

Urinary Anti-infectives and Miscellaneous Urinary Drugs

Key Terms

<i>anti-infectives</i>	<i>overactive bladder</i>
<i>bactericidal</i>	<i>prostatitis</i>
<i>bacteriostatic</i>	<i>pyelonephritis</i>
<i>cystitis</i>	<i>urge incontinence</i>
<i>dysuria</i>	<i>urinary tract infections</i>
<i>neurogenic bladder</i>	<i>urinary urgency</i>

Chapter Objectives

On completion of this chapter, the student will:

- Discuss the uses, general drug actions, adverse reactions, contraindications, precautions, and interactions of the drugs used to treat infections and symptoms associated with urinary tract infections or an overactive bladder.
- Discuss important preadministration and ongoing assessment activities the nurse should perform on the patient taking a drug for a urinary tract infection or an overactive bladder.
- List some nursing diagnoses particular to a patient taking a drug for a urinary tract infection or an overactive bladder.
- 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 drugs used to treat a urinary tract infection or symptoms associated with an overactive bladder.

This chapter discusses drugs used to treat urinary tract infections (UTIs) and certain miscellaneous drugs used to relieve the symptoms associated with an **overactive bladder** (involuntary contractions of the detrusor or bladder muscle). Structures of the urinary system that may be affected include the bladder (**cystitis**), prostate gland (**prostatitis**), the kidney, or the urethra (see Fig. 47-1). These drugs also help control the discomfort associated with irritation of the lower urinary tract mucosa caused by infection, trauma, surgery, and endoscopic procedures.

Urinary tract infection (UTI) is an infection caused by pathogenic microorganisms of one or more structures of the urinary tract. The most common structure affected is the bladder, with the urethra, prostate, and kidney also affected (see Fig. 47-1). Display 47-1 identifies the disorder most frequently associated with each of these structures within the urinary system. Clinical manifestations of a UTI of the bladder (cystitis) include urgency, frequency, burning and pain on urination, and pain caused by spasm in the region of the bladder and the suprapubic area.

Some drugs used in the treatment of UTIs do not belong to the antibiotic or sulfonamide groups of drugs. The drugs discussed in this chapter are **anti-infectives** (against infection) used in the treatment of UTIs, which have an effect on bacteria in the urinary tract. Although administered systemically, that is, by the oral or parenteral route, they do not achieve significant levels in the bloodstream and are of no value in the treatment of systemic infections. They are primarily excreted by the kidneys and exert their major antibacterial effects in the urine. (See Summary Drug Table: Urinary Anti-infectives for a listing of these and other drugs used to treat problems associated with the urinary system.)

DISPLAY 47-1 • Common Disorders Associated With the Urinary System

Cystitis—inflammation of the bladder
Urethritis—inflammation of the urethra
Prostatitis—inflammation of the male prostate gland
Pyelonephritis—inflammation of the kidney and renal pelvis

