chapter 28

Anticonvulsants

Key Terms

absence seizures
anticonvulsants
ataxia
convulsion
epilepsy
gingival hyperplasia
jacksonian seizure
myoclonic seizures
nystagmus
pancytopenia
psychomotor seizures
seizure
status epilepticus
tonic-clonic seizure

Chapter Objectives

On completion of this chapter, the student will:

- List the five types of drugs used as anticonvulsants.
- Discuss the general drug actions, uses, adverse reactions, contraindications, precautions, and interactions of anticonvulsants.
- Discuss important preadministration and ongoing assessment activities the nurse should perform on the patient receiving an anticonvulsant.
- List some nursing diagnoses particular to a patient taking an anticonvulsant.
- Discuss ways to promote an optimal response to therapy, how to manage common adverse reactions when administering the anticonvulsants, and important points to keep in mind when educating a patient about the use of anticonvulsants.

The terms **convulsion** and seizure are often used interchangeably and basically have the same meaning. A **seizure** may be defined as a periodic attack of disturbed cerebral function. A seizure may also be described as an abnormal disturbance in the electrical activity in one or more areas of the brain. Seizures may be classified as partial (focal) or generalized. Each different type of seizure disorder is characterized by a specific pattern of events, as well as a different pattern of motor or sensory manifestation.

Partial or focal seizures arise from a localized area in the brain and cause specific symptoms. A partial seizure can spread to the entire brain and cause a generalized seizure. Partial seizures include simple seizures in which consciousness is not impaired, **jacksonian seizure**s (a focal seizure that begins with an uncontrolled stiffening or jerking in one part of the body such as finger, mouth, hand, or foot that may progress to a generalized seizure), and psychomotor seizures.

Psychomotor seizures occur most often in children 3 years of age through adolescence. The individual may experience an aura with perceptual alterations, such as hallucinations or a strong sense of fear. Repeated coordinated but inappropriate movements, such as clutching, kicking, picking at clothes, walking in circles, and licking are characteristic. The most common motor symptom is drawing or jerking of the mouth and face.

Generalized seizures include absence, myoclonic, and tonic-clonic. Manifestations of a generalized **tonic-clonic seizure** include alternate contraction (tonic phase) and relaxation (clonic phase) of muscles, a loss of consciousness, and abnormal behavior. **Myoclonic seizure**s involve sudden, forceful contractions involving the musculature of the trunk, neck, and extremities. **Absence seizures,** previously referred to as petit mal seizures, are seizures characterized by a brief loss of consciousness during which physical activity ceases. The seizures typically last a few seconds, occur many times a day, and may go unnoticed by others.

Seizure disorders are generally categorized as idiopathic or acquired. Idiopathic seizures have no known cause; acquired seizure disorders have a known cause, including high fever, electrolyte imbalances, uremia, hypoglycemia, hypoxia, brain tumors, and some drug withdrawal reactions. Once the cause is removed (if it can be removed), the seizures theoretically cease.

Epilepsy may be defined as a permanent, recurrent seizure disorder. Examples of the known causes of epilepsy include brain injury at birth, head injuries, and inborn errors of metabolism. In some patients, the cause of epilepsy is never determined.

Drugs used for the management of convulsive disorders are called **anticonvulsants.** Most anticonvulsants have specific uses, that is, they are of value only in the treatment of certain types of seizure disorders. There are five types of drugs used as anticonvulsants: barbiturates, benzodiazepines, hydantoins, oxazolidinediones, and the succinimides. In addition, several miscellaneous drugs are used as anticonvulsants. All possess the ability to depress abnormal neural discharges in the central nervous system (CNS), resulting in an inhibition of seizure activity. Drugs that control generalized tonic-clonic seizures are not effective for absence (petit mal) seizures. If both conditions are present, combined drug therapy is required.

ACTIONS

Generally, anticonvulsants reduce the excitability of the neurons (nerve cells) of the brain. When neuron excitability is decreased, seizures are theoretically reduced in intensity and frequency of occurrence or, in some instances, are virtually eliminated. For some patients, only partial control of the seizure disorder may be obtained with anticonvulsant drug therapy.

USES

The more common types of seizures, which respond to a specific anticonvulsant, are given in the Summary Drug Table: Anticonvulsants. In some cases, the patient does not respond well to one drug, and another drug or a combination of anticonvulsants must be tried. Dosage increases and decreases are often necessary during the initial period of treatment. Dosage adjustment also may be necessary during times of stress, severe illness, or when other drugs are being taken for treatment of conditions other than a seizure disorder. The miscellaneous anticonvulsants are adjuncts to the more widely used anticonvulsants. They are used in patients who have an inadequate response to other anticonvulsants.

Occasionally, **status epilepticus** (an emergency situation characterized by continual seizure activity with no interruptions) can occur. Diazepam (Valium) is most often the initial drug prescribed for this condition. However, because the effects of diazepam last less than 1 hour, a longer-lasting anticonvulsant, such as phenytoin or phenobarbital, also must be given to control the seizure activity.

