Chest CT’

Lecture No. 6 (Dated 22nd August 2020) for 8th & 9th Semester Students of MBBS

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lung field abnormalities -Atelectasis

CT scans show direct and indirect signs of lobar collapse:

Direct signs include:

- Displacement of fissures
- Opacification of the collapsed lobe.

Indirect signs include the following:

- Displacement of the hilum
- Mediastinal shift toward the side of collapse
- Loss of volume in the ipsilateral hemithorax
- Elevation of the ipsilateral diaphragm
- Crowding of the ribs
- Compensatory hyperlucency of the remaining lobes

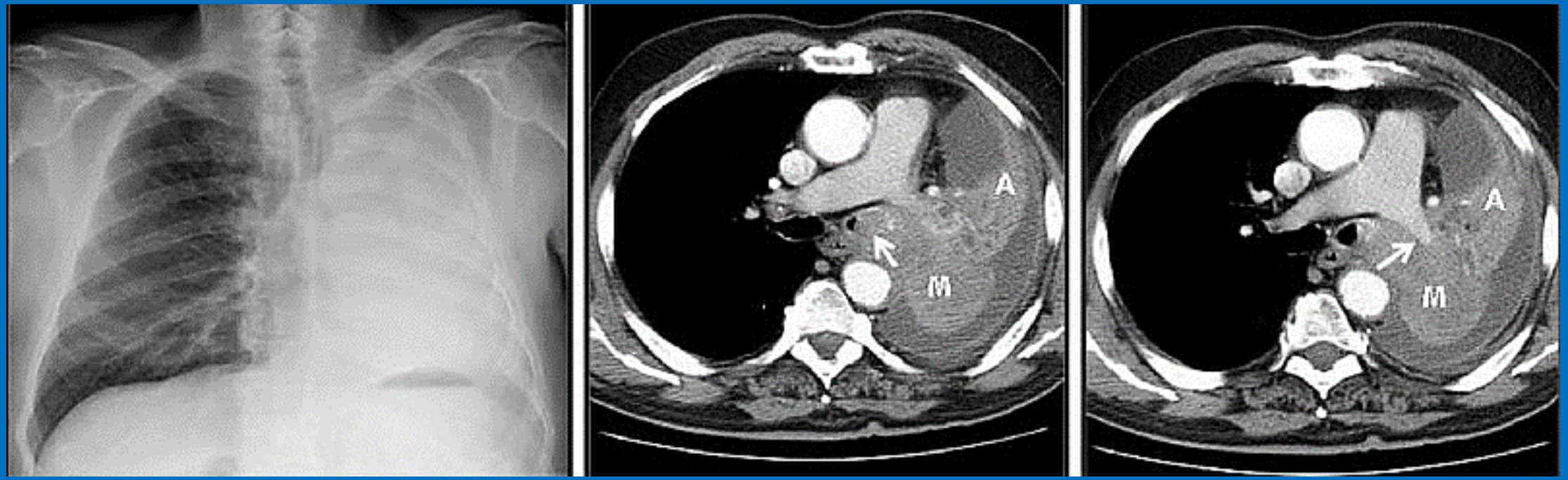
Atelectasis can be sub-categorized by morphology as follows:

- linear(plate, band, discoid, subsegmental) atelectasis
- lobaratelectasis
- Segmentaland subsegment alatelectasis
- Round atelectasis

lung field abnormalities -Atelectasis

Complete atelectasis: Characterized by:

- Opacification of the entire hemithorax
- An ipsilateral shift of the mediastinum.



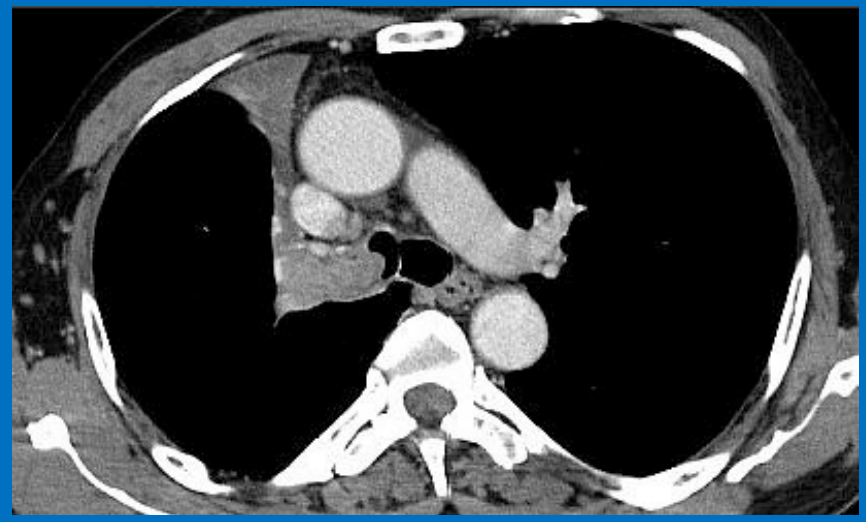
CT: Demonstrates the mediastinal shift to the left and the collapsed left lung (A) surrounded by pleural effusion. A central hilar mass (M) with complete obliteration of the left bronchus and main left pulmonary artery can be noted (arrows)

lung field abnormalities -Atelectasis

Lobar Atelectasis: Right upper lobe collapse:

Increased density in the upper medial aspect of the right hemithorax

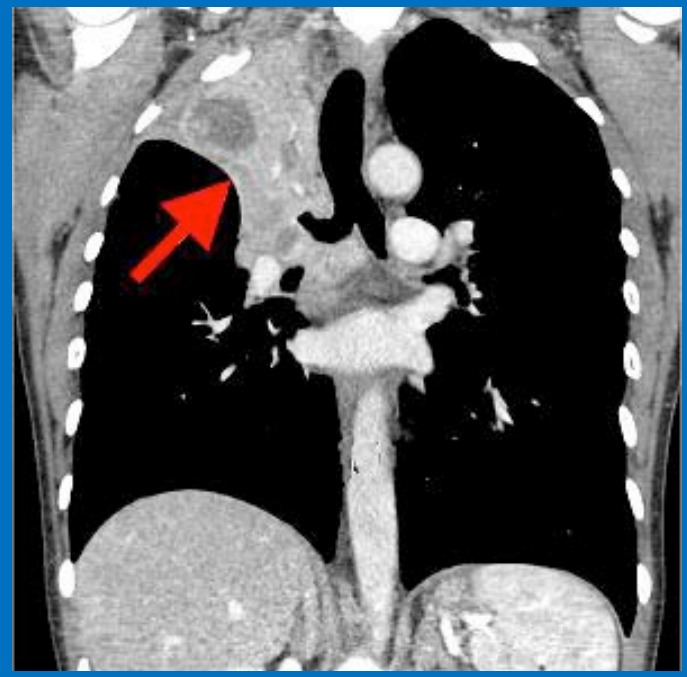
- Appears as a right paratracheal opacity
- Elevation of the minor fissure, appears concave laterally.
- Elevation of the right hilum
- Hyperinflation of the right middle and lower lobe
- Right diaphragmatic tenting (next)
- The Golden S-sign (or reverse S-sign of Golden) (next)
- Non-specific signs :
  - Elevation of the hemidiaphragm
  - Crowding of the right sided ribs
  - Shift of the mediastinum and trachea to the right



Post contrast axial CT scan at the level of the tracheal bifurcation shows a mass obliterating the right upper lobe bronchus and Right upper lobe atelectasis.

Lobar Atelectasis -Right upper lobe collapse

Post-contrast sagittal reformat images in lung window settings show collapse of the right upper lobe with pulling up of the otherwise horizontal minor fissure which now appears concave superiorly



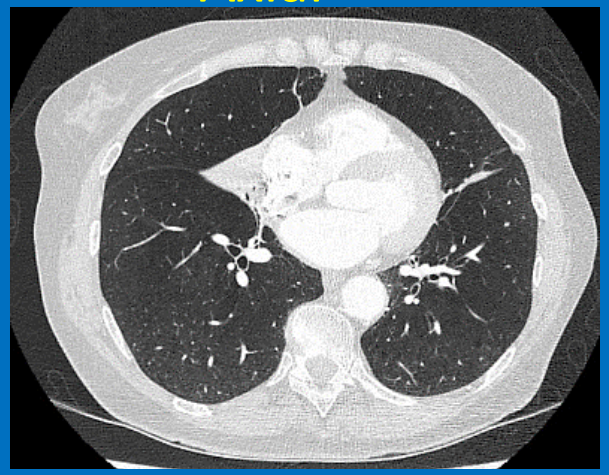
Right upper lobe collapse: Coronal CT reveals the Golden S-sign; a reverse S shaped curve of the horizontal fissure. The supero-lateral concave segment of the S is formed by the elevated horizontal fissure(red arrow). The infero-medial convex segment is formed by the central tumour or lymph node enlargement.

Lung field abnormalities -Atelectasis

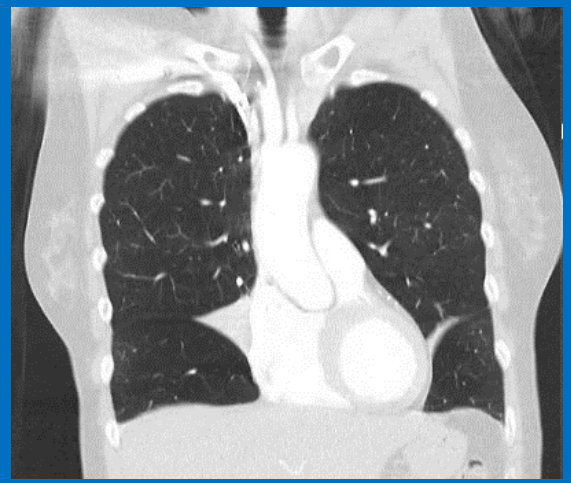
Right middle lobe collapse:

- Axial and coronal images: a triangular opacity along the right heart border, with the apex pointing laterally, is a characteristic finding. This appearance resembles a tilted ice-cream cone.
- Sagittal image: obliquely oriented triangular opacity with apex pointed toward hilum
- Non-specific signs may be subtle or absent due to its small size
- Right middle lobe syndrome are the combination of: right middle lobe collapse and bronchiectasis

Axial



coronal



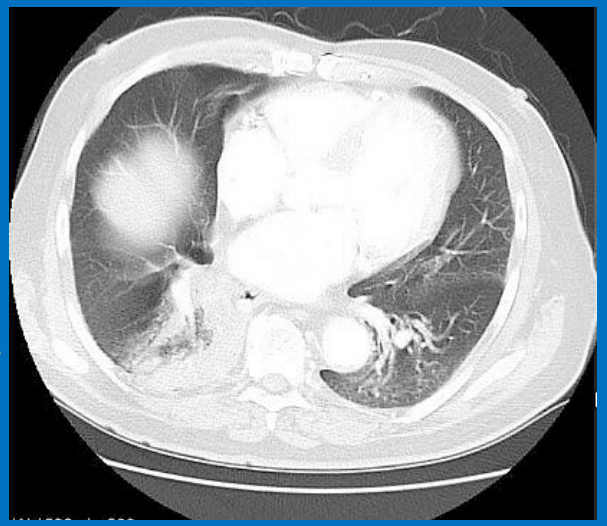
Sagittal

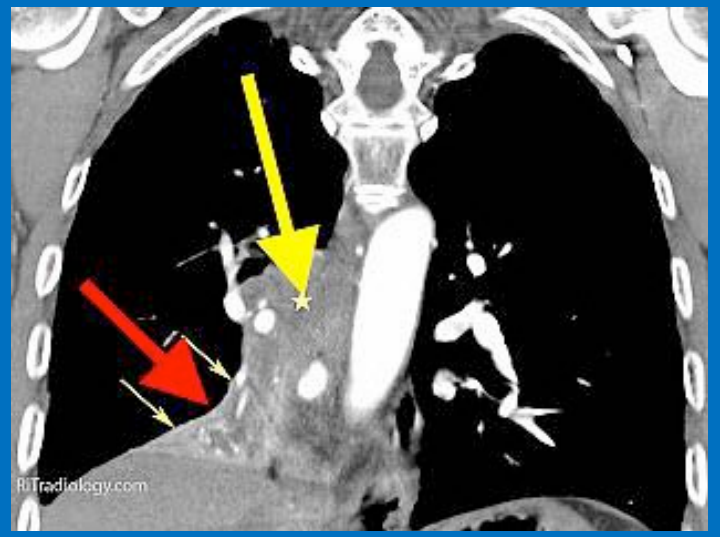
Lung field abnormalities -Atelectasis

Right lower lobe collapse:

