PHC

432 Team

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Bronchial Asthma

Done By:
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Objectives

- Diagnosis of Asthma in children and adults
  - ✓ History
  - ✓ Chest examination
  - ✓ Clinical
  - ✓ Use of PEFR to assess in diagnosis
  - ✓ Investigations “PFT; Spirometry”
- Factors trigger Asthma
- Highlight on COPD “Diagnosis by PFT and Treatment”
- How to assess the severity of Asthma
- Exercise induced asthma (triggers and management)
- Management of Asthma
  - ✓ Rescue management
  - ✓ Prophylaxis
  - ✓ How to use different types of inhalers
  - ✓ Asthma education for patient and how patient can use inhalers properly

Definition

It is a chronic disorder of the airways, characterized by variable reversible and recurring symptoms related to airflow obstruction, bronchial Hyper-responsiveness, and an underlying inflammation.

Pathophysiology

Asthma is a chronic inflammatory disease with a variable course characterized by episodic attacks of acute inflammation.
Acute inflammation in asthma is associated with bronchoconstriction, plasma exudation/edema, vasodilatation, and mucus hypersecretion.
Chronic inflammation in asthma is associated with subepithelial fibrosis, smooth-muscle hyperplasia/hypertrophy, mucus gland hyperplasia, and new-vessel formation. If asthma remains uncontrolled or poorly controlled, the underlying chronic inflammation may lead to structural changes (remodelling) that reduce the extent of airway response to therapy.

Asthma triggers

1. Allergens: food, pollens, molds, dust mites, and pet dander.
2. Irritants: tobacco smoke, smoke from wood-burning, perfumes, cleaning agents..
3. Physiological factors: stress, gastroesophageal reflux (GERD), respiratory infection (viral, bacterial) and rhinitis.
4. Pharmacological factors: aspirin or other NSAIDs, beta-blockers and sulfites.
5. Physical factors: exercise, hyperventilation, cold air.

Exercise induced asthma (EIA)

1. People with exercise-induced asthma are believed to be more sensitive to changes in the temperature and humidity of the air.
2. Symptoms usually begin about 5- 10min after finishing exercise.
3. Rarely starts during the exercise.
4. Typically disappear within an hour, but they may last longer.
5. It can happen under any weather but cold and dry weather is the most common.

How to Approach a Patient with Bronchial Asthma

Obtain a detailed History:

- Analyze the chief complaint.
- Associated symptoms:

  1- Coughing (hemoptysis, sputum)
  2- Wheezing
  3- Chest tightness
  4- Hoarseness and hyperventilation
  5- Shortness of breath

- Risk Factors: (TB,Traveling, Animal contact, smoking)
- Past medical and surgical and allergic history (history of atopy: allergic rhinitis or eczema) and medication history
- Family and social history
- Ask about:

  1- Frequency of attacks and what he did to control it
  2- Recurrent attacks of wheezing
  3- Cough patterns (earlymorning, late at night)
  4- Wheezing or coughing after: (exercise or on exposure to dusts or smoke)
  5- Worsening of symptoms when taking aspirin or NSIDs or B-blockers
  6- Family history of asthma or other or other atopic conditions, such as eczema or allergic rhinitis?
  7- if he experience wheezing, chest tightness, or cough after exposure to pollens, dust, feathered or furry animals, exercise, viral infection, or environmental smoke (cigarettes, burning incense “Bukhoor”, or wood?
  8- Patient’s cold “goes to the chest” or take more than 10 days to clear up?
  9- Hospitalization due to asthma or any other lung disease
  10- Improvement of symptoms after treatment

  11- Admission to the ICU due to asthma? Ever been intubated?

Physical Examination

1. **Inspection:** Shape, Breathing, Deformities, Scars, Apex beat, Skin changes & hair distribution.
2. **Palpation:** Apex beat, Tracheal deviation, Tracheal tug, tactile vocal fremitus, Rib fracture, Chest expansion.
3. **Percussion:** Over the supraclavicular area, clavicle and intercostal space.
4. **Auscultation:** Breathing sound, Added sounds, vocal resonance.

Possible Findings:

1- Wheeze /Rhonchi.
2- Tachypnea.
3- Use of accessory muscles of respiration.
4- Paradoxical pulse (an exaggerated fall in systolic blood pressure during inspiration).
5- Prolonged expiratory phase
6- Cyanosis of nails.
7- Signs of allergy in skin, nose, eyes

Investigation

1. Pulmonary Function Tests:

a.Spirometry Test:

The most reliable way to determine reversible airway obstruction is spirometry, a test that measures the amount of air entering and leaving the lungs. It is now preferred over peak flow measurement for initial confirmation of obstruction of airways in the diagnosis of asthma.
Measure the Forced expiratory volume in 1 second (FEV1) and the Forced vital capacity (FVC) volume-time curve, normally FEV1/FVC ~ 75%.
An obstructive pattern on spirometry is identified numerically by a reduction in the ratio of FEV1 to FVC. (Less than 0.70 or less than the lower limit of normal.

b. Peak Expiratory Flow: Peak flow diaries may also be helpful for patients with moderate or severe asthma. They can provide an objective warning of clinical deterioration.
It is useful for patients to perform themselves.

c. Bronchial provocation Challenge Testing: Not for everyone! Only done when symptoms suggest asthma, but normal spirometry, it may cause a severe asthma attack.
Also used for diagnosis of occupational asthma.