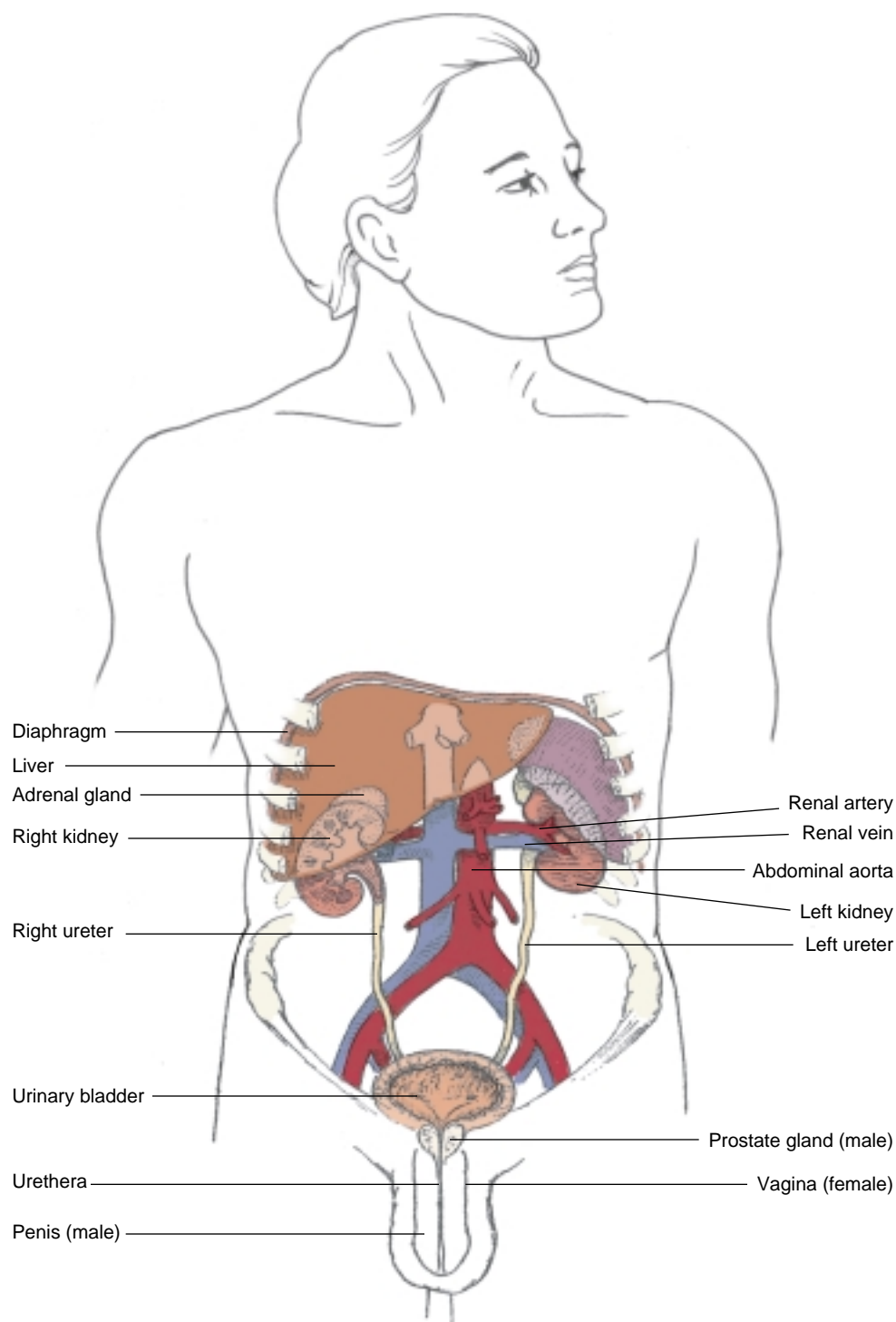


FIGURE 47-1. The normal urinary system, male and female. (Source: Wynsbergke, D., Noback, C. & Carola, R. [1995]. *Human anatomy & physiology* [3rd ed., p. 889]. New York: McGraw-Hill.)

Examples of urinary anti-infectives include cinoxacin (Cinobac), fosfomycin (Monurol), methenamine mandelate (Mandelamine), nalidixic acid (NegGram), and nitrofurantoin (Furadantin).

Additional drugs can be used in the treatment of UTIs. Examples of these drugs include ampicillin

(see Chap. 7), the cephalosporins (see Chap. 8), sulfonamides (see Chap. 6), and norfloxacin (see Chap. 10). Combination drugs are also available. The Summary Drug Table: Urinary Anti-infectives gives examples of the combination drugs used for UTIs.

SUMMARY DRUG TABLE URINARY ANTI-INFECTIVES

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
cinoxacin <i>sin-ox'-a-sin</i>	Cinobac, generic	Initial or recurrent UTIs	Nausea, abdominal pain, vomiting, anorexia, diarrhea, perineal burning, headache, photophobia, dizziness, rash	1 g/d PO in 2–4 divided doses for 7–14 d
fosfomycin tromethamine <i>foss-fo-my'-sin tro-meth-a-meen</i>	Monurol	UTIs caused by susceptible microorganisms	Diarrhea, vaginitis, rhinitis, nausea, headache, back pain	3-g packet PO
methenamine hippurate <i>meth-en'-a-meen</i>	Hiprex, Urex	Suppression or elimination of bacteriuria associated with pyelonephritis, cystitis, or other chronic UTIs, infected residual urine	Anorexia, nausea, vomiting, stomatitis, cramps, rash, bladder irritation, headache	1 g PO BID
methenamine mandelate <i>meth-en'-a-meen</i>	Mandelamine, generic	Same as methenamine hippurate	Same as methenamine hippurate	1 g PO QID
nalidixic acid <i>nal-i-dix'-ic</i>	NegGram	UTIs caused by susceptible microorganisms	Abdominal pain, nausea, vomiting, anorexia, diarrhea, rash, drowsiness, dizziness, photosensitivity reactions, blurred vision, weakness, headache	1 g QID for 1–2 wk; may reduce to 2 g/d for prolonged therapy
nitrofurantoin <i>nye-troe-fyoor-an'-toyn</i>	Furadantin, generic	UTIs caused by susceptible microorganisms	Nausea, vomiting, anorexia, rash, peripheral neuropathy, headache, brown discoloration of urine, hypersensitivity reactions, superinfection	50–100 mg PO QID
nitrofurantoin macrocrystals	Macrobid, Macrochantin, generic	Same as nitrofurantoin	Same as nitrofurantoin	50–100 mg PO QID; SR 100 mg BID
Miscellaneous Urinary Drugs				
flavoxate HCl <i>fla-vox'-ate</i>	Urispas	Symptomatic relief of dysuria, urgency, nocturia, suprapubic pain, frequency and incontinence due to cystitis, prostatitis, urethritis	Nausea, vomiting, dry mouth, nervousness, vertigo, headache, drowsiness, blurred vision, mental confusion (especially in the elderly)	100–200 mg TID, QID PO
oxybutynin chloride <i>ox-i-byoo'-ti-nin</i>	Ditropan, Ditropan XL, generic	Bladder instability, treatment of overactive bladder	Dry mouth, constipation, headache, dizziness, diarrhea, nausea, blurred vision, drowsiness, decreased sweating, heat prostration	5 mg BID, TID PO; maximum dosage, 5 mg QID; extended release: 5–30 mg once daily
phenazopyridine <i>fen-az-oh-peer'-i-deen</i>	Pyridate, Pyridium, Urogesic, generic	Relief of pain associated with irritation of the lower genitourinary tract	Headache, rash, pruritus, GI disturbances, red-orange discoloration of the urine, yellowish discoloration of the skin or sclera	200 mg TID PO
tolterodine tartrate <i>toll-tear'-oh-dyne</i>	Detrol, Detrol LA	Overactive bladder with symptoms of urinary frequency, urgency or urge incontinence	Nausea, vomiting, constipation, dry mouth, headache, dizziness, blurred vision, dysuria	2 mg BID PO; extended release: 2–4 mg once daily PO

