Understanding Asthma – A Common Respiratory Disease & Its Relevant Findings

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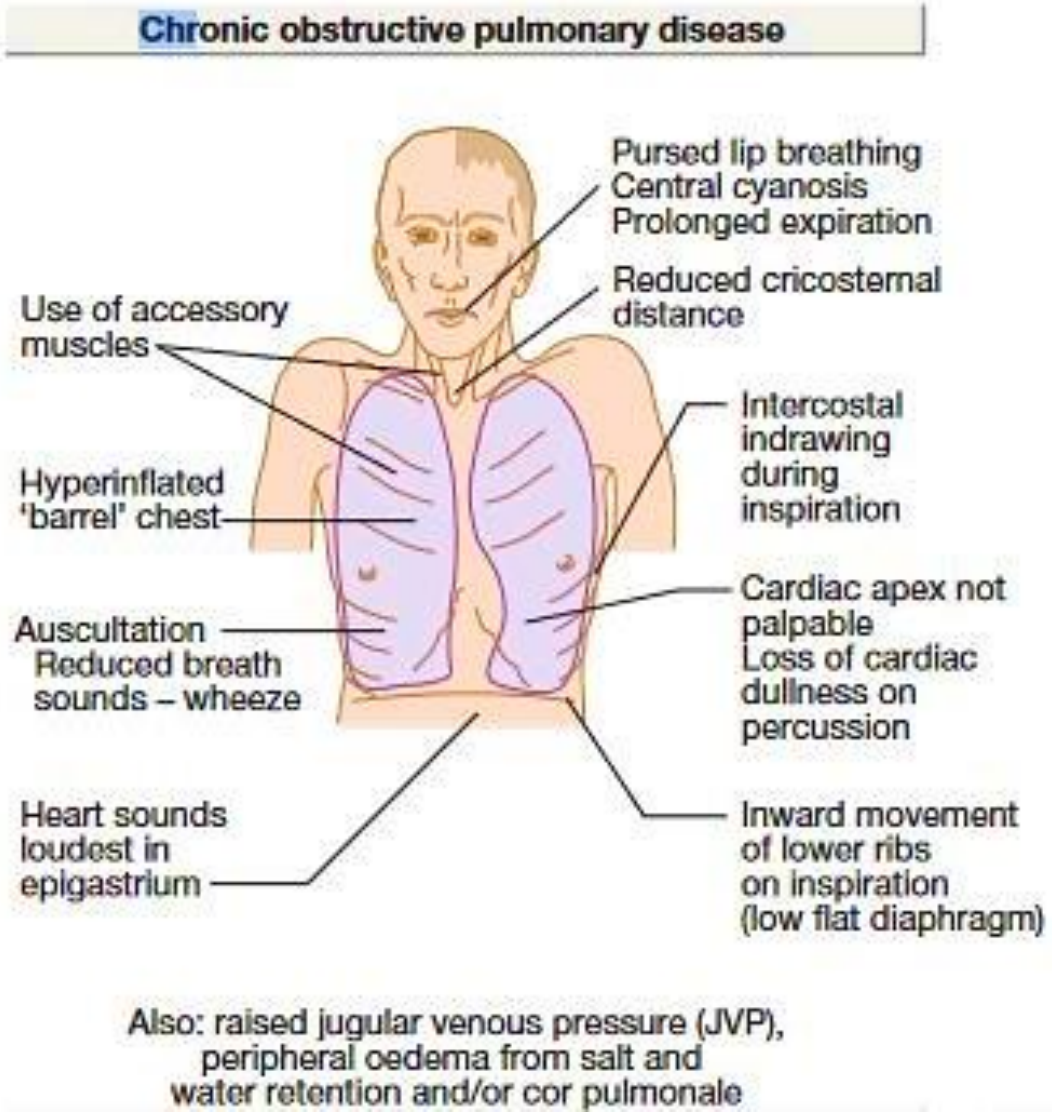
Respiratory diseases

- Respiratory disease is responsible for major burden of morbidity & untimely death as the increasing prevalence of allergy, asthma, chronic obstructive pulmonary disease (COPD), tuberculosis, pneumonia
- contributes to the overall burden of chronic disease in the community.