Nursing Alert

Research suggests an association between the use of anticonvulsants by pregnant women with epilepsy and an increased incidence of birth defects in children born to these women. The use of anticonvulsants generally is not discontinued in pregnant women with a history of major seizures because of the danger of precipitating status epilepticus. However, when seizure activity poses no serious threat to the pregnant woman, the primary health care provider will consider discontinuing use of the drug during pregnancy.

ADVERSE REACTIONS

Barbiturates

The most common adverse reaction associated with phenobarbital is sedation, which can range from mild sleepiness or drowsiness to somnolence. These drugs may also cause nausea, vomiting, constipation, bradycardia, hypoventilation, skin rash, headache, fever, and diarrhea. Agitation, rather than sedation, may occur in some patients. Some of these adverse effects may be reduced or eliminated as therapy continues. Occasionally, a slight dosage reduction, without reducing the ability of the drug to control the seizures, will reduce or eliminate some of these adverse reactions.

Benzodiazepines

As with the barbiturates, the most common adverse reaction seen with the use of clonazepam (Klonopin), clorazepate (Tranxene), and diazepam (Valium) is sedation in varying degrees. Additional adverse effects may include anorexia, constipation, or diarrhea. Some adverse reactions are dose dependent, whereas others may diminish in intensity or cause few problems after several weeks of therapy.

Hydantoins

Phenytoin is the most commonly prescribed anticonvulsant. Many adverse reactions are associated with the use of phenytoin (Dilantin). The most common adverse reactions associated with the hydantoins are related to the CNS and include **nystagmus** (constant, involuntary movement of the eyeball), **ataxia** (loss of control of voluntary movements, especially gait), slurred speech, and mental changes. Other adverse reactions that may be seen include various types of skin rashes, nausea, vomiting, **gingival hyperplasia** (overgrowth of gum tissue), hematologic changes (changes relating to the blood or blood-forming tissue), and hepatotoxicity. Some of these adverse reactions diminish with continuous use of the hydantoins.

SUMMARY DRUG TABLE ANTICONVULSANTS

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
Barbiturates				
phenobarbital *fee-noe-bar'-bi-tal*	*generic*	Status epilepticus, cortical focal seizures, tonic-clonic seizures	Somnolence, agitation, confusion, ataxia, CNS depression, nervousness, nausea, vomiting, constipation, diarrhea, rash	30–200 mg/d PO BID, TID
phenobarbital sodium *fee-noe-bar'-bi-tal*	Luminal Sodium, *generic*	Status epilepticus, cortical focal seizures, tonic-clonic seizures	Somnolence, agitation, confusion, ataxia, CNS depression, nervousness, nausea, vomiting, constipation, diarrhea, rash	30–320 mg IM, IV; may repeat in 6 h
Hydantoins				
ethotoin *eth'-i-toe-in*	Peganone	Tonic-clonic seizures, psychomotor seizures	Ataxia, CNS depression, hypotension, nystagmus, mental confusion, slurred speech, dizziness, drowsiness, gingival hyperplasia, rash, hematopoietic complications	1–3 g/d PO in 4–6 divided doses
mephenytoin *me-fen'-i-toyn*	Mesantoin	Tonic-clonic seizures, psychomotor seizures, focal seizures, Jacksonian seizures	Ataxia, CNS depression, hypotension, nystagmus, mental confusion, slurred speech, dizziness, drowsiness, gingival hyperplasia, rash, hematopoietic complications	50–800 mg/d PO in divided doses
phenytoin sodium, parenteral *fen'-i-toe-in*	Dilantin, *generic*	Tonic-clonic seizures, psychomotor seizures, status epilepticus	Ataxia, CNS depression, hypotension, nystagmus, mental confusion, slurred speech, dizziness, drowsiness, gingival hyperplasia, rash, hematopoietic complications	10–15 mg/kg IV
phenytoin sodium, oral *fen'-i-toe-in*	Dilantin, *generic*	Tonic-clonic seizures, psychomotor seizures, status epilepticus	Ataxia, CNS depression, hypotension, nystagmus, mental confusion, slurred speech, dizziness, drowsiness, gingival hyperplasia, rash, hematopoietic complications	Loading dose: 1 g divided into three doses (400 mg, 300 mg, 300 mg) PO q2h; maintenance dose: started 24 hrs after loading dose, 300–400 mg/d PO
Succinimides				
ethosuximide *eth-oh-sux'-i-mide*	Zarontin, *generic*	Absence seizures	Drowsiness, ataxia, dizziness, irritability, hematologic changes, mental confusion, nervousness, blurred vision, nausea, vomiting, gastric cramps, urinary frequency, anorexia, pruritus, urticaria	Up to 1.5 g/d PO in divided doses; children, 250/mg/d PO
methsuximide *meth-sux'-i-mide*	Celontin Kapseals	Absence seizures	Drowsiness, ataxia, mental confusion, dizziness, irritability, nervousness, blurred vision, nausea, vomiting, gastric cramps, anorexia, pruritus, urticaria	300 mg/d–1.2 g/d PO
phensuximide *fen-sux'-i-mide*	Milontin Kapseals	Absence seizures	Drowsiness, ataxia, mental confusion, dizziness, irritability, nervousness, blurred vision, nausea, vomiting, gastric cramps, anorexia, pruritus, urticaria	1–3 g/d PO in divided doses

(continued)

