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Review of Cardiac Anesthesia & Cardiac Critical Care

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For All Examinations in Cardiac Anesthesia & Cardiac Critical Care

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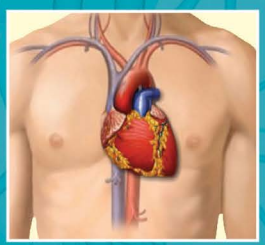

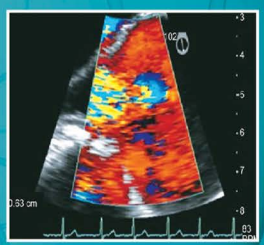

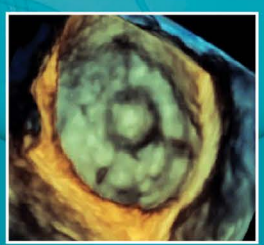

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2nd Edition

JAYPEE

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CHAPTER 4

Cardiac Anesthesia

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1. First-line agents used in treating congestive heart failure:
   a. Hydralazine (Apresoline)
   b. Dobutamine (Dobutrex)
   c. ACE inhibitors
   d. Calcium channel blockers
2. Left ventricular stroke volume: relationship to afterload:
   a. Direct
   b. Inverse
3. Most important digitalis-mediated cardiac effect:
   a. Tachycardia
   b. Improved real perfusion
   c. Decreased AV transmission
   d. Shift of the force-velocity relationship upward
4. The client with a history of diabetes insipidus is admitted with polyuria, polydipsia, and mental confusion. The priority intervention for this client is:
   a. Measure the urinary output
   b. Check the vital signs
   c. Encourage increased fluid intake
   d. Weigh the client
5. Short-term inotropic support of the failing myocardium ***except***:
   a. Furosemide (Lasix)
   b. Dobutamine (Dobutrex)
   c. Milrinone (Primacor)
   d. Dopamine (Intropin)
6. Exogenous agents that improve ventricular performance:
   a. Isoproterenol (Isuprel)
   b. Theophylline
   c. Caffeine
   d. All of the above
7. Appropriate interventions in the management of cardiogenic shock:
   a. Supplemental oxygen
   b. Surgery to repair valve pathologies or to revascularize
   c. Intra-aortic balloon pump
   d. All of the above

Answers: 1. c 2. b 3. d 4. b 5. a 6. d 7. d

8. Perhaps more useful in a CHF patient with marginal GFR due to poor renal perfusion:
   a. Dopamine (Intropin)
   b. Dobutamine (Dobutrex)
   c. Methoxamine (Vasoxyl)

9. Drugs used in the management of congestive heart failure:
   a. Torsemide (Demadex)
   b. Dobutamine (Dobutrex)
   c. Milrinone (Primacor)
   d. All of the above

10. Vasoconstrictors:
   a. Endothelin I
   b. Angiotensin II
   c. Both
   d. Neither

11. Mechanism by which vasodilators improve myocardial performance in CHF:
   a. Increase heart rate
   b. Promote diuresis
   c. Reduce afterload
   d. Reduce pulmonary blood flow

12. All physiological effects associated with acute pulmonary edema ***except***:
   a. Elevation of pulmonary capillary pressures
   b. Alveolar edema
   c. Expectoration of blood-tinged fluid
   d. Pretibial edema

13. Agents which depress ventricular performance:
   a. General anesthetics
   b. Disopyramide (Norpace)
   c. Both (a) and (b)
   d. None of the above

14. Inhibitors and Na/K ATPase: used in management of CHF:
   a. Enalapril (Vasotec)
   b. Amrinone (Inocor)
   c. Dobutamine (Dobutrex)
   d. Digoxin (Lanoxin, Lanoxicaps)
   e. Minoxidil (Loniten)

15. Primarily excreted in the urine; digitalis glycosides with half-life of 1.6 days:
   a. Digoxin (Lanoxin, Lanoxicaps)
   b. Digitoxin
   c. Both
   d. Neither

