Approach to chest x ray surgical point of view

Tayseer Al- Tawarah MD,MRCS

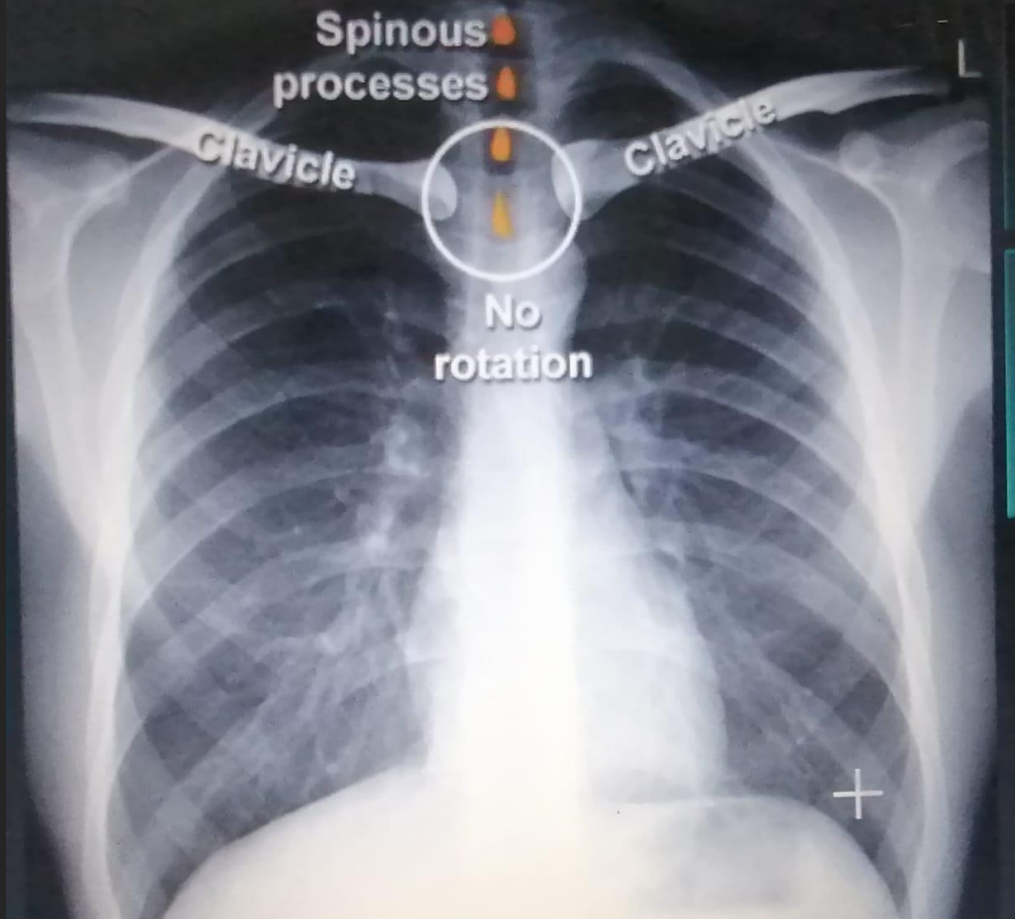
Tamara Arabiyat.

- Begin chest X-ray interpretation by checking the following details:

- Patient details: name, date of birth and unique identification number.
- Date and time the film was taken
- Previous imaging: useful for comparison

- Rotation
- The medial aspect of each clavicle should be equidistant from the spinous processes.

- The spinous processes should also be in vertically orientated against the vertebral bodies.


Spinous processes
Clavicle
Clavicle
No rotation
L

- Inspiration
- The 5-6 anterior ribs, lung apices, both costophrenic angles and the lateral rib edges should be visible.

* AP is done for bed-ridden patients, ICU patients.

