

## PHARMACOLOGY

### TERMS AND DEFINITION

#### Pharmacology

- ❖ It is the study of drugs, their origin, nature, properties and their effects upon living organism

#### Pharmacotherapy

- ❖ It is the use of drugs to prevent, diagnose, or treat signs, symptoms and disease process.

#### Pharmacodynamics

- ❖ What the drug does to the body
- ❖ Involves drug actions on target cells and the resulting alterations in cellular biochemical reactions and functions

#### Pharmacokinetics

- ❖ What the body does to the drug
- ❖ Involves drug movement through the body to reach sites of action, metabolism and excretion.

### PROCESS OF DRUG TRANSPORT (ADME)

#### 1. Absorption

- ❖ Occurs from the time a drug enters the body to the time it enters the bloodstream to be circulated.

#### Factors Influencing Drug Absorption

Dosage form

Route of administration

Blood flow

GI function

Presence of food or other drugs

#### 2. Distribution

- ❖ Transport of drug molecules within the body.

#### 3. Metabolism

- ❖ Also known as Biotransformation
- ❖ Method by which drugs are inactivated by the body.

#### 4. Excretion

- ❖ Refers to the elimination of a drug from the body
- ❖ Kidneys, bowel, lungs and skin
- ❖ Enterohepatic recirculation

### THERAPEUTIC INDEX

#### Side effects

- ❖ Physiologic effects not related to desired drug effects
- ❖ Expected and normal

#### Adverse reactions

- ❖ Any undesired responses to drug administration
- ❖ More severe than side effects
- ❖ Abnormal and reportable

#### Toxic effects

- ❖ Life-threatening effects, emergency
- ❖ Result from excessive amounts of drug and may cause reversible/irreversible damage to body tissues

### NURSING RESPONSIBILITIES IN MEDICATION ADMINISTRATION

OBSERVE THE TEN RIGHTS OF MEDICATION	
Right route	Right to refuse
Right time & frequency	Right drug-drug interaction
Right of the patient	Right education and information
Right drug	Right history and assessment
Right dose	Right documentation

## Be familiar with the medication

- ❖ The reason it is being administered
- ❖ Desired effect, side effects and adverse effects
- ❖ Typical dose and range of safety, if applicable
- ❖ Specific safety regulations before administration
- ❖ Check the compatibility of the medication with the other drugs and infusions the patient is receiving.
- ❖ Do not administer any medication that you did not prepare.

## Assess the patient

- ❖ Food or drug allergies
- ❖ Past medical history and present condition
- ❖ Knowledge deficit and health teaching needed

## Evaluate Responses

- ❖ Evaluate patient for his or her response to the medication, and document if appropriate
- ❖ Report any unfavorable or unexpected response

## ALLERGIC RESPONSES

Difficulty of breathing  
Rashes /pruritus  
Nausea / vomiting  
Wheezing  
Palpitations

## TESTING & CLINICAL TRIALS OF DRUGS

- ❖ Testing process begins with **animal studies**. Next step involves **Food & Drug Administration (FDA)** to review the data obtained in animal studies.

PHASE I	Determine safe dosage, scheduling, and toxicity.
PHASE II	Determine effectiveness with specific diseases.
PHASE III	Establish if new drug is more effective than the standard drug.
PHASE IV	Drug marketed for general use. Continuous monitoring and further testing of drug

## Nursing Considerations in Drug Administration

- ❖ Generally, the client should not take an antacid with medication or with milk because the antacid will affect the absorption of the drug.
- ❖ Enteric-coated and sustained-release tablets should not be opened.
- ❖ Capsules should not be opened.
- ❖ Never adjust or change medication dose or abruptly stop taking the medication without physician's order.
- ❖ Avoid taking any OTC (over-the-counter drug) or any other herbal reparations unless they are approved.
- ❖ Avoid smoking and drinking alcoholic beverages while taking specific drug.
- ❖ Never administer medication if the order is difficult to read or the dose is not within therapeutic range.

Hepatotoxic drugs	Acetaminophen Erythromycin Iron overdose Isoniazid Rifampicin Sulfonamides
Nephrotoxic drugs	Acetaminophen Acyclovir Aminoglycosides Amphotericin B Ciprofloxacin Rifampicin Sulfonamides Tetracycline Contrast medium

Ototoxic drugs	Aminoglycosides Aspirin Chloroquine Loop diuretics
Drug that can be cause staining	Macrodantin Iron Lugol's solution Tetracycline
Teratogenic	Fluoroquinolones Aminoglycosides Tetracycline Ace inhibitor Lithium Oral hypoglycemic Agents

Disulfiram reaction	Metronidazole Cephalosporins Oral hypoglycemic Agents
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## AUTONOMIC NERVOUS SYSTEM (ANS) AGENTS

ORGAN	SYMPA	PARASYMPA
Eye	Mydriasis	Miosis
Bronchioles	Bronchodilate	Bronchoconstrict
Heart	Inc. HR	Dec HR
Blood vessel	Vasoconstriction	Vasodilation
GI tract	Dec. Peristalsis	Inc. Peristalsis
Urinary Bladder	Bladder Relaxation Contracts Sphincter to Prevent Urination	Bladder Contraction Relaxes Sphincter to Permit Urination
Sweat glands	Inc. Secretion	None
Salivary glands	Dec. Secretion	Inc. Secretion
Adrenal glands	Inc. Secretion of Epinephrine & Norepinephrine	None

## SYMPATHETIC NERVOUS SYSTEM

- ❖ Also termed as adrenergic thoracolumbar system
- ❖ Fight or flight system
- ❖ Responsible for preparing the body to respond to stress
- ❖ Epinephrine and norepinephrine are the major neurotransmitters

### Adrenergic receptor organ cells

- ❖ Alpha 1
  - Found in the blood vessels, iris and urinary bladder
- ❖ Alpha 2
  - Found on nerve membranes and act as modulator of NE release
- ❖ Beta 1
  - Cardiac tissue
- ❖ Beta 2
  - Bronchi, smooth muscles in the blood vessels, uterine muscles

### Drug that mimic the effect of the norepinephrine

- ❖ Sympathomimetics
- ❖ Adrenergic agonists

### Drug that block the effect of norepinephrine

- ❖ Sympatholytics
- ❖ Adrenergic Antagonist

## PARASYMPATHETIC NERVOUS SYSTEM

- ❖ Also termed as cholinergic/ craniosacral system
- ❖ Acetylcholine is the major neurotransmitter

### Drugs that mimic acetylcholine

- ❖ Parasympathomimetics
- ❖ Cholinergic agonists

### drugs that block acetylcholine

- ❖ Parasympatholytics
- ❖ Cholinergic antagonist

## COMPARISON BETWEEN SYMPATHETIC AND PARASYMPATHETIC RESPONSES

SYMPATETIC	PARASYMPA	RESPONSE
Sympathomimetic	Parasympathomimetic	Opposite
Sympatholytic	Parasympatholytic	Opposite

Sympathomimetic	Parasympatholytic	Similar
Sympatholytic	Parasympathomimetic	Similar

## Adrenergic Drugs

- ❖ Epinephrine
  - Used in emergencies
  - Treats Allergic reaction, anaphylaxis, bronchospasm & cardiac arrest
  - Potent inotropic drug
- ❖ Norepinephrine
  - Potent vasoconstrictor that increases BP and cardiac output
- ❖ Albuterol
  - Selective for beta-2 adrenergic receptors
  - Response: bronchodilation
  - Used to treat bronchospasm, asthma: bronchitis
  - Should not be given with MAOI (can cause hypertensive crisis)
- ❖ Isoproterenol
  - Acts on B1 & B2 receptors
  - Response: bronchodilation
- ❖ Ephedrine
  - Used to treat hypotensive state, bronchospasm
  - Relief of hay fever, sinusitis and allergic rhinitis
- ❖ Clonidine
  - Selective Alpha 2 adrenergic drug
  - Used to treat hypertension
- ❖ Dopamine
  - Drug of choice for shock
- ❖ Dobutamine
  - Used in treatment of CHF as it increased contractility without changes in rate or increase in O2 demand

