

# Antiparkinsonism Drugs

## Key Terms

blood–brain barrier  
choreiform  
movements  
dystonic movements

on-off phenomenon  
Parkinson's disease  
parkinsonism

## Chapter Objectives

On completion of this chapter, the student will:

- Define the terms *Parkinson's disease* and *parkinsonism*.
- Discuss the uses, general drug action, adverse drug reactions, contraindications, precautions, and interactions of the antiparkinsonism drugs.
- Discuss important preadministration and ongoing assessment activities the nurse should perform on the patient taking antiparkinsonism drugs.
- List some nursing diagnoses particular to a patient taking antiparkinsonism drugs.
- Discuss ways to promote an optimal response to therapy, how to manage adverse reactions, and important points to keep in mind when educating patients about the use of the antiparkinsonism drugs.

**P**arkinson's disease, also called paralysis agitans, is a degenerative disorder of the central nervous system (CNS). The disease is thought to be caused by a deficiency of dopamine and an excess of acetylcholine within the CNS. Parkinson's disease affects the part of the brain that controls muscle movement, causing such symptoms as trembling, rigidity, difficulty walking, and problems in balance. It is characterized by fine tremors and rigidity of some muscle groups and weakness of others. Parkinson's disease is progressive, that is the symptoms become worse over time. As the disease progresses, speech becomes slurred, the face has a masklike and emotionless expression, and the patient may have difficulty chewing and swallowing. The patient may have a shuffling and unsteady gait, and the upper part of the body is bent forward. Fine tremors begin in the fingers with a pill-rolling movement, increase with stress, and decrease with purposeful movement. Depression or dementia may occur, causing memory impairment and alterations in thinking.

Parkinson's disease has no cure, but the antiparkinsonism drugs are used to relieve the symptoms and assist in maintaining the patient's mobility and functioning capability as long as possible. For years, levodopa was the drug that provided the mainstay of treatment. Now, there are new drugs that are used either alone or in combination with levodopa. Entacapone (Comtan), pramipexole

(Mirapex), and ropinirole (Requip) are newer drugs used in the treatment of Parkinson's disease. Drug-induced parkinsonism is treated with the anticholinergics benzotropine (Cogentin) and trihexyphenidyl (Artane).

**Parkinsonism** is a term that refers to the symptoms of Parkinson's disease, as well as the Parkinson-like symptoms that may be seen with the use of certain drugs, head injuries, and encephalitis. Drugs used to treat the symptoms associated with parkinsonism are called antiparkinsonism drugs. As with some other types of drugs, it may be necessary to change from one antiparkinsonism drug to another or to increase or decrease the dosage until maximum response is obtained. The Summary Drug Table: Antiparkinsonism Drugs provides a listing of the drugs used to treat Parkinson's disease. Antiparkinsonism drugs discussed in the chapter are classified as dopaminergic agents, anticholinergic drugs, COMT inhibitors, and dopamine receptor agonists (non-ergot).

## DOPAMINERGIC DRUGS

Dopaminergic drugs are drugs that affect the dopamine content of the brain. These drugs include levodopa (Larodopa), carbidopa (Ladosyn), amantadine (Symmetrel),

and pergolide mesylate (Permax). (See Summary Drug Table: Antiparkinsonism Drugs).

## ACTIONS

The symptoms of parkinsonism are caused by a depletion of dopamine in the CNS. Dopamine, when given orally, does not cross the blood–brain barrier and therefore is ineffective. The body's **blood–brain barrier** is a meshwork of tightly packed cells in the walls of the brain's capillaries that screen out certain substances. This unique meshwork of cells in the CNS prohibits large and potentially harmful molecules from crossing into the brain. This ability to screen out certain substances has important implications for drug therapy because some drugs are able to pass through the blood–brain barrier more easily than others.

