Introduction to Clinical Pharmacology

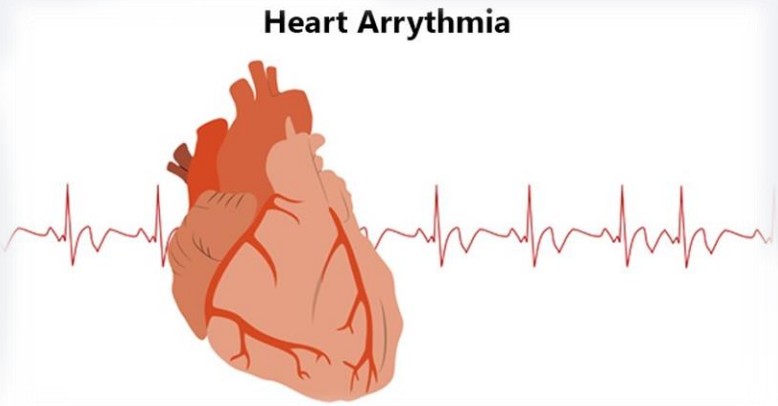
Chapter 24
Adrenergic Blocking Drugs

Alpha-Adrenergic Blocking Drugs: Actions and Uses

- Actions:
  - Stimulation of alpha-adrenergic nerves results in vasoconstriction
  - Primary drugs used in this category cause vasodilation
- Used for the treatment of:
  - Hypertension during preoperative preparation, hypertension caused by pheochromocytoma

Alpha-Adrenergic Blocking Drugs: Adverse Reactions, Contraindications, and Precautions

- Adverse reactions:
  - Weakness; orthostatic hypotension; cardiac arrhythmias; hypotension; tachycardia
- Contraindications and precautions:
  - Contraindicated in patients who are hypersensitive to drugs; patients with coronary artery disease



Alpha-Adrenergic Blocking Drugs: Contraindications and Precautions

- Contraindications and precautions (cont.)
  - Used cautiously during pregnancy and lactation; after recent myocardial infarction; in patients with renal failure or Raynaud disease
- When phentolamine is administered with epinephrine, there is decreased vasoconstrictor and hypertensive action

Beta-Adrenergic Blocking Drugs: Actions

- Actions:
  - Decreased stimulation of sympathetic nervous system on certain tissues
  - Decreased excitability of heart; decreased cardiac workload and oxygen consumption; provides membrane-stabilizing effects

Beta-Adrenergic Blocking Drugs: Uses and Adverse Reactions

- Used in treatment of:
  - Hypertension; cardiac arrhythmias, such as ventricular or supraventricular tachycardia; migraine headaches; angina pectoris; glaucoma
- Adverse reactions:
  - Cardiac reactions; gastrointestinal (GI) reactions; bronchospasm; congestive heart failure

Beta-Adrenergic Blocking Drugs: Contraindications and Precautions

- Contraindicated in patients with allergy to beta blockers; sinus bradycardia; second- or third-degree heart block; heart failure; asthma; emphysema; or hypotension
- Used cautiously in patients with diabetes; thyrotoxicosis; peptic ulcer

Beta-Adrenergic Blocking Drugs: Interactions #1

Interactant drug	Effect of interaction
Antidepressants (MAOIs, SSRIs)	Increased effect of beta blocker, bradycardia
Nonsteroidal anti-inflammatory drugs (NSAIDs), salicylates	Decreased effect of beta blocker
Loop diuretics	Increased risk of hypotension

Beta-Adrenergic Blocking Drugs: Interactions #2

Interactant drug	Effect of interaction
Clonidine	Increased risk of paradoxical hypertensive effect
Cimetidine (Tagamet) and lidocaine	Increased serum level of beta blocker and higher risk of beta blocker toxicity

Alpha/Beta-Adrenergic Blocking Drugs: Actions, Uses, and Adverse Reactions

- Actions:
  - Block the stimulation of both the alpha- and beta-adrenergic receptors, resulting in peripheral vasodilation
- Uses:
  - Carvedilol used for treatment of essential hypertension; in congestive heart failure to reduce progression of disease

Alpha/Beta-Adrenergic Blocking Drugs: Uses and Adverse Reactions

- Uses (cont.)
  - Labetalol used in treatment of hypertension, alone or in combination with another drug such as diuretic
- Adverse reactions
  - Fatigue; dizziness; hypotension; drowsiness; insomnia; weakness; diarrhea; dyspnea; chest pain; bradycardia; skin rash

Alpha/Beta-Adrenergic Blocking Drugs: Contraindications and Precautions

- Contraindicated in patients with hypersensitivity to drugs; bronchial asthma; decompensated heart failure; severe bradycardia
- Used cautiously in patients with drug-controlled congestive heart failure, bronchial asthma, chronic bronchitis impaired hepatic or cardiac function, diabetes; during pregnancy and lactation

Alpha/Beta-Adrenergic Blocking Drugs: Interactions

Interactant drug	Effect of interaction
Antidepressants (tricyclics and SSRIs)	Increased risk of tremors
Cimetidine (Tagamet), halothane	Increased effect of adrenergic blocker
Clonidine	Increased effect of clonidine
Digoxin	Increased serum level of digoxin and higher risk of digoxin toxicity

Antiadrenergic Drugs: Actions and Uses

- Actions:
  - Inhibit the release of norepinephrine from certain adrenergic nerve endings in the peripheral nervous system; affect specific CNS centers, thereby decreasing some of the activity of sympathetic nervous system
- Uses:
  - Used for treatment of certain cardiac arrhythmias and hypertension