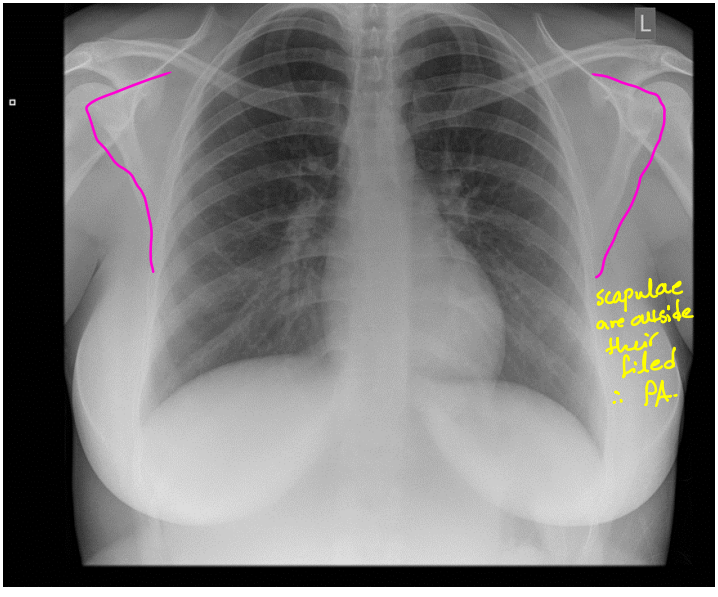
- Projection
- Note if the film is AP or PA: if there is no label, then assume it's a PA film (if the scapulae are not projected within the chest, it's PA).

The standard view

out of their field.

or if the clavicle is outside the lung field.

- Exposure
- The left hemidiaphragm should be visible to the spine and the vertebrae should be visible behind the heart.



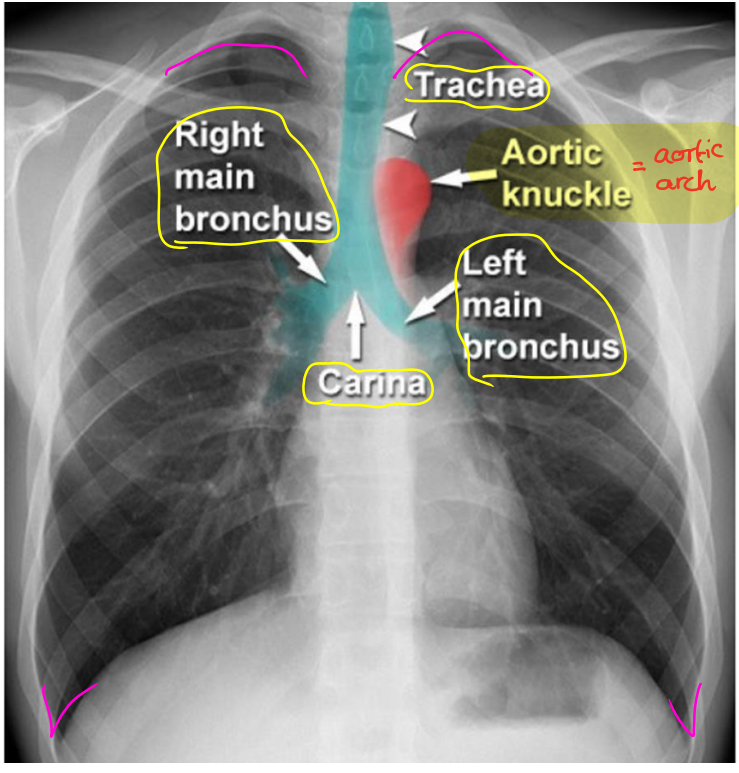
- Data
- Exposure (apics – diaphragmatic costal angle)
- Aligned rips and clavicle
- Number of rips lung occupies = 5-6 normally
- post-ant : scapula is away from rips and vertebra

- ABCDE approach to read any chest X-ray.
- The ABCDE approach can be used to carry out a structured interpretation of a chest X-ray:

- Airway: trachea, carina, bronchi and hilar structures.
- Breathing: lungs and pleura.
- Cardiac: heart size and borders.
- Diaphragm: including assessment of costophrenic angles.
- Everything else: mediastinal contours, bones, soft tissues, tubes, valves, pacemakers

widened mediastinum, subcutaneous emphysema, ..etc.

B ; lung markers reaches chest wall
Diaphragm = angle – air under diaphragm – both on the same level
C ; heart size – aortic knuckle
A mediastinum



* PA
* not rotated.
* Adequate exposure (on inspiration).

