# Fluoroquinolones and Aminoglycosides

## **Key Terms**

bowel prep hematuria hepatic coma neuromuscular blockade neurotoxicity ototoxicity proteinuria

## Chapter Objectives

On completion of this chapter, the student will:

- Discuss the uses, general drug action, contraindications, precautions, interactions, and adverse reactions of the fluoroquinolones and aminoglycosides.
- Discuss preadministration and ongoing assessment activities the nurse should perform on the patient taking the fluoroquinolones and aminoglycosides.
- List some nursing diagnoses particular to a patient receiving a fluoroquinolone or aminoglycoside.
- 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 a fluoroquinolone or aminoglycoside.

As antibiotics became resistant to various microorganisms, researchers sought to develop more powerful drugs that would be effective against these resistant pathogens. The fluoroquinolones and aminoglycosides are two groups of broad-spectrum antibiotics that resulted from this research. The Summary Drug Table: Fluoroquinolones and Aminoglycosides lists the fluoroquinolones and aminoglycosides discussed in this chapter.

## **FLUOROQUINOLONES**

The fluoroquinolones include ciprofloxacin (Cipro), enoxacin (Penetrex), gatifloxacin (Tequin), lomefloxacin (Maxaquin), moxifloxacin (Avelox), ofloxacin (Floxin), and sparfloxacin (Zagam).

#### **ACTIONS**

The fluoroquinolones exert their bactericidal (bacteriadestroying) effect by interfering with an enzyme (DNA gyrase) needed by bacteria for the synthesis of DNA. This interference prevents cell reproduction, leading to death of the bacteria.

## **USES**

The fluoroquinolones are used in the treatment of infections caused by susceptible microorganisms. The fluoroquinolones are effective in the treatment of infections caused by gram-positive and gram-negative microorganisms. They are primarily used in the treatment of susceptible microorganisms in lower respiratory infections, infections of the skin, urinary tract infections, and sexually transmitted diseases. Ciprofloxacin, norfloxacin, and ofloxacin are available in ophthalmic forms for infections in the eyes.

#### ADVERSE REACTIONS

Bacterial or fungal superinfections and pseudomembranous colitis (see Chap. 7) may occur with the use of both of these drugs. The administration of any drug may result in a hypersensitivity reaction, which can



## SUMMARY DRUG TABLE FLUOROQUINOLONES AND AMINOGLYCOSIDES

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
Fluoroquinolones				
ciprofloxacin si-proe-flox'-a-sin	Cipro, Cipro IV	Treatment of infections due to susceptible microorganisms	Nausea, diarrhea, headache, abdominal discomfort, photosensitivity, superinfections, hypersensitivity reactions	250–750 mg PO q12h; 200–400 mg IV q12h
enoxacin en-ox'-a-sin	Penetrex	Same as ciprofloxacin	Same as ciprofloxacin	200–400 mg PO q12h
gatifloxacin ga-tah-flox'-a-sin	Tequin	Same as ciprofloxacin	Same as ciprofloxacin	200–400 mg qd PO or IV
levofloxacin lee-voe-flox'-a-sin	Levaquin	Same as ciprofloxacin	Same as ciprofloxacin	250-500 mg/d PO, IV
lomefloxacin loh-meh-flox'-a-sin	Maxaquin	Same as ciprofloxacin	Same as ciprofloxacin	400 mg PO once daily
moxifloxacin mocks-ah-flox'-a- sin	Avelox	Same as ciprofloxacin	Same as ciprofloxacin	400 mg qd PO
norfloxacin nor- flox'-a-sin	Noroxin	Same as ciprofloxacin, urinary tract infections, uncomplicated gonorrhea, prostatitis	Same as ciprofloxacin	400 mg PO q12h; 800 mg as single dose for gonorrhea
ofloxacin oe-flox'-a-sin	Floxin	Same as ciprofloxacin	Same as ciprofloxacin	200–400 mg PO, IV q12h
trovafloxacin troh-va-flox'-a-sin alatrofloxacin	Trovan Trovan IV	Same as ciprofloxacin	Same as ciprofloxacin, serious liver toxicity	100–200 mg/d PO, IV
Aminoglycosides				
amikacin am-i-kay'-sin	Amikin, Amikacin, <i>generic</i>	Treatment of serious infections caused by susceptible strains of microorganisms	Nausea, vomiting, diarrhea, rash, ototoxicity, nephrotoxicity, hypersensitivity reactions, neurotoxicity, superinfections, neuromuscular blockade	15 mg/kg IM, IV, in divided doses, not to exceed 1.5 g/d
gentamicin jen-ta-mye'-sin	Garamycin, <i>generic</i>	Same as amikacin	Same as amikacin	3 mg/kg/d q8h IM, IV, not to exceed 5 mg/kg/d in divided doses
kanamycin kan-a-mye'-sin	Kantrex, generic	Same as amikacin; oral use for hepatic coma and for suppression of intestinal bacteria	Same as amikacin	7.5–15 mg/kg/d in divided doses IM; 15 mg/kg/d in divided doses IV; suppression of intestinal bacteria 1 g qh for 4h then 1 g q6h for 3672 h PO; hepatic coma 8–12 g/d in divided doses PO



