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## OVER THE COUNTER DRUGS

SUNALI MEHTA

Over the counter Drugs : drugs that may be bought without a doc prescription.

Covered include: cough suppressants, pain relievers, drugs for the GI tract.

Names of the drugs to know are:

Pseudoephedrine

Atropine

Diphenylhydrazine ( Benadryl)

Promethazine (Phenergan)

Disprin

Asprin

Codine

Immodium

Paracetamol (Panadol, panamol)

Diastop

Gaviscon

Mylanta.

These include: Cough suppressants (antitussive agents) , decongestants, expectorants and antihistamines. Analgesics, antipyretics, anti-inflammatory drugs. Antacids, laxatives and anti – diarrhoeal drugs. Vitamin and mineral supplements and herbal remedies.

Imp issues concerning OTC drugs:

1. Inappropriate use
2. Overuse
3. concerns about adverse effects
4. Concerns during pregnancy
5. lack of appreciation of drug interactions.

## OTC drugs for the Upper respiratory tract illness

In the case of respiratory illness the causative agents precipitate a local inflammatory response which primarily involve the mucosal and the submucosal layers of the tract wall. Chemical mediators like histamines and prostaglandins are released from the mucosal wall and they stimulate vasodilation and increased permeability of local blood vessels which leads to the first stage of inflammation. Histamine also leads to the production of viscous mucus from the mucosal cells. This leads to a runny nose and nasal congestion and red and dry throat which are the characteristics of the UTR conditions.

Combinations of Expectorants, decongestants, analgesics , antihistamines and cough suppressants that are used to treat conditions like cold, flu and allergy. These may even contain some vitamins, plant extract or some herbal oil to provide symptomatic relief.

### Antitussive agents (Cough Suppressants)

Coughing is a reflex response caused due to the irritation of the bronchial mucosa layer. It is a reflex action to clear the excessive mucosa and other secretions. Afferent fibres from the mucosal cells terminate in the medulla, where they synapse with the efferent fibers of the respiratory muscle.

Mechanism of action: The action of the CS is to interrupt the tussive reflex. Most of the drugs act centrally at the level of the medulla and some act peripherally by impeding afferent transmission.

These drugs do not completely stop coughing since accumulation of the mucus in the lungs can lead to the collapse of the lungs. They reduce the frequency and severity of coughing when it is non – productive.

Drugs used : Narcotics agents and their derivatives e.g. Codeine ( pholcodine and dihydrocodine) and morphine dextromethorphan. These act centrally. Dextro and phol do not have analgesic properties.

Common Adverse effects are due to the narcotic action: potent emetics. CNS depressants leading to drowsiness and sedation.

### Expectorants:

Mechanism of action: these are used to stimulate mucus production in the dry irritated areas of the respiratory tract leading to unproductive cough. They may also help in reducing the viscosity of the mucus.

1. Liquorice or plant extract: They are irritants of the gastric mucosa and they stimulate the afferent fibers of the vagus nerve to the medulla. This results in increased parasympathetic stimulation of the efferent fiber of the vagus nerve back to the stomach. Vagal stimulation to the lungs increases and leads to the production of mucus.
2. Volatile oils: They stimulate the bronchial glands directly.
3. Salts of ammonium and potassium iodide : are excreted by the bronchial mucosal glands and hence they stimulate mucus production.

Common adverse reactions: relatively free of adverse reactions. Since some are gastric irritants nausea and vomiting may occur. Other reactions are rash, diarrhea, headache and dizziness.

### Mucolytic agents

Mechanism of action: they alter the structure of the viscous mucus and in doing so they enhance the flow of mucus out of the respiratory tract. E.g. Bromohexine and acetylcysteine.

No Adverse effect though sometime bromohexine may cause some GI disturbances.

Acetylcysteine is also available as a aerosol and can be used in cystic fibrosis.

Another mucolytic agent is Dornase alfa (Pulmozyme) and this is used in cystic fibrosis. In this disease the sputum of the patient is thick and contains decaying inflammatory cells particularly neutrophils. As the sputum accumulates it becomes difficult to clear. The dornase alfa is a recombinant human deoxynuclease which is an enzyme that breaks down the DNA of the decaying neutrophils making it easier for the sputum to be cleared.

Adverse reaction : pharyngitis and a hoarse voice.

### Decongestants:

Nasal congestion and a runny nose are the first stage of inflammation, vasodilation, increased permeability of the capillaries.

Mechanism of action: The most effective way is to cause vasoconstriction and this can be achieved by the stimulation of the  $\alpha$  receptors affiliated with the nasal vasculature and these decongestants are called alpha receptor agonists. These include pseudoephedrine and phenylephrine.

Ephedrine can also be used as a decongestant but it does not directly stimulate the alpha receptors whereas it acts indirectly by increasing the production of noradrenaline from the presynaptic terminal which leads to stimulate the alpha adrenoreceptors on the nasal vasculature.

Adverse reactions: since this will stimulate the alpha receptors right around the body it will lead to pupil dilation, constipation and hypertension. Some have CNS activity like pseudoephedrine, ephedrine and xylometazoline which may lead to restlessness, insomnia, agitation and elevated moods.

These should not be used with patients having a cardiovascular conditions and also in combination with some of the antidepressants.

Nasal congestion re – emerges: the rebound dilation of the nasal vasculature by the alpha2 receptor. When alpha2 receptors are activated the noradrenaline released from the sympathetic postganglionic fibre is inhibited. This is because the action of alpha agonists is not limited to the alpha1 receptor.

Antimuscarinic agents: Mucus production in the respiratory tract is mediated by the activation of the parasympathetic muscarinic receptors.

Mechanism of action: antimuscarinic agents block these receptors, drying up the excessive mucus. E.g. atropine and hyoscine.

Common adverse reaction: dry mouth, facial flushing, tachycardia, pupil dilation and constipation.

#### Antihistamines:

Basically used in the treatment of skin allergy, or as antiemetics and as a paediatric sedative. Its use as an OTC drug for the treatment of respiratory illness is extremely overated and can have debilitating side effects.

Mechanism of action: The rupture of mast cells releases chemicals such as histamine which underlies many respiratory illnesses. They are ineffective in controlling the pathophysiological changes resulting from this event since histamine is not the only chemical that is released from the mast cells. This drug provides a little symptomatic relief. But better is the use of sympathomimetics which relax the brochial smooth muscle and reduce oedema. The antihistamines reduce the secretion of excessive mucus due to their secondary antimuscarinic action.

Adverse reactions: sedation. Uncoordination, lack of concentration and lassitude. Central and peripheral antimuscarinic action such as blurred vision, constipation and urinary retention.

#### Analgesics and antipyretics:

Asprin, salicylates, paracetamol are the common analgesics and also help in reducing fever

Mechanism of action: narcotics induce their effect by stimulating the central opiate receptors.

Non – narcotics by inhibiting the synthesis of prostaglandins.

Benzydamine has the properties like antipyretics, analgesics and anti – inflammatory and it is like the other NSAIDS but it is basic in nature and hence does not damage the gastric mucosa. It also has some local anesthetic properties.

#### Other agents:

Vitamin C : thought to stimulate the immune system