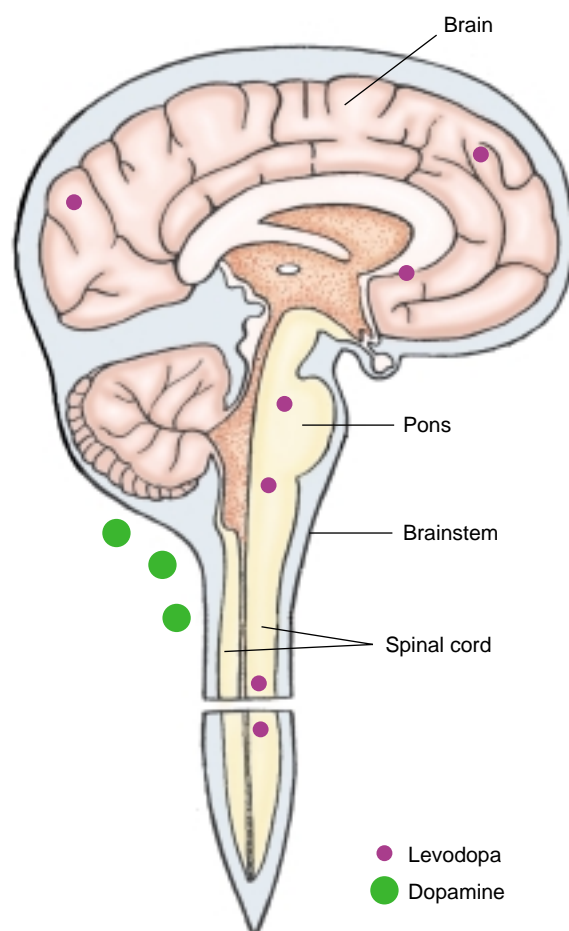
Levodopa is a chemical formulation found in plants and animals that is converted into dopamine by nerve cells in the brain. Levodopa does cross the blood–brain barrier, and a small amount is then converted to dopamine. This allows the drug to have a pharmacologic effect in patients with Parkinson's disease (Fig. 29-1). Combining levodopa with another drug (carbidopa) causes more levodopa to reach the brain. When more levodopa is available, the dosage of levodopa may be reduced. Carbidopa has no effect when given alone. Sinemet is a combination of carbidopa and levodopa and is available in several combinations (eg, Sinemet 10/100 has 10 mg of carbidopa and 100 mg of levodopa; Sinemet CR is a time-released version of the combined drugs).

The mechanism of action of amantadine (Symmetrel) and selegiline (Eldepryl) in the treatment of parkinsonism is not fully understood.

## USES

The dopaminergic drugs are used to treat the signs and symptoms of parkinsonism. As with some other types of drugs, it may be necessary to change from one antiparkinsonism drug to another or to increase or decrease the dosage until maximum response is obtained.

Levodopa has been considered the gold standard drug therapy for Parkinson's disease since it was first used in the 1960s. Carbidopa is always given with levodopa, combined either as one drug or as two separate drugs. When it is necessary to titrate the dose of carbidopa, both carbidopa and levodopa may be given at the same time, but as separate drugs. Sometimes the response with these two drugs can be enhanced by the addition of another drug. For example, selegiline or pergolide may be added to the drug regimen of those being treated with carbidopa and levodopa but who



**FIGURE 29-1.** The blood–brain barrier selectively inhibits certain substances from entering the interstitial spaces of the brain and spinal fluid. It is thought that certain cells within the brain form tight junctions that prevent or slow the passage of certain substances. Levodopa passes the blood–brain barrier, whereas dopamine is unable to pass.

have had a decreased response to therapy with these two drugs.

Amantadine is less effective than levodopa in the treatment of Parkinson's disease but more effective than the anticholinergics. Amantadine may be given alone or in combination with an antiparkinsonism drug with anticholinergic activity. Amantadine is also used as an antiviral drug (see Chap. 14).

## ADVERSE REACTIONS

During early treatment with levodopa and carbidopa, adverse reactions are usually not a problem. But as the disease progresses, the response to the drug may become less, and the period of time that each dose is effective begins to decrease, leading to more frequent doses, and more adverse reactions.

The most serious and frequent adverse reactions seen with levodopa include **choreiform movements**

