

Obstructive lung (airway) diseases 1

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Table 13.1 Disorders Associated With Airflow Obstruction: The Spectrum of Chronic Obstructive Pulmonary Disease

Clinical Entity	Anatomic Site	Major Pathologic Changes	Etiology	Signs/Symptoms
Chronic bronchitis	Bronchus	Mucous gland hypertrophy and hyperplasia, hypersecretion	Tobacco smoke, air pollutants	Cough, sputum production
Bronchiectasis	Bronchus	Airway dilation and scarring	Persistent or severe infections	Cough, purulent sputum, fever
Asthma	Bronchus	Smooth muscle hypertrophy and hyperplasia, excessive mucus, inflammation	Immunologic or undefined causes	Episodic wheezing, cough, dyspnea
Emphysema	Acinus	Air space enlargement, wall destruction	Tobacco smoke	Dyspnea
Small airway disease, bronchiolitis*	Bronchiole	Inflammatory scarring, partial obliteration of bronchioles	Tobacco smoke, air pollutants	Cough, dyspnea

*Can be present in all forms of obstructive lung disease or by itself.

Diffuse pulmonary diseases can be classified into two categories :

1. Obstructive (airway) diseases , characterized by an increase in resistance to air flow caused by partial or complete obstruction at any level .
2. Restrictive diseases , characterized by reduced expansion of lung parenchyma and decreased total lung capacity .

The major diffuse obstructive disorders are :

1. Emphysema .
2. Chronic bronchitis .
3. Bronchiectasis .
4. Asthma .

It should be noted that emphysema is defined on basis of morphologic and radiologic features , whereas chronic bronchitis is defined on the basis of clinical features .

Emphysema and chronic bronchitis often are grouped together under the rubric of **chronic obstructive pulmonary disease (COPD)** .

EMPHYSEMA

Emphysema is characterized by permanent enlargement of the air spaces distal to the terminal bronchioles , accompanied by destruction of their walls without significant fibrosis .

There are four major types of emphysema :

1. Centriacinar (centrilobular) emphysema .

. The central or proximal parts of the acini , formed by respiratory

bronchioles , are affected , while distal alveoli are spared .

. The lesions are more common and severe in the upper lobes , particularly in the apical segments .

with . Is most common in cigarette smokers , often in association with chronic bronchitis .

