

Respiratory Pharmacology

Bronchodilators

Bronchodilators are medications that relax bronchial smooth muscle to improve airflow and relieve airway obstruction. They are classified based on their receptor targets and mechanism of action into direct-acting and indirect-acting agents.

B2 - Agonist

SABA SHORT ACTING

- Salbutamol (Albuterol)

Onset: 5 min
Duration: 4-6 h

Doses:

- Nebulization:
- Neonates 0.25 ml (1.25 mg)
- Pediatrics 0.5 ml (2.5 mg)
- Adults 1 ml (5 mg)

- MDI and DPI:
- 180 mcg (2 puffs) q4-6hr



LABA LONG ACTING

- Salmeterol
- MDI and DPI



- Formoterol
- SVN & DPI



ANTICHOLINERGICS

SAMA SHORT ACTING

Ipratropium bromide (Atrovent)

- Peak effect: 1 to 2 hours
- MDI: 17 µg/puff, 2 puffs 4 times daily
- SVN: (250 mcg/2ml) or (500 mcg/2ml)



LAMA LONG ACTING

Tiotropium (Spiriva)

DPI: 1 inhalation daily (1 capsule)



Adrenergic Bronchodilators

Acts on vascular smooth muscle to produce vasoconstriction, which markedly decreases blood flow at the capillary level.

- Duration of action is 30 minutes to 2 hours.
- Stimulates alpha and beta-receptors.
- Used to decrease mucosal edema and inflammation.

Methyl Xanthenes

MOA:

- Inhibit phosphodiesterase → 1 cAMP
- Adenosine receptor antagonism

pulmonary vasodilatation and bronchodilation.

Inhaled Corticosteroids

(ICS) are anti-inflammatory medications that reduce airway inflammation, suppress inflammatory mediator release, and decrease airway hyperresponsiveness, making them the cornerstone of long-term asthma control.

Fluticasone propionate

administered by : MDI, DPI.



Budesonide (Pulmicort)

SVN: 250 or 500 mcg, twice daily or once daily.

DPI: 220-440 µg daily, 220-880 µg daily.



Combined Anticholinergic and Beta-Agonist Bronchodilators

- SABA + SAMA
- Salbutamol + Ipratropium:

—Combivent (MDI)
—DuoNeb (Liquid for nebulizer)



Combined LABA With Inhaled Steroids

- LABA + ICS :
- Salmeterol + Fluticasone:
 - Advair
 - Seretide



- Formoterol + budesonide:
- Symbicort



Mucolytics

Acetylcysteine (Mucomyst)

Mucolytic agent that reduces the viscosity of airway secretions by breaking disulfide bonds in mucus, facilitating its clearance from the respiratory tract.

Dornase alpha Pulmozyme

Is a **recombinant human DNase I** that reduces mucus viscosity by cleaving extracellular DNA in airway secretions, thereby improving mucus clearance, particularly in patients with cystic fibrosis.

Used most commonly in patients with cystic fibrosis



SABA for quick relief of acute symptoms.



LABA and ICS are for maintenance therapy.



Anticholinergics are essential in COPD management.



Combination therapies improve symptom control and reduce exacerbations.

Common Medications in ICU

Sedative

Medication	Classification	Onset of action	duration
Midazolam	Benzodiazepines	Rapid onset 2-5 min	Duration 3-11hrs
Lorazepam	Benzodiazepines	Slower onset 5-20 min	Duration 8-15hrs
Propofol	Anesthetic	Rapid onset 1-2 min	Up to 20-30hrs

Benzodiazepines Antagonist: Flumazenil (use for sedation vacation)

Common use with MV patients : Midazolam

Common use with head injury = reduce CBF and ICP : Propofol

Analgesia

OPIOIDS	Morphine and Fentanyl
OPIOIDS ANTAGONISTS	Narcan (Naloxane)

Note : High dose of Fentanyl act as sedation

Paralytics

Medication	Onset of action	duration	Classification
Succinylcholine	60 seconds	Short acting 5-10 min	Used to facilitate intubation.
Vecuronium/ Atracurium/ Cisatracurium	3-5 min	Intermediate	Very minimal CV effects.