

# INTERSTITIAL LUNG DISEASE

*Understanding key radiological features*

*Dr. Patrick A. Chui Wan Cheong Jr. OSK  
FRCR*

# Interstitial lung disease - ILD

Refers to many acute and chronic lung disorders causing variable degrees of pulmonary inflammation and fibrosis.

# INTERSTITIAL LUNG DISEASE(ILD)

ILD of known cause e.g drugs or association e.g collagen vascular disease

Idiopathic interstitial pneumonias (IIP)

Granulomatous ILD e.g. sarcoidosis

Other forms of ILD e.g. LAM, HX etc.

Idiopathic pulmonary fibrosis

IIP other than Idiopathic pulmonary fibrosis

Desquamative interstitial pneumonia

Acute interstitial pneumonia

Nonspecific interstitial pneumonia (provisional)

Respiratory bronchiolitis interstitial lung disease

Cryptogenic organising pneumonia

Lymphocytic interstitial pneumonia

# High Resolution CT LUNGS

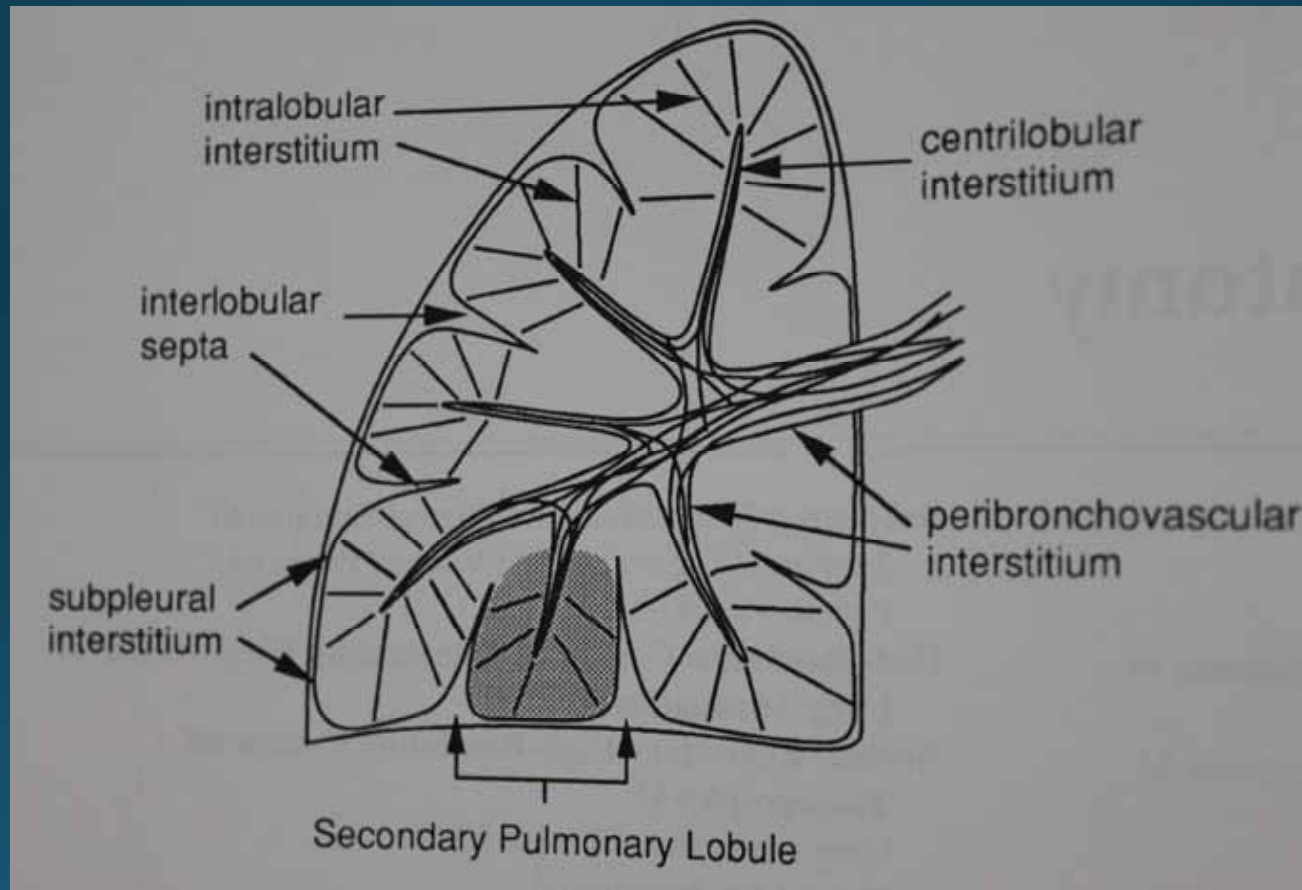
Imaging modality of choice for diffuse lung disease.

- It closely correlates in many instances with histologic and pathologic lung abnormalities.

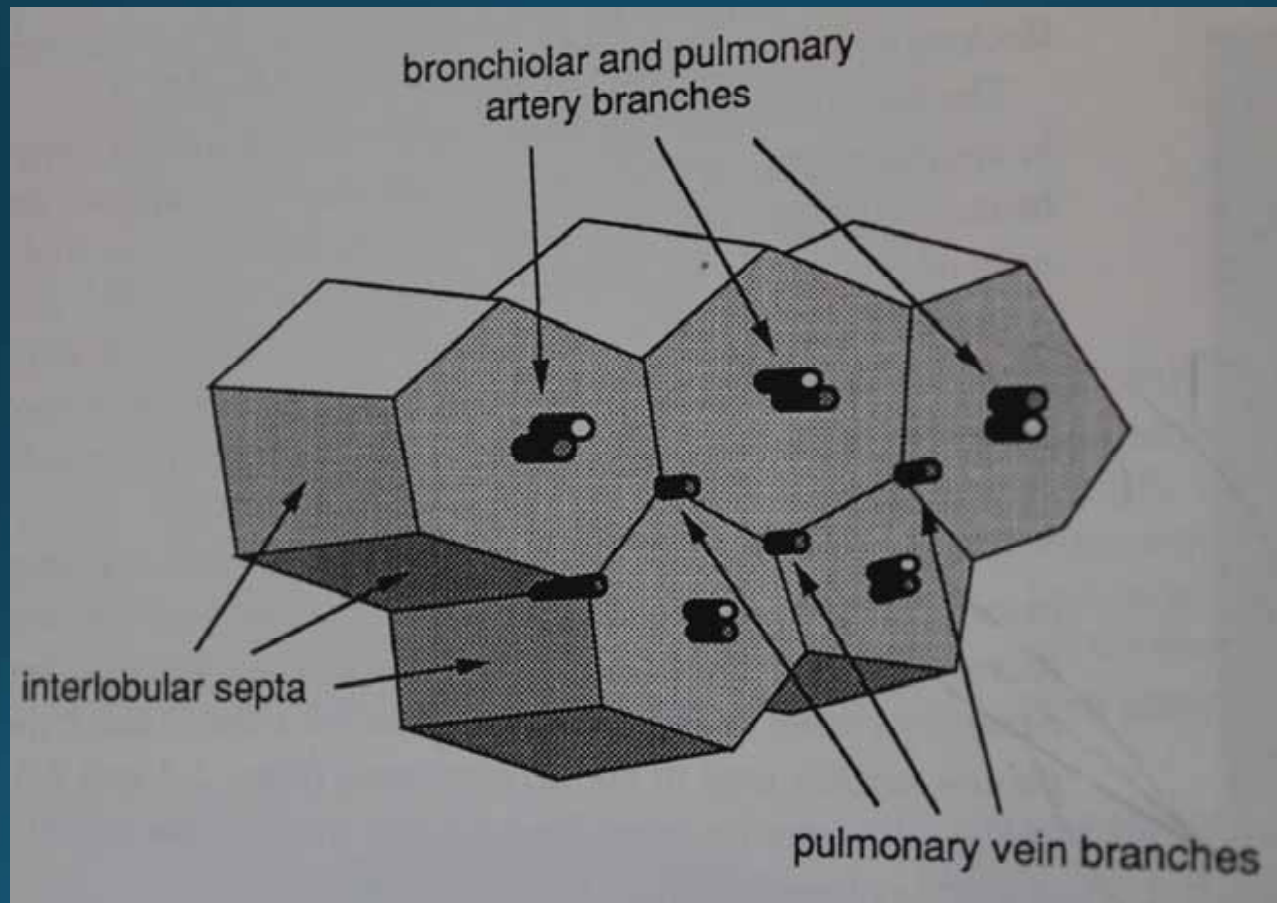
# HRCT Technique

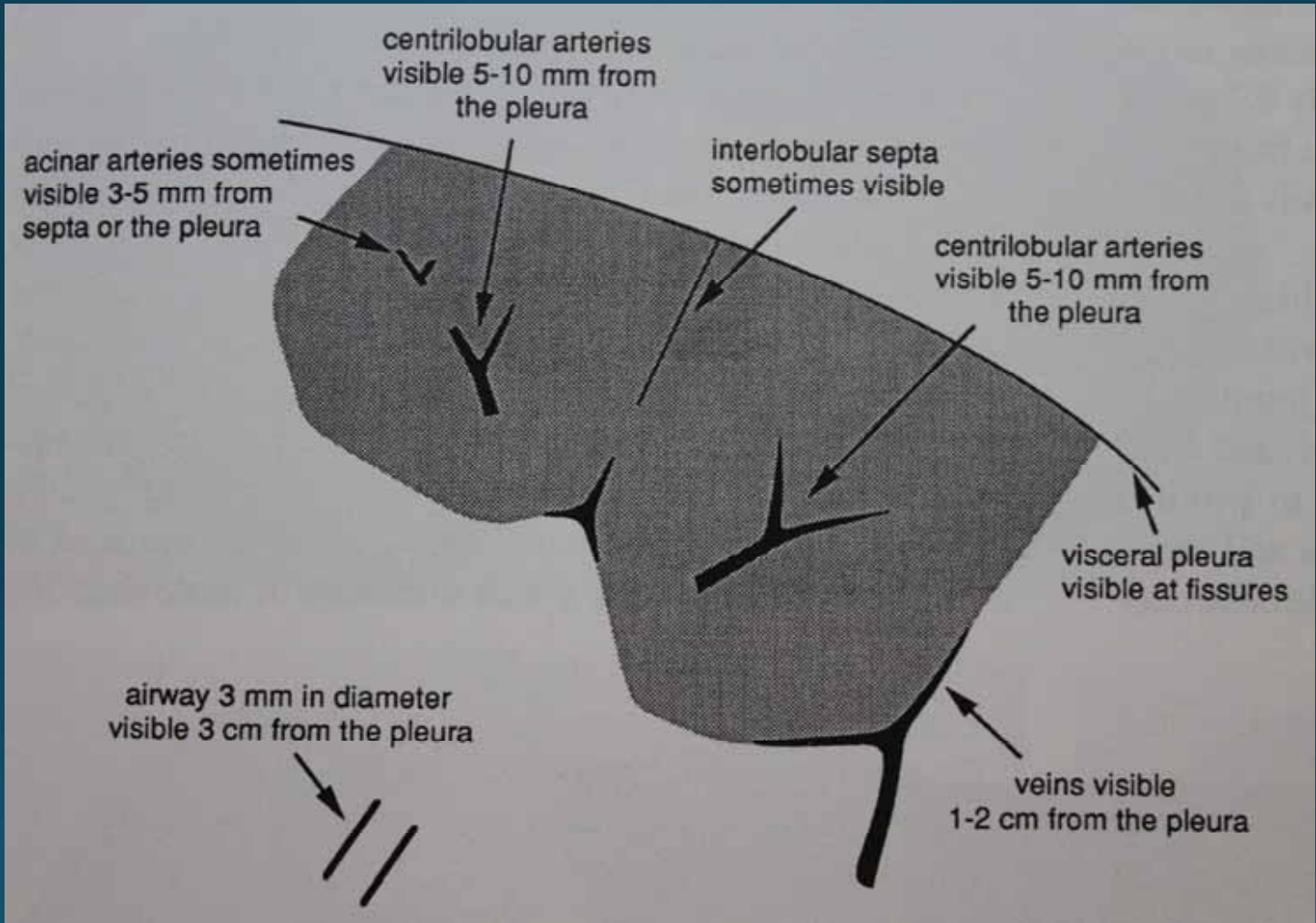
- Thin slices 1 to 1.5mm
- Shortest scan time possible eg. 1 sec or less.
- Image acquisitions during suspended full inspiration (expiration)
- Supine position (prone)
- Plain study
- Lung windows