## Adrenergic Drugs Nursing Responsibilities

- ❖ Record baseline VS
- ❖ Assess other drugs that the client is taking to avoid drug-to-drug interaction
- ❖ Check urinary output and assess for bladder distention
- ❖ Phentolamine mesylate = antidote for NE and dopamine overdose

## Adrenergic Blockers

- ❖ Inhibit or block stimulation of the sympathetic nervous system

### 1. Alpha Adrenergic Blockers

- ❖ Drugs that block or inhibit a response at the alpha-adrenergic receptor sites

#### Non-selective Alpha Blockers (A1, A2)

- ❖ Phentolamine

#### Selective Alpha Blockers (A1)

- ❖ Doxazosin
- ❖ Prazosin

### 2. Beta-adrenergic Blockers

#### Non-selective Beta-adrenergic Blockers

- ❖ Propranolol
- ❖ Nadolol
- ❖ Timolol

#### Caution when giving Non-selective Beta-Adrenergic Blockers:

- ❖ COPD
- ❖ Bronchial Asthma
- ❖ DM

## Undesirable effects

- ❖ Bradycardia
- ❖ Bronchospasm
- ❖ Peripheral vascular constriction
- ❖ Exhaustion
- ❖ Emotional Depression
- ❖ Decrease libido

## Selective Beta-1 Blockers

- ❖ Metoprolol
- ❖ Atenolol
- ❖ Acebutolol
- ❖ Betaxolol
- ❖ Esmolol

## Cholinergic Agonists

- ❖ Drugs that stimulate the parasympathetic nervous system

## 2 Type of Cholinergic Receptors

- ❖ Muscarinic Receptors
  - Stimulate smooth muscles & slows heart rate
- ❖ Nicotinic Receptors
  - Skeletal muscles

## Direct -acting Cholinergic Agonist

- ❖ Bethanechol (Urecholine)
- Used to treat urinary retention and abdominal distention
  - ❖ Metoclopramide (Plasil)
    - Used to treat GERD
    - Increased gastric emptying time
  - ❖ Pilocarpine
    - Constricts the pupil of the eye
    - Treatment of glaucoma

## SIGNS OF OVERDOSE

- Salivations
- Sweating
- Abdominal cramps

**ATROPINE SULFATE** = antidote for cholinergic overdose

## Indirect - acting Cholinergic Agonists

- ❖ Reversible Cholinesterase
  - Physostigmine
  - Neostigmine
  - Pyridostigmine
- ❖ Irreversible Cholinesterase
  - Potent agents
  - Has long-lasting effect
  - PRALIDOXIME = antidote for irreversible acetylcholinesterase-inhibiting drugs

## Drug Effects of Cholinergic Agents "SLUDGE"

S - alivation  
L - acrimation  
U - rinary incontinence  
D - iarrhea  
G - astrointestinal cramps  
E - mesis

## Anti-Cholinergic Drugs

- ❖ Drugs that inhibit the action of acetylcholine by occupying the receptors

Examples

- ❖ Atropine
  - May be used as an antidote for muscarinic agonist poisoning

- ❖ Scopolamine
- ❖ Propantheline bromide
- ❖ Dicyclomine
- ❖ Tropicamide

## NEUROLOGIC DRUGS

### 1. ANTI-CONVULSANTS

- ❖ Modify bioelectric activity at subcortical and cortical areas

Examples

- Diazepam (Valium)
- Phenytoin (Dilantin)
- Phenobarbital (Luminal)

Indication: Prevents seizures

#### Adverse Effects

- Blood dyscrasias
- Nausea and vomiting (N/V)
- Dizziness/Drowsiness
- Phenytoin: ataxia, hirsutism, hypotension

#### Nursing Interventions

- Give medication with food
- Phenytoin
  - ✓ Monitor condition of oral mucosa (S/E: gingival hyperplasia)
  - ✓ Don't mix with other IV fluids
  - ✓ Monitor blood laboratory results

Health Teaching

- Avoid alcohol
- Notify physician of unusual symptoms
- Carry medical alert information
- Take medication on schedule
- Avoid driving and other potentially hazardous machinery
- Phenytoin: good oral hygiene, frequent dental visits

### 2. ANTI-PARKINSON AGENTS

#### Dopaminergics

- ❖ Levodopa
  - Most effective drug for symptoms of Parkinson's disease

Fact: dopamine cannot cross blood brain barrier

- 1% of administered dopamine dose reaches the brain
- Must be given in large doses

#### Carbidopa

- Inhibits the enzyme dopa decarboxylase
- ❖ Levodopa + Carbidopa
  - Levodopa is converted to dopamine by the enzyme dopa decarboxylase.
  - This enzyme is present in the peripheral nervous system
  - Because of its presence, 99% of the levodopa drug is converted into dopamine before it reaches the brain.

PRECAUTIONS IN ANTI-PARKINSONIAN DRUGS	
Anticholinergics	Dry mouth Urinary retention Constipation Blurred vision Tachycardia Glaucoma COPD
Levodopa	Nausea Vomiting Dyskinesia Orthostatic hypotension
Selegiline	Insomnia Meperidine (drug-to-drug interaction)

### 3. ACETYLCHOLINESTERASE INHIBITORS

- Prevent breakdown of acetylcholine at nerve endings
- Facilitate transmission of impulses across myoneural junction
- Strengthen muscle contractions including respiratory muscles

#### Drugs

- Edrophonium chloride (diagnostic purposes)
- Pyridostigmine
- Neostigmine bromide
- Ambenonium

Indication: Treat MYASTHENIA GRAVIS

#### Adverse Effects:

- N/V
- Diarrhea
- Hypersalivation
- CNS disturbances
- Toxicity: Pulmonary edema, respiratory failure, bronchospasm

#### Contraindications:

- Intestinal obstruction
- Renal obstruction
- Peritonitis

#### Nursing Interventions

- Keep Atropine sulfate available for overdose (cholinergic crisis)
- Monitor V/S during period of dosage adjustment
- Administer medication with some food (S/E: gastric upset)
- Administer medication 30 minutes to 1 hour before meals.
- Health Teaching
  - ✓ Wear medic alert jewelry and ID
  - ✓ Change position cautiously

### 4. ANTIDEPRESSANTS

- ❖ Increase norepinephrine levels at subcortical neuroeffector sites

#### Drugs

##### ❖ Tricyclic Antidepressants (TCA)

- Amitriptyline (Elavil)
- Imipramine (Tofranil)
- Amoxapine (Asendin)
- Nortriptyline (Aventyl)

##### ❖ Selective Serotonin Reuptake Inhibitors (SSRI)

- Fluoxetine (Prozac)
- Sertraline (Zoloft)
- Fluvoxamine (Luvox)
- Paroxetine (Paxil)

##### ❖ Monoamine Oxidase Inhibitors (MAOI)

- Tranylcypromine (Parnate)
- Isocarboxazid (Marplan)
- Phenelzine sulfate (Nardil)

Use: Treat depression

#### Adverse Effects

##### TCA

- Orthostatic hypotension
- Drowsiness
- Dizziness
- Confusion
- CNS stimulation

## SSRI

- May interact with tryptophan
- Insomnia
- Headache
- Sexual dysfunction
- Gastric irritation

## MAOI

- Potentiate alcohol, barbiturates, and antihistamines
- Hypertensive crisis with ingestion of foods high in tyramine (beer, wine, chocolate)

## Nursing Interventions

- Maintain suicide precautions especially as depression lifts.
- Give SSRI in morning, TCAs at bedtime.
- Health Teachings:
  - ✓ Do not take OTC medications without physician's approval
  - ✓ Avoid hazardous activities
  - ✓ Effect of medication may take up to 2 to 4 weeks
  - ✓ SSRIs and MAOIs should not be given concurrently or close together
  - ✓ MAOI: Avoid food containing tyramine
    - Give Phentolamine in case of hypertensive crisis.

