

Chapter– 3.2 ASTHMA

Topic: ASTHMA

3.1

Introduction

Asthma is a chronic respiratory condition characterized by reversible airflow obstruction, airway inflammation, and bronchial hyper responsiveness.

Etiopathogenesis: Asthma is a complex condition with multifactorial etiology, involving genetic predisposition and environmental factors.

Common triggers include allergens (e.g., pollen, dust mites, animal dander), respiratory infections, air pollutants, tobacco smoke, occupational exposures, and exercise.

The underlying pathophysiology of asthma involves inflammation of the airways, bronchospasm, mucus hypersecretion, and airway remodeling.

3.2

Types

Asthma can be classified into several subtypes based on various factors, including age of onset, clinical presentation, and triggers. Common types include:

- 1. Allergic asthma:** Triggered by exposure to allergens such as pollen, dust mites, or animal dander.
- 2. Non-allergic asthma:** Triggered by factors other than allergens, such as respiratory infections, exercise, cold air, or irritants.
- 3. Occupational asthma:** Caused by exposure to workplace irritants or allergens.
- 4. Exercise-induced broncho constriction (EIB):** Asthma symptoms triggered by physical activity.
- 5. Aspirin-exacerbated respiratory disease (AERD):** Asthma exacerbated by ingestion of aspirin or other nonsteroidal anti-inflammatory drugs (NSAIDs).

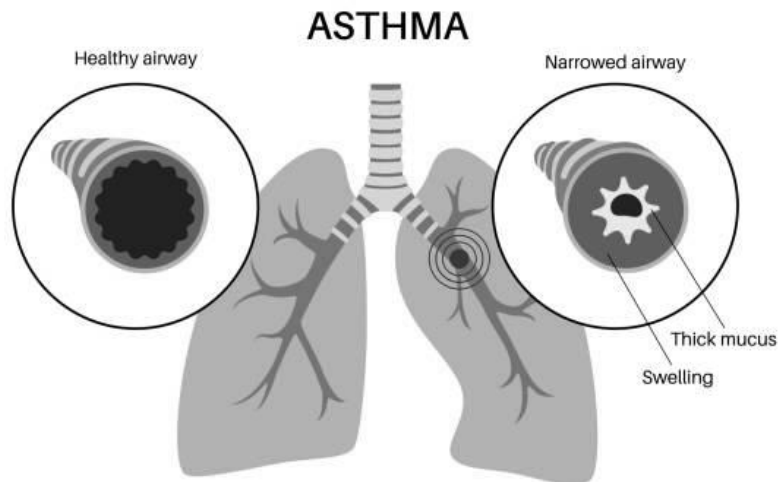


Fig 3.2 Asthmatic Airway

3.3

Symptoms

Common symptoms of asthma include:

- Wheezing (high-pitched whistling sound during breathing)
- Shortness of breath (dyspnea)
- Increased mucus production
- Chest tightness or discomfort
- Coughing, especially at night or early morning
- Difficulty breathing during physical activity or exercise
- Symptoms worsened by triggers such as allergens, respiratory infections, or exposure to irritants

3.4

Diagnostic Test

Diagnostic modalities include:

- Medical history and physical examination are necessary to evaluate symptoms, triggers, and risk factors.
- Spirometry used to measure lung function and assesses airflow limitation (e.g., reduced FEV₁/FVC ratio).
- Peak expiratory flow (PEF) measurement used to monitor variability in airflow obstruction.

- Broncho provocation tests used to assess bronchial hyper responsiveness to methacholine or exercise.
- Allergy testing, identifies specific allergens triggering asthma symptoms.
- Chest X-ray or CT scan to evaluate for other respiratory conditions or complications.

Management

3.5

The management of Asthma involves:

A. Pharmacological Management: Pharmacological treatment of asthma aims to control symptoms, prevent exacerbations, and improve lung function. Common medications used in the management of asthma include:

1. Short-acting Beta2-agonists (SABAs): e.g. Albuterol (salbutamol), Levalbuterol; act quickly to relieve acute bronchoconstriction by relaxing the muscles around the airways, providing rapid relief of symptoms such as wheezing, coughing, and shortness of breath.

2. Long-acting Beta2-agonists (LABAs): e.g. Salmeterol, Formoterol; provide sustained bronchodilation over 12-24 hours and are used for long-term control of asthma symptoms. They are often used in combination with inhaled corticosteroids (ICS) as maintenance therapy in patients with persistent asthma.

3. Inhaled Corticosteroids (ICS): e.g. Fluticasone, Budesonide, Beclomethasone; most effective anti-inflammatory medications for asthma and work by reducing airway inflammation and mucus production.

4. Combination Inhalers (LABA/ICS combinations): e.g. Fluticasone/Salmeterol, Budesonide/Formoterol; provide both bronchodilation and anti-inflammatory effects in a single device, simplifying treatment regimens and improving adherence. They are used for long-term maintenance therapy in patients with moderate to severe asthma.

5. Leukotriene Receptor Antagonists (LTRAs): e.g. Montelukast, Zafirlukast; block the action of leukotrienes, which are inflammatory mediators involved in the pathogenesis of asthma. They are used as add-on therapy.

6. Mast Cell Stabilizers: e.g. Cromolyn sodium, Nedocromil; inhibit the release of inflammatory mediators from mast cells, thereby preventing bronchoconstriction and reducing airway inflammation.

7. Systemic Corticosteroids: e.g. Prednisone, Prednisolone; reserved for severe exacerbations of asthma that do not respond to other treatments. They work by reducing airway inflammation and improving lung function but are associated with significant side effects and

are used for short courses only.

B. Non-Pharmacological Management: Non-pharmacological interventions play a crucial role in the management of asthma and may include:

- Avoidance of triggers: Identification and avoidance of allergens, irritants, or other triggers that exacerbate asthma symptoms.
- Smoking cessation: Avoidance of tobacco smoke exposure, as smoking can worsen asthma symptoms and decrease the effectiveness of treatment.
- Allergen immunotherapy: Desensitization therapy for individuals with allergic asthma.
- Education and self-management: Patient education on asthma triggers, medications, inhaler techniques, and action plans for managing exacerbations.

3.6

Complications

Complications of asthma may include:

- Severe exacerbations requiring hospitalization or emergency care
- Respiratory failure
- Pneumonia or other respiratory infections
- Bronchiectasis (irreversible dilation of the bronchi)
- Status asthmaticus (severe, life-threatening asthma exacerbation unresponsive to standard treatment)