LESSON ASSIGNMENT

LESSON 8

Anticonvulsant Agents.

TEXT ASSIGNMENT

Paragraphs 8-1--8-5.

LESSON OBJECTIVES

After completing this lesson, you should be able to:

8-1. Given a group of statements, select the meaning of epilepsy or convulsions.

8-2. Given a group of statements, select the statement that best differentiates between clonic and tonic convulsions.

8-3. Give the name of a type of epilepsy and a group of descriptions, select the best description of that type of epilepsy.

8-4. From a group of potential causes, select the cause(s) of epilepsy in either a child or an adult.

8-5. Given a group of statements, select the statement that best describes the mechanism of action for anticonvulsants.

8-6. Given the trade name of an anticonvulsant agent and a group of generic names, match the trade name with its generic name.

8-7. Given a trade or generic name of an anticonvulsant agent and a group of statements, select the statement that best describes the clinical use(s) or adverse reaction(s) associated with that agent.

8-8. Given a trade or generic name of a convulsant agent, a description of a situation involving the dispensing of that agent, and a group of statements describing cautions and/or warnings to the patient, select the statement that should be made to the patient receiving that medication.

SUGGESTION

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.
8-1. BASIC DEFINITIONS

Before studying about anticonvulsants, you should review/study the definitions that relate to the topic:

a. **Epilepsy.** Epilepsy is a chronic convulsive disorder of cerebral function. Epilepsy is characterized by recurrent attacks of motor, sensory, psychic, or autonomic nature. The attacks may involve changes in the state of patient consciousness and are usually sudden in onset and brief.

b. **Convulsion.** A convulsion is a violent involuntary contraction or series of contractions of the voluntary muscles. There are two types of convulsions.

   (1) **Clonic convulsions.** A clonic convulsion has alternating periods of contraction and relaxation of the voluntary muscles.

   (2) **Tonic convulsions.** A tonic convulsion is a state of sustained contraction of voluntary muscles.

8-2. TYPES OF EPILEPSY

There are four types of epilepsy. Certain signs and symptoms characterize each type.

a. **Grand Mal.** Grand Mal is the most common type of epilepsy. In this type of epilepsy, the person often experiences an aura (this can consist of certain sounds, fear discomfort) immediately before a seizure. Then the patient loss consciousness and has tonic-clonic convulsions. The seizures generally last from 2 to 5 minutes.

b. **Petit Mal.** This type of epilepsy is most frequently found in children. Brief periods of blank spells or loss of speech characterizes petit mal. During the seizures, which usually last from 1 to 30 seconds, the person stops what he is doing and after the seizure resumes what he was doing before the seizure. Many persons are not aware that they have had a seizure.

c. **Jacksonian (Focal).** This type of epilepsy is rare. It is usually associated with an organic lesion of a certain part of the brain (cerebral cortex). Jacksonian epilepsy is characterized by focal or local clonic type convulsions of localized muscle groups (for example, thumb, big toe, and so forth). The seizures normally last from 1 to 2 minutes.
d. **Psychomotor.** Psychomotor epilepsy is rare. Psychomotor epilepsy is characterized by periods of abnormal types of behavior (for example, extensive chewing or swallowing). The localized seizures may advance to generalized convulsions with resultant loss of consciousness.

### 8-3. CAUSES OF EPILEPSY

a. **In Children.** Epilepsy that occurs in infancy usually results from developmental defects, metabolic diseases, or injuries sustained during birth.

b. **In Adults.** Epilepsy that begins in adulthood usually is caused by trauma (an accident), cerebrovascular accident (a "stroke"), tumors, or diseases associated with the brain.

### Section II. ANTICONVULSANT THERAPY

### 8-4. MECHANISM OF ACTION OF ANTICONVULSANTS

The mode and the site of action of anticonvulsants are not known for sure. However, it is believed that the anticonvulsants suppress seizures by depressing the cerebral (motor) cortex of the brain, thereby raising the threshold of the central nervous system (CNS) to convulsive stimuli. Therefore, the person is less likely to undergo seizures.

### 8-5. SPECIFIC ANTICONVULSANT DRUGS

a. **Phenobarbital.**

   (1) **Clinical uses.** Phenobarbital is orally administered in the treatment of grand mal epilepsy. It is less effective in the treatment of petit mal and psychomotor epilepsy. The injectable form of the drug is used to treat other types of convulsions.

   (2) **Adverse effects.** The most common adverse effects associated with phenobarbital are related to sedation and disinhibition (see lesson 7 of this subcourse). These include dizziness, drowsiness, ataxia (lack of muscular coordination), and nystagmus (a rapid involuntary movement of the eyeball). Furthermore, as discussed in lesson 7 of this subcourse, persons taking phenobarbital can experience withdrawal symptoms when they suddenly stop taking the drug. Epileptic patients are unusually susceptible to the hyperexcitable state induced by too rapid reduction of dosage or too rapid withdrawal of phenobarbital.
(3) **Cautions and warnings.** Patients who take phenobarbital should be warned about drowsiness. Patients who take phenobarbital should not drink alcohol while taking phenobarbital. Dosage of the drug should be reduced by small amounts in order to avoid hastening convulsions. Lastly, phenobarbital may stimulate the activity of a number of enzyme systems and affect the metabolism of various drugs (for example, anticoagulants, phenytoin).

b. **Phenytoin (Dilantin®).**

(1) **Clinical uses.** Phenytoin is used alone or in combination with phenobarbital in the treatment of grand mal and psychomotor epilepsy. It is also used in the treatment of other types of convulsions.

