chapter **20**

Cholinergic Drugs

Objectives

AFTER STUDYING THIS CHAPTER, THE STUDENT WILL BE ABLE TO:

1. Describe effects and indications for use of selected cholinergic drugs.
2. Discuss drug therapy of myasthenia gravis.
3. Discuss the use of cholinergic drug therapy for paralytic ileus and urinary retention.
4. Discuss drug therapy of Alzheimer's disease.
5. Describe major nursing care needs of clients receiving cholinergic drugs.
6. Describe signs, symptoms, and treatment of overdose with cholinergic drugs.
7. Discuss atropine and pralidoxime as antidotes for cholinergic drugs.
8. Discuss principles of therapy for using cholinergic drugs in special populations.
9. Teach clients about safe, effective use of cholinergic drugs.

Critical Thinking Scenario

Jamie, a 14-year-old, was diagnosed with myasthenia gravis 3 years ago and has been well managed on neostigmine (Prostigmin), an anticholinesterase agent. His mother calls the clinic and, clearly upset, reports the following symptoms that Jamie is experiencing: severe headache, drooling, and one fainting episode. Jamie states he "just doesn't feel right."

Reflect on:

- Review the underlying pathophysiology of myasthenia gravis. Explain how Prostigmin alters neurotransmitters to manage this condition. (Hint: Think first how the parasympathetic nervous system is altered and how balance could be restored.)
- Contrast the symptoms of cholinergic crisis (too much Prostigmin) with myasthenic crisis (undertreatment). Which seems to fit with Jamie's symptoms?
- What additional data would you collect to help arrive at a diagnosis before treatment?
- Discuss appropriate medical and pharmacologic management of Jamie.

DESCRIPTION

Cholinergic drugs, also called parasympathomimetics and cholinomimetics, stimulate the parasympathetic nervous system in the same manner as acetylcholine (see Chap. 17). Some drugs act directly to stimulate cholinergic receptors; others act indirectly by slowing acetylcholine metabolism (by the enzyme acetylcholinesterase) at autonomic nerve synapses and terminals. Selected drugs are discussed here in relation to their use in myasthenia gravis, Alzheimer's disease, and atony of the smooth muscle of the gastrointestinal and urinary systems, which results in paralytic ileus and urinary retention, respectively.

In normal neuromuscular function, acetylcholine is released from nerve endings and binds to nicotinic receptors on cell membranes of muscle cells to cause muscle contraction. Myasthenia gravis is an autoimmune disorder in which autoantibodies are thought to destroy nicotinic receptors for acetylcholine on skeletal muscle. As a result, acetylcholine is less able to stimulate muscle contraction and muscle weakness occurs.

In normal brain function, acetylcholine is an essential neurotransmitter and plays an important role in cognitive functions, including memory storage and retrieval. Alzheimer's disease, the most common type of dementia in adults, is characterized by abnormalities in the cholinergic, serotonergic, noradrenergic, and glutamatergic neurotransmission systems (see Chap. 5). In the cholinergic system, there is a substantial loss of neurons that secrete acetylcholine in the brain and decreased activity of choline acetyltransferase, the enzyme required for synthesis of acetylcholine.