

# Pharmacology - RS

Done By

Dana AlKhateeb

Corrected By

Leen  
Alhadidi



# Treatment of Cough

**Dr Munir Gharaibeh, MD, PhD, MHPE**

**Department of Pharmacology**

**School of Medicine**

**December 2021**

# Cough

**Cough is a symptom of an underlying illness.**

Maybe the illness is a serious one which should be treated , maybe something silly like a foreign body which doesn't have to be treated .

**Cough is a useful protective reflex elicited by:**

**Mechanical stimulation of large respiratory passages, by foreign bodies or inflammatory exudates or debris.**

**Chemical stimulation of alveoli. Like fumes**

The foreign body will exit by the cough but if the foreign body is still inside, it might block the airway and the patient will suffocate or it will enter inside and induce an infection / abscess

After receptor activation, impulses are carried through afferent vagal nerves to a medullary center to initiate deep inspirations, followed by strong expiratory effort against closed glottis leading to increased pressure in the airways. Glottis suddenly relaxes, mouth opened, and air is released at high pressure.

# Cough

*Cough is one of the most common reasons patients see physicians, it might indicate:*

**Something is wrong.**

**Exhaustion.**

**Insomnia.**

**Musculoskeletal pain.**

**Hoarseness of voice.**

**Urinary incontinence.** Elderly

**Dizziness, headache, syncope.**

**Nausea, vomiting, retching, and anorexia.** Vagus n. Stimulation

**Fear of cancer, AIDS, or TB.** Or corona

Specially with family history & smoking

# Specific Treatment of Cough

*Directed on the etiology or pathophysiological mechanism:*

**Bronchial Asthma.**

**Postnasal drip due to sinusitis.**

**Postnasal drip due to allergic or perennial non allergic sinusitis.**

**Chronic bronchitis.**

**Gastroesophageal Reflux(GERD).** Mostly begins as a cough then vomiting

**Sarcoidosis.**

**Congestive heart failure.**

Severe pulmonary congestion may lead to pulmonary edema with frothing ( زبد )

**ACEI-induced cough.**

# Nonspecific Treatment of Cough

**Directed at the symptom.**

**Indicated when definitive therapy cannot be given either because:**

**a. the cause is unknown**

**b. definitive therapy did not have the chance to work or will not work( e.g. cancer metastatic to lung).**

Colon cancer / liver cancer / breast cancer

/Lung cancer in late stages

Colon cancer is the most common cancer in the human being

Colon cancer is the most common cancer in men and the second most common cancer in women

# Treatment of Cough

Tussive = cough

Anti ضد

Pro مع

متعوب عالترجمة ترا

So the two categories have opposite effects

Drug treatment is divided into two main categories:

- a. **Antitussive Drugs**: therapy that controls, inhibits or eliminates cough. Useful to suppress intensity and frequency of coughing when it is unproductive and distressing.
  
- b. **Protussive Drugs**: therapy that makes cough more effective, when it is productive, to expel a foreign body or exudates.

Cough when a person is lying down...congestive heart failure ( because the fluid will move back from limbs to the right heart then to the lung)

We have two types of cough :

- ✓ Dry cough and usually doesn't serve any purpose, just irritant
- ✓ Wet or productive cough and aims to expel the foreign body or the inflammatory exudate

# Drugs for Cough

- **Drugs that may alter mucociliary factors.**
- **Drugs acting on the afferent limb.**
- **Drugs acting on the cough center.**
- **Drugs acting on the efferent limb.**
- **Drugs acting on the respiratory skeletal muscles.**



# Drugs for Cough

- Drugs that may alter mucociliary factors:

- **Increase the volume of the secretions.** Give the patient water ,fluids, sweet liquids
- **Change the consistency of mucus (i.e. Mucolytics).** Mucus maybe be sticky and thick
- **Increase mucociliary clearance.**

# Drugs for Cough

- Drugs that may alter mucociliary factors:
- **Ipecacuanha**(عرق الذهب) and **Squill**(بصل الفار): are natural products which have direct effects on CNS and locally to cause emesis which is preceded by increased secretions.

