APPROACH TO PLEURAL DISEASES

PULMONARY MEDICINE

OBJECTIVES

- Know different pleural diseases
- Know their clinical features
- Identify pleural diseases on Chest xray
- Know the approach (diagnosis and management)

PLEURAL DISEASES

- PLEURAL EFFUSION
- PNEUMOTHORAX
- HEMOTHORAX
- PYOTHORAX
- CHYLOTHORAX
- PLEURAL MALIGNANCY (Primary and Secondary)

CASE 1

25 year old male presented in OPD with

Dry cough, Breathlessness, Chest pain on deep inspiration since 20 days

On Physical examination –

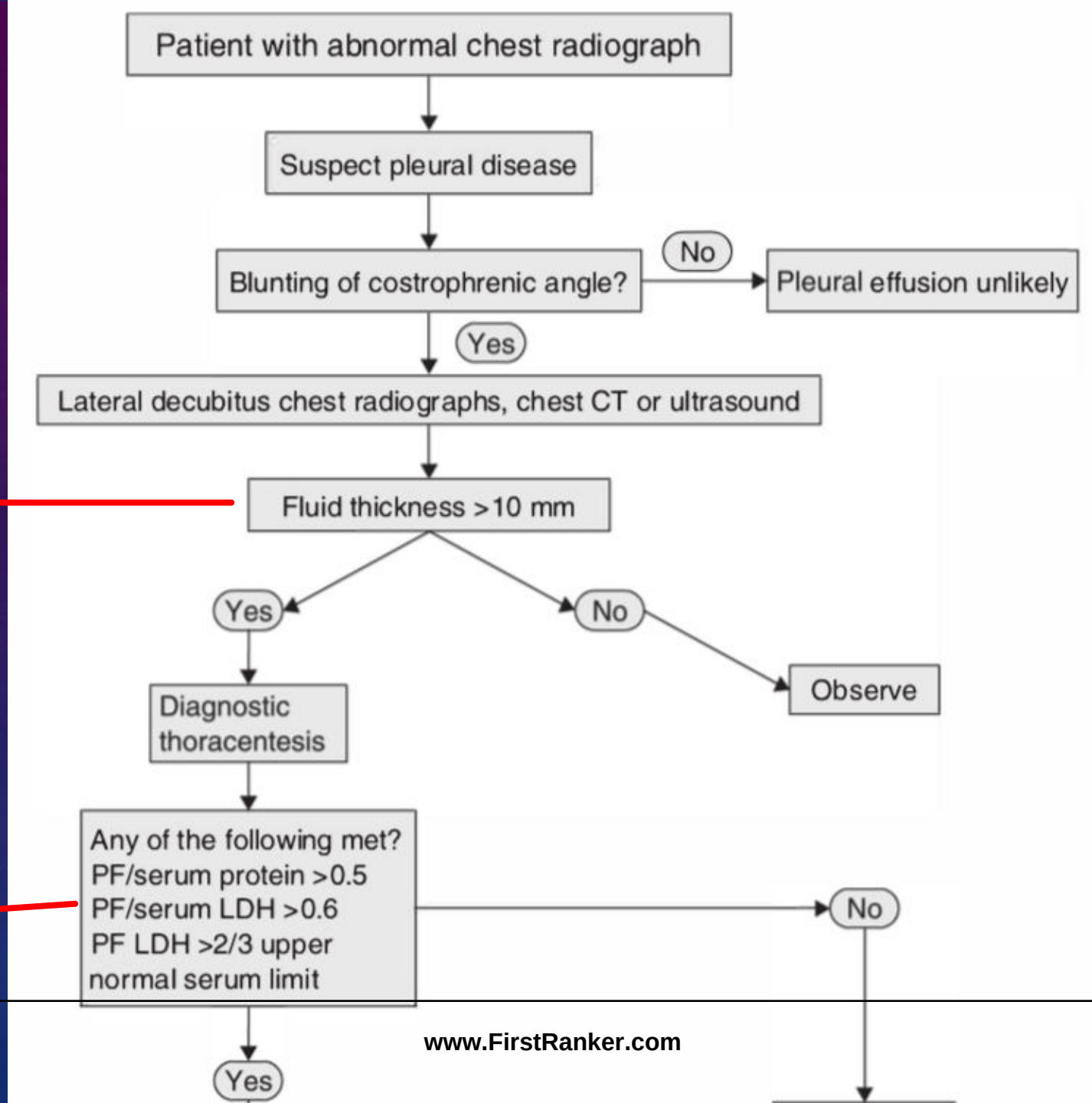
Dull note on percussion over left infrascapular area

