Wolters Kluwer

When you have to be right

Introduction to Clinical Pharmacology

Chapter 29
Skeletal Muscle, Bone, and Joint Disorder Drugs

Learning Objectives

1. List the types of drugs used to treat musculoskeletal disorders.
2. Explain the uses, general drug actions, adverse reactions, contraindications, precautions, and interactions of the drugs used to treat musculoskeletal disorders.
3. Distinguish important preadministration and ongoing assessment activities the nurse should perform on the client taking a drug used to treat musculoskeletal disorders.
4. List nursing diagnoses particular to a client taking a drug for the treatment of musculoskeletal disorders.
5. Examine ways to promote an optimal response to therapy, how to manage adverse reactions, and important points to keep in mind when educating the client about drugs used to treat musculoskeletal disorders.

Overview

- A variety of drugs are used to treat musculoskeletal injuries and disorders; they include
  - skeletal muscle relaxants,
  - Disease-modifying antirheumatic drugs (DMARDs),
  - bone resorption inhibitors—bisphosphonates, and
  - uric acid inhibitors.

Skeletal Muscle Relaxants—Actions and Uses

- **Actions**
  - Sedative action that relieves acute painful musculoskeletal conditions (carisoprodol, baclofen, and chlorzoxazone)
  - Effect the muscle tone reducing the muscle spasm

- **Uses**
  - Acute painful musculoskeletal conditions such as muscle strains and back pain
  - Preoperatively to relax muscle tone throughout the body or specific muscles; can aid in intubation; easier movement of joints and limbs during surgery

Skeletal Muscle Relaxants—Adverse Reactions

- Common Adverse Reactions:
  - Drowsiness
  - Sedation
  - Sleepiness
  - Lethargy
  - Constipation or diarrhea
  - Bradycardia or tachycardia
  - Rash

Skeletal Muscle Relaxants—Contraindications #1

- Contraindicated in clients with:
  - known hypersensitivity to the drugs
  - Baclofen: contraindicated in skeletal muscle spasms caused by rheumatic disorders
  - Carisoprodol: contraindicated in clients with known hypersensitivity to meprobamate

Skeletal Muscle Relaxants—Contraindications #2

- Cyclobenzaprine: contraindicated in clients with a recent myocardial infarction (MI), cardiac conduction disorders, and hyperthyroidism
- Oral dantrolene: contraindicated during lactation and in clients with active hepatic disease and muscle spasm caused by rheumatic disorders

Skeletal Muscle Relaxants—Precautions #1

- Use cautiously in clients with a history of cerebrovascular accident, cerebral palsy, parkinsonism, or seizure disorders and during pregnancy and lactation
- Dantrolene—used cautiously in women over 35 due to increased risk of hepatitis; and pregnancy category C drug when used in pregnancy
  - Carisoprodol: used with caution in clients with severe liver or kidney disease and during pregnancy and lactation
  - Cyclobenzaprine: used cautiously in clients with cardiovascular disease and during pregnancy and lactation

Skeletal Muscle Relaxants—Precautions #2

- Use cautiously in clients with a history of cerebrovascular accident, cerebral palsy, parkinsonism, or seizure disorders and during pregnancy and lactation
- Dantrolene—used cautiously in women over 35 due to increased risk of hepatitis; and pregnancy category C drug when used in pregnancy
- Carisoprodol: used with caution in clients with severe liver or kidney disease and during pregnancy and lactation
- Cyclobenzaprine: used cautiously in clients with cardiovascular disease and during pregnancy and lactation

Skeletal Muscle Relaxants—Interactions #1

Interacting Drug	Common Use	Effect of Interaction
CNS depressants such as alcohol, antihistamines, opiates, and sedatives	Promote a calming effect or provide pain relief	Increased CNS depressant effect
Cyclobenzaprine		
MAOIs	Manage depression	Risk for high fever and convulsions

Skeletal Muscle Relaxants—Interactions #2

Interacting Drug	Common Use	Effect of Interaction
Orphenadrine		
Haloperidol	Treat psychotic behavior	Increase psychosis
Tizanidine		
Antihypertensives	Reduce blood pressure	Increased risk of hypotension

DMARDs—Actions and Uses

- **Actions**
  - Disease-Modifying Antirheumatic Drugs (DMARDs) produce immunosuppression which decreases the bodies immune response
- **Uses**
  - Chronic musculoskeletal conditions like rheumatoid arthritis, cancer therapy, Crohn disease, fibromyalgia

DMARDs—Adverse Reactions

- Adverse Reactions:
  - Nausea, stomatitis
  - Alopecia
  - Sulfasalazine: ocular changes, GI upset, mild pancytopenia
  - Biologic DMARDs: flu-like symptoms
  - Skin rash when given by injection

