

Asthma (Obstructive Disease)		TESTS (cont)		Treatment	
Definition	• Inflammatory condition of the airways • hyperresponsiveness leading to airway edema + bronchoconstriction • Recurrent/intermittent episodes of wheezing, shortness of breath, and/or cough • Usually reversible either spontaneously or with treatment.	Exercise-induced bronchospasm	Decrease in FEV1 of >10% on a treadmill or a stationary bicycle.	Rescue	SABA (albuterol)
Causes	Atopy (IgE mediated) + Environmental triggers (allergens, irritants, chemicals, respiratory infections, physical stress, and emotional stress).	CXR	Normal in mild cases. Severe asthma shows hyperinflation.	Quick relief (acute, mild, intermittent disease)	• Short-acting beta2-agonists (SABAs) • Systemic corticosteroids • Anticholinergics
Diagnosis	Reversible bronchoconstriction on own or with bronchodilator and a history. Consider challenge test	Arterial Blood Gas	• Indicated in respiratory distress. • Hypocarbica from hyperventilation. • Hypoxemia may be present. • If CO2 level is normal or high sign that the patient is decompensating due to fatigue or severe airway obstruction and intubation may be required.	Long-Term control	• Inhaled corticosteroids (ICS; most potent and most effective) • Long-acting beta2-agonists (LABAs) • Mast-cell stabilizers (cromolyn sodium + nedocromil) • Leukotriene modifiers • Methylxanthines (theophylline) • Immunomodulators (omalizumab = anti-IgE)
Severity	Intermittent, mild persistent, moderate persistent, and severe persistent	Challenge Test	• Methacholine challenge, histamine challenge, and thermal (cold air). Principle of nonspecific hyperirritability. • Must both tighten up with the challenge and loosen up with subsequent bronchodilators. • Response to short-acting bronchodilator (increase in the FEV1 > 12% and increase of 200 mL).		
Relationships	• GERD, Allergic rhinitis • Worsened by Allergic bronchopulmonary aspergillosis (ABPA), Obstructive sleep apnea-hypopnea (OSA), Stress				
TESTS					
PFT's	• Normal if no active disease. • FEV1/FVC < 70% • Decreased expiratory flow • Significant response to beta2-agonist. • Normal or increased TLC (due to hyperinflation). • Normal or reduced VC. • DLCO is normal.				



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Treatment (cont)

Acute Exacerbation

- Inhaled B agonist and ipratropium via nebulizer or MDI.
- Assess response clinically and with peak flow.
- IV or oral corticosteroids, then taper when improvement occurs.
- Third-line agents include IV magnesium, which helps with bronchospasm in severe refractory cases.
- Supplemental oxygen to keep $\text{Osat} > 90\%$. Antibiotics if necessary. Intubation for respiratory failure.

Mild Intermittent

- Symptoms <2 times per week, nighttime awakenings <2x per month.
- Normal baseline FEV1 and FEV1/FVC.
- Needs no long-term control medications, just short acting beta agonist (albuterol).

Mild Persistent

- Symptoms >2 times per week but not every day. 3-4 nighttime awakenings per month, minor limitations on activities.
- Normal PFTs.
- Low dose inhaled corticosteroid** indicated with PRN albuterol inhaler.

Treatment (cont)

Moderate Persistent

- Daily symptoms** with frequent exacerbations.
- FEV1 is 60-80% of expected.
- Daily inhaled low dose corticosteroid, PRN albuterol inhaler, and LABA inhaler. +/- cromolyn/methylxanthine/antileukotriene.

Severe Persistent

- Continual symptoms with frequent exacerbations and **limited physical activity**.
- FEV1 <60% of predicted.
- Daily high dose inhaled corticosteroid, PRN albuterol, and long-acting beta agonists. +/- methylxanthine and systemic corticosteroids.

Treatment and Maintenance

Factors used in the determination of both SEVERITY (with initial eval) and CONTROL level (when on continuing treatment)					Initial evaluation: Treatment is based on SEVERITY		Continuing therapy: Treatment is based on CONTROL	
Days with Sx	SABA use (control only)	Nighttime awakenings	FEV1 or PEF ***	Impairment of activity	SEVERITY	Treat per Step level	CONTROL level	Changing Tx based on CONTROL level
≤ 2 days/week	≤ 2 days/week	< 2/month	≥ 80%	None	Intermittent	Step 1	Well controlled	Maintain current step
> 2 days/week but not daily	> 2 days/week but not daily and not sure that it's on any given day	3-4/month	≥ 80%	Minor limitation	Mild Persistent	Step 2	Well controlled	Maintain current step
Daily	Daily	> 1/week but not nightly	> 60% < 80%	Some limitation	Moderate Persistent	Step 3	Not well controlled	Step up 1 step. Reevaluate in 2-6 wks
Through out the day	Several times per day	Often 7/week	≤ 60%	Extremely limited	Severe Persistent	Step 4-5	Very poorly controlled	Consider short course of oral corticosteroids. Step up 1-2 steps. Reevaluate in 2 weeks

***Use only FEV1 for initial evaluation. Use either FEV1 or PEF for determining control and continuing therapy.

Differential Diagnosis of Wheezing

- CHF: due to edema of airways and congestion of bronchial mucosa.
- COPD: inflamed airways may be narrowed or bronchospasm may be present.
- Asthma: most common cause.**
- Cardiomyopathy/Pericarditis: can lead to edema around the bronchi.
- Lung Cancer: due to obstruction of airways (central tumor or mediastinal invasion).



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