SUMMARY DRUG TABLE ANTICONVULSANTS *(Continued)*

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
Oxazolidinedione				
trimethadione *trye-meth-a-dye'-on*	Tridione	Absence seizures	Precipitation of clonic-tonic seizure, diplopia, drowsiness, vomiting, photosensitivity, blurred vision, personality changes, increased irritability, headache, fatigue, exfoliate dermatitis, skin rash, nephrosis, hematologic effects	900 mg–2.4 g/d PO in equally divided doses
Benzodiazepines				
clonazepam *clo-nay'-zeh-pam*	Klonopin, *generic*	Absence seizures, myoclonic and akinetic seizures	Drowsiness, depression, lethargy, apathy, diarrhea, constipation, dry mouth, bradycardia, tachycardia, fatigue, visual disturbances, urticaria, anorexia, rash, pruritus	Initial dose up to 1.5 mg/d PO in 3 divided doses; increase in increments of 0.5–1mg q3d; maximum dose, 20 mg/d
clorazepate *klor-az'-e-pate*	Tranxene SD, *generic*	Partial seizures, anxiety disorders	Drowsiness, depression, lethargy, apathy, diarrhea, constipation, dry mouth, bradycardia, tachycardia, fatigue, visual disturbances, urticaria, anorexia, rash, pruritus	7.5 mg PO TID; increase by increments of 7.5 mg or less weekly; maximum dose, 90 mg/d
diazepam *dye-az'-e-pam*	Valium, *generic*	Status epilepticus, convulsive disorders (all forms), anxiety disorders	Drowsiness, depression, lethargy, apathy, diarrhea, constipation, dry mouth, bradycardia, tachycardia, fatigue, visual disturbances, urticaria, anorexia, rash, pruritus	2–10 mg/d PO 2–4 times/d status epilepticus/severe recurrent convulsive seizures: 5–10 mg initially; may repeat at 5–10 min intervals to a maximum dose of 30 mg IV
Miscellaneous Preparations				
carbamazepine *kar-ba-maz'-e-peen*	Tegretol, Tegretol-XR, *generic*	Tonic-clonic, mixed seizures, psychomotor seizures	Dizziness, nausea, drowsiness, vomiting, aplastic anemia and other blood cell abnormalities	Maintenance: 800–1200 mg/d PO in divided doses
felbamate *fell'-ba-mate*	Felbatol	Partial seizures (adults)	Insomnia, headache, anxiety, acne, rash, dyspepsia, vomiting, constipation, diarrhea, upper respiratory tract infection, fatigue, rhinitis	1200–3600 mg/d PO in divided doses
gabapentin *gab-ah-pen'-tin*	Neurontin	Partial seizures (adults)	Somnolence, dizziness, ataxia, Stevens-Johnson syndrome, nystagmus, tremor, rhinitis, diplopia	900–3600 mg/d PO TID
lamotrigine *la mo' tri geen*	Lamictal, Lamictal Chewable Dispersible Tablets	Partial seizures (adults)	Dizziness, insomnia, rash, somnolence, ataxia, nausea, vomiting, diplopia, headache	50–500 mg/d PO in 2 divided doses
magnesium sulfate *mag-nee'-zhum*	Epsom Salt, *generic*	Hypomagnesemia toxemia, evacuation	High magnesium levels, flushing, sweating, depressed	IM: 4–5 g of a 50% solution q4h

SUMMARY DRUG TABLE ANTICONVULSANTS *(Continued)*

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
		of colon for rectal and bowel examinations	reflexes, hypotension, cardiac and CNS depression	IV: 4 g of a 10%–20% solution, not exceeding 1.5 mL/min of a 10% solution; IV infusion: 4–5 g in 250 mL of 5% dextrose, not exceeding 3 mL/min
oxcarbazepine *ox-car-baz'-e-peen*	Trileptal	Epilepsy	Headache, dizziness, somnolence, ataxia, nystagmus, abnormal gait, insomnia, abdominal pain, diarrhea, dyspepsia, nausea, vomiting	600–1200 mg PO BID
primidone *pri'-mi-done*	Mysoline	Grand mal, psychomotor or focal epileptic seizures	Somnolence, agitation, confusion, ataxia, CNS depression, nervousness, nausea, vomiting, constipation, diarrhea, rash	Up to 500 mg PO QID
valproic acid *val-proe'-ik*	Depakene, Depakote, *generic*	Absence seizures	Nausea, vomiting, rash, sedative effects, indigestion, nystagmus, diplopia	10–60 mg/kg/d PO; if dosage is >250 mg/d, give in divided doses
zonisamide *zoh-niss'-ah-mide*	Zonegran	Epilepsy	Agitation, somnolence, anorexia, nausea, dizziness, headache, diplopia, tiredness, abdominal pain	>16 years 100–600 mg/d PO

*The term *generic* indicates the drug is available in generic form.

Oxazolidinediones

Administration of trimethadione (Tridione) may result in hematologic changes, such as **pancytopenia** (decrease in all the cellular components of the blood), leukopenia, aplastic anemia, and thrombocytopenia. Also reported are various types of skin rashes, diplopia (double vision), vomiting, changes in blood pressure, CNS depression, photosensitivity, and fatal nephrosis. Because these drugs have been associated with serious adverse reactions and fetal malformations, they should be used only when other less toxic drugs are not effective in controlling seizures. The oxazolidinediones may precipitate a tonic-clonic seizure.