## SUMMARY DRUG TABLE ANTIPARKINSONISM DRUGS

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
<b>Dopaminergic Agents</b>				
amantadine <i>a-man'-ta-deen</i>	Symmetrel, <i>generic</i>	Parkinson's disease/ drug-induced extrapyramidal reactions, prevention and treatment of influenza A virus	Light-headedness, dizziness, insomnia, confusion, nausea, constipation, dry mouth, orthostatic hypotension, depression	100–400 mg/d PO in divided doses
bromocriptine <i>broe-moe-krip'-tine</i>	Parlodel, Parlodel Snap Tabs	Parkinson's disease	Drowsiness, sedation, dizziness, faintness, epigastric distress, anorexia	1.25–100 mg/d PO
carbidopa <i>kar'-bi-doe-pa</i>	Lodosyn	Used with levodopa in the treatment of Parkinson's disease	None when given alone; when administered with levodopa, adverse reactions of levodopa	Up to 200 mg/d PO
carbidopa/ levodopa <i>kar'-bi-doe-pa/ lee'-voe-doe-pa</i>	Sinemet CR, Sinemet 10/100, Sinemet 25/100, Sinemet 25/250, <i>generic</i>	Parkinson's disease	Same as levodopa	Dosages individualized to obtain therapeutic effect; average dose is 1 tablet PO TID
levodopa <i>lee'-voe-doe-pa</i>	Dopar, Larodopa, <i>generic</i>	Parkinson's disease	Choreiform or dystonic movements, anorexia, nausea, vomiting, abdominal pain, dysphagia, dry mouth, mental changes, headache, dizziness, increased hand tremor	0.5–8 g/d
pergolide <i>per'-goe-lide</i>	Permax	As adjunct to levodopa/carbidopa in Parkinson's disease	Nausea, dyskinesia, dizziness, hallucinations, somnolence, insomnia, peripheral edema, constipation	0.05–3 mg/d PO TID
selegiline <i>sell-eh'-geh-leen</i>	Carbex, Eldepryl, <i>generic</i>	As adjunct to levodopa/carbidopa in Parkinson's disease	Nausea, hallucinations, confusion, depression, loss of balance, dizziness, nausea	10 mg/d PO in divided doses
<b>Anticholinergic Agents</b>				
benztropine mesylate <i>benz'-tro-peen</i>	Cogentin, <i>generic</i>	Adjunct therapy in Parkinson's disease	Dry mouth, blurred vision, dizziness, nausea, nervousness, skin rash, urinary retention, dysuria, tachycardia, muscle weakness, disorientation, confusion	0.5–6 mg/d PO, IM, IV
biperiden <i>by-per'-i-den</i>	Akineton	Adjunct therapy in Parkinson's disease	Same as benztropine mesylate	2 mg PO 3–4 times/d; maximum dose, 16 mg/24h; 2 mg IM or IV
diphenhydramine <i>dye-fen-hye'-dra- meen</i>	Benadryl, <i>generic</i>	Drug-induced extrapyramidal reactions in Parkinson's disease, allergies	Same as benztropine mesylate	25–50 mg PO q4–6h; 10–400 mg IM, IV
procyclidine <i>pro-sye'-kli-deen</i>	Kemadrin	Parkinson's disease	Same as benztropine mesylate	2.5–5 mg PO TID
trihexyphenidyl <i>trye-hex-ee-fen'-i-dill</i>	Artane, Trihexy-2, <i>generic</i>	Adjunct in the treatment of Parkinson's disease	Same as benztropine mesylate	1–15 mg/d PO in divided doses

## SUMMARY DRUG TABLE ANTIPARKINSONISM DRUGS (Continued)

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
<b>COMT Inhibitors</b>				
entacapone <i>en-tah-kap'-own</i>	Comtan	As adjunct to levodopa/carbidopa in Parkinson's disease	Orthostatic hypotension, dyskinesia, sleep disorders, dystonia, excessive dreaming, somnolence, confusion, dizziness, nausea, anorexia, diarrhea, muscle cramps	200–1600 mg/d PO
tolcapone <i>toll-kap'-own</i>	Tasmar	As adjunct to levodopa/carbidopa in Parkinson's disease	Orthostatic hypotension, dyskinesia, sleep disorders, dystonia, excessive dreaming, somnolence, confusion, dizziness, nausea, anorexia, diarrhea, muscle cramps	100–200 mg PO TID
<b>Dopamine Receptor Agonists, Non-Ergot</b>				
pramipexole <i>pram-ah-pex'-ole</i>	Mirapex	Parkinson's disease	Dizziness, somnolence, insomnia, hallucinations, confusion, nausea, dyspepsia, syncope	0.125–1.5 mg PO TID
ropinirole HCL <i>roe-pin'-o-role</i>	Requip	Parkinson's disease	Dizziness, somnolence, insomnia, hallucinations, confusion, nausea, dyspepsia, syncope	0.25–1 mg PO TID; maximum dose, 24 mg/d

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

(involuntary muscular twitching of the limbs or facial muscles) and **dystonic movements** (muscular spasms most often affecting the tongue, jaw, eyes, and neck). Less common but serious reactions include mental changes, such as depression, psychotic episodes, paranoia, and suicidal tendencies. Common and less serious adverse reactions include anorexia, nausea, vomiting, abdominal pain, dry mouth, difficulty in swallowing, increased hand tremor, headache, and dizziness. Carbidopa is used with levodopa and has no effect when given alone.