- It collapses downwards, posteriorly and medially towards the posterior mediastinum and spine.
- The right hilum is depressed
- Non-specific signs :
  - Elevation of the hemidiaphragm
  - Shift of the mediastinum to right
  - Crowding of the right sided ribs

Right lower lobe collapse: increase density at right lower lobe



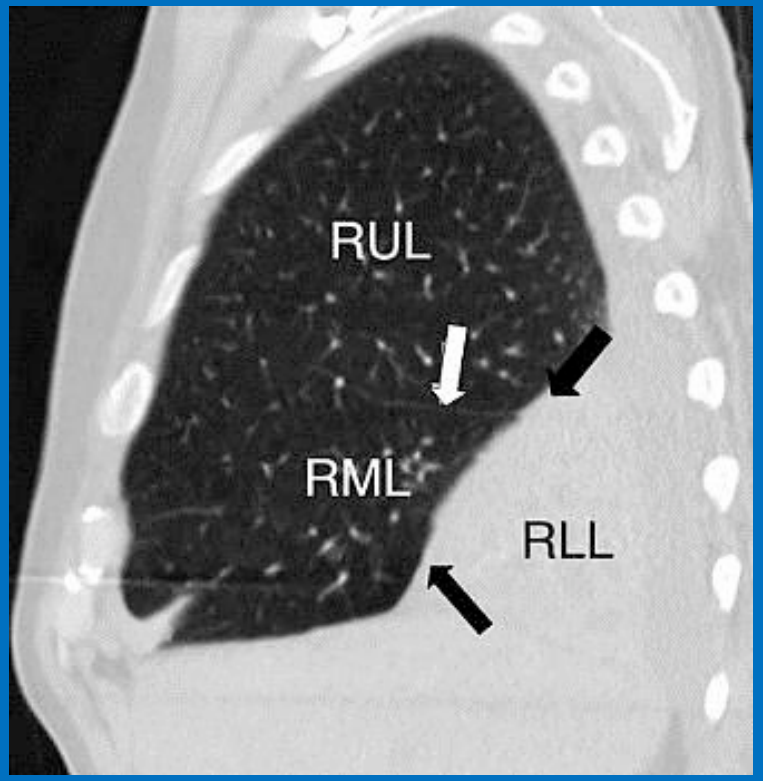


Coronal CT image revealed a large right hilar mass (yellow arrow) resulting in right lower lobe atelectasis(red arrow)

Lobar Atelectasis -Right lower lobe collapse

- On the Sagittal view there is posterior displacement of the oblique fissure.
- There is opacity seen at the level of the ‘mediastinal wedge’, which is the region of the posterior costophrenic sulcus

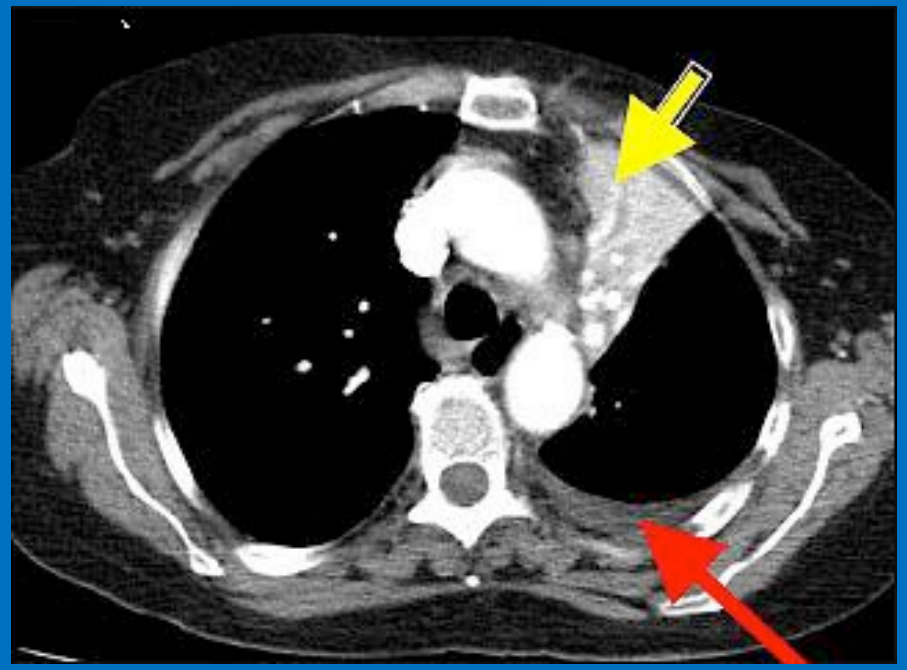
Sagittal reformatted CT image demonstrating that the right lower lobe collapses posteriorly (black arrows). This causes the so called ‘mediastinal wedge’. The horizontal fissure can be seen on the image separating the right upper and middle lobes (white arrow). RLL, right lower lobe; RML, right middle lobe; RUL, right upper lobe.



lung field abnormalities -Atelectasis

Left upper lobe collapse:

- The left upper lobe predominantly lies in the anterior and superior part of the left hemithorax. It collapses medially and anteriorly
- A wedge-shaped triangular opacity, apex at the hilum and base at the chest wall
- Endobronchial obstruction
- Elevation of the left hilum
- Hyperinflation of the left lower lobe
- Non-specific signs :
- Elevation of the hemidiaphragm
- ‘Peaked' or 'tented‘ hemidiaphragm: Juxtaphrenic peak (next)
- Crowding of the left sided ribs
- Shift of the mediastinum to left

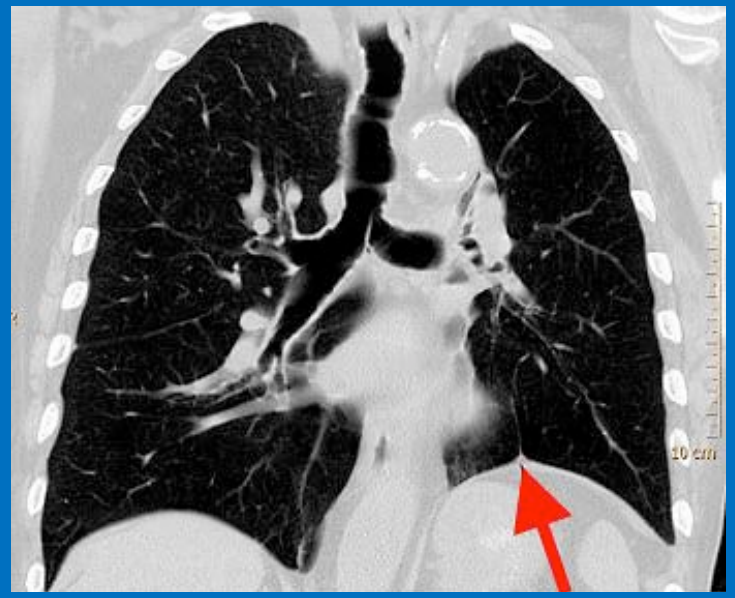


Axial CT slice demonstrating left upper lobe collapse. The collapsed lung is draped over the anterior aspect of the hemithorax (yellow arrow). Note the left pleural effusion in this patient (red arrow)

Lobar Atelectasis -Left upper lobe collapse

Juxtaphrenic peak (Kattan's sign):

- It is a small sharply defined shadow which projects cranially from the medial two thirds of the diaphragmatic surface usually close to the crest of the diaphragm
- commonly seen in upper lobe collapse but may also be seen in middle lobe collapse



Coronal CT image revealed left upper lobe collapse. Juxtaphrenic peak sign (red arrow)

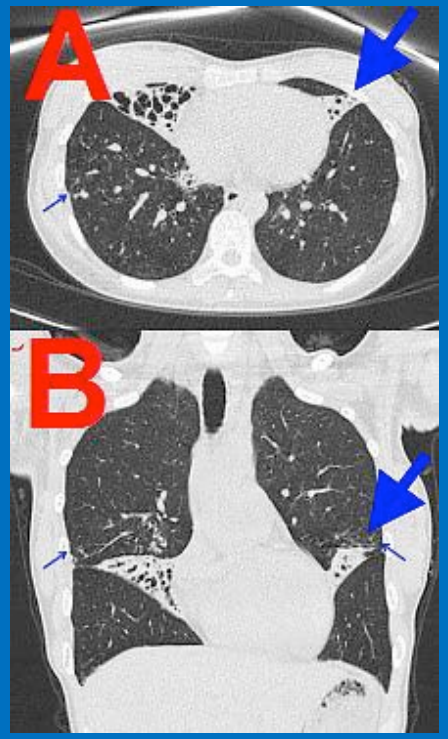
left upper lobe collapse: Coronal CT image revealed triangular opacity with upward displacement of the major fissure (red arrow). Juxtaphrenic peak sign (blue arrow)

Lobar Atelectasis -Left upper lobe collapse

Lingular collapse:

- The lingular segment of the left upper lobe is analogous to the middle lobe
- It does not have its own bronchus, and is therefore commonly collapsed together with the left upper lobe
- The lingual collapses inferiorly and medially

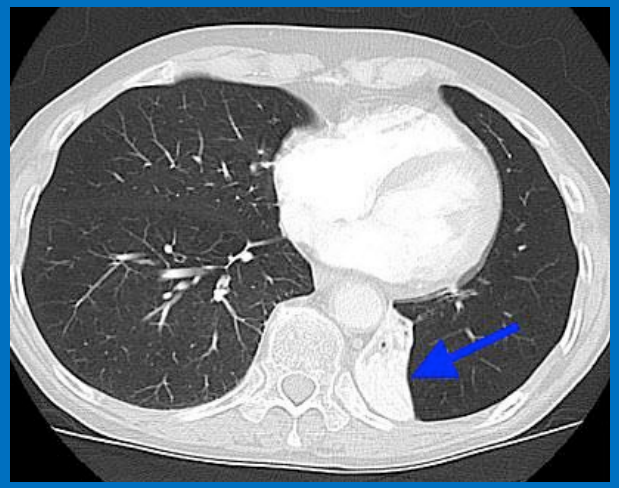
Right middle lobe and lingual distribution of nontuberculous mycobacterial infection. Axial (A) and coronal (B) CT images show advanced cylindrical bronchiectasis and atelectasis of the right middle lobe and lingula in a “Lady Windermere syndrome” distribution.



lung field abnormalities -Atelectasis

Left lower lobe collapse:

- Triangular opacity in the posteromedial aspect of left lung
- left hilum will be depressed
- Non-specific signs indicating left sided atelectasis :
  - Elevation of the hemidiaphragm
  - Crowding of the left sided ribs
  - Shift of the mediastinum to left



Coronal CT reformatted image demonstrating left lower lobe collapse.