Succinimides

Gastrointestinal symptoms occur frequently with the administration of ethosuximide (Zarontin), methsuximide (Celontin Kapseals), and phensuximide (Milontin Kapseals). Mental confusion and other personality changes, pruritus, urticaria, urinary frequency, weight loss, and hematologic changes may also be seen.

Miscellaneous Anticonvulsants

The adverse reactions seen with the various miscellaneous anticonvulsants are given in the Summary Drug Table: Anticonvulsants.

CONTRAINDICATIONS, PRECAUTIONS, INTERACTIONS

Barbiturates

The barbiturates are contraindicated in patients with known hypersensitivity to the drugs. The barbiturates are used cautiously in patients with liver or kidney disease and those with neurological disorders. The barbiturates (eg, phenobarbital) are used with caution in patients with pulmonary disease and in hyperactive children. When barbiturates are used with other CNS depressants (eg, alcohol, narcotic analgesics, and antidepressants), an additive CNS depressant effect may occur. See Chapter 26 for additional information on the barbiturates.

Benzodiazepines

The benzodiazepines are contraindicated in patients with known hypersensitivity to the drugs. The benzodiazepines are used cautiously during pregnancy (Category D) and in patients with psychoses, acute narrow angle glaucoma, liver or kidney disease, and neurologic disorders. The benzodiazepines are used cautiously in elderly or debilitated patients. When the benzodiazepines are used with other CNS depressants (eg, alcohol, narcotic analgesics, and antidepressants),

an additive CNS depressant effect may occur. Increased effects of the benzodiazepines are seen when the drugs are administered with cimetidine, disulfiram, and oral contraceptives. When the benzodiazepines are administered with theophylline, there is a decreased effect of the benzodiazepines. See Chapter 30 for additional information on the benzodiazepines.

Hydantoins

The hydantoins are contraindicated in patients with known hypersensitivity to the drugs. Phenytoin is contraindicated in patients with sinus bradycardia, sinoatrial block, second and third degree AV block, and Adams-Stokes syndrome; it also is contraindicated during pregnancy (ethotoin and phenytoin are Pregnancy Category D) and lactation. Ethotoin is contraindicated in patients with hepatic abnormalities.

When the hydantoins are used with other CNS depressants (eg, alcohol, narcotic analgesics, and antidepressants), an additive CNS depressant effect may occur. The hydantoins are used cautiously in patients with liver or kidney disease and neurologic disorders. Phenytoin is used cautiously in patients with hypotension, severe myocardial insufficiency, and hepatic impairment.

Phenytoin interacts with many different drugs. For example, isoniazid, chloramphenicol, sulfonamides, benzodiazepines, succinimides, and cimetidine all increase phenytoin blood levels. The barbiturates, rifampin, theophylline, and warfarin decrease phenytoin blood levels. When administering the hydantoins with meperidine, the analgesic effect of meperidine is decreased.

Oxazolidinediones

The oxazolidinediones are contraindicated in patients with known hypersensitivity to the drugs. Trimethadione is classified as a Pregnancy Category D drug and is contraindicated during pregnancy and lactation. Trimethadione is used with caution in patients with eye disorders (eg, retinal or optic nerve disease), liver or kidney disease, and neurologic disorders. When trimethadione is used with other nervous system (CNS) depressants (eg, alcohol, narcotic analgesics, and antidepressants), an additive CNS depressant effect may occur.

Succinimides

The succinimides are contraindicated in patients with known hypersensitivity to the drugs. The succinimides are contraindicated in patients with bone marrow depression or hepatic or renal impairment and during lactation. Ethosuximide is classified as a Pregnancy Category C drug and is used with caution during pregnancy. As with all anticonvulsants, when the succinimides are used with other CNS depressants (eg, alcohol, narcotic analgesics, and antidepressants), an additive CNS depressant effect may occur.

When the hydantoins are administered with the succinimides there may be an increase in the hydantoin blood levels. Concurrent administration of valproic acid and the succinimides may result in either a decrease or an increase in succinimide blood levels. When primidone in administered with the succinimides, lower primidone levels may occur.

Miscellaneous Anticonvulsants

The miscellaneous anticonvulsants are contraindicated in patients with known hypersensitivity to any of the drugs. Carbamazepine is contraindicated in patients with bone marrow depression or hepatic or renal impairment and during pregnancy (Category D). Valproic acid is not administered to patients with renal impairment or during pregnancy (Category D). Oxcarbazepine (Trileptal), a miscellaneous anticonvulsant, may exacerbate dementia.

The miscellaneous anticonvulsants are used cautiously in patients with glaucoma or increased intraocular pressure; a history of cardiac, renal or liver dysfunction; and psychiatric disorders. When the miscellaneous anticonvulsants are used with other CNS depressants (eg, alcohol, narcotic analgesics, and antidepressants), an additive CNS depressant effect may occur.

