CHAPTER 20

Cholinergic-Blocking Agents

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Cholinergic-Blocking Agents
Definition

- Also called anticholinergic drugs
- Drugs that block or inhibit the actions of acetylcholine (ACh) in the parasympathetic nervous system (PSNS)

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Cholinergic-Blocking Agents
Mechanism of Action

- Competitive antagonists
  - Compete with ACh
- Block ACh at the receptors in the PSNS
  - ACh is unable to bind to the receptor site and cause a cholinergic effect
- Once these drugs bind to receptors
  - inhibit nerve transmission at these receptors

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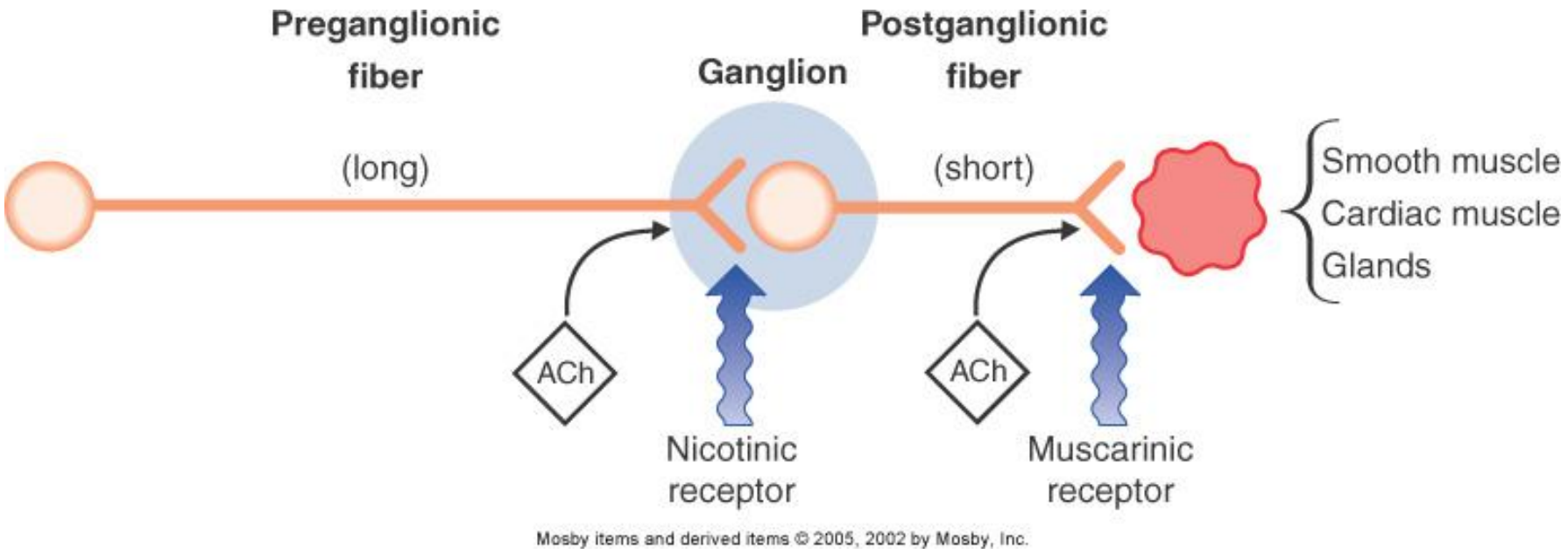

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Figure 20-1 Site of action of cholinergic blockers within the parasympathetic nervous system.

Cholinergic-Blocking Agents
Drug Effects

- Cardiovascular
  - Small doses: decrease heart rate
  - Large doses: increase heart rate
- CNS
  - Small doses: decrease muscle rigidity and tremors
  - Large doses: drowsiness, disorientation, hallucinations

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Cholinergic-Blocking Agents
Drug Effects (cont'd)

- Eye
  - Dilated pupils (mydriasis)
  - Decreased accommodation due to paralysis of ciliary muscles (cycloplegia)
- Gastrointestinal
  - Relax smooth muscle tone of GI tract
  - Decrease intestinal and gastric secretions
  - Decrease motility and peristalsis

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Cholinergic-Blocking Agents
Drug Effects (cont'd)

- Genitourinary
  - Relaxed detrusor muscle
  - Increased constriction of internal sphincter
  - Result: urinary retention
- Glandular
  - Decreased bronchial secretions, salivation, sweating

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Cholinergic-Blocking Agents
Drug Effects (cont'd)

- Respiratory
  - Decreased bronchial secretions
  - Dilated bronchial airways

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Cholinergic-Blocking Agents Indications

- CNS
  - Parkinson's disease
    - Decreased muscle rigidity and muscle tremors
    - Drug-induced extrapyramidal reactions

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Cholinergic-Blocking Agents
Indications

- Cardiovascular
  - Affect the heart's conduction system
    - Low doses: slow the heart rate
    - High doses: block inhibitory vagal effects on the SA and AV node pacemaker cells
      - Result: increased heart rate

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Cholinergic-Blocking Agents Indications: Respiratory

- Blocking the cholinergic stimulation of the PSNS allows unopposed action of the SNS
- Results
  - Decreased secretions from nose, mouth, pharynx, bronchi
  - Relaxed smooth muscles in bronchi and bronchioles
  - Decreased airway resistance
  - Bronchodilation

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Cholinergic-Blocking Agents Indications: Respiratory (cont'd)

