Second 2011
VIVA 5

Q 1 Classify drugs used in the treatment of asthma.

Subsequent questions sought knowledge of mechanism of action of beta 2 agonists in the treatment of asthma, important side effects of beta 2 agonists, actions of muscarinic anticholinergic antagonists, corticosteroids and aerosol drug delivery systems.

First line
- Oxygen
  - Increases the FiO2 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 Gs 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 prefered 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 M3 muscarinic receptors
  - Prevent the cholinergic component of bronchoconstriction (vagalytic)
  - Ipatropium 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
  - Montenlukast is a competitive antagonist at LTD4 and LTE4 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