SUMMARY DRUG TABLE URINARY ANTI-INFECTIVES (Continued)

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
trimethoprim (TMP) <i>trye-meth'-oh-prim</i>	Proloprim, Trimplex, <i>generic</i>	UTIs caused by susceptible microorganisms	Rash, pruritus, epigastric distress, nausea, vomiting	100 mg PO q12h or 200 mg PO q24h for 10 d
Urinary Anti-Infective Combinations				
sulfamethizole <i>sul-fa-meth'-i-zole</i>	Thiosulfil Forte	UTIs caused by susceptible microorganisms	Headache, nausea, vomiting, abdominal pain, crystalluria	0.5–1 g PO TID, QID
trimethoprim and sulfamethoxazole (TMP-SMZ) <i>trye-meth'-oh-prim sul-fa-meth-ox'-a-zole</i>	Bactrim, Bactrim DS, Septra, Septra DS, <i>generic</i>	UTIs caused by susceptible microorganisms, shigellosis and acute otitis media	Gastrointestinal disturbances, allergic skin reactions, headache, anorexia, glossitis, hypersensitivity	160 mg TMP/800 SMZ PO q12h; 8–10 mg/kg/d (based on TMP) IV in 2–4 divided doses
*The term <i>generic</i> indicates the drug is available in generic form. UTI, urinary tract infection.				

ACTIONS, USES, AND ADVERSE REACTIONS

Cinoxacin

As a result of high concentration in the urine, cinoxacin appears to act by interfering with bacterial multiplication by interfering with the replication of DNA in susceptible gram-negative bacteria. Like the sulfonamides and other anti-infectives, the systemic anti-infectives, such as cinoxacin, are used for UTIs that are caused by susceptible microorganisms. Nausea, abdominal pain, vomiting, anorexia, diarrhea, perineal burning, headache, photophobia, and dizziness may be seen with the administration of cinoxacin.

Methenamine and Methenamine Salts

Methenamine and methenamine salts break down and form ammonia and formaldehyde, which are bactericidal. These drugs are used for UTIs that are caused by susceptible microorganisms.

Administration of methenamine and methenamine salts may result in gastrointestinal disturbances, such as anorexia, nausea, vomiting, stomatitis, and cramps. Large doses may result in burning on urination and bladder irritation.

Nalidixic Acid

As a result of its high concentration in the urine, nalidixic acid appears to act by interfering with bacterial multiplication by interfering with the replication of

DNA. Nalidixic acid is used for UTIs that are caused by susceptible microorganisms.

Abdominal pain, nausea, vomiting, anorexia, diarrhea, rash, drowsiness, dizziness, photosensitivity reactions, blurred vision, weakness, and headache may occur with the administration of nalidixic acid. Visual disturbances, when they occur, are noted after each dose and often disappear after a few days of therapy.

Nitrofurantoin

Nitrofurantoin may be **bacteriostatic** (slows or retards the multiplication of bacteria) or **bactericidal** (destroys bacteria), depending on the concentration of the drug in the urine. Nitrofurantoin is used for UTIs that are caused by susceptible microorganisms.

