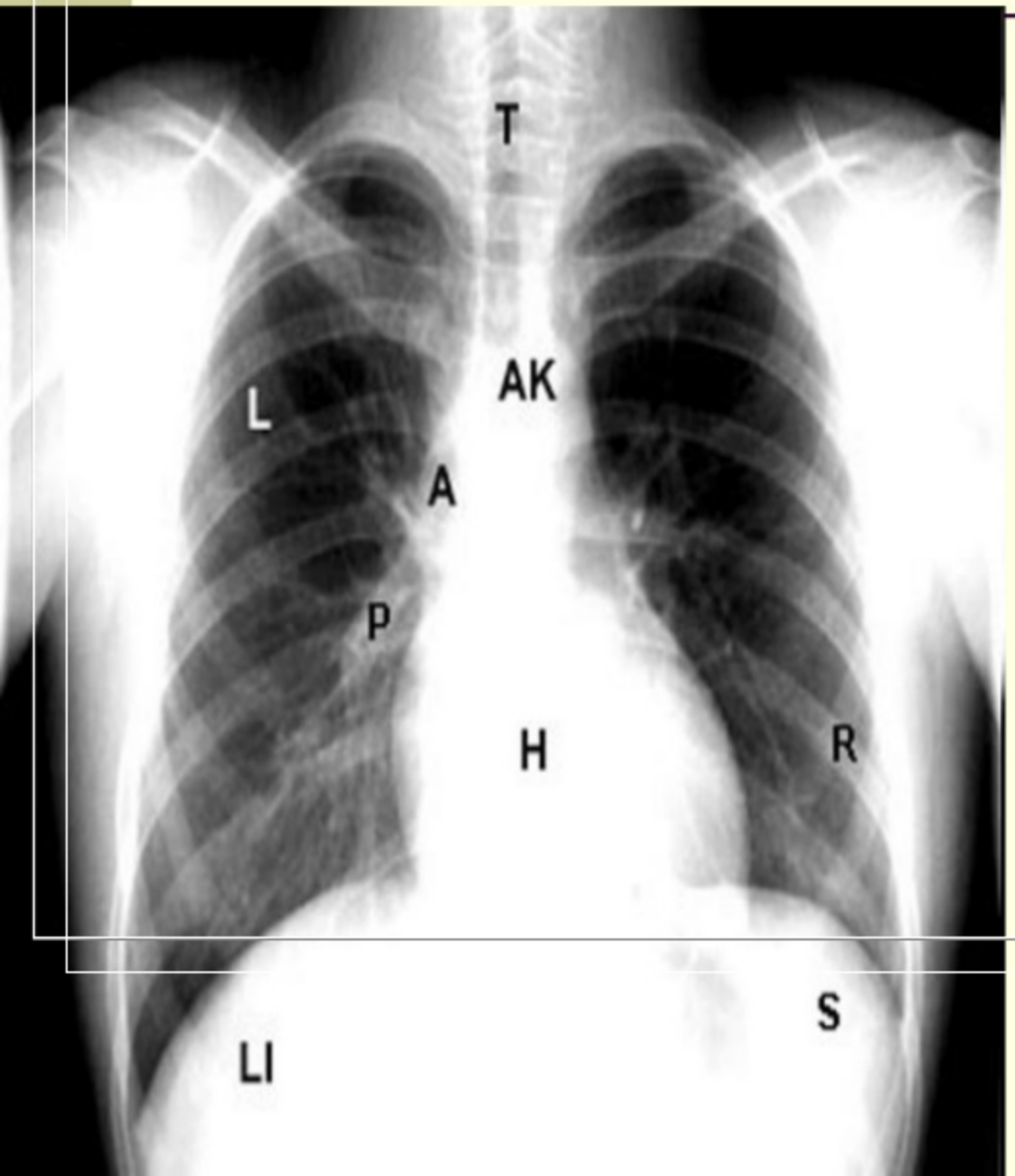
Pathology of lung

NORMAL CHEST X-RAY



- L- Lung
- T- Trachea
- AK- Aortic Knob
- A- Ascending Aorta
- H- Heart
- R- Ribs
- P- Pulmonary Artery
- S- Spleen

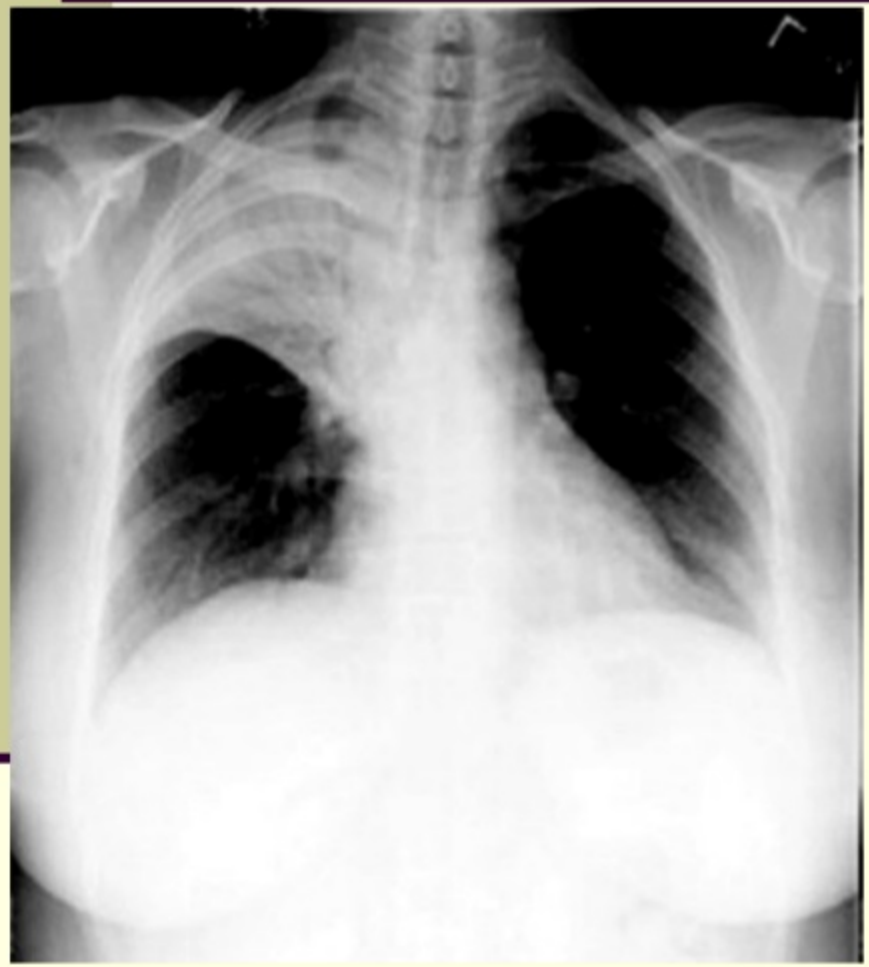
CONSOLIDATION

- Lobar or Segmental Density
- Air Bronchogram
- No Loss of Lung Volume

CONSOLIDATION

- Density in left lower lung field
- Loss of left heart silhouette
- Diaphragmatic silhouette intact
- No shift of mediastinum
- Blunting of costophrenic angle

CONSOLIDATION



- Density in right upper lung field
- Lobar density
- Loss of ascending aorta silhouette
- No shift of mediastinum
- Transverse fissure not significantly shifted
- Air bronchogram

PLEURAL EFFUSION

- Fluid accumulates in the pleural space.
- **Radiological criteria** are:
- Increased Density
- In dependent portion
  - Costophrenic angle in PA view
  - Along sides in lateral decubitus position
  - Along posteriorly in supine position, giving diffuse haziness on the side of effusion
- Blunting of costophrenic angle
- Lack of identifiable diaphragm (silhouette sign principle).

The silhouette sign

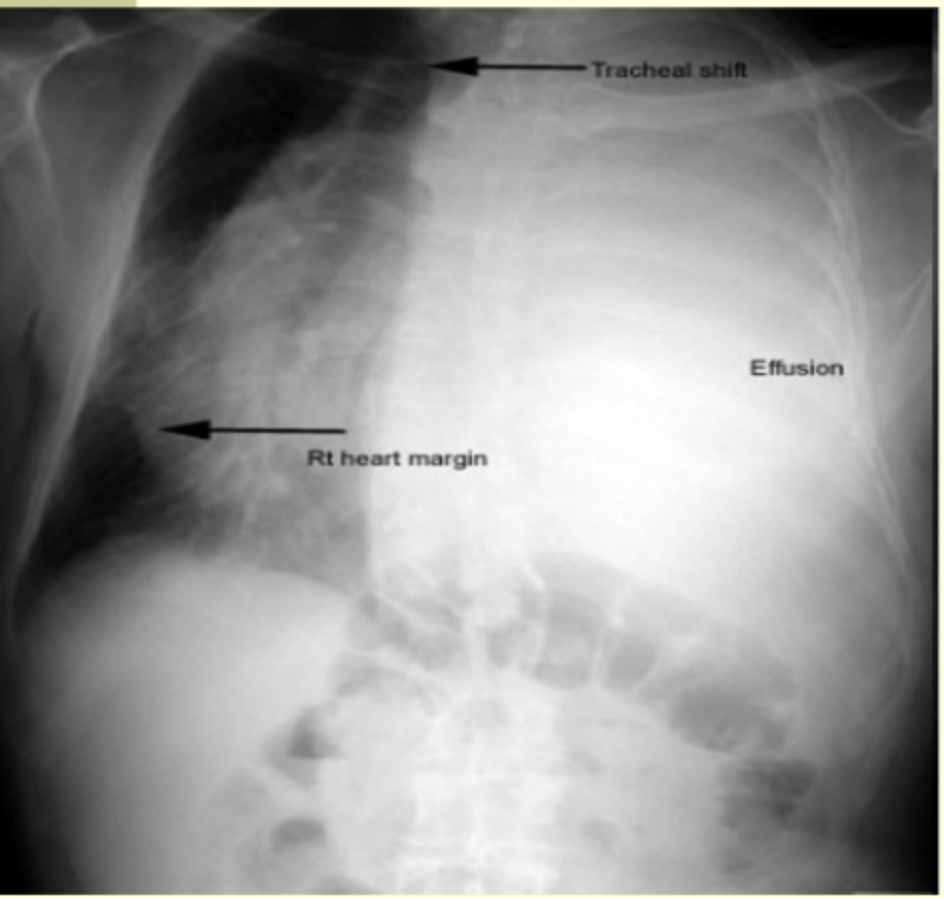
- loss of an interface by adjacent disease and permits localization of a lesion on a film by studying the diaphragm, cardiac and aortic outlines.

- if the border is retained -the abnormality is superimposed, the lesion must he lying either anterior or posterior.

