



Wolters Kluwer

When you have to be right

Introduction to Clinical Pharmacology

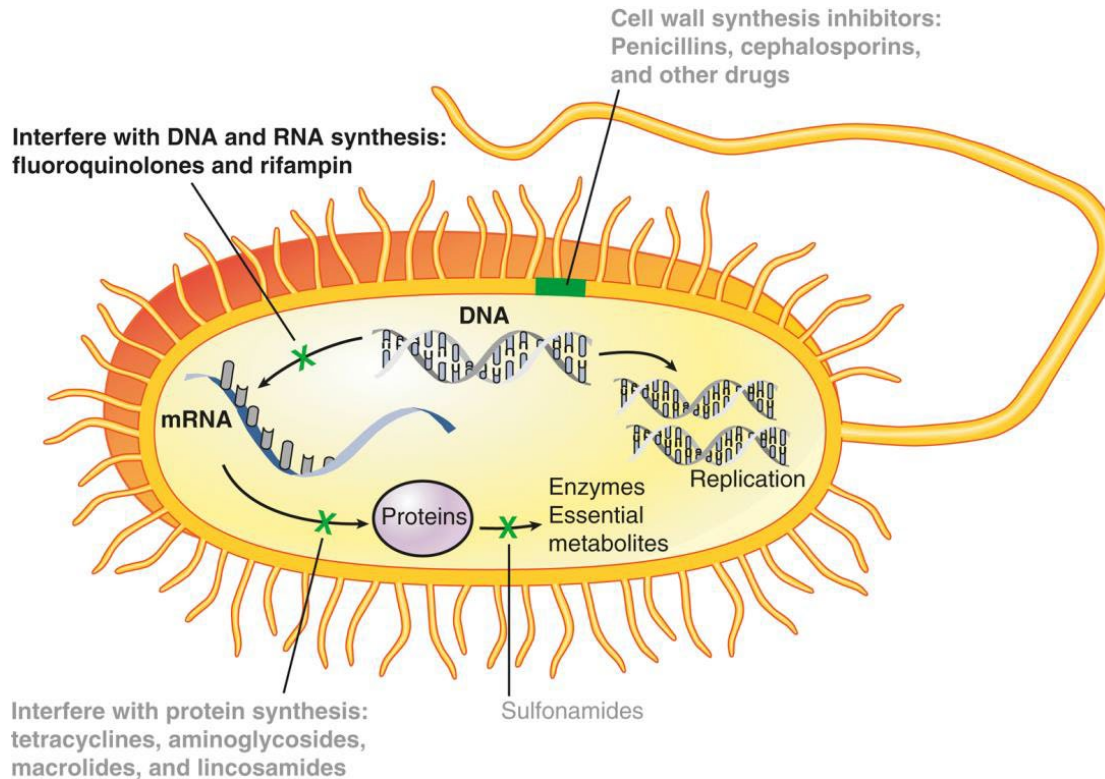
Chapter 9

Antibacterial Drugs That Interfere With DNA/RNA Synthesis

Learning Objectives

1. Explain the uses, general drug actions, contraindications, precautions, interactions, and adverse reactions of antibacterial drugs that interfere with DNA/RNA synthesis.
2. Distinguish preadministration and ongoing assessment activities the nurse should perform on the client taking an antibacterial drug that interferes with DNA/RNA synthesis.
3. List nursing diagnoses particular to a client receiving an antibacterial drug that interferes with DNA/RNA synthesis.
4. Examine ways to promote an optimal response to therapy, how to manage adverse reactions, and important points to keep in mind when educating clients about the use of antibacterial drugs that interfere with DNA/RNA synthesis.