# ANATOMY OF LUNG INTERSTITIUM



# PULMONARY LOBULE



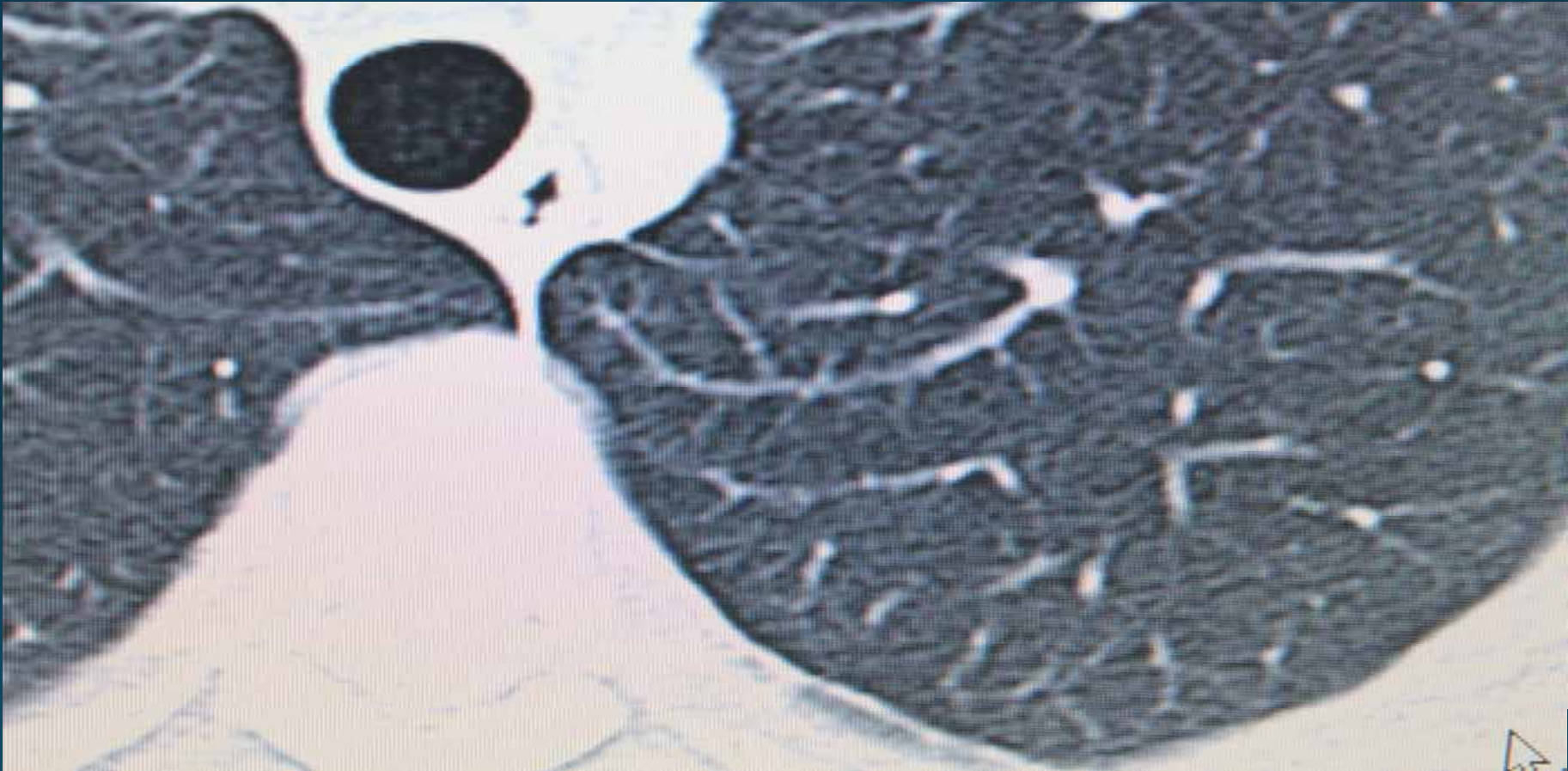


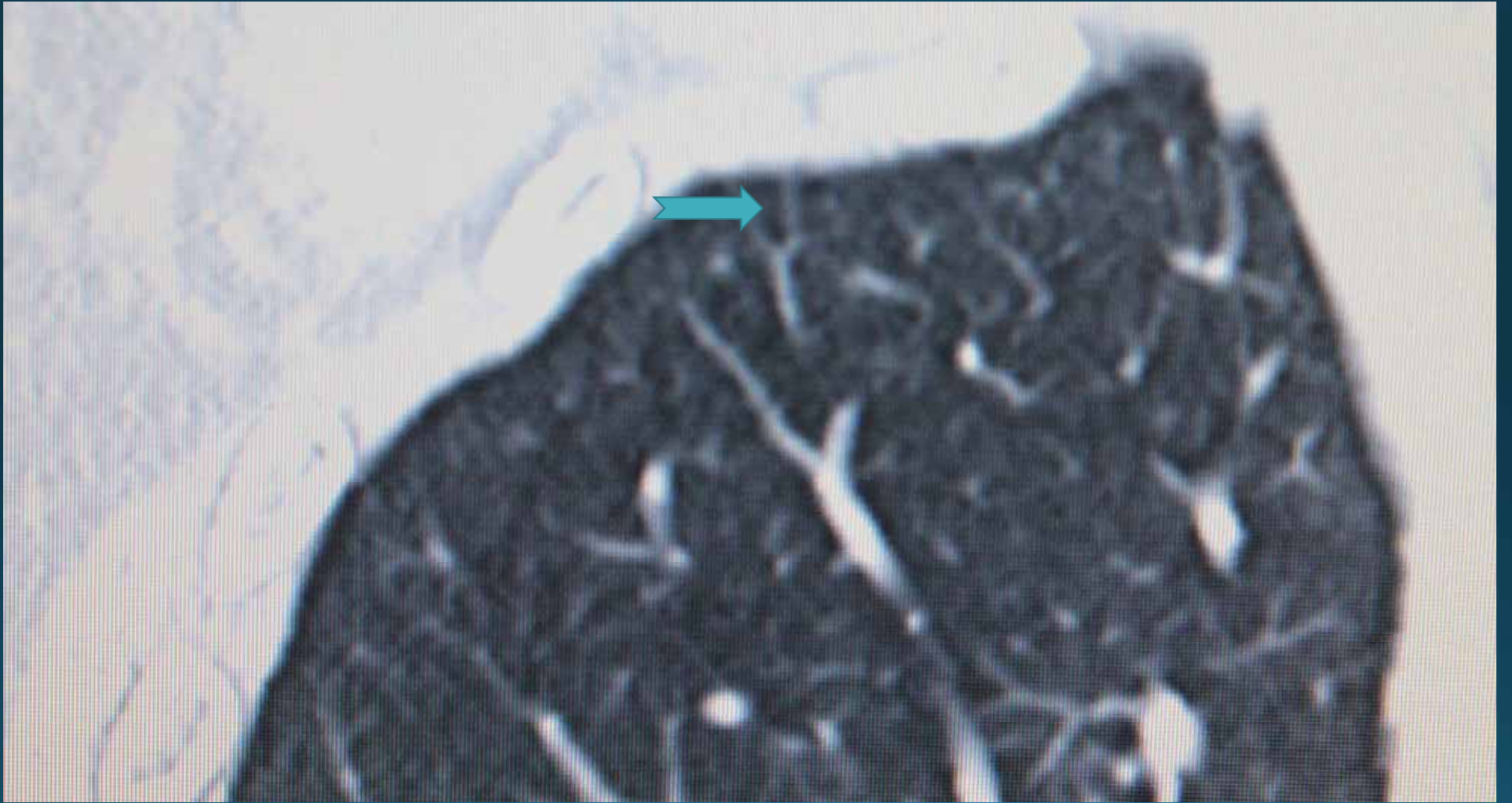




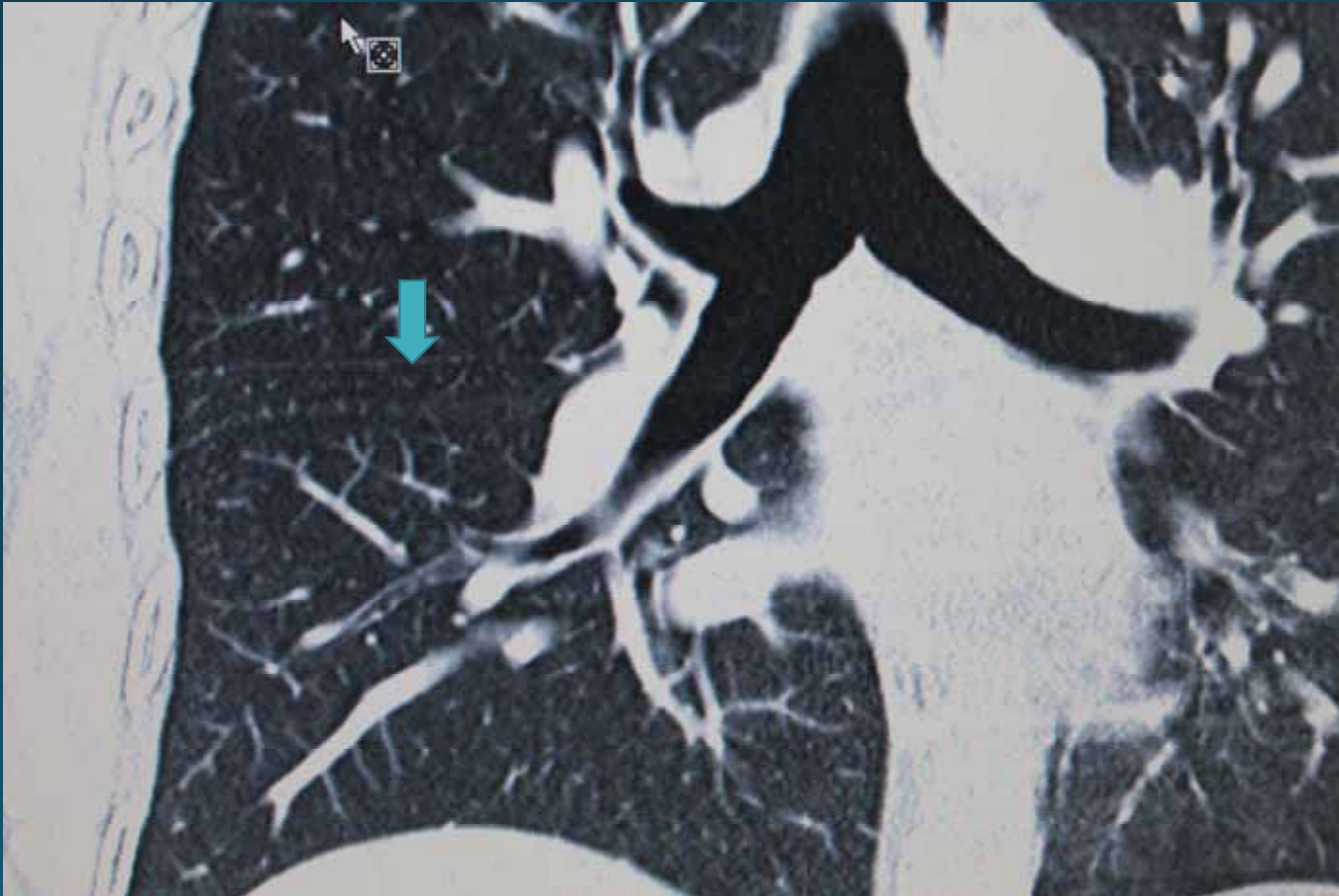




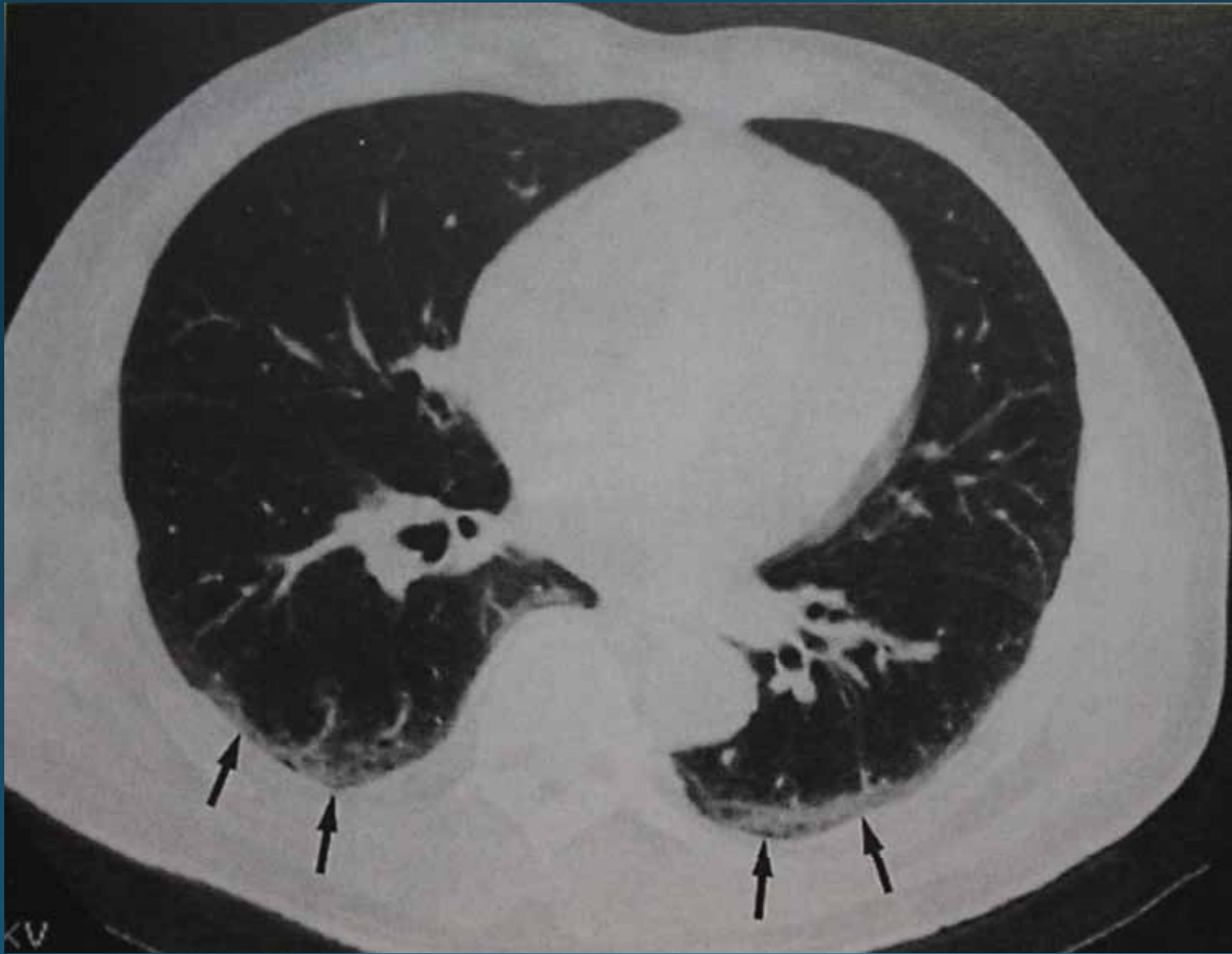




Normal lung interstitium is not visible on CT.







