

Treatment of Cough

Prof. Yousef Al-saraireh
Department of Pharmacology
Faculty of Medicine

Treatment of Cough

- ❖ Cough is a symptom
- ❖ Underlying disorders:
 - Asthma
 - Bronchitis
 - Chronic sinusitis
 - Pulmonary TB
 - Drugs like ACE inhibitors (Accumulation of bradykinin and substance P in respiratory tract)

Types of cough

❖ Useful (productive or wet cough): **a cough that brings up mucus or phlegm**

➤ Encouraged

❖ Useless (unproductive) cough: **a dry cough, doesn't bring up mucus or phlegm**

➤ Suppressed

Treatment of cough

- ❖ Identify the cause:

 - Asthma, sinusitis, side effects of drugs

- ❖ Treat the cause

- ❖ Treat cough accordingly

Sites of action of drugs

❖ Peripheral sites:

- Afferent side of the cough reflex (sensory):
 - Requires warm moist atmosphere to soothe the area
- Efferent side of the cough reflex (motor):
 - Easing cough & make it more productive

❖ Central sites:

- Medulla & cerebral cortex
 - Opioids, sedatives, antihistamines

I. Cough Suppression

- Antitussives (cough suppressants): work by inhibiting a coordinating region for coughing located in the brain stem
 - Suppress dry irritative cough
 - Indicated:
 - No identifiable treatable cause for the cough
 - To suppress a dry irritative cough that may cause sleep disturbance

□ They are:

- **Peripheral Antitussives**
- **Central Antitussives**

Peripheral Antitussives

□ Cough arising above the larynx:

- Demulcent preparations: is a mucilaginous or oleaginous preparation that forms a soothing protective film over a mucous membrane, relieving minor pain and inflammation of the membrane
 - Contain soothing substances that sooth & coat the pharynx
- Simple linctus: a medicine in the form of a syrup, taken to relieve coughs and sore throats
 - Citric acid in sugar-based solution with anise flavor
- Lozenges: are small, typically medicated tablets intended to be dissolved slowly in the mouth to temporarily stop coughs, lubricate, and soothe irritated tissues of the throat

Peripheral Antitussives

❖ Linctus:

- Oral demulcent sugar-based syrup used alone or as a vehicle for other antitussive agents

❖ Lozenges:

- Demulcents to sooth & coat the pharynx
 - Strepsil lozenges
 - Vicks lozenges

Peripheral Antitussives

□ Cough arising below the larynx:

❖ Water aerosol inhalation

❖ Warm environment

❖ Compound benzoin tincture: **solution of benzoin resin in ethanol (inhalation)**

❖ Menthol or eucalyptus aromatic inhalations

❖ Local anaesthetics (**Xylocaine nebulizer**); in very severe cases

Central Antitussives

❖ Block medullary cough centre:

➤ Opioids:

➤ Codeine, methadone, morphine

➤ Methadone, morphine in severe cases; malignancy

➤ Dextromethorphan (in OTC preparations)

➤ Pholcodine (in OTC preparations)

❖ OTC: (over-the counter preparations)

Opioid Antitussives: Codeine

- ❖ Natural low efficacy opioid:
 - Cough suppressant
 - Analgesic
 - Anti-diarrhoeal
- ❖ Converted into morphine by the liver
- ❖ Adverse effects:
 - Nausea, constipation
 - Respiratory depression
 - Dependence

Opioid Antitussives: Methadone; Morphine

❖ Methadone:

- Synthetic similar to morphine
- Long duration of action
- Severe cough in advanced lung cancer

❖ Morphine

- Antitussive in advanced lung cancer

Opioid Antitussives: Dextromethorphan & Pholcodine

□ Dextromethorphan & Pholcodine:

- Have antitussive effect
- No analgesic effect
- No respiratory depressant effect
- Nonaddicting
- Used in OTC drug preparations

Opioid Antitussives

- ❑ Contraindicated in asthma & in COAD:
- ❑ They produce:
 - Bronchospasm
 - Respiratory depression
 - Thick sputum
- ❑ Opioids also to be avoided in children

Cough in Children

- ❖ Opioid Antitussives are avoided
- ❖ A sedating antihistamine may be used:
 - Diphenhydramine
 - Triprolidine

2. Mucolytics & Expectorants

□ Respiratory mucous:

- Consists mainly of water with
- Glycoproteins cross-linked by disulphide bonds
 - Increases in respiratory disease
 - Becomes more viscous or thick
 - Difficult to expectorate

Mucolytics; Carbocysteine

□ Mucolytics Liquefy mucus

□ **Carbocysteine:**

- Mucolytic
- Has free sulphhydryl groups
- Opens disulphide bonds in mucus
- Reduces mucous viscosity
- Orally or by inhalation
- May cause GI irritation & allergic reaction

Expectorants

- ❖ Increase expulsion & volume of bronchial secretions
- ❖ Encourage productive cough:
 - Water inhalation
 - Rehydration are good expectorants
- ❖ Examples of expectorants:
 - Guaifenesin
 - Ipecacuanha
 - Volatile oils

Guaiifenesin

- ❖ Safe & effective expectorant
- ❖ Used with antihistamines & decongestants in cough preparations

OTC Cough preparation

❖ Honey, lemon

❖ Volatile oils (e.g. menthol, anise)

❖ In OTC cough preparations

Examples of OTC Cough Preparations

- ❖ **Actifed expectorant:** Guaiphenesin, Psudoepherin Hcl, and Triprolidine Hcl. Actifed Expectorant Syrup works by thinning the mucus in the air passages, stimulating the alpha and beta-adrenergic receptors, and blocking the action of histamine receptor
- ❖ **Actifed linctus:** Codeine Phosphate, Pseudoephedrine and Triprolidine
- ❖ **Benylin cough preparations:** diphenhydramine which is an antihistamine, helps coughs and dries the nose and chest. The levomenthol is a decongestant that helps you breathe
- ❖ **Venos expectorant:** guaifenesin, liquid glucose and treacle. guaifenesin are thought to work by stimulating receptors in the stomach, causing a reflex increase in the volume of fluid produced in the airways. This decreases the thickness of the secretions in the airways, thus loosening phlegm and making it easier to cough up. The liquid glucose and treacle form a syrupy base that coats and helps soothe a sore, tickly or irritated throat caused by coughing.

General guidelines

- ❖ Identify type of cough & underlying cause
- ❖ Treat the cause
- ❖ Quit smoking
- ❖ For suppression of useless cough
 - Codeine, pholcodine, dextromethorphan or methadone linctuses

General Guidelines

❖ To liquefy sputum:

- Water aerosol with or without:
 - Menthol, benzoin or eucalyptus inhalations
- Drink warm water
- Carbocysteine is useful

Always remember

- ❖ In children, a sedative antihistamine used
- ❖ Cough suppressants:
 - Sputum retention
- ❖ Opioids are CI asthma & COAD
- ❖ Pulmonary TB & malignancies are causes of cough

Always remember

- ❖ Opioid antitussives are usually formulated as linctuses (oral solutions)
- ❖ Water is probably the best expectorant