



Wolters Kluwer

When you have to be right

Introduction to Clinical Pharmacology

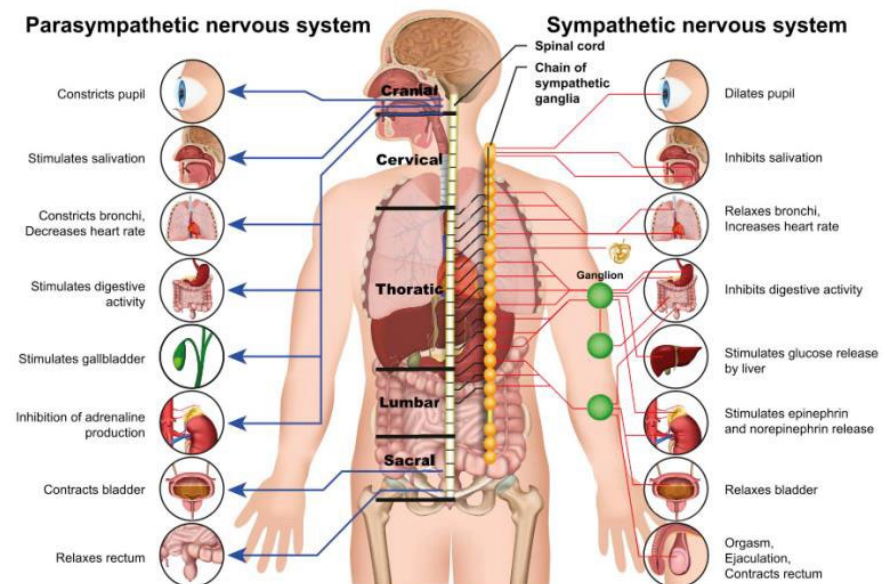
Chapter 24 Adrenergic Blocking Drugs

Learning Objectives

1. List the four types of adrenergic blocking drugs.
2. Explain the uses, general drug actions, general adverse reactions, contraindications, precautions, and interactions of the adrenergic blocking drugs.
3. Distinguish important preadministration and ongoing assessment activities the nurse should perform on the client taking an adrenergic blocking drug.
4. List nursing diagnoses particular to a client taking an adrenergic blocking drug.
5. Examine ways to promote an optimal response to therapy, how to manage common adverse reactions, nursing actions that may be taken to minimize orthostatic or postural hypotension, and important points to keep in mind when educating clients about the use of adrenergic blocking drugs.

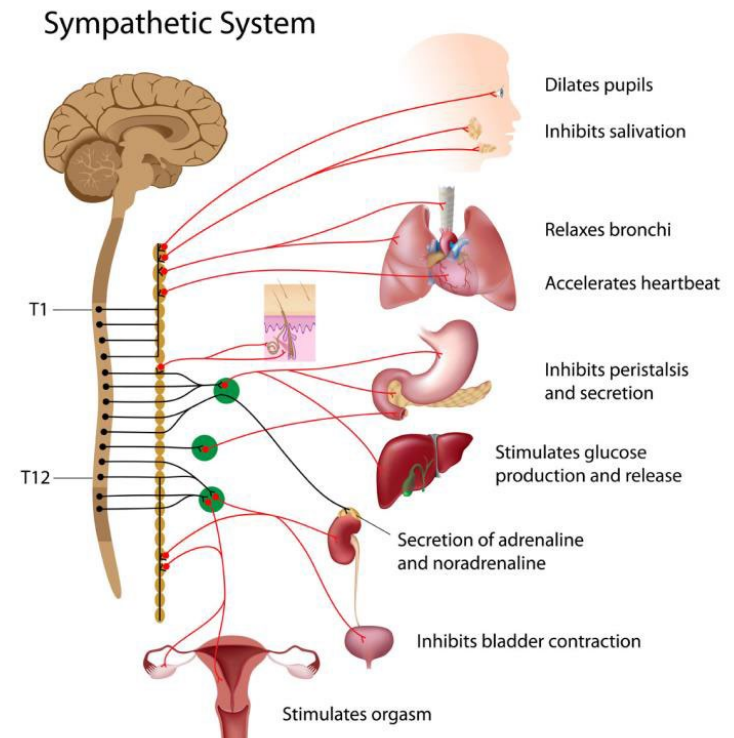
Autonomic Nervous System

- Division of the peripheral nervous system concerned with the functions essential to life of an organism and not consciously controlled (e.g., blood pressure, heart rate, and gastrointestinal activity)
- Divided into two branches:
 - Sympathetic
 - Parasympathetic



