

Asthma is a syndrome characterised by airflow obstruction that is reversible, both spontaneously and with treatment.

#### First line

##### Oxygen

Increases the  $FiO_2$  and improves oxygenation

Should be titrated to saturations  $>90\%$

The risk of a dominant hypoxic respiratory drive is decreased in asthmatics vrs COPD

##### Beta 2 Adrenergic Drugs

Potentiates  $G_s$  PCR, which acts on adenylyl cyclase, increasing cAMP causing smooth muscle relaxation

The result is bronchial dilation and reduction in obstruction

Short beta agonists such as salbutamol are preferred in the acute setting

##### Corticosteroids

Act on intracellular receptors to modulate the production of inflammatory mediators

As this involves gene transcription the onset is delayed to greater than 30 minutes

Orally as prednisolone or IV as methylprednisone or dexamethasone

#### Second Line

##### Muscarinic antagonists

Competitively block  $M_3$  muscarinic receptors

Prevent the cholinergic component of bronchoconstriction (vagolytic)

Ipratropium bromide is short acting and is preferred in the acute setting

##### Phosphodiesterase inhibitors

Phosphodiesterase causes the breakdown of cAMP

Increased intracellular levels of cAMP are associated with smooth muscle relaxation

Theophylline is the most commonly used, but it is problematic with a narrow therapeutic window and the requirement for plasma level monitoring

#### Non established therapies

##### Adrenaline

Used for its beta 2 adrenergic benefits and the decreased mucosal production via alpha receptors

Studies haven't shown benefits over more specific beta 2 agents (+ CVS effects) = non ideal agent

##### Magnesium

Is a membrane stabiliser, possibly improves bronchodilation via reducing calcium influx

Good safety profile, beneficial in a subset of patients with severe acute asthma

##### Antileukotrienes

Leukotrienes are potent mediators of bronchoconstriction, and cause mast cell and eosinophil mediated inflammation

Montelukast is a competitive antagonist at  $LTD_4$  and  $LTE_4$  and may be used as an add on therapy

##### Anaesthetic agents

Ketamine may assist via the increase of catecholamine release

Volatile agents may improve bronchodilation but should be used with caution

Heliox has been recommended as its decreased density decreases the work of breathing