

# Drugs Affecting Respiratory System

# Diseases

Asthma

COPD

Allergic Rhinitis

# Asthma (clinical symptoms)

Shortness of breath •

Cough •

Chest tightness •

Wheezing •

Rapid respiration •

# pathophysiology

Inflammation of bronchial •  
wall

Increase mucus secretion •  
bronchoconstriction •

# Drugs therapy

1- $\beta$ -adrenergic agonist

2-corticosteroids

3-lukotrienes modifiers

4-cromolyn

5-cholinergic antagonist

6- theophylline

7-omalizumab

$\beta$ 2- adrenergic agonist

Albuterol

Levalbuterol

Formeterol

Salmeterol

# Side effects

Tremor

Tachycardia

Hyperglycemia

Hypokalemia

hypomagnesemia



# corticosteroids

Prednisone

Methylprednisolone

Beclomethasone

Budesonide

Fluticasone

mometasone



# M.O.A

1-decrease inflammatory cells

2-reverse mucosal edema

3-decrease capillary permeability

4-inhibit release of leukotrienes

# Side effects

Pharyngeal candidiasis

Osteoporosis

Hypokalemia

Risk of diabetic

Glaucoma

Infections

Hypertension

G.U

# Classification of asthma

intermittent	No daily medication	Short acting $\beta$ 2- agonist
Mild	Low dose steroid	Short acting $\beta$ 2- agonist
moderate	Low dose steroid + long acting $\beta$ 2- agonist	Short acting $\beta$ 2- agonist
severe	High dose steroid +long acting $\beta$ 2- agonist	Short acting $\beta$ 2- agonist

# Leukotrienes modifier

LTB<sub>4</sub>

LTC<sub>4</sub>

LTD<sub>4</sub>

LTE<sub>4</sub>

LTC<sub>4</sub>+LTD<sub>4</sub>+LTE<sub>4</sub> are  
potent bronchoconstrictor

5-Lipoxygenase found in

Mast cells

Basophil cells

Eosinophil cells

Neutrophil cells

# Drugs of LT. modifiers

Zileuton

Montelukast

Zafirlukast

# pharmacodynamics

Zileuton

Selective inhibitor for 5- lipoxygenase enzyme

Prevent formation **LTB4, LTC4, LTD4, and LTE4** .

Montelukast , Zafirlukast

Selective antagonist of cysteinyl LT. -1 receptor

So blocks effect of LTC4, LTD4, LTE4

# Pharmacokinetics

Orally active (3 drugs)

Food delay absorption of Zafirlukast

3 drugs metabolized in the liver

Zileuton and it metab. ----- excre.in  
urine

Zafirlukast + montelukast and metab. ---  
-excre.

With bile.



# Side effects

Elevated hepatic enzymes  
(3 drugs) so it contraindi.in

Liver diseases

Headache

dyspepsia

# cromolyn

Inhibit mast cells degranulation and  
inhibit release of histamine

It not bronchodilator

Given as nebulizer sol. 3-4 times daily

Not useful in management of acute  
asthma

Cause cough , irritation, unpleasant  
taste

# Cholinergic antagonist

**Ipratropium**----- atropine deriv.

Block (M )receptors in airway and inhibit mucus secretion.

For acute asthma

Useful in patients with untolerated adrenergic agonist drugs

***tiotropium***-----**COPD**

# Theophyllin

It bronchodilator

Have anti inflammatory

Metabolized in liver

Narrow therapeutic index

Cause arrhythmia and seizure

cAMP  PDE  AMP

# omalizumab

Monoclonal antibody

Selective binds to human **IgE** , it decrease binding of **IgE** to receptor on mast cells and basophil.

For moderate –severe asthma

S.C only

S.E = Anaphylactic reaction, fever, rash , malignancy .

# COPD

**Progressive and irreversible disease**

**Smoking is the main risk factor**

**Cough**

**Mucus secretion**

**Chest tightness**

**Breathlessness**

**Difficulty in sleeping**

**Fatigue**

# COPD therapy

**Bronchodilators •**

**Corticosteroids •**

**Other new drugs •**

**e.g Roflumilast •**

# Roflumilast

Oral drug •

phosphodiesterase-4 inhibitor •

used to reduce exacerbations •

in patients with severe

chronic bronchitis •



# *Roflumilast*

- reduce inflammation by
- increasing levels of intracellular cAMP in lung cells.
- is not a bronchodilator and
- is not indicated for the relief of acute bronchospasm

# Allergic rhinitis

Inflammatory of mucus memb. Of the nose

Sneezing

Itchy nose/eye

Watery rhinorrhea

Nasal congestion

cough

# Therapy

Antihistamine

Chlopheniramine

Diphenhydramine

Fexofenadine

Loratidine

Desloratidine

Cetirizine

Azelastine

# Therapy

**intra nasal corticosteroid**

**Beclomathasone**

**Budesonide**

**Fluticasone**

**Ciclesonide**

**Mometasone**

**triamcinolone**

# $\alpha$ -agonists

Oxymetazoline

Phenyephrine

Other

Intra nasal cromolyn

# Drugs for treatment cough

Defense mechanism for  
respira.syst.to irritant

Codiene

Dextromethorphan

Guaifenesin

Benzonatate ( anesthetized the  
stretch receptors in resp .system)

# Opioids

## Opioids •

### *Codeine* •

- decreases the sensitivity of cough centers in CNS
- to peripheral stimuli and decreases mucosal secretion

# dextromethorphan

***Dextromethorphan*** •

**is a synthetic derivative of •  
*morphine* that has no  
analgesic effects in antitussive •  
doses**



# Benzonatate

Unlike the opioids, •  
*benzonatate* it  
anesthetizes the stretch  
receptors located in the •  
respiratory passages,  
lungs, and pleura

•

•

# Benzonatate side effect

side effects include •

dizziness, •

numbness of the tongue, •  
mouth, and throat.

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