When carbamazepine is administered with primidone, decreased primidone levels and higher carbamazepine serum levels may result. Cimetidine administered with carbamazepine may result in an increase in plasma levels of carbamazepine that can lead to toxicity. Blood levels of lamotrigine increase when the agent is administered with valproic acid, requiring a lower dosage of lamotrigine.

NURSING PROCESS

● The Patient Receiving an Anticonvulsant

ASSESSMENT

Preadministration Assessment

Seizures that occur in the outpatient setting are almost always seen first by family members or friends, rather than by a member of the medical profession. The occurrence of abnormal behavior patterns or convulsive movements usually prompts the patient to visit the primary health care provider's office or a neurologic clinic. A thorough patient history is necessary to identify the type of seizure disorder. Information the nurse should obtain from those who have observed the seizure is listed in Display 28-1.

DISPLAY 28-1 ● General Assessment of Seizure Activity

- A description of the seizures (the motor or psychic activity occurring during the seizure)
- The frequency of the seizures (approximate number per day)
- The average length of a seizure
- A description of an aura (a subjective sensation preceding a seizure) if any has occurred
- A description of the degree of impairment of consciousness
- A description of what, if anything, appears to bring on the seizure

Additional patient information should include a family history of seizures (if any) and recent drug therapy (all drugs currently being used). Depending on the type of seizure disorder, other information may be needed, such as a history of a head injury or a thorough medical history.

The nurse obtains the vital signs at the time of the initial assessment to provide baseline data. The primary health care provider may order many laboratory and diagnostic tests, such as an electroencephalogram, computed tomographic scan, complete blood count, and hepatic and renal function tests to confirm the diagnosis and identify a possible cause of the seizure disorder, as well as to provide a baseline during therapy with anticonvulsants.

Ongoing Assessment

Anticonvulsants control, but do not cure, epilepsy. An accurate ongoing assessment is important to obtain the desired effect of the anticonvulsant. The dosage of the anticonvulsant may require frequent adjustments during the initial treatment period. Dosage adjustments are based on the patient's response to therapy (eg, the control of the seizures), as well as the occurrence of adverse reactions. Depending on the patient's response to therapy, a second anticonvulsant may be added to the therapeutic regimen, or one anticonvulsant may be changed to another. Regular serum plasma levels of the anticonvulsant are taken to monitor for toxicity.

The patient's seizures, as well as response to drug therapy, must be observed when a hospitalized patient is receiving an anticonvulsant. The nurse must carefully document each seizure with regard to the time of occurrence, the length of the seizure, and the psychic or motor activity occurring before, during, and after the seizure. Most seizures occur without warning, and the nurse may not see the patient until after the seizure begins or after the seizure is over. However, any observations made during and after the seizure are important and may aid in the diagnosis of the type of seizure, as well as assist the primary health care provider in evaluating the effectiveness of drug therapy.

Nursing Diagnoses Checklist

- ✓ **Risk for Injury** related to seizure disorder, adverse drug reactions (drowsiness, ataxia)
- ✓ **Impaired Oral Mucous Membranes** related to adverse drug reactions (hydantoins)
- ✓ **Disturbed Sensory Perception: Visual** related to adverse drug reactions
- ✓ **Risk for Impaired Skin Integrity** related to adverse reactions (rash)

NURSING DIAGNOSES

Drug-specific nursing diagnoses are highlighted in the Nursing Diagnoses Checklist. Other nursing diagnoses applicable to these drugs are discussed in depth in Chapter 4.

PLANNING

The expected outcomes for the patient depend on the type and severity of the seizure but may include an optimal response to therapy (control of seizure), management of common adverse drug reactions (includes minimizing injury and maintaining normal oral mucous membranes), reduction in anxiety, and an understanding of and compliance with the prescribed therapeutic regimen.

Nursing Alert

Status epilepticus may result from abrupt discontinuation of the drug, even when the anticonvulsant is being administered in small daily doses.

IMPLEMENTATION

Promoting an Optimal Response to Therapy

When administering an anticonvulsant, the nurse must not omit or miss a dose (except by order of the primary health care provider). An abrupt interruption in therapy by omitting a dose may result in a recurrence of the seizures. In some instances, abrupt withdrawal of an anticonvulsant can result in status epilepticus.

The nurse aids continuity of anticonvulsant administration by making a notation on the care plan, as well as by informing all health care team members of the importance of the drug. If the primary health care provider discontinues the anticonvulsant therapy, the dosage is gradually withdrawn or another drug is gradually substituted.

To prevent gastric upset, the nurse gives oral anticonvulsants with food or soon after eating. Oral suspensions are shaken well before measuring. If the

patient appears drowsy, the nurse must use caution when giving an oral preparation because aspiration of the tablet, capsule, or liquid may occur. The nurse tests the swallowing ability of the patient by offering small sips of water before giving the drug. If the patient has difficulty swallowing, the nurse withholds the drug and notifies the primary health care provider as soon as possible. A different route of administration may be necessary. Injury may occur when the patient has a seizure. The nurse takes precautions to prevent falls and other injuries until seizures are controlled by the drug.

BARBITURATES. The barbiturate phenobarbital (Luminal) is commonly used to treat convulsive disorders. When administering the barbiturates by the intravenous (IV) route, it is important not to exceed a rate of 60 mg/min and to administer the drug within 30 minutes of preparation. The nurse monitors the patient carefully during administration of a barbiturate. The blood pressure and respirations are taken frequently. Resuscitation equipment and artificial ventilation equipment are kept nearby.