PLEURAL EFFUSION

- Homogenous density
- Meniscus maximum in axilla
- Loss of cardiophrenic angle
- Loss of diaphragmatic and right cardiac silhouette

MASSIVE PLEURAL EFFUSION



- Massive
- Shift of mediastinum

LOCULATED PLEURAL EFFUSION

- Homogenous density
- Loculated
- Loss of cardiophrenic angle
- Loss of lateral portion of diaphragmatic silhouette

ATELECTASIS

- loss of air in the alveoli; alveoli devoid of air

- Increased density, Signs indicating loss of lung volume
- **Types of Atelectasis:**
  - Resorptive Atelectasis
  - Relaxation Atelectasis
  - Adhesive Atelectasis
  - Cicatricial Atelectasis
  - Round Atelectasis

SIGNS OF ATELECTASIS

Generalized

- Shift of mediastinum
- Elevation of diaphragm
- Drooping of shoulder.
- Crowding of ribs
- Movement of Fissures
  - movement of oblique fissures.
  - Forward movement - LUL atelectasis.
  - Backward movement - lower lobe atelectasis.
  - Movement of transverse fissure on PA film.
- Movement of Hilum

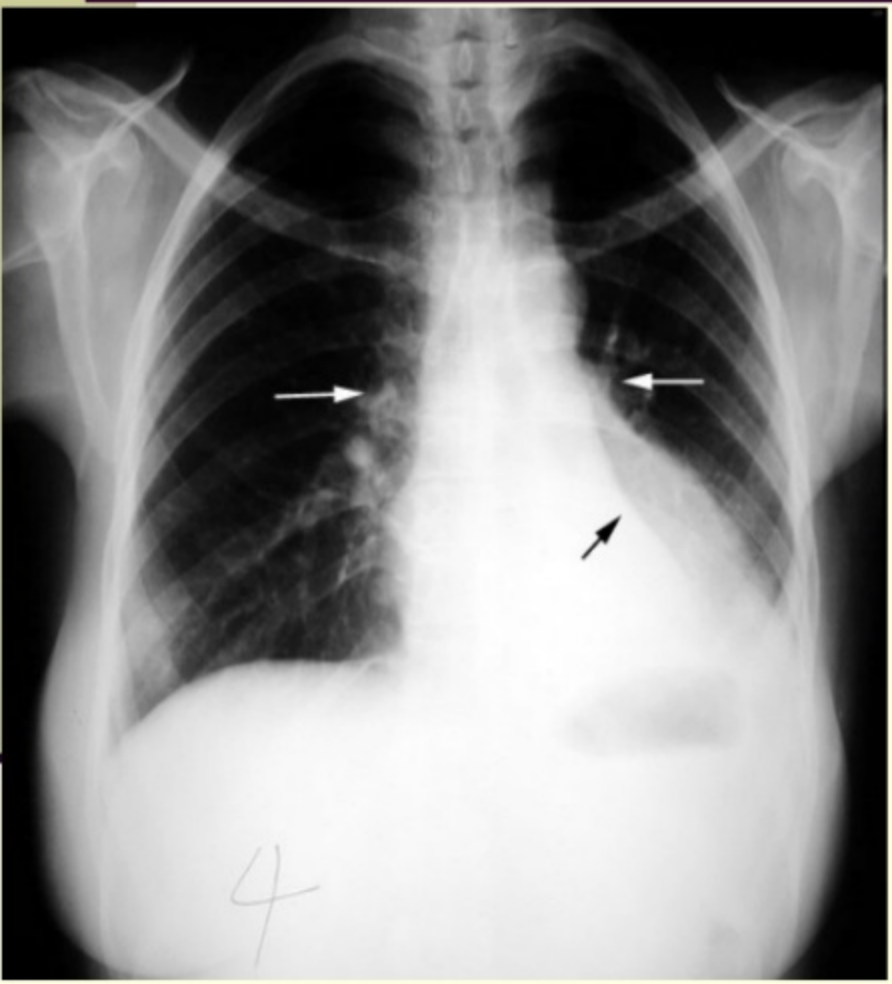
Cont…

- Compensatory Hyperinflation
- Alterations in Proportion of Left and Right Lung
- Hemithorax Asymmetry

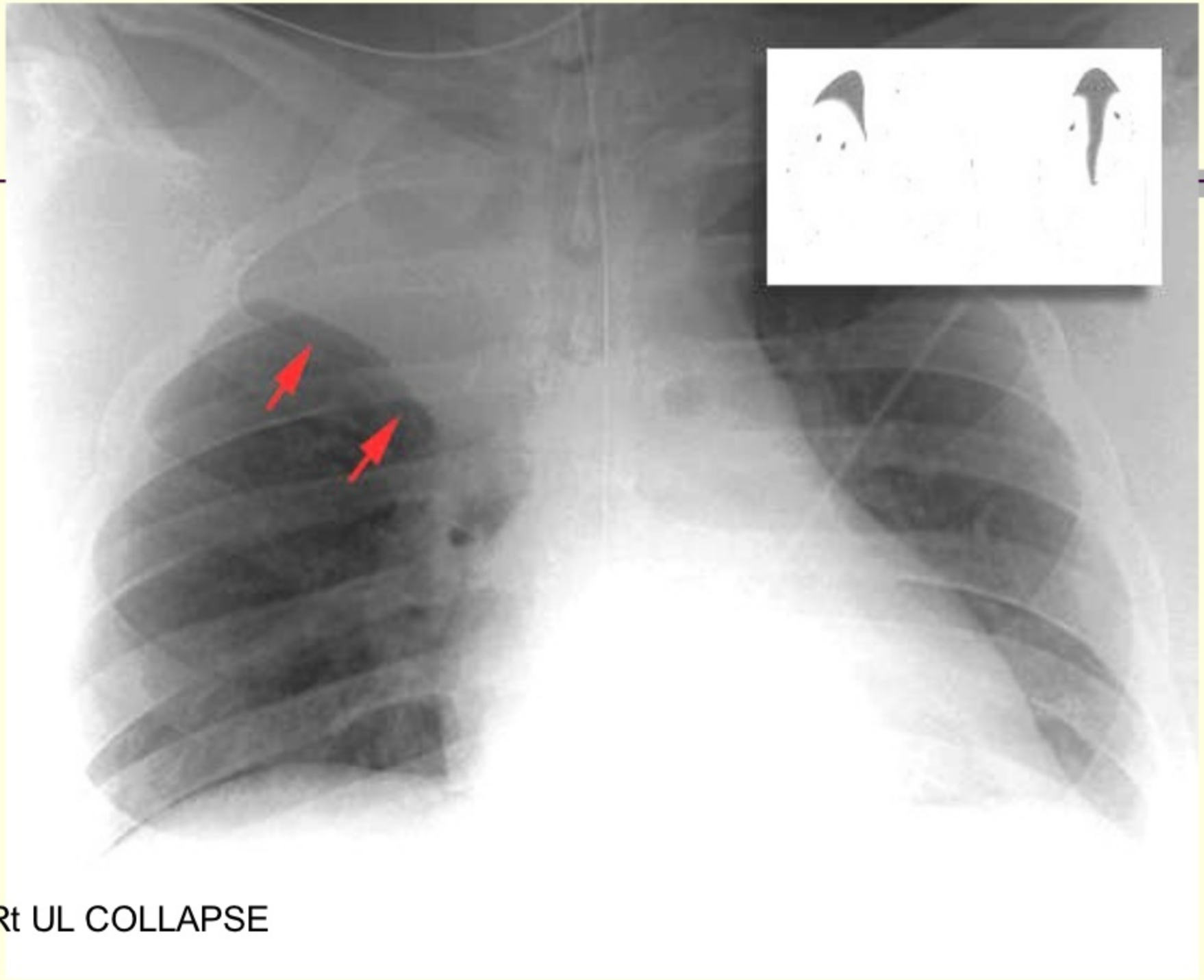
ATELECTASIS RIGHT LUNG

- Homogenous density right hemithorax
- Mediastinal shift to right
- Right hemithorax smaller
- Right heart and diaphragmatic silhouette are not identifiable

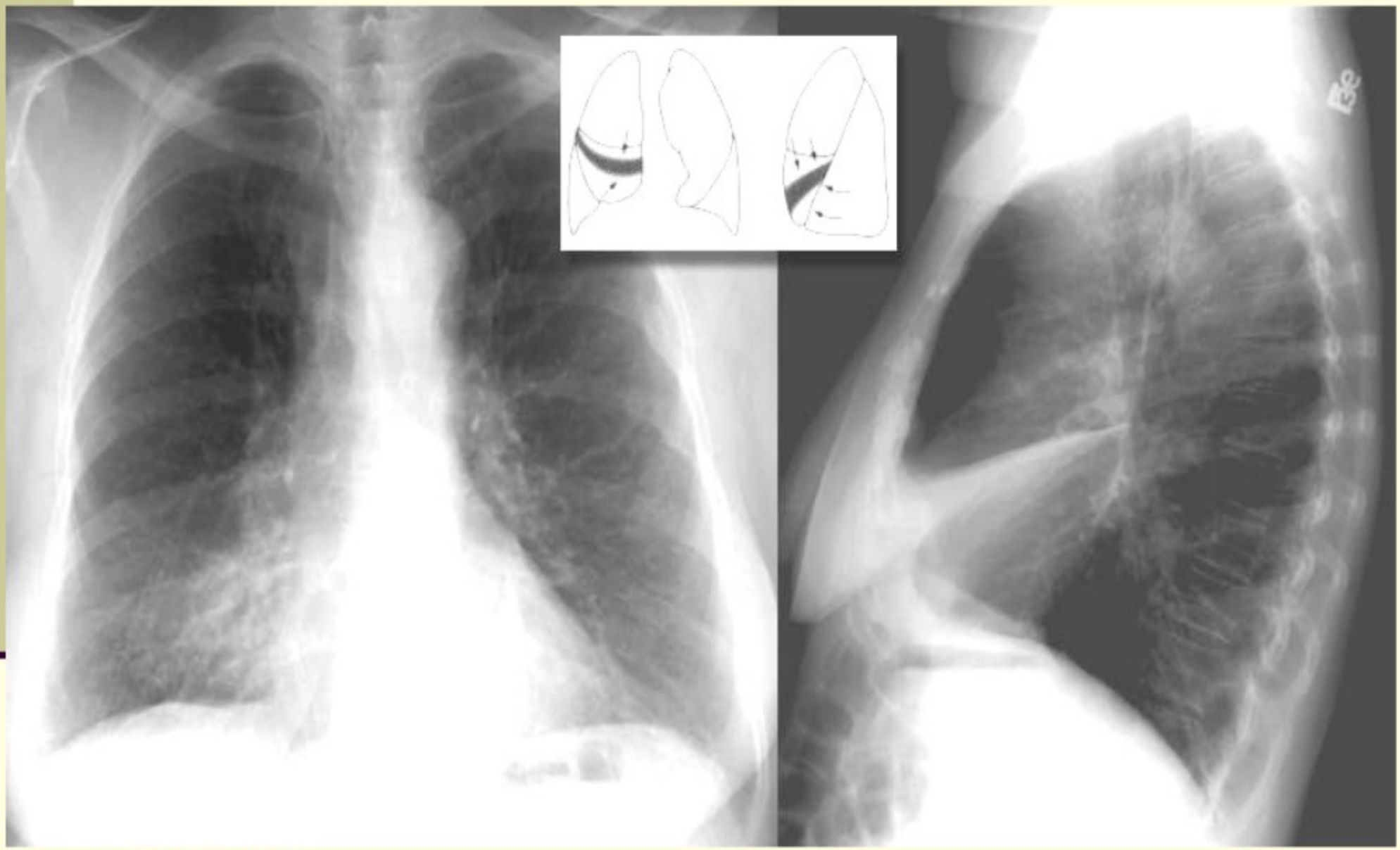
LEFT LOWER LOBE ATELECTASIS



- Inhomogeneous cardiac density
- Left hilum pulled down
- Non-visualization of left diaphragm
- Triangular retrocardiac atelectatic LLL



