APPROACH TO THE PATIENTS OF RESPIRATORY DISEASES

BRONCHIECTASIS

LUNG CAVITY

PULMONARY FIBROSIS

BRONCHIECTASIS

- Definition
- Etiology
- Pathology
- Clinical presentation
- Diagnosis & differential diagnosis
- Treatment

Definition

- Bronchiectasis is a condition anatomically defined by chronic, irreversible dilation and distortion of the bronchi caused by inflammatory destruction of the muscular and elastic components of the bronchial walls.

Etiology

Conditions associated with the development of bronchiectasis

1. Postinfection

- Bacterial pneumonia
- Tuberculosis
- Pertussis
- Measles

2. Proximal airway obstruction

- Foreign body aspiration
- Benign airway tumors
- Middle lobe syndrome

Extrinsic compression by enlarged lymph nod
of the right middle lobe of the lung that
obstructed bronchi and lead to right middle
lobe atelectasis and recurrent infection.

Etiology

3.Abnormal host defense

- Ciliary dyskinesia (Kartagener's syndrome)
- Humoral immunodeficiency

4.Genetic disorders

- Cystic fibrosis
- α1- Antitrypsin deficiency

5.Others

Pathology

- Dilation and distortion of the bronchi
- Damage of airway epithelium
- Dilation and hyperplasia of blood capillary

Clinical presentation

- **The production of large quantities of purulent and often foul-smelling sputum.**

The volume of sputum can be used for estimating the severity of the disease

- Mild < 10 mL
- Moderate 10~150 mL
- Severe >150 mL

※ **Dry bronchiectasis**

usually involve the upper lobes

2. Chronic cough

3. Hemoptysis:

- Frequent
- More commonly in dry variety
- Usually mild (blood streaking of purulent sputum)
- Massive hemoptysis is usually from dilated bronchial arteries or bronchial-pulmonary anastomoses under systemic pressure

4. Recurrent pneumonia:

same segment

5. Systemic manifestations:

fever, weight loss

Clinical presentation

Physical finding

- Early phases or dry variety: normal
- Severe or secondary infection: persisting crackling rales in the same part of lung
- Later stage: digital clubbing, emphysema, and cor pulmonale.

Evaluation

1.Roentgenographic studies

- The plain chest film: increased in size and number of bronchovascular markings (quiet nonspecific)
- Bronchography: (traditional gold standard)

Evaluation

- CT or HRCT: high sensitivity and specificity

  Train track sign: the bronchial wall is thicken and visible; the bronchi lose the trend of narrowing from proximal end to distal end.

  Diamond ring sign: dilated bronchi appear as ring structures with internal diameters greater than those of their accompany pulmonary artery branches.

Evaluation

2.Bronchoscopy

- Evaluating the proximal airways for lesions.
- Assessing the cause of hemoptysis
- Localizing the source of hemoptysis

Diagnosis

- Symptoms
- Sign
- reontgenographic fiding

Treatment

- Medical management

1. Improving the drainage of airway
    1) expectorant
    2) bronchodilators
    3) postural drainage
    4) bronchoscopy

Treatment

- Medical management

2. Antibiotic

- The choice of antibiotics should be accurately by the results of sputum culture and drug sensitivity test.
- Empirical therapy ---antipseudomonal antibiotics.

Treatment

- Surgical therapy

2. Recurrent and refractory clinical symptoms are due to a focal area of disease involvement.
3. Massive hemoptysis

- Management of hemoptysis

CAVITATORY LESIONS OF THE LUNG

Cavity

- A cavity is a gas-filled space seen as a lucenc or low attenuation area, within a pulmonary consolidation, a mass, or a nodule; hence, a lucent area with in the lung that m or may not contain a fluid level and that is surrounded by a wall, usually of varied thickness”

- Bulla

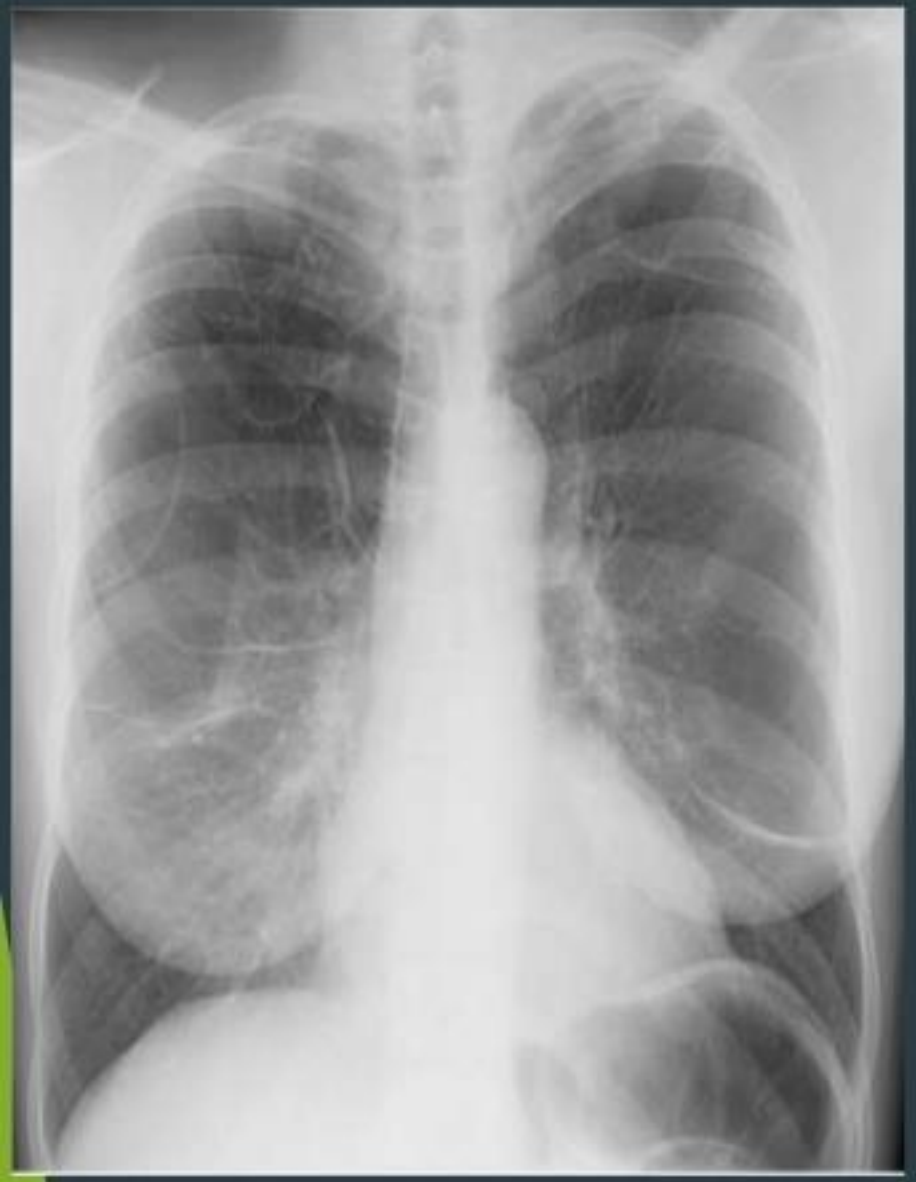
  air filled spaces surrounded by a thin wall < 1mm

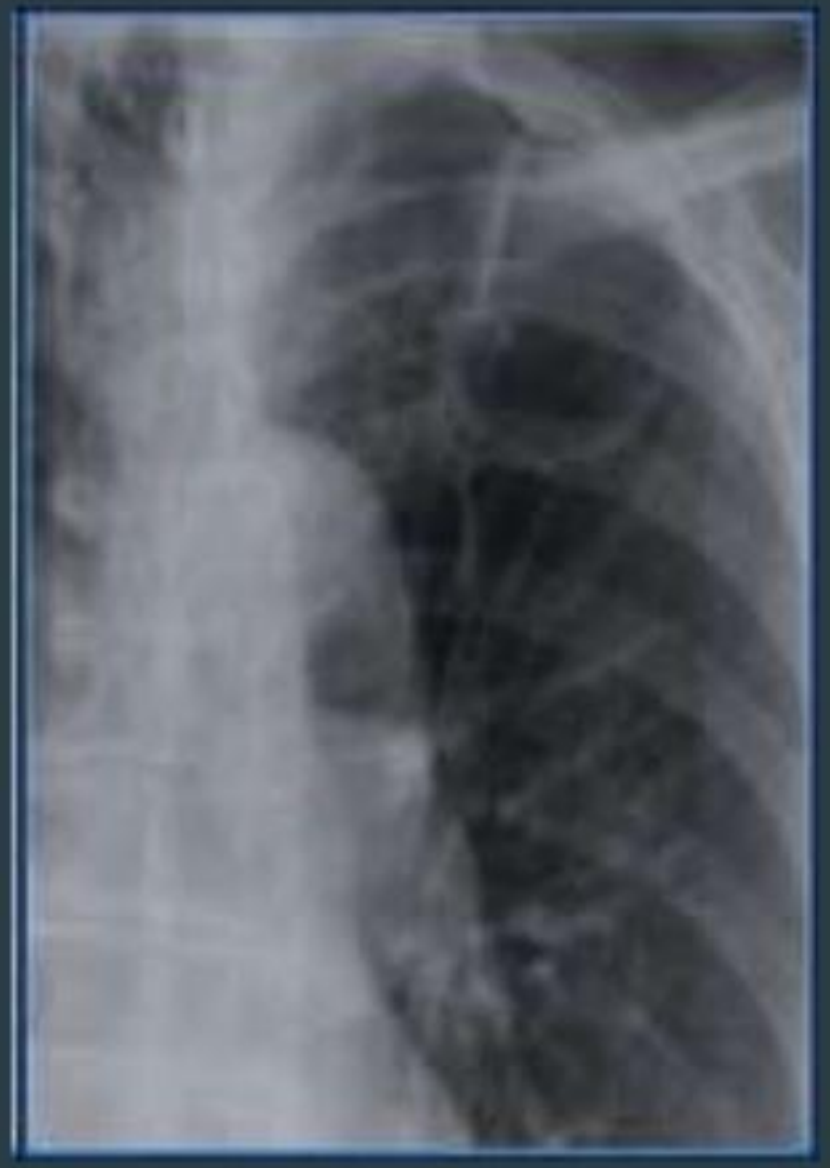
- Cysts

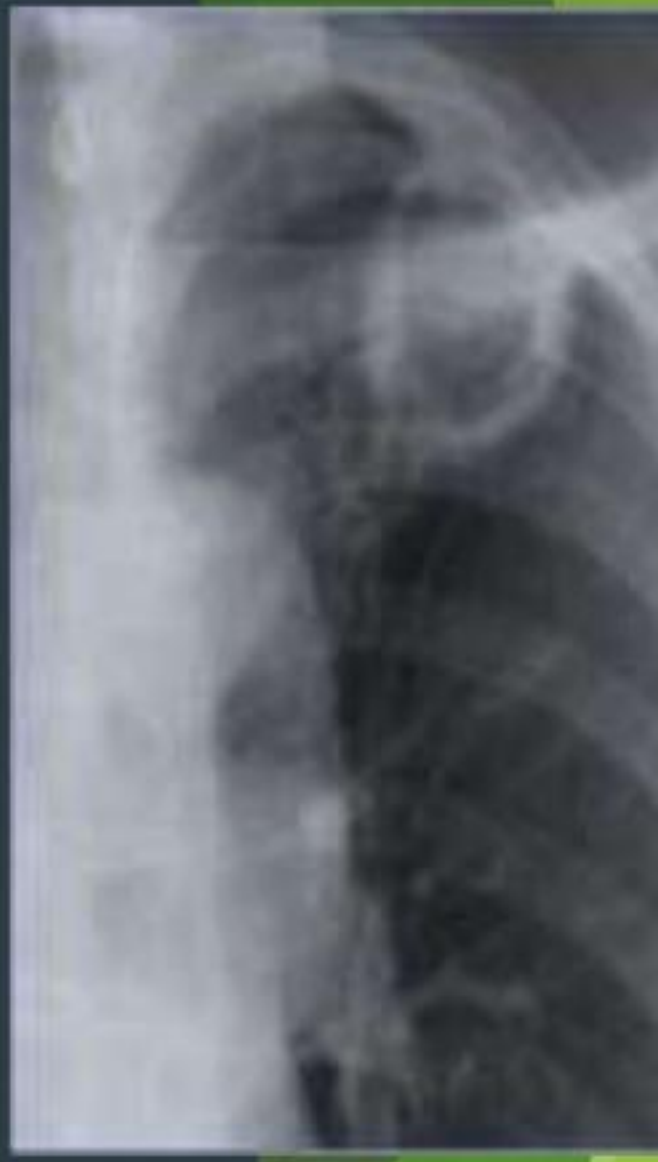
  are air containing spaces surrounded by a thin (2mm or less) wall

- Cavities

  air containing spaces surrounded by a thick wall >3mm and also the air containing lesion that is surrounded by an infilterate and /or a mass.







Bulla

Cyst

Cavity

pathogenesis

- necrosis of lung parenchyma
- Communication with the tracheobronchial tree
- complete destruction
- band of inflammation around the necrotic material

Imaging modalities

- Chest radiograph
- Computed tomography

Radiological characteristics of cavitatory lesi

- Wall thickness
- Characteristics of the inner contour
- Internal content
- Number and location
- Other findings

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- Wall thickness
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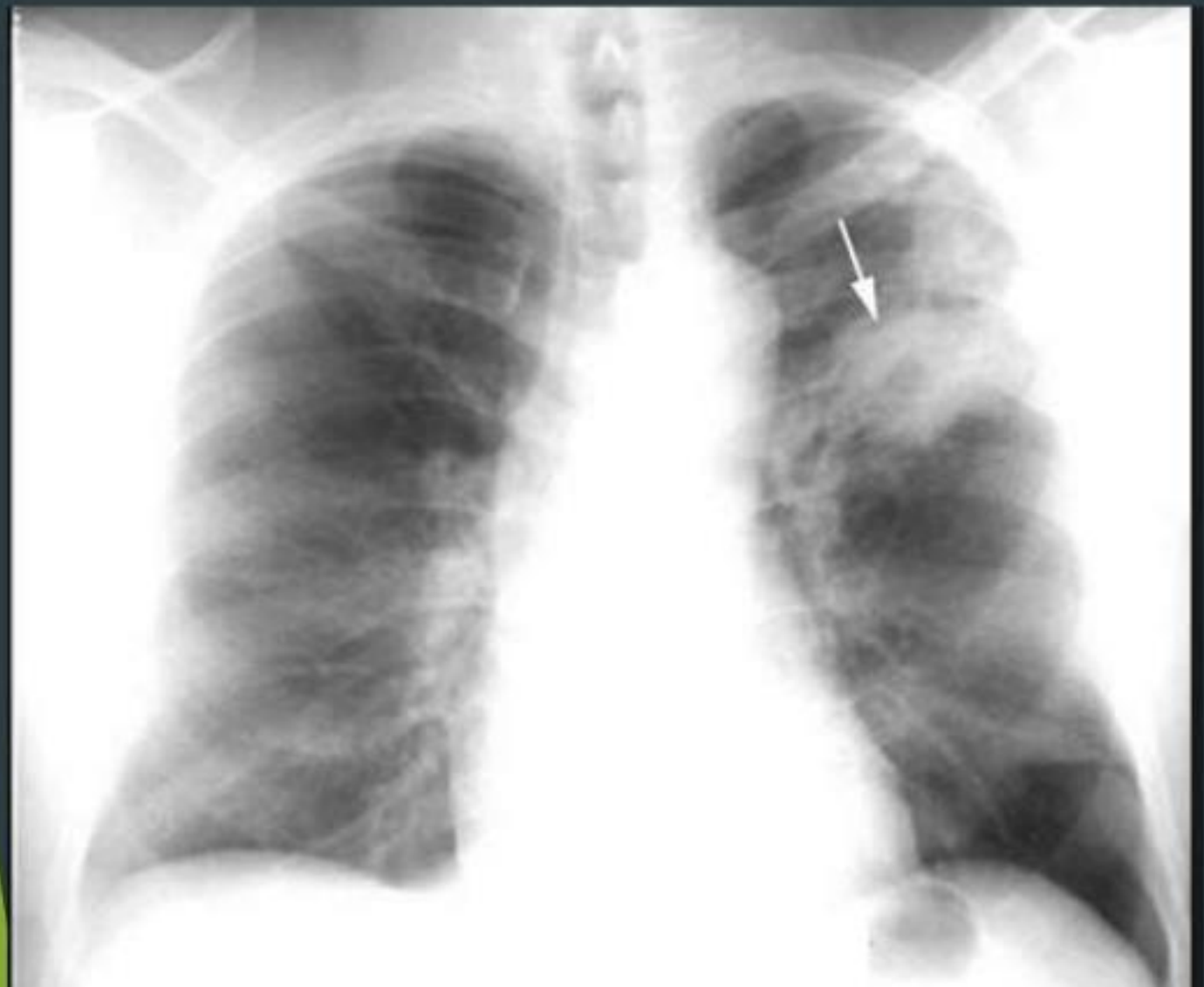
Thick walls