BENZODIAZEPINES. The dosage of the benzodiazepines is highly individualized, and the nurse must increase the dosage cautiously to avoid adverse reactions, particularly in elderly and debilitated patients. IV diazepam may bring seizures under control quickly. However, patients may have a return of seizure activity because of the short duration of the effects of the drug. The nurse must be prepared to administer another dose of the drug. The nurse must not mix diazepam with other drugs. When used to control seizures, the drug is administered by IV push. The nurse injects IV diazepam slowly, allowing at least 1 minute for each 5 mg of drug.

HYDANTOINS. Phenytoin is the most commonly prescribed anticonvulsant because of its effectiveness and relatively low toxicity. However, a genetically linked inability to metabolize phenytoin has been identified. For this reason, it is important to monitor serum concentrations of the drug on a regular basis to detect signs of toxicity. Phenytoin is administered orally and parenterally. If the drug is administered parenterally, the IV route is preferred over the intramuscular route because erratic absorption of phenytoin causes pain and muscle damage at the injection site.

OXAZOLIDINEDIONES. The oxazolidinediones are used only when other, less-toxic drugs have not been effective in controlling the seizure disorder because they have been associated with fetal abnormalities and serious adverse reactions.

SUCCINIMIDES. The succinimides are easily absorbed in the gastrointestinal tract and are effective in controlling absence or petit mal seizures. These drugs are given with food to prevent gastrointestinal upset.

MISCELLANEOUS ANTICONVULSANTS. Valproic acid (Depakene) is unrelated chemically to the other anticonvulsants. This drug is absorbed rapidly when taken orally. Tablets should not be chewed but swallowed whole to avoid irritation to the mouth and throat. The capsules may be opened and the drug sprinkled on a small amount of food, such as pudding or applesauce. This mixture must be swallowed whole immediately and not chewed. Zonisamide is administered orally once a day or in divided doses. The dose may be increased by 100 mg/day every 1 to 2 weeks until control of the seizures is obtained or the patient reaches the maximum dosage of 600 mg/d.

The nurse may give lamotrigine without regard to meals. However, it is important to give carbamazepine with meals to decrease gastric upset. The nurse can crush the tablets if the patient has difficulty swallowing. However, it is important not to crush or chew extended-released carbamazepine.

Monitoring and Managing Adverse Reactions

Drowsiness is a common adverse reaction of the anticonvulsant drugs, especially early in therapy. Therefore, the nurse should assist the patient with all ambulatory activities. The nurse helps the patient to arise from the bed slowly and sit for a few minutes before standing. Drowsiness decreases with continued use.

BARBITURATES. The barbiturates can produce a hypersensitivity rash. Should a skin rash occur, the nurse must notify the primary health care provider immediately because the primary health care provider may discontinue the drug. The nurse carefully examines all affected areas and provides an accurate description. If pruritus is present, the nurse keeps the patient's nails short, applies an antiseptic cream (if prescribed), and tells the patient to avoid the use of soap until the rash subsides.

Gerontologic Alert

The barbiturates may produce marked excitement, depression, and confusion in the elderly. In some individuals the barbiturates produce excitement, rather than depression. The nurse should monitor the older adult carefully during therapy with the barbiturates and report any unusual effects to the primary health care provider.

BENZODIAZEPINES. Carbamazepine may cause aplastic anemia and agranulocytosis. During treatment blood studies are performed frequently. If evidence of bone marrow depression is obtained (eg, the patient's platelet

count and white blood cell count decrease significantly), the primary health care provider is notified because the drug may be discontinued. The nurse reports any unusual bruising or unusual bleeding, fever, sore throat, rash, or mouth ulcers.

Gerontologic Alert

Older or debilitated adults may require a reduced dosage of diazepam to reduce ataxia and oversedation. The nurse observes these patients carefully. Apnea and cardiac arrest have occurred when diazepam is administered to older adults, very ill patients, and individuals with limited pulmonary reserve.

HYDANTOINS. The nurse must also be alert for the signs of blood dyscrasias, such as sore throat, fever, general malaise, bleeding of the mucous membranes, epistaxis (bleeding from the nose), and easy bruising. These are serious reactions that the nurse must report to the primary health care provider immediately. Routine laboratory tests, such as complete blood counts and differential counts, should be performed periodically. When a blood dyscrasia is present, the skin and mucous membranes are protected from bleeding and easy bruising by using a soft-bristled toothbrush, and the extremities are protected from trauma or injury.

Nursing Alert

Phenytoin can cause hematologic changes (eg, aplastic anemia, leukopenia, and thrombocytopenia). The nurse should immediately report any of the following: signs of thrombocytopenia (eg, bleeding gums, easy bruising, increased menstrual bleeding, tarry stools) or leukopenia (eg, sore throat, chills, swollen glands, excessive fatigue, or shortness of breath).

Hypersensitivity reactions and Stevens-Johnson syndrome (a serious, sometimes fatal inflammatory disease) have been reported with the use of phenytoin.