## 5. ANTI-MANIC AGENTS/ MOOD STABILIZERS

- ❖ Reduce adrenergic neurotransmitter level in cerebral tissue

### Drugs

- Lithium carbonate
- Carbamazepine
- Clonazepam

Use: Control of manic phase of mood disorders; bipolar disorder

### Adverse Effects

- Metallic taste
- Hand tremors
- Excess voiding & extreme thirst
- Slurred speech
- Disorientation
- Cogwheel rigidity
- Renal failure
- Respiratory depression

## Nursing Interventions

- Monitor blood levels regularly (Normal Lithium: 0.5-1.5 mEq/L).
- Avoid concurrent administration of adrenergic drugs.
- Evaluate client's response to medication.
- Health Teaching:
  - ✓ Effect of medication may take several weeks
  - ✓ High intake of fluids and normal sodium
  - ✓ Toxicity signs: nausea, vomiting, diarrhea, weak muscles, confusion
  - ✓ Take medication with meals.

## 6. ANTI-PSYCHOTICS/NEUROLEPTICS

- ❖ Block Dopamine receptors in the CNS and sympathetic nervous system.

### Drugs

#### Typical

- Chlorpromazine (Thorazine)
- Haloperidol (Haldol)
- Thioridazine (Mellaril)
- Fluphenazine (Prolixin)



## Atypical (CROQZ)

- Clozapine (Clozaril)
- Risperidone (Risperdal)
- Olanzapine (Zyprexa)
- Quetiapine (Seroquel)
- Ziprasidone (Geodon)

Use: Treatment of psychotic symptoms in schizophrenia, psychosis, Tourette's syndrome

## Adverse effects

- Excessive sedation
- Jaundice
- Orthostatic hypotension
- Urinary retention
- Anorexia
- Dry mouth
- Extrapyramidal side effects (EPS)
  - Acute dystonia
  - Pseudoparkinsonism
  - Akathisia
  - Tardive dyskinesia

## Nursing Interventions

- Assess client's response to therapy
- Monitor for signs of infection, liver toxicity, extrapyramidal symptoms
- Monitor V/S
- Give medication at bedtime
- Health Teaching
  - ✓ Avoid alcohol use
  - ✓ Avoid driving or other hazardous activities
  - ✓ Avoid exposure to direct sunlight
  - ✓ Good oral hygiene
  - ✓ Report extrapyramidal symptoms or signs of infection

## 7. HYPNOTICS/SEDATIVES

- ❖ Depress CNS

### Drugs

- Pentobarbital
- Phenobarbital
- Secobarbital

Use: **INSOMNIA / SEDATION**

## ADVERSE REACTIONS

ADVERSE REACTIONS	
<b>BARBITURATE TOXICITY</b>	Hypertension
	Pulmonary constriction
	Cold and clammy skin
	Cyanosis of lips
	Insomnia
	Hallucination
	Delirium

## Contraindications

- Hypersensitivity
- Pregnancy

## Nursing Interventions

- Monitor client's response to medication
- Health Teaching
  - ✓ Take medication exactly as prescribed.
  - ✓ Avoid alcohol.
  - ✓ Avoid driving and other hazardous activities.

## 8. ANTI-ANXIETY/ANXIOLYTICS

### Drugs

#### Benzodiazepines

- Alprazolam (Xanax)
- Diazepam (Valium)
- Chlordiazepoxide (Librium)

#### Azapirone

- Buspirone (Buspar)

#### Uses:

- Anxiety
- Sleep disorders

### ADVERSE REACTIONS

Dizziness

Drowsiness

Lethargy

Orthostatic hypertension

Skin rash

Blood Dyscrasias

### Contraindications

- Hypersensitivity
- Acute narrow glaucoma
- Liver disease

### Nursing Interventions

- Notify health care provider if systolic BP drops 20 mmHg.
- Administer with food or milk.
- Health Teaching
  - ✓ Do not take OTC medication without health care provider's approval.
  - ✓ Use caution when driving or hazardous.
  - ✓ Action potentiated with alcohol or sedatives.
  - ✓ Never abruptly stop the medication.
  - ✓ Librium = Avoid excessive sunlight

## 9. GENERAL ANESTHETICS

- ❖ Depress the CNS through a progressive sequence

### Drugs

- ❖ Inhalation Anesthetics
  - Cyclopropane
  - Enflurane
  - Ether
  - Nitrous oxide
- ❖ IV Barbiturates
  - Thiopental (Pentothal)
  - Methohexital sodium (Brevital)
- ❖ IV & IM Non-barbiturates
  - Midazolam (Versed)
  - Ketamine (Ketaject)
  - Propofol (Diprivan)

ADVERSE REACTIONS	
Inhalation Anesthetics	Excitement Restlessness Nausea Vomiting Respiratory distress
IV barbiturates	Respiratory distress Hypotension Tachycardia Laryngospasm
IV & IM Non-barbiturates	Respiratory failure Hyper/hypotension Rigidity Psychiatric disturbance

### Contraindications

- CVA
- Increased ICP
- Severe hypertension
- Cardiac decompensation

### Nursing Interventions

- Have O2 and emergency treatment available
- Monitor V/S
- Use precautions if agent is flammable
- Safety precautions

## 10. LOCAL ANESTHETICS

- ❖ Decrease nerve membrane permeability to sodium ion influx

### Drugs

- ❖ Topical
  - Benzocaine (Orajel)
  - Cocaine
  - Lidocaine (Xylocaine)
- ❖ Spinal
  - Dibucaine (Nupercaine)
  - Procaine (Novocaine)
- ❖ Nerve block
  - Bupivacaine (Marcaine)
  - Mepivacaine (Carbocaine)

**Use: PAIN CONTROL** while the client is conscious

### Adverse Effects

- Allergic reactions
- Respiratory arrest
- Arrhythmias / Cardiac arrest
- Convulsion
- Hypotension

### Nursing Interventions

- Have oxygen and emergency equipment available
- Monitor V/S during local anesthesia
- SPINAL ANESTHESIA: keep the client flat for 6-12 hours to prevent spinal headache.

## MUSCULOSKELETAL DRUGS

### 1. SKELETAL MUSCLE RELAXANTS

#### Uses

- Relax muscles
- Treat spasm disorders

#### Drugs

##### ❖ Central

- Cyclobenzaprine (Flexeril)
- Diazepam (Valium)
- Orphenadrine (Norflex)

##### ❖ Peripheral

- Gallamine triethiodide (Flaxedil)
- Succinylcholine (Anectine)

	CENTRAL	PERIPHERAL
Use	Relief of muscle spasm and pain	Facilitation of endotracheal intubation; orthopedic manipulation
Action	Depress CNS, leading to relaxation of voluntary muscles	Block nerve impulses at the myoneural junction
Adverse effects	Tachycardia Dizziness Drowsiness Dry mouth Angioedema	Hypotension Respiratory depression Dysrhythmias
Nursing Interventions	Monitor client for safety precautions Teach client to avoid alcohol and hazardous activities Administer with meals Fluids for dry mouth Do not discontinue abruptly	Have resuscitation equipment available Monitor VS Withhold medication and call care provider if client shows signs of allergic reaction.