Sympathetic Nervous System

- Nerves are stimulated when the body is confronted with stressful situations such as danger, intense emotion, or severe illness
- Fight, flight, or freeze response
- Controls a person's heart rate, breathing rate, and ability to divert blood to skeletal muscles



Adrenergic Blocking Drugs—Actions

- Block neurotransmission in the sympathetic nervous system by directly by blocking the receptor or by indirectly preventing the release of norepinephrine.

BOX 24.1

More Variation on Drug Class Names

Sympatholytic
Antiadrenergic
Adrenergic blockers

All terms meaning—to stop the neurotransmission of norepinephrine along the sympathetic branch of the autonomic nervous system

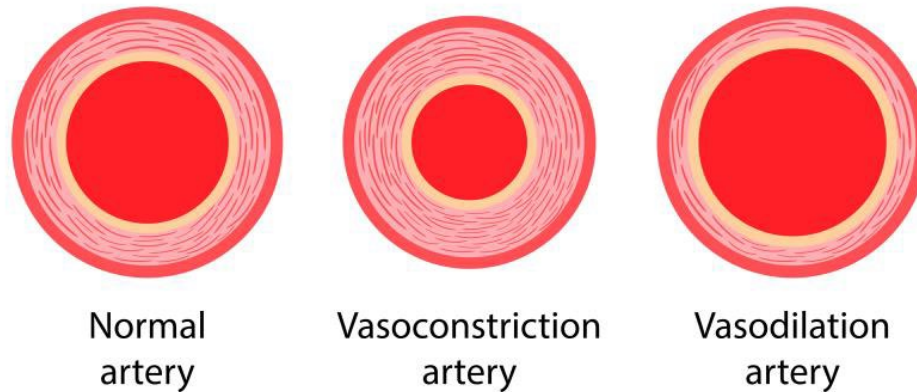
Four Types of Adrenergic Blocking Drugs

- Alpha (α)-adrenergic blocking
- Beta (β)-adrenergic blocking
- α/β -blocking
- Centrally and peripherally acting antiadrenergic drugs

Alpha-Adrenergic Blocking Drugs—Actions

- Interrupt or block alpha-adrenergic nerve stimulation resulting in vasodilation
- Vasodilation occurs through relaxation of the smooth muscle of blood vessels

Vasoconstriction and vasodilation



Alpha-Adrenergic Blocking Drugs—Uses

- Hypertension caused by pheochromocytoma
- Hypertension during preoperative preparation
- Reduce ocular pressure during laser surgery
- Prevent or treat tissue damage caused by extravasation of the drug dopamine



Alpha-Adrenergic Blocking Drugs—Adverse Reactions

- Common Adverse Reactions:
 - Weakness
 - Orthostatic hypotension
 - Cardiac arrhythmias
 - Hypotension
 - Tachycardia
 - Other drug-specific adverse reactions



Alpha-Adrenergic Blocking Drugs— Contraindications and Precautions

- Contraindicated in clients with:
 - known hypersensitivity to the drugs
 - coronary artery disease
- Use cautiously in clients with:
 - pregnancy (pregnancy category C) or lactation
 - recent myocardial infarction
 - renal failure
 - Raynaud disease