Breath sound intensity were decreased with decreased TVF and VR over same area

CHEST XRAY

HOW TO APPROACH

- USG Chest



On ipsilateral decubitus Chest xray

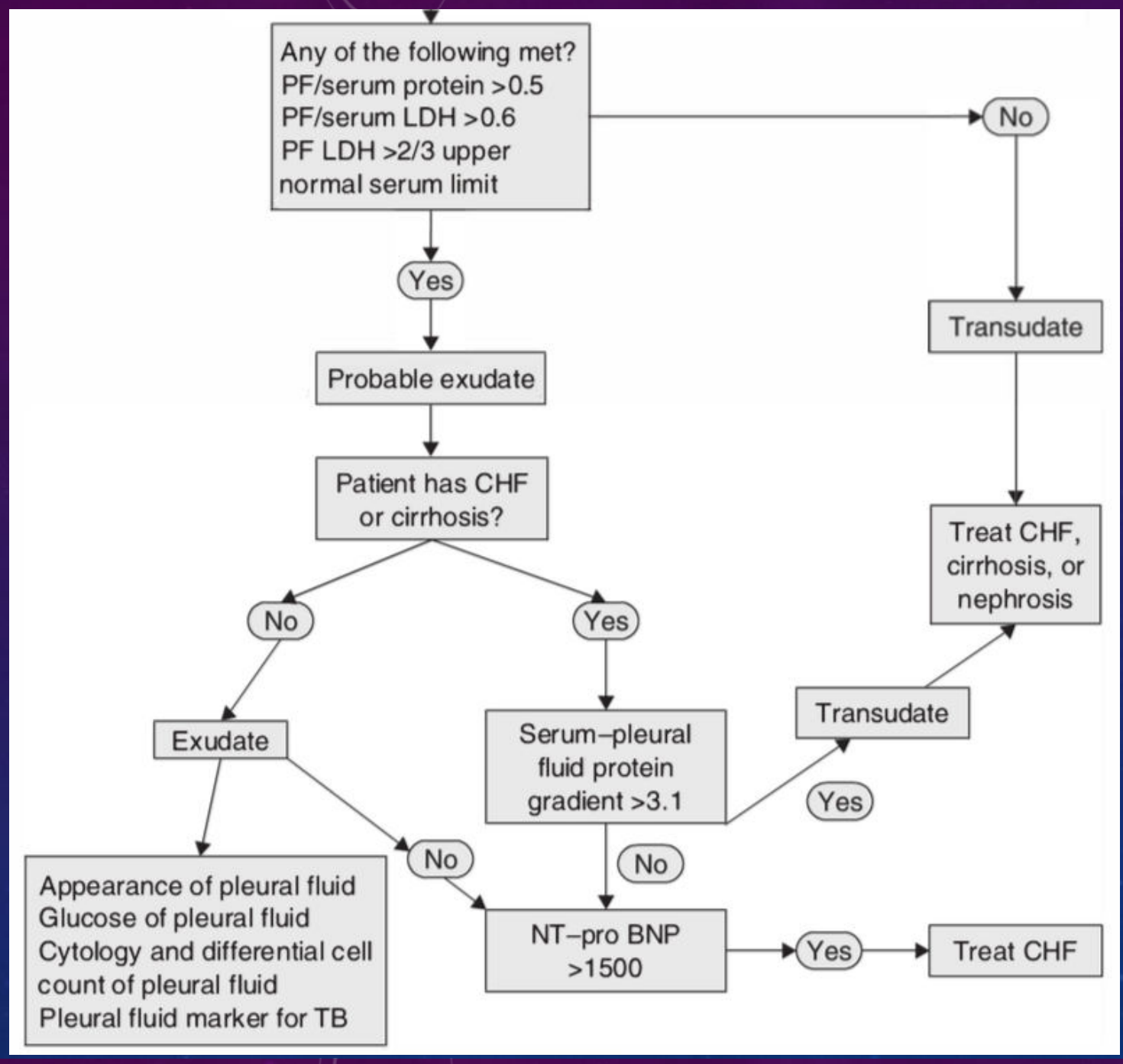
Light's Criteria

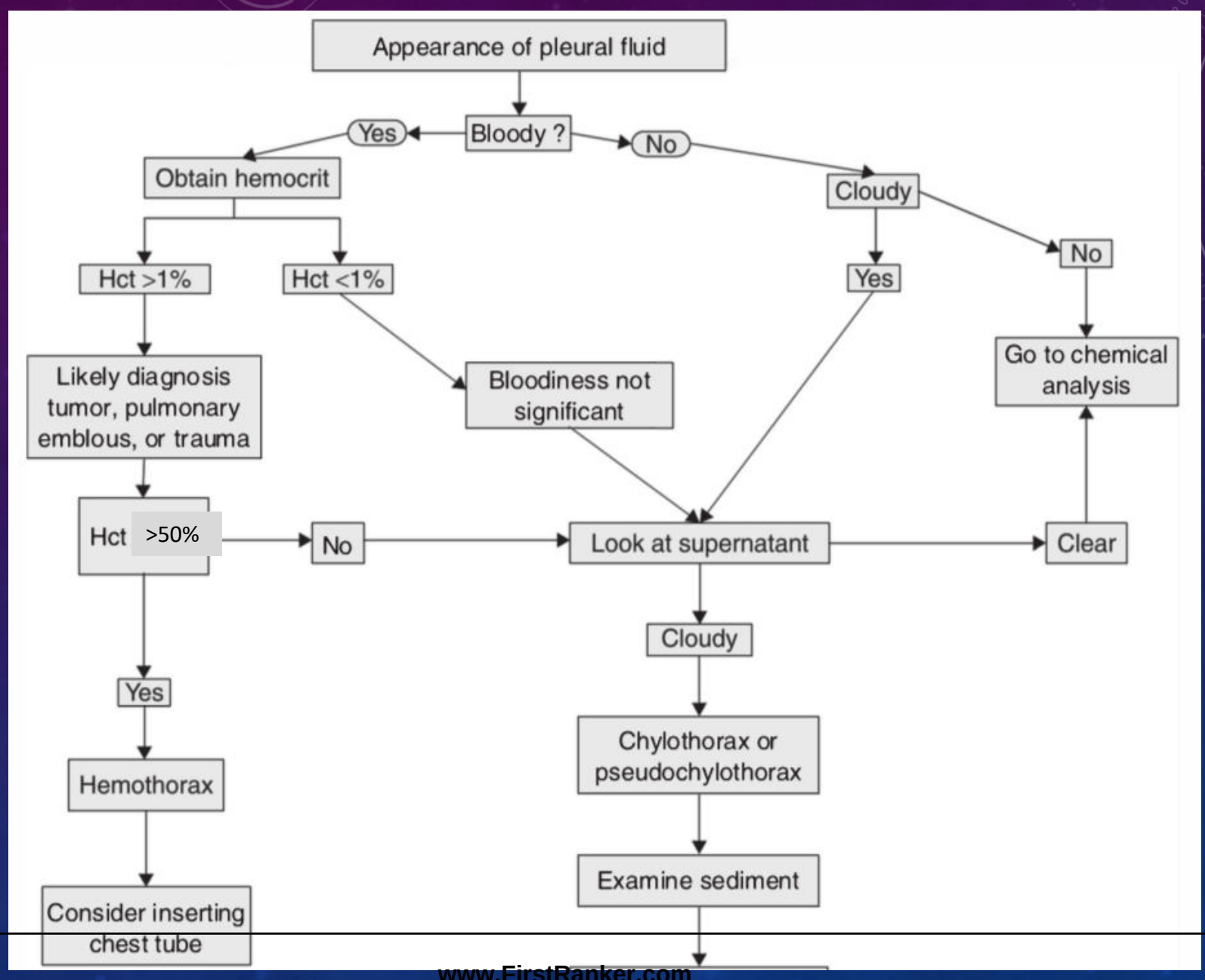
TRANSUDATIVE PLEURAL EFFUSION

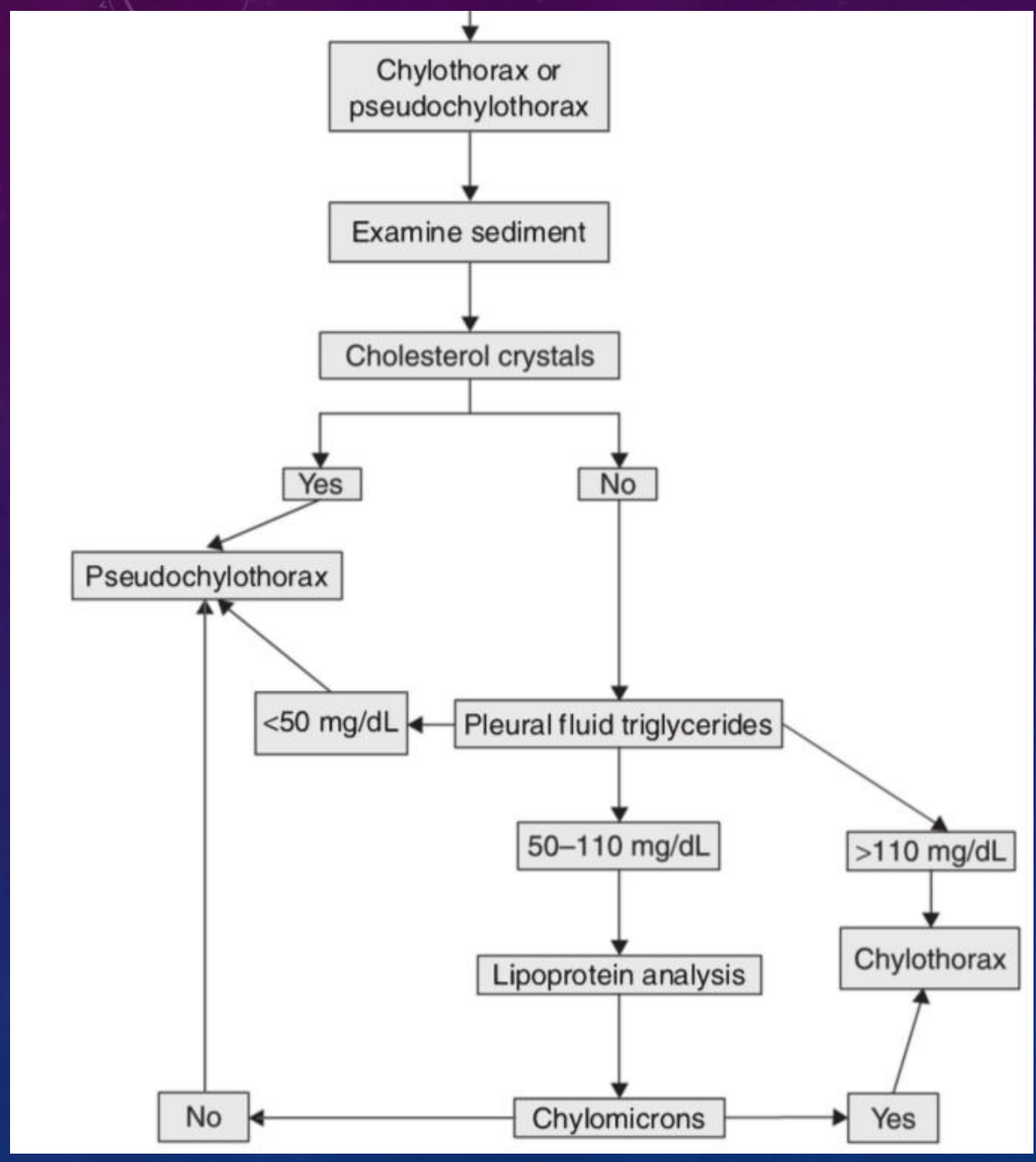
I. Transudative pleural effusions
   A. Congestive heart failure
   B. Cirrhosis
   C. Nephrotic syndrome
   D. Superior vena caval obstruction
   E. Urinothorax
   F. Peritoneal dialysis
   G. Glomerulonephritis
   H. Myxedema
   I. Cerebrospinal fluid leaks to pleura
   J. Hypoalbuminemia
   K. Sarcoidosis