#### SUMMARY DRUG TABLE FLUOROQUINOLONES AND AMINOGLYCOSIDES (Continued)

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
neomycin nee-o-mye'-sin	Mycifradin, Neo-Tabs, <i>generic</i>	Same as amikacin, same as kanamycin	Same as amikacin	15 mg/kg/d q6h for 4 doses, then 300 mg IM bid, not to exceed 1 g/d; pre-op preparation of the bowel, see manufacturer's recommendations for complex 3-day regimen; hepatic coma 4–12 g/d
netilmicin ne-til-mye'-sin	Netromycin	Same as amikacin	Same as amikacin	Up to 6.5 mg/kg/d IV in divided doses
streptomycin strep-toe-mye'-sin	Generic	Same as amikacin, fourth drug in the treatment of TB	Same as amikacin	15 mg/kg/d IM or 25–30 mg/kg IM 2–3 times per week
tobramycin toe-bra-mye'-sin	Nebcin, <i>generic</i>	Same as amikacin	Same as amikacin	3–5 mg/kg/d IM, IV q8h

<sup>\*</sup>The term generic indicates the drug is available in generic form.

range from mild to severe and in some cases can be life threatening. Mild hypersensitivity reactions may only require discontinuing the drug, whereas the more serious reactions require immediate treatment. (Chapters 1 and 7 contain discussions of hypersensitivity reactions.)

The more common adverse effects seen with the administration of these drugs include nausea, diarrhea, headache, abdominal pain or discomfort, and dizziness. A more serious adverse reaction seen with the administration of the fluoroquinolones, especially lomefloxacin and sparfloxacin, is a photosensitivity reaction. This is manifested by an exaggerated sunburn reaction when the skin is exposed to the ultraviolet rays of sunlight or sunlamps.

### **CONTRAINDICATIONS**

The fluoroquinolones are contraindicated in patients with a history of hypersensitivity to the fluoroquinolones, in children younger than 18 years, and in pregnant women (Pregnancy Category C). These drugs also are contraindicated in patients whose life-styles do not allow for adherence to the precautions regarding photosensitivity.

## **PRECAUTIONS**

The fluoroquinolones are used cautiously in patients with renal impairment or a history of seizures, in geriatric patients, and in patients on dialysis.

## **INTERACTIONS**

Concurrent use of the fluoroquinolones with theophylline causes an increase in serum theophylline levels. When used concurrently with cimetidine, the cimetidine may interfere with the elimination of the fluoroquinolones. Use of the fluoroquinolones with an oral anticoagulant may cause an increase in the effects of the oral coagulant. Administration of the fluoroquinolones with antacids, iron salts, or zinc will decrease absorption of the fluoroquinolones. There is a risk of seizures if fluoroquinolones are given with the NSAIDs. There is a risk of severe cardiac arrhythmias when the fluoroquinolones gatifloxacin and moxifloxacin are administered with drugs that increase the QT interval (eg, quinidine, procainamide, amiodarone, and sotalol).

