompresses congenital lobar emphysema
- B.** Maintain spontaneous or very gentle ventilation to avoid worsening air trapping in the affected lobe
- C.** Use aggressive high-pressure mask ventilation to compress the hyperinflated lobe

63. A 2-month-old is undergoing abdominal surgery. Which warming strategy is most appropriate?

- A.** Use active warming, warmed fluids when needed, and minimize exposed surface area

- B.** Raise the ambient operating-room temperature and use passive blankets without additional active warming
- C.** Use warmed humidified respiratory gases as the primary warming method while other exposed surfaces remain uncovered

64. A child with a bidirectional Glenn circulation presents for noncardiac surgery. Which physiologic goal is most important for maintaining pulmonary blood flow?

- A.** Preserve low pulmonary vascular resistance and adequate systemic venous pressure without excessive intrathoracic pressure
- B.** Deliberately increase pulmonary vascular resistance so venous blood preferentially returns to the heart
- C.** Use high mean airway pressure to force superior vena caval blood through the pulmonary circulation

65. A newborn with duodenal atresia has persistent bilious vomiting. Which preoperative step is most important?

- A.** Repeated oral feeding to maintain intravascular volume despite the obstruction
- B.** Gastric decompression and correction of fluid and electrolyte abnormalities
- C.** Avoid intravenous fluid because the obstruction prevents gastrointestinal fluid loss

66. A 10-year-old with reactive airway disease requires a volatile anesthetic. Which agent is most likely to provoke coughing or airway irritation during an inhalational induction?

- A.** Halothane
- B.** Desflurane
- C.** Sevoflurane

67. An infant is positioned prone for a long procedure. Which positioning principle is most important?

- A.** Use tight abdominal support to improve prone stability, accepting increased intraabdominal pressure during ventilation

B. Rotate and extend the neck substantially to improve line access, relying on padding to prevent cervical or brachial injury

C. Protect pressure points and eyes while ensuring the abdomen and airway are free from compression or displacement

68. A 10-year-old with Fontan physiology is anesthetized for laparoscopy. Which change is most likely to reduce cardiac output?

A. Avoiding acidosis and hypoxemia that would otherwise increase pulmonary vascular resistance

B. Maintaining sinus rhythm and adequate preload with low pulmonary vascular resistance

C. High intrathoracic pressure that impedes passive venous flow through the pulmonary circulation

69. A neonate with a large sacrococcygeal teratoma is scheduled for resection. Which intraoperative complication deserves special preparation?

A. Massive hemorrhage from the highly vascular tumor and pelvic vessels

B. Airway obstruction from craniofacial extension of the pelvic tumor

C. Severe hyperkalemia from spontaneous tumor-cell lysis before resection

70. A child undergoing major craniofacial surgery is expected to bleed substantially. Which blood-conservation strategy can reduce allogeneic transfusion requirement when appropriate?

A. Use antifibrinolytic therapy such as tranexamic acid as part of a broader blood-management plan

B. Administer large volumes of hypotonic crystalloid to dilute the hematocrit before surgical bleeding begins

C. Avoid measuring blood loss because transfusion decisions are more accurate without trend information

71. A child with severe pulmonary hypertension develops sudden systemic hypotension, hypoxemia, and right ventricular failure during surgery. Which intervention is a priority?

A. Lower systemic vascular resistance further so right-to-left shunting becomes easier

- B.** Increase systemic pressure, improve oxygenation and ventilation, and reduce pulmonary vascular resistance
- C.** Induce hypercarbia and acidosis because both selectively dilate the pulmonary circulation

72. A very premature infant requires laser treatment for retinopathy of prematurity. Which comorbidity frequently complicates anesthetic management?

- A.** Chronic lung disease and a history of apnea related to extreme prematurity
- B.** Congenital heart disease requiring prior neonatal surgical palliation
- C.** Renal immaturity causing delayed elimination of renally cleared anesthetics

73. A child develops ventricular dysrhythmia and cardiovascular collapse after an inadvertent intravascular bolus of local anesthetic. Which agent is classically associated with the greatest concern for severe cardiotoxicity?

- A.** Chloroprocaine
- B.** Lidocaine
- C.** Bupivacaine

74. A child becomes hypotensive shortly after induction. Heart rate is high, the extremities are cool, and the surgical field is dry. Which cause should be considered first?

- A.** Relative or absolute hypovolemia compounded by anesthetic vasodilation and myocardial depression
- B.** Pulmonary edema caused by excess preload despite no clinical evidence of volume administration
- C.** Isolated fluid overload because cool extremities are a specific sign of hypervolemia

75. A 12-year-old with hypertrophic cardiomyopathy requires anesthesia. Which hemodynamic change is most likely to worsen dynamic left ventricular outflow tract obstruction?

- A.** Reduced preload and afterload combined with increased contractility and tachycardia
- B.** Maintained preload with a normal-to-high systemic vascular resistance and controlled heart rate

C. A mild reduction in contractility while sinus rhythm and ventricular filling are preserved

76. A newly born infant remains apneic with a heart rate of 80 beats/min after warming, positioning, and stimulation. What is the next priority in neonatal resuscitation?

A. Give intravenous epinephrine before any attempt to establish lung inflation

B. Begin chest compressions immediately before attempting assisted ventilation

C. Provide effective positive-pressure ventilation and reassess the heart rate response

77. A child has ongoing hemorrhage during surgery. Which variable best reflects the immediate effect of anemia on arterial oxygen content?

A. Arterial carbon dioxide tension because dissolved carbon dioxide is the main carrier of oxygen

B. Serum chloride because oxygen content is determined primarily by plasma chloride concentration

C. Hemoglobin concentration because most blood oxygen is carried bound to hemoglobin

78. A child has profound rocuronium-induced neuromuscular blockade at the end of surgery. Which reversal drug acts by directly encapsulating free rocuronium molecules?

A. Sugammadex

B. Edrophonium

C. Neostigmine

79. A 9-year-old with dilated cardiomyopathy has severe systolic dysfunction. Which anesthetic goal is most appropriate?

A. Maintain a high systemic vascular resistance to support arterial pressure even if ventricular afterload rises substantially

B. Avoid abrupt increases in afterload and maintain forward flow with careful control of myocardial depression

C. Use a slow heart rate to prolong diastolic filling despite limited ability of the dilated ventricle to increase stroke volume

80. A 5-year-old undergoes infraumbilical surgery and receives a single-shot caudal block. What is a major advantage of this technique?

- A.** Dense thoracic analgesia for upper abdominal and chest surgery from a routine single-shot caudal injection
- B.** Negligible systemic local-anesthetic exposure because caudal epidural absorption is minimal in small children
- C.** Reliable sacral and lower lumbar analgesia can reduce perioperative systemic opioid requirement

81. For a caudal epidural block in a small child, the sacral hiatus is located using which surface landmark relationship?

- A.** The sacral cornua just cephalad to the gluteal cleft over the sacral hiatus
- B.** The anterior superior iliac spines because the caudal canal is entered through the inguinal ligament
- C.** The xiphoid process because the sacral hiatus lies directly beneath the lower sternum in children

82. A child with complete heart block is dependent on an implanted pacemaker. Electrocautery is required near the generator. Which perioperative principle is most appropriate?

- A.** Reprogram to asynchronous pacing before surgery based on the planned cautery location without first establishing device dependence
- B.** Determine device dependence and function preoperatively, minimize electromagnetic interference, and ensure backup pacing is available
- C.** Apply a magnet throughout cautery because magnet response is assumed to be predictable for the implanted generator

83. A child receiving epidural analgesia develops new leg weakness several hours after catheter placement. What is the best response?

- A.** Stop or reduce the infusion and urgently evaluate for excessive block or a compressive neuraxial complication
- B.** Increase the epidural infusion because new weakness suggests that the block has not spread adequately to painful dermatomes

C. Observe the deficit without changing the infusion until routine rounds if blood pressure and oxygenation remain stable

84. A child receives a large-volume peripheral nerve block under general anesthesia. Which action most reduces the risk of local anesthetic systemic toxicity?

A. Rely on a negative aspiration and an epinephrine test dose while allowing the total local-anesthetic dose to exceed the calculated limit

B. Calculate the total milligram dose carefully and inject incrementally with aspiration and monitoring

C. Inject the full dose rapidly once ultrasound shows the intended tissue plane, because visible spread excludes intravascular uptake

85. Neostigmine is given to reverse nondepolarizing neuromuscular blockade in a child. Why is an antimuscarinic agent commonly administered with it?

A. To limit bradycardia, secretions, and other muscarinic effects caused by increased acetylcholine

B. To accelerate neostigmine entry into the central nervous system and improve amnesia

C. To prevent rocuronium from binding directly to acetylcholine receptors after reversal

86. A pediatric anesthesia team reviews a serious airway event to determine why multiple defenses failed. Which method best fits this goal?

A. A literature search alone without reconstructing what occurred in the local system

B. A simple vote on which clinician should be blamed without reviewing the sequence of events

C. A root-cause or systems analysis that examines human, equipment, communication, and process factors

87. A child develops supraventricular tachycardia with a narrow regular complex but remains hemodynamically stable. Vagal maneuvers fail. Which drug is typically the next acute treatment?

A. Adenosine given as a rapid intravenous bolus

B. Atropine given slowly to increase atrioventricular nodal conduction

C. Epinephrine infusion titrated upward until the tachycardia terminates

88. A child after major abdominal surgery has pain despite intermittent opioid boluses and is becoming sedated. Which strategy best improves analgesia while limiting further opioid exposure?

A. Avoid acetaminophen, NSAIDs, or regional anesthesia because combining modalities increases pain sensitization

B. Use multimodal analgesia with nonopioid medications and regional techniques when appropriate

C. Continue escalating opioid doses alone because sedation is unrelated to respiratory depression in children

89. During ultrasound-guided regional anesthesia, the needle tip is not visible. What is the safest next action?

A. Advance the needle using tissue movement as a surrogate for tip location until the target is reached

B. Stop advancing and re-establish continuous visualization of the needle tip before injection

C. Inject a small test volume while the tip is unseen to create hydrodissection and then use the fluid to locate the needle

90. During ultrasound-guided peripheral nerve blockade in a small child, the target nerve is superficial. Which transducer choice generally provides the best spatial resolution?

A. A high-frequency linear transducer suited to shallow structures

B. A continuous-wave Doppler probe without two-dimensional imaging capability

C. A low-frequency curvilinear transducer chosen specifically for maximal penetration

91. A cyanotic child with Eisenmenger physiology requires noncardiac surgery. Which change would most likely worsen systemic oxygen saturation?

A. A fall in systemic vascular resistance that increases right-to-left shunting

B. Maintenance of systemic vascular resistance with avoidance of hypoxemia and acidosis

C. Prevention of sudden increases in pulmonary vascular resistance during induction

- 92.** A neonate undergoes a minor painful procedure. Which nonpharmacologic adjunct has evidence for reducing procedural pain responses in young infants?
- A.** Bright light and repeated tactile stimulation to distract from nociception
 - B.** Oral sucrose combined with comforting measures for brief procedures
 - C.** Prolonged fasting and sensory isolation before the procedure
- 93.** A child has an epidural catheter for postoperative analgesia. Which finding is a contraindication to continuing neuraxial local anesthetic infusion until evaluated?
- A.** Comfortable sleep with preserved spontaneous movement and normal vital signs
 - B.** Mild numbness confined to the intended dermatomes without progression
 - C.** Unexpected progressive motor weakness with back pain or neurologic change
- 94.** During cardiopulmonary bypass in an infant, marked hemodilution occurs. Which effect is a major concern?
- A.** Reduced oxygen-carrying capacity from a low hematocrit despite adequate pump flow
 - B.** Accept substantial hemodilution because lower viscosity permits adequate tissue oxygen delivery at standard bypass flows
 - C.** Increase pump flow to compensate for a very low hematocrit without modifying the oxygen-carrying capacity of the circuit blood
- 95.** An adolescent with chronic neuropathic pain describes burning pain and allodynia after nerve injury. Which medication class is commonly used as part of treatment?
- A.** Use scheduled NSAID therapy alone because inflammatory nociception is usually the dominant mechanism of allodynia after nerve injury
 - B.** Gabapentinoids or selected antidepressants that modulate neuropathic pain pathways
 - C.** Use short-acting opioid monotherapy because neuropathic pain generally responds better to dose escalation than to adjuvant agents

96. A child receives a single-shot peripheral nerve block with ropivacaine. Compared with bupivacaine, why is ropivacaine sometimes favored?