EXUDATIVE PLEURAL EFFUSION

II. Exudative pleural effusions
   A. Neoplastic diseases
      1. Metastatic disease
      2. Mesothelioma
      3. Body cavity lymphoma
      4. Pyothorax-associated lymphoma
   B. Infectious diseases
      1. Bacterial infections
      2. Tuberculosis
      3. Fungal infections
      4. Parasitic infections
      5. Viral infections
   C. Pulmonary embolization
   D. Gastrointestinal disease
      1. Pancreatic disease
      2. Subphrenic abscess
      3. Intrahepatic abscess
      4. Intrasplenic abscess
      5. Esophageal perforation
      6. Postabdominal surgery
      7. Diaphragmatic hernia
      8. Endoscopic variceal sclerosis
      9. Postliver transplant
   E. Heart diseases
      1. Postcoronary artery bypass graft surgery
      2. Postcardiac injury (Dressler's) syndrome
      3. Pericardial disease
      4. Post-Fontan procedure
      5. Pulmonary vein stenosis postcatheter ablation of atrial fibrillation
   F. Obstetric and gynecologic disease
      1. Ovarian hyperstimulation syndrome
      2. Fetal pleural effusion
      3. Postpartum pleural effusion
      4. Meigs' syndrome
      5. Endometriosis
   G. Collagen vascular diseases
      1. Rheumatoid pleuritis
      2. Systemic lupus erythematosus
      3. Drug-induced lupus
      4. Sjögren's syndrome
      5. Familial Mediterranean fever
      6. Churg-Strauss syndrome
      7. Wegener's granulomatosis
   H. Drug-induced pleural disease
      1. Nitrofurantoin
      2. Dantrolene
      3. Methysergide
      4. Ergot drugs
      5. Dasatinib
      6. Amiodarone
      7. Interleukin 2
      8. Procarbazine
      9. Methotrexate
      10. Clozapine
   I. Miscellaneous diseases and conditions
      1. Asbestos exposure
      2 Postlung transplant
      3. Postbone marrow transplant
      4. Yellow nail syndrome
      5. Sarcoidosis
      6. Uremia
      7. Trapped lung
      8. Therapeutic radiation exposure
      9. Drowning
      10. Amyloidosis
      11. Milk of calcium pleural effusion
      12. Electrical burns
      13. Extramedullary hematopoiesis
      14. Rupture of mediastinal cyst
      15. Acute respiratory distress syndrome
      16. Whipple's disease
      17. Iatrogenic pleural effusions
   J. Hemothorax
   K. Chylothorax