# Dependent atelectasis



# HRCT- Findings in diffuse lung disease

**Classified in 4 large categories based on their appearances**

1. ***Linear and reticular opacities (Reticulations)***
2. Increased lung opacity – Ground glass / Air space shadowing
3. Nodules and nodular opacities.
4. Abnormalities associated with decreased lung opacity eg cystic lesions, emphysema and air way abnormalities.



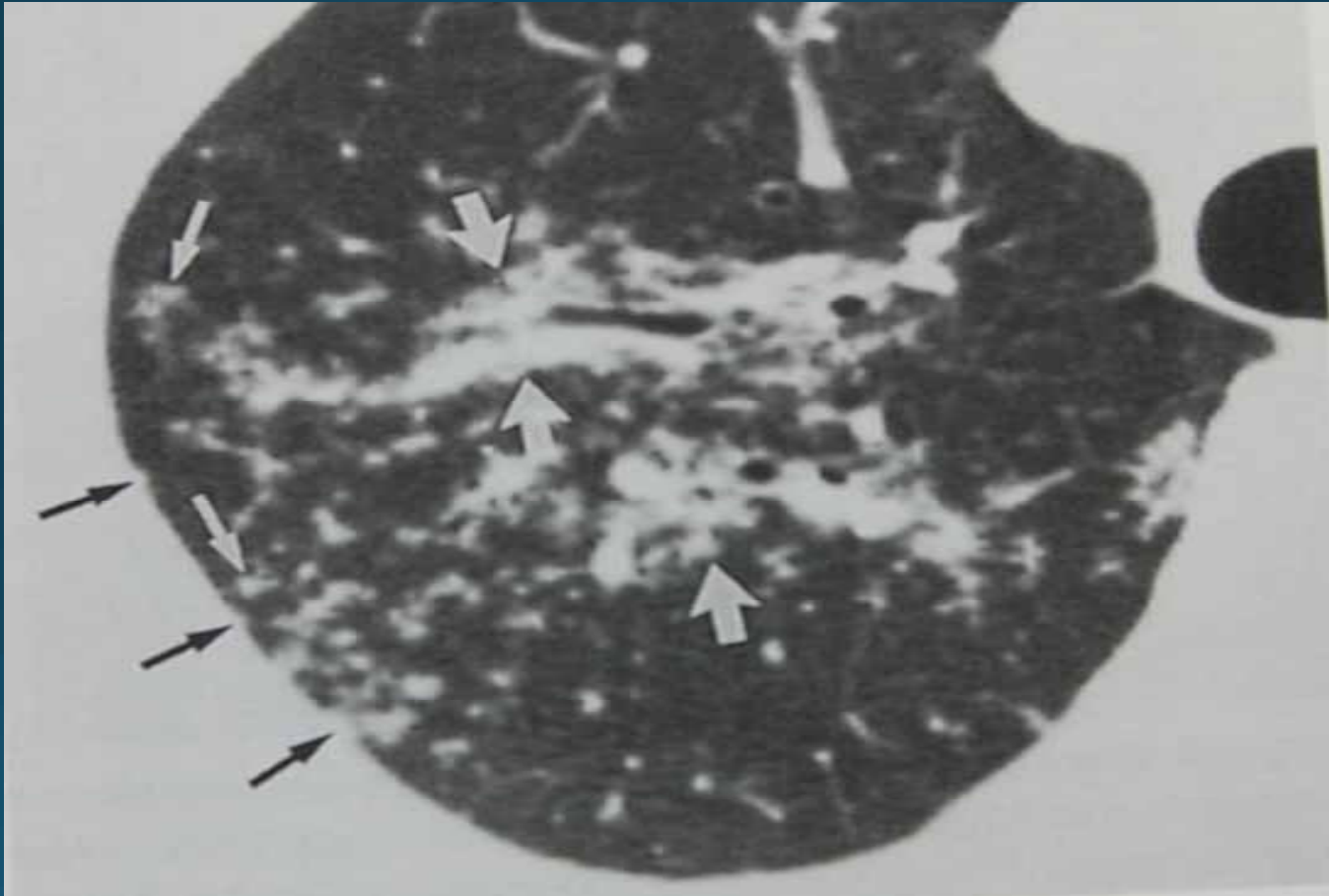
# 1. Linear & reticular opacities

- Caused by thickening of the interstitial fibre network of the lung by fluid or fibrous tissue or infiltration by cells or other materials.
  1. Fluid – eg. pulmonary oedema, haemorrhage, infection.
  2. **Fibrosis – eg. IPF**
  3. Cells – lymphangitis carcinomatosa
  4. Other materials – eg. Amyloid, Alveolar proteinosis.

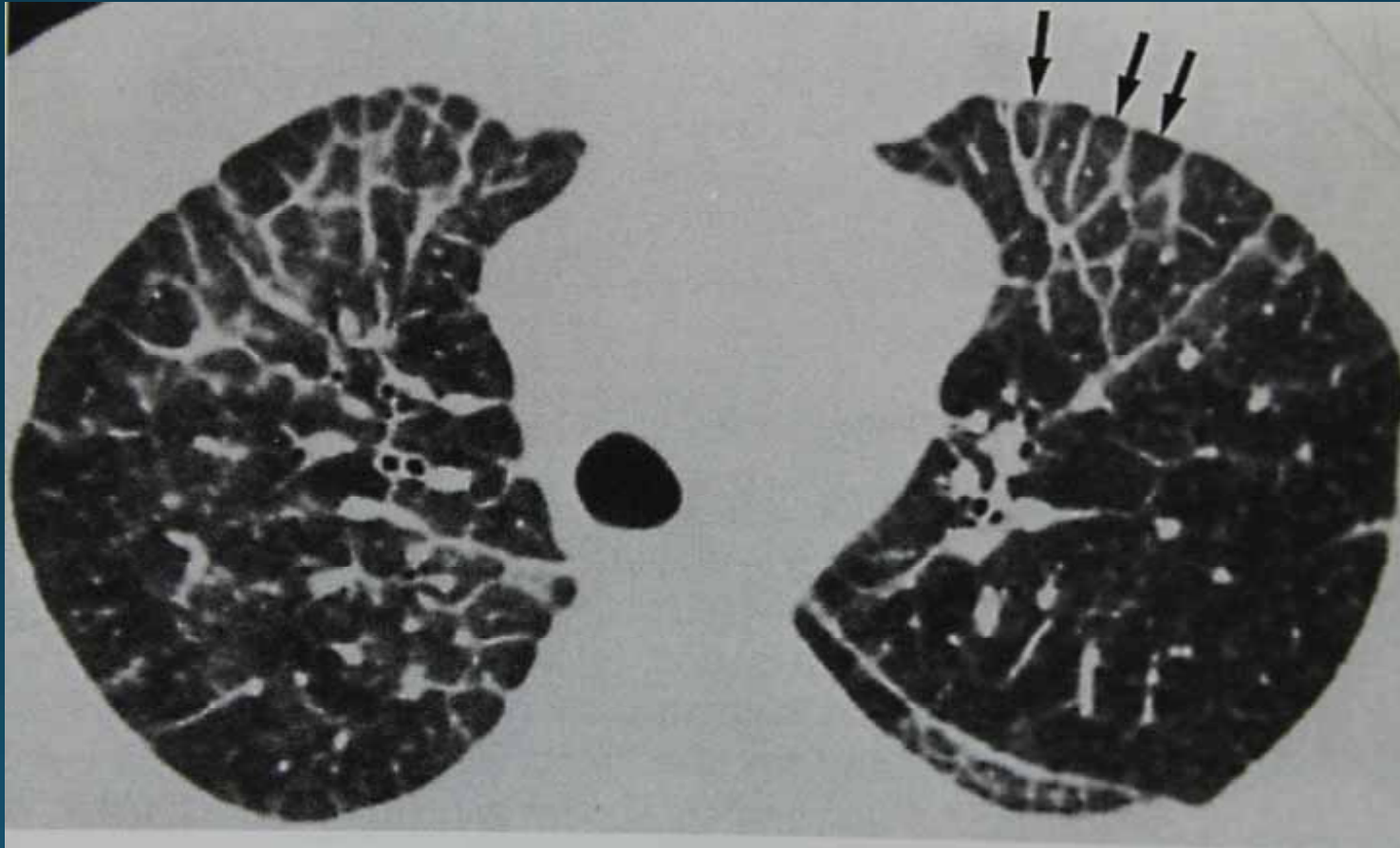
# Linear & Reticular Opacities HRCT Manifestations

- Peribronchovascular interstitial thickening
- Interlobular septal thickening
- Parenchymal bands
- Intralobular interstitial thickening
- Subpleural line
- Irregular linear opacities
- Honeycombing
- (Traction bronchiectasis)

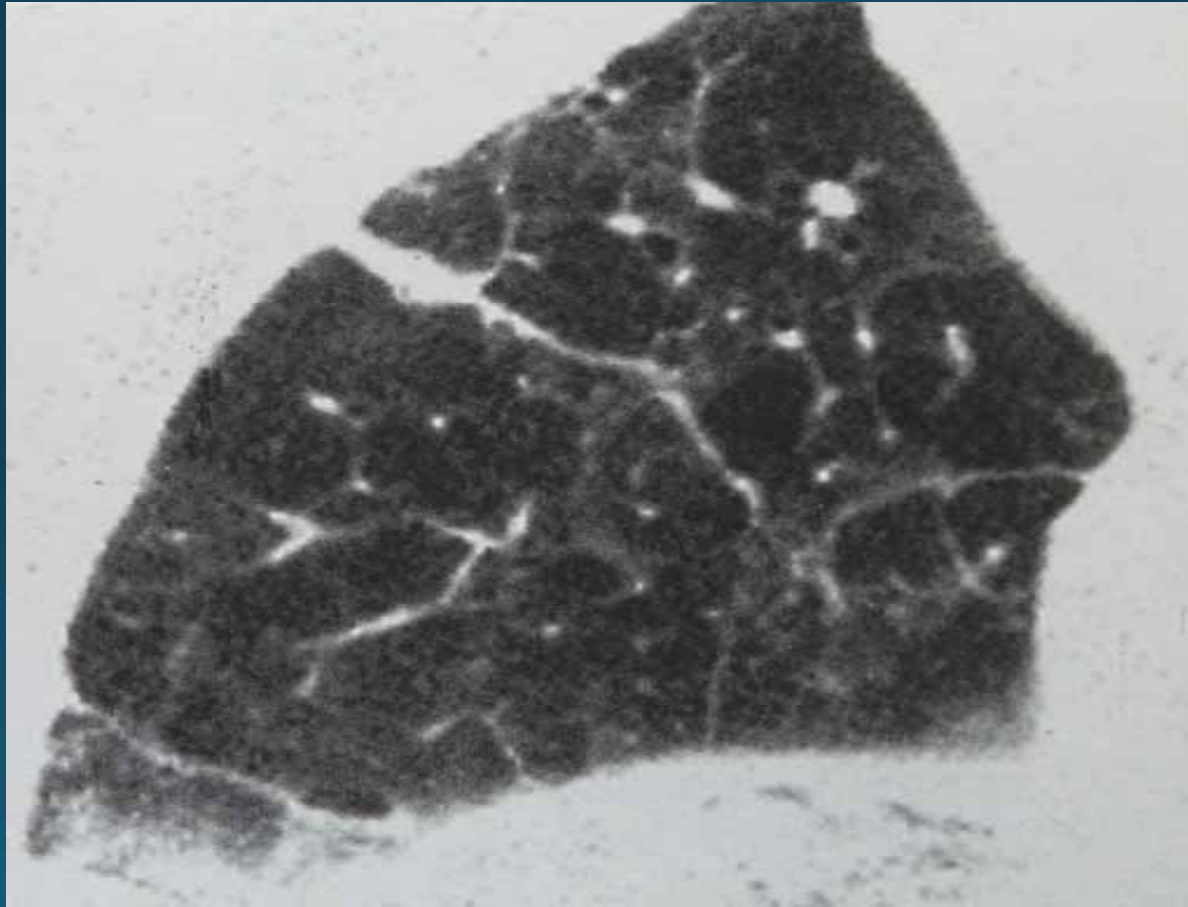
# Peribronchovascular interstitial thickening