### 2. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDs)

- ❖ Interfere with prostaglandin synthesis

#### Drugs

##### COX-1 Inhibitors

- ❖ Ibuprofen (Motrin)
- ❖ Indomethacin (Indocin)
- ❖ Salicylates (Aspirin)

##### COX-2 Inhibitors

- ❖ Celecoxib (Celebrex)
- ❖ Valdecoxib (Bextra)

#### Uses

- ❖ Rheumatoid arthritis
- ❖ Osteoarthritis
- ❖ Dysmenorrhea

#### Adverse Effects

##### COX-1 Inhibitors:

- ❖ Gastric disturbances
- ❖ Skin rash
- ❖ Blood dyscrasias/bleeding
- ❖ CNS disturbances
- ❖ Nephrotoxicity

##### COX-2 Inhibitors:

- ❖ CNS disturbances
- ❖ Nephrotoxicity
- ❖ Myocardial infarction
- ❖ Stroke

#### Contraindications

- ❖ Hypersensitivity
- ❖ Asthma

- ❖ Renal disease
- ❖ Liver disease

### Nursing Interventions

- ❖ Administer one hour before or two hours after meals.
- ❖ Monitor VS.
- ❖ Monitor response to medication.

### 3. ANTI-GOUT AGENTS

- ❖ Increase excretion of uric acid and decrease uric acid formation

#### Drugs

- Allopurinol (Zyloprim)
- Colchicine (Novocolchine)
- Probenecid (Benemid)

Use: Prevents GOUT ATTACKS

#### Adverse Effects

- N/V
- Indigestion
- Blood dyscrasias
- Liver damage
- Skin rash
- GI disturbances

#### Nursing Interventions

- Increase OH to prevent renal calculi
- Monitor I & O
- Administer with meals
- Monitor blood work, including serum uric levels, and electrolyte levels
- Health Teaching
  - ✓ Lose weight if needed.
  - ✓ Avoid high purine foods (organ meats, sardines, shellfish, etc.).
  - ✓ Avoid fermented beverages such as beer, ale, wine.

## GASTROINTESTINAL DRUGS

### 1.ANTI-EMETICS

- ❖ Prevent expulsion of stomach contents by decreasing stimulation of either the chemoreceptor trigger zone, near the medulla, or the vomiting center in the medulla

DRUGS	
Antihistamines	Dramamine Phenergan
Anticholinergic	Scopolamine
Phenothiazines	Thorazine
Serotonin receptor antagonist	Granisetron Ondansetron

Use: Prevent **NAUSEA & VOMITING**

#### Adverse Reactions

- Tachycardia
- Hypotension
- Dry mouth and eyes
- Blurred vision
- Constipation
- Sedation
- Drowsiness

#### Contraindications

- Narrow-angle Glaucoma
- Liver disease
- Intestinal obstruction
- Depression

## Nursing Interventions

- Use non-pharmacologic measures first
  - ✓ Dry toast
  - ✓ Tea
  - ✓ Crackers
  - ✓ Monitor VS
- Monitor for signs and symptoms of vomiting is severe.
- Monitor bowel sounds.
- Provide mouth care after vomiting.
- Health Teaching
  - ✓ Store drug in tight, light-resistant container.
  - ✓ Avoid OTC drugs.
  - ✓ Avoid alcohol.
  - ✓ Avoid during 1st trimester of pregnancy.

## 2. ANTACIDS

- ❖ Neutralize gastric acid

### Drugs

- Aluminum hydroxide (AlOH) gel (Amphogel)
- Magnesium hydroxide (MgOH) (Milk of Magnesia)
- AlOH + MgOH (Maalox/Magaldrate)

Uses: Peptic ulcers, reflux esophagitis, hiatal hernia

### Adverse Reactions

- Aluminum compounds = constipation, intestinal obstruction
- Magnesium compounds = diarrhea
- Reduced absorption of Ca & Fe Nursing Interventions

## Nursing Interventions

- Shake oral suspension well
- Monitor client's response to treatment
- Administer with 8 oz glass of water
- Health Teaching
  - ✓ Avoid overuse of antacid
  - ✓ Dietary restrictions for ulcers
  - ✓ Diet: High in Ca & Fe
  - ✓ For clients on low sodium diet

## 3. ANTI-PEPTIC ULCER DISEASE (PUD)

- ❖ Decrease acetylcholine release
- ❖ Block release of histamines
- ❖ Inhibit secretion of pepsin
- ❖ Inhibit proton pump

### Drugs

- ❖ Proton-pump Inhibitor (PPI)
  - Omeprazole (Prilosec)
  - Lansoprazole (Prevacid)
- ❖ H<sub>2</sub>-receptor Blockers
  - Cimetidine (Tagamet)
  - Ranitidine (Zantac)
  - Famotidine (Pepcid)
- ❖ Cytoprotective agent
  - Sucralfate (Carafate)
  - Misoprostol (Cytotec)
- ❖ Anti-cholinergics
  - Chlordiazepoxide (Librax)
  - Atropine sulfate

Uses: Management of peptic ulcer disease, GERD; protects gastric mucosa from hydrochloric acid production

#### Adverse Reactions

- Dry mouth
- Decreased secretions
- Constipation
- Tachycardia
- Urinary retention
- Headache
- Dizziness
- Constipation
- Pruritus
- Impotence

#### Contraindications

- Anti-cholinergics (narrow-angle glaucoma)
- Renal failure
- Liver disease

#### Nursing Interventions

- Administer on an empty stomach
- Avoid antacids within 30 minutes of sucralfate
- Avoid antacids within one to two hours of other anti-ulcer drugs
- Administer other drugs one to two hours after sucralfate
- Health Teaching
  - ✓ Avoid alcohol, spicy food and caffeinated beverages.
  - ✓ Eliminate smoking.
  - ✓ Increase fluid intake.
  - ✓ Medication can take up to two weeks for full effect.

#### 4. ANTI-DIARRHEAL

- ❖ Forms the stool
- Use: Treatment of diarrhea

##### Drugs

- ❖ Fluid absorbents (Decrease fluid content)
  - Kaolin and Pectin
- ❖ Motility Suppressants (Decrease GI motility)
  - Diphenoxylate hydrochloride (Lomotil)
  - Loperamide hydrochloride (Imodium)
- ❖ Enteric bacterium replacements
  - Lactobacillus acidophilus (Bacid)

ADVERSE REACTIONS	
Fluid absorbents	Gastric disturbances CNS toxicity
Enteric bacterium replacements	Excessive flatulence abdominal cramps
Motility suppressants	Urinary retention Tachycardia Sedations Paralytic ileus Respiratory depression

### Contraindications

- Ulcerative colitis

### Nursing Interventions

- Monitor the effect of medication
- Assess for fluid and electrolyte imbalance
- Assess for cause of diarrhea
- Motility suppressants may cause physical dependence, may impair ability to perform hazardous activities

## 5. LAXATIVES

- ❖ Agents which facilitate defecation, and treat constipation
- ❖ Increase bulk within the bowel
- ❖ Lubricate the intestinal walls
- ❖ Increase peristalsis

### Drugs

- Mineral oil
- Colace
- Metamucil
- Dulcolax
- Milk of magnesia

Use: To treat **CONSTIPATION**

### Adverse Reactions

- Nausea
- Cramping
- Diarrhea
- Dependence with long-term use
- Intestinal lubricants inhibit absorption of fat-soluble vitamins
- Saline cathartics: dehydration, hypernatremia