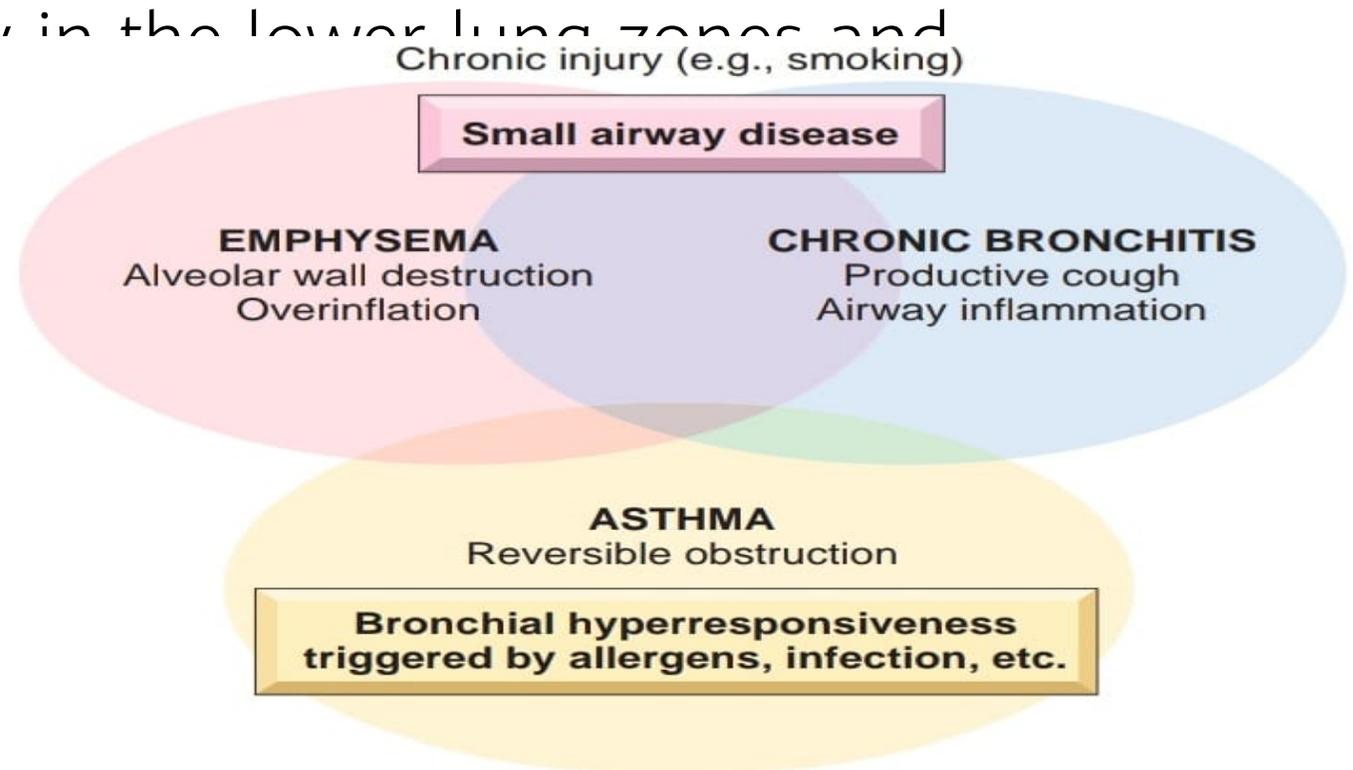
2. Panacinar (panlobular) emphysema :