- A.** It generally has less severe cardiotoxicity at comparable clinical use
- B.** It produces a denser motor block at equianalgesic doses, making postoperative neurologic assessment easier
- C.** Its long duration prevents systemic absorption, so plasma toxicity is less relevant than with bupivacaine

97. While using pulsed-wave Doppler, the displayed velocity wraps around the scale despite a stable flow direction. Which adjustment is most likely to reduce this aliasing?

- A.** Lower the Nyquist limit by decreasing the pulse-repetition frequency
- B.** Increase the pulse-repetition frequency or velocity scale
- C.** Increase transducer frequency while keeping the same pulse-repetition frequency

98. A neonate with critical coarctation of the aorta has weak femoral pulses and systemic hypoperfusion. Which physiologic support is most immediately important before repair?

- A.** Reduce preload aggressively so flow across the narrowed aortic segment decreases
- B.** Close the ductus pharmacologically to prevent pulmonary blood flow from reaching the descending aorta
- C.** Maintain ductal patency to provide distal systemic blood flow

99. A child with severe obstructive sleep apnea receives postoperative opioids after tonsillectomy. Which principle is most important?

- A.** Use standard weight-based opioid dosing with routine pulse-oximetry monitoring because severe OSA does not alter opioid sensitivity
- B.** Use opioid-sparing analgesia and close respiratory monitoring because opioid sensitivity may be increased
- C.** Avoid NSAIDs and acetaminophen after tonsillectomy and rely mainly on opioids to ensure adequate analgesia

100. A child undergoing hypospadias repair receives a caudal block. Which postoperative benefit is expected?

- A.** Earlier ambulation because a caudal block avoids clinically important motor weakness
- B.** Reduced early postoperative pain and opioid requirement
- C.** Reduced postoperative nausea even when systemic opioid exposure is unchanged

101. A child develops seizures and ventricular ectopy after an inadvertent intravascular local anesthetic injection. Which resuscitation modification is appropriate?

- A.** Give a large vasopressin bolus as first-line therapy because lipid emulsion worsens cardiotoxicity
- B.** Use repeated high-dose local anesthetic to competitively displace the toxic drug from cardiac sodium channels
- C.** Treat suspected LAST with airway support, seizure control, lipid emulsion, and cautious use of standard resuscitation drugs

102. A child with myocarditis has ventricular dysfunction and frequent ectopy. Which anesthetic concern is most important?

- A.** Arrhythmias are uncommon in myocarditis, so continuous electrocardiographic monitoring adds little information
- B.** Myocarditis improves contractility reliably during volatile anesthesia, making rapid high-dose induction desirable
- C.** Myocardial depression and dysrhythmia can deteriorate rapidly, so induction should minimize hemodynamic stress

103. A child with severe OSA undergoes adenotonsillectomy. Which postoperative finding is most concerning?

- A.** Transient mild sore throat with normal oxygenation and easy arousal
- B.** Recurrent obstruction and desaturation while asleep despite apparently adequate pain control
- C.** Request for oral fluids with normal breathing and stable vital signs

104. A profoundly vasoconstricted infant has a weak pulse-oximeter signal during surgery. Which limitation of pulse oximetry is most relevant?

- A.** Peripheral vasoconstriction consistently causes a falsely high carbon dioxide reading rather than an oxygen error
- B.** Low peripheral perfusion can degrade the pulsatile signal and reduce measurement reliability
- C.** Pulse oximetry directly measures arterial oxygen tension and remains accurate despite absent pulsatile flow

105. A child with a continuous peripheral nerve catheter is discharged home. Which instruction is most important?

- A.** Protect the numb limb from heat and injury and seek help for toxicity symptoms, weakness beyond expectations, or catheter problems
- B.** Increase the home infusion rate whenever breakthrough pain occurs without first checking motor function, catheter position, or systemic symptoms
- C.** Allow unrestricted use of heating pads and full weight bearing on a numb limb as long as the child reports little pain

106. A child with a small secundum atrial septal defect has no pulmonary hypertension. Which intravenous-line precaution is especially prudent?

- A.** Meticulously remove air from intravenous tubing because transient right-to-left flow can permit paradoxical embolization
- B.** Use standard intravenous-line handling because a resting left-to-right atrial shunt is unlikely to transmit venous air
- C.** Reserve in-line air filters for children with established pulmonary hypertension or persistent resting right-to-left shunting

107. A 7-year-old returns to the operating room for brisk hemorrhage 6 days after tonsillectomy. Which induction assumption is safest?

- A.** Assume the stomach is empty because the child has not eaten solid food since the bleeding began
- B.** Treat the child as hypovolemic with a full stomach containing swallowed blood

C. Avoid obtaining intravenous access because blood loss from secondary tonsillectomy hemorrhage is usually trivial

108. In a randomized trial, postoperative vomiting occurs in 30% of controls and 15% of treated children. What is the absolute risk reduction?

A. 2 percentage points

B. 50 percentage points

C. 15 percentage points

109. A healthy 2-year-old without intravenous access needs elective induction. Which technique is commonly used?

A. Use desflurane for mask induction because its pungency reliably suppresses airway reflexes

B. Administer intravenous propofol before obtaining intravenous access by giving it through the breathing circuit

C. Gradually increase sevoflurane concentration by mask while maintaining spontaneous ventilation

110. An intubated 2-kg neonate is connected to a capnography sampling adaptor that adds substantial apparatus dead space. What is the most likely consequence?

A. Apparatus dead space mainly delays the capnogram but does not materially affect alveolar ventilation in a neonate

B. Rebreathing and impaired ventilation can occur because the added dead space is large relative to tidal volume

C. Additional connector volume lowers airway resistance enough to improve carbon dioxide elimination despite the small tidal volume

111. A child with a large patent ductus arteriosus has pulmonary overcirculation. Which change in vascular resistance tends to reduce the left-to-right shunt?

A. An increase in pulmonary vascular resistance relative to systemic vascular resistance

B. A decrease in pulmonary vascular resistance with unchanged systemic vascular resistance

C. A decrease in systemic vascular resistance accompanied by an even larger decrease in pulmonary vascular resistance

112. A toddler aspirates a peanut and has unilateral wheezing but remains stable. Rigid bronchoscopy is planned. What anesthetic issue is central to management?

A. Maintain spontaneous ventilation to reduce the chance of forcing the foreign body farther distally during bronchoscopy

B. Use controlled positive-pressure ventilation to optimize oxygenation and facilitate a motionless bronchoscopic field

C. The anesthesiologist and surgeon must share the airway and coordinate ventilation during foreign-body removal

113. A 12-year-old with reliable intravenous access asks for a rapid induction. Which drug is commonly used for IV induction in a hemodynamically stable child?

A. Neostigmine

B. Dantrolene

C. Propofol

114. A child with an intracranial mass develops bradycardia and hypertension during induction. Which mechanism should be suspected?

A. A benign reduction in cerebral blood flow from mild hypocapnia that requires no intervention

B. A rising intracranial pressure causing a Cushing response and threatened cerebral perfusion

C. Isolated systemic vasodilation causing reflex vagal activation without intracranial involvement

115. During endoscopic airway laser surgery, which measure most directly reduces the risk of an airway fire?

A. Use the lowest feasible inspired oxygen concentration and avoid nitrous oxide while coordinating laser activation

B. Increase inspired oxygen to 100% whenever the laser is activated to protect the mucosa

C. Fill the airway with nitrous oxide because it does not support combustion

116. A noninvasive blood-pressure cuff is selected for a 4-year-old child. Which sizing principle best reduces systematic measurement error?

A. Choose a cuff with bladder width near 20% of arm circumference to minimize pressure-related measurement error

B. Use a cuff whose bladder width is approximately 40% of the arm circumference and whose length adequately encircles the arm

C. Choose a cuff with bladder width near 80% of arm circumference so oscillometric averaging corrects for oversizing

117. A cuffed tracheal tube is used in a 3-year-old. Which principle is most appropriate?

A. Use an age-appropriate size and monitor cuff pressure to obtain a seal without excessive mucosal pressure

B. Select an uncuffed tube routinely in preschool children because cuffed tubes have a higher clinically important airway-injury rate

C. Inflate the cuff to approximately 35 cm H₂O to eliminate audible leak and improve ventilator accuracy

118. A child with elevated intracranial pressure requires controlled ventilation during induction. Which carbon dioxide strategy is generally preferred in the absence of acute herniation?

A. Permit marked hypercapnia because increased cerebral blood volume lowers intracranial pressure

B. Maintain severe hypocapnia throughout surgery because chronic cerebral vasoconstriction is harmless

C. Maintain near-normal PaCO₂ and avoid routine profound hyperventilation

119. A child with a mature tracheostomy becomes difficult to ventilate shortly after transfer to the operating table. What is the first priority?

A. Assess tracheostomy patency and position and be prepared to suction or replace the tube

- B.** Assume bronchospasm and give bronchodilator before checking the airway device
- C.** Clamp the tracheostomy and ventilate through the nose without assessing whether the upper airway is patent

120. A 6-year-old has a cuffed tracheal tube with internal diameter 5.0 mm. Which bedside estimate gives a reasonable starting depth at the teeth?

- A.** Use a depth in centimeters equal to roughly twice the tube internal diameter, then confirm by auscultation
- B.** Use an age-based depth of age divided by two plus about 8 cm, without needing further clinical confirmation
- C.** Approximately three times the internal diameter, then confirm clinically

121. A child with a ventriculoperitoneal shunt presents with headache, vomiting, and decreasing responsiveness. What is the most important concern before elective anesthesia?

- A.** These symptoms are expected from a functioning shunt and do not alter anesthetic planning
- B.** Shunt malfunction with increased intracranial pressure requires urgent evaluation and treatment
- C.** The primary risk is isolated peripheral neuropathy from excessive cerebrospinal fluid drainage

122. A newborn with bilateral choanal atresia becomes cyanotic at rest but improves when crying. Why does crying improve oxygenation?

- A.** Crying increases functional residual capacity enough to overcome fixed bilateral nasal obstruction
- B.** Opening the mouth bypasses the obstructed nasal passages in an obligate nasal-breathing neonate
- C.** Crying lowers pulmonary vascular resistance and therefore improves oxygenation despite persistent upper-airway obstruction

123. A spontaneously breathing infant is anesthetized with a Jackson-Rees modification of the Ayre T-piece. Which feature makes this circuit useful in small children?

- A.** A built-in carbon dioxide absorber allows low fresh-gas flow while preventing rebreathing

- B.** Patient-end unidirectional valves separate inspired and expired gas, making fresh-gas flow less important
- C.** Low resistance and low apparatus dead space when fresh-gas flow is appropriately set

124. A child with known difficult laryngoscopy can be mask ventilated easily. Which strategy is most appropriate for induction?

- A.** Administer a long-acting paralytic and abandon mask ventilation before any alternative airway equipment is available
- B.** Perform unlimited direct-laryngoscopy attempts until the airway is secured because oxygenation is secondary
- C.** Maintain oxygenation and use a planned advanced-airway technique with backup options rather than repeated traumatic direct laryngoscopy

125. A child taking chronic anticonvulsant therapy presents for surgery. Which medication plan is generally most appropriate?

