

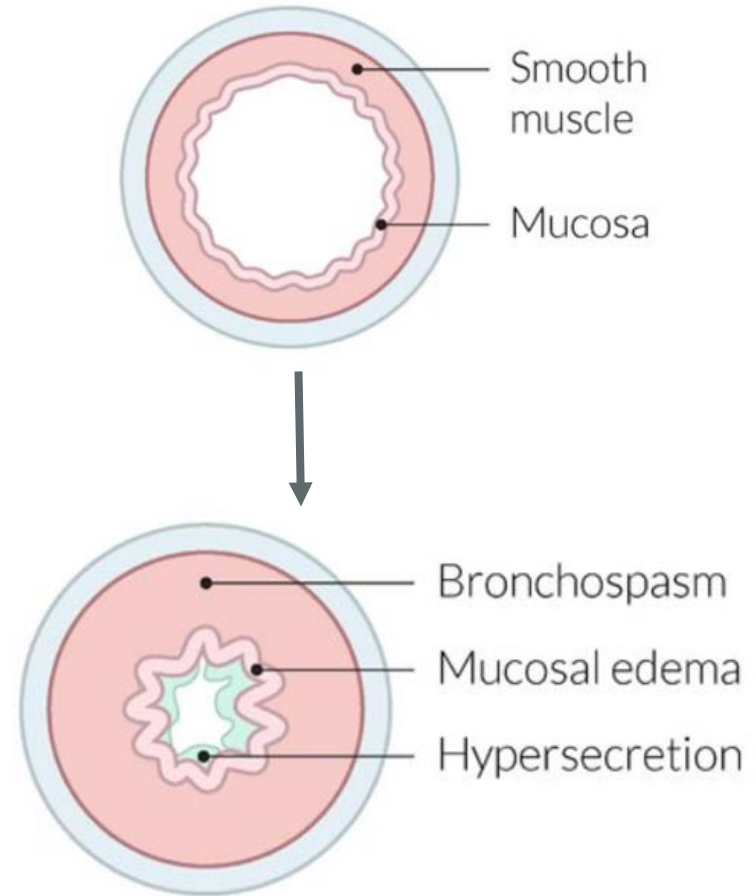
Asthma

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Pathophysiology

Airway inflammation

- Mast cell activation by an “allergen”
- Large Th2 type T cell responses
- IgE antibodies are made and secreted by plasma cells
- IgE binds high-affinity receptors on mast cells
- Degranulation and mediator release occurs
- Chronic inflammation causes permanent changes

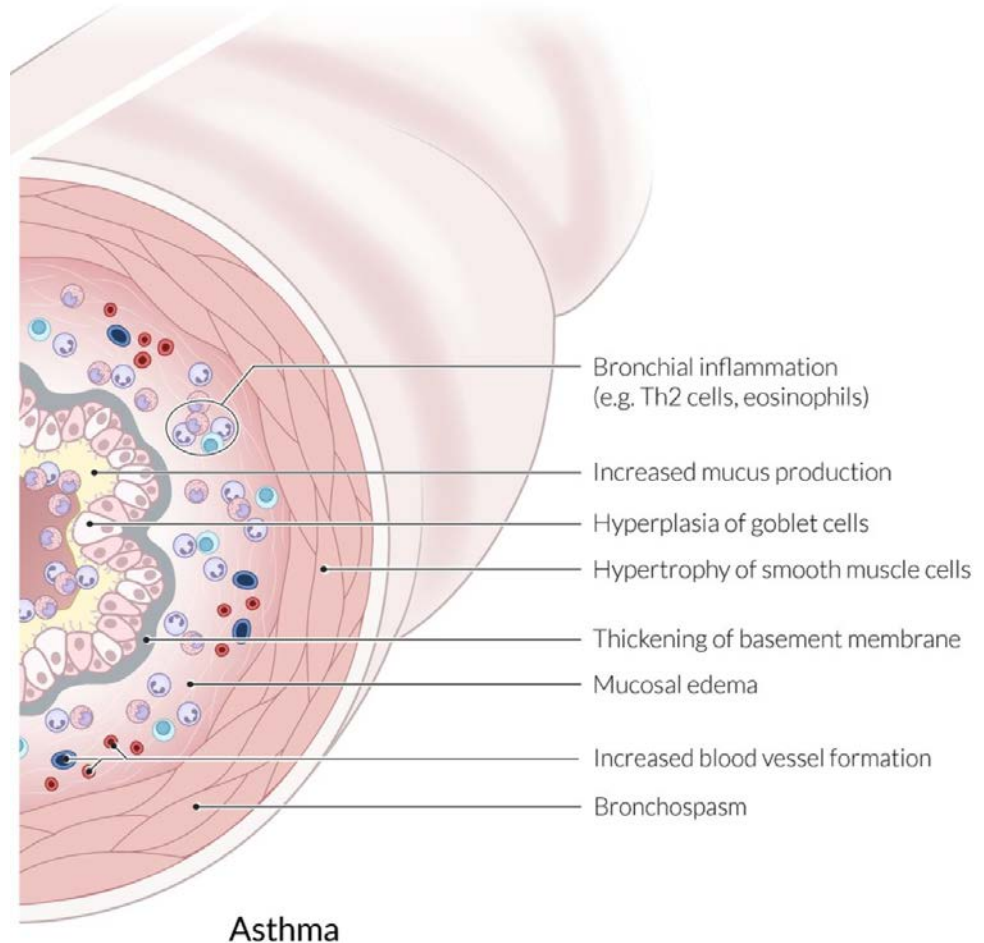


Bronchoconstriction

- Allergen exposure: bronchial smooth muscle contraction
- IgE-dependent release of mast cell mediators (histamine, leukotrienes, prostaglandins)
 - Directly contact airway smooth muscle
- Other factors:
 - Cold air
 - Exercise
 - Irritants (second hand smoke exposure)