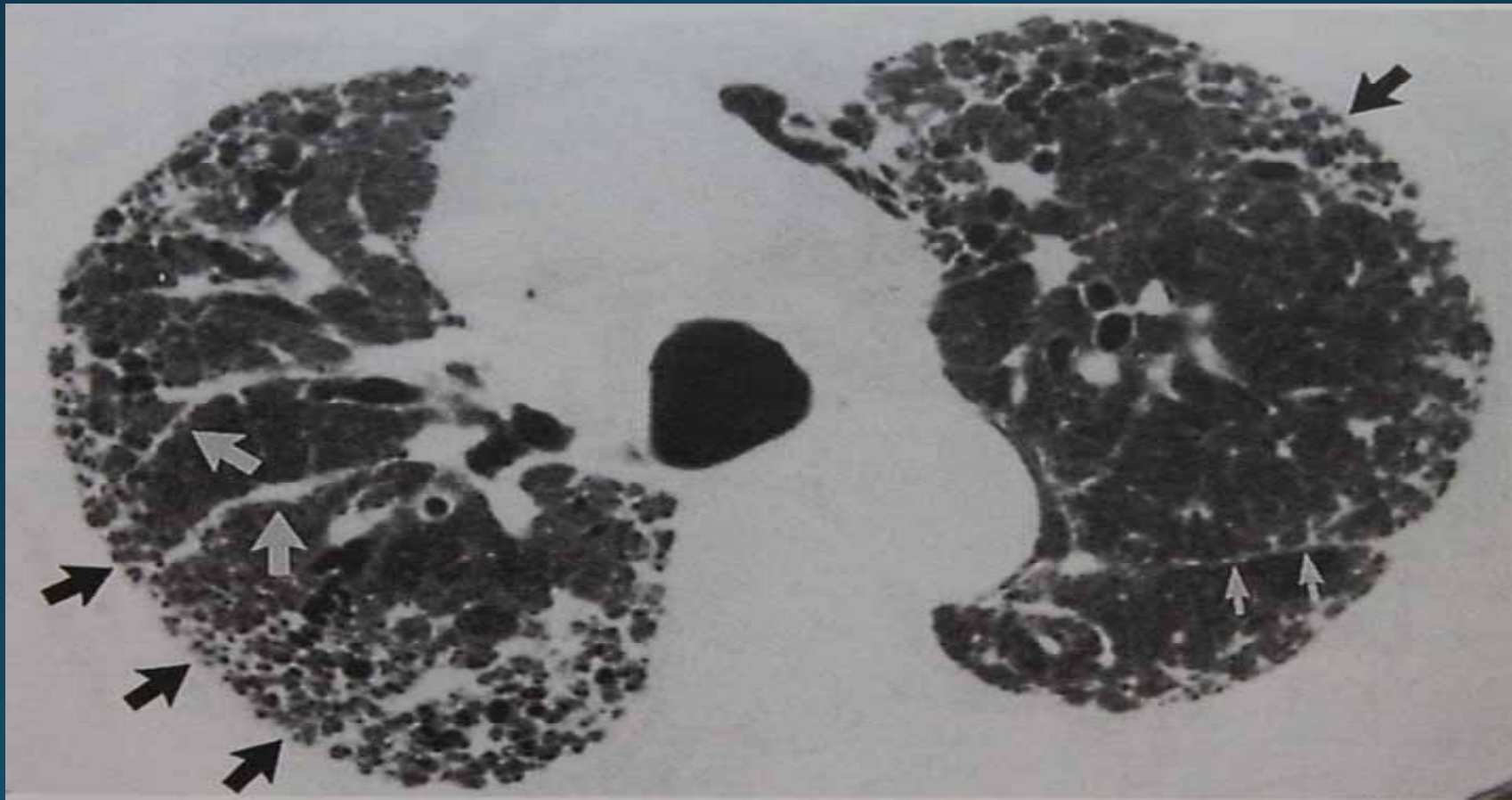
# Interlobular septal thickening



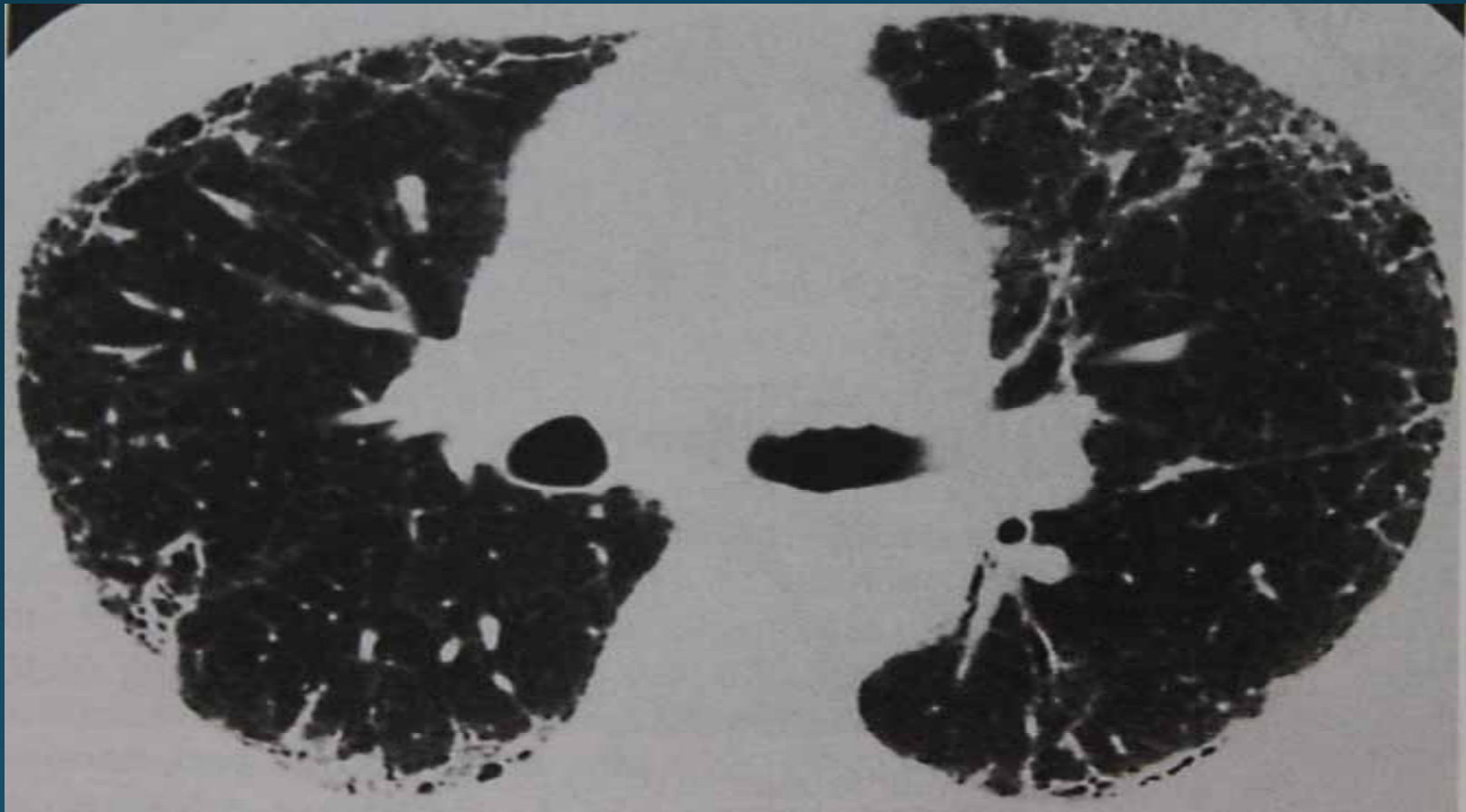
# Parenchymal bands



# Intralobular interstitial thickening

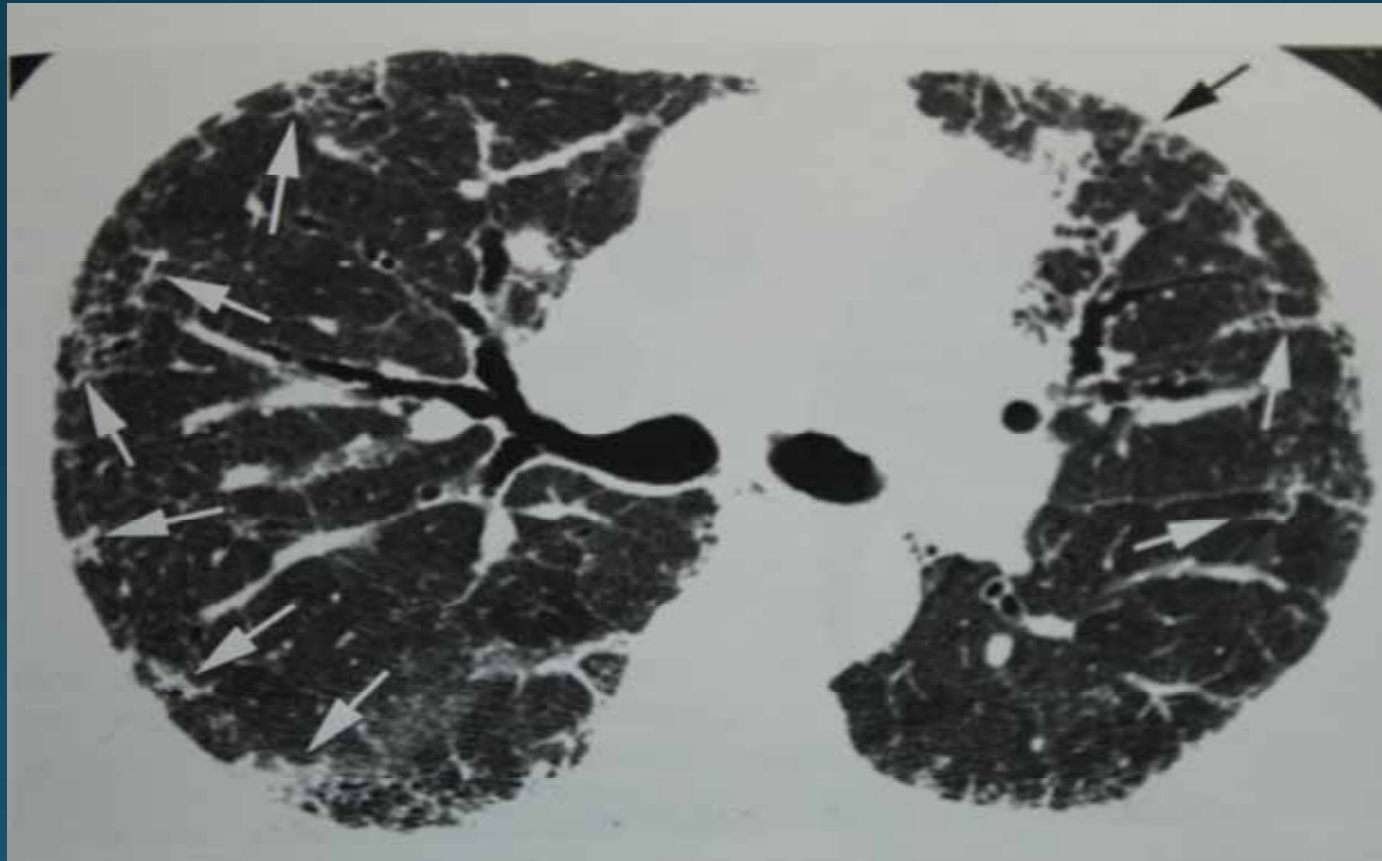


# Subpleural line



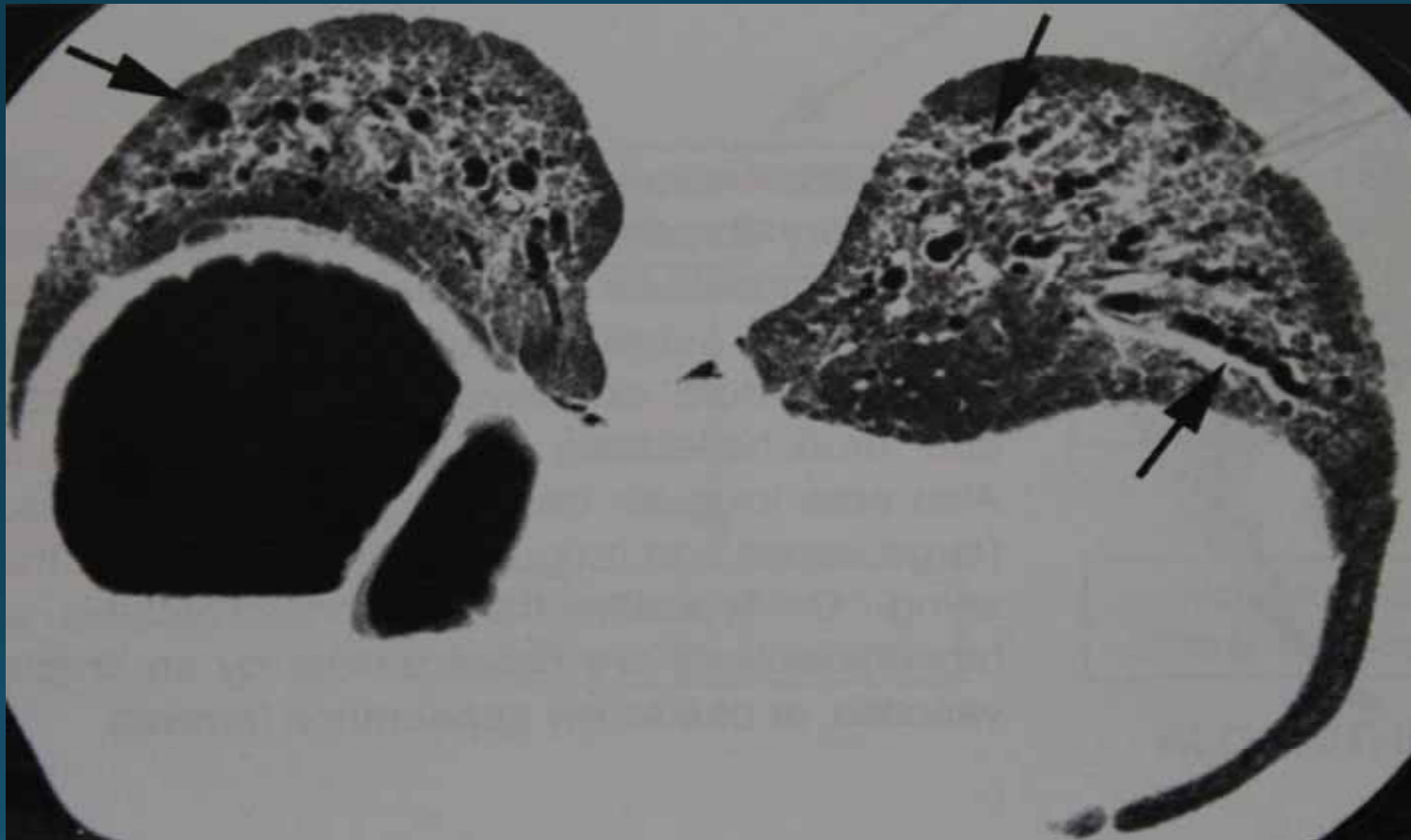


# Irregular linear opacities

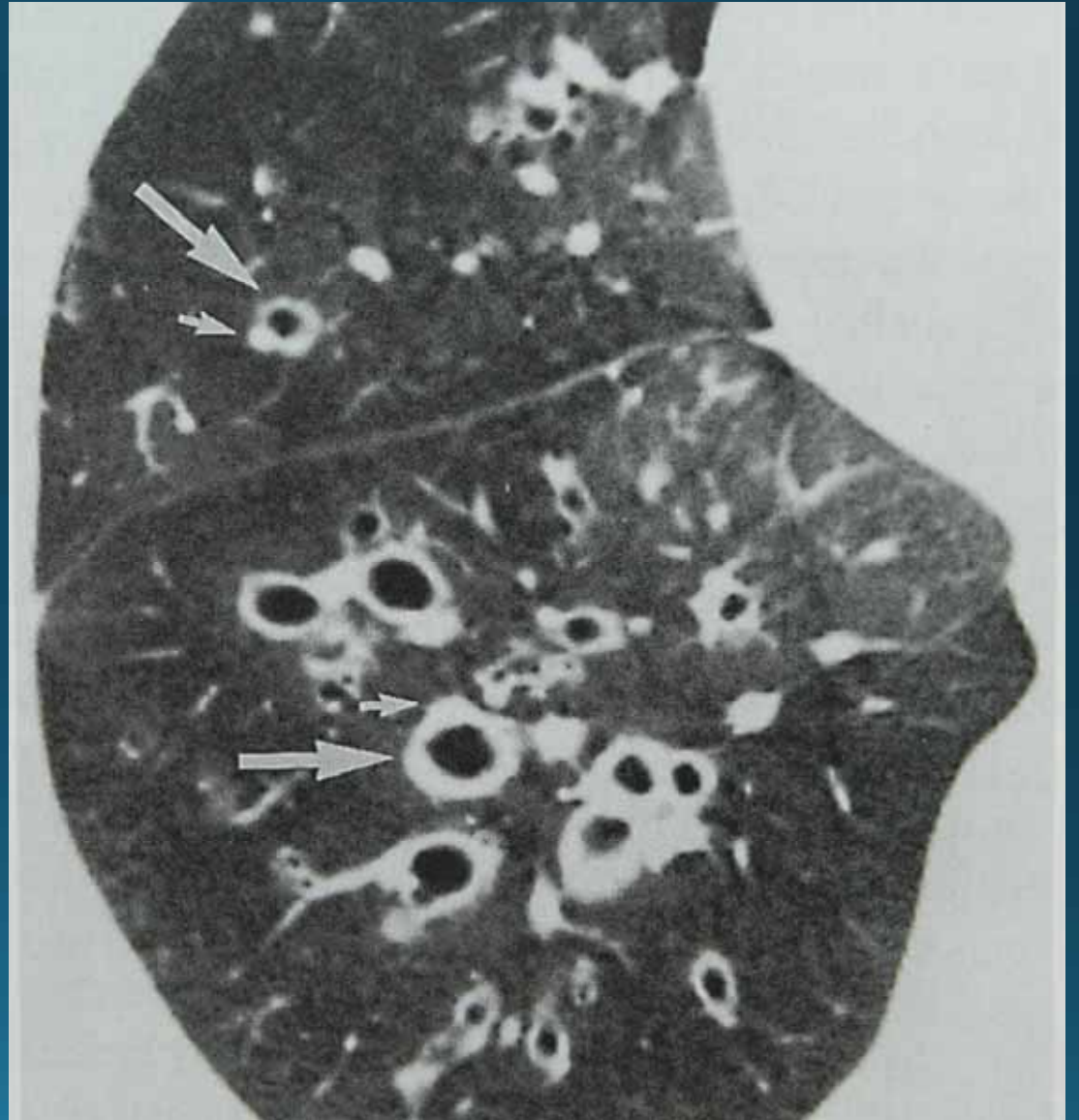