### Contraindications

- GI obstruction
- Suspected appendicitis
- Abdominal pain
- 

### Nursing Interventions

- Monitor effects of medication
- Health Teaching
  - ✓ Dietary considerations (Inc. fiber and fluid intake)
  - ✓ Maintain/increase activity level
  - ✓ Caution regarding overuse of laxatives

## CARDIO DRUGS

### 1. CARDIAC GLYCOSIDES

- ❖ Make heart beat slower but stronger
- ❖ Improve pumping ability of heart
- ❖ Increase force of heart's contraction
- ❖ Decrease rate of contraction
- ❖ Increases cardiac output

### Drugs

- Digoxin (Lanoxin)
- Digitoxin (Crystodigin)
  - ✓ (+) inotropic (Increased heart contractility)
  - ✓ (-) chronotropic (Decreased heart rate)

### Uses

- Congestive Heart Failure
- Atrial flutter



- Atrial fibrillation

### Contraindications

- Ventricular tachycardia
- Ventricular fibrillation
- Second and third degree heart block

### Adverse Effects

- Vision changes: yellow-green halos
- N/V
- Diarrhea
- Anorexia
- Bradycardia
- Xanthopsia
- Muscle weakness
- Dysrhythmia

### Nursing Interventions

- Before giving glycosides, check apical pulse and heart rhythm. Report if <60 bpm (adult); <90 bpm (infants)
- Monitor digoxin levels for possible toxicity (therapeutic range = 0.5 to 2.0 mg/mL)
- Antidote: DIGOXIN IMMUNE FAB (Digibind)
- Monitor intake and output
- Health teaching
  - ✓ Take medications as prescribed
  - ✓ Teach client how to take and record pulse daily
  - ✓ Identify and report signs of toxicity
  - ✓ Daily weights: Report two-pound increase

## 2. ANTI-HYPERTENSIVES

- ❖ Dilate peripheral blood vessels
- ❖ Prevent hypertension

### Drugs

- ❖ Angiotensin-converting Enzyme Inhibitors (ACE-I)
  - Captopril
  - Enalapril
- ❖ Angiotensin II Receptor Blockers (ARBs)
  - Losartan
  - Telmisartan
  - Irbesartan
- ❖ Calcium Channel Blockers (CCB)
  - Verapamil
  - Diltiazem
  - Nifedipine
  - Nicardipine
- ❖ Other Drugs
  - Hydralazine hydrochloride (Apresoline)
  - Reserpine (Serpasil)
  - Prazosin hydrochloride (Minipress)
  - Methyldopa (Aldomet)
  - Clonidine (Catapres)

Use: Treat hypertension

### Adverse Reactions

- Orthostatic hypotension
- Dizziness
- bradycardia/Tachycardia
- Sexual dysfunction
- Deterioration in renal function

### **Nursing Interventions**

- Monitor VS and blood pressure (sitting and standing)
- Monitor for hearing changes
- Monitor renal functioning
- Closely monitor client if hypotensive
- Encourage intake of foods high in Vitamin B
- Health Teaching
- ✓ Low sodium diet
- ✓ Change positions slowly
- ✓ Take medication as instructed
- ✓ Avoid hazardous activities
- ✓ Protect medication from heat and light

### **3. THROMBOLYTICS**

- ❖ Binds with plasminogen to dissolve thrombi (clots) in coronary arteries
- ❖ Activates conversion of plasminogen to plasmin
- ❖ Plasmin is able to break down clots (fibrin)

#### **Drugs**

- Streptokinase (Streptase)
- Urokinase (Abbokinase)

#### **Use**

- Myocardial Infarction
- Deep vein thrombosis
- Pulmonary emboli

#### **Contraindications**

- Active bleeding
- Cerebral embolism/hemorrhage
- Recent intra-arterial diagnostic procedure or surgery
- Recent major surgery
- Severe hypertension

#### **Adverse effects**

- Urticaria
- Itching
- Flushing
- Headache

#### **Nursing Interventions**

- Monitor for bleeding times
- Monitor coagulation studies
- Monitor for allergic reactions
- Antidote: Aminocaproic acid (Fibrinolysis Inhibitors)

### **4. ANTI-LIPEMIC**

- ❖ Lower LDL levels by reducing the synthesis of cholesterol and/or triglycerides

#### **Uses**

- Primary hypercholesterolemia

#### **Drugs**

##### **HMG-CoA Reductase Inhibitors**

- Atorvastatin (Lipitor)
- Simvastatin (Afordel)

##### **Bile Acid Sequestrants**

- Colestipol (Colestid)
- Cholestyramine (Questran)

#### **Contraindications**

- Hypersensitivity
- Pregnancy/Lactation

- Active Liver Disease

### Adverse Reactions

- Skin flushing
- Gastric upset
- Reduced absorption of fat-soluble vitamins
- Disruption of liver function
- Muscle tenderness or weakness

### Nursing Interventions

- Monitor cholesterol levels
- Monitor liver function test
- Health Teaching
  - ✓ Blood work and eye exams will be necessary during treatment
  - ✓ Report: blurred vision, severe GI symptoms, or headache, muscle tenderness or weakness
  - ✓ Diet: low cholesterol; high-fiber

## 5. ANTI-ANGINALS

### Nitrates

- ❖ Dilate arterioles which lowers peripheral vascular resistance (afterload)

### Drugs

- Nitroglycerin
- Isosorbide dinitrate (Isordil)
- Isosorbide mononitrate

### Types

- ❖ Sublingual Medications
  - Offer sips of water before giving. Dryness may inhibit absorption
  - Instruct to put under the tongue and leave until fully dissolved
- ❖ Translingual Medications (tongue spray)
  - Instruct the client to spray directly against the oral mucosa.
  - Avoid inhaling the spray.
- ❖ Transmucosal-Buccal Medications
  - Instruct the client to put between the upper lip and gum or in the buccal area between the cheek and gum.
  - Medication will adhere to the mucosa and slowly dissolve
- ❖ Transdermal Patch
  - Instruct the client to apply the patch over a hairless area, using a new patch and a different site each day.
  - Instruct the client to remove the patch after 12-14 hours, allowing 10-12 "patch-free" hours to avoid tolerance
- ❖ Topical Ointments
  - Instruct the client to remove the ointment on the skin from the previous dose
  - Avoid hairy areas. Cover with plastic wrap. Rotate sites.
  -

Use: Treatment and prevention of acute chest pain caused by Myocardial Ischemia

### Adverse Effects

- Postural hypotension
- Headache
- Flushing
- Dizziness

### Contraindications

- Hypersensitivity
- Severe anemia
- Hypotension
- Hypovolemia

### Nursing Interventions

- Monitor for orthostatic hypotension
- Monitor for tolerance with long — term use

- Administer every 5 minutes but not more than three tablets
- If pain is not relieved after 15 minutes and three tablets, notify physician immediately
- Instruct client:
  - ✓ Take pulse before taking medication
  - ✓ Take oral preparations without food
  - ✓ When to seek medical attention
  - ✓ Not to chew or swallow sublingual tablets
  - ✓ Make position changes slowly
  - ✓ Carry drug so that it is always within reach but avoid exposure to body heat and light
  - ✓ Replace drug approximately every six months
  - ✓ Avoid alcohol ingestion

## **Beta-adrenergic blocking agents**

- ❖ Inhibit sympathetic stimulation of beta-receptors in the heart
- ❖ Decrease heart rate and force of myocardial contraction thus decreasing myocardial oxygen consumption

### **Use**

- Reduces frequency and severity of acute anginal attacks, dysrhythmias

### **Drugs**

- Propranolol (Inderal)
- Metoprolol (Lopressor)
- Nadolol
- Timolol
- Acebutolol
- Betaxolol
- Esmolol
- Pindolol
- Penbutolol