Complete collapse of the left lower lobe due to a mucous plug

lung field abnormalities -Atelectasis

Round atelectasis; also known as folded lung or Blesovsky syndrome:

- Causes: asbestosis is the most common cause, pneumoconiosis, exudative pleuritis, tuberculosis, hemothorax, cardiac surgery, in chronically dialyzed patients
- Usually2.5–8 cm peripheral round, ovaor fusiform lesion of soft tissue density, with air bronchogram
- Sub pleural location, acute angle between the mass and the pleura, thickening of adjacent pleura
- Typically found in lower lung lobes, particularly in posterior regions
- The volume of the affected lobe is reduced
- Comet tail sign (next)
- Pleural effusion

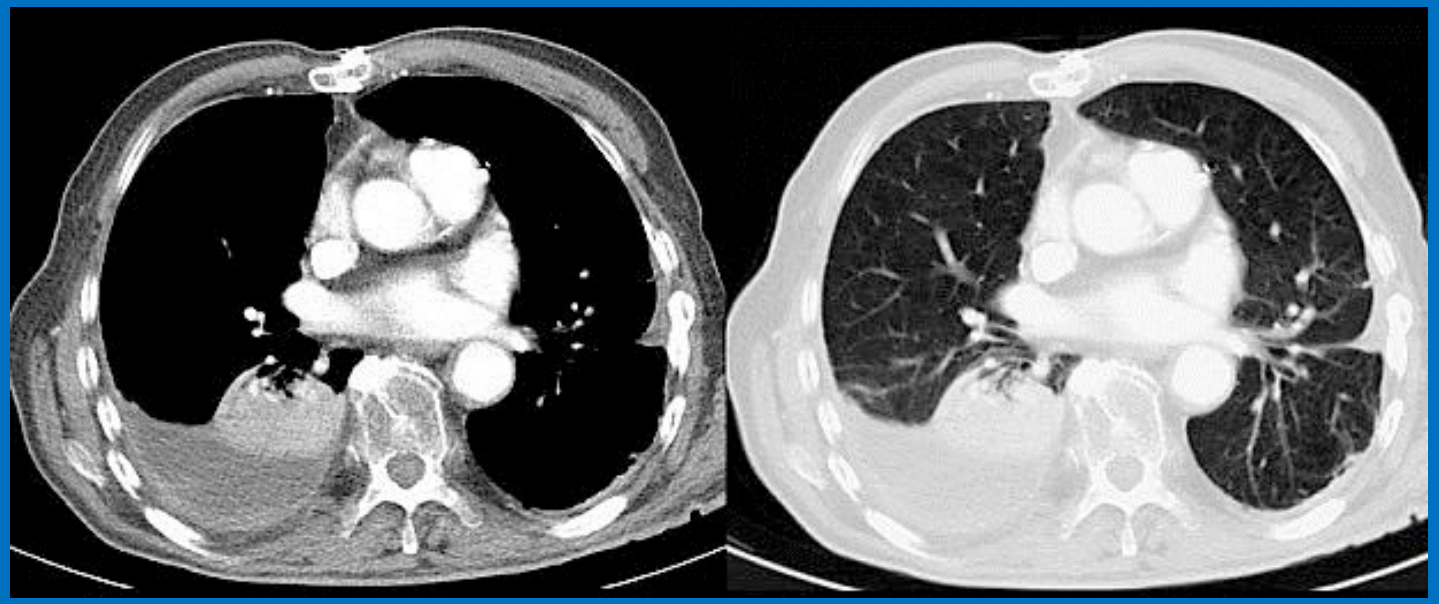
Sagittal projections. Round atelectasis with “comet tail” sign. Displacement of the oblique fissure and reduced volume of the lower lobes.

Atelectasis -Round atelectasis

Comet tail sign:

- Consists of a curvilinear opacity that extends from a subpleural "mass"toward the ipsilateral hilum.
- The bronchovascular bundles appear to be pulled into the mass and resemble a comet tail.
- Adjacent pleural thickening
- On administration of IV contrast, homogenous enhancement is seen. This, however may also be seen in carcinomas and hence cannot be used as a differentiating feature.

Pleural effusion and rounded atelectasis (RA) affecting most of the lower right lobe and adjacent to the distorted and displaced oblique fissure. Air bronchogram in proximal part of RA is also visible

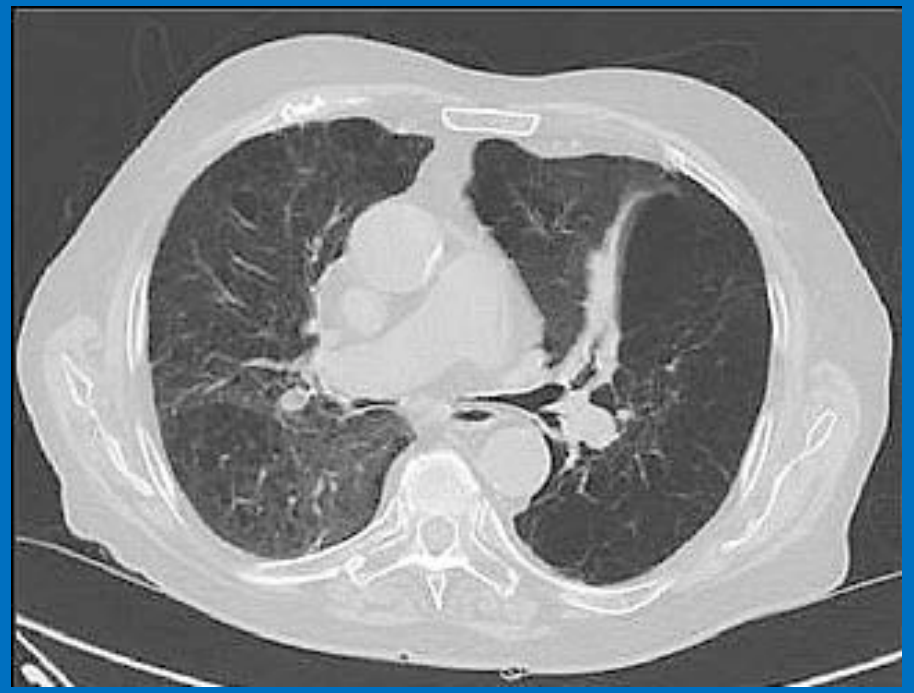


lung field abnormalities -Atelectasis

Segmental atelectasis:

- Collapse of one or several segments of a lung lobe.
- It is a morphological subtype of lung atelectasis.
- Its radiographic appearance can range from being a thin linear to a wedge shaped opacity then does not abut an interlobar fissure.

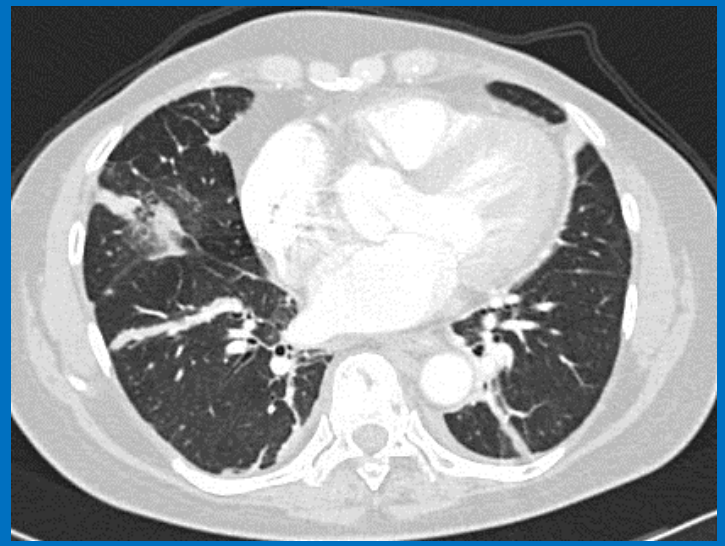
CT: the segmental atelectasis is located within the anterior segment of the left upper lobe. Bronchial wall thickening with partial narrowing of the left upper bronchus and adjacent bullae indicates the compressive nature of the atelectasis.



lung field abnormalities -Atelectasis

Plate-like/ subsegmental /discoid atelectasis:

- Seen in smokers, elderly, after abdominal surgery, patients in the ICU and in pulmonary embolism .
- linear shadows of increased density at the lung bases, usually horizontal, measure 1-3 mm in thickness and are only a few cm long.



Atelectasis; Plate-like consolidations.

lung field abnormalities -Atelectasis

Cicatrisation atelectasis:

- Atelectasis can be the result of fibrosis of lung tissue.
- This is seen after radiotherapy and in chronic infection, especially TB.

Contrast enhanced chest tomography (CECT) scan of chest showing loss of lung volume on left side with lower lobe cicatricial collapse and consolidation with air-bronchogram

lung field abnormalities -Nodules and Masses

A solitary pulmonary nodule:

- Defined as a discrete, well-marginated, rounded opacity less than or equal to 3 cm in diameter that is completely surrounded by lung parenchyma, does not touch the hilum or mediastinum, and is not associated with adenopathy, atelectasis, or pleural effusion.
- Lesions larger than 3 cm are considered masses and are treated as malignancies until proven otherwise.

A 1.5-cmcoin lesion in the left upper lobe in a patient with prior colonic carcinoma. Transthoracic needle biopsy findings confirmed this to be a metastatic deposit

Nodules and Masses-solitary pulmonary nodule

Differential diagnosis:

Neoplastic

Malignant

- Bronchogenic carcinoma
- Solitary metastasis
- Lymphoma
- Carcinoid tumours
- Sarcoma

Benign

- Pulmonary hamartoma
- Pulmonary chondroma

Inflammatory

- Granuloma (e.g. TB)
- lung abscess
- Rheumatoid nodule
- Plasma cell granuloma
- Round pneumonia

Congenital

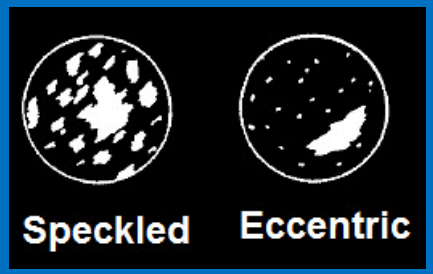
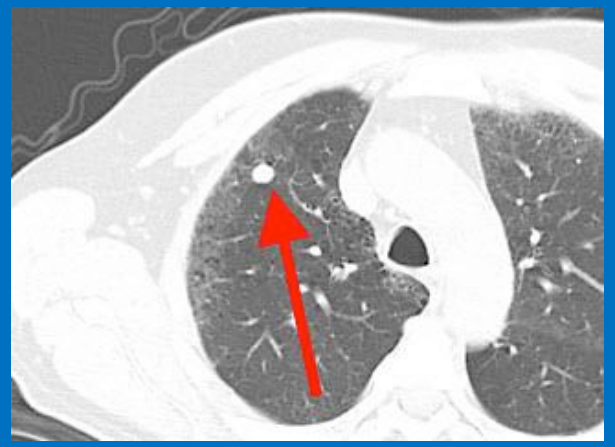
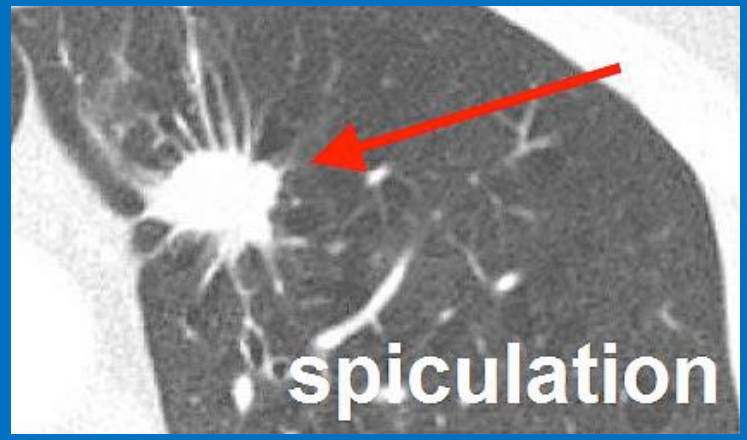
- Arteriovenous malformation
- Lung cyst and Intrapulmonary Bronchogenic Cyst
- Bronchial atresia with mucoid impaction