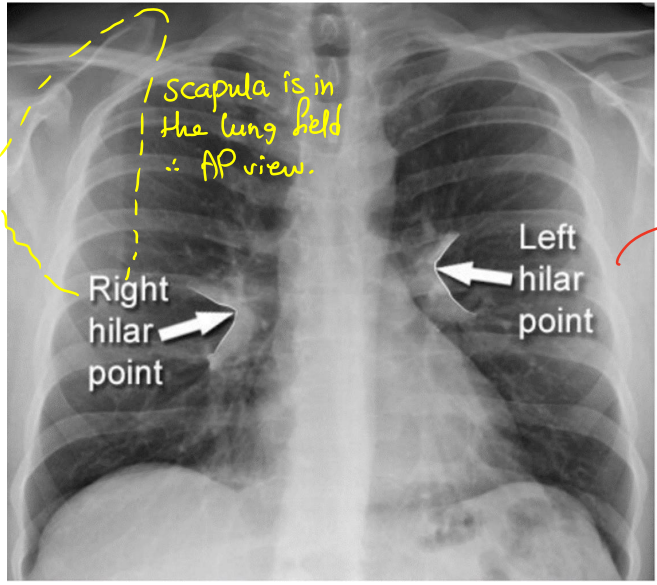
we check if it deviated or not deviated.

Trachea = black space ant to spines and should be aligned centrally than divides into right and left main bronchi.

Hilum = when vessels go in the lung At end of trachea, note any mass in there, prominent or not

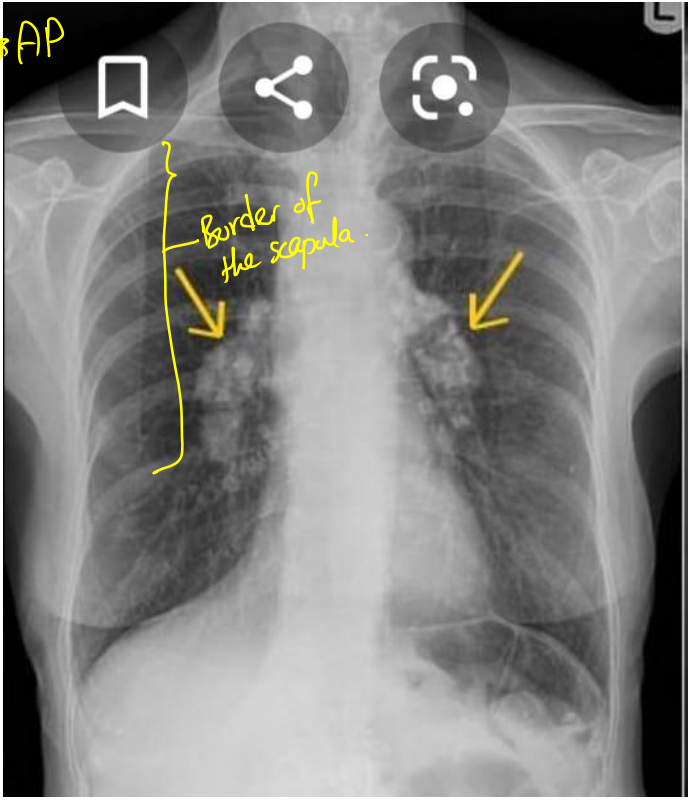
if there's mass → "enlarged hilum"