DMARDs—Contraindications #1

- Contraindicated in clients with:
  - known hypersensitivity to the drugs
  - Methotrexate: contraindicated in clients with renal insufficiency, liver disease, alcohol abuse, pancytopenia, or folate deficiency
  - Biologic DMARDs: should not be used in clients with congestive heart failure or neurologic demyelinating diseases

DMARDs—Contraindications #2

- Leflunomide should not be taken by women who are pregnant or attempting to become pregnant
- Anakinra should not be used in combination with etanercept, adalimumab, or infliximab

DMARDs—Precautions

- Use cautiously in clients with:
  - obesity
  - diabetes
  - hepatitis B or C
  - women should not become pregnant
  - sexual partners should use barrier contraception to prevent transmission of the drug via semen

DMARDs—Interactions

Interacting Drug	Common Use	Effect of Interaction
Sulfa antibiotics	Fight infection	Increased risk of methotrexate toxicity
Aspirin and NSAIDs	Pain relief	Increased risk of methotrexate toxicity

Bone Resorption Inhibitors: Bisphosphonates—Actions and Uses

- **Actions**
  - Act primarily on the bone by inhibiting normal and abnormal bone resorption resulting in increased bone mineral density
- **Uses**
  - Osteoporosis in postmenopausal women and men
  - Hypercalcemia of malignant diseases
  - Paget disease of the bone

Bone Resorption Inhibitors: Bisphosphonates—Adverse Reactions

- Adverse Reactions:
  - Nausea
  - Diarrhea
  - Increased or recurrent bone pain
  - Headache
  - Dyspepsia, acid regurgitation, dysphagia
  - Abdominal pain

Bone Resorption Inhibitors: Bisphosphonates—Contraindications

- Contraindicated in clients with:
  - known hypersensitivity to the drugs
  - delayed esophageal emptying
  - renal impairment
  - use of hormone replacement therapy
  - Alendronate, risedronate: contraindicated in clients with hypocalcemia, during pregnancy (pregnancy category C)
  - Bisphosphonates: contraindicated in clients with delayed esophageal emptying or renal impairment

Bone Resorption Inhibitors: Bisphosphonates—Precautions

- Denosumab is associated with hypokalemia, osteonecrosis of the jaw, infection, skin reactions and atypical femoral fractures; monitored by the FDA Risk Evaluation and Mitigation Strategy program
- Bone Resorption Inhibitor therapy is used cautiously if a pregnant woman presents with malignancy; consider benefit versus potential risk to fetus

Bone Resorption Inhibitors: Bisphosphonates—Interactions

Interacting Drug	Common Use	Effect of Interaction
Calcium supplements or antacids with magnesium and aluminum	Relief of gastric upset	Decreased effectiveness of bisphosphonates
Aspirin	Pain relief	Increase risk of GI bleeding
Theophylline	Alleviation of breathing problems	Increased risk of theophylline toxicity

Uric Acid Inhibitors—Actions and Uses

- **Actions**
  - Allopurinol reduces the production of uric acid; decreasing serum uric acid levels and deposits of urate crystals in joints
  - Febuxostat reduces serum uric aced levels
  - Colchicine reduces inflammation associated with the deposit of crystals in joints
  - IV pegloticase or probenecid reduce uric acid levels in the body

- **Uses**
  - Treatment, management or prevention of gout

Uric Acid Inhibitors—Adverse Reactions #1

- Gastrointestinal System Reactions:
  - Nausea
  - Vomiting
  - Diarrhea

Uric Acid Inhibitors—Adverse Reactions #2

- Other Reactions:
  - Headache
  - Urinary frequency
  - Skin rash (allopurinol)

Uric Acid Inhibitors—Adverse Reactions #3

- Serious Reactions:
  - Exfoliative dermatitis
  - Stevens-Johnson syndrome
  - Severe nausea, vomiting, and bone marrow depression (colchicine)

Uric Acid Inhibitors—Contraindications

- Contraindicated in clients with:
  - known hypersensitivity to the drugs
  - Colchicine: clients with serious GI, renal, hepatic, and cardiac disorders and those with blood dyscrasias
  - Probenecid: contraindicated in clients with blood dyscrasias and uric acid kidney stones and in children younger than 2 years

Uric Acid Inhibitors—Precautions

- Use cautiously in clients with:
  - renal impairment
  - pregnancy (pregnancy category B or C)
  - liver impairment (allopurinol)
  - hypersensitivity to sulfa drugs or who have peptic ulcer disease (probenecid)
  - elderly clients (colchicine)
- Pegloticase infusions are associated with anaphylactic reactions; premedicate with antihistamines and corticosteroids

