

Respiratory System

Department of Radiology & Imaging

Taking Plain Chest PA film



FFD = 6 f (1.85m)

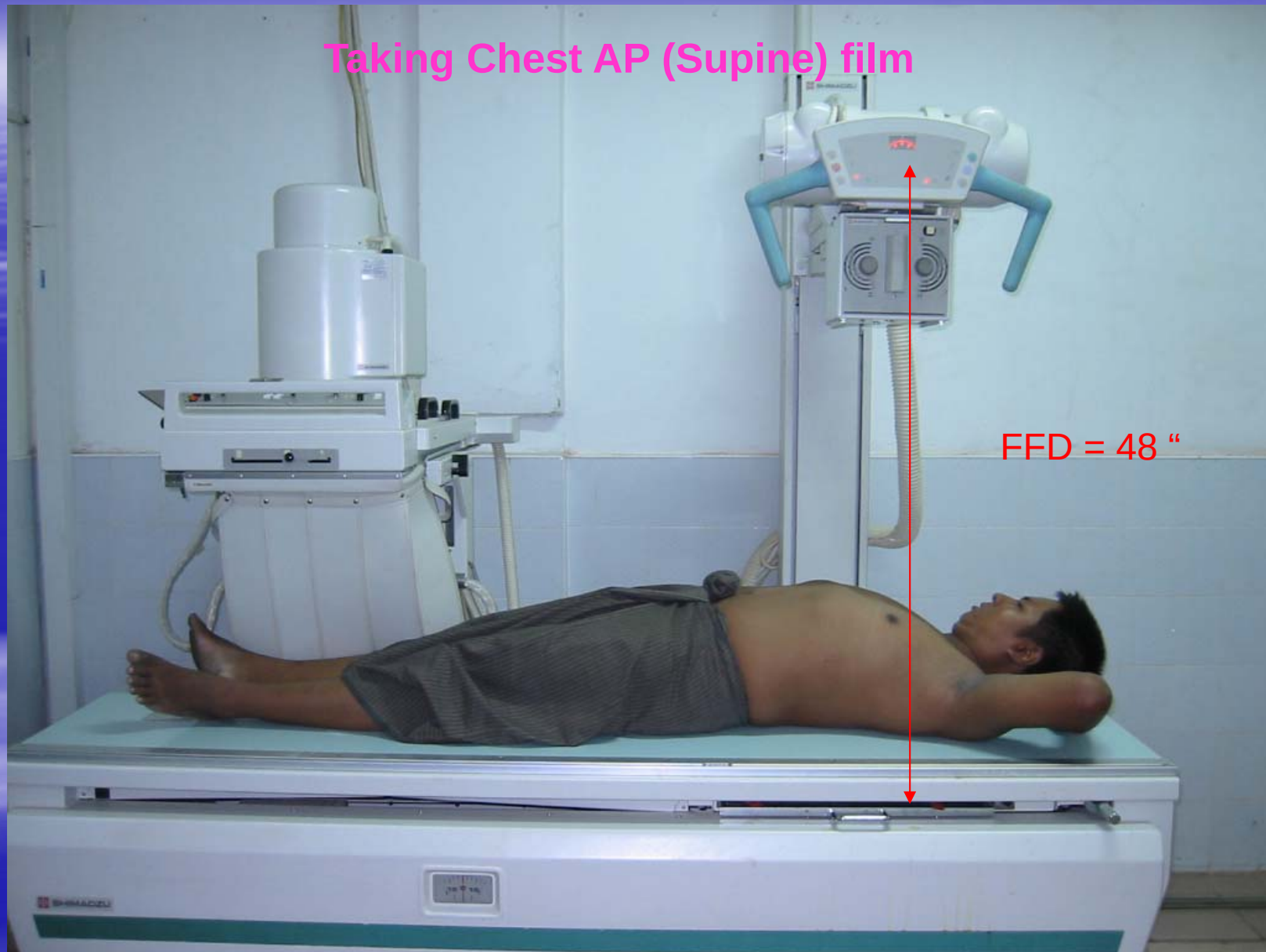
Full inspiration

Centering at T5

Taking Chest Lateral film



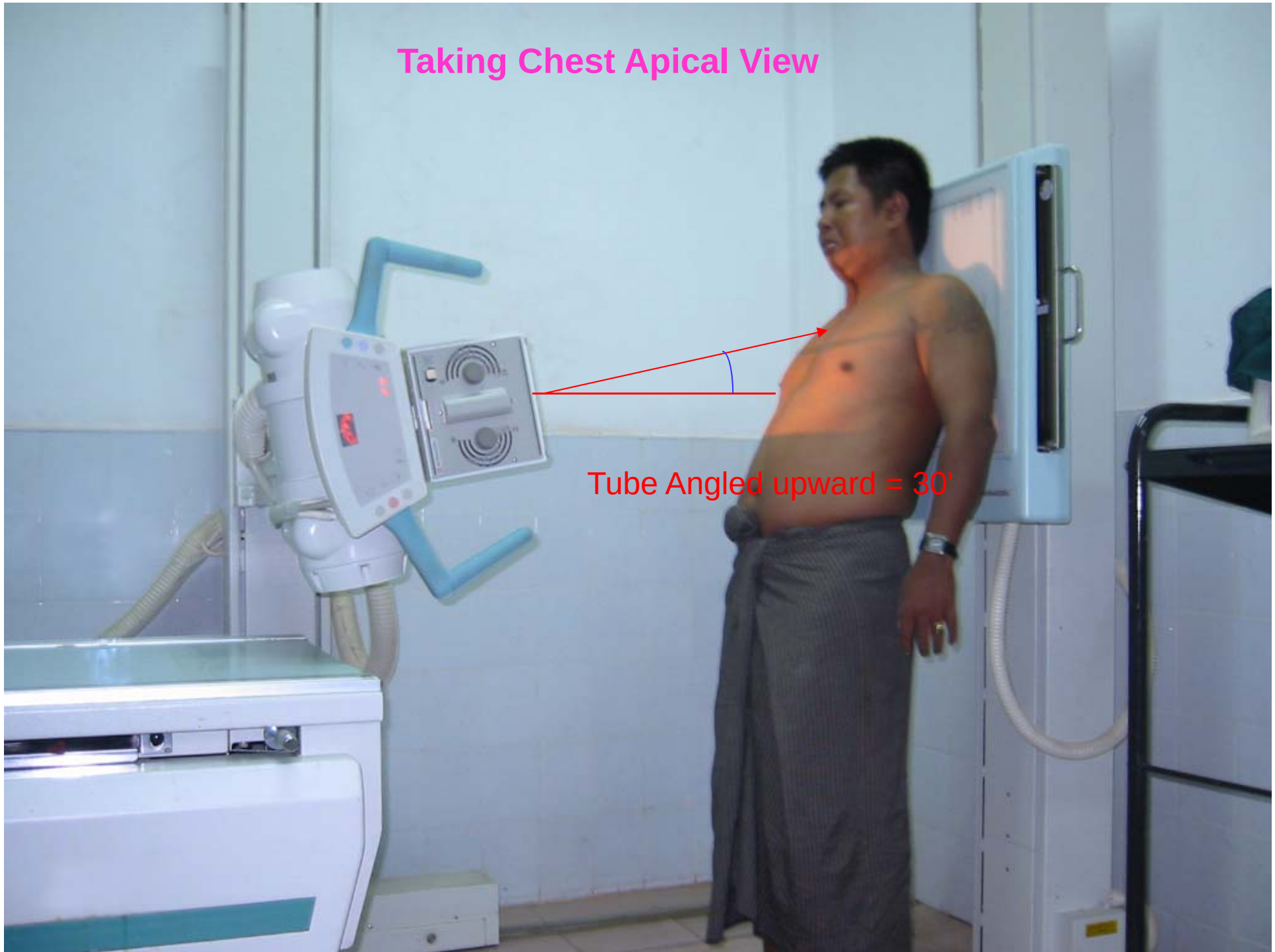
Taking Chest AP (Supine) film



FFD = 48 "

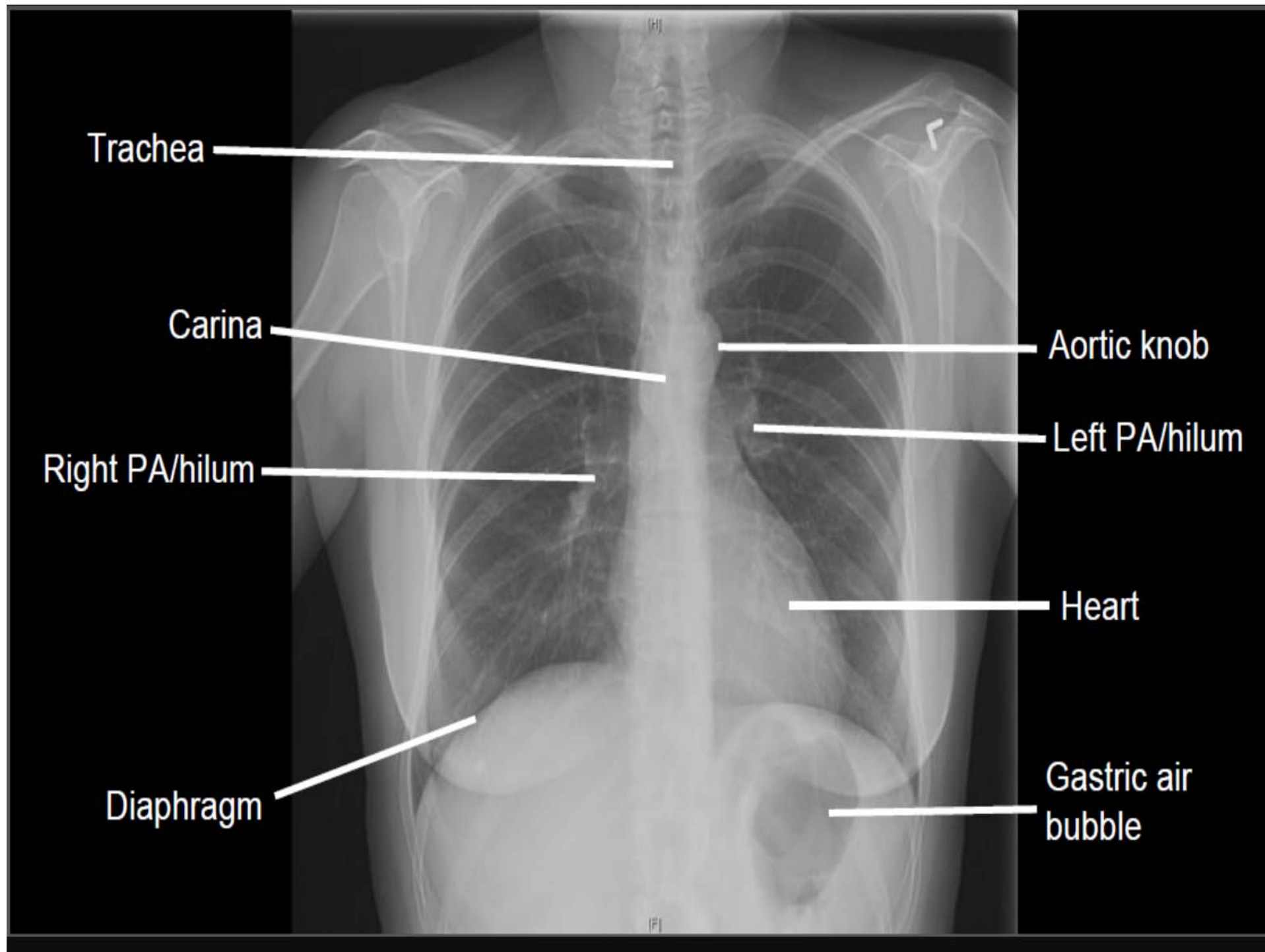
Taking Chest Apical View

Tube Angled upward = 30'