Miscellaneous

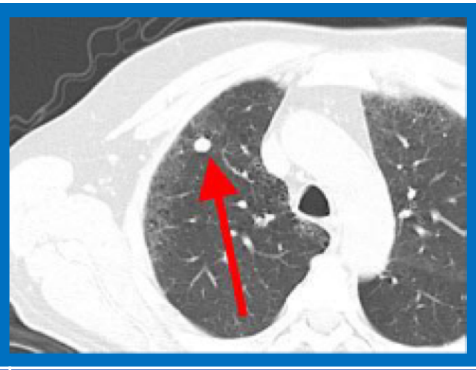
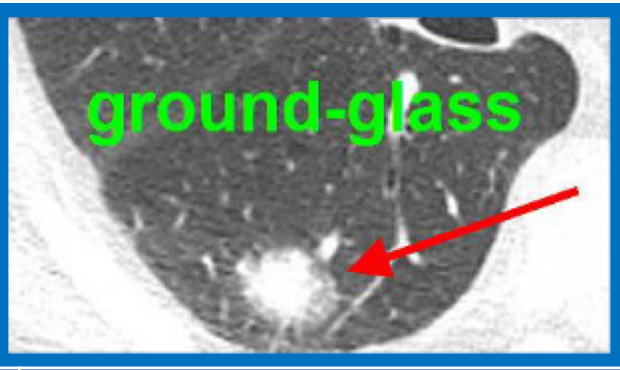
- Hydatidcyst
- Pulmonary infarct
- Intrapulmonary lymph node
- Mucoidimpaction
- Pulmonary haematoma
- Pulmonary amyloidosis
- Fungal infection
- Atelectasis
- Wegener granulomatosis

lung field abnormalities -Nodules and Masses

Solitary pulmonary nodule: benign versus malignant:

Feature	Suggests Benign nodule	Suggests Malignant nodule
Calcification		
Size	< 5 mm	> 10 mm
Margin	well-defined, Smooth 	Irregular, lobulated or spiculated 
Cavitation	thin, smooth wall	thick, irregular walls

Solitary pulmonary nodule: benign versus malignant

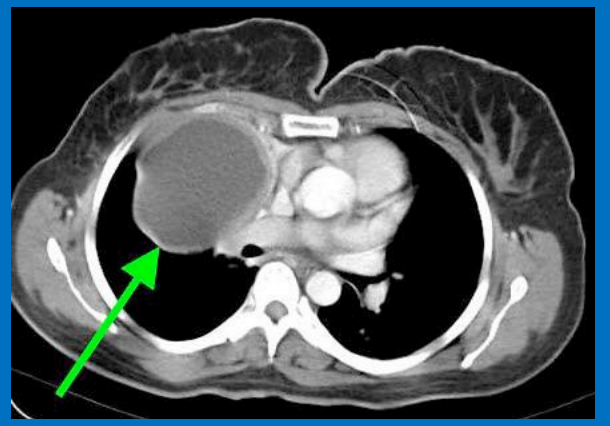
Feature	Suggests Benign nodule	Suggests Malignant nodule
Density	Dense, Solid	Nonsolid, ground-glass
		
Growth	less than one month or more than months, or remains the same size for 2 years	Doubles in 1-18months (average 4-8 months)
Contrast enhancement	absence of significant lung nodule enhancement (≤15 HU)	enhance more than 20 HU
Positron emission tomography (PET) / CT	low or no fluorine 18 (18F)–labeled fluorodeoxyglucose (FDG) uptake at PET/CT suggest benignity	

lung field abnormalities -Nodules and Masses

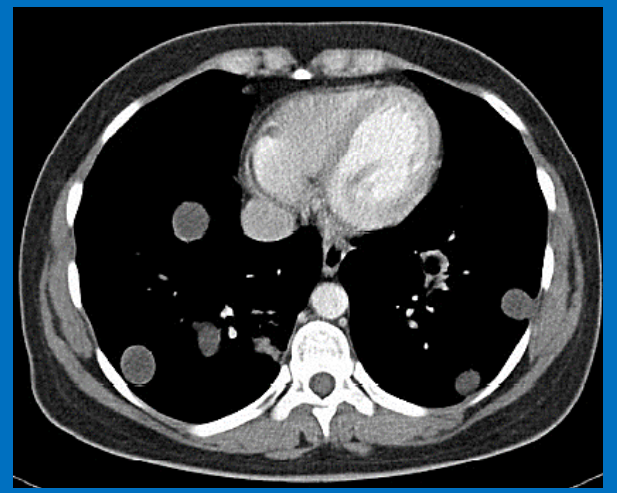
A. Uncomplicated cysts:

- well-circumscribed
- fluid attenuation lesions
- homogenous content
- hypodense content and smooth, hyperdense walls
- enhancement after contrast injection

Hydatid Cyst:
Large cyst with thick wall is seen at right upper lobe



Hydatid Cysts:
multiple hydatid cysts in both lungs as well-demarcated cystic masses

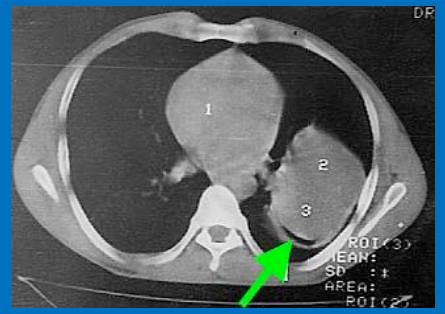


Nodules and Masses –Hydatid Cyst

1. Meniscus sign or air crescent sign: crescents of air between the pericyst and the endocyst due to Bronchial erosion
2. “Inverse crescent sign”: air crescents along the posterior aspect of lesion
3. Cumbosign or onion peel sign: air lining between the endocyst and pericyst has the appearance of an onion peel

Air crescent sign

Inverse crescent sign

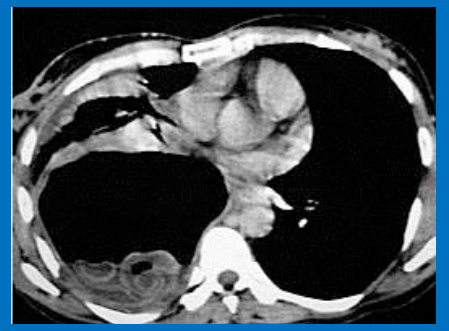


Cumbo sign: Double air arc

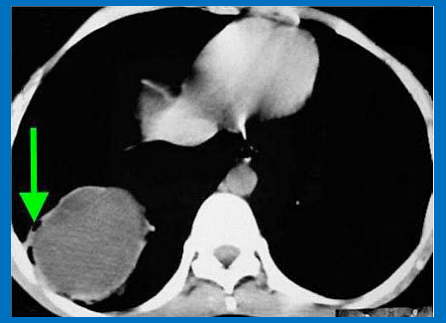
Nodules and Masses –Hydatid Cyst-Complicated cysts

4. “Whirl” or the “serpent sign”: collapsed membranes After expectoration of cyst fluid
5.“Air bubble sign”: Small intracystic air foci can be seen at the periphery of cyst
6.“Water lily sign”: With complete collapse, the crumpled endocyst appears as a wavy membrane floating on fluid

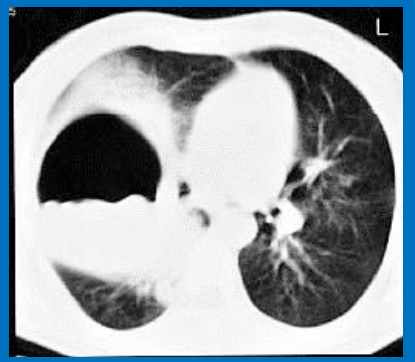
Whirl sign: air and fluid with multiple curvilinear hyperattenuating membranes in dependant part



Air bubble sign



Water lily or Camelot sign

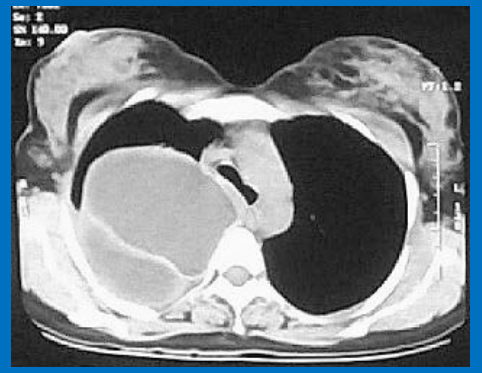


Nodules and Masses –Hydatid Cyst-Complicated cysts

7. “Empty cyst sign”: cyst after complete expectoration of fluid and membranes
8. “Ring enhancement sign”: Increases in the cyst wall thickness with enhancement due to infection
9. Consolidation adjacent to the cyst (ruptured cyst)
10. Other less common thoracic hydatid manifestations include: invasion of the mediastinum, pericardium, chest wall, cardiovascular system, or inferior vena cava

Empty cyst sign

Ring enhancement sign



An infected cavitary lesion with adjacent parenchymal consolidation

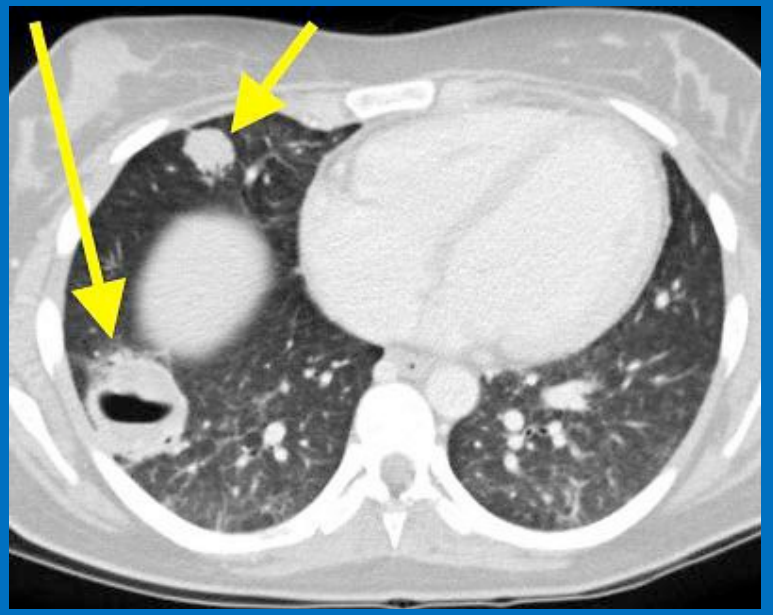
lung field abnormalities -Nodules and Masses

A Pulmonary mass:

An area of pulmonary opacification that measures more than 3 cm. The commonest cause for a pulmonary mass is lung cancer.

Other causes :

- Hyperdense pulmonary mass: (a pulmonary mass with internal calcification)
- Cavitating pulmonary mass (Pulmonary cavity) : (gas-filled areas of the lung in the center of the mass. They are typically thick walled and their walls must be greater than 2-5 mm. They may be filled with air as well as fluid and may also demonstrate air-fluid levels).