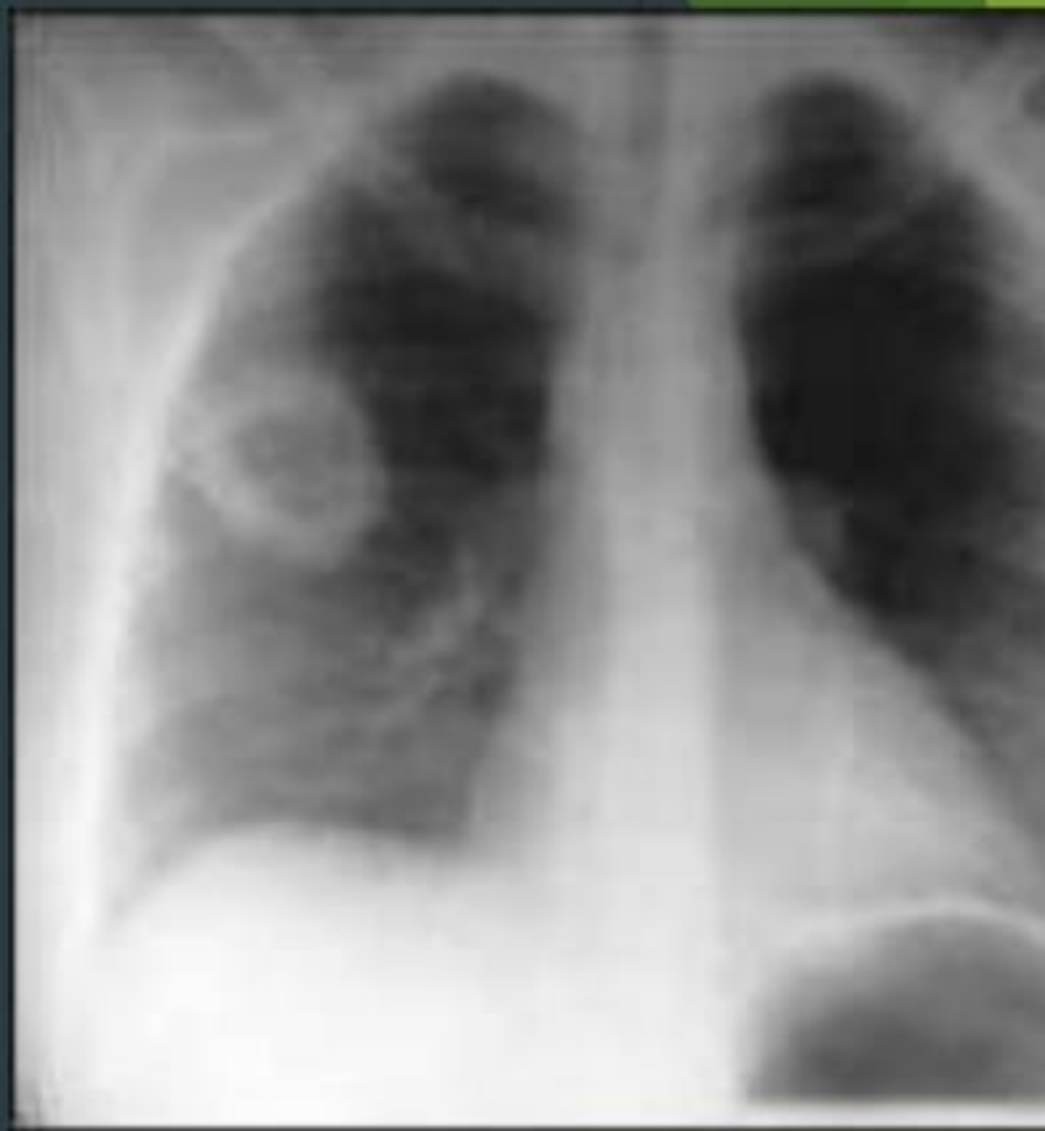
- Lung abscess
- Necrotizing squamous cell lung cancer
- Wegners granulomatosis
- blastomycosis

Thin walled

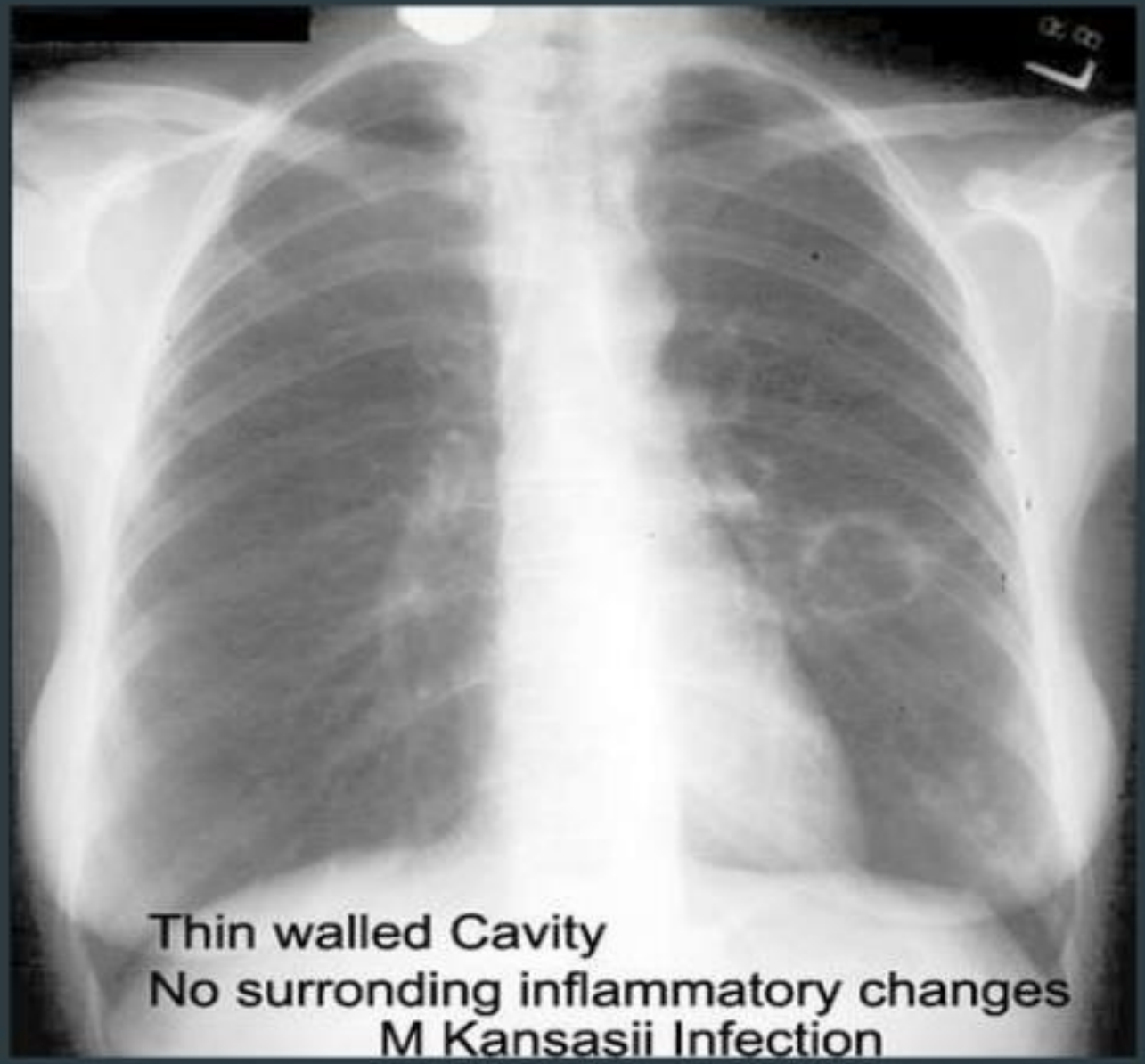
- Coccidiomycosis
- Metastatic carcinomas
- M.Kansasii infection
- Congenital or acquired bull
- Post traumatic systs
- open negative TB

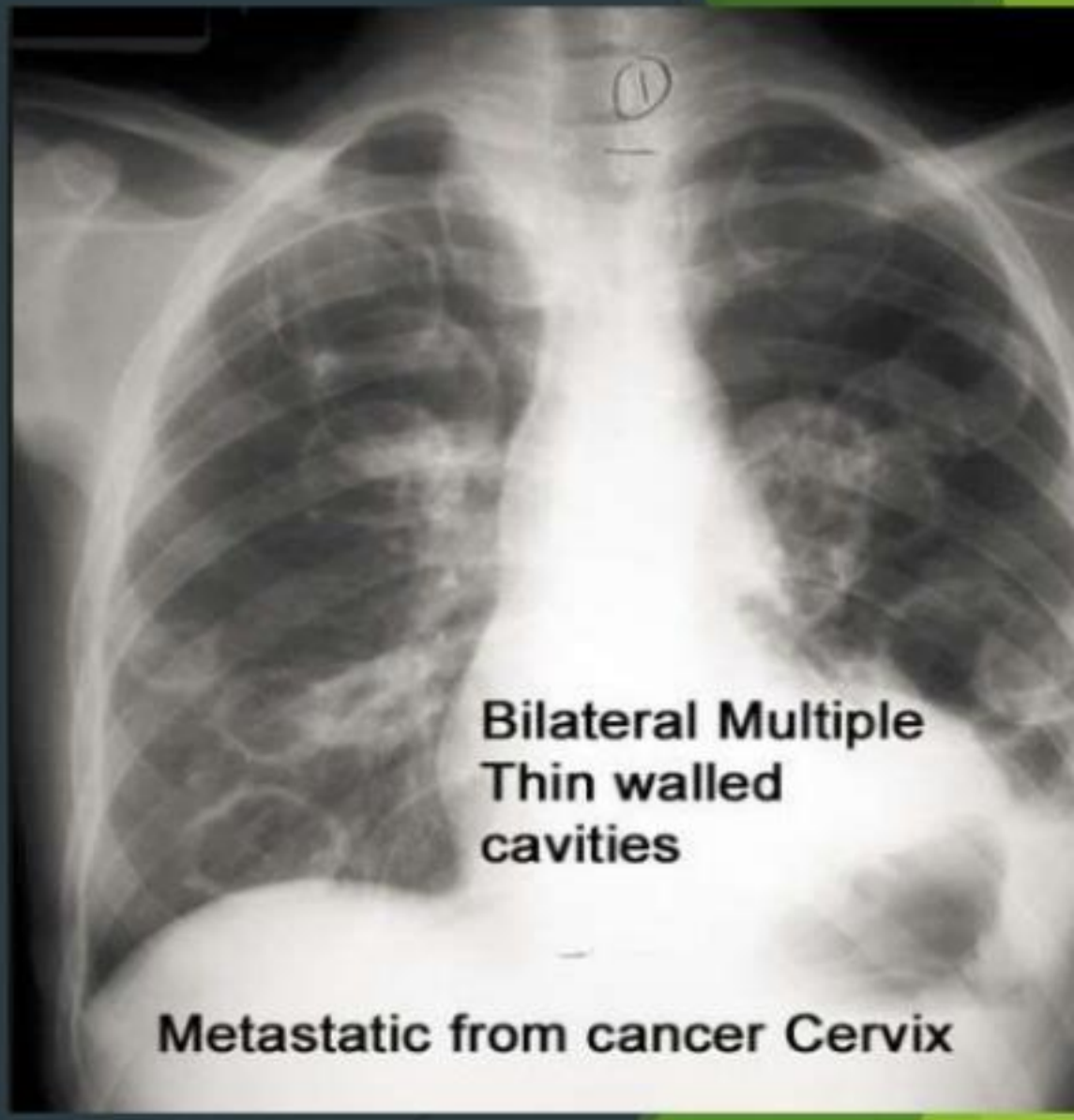
Thick walled cavities





Thin walled


Thin walled Cavity
No surronding inflammatory changes
M Kansasii Infection


Bilateral Multiple
Thin walled
cavities
Metastatic from cancer Cervix

Internal content

- Air liquid

Solid air-fluid level -does not correlate with benign or malignant nature of the lesion ,and the solid content can be seen both in infectious processes such as invasive aspergillos as in necrotic tomors.