Other Views

- Lordotic view
- Lateral decubitus view
- Oblique



PA vs AP views

PA view

Scapula is seen in periphery of thorax

Clavicles project over lung fields

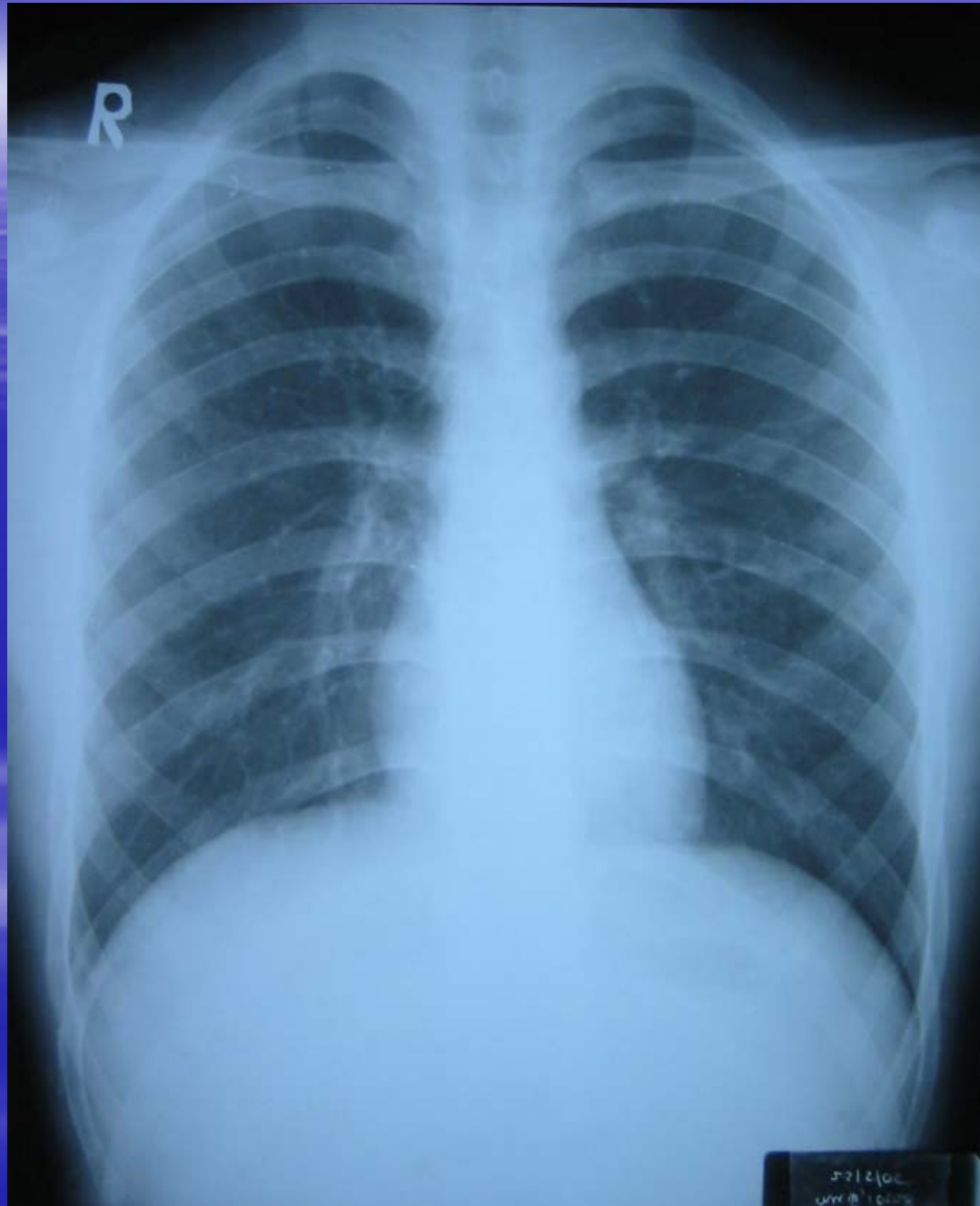
Posterior ribs are distinct

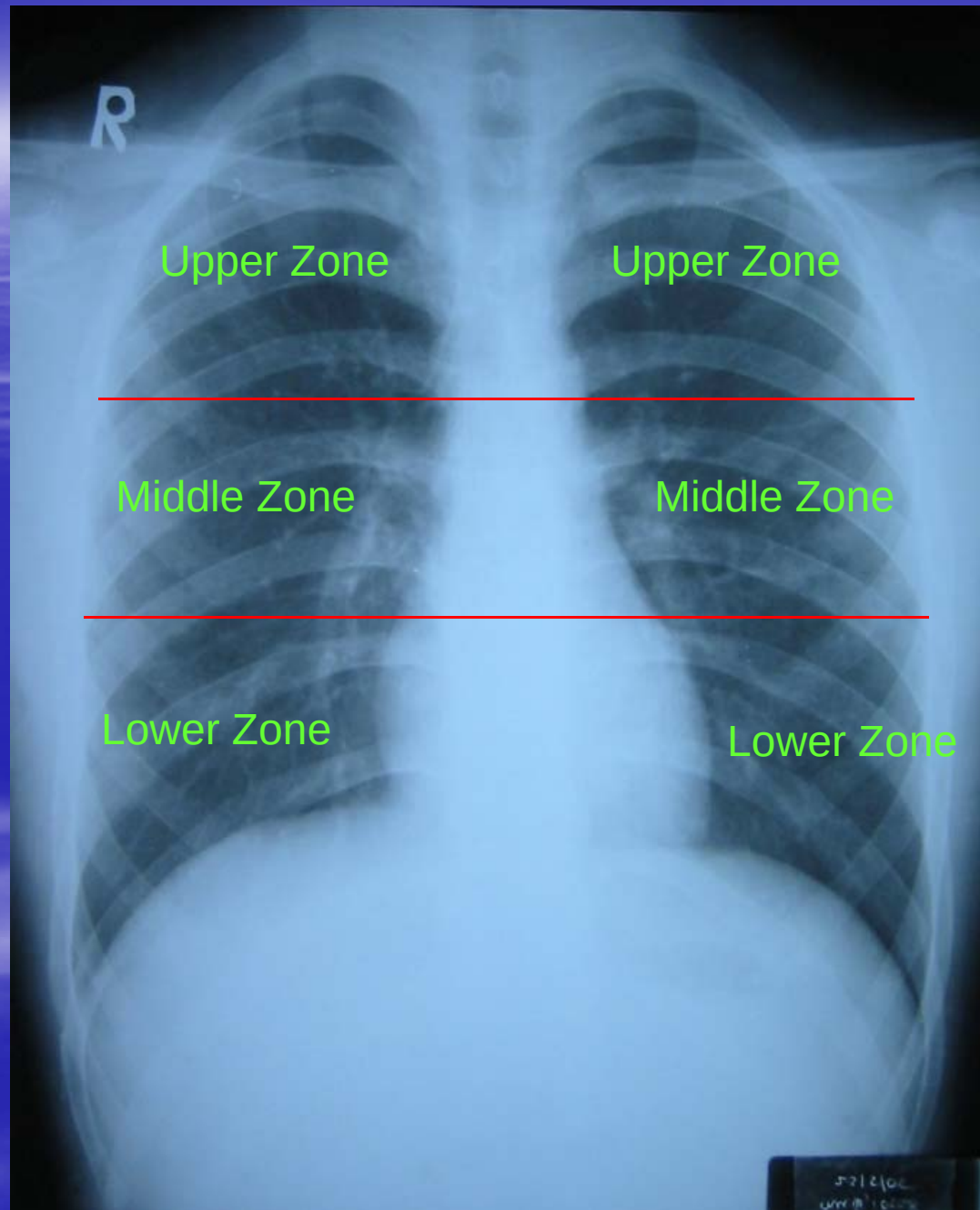
Position of markers

AP view

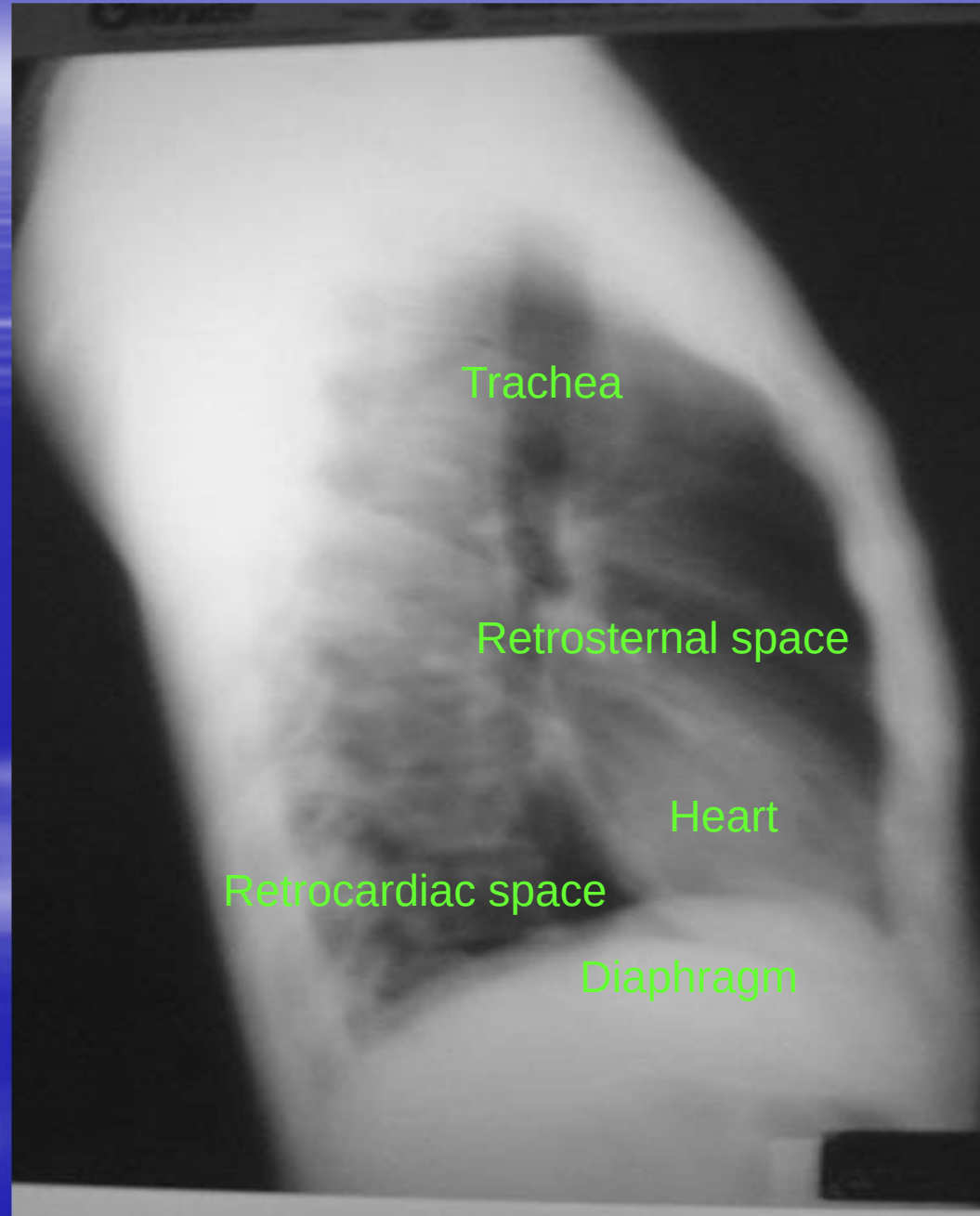
- Scapulae are over lung fields
- Clavicles are above the apex of lung fields
- Position of markers
- Anterior ribs are distinct