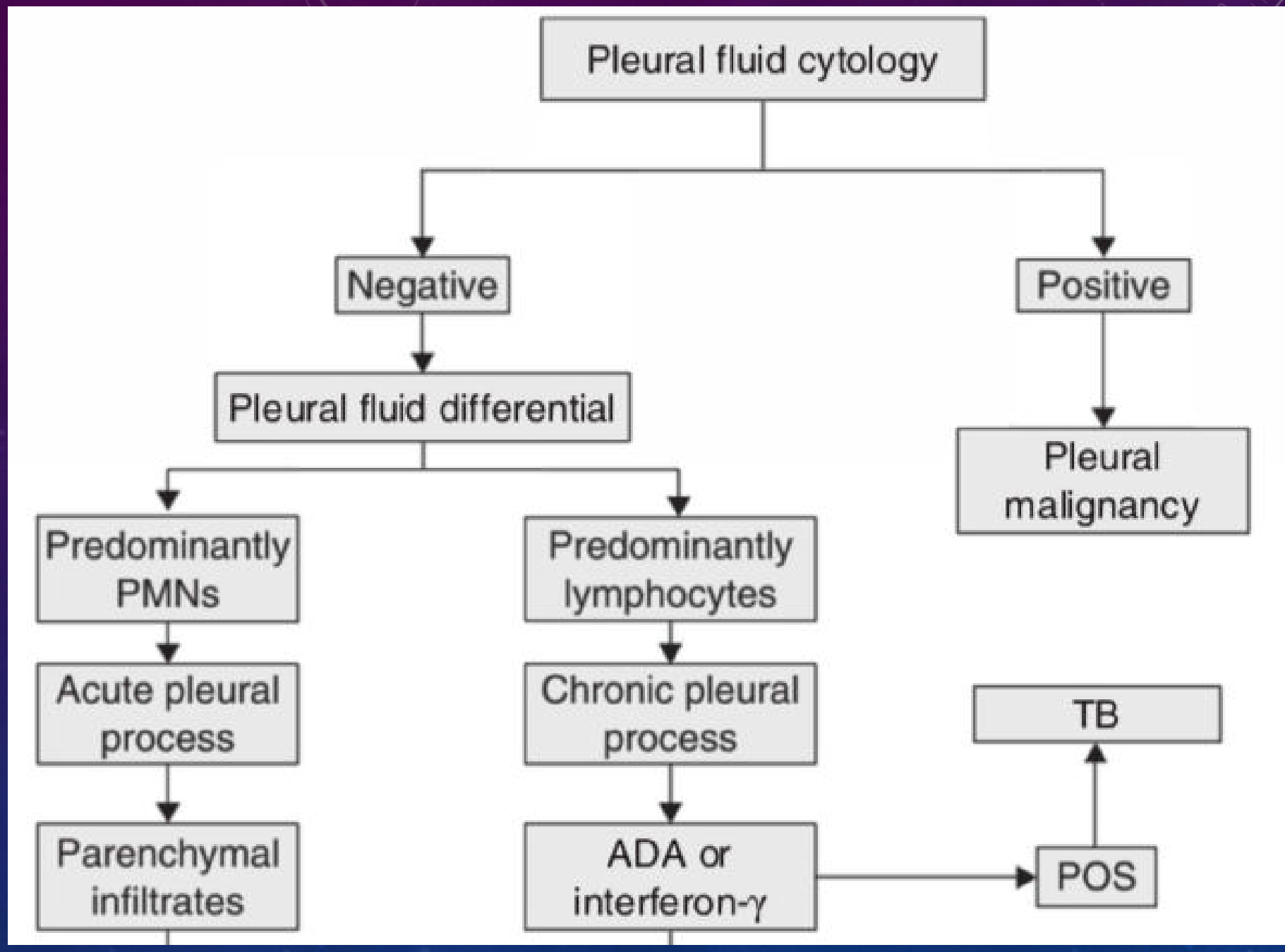


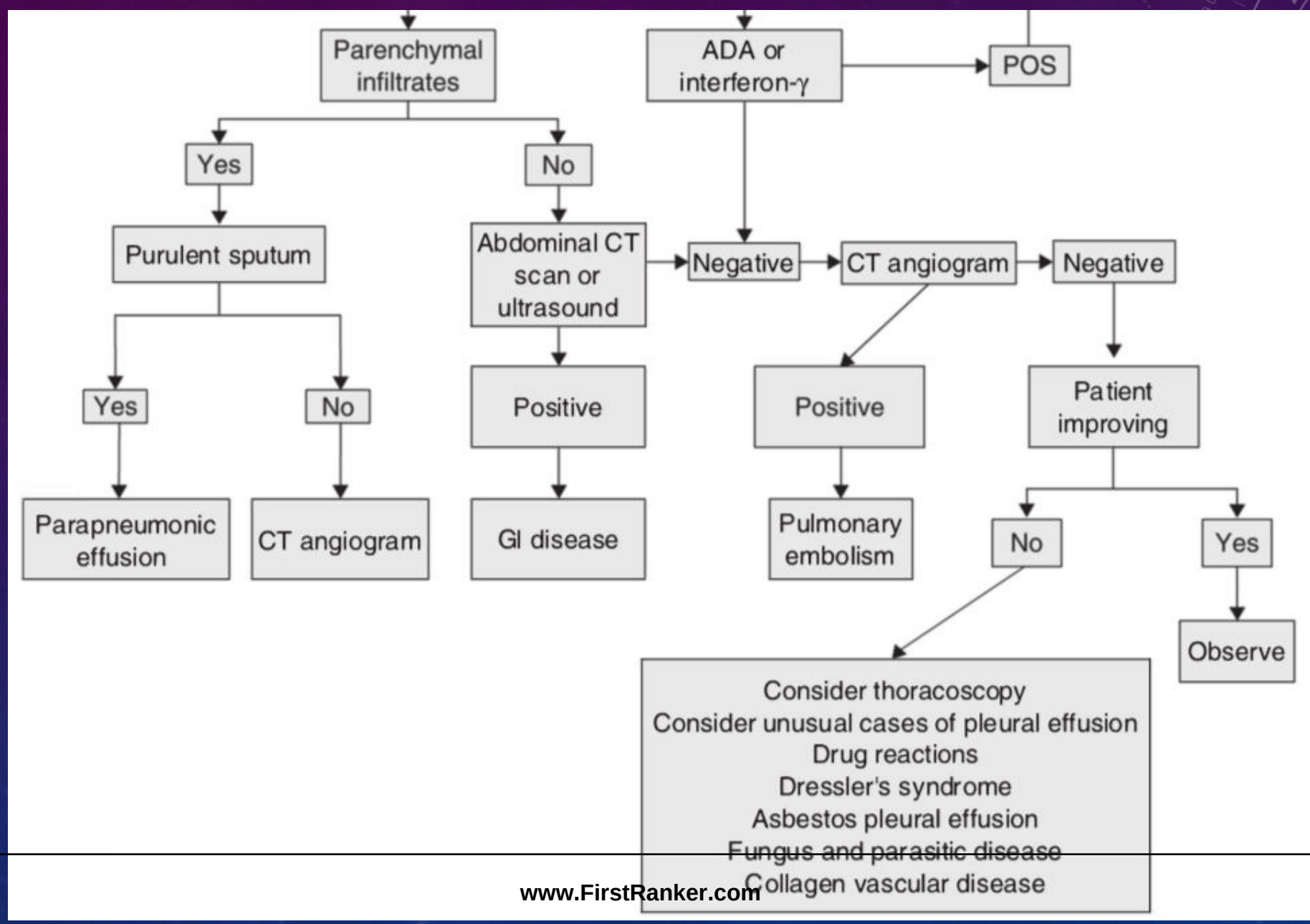




Most patients with a reduced pleural fluid glucose level (<60 mg/dL) have one of four conditions:

- Parapneumonic effusion,
- Malignant pleural effusion,
- Tuberculous pleuritis, or
- Rheumatoid pleural effusion





OPTIONS WHEN NO DIAGNOSIS IS OBTAINED AFTER INITIAL THORACENTESIS

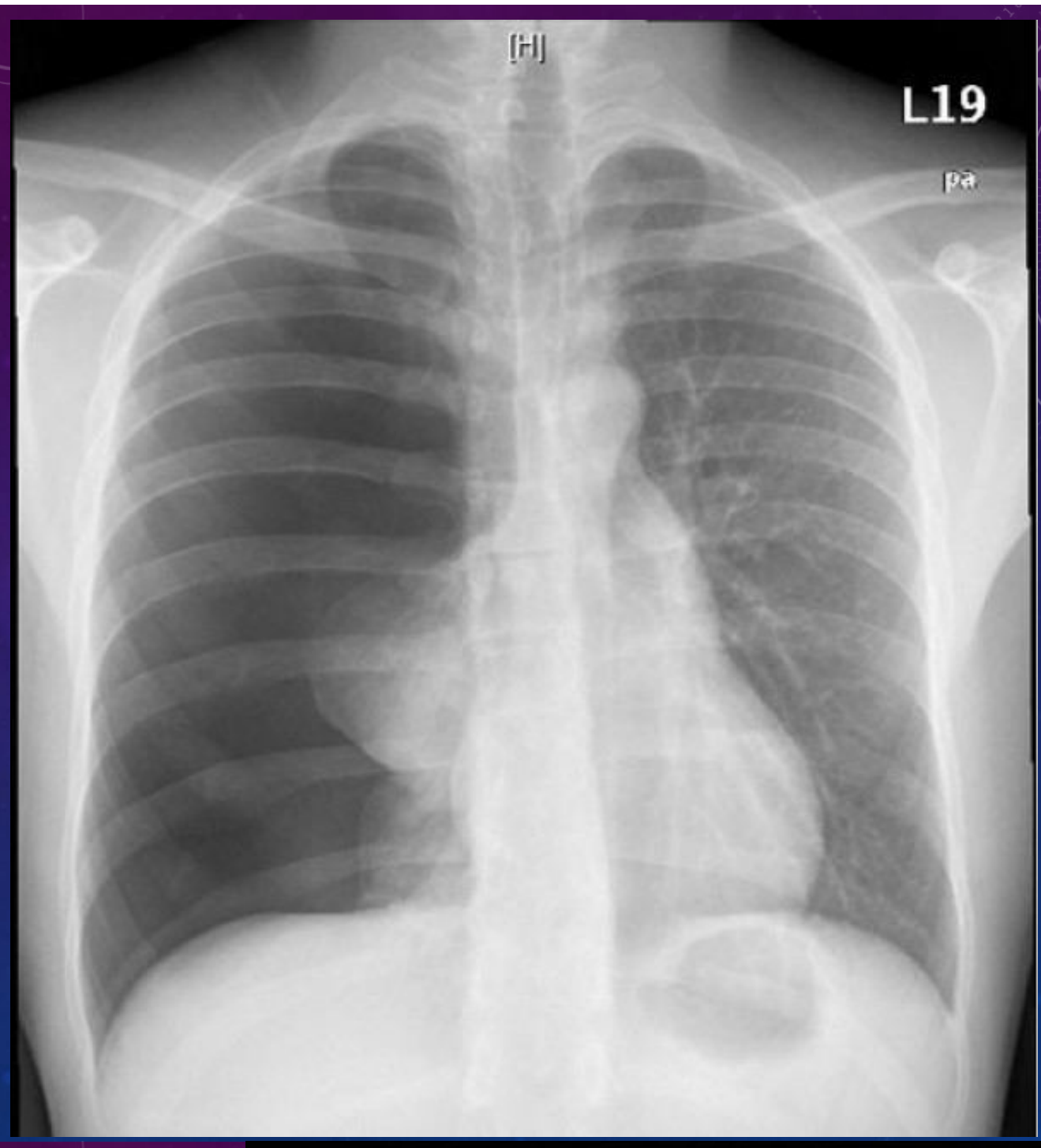
- Observation
- Bronchoscopy
  - A pulmonary infiltrate is present on the chest radiograph or the chest CT scan
  - Hemoptysis is present
  - The pleural effusion is mas-sive, that is, it occupies more than three fourths of the hemithorax.
  - The mediastinum is shifted toward the side of the effusion
- Thoracoscopy
- Needle Biopsy of the Pleura – if thoracoscopy is not available