Alpha-Adrenergic Blocking Drugs—Interactions

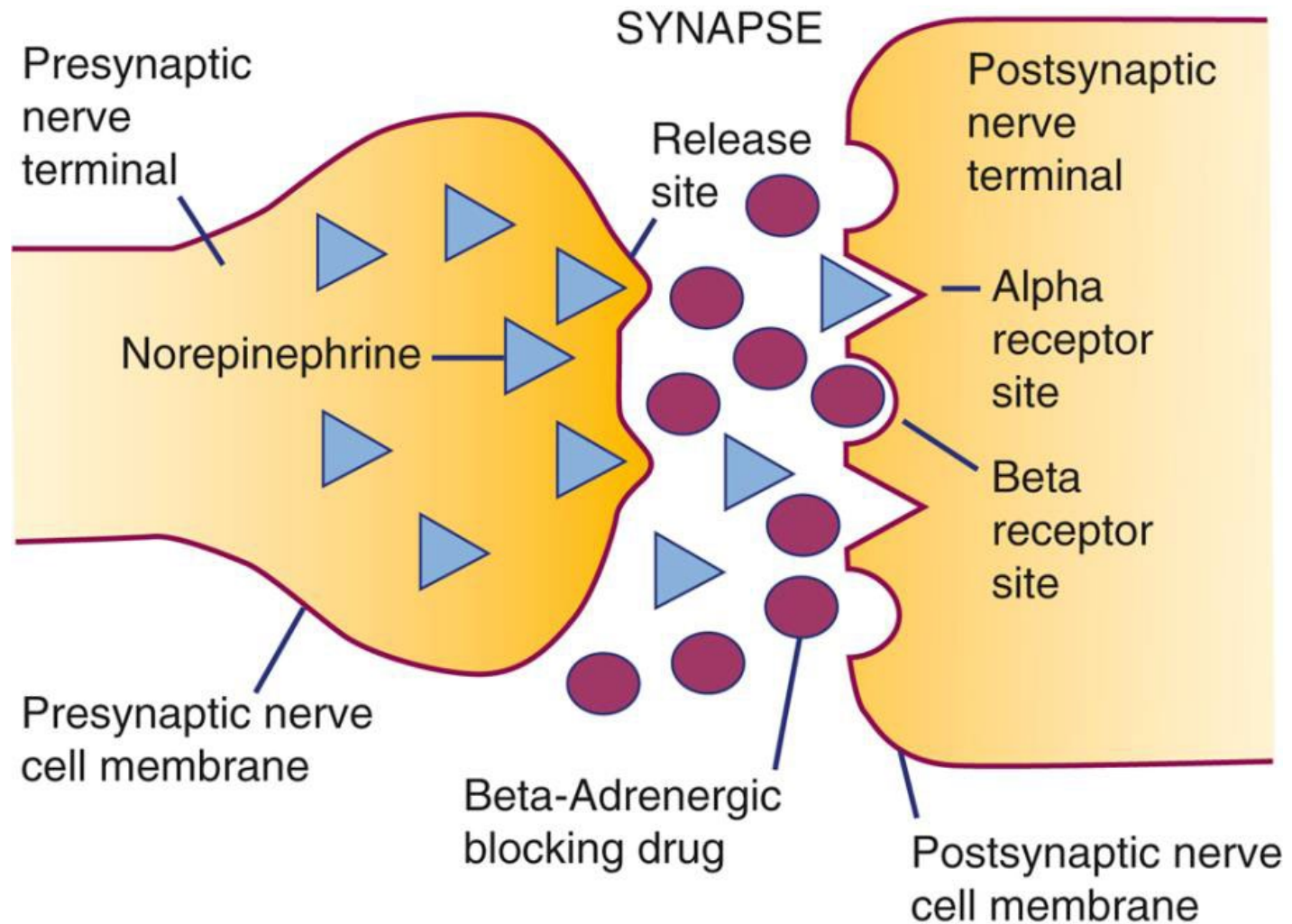
Interacting Drug	Common Use	Effect of Interaction
Epinephrine (when given with phentolamine)	Sympathomimetic—Treatment of severe allergic reactions, restore cardiac rhythm, treat asthma	Decreased vasoconstrictor and hypertensive action

Beta-Adrenergic Blocking Drugs—Actions #1

- Decreased stimulation of sympathetic nervous system on certain tissues
- Block the nerve impulse from jumping the synapse area and continuing to the adjoining nerve ending
- Decreased excitability of heart; decreased cardiac workload and oxygen consumption; provides membrane-stabilizing effects
- Decreases the heart rate and dilates the blood vessels
- When used for glaucoma, reduces production of aqueous humor in the anterior chamber of the eye
- Examples: atenolol and metoprolol