# Traction Bronchiectasis



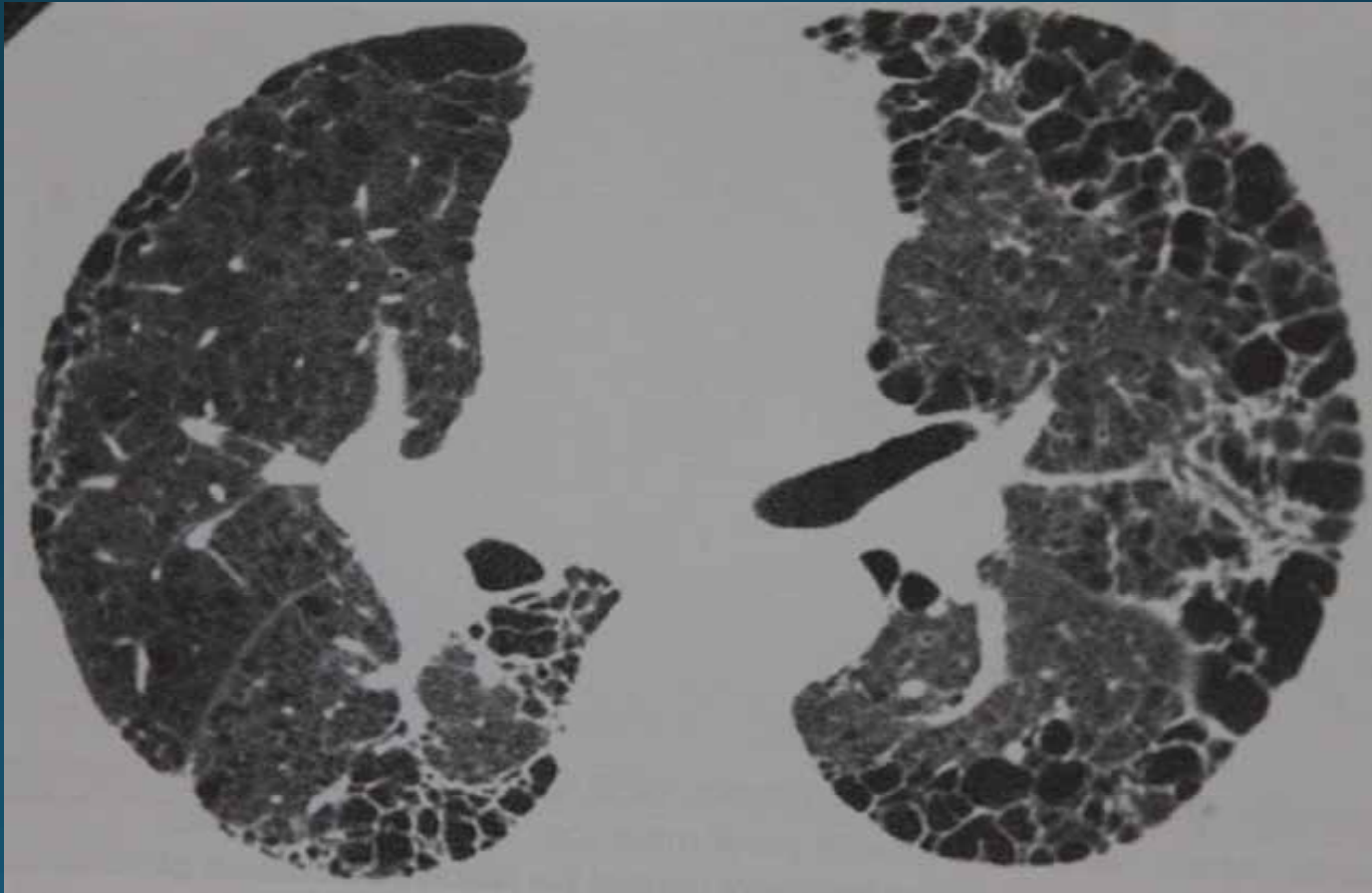
Signet ring sign



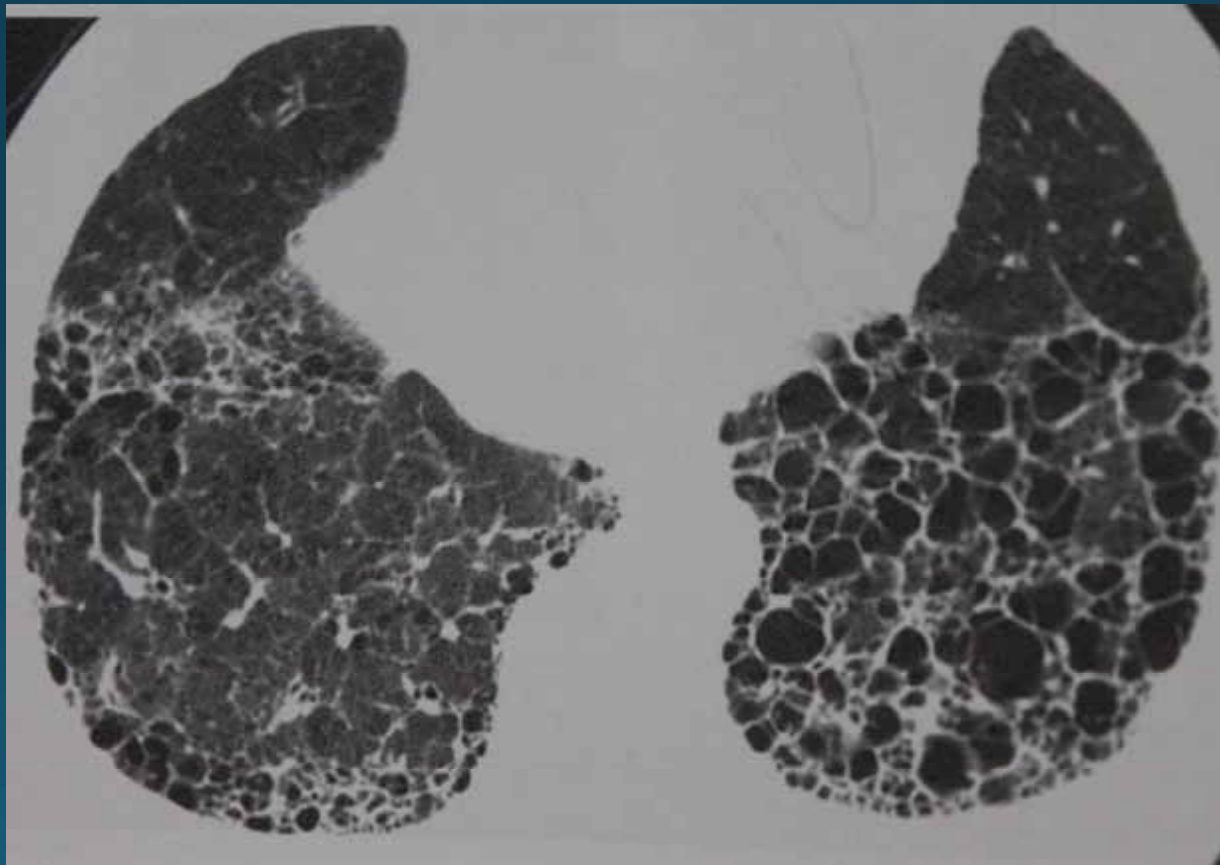
# HONEYCOMBING

- Due to extensive interstitial and alveolar fibrosis causing alveolar damage and bronchiolectasis and hence the honeycomb appearance.
- It represents end stage lung fibrosis.