Rt UL COLLAPSE



RT MID LOBE

FIBROSIS

- Diffuse haziness
- Apical cap thickening
- Blunting of costophrenic angle
- No shift of fluid in lateral decubitus
- Loss of lung volume
- Lines not corresponding to fissures

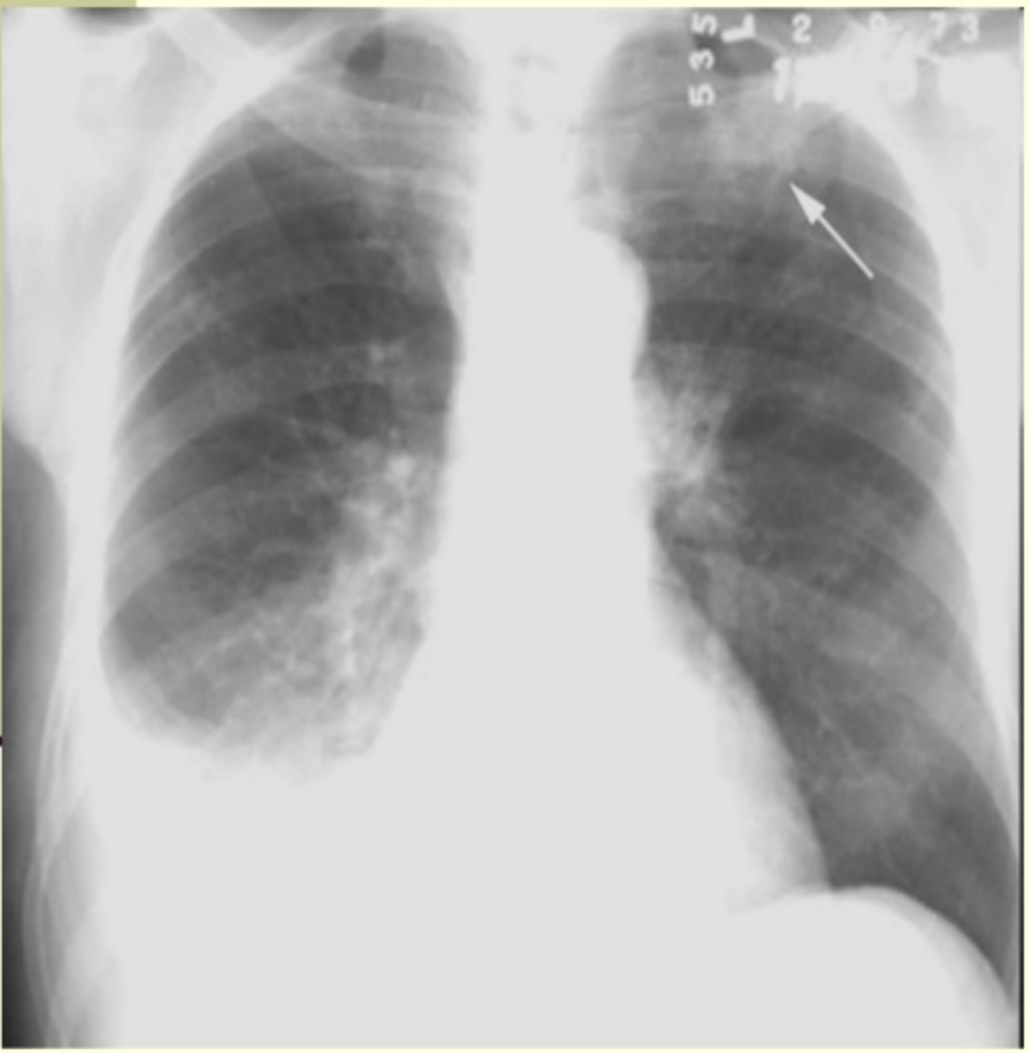
PLEURAL FIROSIS

- Small right hemithorax
- Diffuse haziness
- Tracheal shift to right
- Blunted costophrenic angle
- Lines not corresponding to fissures