Viewing PA Film

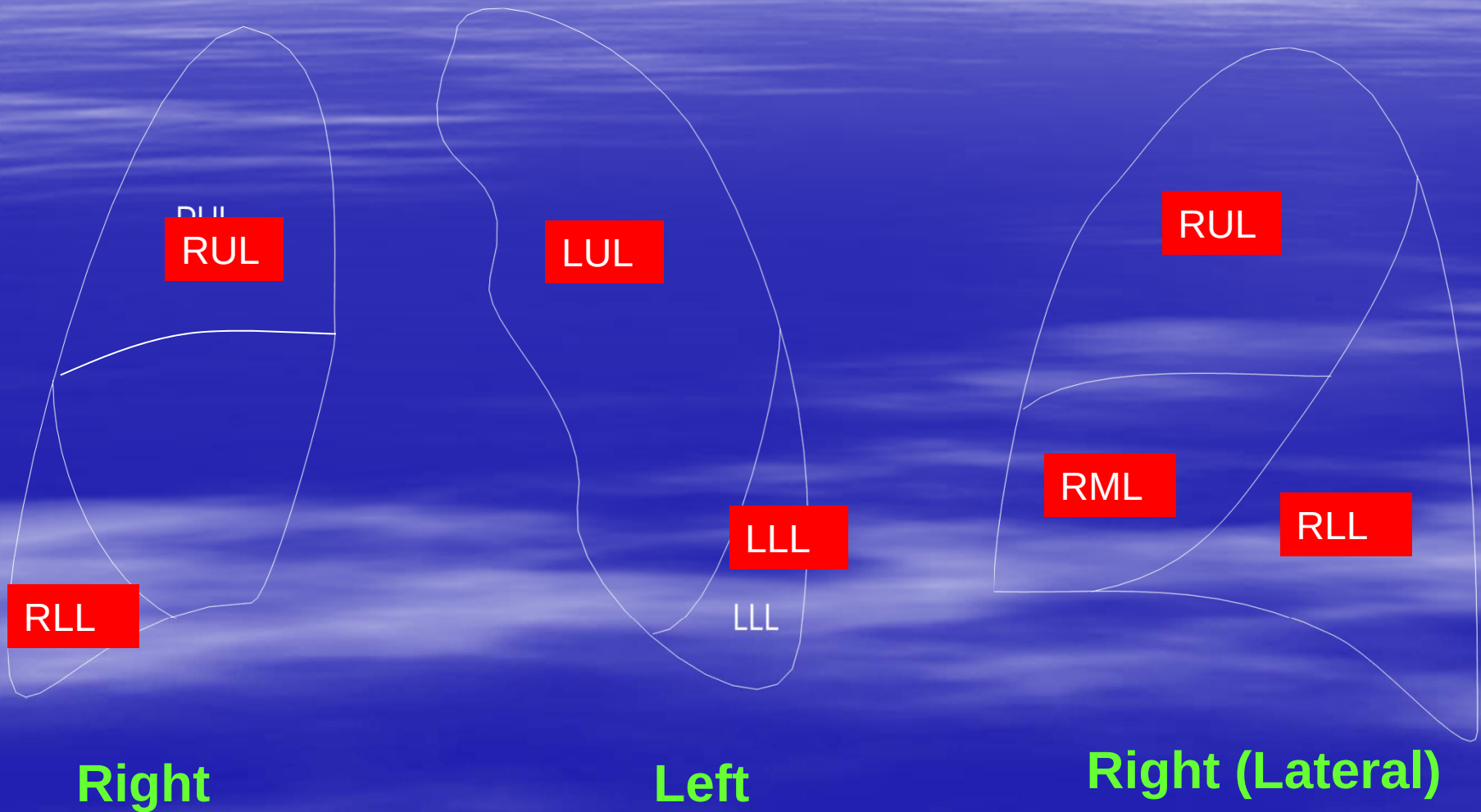




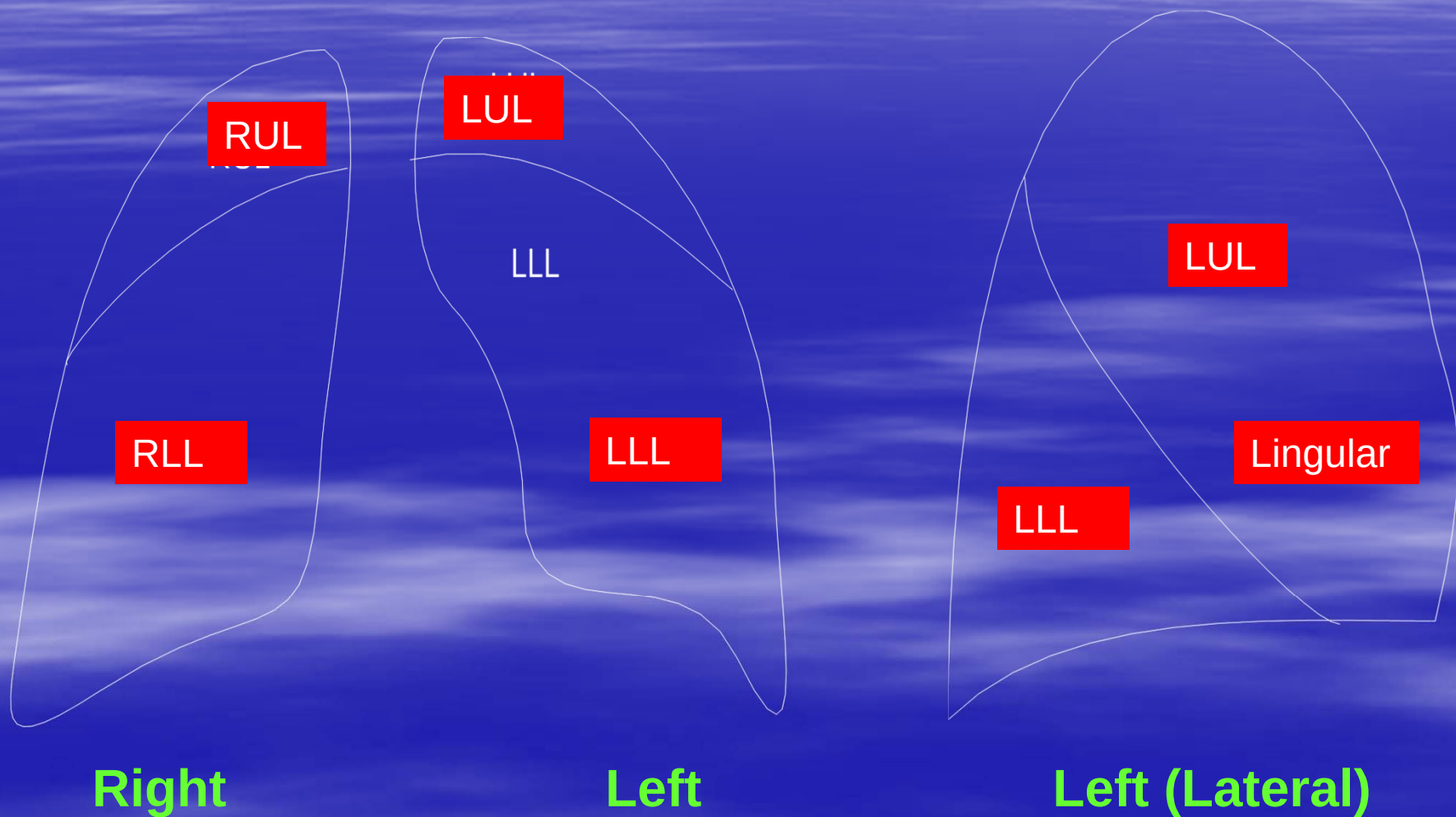
Viewing Lateral Film



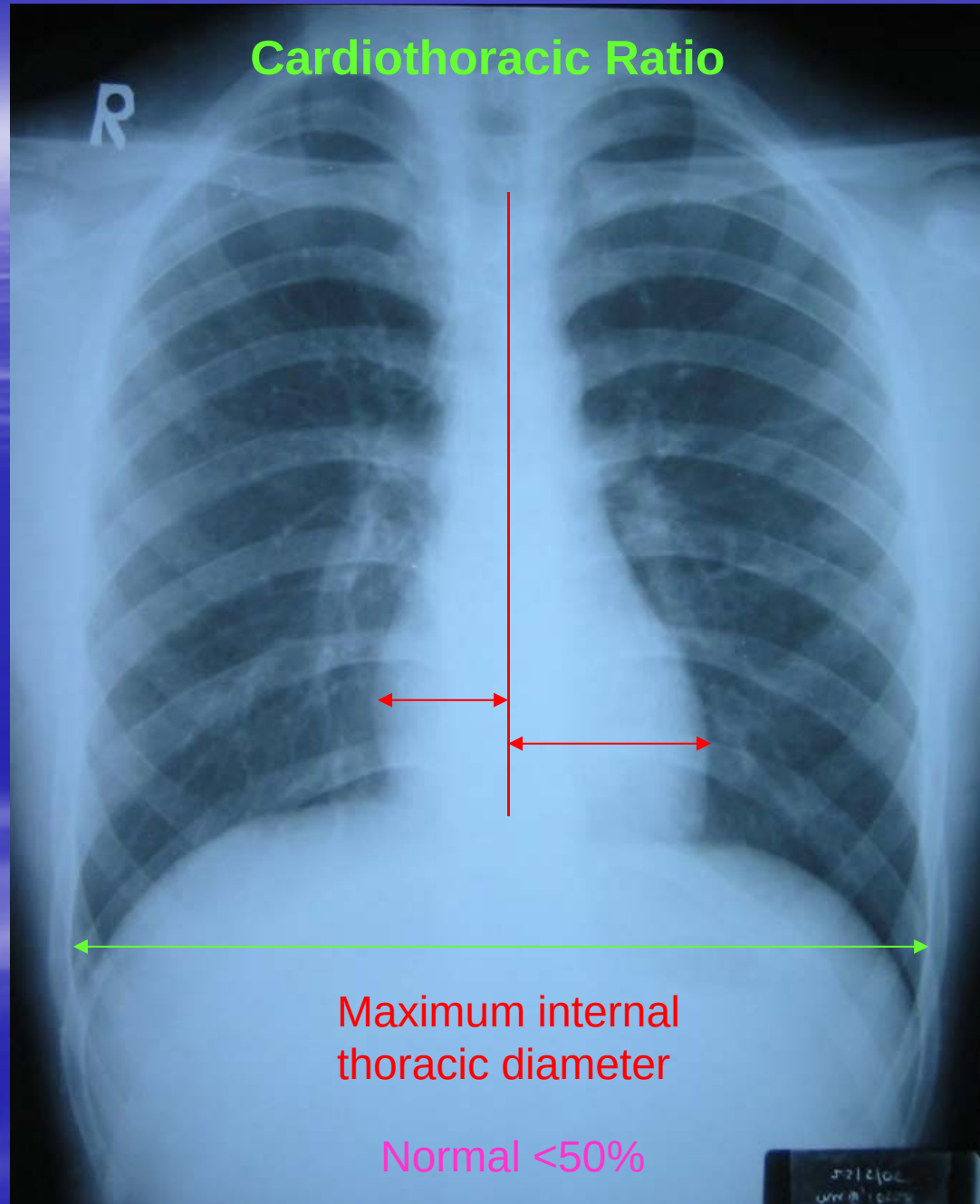
Bronchopulmonary segments



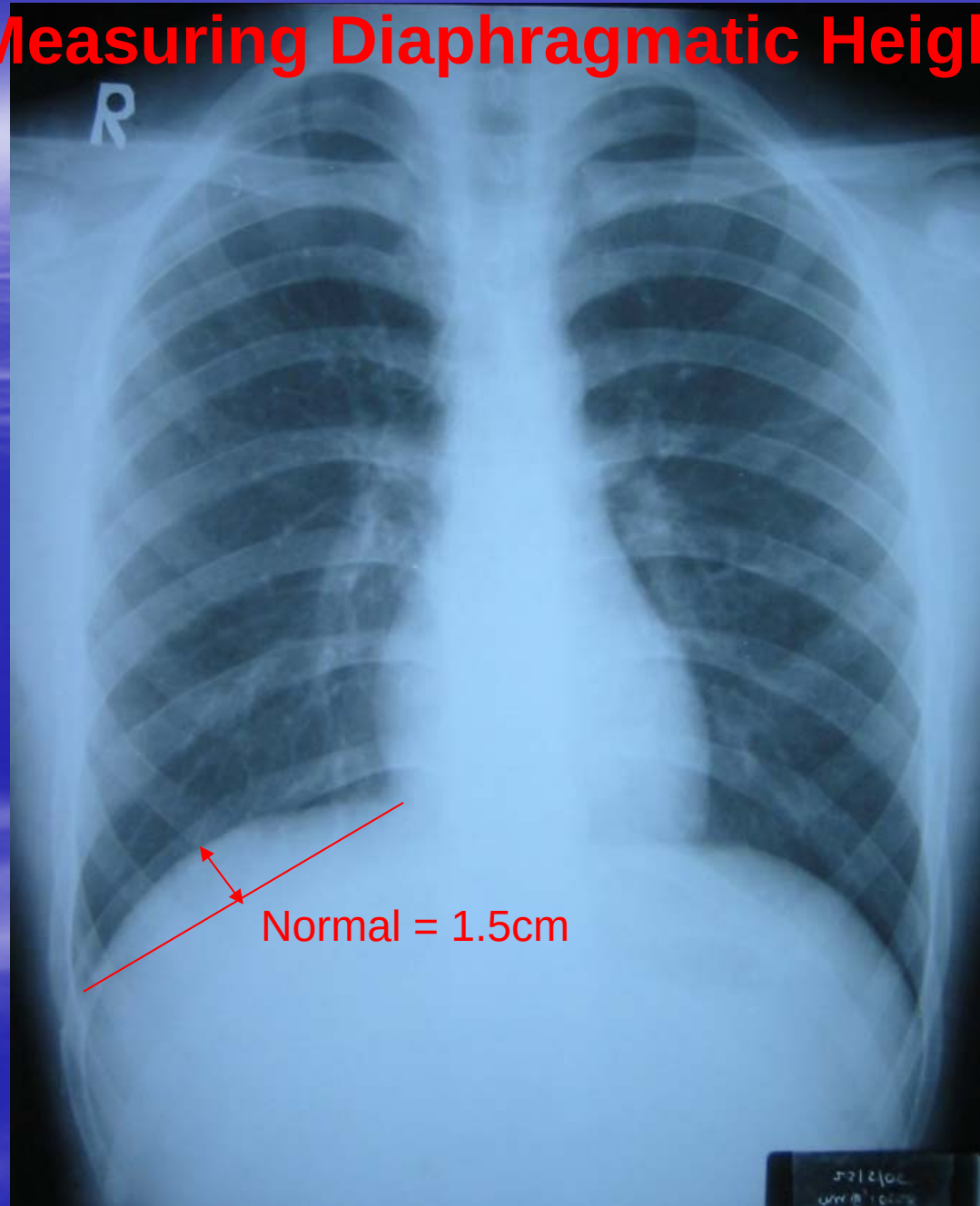
Bronchopulmonary segments