Number and location

- Some l;ocations guide to the possible etiology of the cavitory lesion eg-upper lobes are typical for tuberculosis
- Solitary cavitatory lesion is frequently found in pulmonary abscess ,neoplasm or post traumatic lung cyst etc
- Multiple cavitatory lesions suggest infection,granulomatosis,septic emboli or metastatic disease ,TB

Valuation of the clinical context and the time of the disease process

- clinical scenario
- duration and evolution
- Acute or subacute
- Chronic lesions

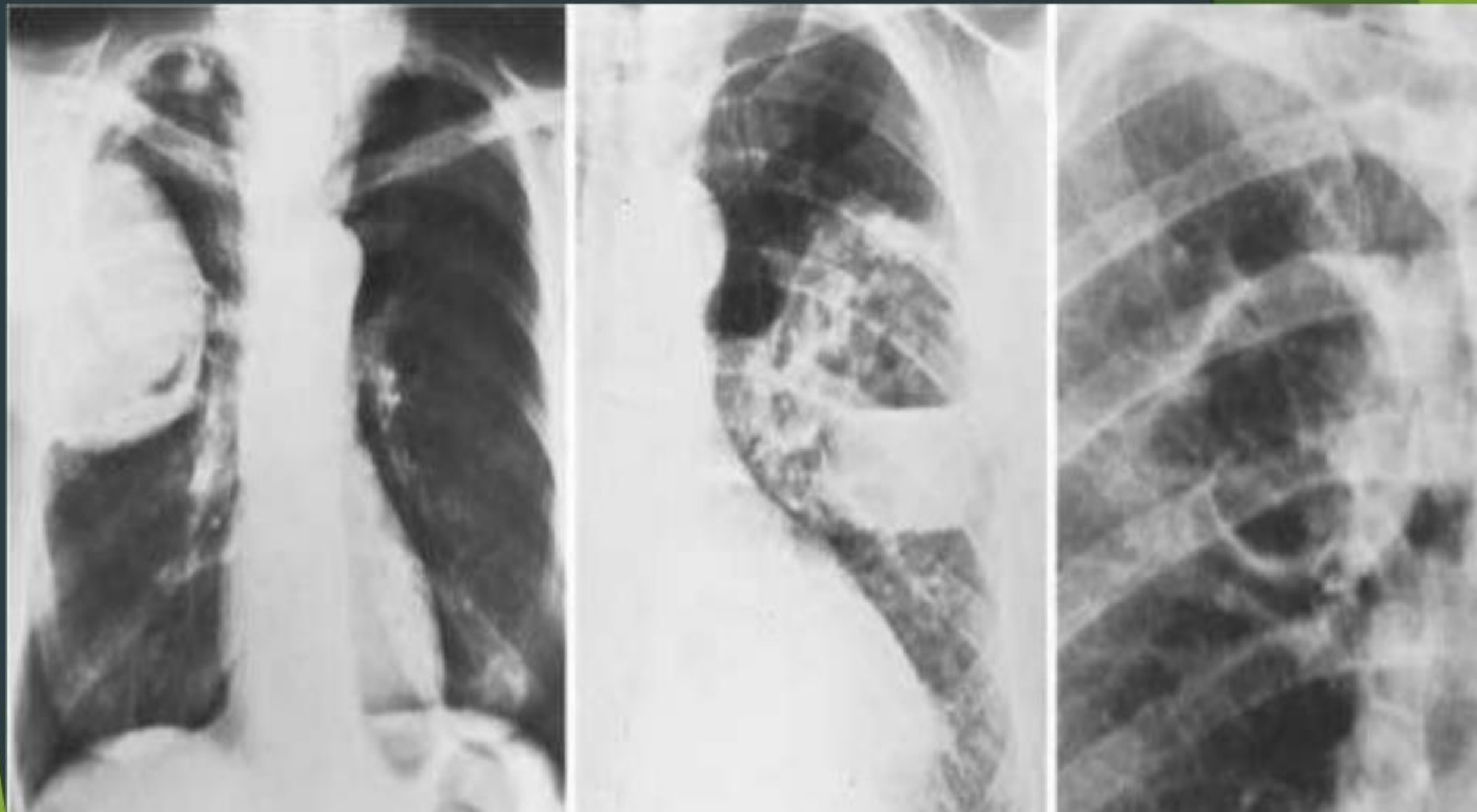
- The differential diagnosis are therefore very broad & includes
- Neoplastic pathology –primary bronchogenic carcinoma,lymphoma,mets
- Infectious-bacterial,mycobacterial,fungal, parasitic
- Pulmonary infarcts
- Septic emboli
- Autoimmune-wegners granulomatosis
  - rheumatoid arthritis

Traumatic

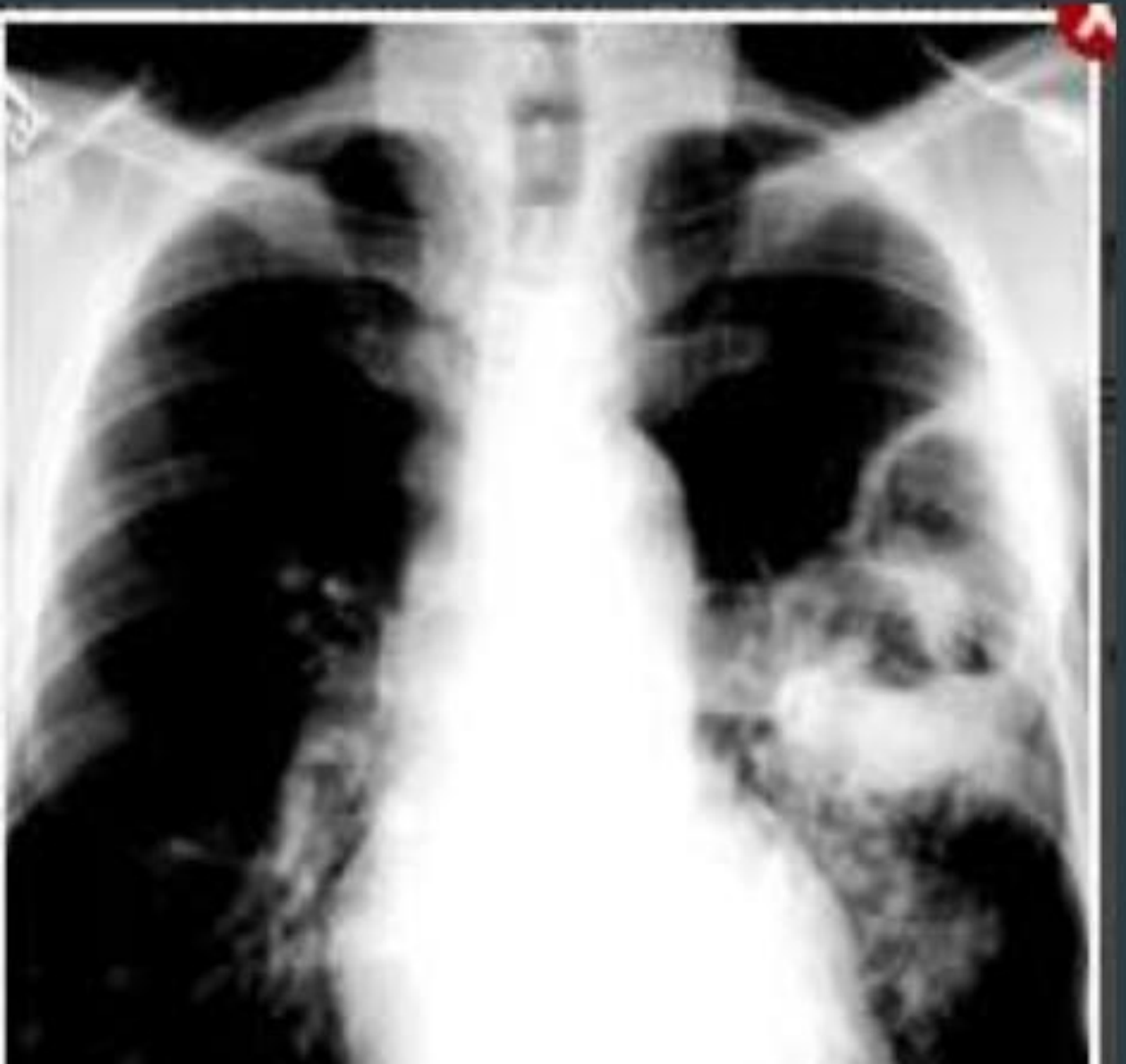
Congenital

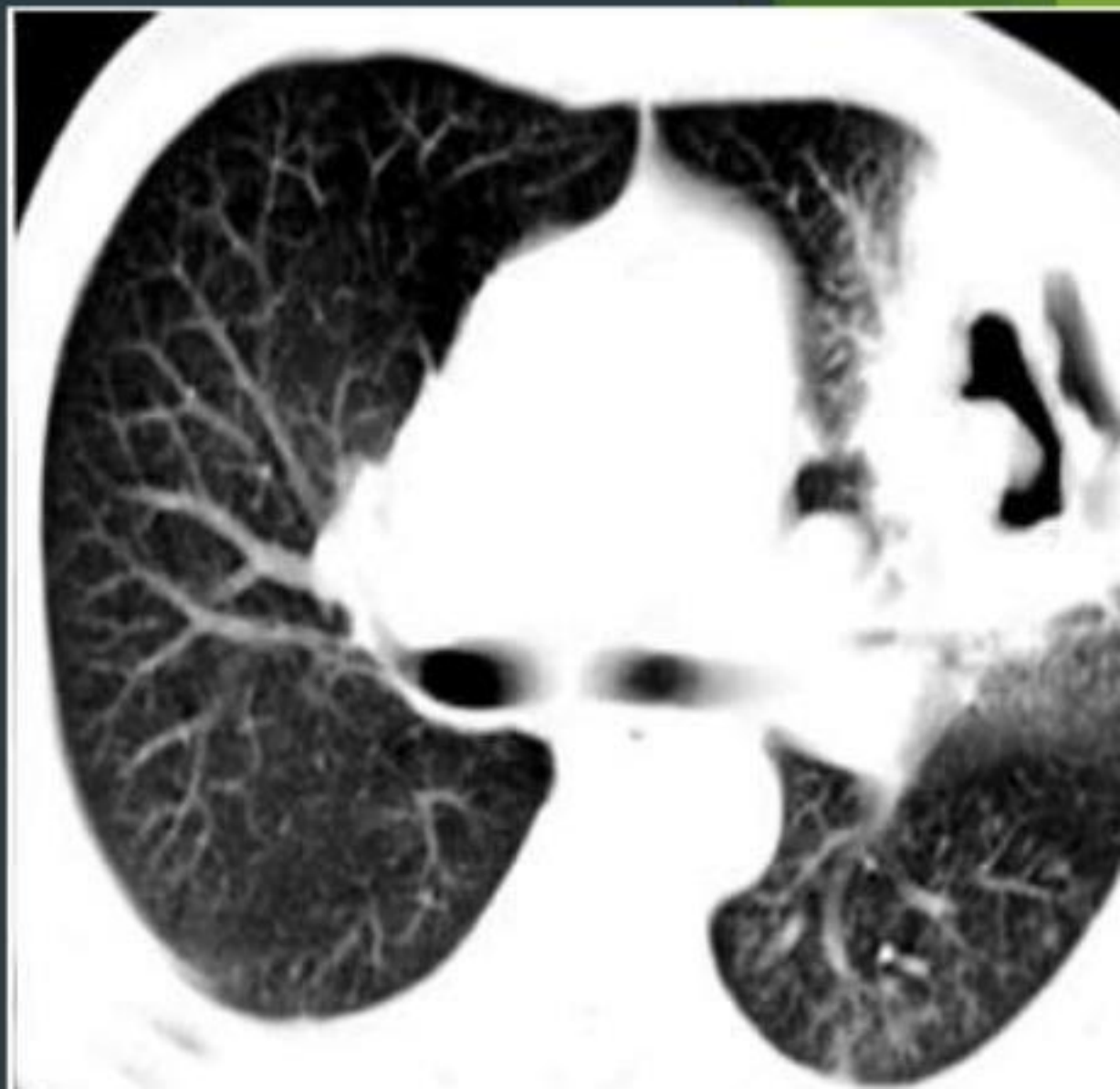
neoplasms

- Isolated cavitatory lung lesion
- Lesion of variable size
- Irregular or speculated margins
- Thick walls
- Associated with mass and other findings
- Air crescent sign may be present in rare cases