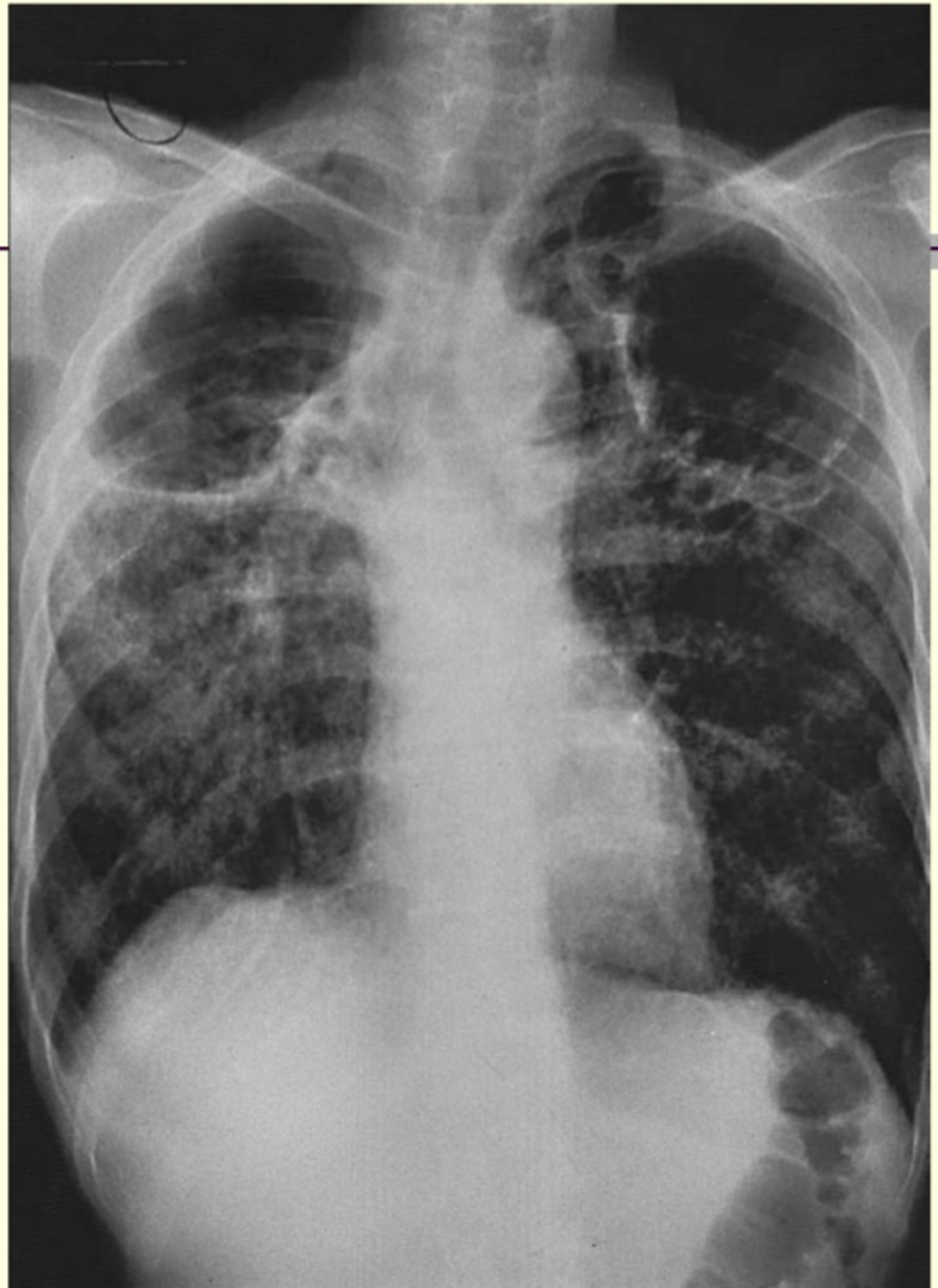
TUBERCULOSIS

- LUL cavities
- RUL infiltrate
- Bilateral upper lobe disease

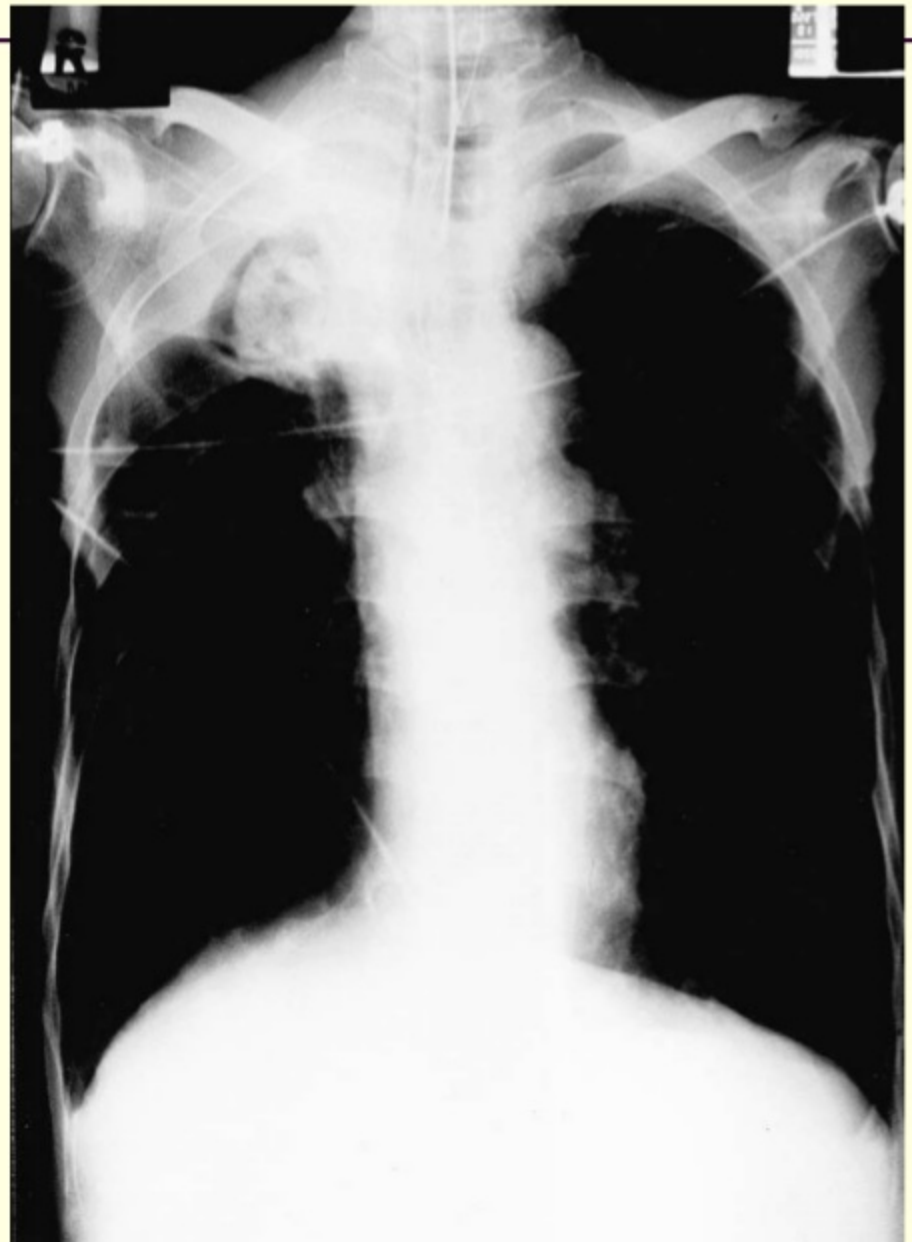
TUERCULOSIS



- LUL cavity
- Cavity behind clavicle - note increased density of clavicle in the region over lying cavity
- Pleural effusion on right



Fungal ball



MILIARY TUBERCULOSIS

- Interstitial nodules
  - Uniform size
  - Sharper edges

PNEUMOTHORAX

- **Air (black) in pleural space.** With No lung markings
- Recognition of atelectatic lung (lung margin).
- **Shift of mediastinum** to the opposite side.
- **Larger hemithorax.**
- **Opposite lung** - vascular markings prominent.

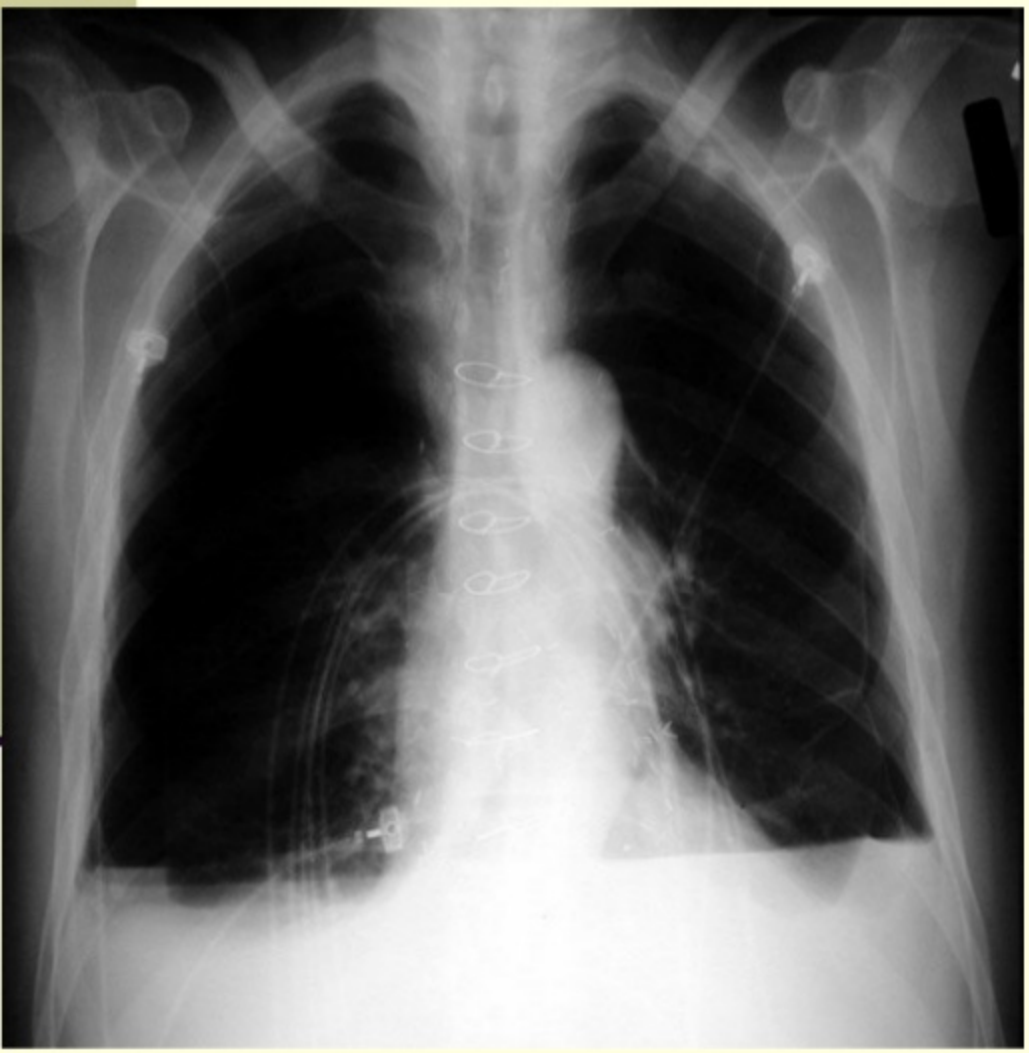
PNEUMOTHORAX

- No vascular markings on right
- No shift of mediastinum to left
- Deep sulcus
- Atelectatic right lung
- Increased haziness on left: Diversion of entire cardiac output
- Small fluid level near costophrenic angle: Hydro pneumothorax

TENSION PNEUMOTHORAX

- No vascular markings on right
- Shift of mediastinum to left
- Deep sulcus
- Atelectatic right lung
- Increased haziness on left: Diversion of entire cardiac output

HYDROPNEUMOTHORAX



- Air in pleural cavity
- Lung margin visible
- Bilateral fluid level: Any time you see a horizontal fluid level, it means that there is air and fluid in the pleural space

LUNG CANCER

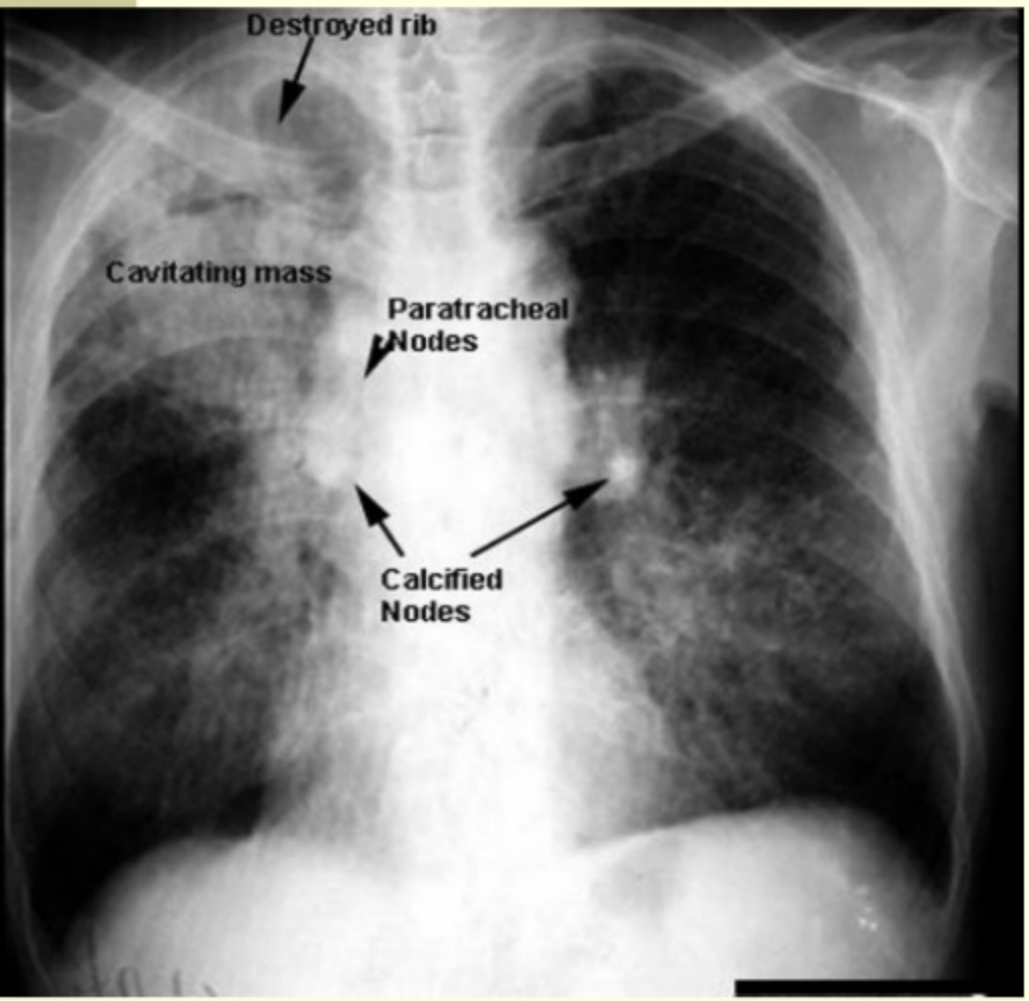
- **Squamous cell**
  - Large mass
    - Cavitation
  - Atelectasis with hilar mass
  - Lympadenopathy
- **Large cell**
  - Large mass
- **Adenocarcinoma**
  - Solitary pulmonary nodule

- **Small cell**
  - Insignificant lung lesion
  - Massive mediastinal adenopathy
- **Alveolar cell**
  - Solitary pulmonary nodule
  - Pneumonic
  - Multicentric
- **Pancoast tumor**
  - Apical shadow
  - Posterior rib destruction
  - Drooping of shoulder / Brachial plexus

ALVEOLAR CELL CARCINOMA

- **Alveolar Cell Carcinoma / Solitary Pulmonary Nodule**
- LUL anterior segment lesion
- Round with irregular margins
- Air bronchogram

PANCOAST TUMOUR



- Right apical mass
- Cavitating mass
- Para tracheal nodes
- 2nd rib destruction
- Calcified nodes (silicosis)

