Drugs for Disorders of the Respiratory System

Part 2

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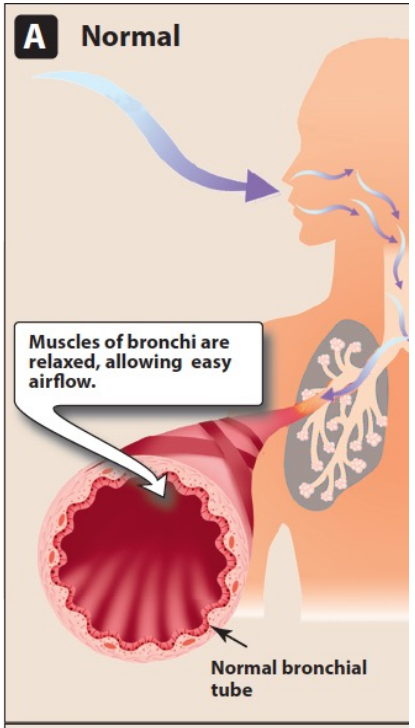

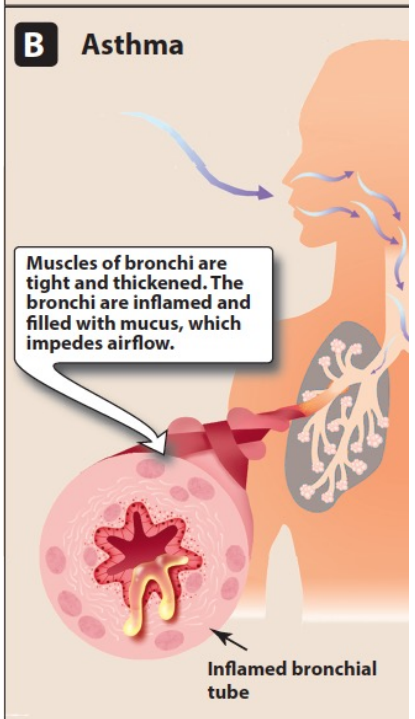

Chronic Obstructive Pulmonary Disease (COPD)

- COPD is a chronic, irreversible obstruction of airflow that is usually progressive.

- Symptoms include cough, excess mucus production, chest tightness, breathlessness, difficulty sleeping, and fatigue.

- Although symptoms are similar to asthma, the characteristic irreversible airflow obstruction of COPD is one of the most significant differences between the diseases.

- Smoking is the greatest risk factor for COPD and is directly linked to the progressive decline of lung function as demonstrated by forced expiratory volume in one second (FEV1).

- Smoking cessation and/or continued avoidance should be recommended regardless of stage/severity of COPD and age of patient.

- Drug therapy for COPD is aimed at relief of symptoms and prevention of disease progression. Unfortunately, with currently available care, many patients still experience declining lung function over time.

A. Bronchodilators

- Inhaled bronchodilators, including the β2-adrenergic agonists and anticholinergic agents (***ipratropium and tiotropium***), are the foundation of therapy for COPD.

- These drugs increase airflow, alleviate symptoms, and decrease exacerbation rates.

- **The long-acting agents, LABAs and tiotropium**, are preferred as first-line treatment of COPD for all patients except those who are at low risk with less symptoms.

- Combination of both an anticholinergic and a β2 agonist may be helpful in patients who have inadequate response to a single inhaled bronchodilator.

PATIENT GROUP	RECOMMENDED FIRST CHOICE	ALTERNATIVE CHOICE
A Low risk Less symptoms	Short-acting anticholinergic when necessary or Short-acting β_2 agonist when necessary	Long-acting anticholinergic or Long-acting β_2 agonist or Short-acting β_2 agonist and short-acting anticholinergic
B Low risk More symptoms	Long-acting anticholinergic or Long-acting β_2 agonist	Long-acting anticholinergic and long-acting β_2 agonist
C High risk Less symptoms	Inhaled corticosteroid + long-acting β_2 agonist or Long-acting anticholinergic	Long-acting anticholinergic and long-acting β_2 agonist or Long-acting anticholinergic and PDE-4 inhibitor or Long-acting β_2 agonist and PDE-4 inhibitor
D High risk More symptoms	ICS + long-acting β_2 agonist and/or Long-acting anticholinergic	ICS + long-acting β_2 agonist and long-acting anticholinergic or ICS + long-acting β_2 agonist and PDE-4 inhibitor or Long-acting anticholinergic and long-acting β_2 agonist or Long-acting anticholinergic and PDE-4 inhibitor

B. Corticosteroids

- The addition of an ICS to a long-acting bronchodilator may improve symptoms, lung function and quality of life in COPD patients with FEV1 of less than 60% predicted. However, the use of an ICS is associated with an increased risk of pneumonia, and therefore, use should be restricted to these patients.

- Although often used for acute exacerbations, oral corticosteroids are not recommended for long-term treatment.

C. Other agents

- ***Roflumilast*** is an oral phosphodiesterase-4 inhibitor used to reduce exacerbations in patients with severe chronic bronchitis.