## **AMINOGLYCOSIDES**

The aminoglycosides include amikacin (Amikin), gentamicin (Garamycin), kanamycin (Kantrex), neomycin (Mycifradin), netilmicin (Netromycin), streptomycin, and tobramycin (Nebcin).

#### **ACTIONS**

The aminoglycosides exert their bactericidal effect by blocking a step in protein synthesis necessary for bacterial multiplication. They disrupt the functional





ability of the bacterial cell membrane causing cell death.

### **USES**

The aminoglycosides are used in the treatment of infections caused by susceptible microorganisms. The aminoglycosides are used primarily in the treatment of infections caused by gram-negative microorganisms.

Because the oral aminoglycosides are poorly absorbed, they are useful to suppressing gastrointestinal bacteria. The oral aminoglycosides kanamycin (Kantrex) and neomycin (Mycifradin) are used preoperatively to reduce the number of bacteria normally present in the intestine (**bowel prep**). A reduction in intestinal bacteria is thought to lessen the possibility of abdominal infection that may occur after surgery on the bowel.

Kanamycin, neomycin, and paromomycin are used orally in the management of **hepatic coma**. In this disorder, liver failure results in an elevation of blood ammonia levels. By reducing the number of ammoniaforming bacteria in the intestines, blood ammonia levels may be lowered, thereby temporarily reducing some of the symptoms associated with this disorder.

#### ADVERSE REACTIONS

The aminoglycosides are capable of causing nephrotoxicity (damage to the kidneys by a toxic substance) and ototoxicity (damage to the organs of hearing by a toxic substance). Signs and symptoms of nephrotoxicity may include protein in the urine (proteinuria), hematuria (blood in the urine), increase in the blood urea nitrogen level, decrease in urine output, and an increase in the serum creatinine concentration. Nephrotoxicity is usually reversible once the drug is discontinued. Signs and symptoms of ototoxicity include tinnitus, dizziness, roaring in the ears, vertigo, and a mild to severe loss of hearing. If hearing loss occurs, it is most often permanent. Ototoxicity may occur during drug therapy or even after the drug is discontinued. The short-term administration of kanamycin and neomycin as a preparation for bowel surgery rarely causes these two adverse reactions.

**Neurotoxicity** (damage to the nervous system by a toxic substance) may also be seen with the administration of the aminoglycosides. Signs and symptoms of neurotoxicity include numbness, skin tingling, circumoral (around the mouth) paresthesia, peripheral paresthesia, tremors, muscle twitching, convulsions, muscle weakness, and **neuromuscular blockade** (acute muscular paralysis and apnea).

Additional adverse reactions seen with administration of the aminoglycosides may include nausea, vomiting, anorexia, rash, and urticaria. When these drugs are given, individual drug references, such as the package insert, should be consulted for more specific adverse reactions.

Like the other anti-infectives, bacterial or fungal superinfections and pseudomembranous colitis (see Chap. 7) may occur with the use of these drugs. The administration of the aminoglycosides may result in a hypersensitivity reaction, which can range from mild to severe and in some cases can be life threatening. Mild hypersensitivity reactions may only require discontinuing the drug, whereas the more serious reactions require immediate treatment.

## CONTRAINDICATIONS

The aminoglycosides are contraindicated in patients with hypersensitivity to aminoglycosides. The aminoglycosides should not be given to patients requiring long-term therapy because of the potential for ototoxicity and nephrotoxicity. One exception is the use of streptomycin for long-term management of tuberculosis. These drugs are contraindicated in patients with preexisting hearing loss, myasthenia gravis, parkinsonism, and during lactation or pregnancy. Neomycin, amikacin, gentamicin, kanamycin, netilmicin, and tobramycin are Pregnancy Category D drugs; the remainder are Category C.

#### **PRECAUTIONS**

The aminoglycosides are used cautiously in patients with renal failure (dosage adjustments may be necessary), in the elderly, and in patients with neuromuscular disorders.

### INTERACTIONS

Administration of the aminoglycosides with the cephalosporins may increase the risks of nephrotoxicity. When the aminoglycosides are administered with loop diuretics there is an increased risk of ototoxicity (irreversible hearing loss). There is an increased risk of neuromuscular blockage (paralysis of the respiratory muscles) if the aminoglycosides are given shortly after general anesthetics (neuromuscular junction blockers).