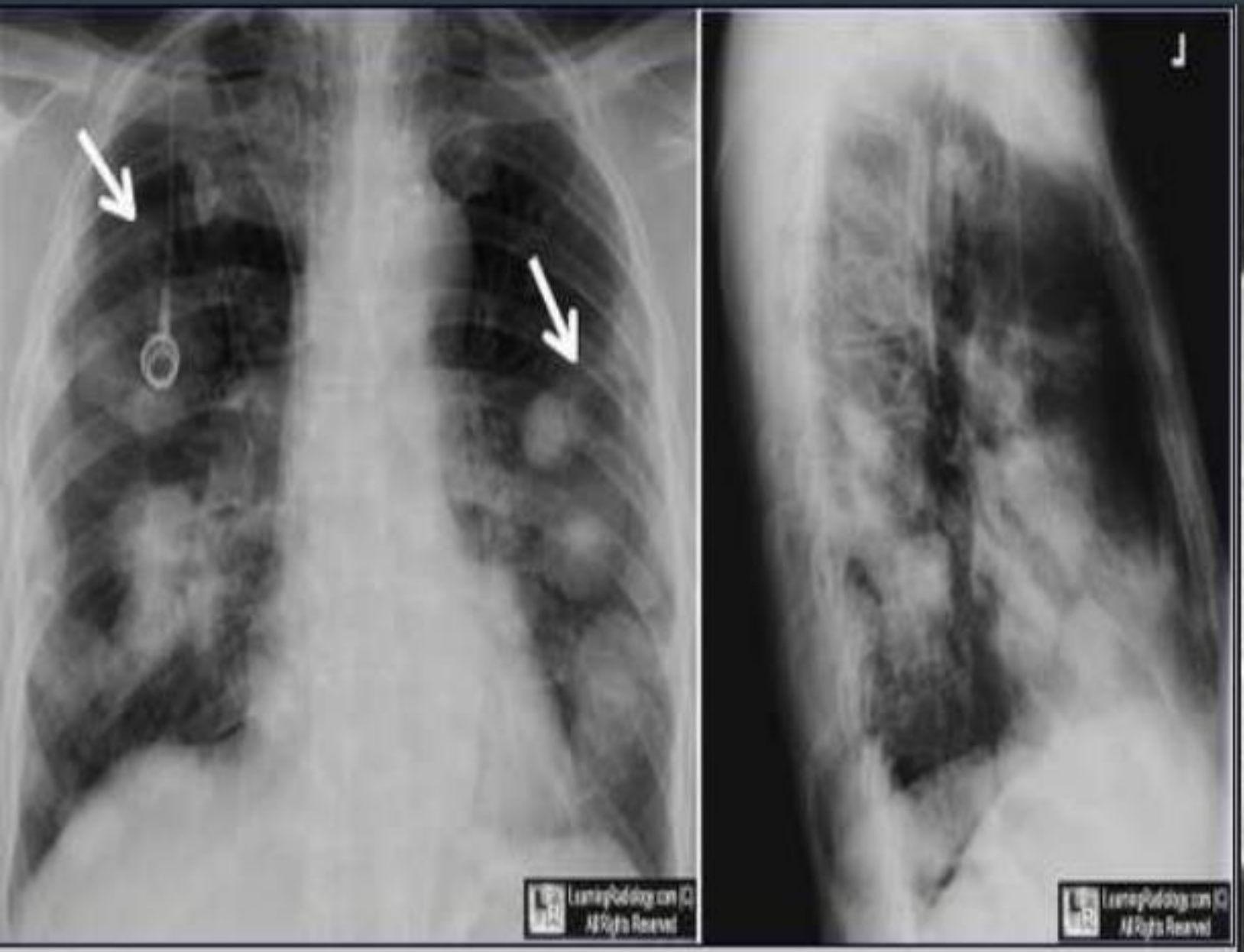
neoplasm





METASTATIC

- Metastases are multiple
- differing sizes
- thick and irregular walls (adenocarcinomas)
- Thin-walled cavities (squamous cell carcinomas)
- Cavitation is more common in upper lobe lesions than lower lo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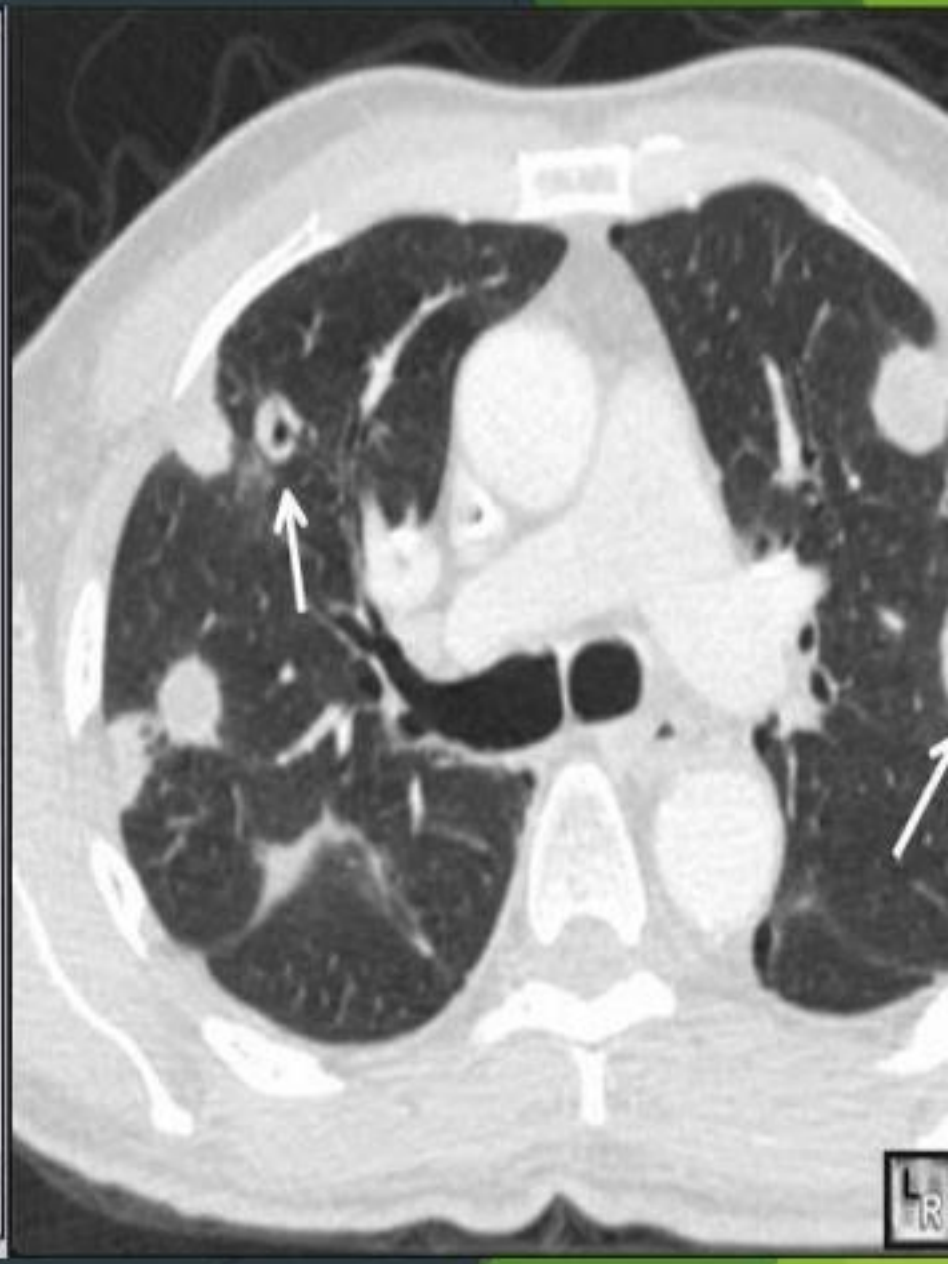


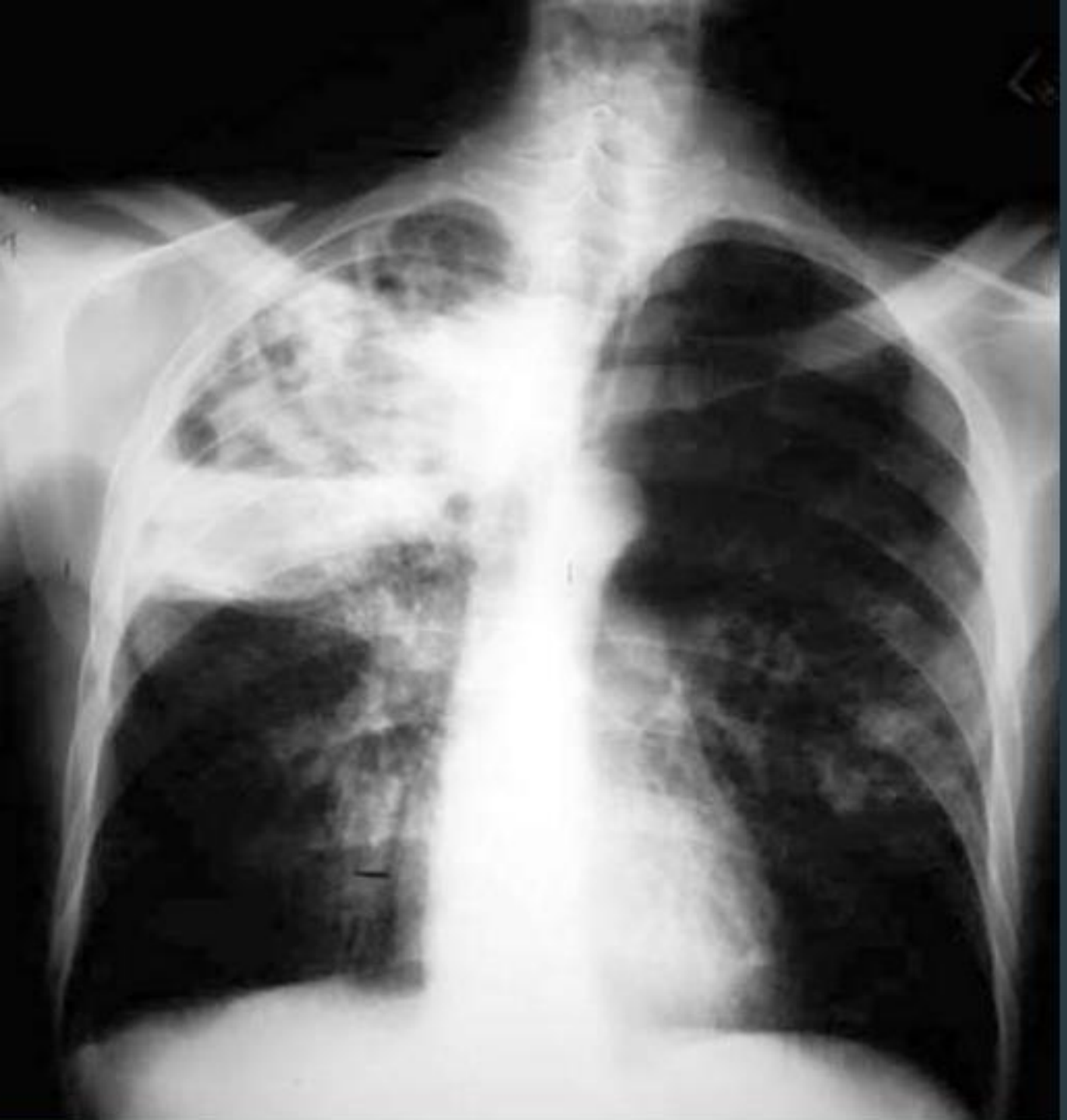
Infectious pathology

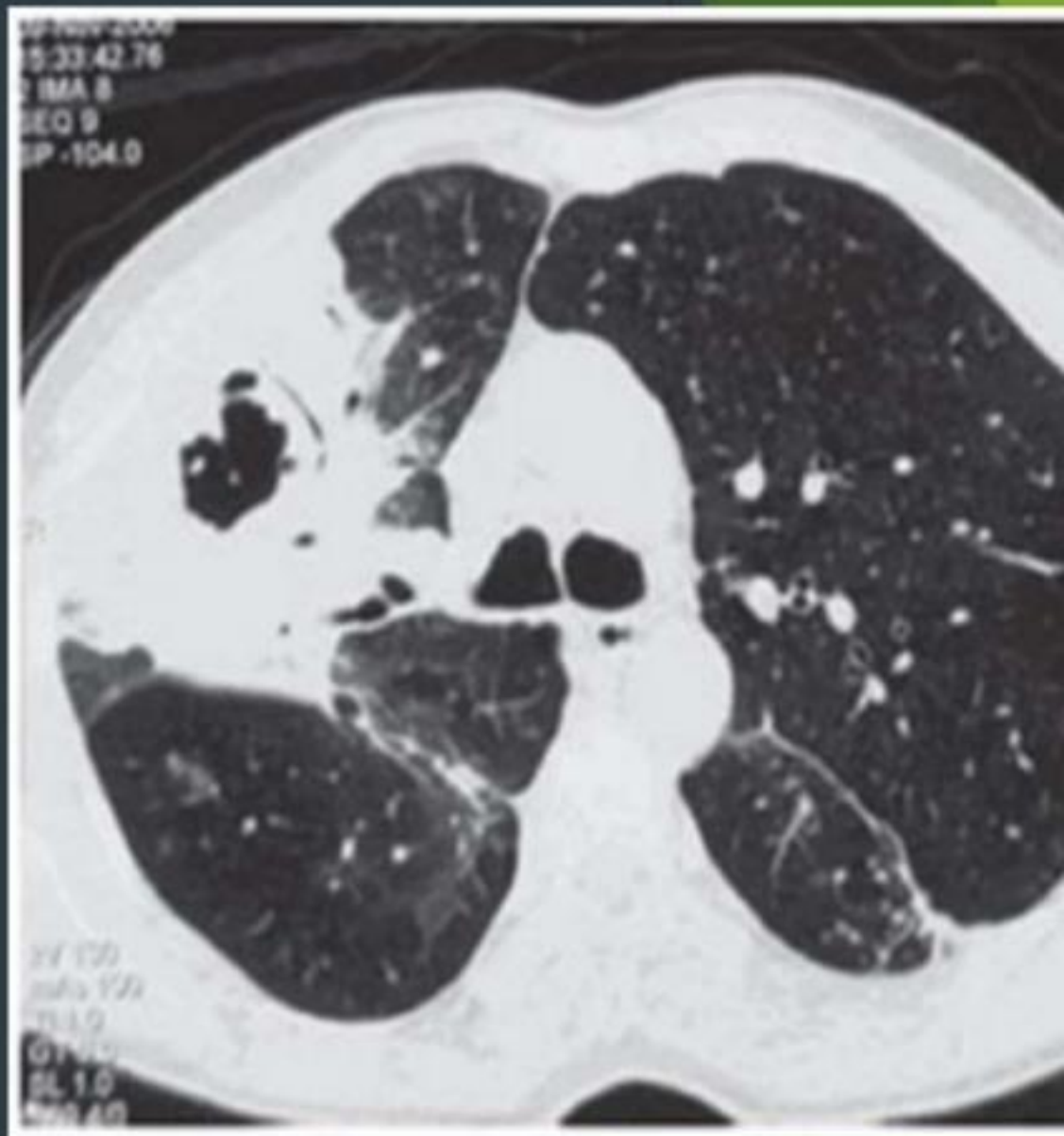
- Necrotizing bacterial pneumonia

- Caused by staph aureus,gram negative bacteria and anerobic bacteria

- Primary consolidation that can associate cavitation inside

- In anerobic bacteria it is common to develop abscesses with thick and irregular walls containing air fluid levels

