

# DRUGS ACTING ON THE RESPIRATORY SYSTEM

## part II

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### 3\Muscarinic Antagonists

- Muscarinic antagonists inhibit acetylcholine's effect at muscarinic receptors, **blocking airway smooth muscle contraction and mucus secretion.**
- Systemic adverse effects include urinary retention, tachycardia, loss of accommodation, and agitation.

- Ipratropium bromide, being **poorly absorbed and not enter CNS**, allows high dose delivery to muscarinic receptors in airways, making it safe for bronchial asthma.
- Antimuscranic antagonist drugs are **less effective than  $\beta$ -agonists** in reversing asthmatic bronchospasm.
- Ipratropium enhances **bronchodilation** in acute severe asthma.
- Antimuscarinic agents are valuable in chronic obstructive pulmonary diseases and as alternative therapies for patients intolerant of  $\beta$ -agonists.

## 4. ANTI-INFLAMMATORY AGENTS:

### CORTICOSTEROIDS

Used both for treatment and prophylactic purposes

#### Mechanism of action

- Inhibits production of inflammatory mediators.
- Potentiates effects of  $\beta$ -receptor agonists.
- Inhibits lymphocytic-eosinophilic airway mucosal inflammation.

## Effects on airway

- decreases bronchial reactivity
- increases airway caliber
- decreases frequency of asthma exacerbation and severity of symptoms

NOTE: The corticosteroids commonly used are hydrocortisone, prednisolone, beclomethasone, triamcinolone and etc.

# Corticosteroids Administration

- Can be taken via **aerosol, oral, or IV** administration.
- Oral and parenteral are reserved for urgent treatment and unimproved patients.
- Aerosol treatment reduces systemic adverse effects.
- Discourage abrupt **discontinuation due to adrenal insufficiency fear.**
- Doses should be decreased after improvement.
- Regular or controlled therapy is better maintained with aerosol corticosteroids.

## **Clinical uses in bronchial asthma**

**1-Urgent treatment** of severe asthma not improved with bronchodilator

IV, inhalation or oral.

**2-Nocturnal asthma** prevention

oral or inhalation

**3-Chronic asthma** ...Regular aerosol corticosteroid

## **Side effects:**

Suppression of the hypothalamic-pituitary-adrenal axis

- Osteoporosis
- Sodium retention and hypertension
- Cataract
- Impairment of growth in children
- Susceptibility to infection like oral candidiasis, tuberculosis

## Stabilizing Mast Cells for Prophylaxis

- Inhibits release of histamine and mediators.
- Alters delayed chloride channel function.
- No role once mediator is released.

### Clinical uses

- Exercise and antigen induced asthma
- Occupational asthma

# Status asthmatics

Very severe and sustained attack of asthma which fails to respond to treatment with usual measures

## Management includes:

- A. - Administration of oxygen
- B. - Frequent or continuous administration of aerosolized  $\beta_2$  agonists like salbutamol
- C. - Systemic corticosteroid like methyl prednisolone or hydrocortisone IV

D- Aminophylline IV infusion

E - Iv fluid to avoid dehydration

F- Antibiotics in the presence of evidence



# Anti-Tussives

- Cough: Protective reflex for expulsion of sputum and irritants.
- Types: Useful productive cough, Useless cough, non-productive chronic cough, and cough due to smoking and local irritants.
- Drugs suppress cough intensity and frequency.

## **Two Types of Anti-tussives:**

### **Central anti- tussives**

Suppress the medullary cough center and may be divided into two groups:

- 1- Opioid antitussive e.g. codeine, hydrocodeine, etc
- 2- Non opioid antitussives e.g. dextromethorphan

### **Peripheral antitussives**

Decrease the input of stimuli from the cough receptor in the respiratory passage. e.g: Demulcents e.g. liquorices lozenges, honey

# Demulcents and Antitussives Overview

- **Demulcents coat** irritated pharyngeal mucosa, providing mild analgesic effect.
- **Codeine** is less addictive and central antitussive, with main side effects: mouth dryness, constipation, dependence.
- **Dextromethorphan** is an opoid synthetic antitussive, free of analgesic and addictive properties, with main side effects: respiratory depression.

## Expectorants:

- Aid in removing thick mucus from respiratory passages.
- Examples include Ipecac alkaloid, sodium citrate, saline expectorant, guanfenesin, potassium salts.

## Mucolytics:

- Liquify mucus and facilitate expectoration.
- Examples include acetylcysteine.

## Decongestants:

- Reduce nasal congestion, open clogged passages, enhance sinus drainage.

## Mechanism :

They are  $\alpha_1$  agonists, which produce localized vasoconstriction on the small blood vessels of the nasal membrane

## Used

in congestion associated with rhinitis, hay fever, allergic rhinitis and to a lesser extent common cold. Drugs can be administered nasally or orally for longer duration of action.

## **Classification:**

1. Short acting decongestants administered topically – phenylephrine, phenylpropanolamine
2. Long acting decongestants administered orally - ephedrine, pseudoephedrine, naphazoline
3. Long acting topical decongestants Xylometazoline and oxymetazoline