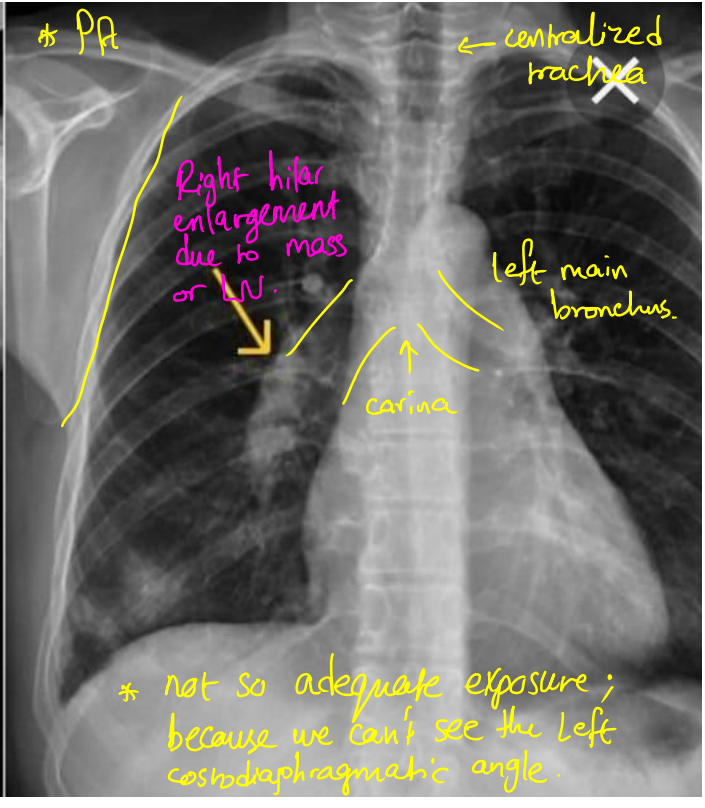
* AP
* No rotation.
* Adequate exposure.
* Trachea is centralized (against the spinous processes) (but still normal if it was slightly deviated to the right)