Beta-Adrenergic Blocking Drugs—Actions #2



Beta-Adrenergic Blocking Drugs—Uses

- Hypertension (first choice with stable angina)
- Cardiac arrhythmia (ventricular or supraventricular tachycardia)
- Migraine headaches
- Heart failure
- Angina pectoris
- Glaucoma
- Prevent reinfarction in clients with recent MI
- Alert: discontinue these drugs slowly—taper; do not stop abruptly



Pharmacology in Practice Exercise #1

- ❖ A nurse is caring for a client with glaucoma. The client is administered a beta-adrenergic blocking ophthalmic preparation, such as timolol. How will the effectiveness of the drug be determined?
 - a) Measure the intraocular pressure of the client
 - b) Monitor the blood pressure of the client
 - c) Monitor the respiratory rate of the client
 - d) Measure the pulse rate of the client



Beta-Adrenergic Blocking Drugs—Adverse Reactions #1

- Generalized Adverse Reactions:
 - Orthostatic hypotension
 - Bradycardia
 - Dizziness, vertigo
 - Headache
 - Bronchospasm



Beta-Adrenergic Blocking Drugs—Adverse Reactions #2

- Gastrointestinal System Reactions:
 - Hyperglycemia
 - Nausea
 - Vomiting
 - Diarrhea



Beta-Adrenergic Blocking Drugs—Contraindications and Precautions

- Contraindicated in clients with:
 - known allergy to the beta-blockers
 - sinus bradycardia
 - second- or third-degree heart block
 - asthma or emphysema
 - hypotension
- Use cautiously in clients with:
 - diabetes
 - thyrotoxicosis
 - peptic ulcer



Beta-Adrenergic Blocking Drugs—Interactions #1

Interacting Drug	Common Use	Effect of Interaction
Antidepressants (MAOIs, SSRIs)	Management of depression	Increased effect of the beta-blocker, bradycardia
Nonsteroidal anti-inflammatory drugs (NSAIDs), salicylates	Pain relief	Decreased effect of the beta blocker
Loop diuretics	Management of cardiovascular problems	Increased risk of hypotension

Beta-Adrenergic Blocking Drugs—Interactions #2

Interacting Drug	Common Use	Effect of Interaction
Clonidine	Management of cardiovascular problems	Increased risk of paradoxical hypertensive effect
Cimetidine	Management of GI problems	Increased serum level of the beta-blocker and higher risk of beta-blocker toxicity
Lidocaine	Management of cardiovascular problems	Increased serum level of the beta-blocker and higher risk of beta-blocker toxicity

Alpha/Beta-Adrenergic Blocking Drugs—Actions

- Block the stimulation of both the alpha- and beta-adrenergic receptors, resulting in peripheral vasodilation
- Examples: carvedilol and labetalol



Alpha/Beta-Adrenergic Blocking Drugs—Uses

- Carvedilol—hypertension and heart failure to reduce progression of the disease
- Labetalol—gestational hypertension alone or in combination with another drug



Alpha/Beta-Adrenergic Blocking Drugs—Adverse Reactions

- Generalized Adverse Reactions:
 - Fatigue
 - Dizziness
 - Drowsiness, insomnia
 - Weakness
 - Diarrhea
 - Dyspnea
 - Chest pain, bradycardia, hypotension
 - Skin rash



Alpha/Beta-Adrenergic Blocking Drugs— Contraindications

- Contraindicated in clients with:
 - known hypersensitivity to the drugs
 - bronchial asthma
 - decompensated heart failure
 - severe bradycardia



Alpha/Beta-Adrenergic Blocking Drugs—Precautions

- Use cautiously in clients with:
 - Drug-controlled heart failure
 - chronic bronchitis
 - impaired hepatic or cardiac function
 - diabetes
 - pregnancy (pregnancy category C)
 - lactation



Alpha/Beta-Adrenergic Blocking Drugs—Interactions

Interacting Drug	Common Use	Effect of Interaction
Antidepressants (tricyclics, SSRIs)	Management of depression	Increased risk of tremors
Cimetidine	Management of GI problems	Increased effect of the adrenergic blocker
Clonidine	Management of cardiovascular problems	Increased effect of clonidine
Digoxin	Management of cardiac problems	Increased serum level of the digoxin and higher risk of digoxin toxicity