Two Lesions, the larger of the two having a large central cavity and air-fluid level

lung field abnormalities -Nodules and Masses

Hyperdense pulmonary mass: They include:

- Granuloma: most common
- Pulmonary hamartoma
- Bronchogenic carcinoma
- Carcinoidtumours
- Pulmonary metastases
- Bronchogeniccyst
- Dystrophic calcification:
  - Papillary thyroid carcinoma
  - Giant cell tumourof bone
  - Synovial sarcoma
  - Treated pulmonary metastases
- Bone forming / cartilage mineralisation:
  - Osteosarcoma
  - Chondrosarcoma

Pulmonary hamartoma. A well defined lobulated soft tissue mass occupying the anterior basal segment of left lower lobe and shows popcorn calcification and no significant enhancement. No fat could be identified within the lesion.

lung field abnormalities -Cavities

Pulmonary cavities :

- Are gas-filled areas of the lung in the center of a nodule, mass or area of consolidation.
- They are typically thick walled and their walls must be greater than 2-5 mm.
- They may be filled with air as well as fluid and may also demonstrate air-fluid levels.

pulmonary tuberculosis. Cavitating lesion with air-fluid level, in the left upper lobe with widespread patchy, linear and nodular opacities (tree in bud appearance) along with consolidation.

lung field abnormalities -Cavities

Pulmonary cavities : A helpful mnemonic is CAVITY:

C: cancer

- Bronchogenic carcinoma: (especially squamous cell carcinoma)
- Cavitatory metastasis (es):
- Squamous cell carcinoma
- Adenocarcinoma, e.g. gastrointestinal tract, breast
- Sarcoma

A: autoimmune; granulomas:

- Wegener's granulomatosis
- Rheumatoid nodules.

V: vascular (both bland and septipulmonary embolus)

I: infection (bacterial/fungal)

- Pulmonary abscess
- Cavitating pneumonia
- Pulmonary tuberculosis
- Septic pulmonary emboli

T: trauma -pneumatocoeles

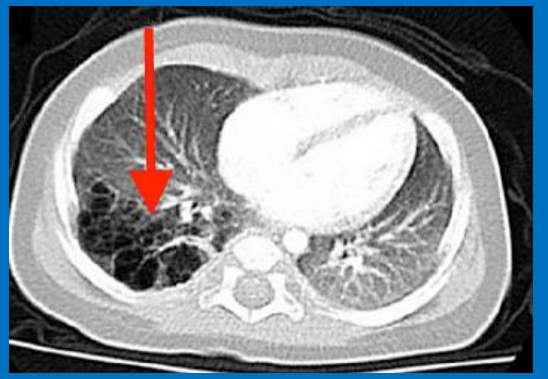
Y: youth (not true "cavity")

- Congenital cystic adenomatoid malformation (CCAM)
- Pulmonary sequestration
- Bronchogenic cyst

lung field abnormalities -Cavities

Congenital pulmonary airway malformations (CPAM) or (CCAM):

- **Classified by CT as:**
  - Type I(large (2-10 cm)variable cysts with at least one dominant cyst) and II(smaller(< 2 cm) uniform cysts) CCAM demonstrate a multicystic (air-filled) lesion.
  - Type III (microcysts) CCAM: Least common types, can appear as a consolidation.
- **The cysts** may be completely or partially fluid filled, in which case the lesion may appear solidor with air fluid levels.
- **Large lesions** may cause mass effect with resultant, mediastinal shift, and depression and even inversion of the diaphragm.



Type II CPAM: several small cysts (arrow) in the right lower lobe.

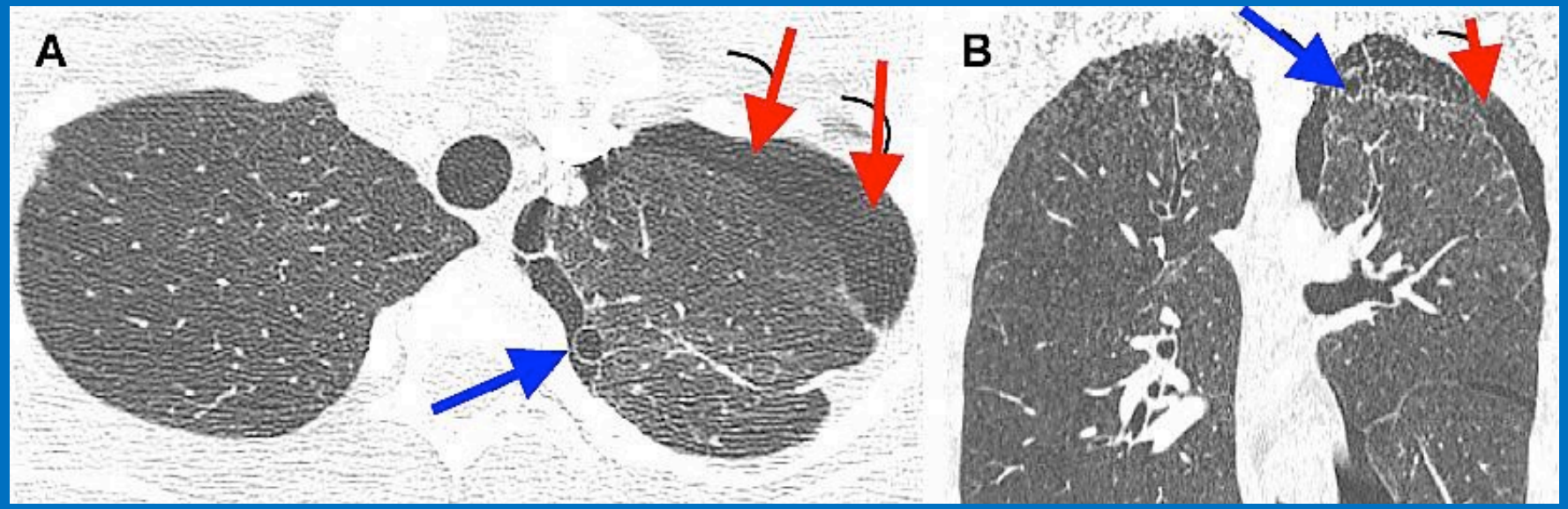
Type I CPAM: air-filled, thin-walled spaces of varying size.

Pleural disease -Pneumothorax

Pneumothorax;

HRCT benefits:

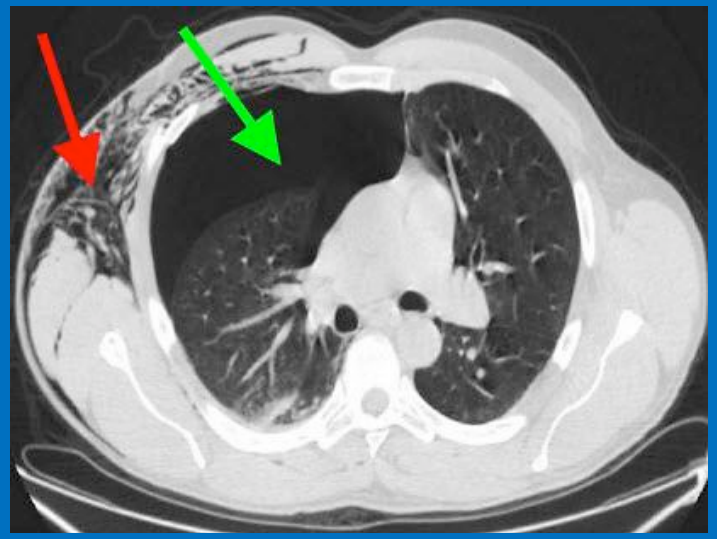
1. CT is the most reliable imaging study for the diagnosis, but it is not recommended for routine use
2. Confirm the diagnosis of pneumothorax in mechanically ventilated patients
3. Detect underlying emphysema, parenchymal and pleural diseases



Moderate left-sided pneumothorax. (A) Axial and (B) coronal CT demonstrating subpleural blebs (blue arrow). Red arrows indicate pneumothorax

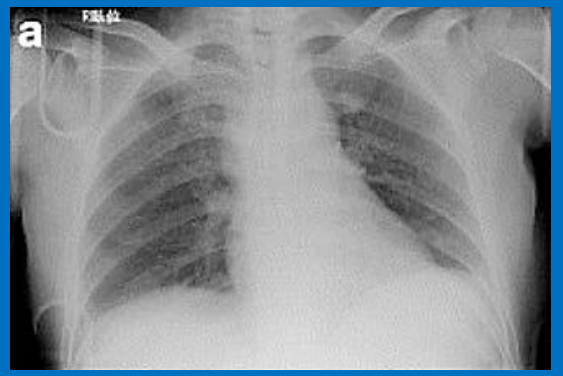
Pleural disease –Pneumothorax -HRCT benefits

4. Determine the exact size of the pneumothorax
5. Detect occult(a pneumothorax that is seen only on CT and not a conventional chest x-ray) pneumothoraces, blebs, bullae, cysts and pneumomediastinum

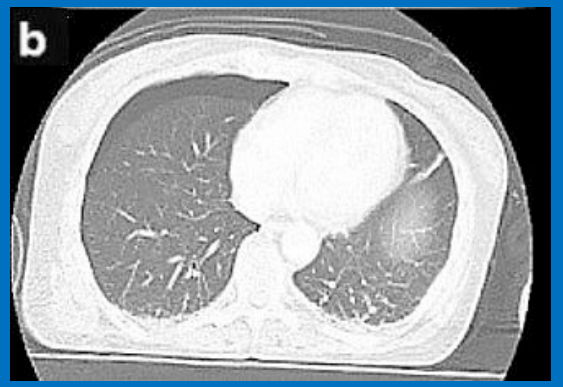


Tension pneumothorax (green arrow) and subcutaneous emphysema (red arrow). CT shows increased volume of the right hemithorax, reduction of ipsilateral pulmonary volume and shifts the mediastinum to the left

Anteroposterior supine radiograph shows no abnormality.



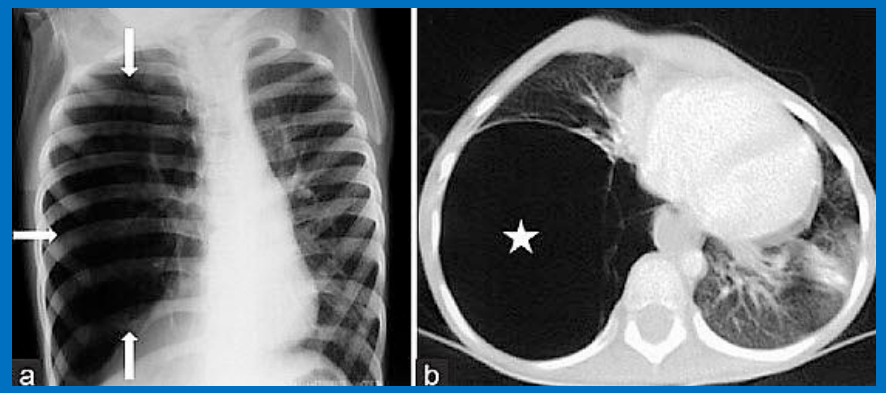
CT scan shows the existence of an occult pneumothorax on the right side.



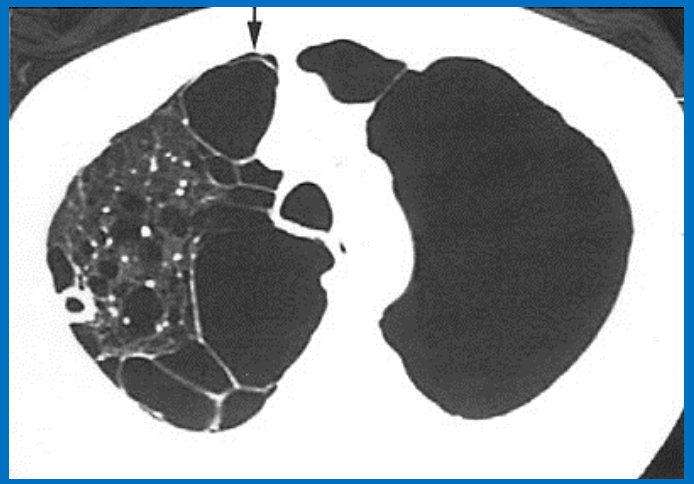
Pleural disease – Pneumothorax - HRCT benefits

6. Distinguish between a large bulla and a pneumothorax

7. "Double wall" sign described in cases with ruptured bulla causing pneumothorax (air outlining both sides of the bulla wall parallel to the chest wall).



