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PHARMACOLOGY - III

UNIT 1

TOPIC :

- c. Expectorants and antitussives

Expectorants and antitussives

Expectorants

→ Expectorants are drugs that help remove mucus (sputum) from the respiratory tract.

→ They make cough productive by increasing bronchial secretions or decreasing mucus viscosity.

→ Expectorants are agents that facilitate expulsion of mucus from airways.

Uses of Expectorants

Used in:

- Productive cough
- Bronchitis
- COPD
- Respiratory tract infections
- Bronchiectasis

Classification of Expectorants

A. Secretory Expectorants

Increase respiratory secretions.

Examples

- Guaifenesin
- Ammonium chloride
- Potassium iodide
- Sodium citrate

B. Mucolytics

Reduce thickness of mucus.

Examples

- Acetylcysteine
- Bromhexine
- Ambroxol
- Carbocisteine

A. Secretory Expectorants

Guaifenesin

Mechanism

- Increases respiratory tract fluid
- Reduces mucus stickiness

Uses

- Productive cough
- Bronchitis

Adverse Effects

- Nausea, Vomiting, Drowsiness

Ammonium Chloride

Mechanism

- Stimulates bronchial secretion reflexly.

Uses

- Productive cough

Adverse Effects

- Gastric irritation, Acidosis in high doses

Potassium Iodide

Mechanism

- Increases bronchial secretions.

Uses

- Chronic bronchitis

Adverse Effects

- Metallic taste, Skin rash, Salivary gland swelling

Sodium Citrate

Mechanism

Makes sputum less viscous.

Uses

- Productive cough

Adverse Effects

- Gastric irritation

B. Mucolytics

Acetylcysteine

Mechanism

- Breaks disulfide bonds in mucus proteins.

Uses

- COPD
- Bronchitis
- Thick mucus conditions

Adverse Effects

- Bronchospasm
- Nausea
- Unpleasant odor

Bromhexine

Mechanism

- Depolymerizes mucopolysaccharides in mucus.

Uses

- Productive cough
- Respiratory infections

Adverse Effects

- Gastric irritation
- Headache

Ambroxol

Actions

- Mucolytic action
- Improves mucus clearance
- Increases surfactant secretion

Uses

- Bronchitis
- COPD

Adverse Effects

- Dry mouth
- Nausea

Anti-Tussives

→ Antitussives are drugs used to suppress cough reflex.

→ They are mainly used in dry, non-productive, irritating cough where no mucus is present.

Dry Cough

Dry cough is characterized by:

- Absence of sputum
- Irration in throat
- Persistent coughing

Common causes:

- Viral infections
- Allergy
- Smoke irritation
- Asthma

Therapeutic Goals

- Suppress excessive cough
- Provide symptomatic relief
- Improve sleep and comfort
- Reduce throat irritation

Classification of Antitussives

A. Opioid Antitussives

- Act centrally on cough center.

Examples

- Codeine, Pholcodine

B. Non-opioid Antitussives

- Suppress cough without strong opioid effects.

Examples

- Dextromethorphan, Noscapine

C. Peripheral Antitussives

- Act on cough receptors in respiratory tract.

Examples

- Benzonatate, Levodropropizine

A. Opioid Antitussives

Codeine

Mechanism of Action

- Acts on cough center in medulla and suppresses cough reflex.

Pharmacological Effects

- Reduces cough frequency
- Mild sedative effect
- Mild analgesic action

Pharmacokinetics

- Administered orally
- Well absorbed from GIT
- Metabolized in liver

Therapeutic Uses

- Dry cough
- Nocturnal cough
- Irritating cough

Adverse Effects

- Sedation
- Constipation
- Respiratory depression
- Nausea
- Dependence with prolonged use

Contraindications

- Asthma
- Respiratory insufficiency
- Children
- Head injury

Pholcodine

Mechanism of Action

- Suppresses medullary cough center.

Pharmacological Effects

- Antitussive action
- Less respiratory depression than codeine

Uses

- Dry cough
- Persistent irritating cough

Advantages

- Lower addiction potential
- Longer duration of action

Adverse Effects

- Drowsiness
- GI upset

B. Non-opioid Antitussives

Dextromethorphan

→ Most commonly used non-opioid antitussive.

Mechanism of Action

- Acts centrally on medullary cough center to suppress cough.

Pharmacological Effects

- Suppresses cough
- Minimal analgesic action
- No major respiratory depression

Pharmacokinetics

- Oral administration
- Rapid absorption

Therapeutic Uses

- Dry cough
- Common cold
- Upper respiratory tract infections

Advantages

- Less addictive
- Safer than codeine

Adverse Effects

- Drowsiness, Dizziness, Nausea

Noscapine

Mechanism of Action

- Suppresses cough center without opioid analgesic effect.

Pharmacological Effects

- Antitussive effect
- Minimal respiratory depression

Uses

- Dry irritating cough

Adverse Effects

- Sedation
- GI discomfort

C. Peripheral Antitussives

Benzonatate

Mechanism of Action

- Anesthetizes stretch receptors in respiratory passages and lungs.

Pharmacological Effects

- Reduces cough receptor sensitivity
- Suppresses cough reflex

Therapeutic Uses

- Irritating cough
- Chronic dry cough

Adverse Effects

- Sedation
- Numbness of mouth
- Hypersensitivity reactions

Levodropropizine

Mechanism of Action

- Acts peripherally on airway sensory nerves.

Uses

- Non-productive cough

Adverse Effects

- Dizziness

- Fatigue

Pharmacological Effects of Antitussives

- Suppress cough reflex
- Reduce cough frequency
- Relieve throat irritation
- Improve sleep

Therapeutic Uses of Antitussives

- Dry cough
- Allergic cough
- Nocturnal cough
- Irritating cough
- Post-viral cough

Advantages of Antitussives

- Symptomatic relief
- Improved patient comfort
- Better sleep
- Reduced throat irritation