Nitrofurantoin administration may result in nausea, vomiting, anorexia, rash, peripheral neuropathy, headache, brown discoloration of the urine, and hypersensitivity reactions, which may range from mild to severe. Acute and chronic pulmonary reactions also have been seen.

Fosfomycin

Fosfomycin is bactericidal and interferes with bacterial cell wall synthesis. Fosfomycin is used for UTIs that are caused by susceptible microorganisms. Adverse reactions that may occur with fosfomycin include headache, dizziness, nausea, abdominal cramps, and vaginitis.

Trimethoprim

Trimethoprim (Trimpex) interferes with the ability of bacteria to metabolize folinic acid, thereby exerting bacteriostatic activity. Trimethoprim is used for UTIs that are caused by susceptible microorganisms. Trimethoprim administration may result in rash, pruritus, epigastric distress, nausea, and vomiting. When trimethoprim is combined with sulfamethoxazole (Septra), the adverse effects associated with a sulfonamide may also occur. The adverse reactions seen with other anti-infectives, such as ampicillin, the sulfonamides, and cephalosporins, are given in their appropriate chapters.

Flavoxate

Flavoxate (Urispas) counteracts smooth muscle spasm of the urinary tract by relaxing the detrusor and other muscles through action at the parasympathetic receptors. Flavoxate is used to relieve symptoms of **dysuria** (painful or difficult urination), urinary urgency (a strong and sudden desire to urinate), nocturia (excessive urination during the night), suprapubic pain and frequency, and **urge incontinence** (accidental loss of urine caused by a sudden and unstoppable urge to void). Flavoxate can cause blurred vision, drowsiness, nausea and vomiting, nervousness, vertigo, headache, and mental confusion (particularly in the elderly).

Oxybutynin

Oxybutynin (Ditropan) acts by relaxing the bladder muscle and reducing spasm. Oxybutynin is used to treat bladder instability (ie, urgency, frequency, leakage, incontinence, and painful or difficult urination) caused by a **neurogenic bladder** (altered bladder function caused by a nervous system abnormality). Adverse reactions observed in patients taking oxybutynin include dry mouth, constipation or diarrhea, decreased production of tears, decreased sweating, gastrointestinal disturbances, dim vision, and urinary hesitancy.

Phenazopyridine

Phenazopyridine (Pyridium) is a dye that exerts a topical analgesic effect on the lining of the urinary tract. It has no anti-infective activity. Phenazopyridine, a urinary analgesic, is available as a separate drug but is also included in some urinary anti-infective combination drugs. This drug is a urinary tract analgesic used to relieve the pain, burning, urgency, frequency, and irritation caused by infection, trauma, catheters, or surgical procedures of the urinary tract. Adverse reactions associated with phenazopyridine include headache, rash, and gastrointestinal upset.

Tolterodine

Tolterodine (Detrol) is an anticholinergic drug that is able to inhibit bladder contractions and delay the urge to void. Tolterodine tartrate is used to treat symptoms of overactive bladder, such as urinary frequency, urgency, or urge incontinence. Tolterodine is associated with anticholinergic adverse reactions such as dry mouth (the most commonly reported adverse reaction), drowsiness, decreased sweating, blurred vision, nausea, vomiting, dizziness, and abdominal pain. The adverse reactions of tolterodine, compared with other anticholinergic drugs, are less problematic because tolterodine is more specific for the bladder.

CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

Cinoxacin

Cinoxacin is contraindicated in patients with known hypersensitivity to the individual drug and in patients with anuria. Cinoxacin is a Pregnancy Category B drug and should be used with caution during pregnancy and lactation. Cinoxacin is used with caution in patients with hepatic impairment. When cinoxacin is administered with probenecid, there is a risk for lowered urine concentration of cinoxacin.

Methenamine and Methenamine Salts

Methenamine is contraindicated in patients with a hypersensitivity to the drug, those with hepatic impairment, and during pregnancy (Pregnancy Category C) and lactation. Patients who are allergic to tartrazine should not take methenamine hippurate (Hiprex). The drug is used cautiously in patients with renal or hepatic impairment or gout (may cause crystals to form in the urine). No serious interactions have been reported.

Nalidixic Acid

Nalidixic acid is contraindicated in patients who are hypersensitive to the drug or any of its components, those who have convulsive disorders, and during pregnancy (Pregnancy Category C) and lactation. Nalidixic acid is used cautiously in patients with renal and hepatic impairment, cerebral arteriosclerosis, and in patients with glucose-6-phosphate dehydrogenase (G6PD) deficiency. When nalidixic acid is administered with the oral anticoagulants there is an increased risk of bleeding.