LARGE CELL CANCER

Large Cell Cancer

- Mass RUL

LUNG MASS

Mass

- Round or oval
- Sharp margin
- Homogenous
- No respect for anatomy
- Lung Cancer: Large cell

LUNG ABSCESS

Lung Abscess

- Bilateral
- Multiple
- Fluid level

LUNG ABSCESS

Lung Abscess

- Anterior segment of LUL
- Atypical location for aspiration lung abscess
- Thick wall
- Fluid level

PULMOARY EDEMA

Pulmonary Edema
Acute Diffuse Alveolar

- Bilateral
- Diffuse
- Butterfly pattern
- Soft fluffy lesions
- Coalescing
- Air bronchogram

EMPHYSEMA

Alpha 1 Anti-Trypsin Deficiency

- Hyperinflation
- Hyperlucency
- Low set flat diaphragm
- Vertical heart
- Pre and infra cardiac lungs
- Barrel shape

Emphysema

- Avascular zones
- Cephalization of upper lung fields is not evident
- Predominant basal involvement (not evident)

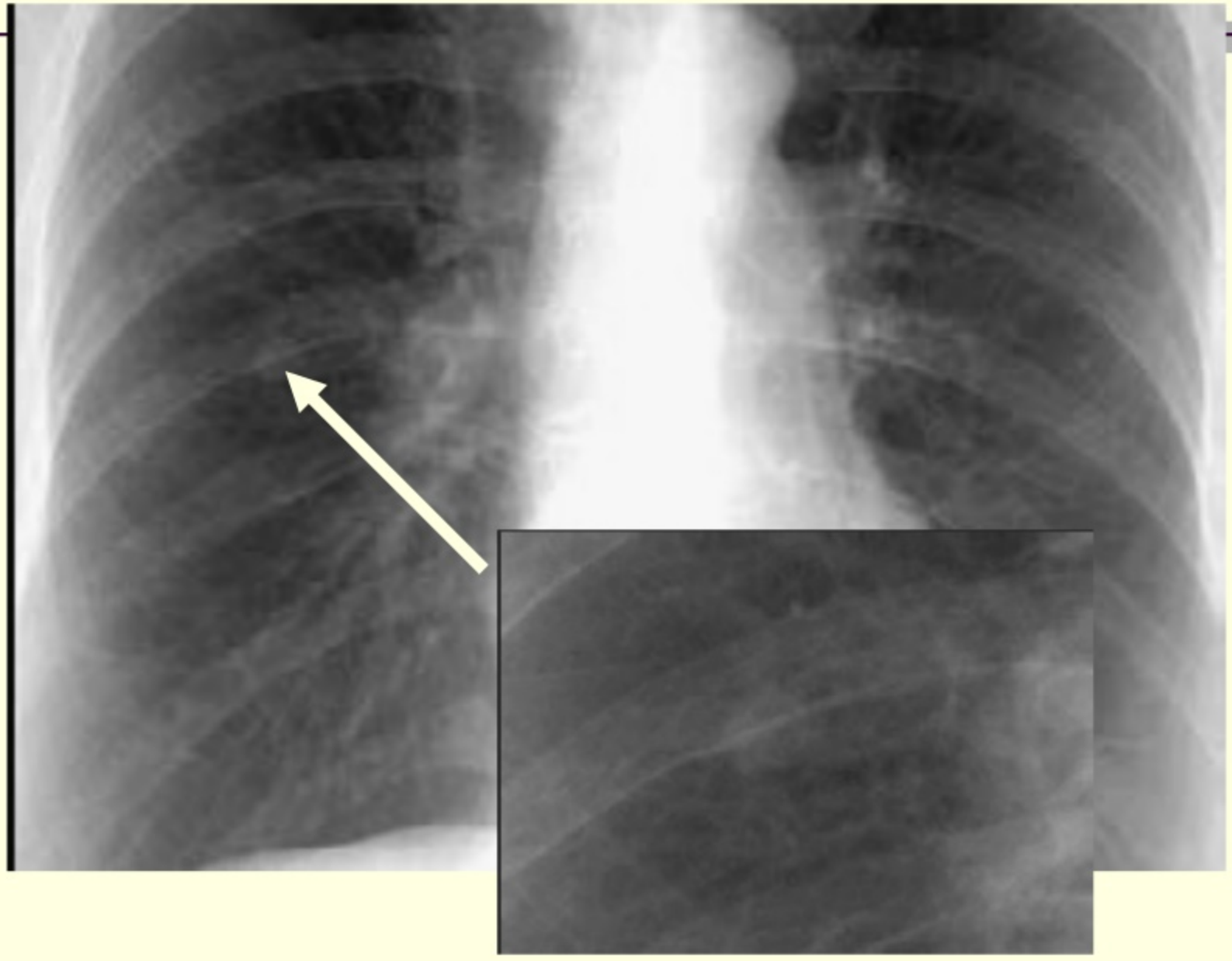
- SOME D/D

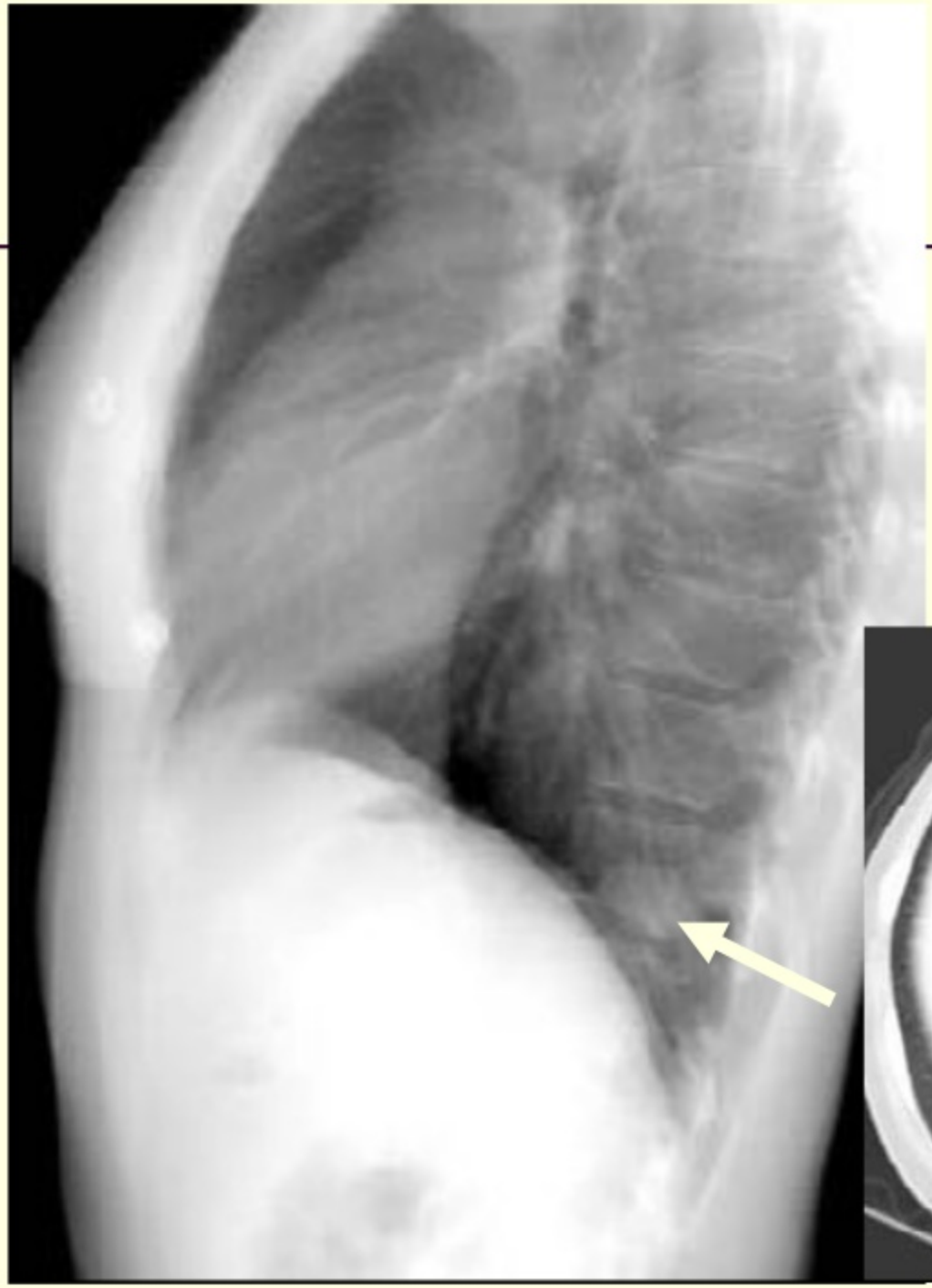
MULTIPLE NODULES OR MASS >3 CM

- **M**ets/Carcinoma/Lymphoma
- **T**B/granuloma
- **W**egeners
- **R**heumatoid nodules/Round pneumonia
- **F**ungal
- **S**arcoid
- **S**eptic pulmonary emboli

COIN LESION <3 CM

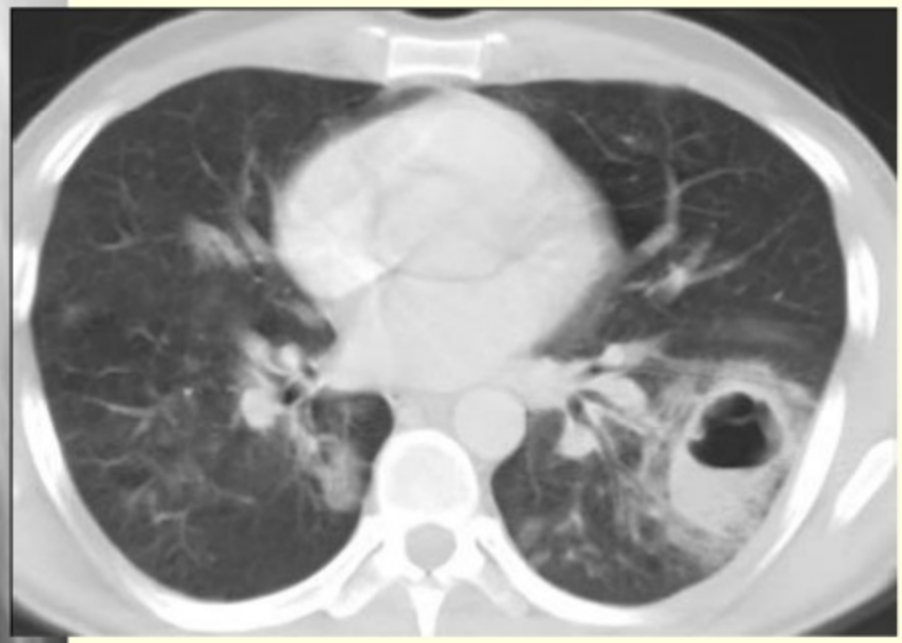
- **C**arcinoma/Congenital
- **H**amartoma/Hematoma
- **A**VM/Abscess
- **N**eoplasm–mets
- **G**ranuoma
- TB pneumonia





