

CHAPTER 19

Cholinergic Agents

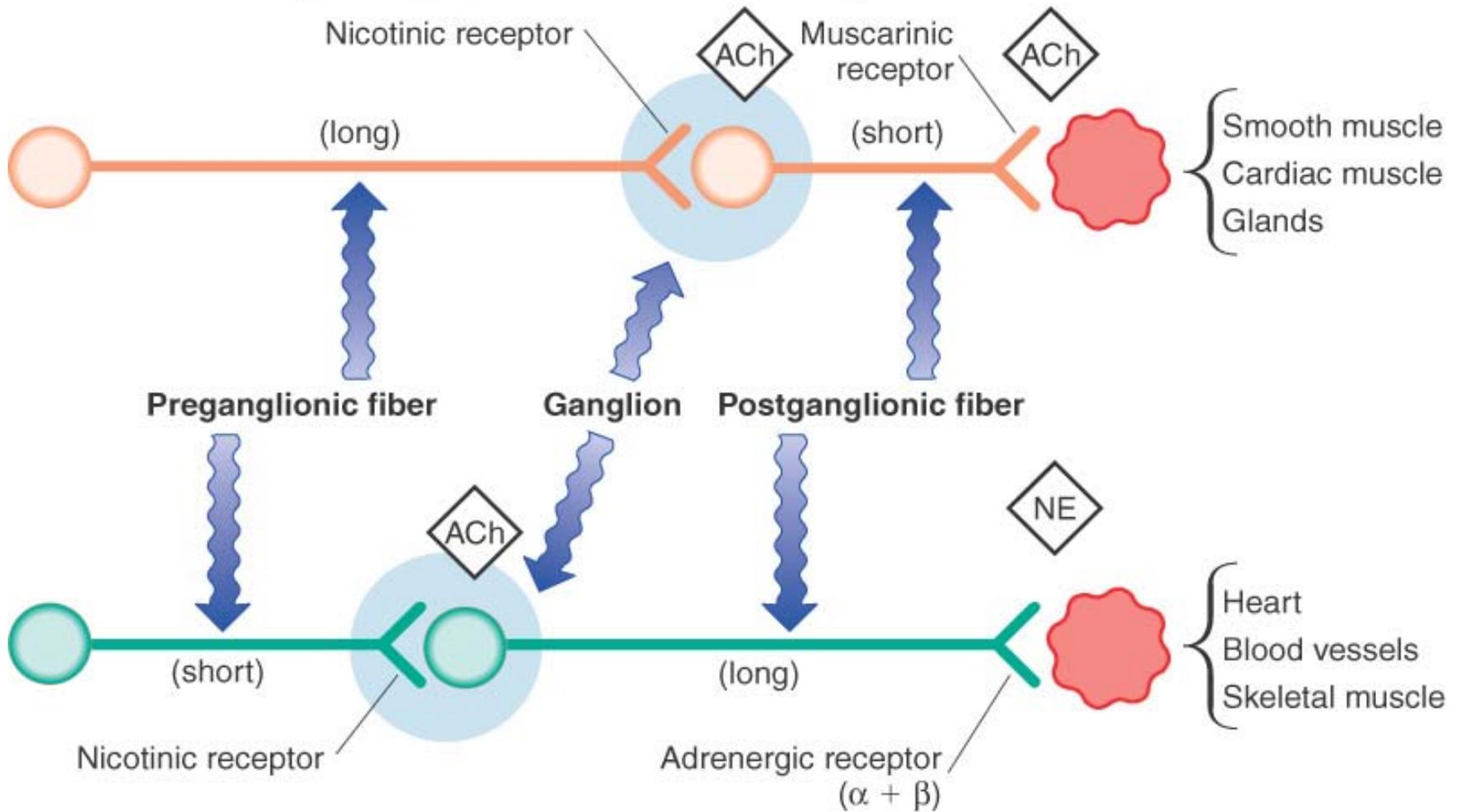
Cholinergic Agents: Definition

- Drugs that stimulate the parasympathetic nervous system (PSNS)
- The PSNS is the opposing system to the SNS

Cholinergic Agents: Definition (cont'd)

- Also known as cholinergic agonists or parasympathomimetics
- Mimic the effects of the PSNS neurotransmitter
 - Acetylcholine (ACh)

Parasympathetic nervous system



Sympathetic nervous system

Cholinergic Receptors

- Two types
 - Nicotinic receptors
 - Muscarinic receptors

Cholinergic Agents

Mechanism of Action

- Direct-acting cholinergic agonists
 - Bind to cholinergic receptors
 - Direct activation of parasympathetic nerve fiber

Cholinergic Agents

Mechanism of Action (cont'd)

- Indirect-acting cholinergic agonists (Cholinesterase Inhibitors)
 - Inhibit the enzyme cholinesterase, which breaks down ACh
 - Result: more ACh is available at the receptors
 - Types
 - Reversible
 - Bind to cholinesterase for a period of minutes to hours
 - Irreversible
 - Bind to cholinesterase and form a permanent covalent bond
 - The body must make new cholinesterase

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Drug Effects

- Effects seen when the PSNS is stimulated
- The PSNS is the “*rest and digest*” system

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Drug Effects (cont'd)

“SLUDGE”

- Salivation
- *L*acrimation
- *U*rinary incontinence
- *D*iarrhea
- *G*astrointestinal cramps
- *E*mesis

