

Chronic Obstructive Pulmonary disease:

Chronic Bronchitis:

Inflammation of the bronchial tubes which causes cough with expectoration for at least 3 months a year for consecutive 2 years.

Causes:

i) Primary: Smoking

ii) Secondary: Air pollutant, Dust, Toluene isocyanide
Virus - Rhinovirus, orthomyxovirus (Influenza)
Bacterial - Streptococcal, Staphylococcal.

Pathology:

Exposure to irritants & smoking

Hypertrophy of
Hyperplasia of the
Bronchial mucinous
gland & Goblet cells

↓
Excessive Mucus production

↓
Obstruction in the bronchioles

↓
Air trapping.

Cilia become short
and less motile

Clinical features:

- Cough with expectoration for 3 months, 2 years
- In initial production, later stages scanty
- Breathlessness
- Wheeze & Crackles on Auscultation
- Hypoxemia & Hypercapnia → Cyanosis → Blue Bloaters

Complication:

i) Cyanosis $\rightarrow$ Hypoxemia & Hypercapnia

$\downarrow$
Respiratory failure

ii) Pulmonary hypertension $\rightarrow$

$\downarrow$
Right ~~Left~~ Ventricular hypertrophy

$\downarrow$
Cor Pulmonale

iii) Recurrent lung infection.

Investigation:

i) Spirometry:

$\uparrow$ TLC (Total lung capacity $\rightarrow$ Max volume into lungs $\uparrow$).

$\downarrow$ FVC $\rightarrow$ Max amount of air ^{out} in single breath

$\downarrow$ FEV₁ $\rightarrow$ First second of air out in single breath.

$\downarrow$ FEV₁ $\rightarrow$ Forced expiratory volume to Forced

$\downarrow$ FVC vital capacity Ratio lower in COPD.

ii) Reid's Index $\rightarrow$ (Portmound) Not diagnostic

= Thickness of alveoli = $> 40\%$

Thickness of wall

iii) Chest X-ray (PA & lateral view)

iv) Blood gas analysis.

Management:

- Quit smoking. Use Face mask.

- Expectorant,

- Oxygen supply.

Emphysema

(Tylate or Swell)

- Alveoli permanently enlarge and lose its elasticity.

Causes:

i) Primary: Smoking

ii) Secondary: Air pollution, Dust, Fumes, iron pyrites.

Virus - Rhinovirus, Orthomyxovirus.

Bacterial - Streptococcal, Staphylococcal.

α_1 Antitrypsin deficiency

Pathology:

Exposure to irritant, smoking



Immune cells

↓ produce

Proteases (Collagenase, Elastase)



Break down Collagen, Elastin



So elasticity is lost and alveoli

inflame



Air trapping $\Rightarrow$ Gas exchange $\downarrow$ $\Rightarrow$ $CO_2 \uparrow$

Types:

i) Centriacinar $\rightarrow$ Due to Cigarette Smoking.

affects proximal alveoli, upper lobes

ii) Panacinar $\rightarrow$

Affecting the whole alveoli

- Due to α_1 Antitrypsin deficiency which suppresses the alveolar macrophages from secreting proteases.

Alveolar macrophage



Proteases $\leftarrow \alpha_1$ Antitrypsin suppress.

iii) Paraseptal $\rightarrow$ Distal alveoli $\rightarrow$ May break and cause pneumothorax.

Symptoms:

- Dyspnea - (Diminished gaseous exchange)
- Breathing through mouth (Pink Puff) which increases the interalveolar pressure

↓
Weight loss

- Cough [Some sputum]
- Hypoxemia → Cyanosis → Pulmonary hypertension

Signs:

- Barrel shaped chest [Anterior-Posterior diameter ↑]

Complication

1) Respiratory Failure

2) Pulmonary hypertension

Right Ventricular hypertrophy

↓
Cor Pulmonale → Jugular Venous distension, oedema
Hepatomegaly

3) Pneumothorax, 4) Pneumonia

Investigation:

1) Spirometry: In asthma, reversible no after
↑ TLC = $\frac{\Delta FEV_1}{FVC}$ But COPD irreversible --
Bronchodilators it increases.

2) Chest X-ray: ↑ Anterior-Posterior diameter

3) Blood gas analysis

Treatment:

- Quit smoking, Face Mask

- Oxygen supply

→ Influenza Vaccine because
infection triggers COPD.