## The Patient Receiving a Fluoroquinolone or Aminoglycoside

#### **ASSESSMENT**

#### **Preadministration Assessment**

Before administering a fluoroquinolone or an aminoglycoside, the nurse identifies and records the signs and symptoms of the infection. It is particularly important for the nurse to obtain a thorough allergy history, especially a history of drug allergies. The nurse should take and record vital signs as well.

The primary health care provider may order culture and sensitivity tests, and the culture is obtained before the first dose of the drug is given. When an aminogly-coside is to be given, laboratory tests such as renal and hepatic function tests, complete blood count, and urinalysis also may be ordered.

When kanamycin or neomycin is given for hepatic coma, the nurse must evaluate the patient's level of consciousness and ability to swallow.

#### **Ongoing Assessment**

During drug therapy with the aminoglycosides or the fluoroquinolones, it is important for the nurse to perform an ongoing assessment. In general, the nurse compares the initial signs and symptoms of the infection, which were recorded during the initial assessment, to the current signs and symptoms. The nurse then records these findings in the patient's chart. When kanamycin or neomycin is given for hepatic coma, the nurse evaluates and records the patient's general condition daily.

The nurse monitors the patient's vital signs every 4 hours or as ordered by the primary health care provider. The nurse should notify the primary health care provider if there are changes in the vital signs, such as a significant drop in blood pressure, an increase in the pulse or respiratory rate, or a sudden increase in temperature.

When an aminoglycoside is being administered, it is important to monitor the patient's respiratory rate because neuromuscular blockade has been reported with the administration of these drugs. The nurse reports any changes in the respiratory rate or rhythm to the primary health care provider because immediate treatment may be necessary.

#### **NURSING DIAGNOSES**

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

#### Nursing Diagnoses Checklist

- Risk for Imbalanced Body Temperature: Hyperthermia related to infectious process
- ✓ **Diarrhea** related to superinfection secondary to antibiotic therapy, adverse drug reaction
- ✓ **Disturbed Sensory Perception: Auditory** related to adverse drug reactions of the aminoglycosides
- Ineffective Tissue Perfusion: Renal related to adverse drug reactions of the aminoglycosides

#### **PLANNING**

The expected outcomes for the patient may include an optimal response to therapy, which includes control of the infectious process, an absence of adverse drug effects, and an understanding of and compliance with the prescribed treatment regimen.

#### **IMPLEMENTATION**

# Promoting an Optimal Response to Therapy: Fluoroquinolones

The nurse encourages patients who receive the fluoroquinolones to increase their fluid intake. Norfloxacin and enoxacin are given on an empty stomach (eg, 1 hour before or 2 hours after meals). Ciprofloxacin and lomefloxacin can be given without regard to meals. However, the manufacturer recommends that the drug be given 2 hours after a meal. Moxifloxacin is given once a day for the period prescribed. If the patient is taking an antacid, moxifloxacin should be administered 4 hours before or 8 hours after the antacid.

Ciprofloxacin, gatifloxacin, and ofloxacin are the only fluoroquinolones given intravenously (IV). None of the fluoroquinolones are given intramuscularly (IM).

MONITORING FOR HYPERTHERMIA. The infectious process is accompanied by an elevation in temperature. When the patient is being treated for the infection the nurse must monitor the vital signs, particularly the body temperature. As the anti-infective works to rid the body of the infectious organism, the body temperature should return to normal. The nurse monitors the vital signs (temperature, pulse, and respiration) frequently to monitor the drug's effectiveness in eradicating the infectious process. The nurse checks the vital signs every 4 hours or more frequently if the temperature is elevated. The primary health care provider is notified if a temperature is greater than 101° Fahrenheit.

# Promoting an Optimal Response to Therapy: Aminoglycosides

The oral aminoglycosides may be given without regard to meals. If there is any doubt about administration of these drugs with or without food, consult the hospital pharmacist.