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Drug Effects (cont'd)

- Stimulate intestine and bladder
 - Increased gastric secretions
 - Increased gastrointestinal motility
 - Increased urinary frequency
- Stimulate pupil
 - Constriction (miosis)
 - Reduced intraocular pressure
- Increased salivation and sweating

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Drug Effects (cont'd)

- Cardiovascular effects
 - Decreased heart rate
 - Vasodilation
- Respiratory effects
 - Bronchial constriction, narrowed airways

Cholinergic Agents

Indications

Direct-acting agents

- Reduce intraocular pressure
- Useful for glaucoma and intraocular surgery
 - Examples: acetylcholine, carbachol, pilocarpine
- Topical application due to poor oral absorption

Cholinergic Agents

Indications

- Direct-acting agents
 - Stimulates production of saliva
 - Sjogren's syndrome
 - Xerostomia
 - » Dry mouth
 - Example
 - Cevimeline (Evoxac)

Cholinergic Agents

Indications (cont'd)

Direct-acting agent

- Example
 - bethanechol (Urecholine)
- Increases tone and motility of bladder and GI tract
- Relaxes sphincters in bladder and GI tract
 - allowing them to empty
 - Helpful for postsurgical atony of the bladder and GI tract
- Oral dose or SC injection

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Indications (cont'd)

Indirect-acting agents

- Examples:
 - physostigmine, pyridostigmine (Mestinon)
- Cause skeletal muscle contractions
- Used for diagnosis and treatment of myasthenia gravis
- Used to reverse neuromuscular blocking agents
- Used to reverse anticholinergic poisoning (antidote)

Cholinergic Agents

Indications (cont'd)

- Patient teaching myasthenia gravis pts receiving cholinergic agents
 - Take med 30 minutes ac
 - Allow onset & effect during meal
 - Aids in swallowing
 - Dosages should be evenly spaced
 - Optimize effects
 - Side effects to report to MD
 - Increased muscle weakness
 - Abdominal cramping, diarrhea

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Indications (cont'd)

Indirect-acting agents

- Examples
 - donepezil (Aricept)
 - tacrine (Cognex)
 - rivastigmine (Exelon)
 - galantamine (Reminyl) – name changed to Razadyne
- Used in the treatment of mild to moderate Alzheimer's disease
 - DOES NOT CURE OR REVERSE DISEASE
- Helps to increase or maintain memory and learning capabilities
 - May take up to 6 weeks to see improvement

Cholinergic Agents

Side Effects

- Side effects are a result of overstimulation of the PSNS
 - Cardiovascular
 - Bradycardia, hypotension, conduction abnormalities (AV block and cardiac arrest)
 - CNS
 - Headache, dizziness, convulsions
 - Gastrointestinal
 - Abdominal cramps, increased secretions, nausea, vomiting

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Side Effects (cont'd)

- Respiratory
 - Increased bronchial secretions, bronchospasms
- Other
 - Lacrimation, sweating, salivation, loss of binocular accommodation, miosis

Cholinergic Agents

Interactions

- Anticholinergics, antihistamines, sympathomimetics
 - Antagonize cholinergic agents
 - Resulting in decreased responses
- Other cholinergic agents
 - Additive effects

Cholinergic Agents

Nursing Implications

- Keep in mind that these agents will stimulate the PSNS and mimic the action of ACh
- Assess for allergies, presence of GI or GU obstructions, asthma, peptic ulcer disease, or coronary artery disease
- Perform baseline assessment of VS and systems overview

Cholinergic Agents

Nursing Implications (cont'd)

- Medications should be taken as ordered and not abruptly stopped
- The doses should be spread evenly apart to optimize the effects of the medication
- Overdosing can cause life-threatening problems. Patients should not adjust the dosages unless directed by the physician

Cholinergic Agents

Nursing Implications (cont'd)

- Encourage patients with myasthenia gravis to take medication 30 minutes before eating to help improve chewing and swallowing
- When donepezil is prescribed for Alzheimer's disease, be honest with caregivers and patients that the drug is for management of symptoms, not a cure
- Therapeutic effects of donepezil may not occur for up to 6 weeks

Cholinergic Agents

Nursing Implications (cont'd)

- Atropine is the antidote for cholinergics. It should be available in the patient's room for immediate use if needed
- Patients should notify their physician if they experience muscle weakness, abdominal cramps, diarrhea, or difficulty breathing

Cholinergic Agents

Nursing Implications (cont'd)

Monitor for side effects:

- Increased respiratory, bronchospasms, difficulty breathing
- Abdominal cramping secretions
- Hypotension, bradycardia, dysrhythmias
- Increase in frequency and urgency of voiding patterns
- Nausea and vomiting, diarrhea
- Increased sweating

Cholinergic Agents

Nursing Implications (cont'd)

- Monitor for Therapeutic Effects
 - Alleviated signs and symptoms of myasthenia gravis
 - In postoperative patients with decreased GI peristalsis, look for:
 - Increased bowel sounds
 - Passage of flatus
 - Occurrence of bowel movements

Cholinergic Agents

Nursing Implications (cont'd)

- Monitor for Therapeutic Effects (cont'd)
 - In patients with urinary retention/ hypotonic bladder, urination should occur within 60 minutes of bethanechol administration