- A.** Withhold the morning anticonvulsant dose to reduce interactions with anesthetic drugs, then restart therapy after surgery
- B.** Continue scheduled anticonvulsants perioperatively whenever feasible to avoid breakthrough seizures
- C.** Substitute perioperative benzodiazepine coverage for the child's usual anticonvulsants because it provides equivalent seizure prevention

126. A child undergoes laryngotracheal reconstruction with a fresh airway graft and postoperative stent. Which postoperative goal is most important?

- A.** Prevent agitation, coughing, and accidental airway device displacement while protecting the reconstructed airway
- B.** Perform frequent suctioning across the reconstructed segment to prevent secretion accumulation around the stent
- C.** Plan early extubation to avoid pressure from the airway device on the graft, even when postoperative edema is anticipated

127. Immediately after extubation, a child has inspiratory effort but no air movement, paradoxical chest motion, and rapidly falling saturation. What is the first-line response for suspected laryngospasm?

- A.** Force repeated suctioning through closed vocal cords because stimulation reliably relaxes the larynx
- B.** Remove the stimulus, apply jaw thrust with continuous positive airway pressure and 100% oxygen, then deepen anesthesia or give neuromuscular blockade if needed
- C.** Delay airway support while waiting for spontaneous resolution even as oxygen saturation falls rapidly

128. During a long pediatric anesthetic, the carbon dioxide absorbent canister becomes warm. Which process best explains this finding?

- A.** Absorbent granules cool because carbon dioxide is physically adsorbed without a chemical reaction
- B.** Volatile anesthetic vaporization in the canister is strongly exothermic and produces carbon dioxide
- C.** The chemical reaction that absorbs carbon dioxide is exothermic and generates heat and water

129. A newborn with myelomeningocele is scheduled for repair. Which associated abnormality is particularly relevant to neurologic and airway planning?

- A.** An isolated Chiari I malformation without hydrocephalus, which is the typical neural-tube-defect association
- B.** A tethered spinal cord without hindbrain involvement, which accounts for most perioperative swallowing and ventilatory problems
- C.** Chiari II malformation with possible hydrocephalus and brainstem dysfunction

130. A child undergoing cochlear implantation requires facial nerve monitoring. Which anesthetic choice best preserves the usefulness of that monitoring?

- A.** Avoid or minimize long-acting neuromuscular blockade after airway control when facial EMG monitoring is required
- B.** Maintain a low-dose rocuronium infusion so facial muscle movement does not interfere with surgical exposure

C. Allow profound blockade until skin closure and rely on electrical stimulation intensity to overcome the neuromuscular block

131. After intubation, a child develops wheezing, prolonged expiration, and a rising peak airway pressure with unchanged plateau pressure. Which problem is most likely?

- A.** Reduced lung compliance from atelectasis or pulmonary edema
- B.** Increased airway resistance from bronchospasm or tube obstruction
- C.** Endobronchial intubation with loss of ventilated lung volume

132. A child with a traumatic brain injury is hypotensive before neurosurgery. Which principle is most important for cerebral protection?

- A.** Use sustained severe hypocapnia to lower intracranial pressure even if cerebral blood flow falls substantially
- B.** Accept systemic blood pressure below the normal range for age to reduce surgical bleeding despite elevated intracranial pressure
- C.** Avoid hypotension because cerebral perfusion pressure depends on adequate arterial pressure relative to intracranial pressure

133. An infant undergoes open craniosynostosis repair. Which intraoperative problem is most likely to become clinically important?

- A.** Rapid blood loss that can represent a large fraction of the infant's circulating volume
- B.** Hypothermia from prolonged exposure as the dominant expected problem, with major hemorrhage being uncommon in modern open repair
- C.** Venous air embolism as the principal anticipated complication, with transfusion rarely needed because scalp blood loss is limited

134. A 2-year-old requires one-lung ventilation for thoracoscopy. Which lung-isolation approach is most practical in many children of this size?

- A.** Advance an age-appropriate single-lumen tube deeply into one mainstem bronchus and accept loss of access to that lung

- B.** Use the smallest available double-lumen tube even when its external diameter is poorly matched to the child's airway
- C.** Use a bronchial blocker with an age-appropriate single-lumen tracheal tube

135. An uncovered neonate lies in a cool operating room near colder walls and equipment. Which heat-transfer mechanism describes loss of heat to these surrounding surfaces without direct contact?

- A.** Convection from the infant to cooler moving air in the operating room
- B.** Radiation from the infant to cooler surrounding surfaces
- C.** Evaporation of moisture from exposed skin and surgical preparation fluid

136. Using the same trial with a 15-percentage-point absolute risk reduction, what is the approximate number needed to treat to prevent one additional episode of vomiting?

- A.** About 50 children
- B.** About 2 children
- C.** About 7 children

137. A child with severe spasticity receives an intrathecal baclofen pump and presents with fever, rigidity, and autonomic instability after the pump empties unexpectedly. What should be suspected?

- A.** Acute baclofen withdrawal, which can become life-threatening
- B.** Baclofen overdose, which typically causes hyperreflexia and severe rigidity
- C.** A benign expected effect of chronic baclofen therapy that requires no urgent treatment

138. An infant with cleft palate is recovering after repair. Which airway concern is greatest in the early postoperative period?

- A.** Upper-airway obstruction from edema, blood, secretions, or tongue position
- B.** Loss of respiratory drive from the surgical closure itself even without sedative or opioid exposure
- C.** Lower-airway obstruction from mandatory bronchial casts caused by palate closure

139. A child with bowel obstruction requires emergency induction. Which airway plan best addresses aspiration risk while preserving pediatric safety?

- A.** Use a classic apnea-based rapid-sequence induction and avoid gentle mask ventilation during the entire intubation attempt
- B.** Perform awake tracheal intubation because aspiration risk from bowel obstruction outweighs the disadvantages of an awake pediatric airway
- C.** Preoxygenate carefully and use a rapid controlled sequence with immediate ability to ventilate if oxygenation requires it

140. A child under general anesthesia develops abrupt hypotension, wide-complex dysrhythmia, and cardiovascular collapse immediately after a peripheral nerve block. Which treatment should be prepared early while standard resuscitation proceeds?

- A.** Flumazenil to reverse the cardiovascular effects of amide local anesthetics
- B.** Methylene blue as the primary antidote for local anesthetic sodium-channel blockade
- C.** Intravenous lipid emulsion for suspected local anesthetic systemic toxicity

141. A 5-week-old infant with projectile nonbilious vomiting is scheduled for pyloromyotomy. Laboratory testing shows chloride 82 mEq/L and bicarbonate 38 mEq/L. What is the best next step?

- A.** Proceed after restoring urine output and blood pressure even if significant hypochloremic alkalosis persists
- B.** Correct dehydration and the hypochloremic metabolic alkalosis before proceeding to surgery
- C.** Correct potassium concentration alone and proceed while leaving chloride depletion and elevated bicarbonate untreated

142. A neonate with Pierre Robin sequence has micrognathia, glossoptosis, and airway obstruction. Which airway problem should be anticipated?

- A.** Difficult mask ventilation and laryngoscopy because the tongue falls posteriorly in a small mandible
- B.** Isolated lower-airway bronchospasm without any upper-airway obstruction

C. Easy direct laryngoscopy because micrognathia brings the glottis closer to the incisors

143. During mask ventilation of an anesthetized infant, the tongue obstructs the pharynx. Which simple airway adjunct can help if there is no gag reflex?

- A. A nasogastric tube positioned across the glottis
- B. An appropriately sized oropharyngeal airway
- C. A large rigid suction catheter left between the vocal cords

144. A newborn with gastroschisis arrives for operative management. Which initial physiologic problem deserves aggressive attention?

- A. Heat and fluid loss from exposed bowel with risk of hypovolemia and hypothermia
- B. Obligate hypervolemia because exposed bowel absorbs large volumes of fluid from the environment
- C. Severe pulmonary hypoplasia from abdominal viscera occupying the thoracic cavity

145. A child with a large facial venous malformation undergoes resection. Which anesthetic issue should be anticipated?

- A. Potential difficult airway and major blood loss depending on lesion location and vascularity
- B. Assume the external appearance reflects the full extent of the lesion and plan a routine airway approach without additional imaging review
- C. Plan routine small-bore access because slow-flow venous malformations usually bleed less than high-flow arteriovenous lesions

146. Minutes after cefazolin administration, a child develops hypotension, bronchospasm, and generalized erythema. What is the most important initial drug?

- A. Rapid isotonic crystalloid bolus as the primary first-line treatment before any vasoactive medication
- B. Intravenous diphenhydramine as the primary first-line drug for cardiovascular and respiratory compromise

C. Intravenous epinephrine as the first-line drug for cardiovascular and respiratory compromise

147. A child with a pathogenic RYR1 variant develops rapidly rising end-tidal carbon dioxide, generalized rigidity, tachycardia, and hyperthermia during volatile anesthesia. What is the core cellular abnormality?

A. Failure of acetylcholine synthesis at the neuromuscular junction causing flaccid paralysis

B. Excessive potassium uptake into skeletal muscle from increased sodium-potassium ATPase activity

C. Uncontrolled calcium release from skeletal-muscle sarcoplasmic reticulum

148. A premature infant with necrotizing enterocolitis requires laparotomy. Which combination of problems is most likely?

A. Sepsis, metabolic acidosis, coagulopathy, and intravascular volume depletion

B. Normal coagulation and perfusion because necrotizing enterocolitis remains confined to the intestinal mucosa

C. Isolated respiratory alkalosis with hypertension and excessive intravascular volume

149. During strabismus surgery, a child suddenly develops bradycardia when an extraocular muscle is pulled. What is the most likely cause?

A. A carotid sinus reflex caused by traction on the globe's arterial supply

B. The oculocardiac reflex mediated by trigeminal afferents and vagal efferents

C. Direct beta-adrenergic stimulation of the sinoatrial node from extraocular muscle stretch

150. A child in cardiac arrest has a nonshockable rhythm. According to current pediatric advanced life support principles, what medication timing is favored?

A. Give epinephrine as early as possible while high-quality CPR continues

B. Defibrillate first despite the nonshockable rhythm, then give epinephrine if a shockable rhythm appears

C. Give sodium bicarbonate first to correct acidosis, then administer epinephrine during CPR

- 151.** An intubated child in cardiac arrest is receiving continuous chest compressions. What ventilation rate is reasonable under current pediatric resuscitation guidance?
- A.** About 10 breaths per minute, applying the adult advanced-airway rate to children during CPR
 - B.** About 40 to 60 breaths per minute to match normal infant respiratory rates during cardiac arrest
 - C.** About 20 to 30 breaths per minute while avoiding excessive ventilation
- 152.** A newborn with esophageal atresia and distal tracheoesophageal fistula is taken for repair. Which ventilation principle helps limit gastric distention before the fistula is controlled?
- A.** Use high-pressure mask ventilation before intubation to splint the airway and reduce flow through the distal fistula
 - B.** Position the tracheal tube proximal to the fistula so positive pressure can enter both the lungs and stomach freely
 - C.** Use gentle ventilation and position the tracheal tube so positive pressure preferentially reaches the lungs rather than the fistula
- 153.** A child with an open-globe injury requires emergency repair. Which induction goal is most important?
- A.** Allow vigorous coughing during laryngoscopy because it lowers intraocular pressure
 - B.** Secure the airway while minimizing coughing, straining, hypoxia, and large increases in intraocular pressure
 - C.** Delay airway protection despite a full stomach because aspiration is less important than any small pressure change
- 154.** A 6-month-old infant requires neuromuscular blockade for emergency intubation. Why is the weight-based dose requirement for succinylcholine generally higher in infants than in adults?
- A.** Greater plasma cholinesterase activity in infancy increases metabolism so a larger dose is needed to overcome faster breakdown
 - B.** A larger extracellular fluid volume increases the apparent volume of distribution for this water-soluble drug

C. A higher density of mature junctional acetylcholine receptors makes each receptor less sensitive to depolarization

155. A child awakens during emergence with intense thrashing, inconsolability, and no purposeful interaction after sevoflurane anesthesia. Pain appears well controlled. What is the most likely diagnosis?