Obstructive vs Restrictive diseases

- Common respiratory diseases generally classified into
- obstructive group
- restrictive group
- having some common symptoms like shortness of breath, cough
- a key difference is when you are feeling trouble in exhaling air is obstructive & harder to inhale air is the restrictive one.

Common features of obstructive disease



Asthma – a common obstructive disease

- A chronic inflammatory disease associated with airway hyper-responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness & cough, particularly at night & in early morning.
- These episodes are usually associated with widespread but variable airflow obstruction within the lung that is often reversible spontaneously or with treatment.

History of asthma….

In order to know where we are, we must know where we come from.

- The first accounts of asthma with clinical description was recorded during Greeks & Romans by **Aretus & Aulus Celsus Cornelius**.
- The Renaissance are remembered for postulating theories on pathogenesis of bronchial asthma.
- The 17th & 18th centuries saw the discovery of anatomical foundation of asthma.

History of asthma..cont'd

- The allergic nature of bronchial asthma was studied by **Salter Meltzer**.
- S Meltzer's hypothesis of histamine release as the pathogenesis of bronchial asthma leads the way for the 20th centuries leading discoveries.

Epidemiology….

- The prevalence of asthma increased steadily over the later part of last century, first in developed & then in the developing world.
- The socio-economic impact is enormous, as poor control leads to days lost from school or work, unscheduled health-care visits & hospital admissions.

Pathophysiology….

- Airway hyper-reactivity (AHR) - a tendency for airways to narrow excessively in response to triggers that have little or no effect in normal individuals.
- Studies have explored the potential role of some triggering substances like indoor & outdoor allergens, microbial exposure, diet, vitamins, tobacco smoke, air pollution & obesity but no clear consensus have emerged.

Pathophysiology.....cont'd

- With increasing severity & chronicity of the disease, remodeling of the airway may occur, leading to fibrosis of the airway wall, fixed narrowing of the airway & a reduced response to bronchodilator medication.

Clinical features

- Typical symptoms include recurrent episodes of wheezing, chest tightness, breathlessness & cough.
- Asthma is commonly mistaken for a cold or chest infection which is taking time to resolve & sometimes due to lack of wheeze or breathlessness may lead to a delay in reaching the diagnosis.

FEV_1,FVC ratio

- Supportive evidence is provided by the demonstration of variable airflow obstruction, preferably by using spirometry to measure FEV_1 & FVC.
- This indicates the obstructive defect, defines its severity & provides a baseline for bronchodilator reversibility.
- If spirometry is not available, a peak flow meter may be used.

What is FEV_1,FVC ratio……

- **FVC or forced vital capacity :** it is the largest volume of air that a person can expire from the lungs with maximum effort after a initial forceful inspiration.
- **FEV_1 or forced expiratory volume in 1^{st} second :** volume of air expired during the 1^{st} second of FVC.

FEV_1 , FVC ratio

$$\frac{FEV_1}{FVC}$$

=(3600/4600) x100% =80%

>80% is normal value.

FEV_1 decreased in :

- Expiratory muscle weakness
- Increased airway resistance (OLD)