16. Most significant factor in blood flow resistance:
   a. Vessel length
   b. Blood viscosity
   c. Vessel radius

17. Consequences of rennin-angiotensin system activation:
   a. Reduced circulating angiotensin II
   b. Reduced aldosterone
   c. Reduced vasoconstriction
   d. None of the above

18. Physiological depressants of left ventricular function (depression of myocardial force-velocity curves):
   a. Hypercapnea
   b. Hypoxia
   c. Ischemia
   d. All

Answers: 8. a 9. d 10. c 11. c 12. d 13. c 14. d 15. a 16. c 17. d 18. d

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19. Clinical efficacy of digitalis glycosides is based on:
    a. Decreased transmission through the AV node
    b. Increased myocardial contractility
    c. Both
    d. Neither

20. Factors that can cause congestive heart failure:
    a. Systemic hypertension
    b. Arrhythmias
    c. Pulmonary emboli
    d. All of the Above

21. Associated with cardiac cachexia:
    a. Impairment of intestinal absorption
    b. Anorexia
    c. Increased tumor necrosis factor (circulating)
    d. All of the above

22. Atrial contractions (atrophic) are more likely to be important in:
    a. The normal ventricle
    b. The hypertrophic ventricle
    c. No difference

23. Factors influencing end-diastolic volumes:
    a. Venous tone
    b. Skeletal muscle activity
    c. Uterine contraction
    d. All of the above

24. Duration of action—subarachnoid injection of ester-type local anesthetics.
    a. Extremely short
    b. Extremely long

25. Consequences of vasodilatory local anesthetic property:
    a. Reduced systemic absorption
    b. Shorter duration of action
    c. Both
    d. Neither

26. Highest local anesthetic blood levels associated with this type of regional anesthesia:
    a. Epidural
    b. Brachial plexus
    c. Sciatic
    d. Intercostal
    e. Caudal

27. Consequences of fetal acidosis (sometimes associated with prolonged labor) on local anesthetic accumulation in the fetus:
    a. Reduced
    b. Enhanced

28. Plasma concentration of local anesthetics determined by:
    a. Rate of tissue distribution
    b. Rate of drug clearance
    c. Both
    d. Neither

29. Ester-type local anesthetic-most rapid hydrolysis:
    a. Fetracaine (pontocaine)
    b. Procaine (Novocain)
    c. Chloroprocaine (Nesacaine)

Answers: 19. c 20. d 21. d 22. b 23. d 24. b 25. b 26. d 27. b 28. c 29. c

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30. Enhancement of spinal anesthesia by the presence of epinephrine in local anesthetics: Reason(s).....
    a. Increased substance P release
    b. Increased dorsal horn neuronal activity
    c. Decreased local neuronal uptake
    d. None of the above

31. Ester type local anesthetics are more likely available for significant placental transfer:
    a. True
    b. False

32. Propranolol (Inderal) — local anesthetic effect(s):
    a. Inhibits bupivacaine (Marcaine) extraction
    b. Increases lidocaine (Xylocaine) plasma clearance
    c. Decreases bupivacaine (Marcaine) plasma clearance

33. Duration of action:
    a. Ester-type local anesthetics—longer duration of action compared to amides
    b. Amide-type local anesthetics—longer duration of action compared to esters

34. Factor(s) that may reduce plasma cholinesterase activity:
    a. Hepatic disease
    b. Elevated BUN
    c. Parturient patient

35. Systemic toxicity: ester-type local anesthetics:
    a. Inversely proportional to hydrolytic rate
    b. Directly proportional the hydrolytic rate

36. Chemical properties—local anesthetics:
    a. Weak bases
    b. May exist as a cation
    c. May exist in uncharged form
    d. Most local anesthetics have pKa's ranging from 6.0-7.0