# HONEYCOMBING



# Honeycombing



# HRCT- Findings in diffuse lung disease

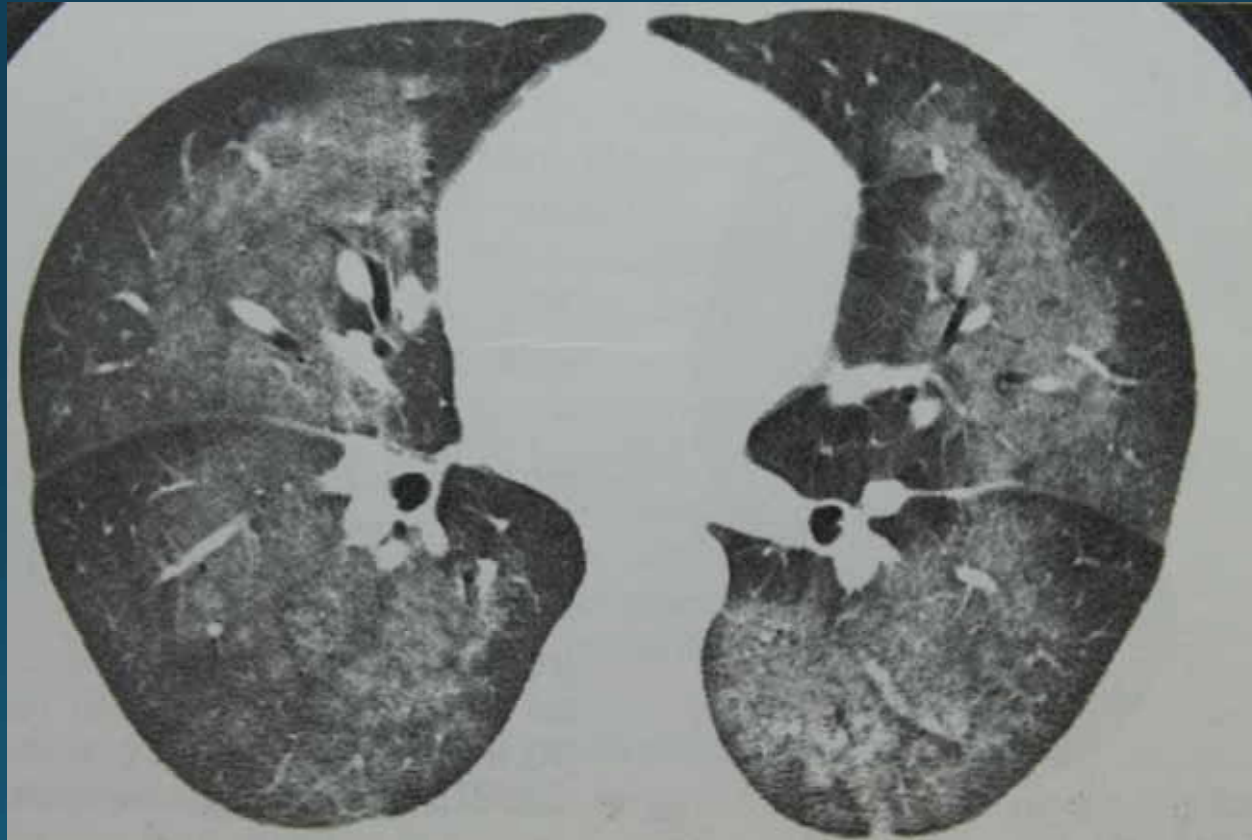
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# GGO

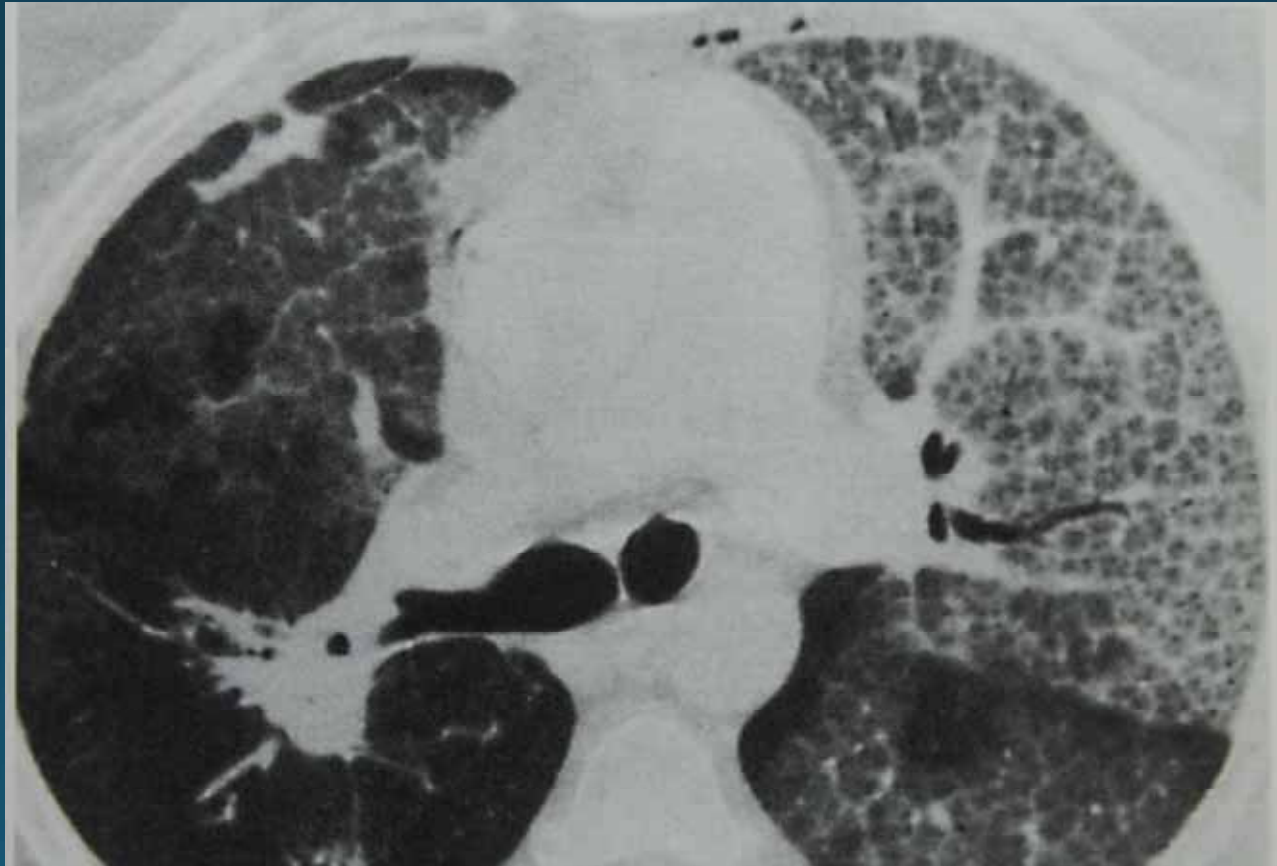
- Hazy increase in lung opacity that does not obscure underlying vessels.
- Reflects minimal interstitial thickening or partial air space filling by fluid or increase in capillary blood volume.
- Often indicates the presence of ongoing, active & treatable disease
- Only diagnose an active process only when GGO is not associated with HRCT findings of fibrosis.
- If fibrosis or traction bronchiectasis is the predominant feature, then active disease is unlikely.