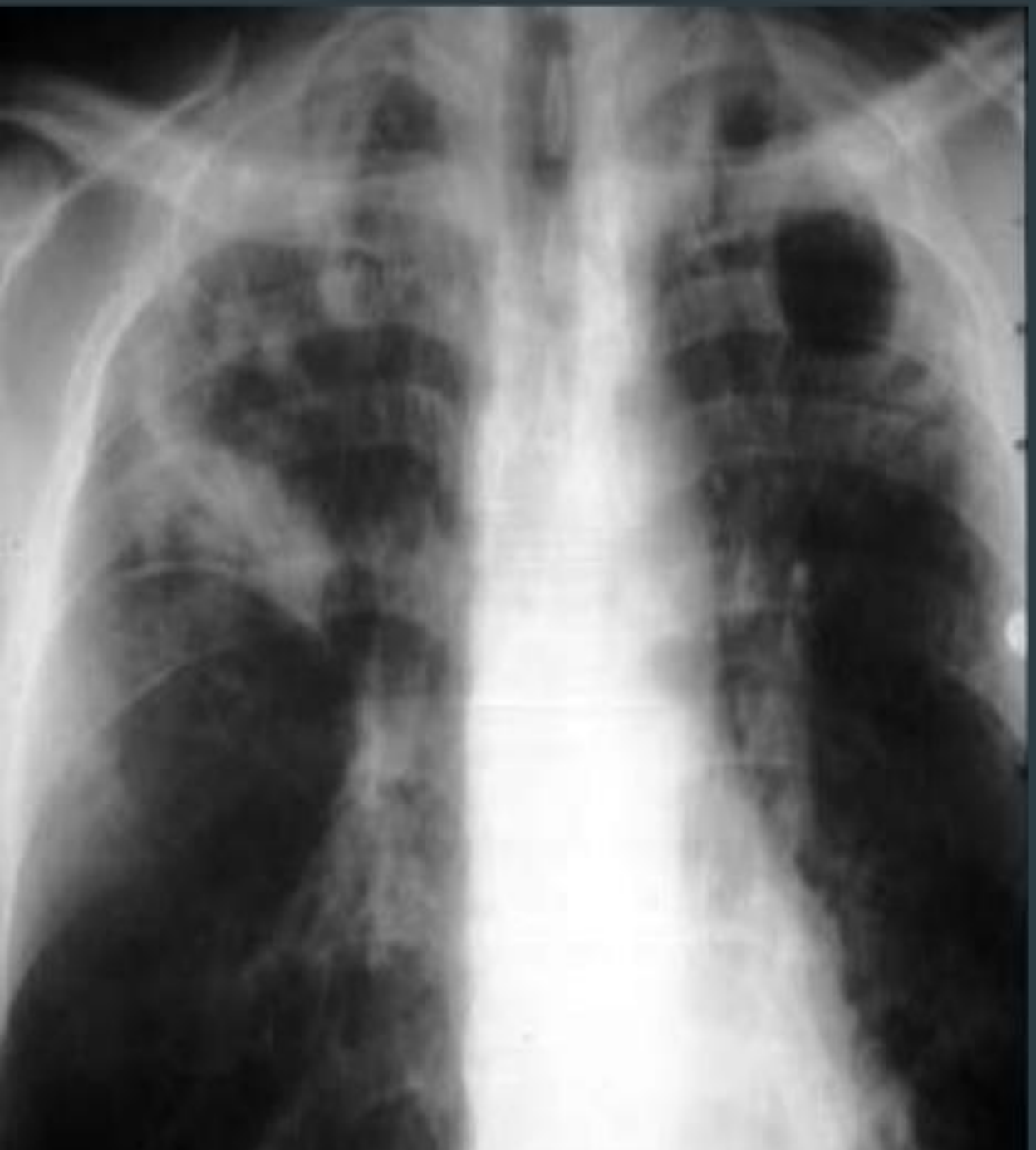


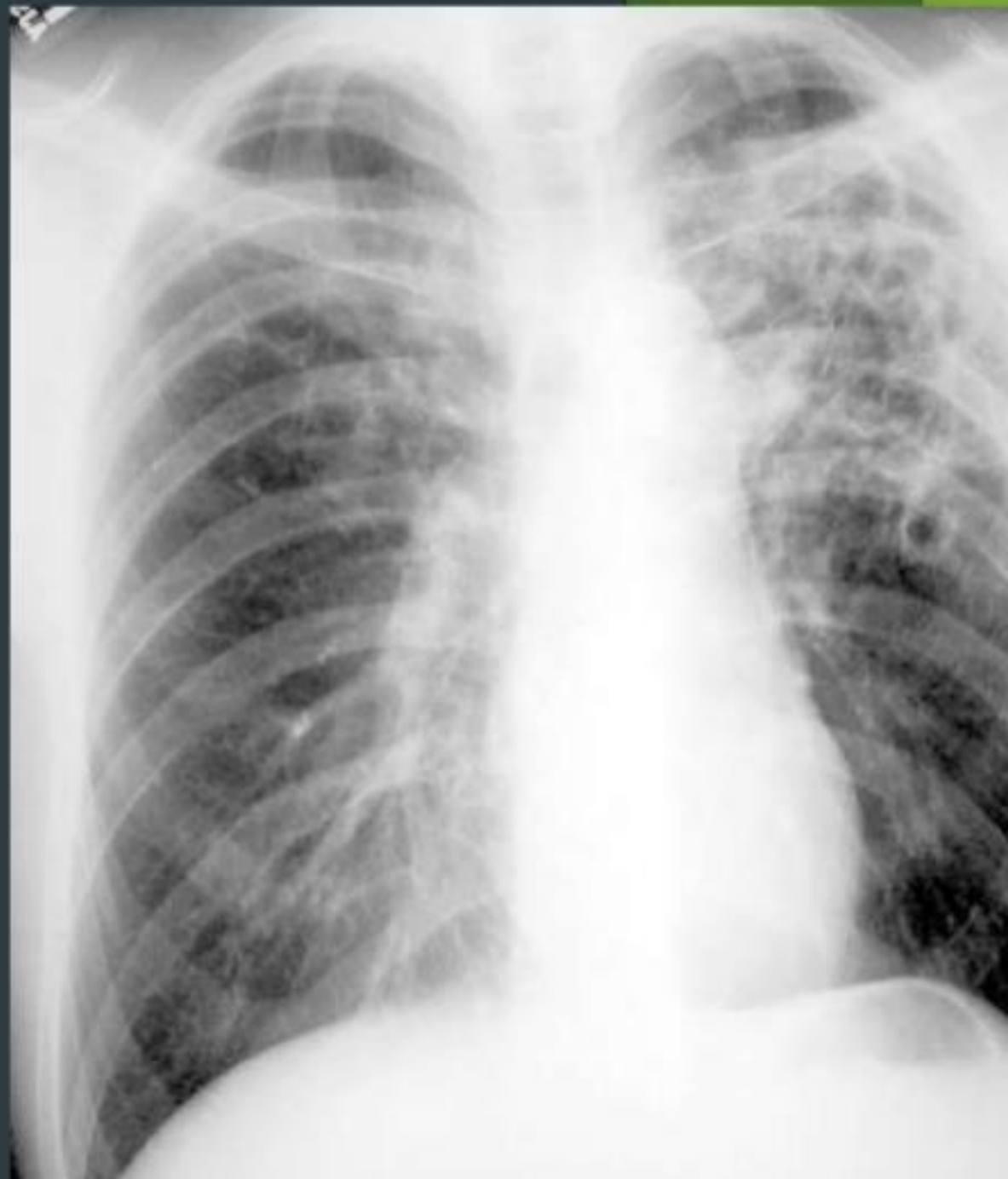


Postprimary tuberculosis

- prescence of infiltrates with multiple satellite nodules and cavitatory lesions

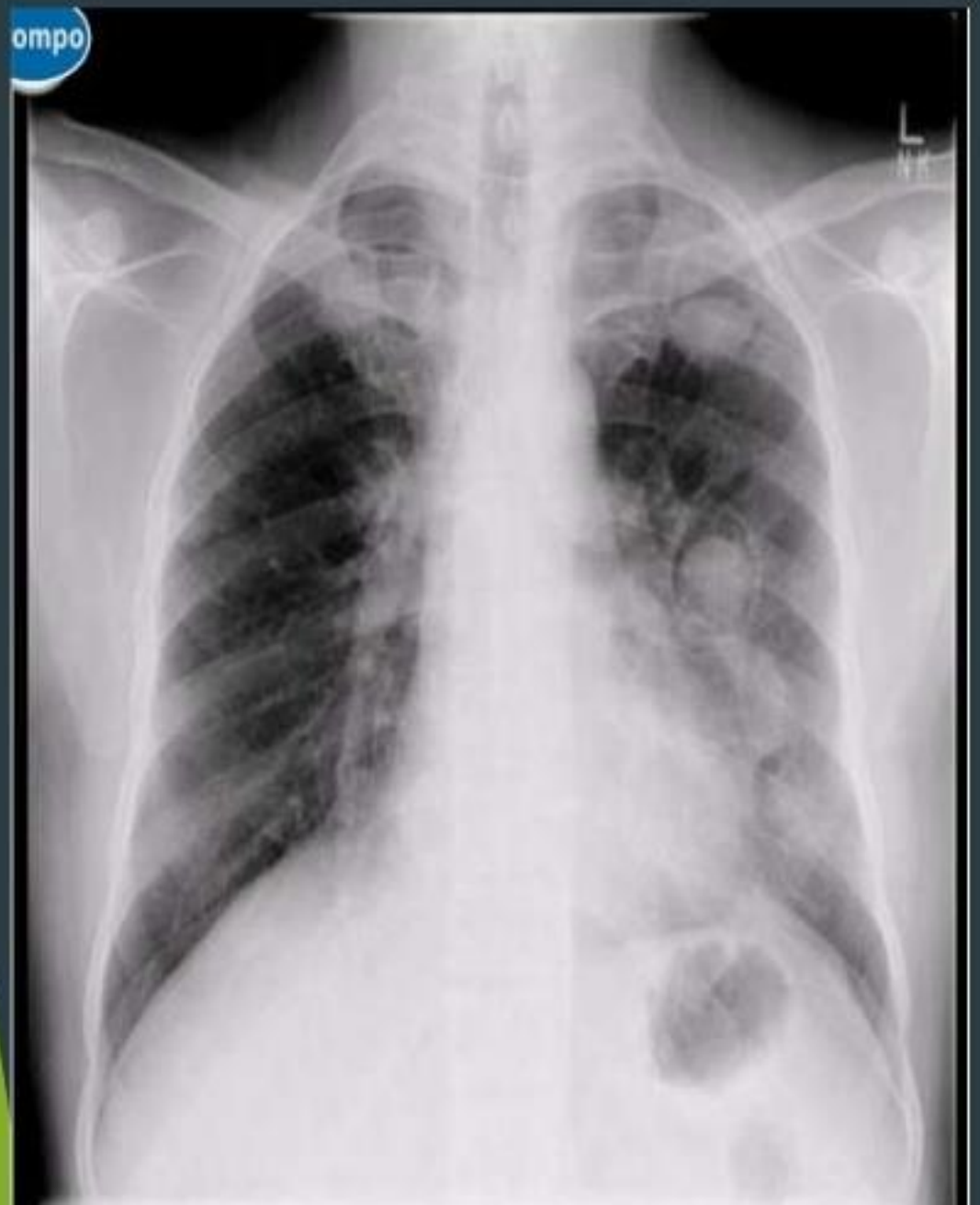
- located preferentially in the upper lobes and in the apical segments of the lower lobes
- Vary widely in size
- Both thick & thin walls
- Inner walls can be smooth and more irregular and thick





Fungal infections

- Most common aspergillus
- Cavitatory lesions of variable wall thickness
- In aspergillosis –thick walls ,isolated or multiple in the upper lobes associated with focal opacities and diffuse infilterates
- Air crescent sign
- Halo sign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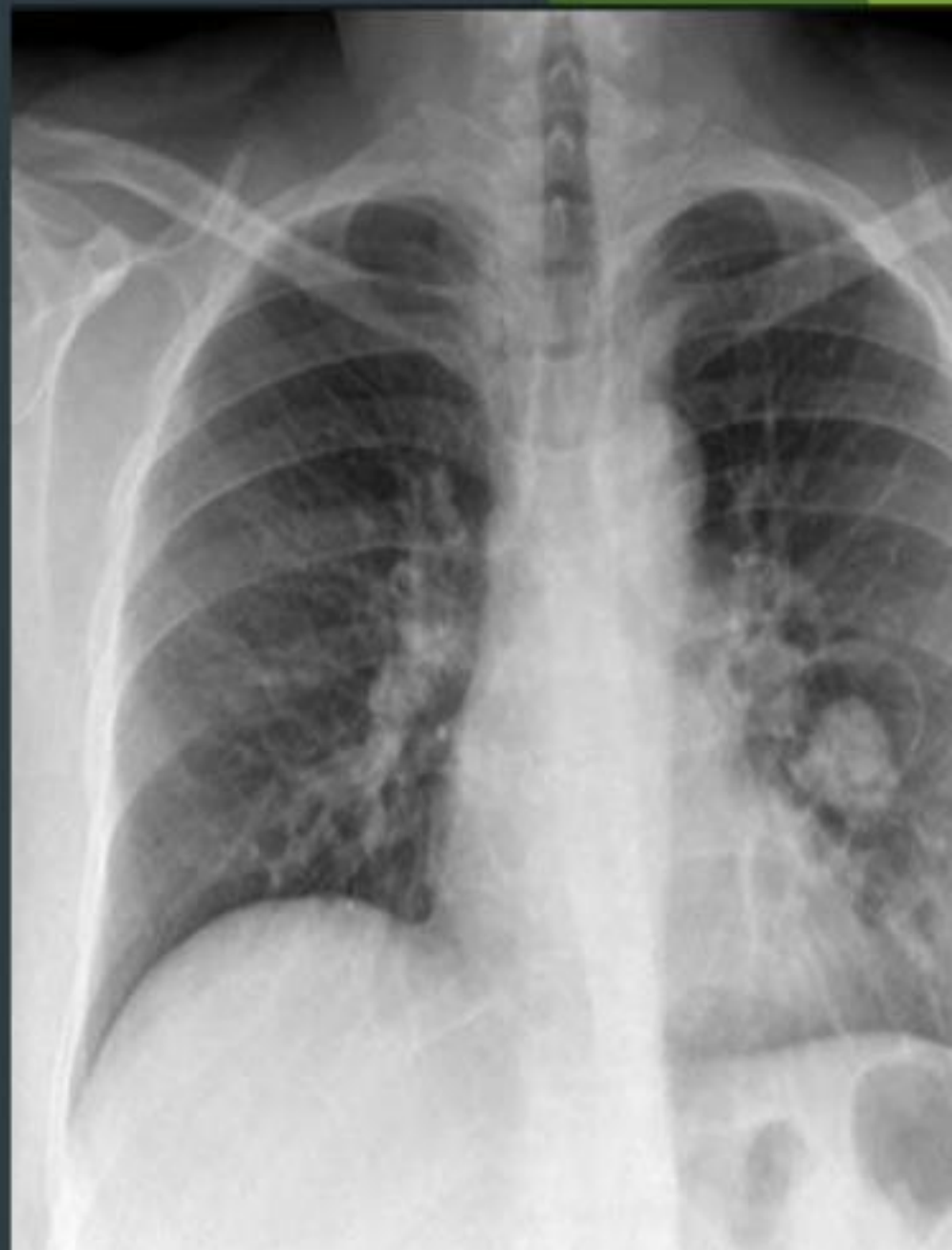
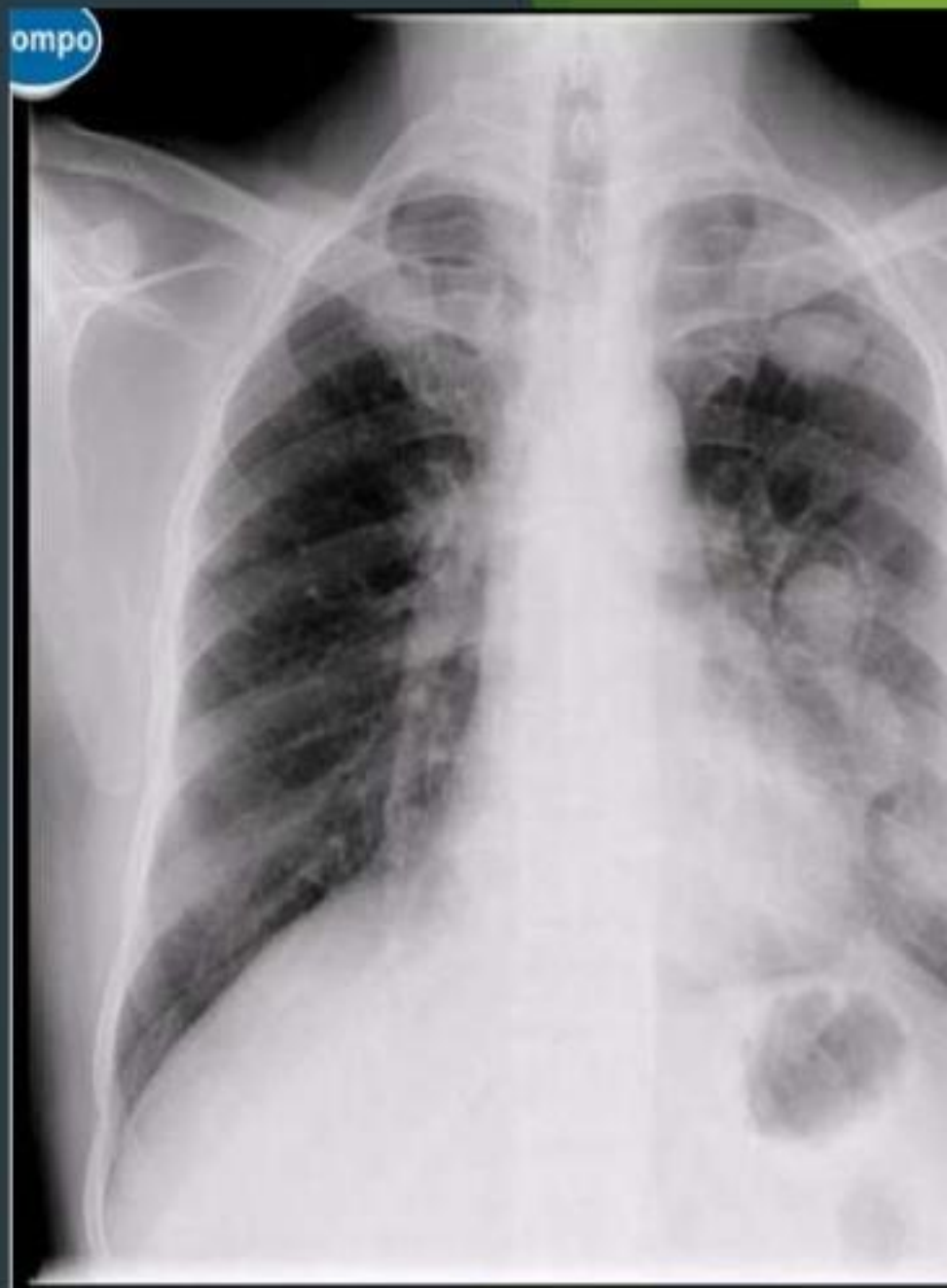


Dds for air crescent sign

- Angioinvasive aspergillosis
- Lung abscesses
- Bronchogenic carcinoma
- T.B cavity with Rasmussen aneurysm
- Hyaditd cyst