Antiadrenergic Drugs: Adverse Reactions

- Adverse reactions:
  - Generalized reactions of drugs that work on the CNS: dry mouth; drowsiness; sedation; anorexia; rash; malaise; weakness
  - Hypotension, weakness, lightheadedness, and bradycardia are adverse reactions associated with administration of peripherally acting antiadrenergic drugs

Antiadrenergic Drugs: Contraindications and Precautions #1

- Contraindications and precautions:
  - Contraindicated in active hepatic disease; antidepressant therapy using MAOIs; patients with history of hypersensitivity to these drugs
  - Reserpine is contraindicated in patients who have an active peptic ulcer or ulcerative colitis and in patients who are mentally depressed

Antiadrenergic Drugs: Contraindications and Precautions #2

- Used cautiously in patients with history of liver disease or renal function impairment; during pregnancy and lactation
- Reserpine is used cautiously in patients with history of depression; in patients with renal impairment; during pregnancy and lactation

Antiadrenergic Drugs: Interactions

Interactant drug	Effect of interaction
Adrenergics, beta blockers	Increased risk of hypertension
Levodopa	Decreased effect of levodopa, hypotension
Anesthetic agents	Increased effect of anesthetic
Lithium	Increased risk of lithium toxicity
Haloperidol (Haldol)	Increased risk of psychotic behavior

Nursing Process: Assessment #1

- Preadministration assessment:
  - Establish an accurate database before any adrenergic blocking drug is administered for the first time
  - Record onset, type, radiation, location, intensity, and duration of anginal pain when the drug is administered for anginal pain
  - Compare the current symptoms with the symptoms before therapy
  - Hypertension: blood pressure and pulse on both arms
  - Cardiac arrhythmia: pulse rate, pulse rhythm, and patient's general appearance

Nursing Process: Assessment #2

- Ongoing assessment:
  - Observe the patient for appearance of adverse reactions
  - If propranolol is given for angina, ask the patient about the relief of symptoms and record responses in patient's chart

Nursing Process: Planning

- Nursing Diagnoses
  - **Impaired Comfort** related to drying of secretions secondary to medication
  - **Ineffective Tissue Perfusion: Peripheral** related to hypotension
  - **Risk for Injury** related to vertigo, dizziness, weakness, and syncope secondary to hypotension

Nursing Process: Implementation #1

- Promoting an optimal response to therapy:
  - Administer drugs preventing release of neurotransmitters
  - Contact primary care provider immediately if angina worsens or does not appear to be controlled by drug
  - Monitor patient for decrease in blood pressure when drug is administered for hypertension
  - When a beta-adrenergic blocking ophthalmic preparation, such as timolol, is administered to patient with glaucoma, it is important to insist that patient have periodic follow-up examinations by an ophthalmologist

Nursing Process: Implementation #2

- Monitoring and managing patient needs:
  - Impaired comfort:
    - Report adverse reactions to primary care provider; record the reactions on patient's chart; withhold next dose when adverse reaction is serious/potentially serious; relieve a patient's constipation by encouraging increased fluid intake; maintain a daily record of bowel elimination

Nursing Process: Implementation #3

- Monitoring and managing patient needs (cont.):
  - Ineffective tissue perfusion: cardiac/peripheral:
    - During therapy take patient's blood pressure before each dose is given
    - Patients with a life-threatening arrhythmia may receive an adrenergic blocking drug, such as propranolol, by the intravenous (IV) route; monitor blood pressure, respiratory rate, and rhythm

Nursing Process: Implementation #4

- Monitoring and managing patient needs (cont.)
  - Risk of injury:
    - Patients receiving an adrenergic blocking drug may experience postural (orthostatic) hypotension

Nursing Process: Implementation #5

- Educating the patient and family:
  - Describe drug regimen and stress importance of continued and uninterrupted therapy when teaching patient who is prescribed adrenergic blocking drug
  - Educating the patient with hypertension, cardiac arrhythmia, or angina:
    - Stress importance of diet, weight loss in therapy of hypertension

Nursing Process: Implementation #6

- Educating the patient and family (cont.)
  - Advise hypertensive patient to lose weight or eat a special diet, such as a low-salt diet
- Educating the patient with glaucoma:
  - Demonstrate the technique of eye drop instillation and explain the prescribed treatment regimen to the patient
  - Contact primary health care provider if eye pain, excessive tearing, or change in vision occurs

Nursing Process: Evaluation

- The therapeutic effect is achieved; hypertension, cardiac arrhythmia, or glaucoma is controlled
- Adverse reactions are identified, reported, and managed successfully through appropriate nursing interventions
- No evidence of injury related to orthostatic (postural) hypotension is seen
- The patient and family demonstrate an understanding of the drug regimen

Question #1

- Is the following statement true or false?
- The sympathetic branch of the autonomic nervous system regulates involuntary body functions.

Answer to Question #1

- True
- The sympathetic branch of the autonomic nervous system regulates involuntary body functions. The antiadrenergic drugs block the neurotransmitter norepinephrine in the sympathetic branch.

Question #2

- Is the following statement true or false?
- The purpose of adrenergic blocking drugs is to block or interrupt the signals which divert blood flow to the vital organs.

Answer to Question #2

- True
- The purpose adrenergic blocking drugs is to block or interrupt the signals which divert blood flow to the vital organs. Instead the blood vessels dilate and relax smooth muscle. The heart rate decreases as well as lowers the blood pressure.

Question #3

- Is the following statement true or false?
- Drugs that block the sympathetic system are called sympatholytic or antiadrenergic.

Answer to Question #3

- True
- Drugs that block the sympathetic system are called sympatholytic or antiadrenergic. Actions in the body are modified depending on how the drug acts on different cell receptors. Drugs can be selective for alpha or beta receptors. Drugs can also be nonselective.