CAVITY

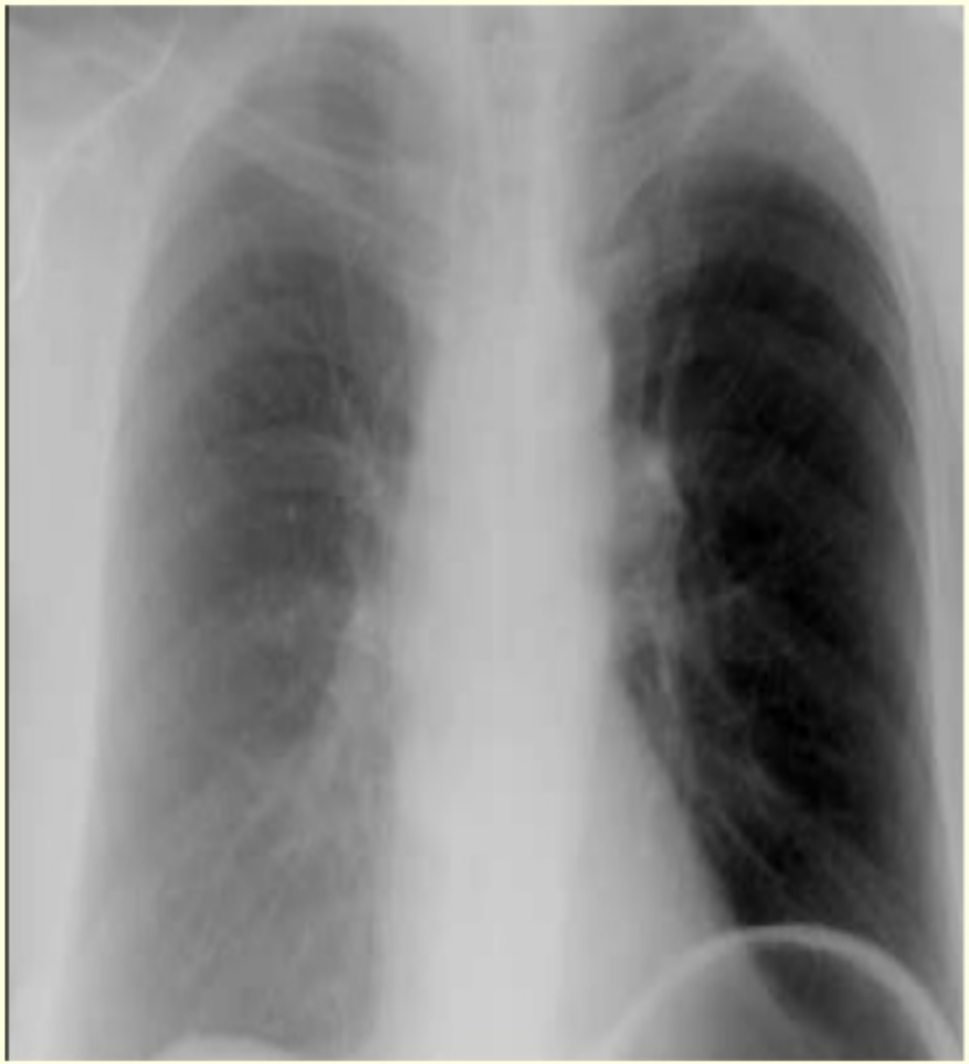
- **C**arcinoma-SCC
- **A**bscess-fungal/bacterial/TB
- **V**ascular-septic emboli
- **I**nflammatory-rheumatoid nodule
- **T**rauma-resolving contusion
- **Y**oung-bronchogenic cyst



UNILATERAL HYPERLUCENT LUNG

- **P**oland syndrome/Pneumothorax
- **O**ligemia/Obstruction (PE)
- **E**mphysema
- **M**astectomy
- **S**wyer James

Emphysema



Anterior Mediastinal Masses

- 1. Thymoma
- 2. Teratoma
- 3. Substernal thyroid
- 4. Lymphoma

Opacified Hemithorax

- 1. Atelectasis
- 2. Pleural effusion
- 3. Pneumonia
- 4. Post-pneumonectomy/ agenesis

Large Cavitary Lung Lesions

- 1. Abscess
- 2. Carcinoma
- 3. TB

Bronchogenic Carcinoma

Upper Lobe Disease

- 1. TB (2° TB)
- 2. Silicosis
- 3. Eosinophilic granuloma

- **Micronodular Lung Disease**
- 1. Mets
- 2. Sarcoid
- 3. Pneumoconiosis
- 4. Miliary TB

Micronodular Lung Disease- Sarcoid

- **Small Cavitary Lung Lesions**
- 1. Septic emboli
- 2. Rheumatoid nodules
- 3. Squamous or transitional cell mets
- 4. Wegener's Granulomatosis

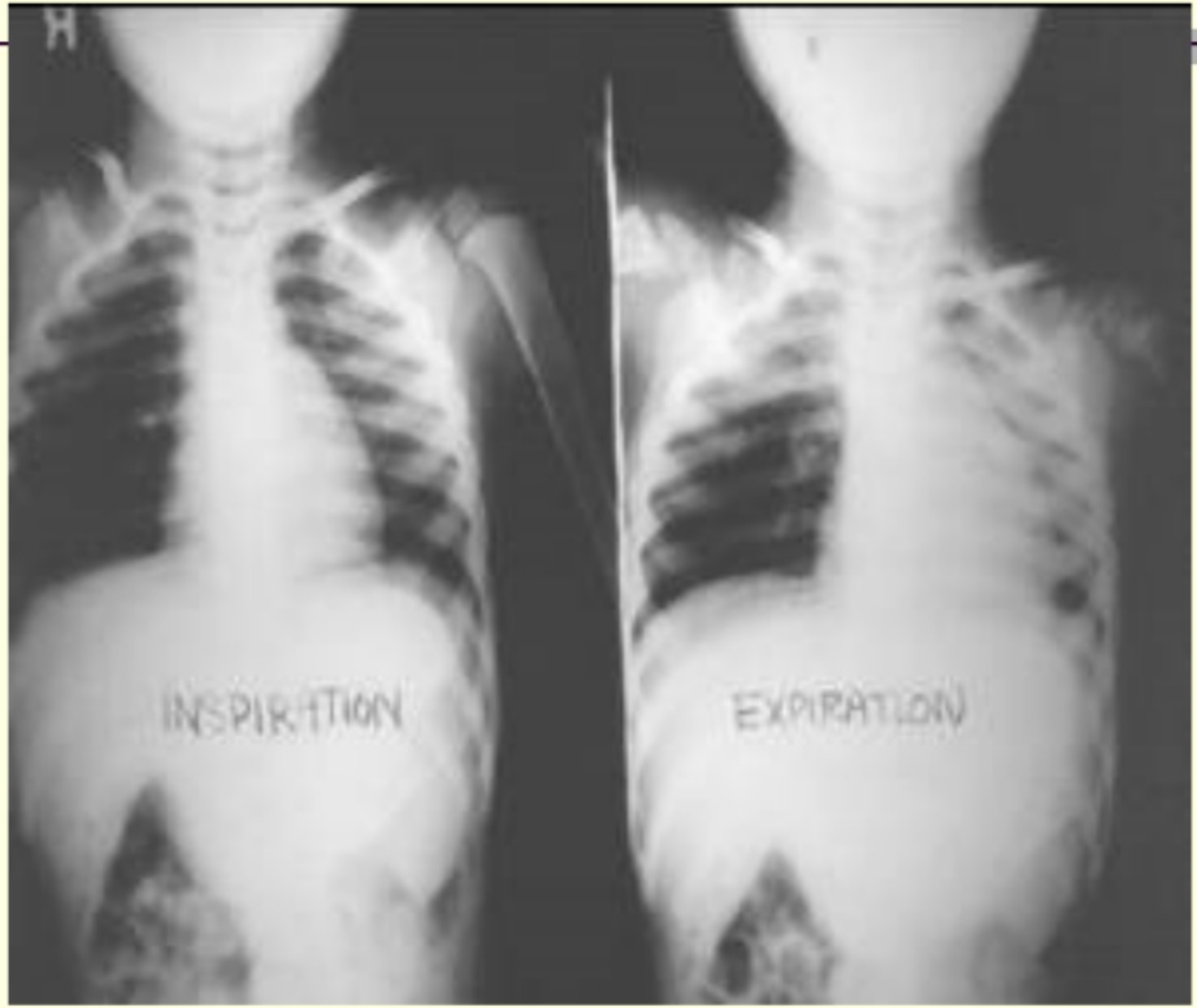
- **Multiple Lung Nodules**
- 1. Mets
- 2. Wegener's granulomatosis
- 3. Rheumatoid nodules
- 4. AVMs
- 5. Septic emboli

- **Pulmonary Interstitial Edema**
- 1. CHF
- 2. Lymphangitic spread
- 3. Allergic reaction

CHF

- **Unilateral Hyperlucent Lung**
- 1. Mcleod's syndrome
- 2. Pulmonary embolism
- 3. Pneumothorax
- 4. Obstructive/ compensatory emphysema