37. Local anesthetics: chemical properties:
    a. Many local anesthetics are chiral
    b. S enantiomers are often less toxic than racemates
    c. Ropivacaine (Naropin) is an example of a pure R enantiomer
    d. All of the above

38. Higher vascularity—promotes increased, rapid local anesthetic absorption:
    a. Tendon
    b. Tracheal mucosal

39. Consequence of clonidine (Catapres) addition to local anesthetic solutions:
    a. Increase local anesthetic effect
    b. Reduce local anesthetic effect

40. Clearance mechanisms for local anesthetics:
    a. Amides-mainly renal
    b. Esters-rapid clearance; hydrolysis
    c. Both
    d. Neither

Answers: 30. d 31. b 32. a, c 33. b 34. a, b 35. a 36. a to d
37. a, b 38. b 39. a 40. b

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41. Local infection (acidosis conditions) —effect on anesthetic effectiveness:
    a. Increased effectiveness
    b. Reduced effectiveness

42. Factors that influence local anesthetic absorption and distribution:
    a. Dosage
    b. Presence of epinephrine in the local anesthetic solution
    c. Injection site
    d. Chemical properties of the drug

43. Factors influencing local anesthetic distribution and plasma concentrations:
    a. Liver function
    b. Cardiovascular status
    c. Extent of protein binding
    d. Patient age

44. Ester-type local anesthetic:
    a. Lidocaine (Xylocaine)
    b. Tetracaine (pontocaine)
    c. Ropivacaine (Naropin)
    d. Dibucaine (Nupercainal, generic)
    e. Bupivacaine (Marcaine)

45. Pulmonary extraction from the venous circulation limits the amount of local anesthetic that will reach the systemic circulation:
    a. True
    b. False

46. Amide-type local anesthetic:
    a. Cocaine
    b. Tetracaine (pontocaine)
    c. Prilocaine (Citanest)
    d. Lidocaine (Xylocaine)
    e. Bupivacaine (Marcaine)

47. Which one of the following local anesthetics belongs to the ester group?
    a. Procaine
    b. Bupivacaine
    c. Lignocaine
    d. Mepivacaine

48. Which of the following nerves should be blocked for an operation at the medial aspect of the lower leg?
    a. Femoral
    b. Sciatic
    c. Common peroneal
    d. Tibial

49. A patient is scheduled to undergo laparoscopic cholecystectomy. Thirty minutes after premedication with morphine and midazolam, she suddenly develops right upper quadrant abdominal pain and nausea. Which of the following is the most appropriate therapy for this patient's pain?
    a. Flumazenil
    b. Ketorolac
    c. Naloxone
    d. Ranitidine

50. The relaxant effect of vecuronium on the neuromuscular system is augmented by adding a volatile anesthetic to a nitrous oxide/opioid anesthetic because of a decrease in:
    a. Muscle blood flow.
    b. Release of acetylcholine at the motor end-plate.
    c. Reuptake of acetylcholine at the motor end-plate.
    d. Sensitivity of the postjunctional membrane to depolarization.

Answers: 41. b 42. a to d 43. a to d 44. b 45. a 46. d, e 47. a 48. a 49. c 50. d

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51. An 85-kg, 35-year-old woman has persistent somnolence after a prolonged lower extremity orthopedic procedure during spinal anesthesia. During the last two hours of surgery, midazolam 5 mg and fentanyl 150 μg were administered for increasing restlessness and discomfort. Which of the following is most likely to result from administration of flumazenil?
    a. Grand mal seizure
    b. Hypertension and tachycardia
    c. Reversal of somnolence followed by resedation
    d. Sudden onset of pulmonary edema

52. A 68-year-old woman with primary hyperparathyroidism is scheduled to undergo parathyroidectomy. Her serum calcium concentration is 15 mg/dL. The most appropriate initial management is intravenous administration of:
    a. Indomethacin
    b. Magnesium sulfate
    c. Methylprednisolone
    d. Normal saline