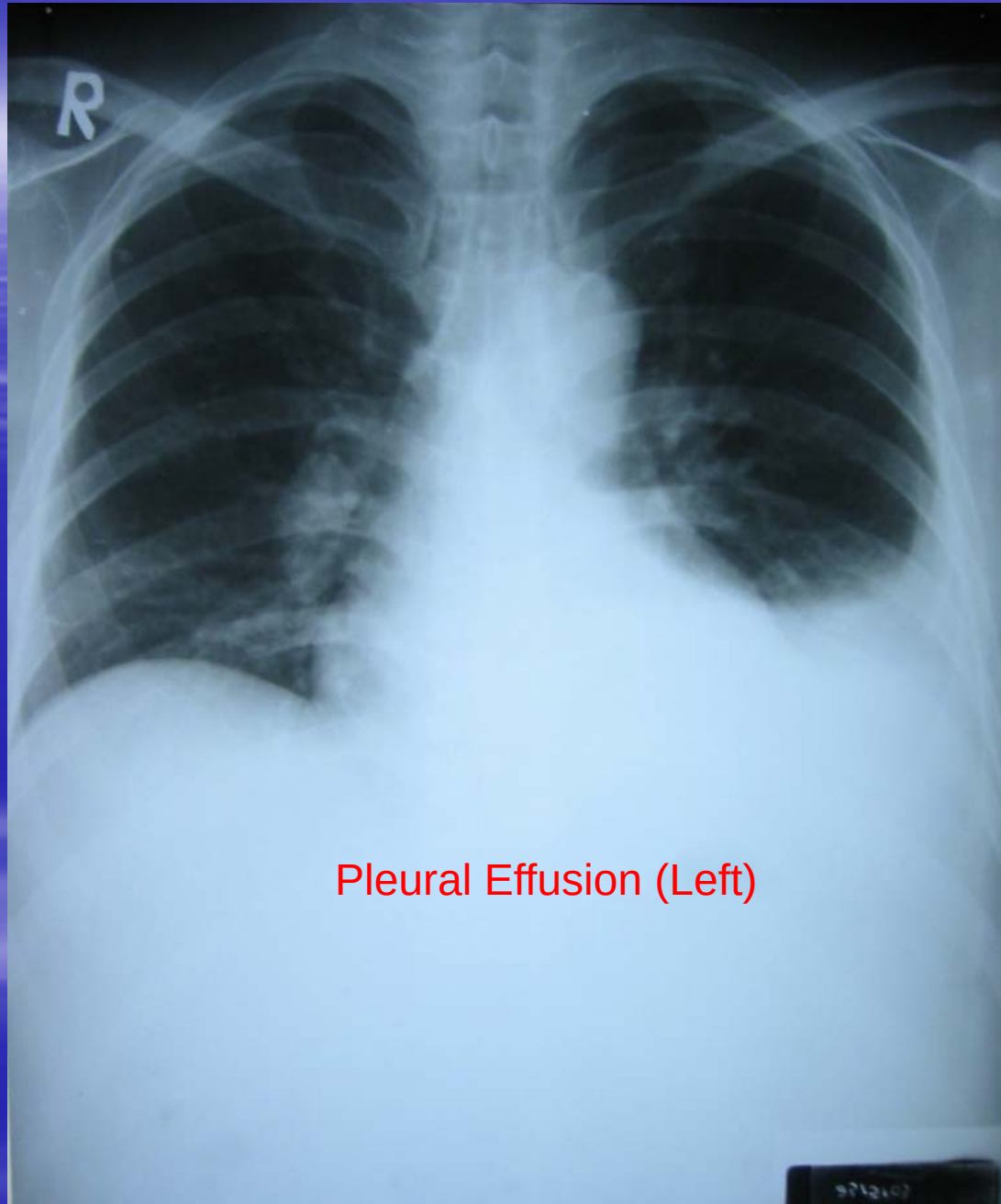


Cardiothoracic Ratio

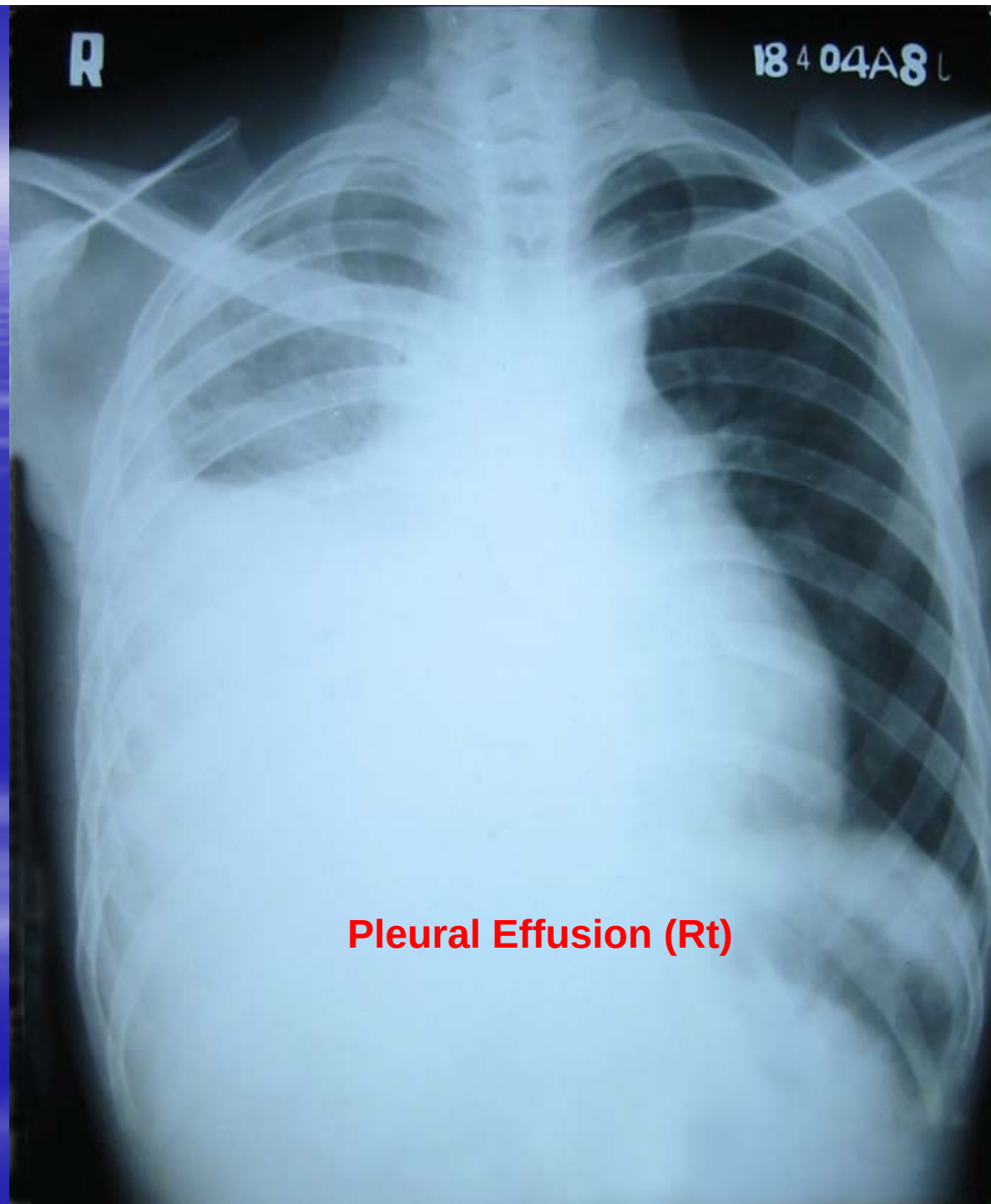


Measuring Diaphragmatic Height

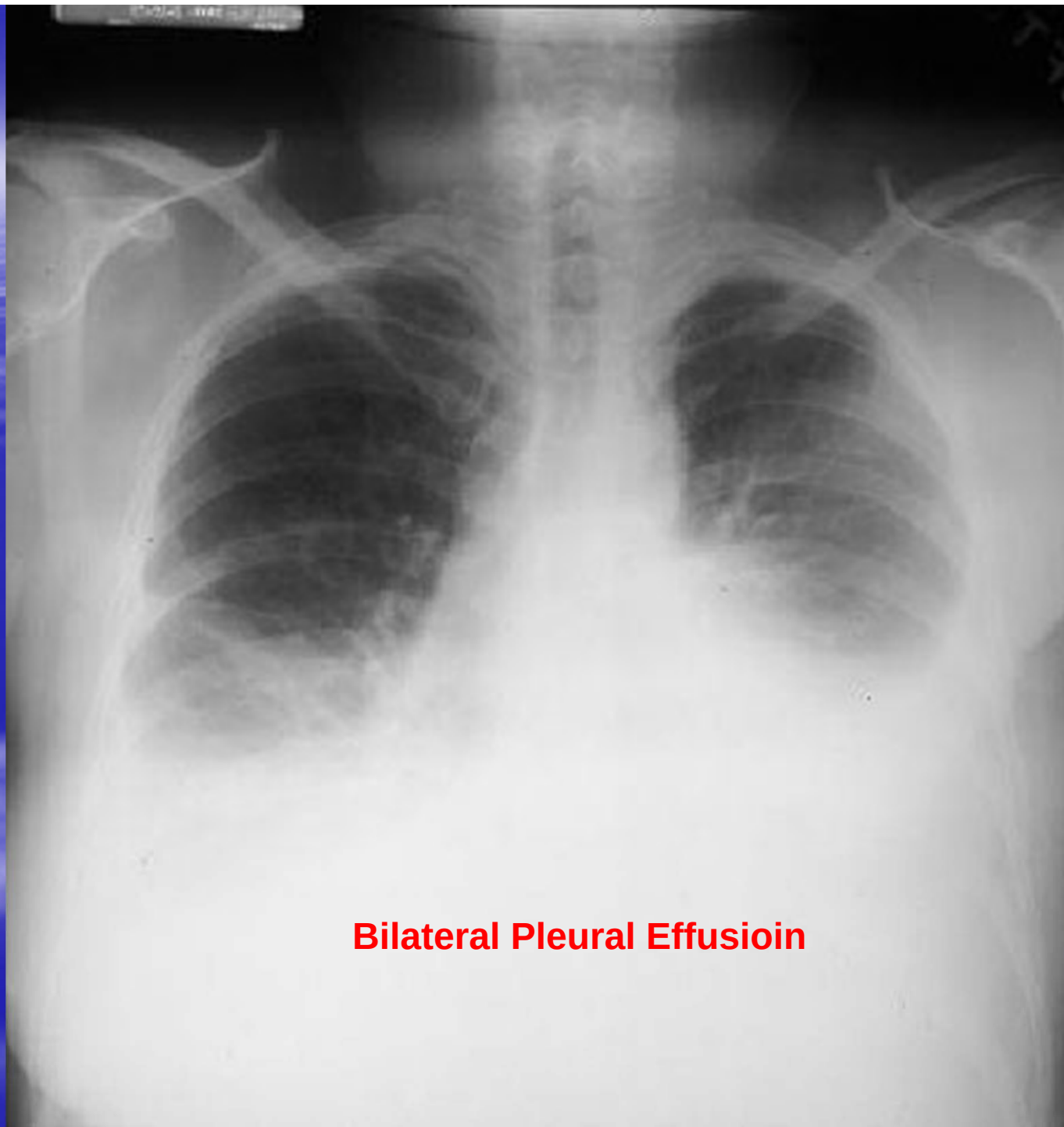




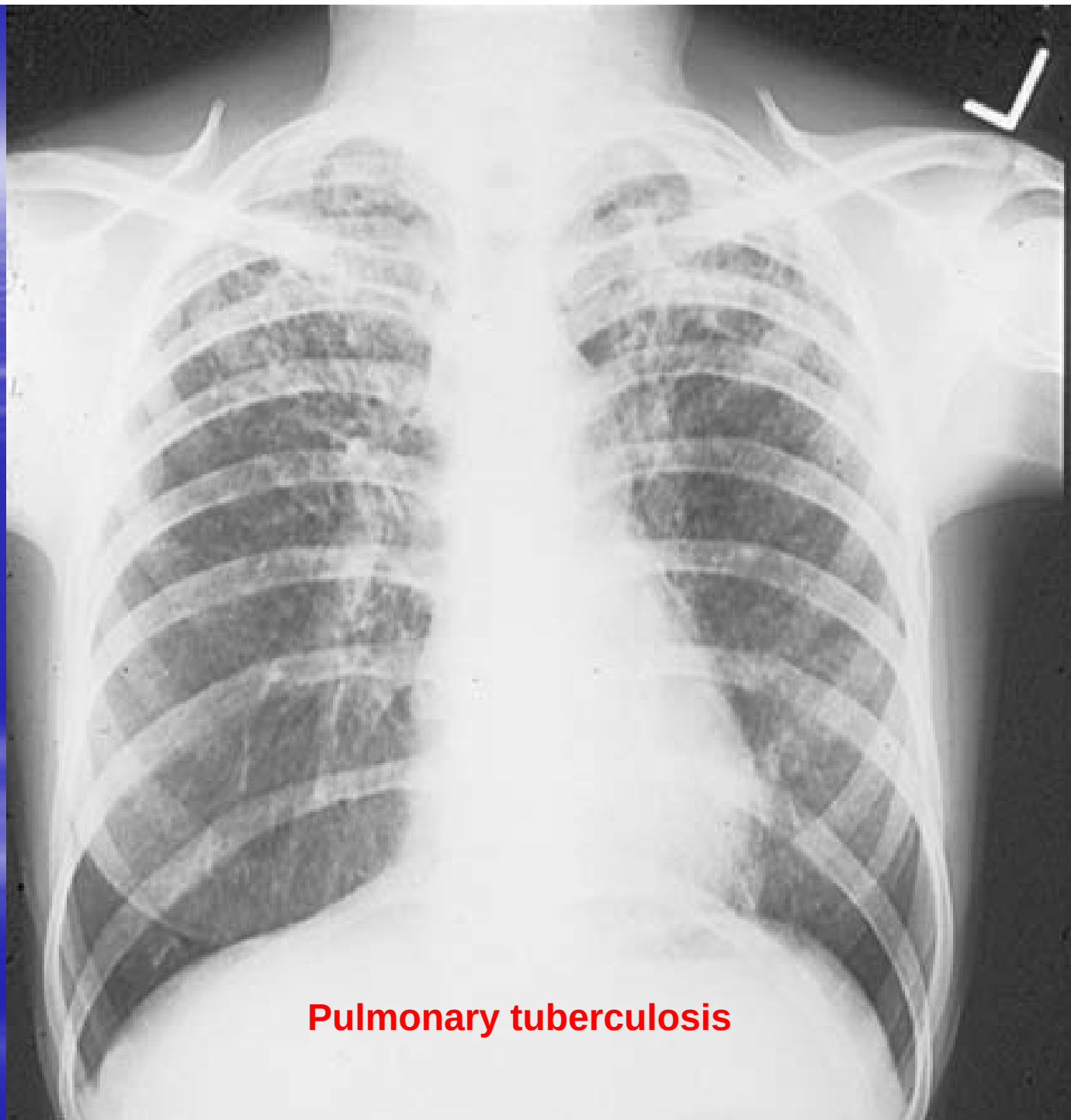
Pleural Effusion (Left)



Pleural Effusion (Rt)



