

Lippincott Pharmacology Collected Questions

Collected by:

Lisa J. Al Mashayikh

Study Questions

Choose the **ONE** best answer.

- 13.1 Which of the following is a potent analgesic but a weak anesthetic?
- A. Etomidate.
 - B. Halothane.
 - C. Midazolam.
 - D. Nitrous oxide.
 - E. Thiopental.
- 13.2 The potency of inhaled anesthetics is defined quantitatively as:
- A. Blood/gas partition coefficient.
 - B. Cerebrovascular resistance.
 - C. Minimum alveolar concentration.
 - D. Diffusion hypoxia.
- 13.3 Which of the following determines the speed of recovery from intravenous anesthetics used for induction?
- A. Liver metabolism of the drug.
 - B. Protein binding of the drug.
 - C. Ionization of the drug.
 - D. Redistribution of the drug from sites in the CNS.
 - E. Plasma clearance of the drug.

Correct answer = D. Etomidate is a hypnotic agent but lacks analgesic activity. Midazolam is a common sedative/amnesic. Halothane and thiopental are potent anesthetics with weak analgesic properties. Nitrous oxide provides good analgesia but is a weak anesthetic that must be combined with other agents to provide complete anesthesia.

Correct answer = C. Potency of inhaled anesthetics is defined by MAC, equivalent to the median effective dose (ED_{50}) of the anesthetic. Blood/gas partition coefficient determines solubility of the gas in blood. Cerebrovascular resistance is decreased by inhalation anesthetics. Diffusion hypoxia is associated with nitrous oxide.

Correct answer = D. Following initial flooding of the CNS with nonionized molecules, the drug diffuses into other tissues. With secondary tissue uptake, the plasma concentration falls, allowing the drug to diffuse out of the CNS. This initial redistribution of drug into other tissues leads to the rapid recovery seen after a single dose of an IV induction drug. Protein binding, ionization, and lipid solubility affect the rate of transfer.

Study Questions

13.4 Which one of the following is a potent intravenous anesthetic but a weak analgesic?

- A. Propofol.
- B. Benzodiazepines.
- C. Ketamine.
- D. Fentanyl.
- E. Isoflurane.

Correct answer = A. Propofol is a potent anesthetic but a weak analgesic. It is the most widely used intravenously administered general anesthetic. It has a high lipid solubility. The other choices do not fit this profile.

13.5 Which of the following is correct regarding local anesthetics?

- A. They affect only small, unmyelinated nerve fibers.
- B. They have either a lipophilic or a hydrophilic group.
- C. They have either an amide or an ester linkage.
- D. They are unaffected by pH of the tissue and pKa of the drug.
- E. In their ionized form, they interact with the protein receptor of calcium channels.

Correct answer = C. The small, unmyelinated nerve fibers that conduct impulses for pain, temperature, and autonomic activity are most sensitive to the action of local anesthetics, but other nerve fibers are affected also. Local anesthetics have a lipophilic group, joined by either an amide or ester linkage to a carbon chain that, in turn, is joined to a hydrophilic group. Onset and duration of action of local anesthetics are influenced by both pH of the tissue and pKa of the drug. Local anesthetics work by blocking sodium ion channels.

13.6 Which of the following is correct regarding malignant hyperthermia?

- A. It is triggered by dantrolene.
- B. It is triggered by local anesthetics.
- C. It is generally mild and clinically insignificant.
- D. It has no familial component.
- E. It involves increased skeletal muscle oxidative metabolism.

Correct answer = E. Malignant hyperthermia involves increased skeletal muscle oxidative metabolism and is a life-threatening condition. Dantrolene is the specific pharmacologic treatment. Local anesthetics have been shown to be safe. Triggering agents include *succinylcholine* and halogenated hydrocarbon volatile anesthetic agents in susceptible individuals. Susceptibility to malignant hyperthermia is inherited in an autosomal dominant fashion.

13.7 A patient with heart failure and significantly reduced cardiac output requires surgical anesthesia. Which of the following would you expect to see in this patient?

- A. Slower induction time with IV anesthetics.
- B. Need for increased dosage of IV anesthetics.
- C. Slower induction time with inhaled anesthetics.
- D. Enhanced removal of inhaled anesthetics to peripheral tissues.

Correct answer = A. When cardiac output is reduced, the body compensates by diverting more cardiac output to the cerebral circulation. A greater proportion of the IV anesthetic enters the cerebral circulation under these circumstances. Therefore, the dose of the IV drug must be reduced (not increased). Also, with reduced cardiac output, it takes a longer time for an IV induction drug to reach the brain, resulting in a slower induction time. For inhaled anesthetics, lower cardiac output removes anesthetic from the alveoli to the peripheral tissues more slowly and thus enhances the rate of rise in alveolar concentration of gas. Therefore, the gas reaches equilibrium between the alveoli and the site of action in the brain more quickly.

13.8 An 80-year-old patient with asthma and low blood pressure requires anesthesia for an emergency surgical procedure. Which of the following agents would be most appropriate for inducing anesthesia in this patient?

- A. Desflurane.
- B. Ketamine.
- C. Propofol.
- D. Thiopental.

Correct answer = B. Ketamine may be beneficial since it is a potent bronchodilator and may not lower blood pressure like other agents. Desflurane is an inhaled anesthetic that may stimulate respiratory reflexes. It is used for maintenance, not induction, and may lower blood pressure. Propofol may also decrease blood pressure. Thiopental is a short-acting barbiturate that can cause bronchospasm.

13.9 A 52-year-old woman will be undergoing sedation with propofol for a brief diagnostic procedure. Which of the following is an advantage of propofol for this patient?

- A. Rapid analgesia.
- B. Sustained duration.
- C. Decreased incidence of nausea and vomiting.
- D. Less pain at the injection site.

Correct answer = C. Propofol has some antiemetic effect, so it does not cause postoperative nausea and vomiting. It has a short duration of action (which makes it good for brief procedures), but does not produce analgesia. Pain at the injection site is common.

13.10 A 32-year-old woman requests an epidural to ease labor pains. She reports that she had an allergic reaction to Novocain (procaine) at the dentist's office. Which of the following local anesthetics would be appropriate for use in an epidural for this patient?

- A. Chlorprocaine.
- B. Mepivacaine.
- C. Ropivacaine.
- D. Tetracaine.

Correct answer = C. Procaine is an ester local anesthetic. Since this patient has an allergy to procaine, other ester anesthetics (chlorprocaine, tetracaine) should not be used. Mepivacaine, an amide local anesthetic, should not be used due to the potential for increased toxicity to the neonate. Ropivacaine is an amide anesthetic.