The most common serious adverse reactions to amantadine are orthostatic hypotension, depression, congestive heart failure, psychosis, urinary retention, convulsions, leukopenia, and neutropenia. Less serious reactions include hallucinations, confusion, anxiety, anorexia, nausea, and constipation. Adverse reactions with selegiline include nausea, hallucinations, confusion, depression, loss of balance, and dizziness.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

The dopaminergic drugs are contraindicated in patients with known hypersensitivity to the drugs. Levodopa is contraindicated in patients with narrow-angle glaucoma, those receiving a monoamine oxidase inhibitor (see

Chap. 31), and during lactation. Levodopa is used cautiously in patients with cardiovascular disease, bronchial asthma, emphysema, peptic ulcer disease, renal or hepatic disease, and psychosis. Levodopa and combination antiparkinsonism drugs (eg, carbidopa/levodopa) are classified as Pregnancy Category C and are used with caution during pregnancy and lactation.

Levodopa interacts with many different drugs. When levodopa is used with phenytoin, reserpine, and papaverine, there is a decrease in response to levodopa. The risk of a hypertensive crisis increases when levodopa is used with the monoamine oxidase inhibitors (see Chap. 31). Foods high in pyridoxine (vitamin B<sub>6</sub>) or vitamin B<sub>6</sub> preparations reverse the effect of levodopa. However, when carbidopa is used with levodopa, pyridoxine has no effect on the action of levodopa. In fact, when levodopa and carbidopa are given together, pyridoxine may be prescribed to decrease the adverse effects associated with levodopa.

Selegiline is used cautiously in patients with psychosis, dementia, or excessive tremor. When selegiline is administered with levodopa, the effectiveness of levodopa increases. This effect allows for a decrease in the dosage of levodopa. If selegiline is given in doses greater than 10 mg/d there is an increased risk of hypertension, particularly if tyramine-containing foods (eg, beer, wine, aged cheese, yeast products, chicken livers, and pickled herring) are ingested. A potentially serious reaction

(confusion, agitation, hypertension, and seizures) can occur when fluoxetine is administered with selegiline. Fluoxetine therapy is discontinued for a least 1 week before treatment with selegiline is initiated.

Amantadine is used cautiously in patients with seizure disorders, hepatic disease, psychosis, cardiac disease, and renal disease. The antihistamines, phenothiazines, disopyramide, and alcohol increase the risk of adverse reactions when administered with amantadine.

## ANTICHOLINERGIC DRUGS

### ACTIONS

Drugs with anticholinergic activity inhibit acetylcholine (a neurohormone produced in excess in Parkinson's disease) in the CNS. Drugs with anticholinergic activity are generally less effective than levodopa.

### USES

Drugs with anticholinergic activity are used as adjunctive therapy in all forms of parkinsonism and in the control of drug-induced extrapyramidal disorders. Examples of drugs with anticholinergic activity include benzotropine mesylate (Cogentin), biperiden (Akineton), diphenhydramine, procyclidine (Kemadrin), and trihexyphenidyl (Artane). See Summary Drug Table: Antiparkinsonism Drugs for specific uses of these drugs.

### ADVERSE REACTIONS

Frequently seen adverse reactions to drugs with anticholinergic activity include dry mouth, blurred vision, dizziness, mild nausea, and nervousness. These may become less pronounced as therapy progresses. Other adverse reactions may include skin rash, urticaria (hives), urinary retention, dysuria, tachycardia, muscle weakness, disorientation, and confusion. If any of these reactions are severe, the drug may be discontinued for several days and restarted at a lower dosage, or a different antiparkinsonism drug may be prescribed.

### CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

These drugs are contraindicated in those with a hypersensitivity to the anticholinergic drugs, those with glaucoma (angle-closure), pyloric or duodenal obstruction, peptic ulcers, prostatic hypertrophy, achalasia (failure of

the muscles of the lower esophagus to relax causing difficulty swallowing), myasthenia gravis, and megacolon.

These drugs are used with caution in patients with tachycardia, cardiac arrhythmias, hypertension, hypotension, those with a tendency toward urinary retention, those with decreased liver or kidney function, and those with obstructive disease of the urinary system or gastrointestinal tract. The anticholinergic drugs are given with caution to the older adult.



### Gerontologic Alert

*Individuals older than 60 years frequently develop increased sensitivity to anticholinergic drugs and require careful monitoring. Confusion and disorientation may occur. Lower doses may be required.*

When the anticholinergic drugs are administered with amantadine, there is an increased anticholinergic effect. When digoxin is administered with an anticholinergic drug, digoxin blood levels may be increased, leading to an increased risk for digitalis toxicity. Haloperidol and anticholinergic co-administration may result in worsening of schizophrenic symptoms, decreased haloperidol blood levels, and development of tardive dyskinesia (see Chap. 32). When the anticholinergic drugs are administered with the phenothiazines, there is a decrease in the therapeutic effects of the phenothiazines and an increase in anticholinergic adverse reactions.