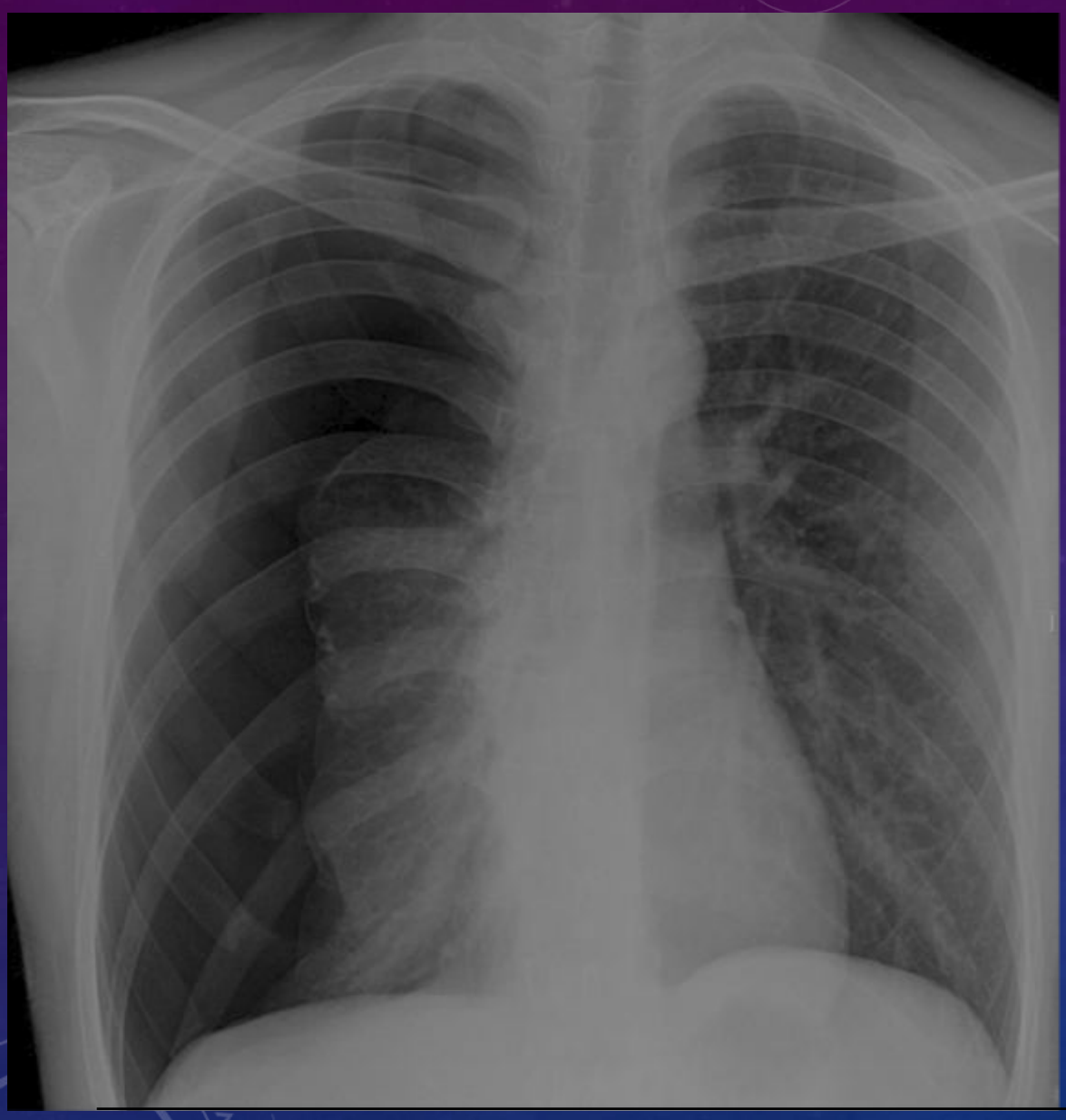
CASE 2

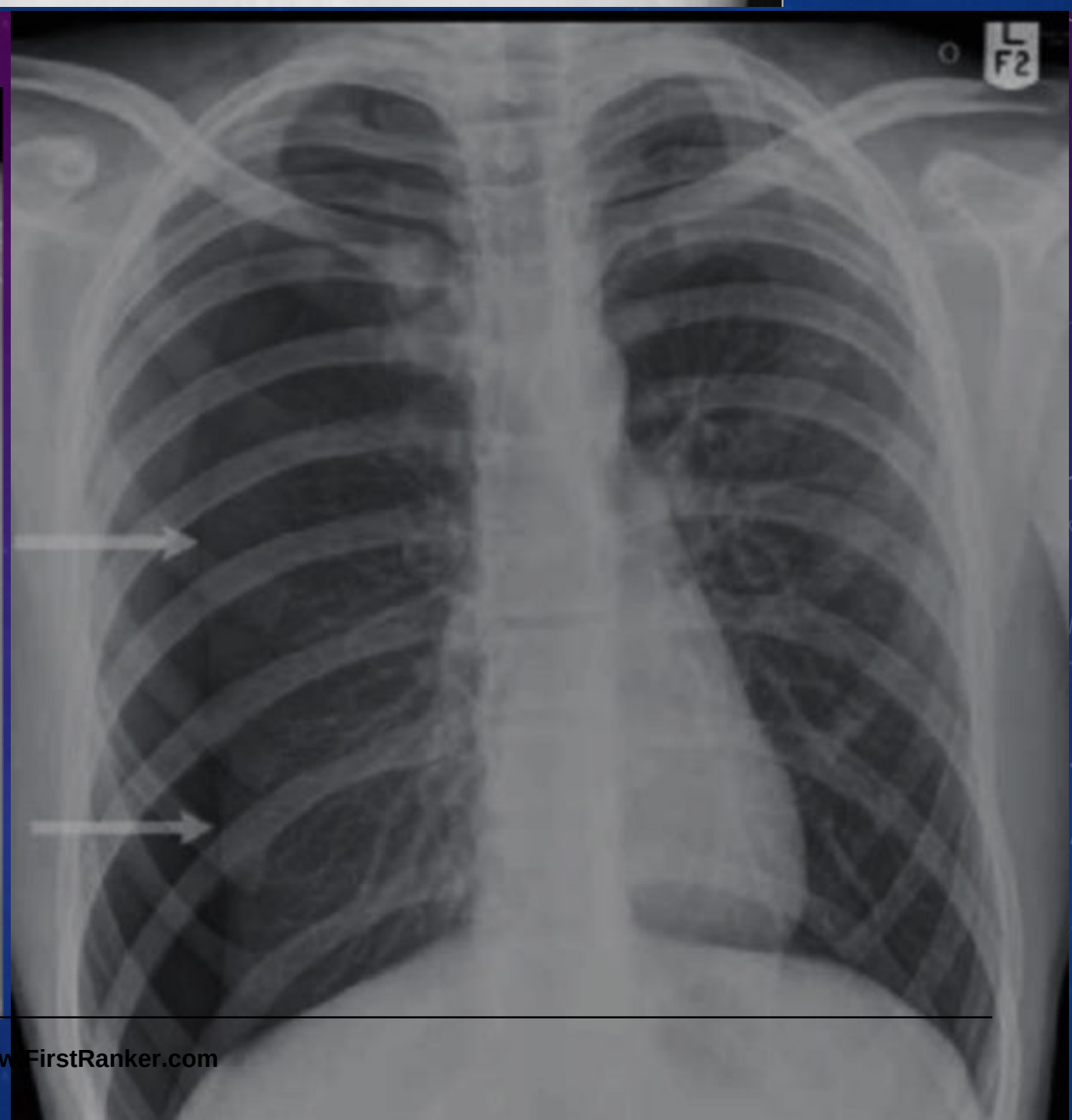
A 50 year old male, case of COPD, presented in OPD with