Nitrofurantoin

Nitrofurantoin is contraindicated in patients with renal impairment, those with hypersensitivity to the drug, and in lactating women. Nitrofurantoin is classified as a Pregnancy Category B drug and is used with caution during pregnancy. The drug is also used with caution in patients with a G6PD deficiency (see Chap. 1), anemia, or diabetes. There is a decreased absorption of nitrofurantoin when the drug is administered with magnesium trisilicate or magaldrate. When nitrofurantoin is administered with anticholinergics, there is a delay in gastric emptying, increasing the absorption of nitrofurantoin.

Fosfomycin

Fosfomycin is contraindicated in patients with a hypersensitivity to the drug. Fosfomycin is used cautiously during pregnancy (Pregnancy Category B) and lactation. There is a lowered plasma concentration and urinary tract excretion when fosfomycin is administered with metoclopramide.

Trimethoprim

Trimethoprim is contraindicated in patients with a hypersensitivity to the drug and in those with a creatine clearance of less than 15 mL/min. The drug is used cautiously in patients with hepatic or renal impairment and in patients with megaloblastic anemia caused by folate deficiency. Trimethoprim is classified as a Pregnancy Category C drug, and its use is not recommended during pregnancy and lactation.

No significant interactions have been reported.

There is an increased risk for hypoglycemia when products containing sulfamethoxazole are administered with oral antidiabetic drugs such as tolbutamide, tolazamide, and glipizide and an increased risk of hemorrhage when given with oral anticoagulants. An increased urinary pH decreases the effectiveness of methenamine. Therefore, to avoid raising the urine pH when taking methenamine, the patient should not use antacids containing sodium bicarbonate or sodium carbonate. Nalidixic acid may increase the effects of the anticoagulants.

Flavoxate

This drug is contraindicated in patients with intestinal or gastric blockage, abdominal bleeding, or urinary tract blockage. The drug is used cautiously in patients with glaucoma and during pregnancy (Pregnancy Category C) and lactation. No significant interactions have been reported.

Oxybutynin

Oxybutynin is contraindicated in patients with a hypersensitivity to the drug, those with glaucoma, partial or complete blockage of the gastrointestinal tract, myasthenia gravis, or urinary tract obstruction. The drug is used cautiously in patients with kidney or liver disease, heart failure, irregular or rapid heart rate, hypertension, or enlarged prostate and during pregnancy (Pregnancy Category C) and lactation. There is a decreased effectiveness of the phenothiazines when these drugs are administered with oxybutynin. A decreased response and increased risk of tardive dyskinesia may occur when haloperidol is administered with oxybutynin.

Phenazopyridine

Phenazopyridine is contraindicated in patients with renal impairment and in undiagnosed urinary tract pain. Phenazopyridine is used cautiously during pregnancy (Pregnancy Category C) and lactation.



Nursing Alert

Phenazopyridine is not administered for more than 2 days when used in combination with an antibacterial drug to treat a UTI. When used more than 2 days, the drug may mask the symptoms of a more serious disorder.

Phenazopyridine treats the symptom of pain but does not treat the cause of the disorder. No significant interactions have been reported.

Tolterodine

Tolterodine is contraindicated in patients with urinary retention (inability to urinate), gastric retention, uncontrolled narrow-angle glaucoma, and in patients with hypersensitivity to the drug. Tolterodine is used with caution in patients with significant bladder outflow blockage or slow urinary stream because of the risk of urinary retention, pyloric stenosis (a narrowing of the opening where the stomach contents are emptied into the small intestine), and liver or kidney disease. This drug is classified as a Pregnancy Category C drug and should not be used during pregnancy or lactation. No significant interactions have been reported.

Miscellaneous Drugs

The miscellaneous drugs are used to relieve the symptoms associated with an overactive bladder (involuntary contractions of the detrusor or bladder muscle)

that sometimes occur due to disorders such as cystitis, prostatitis, or other affected structures such as the kidney or the urethra. Overactive bladder is estimated to affect more than 16 million individuals in the United States. Symptoms of an overactive bladder include **urinary urgency**, frequent urination day and night, and **urge incontinence**, accidental loss of urine caused by a sudden and unstoppable need to urinate. These drugs also help control the discomfort associated with irritation of the lower urinary tract mucosa caused by infection, trauma, surgery, and endoscopic procedures. Other miscellaneous drugs are used to relieve the pain associated with irritation of the lower genitourinary tract (eg, phenazopyridine) caused by infection, trauma, surgery, and endoscopic procedures.

Health Supplement Alert: Cranberry

Cranberry juice has long been recommended for use in treating and preventing urinary tract infections (UTIs). Clinical studies have confirmed that cranberry juice is beneficial to individuals with frequent UTIs. Cranberries inhibit bacteria from attaching to the walls of the urinary tract and prevent certain bacteria from forming dental plaque in the mouth. Cranberry juice is safe for use as a food and for urinary tract health. Cranberry juice and capsules have no contraindications, no known adverse reactions, and no drug interactions. The recommended dosage is 9 to 15 capsules a day (400–500 mg/d) or 4 to 8 ounces of juice per day. (See Chap. 6 for more information.)