Antibiotics That Interfere With DNA/RNA Synthesis

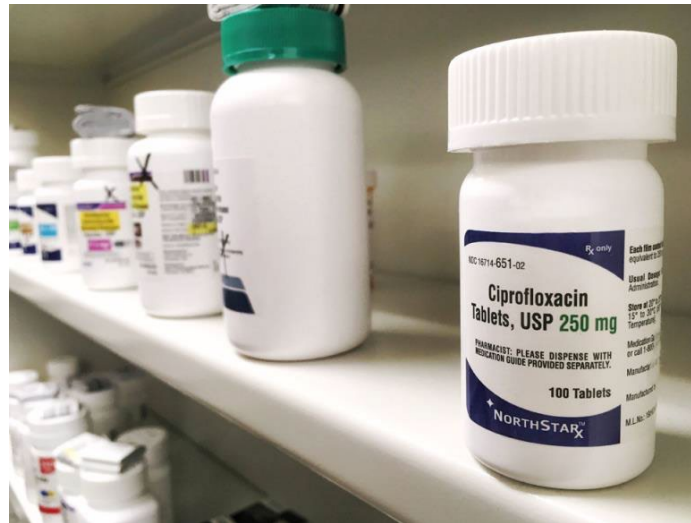


Antibiotic Stewardship—Superinfections

- ❖ Antibiotics can sometimes be overused
- ❖ Superinfections happen when antibiotics disrupt normal flora causing a secondary infection or “superinfection”
- ❖ *C. diff.*—one of the most common cause of antibiotic-related diarrheas in long-term care (LTC) facilities
- ❖ Antibiotic Stewardship Program for Nursing Homes intends to reduce the inappropriate and unnecessary prescription of antibiotics in LTC
- ❖ Types of superinfections
 - *C. diff.*
 - Candidiasis or moniliasis

Fluoroquinolones—Actions

- ❖ Bactericidal effect—interfere with the synthesis of bacterial enzymes which in turn prevent the making of bacterial DNA
 - Prevention of cell reproduction = bacterial cell death



Fluoroquinolones—Uses

- ❖ Used to treat infections caused by gram-negative and gram-positive microorganisms:
 - Lower respiratory tract infections
 - Bone and joint infections
 - Urinary tract infections
 - Infections of the skin
 - Sexually transmitted infections

- ❖ Ciprofloxacin and ofloxacin are ophthalmic forms for infections in the eyes



Fluoroquinolones—Adverse Reactions

❖ Common Adverse Reactions:

- Nausea
- Diarrhea
- Headache
- Abdominal pain or discomfort
- Dizziness
- Photosensitivity



❖ Serious Adverse Effects:

- Aortic dissection or rupture
- Hypersensitivity
- Bacterial or fungal superinfections

Fluoroquinolones—Contraindications

❖ Contraindicated in clients:

- with a history of hypersensitivity
- younger than 18 years
- during pregnancy (pregnancy category C)
- who cannot follow precautions regarding photosensitivity



❖ Used cautiously in clients with:

- Diabetes
- Renal impairment
- A history of seizures
- Geriatric clients (greater risk of tendonitis and tendon rupture)
- Dialysis

Fluoroquinolones—Interactions

Interacting Drug	Common Use	Effect of Interaction
Theophylline	Management of respiratory problems (asthma)	Increased serum theophylline level
Cimetidine	Management of GI upset	Interferes with elimination of antibiotic
Oral anticoagulants	Prevent blood clots	Increased bleeding risks
Antacids, iron salts, or zinc	Relief of heartburn and GI upset	Decreased absorption of antibiotic
Nonsteroidal anti-inflammatory drugs (NSAIDs)	Relief of pain and inflammation	Risk of seizure activity
Drugs that increase QT interval (quinidine, procainamide, amiodarone, sotalol)	Treatment of cardiac arrhythmias	Risk of severe cardiac arrhythmias
Corticosteroids	Decrease inflammation, swelling; treat allergic reactions	Increased risk of tendinitis and tendon rupture

Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #1

❖ Preadministration Assessment

❖ Objective Data

- Description of the external signs of infection (drainage, redness, changes in appearance of sputum, cough, and swelling)
- Vital signs
- Infection culture and sensitivity results
- Renal and hepatic function tests, complete blood count, and urinalysis (if client has history of impaired function)



Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #2

❖ Preadministration Assessment continued

❖ Subjective Data

- Client symptoms of infection including pain, malaise, and fatigue
- Allergy history
- History of heart, renal, or hepatic disease and any previous seizure activity



Pharmacology in Practice Exercise #1

- ❖ The client is being treated with a fluoroquinolone for an infection. Tendon rupture occurs more frequently in the older adult when taking which of the following drugs with the fluoroquinolones?
- a) Antianginal drugs
 - b) Corticosteroids
 - c) Oral antidiabetic drugs
 - d) Respiratory bronchodilators



Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #3

❖ Ongoing Assessment

- Take vital signs every 4 hours or as ordered
- Notify the primary health care provider if there are changes in the vital signs or if signs and symptoms worsen
- Compare current signs and symptoms of infection with baseline and/or previous assessments and record any specific findings



Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #4

❖ Nursing Diagnoses

- Risk for Impaired Comfort related to fever
- Risk for Impaired Skin Integrity related to photosensitivity
- Acute Pain related to tissue injury during drug therapy
- Diarrhea related to superinfection secondary to antibiotic therapy or adverse drug reaction

Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #5

❖ Planning

- Expected client outcomes depend on the reason for administration of the antibiotic but may include:
 - Controlling the infectious process or prophylaxis of bacterial infection
 - Management of adverse drug effects
 - Confidence and understanding of the prescribed treatment regimen

Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #6

❖ Implementation

- Promoting an optimal response to therapy
 - Observe the client for adverse reactions during the first 48 hours of administration
 - Report any adverse reactions to the primary health care provider
 - Always listen to, evaluate, and report any complaints the client may have—could be an early sign of adverse drug reaction
 - Encourage clients to increase fluid intake

Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #7

❖ Implementation

- Promoting an optimal response to therapy continued
 - Norfloxacin given on empty stomach (1 hour before or 2 hours after meals)
 - Instruct client to swallow extended release or controlled release drugs whole without crushing, chewing, or breaking them
 - In a client taking an antacid, ciprofloxacin and moxifloxacin should be administered 2 to 4 hours before or 6 to 8 hours after the antacid



Pharmacology in Practice Exercise #2

- ❖ The client was prescribed 320 mg of Gemifloxacin per day for 5 days. Today is Thursday. What will be the last day to take this prescription?



Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #8

❖ Implementation—Monitoring and Managing Client Needs

- Risk for Impaired Comfort related to fever
 - Monitor: temperature at frequent intervals
 - Elevated temperature (temp. over 101°F): notify the primary health care provider, check temperature, pulse, and respirations every hour until temperature returns to normal; administer antipyretic medication if prescribed



Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #9

❖ Implementation— Monitoring and Managing Client Needs

- Impaired Skin Integrity
 - Skin: more sensitive to sunlight when taking fluoroquinolones (photosensitivity)
 - Sunscreens and cover-up clothing recommended



Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #10

- ❖ Implementation—Monitoring and Managing Client Needs
- ❖ Parenteral Administration
 - Acute Pain: Tissue Injury
 - Inspect needle site and area around needle for signs of extravasation of the IV fluid or tenderness, pain, and redness (signs of phlebitis or thrombophlebitis)
 - Check rate of infusion every 15 minutes
 - Assess the vein used for the IV infusion every 4 to 8 hours
 - In case of symptoms: restart the IV in another vein; report to primary health care provider

Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #11

❖ Implementation—Monitoring and Managing Client Needs

○ Diarrhea

- Observe for and report symptoms of bacterial or fungal superinfection—usually starts 4 to 10 days after initiation of treatment
- Inspect stools for blood and mucus and report abnormalities to provider
- Drug therapy may have to be discontinued to treat diarrhea, superinfection, or pseudomembranous colitis

Pharmacology in Practice Exercise #3

- ❖ A superinfection can develop rapidly and is potentially serious. Identify how antibacterial drug therapy can lead to a superinfection. Arrange the following steps as they relate to developing a superinfection during anti-infective therapy.
 - a) Secondary infection is superimposed on the original infection
 - b) Uncontrolled growth of bacteria
 - c) Antibiotics disrupt the normal flora of the bowel
 - d) Client experiences cramping, diarrhea, and bleeding
 - e) Microorganisms produce toxins



Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #12

❖ Implementation—Educating the Client and Family

- Develop a teaching plan for the client and family to include:
 - Explain the adverse reactions of specific prescribed antibiotics
 - Advise about the signs and symptoms of potentially serious adverse effects



Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #13

- ❖ Implementation—Educating the Client and Family continued
 - Develop a teaching plan for the client and family to include:
 - Monitoring for:
 - Fever
 - Rashes
 - Diarrhea
 - Burning sensation in the mouth or throat
 - Signs of fungal infection in mouth, groin, skin folds, and anogenital area

Nursing Process—Client Receiving a Fluoroquinolone or Miscellaneous Anti-Infective #14

❖ Evaluation

- Was the therapeutic effect achieved? Infection is controlled?
- Were adverse reactions: identified, reported, and managed?
 - Client is comfortable and afebrile
 - Skin is intact and free of inflammation, irritation, infection, or ulcerations
 - Client reports no pain or injury
 - Client does not experience or is able to manage diarrhea
- Did client and family express confidence and demonstrate understanding of drug regimen?

Turn and Talk—Case Study

- ❖ A 54-year-old client is hospitalized for pyelonephritis. The physician orders ciprofloxacin 400 mg every 12 hours for 2 days and then ciprofloxacin 500 mg by mouth every 12 hours for 12 more days.
- 1. What preadministration assessments should be completed before starting the client on ciprofloxacin?
- 2. Ciprofloxacin is available in a 10-mg/mL vial. How many milliliters will the nurse need to prepare for one 400-mg dose?
- 3. What should the nurse tell the client about the ciprofloxacin before leaving the hospital?

