



Anti-tussive, mucolytic and expectorant agents

DR T. N CHIDUMAYO MD, PHARMACOLOGY LECTURER,

Intended Learning Outcomes



Understand the characteristics of respiratory mucous hypersecretory conditions and cough.



List the drugs used for mucous hypersecretory condition, their mechanisms of action, and adverse effects.



Know the agents used to treat cough, their mechanisms of action, and adverse effects.

Mucolytics

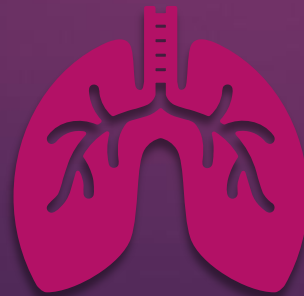
MUCOLYTICS

Thick secretions can be a problem in patients⁴ with obstructive lung disease.

Mucolytic agents loosen secretions.

Acetylcysteine: *Decrease hypersecretion and liquefy pulmonary secretions*

- Little evidence that inhaled acetylcysteine is more effective than adequate hydration for thinning or increasing the clearance of secretions.



Precautions or contraindications for mucolytics

Asthma or a history of bronchospasm.

- IV administration or inhalation may result in acute bronchospasm or anaphylaxis

Respiratory insufficiency, inadequate cough mechanism, or gag reflex depression.

- Liquefied pulmonary secretions can occlude the airway if the patient is unable to adequately clear the secretions.

EXPECTORANTS

Expectorants

Expectorant therapy increases the volume and decrease the viscosity of **bronchial secretions**.

- Secretions can be more easily cleared by the mucociliary system and by coughing

Guaifenesin is the only agent approved for use as an expectorant.

Offers little clinical benefit for patients with obstructive lung disease.

- **Adequate fluid intake required to be effective.**

Guaifenesin

Commonly combined in cough syrups for the symptomatic management of productive (**“wet”**) **coughs** associated with:

- Upper respiratory tract infections (bronchitis, pharyngitis, influenza, and measles or coughs provoked by sinusitis).

Commonly used in combination with the **cough suppressant, dextromethorphan.**

- To reduce dry cough, while loosening mucus in the respiratory tract to allow for productive cough.

Expectorants should not be used for self-medication for **persistent or chronic coughs such as those associated with smoking or COPD.**

- A persistent cough may be indicative of a serious condition. If cough persists for more than a week, is recurrent, or is accompanied by a fever, a consult a physician.

Side Effects of Guaifenesin

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- ▶ Side effects of the expectorants are few and not serious at recommended doses.
 - ▶ GIT: Nausea, vomiting and diarrhea.
 - ▶ CNS: Drowsiness, dizziness, and headache.

Precautions or Contraindications for Expectorants

Persistent or chronic cough

Some asthmatics are prone to bronchospasm

Cardiovascular disease and hypertension

Diabetes, glaucoma, hyperthyroidism

Prostatic hypertrophy, especially with combination products

Pregnancy or lactation

Antitussives

Antitussives/ cough suppressants

Cough is an important pulmonary defense mechanism assisting the clearance of secretions and debris from the lower respiratory tract.

Cough suppressants are indicated for patients with persistent, fatiguing, non-productive cough and pain (e.g., pleurisy and fractured ribs).

Opiate agonists (**dextromethorphan and hydrocodone**) are potent antitussive agents.

The mechanism of action is **direct suppression** of cough reflex at the **cough center of the medulla**.

Antitussives: Indications and Side Effects



Antitussive agents are used for **inflammatory, non-infectious tracheal and pulmonary diseases**.



During **invasive diagnostic techniques** such as endoscopic examination and bronchoalveolar lavage.



Opiate agonists may increase the viscosity of respiratory secretions and produce sedation and constipation.

Narcotic antitussives

Cough suppressants are divided into:

- Narcotic preparations: **codeine and hydrocodone**
- Non-narcotic preparations: **dextromethorphan**

Codeine: a narcotic antitussive, widely used as a cough suppressant with reduced incidence of side effects at antitussive doses compared to morphine.

Less respiratory depression and bronchial constriction.

Hydrocodone: narcotic cough suppressant, has slightly greater antitussive activity compared to codeine but is more sedating.

Recent change from DEA, hydrocodone is prescribed less frequently as an antitussive.