Emesis and cough share the same neural pathways

- **Volatile oils** (e.g., lemon, anise, pine), have direct action on bronchi.  
+ olive oil
- **Iodinated glycerol**: is excreted through bronchial glands and stimulates secretions directly. Widely used but have doubtful efficacy. Can cause congenital hypothyroidism, so contraindicated in pregnancy and during lactation.

- Drugs that may alter mucociliary factors:

- **Bromhexine:** increases **lysosome** activity leading to increased enzyme secretion and hydrolysis of mucopolysacharides.

- **Carbocisteine:** an aerosol, works through its SH group to reduce disulfide bonds in mucoproteins leading to enhancement of flow. May irritate the airways in some sensitive patients.

May lead to bronchoconstriction

- **Combination of H1-histamine antagonist and a decongestant.**

- **Ammonium chloride.**

- **Hydration: either orally or intravenously.**

As the dr said, fluids are effective

Cough treatments usually are mix of different drugs + over the counter but the drug differs if the cough is dry or productive

- Drugs that may alter mucociliary factors:

- Ipratropium bromide.
- Beta adrenergic agonists.
- Theophylline.
- Sodium chromoglycate.
- Beclomethasone.

***These drugs are discussed in the treatment of bronchial asthma.***

- **Drugs that may alter mucociliary factors. ✓**

- **Drugs acting on the afferent limb:**

- **Local anesthetics:**

- **Lidocaine, applied topically, has transient antitussive effect. Intravenously, could have a central effect.**

May cause spasms

- **Opioids:**

- **This is besides their primary central effect.**

Work in the brain, inhibit pain sensation everywhere in the body

Can cause addiction, used for Late stages patients

- **Drugs that may alter mucociliary factors.** ✓
- **Drugs acting on the afferent limb.** ✓
- **Drugs acting on the cough center:**
  - **Narcotics:**
    - **Codiene:** Is the standard, recently found no more effective than syrup vehicle. May have demulcent (ملطف) activity.
    - **Diamorphine.** Late stages patients
    - **Morphine.** patients
  - **Non narcotic:**
    - **Dextromethorphan.**
    - **Glaucine.**
    - **Diphenhydramine.**
    - **Pholcodine**

Used as suppressor of cough rather than pain killer

- Drugs that may alter mucociliary factors. ✓
- Drugs acting on the afferent limb. ✓
- Drugs acting on the cough center. ✓
- Drugs acting on the efferent limb: Anticholinergic , atropine like drug

Atropine which is the prototype of parasympatholytics failed to treat bronchial asthma as it causes dryness

- Ipratropium Bromide
  - Given as an aerosol. Locally
  - Effective for asthma, chronic bronchitis, and persistent cough following URTI.
  - Can also have effects on cough receptors by altering mucociliary factors

- Drugs that may alter mucociliary factors. ✓
- Drugs acting on the afferent limb. ✓
- Drugs acting on the cough center. ✓
- Drugs acting on the efferent limb. ✓
  
- **Drugs acting on the respiratory skeletal muscles:**
  - relaxation of respiratory skeletal muscles
  - **Nondepolarizing blockers like pancuronium.**
  - **May be considered in patients who can not be mechanically ventilated because of uncontrollable spasms of coughing.**



# Protussive Therapy

- **This treatment increases cough effectiveness with or without increasing cough frequency.**
- **They either increase superficial velocity or alter mucus factors.**
- **Indicated when cough performs a useful function, and needs to be encouraged( e.g. bronchiectasis, cystic fibrosis, pneumonia and postoperative atelectasis).**

Bronchiectasis: dilation of small bronchioles which cause infection (sputum, secretions)

# Protussive Therapy

We know Saline is salt and water mixture ( 0.9 %)

- Hypertonic(3%) Saline Aerosol:
  - Improves cough clearance but not pulmonary function or subjective assessment.
- Amiloride Aerosol:
  - For cystic fibrosis.
- Bronchodilators:
  - However, with too much relaxation, flow rates may actually decrease.

The caliber of bronchi should be suitable for expelling the exudate

# Protussive Therapy

- **Mechanical Measures:**

- **Positive insufflation followed by manual compression of the lower thorax and abdomen.**
- **Abdominal push manoeuvre to assist expiration.**
- **Combining abdominal binding and muscle training of the clavicular portion of pectoralis major.**
- **Combination of positive expiratory pressure and chest physiotherapy in patients with chronic bronchitis.**