### **Adverse Effects**

- Blood dyscrasias
- Hypotension
- GI disturbances
- Flushing of the skin

### **Contraindications**

- Hypersensitivity
- Cardiogenic shock
- Cardiac failure

### **Nursing Interventions**

- Weigh daily. Report weight gain of 5 lbs. or greater
- Monitor ECG if using for dysrhythmia
- Administer on an empty stomach
- Protect injectable solution from light
- Instruct client
  - ✓ Take pulse before taking the drug
  - ✓ Not to discontinue the drug abrupt
  - ✓ Avoid hazardous activities if drowsiness occurs
  - ✓ Make position changes slowly
  - ✓ Take drug at same time each day

## **Calcium-Channel Blockers**

- ❖ Prevent the movement of extracellular calcium into the cell resulting in coronary and peripheral artery dilation
- ❖ Decrease cardiac contractility

### **Uses**

- Stable angina
- Dysrhythmias

- Hypertension

## Drugs

- Verapamil
- Nifedipine
- Diltiazem
- Nicardipine
- Felodipine

## Adverse Effects

- Headache
- Drowsiness
- Dizziness
- GI disturbances
- Flushing of the skin

## Contraindication

- Hypersensitivity

## Nursing Interventions

- Monitor chest pain
- Monitor ECG if used for dysrhythmias
- Administer with food
- Instruct the client:
  - ✓ Increase fluids to counteract constipation
  - ✓ Take pulse before taking drug
  - ✓ Avoid hazardous activities until stabilized on drug
  - ✓ Limit caffeine consumption
  - ✓ Avoid alcohol
  - ✓ Change position slowly

## 6. MEDICATIONS FOR HYPOTENSION & SHOCK

- ❖ Adrenergic agonists
- ❖ Mimics the action of the sympathetic nervous system
- ❖ Increases the cardiac output, (+) inotrope, (+) chronotrope
  - Inotrope: Increases cardiac contractility
  - Chronotrope: Increases heart rate
  - Dromotrope: Increases AV conduction

## Drugs and Uses

- Dopamine & Dobutamine: hypovolemic and cardiogenic shock
- Epinephrine: anaphylactic shock

## Adverse Effects

- Dysrhythmias
- Tissue necrosis (extravasation)
- Tremors
- Anxiety
- Dizziness (epinephrine)

## Contraindications

- Hypersensitivity
- Ventricular fibrillation
- Tachydysrhythmias

## Nursing Interventions

- Correct hypokalemia before administering
- Monitor vital signs frequently
- Monitor ECG continuously during administration
- Administer with infusion pump
- Start drug slowly and increase according to health care provider's orders
- Monitor injection site for extravasation
- Protect solution from light

- Do not use discolored solution
- Stop the drug gradually

## 7. ANTICOAGULANTS

- ❖ Disrupt the blood coagulation process,  
Thereby suppressing the production of fibrin

### Drugs

- Heparin
- Warfarin

### Uses

- Pulmonary embolism
- Deep vein thrombosis
- Myocardial infarction
- Atrial fibrillation

### Adverse Effects

- Allergic responses (chills, fever, urticarial)
- Use cautiously if client tends to bleed (hemophilia, peptic ulcer)
- N/V
- Diarrhea
- Abdominal cramps

### Contraindications

- Hemophilia
- Leukemia
- Peptic ulcer
- Blood dyscrasias

### Nursing Interventions

- Heparin: Monitor aPTT (activated partial thromboplastin time)
  - ✓ Therapeutic levels: aPTT increase by a factor of 1.5 to 2.5 (25 to 38 seconds)
- Parenteral (SQ) Coumadin: Monitor PT (Prothrombin time)
  - ✓ INR: **2.0 to 3.0**
  - ✓ Oral
- Do baseline blood studies before therapy
- Have antidote ready:
  - ✓ Heparin: **Protamine sulfate**
  - ✓ Coumadin: **Vitamin K**
- Monitor client for symptoms of hemorrhage (INC. PR, Dec, BP)
- Avoid salicylates (Aspirin)
- Avoid IM injections
- Teach client
  - ✓ Take medication at same time every day
  - ✓ Wear medical alert jewel
  - ✓ Use of soft toothbrush
  - ✓ Report and signs of bleeding, red or black bowel movement, headaches, rashes, red or pink-tinged urine, sputum
  - ✓ Avoid trauma

## 8. ANTI-DYSRHYTHMICS

- ❖ Prevent abnormal heart rhythms

DRUGS	
<b>Class I (Sodium Channel Blockers)</b>	Quinidine Procainamide Lidocaine Flecainide
<b>Class II (Beta Blockers)</b>	Acebutolol Propranolol Esmolol
<b>Class III (Conduction Delayers)</b>	Bretylum Amiodarone
<b>Class IV (Calcium – channel Blockers)</b>	Verapamil Diltiazem Nifedipine

**Use:** Treat abnormalities in cardiac rate and rhythm

### Adverse Effects

- Hypotension
- N/V
- Blood dyscrasias
- Diarrhea

### Nursing Interventions

- Monitor Cardiac Rhythm
- Monitor blood levels
- Monitor for blood dyscrasias
- Administer oral preparation with meals
- Monitor ECG
- Use infusion-control devices for IV administration
- Health teaching
  - ✓ Report changes in heart rate and/or rhythm
  - ✓ Report any side effects

## RESPIRATORY DRUGS

### 1. BRONCHODILATORS

❖ Dilates air passages in the lungs, specific action dependent on type of drug

DRUGS	
<b>Beta-adrenergic</b>	Albuterol/Salbutamol Terbutaline Epinephrine
<b>Xanthine derivative</b>	Aminophylline Theophylline
<b>Anticholinergic</b>	<p>Ipratropium Bromide Uses</p> <ul style="list-style-type: none"> <li>• Bronchospasms</li> <li>• Asthma</li> </ul> <p><b>Adverse Effects</b></p> <ul style="list-style-type: none"> <li>• Dizziness</li> <li>• Tremors</li> <li>• Anxiety</li> <li>• Palpitations</li> <li>• GI disturbances</li> <li>• Headaches</li> <li>• Tachycardia</li> <li>• Dysrhythmia</li> </ul> <p><b>Contraindications</b></p> <ul style="list-style-type: none"> <li>• Hypersensitivity</li> <li>• Narrow angle glaucoma</li> <li>• Severe cardiac disease</li> </ul> <p><b>Nursing Intervention</b></p> <ul style="list-style-type: none"> <li>• Monitor theophylline levels (N: 10 to 20 mcg/dL)</li> <li>• Monitor I &amp; O and VS</li> <li>• Health Teaching <ul style="list-style-type: none"> <li>✓ Take medication as prescribed only</li> <li>✓ Report adverse effects</li> <li>✓ Stop smoking during therapy</li> <li>✓ Take with meals</li> <li>✓ Avoid OTC drugs</li> </ul> </li> </ul>

### 2. MUCOLYTICS / EXPECTORANTS

**Mucolytics:** act by dissolving chemical bonds within the mucus, causing it to separate and liquefy, thereby reducing viscosity

**Expectorants:** stimulate a gastric mucosal production of lung mucus



DRUGS	
<b>Mucolytics</b>	Acetylcysteine (Mucomyst)
<b>Expectorants</b>	Guaifenesin (Robitussin)

#### Uses

- Asthma
- Acute / Chronic broncho – pulmonary disease
- Cystic fibrosis
- **N-acetylcysteine: Acetaminophen toxicity**