With the exception of paromomycin, all of the aminoglycoside drugs can be given intramuscularly (IM). For optimal results, the nurse should inspect previous injection sites for signs of pain or tenderness, redness, and swelling. The nurse informs the primary health care provider of any persistence in a localized reaction of pain, redness, or extreme tenderness. It is important to rotate injection sites and record the site used on the patient's chart. With the exception of paromomycin and streptomycin, all of the aminoglycoside drugs can be given intravenously (IV).

SUPPRESSION OF INTESTINAL BACTERIA. When kanamycin or neomycin is given for suppression of intestinal bacteria before surgery, the primary health care provider's orders regarding the timing of the administration of the drug are extremely important. Omission of a dosage or failure to give the drug at the specified time may result in inadequate suppression of intestinal bacteria. When neomycin is given, enteric-coated erythromycin (see Chap. 9) may be given at the same time as part of the bowel preparation.

HEPATIC COMA. When the aminoglycosides kanamycin or neomycin are given orally as treatment for hepatic coma, the nurse exercises care when giving the drug. During the early stages of this disorder, various changes in the level of consciousness may be seen. At times, the patient may appear lethargic and respond poorly to commands. Because of these changes in the level of consciousness, the patient may have difficulty swallowing, and a danger of aspiration is present. If the patient appears to have difficulty taking an oral drug, the nurse withholds the drug and contacts the primary health care provider.

#### Monitoring and Managing Adverse Drug Reactions

A variety of adverse reactions can be seen with the administration of the fluoroquinolones or aminoglycosides. The nurse observes the patient, especially during the first 48 hours of therapy. It is important to report the occurrence of any adverse reaction to the primary health care provider before the next dose of the drug is due. If a serious adverse reaction such as a hypersensitivity reaction, respiratory difficulty, severe diarrhea, or a decided drop in blood pressure occurs, the nurse contacts the primary health care provider immediately.

The nurse always listens, evaluates, and reports any complaints the patient may have; certain complaints may be an early sign of an adverse drug reaction. The nurse should report all changes in the patient's condition and any new problems that occur (eg, nausea or diarrhea) as soon as possible. It is then up to the primary health care provider to decide if these changes or

problems are a part of the patient's infectious process or the result of an adverse drug reaction.

MONITORING FOR DIARRHEA. Because superinfections and pseudomembranous colitis can occur during therapy with these drugs, the nurse checks the patient's stools and reports any incidence of diarrhea immediately because this may indicate a superinfection or pseudomembranous colitis. If diarrhea does occur and blood and mucus appear in the stool, the nurse should save a sample of the stool and test it for occult blood using a test such as Hemoccult. If the stool tests positive for blood, it is important to save the sample for possible additional laboratory tests.

MONITORING DRUGS GIVEN INTRAVENOUSLY. For optimal results, the nurse inspects the needle site and the area around the needle every hour for signs of extravasation of the IV fluid. The nurse performs these assessments more frequently if the patient is restless or uncooperative. It is important to check the rate of infusion every 15 minutes and adjust it as needed. The nurse should inspect the vein used for the IV infusion every 4 hours for signs of tenderness, pain, and redness (which may indicate phlebitis or thrombophlebitis). If these are apparent, the nurse must restart the IV in another vein and bring the problem to the attention of the primary health care provider.

# Monitoring and Managing Adverse Drug Reactions: Fluoroquinolones

All fluoroquinolone drugs can cause pain, inflammation, or rupture of a tendon. The Achilles tendon is particularly vulnerable. This problem can be so severe that prolonged disability results, and, at times, surgical intervention may be necessary to correct the problem. In addition, the fluoroquinolone drugs, particularly sparfloxacin and lomefloxacin, cause dangerous photosensitivity reactions. Patients have experienced severe reactions even when sunscreens or sunblocks were used.

## Monitoring and Managing Adverse Drug Reactions: Aminoglycosides

The aminoglycosides are potentially neurotoxic, nephrotoxic, and ototoxic and are capable of causing permanent damage to these organs and structures. The nurse notifies the primary health care provider immediately when one or more signs and symptoms of these adverse reactions is suspected.