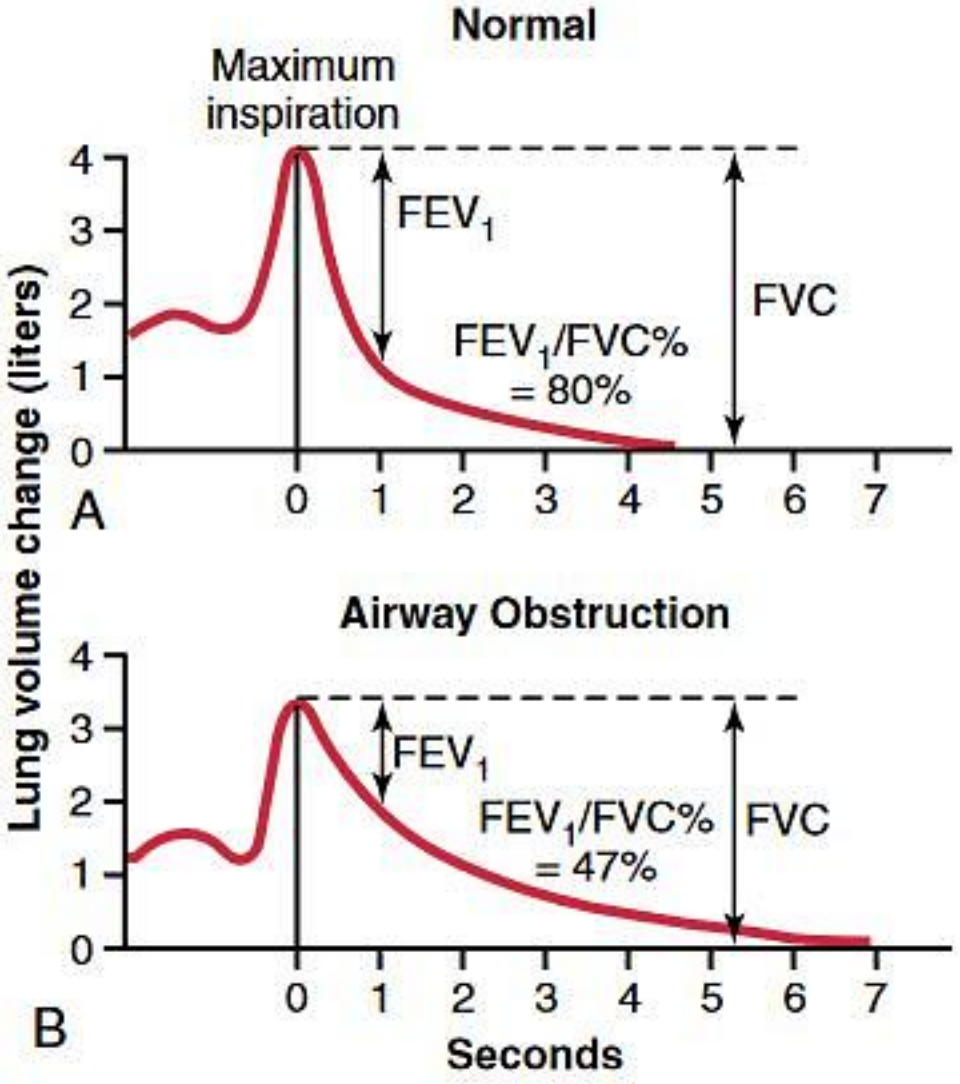
In OLD, FEV_1 is abnormally low.

In RLD ,FVC is low but FEV_1 is more than 80%.

How to measure….

- To record forced vital capacity (FVC) & timed vital capacity (FEV_1) the kymograph speed should be in 1200mm/min.
- Then ask the subject to first take a deep breath & expel the air from the lungs as forcefully & as quickly as possible. Take 3 recordings at intervals of about 2 minutes.

