DRUG TREATMENT OF COUGH

I. CRITICAL DECISION: SHOULD THE COUGH BE SUPPRESSED?

Before selecting a pharmacological agent, the primary clinical objective must be determined.

A. Useful (Productive) Cough

- **Definition:** Helps clear mucus, pus, or secretions from the airways.
- **Examples:** Bronchitis with sputum, pneumonia, cystic fibrosis.
- **Management Goal:** Do **NOT** suppress. **Improve clearance** and facilitate expectoration.

B. Useless (Unproductive) Cough

- **Definition:** Dry, irritating, and exhausting; does not clear secretions.
- **Examples:** Post-viral irritation, night cough disturbing sleep.
- **Management Goal: Suppression** is appropriate to reduce patient distress and exhaustion.

II. SITES OF PHARMACOLOGICAL INTERVENTION

Drugs are classified based on where they interrupt the cough reflex:

1. **Afferent Side (Sensory):** Reducing triggers in the airway.
2. **Efferent Side (Secretions):** Modifying the quality or volume of mucus.
3. **Central Nervous System:** Suppressing the medullary cough center.

III. MANAGEMENT OF PRODUCTIVE COUGH (PROMOTING CLEARANCE)

A. Mucolytics (Reducing Viscosity)

Used when sputum is thick, sticky, and difficult to expel.

- **Bromhexine: Depolymerizes mucopolysaccharide fibers** to thin the mucus.
- **Acetylcysteine / Carbocysteine / Mecysteine:** Contains sulfhydryl (–SH) groups that **break disulfide bonds in mucus**.
- **Clinical Notes:** Best administered via **inhalation/nebulization**; requires **adequate hydration to be effective.**

B. Dornase Alfa (Specialized Agent)

- **Indication:** Exclusively for **Cystic Fibrosis**.
- **Mechanism:** A **recombinant DNase** that degrades DNA released from lysed inflammatory cells, which causes the extreme thickness of CF sputum.

C. Expectorants (Increasing Volume)

- **Agents: Guaifenesin**, **mentholated water vapor**.
- **Mechanism: Increases the volume and reduces the adhesiveness of bronchial secretions.**
- **Clinical Note: Clinical efficacy of guaifenesin is often debated**; its primary side effects include **nausea, vomiting** and **headaches**.

IV. MANAGEMENT OF DRY COUGH (SUPPRESSION)

A. Peripheral Suppression: Demulcents

Used for upper airway irritation (throat tickle).

- **Lozenges / Syrups / Linctus (Licorice and Methylcellulose):** Coat the pharyngeal mucosa **above the larynx.**
- **Warm Water Vapor Inhalation:** Useful for irritation arising **below the larynx.**

- **Menthol and Eucalyptus:** Provides a **mild local anesthetic effect** on sensory receptors.

B. Central Suppression: True Antitussives

Contraindications: Never use in productive cough, **bronchial asthma**, or **suppurative lung diseases**.

1. Opioid Antitussives (e.g., Codeine)

- **Mechanism: Suppresses the medullary cough center** at **doses lower than those required for analgesia** (**15mg** vs **60mg**).
- Part of its antitussive effect is due to **Sedation.**
- **Adverse Effects: Sputum retention due to inhibiting ciliary activity**, **constipation**.

2. Non-Opioid Antitussives (e.g., Dextromethorphan)

- **Clinical Status: The preferred agent for dry cough.**
- **Advantages: Non-narcotic, non-addictive, non-analgesic, non-constipating and does not inhibit mucociliary clearance.**
- **Efficacy: Equivalent to codeine with fewer side effects.**

C. Antihistamines (H1 Blockers)

- **Example: Diphenhydramine.**
- **Use Case: Night cough** or **cough secondary to allergic rhinitis**.
- **Precaution:** Causes **significant sedation**; use with children **at night only**.

V. FINAL CLINICAL ALGORITHM

- **Step 1: Is the cough productive?**
  - **YES:** Use **mucolytics**, **expectorants**, and **maintain high hydration**.
  - **NO:** Proceed to Step 2.
- **Step 2: Is the irritation localized to the throat/upper airway?**
  - **YES:** Use demulcents (lozenges or steam).
  - **NO:** Proceed to Step 3.
- **Step 3: Is the cough severe, dry, and distressing?**
  - **YES:** Use Central Antitussives (Dextromethorphan preferred; Codeine for severe cases).