- Worsening breathlessness with right side chest pain since 1 day
- On Exmination
  - Hyperresonant percussion note right side
  - Decreased breath sound intensity right side with decrease TVF and VR

CHEST X-RAY







PNEUMOTHORAX

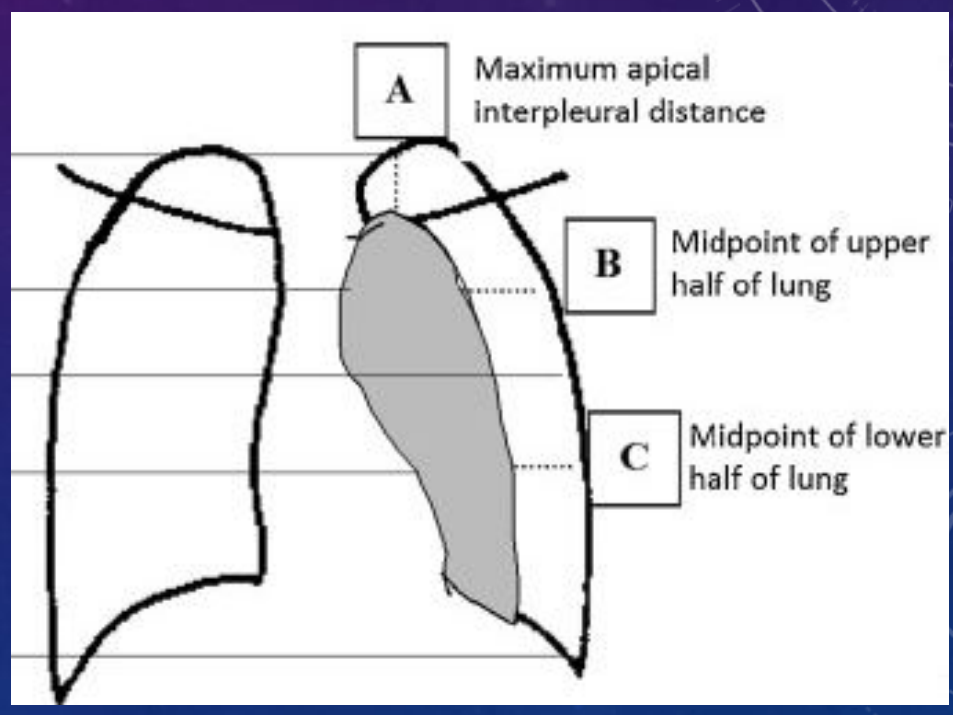
- SPONTANEOUS
  - PRIMARY
  - SECONDARY
- TRAUMATIC
  - DIRECT/ INDIRECT TRAUMA
  - IATROGENIC

QUANTITATION OF PNEUMOTHORAX

Collin's method

Light's Index

$$\% \text{ pneumothorax} = 100\left(1 - \frac{(\text{diameter lung})^3}{(\text{diameter hemithorax})^3}\right)$$



$$\% \text{ pneumothorax} = 4.2 + [4.7 \times (A + B + C)]$$

TREATMENT – PRIMARY SPONTANEOUS PNEUMOTHORAX

- Upto 15 % volume
  - Observation with supplemental oxygen

- > 15 % volume
  - Tube thoracostomy

TREATMENT – SECONDARY SPONTANEOUS PNEUMOTHORAX

- TUBE THORACOSTOMY WITH INSTILLATION OF A SCLEROSING AGENT

- MEDICAL THORACOSCOPY
- VIDEO-ASSISTED THORACOSCOPIC SURGERY

} For Persistent air leak

TREATMENT – IATROGENIC PNEUMOTHORAX

No/Mild symptoms, < 40% of the hemithorax	Observation with supplemental O2
More than mildly symptomatic, > 40% of the hemithorax	ASPIRATION/TUBE THORACOSTOMY
If the patient is on mechanical ventilation	Tube thoracostomy

TREATMENT – NON IATROGENIC TRAUMATIC PNEUMOTHORAX

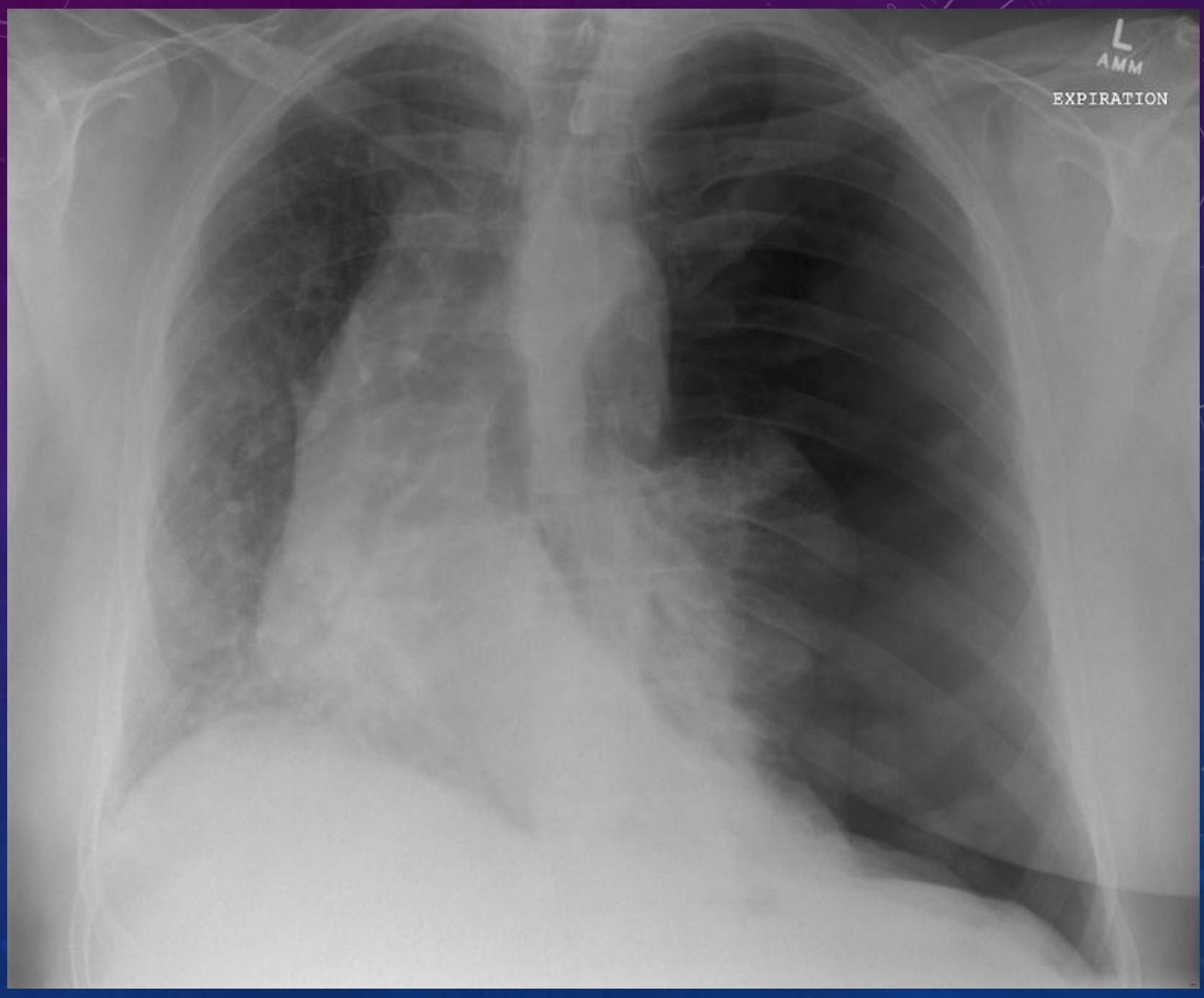
- TUBE THORACOSTOMY [May not be necessary for patients with small pneumothoraces or those with occult pneumothoraces]