(2) **Adverse effects.** Adverse effects associated with phenytoin include ataxia (lack of muscular coordination, staggering walk), nystagmus (a rapid, involuntary movement of the eyeball), and slurred speech. Drowsiness and fatigue may accompany these adverse effects in some patients by tremors and nervousness and in others.

(3) **Caution and warning.** Drug interactions can occur between phenytoin and alcohol, barbiturates, folic acid, coumarin-type anticoagulants, disulfiram, the sulfonamides, and sympathomimetic agents. Phenytoin should be used cautiously with patients who are alcoholics or who have blood dyscrasias.

c. **Ethosuximide (Zarontin®).**

(1) **Clinic use.** Ethosuxamide is the drug of first choice for the treatment of petit mal epilepsy.

(2) **Adverse effects.** Drowsiness, ataxia, and gastrointestinal irritation are adverse effects associated with the use of ethosuxamide.

(3) **Caution and warning.** Ethosuxamide should be used cautiously with patients who have blood dyscrasias or liver or kidney impairment.

d. **Clonazepam (Klonopin®).**

(1) **Clinical uses.** Clonazepam is used in the treatment of grand mal epilepsy. It is the alternate drug for the treatment of petit mal in patients who fail to respond to ethosuxamide (Zarontin) therapy.

(2) **Adverse effects.** The primary side effect associated with clonazepam is central nervous system depression. Drowsiness is frequently seen in patients who take this medication.
e. Diazepam (Valium®), Lorazepam (Ativan®).

(1) **Clinical uses.** Diazepam or Lorazepam are drugs of first choice for the treatment of status epilepticus (a particular type of convulsive disorder) when it is given intravenously.

(2) **Adverse effects.** Drowsiness, fatigue, and ataxia are the most common adverse effects seen with diazepam.

**NOTE:** Midazolam (Versed®) may be used as a continuous infusion for the treatment of status epilepticus in patients that fail diazepam or lorazepam.

*Continue with Exercises*

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EXERCISES, LESSON 8

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided at the end of the exercise.

After you have completed all of these exercises, turn to “Solutions to Exercises” at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. Which of the following statements best describes epilepsy?
   a. A mental condition that can be transmitted from one person to another.
   b. A chronic convulsive disorder of brain function.
   c. A chronic mental condition that is always characterized by violent contractions of the involuntary muscles.
   d. A condition that harms the brain in such a way that the person cannot live a normal life.

2. Which of the following statements best describes grand mal epilepsy?
   a. A type of epilepsy characterized by brief periods of blank spells or loss of speech.
   b. A type of epilepsy characterized by focal or local clonic type convulsions of localized muscle groups (for example, thumb, big toe, and so forth).
   c. A type of epilepsy characterized by seizures which generally last from 2 to 5 minutes.
   d. A rare type of epilepsy characterized by periods of abnormal behavior (for example, extensive chewing).
3. Which of the following cause epilepsy in adults?
   a. Tumors.
   b. Trauma.
   c. Cerebrovascular accident.
   d. All the above.

4. The anticonvulsants act by:
   a. Depressing the cerebral cortex of the brain, thereby lowering the threshold of the CNS to convulsive stimuli.
   b. Stimulating the cerebral cortex of the brain, thereby raising the threshold of the CNS to convulsive stimuli.
   c. Depressing the cerebral cortex of the brain, thereby raising the threshold of the CNS to convulsive stimuli.
   d. Depressing the cerebral cortex of the brain, thereby deadening the part of the brain that is responsible for the seizures.

SPECIAL INSTRUCTIONS FOR EXERCISES 5 THROUGH 8.: Match the generic name with its corresponding trade name.

5. Clonazepam ________________  a. Zarontin®
6. Diazepam ________________  b. Klonopin®
7. Phenytoin ________________  c. Valium®
8. Ethosuximide ________________  d. Dilantin®
9. Phenobarbital is orally administered in the treatment of:
   a. Grand mal epilepsy.
   b. Petit mal epilepsy.
   c. Jackson epilepsy.
   d. Psychomotor epilepsy.

10. Patients who take phenobarbital should be cautioned not to:
    a. Take aspirin with the drug.
    b. Take the drug with meals.
    c. Take the medication immediately after a seizure.
    d. Take the medication with alcohol.

11. Which adverse effect(s) is/are associated with the use of ethosuximide?
    a. Dizziness.
    b. Ataxia.
    c. Nystagmus.
    d. All the above.

12. Which adverse effect(s) is/are associated with the use of phenytoin.
    a. Nystagmus.
    b. Ataxia.
    c. Slurred speech.
    d. All the above.

Check Your Answers on Next Page
SOLUTIONS TO EXERCISES, LESSON 8

1. b  (para 8-1a)
2. c  (para 8-2a)
3. d  (para 8-3b)
4. c  (para 8-4)
5. b  (para 8-5d)
6. c  (para 8-5c)
7. d  (para 8-5b)
8. a  (para 8-5c)
9. a  (para 8-5a)
10. d  (para 8-5a(3))
11. b  (para 8-5c(2))
12. d  (para 8-5b(2))

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