A. Malignant hyperthermia

B. Residual neuromuscular blockade

C. Emergence delirium

156. A child with fulminant hepatic failure requires emergency surgery. Which laboratory abnormality is most likely to reflect impaired hepatic synthetic function?

A. An isolated rise in serum sodium as the most specific indicator of liver synthetic failure

B. Markedly shortened prothrombin time from excessive production of vitamin K-dependent factors

C. Prolongation of prothrombin time or INR from reduced clotting-factor synthesis

157. A child has a strong history of postoperative nausea and vomiting and is scheduled for strabismus repair. Which plan is most appropriate?

A. Use a multimodal antiemetic strategy and reduce emetogenic anesthetic factors when feasible

B. Use a single antiemetic only after vomiting occurs because strabismus-related emesis is usually brief and self-limited

C. Rely on a volatile-sparing technique alone and omit antiemetic prophylaxis despite the child's strong prior history of vomiting

158. A fellow is performing a difficult pediatric regional block under supervision. Which supervisory practice is most appropriate?

A. Provide direct hands-on supervision for each procedural step independent of trainee experience or patient complexity

B. Base procedural independence mainly on postgraduate year because time in training is a practical surrogate for competence

C. Match supervision to the trainee's competence and patient risk, with the supervising anesthesiologist immediately available to intervene

159. A child with multiple risk factors for postoperative nausea and vomiting is undergoing ambulatory surgery. Which preventive strategy is most effective?

A. Use more than one antiemetic class and reduce baseline emetogenic factors when feasible

B. Give no prophylaxis and wait until repeated vomiting occurs in recovery

C. Use a single very large opioid dose because opioids suppress the medullary vomiting center in children

160. A 4-year-old receives atropine before airway instrumentation. Which receptor action accounts for the expected increase in heart rate and reduction in secretions?

A. Competitive antagonism of muscarinic acetylcholine receptors

B. Selective agonism of alpha-2 adrenergic receptors in the locus coeruleus

C. Irreversible antagonism of nicotinic acetylcholine receptors at the motor end plate

161. A neonate receives a renally eliminated antibiotic during a prolonged procedure. Which developmental renal feature is most relevant to dose interval?

A. Assume glomerular filtration is near adult values at birth and focus dose adjustment primarily on hepatic metabolism

B. Shorten the dosing interval because neonatal tubular secretion is more efficient than in older children

C. Low glomerular filtration and tubular function can prolong drug elimination

162. An infant undergoing examination for retinopathy of prematurity develops apnea after sedation. Which background factor most increases this risk?

A. Extreme prematurity with immature respiratory control and associated chronic lung disease

B. Treat the retinal procedure itself as the main cause of apnea because ocular stimulation directly suppresses diaphragmatic motor output

C. Assume respiratory control is mature once laser treatment is scheduled, with sedation risk determined mainly by eye disease severity

163. A child becomes hypotensive and bradycardic after excessive anesthetic depth. Which immediate management principle is most appropriate?

- A. Reduce the anesthetic depressant effect while supporting oxygenation, preload, and circulation
- B. Deepen anesthesia further because hypotension proves sympathetic stimulation is inadequate
- C. Ignore bradycardia because heart rate is unrelated to cardiac output in young children

164. A child with renal failure has potassium 7.1 mEq/L and peaked T waves before urgent surgery. Which intervention most immediately stabilizes the myocardium?

- A. Insulin with glucose to shift potassium from plasma into cells
- B. Intravenous calcium while additional measures shift or remove potassium
- C. Sodium bicarbonate to shift potassium during significant metabolic acidosis

165. A child undergoes posterior spinal fusion with motor-evoked potential monitoring. Which anesthetic technique best supports reliable signals?

- A. Use deep volatile anesthesia with continuous neuromuscular blockade to maximize motor-evoked potential amplitude
- B. Use a technique with limited volatile anesthetic and avoid sustained neuromuscular blockade when motor responses are needed
- C. Ignore blood pressure and temperature because motor-evoked potentials are unaffected by physiologic conditions

166. A child receives acetaminophen as part of multimodal analgesia. Which mechanism is most accurate?

- A. It is a pure peripheral opioid receptor agonist with no clinically relevant central action
- B. It irreversibly inhibits platelet cyclooxygenase and produces prolonged antiplatelet effects

C. It provides central analgesic and antipyretic effects with minimal peripheral anti-inflammatory activity

167. A child with a central venous catheter suddenly develops a narrow-complex tachycardia during guidewire placement. What is the likely mechanism?

A. Immediate malignant hyperthermia caused by contact between the guidewire and blood

B. Mechanical irritation of the right atrium or ventricle by the wire or catheter

C. Pulmonary edema from excessive intrathoracic pressure generated by the catheter

168. A child with unilateral ureteropelvic junction obstruction has preserved contralateral renal function. Which perioperative priority is most appropriate?

A. Administer a large nephrotoxic drug load because the unobstructed kidney prevents any renal complication

B. Induce prolonged hypotension to decrease urine production and protect the obstructed kidney

C. Maintain adequate intravascular volume and renal perfusion while avoiding unnecessary nephrotoxins

169. A boy with Duchenne muscular dystrophy needs scoliosis surgery. Which anesthetic approach best reduces the risk of anesthesia-induced rhabdomyolysis?

A. Avoid succinylcholine and generally avoid triggering volatile anesthetics, using a nontriggering technique

B. Use succinylcholine for intubation because potassium release is reduced in muscular dystrophy

C. Use high-dose volatile anesthesia because dystrophin deficiency protects against rhabdomyolysis

170. A child vomits during induction and gastric contents are seen in the pharynx. What is the immediate priority?

A. Administer prophylactic antibiotics immediately before addressing oxygenation or airway contamination

B. Delay suctioning so gastric contents can drain distally without disrupting the induction

C. Suction the airway, secure oxygenation and ventilation, and protect the trachea as needed

171. A child with a functioning renal transplant presents for elective surgery. Which medication principle is usually appropriate?

A. Hold the calcineurin inhibitor on the day of surgery to avoid nephrotoxicity, even if no alternative immunosuppression is provided

B. Continue baseline immunosuppressive therapy and consider drug interactions and infection risk

C. Double the routine immunosuppressant doses perioperatively because surgical stress increases the risk of acute rejection

172. A tourniquet has been inflated for a prolonged period during limb surgery. What change may occur shortly after release?

A. A transient fall in systemic vascular resistance with return of acid, potassium, and metabolites from the limb

B. No systemic effect because tourniquet-isolated metabolites remain trapped after deflation

C. A sustained increase in systemic vascular resistance with abrupt respiratory alkalosis from metabolite washout

173. A child receives clonidine as an adjunct for perioperative analgesia. Which effect is most consistent with its pharmacology?

A. Direct beta-2 agonism causing bronchodilation without any sedative effect

B. Dopamine receptor antagonism producing antiemesis as its principal perioperative action

C. Reduced sympathetic outflow with sedation and analgesic-sparing effects

174. A child is anesthetized for MRI. Which safety principle is unique and essential in this environment?

A. Continuous physiologic monitoring is unnecessary because the MRI scanner provides real-time vital signs

B. All equipment entering the magnet room must be MRI compatible and the airway must remain accessible despite remote positioning

C. Standard ferromagnetic anesthesia equipment can be used safely if it is placed close to the magnet bore

175. A child with classic congenital adrenal hyperplasia has been taking chronic glucocorticoids and is scheduled for major surgery. Which endocrine issue is most important?

A. Continue the child's usual maintenance glucocorticoid regimen without an additional stress dose for major surgery

B. Provide appropriate perioperative stress glucocorticoid coverage to prevent adrenal crisis

C. Provide mineralocorticoid replacement alone because perioperative hypotension is expected to reflect sodium loss more than cortisol deficiency

176. A child with osteogenesis imperfecta presents for fracture fixation. Which perioperative issue is most important?

A. Handle and position gently because fragile bones can fracture with transfers or excessive force

B. Avoid succinylcholine primarily because osteogenesis imperfecta is a proven malignant-hyperthermia syndrome

C. Use routine forceful positioning to overcome contractures because iatrogenic fractures are uncommon under anesthesia

177. A child receives deep sedation for a painful procedure outside the operating room. Which monitoring is particularly valuable for early detection of hypoventilation?

A. Use continuous pulse oximetry with intermittent respiratory-rate checks, relying on desaturation to reveal early hypoventilation

B. Continuous capnography in addition to pulse oximetry and clinical observation

C. Use a precordial stethoscope alone because supplemental oxygen makes expired carbon dioxide monitoring less informative

178. During mask induction, inspired sevoflurane concentration is increased. Which property helps explain why alveolar concentration rises relatively quickly compared with a more blood-soluble volatile anesthetic?

- A.** Irreversible binding to hemoglobin prevents uptake from the alveoli
- B.** A very high blood-gas partition coefficient causes rapid equilibration with the brain
- C.** A relatively low blood-gas partition coefficient limits uptake into blood

179. After neurosurgery, a child develops large volumes of dilute urine, rising serum sodium, and high serum osmolality. Which diagnosis is most likely?

- A.** Central diabetes insipidus from deficient antidiuretic hormone effect
- B.** Syndrome of inappropriate antidiuretic hormone secretion causing water retention
- C.** Acute adrenal crisis producing concentrated urine and isolated hyponatremia

180. A toddler has multiple bruises of different ages and a femur fracture inconsistent with the reported mechanism. What is the anesthesiologist's responsibility?

- A.** Ensure immediate safety and follow mandatory reporting procedures for suspected child abuse
- B.** Wait for confirmatory skeletal-survey findings before making a report, even when the injury pattern and history are already concerning
- C.** Document the injuries but defer the concern entirely to another specialty because reporting by the anesthesia team could duplicate a report

181. A child on venovenous ECMO requires surgery. Which anesthetic issue is especially important?

- A.** Use standard anesthetic dosing because circuit sequestration and priming-volume effects are small compared with patient clearance
- B.** Interrupt systemic anticoagulation for surgery without changing the plan for circuit surveillance or thrombosis prevention
- C.** Anticoagulation, altered drug pharmacokinetics, and limited cardiopulmonary reserve complicate perioperative management

182. A child with meningitis develops hyponatremia, low serum osmolality, and inappropriately concentrated urine without signs of hypovolemia. Which disorder is most likely?

- A.** Syndrome of inappropriate antidiuretic hormone secretion (SIADH)

- B.** Central diabetes insipidus causing renal free-water loss
- C.** Cerebral salt wasting causing renal sodium and volume loss

183. A 20-kg child has a 30% total body surface area thermal burn and is within the first several hours after injury. Which fluid principle is appropriate?

- A.** Give the calculated crystalloid formula as a fixed volume target rather than adjusting it to urine output and perfusion
- B.** Use a weight- and burn-size-based crystalloid resuscitation plan and titrate to physiologic endpoints such as urine output
- C.** Use colloid as the primary initial resuscitation fluid because early capillary leak is expected to limit crystalloid effectiveness

184. During pediatric laparoscopy, carbon dioxide insufflation causes a sudden decrease in venous return and blood pressure. Which intervention is most appropriate?

- A.** Increase intravenous fluid while maintaining the same insufflation pressure
- B.** Increase PEEP to improve ventilation while maintaining the same pneumoperitoneum
- C.** Reduce insufflation pressure and support preload and circulation

185. A child is receiving total intravenous anesthesia with propofol. Which physiologic effect should be anticipated after a large induction bolus?

- A.** Consistent systemic vasoconstriction with increased preload and afterload
- B.** Dose-dependent hypotension from vasodilation and myocardial depression
- C.** Marked catecholamine release producing hypertension and tachycardia in most patients

186. A child experiences an unexpected severe perioperative complication. Which disclosure principle is most appropriate?