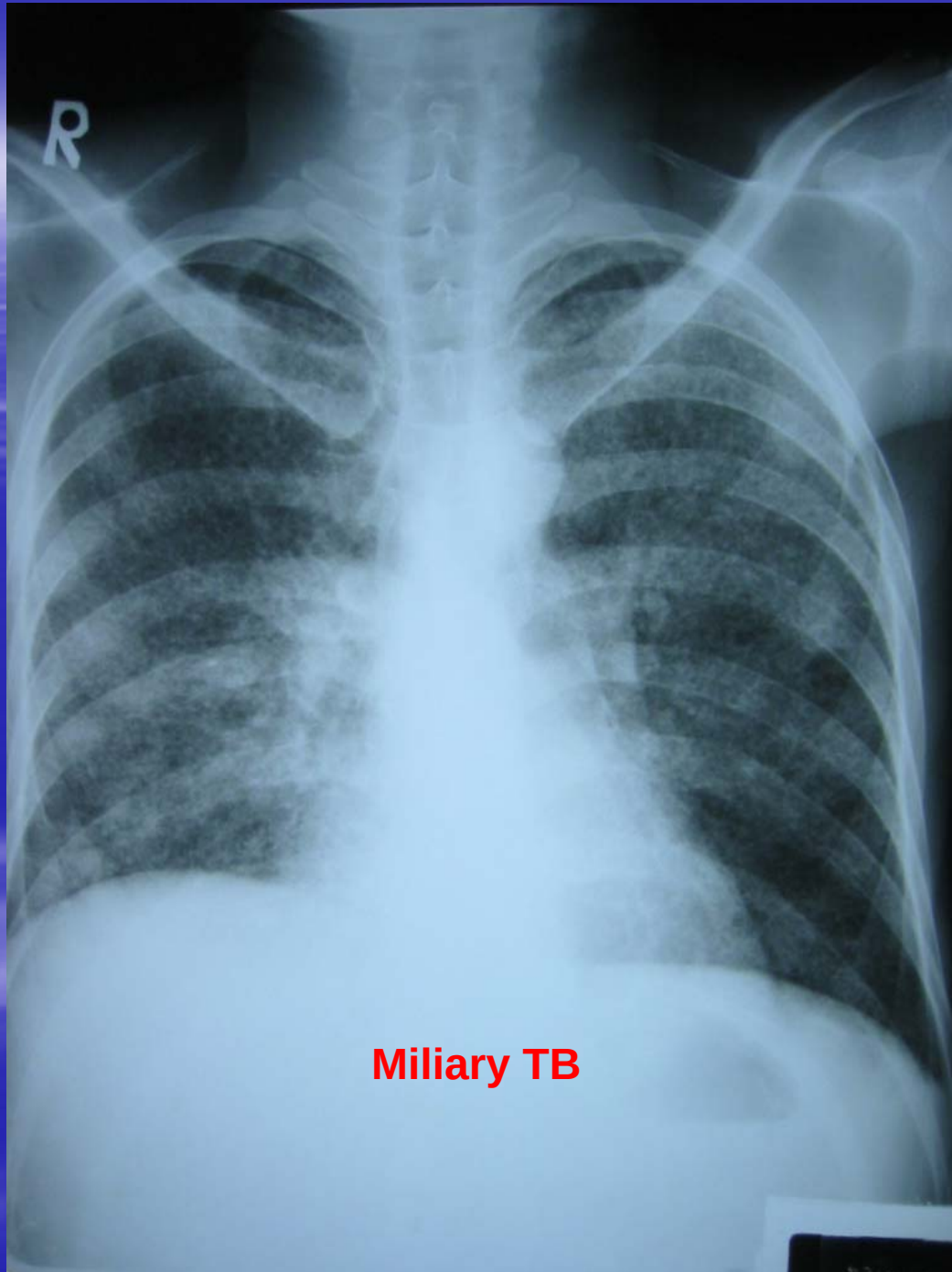
Bilateral Pleural Effusion



Pulmonary tuberculosis



Extensive Pulmonary TB



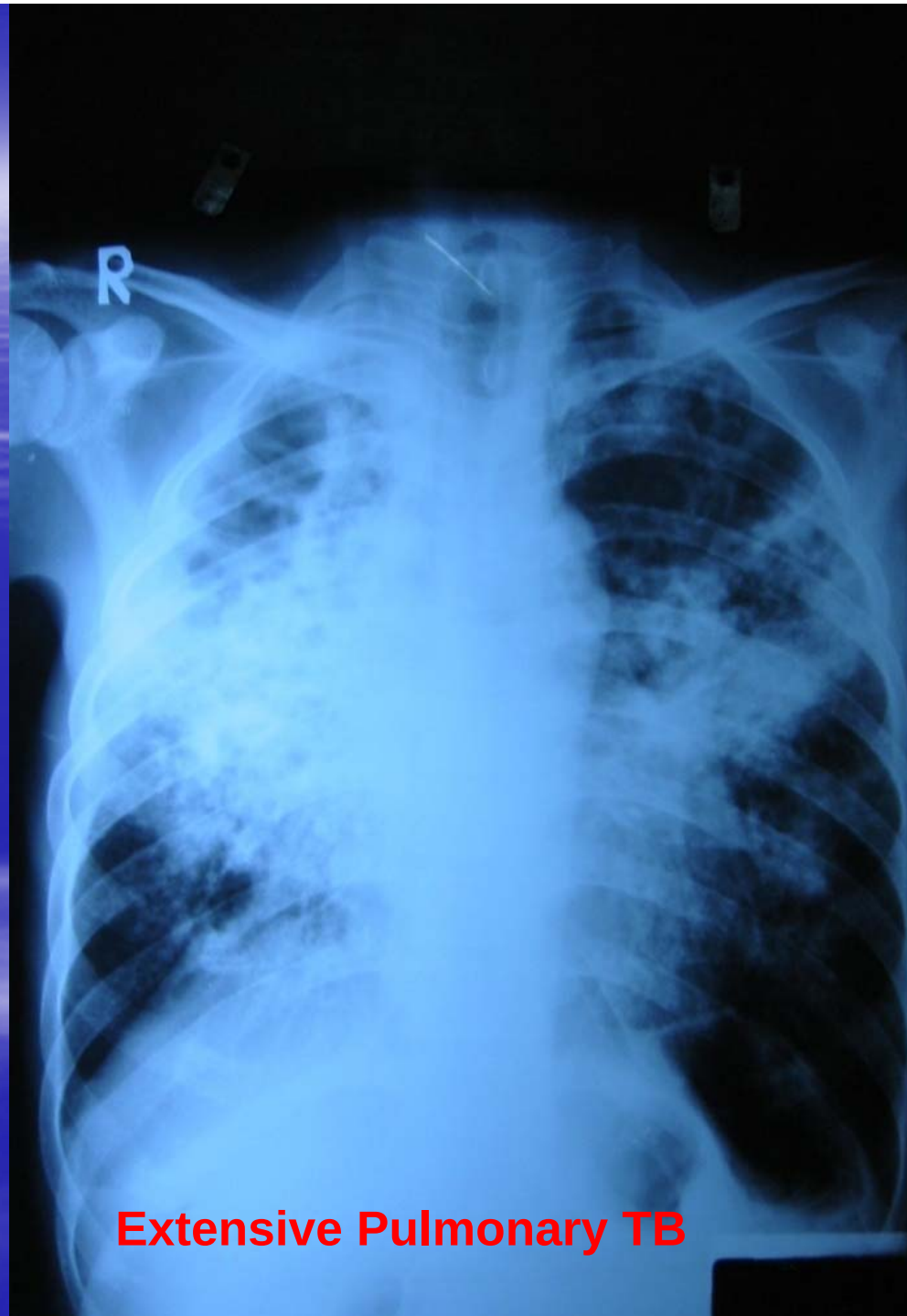
Miliary TB

Miliary Opacities

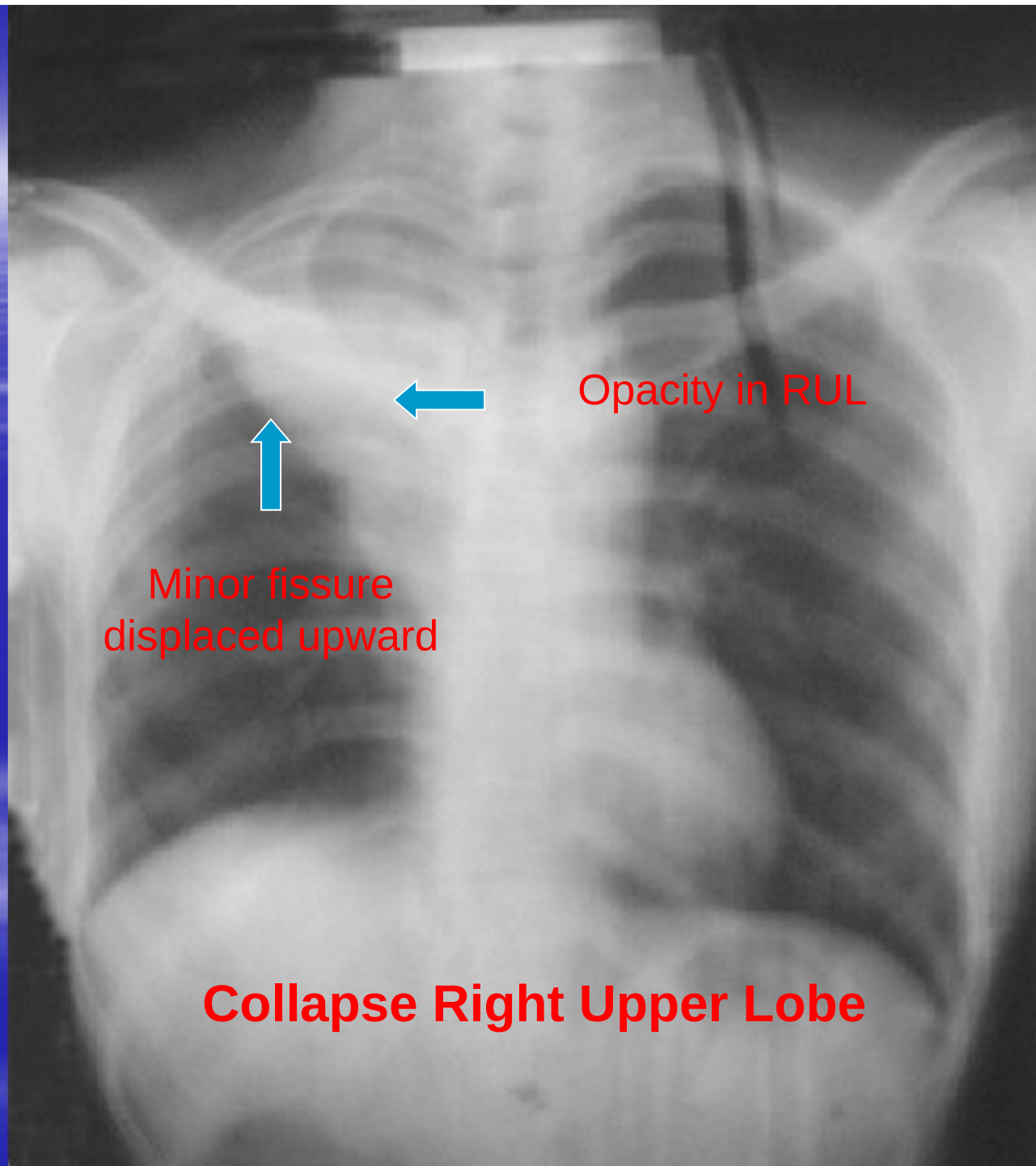
- Widespread small discrete opacities of similar size up to 3mm in diameter

Causes of Miliary Nodules

- Infectious disease
 1. Tuberculosis
 2. Fungus (histoplasmosis, coccidioidomycosis, blastomycosis)
 3. Bacteria (salmonella, nocardia)
 4. Virus (varicella)
- Metastasis (Thyroid Ca, melanoma, adenoma, of breast, stomach & etc)
- Granulomatous disease
 1. Eosinophilic granuloma
 2. Sarcoidosis
- Alveolar microlithiasis (rare)
- Bronchiolitis obliterans
- Gaucher disease



Extensive Pulmonary TB



Opacity in RUL

Minor fissure
displaced upward

Collapse Right Upper Lobe

Collapse

- Diminish volume of air in the lung with associated reduction of lung volume

Collapse

- Radiological sign

- ✓ Direct sign

- Opacity
 - Crowding of vessels
 - Fissural displacement

- ✓ Indirect sign

- Compensatory emphysema
 - Rib crowding
 - Mediastinal & hilar shift
 - Elevation of diaphragm