## 2. Increased lung opacity – Ground glass

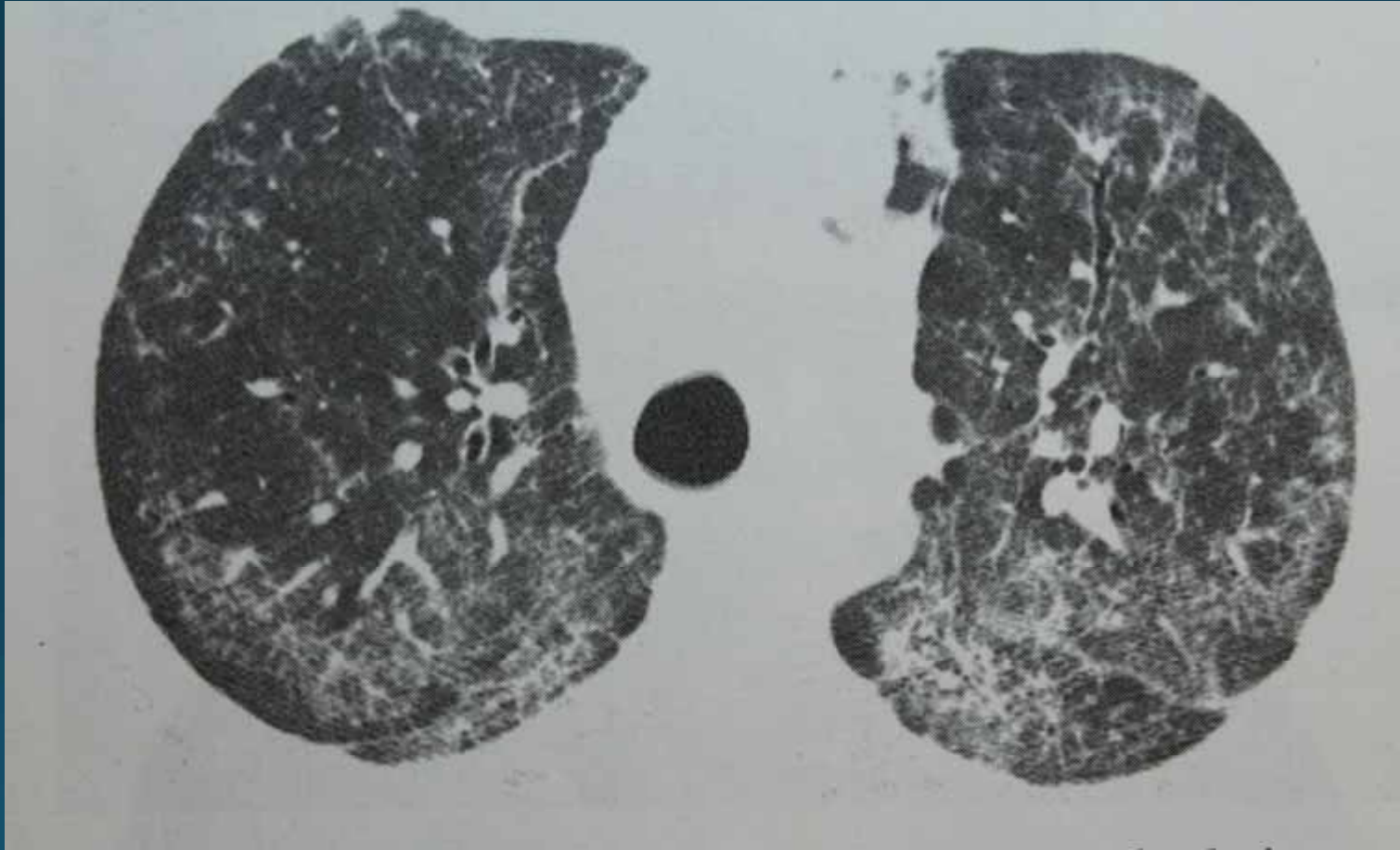




# CRAZYPAVING



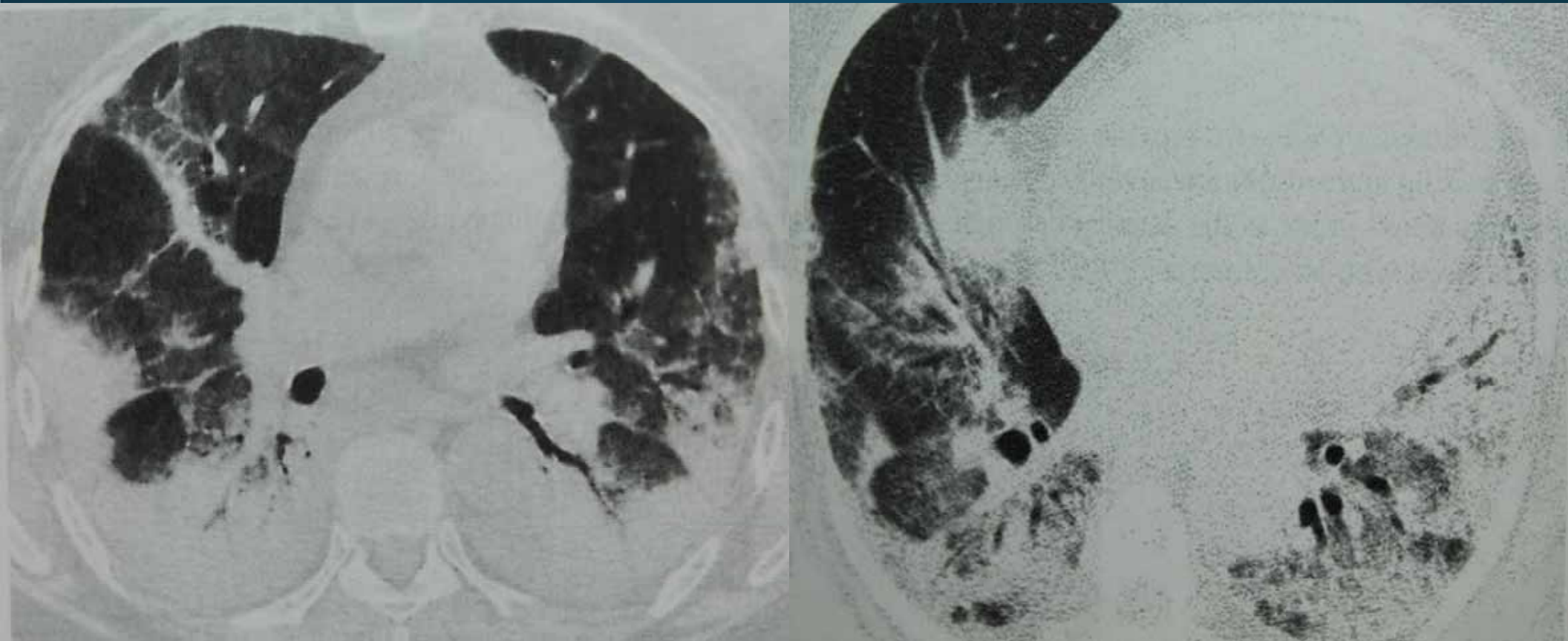
# NSIP



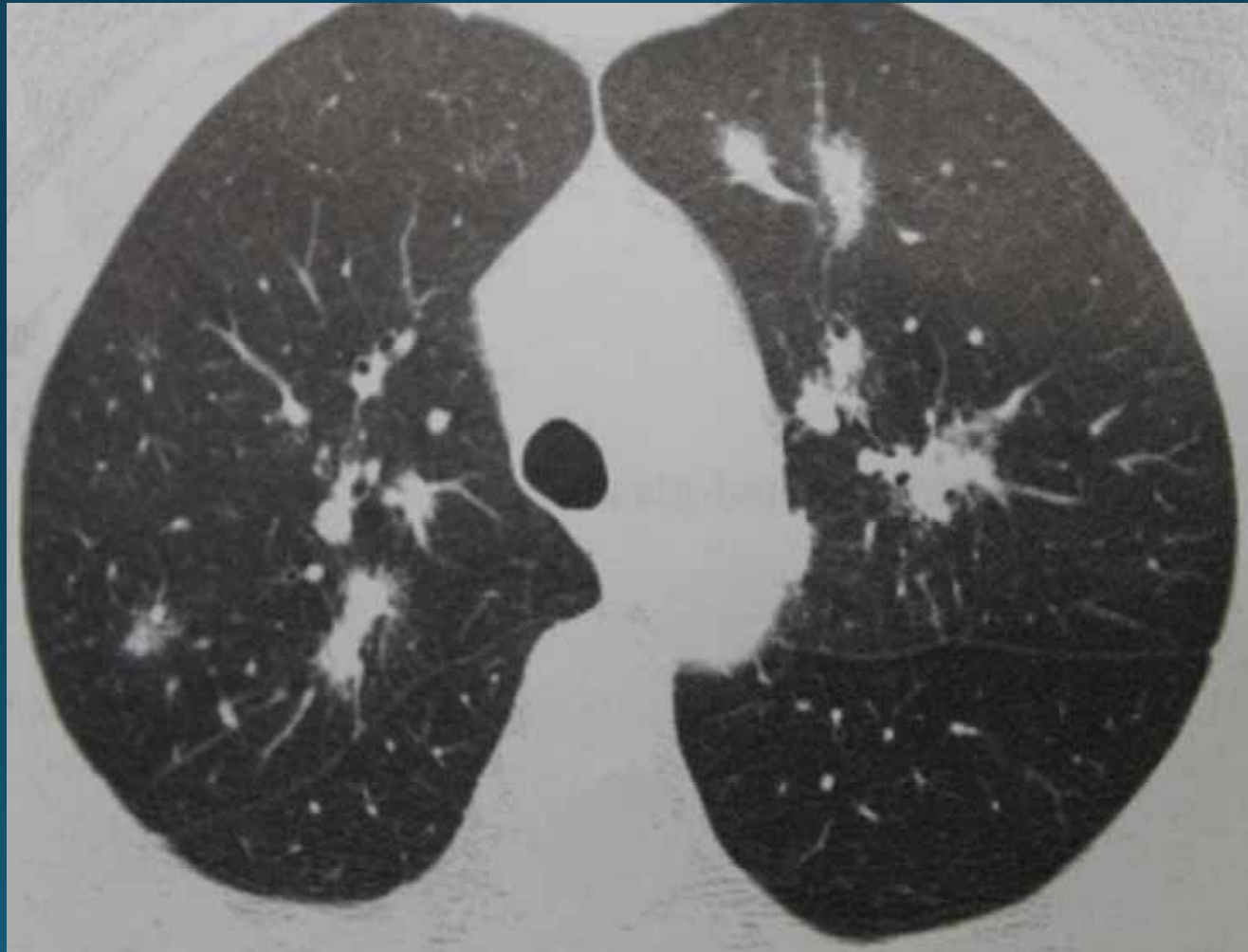
## AIRWAY ABNORMALITY- MOSAIC PATTERN



## 2. Increased lung opacity – Consolidation



COP



# HRCT- Findings in diffuse lung disease

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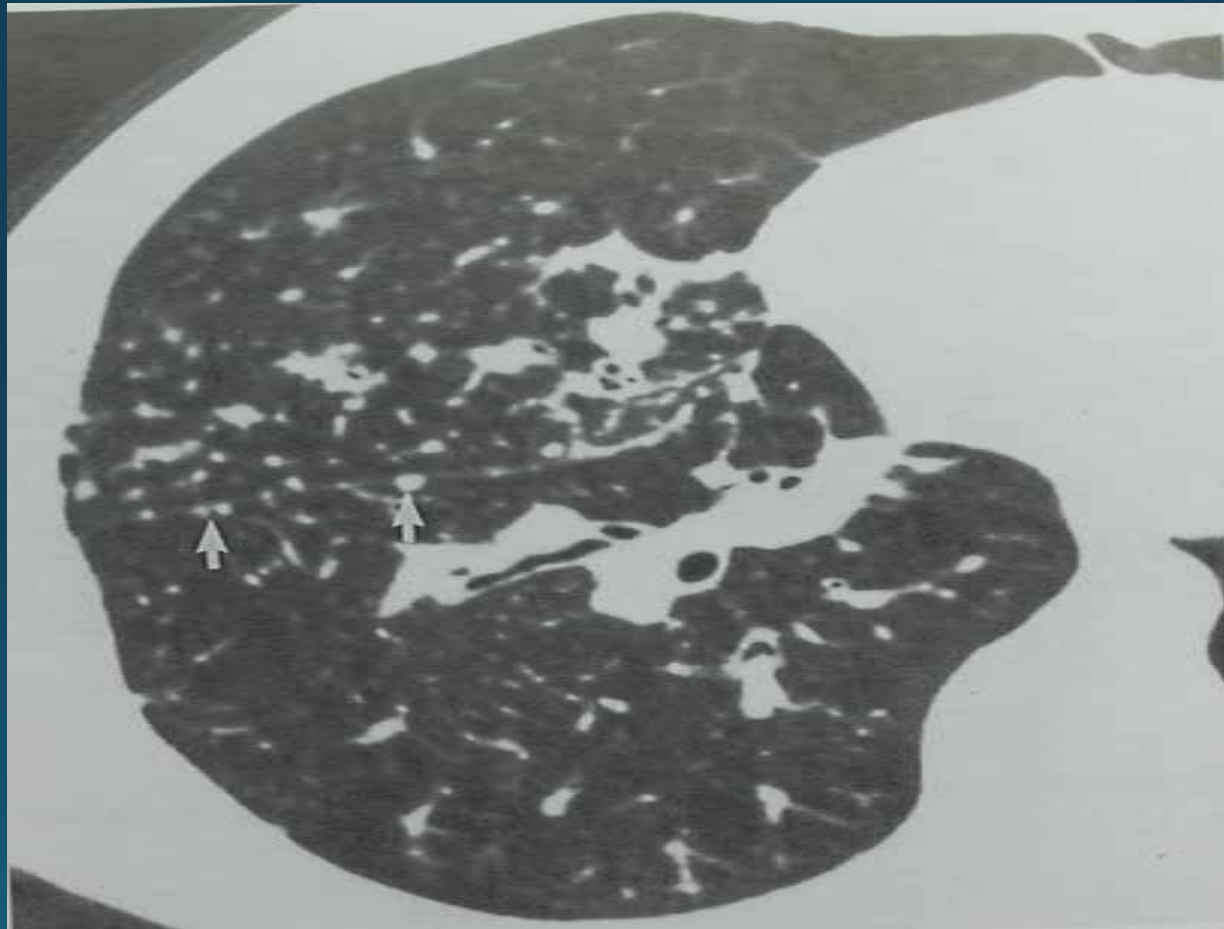
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# Nodules and Nodular Opacities

- A known feature LIP & COP
- More common in Sarcoidosis, Silicosis, Coal Worker's pneumoconiosis, Amyloidosis.
- Miliary TB, Viral pneumonia, Metastatic disease – lymphangitis ca.