NURSING PROCESS

● The Patient Receiving a Urinary Anti-infective or a Miscellaneous Urinary Drug

ASSESSMENT

Preadministration Assessment

When a UTI has been diagnosed, sensitivity tests are performed to determine bacterial sensitivity to the drugs (antibiotics and urinary anti-infectives) that will control the infection. The nurse questions the patient regarding symptoms of the infection before instituting therapy. The nurse records the color and appearance of the urine. The nurse takes and records the vital signs. A urine sample for culture and sensitivity is obtained before the first dose of the drug is given.

When the miscellaneous drugs are administered, the nurse documents the symptoms the patient is experiencing to provide a baseline for future assessment. The nurse assesses for and documents pain, urinary frequency, bladder distension, or other symptoms associated with the urinary system.

Ongoing Assessment

Many UTIs are treated on an outpatient basis because hospitalization usually is not required. UTIs may be seen in the hospitalized or nursing home patient with an indwelling urethral catheter or a disorder such as a stone in the urinary tract.

When caring for a hospitalized patient with a UTI, the nurse monitors the vital signs every 4 hours or as ordered by the primary health care provider. Any significant rise in temperature is reported to the primary health care provider because methods of reducing the fever or repeat culture and sensitivity tests may be necessary.

The nurse monitors the patient's response to therapy daily. If after several days the symptoms of the UTI have not improved or if they become worse, the nurse notifies the primary health care provider as soon as possible. Periodic urinalysis and urine culture and sensitivity tests may be ordered to monitor the effects of drug therapy.

When the nurse is administering any of the miscellaneous drugs, the nurse monitors the patient for a reduction in the symptoms obtained in the preadministration assessment such as dysuria, urinary frequency, urgency, nocturia, and relief of any pain associated with irritation of the lower genitourinary tract.

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, and an understanding of and compliance with the prescribed therapeutic regimen.

IMPLEMENTATION

Promoting an Optimal Response to Therapy

URINARY ANTI-INFECTIVES. To promote an optimal response to therapy, the nurse gives these drugs with food to prevent gastrointestinal upset. The nurse

Nursing Diagnoses Checklist

- ✓ **Impaired Urinary Elimination** related to urinary tract infection
- ✓ **Impaired Nutrition: Less than Body Requirements** related to adverse drug effects (eg, nausea, vomiting)
- ✓ **Pain** or discomfort related to infectious process



Patient and Family Teaching Checklist

Using Fluids to Prevent and Treat UTIs

The nurse:

- ✓ Discusses UTIs, their causes, and the need for fluids and drug therapy.
- ✓ Reviews the drug therapy regimen, including prescribed drug, dose, and frequency of administration.
- ✓ Stresses the importance of continued therapy even if patient feels better after a few doses.
- ✓ Instructs to continue therapy until all of drug is finished or prescriber discontinues therapy.
- ✓ Explains the rationale for increasing fluid intake to at least 2000 mL/d (unless contraindicated) to aid in physical removal of bacteria.
- ✓ Urges patient to drink fluids every hour.
- ✓ Offers suggestions for fluids to drink based on patient's likes and dislikes.
- ✓ Demonstrates procedure for measuring intake and output using household measures.
- ✓ Informs about urine appearance when intake is increased.
- ✓ Encourages continued increased fluid intake even if symptoms subside.
- ✓ Instructs to notify primary health care provider if urine output is low, urine appears dark or concentrated during the daytime, or symptoms do not improve after 3 to 4 days.
- ✓ Reviews signs and symptoms of possible adverse reactions and of new infection or worsening infection, both verbally and in writing.
- ✓ Emphasizes the importance of follow-up visits and laboratory tests to determine the effectiveness of therapy.

administers nitrofurantoin with food, meals, or milk because this drug is particularly irritating to the stomach. Fosfomycin comes in a 3-g one-dose packet that must be dissolved in 90 to 120 mL water (not hot water). It can be administered with food to prevent gastric upset. The nurse administers the drug immediately after dissolving it in water.

The nurse advises the patient to drink at least 2000 mL or more of fluids each day unless the primary health care provider orders otherwise. Drinking extra fluids aids in the physical removal of bacteria from the genitourinary tract and is an important part of the treatment of UTIs (see Patient and Family Teaching Checklist: Using Fluids to Prevent and Treat UTIs). The nurse offers fluids, preferably water, to the patient at hourly intervals. Cranberry or prune juice is usually given rather than orange juice, other citrus juices, or vegetable juices.

