

Asthma

Biomedical Engineering - URJC

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Asthma Overview

Key concepts on **asthma**:

- 1 Chronic lung disease affecting all age groups.
- 2 Most common among children.
- 3 Caused by inflammation and airway muscle tightening.
- 4 Symptoms: cough, wheeze, shortness of breath, chest tightness.
- 5 Inhaled medication and trigger avoidance for management.

Asthma Introduction

Definition of asthma

- Chronic inflammatory airway disease.
- **Reversible, intermittent** airway obstruction.
- Hyper-reactivity and recurrent episodes of symptoms.

Etiology of Asthma

Pathophysiology

Asthma comprises a range of heterogeneous phenotypes. Factors that influence the risk of asthma can be divided into those that **cause the development** of asthma and those that **trigger** asthma symptoms

Development of asthma:

- Complex, multifactorial pathology.
- Genetic predisposition and atopy.
- Environmental exposure: tobacco smoke, allergens.

Triggers for Asthma

Some **triggers** of asthma:

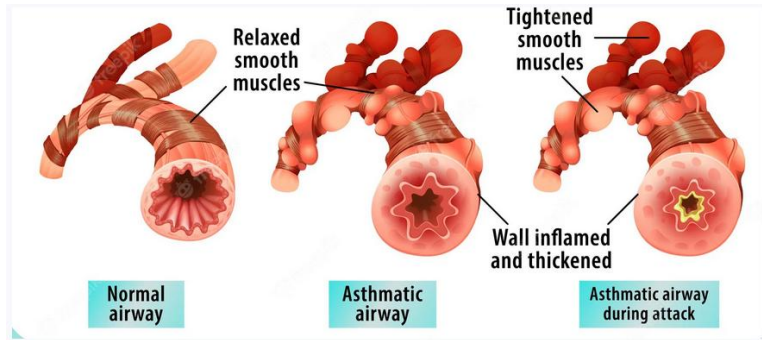
- Viral infections, exercise, esophagic reflux, sinusitis, allergens, cold air.
- Aspirin, beta-blockers, tobacco smoke, environmental factors.

Pathophysiology of Asthma

What happens in an asthmatic bronchi

- Acute, **reversible** airway inflammation.
- Inflammatory cell infiltration, mucus hypersecretion, smooth muscle contraction.
- Physiological effects most pronounced in medium-sized bronchi.
- Reversible changes may become irreversible over time.
- Airway remodeling and chronic disease progression.

Pathophysiology of Asthma



Clinical Manifestations

What happens to an asthmatic patients?

- Wheeze, cough, chest tightness, breathlessness (dyspnea).
- Variable symptoms, diurnal variation.
- Exacerbated by allergies, exercise, cold.
- Nocturnal coughing spells, potential chest pain.

Pathophysiology of Asthma

ASTHMA SYMPTOMS



wheezing



cough



shortness
of breath



tachycardia



difficulty
breathing



pale and
wet skin



dyspnea



chest
tightness

Physical Exam

Some signs on physical examn

- Acute exacerbation signs: tremor, tachycardia, respiratory distress.
- Bilateral **expiratory wheeze** on auscultation.

Diagnosis of Asthma

Consideration (and suspicion) of asthma:

- Consider in patients with characteristic symptoms.
- Nocturnal symptoms, different triggers, atopy history.
- Respiratory function tests and diagnostic methods.

Diagnostic Tests

Some useful diagnostic tests:

- 1 Peak flow measures, spirometry, methacholine/histamine challenge.
- 2 Exercise spirometry for exercise-induced bronchoconstriction.

Medical Management

Usually asthma responses quite well to bronchodilators. Do not subestiniate the importance of proper diagnosis for effective treatment.

2 types of therapeutic drugs

- 1 Bronchodilators (beta-2 agonists, muscarinic antagonists).
- 2 Anti-inflammatories (inhaled steroids).

Pathophysiology of Asthma