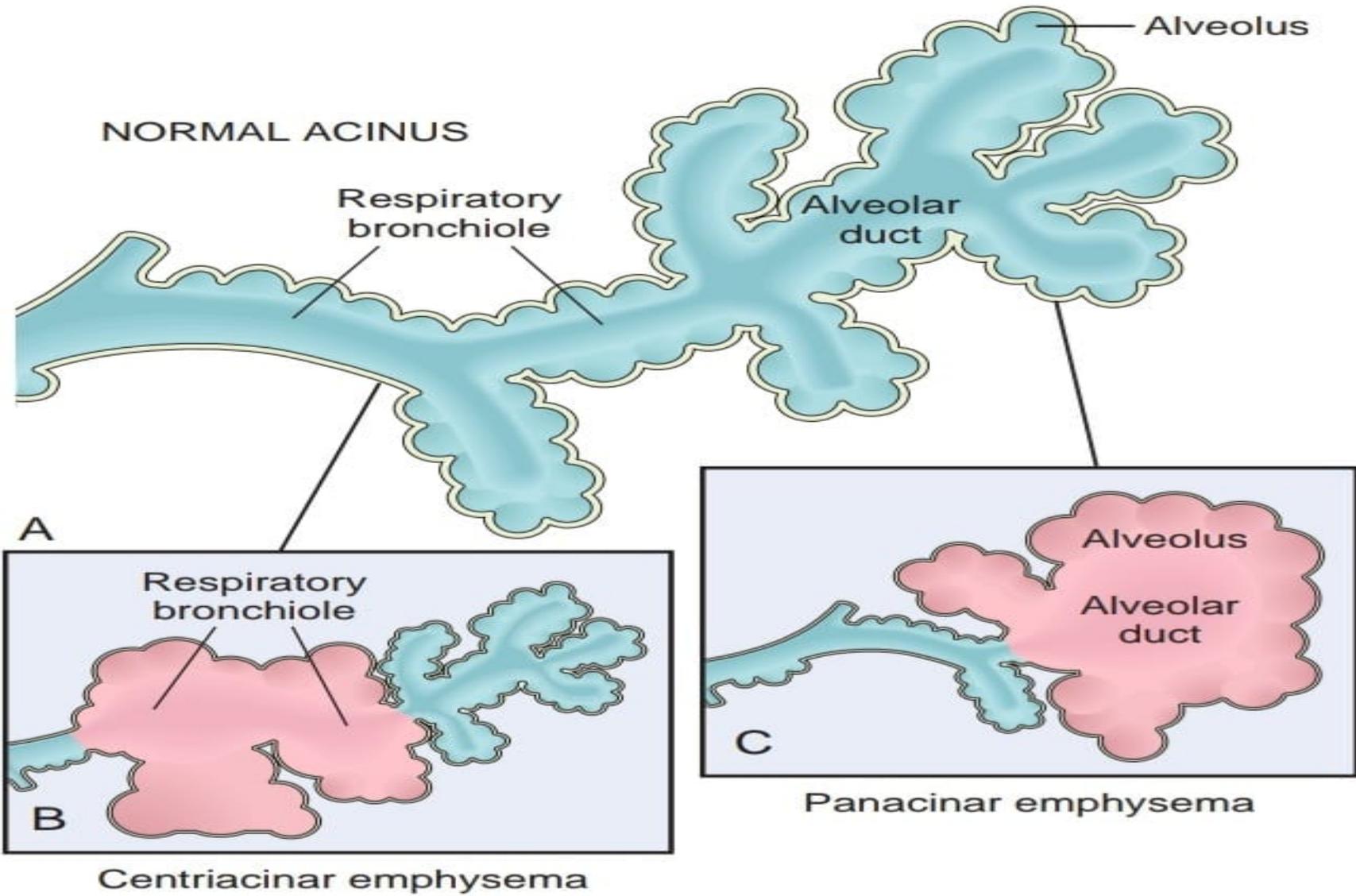
. The acini are uniformly enlarged , from the level of the respiratory

bronchiole to the terminal blind alveoli .

. Occur more commonly in the lower lung zones and associated with

α 1-anti-trypsin deficiency





3 Distal acinar (paraceptal) emphysema :

- . The proximal portion of the acinus is normal but the distal part is primarily involved .
- . Is more striking adjacent to the pleura , along the lobular connective tissue septa ,and at the margin of the lobules .
- . It occur adjacent to the areas of fibrosis , scaring , or atelectasis and is usually more severe in the upper half of the lungs .
- .The characteristic finding is the presence of multiple , contiguous , enlarged air spaces ranging in diameter less than 0.5 mm to more than 2.0 cm , sometimes forming cystic structures that with progressive enlargement , give rise to bullae.
- . The cause is unknown .
- . Most common in young adults who present with spontaneous pneumothorax .

4. Irregular emphysema :

. The acinus is irregularly involved , is almost invariably associated

scarring .

. Clinically asymptomatic .

. The most common form of emphysema .