- A.** Communicate promptly and honestly with the family about what is known, the child's condition, and the plan while the event is investigated

- B.** Wait for completion of the formal event investigation before the first substantive discussion with the family
- C.** Provide a definitive causal explanation immediately, even when the team has not yet established the mechanism of the complication

187. A child with pheochromocytoma is scheduled for tumor resection. Which preoperative sequence is most appropriate?

- A.** Begin beta blockade for tachycardia before alpha blockade, then treat any subsequent hypertension with additional beta antagonist
- B.** Use a combined alpha-beta blocker without separate alpha titration or deliberate preoperative volume expansion
- C.** Establish alpha-adrenergic blockade and volume repletion before considering beta blockade for persistent tachycardia

188. A child rescued from an enclosed-space fire has soot around the mouth and progressive hoarseness. Which action is most appropriate?

- A.** Observe closely and defer intubation until stridor or oxygen desaturation appears, using symptoms to time airway control
- B.** Use noninvasive positive-pressure ventilation to avoid tracheal intubation even as progressive supraglottic edema is suspected
- C.** Secure the airway early because edema from inhalation injury can progress rapidly

189. An ex-premature infant is stable in PACU after hernia repair but remains within an age range at risk for postoperative apnea. Which disposition is most appropriate?

- A.** Discharge immediately after the first normal respiratory rate because apnea risk ends at extubation
- B.** Continue cardiorespiratory monitoring for an interval appropriate to postmenstrual age and risk factors
- C.** Administer a sedating opioid to test respiratory reserve before deciding on discharge

190. A child with severe hepatic dysfunction is given cisatracurium. Which feature makes its elimination relatively independent of organ function?

- A.** Spontaneous Hofmann degradation at physiologic pH and temperature
- B.** Renal tubular secretion that increases automatically when liver function declines
- C.** Exclusive biliary excretion of unchanged drug at a fixed rate

191. A child with sickle cell disease requires major surgery. Which perioperative strategy most directly reduces sickling risk?

- A.** Induce deliberate hypothermia and dehydration to reduce oxygen consumption
- B.** Avoid hypoxemia, hypothermia, acidosis, dehydration, and severe circulatory stasis
- C.** Permit prolonged hypoxemia because low oxygen tension suppresses hemoglobin S polymerization

192. A child with a major burn injury 5 days ago requires another operation. Which neuromuscular blocker is contraindicated?

- A.** Cisatracurium because Hofmann elimination becomes explosive in burned tissue
- B.** Succinylcholine because upregulated extrajunctional receptors can cause dangerous hyperkalemia
- C.** Rocuronium because nondepolarizing blockade releases more potassium than succinylcholine after burns

193. A child under deep procedural sedation becomes unresponsive to verbal stimulation but continues breathing. Which principle governs the sedation provider's competence?

- A.** Train the sedation provider to manage problems expected at the intended depth and rely on an emergency team for deeper rescue
- B.** Rely on the proceduralist for airway rescue when the sedation is brief and continuous physiologic monitoring is available
- C.** The provider must be able to rescue the child from a deeper-than-intended level of sedation, including airway support

194. A boy with hemophilia A requires surgery. Which coagulation factor is deficient?

- A.** Factor XI
- B.** Factor IX
- C.** Factor VIII

195. A child with severe traumatic brain injury and suspected hemorrhagic shock arrives for surgery. Which resuscitation priority best limits secondary brain injury?

- A.** Prevent hypoxemia and hypotension while controlling hemorrhage and maintaining cerebral perfusion
- B.** Allow prolonged hypotension to reduce intracranial pressure even if cerebral perfusion falls
- C.** Avoid oxygen supplementation because hyperoxia is more dangerous than early traumatic hypoxemia

196. A child is ready for discharge after ambulatory sedation. Which criterion is most important?

- A.** Return toward baseline consciousness with stable airway, ventilation, circulation, and appropriate caregiver supervision
- B.** Discharge once a recovery score threshold is met even if the child remains substantially more somnolent than baseline
- C.** Discharge after a short period of stable vital signs even if airway tone is lost whenever stimulation stops

197. An anesthetized child has a train-of-four count of 1 after rocuronium. What does peripheral nerve stimulation primarily assess?

- A.** The depth of cortical hypnosis and likelihood of explicit recall during surgery
- B.** The degree of neuromuscular transmission impairment produced by the blocking drug
- C.** The adequacy of analgesia by measuring spinal nociceptive transmission directly

198. A child with Down syndrome is scheduled for adenotonsillectomy. Which combination is particularly relevant to anesthetic planning?

- A.** Obtain screening cervical spine radiographs in asymptomatic children and otherwise use routine airway and postoperative respiratory planning
- B.** Obstructive sleep apnea, potential difficult airway features, and possible cervical spine instability
- C.** Focus primarily on macroglossia because sleep-disordered breathing, congenital heart disease, and cervical symptoms contribute less to anesthetic risk

199. A child is resuscitated after cold-water submersion and remains markedly hypothermic. Which statement is most appropriate?

- A.** Continue controlled rewarming and resuscitation because profound hypothermia can preserve neurologic viability despite prolonged arrest
- B.** Stop resuscitative efforts early because a prolonged arrest before rewarming predicts poor neurologic outcome even in severe hypothermia
- C.** Apply rapid peripheral surface warming alone and avoid core-directed rewarming because redistribution afterdrop is clinically unimportant

200. An adolescent with chronic postsurgical pain has escalating disability despite increasing medication. Which approach is most appropriate?

- A.** Escalate opioid therapy as the central treatment while postponing rehabilitation until pain intensity is minimal
- B.** Recommend strict activity restriction until the child is pain-free, then begin physical and psychological rehabilitation
- C.** Use an interdisciplinary plan that addresses physical function, psychology, sleep, family factors, and pharmacologic therapy

Answers

1. A. Fever, productive cough, wheezing, and systemic illness suggest more than an uncomplicated mild URI and increase the risk of perioperative respiratory adverse events. Elective surgery is usually deferred until the acute illness has improved.

- 2. C.** Croup is predominantly subglottic inflammatory edema. Nebulized epinephrine can rapidly reduce mucosal edema, while corticosteroids provide a more sustained anti-inflammatory effect; beta-2 bronchodilation does not address the principal obstruction.
- 3. C.** Fetal oxygen delivery remains dependent on maternal oxygenation, maternal cardiac output, and uteroplacental blood flow. Open fetal procedures also require marked uterine relaxation, so maternal hemodynamics and anesthetic depth must be balanced carefully.
- 4. B.** Infants have a relatively large occiput that can flex the neck when they lie flat. A small shoulder roll helps restore a neutral or mildly extended sniffing relationship and can improve mask ventilation and laryngoscopy.
- 5. B.** Good asthma control reduces perioperative respiratory risk. Usual controller therapy should be continued, and a short-acting bronchodilator is often useful before airway manipulation in patients with reactive airways.
- 6. C.** A child with suspected epiglottitis can deteriorate abruptly if agitated or forced supine. Airway control should occur in a controlled environment with experienced personnel, preservation of spontaneous breathing until the airway is secured, and immediate backup for a surgical airway.
- 7. B.** The EXIT procedure preserves uteroplacental circulation so oxygenation can continue while the fetal airway is secured. Profound uterine relaxation and maintenance of maternal blood pressure are essential until the airway is established and cord clamping is safe.
- 8. C.** When delay would threaten life or limb and a legal guardian is unavailable, emergency treatment may proceed under the emergency exception to consent. Documentation of the circumstances and continued efforts to reach the guardian are important.
- 9. B.** Down syndrome is strongly associated with OSA because of adenotonsillar hypertrophy, hypotonia, macroglossia, and craniofacial anatomy. Severity of sleep-disordered breathing affects anesthetic, opioid, and postoperative monitoring decisions.
- 10. A.** Infants consume oxygen at a higher rate per kilogram while maintaining a relatively small oxygen reservoir in functional residual capacity. This combination shortens the safe apnea interval and explains the rapid fall in saturation after apnea begins.
- 11. C.** Severe bronchospasm prolongs the time needed for exhalation. A slower rate, adequate expiratory time, and avoidance of excessive tidal volume reduce air trapping and auto-PEEP; permissive hypercapnia may be safer than aggressive minute ventilation.
- 12. C.** The fetal circulation depends on maternal uteroplacental blood flow for oxygen delivery. Maternal hypotension can reduce placental perfusion and must be treated promptly while other fetal and procedural causes of bradycardia are assessed.

- 13. B.** Standard U.S. elective fasting guidance permits clear liquids until 2 hours before anesthesia in otherwise healthy patients. Longer intervals apply to breast milk, formula, nonhuman milk, and solid food.
- 14. C.** Bronchopulmonary dysplasia reflects chronic lung injury after prematurity and ventilatory/oxygen exposure. These infants may have reactive airways, impaired compliance, ventilation-perfusion mismatch, oxygen dependence, and pulmonary hypertension.
- 15. B.** Many maternal anesthetic drugs cross the placenta, but fetal concentrations and immobility may be insufficient or unpredictable for invasive fetal surgery. Direct fetal analgesia and neuromuscular blockade can therefore be used when procedural conditions require it.
- 16. B.** Young infants have a larger total body water and extracellular water fraction than older children and adults. Water-soluble drugs can therefore have a larger weight-normalized volume of distribution and may require different loading-dose considerations.
- 17. A.** Midazolam is a short-acting benzodiazepine commonly used for pediatric premedication because it provides anxiolysis, sedation, and anterograde amnesia. Its respiratory depressant effects can be amplified by other sedatives or opioids.
- 18. A.** Cystic fibrosis produces dehydrated airway secretions and chronic infection. Preoperative optimization includes airway clearance, bronchodilator therapy when indicated, treatment of infection, and adequate hydration rather than suppression of pulmonary toilet.
- 19. B.** Mask ventilation can distend intrathoracic bowel and worsen lung compression in congenital diaphragmatic hernia. Early tracheal intubation, gastric decompression, gentle ventilation, and attention to pulmonary hypertension are key priorities.
- 20. B.** Parental presence during induction has variable effects and depends on the child, parent, staff, and setting. It can be useful as part of a broader plan but does not consistently outperform other preparation strategies for every child.
- 21. A.** Loss of chest-wall tone, supine positioning, positive-pressure ventilation, and paralysis can worsen airway or vascular compression from an anterior mediastinal mass. Maintaining spontaneous breathing and the position of comfort until a definitive plan is established is safer in a high-risk child.
- 22. B.** In the common esophageal atresia with distal fistula, positive-pressure gas can enter the stomach through the fistula. Gastric distention can elevate the diaphragm, worsen ventilation, and in severe cases threaten gastric rupture.
- 23. A.** Volatile anesthetic requirement is age dependent. MAC is relatively high in infants and young children and then declines with age, so age must be considered when interpreting end-tidal anesthetic concentrations.

- 24. C.** Children with autism may benefit from advance planning, familiar communication methods, caregiver participation, reduced sensory stimulation, and a tailored premedication or induction plan. A rigid one-size-fits-all approach can worsen distress.
- 25. C.** Small children often cannot accommodate a double-lumen tube. Bronchial blockers can provide selective mainstem occlusion while allowing use of an appropriately sized single-lumen tracheal tube.
- 26. B.** Pyloric stenosis is not an emergency once the stomach is decompressed. Persistent hypochloremic metabolic alkalosis should be corrected before anesthesia because alkalemia and associated hypoventilation increase perioperative respiratory risk.
- 27. A.** Positional dyspnea, orthopnea, stridor, syncope, and evidence of tracheobronchial or vascular compression identify a high-risk mediastinal mass. Anesthetic-induced loss of muscle tone and spontaneous ventilation can precipitate collapse.
- 28. B.** Glomerular filtration and renal blood flow are reduced in neonates and mature over infancy. Drugs that depend heavily on renal elimination may therefore have reduced clearance and a prolonged half-life in neonates.
- 29. B.** Surfactant lowers surface tension and stabilizes alveoli, especially at low lung volumes. Deficiency increases the work of breathing, reduces compliance, and promotes widespread atelectasis and shunt.
- 30. A.** Gastroschisis exposes bowel to amniotic fluid and then the environment, producing inflammation and substantial evaporative losses. Resuscitation often requires more fluid than standard maintenance while avoiding hypothermia.
- 31. B.** Historically, children with spina bifida have had a high prevalence of latex sensitization from repeated surgical and catheter exposure. A latex-safe environment reduces the risk of perioperative anaphylaxis.
- 32. B.** In the lateral position, gravity increases perfusion to the dependent lung. Placing the better-functioning lung down can improve ventilation-perfusion matching when the clinical situation and surgical needs permit.
- 33. A.** Omphalocele is frequently associated with cardiac defects, chromosomal abnormalities, and other syndromes. Preoperative assessment should therefore extend beyond the abdominal wall defect itself.
- 34. C.** GERD varies widely in severity. The airway plan should consider symptoms, neurologic disease, delayed gastric emptying, obstruction, fasting status, and procedural factors rather than applying an automatic technique to every child with reflux.
- 35. A.** Infants have lower concentrations of alpha-1-acid glycoprotein, an important binding protein for amide local anesthetics. A larger free fraction can increase susceptibility to systemic toxicity at a given total plasma concentration.

