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
• Anticholinnergics
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-Syneprhine)
- 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