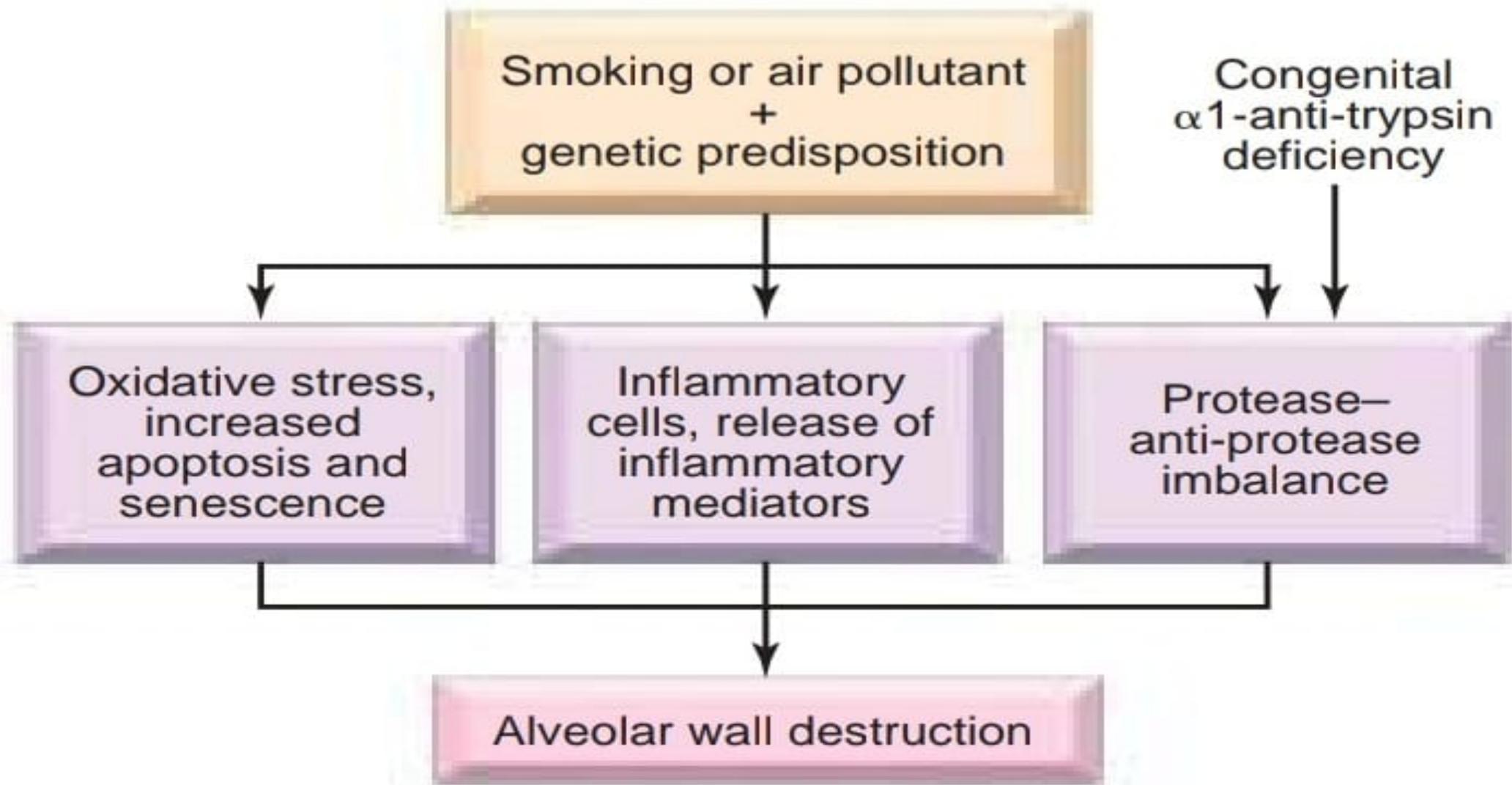
Factors that influence the development of emphysema are :

1. Inflammatory cells and mediators .

2. Protease-anti-protease imbalance .

3. Oxidative stress .

4. Airway infection .



A1 anti-trypsin is normally present in : serum

tissue fluids

macrophages

. Is a major inhibitor of proteases (particularly elastase).

. Secreted by neutrophils during inflammation .

. Is encoded by a gene in the proteinase inhibitor (Pi) locus

on

chromosome 14 .

The diagnosis and classification of emphysema depend largely on the macroscopic appearance of the lung .

Panacinar emphysema produces pale , voluminous lungs that often obscure the heart when anterior chest wall is removed at autopsy .

Centriacinar emphysema are less impressive , until late stages , the lungs are deeper pink than panacinar emphysema and less voluminous , and the upper two thirds of the lungs are more severely affected than the lower lungs .