Chest radiograph shows unilateral hyperlucency affecting the entire right lung (white arrows). (b) CT demonstrates a large bulla (star) on the right side causing considerable compression of the mediastinum

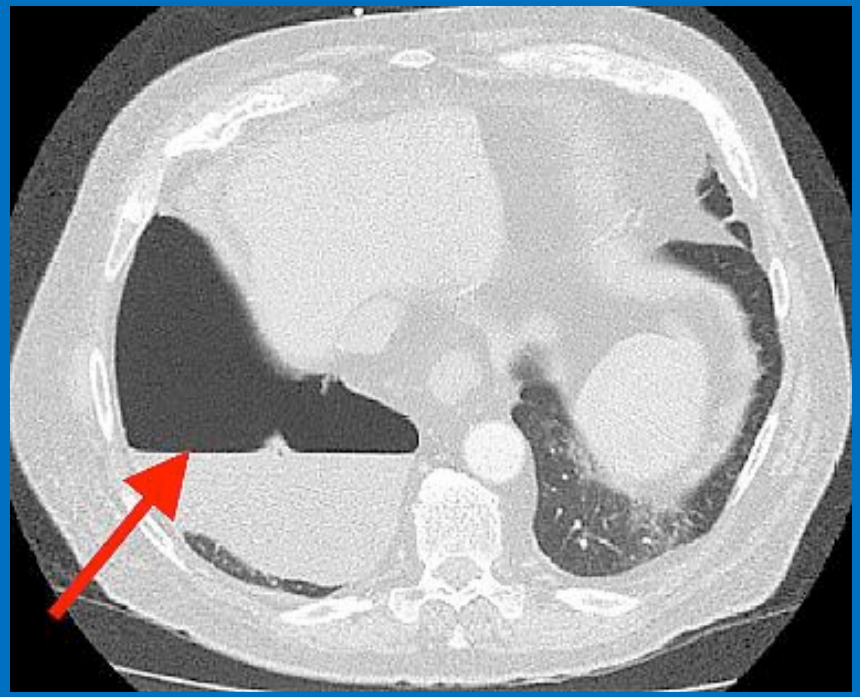


CT shows large asymmetric upper lobe bullae. Chest tube is located peripherally in right pleural space. Note presence of air in pleural space surrounding anterior bulla on right (arrow) and parallel configuration of bulla wall with chest wall. This is double-wall sign of pneumothorax.

Pleural disease –Pneumothorax

Hydropneumothorax:

- The concurrent presence of both free fluid and air within the pleural space
- It can occur secondary to various situations such as thoracocentesis, thoracic trauma, esophagopleural fistula, neoplastic processes, post-traumatic, post-pneumonectomy, infection, pulmonary infarction, cystic lung disease, obstructive lung disease or bronchopleural fistula.
- CT depicts hydropneumothorax, with the horizontal air fluid interface



Axial contrast CT image demonstrates a right-sided hydropneumothorax. Note the air and fluid interface (arrow).

Pleural disease -Pleural thickening

Pleural thickening; It is classified according to :

1.Aetiology:

Benign (greater than 5 cm in width, 8 cm in craniocaudal extent, and 3 mm in thickness):

>Recurrent inflammation

> Recurrent pneumothoraces

> Following a pleural empyema

> Complication of haemothorax

> Asbestosis & silicosis

Malignant (nodular (>1 cm),shows circumferential involvement, and involves the mediastinal pleura):

> Primary pleural malignancy

> Mesothelioma

> Primary pleural lymphoma

> Pleural metastases

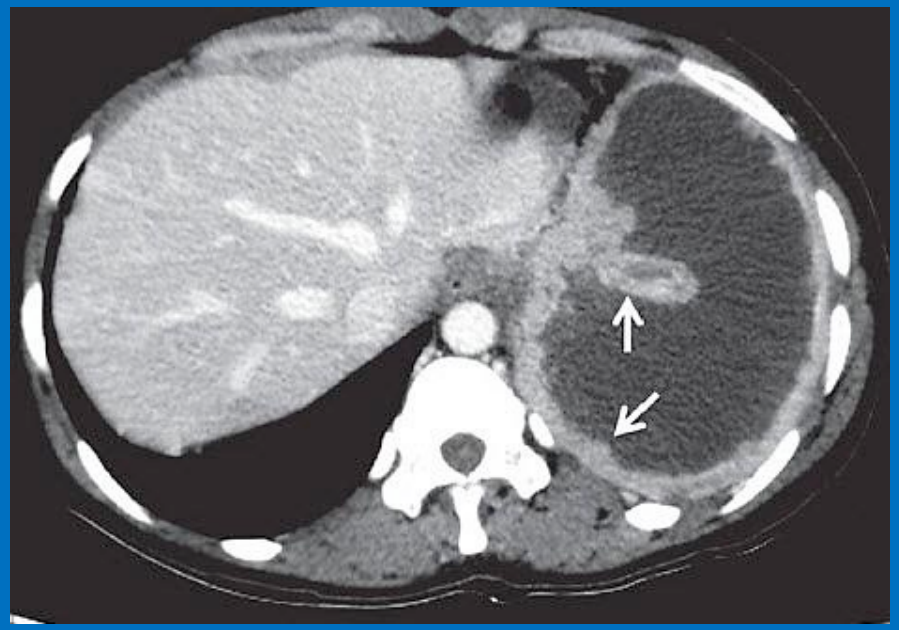
> Secondary pleural lymphoma

2.Morphology:

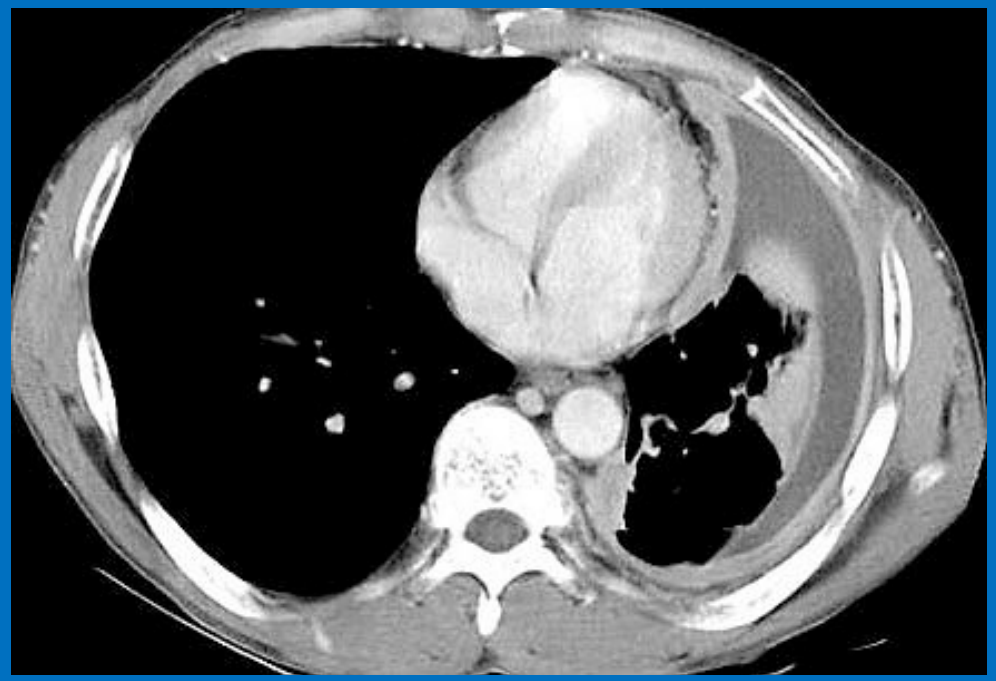
> focal/pleural plaques(more than 5 mm)

> Diffuse (involvement more than 25% of chest wall if bilateral and 50% if unilateral)

Pleural disease -Pleural thickening



Pleural metastases: Axial **contrast-enhanced** CT scan showing **nodular pleural thickening**(arrows) involving the **costal** and **mediastinal** pleura with malignant **pleural effusion** in a case of **metastatic ovarian adenocarcinoma**

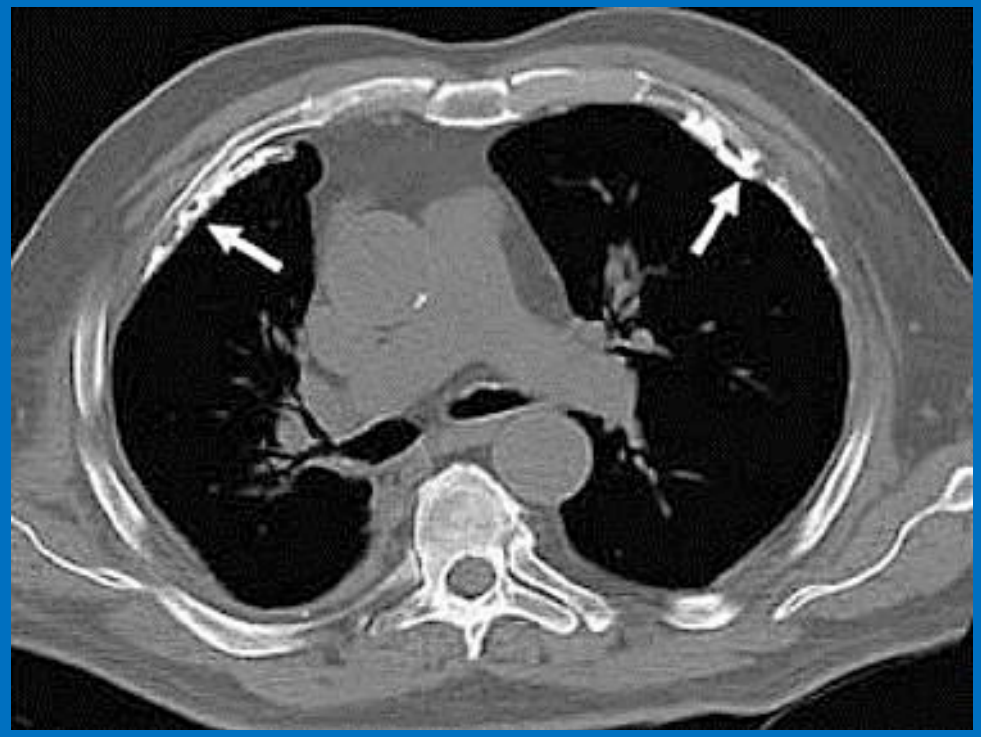


Tuberculous Pleural Effusion: CT scan with intravenous **contrast enhancement** shows **loculated pleural fluid**, **thickening** and **enhancement** of left pleura**, extrapleural fat** proliferation.