#### Adverse Reactions

- Oropharyngeal Irritation
- Bronchospasm
- Gastric effects
- N/V

#### Contraindications

- Increased intracranial pressure
- Status asthmaticus

#### Nursing interventions

- Monitor respiratory status
- Health Teaching
  - ✓ Take no fluids directly after oral administration
  - ✓ Increase oral fluid intake
  - ✓ Encourage coughing and deep breathing, especially before treatment

### 3. ANTI-TUSSIVES

- ❖ Acts on the cough control center in the medulla to suppress the cough reflex

DRUGS	
<b>Narcotic</b>	Codeine Hydrocodone bitartrate
<b>Non-Narcotic</b>	Dextromethorphan

#### Uses

- Colds
- Respiratory congestion
- Pneumonia
- Bronchitis

- Cystic Fibrosis
- Emphysema
- Cancer-induced cough

### **Adverse Effects**

- Drowsiness
- Nausea
- Dry mouth
- Dizziness
- Constipation (codeine)

### **Contraindications**

- Hypothyroidism
- Iodine sensitivity

### **Nursing Intervention**

- Monitor blood counts with long term therapy
- Increase fluid intake humidify client's room
- Avoid driving and other hazardous activity especially if taking narcotic type
- Antitussives add to the effects of alcohol

## **4. ANTIHISTAMINES**

- ❖ Blocks histamine at receptor sites

### **Drugs**

- Promethazine HCl (Phenergan)
- Chlorpheniramine maleate
- Diphenhydramine
- Loratadine
- Cetirizine

### **Uses**

- Relieves symptoms of allergies, colds, pruritus
- Prevents problems in blood transfusions and drug reactions

### **Adverse Reactions**

- Drowsiness
- Gastric effects
- Dry Mouth
- Headache
- Thickening of bronchial secretion

### **Contraindications**

- Acute Asthma
- Lower respiratory
- Narrow angle glaucoma

### **Nursing Intervention**

- Discontinue four days before skin testing for allergies
- Avoid interaction with CNS depressants
- Health Teaching
- Avoid driving and hazardous activities

- Take antihistamines with food
- Additive effects with alcohol
- Additive effect with alcohol and other CNS depressants

## 5. ANTI-INFLAMMATORY DRUGS

- ❖ Stabilize mast cells so chemical mediators are not released easily
- ❖ Decrease bronchial hyperactivity
- ❖ Decrease airway inflammation

DRUGS	
<b>Mast Cell Stabilizer</b>	Cromolyn Sodium
<b>Corticosteroids</b>	Beclomethasone Budesonide Mometasone Fluticasone Triamcinolone
<b>Leukotriene Receptor Antagonist</b>	Montelukast Zafirlukast
<b>Immunomodulators</b>	Omalizumab

**Use:** Prevent asthma attacks; exercise-induced bronchospasm

### Adverse Effects

- Cough
- CNS Disturbances
- Burning, stinging eyes
- Throat irritation
- Headache

### Contraindications

- Status asthmaticus
- Hypersensitivity

### Nursing Intervention

- Give bronchodilators first before steroids
- Monitor eosinophil count
- Monitor respiratory status
- Store in highly closed light-resistant container
- Health Teaching
  - ✓ How to use inhaler
  - ✓ Rinse mouth after using steroid inhaler
  - ✓ When to call health care provider if medications are not effective
  - ✓ Therapeutic effect may take up to four weeks

## ENDOCRINE DRUGS

### 1. ANTI-DIABETIC AGENTS

- ❖ Provide insulin to promote transport of glucose

#### Drugs

- ❖ First-generation Sulfonylureas
  - Acetohexamide
  - Chlorpropamide
  - Tolazamide
  - Tolbutamide
- ❖ Second-generation Sulfonylureas
  - Glipizide
  - Glyburide
  - Glimepiride
- ❖ Biguanide
  - Metformin
- ❖ Alpha Glucosidase inhibitors
  - Acarbose
- ❖ Thiazolidinediones
  - Pioglitazone
  - Rosiglitazone
- ❖ Meglitinides
  - Repaglinide
  - Nateglinide

#### Adverse Effects

- Hypoglycemia
- Irritability
- Confusion
- Convulsions
- Tachycardia
- Tremors
- Moist skin
- Headache
- Nausea
- Bloating
- Diarrhea

#### Contraindications

- Adrenal insufficiency
- Myocardial infarction
- Thyrotoxicosis

#### Nursing Intervention

- Monitor client's response to medication
- Health Teaching
  - ✓ Usually life-long therapy
  - ✓ Take medication same time each day
  - ✓ Monitor pulse rate; report pulse rate over 100
  - ✓ Report signs of toxicity (chest pain, palpitations, nervousness)

- ✓ Wear medic alert jewelry/ID
- ✓ Avoid OTC medication unless approved by health care provider
- ✓ Continue medical supervision

### 3. ANTI-HYPERTHYROID AGENTS

- ❖ Blocks synthesis of thyroid hormone

#### Drugs

- Iodine (Lugol's Solution)
- Methimazole (Tapazole)
- Propylthiouracil (PTU)

#### Adverse Effects

- Agranulocytosis
- Skin Disturbance
- Decreased metabolism
- Gastric disturbance
- Iodine: stains teeth, bitter taste

#### Contraindications

- Hypersensitivity

#### Nursing Interventions

- Administer iodine preparations through straw
- Monitor effects of medication
- Instruct the client
  - ✓ Report side effects
  - ✓ Avoid OTC drugs containing iodine
  - ✓ Carry medic alert jewelry

### 4. ANTERIOR PITUITARY: GROWTH HORMONE

- ❖ Stimulates the growth of practically all organs and tissues

#### Drugs

- Somatrem (Protropin)
- Somatropin (Humatrope)
- Sandostatin (Octreotide)

**Use:** Treat Dwarfism

#### Adverse Effects

- Hyperglycemia
- Hypothyroidism
- Interaction with glucocorticoids

#### Contraindications

- Hypersensitivity to benzyl alcohol
- Closed epiphyses
- Intracranial lesions

#### Nursing Interventions

- Monitor diabetic client closely
- Instruct client
  - ✓ Record height measurements at regular intervals

- ✓ Report to physician if growth is less than expected

## 5. ANTI-DIURETIC HORMONE (ADH)

- ❖ Helps distal renal tubules reabsorb water

### Drugs

- Lypressin (Diapad)
- Vasopressin (Pitressin)

**Use:** Treatment of Diabetes Insipidus

### Adverse Effects

- Gastric disturbances
- Hyponatremia
- Water intoxication
- Cardiac disturbances

### Nursing Interventions

- Monitor response to therapy: I&O, blood pressure
- Assess for dehydration

## GENITOURINARY DRUGS

### 1. DIURETICS

- ❖ Interfere with sodium reabsorption

DRUGS	
<b>THIAZIDES</b>	Hydrochlorothiazide Chlorothiazide
<b>LOOP</b>	Bumetanide (Bumex) Furosemide (Lasix)
<b>OSMOTIC</b>	Mannitol Urea
<b>CARBONIC ANHYDRASE</b>	Acetazolamide
<b>POTASSIUM SPARING</b>	Spironolactone Triamterene

**Uses:** Hypertension, edema

### Adverse Reaction

- GI irritation
- Orthostatic hypotension
- Dehydration
- Electrolyte imbalance: hyponatremia, hypokalemia (except for potassium-sparing)

### **Contraindications**

- Electrolyte imbalances
- Dehydration

### **Nursing Interventions**

- Monitor weight, intake and output, vital signs
- Give medication in morning
- Monitor client for fluid and electrolyte imbalance
- Health Teaching
  - ✓ Change positions slowly
  - ✓ Report changes in hearing
  - ✓ Diabetic clients: closely monitor glucose levels