p/o FB

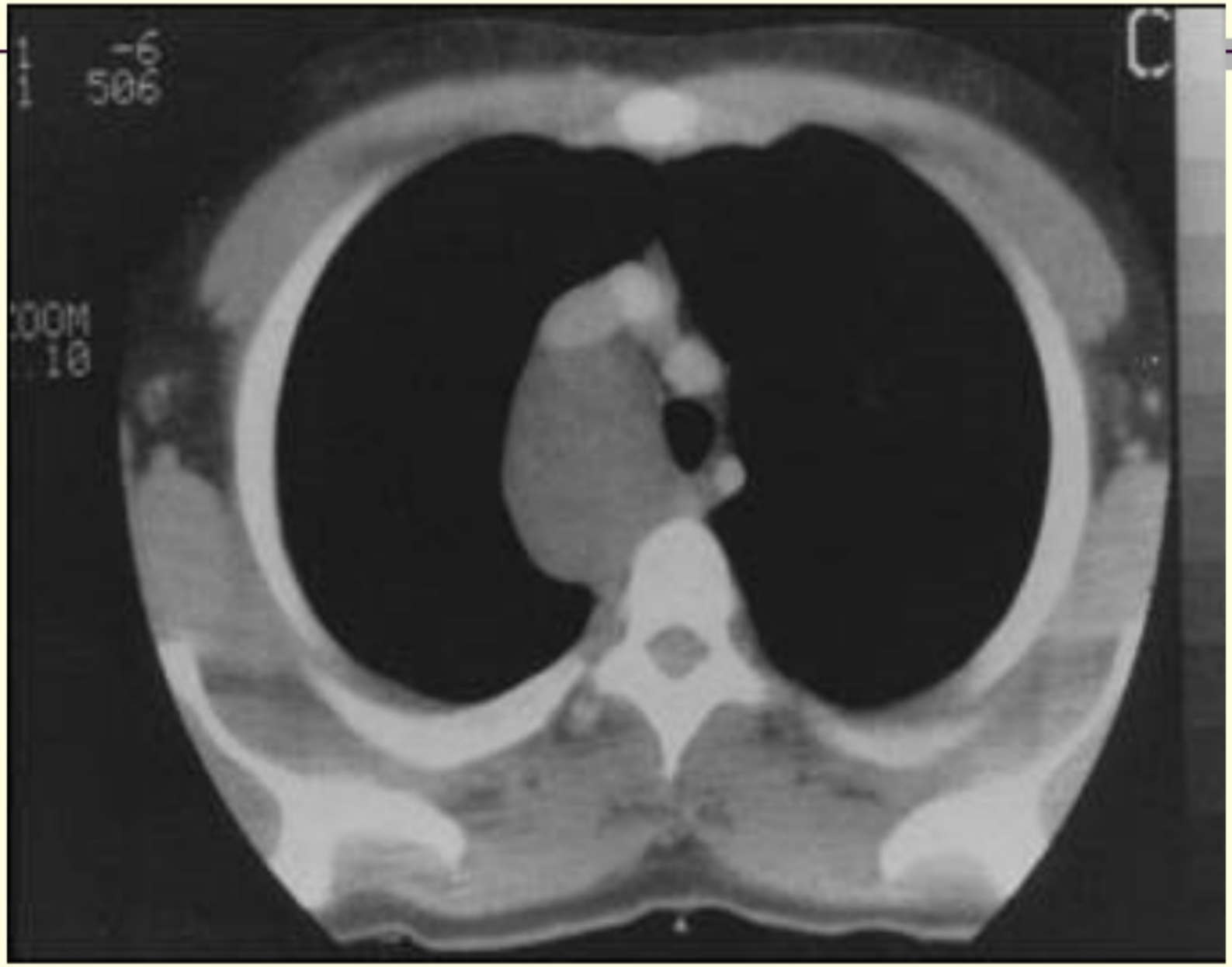


- **Cavitating Pneumonia**
- 1. Staph
- 2. Strep
- 3. TB
- 4. Gram negative (Klebsiella)

Staph

- **Middle Mediastinal Masses**
- 1. Lymphadenopathy
- 2. Aneurysms
- 3. Esophageal duplication
- 4. Bronchogenic cysts

Bronchogenic cysts



- **Hilar Adenopathy**
- 1. Sarcoid
- 2. TB
- 3. Lymphoma
- 4. Bronchogenic ca
- 5. Mets

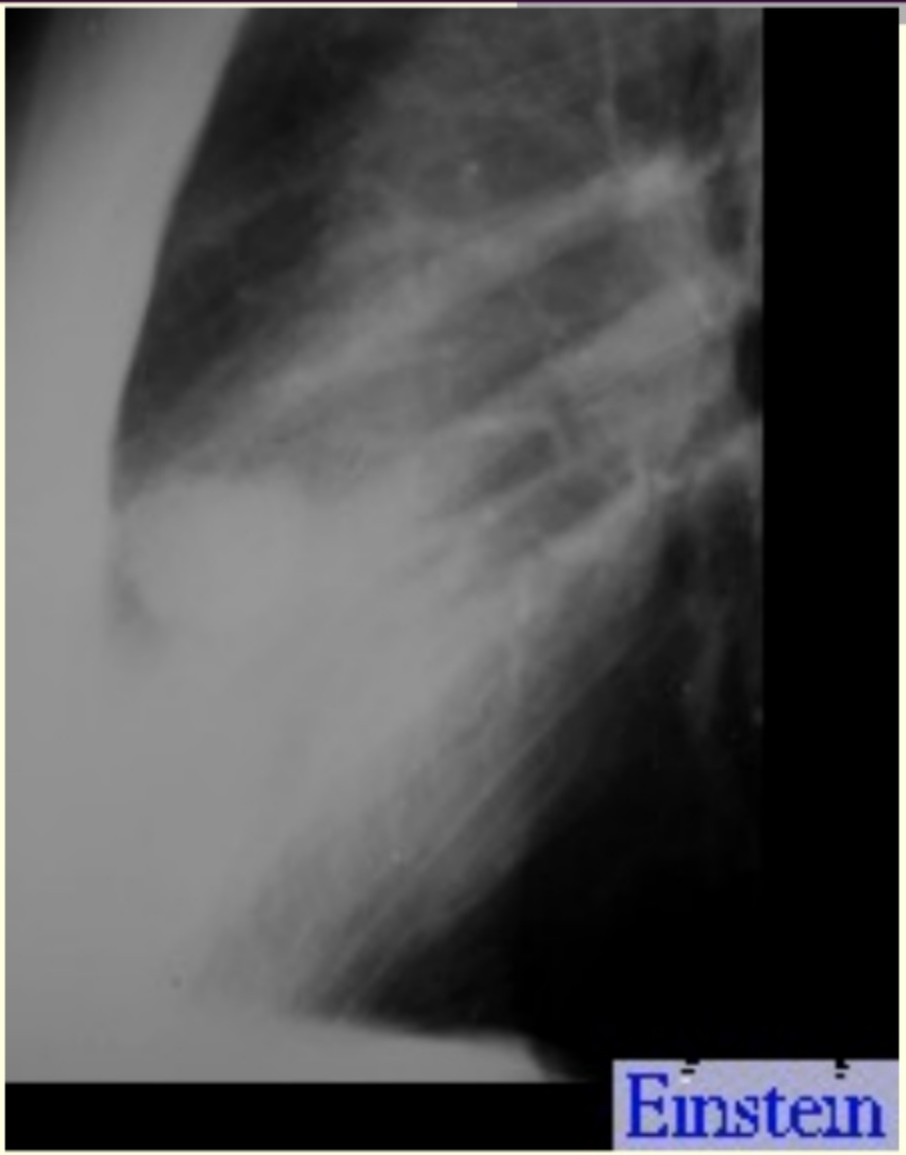
Sarcoid

- **Cavities Containing Masses**
- 1. Aspergillosis
- 2. Cavitating bronchogenic ca
- 3 Tuberculosis
- 4 Hydatid cyst

Aspergillosis

- **Solitary Pulmonary Nodule**
- 1. Bronchogenic ca
- 2. Hamartoma
- 3. Histoplasmoma
- 4. TB granuloma
- 5. Bronchial adenoma
- 6. Solitary met
- 7. Round pneumonia
- 8. Rounded atelectasis

Hamartoma



Pleural Effusion

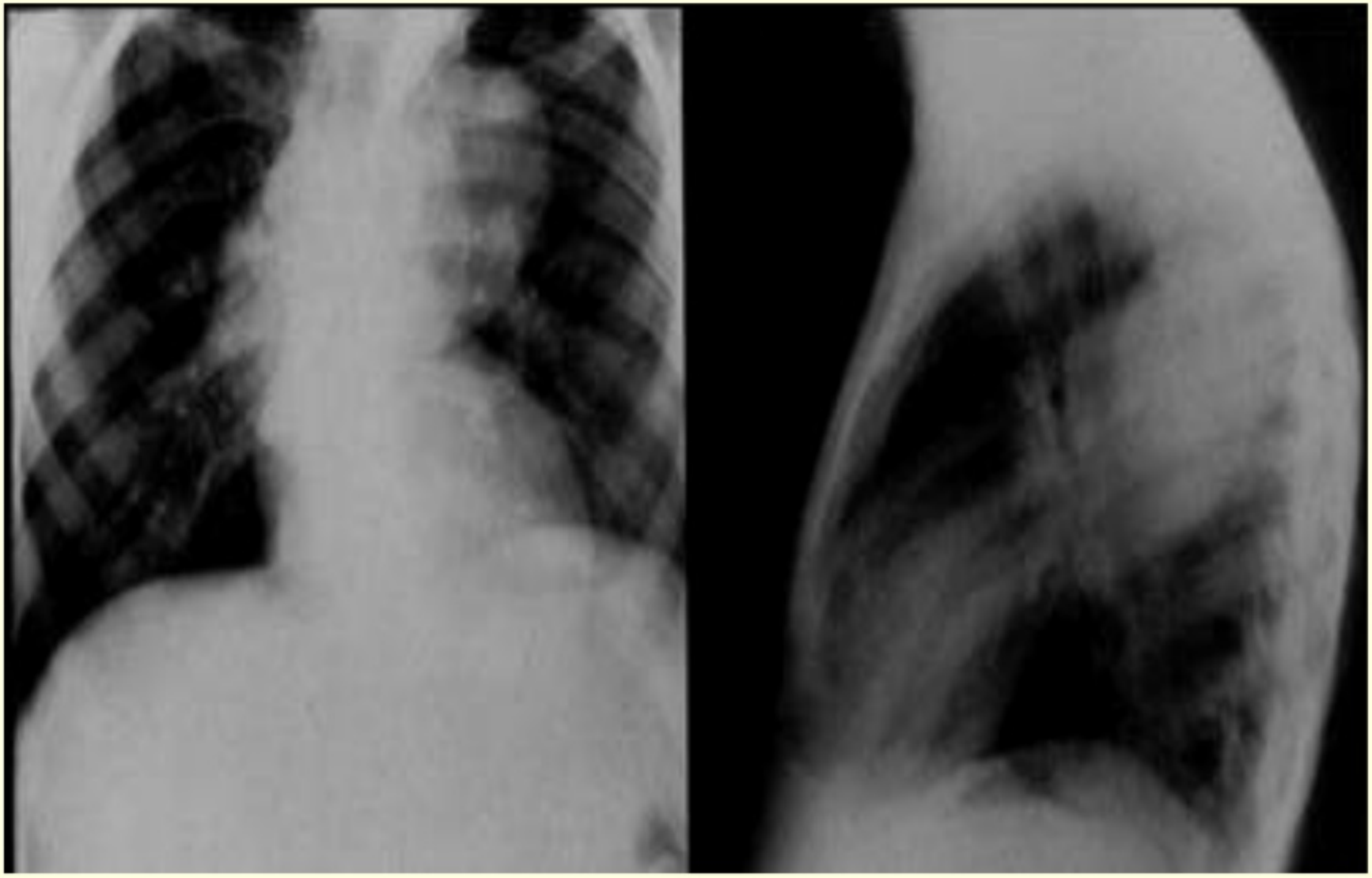
1. CHF
2. Mets
3. Pancreatitis
4. Pulmonary embolism
5. Trauma
6. Empyema
7. Collagen vascular
8. Ovarian tumor (Meig's Syndrome)
9. Chylothorax