MONITORING FOR NEUROTOXICITY. The nurse should be alert for symptoms such as numbness or tingling of the skin, circumoral paresthesia, peripheral paresthesia (numbness or tingling in the extremities), tremors, and muscle twitching or weakness. The nurse reports any symptom of neurotoxicity immediately to the primary health care provider. Convulsions can occur if the drug is not discontinued.

## Nursing Alert

Neuromuscular blockade or respiratory paralysis may occur after administration of the aminoglycosides. Therefore, it is extremely important that any symptoms of respiratory difficulty be reported immediately. If neuromuscular blockade occurs, it may be reversed by the administration of calcium salts, but mechanical ventilation may be required.

INEFFECTIVE TISSUE PERFUSION: RENAL. The patient taking an aminoglycoside is at risk for nephrotoxicity. The nurse measures and records the intake and output and notifies the primary health care provider if the output is less than 750 mL/day. It is important to keep a record of the fluid intake and output as well as a daily weight to assess hydration and renal function. The nurse encourages fluid intake to 2000 mL/day (if the patient's condition permits). Any changes in the intake and output ratio or in the appearance of the urine may indicate nephrotoxicity. The nurse reports these types of changes to the primary health care provider promptly. The primary health care provider may order daily laboratory tests (ie, serum creatinine and blood urea nitrogen [BUN]) to monitor renal function. The nurse reports any elevation in the creatinine or BUN level to the primary health care provider because an elevation may indicate renal dysfunction.

DISTURBED SENSORY PERCEPTION: AUDITORY. The patient taking aminoglycosides is at risk for ototoxicity. Auditory changes are irreversible, usually bilateral, and may be partial or total. The risk is greater in patients with renal impairment or those with preexisting hearing loss. It is important for the nurse to detect any problems with hearing and report them to the primary health care provider because continued administration could lead to permanent hearing loss.

## Nursing Alert

To detect ototoxicity, the nurse carefully evaluates the patient's complaints or comments related to hearing, such as a ringing or buzzing in the ears or difficulty hearing. If hearing problems do occur, the nurse reports this problem to the primary health care provider immediately. To monitor for damage to the eighth cranial nerve, an evaluation of hearing may be done by audiometry before and throughout the course of therapy.

### **Educating the Patient and Family**

Carefully planned patient and family education is important to foster compliance, relieve anxiety, and promote therapeutic effect. The nurse explains all adverse reactions associated with the specific prescribed antibiotic to the patient. The nurse advises the patient of the signs and symptoms of potentially serious adverse reactions, such as hypersensitivity reactions, moderate to severe diarrhea, sudden onset of chills and fever, sore throat, sores in the mouth, or extreme fatigue. The nurse should explain to the patient the necessity of contacting the primary health care provider immediately if such symptoms occur. The nurse cautions the patient against the use of alcoholic beverages during therapy unless approved by the primary health care provider. To reduce the incidence of noncompliance to the treatment regimen, a teaching plan is developed to include the following information:

- Take the drug at the prescribed time intervals.
  These time intervals are important because a certain amount of the drug must be in the body at all times for the infection to be controlled.
- Drink six to eight large glasses of fluids while taking these drugs and take each dose with a full glass of water.
- Do not increase or omit the dose unless advised to do so by the primary health care provider.
- Complete the entire course of treatment. Do not stop the drug, except on the advice of a primary health care provider, before the course of treatment is completed even if symptoms improve or disappear. Failure to complete the prescribed course of treatment may result in a return of the infection.
- Follow the directions supplied with the prescription regarding taking the drugs with meals or on an empty stomach. For drugs that must be taken on an empty stomach, take them 1 hour before or 2 hours after a meal.
- Notify the primary health care provider if symptoms of the infection become worse or there is no improvement in the original symptoms after 5 to 7 days of drug therapy.
- Avoid any exposure to sunlight or ultraviolet light (tanning beds, sunlamps) while taking these drugs and for several weeks after completing the course of therapy. Wear sunblock, sunglasses, and protective clothing when exposed to sunlight.
- Avoid tasks requiring mental alertness until response to the drug is known.

