Drugs affecting the autonomic nervous system

N231

Nursing Pharmacology

Objectives

Analyze the implementation of the nursing process in the promotion and maintenance of system stability for individuals receiving autonomic nervous system drugs

Required Reading

- Kee (Chapter 18) pp. 252-267
- Kee (Chapter 19) pp. 269-283
- Lecture Notes

Autonomic Nervous System (ANS)

- Is an involuntary nervous system over which a person has little or no control

Two main subdivisions

- **Sympathetic**

(fight or flight)

Neurotransmitters

Epinephrine

Norepinephrine

Dopamine

- **Parasympathetic**

(rest and digest)

Primary neurotransmitter

Acetylcholine

Two subdivisions

- **Sympathetic**

Four main adrenergic receptors:

A1, A2, B1, B2

- **Parasympathetic**

Receptors: Muscarinic and Nicotinic

Classifications

Sympathetic Nervous System (SNS)

- Adrenergic
- Adrenergic blocker

Parasympathetic Nervous System (PNS)

- Cholinergic
- Anticholinergics

Alpha Adrenergic Receptors

- Located in the vascular tissues (vessels) of muscles. When the alpha 1 receptor is stimulated the arterioles and venules constrict increasing peripheral resistance and blood return to the heart improving circulation and increasing blood pressure

Alpha2 Receptor

- Located in the postganglionic sympathetic nerve endings. When stimulated it inhibits the release of norepinephrine leading to a decrease in vasoconstriction. This results in vasodilation and a decrease in BP.

Adrenergic Drugs therapeutic use

- Allergic reactions
- Heart Failure
- Shock
- Asthma
- Nasal congestion

Adrenergic Agonists

- Norepinephrine (Levophed)
- Epinephrine (Adrenalin Chloride)
- Dopamine HCL (Intropin)
- Albuterol (Proventil)
- Phenylephrine (Neo-Synephrine)
- Dobutamine HCL (Dobutrex)

Norepinephrine “Levophed”

- Used in the treatment of shock states when drugs such as Dopamine and Dobutamine have failed to produce adequate BP

Side-effects of Norepinephrine "Levophed"

- Angina
- Tachycardia
- Hypertension
- Dysrhythmias
- Extravasation

Epinephrine's therapeutic use

- Drug of choice for anaphylactic shock
- Drug of choice for treatment of acute bronchospasm
- Cardiac arrest

Epinephrine Contraindications

- Severe organic cardiac disease
- Diabetes
- During labor
- General anesthesia
- Hypertension
- Cerebrovascular disease

Epinephrine Side-effects

- Cardiac arrhythmias
- Angina pectoris
- Subarachnoid hemorrhage
- Nervousness
- Disorientation
- Pulmonary edema

Alpha Adrenergic Agonists

- Clonidine (Catapres)
- Methyldopa (Aldomet)

Safe Nursing Practices with Adrenergic Drugs

Pre-administration

- Assessment
- Why are they being used?
- Careful preparation
- Drug allergies
- Pulmonary status
- Medication reconciliation

Safe Nursing Practices with Adrenergic Drugs

- Monitor BP and cardiac output
- Monitor ↑ or ↓ in peripheral resistance
- Monitor for ↓ in renal perfusion
- ECG and hemodynamic parameters

Alpha Blockers Uses

- Are helpful in decreasing symptoms of BPH
- Can be used to treat peripheral vascular disease (Raynaud's disease)
- Promote vasodilation causing decrease in BP
- Tic management

Alpha 1 Adrenergic blocker

- Vasodilation of arteries and veins
- ↓ peripheral vascular resistance
- ↓ symptoms of urinary urgency, hesitancy and nocturia
- Relax muscles in the prostate and bladder neck

Alpha adrenergic Blockers

- Terazosin (Hytrin)
- Flomax (Tamsulosin)

- Cardura(Doxazosin)
- Prazosin (Minipress)