- 36. A.** Developmentally capable children and adolescents should be involved in decisions that affect them. Seeking assent respects emerging autonomy while recognizing that parents or guardians usually hold legal decision-making authority.
- 37. B.** Bronchiolitis causes small-airway inflammation, edema, and secretions. General anesthesia can worsen airway reactivity, and mechanical ventilation must account for obstructive physiology and the risk of dynamic hyperinflation.
- 38. A.** Children with spina bifida and myelomeningocele have historically had a high risk of latex sensitization because of repeated procedures and catheter exposure. Latex-free precautions are appropriate when this risk is present.
- 39. C.** Routine broad laboratory screening in healthy children rarely changes management and can create false-positive results. Testing should be targeted to clinical conditions and procedural risk.
- 40. A.** Remifentanyl contains an ester linkage that is rapidly hydrolyzed by nonspecific esterases in blood and tissues. Its termination is therefore largely independent of hepatic or renal function and remains rapid after infusions.
- 41. B.** As respiratory muscle fatigue progresses, airflow and stridor can become deceptively quieter while obstruction remains severe. Reduced air movement, altered consciousness, rising carbon dioxide, or diminished respiratory effort are ominous signs.
- 42. C.** NEC with perforation can produce sepsis, capillary leak, acidosis, coagulopathy, and major volume depletion. Induction may precipitate cardiovascular collapse unless resuscitation, vasoactive support, and blood products are prepared.
- 43. A.** Parents usually provide legal permission for minors, but children and adolescents should be involved according to development and capacity. Assent, dissent, urgency, and specific legal exceptions all matter in ethical pediatric decision-making.
- 44. C.** Restrictive disease reduces compliant lung volume, increasing the risk of volutrauma and barotrauma. Lung-protective ventilation emphasizes appropriate tidal volume, judicious PEEP, and acceptance of less-than-perfect blood gases when needed to avoid injurious pressures.
- 45. A.** Former premature infants with BPD may have limited respiratory reserve, reactive airways, and pulmonary hypertension. Postoperative monitoring should reflect their gestational age, current oxygen requirement, anemia, and overall clinical status.
- 46. C.** Young age, high ASA physical status, major comorbidity, and emergency procedures are repeatedly associated with greater pediatric perioperative risk. The combination in a sick infant should prompt enhanced preparation and monitoring.
- 47. A.** Dexmedetomidine is a selective alpha-2 adrenergic agonist. Reduced central sympathetic outflow provides sedation and analgesic-sparing effects but can also produce bradycardia and hypotension.

- 48. B.** After lung expansion, oxygen tension rises and placental prostaglandin supply is removed. Increased oxygen and reduced prostaglandin signaling constrict ductal smooth muscle and promote functional closure.
- 49. B.** PPHN persists when pulmonary vascular resistance remains abnormally high, promoting right-to-left shunting through fetal channels. Hypoxemia, hypercarbia, acidosis, pain, and hypothermia can worsen the pulmonary vasoconstriction.
- 50. C.** Obesity and OSA increase the risk of perioperative airway obstruction and hypoventilation. Opioid-sparing analgesia, awake extubation when appropriate, and postoperative monitoring should reflect OSA severity and the procedure.
- 51. B.** Isotonic balanced crystalloids reduce the risk of iatrogenic hyponatremia and provide appropriate extracellular volume replacement for most perioperative children. Fluid composition and rate still require individualization.
- 52. A.** Ductal-dependent systemic lesions rely on a patent ductus to deliver blood to the systemic circulation. Prostaglandin E1 can maintain or restore ductal patency, although apnea is an important adverse effect and airway support must be available.
- 53. C.** Former premature infants remain at increased risk of postoperative apnea, particularly at younger postmenstrual ages and with anemia or prior apnea. This risk often determines whether prolonged cardiorespiratory monitoring is needed.
- 54. B.** Ondansetron can prolong ventricular repolarization and the QT interval, particularly in susceptible patients or with other QT-prolonging drugs. Dexamethasone does not share this characteristic, and aprepitant is not a typical cause of clinically important QT prolongation.
- 55. C.** Neonates have limited energy reserves and may develop hypoglycemia, particularly when premature or ill. Glucose-containing fluid may be appropriate for selected infants, but blood glucose should guide therapy to avoid both hypo- and hyperglycemia.
- 56. C.** Left-to-right shunt magnitude depends in part on the relative resistance of the pulmonary and systemic circulations. Lowering pulmonary vascular resistance can drive more blood across the defect into the lungs and worsen pulmonary overcirculation.
- 57. B.** A vein of Galen malformation can function as a massive low-resistance arteriovenous shunt. The neonatal heart may be unable to sustain the resulting high cardiac output, producing heart failure and pulmonary hypertension.
- 58. A.** Near misses and errors without harm can reveal the same system vulnerabilities that later cause serious injury. A safety culture encourages reporting and analysis of contributing factors rather than relying only on individual blame.

- 59. B.** Potassium accumulates in the supernatant of stored red blood cells. Rapid large-volume transfusion in a small infant can deliver a clinically important potassium load and precipitate dangerous dysrhythmias.
- 60. B.** Nitrous oxide diffuses into air-filled closed spaces faster than nitrogen leaves them, increasing volume or pressure. It should therefore be avoided with an undrained pneumothorax and other clinically important closed gas collections.
- 61. C.** A tet spell reflects increased right-to-left shunting, often from dynamic right ventricular outflow obstruction and reduced systemic vascular resistance. Increasing SVR, supporting preload, calming the child, and treating infundibular spasm promote pulmonary blood flow.
- 62. B.** Positive pressure can preferentially inflate the affected lobe and worsen mediastinal shift in congenital lobar emphysema. Spontaneous breathing or cautious low-pressure ventilation is often maintained until surgical decompression is available.
- 63. A.** Infants lose heat rapidly because of their large surface-area-to-mass ratio and limited thermoregulatory reserve. Forced-air or conductive warming, warm ambient conditions, warmed fluids, and minimizing exposure help prevent hypothermia.
- 64. A.** After a Glenn shunt, superior vena caval blood reaches the pulmonary arteries passively. Pulmonary blood flow therefore depends on low PVR, an adequate venous pressure gradient, and avoidance of excessive positive intrathoracic pressure.
- 65. B.** Intestinal obstruction causes vomiting, dehydration, and electrolyte disturbances. Gastric decompression and resuscitation should precede anesthesia, while associated anomalies are evaluated.
- 66. B.** Desflurane is pungent and can stimulate airway reflexes, causing coughing, breath holding, laryngospasm, and sympathetic activation. Sevoflurane is much less irritating and is commonly used for inhalational induction in children.
- 67. C.** Prone positioning introduces risks of pressure injury, ocular injury, impaired ventilation, venous congestion, and airway movement. Meticulous padding, neutral alignment, abdominal freedom, and repeated airway checks are essential.
- 68. C.** Fontan circulation lacks a subpulmonary ventricle, so pulmonary flow is passive and highly preload dependent. High mean airway pressure, hypovolemia, acidosis, or elevated PVR can reduce transpulmonary flow and ventricular filling.
- 69. A.** Large sacrococcygeal teratomas can be extremely vascular and may also produce high-output cardiac failure. Large-bore access, blood availability, temperature control, and anticipation of rapid blood loss are important.

- 70. A.** Antifibrinolytic therapy can reduce blood loss in several high-bleeding pediatric operations, including craniofacial and spine surgery. It works best within a broader plan that includes surgical hemostasis, temperature control, laboratory assessment, and timely component therapy.
- 71. B.** A pulmonary hypertensive crisis can produce acute RV failure and right-to-left shunting. Management includes 100% oxygen, correction of acidosis and hypercarbia, maintenance of systemic perfusion pressure, adequate anesthesia, and selective pulmonary vasodilation when available.
- 72. A.** Retinopathy of prematurity occurs in infants born very preterm, many of whom also have bronchopulmonary dysplasia, prior apnea, anemia, and other sequelae of prematurity. Those conditions can dominate the anesthetic risk.
- 73. C.** Bupivacaine binds cardiac sodium channels avidly and dissociates relatively slowly, making severe ventricular dysrhythmia and myocardial depression an important toxicity concern. All local anesthetics can cause systemic toxicity, but bupivacaine is particularly cardiotoxic.
- 74. A.** Hypotension after induction often reflects a combination of reduced sympathetic tone, vasodilation, myocardial depression, and limited preload. Assessment should include volume status, bleeding, anesthetic depth, cardiac disease, and other causes such as anaphylaxis.
- 75. A.** Dynamic obstruction worsens when the ventricular cavity is small and ejection is vigorous. Avoiding hypovolemia, vasodilation, tachycardia, and increased contractility helps maintain filling and reduces outflow tract obstruction.
- 76. C.** Most neonatal bradycardia is caused by inadequate ventilation. When a newborn is apneic or the heart rate remains below 100 beats/min, effective positive-pressure ventilation is the critical next step; compressions are added if the heart rate remains below 60 despite effective ventilation.
- 77. C.** Arterial oxygen content is dominated by oxygen bound to hemoglobin, with only a small contribution from dissolved oxygen. Severe anemia can therefore reduce oxygen delivery even when pulse oximetry remains near 100%.
- 78. A.** Sugammadex is a modified cyclodextrin that forms a tight complex with aminosteroid neuromuscular blockers such as rocuronium. By reducing free rocuronium concentration, it promotes movement of drug away from the neuromuscular junction and reverses blockade.
- 79. B.** Dilated cardiomyopathy is characterized by poor contractility and often limited ability to augment stroke volume. Excessive afterload and myocardial depressant effects can reduce forward flow, so hemodynamic changes should be gradual and tailored to perfusion.
- 80. C.** Caudal epidural analgesia is commonly used for infraumbilical procedures and can provide effective postoperative pain control. Local anesthetic dose must still be carefully calculated because systemic toxicity remains possible.