The nurse notifies the primary health care provider if the patient fails to drink extra fluids, if the urine output is low, or if the urine appears concentrated during daytime hours. The urine of those drinking 2000 mL or more per day will appear dilute and light in color.

Elderly patients often have a decreased thirst sensation and must receive encouragement to increase fluid intake. The nurse offers fluids at regular intervals to elderly patients or those who seem unable to increase their fluid intake without supervision.

The nurse measures the fluid intake and output, especially when the primary health care provider orders an increase in fluid intake or when a kidney infection is being treated. The primary health care provider may also order daily urinary pH levels when methenamine or nitrofurantoin is administered. These drugs work best in acid urine; failure of the urine to remain acidic may require administration of a urinary acidifier, such as ascorbic acid.

MISCELLANEOUS URINARY DRUGS. Flavoxate is administered orally three to four times daily. The dosage may be reduced when the patient's symptoms improve. Phenazopyridine is administered after meals to prevent GI upset. This drug is not administered for more than 2 days to patients receiving antibiotics for treatment of a UTI. Continued use may mask the symptoms of a urinary tract infection that is not responding to treatment with an antibiotic. When administering these drugs, the nurse monitors the fluid intake and urinary output for volume and frequency. The patient is encouraged to drink at least 2000 mL of fluid daily (if condition permits) to dilute urine and decrease pain on voiding.

Monitoring and Managing Adverse Drug Reactions

URINARY ANTI-INFECTIVES. The nurse observes the patient for adverse drug reactions. If an adverse reaction occurs, the nurse contacts the primary health care provider before the next dose of the drug is due. However, serious drug reactions, such as a pulmonary reaction, are reported immediately.

Pulmonary reactions have been reported with the use of nitrofurantoin and may be seen within hours and up to 3 weeks after therapy with this drug is initiated. Signs and symptoms of an acute pulmonary reaction include dyspnea, chest pain, cough, fever, and chills. If these reactions occur, the nurse immediately notifies the primary health care provider and withholds the next dose of the drug until the patient is seen by a primary health care provider. Signs and symptoms of chronic pulmonary reactions, which may be seen during prolonged therapy, include dyspnea, nonproductive cough, and malaise.

MISCELLANEOUS URINARY DRUGS. Common adverse reactions with flavoxate, oxybutynin, and tolterodine include dry mouth, dizziness, blurred vision, and constipation.

For patients with dry mouth the nurse suggests that the patient suck on hard candy, sugarless lozenges, or small pieces of ice and performs frequent mouth care. This effect sometimes lessens with continued use of the drug. Hospitalized patients experiencing drowsiness or blurred vision may require assistance when ambulating. For patients with constipation, the nurse encourages fluids, provides a high-fiber diet, and provides times for ambulation or exercise (if the patient's condition allows). If constipation persists, the primary health care provider may prescribe a mild laxative or stool softener.

The nurse informs the patient that phenazopyridine may cause a reddish orange discoloration of the urine and may stain fabrics or contact lenses. The nurse assures the patient that this is normal and will subside when use of the drug is discontinued.

Educating the Patient and Family

The nurse stresses the importance of increasing fluid intake to at least 2000 mL/d (unless contraindicated) to help remove bacteria from the genitourinary tract (see Patient and Family Teaching Checklist: Using Fluids to Prevent and Treat UTIs). In many cases, symptoms are relieved after several days of drug therapy. To ensure compliance with the prescribed drug regimen, the nurse stresses the importance of completing the full course of drug therapy even though symptoms have been relieved. A full course of therapy is necessary to ensure all bacteria have been eliminated from the urinary tract. The nurse should include the following points in a patient and family teaching plan:

- Take the drug with food or meals (nitrofurantoin must be taken with food or milk). If gastrointestinal upset occurs despite taking the drug with food, contact the primary health care provider.
- Take the drug at the prescribed intervals and complete the full course of therapy. Do not discontinue taking the drug even though the symptoms have disappeared, unless directed to do so by the primary health care provider.
- If drowsiness or dizziness occurs, avoid driving and performing tasks that require alertness.
- During therapy with this drug, avoid alcoholic beverages and do not take any nonprescription drug unless its use has been approved by the primary health care provider.
- Notify the primary health care provider immediately if symptoms do not improve after 3 or 4 days.
- Nitrofurantoin: Take this drug with food or milk to improve absorption. Continue therapy for at least 1 week or for 3 days after the urine shows no signs of infection. Notify the primary health care provider immediately if any of the following occur: fever, chills, cough, shortness of breath, chest pain, or difficulty breathing. Do not take the next dose of the

drug until the primary health care provider has been contacted. The urine may appear brown during therapy with this drug; this is not abnormal.