Histologic examination :

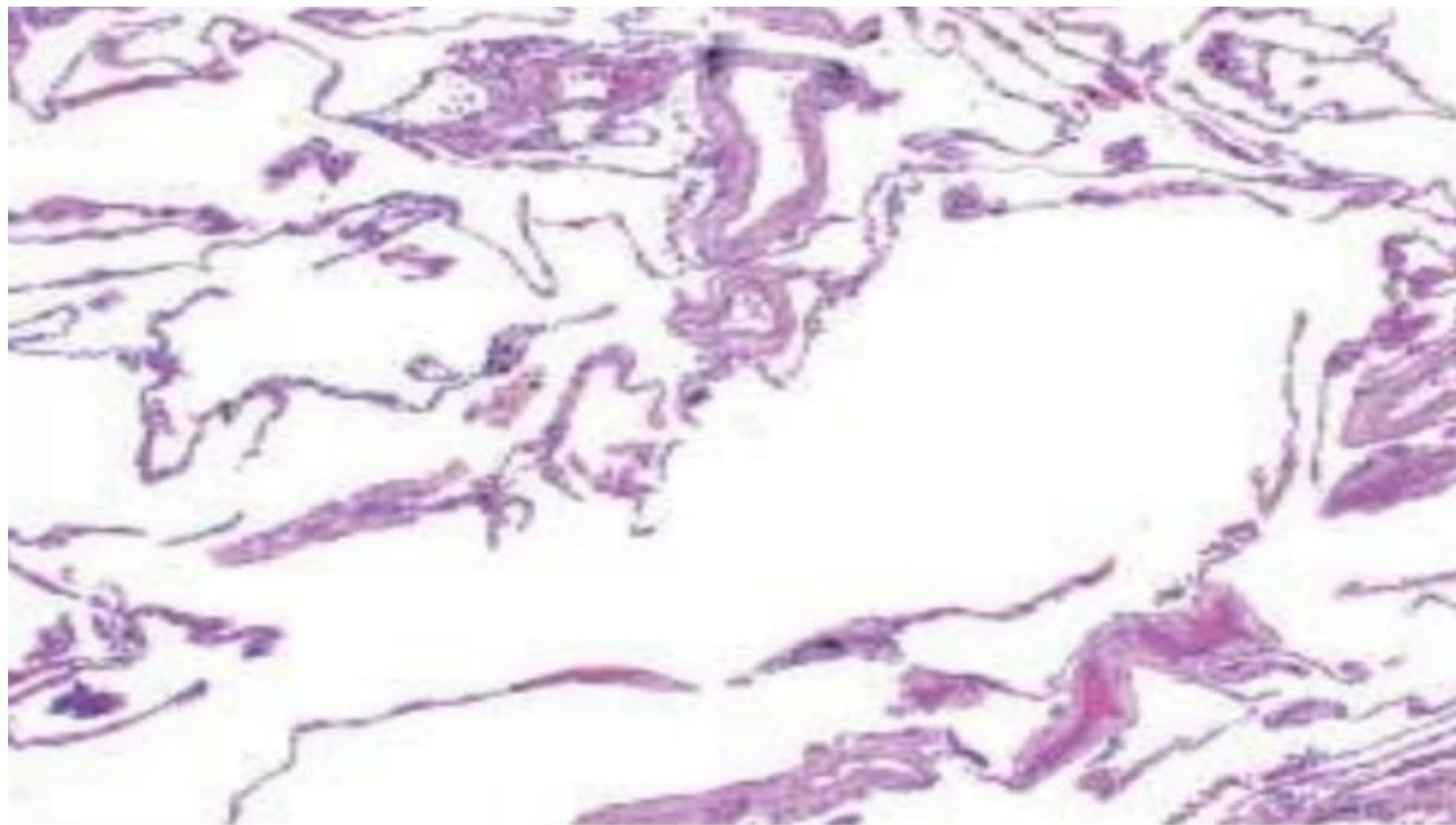
Destruction of alveolar wall without fibrosis leading to enlarged air spaces .

