

The background features an abstract design with orange lines and circles. In the top right, there are two concentric circles with internal hatching. Below them is a smaller, similar circular pattern. In the bottom right corner, there are three overlapping solid orange circles of different sizes. Diagonal lines cross the upper half of the page.

Pathology Team 430

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The 4th Lecture:

Chronic Obstructive Pulmonary Diseases COPD

Chronic bronchitis

1] Clinical presentation.

The clinical definition of chronic bronchitis is a **productive cough that occurs during at least 3 consecutive months over at least 2 consecutive years.**

Note:

He may have mild fever, wheezing, dyspnea

Chronic bronchitis is clearly linked to **cigarette smoking** and is also associated with air pollution, infection and genetic factors. It may lead to cor pulmonale. (Heart failure induced by pulmonary diseases).

2] Pathological changes.

Typical characteristics include **hypersecretion of mucus** due to marked **hyperplasia of mucus-secreting submucosal glands within the bronchiol wall.**

Note:

There is an increasing in the thickness of bronchial wall, because of hyperplasia of the submucosal gland and goblet cells. This will lead to increasing in Reid index: ratio of the thickness of the gland layer to that of the bronchial wall.

Complications: it is mostly associated with Emphysema, respiratory failure

Respiratory failure:

✚ **Pulmonary acidosis**

✚ **Right ventricle heart failure which called Cor pulmonale**

Emphysema

1] General considerations, definitions and clinical features.

- (a) Emphysema is **dilation of airway spaces** from and beyond the respiratory bronchioles **with destruction of alveolar walls**.
- (b) The disease is strongly associated with **cigarette smoking**.

Note:

Pulmonary acinus = pulmonary alveolus

2] Clinical characteristics.

- Include **increased anteroposterior diameter of the chest (Barrell chest)**.
- Increased total vital capacity; hypoxia, cyanosis and respiratory acidosis.**
- He may also have respiratory failure and chronic bronchitis, dyspnea, and wheezing.**

3] Types of emphysema: four types

(a) Centrilobular, or centriacinar emphysema.

Dilatation of the respiratory bronchioles is most often localized to the upper part of the pulmonary lobes.
Common in smokers

(b) Panacinar emphysema.

1. **Dilatation of the entire respiratory acinus**, including the alveoli, alveolar ducts, respiratory bronchioles and terminal bronchioles. The disease is most often distributed uniformly throughout the lung.
2. It is associated with loss of elasticity and sometimes with genetically determined **common in people who have deficiency of alpha I-antitrypsin (alpha 1 - protease inhibitor)**.

(c) Paraseptal emphysema.

1. **Dilatation involves mainly the distal part of the acinus**, including the alveoli and to a lesser extent, the alveolar ducts. It tends to localize subjacent to the pleura and interlobar septa.
2. It is associated occasionally with large **subpleural bullae or blebs**.

Note:

He may developed pneumothorax because of the rupture of the bullae characterized by sever dyspnea and atelectasis.

That is the acute emergency of Paraseptal emphysema. In case of asthma the AM is the status asthmatics.

(d) Irregular emphysema: Is the most common subtype and characterized by irregular involvement of the acinus with scarring within the walls of enlarged air spaces.

This type is usually **a complication of various inflanunatory processes including chronic pulmonary tuberculosis. especially people they have long-stand TB**

3] Complications.

- (a) Emphysema is often complicated by or coexistent with chronic bronchitis.
- (b) Interstitial emphysema, in which air spaces may enter into the interstitial tissues of the chest from a tear in the airways may sometimes occur.
- (c) Other complications of emphysema may include rupture of a surface bleb **(markedly dilated and emphysematous alveolus) with resultant pneumothorax.**

- 4] Postulated causes. Emphysema may result from action of proteolytic enzymes such as elastase on the alveolar wall. Elastase can induce destruction of elastin unless neutralized by the antiproteinase-antielastase activities of alpha 1-antitrypsin which can be deficient in cases of emphysema.
- (a) Cigarette smoking attracts neutrophils and macrophages, which are sources of elastase (an enzyme which destroys elastic fibers from the wall of alveoli).
- (b) **Hereditary alpha 1 antitrypsin deficiency accounts for a small subgroup of cases of panacinar emphysema. It is caused by variants in the α_1 (proteinase inhibitor) gene, localized to chromosome 14.**

Bronchiectasis

- 1] Definition: **This condition is characterized by permanent and abnormal bronchial dilatation** which is caused by chronic infection with inflammation and necrosis of the bronchial wall.
- 2] Predisposing factors: include **bronchial obstruction, most often by tumor.**

Other predisposing factors include **chronic sinusitis accompanied** by postnasal drip. The disease is rarely a manifestation of **Kartagener syndrome (sinusitis, bronchiectasis and situs inversus sometimes with hearing loss and male infertility)**, caused by a defect in the motility of respiratory, auditory and **sperm cilia** that is referred to as primary ciliary dyskinesia, an uncommon autosomal recessive syndrome. In this condition, there is a structural **defect in dynein** arms of **microtubule of the cilia** which can be seen by electron microscope.

Impaired ciliary activity predisposes to infection in the sinuses and bronchi and disturbs embryogenesis, sometimes resulting in situs inversus.

Male infertility is an important manifestation of ciliary dyskinesia.

3] Pathological features: Bronchiectasis most often involves **the lower lobes of both lungs**. Characteristics include production of copious **purulent sputum productive cough ((always))**, hemoptysis and **recurrent pulmonary infection** that may lead to **lung abscesses**.

Note:

This abscesses can go other place like brain cause brain abscesses, amyloidosis"



Good Luck