- Respiratory agents are used to treat:
  - Exercise-induced bronchospasms
  - Chronic bronchitis
  - Asthma
  - Chronic obstructive pulmonary disease

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Cholinergic-Blocking Agents Indications: Gastrointestinal

- PSNS controls gastric secretions and smooth muscles that produce gastric motility
- Blockade of PSNS results in:
  - Decreased secretions
  - Relaxation of smooth muscle
  - Decreased GI motility and peristalsis

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Cholinergic-Blocking Agents

Indications: Gastrointestinal (cont'd)

Gastrointestinal agents are used to treat:

- Peptic ulcer disease
- Irritable bowel disease
- GI hypersecretory states

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Cholinergic-Blocking Agents Indications : Genitourinary

- Relaxed detrusor muscles of the bladder
- Increased constriction of the internal sphincter
- Reflex neurogenic bladder
- Incontinence

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Cholinergic-Blocking Agents
Examples & Uses

- atropine
  - Pre-op
    - Reduce salvation, respiratory & GI secretions
  - Severe bradycardia
- benztropine (Cogentin), trihexyphenidyl (Artane)
  - Parkinson's disease
- glycopyrrolate (Robinul)
  - Adjunct treatment for peptic ulcer disease
  - Pre-op med

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Cholinergic-Blocking Agents
Examples & Uses (cont.)

- scopolamine (Transderm-Scop)
  - Prevention of motion sickness
- tolterodine (Detrol)
  - Treatment of frequency, urgency caused by bladder overactivity
- oxybutynin (Ditropan)
  - Treatment of frequency, urgency caused by bladder overactivity
  - Antispasmodic for neurogenic bladder
    - i.e, following spinal cord injury

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Cholinergic-Blocking Agents
Examples & Uses (cont.)

- Ipratropium inhaled (Atrovent)
  - Bronchodilator for COPD
- dicyclomine (Bentyl)
  - GI antispasmodic
    - Irritable bowel syndrome
    - Colic and enterocolitis in infants

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Cholinergic-Blocking Agents
Side Effects (cont.)

Body System	Side/Adverse Effects
Cardiovascular	Increased heart rate, dysrhythmias
CNS	CNS excitation, restlessness,irritability, disorientation, hallucinations, delirium

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Cholinergic-Blocking Agents
Side Effects (cont.)

Body System	Side/Adverse Effects
Eye	Dilated pupils, decreased visual accommodation, increased intraocular pressure
Gastrointestinal	Decreased salivation, decreased gastric secretions, decreased motility

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Cholinergic-Blocking Agents
Side Effects (cont.)

Body System	Side/Adverse Effects
Genitourinary	Urinary retention
Glandular	Decreased sweating
Respiratory	Decreased bronchial secretions

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Cholinergic-Blocking Agents
Interactions (cont.)

- Antihistamines, phenothiazines, tricyclic antidepressants, MAOIs
- When given with cholinergic blocking agents, cause *additive* cholinergic effects, resulting in increased effects

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Cholinergic-Blocking Agents
Nursing Implications

- Keep in mind that these agents will block the action of ACh in the PSNS
- Assess for allergies, presence of BPH, glaucoma, tachycardia, MI, CHF, hiatal hernia, and GI or GU obstruction
- Perform baseline assessment of VS and systems overview

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Cholinergic-Blocking Agents
Nursing Implications (cont.)

- Medications should be taken exactly as prescribed to have the maximum therapeutic effect
- Overdosing can cause life-threatening problems
- Blurred vision may cause problems with driving or operating machinery

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Cholinergic-Blocking Agents
Nursing Implications (cont.)

- Patients may experience sensitivity to light and may want to wear dark glasses or sunglasses
- When giving ophthalmic solutions, apply pressure to the inner canthus to prevent systemic absorption

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Cholinergic-Blocking Agents
Nursing Implications (cont.)

- Dry mouth may occur
  - Chewing gum and hard candy
  - Frequent mouth care
- Check with physician before taking any other medication, including OTC medications
- *Antidote* for atropine overdose is physostigmine (cholinergic agonist)

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Cholinergic-Blocking Agents
Nursing Implications (cont.)

- Anticholinergics taken by the geriatric patient may lead to higher risk for heatstroke due to effects on heat-regulating mechanisms
  - Teach increase fluids
  - Teach s/s of early fluid loss
- Teach patients to limit physical exertion, and avoid high temperatures and strenuous exercise
- Emphasize the importance of adequate fluid and salt intake

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Cholinergic-Blocking Agents
Nursing Implications (cont.)

- Patients should report the following to their physician
  - Urinary hesitancy and/or retention
  - Constipation
  - Palpitations, tremors
  - Sedation or amnesia, confusion
  - Excessive dry mouth (especially if they have chronic lung infections or disease)
  - Fever

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Cholinergic-Blocking Agents
Nursing Implications (cont.)

- Monitor for therapeutic effects
  - Parkinson's disease
    - Fewer tremors and decreased salivation and drooling
  - Peptic ulcer disease
    - Decreased abdominal pain
  - For urologic problems
    - Improved urinary patterns
    - Less hypermotility
    - Increased time between voiding

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Cholinergic-Blocking Agents
Nursing Implications (cont.)

- Monitor for side effects
  - Constipation
  - Tremors
  - Hallucinations
  - Urinary retention
  - Fever
  - CNS depression (occurs with large doses of atropine)
  - Tachycardia
  - Confusion
  - Sedation
  - Hot, dry skin

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