Airway remodeling

- Structural changes in the airway
 - Irreversible airflow limitation
- Histopathology:
 - Loss/damage of pseudostratified airway epithelium
 - Increased mucus-producing goblet cells
 - Fibrotic thickening of reticular basement membrane
- Results:
 - Bronchial wall thickening



Diagnosis

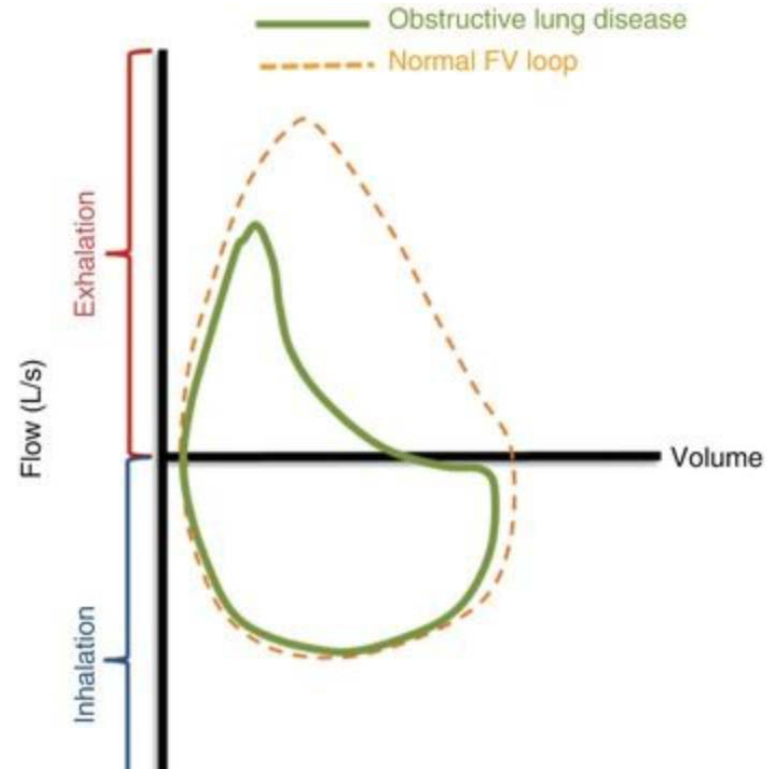
History

- Episodic symptoms of airflow obstruction
 - Wheezing
 - Difficulty breathing
 - Chest tightness
 - Cough (worse at night)
- Personal history
 - Allergies
 - Eczema
- Family history
 - Asthma
 - Allergies
 - Eczema






Lung function tests (spirometry)

- Showing reversible airflow obstruction
- FEV1/FVC ratio is reduced (less than the lower limit of normal)
- FEV1 increases by 12% from baseline after bronchodilator use



Classification

Components of Severity		Classification of Asthma Severity (Youths ≥12 years of age and adults)			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment Normal FEV ₁ /FVC: 8–19 yr 85% 20–39 yr 80% 40–59 yr 75% 60–80 yr 70%	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3–4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting beta ₂ -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not >1x/day	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	<ul style="list-style-type: none">• Normal FEV₁ between exacerbations• FEV₁ >80% predicted• FEV₁/FVC normal	<ul style="list-style-type: none">• FEV₁ ≥80% predicted• FEV₁/FVC normal	<ul style="list-style-type: none">• FEV₁ >60% but <80% predicted• FEV₁/FVC reduced 5%	<ul style="list-style-type: none">• FEV₁ <60% predicted• FEV₁/FVC reduced >5%
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year (see note)	≥2/year (see note) 		
		 Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. 			
		Relative annual risk of exacerbations may be related to FEV ₁			

Treatment

**Intermittent
asthma**

Persistent asthma: daily medication

Consult with asthma specialist if step 4 care or higher is required.
Consider consultation at step 3.

Step 1

Preferred:
SABA PRN

Step 2

Preferred:
Low-dose ICS

Alternative:
Cromolyn,
LTRA,
Nedocromil,
or
Theophylline

Step 3

Preferred:
Low-dose
ICS + LABA
OR
Medium-dose
ICS

Alternative:
Low-dose
ICS + either
LTRA,
Theophylline,
or Zileuton

Step 4

Preferred:
Medium-dose
ICS + LABA

Alternative:
Medium-dose
ICS + either
LTRA,
Theophylline,
or Zileuton

Step 5

Preferred:
High-dose
ICS + LABA

AND

Consider
Omalizumab
for patients
who have
allergies

Step 6

Preferred:
High-dose
ICS + LABA +
oral
corticosteroid

AND

Consider
Omalizumab
for patients
who have
allergies

Step up if
needed
(first, check
adherence,
environmental
control, and
comorbid
conditions)

**Assess
control**

Step down if
possible
(and asthma is
well controlled
at least
3 months)

Each step: patient education, environmental control, and management of comorbidities.

Steps 2-4: consider subcutaneous allergen immunotherapy for patients who have allergic asthma (see footnotes).

Quick-relief medication for all patients

- SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Short course of oral systemic corticosteroids may be needed.
- Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and the need to step up treatment.

USE A SPACER



Questions?