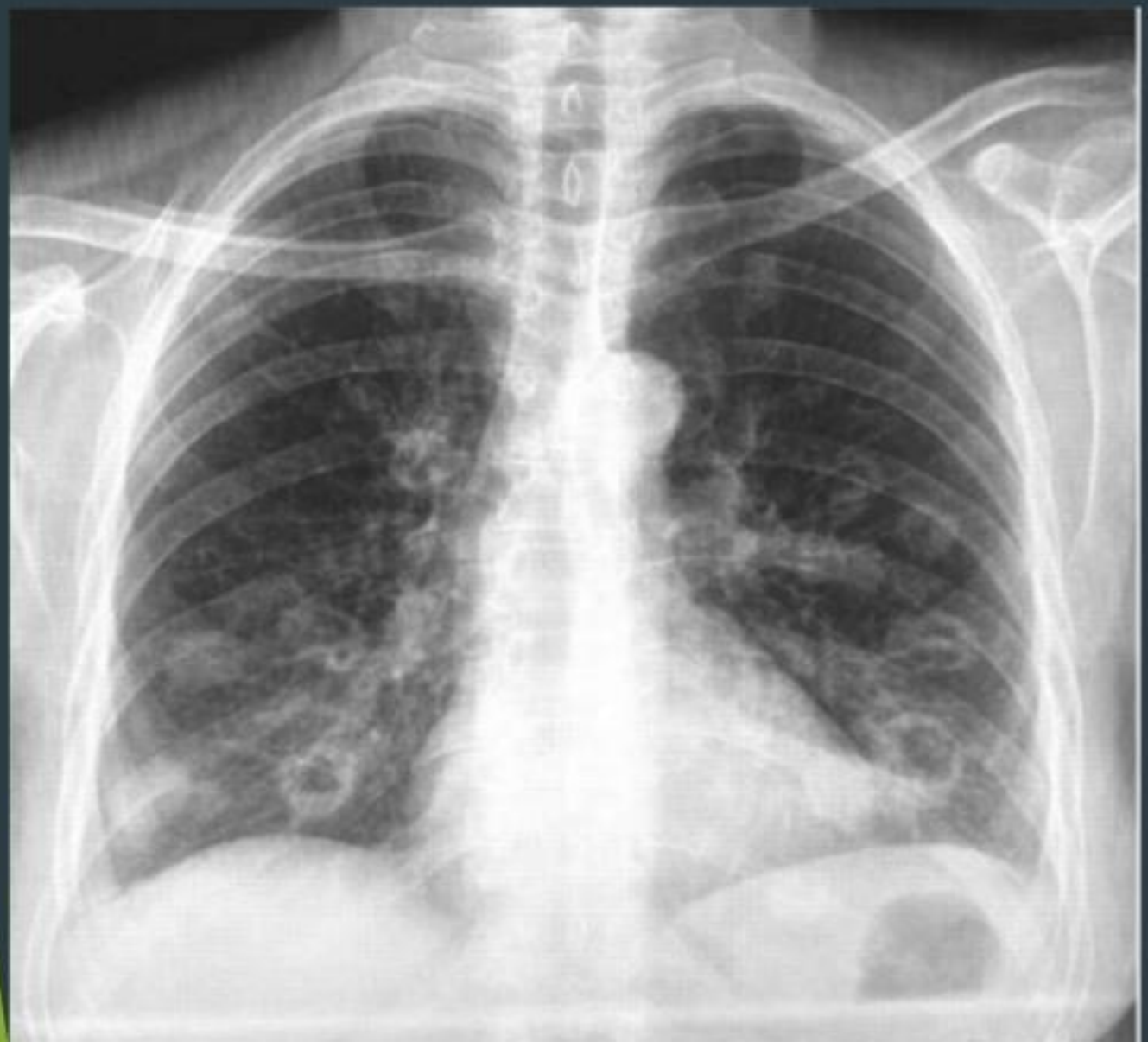


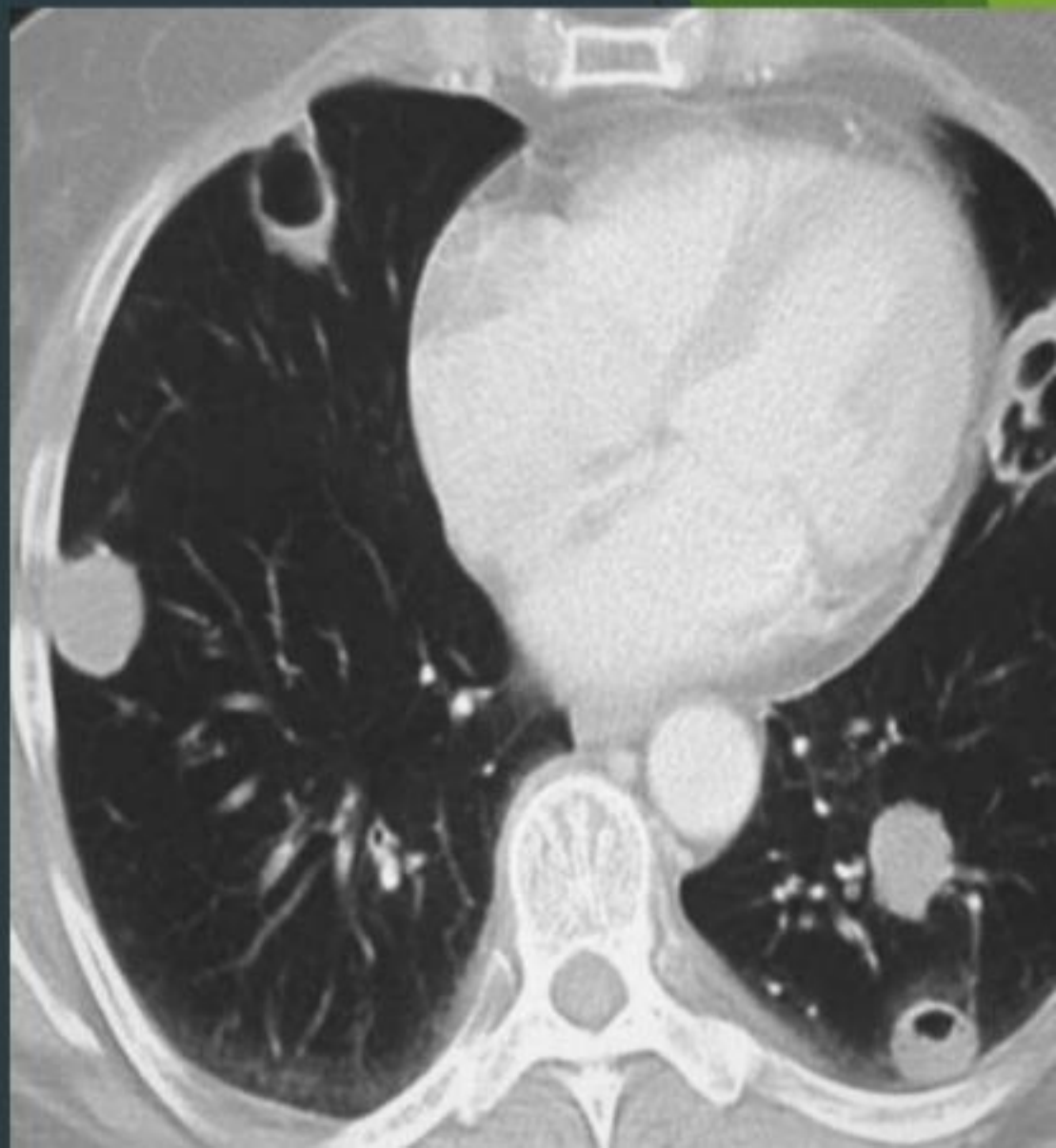
rheumatoid arthritis

Affects mainly women 20 -50 yrs

Bilateral and multiple lung nodules ,usually small in

size and with sub pleural location that may cavitate

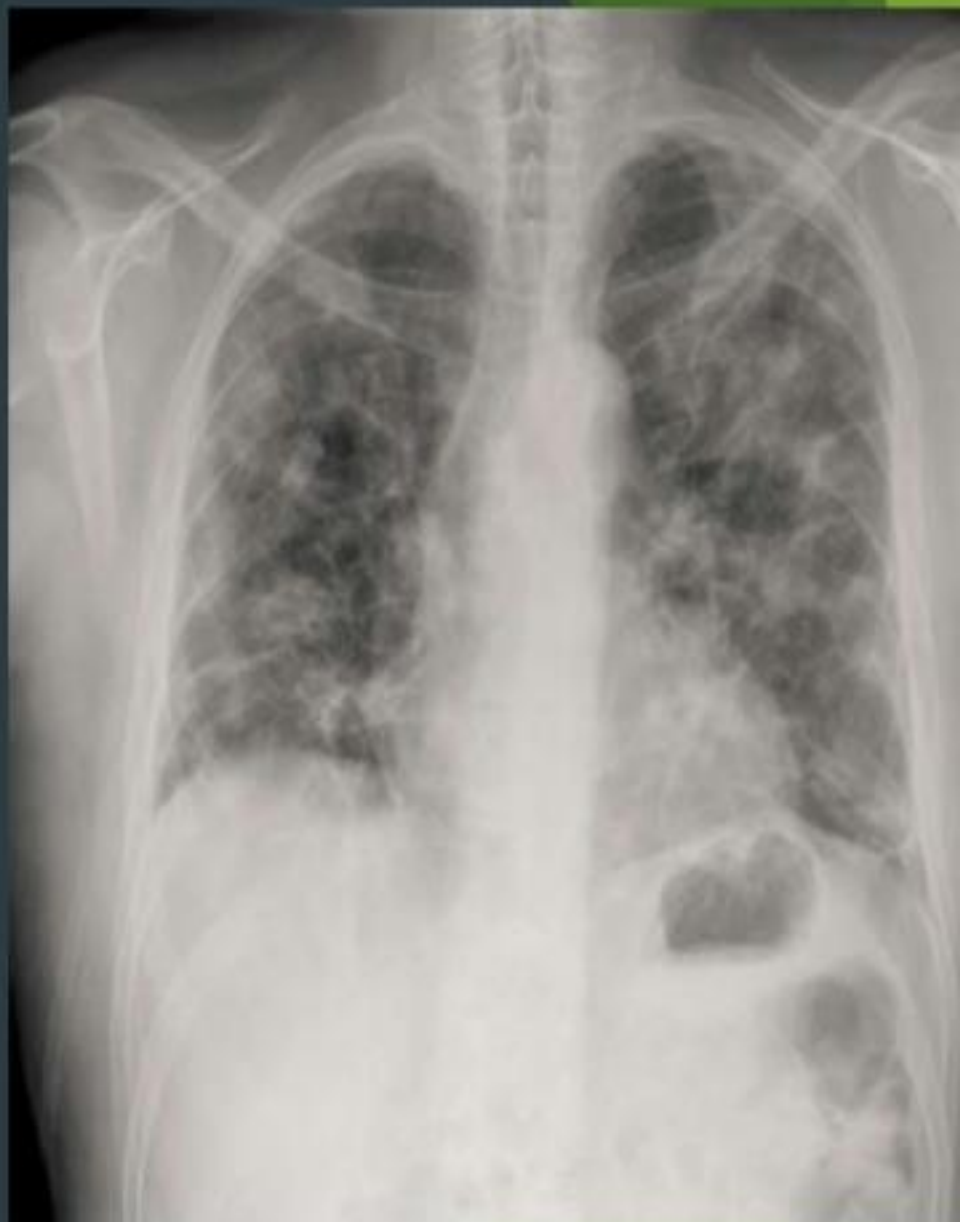




Organising pneumonia

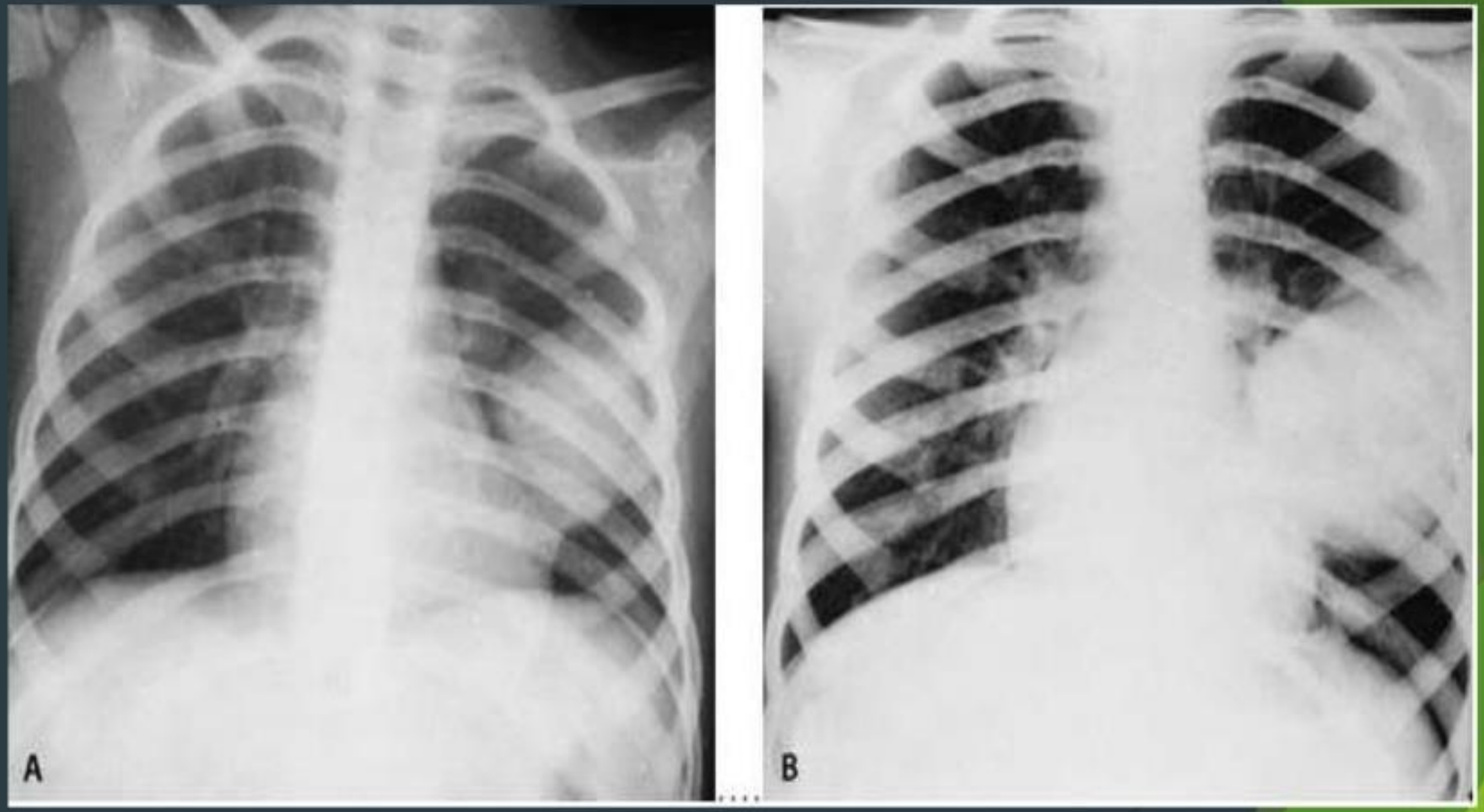
- Manifests as ground glass opacities with patchy areas of consolidation ,peripheral distribution and nodules that may cavitate

