Study Questions

Choose the ONE best answer.

9.1 Which one of the following statements is correct regarding benzodiazepines?

A. Benzodiazepines directly open chloride channels.
B. Benzodiazepines show analgesic actions.
C. Clinical improvement of anxiety requires 2 to 4 weeks of treatment with benzodiazepines.
D. All benzodiazepines have some sedative effects.
E. Benzodiazepines, like other CNS depressants, readily produce general anesthesia.

Correct answer = D. Although all benzodiazepines can cause sedation, the drugs labeled "benzodiazepines" in Figure 9.1 are promoted for the treatment of sleep disorder. Benzodiazepines enhance the binding of $GABA_A$ to its receptor, which increases the permeability of chloride. The benzodiazepines do not relieve pain but may reduce the anxiety associated with pain. Unlike the tricyclic antidepressants and the monoamine oxidase inhibitors, the benzodiazepines are effective within hours of administration. Benzodiazepines do not produce general anesthesia and, therefore, are relatively safe drugs with a high therapeutic index.

9.2 Which one of the following is a short-acting hypnotic?

A. Phenobarbital.
B. Diazepam.
C. Chlordiazepoxide.
D. Triazolam.
E. Flurazepam.

Correct answer = D. Triazolam is a short-acting drug. It has little daytime sedation. The other drugs listed are longer acting.

9.3 Which one of the following statements is correct regarding the anxiolytic and hypnotic agents?

A. Phenobarbital shows analgesic properties.
B. Diazepam and phenobarbital induce the cytochrome P450 enzyme system.
C. Phenobarbital is useful in the treatment of acute intermittent porphyria.
D. Phenobarbital induces respiratory depression, which is enhanced by the consumption of ethanol.
E. Buspirone has actions similar to those of the benzodiazepines.

Correct answer = D. Barbiturates and ethanol are a potentially lethal combination. Phenobarbital is unable to alter the pain threshold. Only phenobarbital strongly induces the synthesis of the hepatic cytochrome P450 drug-metabolizing system. Phenobarbital is contraindicated in the treatment of acute intermittent porphyria. Buspirone lacks the anticonvulsant and muscle-relaxant properties of the benzodiazepines and causes only minimal sedation.

9.4 A 45-year-old man who has been injured in a car accident is brought into the emergency room. His blood alcohol level on admission is 275 mg/dL. Hospital records show a prior hospitalization for alcohol-related seizures. His wife confirms that he has been drinking heavily for 3 weeks. What treatment should be provided to the patient if he goes into withdrawal?

A. None.
B. Lorazepam.
C. Pentobarbital.
D. Phenytoin.
E. Buspirone.

Correct answer = B. It is important to treat the seizures associated with alcohol withdrawal. Benzodiazepines, such as chlordiazepoxide, diazepam, or the shorter-acting lorazepam, are effective in controlling this problem. They are less sedating than pentobarbital or phenytoin.

9.5 Which one of the following is a short-acting hypnotic and better for sleep induction compared to sleep maintenance?

A. Temazepam.
B. Flurazepam.
C. Zaleplon.
D. Buspirone.
E. Escitalopram.

Correct answer = C. Zaleplon has the shortest half-life and duration of action. Buspirone and escitalopram are not effective hypnotic agents. Temazepam and flurazepam have longer durations of action and will reduce nighttime awakenings but will have a greater risk of daytime sedation or hangover effect compared to zaleplon.

9.6 Which of the following agents has a rapid anxiolytic effect and would be best for the acute management of anxiety?

A. Buspirone.
B. Venlafaxine.
C. Lorazepam.
D. Escitalopram.
E. Duloxetine.

Correct answer = C. The benzodiazepines have same-dose, first-dose efficacy for anxiety, whereas the other agents require 2 to 8 weeks for clinically significant improvement in anxiety.

9.7 Which of the following sedative–hypnotic agents utilizes melatonin receptor agonism as the mechanism of action to induce sleep?

A. Zolpidem.
B. Eszopiclone.
C. Estazolam.
D. Ramelteon.
E. Diphenhydramine.

Correct answer = D. Ramelteon is the only melatonin receptor agonist to promote sleep, especially in sleep-phase disrupted sleep. Zolpidem, eszopiclone, and estazolam all utilize the benzodiazepine receptor, and diphenhydramine is a histamine receptor antagonist.

9.8 All of the following agents for the management of insomnia are controlled substances and may have a risk for addiction or dependence except:

A. Zaleplon.
B. Flurazepam.
C. Doxepin.
D. Zolpidem.
E. Triazolam.

Correct answer = C. Only doxepin, a tricyclic agent with significant antihistaminergic properties, is considered to have no risk of addiction or dependence, whereas the other agents listed all have DEA schedule IV designations with some risk for addiction or dependence, especially when used for extended periods.

9.9 All of the following agents may cause cognitive impairment, including memory problems when used at recommended doses except:

A. Diphenhydramine.
B. Zolpidem.
C. Alprazolam.
D. Phenobarbital.
E. Ramelteon.

Correct answer = E. All of the above listed agents, except ramelteon, have been associated with cognitive impairments, including memory impairment. Diphenhydramine likely causes its cognitive problems from its anticholinergic and antihistaminergic effects. Zolpidem, alprazolam, and phenobarbital are well-known causes of cognitive impairment, including anterograde amnesia. Ramelteon has safety data extending to 6 months and is a noncontrolled hypnotic agent acting as a melatonin receptor agonist. It is not considered to have a risk for cognitive impairment as compared to the other agents listed.

9.10 Which agent is best used in the Emergency Room setting for patients who are believed to have received too much of a benzodiazepine drug or taken an overdose of benzodiazepines?

A. Diazepam.
B. Ramelteon.
C. Flumazenil.
D. Doxepin.
E. Naloxone.

Correct answer = C. Flumazenil is only indicated to reverse the effects of benzodiazepines via antagonizing the benzodiazepine receptor. It should be used with caution due to a risk of seizures if the patient has been a long time recipient of benzodiazepines or if the overdose attempt was with mixed drugs. Naloxone is an opioid receptor antagonist. The other agents are not efficacious in reversing effects of benzodiazepines.