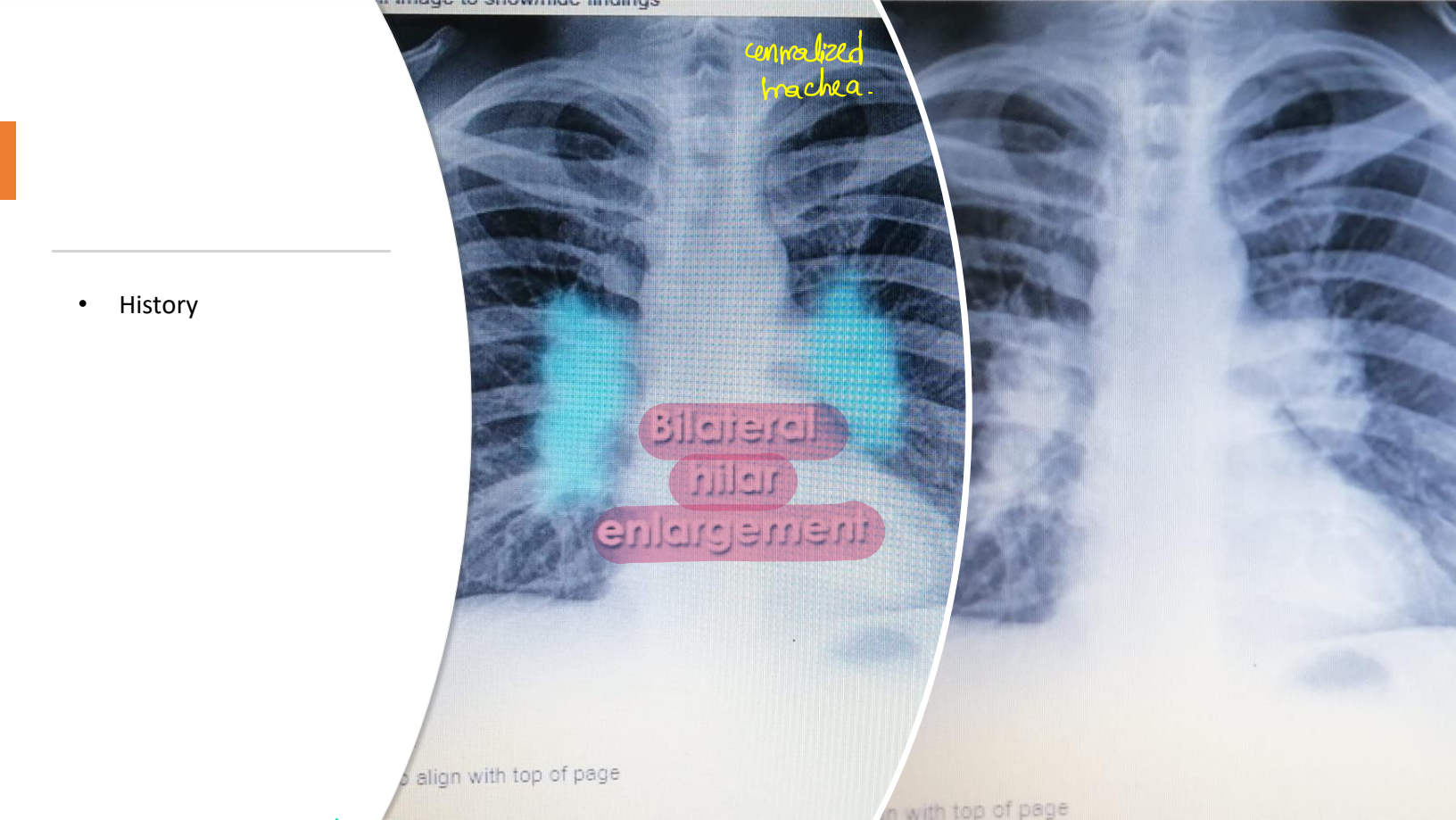
→ pulmonary A+V + Bronchus

Bilateral hilar enlargement:





- History

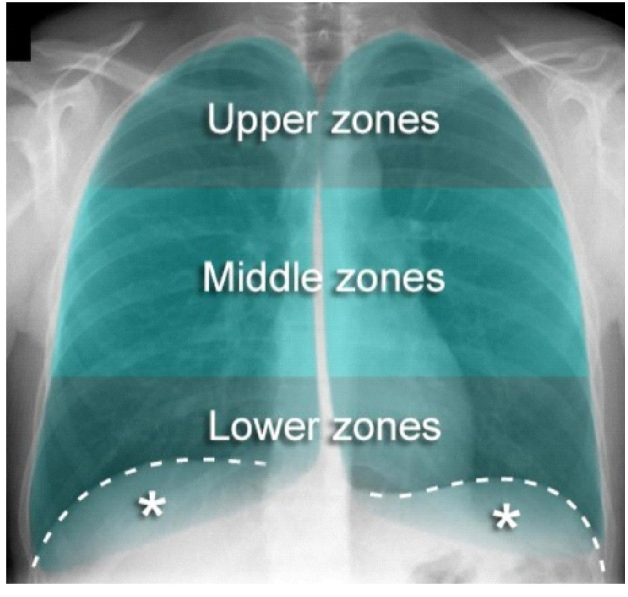

centralized trachea.
Bilateral hilar enlargement
align with top of page

Breathing

Lung field (zones).

- compare the right with the left.