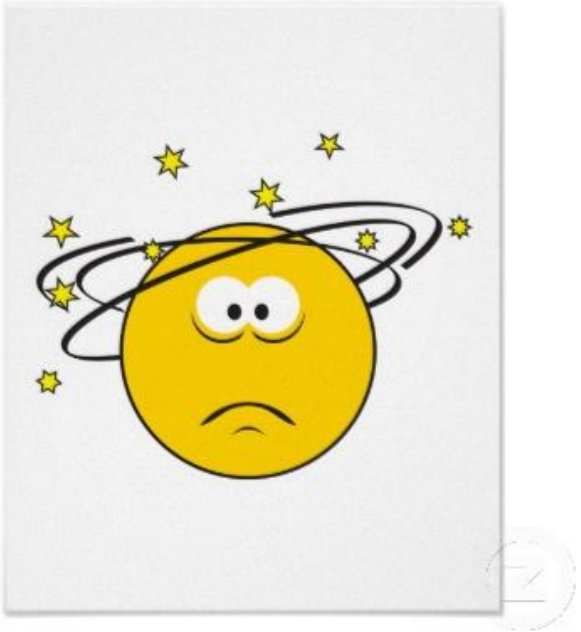
Saw Palmetto- widely used to treat BPH

Selective-Non Selective

- Alpha-blocking agents are divided into two groups
- Selective alpha blockers that block alpha1
- Non-selective alpha blockers that block alpha1 and alpha2

General side effects of alpha blockers

- Orthostatic hypotension
- Tachycardia
- Vertigo
- Sexual dysfunction
- Nasal congestion
- Dry mouth



Safe Nursing Practices

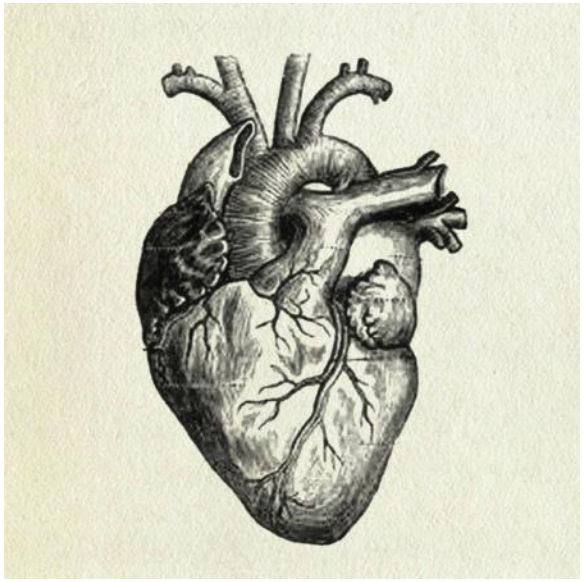
- Assess for hypotension
- Assess for syncope
- I & O
- Daily weights
- Monitor labs
- Provide resources

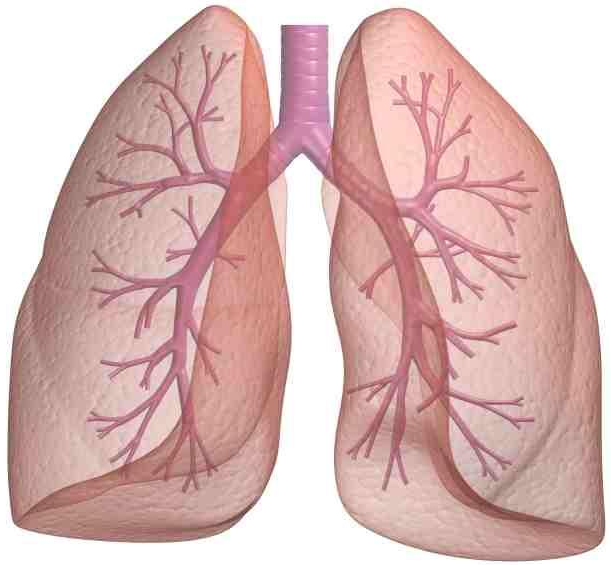
Patient teaching

- Avoid driving
- Avoid hazardous activities
- Limit caffeine intake
- Limit clutter
- Use a night light
- Get out of bed slowly