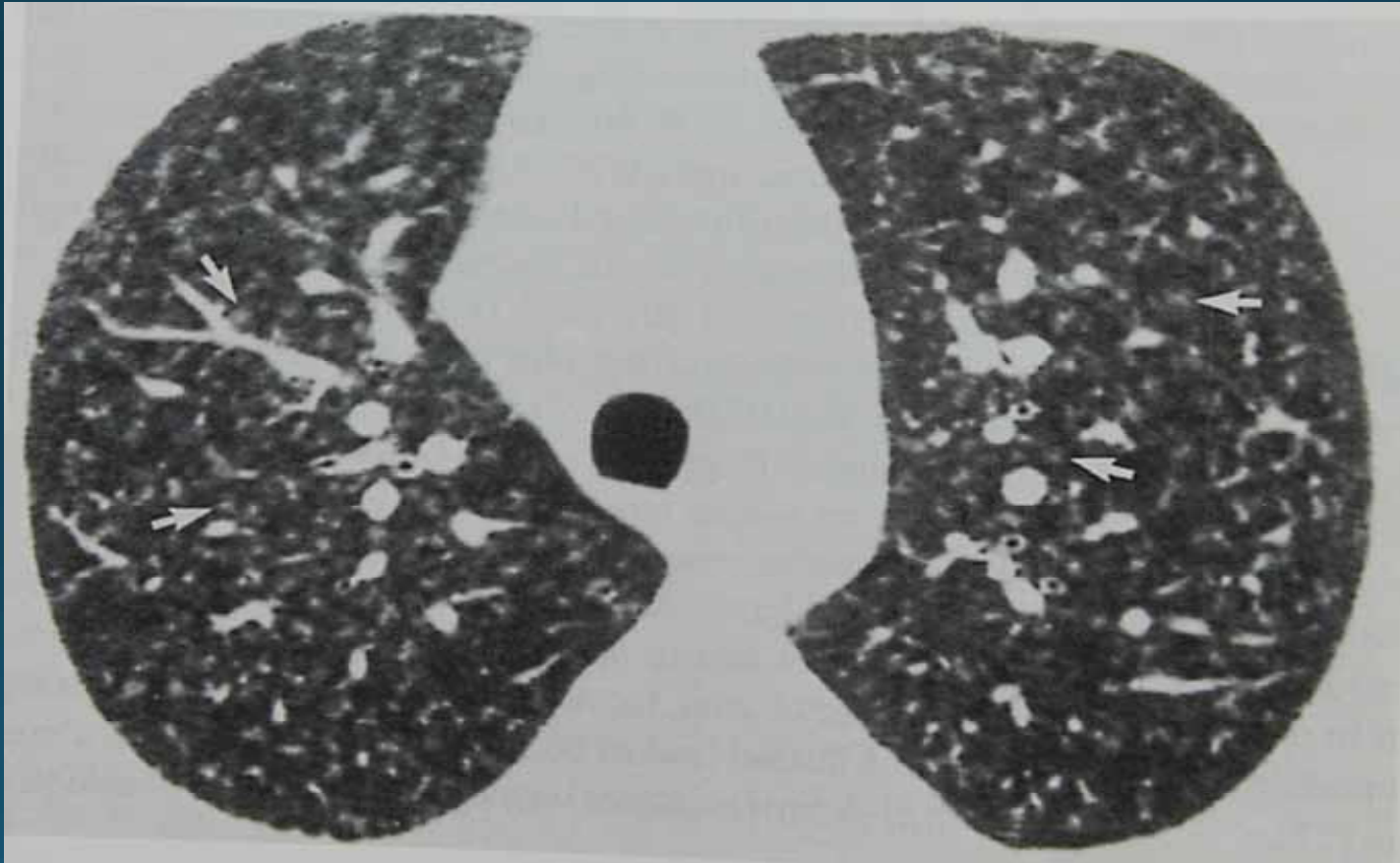


# SARCOIDOSIS

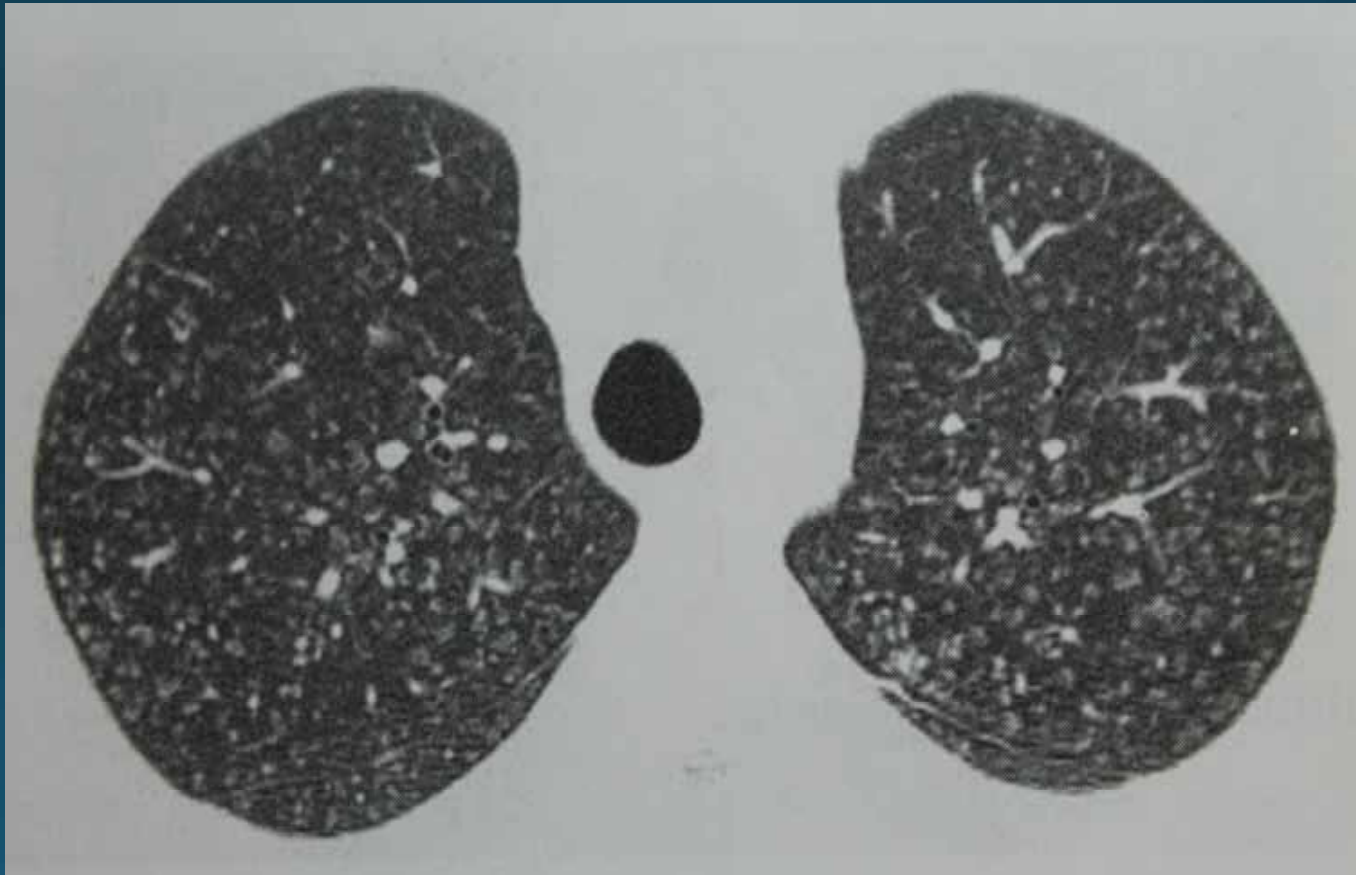




# Centrilobular nodules in COP



# Subacute hypersensitivity pneumonitis



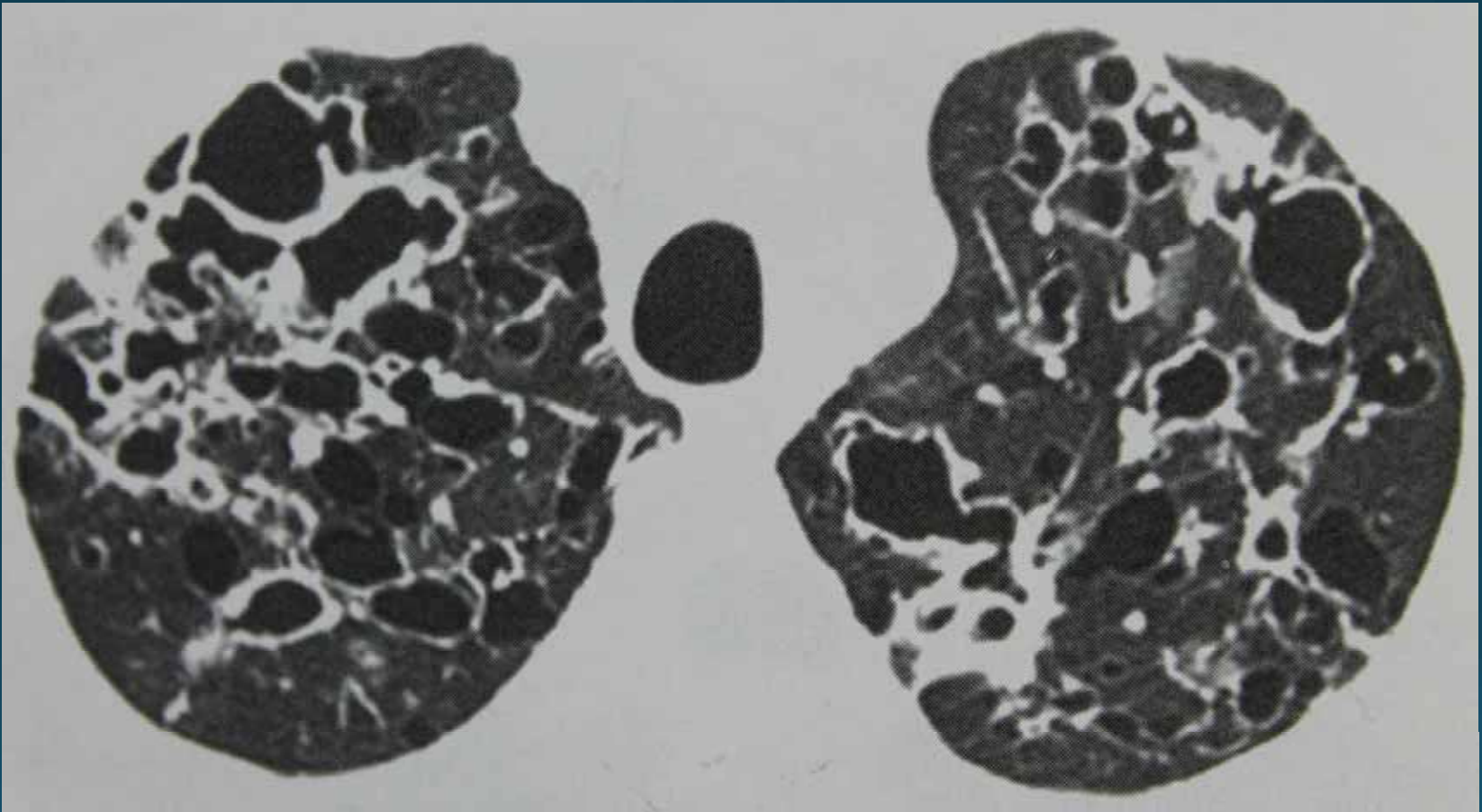
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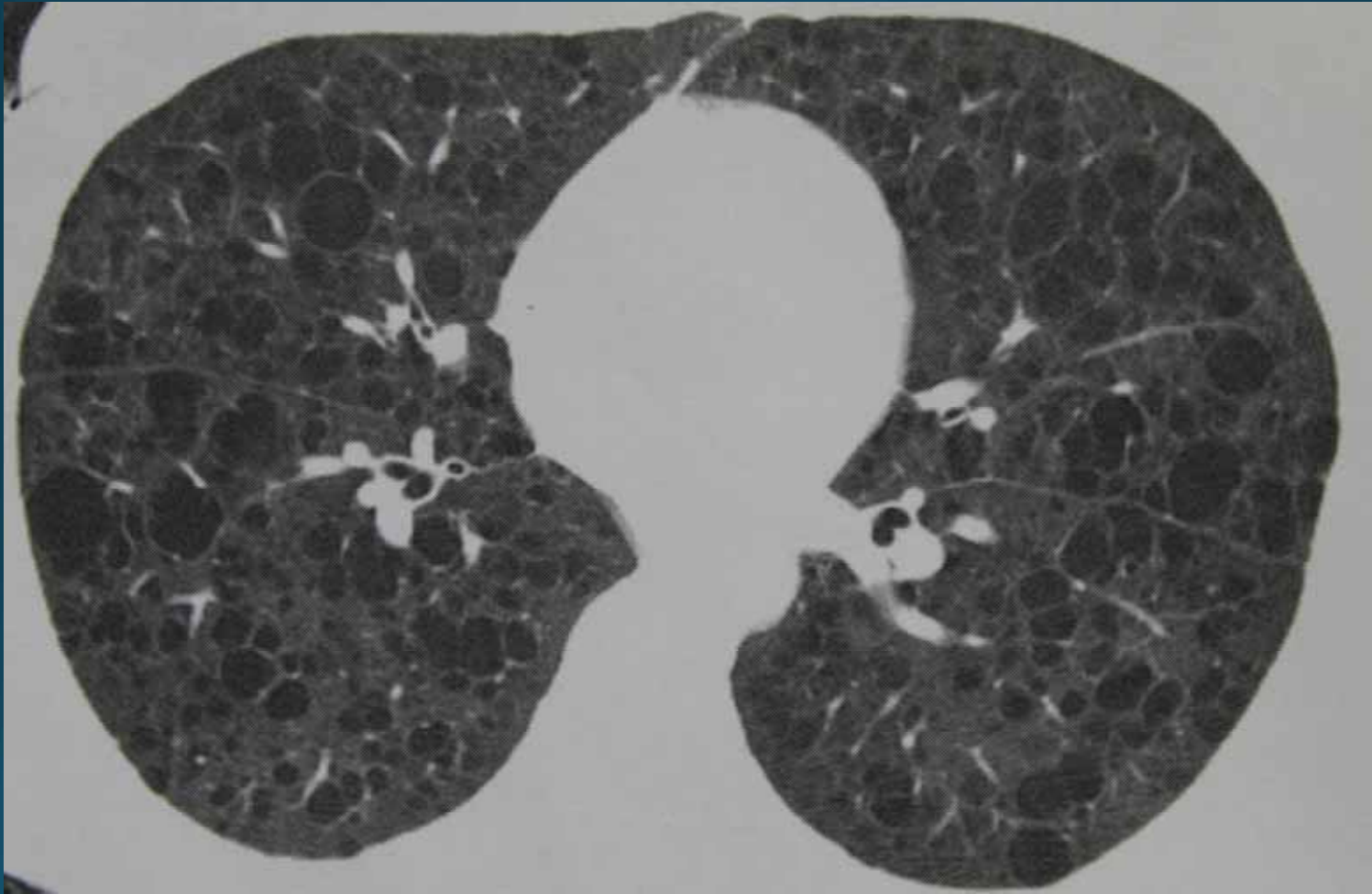
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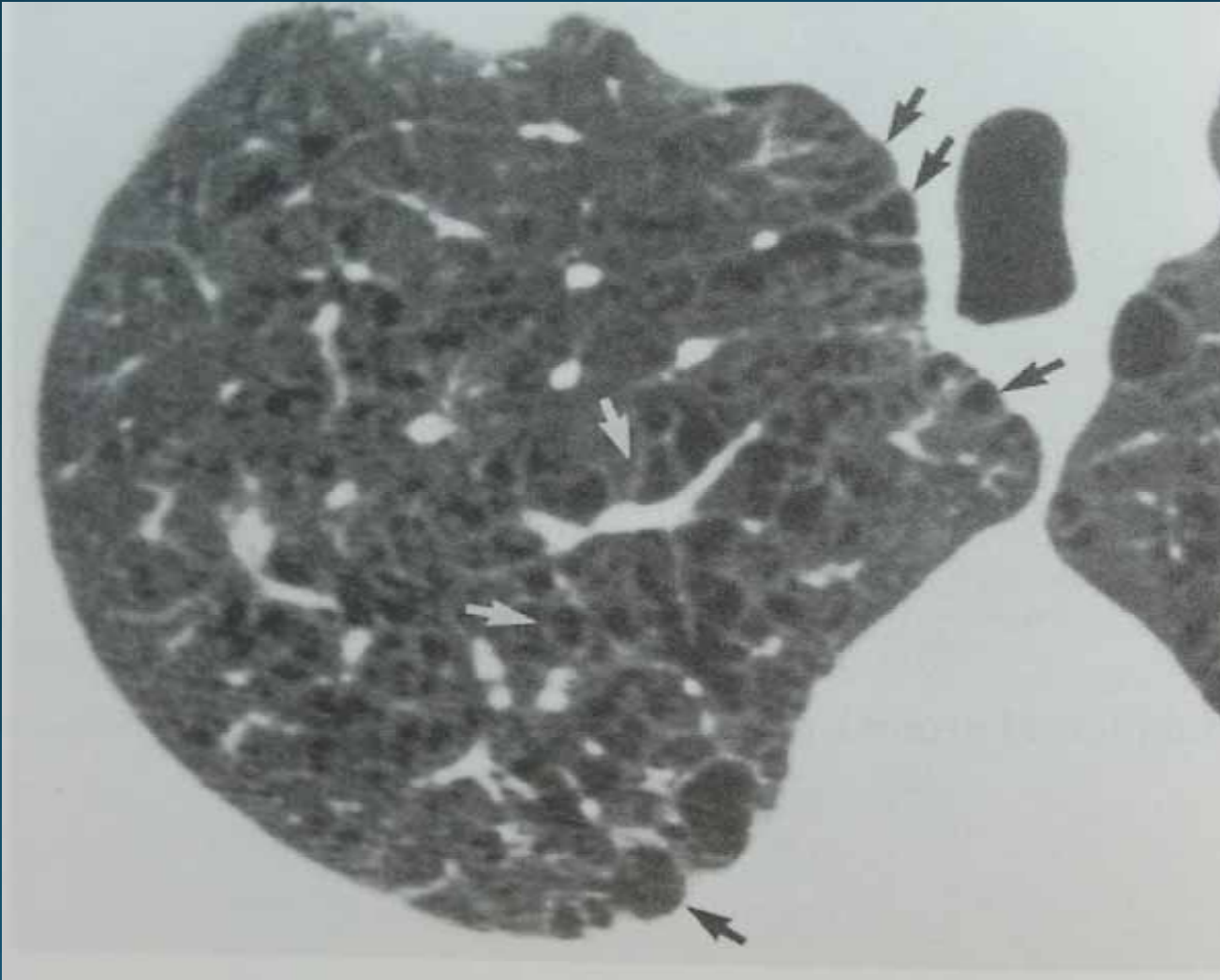
## Differential diagnosis of cystic lung disease

- LAM
- Langerhans histiocytosis
- LIP
- Bullous disease – emphysema
- Pneumatoceles
- Cystic bronchiectasis
- Honeycombing









ATS / ERS / JRS / ALAT

INTERNATIONAL GUIDELINES

Idiopathic pulmonary fibrosis

2011

The presence of a UIP pattern on HRCT is sufficient for the diagnosis of IPF and surgical biopsy is not required (2011 consensus).

**TABLE-1: HRCT CRITERIA FOR UIP PATTERN**

<b>UIP Pattern (All Four Features)</b>	<b>Possible UIP Pattern (All Three Features)</b>	<b>Inconsistent with UIP Pattern (Any of the Seven Features)</b>
<ul style="list-style-type: none"> <li>• Subpleural, basal predominance</li> <li>• Reticular abnormality</li> <li>• Honeycombing with or without traction bronchiectasis</li> <li>• Absence of features listed as inconsistent with UIP pattern (see third column)</li> </ul>	<ul style="list-style-type: none"> <li>• Subpleural, basal predominance</li> <li>• Reticular abnormality</li> <li>• Absence of features listed as inconsistent with UIP pattern (see third column)</li> </ul>	<ul style="list-style-type: none"> <li>• Upper or mid-lung predominance</li> <li>• Peribronchovascular predominance</li> <li>• Extensive ground glass abnormality (extent&gt;reticular abnormality)</li> <li>• Profuse micronodules (bilateral, predominantly upper lobes)</li> <li>• Discrete cysts (multiple, bilateral, away from areas of honeycombing)</li> <li>• Diffuse mosaic attenuation/air-trapping (bilateral, in three or more lobes)</li> <li>• Consolidation in bronchopulmonary segment(s)/lobe(s)</li> </ul>