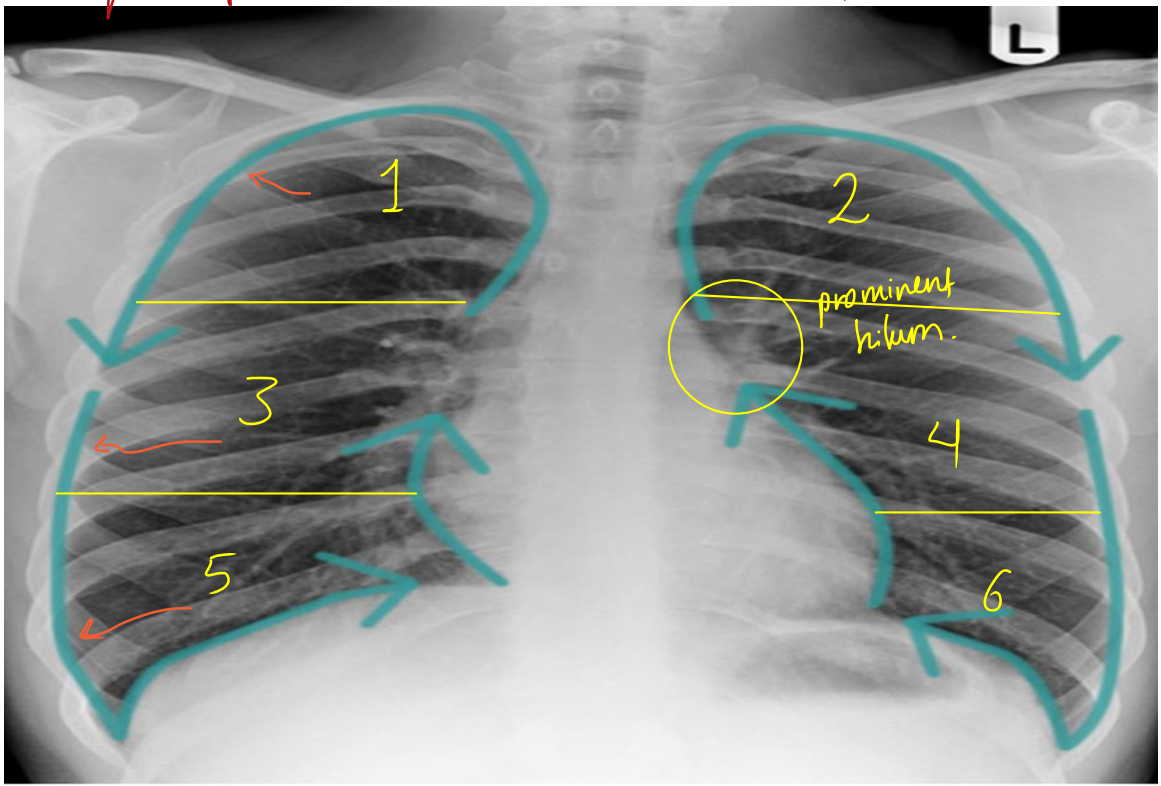
check if there's any mass, infiltration



Lung markings

- pneumothorax ---

- adequate exposure - PA. - centralized trachea + prominent hilum. - no masses nor infiltrations bilaterally



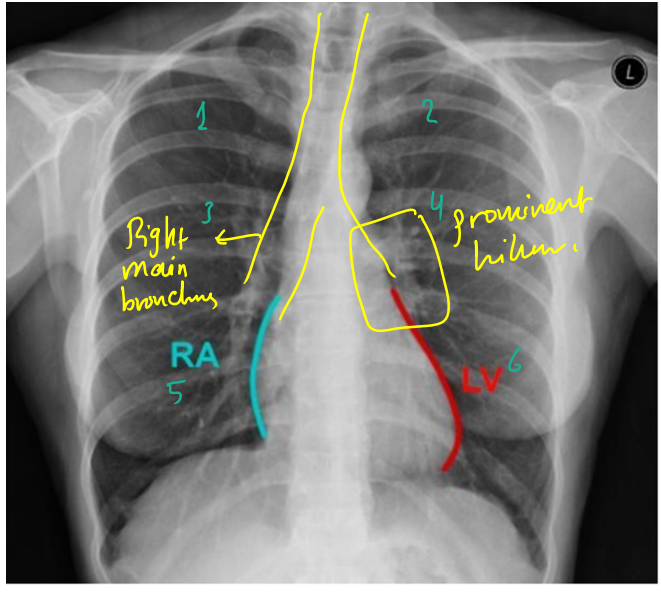
Vascular marking : الخطوط الوعائية

should reach all borders of chest wall normally, if not pneumothorax or effusion

= The lung is fully inflated.

C irculation = Heart

- Adequate exposure.
- PA.
- Centralized trachea.
- Prominent hilum.
- no infiltrations nor masses.



- vascular markings reach the chest wall ∴ no pneumothorax.

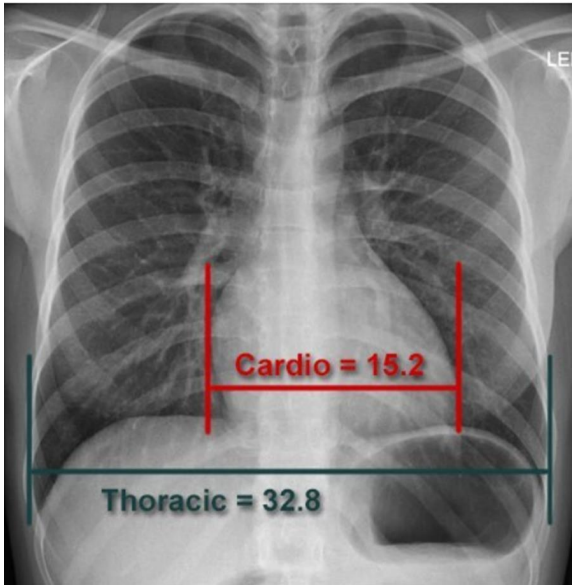
- To know the heart size you should outline its borders to see the cardiothoracic ratio.