53. Which of the following tests most reliably predicts the likelihood that a patient will develop malignant hyperthermia?
    a. Calcium uptake assay in skeletal muscle biopsy
    b. Genetic testing of the ryanodine receptor
    c. Halothane-caffeine contracture test
    d. Serum creatine kinase concentration

54. Oxygen 100 mL/min is bubbled through a vaporizer containing an anesthetic with a vapor pressure of 150 mmHg, and this mixture is added to a fresh gas flow of 5 L/min. The delivered anesthetic concentration is:
    a. 0.25%
    b. 0.5%
    c. 1%
    d. 2.5%

55. An adult patient with mild hypothermia is anesthetized with 1 MAC of isoflurane. Which of the following is the most effective physiologic mechanism for maintaining body temperature in this patient?
    a. Nonshivering thermogenesis
    b. Redistribution of heat from the core to the periphery
    c. Shivering thermogenesis
    d. Vasoconstriction

56. A 72-year-old man who has just received midazolam for an endoscopic procedure of the upper gastrointestinal tract. Sedation is easily antagonized by flumazenil. Although the endoscopist asks to send the patient home in one hour, why should this patient remain hospitalized for observation?
    a. Flumazenil has low affinity for benzodiazepine receptors
    b. Flumazenil has moderate intrinsic agonist activity
    c. Late onset seizure is likely
    d. Midazolam has a longer duration of action than flumazenil

57. Which of the following factors exerts the greatest effect on the extent of spread of local anesthetic following subarachnoid block with hyperbaric bupivacaine?
    a. Added epinephrine
    b. Barbotage
    c. Patient position
    d. Total dose of drug

Answers: 51. c 52. d 53. c 54. b 55. d 56. d 57. c

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58. A 17-year-old boy develops pulmonary edema after resolution of postoperative laryngospasm. While breathing 100% oxygen, SpO_2 is 80%. Which of the following is the most appropriate management?
    a. Administration of albuterol
    b. Administration of furosemide
    c. Infusion of nitroglycerin
    d. Positive-pressure ventilation

59. An otherwise healthy 61-year-old man receives a spinal anesthetic for transurethral resection of the prostate (TURP). Forty-five minutes after the start of the procedure, he suddenly develops nausea, diaphoresis, and sharp pain in the left shoulder. Which of the following is the most likely cause?
    a. Angina pectoris
    b. Bladder perforation
    c. Hyponatremia
    d. Inadequate spinal sensory level

60. A 36-year-old woman is receiving general anesthesia for a diagnostic laparoscopy in the Trendelenburg position with carbon dioxide insufflation. During a 15-minute period after induction, her SpO_2 decreases from 99% to 90% and $PETCO_2$ increases from 38 to 43 mmHg. FiO_2 is 0.3; all ventilator settings have been constant. Which of the following is the most likely cause of the decrease in SpO_2?
    a. Carbon dioxide embolus
    b. Compression of the vena cava
    c. Decreased diaphragmatic excursion
    d. Pneumothorax

61. Two hours after a laparoscopic cholecystectomy, an obese 45-year-old woman is receiving intravenous patient-controlled analgesia with morphine. Her SpO_2 is 92% on room air. Which of the following is the most likely cause?
    a. Absorption of carbon dioxide from the abdomen
    b. Hypoventilation
    c. Impaired oxygen diffusion
    d. Increased dead space

62. In a patient receiving pressure support ventilation, pressure support breaths are triggered by achieving which of the following preset milestones?
    a. A decrease in airway pressure
    b. An increase in airway pressure
    c. An inspiratory flow rate
    d. An inspired volume

63. A healthy 42-year-old man has an increase in heart rate from 60 bpm to 120 bpm during induction of anesthesia. Which of the following factors is most likely to satisfy the increased metabolic demand of the myocardium?
    a. Decreased coronary artery resistance
    b. Increased coronary perfusion pressure
    c. Increased oxygen extraction by the myocardium
    d. Shift to anaerobic metabolism