## COMT INHIBITORS

A newer classification of antiparkinson drugs is the catechol-*O*-methyltransferase (COMT) inhibitors. Examples of the COMT inhibitors are entacapone (Comtan) and tolcapone (Tasmar).

### ACTIONS

These drugs are thought to prolong the effect of levodopa by blocking an enzyme, catechol-*O*-methyltransferase (COMT), which eliminates dopamine. When given with levodopa, the COMT inhibitors increase the plasma concentrations and duration of action of levodopa.

### USES

The COMT inhibitors are used as adjuncts to levodopa/carbidopa in Parkinson's disease. Tolcapone is a potent COMT inhibitor that easily crosses the blood-brain barrier. However, the drug is associated with liver damage



and liver failure. Because of the danger to the liver, tolcapone is reserved for people who are not responding to other therapies. Entacapone is a milder COMT inhibitor and is used to help manage fluctuations in the response to levodopa in individuals with Parkinson's disease.

## ADVERSE REACTIONS

The adverse reactions most often associated with the administration of the COMT inhibitors include disorientation, confusion, light-headedness, dizziness, dyskinesias, hyperkinesias, nausea, vomiting, hallucinations, and fever. Other adverse reactions are orthostatic hypotension, sleep disorders, excessive dreaming, somnolence, and muscle cramps. A serious and possibly fatal adverse reaction that can occur with the administration of tolcapone is liver failure.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

These drugs are contraindicated in patients with a hypersensitivity to the drugs and during pregnancy (Category C) and lactation. Tolcapone is contraindicated in patients with liver dysfunction. The COMT inhibitors are used with caution in patients with hypertension, hypotension, and decreased hepatic or renal function.

The COMT inhibitors should not be administered with the monoamine oxidase (MAO) inhibitors (see Chap. 31) because there is an increased risk of toxicity. If the COMT inhibitors are administered with norepinephrine, dopamine, dobutamine, methyldopa, or epinephrine, there is a risk of increased heart rate, arrhythmias, and excessive blood pressure changes.

## DOPAMINE RECEPTOR AGONISTS (NON-ERGOT)

### ACTIONS

The exact mechanism of action of these drugs is not understood. It is thought that these drugs act directly on postsynaptic dopamine receptors of nerve cells in the brain, mimicking the effects of dopamine in the brain.

### USES

The dopamine receptor agonists, such as pramipexole (Mirapex) and ropinirole (Requip), are used for the treatment of the signs and symptoms of Parkinson's disease.

## ADVERSE REACTIONS

The most common adverse reactions seen with pramipexole and ropinirole include nausea, dizziness, postural hypotension, hallucinations, somnolence, vomiting, confusion, visual disturbances, abnormal involuntary movements, and headache.

## CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

The dopamine receptor agonists are contraindicated in patients with known hypersensitivity to the drugs, severe ischemic heart disease, or peripheral vascular disease. The dopamine receptor agonists are used with caution in patients with dyskinesia, orthostatic hypotension, and hepatic or renal impairment. The dopamine receptor agonists are used cautiously in patients with a history of hallucinations or psychosis, cardiovascular disease, and renal impairment. Both ropinirole and pramipexole are Pregnancy Category C drugs, and safety during pregnancy has not been established.

There is an increased risk of CNS depression when the dopamine receptor agonists are administered with other CNS depressants. When administered with levodopa, the dopamine receptor agonists increase the effects of levodopa (a lower dosage of levodopa may be required). In addition, when the dopamine receptor agonists are administered with levodopa, there is an increased risk of hallucinations. When administered with ciprofloxacin, there is an increased effect of the dopamine receptor agonist.

The phenothiazines may decrease the effectiveness of the dopamine receptor agonists. When pramipexole is administered concurrently with cimetidine, ranitidine, verapamil, and quinidine, there is an increased effect of pramipexole. When ropinirole is administered with the estrogens, particularly estradiol, there may be an increased effect of ropinirole.

## NURSING PROCESS

### ● The Patient Receiving an Antiparkinsonism Drug

#### ASSESSMENT

##### *Preadministration Assessment*

Because of memory impairment and alterations in thinking in some patients with parkinsonism, a history obtained from the patient may be unreliable. When necessary, the nurse obtains the health history from a family member. Important data to include is information regarding the symptoms of the disorder, the length of

time the symptoms have been present, the ability of the patient to carry on activities of daily living, and the patient's current mental condition (eg, impairment in memory, signs of depression, or withdrawal).