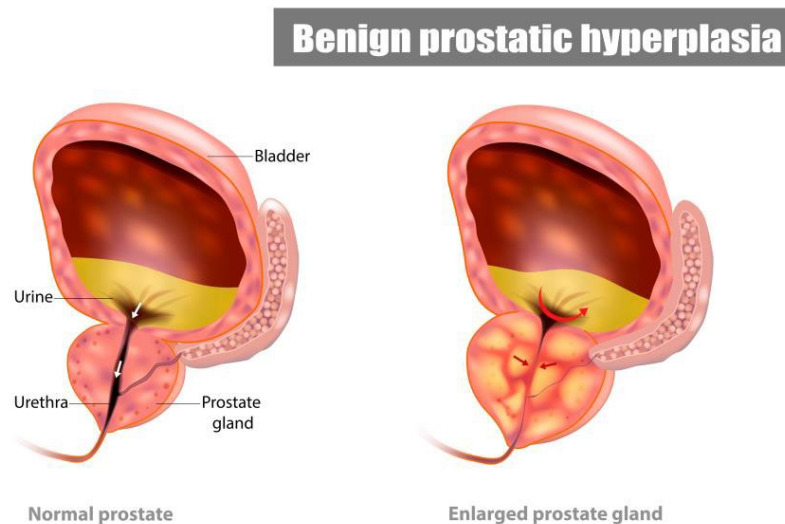
Centrally and Peripherally Acting-Adrenergic Blocking Drugs—Actions

- Peripherally acting: inhibit the release of norepinephrine from certain adrenergic nerve endings in the nervous system
- Example: prazosin
- Centrally acting: affects specific CNS centers, decreasing some of the activity in the sympathetic nervous system
- Example: clonidine



Centrally and Peripherally Acting Antiadrenergic Drugs—Uses

- Cardiac arrhythmias
- Hypertension
- Benign prostatic hypertrophy/hyperplasia (BPH)



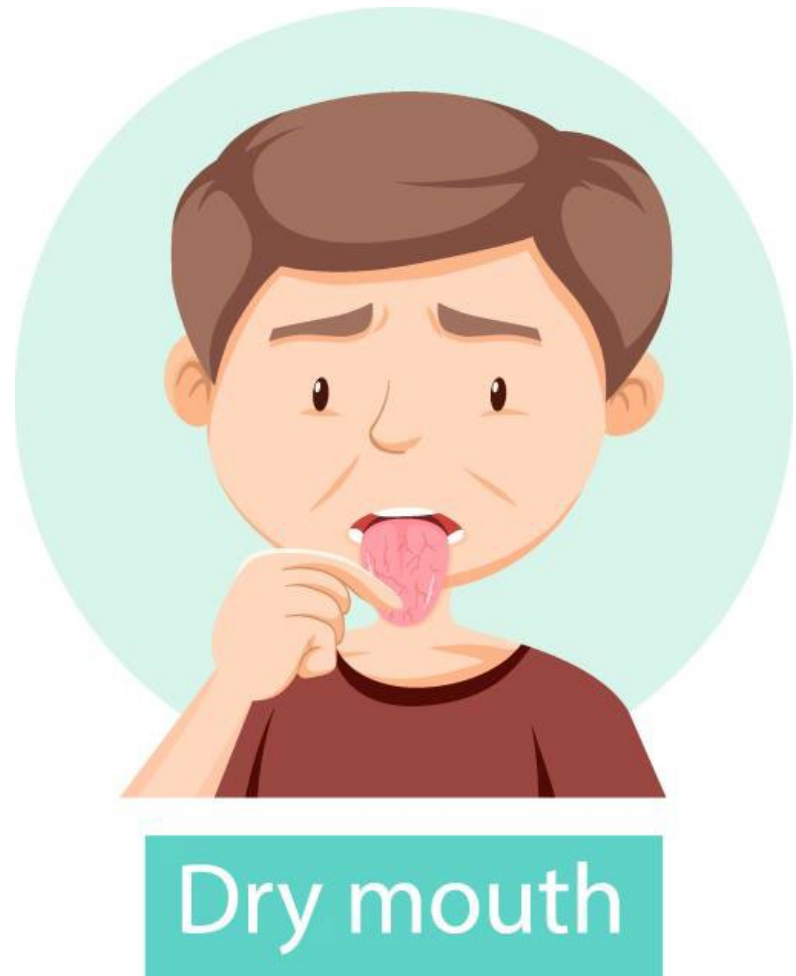
Peripherally Acting Antiadrenergic Drugs—Adverse Reactions