R

Minor fissure
not displaced



Opacity

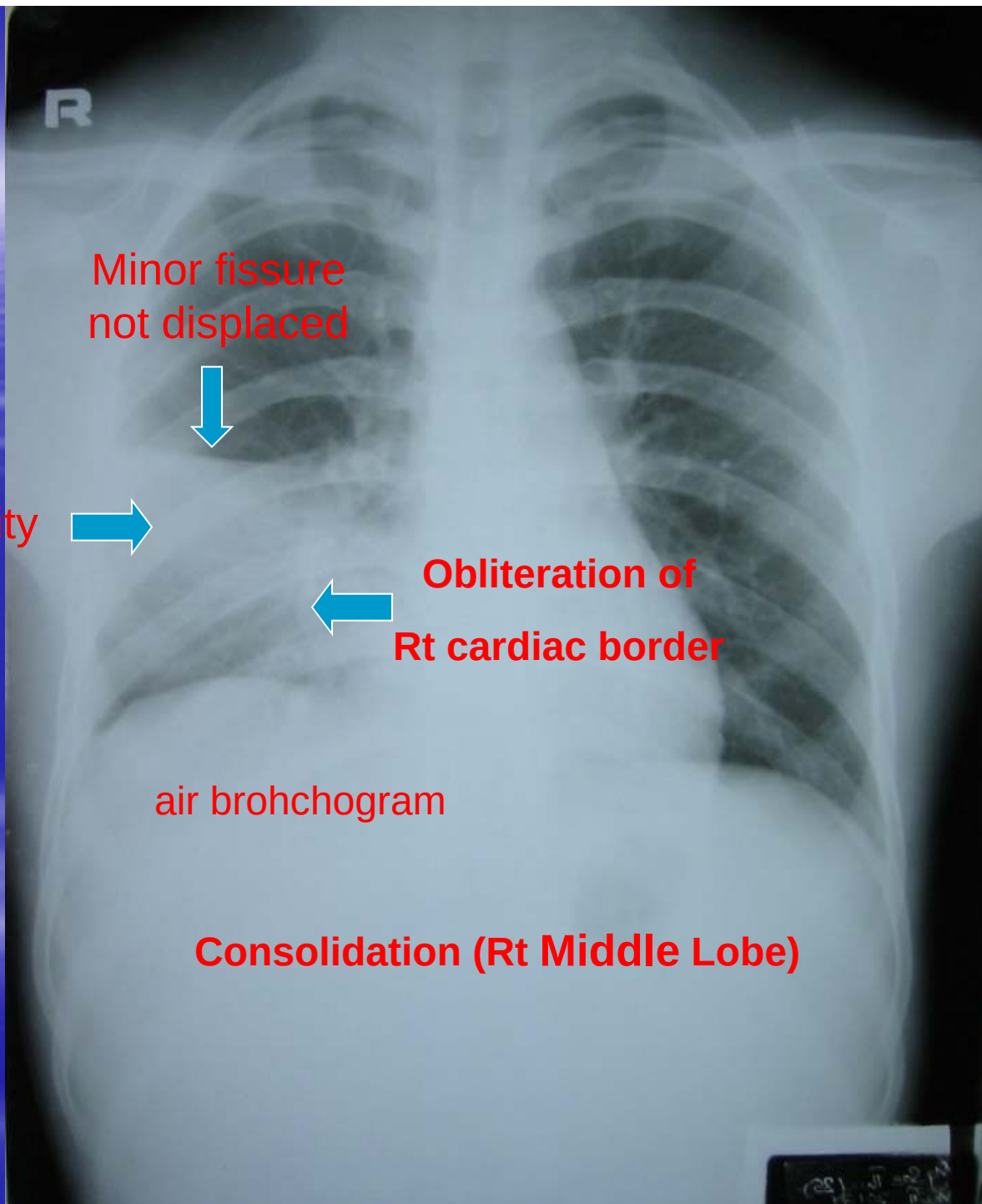


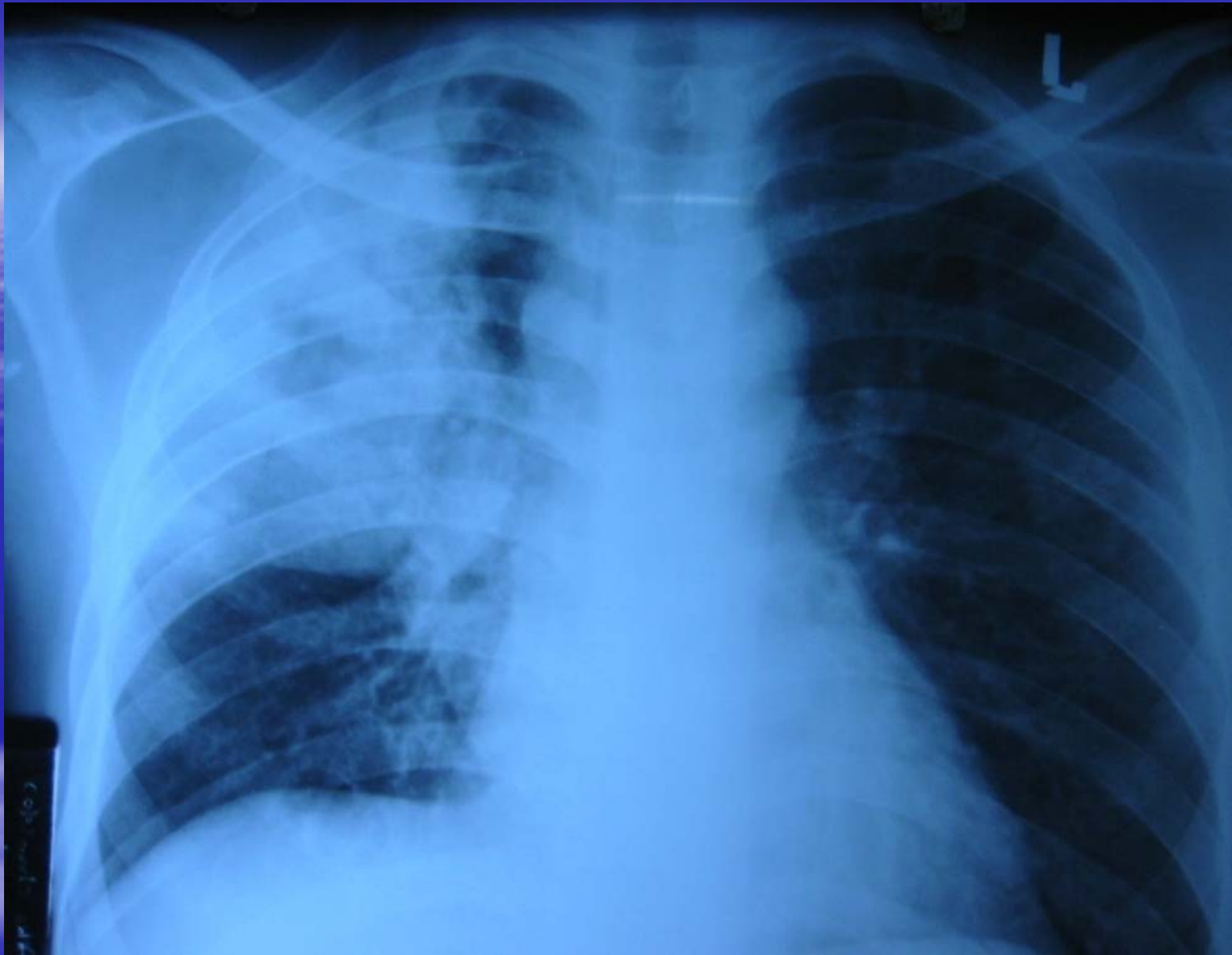
Obliteration of
Rt cardiac border



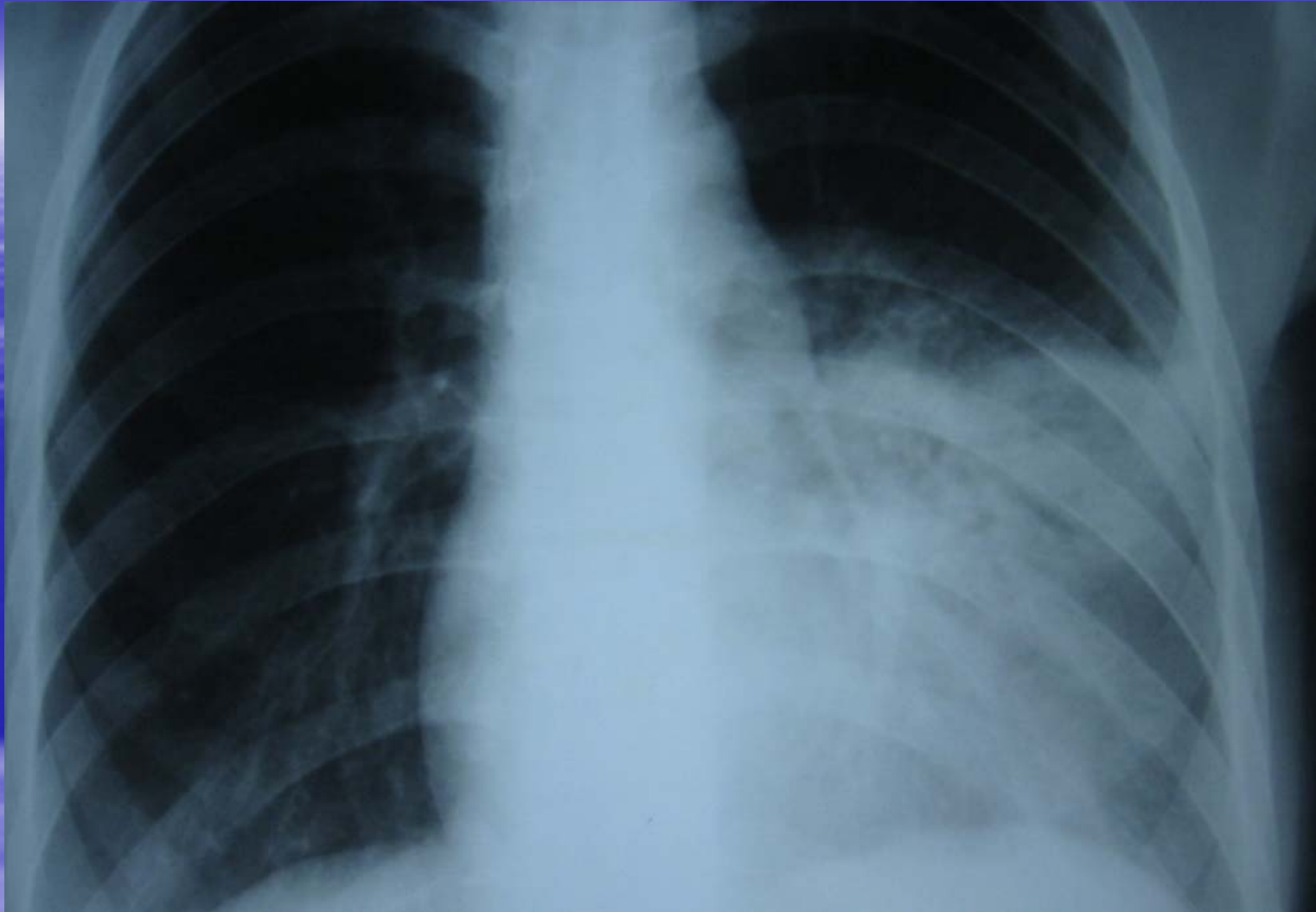
air brohchogram

Consolidation (Rt Middle Lobe)





Consolidation Rt Upper Lobe



Lingular Segment Consolidation

Consolidation

- Definition

replacement of air in one or more acini by fluid or solid material

Consolidation

- Radiological signs

- ✓ usually large homogeneous shadowing
- ✓ confined to segment & bounded by segmental margin (fissure, diaphragm, heart contour)
- ✓ no evidence of loss of volume
- ✓ air bronchogram

Causes of Consolidation

➤ Inflammatory = Pus

1. Lobar pneumonia
2. Bronchopneumonia
3. Unusual pneumonia (Viral, Pneumocystis, Fungal, TB)
4. Aspiration

➤ Hamemorrhage = Blood

1. Trauma: contusion
2. Pulmonary embolism
3. Bleeding diathesis (leukaemia, haemophilia, anticoagulants, DIC)
4. Vasculitis (Wegener granulomatosis, SLE, etc)
5. Idiopathic pulmonary haemosiderosis
6. Bleeding metastasis: choriocarcinoma

➤ Transudate = Water

1. Cardiac oedema
2. Neurogenic oedema
3. Hypoproteinaemia
4. Fluid overload
5. Renal failure
6. Shock
7. ARDS

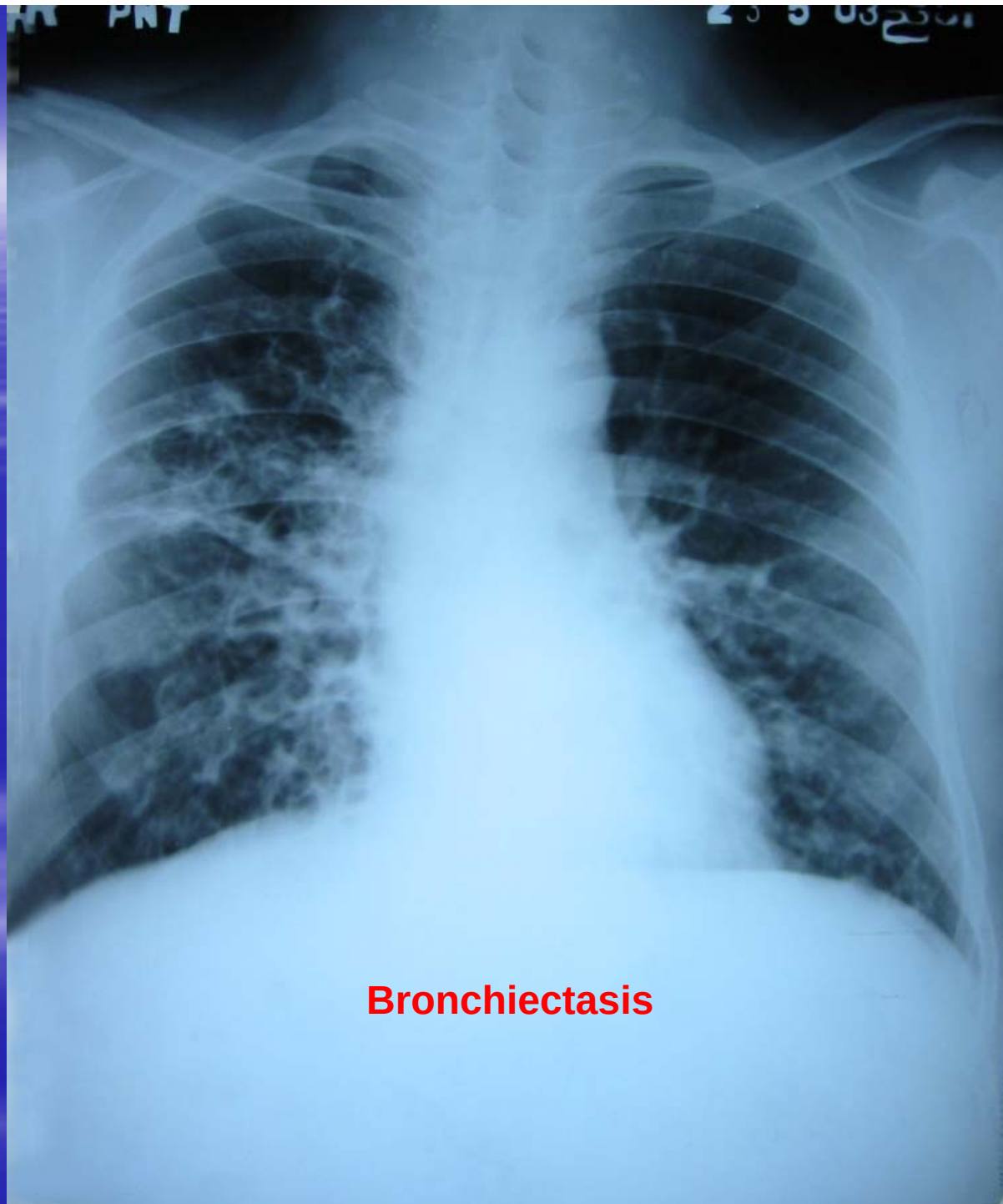
➤ Secretion = Protein

1. Alveolar proteinosis
2. Mucus plugging

➤ Malignancy = Cells

1. Bronchoalveolar cell carcinoma
2. Lymphoma

➤ Interstitial disease: alveolar sarcoid



Bronchiectasis

Bronchiectasis

- Definition

irreversible dilatation of one or more bronchi.