Before starting the drug therapy, the nurse performs a physical assessment of the patient to provide a baseline for future evaluations of drug therapy. It also is important to include an evaluation of the patient's neurologic status. Display 29-1 describes the assessments the nurse would make when evaluating the neurological status.

### Ongoing Assessment

The nurse evaluates the patient's response to drug therapy by neurologic observations (see Display 29-1) and compares these observations with the data obtained during the initial physical assessment. For example, the patient is assessed for clinical improvement of the symptoms of the disease, such as improvement of tremor of head and/or hands at rest, muscular rigidity, mask-like facial expression, and ambulation stability. Although drug response may occur slowly in some patients, these observations aid the primary health care provider in adjusting the dosage of the drug upward or downward to obtain the desired therapeutic results.

## 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 may include an optimal response to drug therapy, management of common adverse drug reactions, absence of injury, and an understanding of and compliance with the prescribed therapeutic regimen.

### DISPLAY 29-1 • Neurologic Evaluation

The neurologic evaluation includes observation for the following:

- Tremors of the hands or head while the patient is at rest
- A masklike facial expression
- Changes (from the normal) in walking
- Type of speech pattern (halting, monotone)
- Postural deformities
- Muscular rigidity
- Drooling, difficulty in chewing or swallowing
- Changes in thought processes
- Ability of the patient to carry out any or all of the activities of daily living (eg, bathing, ambulating, dressing)

### Nursing Diagnoses Checklist

- ✓ **Imbalanced Nutrition: Less than Body Requirements** related to adverse drug effects (nausea, vomiting)
- ✓ **Risk for Injury** related to parkinsonism, adverse drug reactions (dizziness, light-headedness, orthostatic hypotension, loss of balance)
- ✓ **Impaired Physical Mobility** related to alterations in balance, unsteady gait, dizziness
- ✓ **Imbalanced Nutrition: Less than Body Requirements** related to adverse drug effects (nausea, vomiting)
- ✓ **Constipation** related to adverse drug reactions

## IMPLEMENTATION

### Promoting an Optimal Response to Therapy

Effective management of the patient with parkinsonism requires that the nurse carefully monitor the drug therapy, provide psychological support, and place a strong emphasis on patient and family teaching.

The drugs used to treat parkinsonism also may be used to treat the symptoms of parkinsonism that occur with the administration of some of the psychotherapeutic drugs (see Chap. 32). When used for this purpose, the antiparkinsonism drugs may exacerbate mental symptoms and precipitate a psychosis. The nurse must observe the patient's behavior at frequent intervals. If sudden behavioral changes are noted, the nurse withholds the next dose of the drug and immediately notifies the primary health care provider.

### Monitoring and Managing Adverse Drug Reactions

The nurse observes the patient daily for the development of adverse reactions. All adverse reactions are reported to the primary health care provider because a dosage adjustment or change to a different antiparkinsonism drug may be necessary with the occurrence of the more serious adverse reactions.

### Nursing Alert

*The nurse observes patients receiving levodopa or carbidopa and levodopa for the occurrence of choreiform and dystonic movements, such as facial grimacing, protruding tongue, exaggerated chewing motions and head movements, and jerking movements of the arms and legs. If these occur, the nurse should withhold the next dose of the drug and notify the primary health care provider because it may be necessary to reduce the dosage of levodopa or discontinue use of the drug.*

Some adverse reactions, although not serious, may be uncomfortable. An example of a less serious but uncomfortable adverse reaction is dryness of the mouth. The nurse can help relieve dry mouth by offering frequent

sips of water, ice chips, or hard candy (if allowed). If dry mouth is so severe that there is difficulty in swallowing or speaking, or if loss of appetite and weight loss occurs, the dosage of the antiparkinsonism drug may be reduced.

### Nursing Alert

*A serious and potentially fatal adverse reaction to tolcapone is hepatic injury. Regular blood testing to monitor liver function is usually prescribed. The physician may order testing of serum transaminase levels at frequent intervals (eg, every 2 weeks for the first year and every 8 weeks thereafter). Treatment is discontinued if the ALT (SGPT) exceeds the upper normal limit or signs or symptoms of liver failure develop. The patient is observed for persistent nausea, fatigue, lethargy, anorexia, jaundice, dark urine, pruritus, and right upper quadrant tenderness.*

Some patients with parkinsonism communicate poorly and do not tell the primary health care provider or nurse that problems are occurring. The nurse observes the patient with parkinsonism for outward changes that may indicate one or more adverse reactions. For example, a sudden change in the facial expression or changes in posture may indicate abdominal pain or discomfort, which may be caused by urinary retention, paralytic ileus, or constipation. Sudden changes in behavior may indicate hallucinations, depression, or other psychotic episodes.