- Nalidixic acid: Take this drug with food to prevent GI upset. Avoid prolonged exposure to sunlight or ultraviolet light (tanning beds or lamps) because an exaggerated sunburn may occur.
- Methenamine, methenamine salts: Avoid excessive intake of citrus products, milk, and milk products.
- Fosfomycin comes in dry form as a one-dose packet to be dissolved in 90 to 120 mL water (not hot water). Drink immediately after mixing and take with food to prevent gastric upset.

MISCELLANEOUS DRUGS

- For dry mouth, suck on hard candy, sugarless lozenges, or small pieces of ice and perform frequent mouth care.
- These drugs may cause drowsiness or blurred vision. Do not drive or operate dangerous machinery or participate in any activity that requires full mental alertness until you know how this medication affects you.
- If you experience constipation, drink plenty of fluids, eat a high-fiber diet, and exercise (if your condition allows). If constipation persists, the primary health care provider may prescribe a mild laxative or stool softener.
- Flavoxate: Take this drug three to four times daily as prescribed. This drug is used to treat symptoms; other drugs are given to treat the cause.
- Oxybutynin: Take this drug with food or without food. Oxybutynin (Ditropan XL) contains an outer coating that may not disintegrate and may be observed on occasion in the stool. This is not a cause for concern. This drug can cause heat prostration (fever and heat stroke caused by decreased sweating) in high temperatures. If you live in hot climates or will be exposed to high temperatures, take appropriate precautions.
- Phenazopyridine: This drug may cause a reddish-orange discoloration of the urine and may stain fabrics or contact lenses. This is normal. Take the drug after meals. Do not take this drug for more than 2 days if you are also taking an antibiotic for the treatment of a UTI.
- Tolterodine: If you experience difficulty voiding, take the drug immediately after voiding. If dysuria persists, notify the primary health care provider.

EVALUATION

- The therapeutic effect is achieved.
- Adverse reactions are identified, reported to the primary health care provider, and managed successfully through appropriate nursing interventions.

- The patient and family demonstrate an understanding of the drug regimen.
- The patient verbalizes the importance of complying with the prescribed therapeutic regimen.

● Critical Thinking Exercises

1. Mr. Elliott, age 42 years, had a UTI 8 weeks ago. He failed to see his primary health care provider for a follow-up urine sample 2 weeks after completing his course of drug therapy. Mr. Elliot is in to see his primary health care provider because his symptoms of a UTI have recurred. The primary health care provider suspects that Mr. Elliott may not have followed instructions regarding treatment for his UTI. Analyze the situation to determine what points you would stress in a teaching plan for this patient.
2. Ms. Howard, age 86 years, has Alzheimer's disease and is a resident in a nursing home. She has a UTI and is prescribed cinoxacin (Cinobac). Discuss specific nursing tasks to include in a nursing care plan for this patient. What potential problems could be anticipated because of the Alzheimer's disease? What drugs might the primary care provider prescribe for the Alzheimer's disease?

● Review Questions

1. The nurse correctly administers nitrofurantoin (Macrochantin) _____.
 - A. with food
 - B. no longer than 7 days
 - C. without regard to food
 - D. no longer than 2 days
2. To avoid raising the pH when taking methenamine (Mandelamine), the nurse advises the patient to _____.
 - A. use an antacid before taking the drug
 - B. take an antacid immediately after taking the drug
 - C. avoid antacids containing sodium bicarbonate or sodium carbonate
 - D. avoid the use of antacids 1 hour before or 2 hours after taking the drug
3. What instruction would be most important to give a patient prescribed fosfomycin (Monurol)?
 - A. Drink one to two glasses of cranberry juice daily to promote healing of the urinary tract.
 - B. You may take the drug without regard to meals.
 - C. This drug comes in a one-dose packet that must be dissolved in 90 mL or more of fluids.
 - D. This drug may cause mental confusion.
4. What statement(s) would be included in a teaching plan for a patient prescribed phenazopyridine (Pyridium)?
 - A. There is a danger of heat prostration or heat stroke when taking phenazopyridine in a hot climate.
 - B. This drug may turn the urine dark brown. This is an indication of a serious condition and should be reported immediately.
 - C. This drug may cause photosensitivity. Take precautions when out in the sun by wearing sunscreen, a hat, and long-sleeved shirts for protection.
 - D. This drug may turn the urine reddish-orange. This is a normal occurrence that will disappear when use of the drug is discontinued.

● Medication Dosage Problems

1. Cinoxacin 500 mg is prescribed. The drug is available in 250-mg tablets. The nurse administers _____.
2. Nitrofurantoin oral suspension 50 mg is prescribed. The oral suspension contains 25 mg/5 mL. The nurse administers _____.