Causes of Bronchiectasis

➤ Congenital

1. Congenital bronchiectasis
2. Cystic fibrosis
3. Kartagener's
4. Congenital hypogammaglobulinaemia

➤ Obstructive

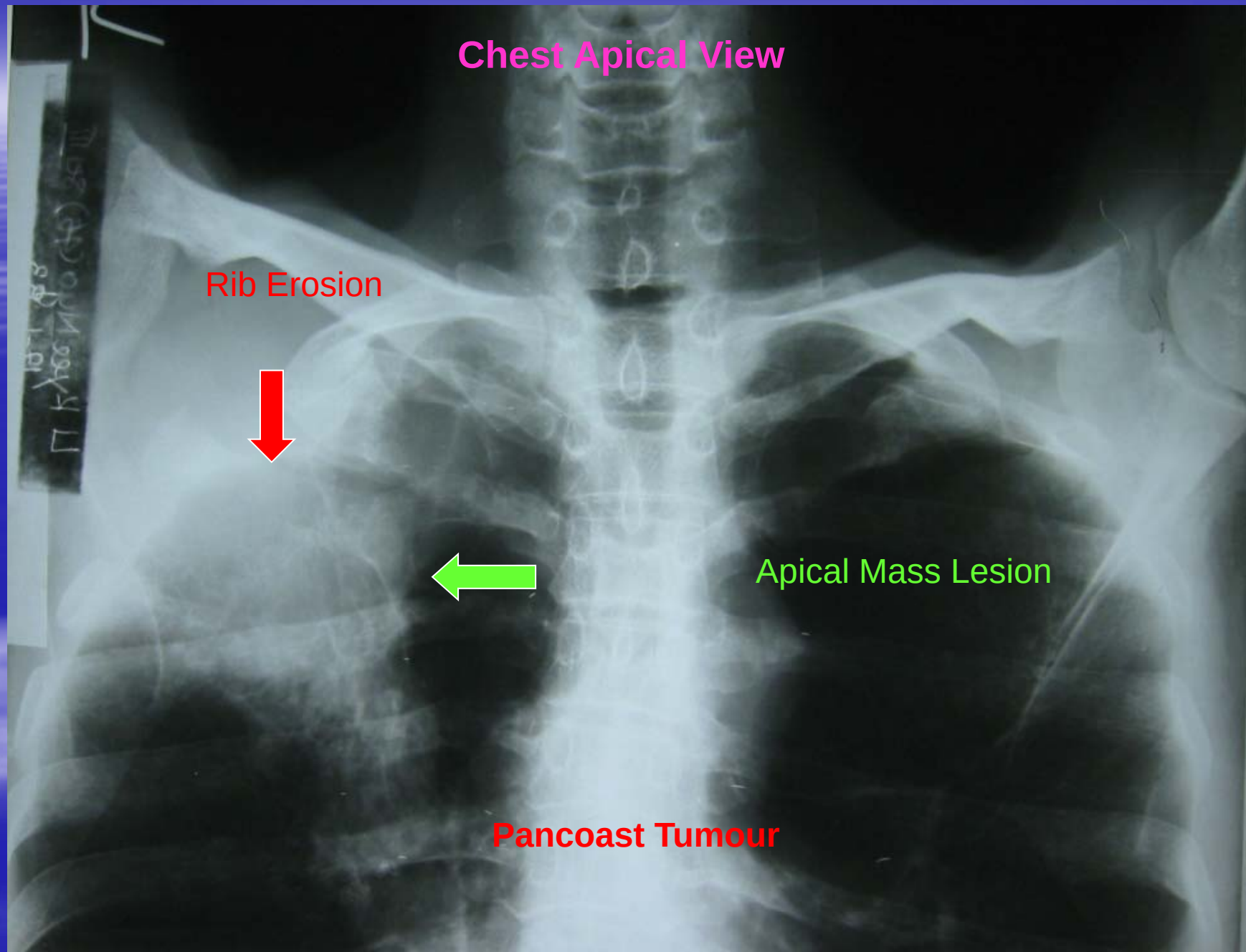
1. Localised obst: tumour, foreign body, L/N
2. Generalised obst: chronic bronchitis, emphysema, asthma

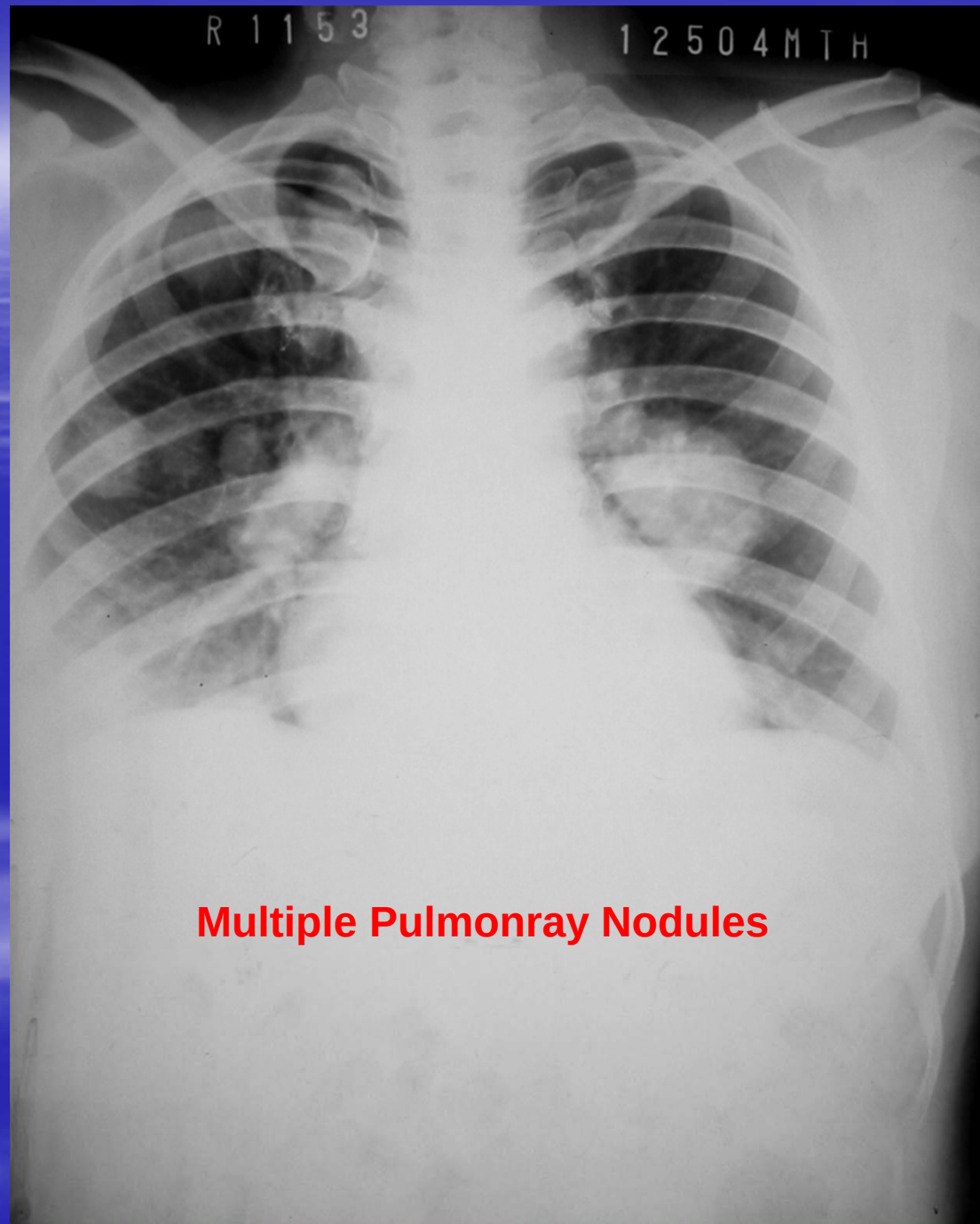
➤ Infection

Whooping cough, Measles, Childhood Pneumonia,
Primary or post primary TB

➤ Non-infective casues

1. Bronchopulmonary aspergillosis
2. Inhalation of noxious fluid or gases
3. Intrinsic connective tissue abnormality:
Ehler-Danlos \$, Marfan's \$, Sjogren \$,
Tracheobronchomegaly





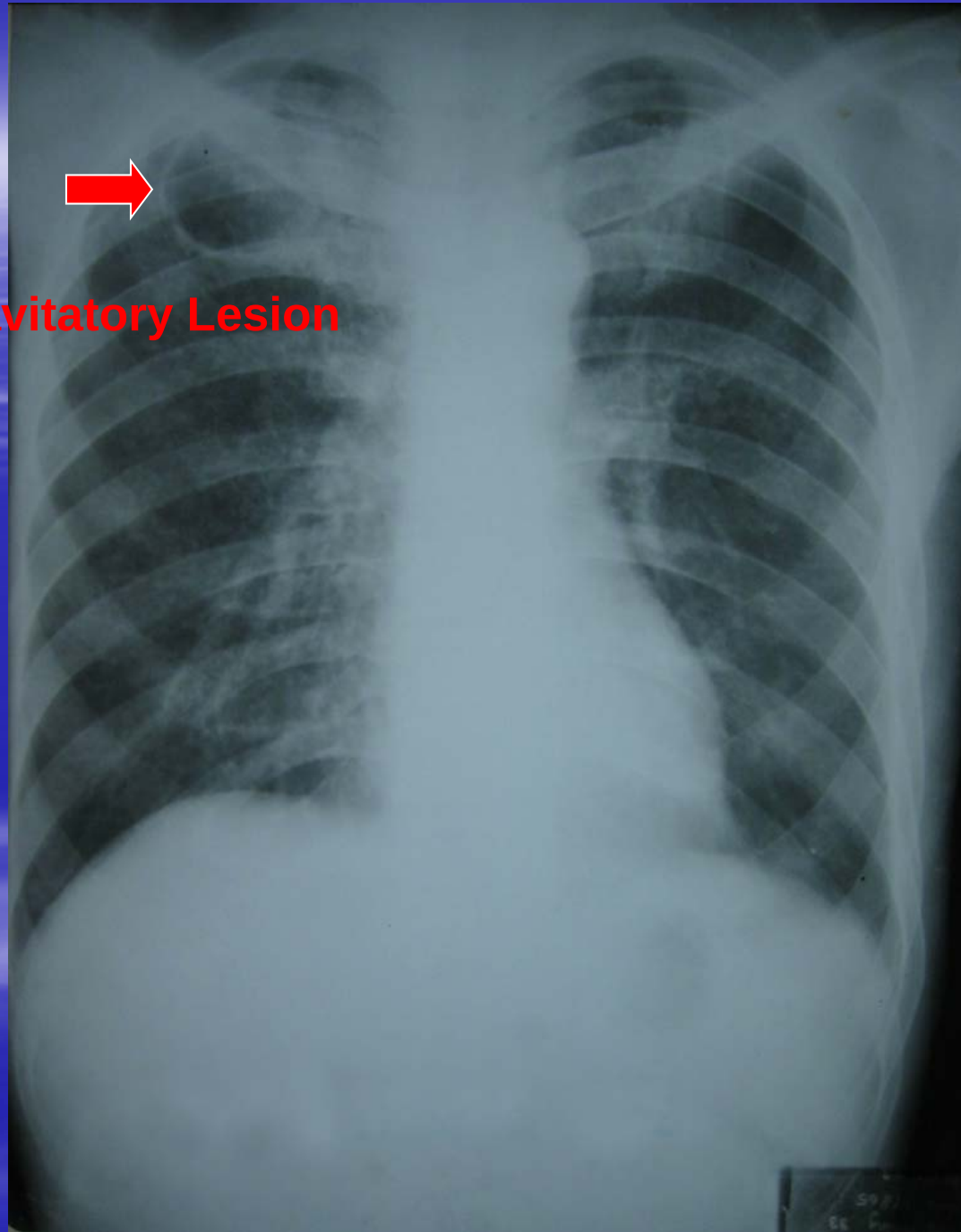
Multiple Pulmonary Nodules



Pulmonary metastasis

Causes of Multiple Pulmonary Nodules

- **Neoplastic:** metastasis (breast, thyroid, kidney, GIT)
- **Infections**
 1. Abscess
 2. Hydatid
 3. Histoplasmosis
 4. Coccidioidomycosis
- **Immunological**
 1. Wegener's granulomatosis
 2. Rheumatoid nodules
 3. Caplan's \$
- **Inhalational:** Progressive massive fibrosis
- **Vascular:** AVM



Cavitary Lesion

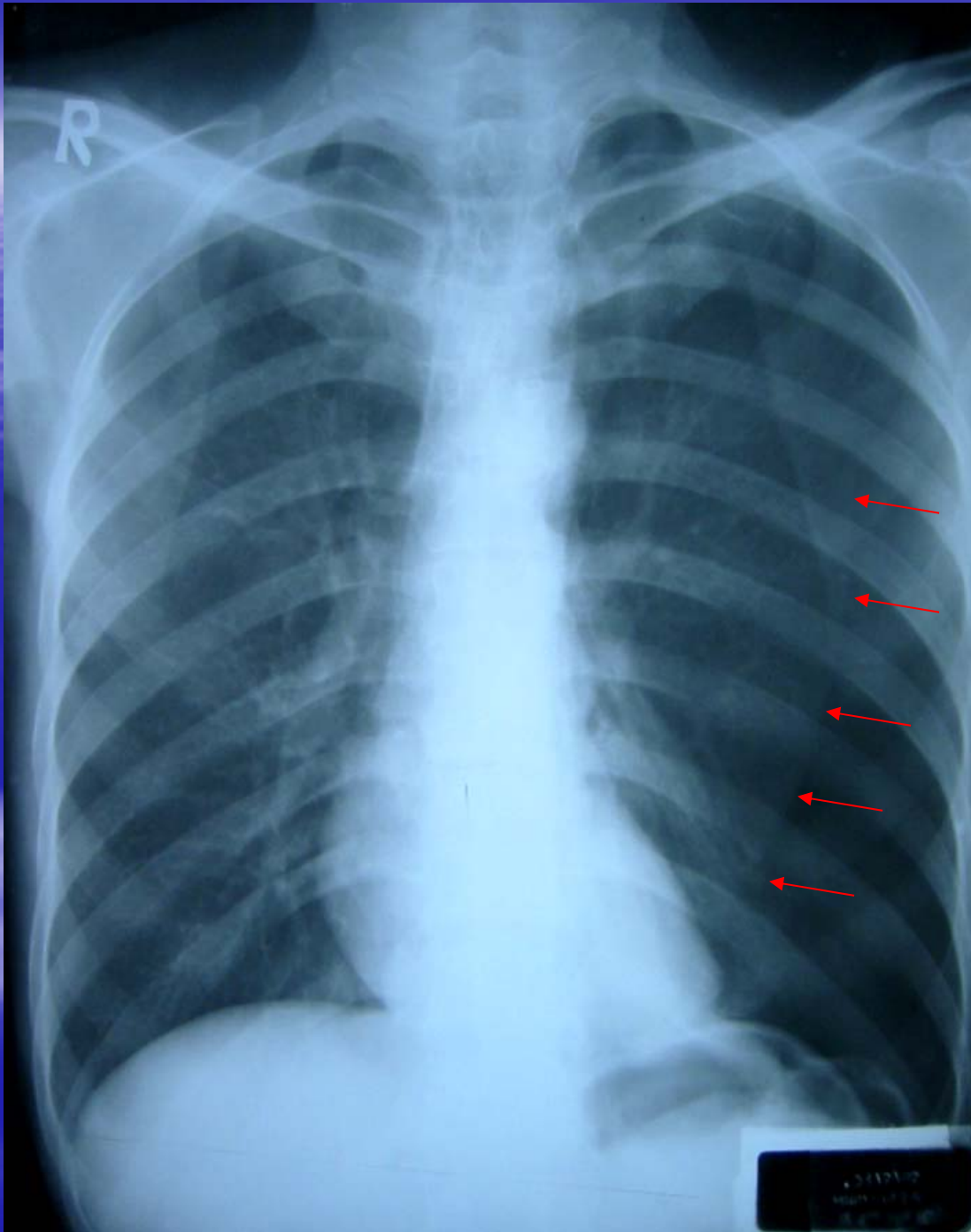
Cavitation lesions

- A cavity is a lucency exceeding 1cm in diameter surrounded by a complete wall which is 3mm or more in thickness