Uric Acid Inhibitors—Interactions #1

Interacting Drug	Common Use	Effect of Interaction
Allopurinol and Febuxostat		
Ampicillin	Anti-infective agent	Increased risk of rash
Theophylline	Alleviation of breathing problems	Increased risk of theophylline toxicity
Aluminum based antacids	Relief of gastric upset	Decreased effectiveness of allopurinol

Uric Acid Inhibitors—Interactions #2

Interacting Drug	Common Use	Effect of Interaction
Probenecid		
Penicillins, cephalosporins, acyclovir, rifampin, and sulfonamides	Anti-infective agent	Increased serum-level of anti-infective
Barbiturates and benzodiazepines	Sedation	Increased serum level of sedative
NSAIDs	Pain relief	Increased serum level of NSAID
Salicylates	Pain relief	Decreased effectiveness of probenecid

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #1

- **Preadministration Assessment**

- **Objective** Data
  - Description of signs of immobility and effects of change in activities of daily living
  - Description of the affected joints in the extremities; appearance of skin over the joint; evidence of joint deformity and signs of immobility
  - Vital signs
  - Laboratory tests and bone scans to measure bone density
  - Tuberculin skin test

    (with Biologic DMARDs)

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #2

- **Preadministration Assessment (continued)**
- **Subjective** Data
  - Type and duration of symptoms
  - Pain experience (onset, type, radiation, location, intensity, and duration)
  - If being used for prevention, factors supporting the client to use the drug and that might support adherence
  - Health history (immunocompromise or travel to areas with infectious diseases)
  - Remedies attempted before seeking care

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #3

- **Ongoing Assessment**
  - Gout: Inspect the joints involved every 1 to 2 hours to identify immediately a response or nonresponse to therapy
  - Question the client regarding relief of pain, adverse drug reactions
  - Evaluate and document the effectiveness of therapy

Pharmacology in Practice Exercise #1

- A long-term care client tells the nurse, “I have painful gout.” What should the nurse assess to determine if the client has gout?

a) Appearance of skin for rash

b) Evidence of hearing loss

c) Pain in the abdomen

d) Mobility of affected joint

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #4

- **Nursing Diagnosis**
  - Readiness for Enhanced Fluid Balance related to need for increased fluid intake to promote excretion of urate crystals
  - Impaired Comfort: Gastric Distress related to irritation of gastric lining from medication administration
  - Injury Risk related to medication-induced drowsiness and associated risk for imbalance and falls
  - Allergic Risk related to response to substance trigger (drug allergy)

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #5

Planning

- Expected client outcomes depend on the reason for administration but may include:
  - Optimal response to therapy
  - Management of adverse drug reactions
  - Confidence in an understanding of the prescribed medication regimen

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #6

- **Implementation**
  - Promoting Optimal Response to Therapy
    - Clients may have long-standing chronic pain and joint deformities; medications are used for management, but nurse should encourage client to rest, participate in physical therapy, and teach the client that the therapeutic regimen is getting the client to a tolerable level of pain
    - Assist client to deal with emotional response to chronic condition; educate client that benefit of drug may take weeks or longer to notice

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #7

- **Implementation**
  - Promoting Optimal Response to Therapy (continued)
    - Be alert to adverse reactions such as skin rash, fever, cough, or easy bruising
    - Be attentive to specific client complaints such as visual changes, tinnitus, or hearing loss
    - Evaluate any complaint or comment made by the client and report it to the primary health care provider

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #8

- **Implementation**
  - Promoting Optimal Response to Therapy
    - Report any findings of potential severe adverse reactions like Stevens-Johnson syndrome when client is on allopurinol
    - Monitor labs closely for clients on methotrexate for signs of thrombocytopenia and leukopenia; hematology, liver, and renal function tests every 1 to 3 months

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #9

- **Implementation**
  - Monitoring and Managing Client Needs
    - **Readiness for Enhanced Fluid Balance**
      - Encourage a liberal fluid intake and measure the intake and output; output should be about 2 liters
      - Consider supplemental IV fluids if client fails to drink 3000 mL of fluid per day

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #10

- **Implementation**
  - Monitoring and Managing Client Needs
    - **Impaired Comfort: Gastric Distress**
      - To facilitate delivery of bone resorption inhibitor to the stomach and minimize GI effects, administer the drug with 6 to 8 oz of water directly upon waking while the client is in an upright position
      - Client must remain upright for 30 minutes after administration
      - Etidronate is not administered with food, vitamin and mineral supplements, or antacids