CCF

- **Left-sided Pleural Effusion**
- 1. Dissecting aortic aneurysm
- 2. Pancreatitis
- 3. Distal thoracic duct rupture
- 4. Esophageal pathology

Dissecting aortic aneurysm

- **Posterior Mediastinal Masses**
- 1. Neurogenic tumors
- 2. Lymphadenopathy
- 3. Extramedullary hematopoesis
- 4. SPINAL PATHOLOGY
- 5. DIAPHRAGMATIC HERNIA



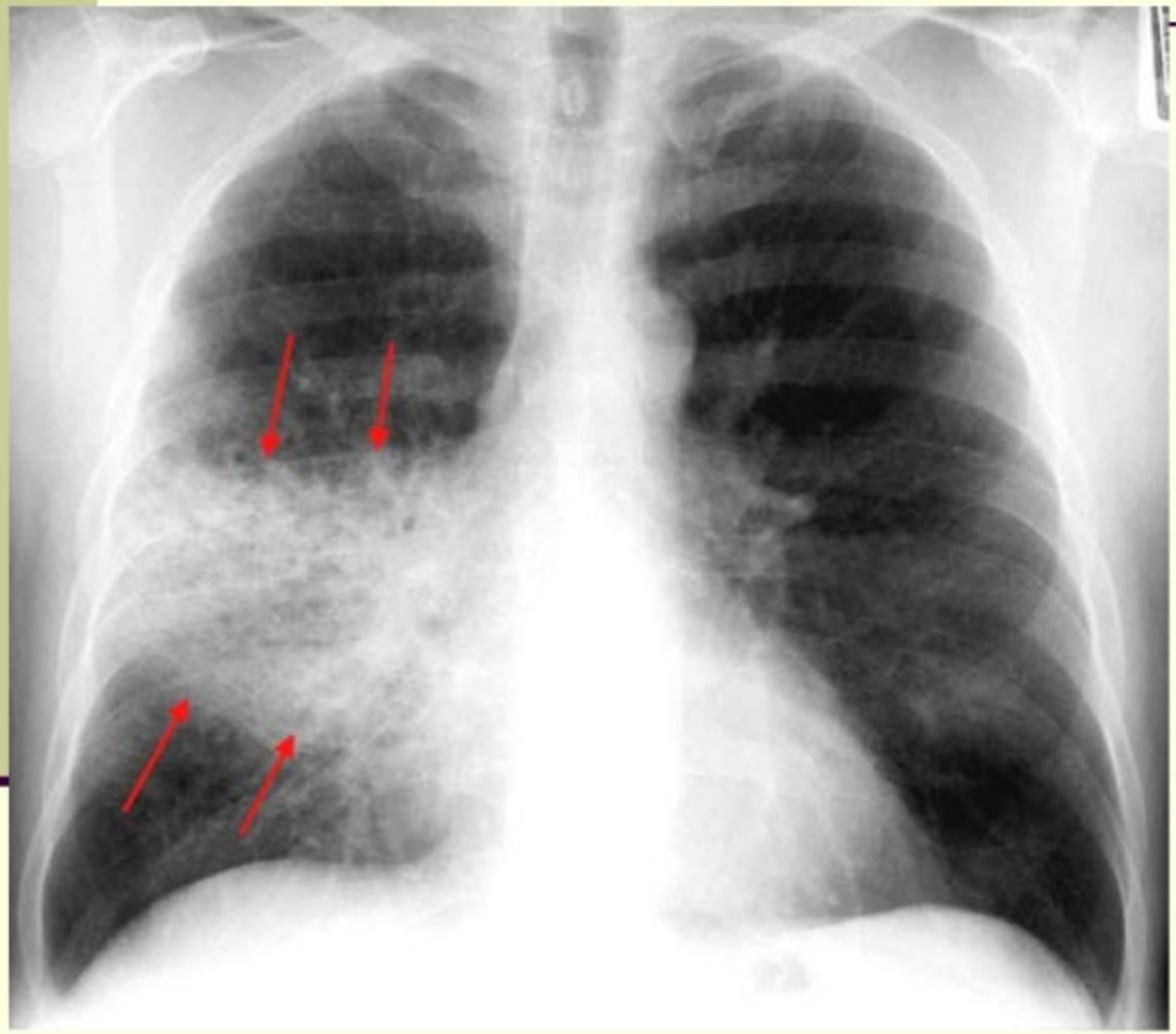
- **Lung Disease & Rib Destruction**
- 1. Bronchogenic ca, i.e Pancoast tumor
- 2. Actinomycosis
- 3. Blastomycosis
- 4. Multiple myeloma

- **Unilateral Pulmonary Edema**
- 1. Aspiration
- 2. Disease in other lung, e.g. COPD
- 3. Postural
- 4. Rapid expansion of PTX

Unilateral Pulmonary Edema

- **Reverse “Pulmonary Edema”**
- 1. Eosinophilic lung disease, e.g. Loeffler’s
- 2. Sarcoid
- 3. Pulmonary contusions

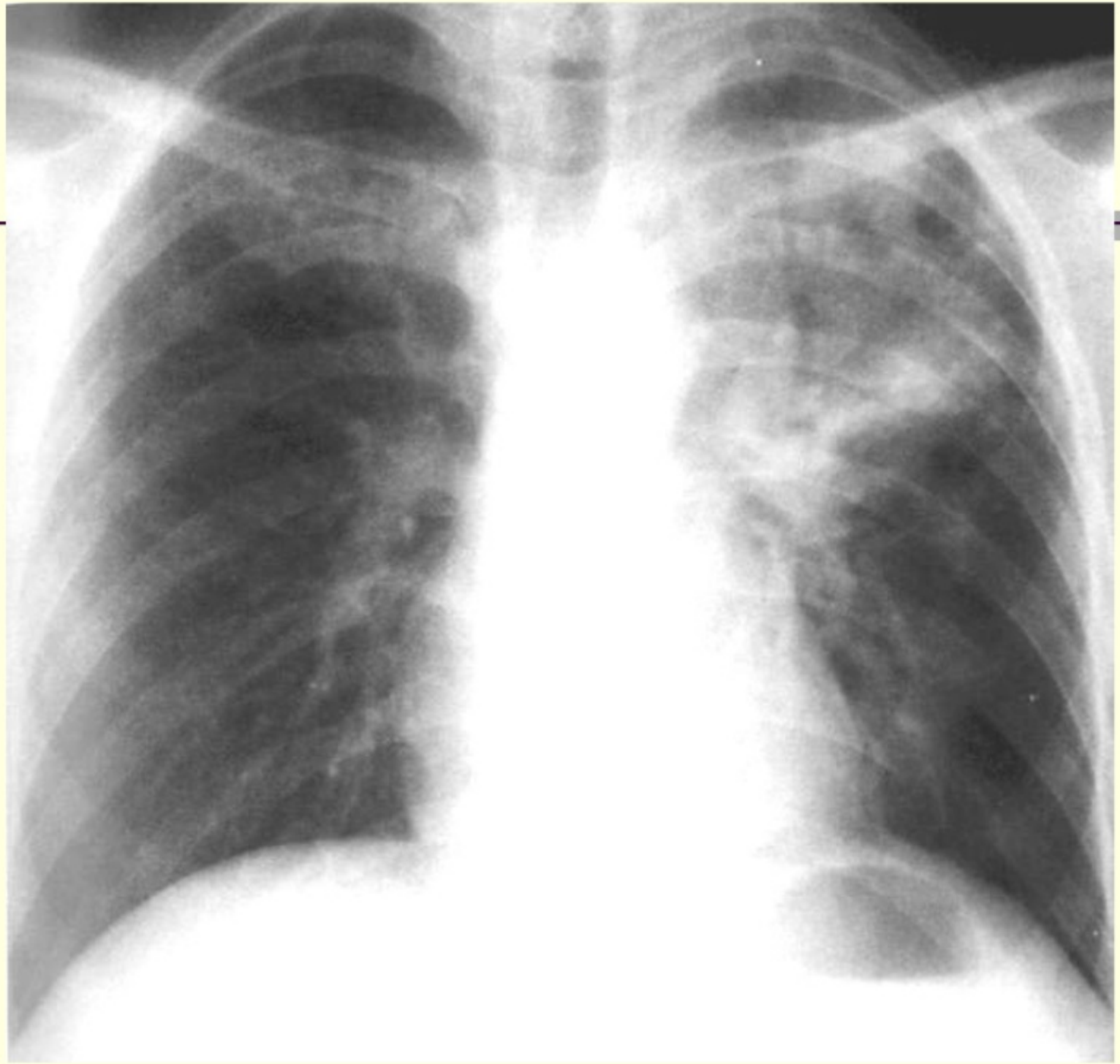
DIAGNOSIS PLEASE



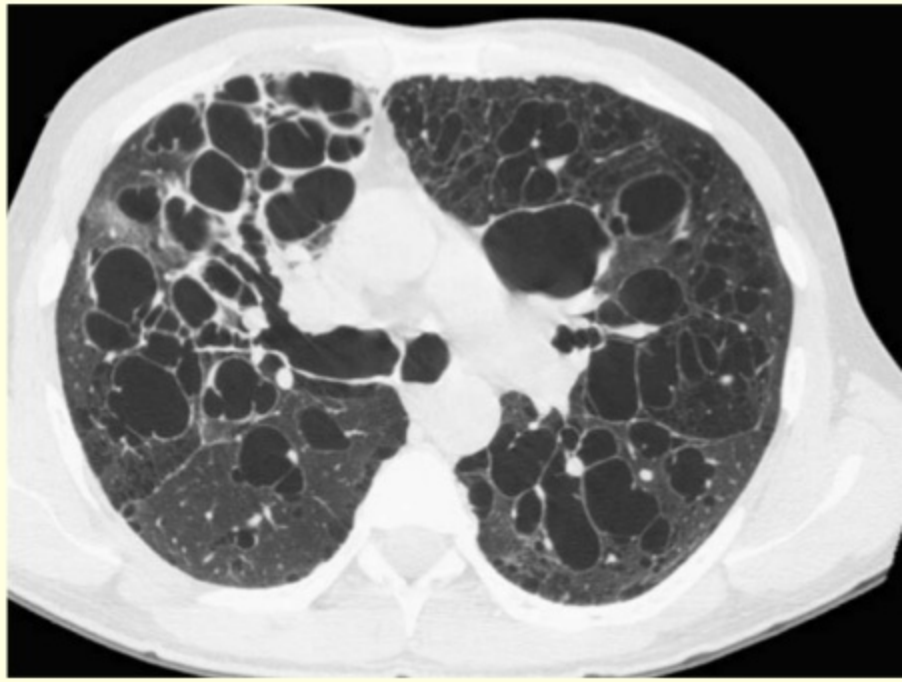
- RT ML CONSOLIDATION

- CANNON BALL METZ

- ABSCESS



- LT UL CONSLIDATION



- BRONCHIECTASIS

- OS METZ

- Thank you