- 81. A.** The caudal epidural space is approached through the sacral hiatus, which lies between the sacral cornua near the upper gluteal cleft. Ultrasound can help identify anatomy, especially when landmarks are unclear.
- 82. B.** Management of a paced child requires knowledge of device type, underlying rhythm, dependence, and expected response to electromagnetic interference. Cautery precautions and immediate backup pacing/defibrillation capability are important when clinically relevant.
- 83. A.** New or progressive motor deficit during neuraxial analgesia must be taken seriously. Excess local anesthetic can cause motor block, but epidural hematoma or another compressive lesion requires prompt assessment because neurologic outcome can depend on rapid intervention.
- 84. B.** LAST prevention begins with weight-based dose calculation, awareness of additive doses, incremental injection, aspiration, ultrasound guidance, and monitoring. Under general anesthesia, early neurologic symptoms may be hidden.
- 85. A.** Acetylcholinesterase inhibition increases acetylcholine at both nicotinic and muscarinic synapses. Glycopyrrolate or atropine is therefore paired with neostigmine to blunt bradycardia, salivation, and other muscarinic effects.
- 86. C.** Systems-based event analysis reconstructs the timeline and looks for latent conditions, communication failures, equipment issues, workload, and process design. The goal is to build stronger defenses rather than identify a single person to blame.
- 87. A.** Adenosine transiently blocks conduction through the atrioventricular node and can terminate many reentrant pediatric supraventricular tachycardias. It must be given rapidly because of its extremely short half-life.
- 88. B.** Multimodal analgesia targets pain through different mechanisms and can reduce opioid requirements and adverse effects. Acetaminophen, NSAIDs when appropriate, regional blocks, and selected adjuncts can improve analgesia without simply escalating opioid dose.
- 89. B.** Needle-tip visualization is central to ultrasound-guided block safety. If the tip is lost, advancing or injecting can injure nerves, vessels, pleura, or other structures, so position should be re-established first.
- 90. A.** Higher ultrasound frequencies improve axial and lateral resolution but penetrate less deeply. Because many pediatric targets are superficial, a high-frequency linear probe is commonly advantageous.
- 91. A.** When pulmonary vascular resistance is fixed and high, decreasing systemic vascular resistance favors more right-to-left shunting across the communication. Maintaining SVR, preload, oxygenation, and acid-base status helps limit deterioration.

- 92. B.** For brief procedures in neonates, oral sucrose with nonnutritive sucking and comforting can reduce behavioral pain responses. It is an adjunct, not a substitute for adequate analgesia during more invasive or prolonged procedures.
- 93. C.** Progressive motor deficit, severe back pain, bowel or bladder dysfunction, or new neurologic change may indicate excessive blockade or a rare compressive complication. The infusion should be stopped and urgent evaluation obtained.
- 94. A.** Infants have a small circulating blood volume relative to the priming volume of a bypass circuit, so hemodilution can be substantial. A very low hematocrit reduces arterial oxygen content and may compromise tissue oxygen delivery even when flow appears adequate.
- 95. B.** Neuropathic pain often responds incompletely to conventional analgesics. Gabapentinoids, certain antidepressants, rehabilitation, psychological strategies, and interventional approaches may be combined according to the child's condition.
- 96. A.** Ropivacaine is an amide local anesthetic with a somewhat more favorable cardiotoxicity profile than racemic bupivacaine. Systemic toxicity remains possible, so dose limits and injection precautions still apply.
- 97. B.** Aliasing occurs when the Doppler shift exceeds the Nyquist limit. Increasing pulse-repetition frequency raises that limit and can restore an unwrapped velocity display when technically feasible.
- 98. C.** In severe neonatal coarctation, lower-body perfusion may depend on blood reaching the descending aorta through the ductus. Prostaglandin E1 support can therefore be lifesaving while the child is stabilized for intervention.
- 99. B.** Children with severe OSA can be particularly vulnerable to opioid-induced ventilatory impairment. Multimodal opioid-sparing analgesia and an appropriate level of postoperative monitoring reduce risk.
- 100. B.** Caudal blockade can provide effective analgesia for infraumbilical and perineal surgery. The extent and duration depend on local anesthetic choice, dose, volume, and adjuncts, and side effects remain possible.
- 101. C.** LAST management differs from routine arrest because additional sodium-channel-active drugs and very large epinephrine doses may worsen toxicity. Early lipid emulsion, effective ventilation, seizure treatment, and modified cardiovascular support are central.
- 102. C.** Myocarditis can impair systolic function and create an electrically unstable myocardium. Anesthetic drugs, hypoxia, acidosis, and abrupt changes in preload or afterload can precipitate decompensation, so induction must be carefully titrated.

- 103. B.** Severe OSA increases the risk of postoperative airway obstruction and opioid-related respiratory depression. Recurrent desaturation or obstruction during sleep warrants close monitoring and escalation of respiratory support as needed.
- 104. B.** Pulse oximetry depends on detecting pulsatile arterial blood flow. Severe vasoconstriction, low cardiac output, motion, and probe problems can degrade the signal and make the displayed saturation less reliable.
- 105. A.** Ambulatory regional analgesia requires clear caregiver instructions about limb protection, catheter care, pump function, and warning symptoms. Local anesthetic toxicity and falls or thermal injury are uncommon but potentially serious.
- 106. A.** Although flow across an uncomplicated ASD is usually left to right, transient right-to-left flow can occur with pressure changes. Preventing venous air entry is therefore prudent in any patient with an intracardiac communication.
- 107. B.** Children with post-tonsillectomy bleeding may have underestimated blood loss, hypovolemia, and a stomach full of swallowed blood. Resuscitation, suction readiness, and an induction plan that addresses aspiration risk are essential.
- 108. C.** Absolute risk reduction is the control event rate minus the treatment event rate: 30% minus 15% equals 15 percentage points. Relative risk reduction would be 50% in this example, which is a different measure.
- 109. C.** Sevoflurane is nonpungent and supports rapid inhalational induction, making it a common choice when IV access is not yet present. Airway obstruction can still occur as anesthetic depth increases.
- 110. B.** Small infants have very small absolute tidal volumes, so even a few milliliters of connector or sampling dead space can be important. Excess apparatus dead space can increase rebreathing and carbon dioxide retention.
- 111. A.** Left-to-right ductal flow is favored when systemic pressure and resistance exceed those of the pulmonary circuit. Increasing PVR relative to SVR reduces that gradient, although deliberately inducing hypoxia or acidosis to do so is not a therapeutic strategy.
- 112. C.** Foreign-body bronchoscopy requires close coordination because instrumentation and ventilation occur through a shared airway. Either spontaneous or controlled ventilation may be appropriate depending on the foreign body, team preference, and ventilation conditions.
- 113. C.** Propofol provides rapid loss of consciousness and rapid recovery and is widely used for IV induction. It commonly causes injection pain, vasodilation, and dose-dependent hypotension.

- 114. B.** Hypertension with bradycardia can be a late sign of increased intracranial pressure and impending herniation. Immediate attention to oxygenation, ventilation, cerebral perfusion, and the underlying cause is required.
- 115. A.** Airway fire requires an oxidizer, ignition source, and fuel. Reducing oxygen concentration, avoiding nitrous oxide, protecting combustible materials, and clear communication before laser activation reduce the risk.
- 116. B.** A cuff that is too small tends to overestimate blood pressure, whereas an excessively large cuff may underestimate it. Pediatric cuff selection should therefore be based on arm circumference, with bladder width near 40% and adequate encirclement.
- 117. A.** Modern cuffed tubes can be used safely in infants and children when appropriately sized and when cuff pressure is kept low. A minimal effective seal reduces leak without excessive tracheal mucosal pressure.
- 118. C.** Carbon dioxide is a potent regulator of cerebral vascular tone. Routine aggressive hyperventilation can reduce cerebral blood flow excessively; near-normal PaCO₂ is preferred, with temporary moderate hyperventilation reserved for acute intracranial hypertension when necessary.
- 119. A.** Mechanical obstruction, displacement, or secretions are common causes of sudden ventilation difficulty in a tracheostomy patient. Rapid assessment of the tube and an age-appropriate rescue plan are essential.
- 120. C.** A common pediatric rule of thumb is depth near three times the tube internal diameter in centimeters. Any formula is only a starting point; bilateral breath sounds, capnography, tube markings, and imaging when indicated confirm position.
- 121. B.** Symptoms of headache, vomiting, lethargy, or altered mental status in a shunted child may indicate obstruction and intracranial hypertension. Elective anesthesia should not proceed without evaluation because deterioration can be rapid.
- 122. B.** Neonates preferentially breathe through the nose, so bilateral choanal obstruction can cause severe distress. Crying opens the mouth and temporarily provides an alternate route for ventilation.
- 123. C.** The Jackson-Rees system is a Mapleson F circuit with low resistance and little apparatus dead space, useful in infants. It does not contain a carbon dioxide absorber, so sufficient fresh-gas flow is necessary to limit rebreathing.
- 124. C.** Pediatric difficult-airway management prioritizes oxygenation and limiting repeated attempts that cause edema or bleeding. Video laryngoscopy, flexible endoscopy, supraglottic rescue, and surgical backup should be planned according to the child's anatomy and team expertise.
- 125. B.** Abrupt interruption of anticonvulsant therapy can precipitate breakthrough seizures. The usual regimen should generally be maintained, using alternate routes if oral dosing is temporarily unavailable.

- 126. A.** After complex airway reconstruction, the new airway may be vulnerable to trauma and displacement. Sedation, humidification, secretion management, and airway-device plans must be coordinated closely with the surgical team.
- 127. B.** Laryngospasm is sustained glottic closure and can cause rapid desaturation in children. Initial treatment includes removing stimulation, opening the airway, CPAP with oxygen, and deepening anesthesia; persistent complete spasm may require succinylcholine or another rapid neuromuscular strategy.
- 128. C.** Carbon dioxide reacts chemically with absorbent bases in soda lime or related products. The reaction is exothermic and produces heat and water, so canister warming is expected during active absorption.
- 129. C.** Myelomeningocele is strongly associated with Chiari II malformation and hydrocephalus. Brainstem and lower cranial nerve dysfunction can affect swallowing, breathing, and postoperative airway control.
- 130. A.** Electromyographic facial nerve monitoring depends on the ability of facial muscles to respond. Persistent neuromuscular blockade can suppress the signal, so anesthetic planning should account for the monitoring technique.
- 131. B.** A rise in peak pressure with relatively preserved plateau pressure suggests increased resistive pressure rather than reduced compliance. Bronchospasm, secretions, a kinked tube, or an undersized tube should be considered.
- 132. C.** Secondary brain injury is worsened by hypotension and hypoxemia. Maintaining adequate mean arterial pressure and oxygenation helps preserve cerebral perfusion pressure when intracranial pressure may be elevated.
- 133. A.** Open craniostomy repair can produce major blood loss over a short period. Because an infant's total blood volume is small, early recognition, antifibrinolytic and blood-conservation strategies, and rapid transfusion capability are important.
- 134. C.** Double-lumen tubes are too large for many small children. Bronchial blockers permit lung isolation through or beside a pediatric single-lumen tube and can be positioned under bronchoscopic guidance.
- 135. B.** Radiation transfers heat between the infant and cooler surrounding surfaces without direct contact. Convection involves heat loss to moving air, and evaporation occurs when liquid on the skin changes to vapor; all can matter clinically, but the stem specifically describes radiation.
- 136. C.** Number needed to treat is the reciprocal of the absolute risk reduction expressed as a proportion. One divided by 0.15 is about 6.7, which rounds to approximately 7 children.

- 137. A.** Abrupt interruption of intrathecal baclofen can cause rebound spasticity, hyperthermia, autonomic instability, rhabdomyolysis, and organ failure. Prompt recognition and restoration of baclofen therapy with supportive care are important.
- 138. A.** Cleft palate repair can be followed by airway edema, bleeding, secretions, and altered upper-airway anatomy. Extubation and recovery require careful observation for obstruction and bleeding.
- 139. C.** Children have less oxygen reserve than adults, so aspiration-risk induction must balance rapid airway protection with prevention of hypoxemia. Gentle ventilation may be necessary if oxygenation is falling, even when a rapid-sequence approach is used.
- 140. C.** Severe local anesthetic systemic toxicity can present with cardiovascular collapse, sometimes without observable early neurologic symptoms under anesthesia. Intravenous lipid emulsion is an important component of treatment together with airway support, seizure management, and modified resuscitation.
- 141. B.** Pyloric stenosis is a medical resuscitation problem before it is an anesthetic problem. Volume depletion and hypochloremic metabolic alkalosis should be corrected before anesthesia to reduce apnea and hemodynamic risk.
- 142. A.** Micrognathia and posterior tongue displacement can cause severe upper-airway obstruction and make direct laryngoscopy difficult. Maintaining spontaneous ventilation until the airway plan is proven can be important in severe cases.
- 143. B.** An oropharyngeal airway displaces the tongue anteriorly and can restore pharyngeal patency in an unconscious child. It should be sized appropriately and avoided in a lightly anesthetized patient with an intact gag reflex.
- 144. A.** Exposed bowel in gastroschisis produces substantial evaporative heat and fluid losses. Warmth, gastric decompression, fluid resuscitation, and protection of the bowel are important before and during operative management.
- 145. A.** Large craniofacial vascular malformations may distort the airway and bleed substantially during resection. Some extensive venous malformations can also be associated with localized intravascular coagulopathy.
- 146. C.** Perioperative anaphylaxis with cardiovascular or respiratory compromise requires prompt epinephrine together with oxygen, airway support, fluids, and removal of the trigger. Antihistamines and corticosteroids are adjuncts, not substitutes for epinephrine.
- 147. C.** Malignant hyperthermia is a hypermetabolic skeletal-muscle crisis caused by dysregulated intracellular calcium, commonly involving RYR1-related calcium release channels. Sustained calcium elevation drives rigidity, carbon dioxide production, acidosis, hyperkalemia, and heat generation.