- Although its activity is not well defined in COPD, it is theorized to reduce inflammation by increasing levels of intracellular cAMP in lung cells.

- Roflumilast is not a bronchodilator and is not indicated for the relief of acute bronchospasm.

Allergic Rhinitis

- Rhinitis is an inflammation of the mucous membranes of the nose and is characterized by sneezing, itchy nose/eyes, watery rhinorrhea, nasal congestion, and sometimes, a nonproductive cough.

- An attack may be precipitated by inhalation of an allergen (such as dust, pollen, or animal dander).

- The foreign material interacts with mast cells coated with IgE generated in response to a previous allergen exposure. The mast cells release mediators, such as histamine, leukotrienes, and chemotactic factors that promote bronchiolar spasm and mucosal thickening from edema and cellular infiltration.

- Antihistamines and/or intranasal corticosteroids are preferred therapies for allergic rhinitis.

A. Antihistamines (H1-receptor blockers)

- Antihistamines are useful for the management of symptoms of allergic rhinitis caused by histamine release (sneezing, watery rhinorrhea, itchy eyes/nose).

- They are more effective for prevention of symptoms, rather than treatment once symptoms have begun.

- Ophthalmic and nasal antihistamine delivery devices are available for more targeted tissue delivery.

- First-generation antihistamines, such as diphenhydramine and chlorpheniramine, are usually not preferred due to adverse effects, such as sedation, performance impairment, and other anticholinergic effects.

- The second-generation antihistamines (for example, ***fexofenadine, loratadine, desloratadine, cetirizine, and intranasal azelastine***) are generally better tolerated.

- Combinations of antihistamines with decongestants are effective when congestion is a feature of rhinitis.

B. Corticosteroids

- Intranasal corticosteroids, such as ***beclomethasone, budesonide, fluticasone, ciclesonide, mometasone, and triamcinolone***, are the most effective medications for treatment of allergic rhinitis.

- They improve sneezing, itching, rhinorrhea, and nasal congestion.

- Systemic absorption is minimal, and side effects of intranasal corticosteroid treatment are localized.

- To avoid systemic absorption, patients should be instructed not to inhale deeply while administering these drugs because the target tissue is the nose, not the lungs or the throat.

- For patients with chronic rhinitis, improvement may not be seen until 1 to 2 weeks after starting therapy.

C. α-Adrenergic agonists

- Short-acting α-adrenergic agonists ("nasal decongestants"), such as ***phenylephrine***, constrict dilated arterioles in the nasal mucosa and reduce airway resistance.

- Longer-acting ***oxymetazoline*** is also available. When administered as an aerosol, these drugs have a rapid onset of action and show few systemic effects.

- The α-adrenergic agonist intranasal formulations should be used no longer than 3 days due to the risk of rebound nasal congestion (rhinitis medicamentosa). For this reason, the α-adrenergic agents have no place in the long-term treatment of allergic rhinitis.

- Administration of oral α-adrenergic agonist formulations results in a longer duration of action but also increased systemic effects.

D. Other agents

- Intranasal ***cromolyn*** may be useful in allergic rhinitis, particularly when administered before contact with an allergen.

- To optimize the therapeutic effect, dosing should begin at least 1 to 2 weeks prior to allergen exposure.

- A nonprescription (over-the-counter) nasal formulation of cromolyn is available.

- Although potentially inferior to other treatments, some ***Leukotriene modifiers (LT) antagonists*** are effective for allergic rhinitis as monotherapy or in combination with other agents. They may be a reasonable option in patients who also have asthma.

- An intranasal formulation of ***ipratropium*** is available to treat rhinorrhea associated with allergic rhinitis or the common cold. It does not relieve sneezing or nasal congestion.

Cough

- Coughing is an important defense mechanism of the respiratory system to irritants and is a common reason for patients to seek medical care.

- A troublesome cough may represent several etiologies, such as the common cold, sinusitis, and/or an underlying chronic respiratory disease.

- In some cases, cough may be an effective defense reflex against an underlying bacterial infection and should not be suppressed.

- Before treating cough, identification of its cause is important to ensure that antitussive treatment is appropriate.

- The priority should always be to treat the underlying cause of cough when possible.

Opioids

- ***Codeine***, an opioid, decreases the sensitivity of cough centers in the central nervous system to peripheral stimuli and decreases mucosal secretion.

- These therapeutic effects occur at doses lower than those required for analgesia. However, common side effects, such as constipation, dysphoria, and fatigue, still occur. In addition, it has addictive potential.

- ***Dextromethorphan*** is a synthetic derivative of morphine that has no analgesic effects in antitussive doses.

- In low doses, it has a low addictive profile. However, it is a potential drug of abuse, since it may cause dysphoria at high doses.

- Dextromethorphan has a significantly safer side effect profile than codeine and is equally effective for cough suppression.

- ***Guaifenesin***, an expectorant, is available as a single-ingredient formulation and is also a common ingredient in combination products with codeine or dextromethorphan.


Thank You!