Pleural disease -Pleural thickening

Asbestos related pleural plaques:

- Defined as variable-size localized pleural thickenings of soft tissue, or calcific densities attached along the pleura of the chest wall, diaphragm, and mediastinum on the CT scans.
- Most pleural plaques are multiple, bilateral, and often symmetrical
- Located in the mid-portion of the chest wall, adjacent to ribs, involving sixth to ninth ribs

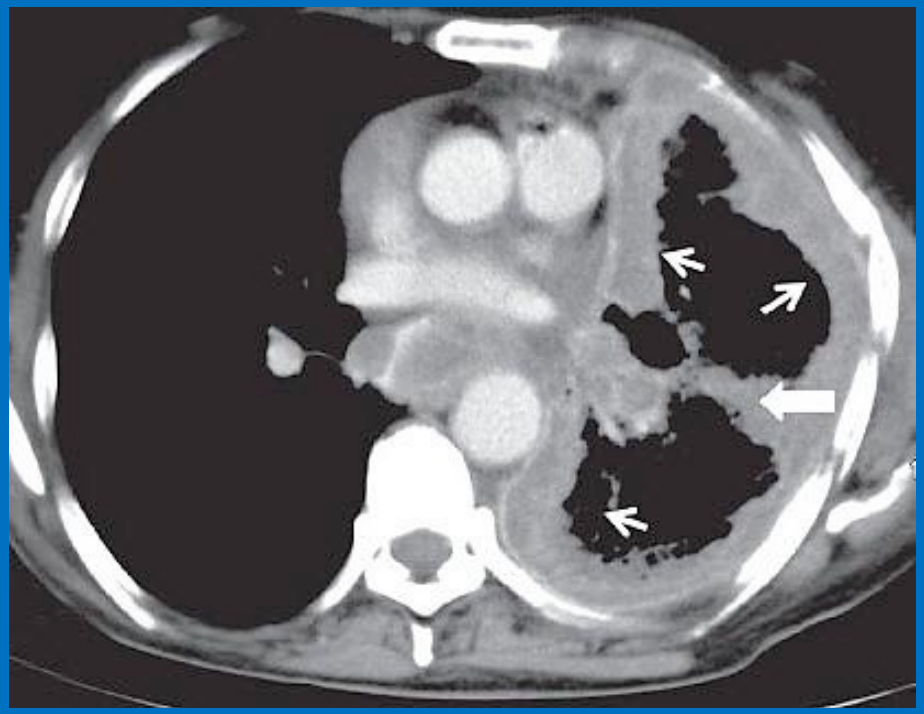


Non–contrast-enhanced computed tomography (CT) of the chest shows pleural thickening and extensively calcified pleural plaques bilaterally (arrows).

Pleural disease -Pleural thickening

Mesothelioma:

- The appearance is that of a soft tissue attenuation nodular mass which spreads along pleural surfaces including into pleural fissures and often creating a pleural rind.
- Diffuse nodular pleural thickening, pleural plaques, and pleural effusion
- Large pleural effusion without mediastinal shift may also be seen
- Calcifications are seen involving the diaphragmatic parietal pleura
- Unresectability includes encasement of diaphragm and involvement of extrapleural fat, ribs, or other mediastinal structures



Malignant mesothelioma: Axial contrast-enhanced CT scan showing enhancing nodular pleural thickening(arrows) involving the costal and mediastinal pleura, extending into the major fissure (arrowhead) with crowding of ribs suggestive of volume loss changes in left hemithorax

Pleural disease -Pleural thickening

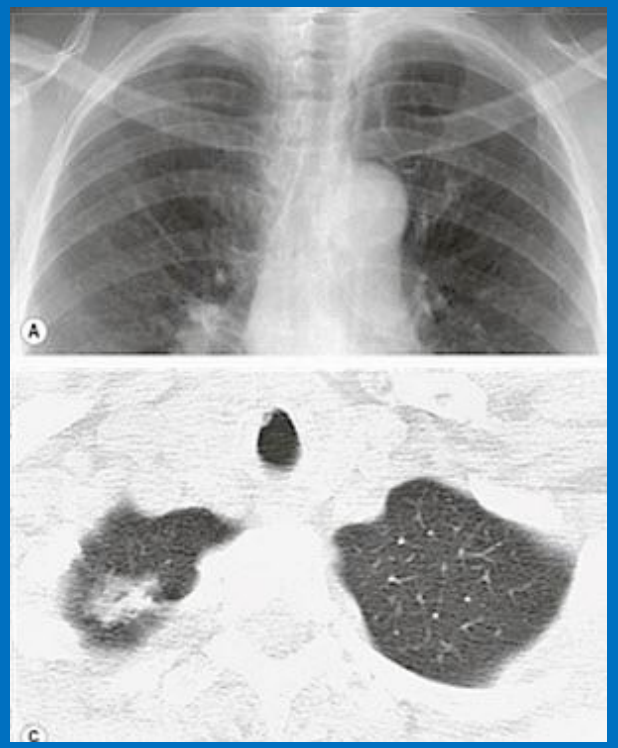
Apical pleural cap:
it is an irregular density, usually less than 5 mm thick, but the width is variable, located over the lung apex. Compared with tumors, idiopathic caps are much smaller in craniocaudal than in axial dimensions

Causes:

- Pleural thickening/scarring
  - Idiopathic: common feature of advancing age
  - Tuberculosis, mycetoma
  - Radiation fibrosis
- Pancoast tumour
- Haematoma
- Lymphoma
- Abscess
- Metastases
- Extrapleural fat.

Apical pleural scar. A, Chest radiograph shows asymmetric soft tissue thickening at the right apex.

C, CT shows irregular subpleural density, with speculation mimicking lung cancer.

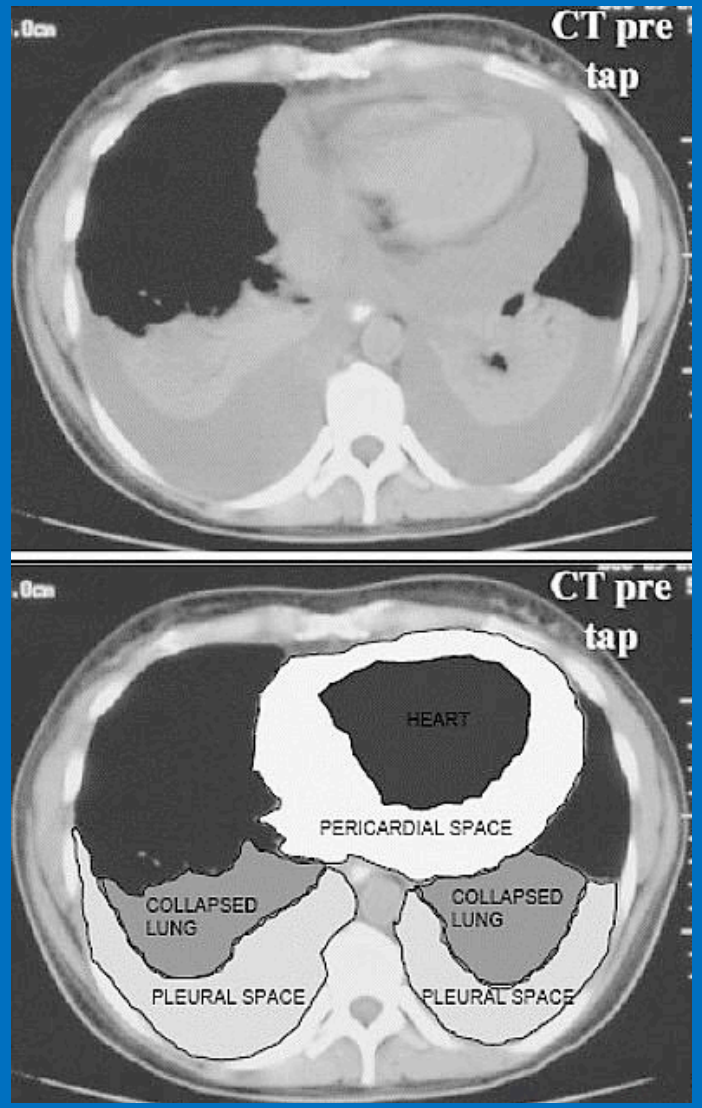


Pleural disease -Pleural effusion

Pleural effusion is an abnormal collection of fluid in the pleural space. Fluid may be (Transudate, Exudate, Pus, Blood, Chyle, Cholesterol, Urine)

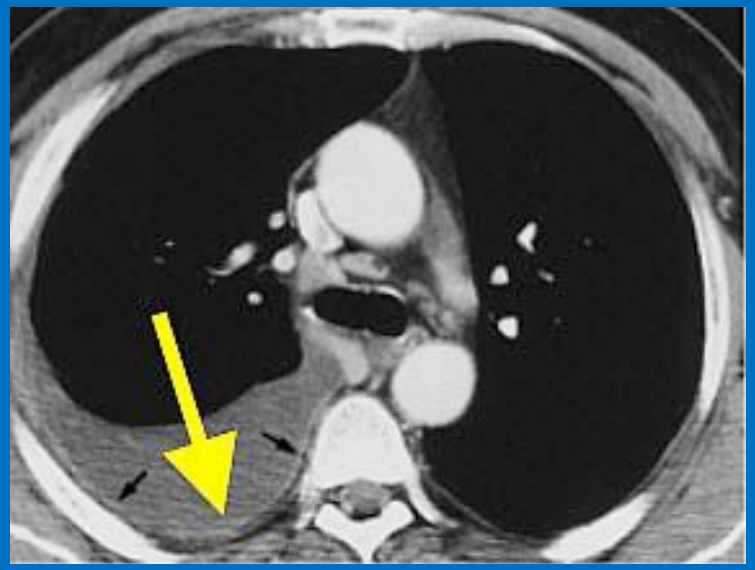
Indications of CT in effusions:

1. Assessment of pleural disease
2. Detect small effusions
3. Assesses mediastinum, lung parenchyma
4. Diagnose empyema
5. Distinguish lung abscess from empyema
6. Differentiate between benign and malignant pleural thickening
7. Size can be measured roughly as: < 20%, 20% to 40%, and > 40% of the hemithorax for small, moderate, and large effusions, respectively

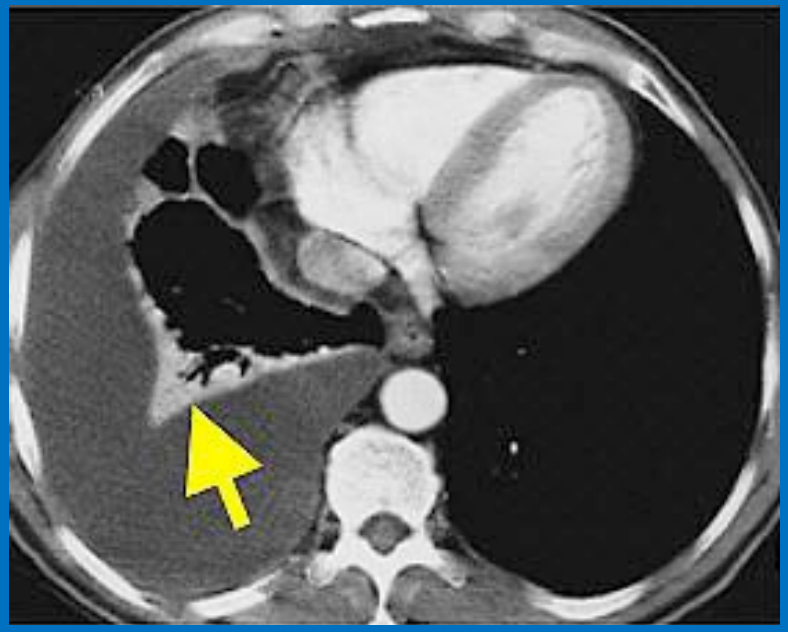


Pleural disease -Pleural effusion

- Pleural effusion gives a homogeneous crescentic opacity in the most dependent part of the pleural cavity, usually in the midthorax
- The lower CT attenuation of pleural fluid usually allows distinction from dependent atelectasis, pleural thickening, and masses



Contrast-enhanced CT shows Aright-sided effusion, associated with mild thickening and enhancement of the parietal pleura (arrow) and minimally enlarged mediastinal nodes. these findings indicate an exudative effusion