Nursing Alert

The nurse informs the primary health care provider immediately if a skin rash occurs. The use of phenytoin is usually discontinued if a skin rash occurs. If the rash is exfoliative (red rash with scaling of the skin), purpuric (small hemorrhages or bruising on the skin), or bullous (skin vesicle filled with fluid, ie, blister) use of the drug is not resumed. If the rash is milder (eg, measles-like), therapy may be resumed after the rash has completely disappeared.

The hydantoins may affect the blood glucose levels. In some patients these drugs have an inhibitory effect on the release of insulin in the body, causing hyperglycemia. The nurse closely monitors blood glucose levels, particularly in patients with diabetes. The nurse reports any abnormalities to the primary health care provider.

Long-term administration of the hydantoins can cause gingivitis and gingival hyperplasia (overgrowth of gum tissue). It is important to periodically inspect the teeth and gums of patients in a hospital or long-term clinical setting who are receiving one of these drugs. The nurse reports any changes in the gums or teeth to the primary health care provider. It is important that oral care be given after each meal and that the mouth and gums be inspected routinely.

The nurse monitors vital signs every 4 hours or as ordered. Any adverse drug reactions or signs of toxicity are reported to the primary health care provider immediately.

Nursing Alert

When administering phenytoin, the nurse closely monitors the patient for the following signs of drug toxicity: slurred speech, ataxia, lethargy, dizziness, nausea, and vomiting. Phenytoin plasma levels between 10 and 20 mcg/mL give optimal anticonvulsant effect. However, many patients achieve seizure control at lower serum concentration levels. Levels greater than 20 mcg/mL are associated with toxicity. Patients with plasma levels greater than 20 mcg/mL may exhibit nystagmus, and at concentrations greater than 30 mcg/mL, ataxia and mental changes are usually seen.

OXAZOLIDINEDIONES. Drowsiness is the most common adverse reaction and, as with the other anticonvulsants, tends to subside with continued use. Visual disturbances may also occur. The patient with a visual disturbance is assisted with ambulation and oriented carefully to the environment. The nurse ensures that the environment is safe. The patient may be especially sensitive to bright lights and may want the room light to be kept dim. Because photosensitivity can occur, the nurse must keep the patient out of the sun. The nurse instructs the patient to use sunscreens and protective clothing until the individual effects of the drug are known.

SUCCINIMIDES. The succinimides are particularly toxic. The nurse must be alert for signs of blood dyscrasias, such as the presence of fever, sore throat, and general malaise. The nurse reports any of these symptoms immediately because fatal blood dyscrasias have occurred. Routine blood tests may be performed, such as complete blood counts and differential counts.

MISCELLANEOUS ANTICONVULSANTS. A severe and potentially fatal rash can occur in patients taking lamotrigine. The nurse must immediately report any rash in

Nursing Alert

The nurse must report symptoms of succinimide overdosage immediately. Symptoms of overdosage include confusion, sleepiness, unsteadiness, flaccid muscles, slow shallow respirations, nausea, vomiting, hypotension, absent reflexes, and CNS depression leading to coma. It is important to report symptoms to the primary health care provider immediately. Therapeutic serum blood levels of ethosuximide (Zarontin) range from 40 to 100 mcg/mL.

a patient taking lamotrigine to the primary health care provider before the next dose is due. Discontinuation of the drug may be required.

Educating the Patient and Family

When the patient receives a diagnosis of epilepsy, the nurse must assist the patient and the family to adjust to the diagnosis. The nurse should instruct family members in the care of the patient before, during, and after a seizure. The nurse explains the importance of restricting some activities until the seizures are controlled by drugs. Restriction of activities often depend on the age, sex, and occupation of the patient. For example, the nurse should advise a mother with a seizure disorder who has a newborn infant to have help when caring for her child. The nurse also would warn a carpenter about climbing ladders or using power tools. For some patients, the restriction of activities may create problems with such things as employment, management of the home environment, or child care. If a problem is recognized, a referral may be needed to a social worker, discharge planning coordinator, or public health nurse.

The nurse reviews adverse drug reactions associated with the prescribed anticonvulsant with the patient and family members. The patient and family members are instructed to contact the primary health care provider if any adverse reactions occur before the next dose of the drug is due. The patient must not stop taking the drug until the problem is discussed with the primary health care provider.

Some patients, once their seizures are under control (eg, stop occurring or occur less frequently), may have a tendency to stop the drug abruptly or begin to omit a dose occasionally. The drug must never be abruptly discontinued or doses omitted. If the patient experiences drowsiness during initial therapy, a family member should be responsible for administration of the drug.

The nurse should include the following points in a patient and family teaching plan.

- Do not omit, increase, or decrease the prescribed dose.
- Anticonvulsant blood levels must be monitored at regular intervals, even if the seizures are well controlled.
- This drug should never be abruptly discontinued, except when recommended by the primary health care provider.
- If the primary health care provider finds it necessary to stop the drug, another drug usually is prescribed. Start taking this drug immediately (at the time the next dose of the previously used drug was due).
- These drugs may cause drowsiness or dizziness. Observe caution when performing hazardous tasks. Do not drive unless the adverse reactions of drowsiness, dizziness, or blurred vision are not significant. Driving privileges will be given by the primary health care provider based on seizure control.
- Avoid the use of alcohol unless use has been approved by the primary health care provider.
- Carry identification, such as a Medic-Alert tag, indicating drug use and the type of seizure disorder.
- Do not use any nonprescription drug unless use of a specific drug has been approved by the primary health care provider.
- Keep a record of all seizures (date, time, length), as well as any minor problems (eg, drowsiness, dizziness, lethargy), and bring this information to each clinic or office visit.
- Contact the local branches of agencies, such as the Epilepsy Foundation of America, for information and assistance with problems such as legal matters, insurance, driver's license, low-cost prescription services, and job training or retraining.