TENSION PNEUMOTHORAX

- Intrapleural pressure exceeds atmospheric pressure throughout expiration and often during inspiration as well
- Mostly, patients on Mechanical ventilation
- One way valve mechanism

CLINICAL FEATURES

- The patient appears distressed with rapid labored respirations, cyanosis, and usually profuse diapho-resis, hypotension, and marked tachycardia
- Contralateral mediastinal shift



TREATMENT

- TUBE THORACOSTOMY

HEMOTHORAX

- Penetrating or nonpenetrating chest trauma
- Occasionally, iatro-genic – Placement of central venous catheters percutaneously by the subclavian or internal jugular route

TREATMENT – TRAUMATIC HEMOTHORAX

- TUBE THORACOSTOMY (LARGE BORE 24-36 F)

  Advantages

  - It allows more complete evacuation of the blood from the pleural space;
  - It stops the bleeding if the bleeding is from pleural lacerations;
  - It allows one to quantitate easily the amount of continued bleed-ing;
  - It may decrease the incidence of subsequent empyema because blood is a good culture medium;
  - The blood drained from the pleural space may be autotransfused; and
  - The rapid evacua-tion of pleural blood decreases the incidence of sub-sequent fibrothorax

- Video-assisted thoracic surgery (VATS)

NON TRAUMATIC HEMOTHORAX

- Metastatic malignant pleural disease [m/c]
- Complication of anticoagulant therapy

TREATMENT

- Tube thoracostomy
- VATS

PYOTHORAX

- Parapneu-monic effusion - Pleural effusion associated with bacterial pneu-monia, lung abscess, or bronchiectasis

- Empyema - Pus in pleural space

Evolution of parapneumonic effusion :

1. Exudative stage
2. Fibro-purulent stage
3. Organization stage

Bacteriology:

Aerobic [Gm Positive > Gm Negative] > Mixed Aerobic & Anaerobic > Anaerobic

Str. Pneumonie, Staph aureus	E. Coli, Pseudomonas, Klebsiella	Bacteroids, Peptostreptococcus

Clinical manifestation :

- Acute fever,
- Chest pain,
- Leukocytosis

Diagnosis:

Chest xray

USG chest

Diagnostic thoracocentesis

CHEST XRAY

USG CHEST

CT CHEST

Bad prognostic factors:

- Pus present in pleural space
- Gram stain of pleural fluid positive
- Pleural fluid glucose below 40 mg/dl
- Pleural fluid culture positive
- Pleural fluid pH <7.0
- Pleural fluid LDH >3 x upper normal limit for serum
- Pleural fluid loculated

Treatment options

- Therapeutic thoracentesis
- Tube thoracostomy
- Tube thoracostomy with the intrapleural adminis-tration of fibrinolytics
- Thoracoscopy with the breakdown of adhesions
- Thoracotomy with decortication

PRIMARY PLEURAL MALIGNANCY

- Malignant Mesothelioma
- Solitary Fibrous Tumors of the Pleura

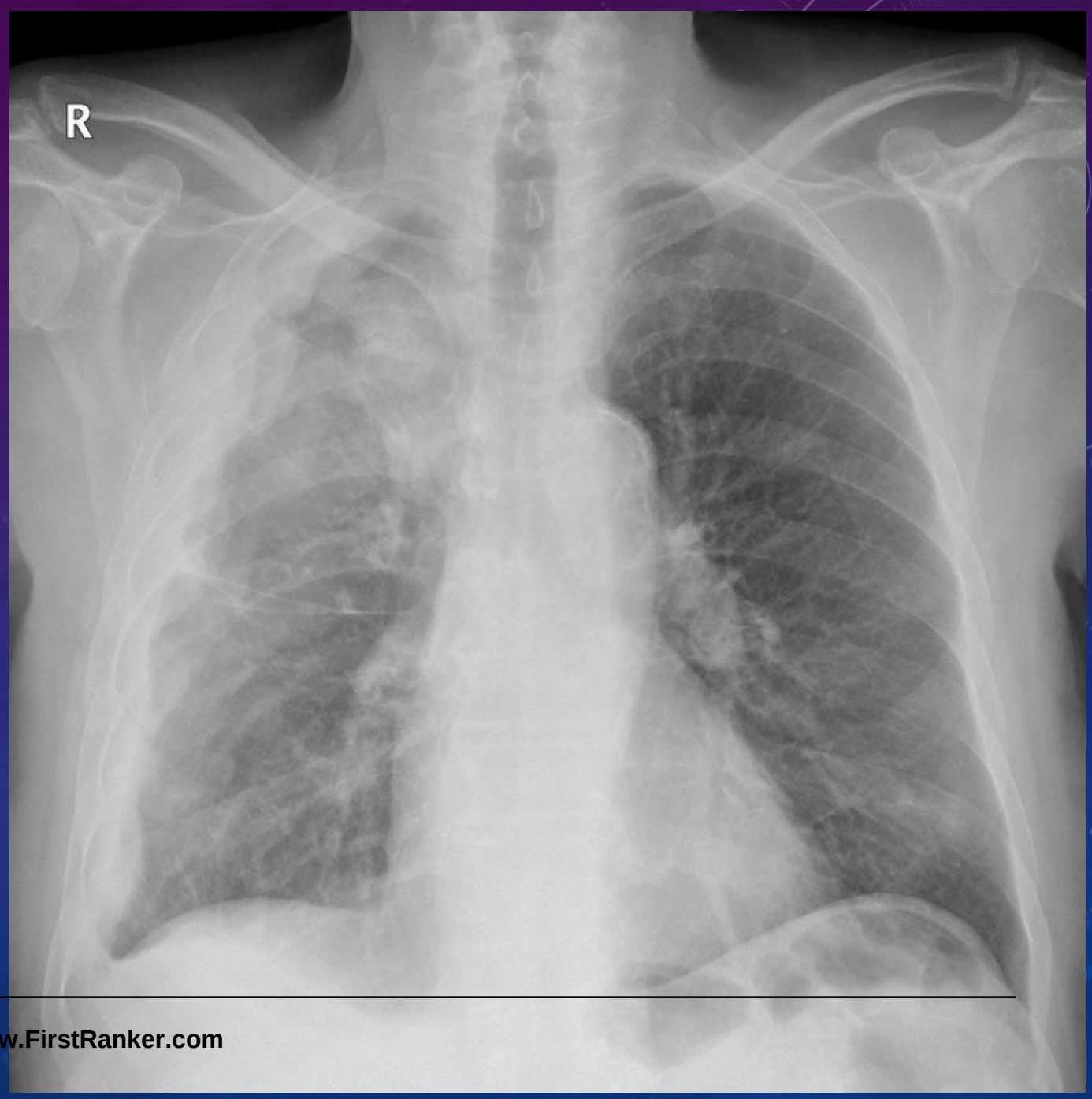
Malignant mesotheliomas :

- Multiple white or gray granules, nodules, or flakes on parietal pleura.