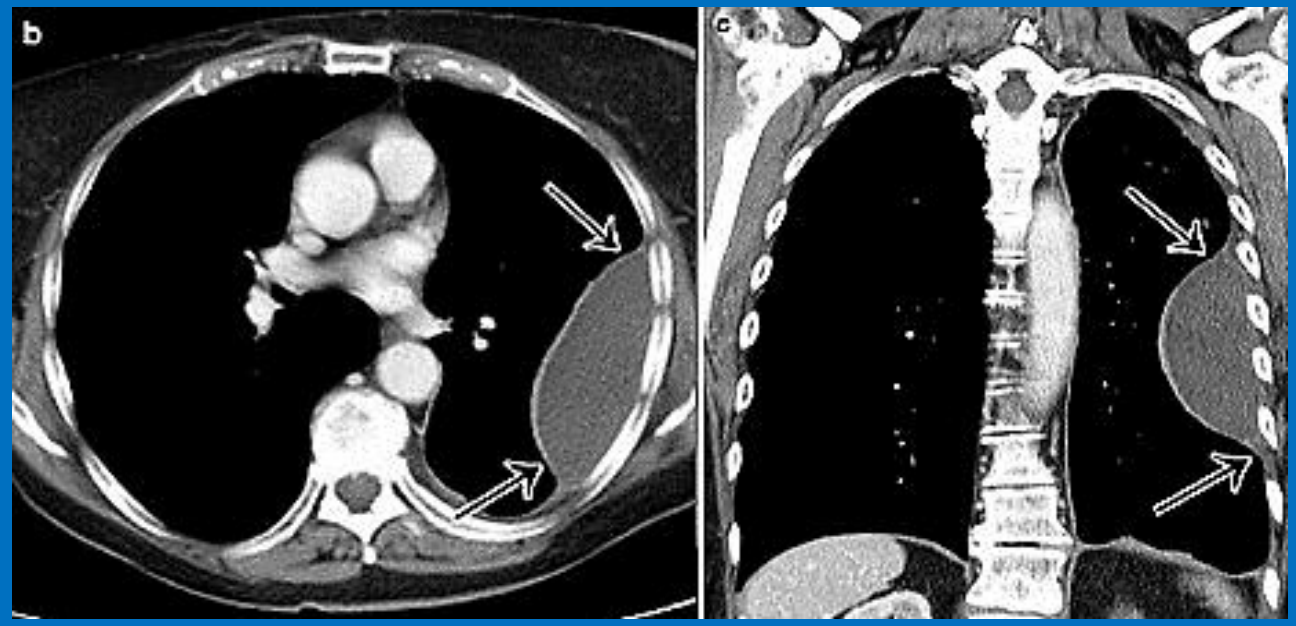


Contrast-enhanced CT shows a larger effusion causing marked compression atelectasis of the right lower lobe (arrow). Note lack of enhancement of the pleural surfaces, consistent with a transudative effusion

Pleural disease -Pleural effusion

Loculated pleural effusion:

- In the setting of pleuritis, loculation of fluid may occur within the fissures or between the pleural layers (visceral and parietal).
- Loculation commonly occurs with exudative fluid, blood and pus.

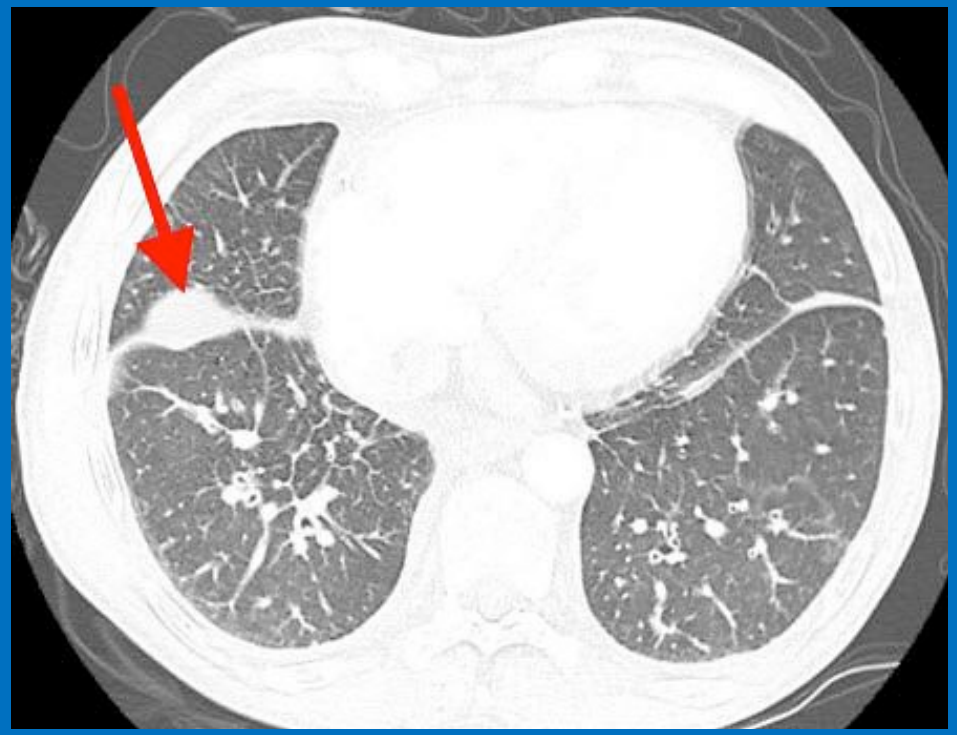


Axial (left) and coronal (right) images demonstrate clearly the loculated pleural effusion(arrows)

Pleural disease -Pleural effusion –Loculated effusion

Encysted (encapsulated) pleural effusion in the fissure:

- Loculated effusion in the fissures appears as a well-defined elliptical opacity with pointed margins.
- Pseudotumor/vanishing tumor (phantom tumor): Loculated effusion in the fissures , secondary to congestive heart failure, hypoalbuminemia, renal insufficiency or pleuritis. Radiologically simulating a neoplasm. It disappears rapidly in response to the treatment of the underlying disorder.

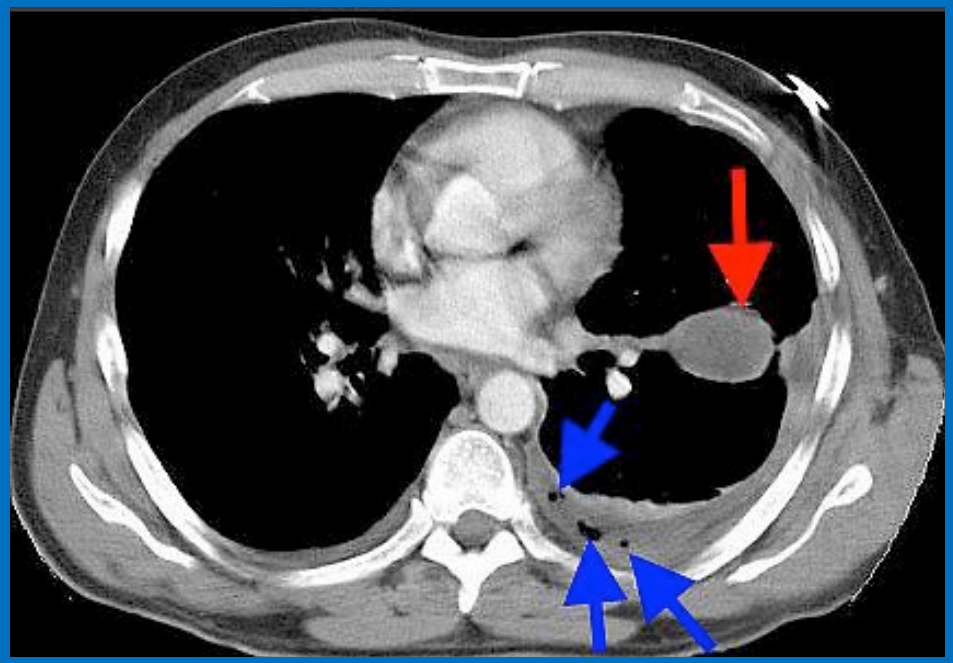


CT of the chest demonstrates cardiomegaly and extensive smooth interlobular septal thickening consistent with congestive cardiac failure. There is focal fissural fluid collection (arrow), so called pseudotumours.

Pleural disease -Pleural effusion

Empyema: Features suggestive of an empyema include:
Empyema: Contrast-enhanced axial CT scan; loculated fluid in the left major fissure, a pseudotumor (red arrow). Gas bubbles are present (blue arrows).

- Typically appear lenticular with a smooth wall, conform to the shape of the chest wall, and, if large, cause compression of the lung
- Obvious septations
- Pleural thickening
- Gas bubbles in the pleura
- Loculations in fissures, septa
- Adjacent consolidation or abscess or lymphadenopathy
- Empyema necessitates: empyema extending into the chest wall.
- Enhanced CT demonstrate the split-pleura sign; i.e. it is contrast-enhanced thickened visceral and parietal pleura separated by fluid

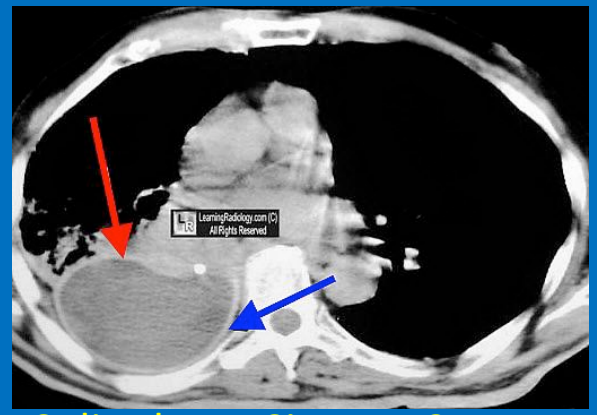


Empyema: Contrast-enhanced axial CT scan; loculated fluid in the left major fissure, a pseudotumor (red arrow). Gas bubbles are present (blue arrows).

Pleural disease -Pleural effusion -Empyema

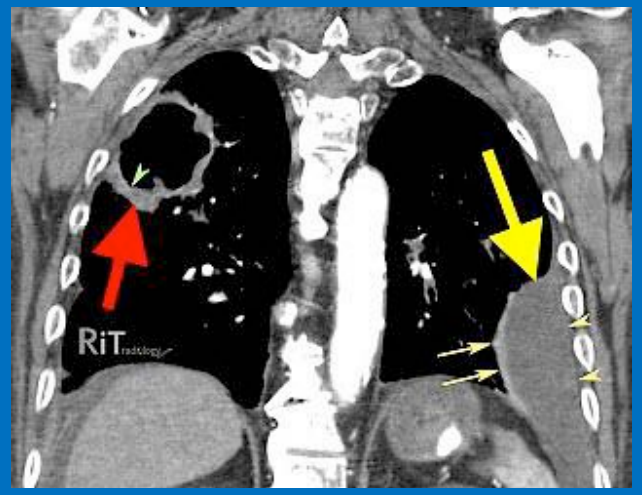
Empyema vs pulmonary abscess:

- **Relationship to adjacent bronchi/vessels:**
  abscesses will abruptly interrupt the bronchovascular structures
  empyema will usually distort and compress adjacent lung
- **Split pleura sign**
- **Wall:**
  abscesses have thick irregular walls
  empyema are usually smoother
- **Angle with pleura:**
  abscesses usually have an acute angle
  empyema have obtuse angles



Split Pleura Sign-on CT, contrast-enhanced visceral and parietal pleurae divide around a less-dense empyema

Coronal reformatted chest CT show **an abscess** (red arrow) and an **empyema**(yellow arrow)



Pleural disease -Pleural effusion

How do you suggest the etiology of effusion from chest CT?

- **Bilateral:** consider **transudative** effusions **first**. You will need clinical information.
- **Bilateral** effusions with **cardiomegaly**: **Congestive heart failure**
- **Bilateral** pleural effusions associated with **ascites** in a **alcoholic**: **Cirrhosis**
- **Unilateral: most** of them are **exudative**
- **Large unilateral** effusion: **Malignancy**
- Pleural effusion with **apical infiltrates**: **Tuberculosis**
- Pleural effusion with **nodes or mass** or **lytic bone** lesions: **Malignancy**
- **Loculated** effusions are **empyemas**
- Pleural effusion with a **missing breast** suggesting resection for cancer: **Malignancy**
- Pleural effusion following **chest trauma**: **Hemothorax**
- In patients with **mediastinal lymphoma**: **Chylothorax**

Rest of the topic will be covered in next class on 29th August 2020

Thank You