## **2. SULFONAMIDES**

### **Drugs**

- Succinylsulfathiazole (Sulfasuxidine)
- Sulfisoxazole (Gantrisin)
- Trimethoprim-Sulfamethoxazole (Bactrim)

**Use:** Urinary tract Infection

### **Adverse Effects**

- Gastric Irritation
- Rash
- Malaise
- Blood dyscrasias
- Crystalluria
- Photosensitivity
- Allergic response

### **Contraindications**

- Hypersensitivity
- Infants <2 months old
- Pregnancy at term

### **Nursing Interventions**

- Check if the client has history of allergies
- Monitor client's response to treatment
- Monitor vital signs and blood work
- Health Teaching
  - ✓ Increase OFI
  - ✓ Take medication as prescribed
  - ✓ Avoid OTC medication unless approved by health care provider
  - ✓ Avoid direct sunlight

## **3. IMMUNOSUPPRESSANTS**

### **Drugs**

- Cyclosporine (Sandimmune)

### Uses

- Prevent organ rejection in transplant patient
- Treat autoimmune disorders

### Adverse Effects

- Nephrotoxicity
- Infection
- Hypertension
- Tremor
- Hirsutism

### Contraindications

- Hypersensitivity

### Nursing intervention

- Monitor BUN and creatinine (liver function test)
- Health Teaching
  - ✓ Report early signs of infection (fever, sore throat)
  - ✓ Medication may be taken with meals
  - ✓ Hirsutism is reversible when the treatment stops

## 4. ANTI-INFECTIVE

- ❖ Interferes with several bacterial enzyme system

### Drugs

- Nitrofurantoin (Furadantin)
- Methenamine (Hiprex)

### Uses

- Pyelonephritis
- Pyelitis
- Cystitis

### Adverse Effects

- Anorexia
- N/V
- Methenamine (crystalluria, bladder irritation)
- Nitrofurantoin (exfoliative dermatitis, interstitial nephritis, necrosis)

### Contraindications

- Hypersensitivity
- Anuria
- Severe renal disease

### Nursing Interventions

- Monitors intake and output
- Health teaching
  - ✓ Take medication as prescribed
  - ✓ Increase OFI
  - ✓ Take medication with food or milk
  - ✓ Nitrofurantoin



- Do not crush pill because it stains teeth: dilute oral suspension and rise mouth after taking
- Report muscle weakness, tingling or numbness
- Urine may look brown or rust yellow
- Avoid alcohol

## OTHER DRUGS

### Antibiotics

#### Action

- Destroy or inhibit bacteria

#### Drugs

- ❖ Penicillin
  - Ampicillin
  - Penicillin G
  - Penicillin V
- ❖ Cephalosporins
  - First Generation
    - ✓ Cephalexin
    - ✓ Cefadroxil
    - ✓ Cefradine
    - ✓ Cephazolin
    - ✓ Cephalothin
    - ✓ Cephapirin
  - Second Generation
    - ✓ Cefaclor
    - ✓ Cefprozil
    - ✓ Cefuroxime
    - ✓ Cefamandole
    - ✓ Cefotetan
    - ✓ Cefoxitin
    - ✓ Cefmetazole
  - Third Generation
    - ✓ Cefdinir
    - ✓ Cefixime
    - ✓ Cefpodoxime
    - ✓ Cefotaxime
    - ✓ Ceftazidime
    - ✓ Ceftriaxone
    - ✓ Cefoperazone
  - Fourth Generation
    - ✓ Cefepime
- ❖ Macrolides
  - Erythromycin
  - Clarithromycin
  - Azithromycin
- ❖ Tetracycline
  - Oxytetracycline
  - Doxycycline
  - Minocycline
- Aminoglycosides

- Amikacin
- Gentamicin
- Netilmicin
- Streptomycin
- Tobramycin
- Kanamycin
- Neomycin

**Use:** Treat bacterial infection

### Adverse Effects

- Gastric disturbance: N/V, poor appetite, diarrhea
- Allergic reactions
- Loss of water-soluble vitamins and minerals
- Tetracyclines: Hepatotoxicity, phototoxicity, hyperuricemia, tooth enamel hypoplasia, and bone defects in children under eight years of age
- Fluroquinolones: Photosensitivity
- Aminoglycosides: Ototoxicity, leukopenia, thrombocytopenia, headache, confusion, peripheral neuropathy, optic neuritis, nephrotoxicity

### Contraindications

- Hypersensitivity
- Pregnancy
  - ✓ Tetracyclines
  - ✓ Fluoroquinolones
  - ✓ Aminoglycosides
- Fluoroquinolones: children < 18 years of age

### Nursing Interventions

- Monitor client for allergies
- Monitor client's response to treatment
- Teach client
- Take all prescribed medication
- Symptoms of allergic response
- If taking a liquid (suspension), shake it first
- Take medication before meals
- Tetracyclines
  - ✓ Not for young children or in last half of pregnancy
  - ✓ Possible oral anticoagulant effects
- Fluoroquinolones: Avoid hazardous activities; avoid sunlight
- Aminoglycosides: may potentiate neuromuscular blocking agents, general anesthesia or magnesium effects

## ANTIVIRALS

### Action

- Interfere with DNA synthesis needed for viral replication

### Drugs

- Acyclovir sodium
- Valacyclovir
- Amantadine
- Rimantadine

- Oseltamivir

- Foscarnet
- Vidarabine
- Ribavirin

**Use:**

- Viral infections

**Adverse Effects**

- Orthostatic hypotension
- Dizziness
- GI disturbance
- Nephrotoxicity
- Blood dyscrasias

**Contraindication**

- Hypersensitivity
- Immunosuppression

**Nursing Intervention**

- Monitor vital signs during antiviral therapy
- Monitor effect of therapy
- Increase fluid intake
- Monitor for signs of superinfection: sore throat, fever, fatigue

## ANTIFUNGALS

**Action**

- Destroy fungal cells or inhibits their reproduction

**Drugs**

- Amphotericin B
- Nystatin
- Fluconazole
- Ketoconazole
- Miconazole
- Voriconazole
- Posaconazole
- Griseofulvin

**Use**

- Treat local and systemic fungal infections

**Adverse Effects**

- Gastric irritability: Nausea & Vomiting
- Headache
- Fever & Chills
- Paresthesia
- Renal Impairment

**Contraindications**

- Hypersensitivity
- Severe bone marrow depression

**Nursing Intervention**

- Monitor vital signs and I & O during therapy

- Amphotericin B
  - ✓ Protect IV solutions from light
  - ✓ Monitor blood work
  - ✓ Use infusion device for IV administration
- Griseofulvin
  - ✓ Instruct the client to avoid sunlight

## ANTIPARASITICS

- ❖ Interfere with parasite metabolism and reproduction

### Drugs

- ❖ Anti-helminthic
  - Albendazole
  - Mebendazole
  - Piperazine
- ❖ Amebicides
  - Chloroquine
  - Metronidazole (Flagyl)
- ❖ Antimalarials
  - Chloroquine
  - Quinine sulfate

### Use

- Kill parasites, helminths and protozoa

### Adverse Effects

- Anti-helminthic
  - ✓ GI upset
  - ✓ CNS disturbance
  - ✓ Skin rashes
  - ✓ Headache
- Amebicides
  - ✓ GI upset
  - ✓ Blood dyscrasias
  - ✓ Skin rash
  - ✓ CNS disturbances
- Antimalarials
  - ✓ GI upset
  - ✓ Blood dyscrasias
  - ✓ Visual disturbance

### Nursing Intervention

- Administer medication with food
- Monitor vital signs, blood work during therapy
- Use safety precautions if CNS disturbances manifested
- Teach client to prevent further infection
- Antimalarials: Frequent visual examinations; urine may turn rust colored

**References:**

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