Cough

Cough

- A reflex activity with elements of voluntary control
- A protective respiratory behaviour of forced expulsive manoeuvre of air, usually against a closed glottis – causing the sound
- Functions of Cough
    - Clears inhaled particulate matter, irritants etc.
    - Protects the lungs
    - Transmits infections

Causes of Cough

- Acute infection e.g. cold
- Chronic infection e.g. tuberculosis
- Lung disease e.g. asthma
- Tumours e.g. lung cancer
- Foreign body
- Middle ear issues
- Cardiovascular issues
- Drugs e.g ACE inhibitors

Classification of Cough

- Acute
    - < 2 weeks
    - Does not require treatment
    - Often caused by respiratory tract infections, pneumonia etc.
- Sub-acute
    - 2-4 weeks
    - Does not require treatment
    - Often caused by asthma, infection etc.
- Chronic
    - > 8 weeks, > 4 weeks in children
    - Requires treatment
    - Often caused by asthma, GORD, upper airway cough syndrome (post nasal drip) etc.
    - Smokers, females, elderly and those who are exposed to pollution are most at risk of developing chronic cough
    - When to refer
        - Blood in cough
        - History of smoking
        - Difficulty swallowing
        - Hoarseness of voice

        - Weight loss
        - Abnormal x-ray
        - Abnormal sounds

Investigating a Cough

- Ask the patient
    - Duration – to classify it
    - Lifestyle
    - Smoking history
    - Medicines e.g. ACE inhibitors
    - History of respiratory tract infection
    - Other symptoms suggestive of a co-existent disease
- The patient may need
    - Chest x-ray
    - Spirometry
    - Bronchiole challenge test
    - CT scan of the sinuses and/or chest
    - Examination of the nasal passage
    - Bronchoscopy

Physiology of Cough

- Inspiratory Phase
    - Cough receptors are stimulated
    - Vocal cords open widely, allowing air to enter the lungs
    - Diaphragm and external intercostal muscles contract, expanding the chest cavity
    - Intra-thoracic pressure rises
- Compression Phase
    - The epiglottis and vocal cords close, trapping air in the lungs
    - Intra-thoracic pressure rises even further
- Expulsion Phase
    - Internal intercostal and abdominal muscles contract
    - Intra-thoracic pressure rises as volume drops
    - Vocal cords and epiglottis open
    - Air is released at a high pressure – the cough

Mechanism of Cough

- Cough receptors around the body especially in the larynx, trachea and bronchi are triggered by particles, mechanical stimulation etc. and send signals through the vagus nerve to the “cough centre” (medulla, nucleus tractus solitarius (NTS)) that directs motor nerves to cough
- Unmyelinated C- fibres in the lung are triggered by bradykinin, capsaicin H+ etc. (nociceptor)

- Myelinated vagal afferent nerves in the trachea and bronchi are triggered by mechanical stimulation (mechanoreceptor)
- Myelinated pulmonary stretch receptors in the intrapulmonary airways are triggered by changes in lung volume, there are rapidly acting receptors (RAR) and slow acting receptors (SAR) (mechanoreceptor)
- There are also cough receptors in the ear, nose and pharynx etc.

Treatment of Cough

Specific Treatments

- Post-nasal drip
    - Oral antihistamine
- Increased bronchial reactivity
    - Inhaled corticosteroids if airway hyperresponsiveness is present
    - Inhaled ipratropium bromide if airway hyperresponsiveness is not present
- Bordetella pertussis
    - Macrolide
- Allergic rhinitis
    - Intranasal corticosteroid
- Asthma
    - Inhaled corticosteroids
- Eosinophilic bronchitis
    - Inhaled corticosteroids
- GORD
    - Acid suppression, lifestyle changes
- Due to ACE inhibitor use
    - Stop ACE inhibitor use – change to an angiotensin II receptor blocker

Non-Specific Treatments

All of the below have limited clinical efficacy and should be used with caution

- Neuromodulators
    - Target cough hyper-responsiveness
    - May be either central or peripheral
    - Central
        - Dextromethorphan
            - The most common non-opioid used for cough
        - Codeine
        - Morphine
            - Side effects; constipation, drowsiness
        - Gabapentin
            - Side effects; sedation, dizziness, depression, suicidal thoughts
        - Pregabalin

        - Amitriptyline
    - Peripheral
        - Benzonatate
        - Nebulised lignocaine
- Mucolytics
    - May alter the volume of cough secretions or their composition