Non-narcotic antitussives

Dextromethorphan are used more frequently because they do not:

- Depress respirations
- Cause dependence
- less side effects at recommended doses.

Similar antitussive effect as codeine at the same dose.

Dextromethorphan should not be used in patients under the age of 4 because cough center in the brain not fully developed.



POM

Each 10ml Triphen
Dry Cough syrup contains:
Dextromethorphan
Hydrobromide BP 30mg

Preservative:

Sodium Benzoate BP 0.2%

Indications:

Triphen dry cough syrup is indicated for the symptomatic relief of non productive cough

Dosage and Directions for Use:**Adults:**

5ml every 6 hours

Children 6-12 years:

2.5-5ml every 6 hours

Children 1-6 years:

2.5ml every 8 hours

Or as directed by the Physician.

Do Not Exceed the Stated Dose.

Storage Conditions:

Store at room temperature below 30°C.
Protected from direct light, heat and moisture.

KEEP ALL MEDICINES OUT OF
REACH OF CHILDREN

Triphe

DRY COUG

• Alcohol Free • Sugar F

For Non
Productive Cough



Suitable for ages 1 and older 100

Benzonatate & Diphenhydramine

Benzonatate (Tessalon) is chemically related to the local anesthetic tetracaine.

- Acts centrally like the other antitussives.
- Suppresses cough peripherally by anesthetizing receptors in the alveoli of the lungs, bronchi, and pleura.

Diphenhydramine (Benadryl), is a first-generation antihistamine, used as a cough suppressant.

- Patients experiencing a cough associated with the common cold or postnasal drip use a first-generation antihistamine and a decongestant to treat cough.

Side Effects of Antitussives



RESPIRATORY
DEPRESSION
(LARGE DOSES OR
EXCESSIVE USE)



CONSTIPATION



SEDATION AND
DIZZINESS



NAUSEA AND
VOMITING



URINARY
RETENTION WITH
NARCOTIC
ANTITUSSIVES

Precautions or contraindications of antitussives

- I. Addiction-prone patients (narcotic antitussives).
- II. Chronic obstructive airway disease (COPD).
- III. Concurrent use with other CNS depressants.
- IV. Use of cough suppressants in coughs associated with upper respiratory infection (URI) are not recommend, due to limited efficacy.
- V. Caution for antitussives in children.



Antitussives

GENERIC NAME	TRADE NAME	DOSAGE	COMMENTS
Narcotic			
codeine with guaifenesin	Cheratussin AC	Syrup 10–20 mg q4–6h	Antitussive dose is lower than that required for analgesia. Any cough medicine containing a controlled substance is not for extended use; can develop physical dependence and tolerance; watch for side effects
with promethazine	(Phenergan) ^a with codeine		
hydrocodone with homatropine ^b	Hydromet	Syrup or tabs 5 mg q4–6 h	
with chlorpheniramine	Tussionex	ER Susp, 5 mL q12h	
Non-narcotic			
benzonatate	Tessalon	Caps 100–200 mg TID	Related to tetracaine; swallow caps whole
dextromethorphan	Delsym	ER susp, 10 mL (60 mg) q12h	Note interactions
with guaifenesin	Robitussin DM	Sol 10–20 mg q4h or Sol 30 mg q6–8h	
	Mucinex DM	Tab (200-400/10-20mg) 1 to 2 taken BID	Extended release, do not crush or chew
diphenhydramine	Benadryl	Caps, liquid 25 mg q4–6h	Antihistamine with anticholinergic effects, especially drying

a. This brand name is no longer marketed, but the name is still commonly used.

b. An anticholinergic agent is added in subtherapeutic amounts to some hydrocodone products to discourage deliberate overdose.

Scenario

An 18-year-old MED4 student has a dry cough for 2 days, with no fever, but slight headache whenever he coughs. He buys an OTC cough mixture to stop (suppress) the cough and allow him to sleep at night. (15 Marks)

- Why do we cough? (2 Mark)
- Name two side effects expected from most cough suppressants? (2 Marks)
- What is the most effective medication for suppression of coughs? (2 Marks)
- What oral gel capsule is used for cough suppression? What is the mode of action? (3 Marks).

The student notices some white sputum after 2 days of treatment. His friend in MED 7 tells him to get a mucolytic or expectorant cough mixture.

- What is a mucolytic, and its indication? (3 Marks)
- What is an expectorant, and its indication? (3 Marks)