FEV_1,FVC ratio

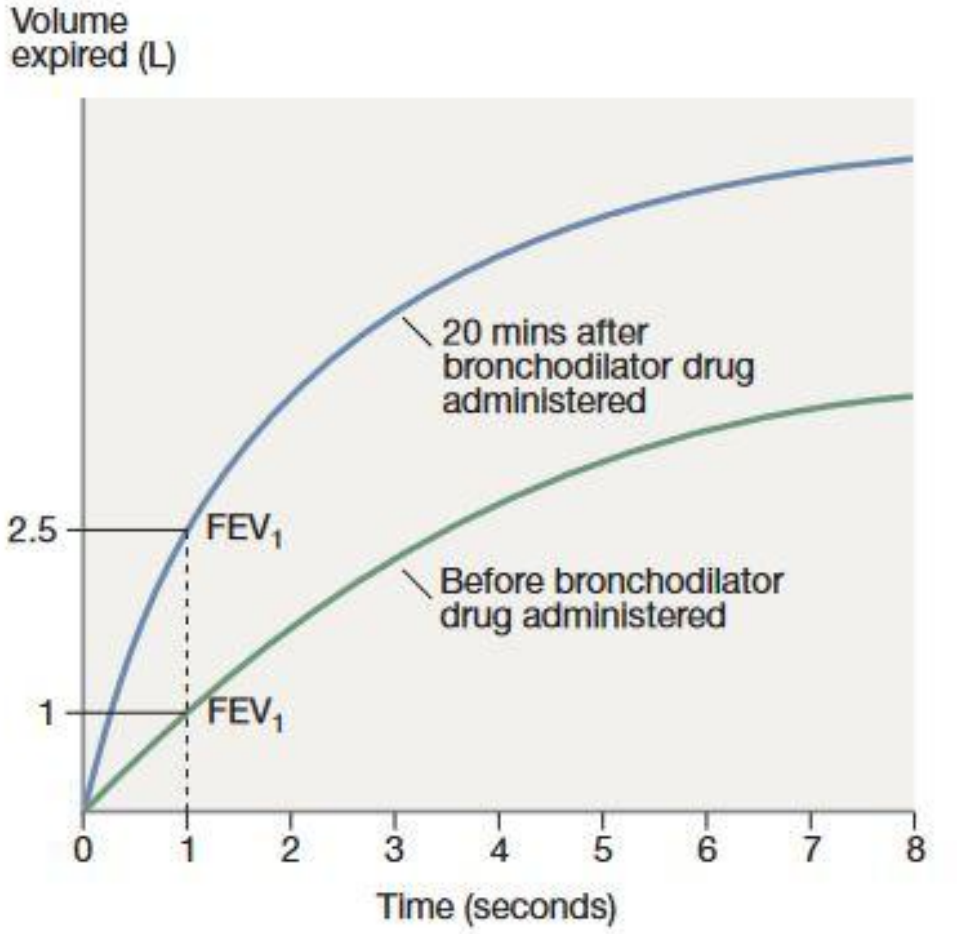


How to make diagnosis

Compatible clinical history plus either/or :

- FEV_1 > 15% increase following administration of a bronchodilator/trial of corticosteroids.
- > 20% diurnal variation on ≥ 3 days in a week for two weeks on PEF diary.
- FEV_1 ≥ 15% decrease after 6 minutes of exercise.

Reversibility test : before & after inhalation of β_2-adrenoceptor agonist



Other investigations

- Measurement of allergic status : the presence of atopy may be demonstrated by skin prick tests.
- Similar information may be provided by measurement of total & allergen-specific I_gE.
- Radiological examination : chest X-ray appearances are often normal. It is necessary to diagnose if asthma is complicated by any other broncho pulmonary disease or not.

Management….

- Asthma is a chronic condition but may be controlled with appropriate treatment in majority of patients.
- Unfortunately, surveys demonstrate that majority of individuals with asthma report suboptimal control.
- Whenever possible, patients should be encouraged to take responsibility for managing their own disease.

The stepwise approach to the management of asthma

- **Step-1 :** occasional use of inhaled short-acting β_2- adrenoceptor agonist bronchodilators.
- **Step-2 :** introduction of regular preventer therapy by inhaled corticosteroids in addition to inhaled β_2- agonists.
- **Step-3 :** add-on therapy – should be considered in adults taking 800 µg/day BDP.

The stepwise approach to the management of asthma….cont'd

- **Step-4 :** in case of poor control on moderate dose of inhaled steroid & add-on therapy, the dose of ICS may be increased to 2000 µg BDP daily.
- **Step-5 :** continuous or frequent use of oral steroids - prednisolone therapy should be orally in the lowest amount necessary to control symptoms.

Step-down therapy

- Once asthma control is established, the dose of inhaled or oral corticosteroid should be titrated to the lowest dose at which effective control is maintained.
- Decreasing the dose of ICS by around 25-50% every 3 months is a reasonable strategy for most patients.

Asthma in pregnancy

- Safety data : good for β_2-agonists, inhaled steroids, theophyllines & oral prednisolone.
- Steroids : women on maintenance prednisolone > 7.5mg/day should receive hydrocortisone 100mg 3-4 times daily during labour.
- Breastfeeding : use medications as normal.

Ideal use of an inhaler ....

- Remove the cap and shake the inhaler
- Breathe out gently and place the mouthpiece into the mouth
- Incline the head backwards to minimise oropharyngeal deposition
- Simultaneously, begin a slow deep inspiration, depress the canister and continue to inhale
- Hold the breath for 10 seconds

Awareness….

- WHO is committed to improving the diagnosis, treatment & monitoring of asthma to reduce the global burden of NCDs & make progress towards universal health coverage.
- Inhaled medication can control asthma symptoms & allow people with asthma to lead a normal, active life.
- Avoiding triggers of asthma can also help to reduce asthma symptoms.


Thank you!