### Gerontologic Alert

*Hallucinations occur more often in the older adult than in the younger adult receiving the antiparkinsonism drugs, especially when taking the dopamine receptor agonists. The nurse should assess the older adult for signs of visual, auditory, or tactile hallucinations. The incidence of hallucinations appears to increase with age.*

Visual difficulties (eg, adverse reactions of blurred vision and diplopia) may be evidenced by the patient's sudden refusal to read or watch television or by the patient bumping into objects when ambulating. The nurse carefully evaluates any sudden changes in the patient's behavior or activity and reports them to the primary health care provider. The patient with visual difficulties may need assistance with ambulation. The room should be kept well lighted, the use of scatter or throw rugs should be avoided, and any small pieces of furniture or objects that might increase the risk of falling should be removed. The nurse carefully assesses the environment and makes the necessary adjustments to ensure the patient's safety.

Some patients taking the antiparkinsonism drugs experience gastrointestinal disturbances such as nausea, vomiting, or constipation. This can affect the patient's nutritional status. It is a good idea for the nurse to create a calm environment, serve small frequent meals, and serve foods the patient prefers to help improve nutrition. The nurse also may monitor the patient's weight daily. Gastrointestinal disturbances are sometimes helped by taking the drug with meals. Severe nausea or vomiting may necessitate discontinuing the drug and changing to a different antiparkinsonism drug. With continued use of the drug, nausea usually decreases or is resolved. If constipation is a problem, the nurse stresses the need for a diet high in fiber and increasing fluids in the diet. A stool softener may be needed to help prevent constipation.

Minimizing the risk for injury is an important aspect in the care of the patient with parkinsonism. These patients may have difficulty ambulating. Adverse reactions, such as dizziness, muscle weakness, and ataxia (lack of muscular coordination) may further increase difficulty with ambulatory activities. These individuals are especially prone to falls and other accidents because of their disease process and possible adverse drug reactions. The nurse assists the patient in getting out of the bed or a chair, walking, and other self-care activities. In addition, assistive devices such as a cane or walker may be helpful with ambulation. The nurse may suggest that the patient wear shoes with rubber soles to minimize the possibility of slipping. Patients are prone to orthostatic hypotension as a result of the drug regimen. These patients are instructed to arise slowly from a sitting or lying position, especially after sitting or lying for a prolonged time.

The **on-off phenomenon** may occur in patients taking levodopa. In this condition, the patient may suddenly alternate between improved clinical status and loss of therapeutic effect. This effect is associated with long-term levodopa treatment. Low doses of the drug, reserving the drug for severe cases, or the use of a "drug holiday" may be prescribed. Should symptoms occur, the primary health care provider may order a drug holiday that includes complete withdrawal of levodopa for 5 to 14 days, followed by gradually restarting use of the drug at a lower dose.

### Nursing Alert

*Do not abruptly discontinue use of the antiparkinsonism drugs. Neuroleptic malignant-like syndrome may occur when the antiparkinsonism drugs are discontinued or the dosage of levodopa is reduced abruptly. The nurse carefully observes the patient and reports the following symptoms: muscular rigidity, elevated body temperature, and mental changes.*



### Educating the Patient and Family

The nurse evaluates the patient's ability to understand the therapeutic drug regimen, ability to care for himself or herself in the home environment, and ability to comply with the prescribed drug therapy. If any type of assistance is needed, the nurse provides a referral to the discharge planning coordinator or social worker.

If the patient requires supervision or help with daily activities and the drug regimen, the nurse encourages the family to create a home environment that is least likely to result in accidents or falls. Changes such as removing throw rugs, installing a handrail next to the toilet, and moving obstacles that can result in tripping or falling can be made at little or no expense to the family.

The nurse should include the following information in the patient and family teaching plan:

- Take this drug as prescribed. Do not increase, decrease, or omit a dose or stop taking the drug unless advised to do so by the primary health care provider. If gastrointestinal upset occurs, take the drug with food.
- If dizziness, drowsiness, or blurred vision occurs, avoid driving or performing other tasks that require alertness.
- Avoid the use of alcohol unless use has been approved by the primary health care provider.
- Relieve dry mouth by sucking on hard candy (unless the patient has diabetes) or frequent sips of water. Consult a dentist if dryness of the mouth interferes with wearing, inserting, or removing dentures or causes other dental problems.
- Inform patients that orthostatic hypotension may develop with or without symptoms of dizziness, nausea, fainting, and sweating. Caution the patient against rising rapidly after sitting or lying down.
- Notify the primary health care provider if any of these problems occur: severe dry mouth, inability to chew or swallow food, inability to urinate, feelings of depression, severe dizziness or drowsiness, rapid or irregular heartbeat, abdominal pain, mood changes, and unusual movements of the head, eyes, tongue, neck, arms, legs, feet, mouth, or tongue.
- Keep all appointments with the primary health care provider or clinic personnel because close monitoring of therapy is necessary.
- When taking levodopa, avoid vitamin B<sub>6</sub> (pyridoxine) because this vitamin may interfere with the action of levodopa (see Home Care Checklist: Avoiding Certain Foods While Taking Levodopa).
- Patients with diabetes: Levodopa may interfere with urine tests for glucose or ketones. Report any abnormal result to the primary care provider before adjusting the dosage of the antidiabetic medication.
- Tolcapone: Keep all appointments with the primary care provider. Liver function tests are performed

periodically and are an important part of therapy. Report any signs of liver failure, such as persistent nausea, fatigue, lethargy, anorexia, jaundice, dark urine, pruritus, and right upper quadrant tenderness.

### EVALUATION

- The therapeutic effect is achieved and the symptoms of parkinsonism are controlled.
- Adverse reactions are identified, reported to the primary health care provider, and managed successfully through appropriate nursing interventions.
- No evidence of injury is seen.
- The patient verbalizes an understanding of the treatment modalities, adverse reactions, and importance of continued follow-up care.
- The patient and family demonstrate an understanding of the drug regimen.

### ● Critical Thinking Exercises

1. Ms. Dennis, age 89 years, has Parkinson's disease and is taking amantadine daily. In discussing her care with the family, determine what information you would include in the teaching plan and what information would be most important for the family to understand. Explain your answer.
2. Ms. Whitman is taking two drugs for Parkinson's disease: levodopa and carbidopa. Ms. Whitman questions you as to why she received two drugs while her friend with Parkinson's disease is taking only one drug. Discuss how you would explain this to Ms. Whitman.
3. Discuss the special considerations the nurse should be aware of when administering tolcapone.
4. Explain what adverse reaction would be more likely to occur in the older adult prescribed a non-ergot dopamine receptor agonist drug. Describe how you would assess for this adverse reaction.

### ● Review Questions

1. The most serious adverse reactions seen with levodopa include \_\_\_\_\_.
  - A. choreiform and dystonic movements
  - B. depression
  - C. suicidal tendencies
  - D. paranoia
2. Elderly patients prescribed one of the dopamine receptor agonists are monitored closely for which of the following adverse reactions?
  - A. occipital headache
  - B. hallucinations
  - C. paralytic ileus
  - D. cardiac arrhythmias



## Home Care Checklist

### AVOIDING CERTAIN FOODS WHILE TAKING LEVODOPA

If your patient with parkinsonism is taking levodopa, he must be careful to avoid vitamin B<sub>6</sub> (pyridoxine) because it may interfere with the therapeutic effects of the drug. Most multivitamin supplements contain vitamin B<sub>6</sub>. Therefore, be sure to instruct your patient to check with his health care provider before taking any vitamin supplements.

Vitamin B<sub>6</sub> is also found in a wide variety of food sources. It may be impossible to ask the patient to avoid these food sources entirely, but your patient may need to limit or decrease such intake to enhance or maintain the drug's effectiveness. Use the list below to teach your patient about possible food sources of vitamin B<sub>6</sub>.

 Organ meats	 Pork
 Chicken	 Egg yolk
 Fish	 Whole grain cereals
 Peanuts	 Corn
 Walnuts	 Potatoes
 Oats	 Bananas
 Yeast	 Raisins
 Wheat germ	 Molasses

3. When taking an anticholinergic drug for parkinsonism, the patient would mostly experience which of the following adverse reactions?
  - A. constipation, urinary frequency
  - B. muscle spasm, convulsions
  - C. diarrhea, hypertension
  - D. dry mouth, dizziness
4. The patient taking tolcapone for Parkinson's disease is monitored closely for \_\_\_\_\_.
  - A. kidney dysfunction
  - B. liver dysfunction

- C. agranulocytosis
- D. the development of an autoimmune disease

### ● Medication Dosage Problems

1. Levodopa 0.75 g PO is prescribed. The drug is available in 100-mg tablets, 250-mg tablets, and 500-mg tablets. The nurse administers \_\_\_\_\_.
2. Ropinirole 6 mg PO is prescribed. The drug is available in 2-mg tablets. The nurse administers \_\_\_\_\_.