Answers: 58. d 59. b 60. c 61. b 62. a 63. a

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64. Which of the following laboratory values is most likely to confirm adequate synthetic hepatic function?
    a. Partial thromboplastin time
    b. Prothrombin time
    c. Serum alanine aminotransferase concentration
    d. Total serum bilirubin concentration

65. In a patient undergoing extracorporeal shock wave lithotripsy, ventricular dysrhythmias are best prevented by:
    a. Beta-adrenergic blockade
    b. ECG synchronization
    c. Epidural blockade to T4
    d. General anesthesia

66. Pressure support ventilation:
    a. Can only be used in a spontaneously breathing patient.
    b. Cannot be used in conjunction with continuous positive airway pressure
    c. Delivers a specified volume regardless of airway pressure
    d. Increases the work of breathing

67. Compared with a semi closed circle system, the Bain circuit provides:
    a. Better scavenging of expired gases
    b. Less rebreathing of carbon dioxide
    c. A lower fresh gas flow requirement
    d. More rapid change in inspired gas concentration

68. A new intravenous anesthetic is found to have a very large volume of distribution. This drug is most likely to have which of the following properties?
    a. Hydrophilic with a high degree of plasma protein binding
    b. Hydrophilic with a large nonionized fraction
    c. Hydrophilic with a low degree of tissue protein binding
    d. Lipophilic with a high degree of tissue protein binding

69. Which of the following is correct concerning anaphylactic and anaphylactoid reactions?
    a. Anaphylactoid reactions are mediated by IgE
    b. Anaphylactic reactions occur on the first exposure to the allergen
    c. Endogenous histamine release occurs only during an anaphylactoid reaction.
    d. They are clinically indistinguishable

70. Which of the following drugs has the longest duration of action in a patient with renal failure?
    a. Neostigmine
    b. Rocuronium
    c. Succinylcholine
    d. Vecuronium

71. A patient with diabetic ketoacidosis is scheduled for an emergent laparotomy. Which of the following best explains the decrease in serum potassium concentration that occurs in this patient following administration of insulin?
    a. Dilutional hypokalemia follows free water retention from decreased osmotic diuresis
    b. Extracellular potassium is actively transported with glucose into cells
    c. Insulin enhances renal excretion of potassium
    d. Intracellular potassium is exchanged for extracellular glucose

Answers: 64. b 65. b 66. a 67. d 68. d 69. d 70. a 71. b

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72. In an anesthesia machine with a circle system, which of the following findings indicates a leak in the oxygen flowmeter tube above the level of the bobbin?
    a. Activation of the machine fail-safe alarm
    b. A decrease in the expired tidal volume
    c. A decrease in FiO_2 when oxygen and nitrous oxide are administered concurrently
    d. Failure of the oxygen bobbin to rise when turned on

73. Instillation of local anesthetic into the trachea via the cricothyroid membrane mimics the sensory effect seen following blockade of which of the following nerves?
    a. Glossopharyngeal nerve
    b. Hypoglossal nerve
    c. Internal branch of the superior laryngeal nerve
    d. Recurrent laryngeal nerve

74. Which of the following best explains the failure of nondepolarizing neuromuscular blocking agents to produce fasciculation?
    a. Absence of acetylcholine receptor activation
    b. Binding in the ion channel of the acetylcholine receptor
    c. Binding to agonist and antagonist sites on the acetylcholine receptor
    d. Binding to presynaptic and postsynaptic acetylcholine receptors

75. A 40-year-old woman is receiving general anesthesia with nitrous oxide and isoflurane for intraperitoneal insufflation of carbon dioxide for laparoscopic cholecystectomy. Her systolic blood pressure suddenly decreases to 70 mm Hg. Which of the following findings does NOT indicate a carbon dioxide embolus?
    a. Decreased $PETCO_2$
    b. Hemodynamic improvement with hyperventilation
    c. Hemodynamic improvement with discontinuation of nitrous oxide
    d. Increased $PETCO_2$