Beta Blocker Actions

- B1 Blockers affect the heart
- B2 Blockers affect the Lungs

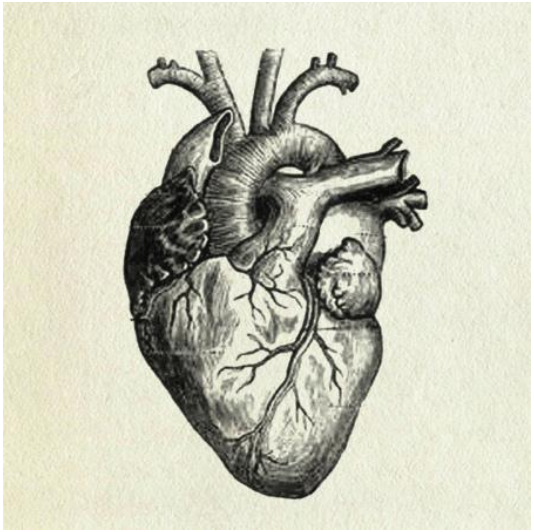




Selective vs. Non-Selective

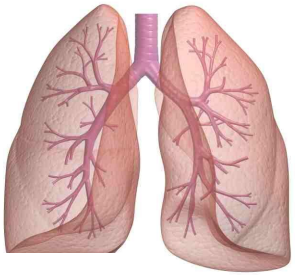
Selective

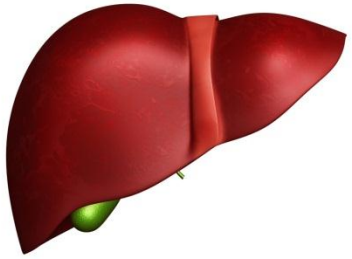
- Affect the heart



Non-Selective

- Affect lungs, Liver, Glucose





Beta Blockers Indications

- HTN
- Mitral Valve Prolapse
- CHF
- Asthma
- Glaucoma
- Migraine Prophylaxis

Beta Blockers

- Block the actions of Epi and Norepi
- Slow down the nerve impulses that travel to the heart
- Selective
- Non-selective

Examples of B-Blockers

- Atenolol (Tenormin)
- Metoprolol (Lopressor)

- Propranolol (Inderal)
- Carvedilol (Coreg)

Beta Blockers Side Effects

- Bradycardia
- Erectile dysfunction
- Reduced exercise capacity
- Hypotension
- GI disturbance
- CHF
- Depression

Cholinergic Agonists

- Drugs that stimulate the parasympathetic nervous system
- Cholinergic agonists or parasympathomimetics mimic the parasympathetic neurotransmitter acetylcholine

Cholinergic Drugs Therapeutic use

- Myasthenia gravis
- Urinary Retention
- Glaucoma
- N/V
- Alzheimer’s

Muscarinic and Nicotinic Receptors

- Two types of cholinergic receptors
- Muscarinic receptors stimulate smooth muscle and slow the heart rate
- Nicotinic receptors affect the skeletal muscles

Cholinergic Agonists

The major responses of cholinergic agonists are to:

- stimulate bladder and gastrointestinal (GI) tone
- constrict the pupils
- increase neuromuscular transmission

Cholinergic Agonists

Other effects of cholinergic agonists include:

- Decreased HR and BP
- Increase salivary, GI and bronchial glandular secretions

Cholinergic Drugs

- Prostigmine (Neostigmine)
- Bethanechol (Urecholine
- Donepezil (Aricept)
- Endrophonium (Tensilon)
- Pyridostigmine (Mestinon)
- Reglan(Metoclopramide)

Cholinergic Crisis

Salivation

Lacrimation

Urination

Defecation

Anticholinergic Drugs

- Inhibit the action of acetylcholine by occupying acetylcholine receptors
- They have the opposite response of cholinergic drugs

Therapeutic use of anticholinergics

- GI disorders
- GU disorders
- Parkinson's disease
- Motion sickness
- Assist in preventing side effects of other drugs

Anticholinergics

- Detrol (tolterodine)
- Atropine
- Oxybutynin (Ditropan)
- Scopolamine (Transderm-Scop)
- Trihexyphenidyl (Artane)
- Benztropine (Cogentin)

ANTICHOLINERGIC SIDE EFFECTS

Hot as a hare

Dry as a bone

Blind as a bat

Red as a beet

Mad as a hatter

Safe Nursing Practices

- Monitor I&O
- Assess for constipation
- Assess for Bradycardia
- Assess for hypotension
- Assess for bronchospasms

Nursing Diagnoses

- Ineffective airway clearance
- Risk for bleeding
- Risk for impaired skin integrity
- Risk for falls
- Sexual dysfunction
- Risk for disturbed personal identity
- Risk for situational low-self esteem

Questions