HYDANTOINS

- Inform the dentist and other primary health care providers of use of this drug.
- Brush and floss the teeth after each meal and make periodic dental appointments for oral examination and care.
- Take the medication with food to reduce gastrointestinal upset.
- Phenytoin suspension must be thoroughly shaken immediately before use.
- Do not use when capsules are discolored.
- Notify the primary health care provider if any of the following occurs: skin rash, bleeding, swollen or tender gums, yellowish discoloration of the skin or eyes, unexplained fever, sore throat, unusual bleeding or bruising, persistent headache, malaise, or pregnancy.

SUCCINIMIDES

- If gastrointestinal upsets occurs, take the drug with food or milk.
- Phensuximide may discolor the urine pink, red, or red-brown. This is not abnormal and will cause no harm.
- Notify the primary health care provider if any of the following occurs: skin rash, joint pain, unexplained fever, sore throat, usual bleeding or bruising, drowsiness, dizziness, blurred vision, or pregnancy.

OXAZOLIDINEDIONES

- This drug may cause photosensitivity. Take protective measures (eg, use sunscreens, wear protective clothing) when exposed to ultraviolet light or sunlight until tolerance is determined.
- Notify the primary care provider if the following reactions occur: visual disturbances, excessive drowsiness or dizziness, sore throat, fever, skin rash, pregnancy, malaise, easy bruising, epistaxis, or bleeding tendencies.
- Avoid pregnancy while taking trimethadione; the drug has caused serious birth defects.

EVALUATION

- The therapeutic effect is achieved, and convulsions are controlled.
- No evidence of injury is seen.
- Adverse reactions are identified, reported to the primary health care provider, and managed successfully through appropriate nursing interventions.
- Oral mucous membranes appear normal.
- The patient verbalizes the importance of complying with the prescribed treatment regimen.
- The patient verbalizes an understanding of treatment modalities and the importance of continued follow-up care.
- The patient and family demonstrate an understanding of the drug regimen.

● *Critical Thinking Exercises*

1. *Ms. Taylor tells you that since she has been taking phenytoin she has had no seizures. In fact, she states that she has omitted one or two doses over the last month because she is "doing so well." Explain your response to Ms. Taylor's statement.*
2. *Mr. Parks, age 32 years, has recently received a diagnosis of epilepsy. He has been taking the anticonvulsant carbamazepine, but his seizures are not yet under control. Mr. Parks asks you how long it will take to "cure" his epilepsy. Determine how you would respond to Mr. Parks.*
3. *Develop a teaching plan educating the family members on what to do when the patient has a seizure.*

● Review Questions

1. A patient is prescribed phenytoin for a recurrent convulsive disorder. The nurse informs the patient that the most common adverse reactions are _____.
   - **A.** related to the gastrointestinal system
   - **B.** associated with the reproductive system
   - **C.** associated with kidney function
   - **D.** related to the CNS
2. Which of the following adverse reactions, if observed in a patient prescribed phenytoin, would indicate that the patient may be developing phenytoin toxicity?
   - **A.** severe occipital headache
   - **B.** ataxia
   - **C.** hyperactivity
   - **D.** somnolence
3. When administering phenobarbital to an elderly patient the nurse should monitor the patient for unusual effects of the drug such as _____.
   - **A.** marked excitement
   - **B.** excessive sweating
   - **C.** insomnia
   - **D.** agitation
4. When caring for a patient taking a succinimide for absent seizures, the nurse monitors the patient for blood dyscrasias. Which of the following symptoms would indicate that the patient may be developing a blood dyscrasia?
   - **A.** constipation, blood in the stool
   - **B.** diarrhea, lethargy
   - **C.** sore throat, general malaise
   - **D.** hyperthermia, excitement
5. Which statement would be included when educating the patient taking trimethadione for absence seizures?
   - **A.** Take this drug with milk to enhance absorption.
   - **B.** Wear a sunscreen and protective clothing when exposed to sunlight.
   - **C.** To minimize adverse reactions, take this drug once daily at bedtime.
   - **D.** Visit a dentist frequently because this drug increases the risk of gum disease.

● Medication Dosage Problems

1. The nurse is preparing to administer an anticonvulsant for status epilepticus. The primary care provider prescribes Luminal 200 mg IV. The drug is available in a dosage of 60 mg/mL. The nurse administers _____.
2. Zonisamide 200 mg is prescribed. The drug is available in 100-mg tablets. The nurse administers _____.
3. The primary care provider prescribes ethosuximide syrup 500 mg for a patient with absence seizures. The drug is available in a strength of 250 mg/5 mL. The nurse administers _____.