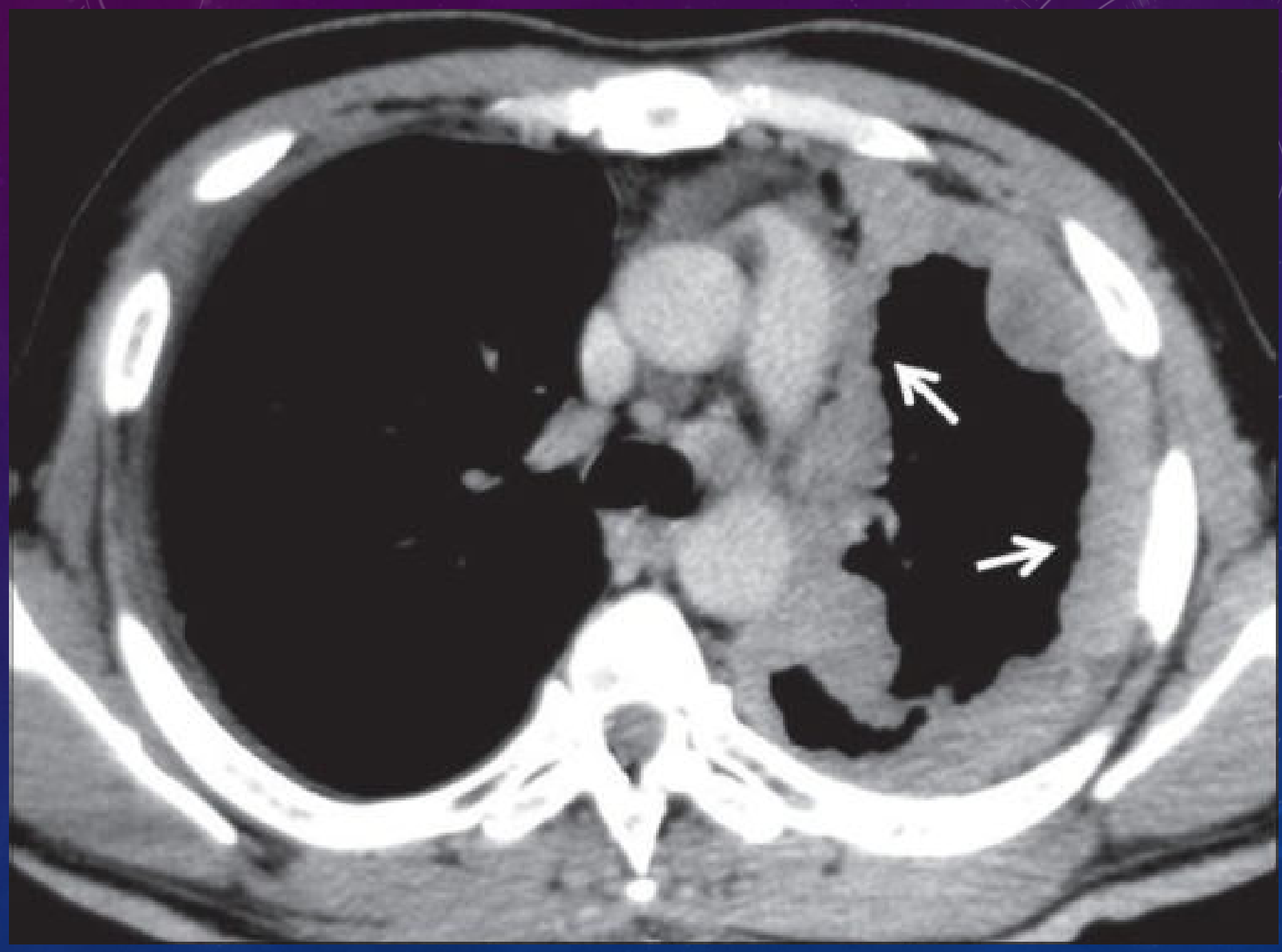
- Pleural surface becomes progressively thicker and nodular

- Tumor extends to form a continuous layer encasing the lung - contraction of the involved hemithorax.

CHEST X-RAY



CHEST CT

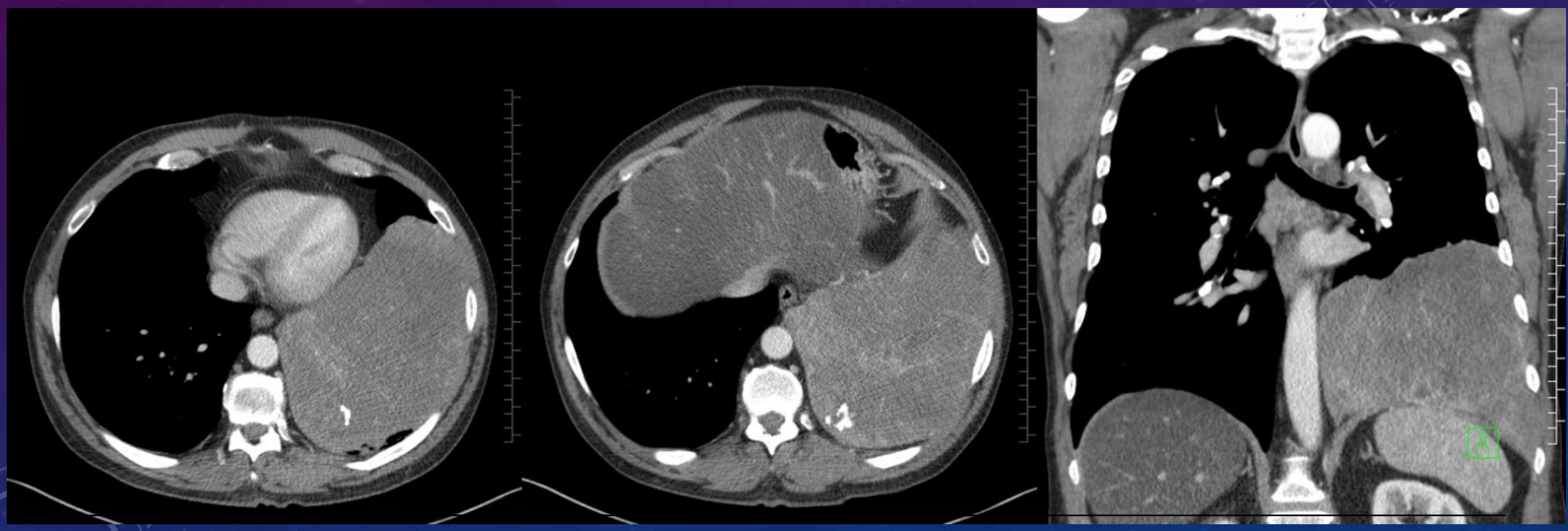


SOLITARY FIBROUS TUMORS OF THE PLEURA

- Mostly benign
- 7- 60 % malignant
- Grossly, appear as firm, encapsulated yellow tumors, which may be vascular with promi-nent veins over their external surfaces

CHEST X-RAY

CHEST CT



METASTATIC PLEURAL MALIGNANCY

PLEURAL EFFUSIONS RELATED TO METASTATIC MALIGNANCY

TABLE 10.1 ■ Causes of Malignant Pleural Effusions in Two Different Series

	Spriggs and Boddington[a]		Anderson et al.[b]	
Tumor	*n*	%	*N*	%
Lung carcinoma	275	43	32	24
Breast carcinoma	157	25	35	26
Lymphoma and leukemia	52	8	34	26
Ovarian carcinoma	27	4	9	7
Sarcoma (including melanoma)	13	2	5	4
Uterine and cervical carcinoma	6	1	3	2
Stomach carcinoma	18	3	1	1
Colon carcinoma	9	1	0	0
Pancreatic carcinoma	7	1	0	0
Bladder carcinoma	7	1	0	0
Other carcinoma	23	4	6	4
Primary unknown	40	6	8	6
Total	634		133	

THANK YOU