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #11

- **Implementation**
  - Monitoring and Managing Client Needs
    - **Injury Risk**
      - Many of these drugs cause drowsiness; pain and deformity can hamper mobility
      - Evaluate the client carefully before allowing the client to ambulate alone
      - Notify the primary health care provider before the next dose is due if drowsiness is severe

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #12

- **Implementation**
  - Monitoring and Managing Client Needs
    - **Injury Risk (continued)**
      - Assist with ambulatory activities if drowsiness does occur
      - Clients on bed rest need to be turned every 2 hours
      - Clients with osteoporosis may need a brace or corset when out of bed

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #13

- **Implementation**
  - Monitoring and Managing Client Needs
    - **Allergy Risk**
      - Monitor clients with gout being treated with IV pegloticase closely for the development of adverse reactions
      - Keep resuscitation equipment nearby in case of anaphylaxis

Pharmacology in Practice Exercise #2

- Which of the following nursing diagnoses is of greatest priority when a client is taking a bisphosphonate drug?

  a) Readiness for enhanced fluid balance

  b) Impaired Comfort: Gastric Distress

  c) Injury Risk

  d) Allergic Risk

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #14

- **Implementation—Educating the** Client and Family
  - Explain that treatment for the disorder includes drug therapy, as well as other medical management
  - Emphasize importance of not taking any nonprescription drugs unless their use has been approved by primary health care provider
  - If the medication requires subcutaneous injection, teach the client and family how to administer injection, to rotate administration sites, and proper disposal of syringes

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #15

- **Implementation—Educating the** Client and Family
- **When using drugs for muscle spasm and cramping:**
  - Explain that the drug can cause drowsiness and to avoid driving or doing hazardous tasks
  - The drug is for short-term use. Advise client not to take the medication for longer than 2 to 3 weeks.
  - Teach the client to avoid alcohol or other CNS depressants

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #16

- **Implementation—Educating the** Client and Family
- **When using drugs for rheumatoid arthritis:**
  - With methotrexate, teach client or family to use a calendar or other memory aid to remember to take drug on same day every week
  - Teach client or family to notify provider immediately for adverse reactions
  - Tell female clients of childbearing age to use contraceptive therapy with methotrexate and for 8 weeks after therapy

Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #17

- **Implementation—Educating the** Client and Family
- **When using drugs to treat gout:**
  - Teach client to drink at least 10 glasses of water a day until the attack has subsided
  - Teach the client to take the drug with food to minimize GI discomfort
  - Teach the client to avoid driving or perform other hazardous activities
  - During active gout, tell the client to notify the primary care provider if pain is not relieved in a few days or if a skin rash occurs

Pharmacology in Practice Exercise #3

- A client with rheumatic arthritis is administered a DMARD. What specific problem should the client be instructed to monitor for while taking an immunosuppressive drug?

  a) Bleeding tendencies

  b) Hypoglycemia

  c) Infections

  d) Epigastric distress

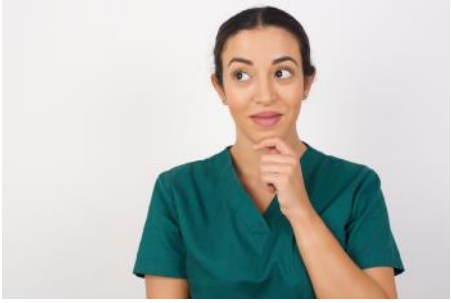
Nursing Process—Client Receiving a Drug for a Musculoskeletal Disorder #18

- **Evaluation**
  - Was the therapeutic effect achieved, pain decreased, and mobility improved or maintained?
  - Were adverse reactions: identified, reported, and managed?
    - Client improves fluid balance
    - GI comfort is maintained
    - No evidence of injury
    - Allergic risk is minimized
  - Did client and family express confidence and demonstrate understanding of drug regimen?

Turn and Talk—Case Study #1

- A client presents to the emergency department with complaints of a swollen ankle that is painful to the touch.

1. What assessment should the nurse perform before the physician examines the client?
2. The emergency department physician diagnoses the client with an acute gout attack. The physician orders colchicine 0.5 mg IV every 6 hours until the attack is aborted. What should the nurse include in the ongoing assessment of the client?



Turn and Talk—Case Study #2

- A client presents to the emergency department with complaints of a swollen ankle that is painful to the touch.

3. The client is feeling better and is sent home to follow up with the primary care physician in a few days. At the follow-up appointment the physician gives the client a prescription for allopurinol 100 mg every day. What should the nurse instruct the client to do while they are taking the allopurinol?