Alveolar loss.

The number of alveolar capillaries is diminished .

Terminal and respiratory bronchioles may be deformed because of the loss of septa .

Bronchiolar inflammation and submucosal fibrosis are consistently present in advanced disease .



Clinical features :

Dyspnea

Weight loss

Barrel chest

Pink puffers

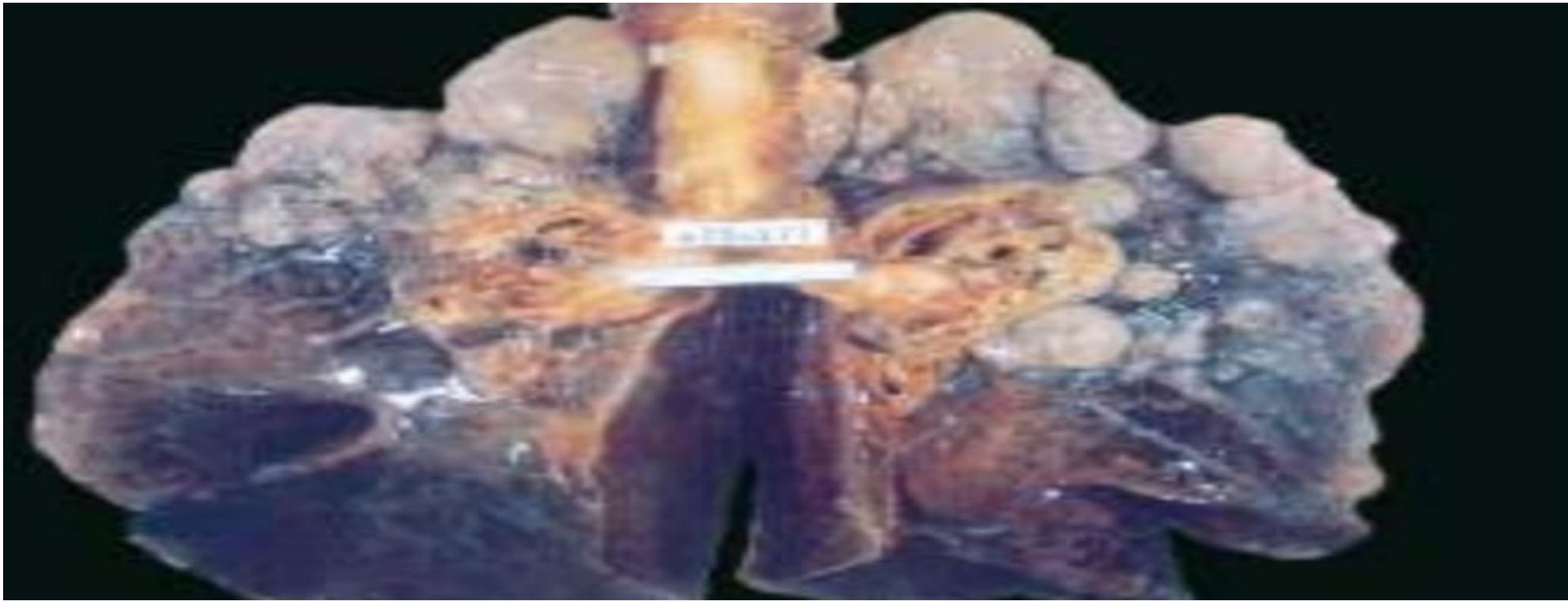
Blue bloaters (with chronic bronchitis and obese)

COPD ---secondary hypertension

Death due to respiratory failure or right-sided heart failure

Conditions related to emphysema :

1. Compensatory emphysema .
2. Obstructive overinflation .
3. Bullous emphysema .
4. Mediastinal (interstitial) emphysema



THANK YOU