76. Coughing that occurs during awake intubation is prevented by local anesthetic block of which of the following nerves?
    a. Superior laryngeal and glossopharyngeal
    b. Superior laryngeal and hypoglossal
    c. Recurrent laryngeal and glossopharyngeal
    d. Recurrent laryngeal and superior laryngeal

77. What is the MOST likely explanation for the initial reduction in core temperature during general anesthesia?
    a. Ablation of thermoregulatory vasoconstriction
    b. Conductive heat loss
    c. Evaporative heat loss in the respiratory tract
    d. Redistribution of heat from the core to the periphery

78. Which of the following is characteristic of the pharmacokinetics of alfentanil?
    a. Clearance is greater than that of fentanyl
    b. Protein binding is minimal
    c. The majority of alfentanil in plasma is ionized
    d. Volume of distribution is smaller than that of fentanyl

Answers: 72. c 73. d 74. a 75. c 76. d 77. d 78. d

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79. A 65-kg, 70-year-old man in the PACU is breathing spontaneously at 20/min through an endotracheal tube connected to a T-piece with a fresh gas flow of 5 L/min and an FiO2 of 0.5. His tidal volume is 350 mL. Over one hour, his SpO_2 decreases from 98% to 84%, and then improves to 92% when FiO2 is increased to 1.0. Which of the following is the MOST likely cause of his hypoxemia?
    a. Decreased functional residual capacity
    b. Increased dead space ventilation
    c. Inhibition of hypoxic pulmonary vasoconstriction
    d. Room air admixture during inspiration

80. A 40-year-old man who is scheduled for repair of a tendon laceration of the left hand has complete anesthesia in the median, radial, and ulnar nerve distributions after supraclavicular block. Two hours of tourniquet inflation are required for completion of the procedure. The MOST appropriate NEXT step is an additional block of which of the following nerves?
    a. Axillary
    b. Intercostobrachial
    c. Lateral antebrachial cutaneous
    d. Musculocutaneous

81. Redistribution from the brain to which of the following sites is PRIMARILY responsible for emergence after a single dose of propofol?
    a. Fat
    b. Liver
    c. Lung
    d. Skeletal muscle

82. An anesthesia machine is set to deliver oxygen 2 L/min, nitrous oxide 2 L/min, and sevoflurane. After 30 minutes of stable anesthesia, which of the following is the MOST likely cause of a DECREASE in the oxygen analyzer reading from 50% to 30%?
    a. A leak in the ventilator bellows
    b. Accumulation of water on the oxygen sensor membrane
    c. Disconnection of the wall oxygen hose
    d. Presence of the oxygen analyzer in the expiratory limb

83. An induction dose of ketamine is MOST likely to have which of the following effects?
    a. Analgesia
    b. Attenuation of respiratory response to carbon dioxide
    c. Decreased cerebral metabolic rate
    d. Preservation of laryngeal reflexes

84. As compared to an intravenous dose of morphine, what is the MOST likely explanation for the DECREASED duration of action of an intravenous dose of fentanyl?
    a. It has a greater lipid solubility
    b. It has increased hepatic metabolism
    c. It has less protein binding
    d. It has a shorter elimination half-life

85. The standard error of the mean (SE) describes which of the following?
    a. The precision of the population mean
    b. The range of the sample values
    c. The limits of the 95% confidence interval
    d. The deviation about the median of the study group

Answers: 79. a 80. b 81. d 82. b 83. a 84. a 85. a

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86. Pulse oximetry accurately reflects SaO_2 in which of the following situations?
    a. Administration of indocyanine green
    b. Carboxyhemoglobinemia
    c. 40% fetal hemoglobin concentration
    d. Methemoglobinemia

87. An otherwise healthy patient with fasting blood glucose of 100 mg/dL is receiving a four-hour general anesthetic for repair of tendon lacerations. What is his expected blood glucose concentration on emergence?
    a. Marked hypoglycemia
    b. Mild hypoglycemia
    c. Mild hyperglycemia
    d. Marked hyperglycemia