- Generalized Adverse Reactions:
 - Hypotension
 - Weakness
 - Lightheadedness
 - Bradycardia



Centrally Acting Antiadrenergic Drugs—Adverse Reactions

- Generalized Adverse Reactions:
 - Dry mouth
 - Drowsiness
 - Sedation
 - Anorexia
 - Rash
 - Malaise
 - Weakness



Peripherally Acting Antiadrenergic Drugs— Contraindications and Precautions

- Contraindicated in clients with:
 - known hypersensitivity to the drugs
 - active peptic ulcer or ulcerative colitis (reserpine)
- Use cautiously in clients with:
 - renal impairment
 - cardiovascular disease
 - pregnancy and lactation



Centrally Acting Antiadrenergic Drugs— Contraindications and Precautions

- Contraindicated in clients with:
 - known hypersensitivity to the drugs
 - active hepatic disease
 - antidepressant therapy using MAOIs
- Use cautiously in clients with:
 - a history of liver disease or renal impairment
 - pregnancy and lactation



Centrally and Peripherally Acting Antiadrenergic Drugs—Interactions #1

Interacting Drug	Common Use	Effect of Interaction
Adrenergic drugs	Management of cardiovascular problems	Increased risk of hypertension
Levodopa	Management of Parkinson disease	Decreased effect of the levodopa, hypotension
Anesthetic agents	Surgical anesthesia	Increased effect of the anesthetic

Centrally and Peripherally Acting Antiadrenergic Drugs—Interactions #2

Interacting Drug	Common Use	Effect of Interaction
Beta blockers	Management of cardiovascular problems	Increased risk of hypertension
Lithium	Treatment of psychosis	Increased risk of lithium toxicity
Haloperidol	Treatment of psychosis	Increased risk of psychotic behavior

Pharmacology in Practice Exercise #2

- ❖ A nurse is caring for a client taking both an antidepressant and an adrenergic blocking drug. Which of the following actions should the nurse perform when the client receiving adrenergic blocking drugs shows a dramatic decrease in blood pressure?
- a) Monitor for excessive perspiration
 - b) Monitor for confusion
 - c) Adjust into a more comfortable position
 - d) Hold the drug dose



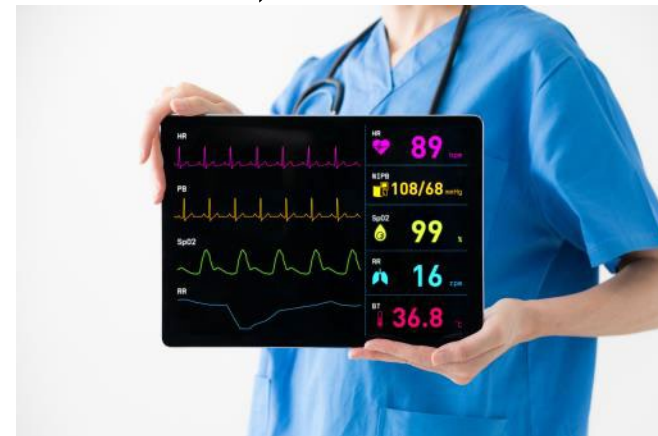
Nursing Process—Client Receiving an Adrenergic Blocking Drug #1

❖ Preadministration Assessment

❖ Will depend on the drug, the client, and the reason for administration.