- Radiological findings are non specifiic



Parasitic

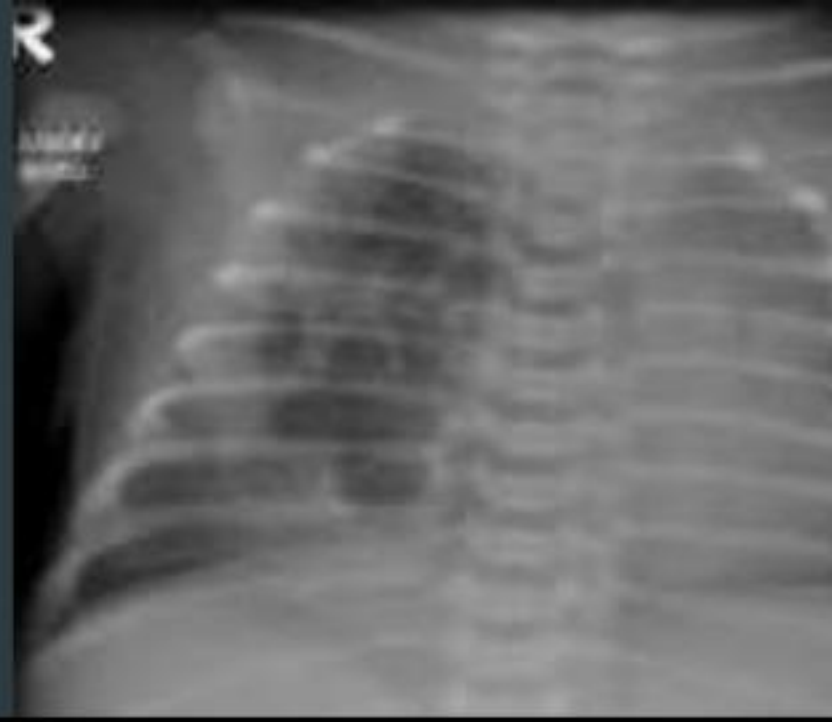
- Hyaditd cyst of the lung-appear as homogenous masses on pla CXR
- If air penetrates between the cyst wall or in to the cyst a cavitatory appreancs may result
- Crescent sign,meniscus sign,and water lilly sign

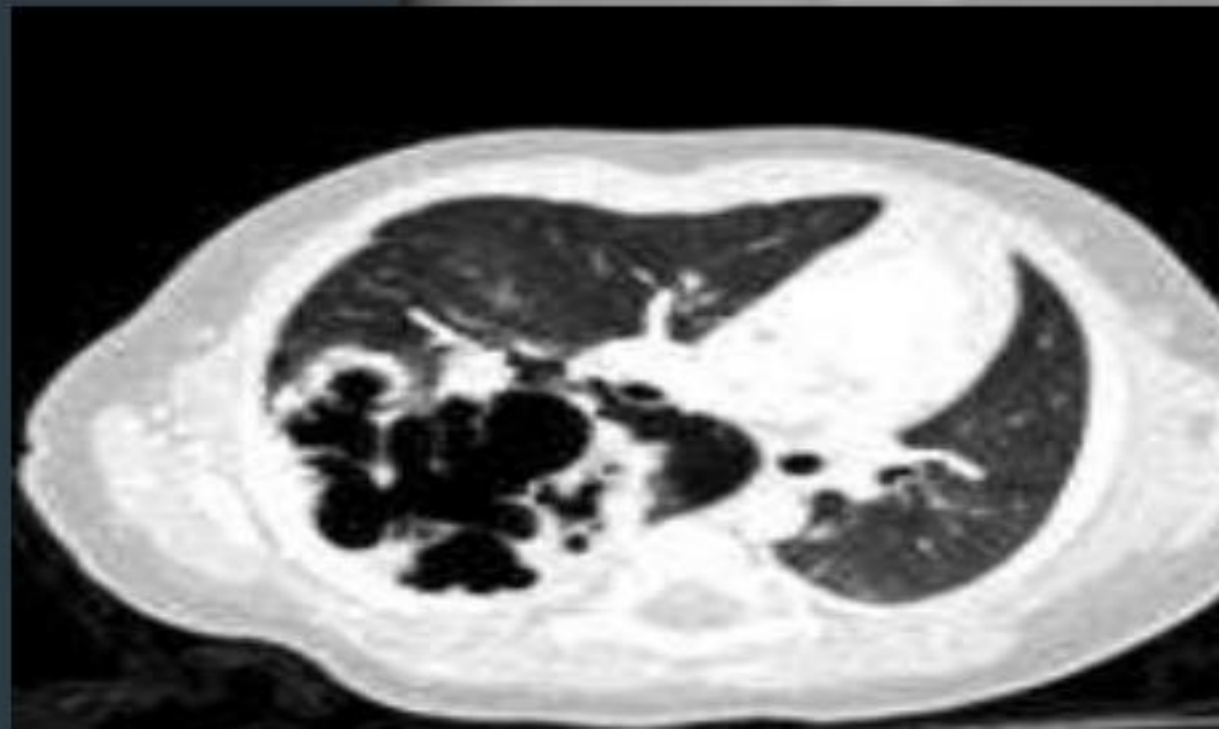

A
B

Congenital

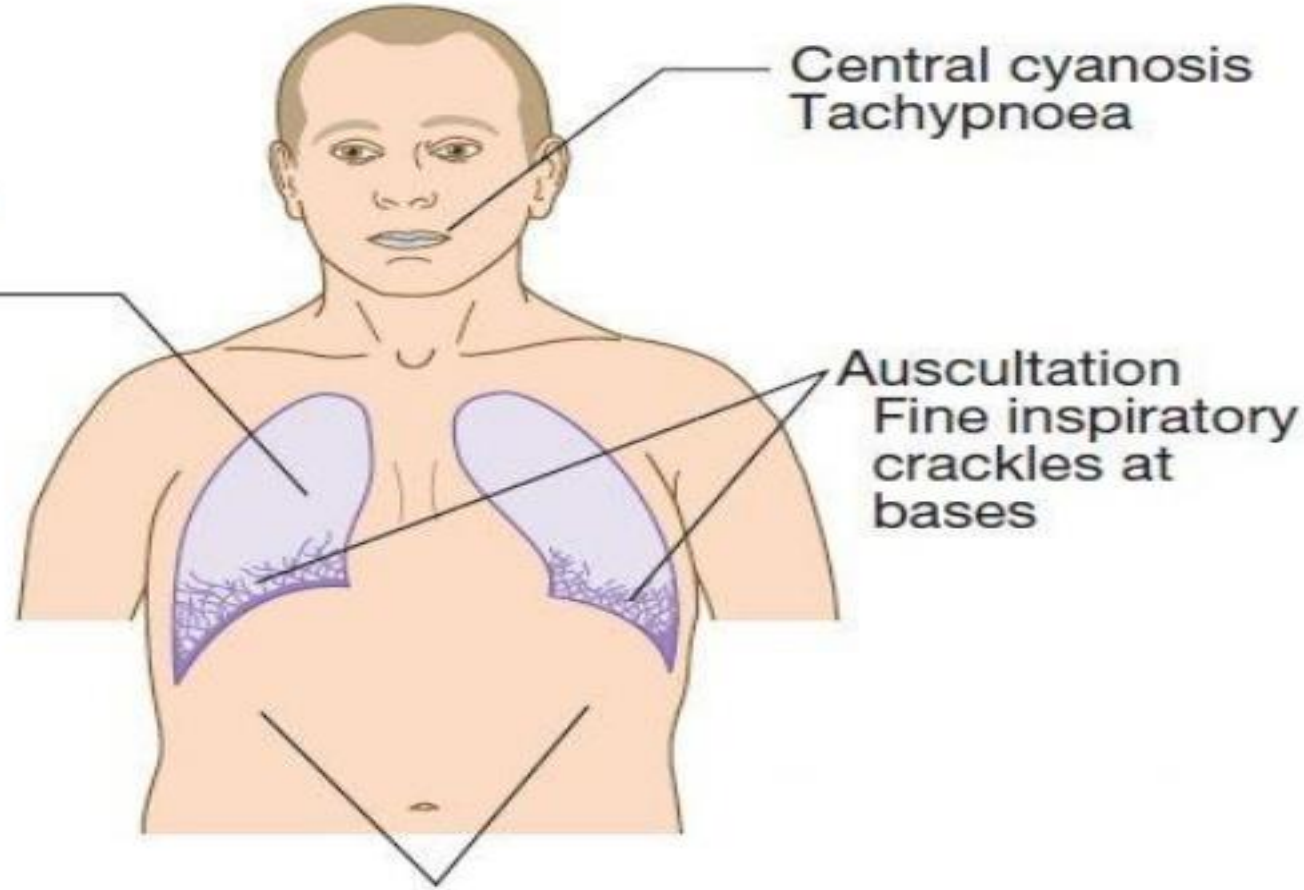
- congenital pulmonary airways malformation (CPAM)
- Multicystic ,intralobar mass of disorganised lung tissue
- 70 % presents in first wk ;10 % after 1st yr

- may demonstrate a multicystic (air-filled) lesion on CXR





PULMONARY FIBROSIS



Also: finger clubbing common in idiopathic pulmonary fibrosis; raised JVP and peripheral oedema if cor pulmonale

TYPES

Replacement fibrosis

Focal fibrosis

Interstitial fibrosis

REPLACEMENT FIBROSIS

- Fibrous tissue is laid down over areas of lung destruction
- Often localised, extent depends on extent of destruction.

CAUSES

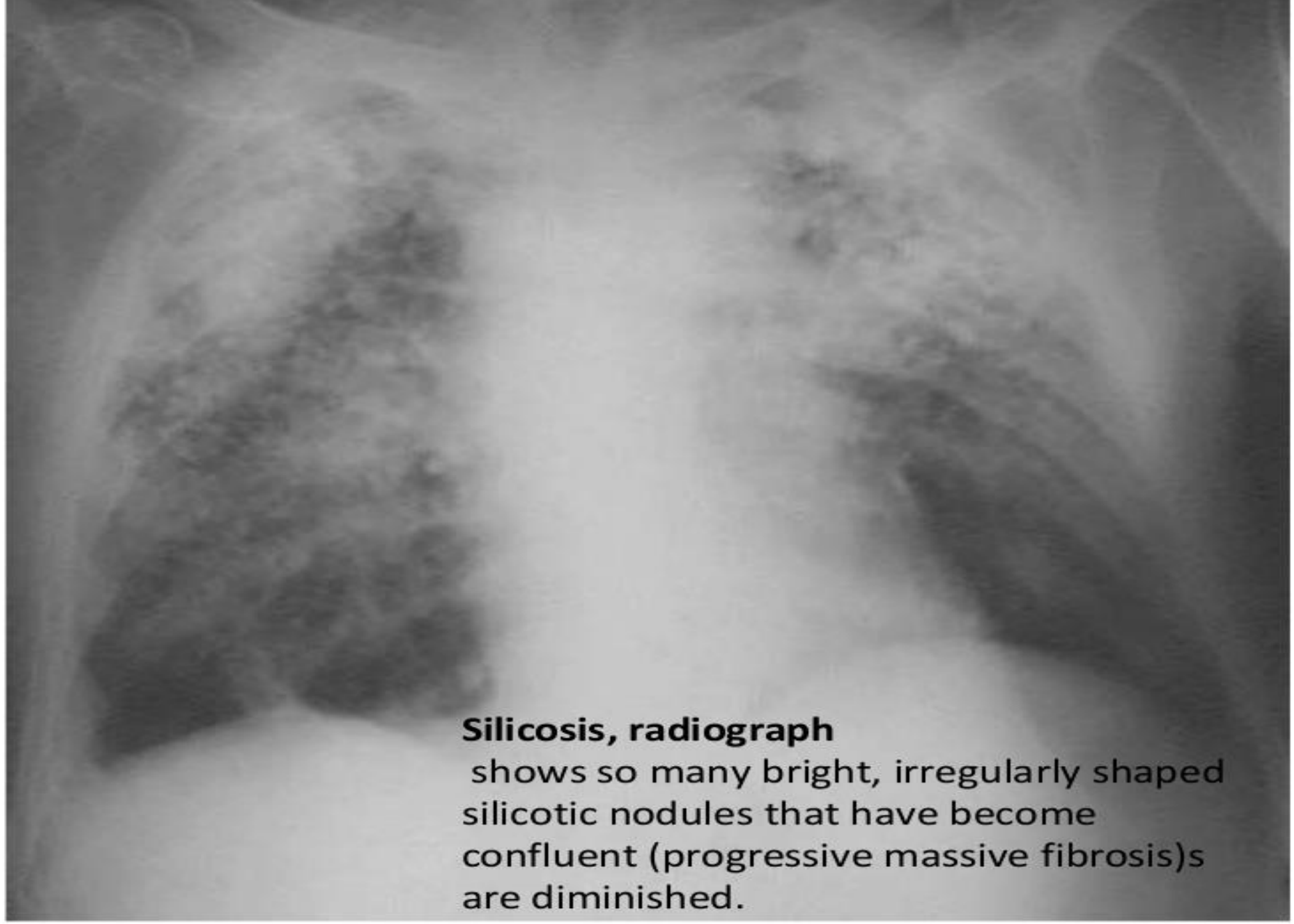
- Pulmonary tuberculosis
- All types of pulmonary suppuration like:
  - Lung abscess
  - Empyema
  - Bronchiectasis
- Pneumonia
- Fungal infection
- Pulmonary infarction
- Chronic pleural effusion
- Irradiation of lung

CLINICAL FEATURES

- Chest – asymmetrical and flattening of affected side.
- Drooping of shoulder
- Diminution of movement
- Trachea and mediastenal structures pulled towards same side.
- VR &VF depend on severity of fibrosis .In extensive fibrosis they are reduced .
- If any main bronchus near fibrotic area VR & VF reduced and breath sound becomes bronchial

FOCAL FIBROSIS

- Seen in pneumoconiosis –**silicosis**
- Extent of fibrosis : small nodules to extensive lesion



Silicosis, radiograph
shows so many bright, irregularly shaped silicotic nodules that have become confluent (progressive massive fibrosis)s are diminished.