88. Which of the following drugs INCREASES gastric pH while DECREASING gastric volume?
    a. Glycopyrrolate
    b. Magnesium trisilicate
    c. Metoclopramide
    d. Ranitidine

89. Which of the following conditions is NOT associated with upregulation of the postjunctional acetylcholine receptors at the neuromuscular junction?
    a. Burn injuries
    b. Myasthenia gravis
    c. Prolonged bed rest
    d. Prolonged use of neuromuscular blocking agents

90. What characteristic of nitrous oxide MOST likely explains why its alveolar and inspired concentrations equilibrate more rapidly than those of desflurane?
    a. Higher vapor pressure
    b. Lower blood gas solubility
    c. Creation of a second gas effect
    d. Delivery at a higher inspired concentration

91. What is the PRIMARY purpose of denitrogenation prior to anesthetic induction?
    a. Improving matching of ventilation and perfusion
    b. Increasing contribution of second gas effect to rate of induction
    c. Increasing oxygen reserve in the functional residual capacity
    d. Maximizing arterial oxygen content

92. A 32-year-old woman sustains an injury to the left recurrent laryngeal nerve during thyroidectomy. Which of the following is the MOST likely postoperative finding?
    a. Adduction of the left vocal cord at rest
    b. Aphonia
    c. Aspiration caused by glottic incompetency
    d. Impaired coughing

93. What is the MOST likely reason that desflurane is delivered using a vaporizer that contains internal heaters?
    a. Heat decreases the drug's viscosity
    b. Desflurane does not vaporize adequately at room temperature
    c. Heat increases the drug's oil:gas partition coefficient
    d. Heat prevents fluctuations of vapor pressure

Answers: 86. c 87. c 88. d 89. b 90. d 91. c 92. a 93. d

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94. An otherwise healthy 70-year-old man receives 12 units of packed red blood cells for persistent diffuse bleeding during a suprapubic prostatectomy. Hemoglobin concentration is 11 g/dL; platelet count is 55,000/mm^3; plasma fibrinogen concentration is 180 mg/dL; prothrombin time is 14 sec; and partial thromboplastin time is 35 sec. The MOST appropriate therapy is administration of which of the following?
    a. Cryoprecipitate
    b. Desmopressin (DDAVP)
    c. Epsilon-aminocaproic acid
    d. Platelets

95. What is the expected mixed venous oxygen tension, in mm Hg, in a normal adult after breathing 100% oxygen for 10 minutes?
    a. 573
    b. 150
    c. 95
    d. 45

96. Which of the following drugs has the SHORTEST elimination half-life?
    a. Flumazenil
    b. Diazepam
    c. Lorazepam
    d. Midazolam

97. Nerve impulses travel in myelinated nerves by a process called what?
    a. Domino effect
    b. Saltatory conducation
    c. Relative refractory
    d. Nodes of Ranvier

98. Which portion of the nerve do local anesthetics work on?
    a. Neuron
    b. Dendrites
    c. Nerve membrane
    d. Myelinated sheath
    e. Schwann cells

99. What is one important way that local anesthetic drugs differ from all other drugs used in dentistry?
    a. High potential of overdose
    b. Route of administration
    c. Rate of uptake into bloodstream
    d. Action ceased when absorbed into bloodstream
    e. Blood levels must be sufficient to exert effect

100. When procaine undergoes metabolic breakdown, the major metabolic product (metabolite) is what?
    a. Pseudocholinesterase
    b. Chloroprocaine
    c. PAMA
    d. Succinylcholine
    e. Para-aminobenzoic acid

101. Biotransformation of amides takes place where?
    a. Liver
    b. Kidneys
    c. Blood plasma
    d. Spleen
    e. Bloodstream

Answers: 94. d 95. d 96. a 97. b 98. c 99. d 100. e 101. a

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ISBN 978-93-5270-066-0