Causes of Cavitory lesions

- **Infective:** Staph aureus, Kleb pneumoniae, TB, Aspiration
- **Neoplastic:** Ca Bronchus, Metastasis, Hodgkin's
- **Vascular:** Infarction
- **Abnormal lung:** Cystic bronchiectasis, Bronchogenic cyst, Sequestered segment, Infective emphysematous bulla
- **Granuloma:** RA nodules, Wegener's, Sarcoidosis
- **Traumatic:** Haematoma, Traumatic lung cyst

PNEUMOTHORAX



Visceral Pleural Line

Pneumothorax

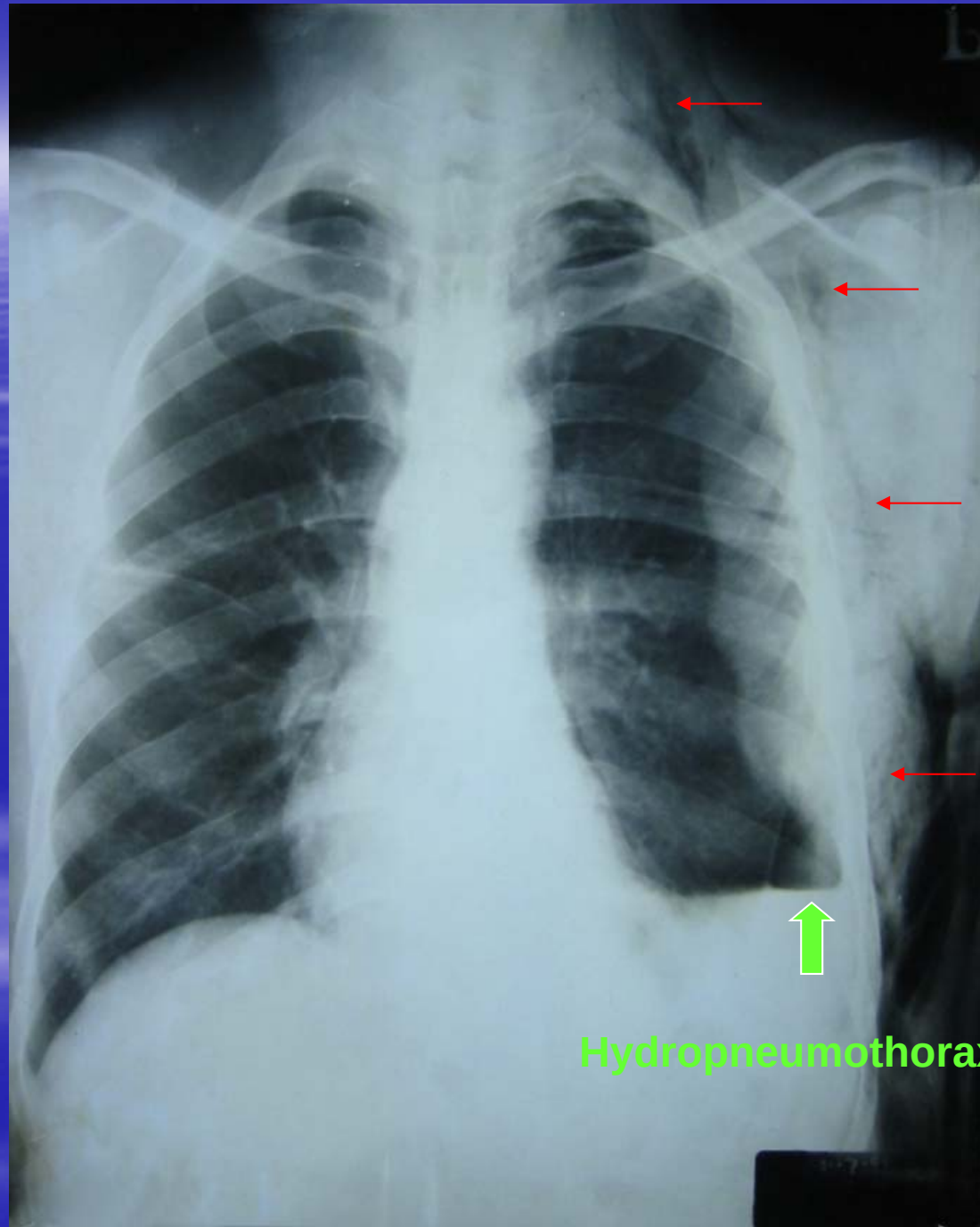
➤ Radiological features

1. **Lung edge:** a thin white line of lung margin, the visceral pleura
2. **Absent lung marking** between the lung edge and chest wall
3. **Mediastinal shift:** when a tension pneumothorax develop

Pneumothorax

➤ Causes

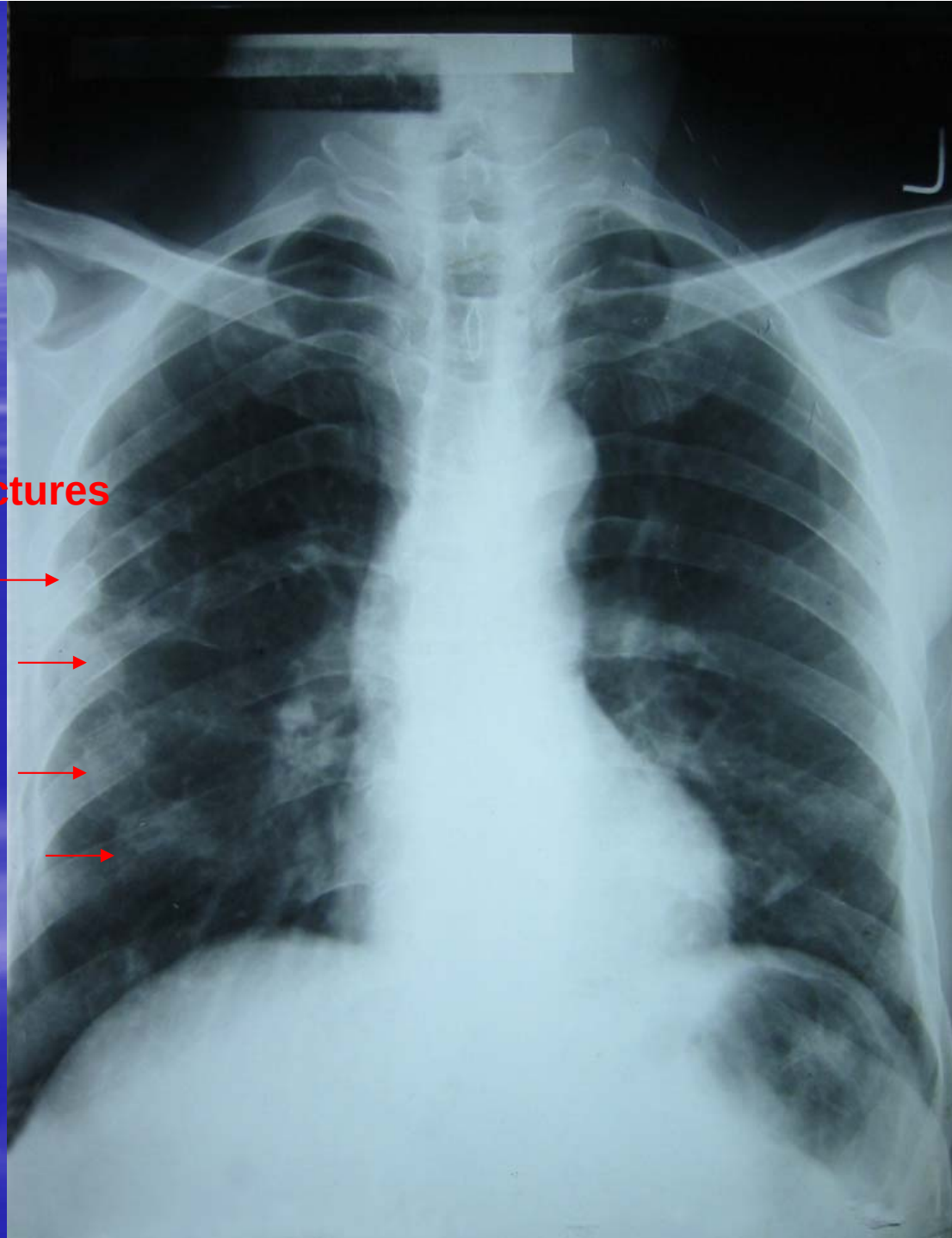
1. **Iatrogenic:** lung biopsy, chest aspiration, thoracic surgery, central line insertion
2. **Spontaneous:** common in tall thin young male, due to rupture of small pleural bleb
3. **Trauma:** stab wound, rib #, associated with surgical or mediastinal emphysema
4. **Secondary to lung disease:** emphysema, cystic fibrosis, interstitial lung disease
5. **Secondary to mediastinal emphysema**

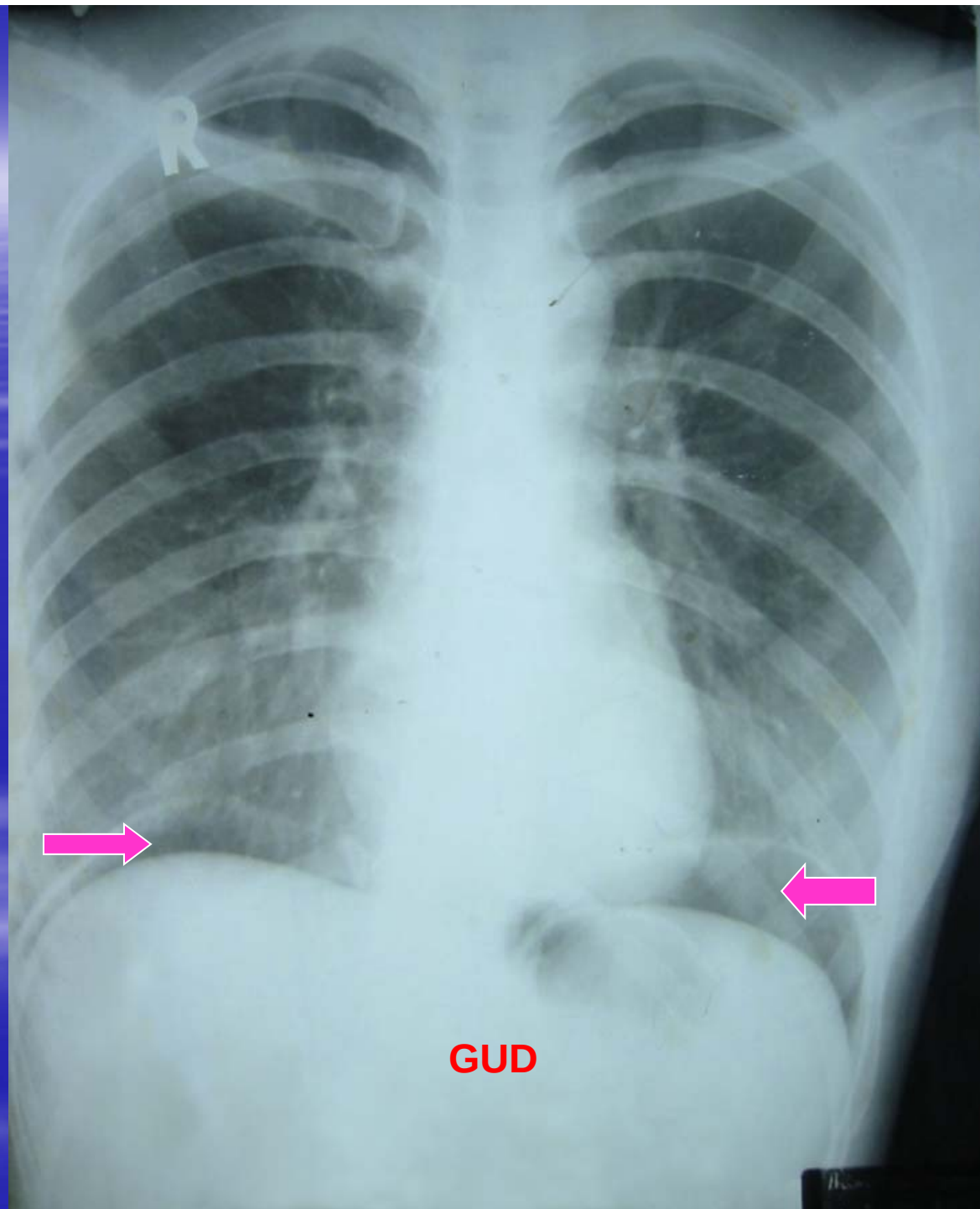


**Subcutaneous
Emphysema**

Hydropneumothorax

Multiple Rib Fractures





GUD

Pneumoperitoneum

➤ Radiological signs

- ✓ Upright plain film: lucent crescent of air under the diaphragm
- ✓ Supine film: air outlining both sides of the bowel wall (Ringler sign)
- ✓ Foot ball sign: air outlining the entire abdominal cavity
- ✓ Left lateral decubitus abdominal film: useful of equivocal & ill cases

Pneumoperitoneum

Causes

1. Perforation

- a. Peptic ulcer
- b. Inflammation: diverticulitis, appendicitis, toxic megacolon, necrotizing enterocolitis
- c. Infarction
- d. Malignant neoplasm
- e. Obstruction
- f. Pneumatosis coli

2. Iatrogenic: surgery, peritoneal dialysis

3. Secondary to pneumomediastinum

4. Secondary to pneumothorax

5. Through female genital tract

- a. Perforation of uterus/vagina
- b. Culdocentesis
- c. Rubin test: tubal patency test
- d. Pelvic examination

6. Intraperitoneal

- a. Gasforming peritonitis
- b. Rupture of abscess

Thank You