2. Other supportive tests:

a. Arterial Blood Gases
b. Allergy Skin test
c. Level of specific IgE in the serum
d. Chest X-ray.

Management

1. The goal of management should be to obtain and sustain complete control.

2. Global Initiative for Asthma (GINA) 6-point plan:

a. Educate patients to develop a partnership in asthma management (Box.2)
b. Provide regular follow-up care
c. Avoid exposure to risk factors (allergens…)
d. Assess and monitor asthma severity with symptom reports and measures of lung function as much as possible
e. Establish medication plans for chronic management in children and adults
f. Establish individual plans for managing exacerbations

3. Poor Asthma control could be due to:

a. Inhaler technique.
b. Adherence to prescribed regimen.
c. Environmental changes.
d. Consider alternative diagnoses

Table.1/ Pharmacologic medications for asthma

controller	Reliever
Drugs taken daily on long term to keep asthma under control.	Used as needed! Act to quickly reverse broncho-constriction
1. Inhaled corticosteroid: most effective. (Fluticasone, budesonide) 2. Long acting beta 2 agonist: NOT used as monotherapy. Formetrol 3. Leukotriene receptor antagonist.(mast cell stabilizer) 4. Theophylline.	1. Short acting beta 2 agonist.(salbutamol) 2. Anticholinergic (**Ipratropium)**

Symbicort is budesonide + formetrol.

Table .2/ Classification, Diagnosis and Management of Asthma

Classification	Daytime symptoms	Nighttime symptoms	Pulmonary function tests	Management strategy
Mild intermittent (Step 1)	≤2 times/week	≤2 times/month	FEV1 or PEF ≥80% of predicted; PEF variability ≤ 20%.	Short acting bronchodilators only when needed
Mild persistent (Step 2)	2-6 times/week	> 2 times/month	FEV1 or PEF ≥80% of predicted; PEF variability 20-30%.	Step 1 medications plus daily low dose inhaled steroid (or mast cell stabilizer)
Moderate persistent (Step 3)	Daily	1 time/week	FEV1 or PEF 60-80% of predicted; PEF variability ≤ 30%.	Step 2 medications plus long-acting bronchodilators and antileukotriene trial.
Severe (Step 4)	Continuous	Frequent	FEV1 or PEF ≤60% of predicted; PEF variability ≤ 20%.	Step 3 medication plus high dose inhaled steroids, systemic steroids, and other therapies.

Box .1

Special Situations in Management
1. Asthma and pregnancy: salbutamol and low doses of ICS. 2. Exercise induced asthma: SABA before exercise + warm up.

Box .2

Patients education (What we should tell asthma patients)
1. Avoid risk factors. 2. Take medications correctly. 3. Understand the difference between "controller" and "reliever" medications. 4. Monitor their status using symptoms and, if available, PEF, or ACT. 5. Recognize signs that asthma is worsening and take action. 6. Seek medical help as appropriate

Imp in the OSCE

Box .3

Management of Acute Asthmatic Attack:
▪ Oxygen to achieve O2 saturation >= 90%. ▪ Inhaled SABA continuously for 1 hour. ▪ Systemic corticosteroids if no immediate response.

Table.3/ Comparison between Asthma and COPD

	Asthma	COPD
age	Childhood or adolescence	Elderly or more advanced age
Smoking history	No common	Almost always present, significant
Symptoms	Intermittent	Progressive
Co-existing conditions	Allergic rhinitis, eczema (immunity related diseases)	CAD or osteoporosis (smoking related disease)
Inhaled steroids	Standard treatment	Not very beneficial
Forced expiratory volume in first sec (FEV1) changes	return to normal between asthma attacks or after reliever therapy	generally not reversible

Summary

- Bronchial Asthma is a chronic disorder of the airways, characterized by variable reversible and recurring symptoms related to airflow obstruction, bronchial Hyper-responsiveness, and an underlying inflammation.
- Asthma characterized by episodic attacks of acute inflammation.
- Acute inflammation in asthma is associated with bronchoconstriction, plasma exudation/edema, vasodilatation, and mucus hypersecretion.
- Asthma triggers by
    - Allergen e.g. food or pollen.
    - Irritant e.g. tobacco smoke.
    - Physiological factors e.g. stress.
    - Pharmacological factor e.g. aspirin.
- Asthma symptom that induced by exerciseusually begin about 5-10min after finishing exercise.
- Poor Asthma control could be due to:
    - Inhaler technique.
    - Adherence to prescribed regimen.
    - Environmental changes.
    - Consider alternative diagnoses

Questions

1) A 37-year-old non-smoking man complains of a 3-month history of a nonproductive cough that is worse with exercise. He does not have fevers or other symptoms to suggest infection. He is normotensive, and his lungs are clear to auscultation bilaterally, except for an occasional expiratory wheeze on forced expiration. What are the expected finding on spirometry?

a. FEV1 is ≥80% predicted value with an FEV1/FVC of <0.7% (70%).
b. FEV1/FVC of <0.7 (70%).
c. normal or higher than normal FEV1/FVC.

2) Which of the following medications is considered as a QUICK ASTHMA RELIEVER?

a. Salmeterol
b. Montelukast
c. Salbutamol

3) In which step of the Asthma stepwise management, is oral steroids are used?

a. Step 2
b. Step 3
c. Step 4

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Answers:

1st Question: B

2nd Question: C

3rd Question: C