# SPECIFIC INSTRUCTIONS REGARDING FLUOROQUINOLONE THERAPY

 When taking the fluoroquinolones, report any signs of tendinitis, such as pain or soreness in the leg, shoulder, or back of the heel. Periodic applications

- of ice may help relieve the pain. Until tendinitis or tendon rupture can be excluded, rest the involved area and avoid exercise.
- Do not take antacids or drugs containing iron or zinc because these drugs will decrease absorption of the fluoroquinolone.

## SPECIFIC INSTRUCTIONS REGARDING AMINOGLYCOSIDE THERAPY

 Notify the primary health care provider of any ringing in the ears or difficulty hearing, numbness or tingling around the mouth or in the extremities, and of any change in urinary patterns.

# SPECIFIC INSTRUCTIONS FOR A PREOPERATIVE PREPARATION OF THE BOWEL

• When taking an aminoglycoside for preparation of the bowel before surgery, take the prescribed drug at the exact times indicated on the prescription container. Some bowel prep regimens are complex. For example, when kanamycin is prescribed for suppression of intestinal bacteria in preparation for bowel surgery, the drug is given orally every hour for 4 hours followed by 1 g every 6 hours for 36 to 72 hours.

#### **EVALUATION**

- The therapeutic effect is achieved, the infection is controlled, and the bowel is cleansed sufficiently.
- Adverse reactions are identified, reported to the primary health care provider, and managed successfully through nursing interventions.
- The patient and family demonstrate understanding of the drug regimen.
- The patient verbalizes the importance of complying with the prescribed therapeutic regimen.

## Critical Thinking Exercises

- Mr. Baker is receiving amikacin (Amikin) IV as treatment for a bacterial septicemia. When checking a drug reference you note that this drug is an aminoglycoside. Considering the most serious toxic effects associated with this group of drugs, determine what daily assessments you would perform to detect early signs and symptoms of these adverse drug effects.
- Ms. Carson is seen in the outpatient clinic for a severe respiratory infection and is prescribed ciprofloxacin. Discuss what you would include in the teaching plan for this patient.
- 3. A patient is prescribed ciprofloxacin for a severe respiratory infection. What serious adverse reaction(s)

should the nurse warn the patient to be especially observant for? What common adverse reactions should the patient be aware of? What important information should the nurse include in the teaching plan concerning adverse reactions?

## Review Questions

- Mr. Allison is taking gentamicin for a severe gramnegative infection. The nurse observes him for signs of neurotoxicity, which include \_\_\_\_\_\_.
  - A. anorexia and abdominal pain
  - B. decreased urinary output and dark, concentrated urine
  - C. muscle twitching and numbness
  - D. headache and agitation
- 2. Patients taking a fluoroquinolone are encouraged to \_\_\_\_\_.
  - A. nap 1 to 2 hours daily while taking the drug
  - B. eat a high-protein diet
  - C. increase their fluid intake
  - D. avoid foods high in carbohydrate
- 3. Which of the following complaints by a patient taking tobramycin would be most indicative the patient is experiencing ototoxicity?
  - A. tingling of the extremities
  - B. complaints that he is unable to hear the television
  - C. changes in mental status
  - D. short periods of dizziness
- 4. A patient is prescribed moxifloxacin. The nurse notes that the patient is also taking an antacid. The nurse correctly administers moxifloxacin .
  - A. once daily PO, 4 hours before the antacid
  - twice daily PO, immediately following the antacid
  - once daily IM without regard to the administration of the antacid
  - D. every 12 hours IV without regard to the administration of the antacid
- 5. The nurse is asked why kanamycin is given as a "bowel prep" before gastrointestinal surgery. The nurse correctly replies \_\_\_\_\_.
  - A. abdominal surgery requires starting antibiotic therapy 4 days before surgery
  - B. the bacteria found in the bowel cannot be destroyed after surgery
  - C. a reduction of intestinal bacteria lessens the possibility of postoperative infection
  - anesthesia makes the bowel resistant to an antibiotic after surgery

## Medication Dosage Problems

1. A patient is prescribed 40 mg of tobramycin IM. Use the drug label shown below to determine the amount of drug to administer. The nurse would administer



2. The primary health care provider prescribed 400 mg gatifloxacin PO daily for 7 days. The drug is available in 200-mg tablets. How many tablets would the nurse administer each day?