• Objective Data

- General client appearance; dyspnea, peripheral edema, distended neck veins, cough
- Vital signs (both arms and orthostatic BPs)
- Electrocardiogram



Nursing Process—Client Receiving an Adrenergic Blocking Drug #2

❖ Preadministration Assessment (continued)

• Subjective Data

- Current symptoms
- Pain experience: onset, type, radiation, location, intensity, and duration
- Precipitating factors of angina
- Allergy history
- History of other chronic health conditions



Nursing Process—Client Receiving an Adrenergic Blocking Drug #3

❖ Ongoing Assessment

- Observe the client for appearance of adverse reactions
- Clients will monitor their own blood pressure while outpatient via home equipment, pharmacy, or fire station



Nursing Process—Client Receiving an Adrenergic Blocking Drug #4

❖ Nursing Diagnoses

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

Nursing Process—Client Receiving an Adrenergic Blocking Drug #5

❖ Planning

- Expected client outcomes depend on the reason for administration of the adrenergic blocking drug 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 an Adrenergic Blocking Drug #6

❖ Implementation

- Promoting Optimal Response to Therapy
 - Most drugs can be taken with or without food (except sotalol, which is given on an empty stomach)
 - Antiadrenergics should be given the same time every day
 - Monitor the client's response to therapy; if symptoms worsen or are not controlled communicate with primary health care provider immediately

Nursing Process—Client Receiving an Adrenergic Blocking Drug #7

❖ Implementation

- Promoting Optimal Response to Therapy continued
 - If the drug is administered for hypertension and the client has a significant increase in blood pressure, administer the ordered dose and notify the primary health care provider—additional drug therapy
 - Beta-adrenergic blocking ophthalmic preparation: clients must continue follow-up examinations with ophthalmologist where intraocular pressure is measured

Nursing Process—Client Receiving an Adrenergic Blocking Drug #8

❖ Implementation

- Monitoring and Managing Client Needs
 - **Impaired Comfort**
 - Report adverse reactions to primary health care provider
 - Assist with measures to relieve dry mouth (frequent sips of water, sugarless hard candy or gum)



Nursing Process—Client Receiving an Adrenergic Blocking Drug #9

❖ Implementation

- Monitoring and Managing Client Needs
 - **Impaired Comfort (continued)**
 - Prevent constipation: encourage high-fiber foods and fluids (unless contraindicated)
 - Administer laxative or stool softener if ordered
 - Maintain record of bowel movements—inpatient
 - Lessen GI symptoms by administering drugs at a specific time in relation to meals, food, or with antacids



Nursing Process—Client Receiving an Adrenergic Blocking Drug #10

❖ Implementation

- Monitoring and Managing Client Needs
 - **Ineffective Tissue Perfusion: Peripheral**
 - During therapy take client's blood pressure on the same arm before each dose is given and record on the MAR
 - Monitor blood pressure on both arms and take orthostatic blood pressure measurements



Nursing Process—Client Receiving an Adrenergic Blocking Drug #11

❖ Implementation

- Monitoring and Managing Client Needs
 - **Ineffective Tissue Perfusion: Peripheral (continued)**
 - Take an apical pulse and blood pressure before giving propranolol. Do not give if the pulse is below 60 beats/minute, if heart rate/rhythm is irregular, or if systolic blood pressure is less than 90 mm Hg
 - Clients with a life-threatening arrhythmia may receive an adrenergic blocking drug, such as propranolol, by the intravenous (IV) route; cardiac monitoring

Nursing Process—Client Receiving an Adrenergic Blocking Drug #12

❖ Implementation

- Monitoring and Managing Client Needs
 - **Injury Risk**
 - Clients receiving an adrenergic blocking drug may experience postural (orthostatic) hypotension
 - Hold the dose for a drop in 20 mm Hg systolic or a systolic below 90 mm Hg
 - Minimize first-dose effect if indicated by decreasing initial dose and administering at bedtime. Slowly increase dose over 2 weeks per provider orders.