148. A. Severe NEC can produce bowel necrosis, sepsis, capillary leak, acidosis, thrombocytopenia or coagulopathy, and shock. Anesthetic management often requires aggressive resuscitation and preparation for major physiologic instability.

149. B. Traction on extraocular muscles can trigger the oculocardiac reflex, producing bradycardia or other dysrhythmias. The surgeon should release traction, anesthetic depth and ventilation should be assessed, and anticholinergic therapy may be used when needed.

150. A. For pediatric cardiac arrest with an initial nonshockable rhythm, early epinephrine is associated with better outcomes and should be administered as soon as feasible during high-quality CPR. Routine calcium is not recommended without a specific indication.

151. C. Current pediatric resuscitation guidance supports approximately 20 to 30 breaths per minute when an advanced airway is in place during CPR. Excessive ventilation can impair venous return and should be avoided.

152. C. Positive pressure can pass through a distal tracheoesophageal fistula into the stomach, impairing ventilation and risking rupture. Gentle ventilation and appropriate tube positioning relative to the fistula help direct gas into the lungs.

153. B. Open-globe injury requires balancing aspiration risk against the need to avoid sudden increases in intraocular pressure. Smooth induction, adequate depth, and prevention of coughing or bucking help protect ocular contents while securing the airway.

154. B. Succinylcholine is distributed largely in extracellular fluid, which is proportionally larger in infants. Consequently, a larger milligram-per-kilogram dose is typically needed to achieve comparable neuromuscular effect.

155. C. Emergence delirium is characterized by agitation, inconsolability, disorientation, and lack of purposeful contact during early recovery, especially in younger children after volatile anesthesia. Pain, hypoxemia, hypoglycemia, and other causes must still be excluded.

156. C. The liver synthesizes most coagulation factors, so severe hepatic failure commonly prolongs PT/INR. Coagulopathy may coexist with thrombocytopenia and complex changes in both procoagulant and anticoagulant pathways.

157. A. Strabismus surgery is a recognized risk factor for postoperative nausea and vomiting in children. Combining antiemetics with an anesthetic technique that limits emetogenic exposure can reduce risk in susceptible patients.

158. C. Safe supervision is graduated: responsibility increases as competence is demonstrated, but the attending remains appropriately available for the patient's risk and the trainee's skill level. Clear roles and timely intervention are part of patient safety.

- 159. A.** Pediatric PONV risk is reduced by multimodal prophylaxis, such as dexamethasone plus a 5-HT3 antagonist, combined with opioid-sparing analgesia and less emetogenic anesthetic techniques when practical.
- 160. A.** Atropine blocks muscarinic acetylcholine receptors, reducing vagal effects on the sinoatrial node and decreasing secretions. It does not antagonize nicotinic neuromuscular receptors.
- 161. C.** Both glomerular filtration and tubular processes are immature in neonates. Renally cleared drugs may accumulate unless dose or interval is adjusted for age and renal function.
- 162. A.** ROP is a disease of prematurity, and the same infants may have immature respiratory control, prior apnea, anemia, and BPD. Sedatives can further depress ventilation and precipitate apnea.
- 163. A.** Young children depend substantially on heart rate to maintain cardiac output, and anesthetic overdose can reduce vascular tone, contractility, and rate. Treatment includes reducing the offending anesthetic and restoring effective ventilation and circulation.
- 164. B.** Severe hyperkalemia with electrocardiographic changes requires immediate cardiac membrane stabilization with intravenous calcium. Insulin with glucose, beta-agonist therapy, bicarbonate in selected patients, and definitive potassium removal address the serum potassium itself.
- 165. B.** Motor-evoked potentials are depressed by volatile anesthetics and neuromuscular blockade. Total intravenous or low-volatile techniques, stable physiology, and avoidance of persistent paralysis help preserve monitoring quality.
- 166. C.** Acetaminophen has analgesic and antipyretic effects mediated predominantly through central mechanisms and has relatively weak peripheral anti-inflammatory activity. Unlike aspirin, it does not cause irreversible platelet inhibition.
- 167. B.** A guidewire advanced too far can irritate the right atrium or ventricle and provoke ectopy or supraventricular tachycardia. Withdrawing the wire while assessing rhythm and hemodynamics is appropriate.
- 168. C.** Renal protection depends on maintaining perfusion and avoiding additional insults. Even with a normal contralateral kidney, dehydration, hypotension, and nephrotoxins can worsen perioperative renal function.
- 169. A.** Duchenne muscular dystrophy carries a risk of severe hyperkalemic arrest with succinylcholine and rhabdomyolysis with volatile anesthetics. A nontriggering technique and careful cardiac and respiratory planning are preferred.
- 170. C.** Aspiration management begins with rapid airway clearance and restoration of oxygenation and ventilation. Tracheal intubation and suctioning may be needed; antibiotics are not automatically indicated solely because aspiration occurred.

- 171. B.** Abrupt interruption of immunosuppression can threaten graft function. Perioperative planning includes continuing the regimen when feasible, assessing renal function and electrolytes, preventing infection, and recognizing interactions with anesthetic drugs.
- 172. A.** Tourniquet deflation returns sequestered blood and metabolites to the central circulation. Hypotension, transient hyperkalemia, acidosis, and increases in carbon dioxide can occur, particularly after long inflation times or large-limb tourniquets.
- 173. C.** Clonidine is an alpha-2 adrenergic agonist that reduces central sympathetic outflow. It can provide sedation and analgesic-sparing effects, while also causing bradycardia or hypotension.
- 174. B.** The MRI environment creates projectile risk from ferromagnetic objects and restricts direct patient access. MRI-compatible monitoring, infusion, airway equipment, and an emergency plan for rapid removal from the scanner are required.
- 175. B.** Children with adrenal insufficiency cannot mount a normal cortisol response to major stress. Perioperative glucocorticoid supplementation is required according to the degree of surgical stress and the child's maintenance regimen.
- 176. A.** Osteogenesis imperfecta causes bone fragility, so transfers, positioning, blood-pressure cuff placement, and airway manipulation should be gentle. Depending on severity, craniofacial, cervical, bleeding, and cardiopulmonary issues may also matter.
- 177. B.** Capnography can detect apnea or hypoventilation before oxygen saturation falls, especially when supplemental oxygen is administered. Deep sedation requires staff and equipment capable of rescuing a patient who progresses to general anesthesia.
- 178. C.** Lower blood solubility means less anesthetic must dissolve in blood before alveolar partial pressure rises. This accelerates the increase in alveolar and brain partial pressures and supports relatively rapid induction and emergence.
- 179. A.** Central diabetes insipidus produces inadequate ADH activity, leading to free-water loss, dilute polyuria, and hyponatremia. Treatment requires careful water replacement and often desmopressin or vasopressin depending on the situation.
- 180. A.** Injuries inconsistent with the history or development should raise concern for nonaccidental trauma. Clinicians must protect the child, document objective findings, and follow jurisdictional reporting requirements rather than attempting an independent criminal investigation.
- 181. C.** ECMO circuits alter drug distribution and clearance and usually require systemic anticoagulation, while the underlying illness may leave little reserve. Communication with the ECMO team about flow, anticoagulation, cannula position, and emergency plans is essential.

182. A. SIADH produces excess water retention, hypo-osmolar hyponatremia, and urine that remains inappropriately concentrated. Clinical volume status and urine studies help distinguish it from cerebral salt wasting and other causes.

183. B. Major burns cause capillary leak and intravascular depletion. Initial crystalloid is estimated from body weight and burn size, then adjusted to perfusion and urine output rather than treating the formula as an inflexible dose.

184. C. Pneumoperitoneum can compress abdominal veins, reduce venous return, elevate the diaphragm, and increase carbon dioxide absorption. Lowering insufflation pressure and supporting hemodynamics can reverse the problem.

185. B. Propofol commonly lowers blood pressure through reduced systemic vascular resistance and some myocardial depression. The effect can be pronounced in hypovolemic or hemodynamically fragile children.

186. A. Open communication after an adverse event should be timely, compassionate, factual, and clear about what is known and what remains under review. Ongoing updates and attention to the child's immediate needs are central.

187. C. Alpha blockade is established first to control vasoconstriction and hypertension and allow restoration of intravascular volume. Beta blockade may be added afterward if needed; giving beta blockade first risks unopposed alpha-adrenergic vasoconstriction.

188. C. Facial burns, soot, hoarseness, and enclosed-space exposure suggest inhalation injury. Airway edema may worsen over hours, making early controlled intubation safer than waiting for a difficult emergency airway.

189. B. Postoperative apnea can occur after an initially uneventful recovery in former premature infants. Monitoring decisions depend on postmenstrual age, anemia, prior apnea, chronic lung disease, and institutional policy.

190. A. Cisatracurium undergoes Hofmann elimination, a temperature- and pH-dependent chemical degradation process. This makes its clearance less dependent on hepatic and renal function than many other neuromuscular blockers.

191. B. Hemoglobin S polymerization and sickling are promoted by deoxygenation, acidosis, dehydration, hypothermia, and stasis. Careful oxygenation, temperature, volume, acid-base, and pain management reduces perioperative stressors that precipitate vaso-occlusion.

192. B. After major burns, extrajunctional acetylcholine receptors increase and the potassium response to succinylcholine can become profound. The risk emerges after the first day or so and may persist for many months.

- 193. C.** Sedation exists on a continuum, and children can unintentionally pass into a deeper state. Providers must be capable of rescuing airway, ventilation, and cardiovascular function appropriate to the next deeper level.
- 194. C.** Hemophilia A is caused by factor VIII deficiency, whereas hemophilia B is factor IX deficiency. Perioperative management depends on factor replacement to an activity level appropriate for the planned procedure.
- 195. A.** Hypoxemia and hypotension are major preventable contributors to secondary injury after pediatric traumatic brain injury. Airway, oxygenation, hemorrhage control, and adequate perfusion are therefore immediate priorities.
- 196. A.** Safe discharge requires recovery of protective airway function, stable vital signs, and return toward the child's baseline mental status. Caregivers also need clear instructions about supervision, activity, diet, and warning signs.
- 197. B.** Peripheral nerve stimulation evaluates neuromuscular transmission and helps quantify blockade and recovery. It does not measure hypnosis or analgesia, so those components of anesthesia require separate assessment.
- 198. B.** Children with Down syndrome commonly have upper-airway obstruction and OSA, craniofacial features that can complicate ventilation, and a risk of cervical spine instability; congenital heart disease is also common. Neurologic symptoms should guide cervical spine precautions and evaluation.
- 199. A.** Severe hypothermia can reduce metabolic demand and occasionally permit neurologically intact survival after prolonged submersion. Resuscitation and controlled rewarming should continue while rhythm, perfusion, electrolytes, and core temperature are managed.
- 200. C.** Chronic pediatric pain is best approached using a biopsychosocial model. Functional rehabilitation, psychological treatment, sleep and school goals, family support, and selected medications are integrated rather than relying on escalating analgesics alone.