INTERSTITIAL FIBROSIS

- End result of ILD
- CAUSES
- Fibrosing alveolitis
- Allergic alveolitis
- Connective tissue disorders
- Asbestosis
- Sarcoidosis(in 20% cases)
- Radiation injury
- Chronic pulmonary oedema

IDIOPATHIC PULMONARY FIBROSIS(*cryptogenic fibrosing alveolitis*)

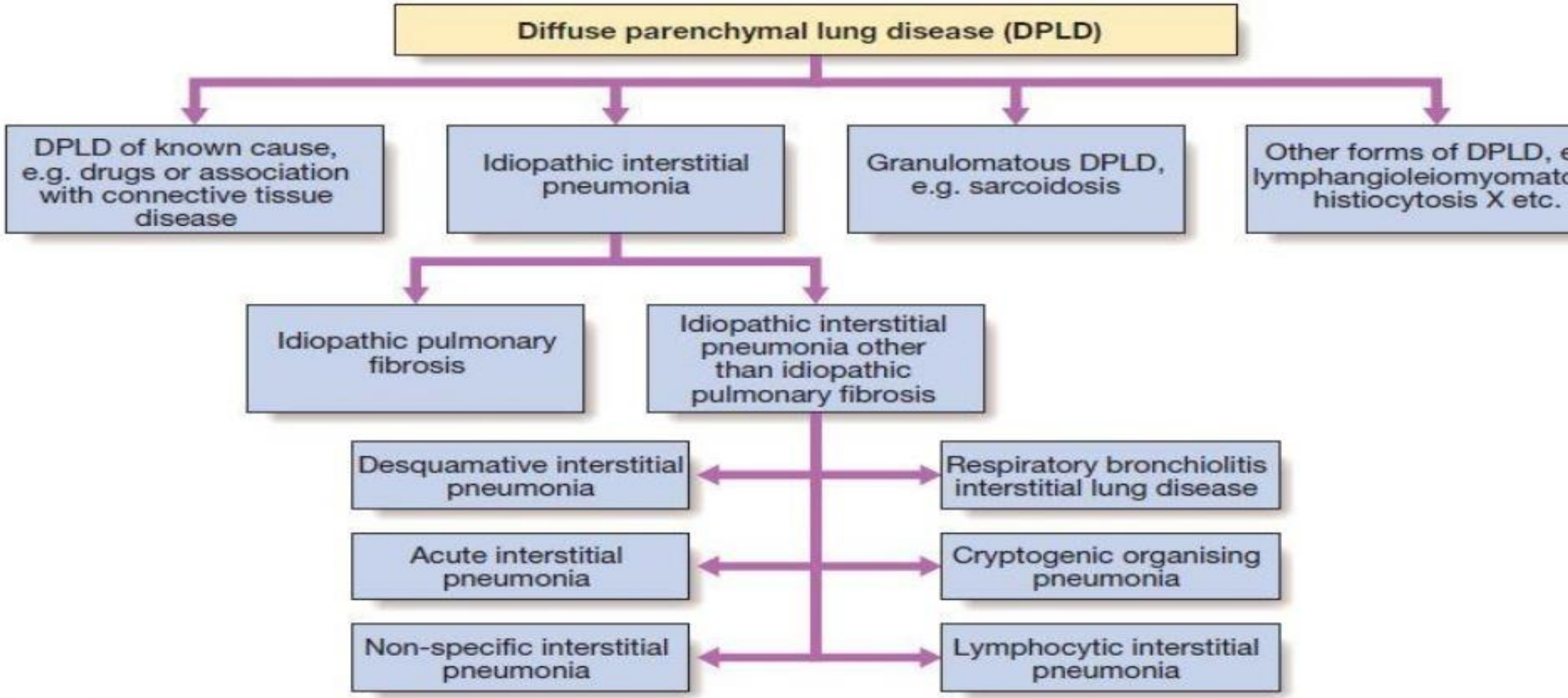
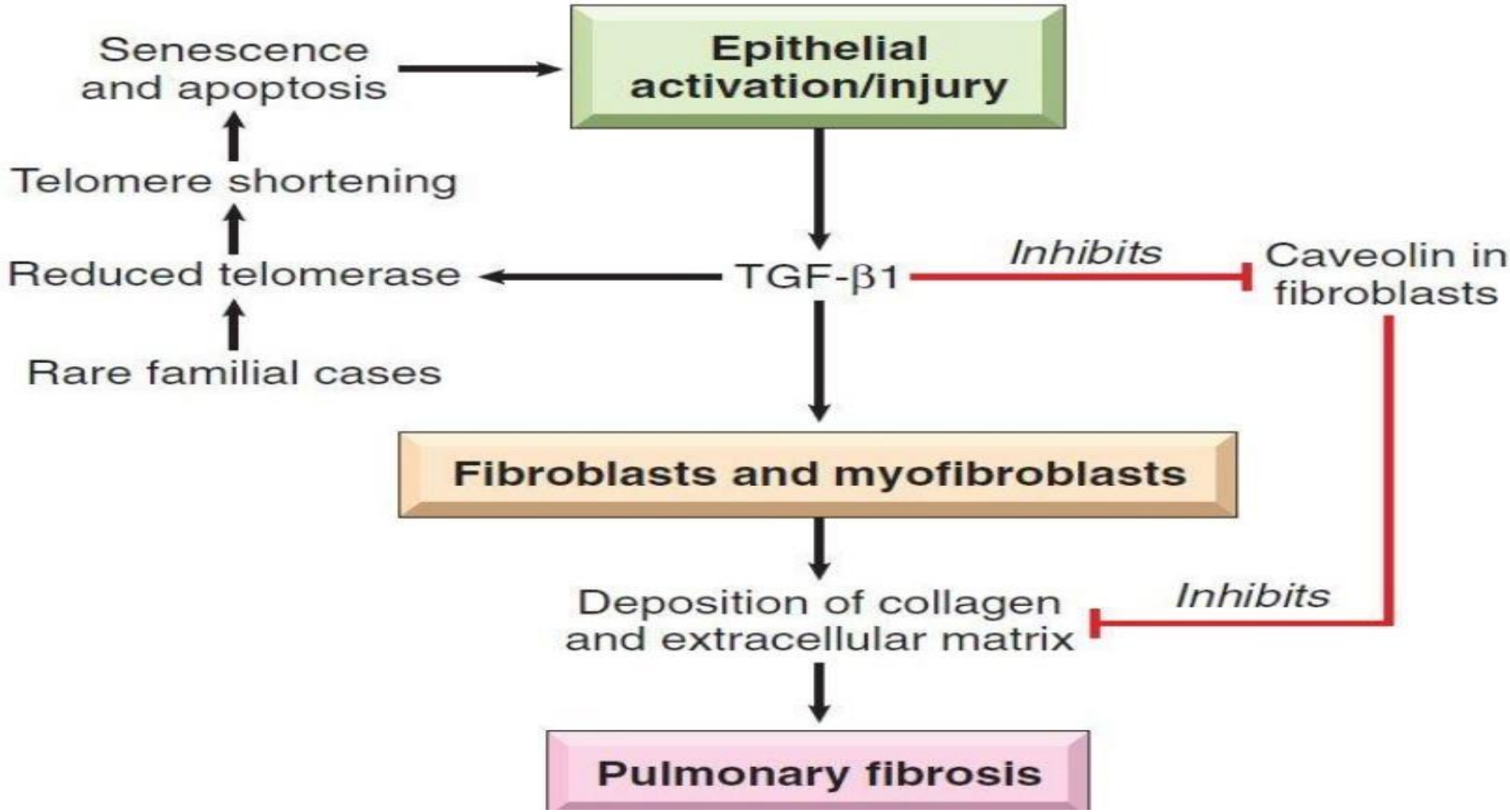


Fig. 19.55 Classification of diffuse parenchymal lung disease.

IPF

- *refers to a pulmonary disorder of* unknown etiology.
- characterized by **patchy but progressive b/l interstitial fibrosis**
- presents in the older adult, uncommon before the age of 50 years.
- associated with the histological or radiological pattern of usual interstitial pneumonia(UIP)
- Among the ILD in old age IPF is the most common ILD with a worse prognosis.

PATHOGENESIS OF IPF

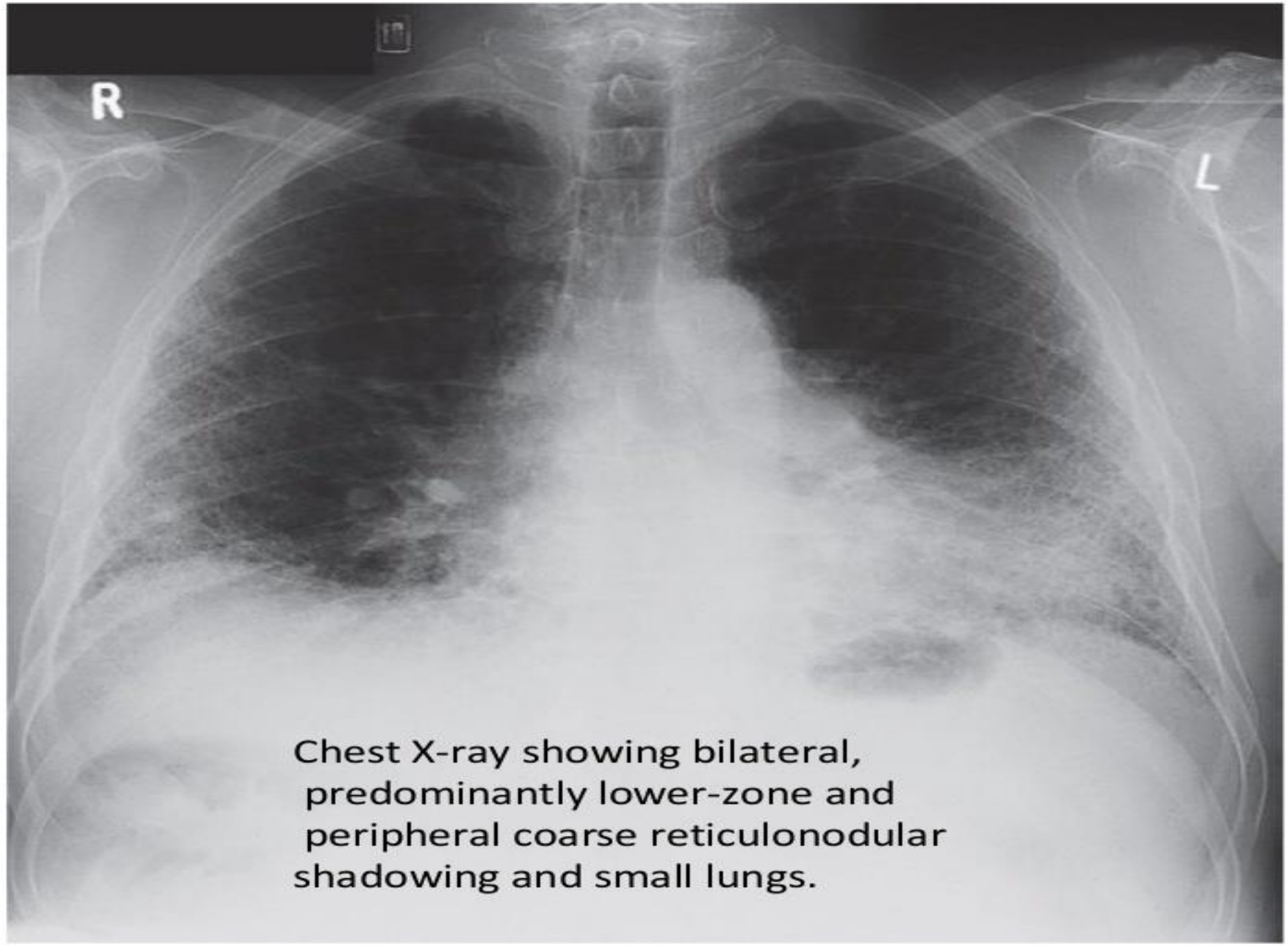


Clinical features

- gradual onset of a nonproductive cough and progressive dyspnea
- Clinical findings include finger **clubbing** and the presence of bi-basal fine late inspiratory crackles likened to the unfastening of **Velcro**.
- Cyanosis, cor pulmonale, and peripheral edema - in later stages

INVESTIGATIONS

- on chest X-ray as b/l lower lobe and subpleural reticular shadowing.
- HRCT typically demonstrates a patchy, predominantly peripheral, subpleural and basal reticular pattern and, in more advanced disease, the presence of honeycombing cysts and traction bronchiectasis
- Pulmonary function tests classically show a restrictive defect with reduced lung volumes and gas transfer.



Chest X-ray showing bilateral, predominantly lower-zone and peripheral coarse reticulonodular shadowing and small lungs.

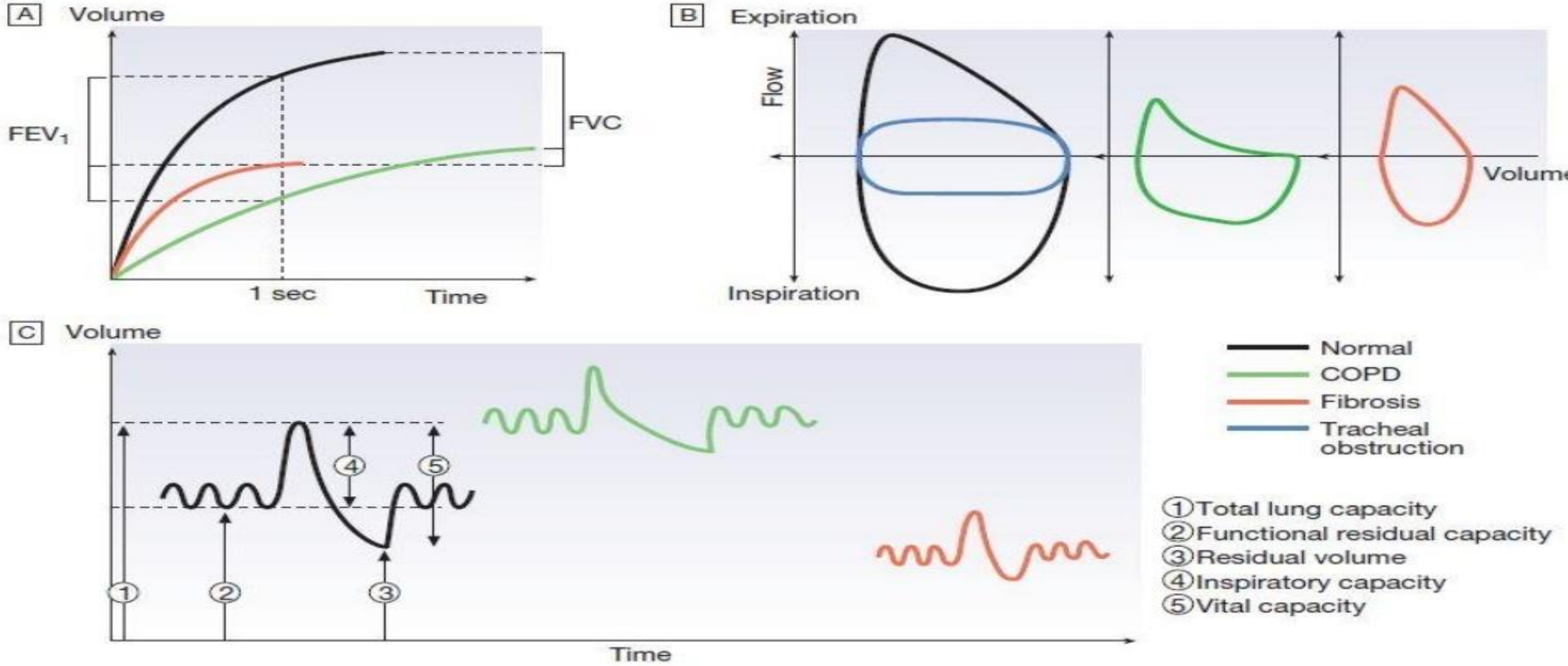


Fig. 19.7 Respiratory function tests in health and disease. [A] Volume/time traces from forced expiration in a normal subject, in COPD and in fibrosis. COPD causes slow, prolonged and limited exhalation. In fibrosis, forced expiration results in rapid expulsion of a reduced forced vital capacity (FVC). Forced expiratory volume (FEV_1) is reduced in both diseases but is disproportionately reduced, compared to FVC, in COPD. [B] The same data plotted as flow/volume loops. In COPD, collapse of intrathoracic airways limits flow, particularly during mid- and late expiration. The blue trace illustrates large airway obstruction, which particularly limits peak flow rates. [C] Lung volume measurement. Volume/time graphs during quiet breathing with a single maximal breath in and out. COPD causes hyperinflation with increased residual volume. Fibrosis causes a proportional reduction in all lung volumes.

MANAGEMENT

- Treatment is difficult
- mean survival is 3 years or less.
- Lung transplantation is the only definitive therapy available
- Oxygen may help breathlessness
- but opiates may be required to relieve severe dyspnoea.

Other causes of pulmonary fibrosis…

- As a consequence of chemotherapy especially the drug ‘bleomycin’
- In advanced rheumatoid arthritis
- A relatively uncommon manifestation of SLE
- In most cases of systemic sclerosis

Upper lobe fibrosis

- Pulmonary TB
- Ankylosing spondylitis
- Silicosis
- Sarcoidosis
- Rheumatoid arthritis
- Radiation

Lower lobe fibrosis

- Asbestosis
- Fibrosing alveolitis
- Bronchiectasis
- Scleroderma
- Loeffler's syndrome

THANK YOU