Nursing Process—Client Receiving an Adrenergic Blocking Drug #13

❖ Implementation

- Monitoring and Managing Client Needs
 - **Injury Risk (continued)**
 - Call light should be placed nearby
 - Instruct clients to rise slowly and provide assistance with getting out of bed or a chair
 - Instruct client to sit or stand for 1 minute prior to rising or ambulating
 - Remain with client while ambulating
 - Teach client to avoid hot showers, baths, or standing in one place for prolonged periods

Pharmacology in Practice Exercise #3

- ❖ A nurse is caring for a client on beta-adrenergic blocker therapy. The client is going to be administered lidocaine at the dental clinic. Which of the following interactions may occur and the nurse should instruct the client to ward the dental clinic staff if possible?
- a) Increased risk of hypotension
 - b) Increased serum level of the beta blocker
 - c) Increased risk of paradoxical hypertensive effect
 - d) Increased side effect of the beta blocker



Nursing Process—Client Receiving an Adrenergic Blocking Drug #14

❖ Implementation—Educating the Client and Family

- Describe drug regimen and stress importance of continued and uninterrupted therapy when teaching client who is prescribed adrenergic blocking drug
- Investigate barriers that might be leading to interruption of drug regimen (e.g., financial barriers) and make appropriate referrals if indicated
- Educate the client regarding the cardiac conditions that can occur if the beta blocker is stopped suddenly
- If ordered by the primary health care provider, stress importance of diet, weight loss in therapy of hypertension

Nursing Process—Client Receiving an Adrenergic Blocking Drug #15

❖ Implementation—Educating the Client and Family

- Teach client:
 - about DASH diet and refer to a registered dietitian if indicated
 - to observe and report adverse reactions
 - to avoid driving or performing hazardous tasks
 - to check first with the primary health care provider before taking nonprescription drugs
 - to inform dentists and other providers about adrenergic blocking drug
 - to keep all primary health care provider appointments
 - to monitor blood pressure in the home setting

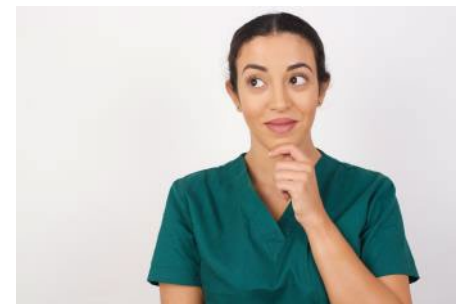
Nursing Process—Client Receiving an Adrenergic Blocking Drug \$16

❖ Evaluation

- Was the therapeutic effect achieved? Was the client's hypertension or other health condition controlled?
- Were adverse reactions: identified, reported, and managed?
 - Dryness is managed and comfort maintained
 - Peripheral tissue perfusion is maintained
 - No evidence of injury
- Did client and family express confidence and demonstrate understanding of drug regimen?

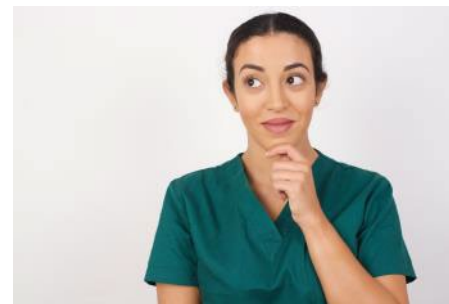
Turn and Talk—Case Study #1

- ❖ A client presents to the emergency department via ambulance with nausea and substernal chest pain. After being assessed by the emergency department physician, it is determined that the client is having an acute myocardial infarction. The physician orders metoprolol (Lopressor) three bolus doses of 5 mg IV.
- 1. Before administering the three bolus doses of metoprolol (Lopressor) to the client, what should the nurse's preadministration include?
- 2. What ongoing assessments should the nurse conduct with the client?



Turn and Talk—Case Study #2

- ❖ A client presents to the emergency department via ambulance with nausea and substernal chest pain. After being assessed by the emergency department physician, it is determined that the client is having an acute myocardial infarction. The physician orders metoprolol (Lopressor) three bolus doses of 5 mg IV.
- 3. The client is to be discharged with a prescription for metoprolol succinate ER (Toprol XL) 50 mg every morning. What should the nurse include in the client's discharge instructions specifically in regard to the metoprolol?



Turn and Talk—Case Study #3

- ❖ A client presents to the emergency department via ambulance with nausea and substernal chest pain. After being assessed by the emergency department physician, it is determined that the client is having an acute myocardial infarction. The physician orders metoprolol (Lopressor) three bolus doses of 5 mg IV.
4. What should the nurse teach the client to improve the outcomes?