Cardiovascular ration 0.2-0.5 normally

if it's larger ∴ cardiomegaly.

- Cardiothoracic ratio (to calculate it, cardiac borders should be defined first).

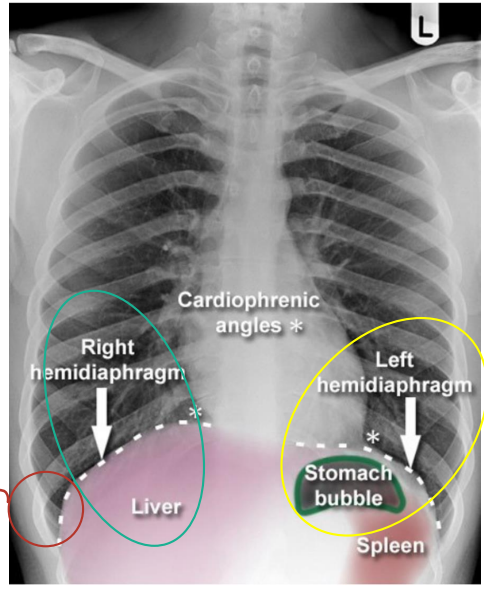
maximal trans-cardiac diameter / maximal trans-thoracic diameter = Ratio



Stomach funds = black

= gastric bubble.

Diaphragm



1- Elevation ? normally it's slightly elevated on the right side because of the liver.

2- Gastric bubble.

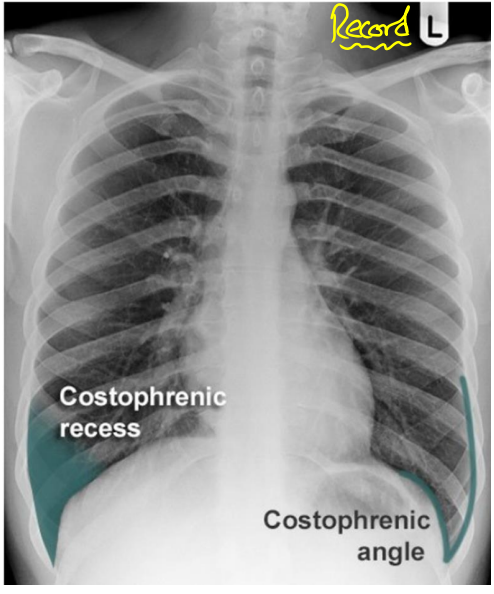
3- See if there's Air Under Diaphragm.

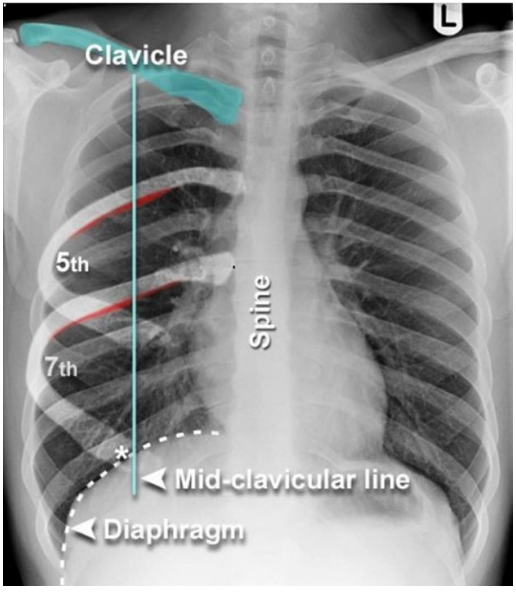
4- Check the costophrenic angle.

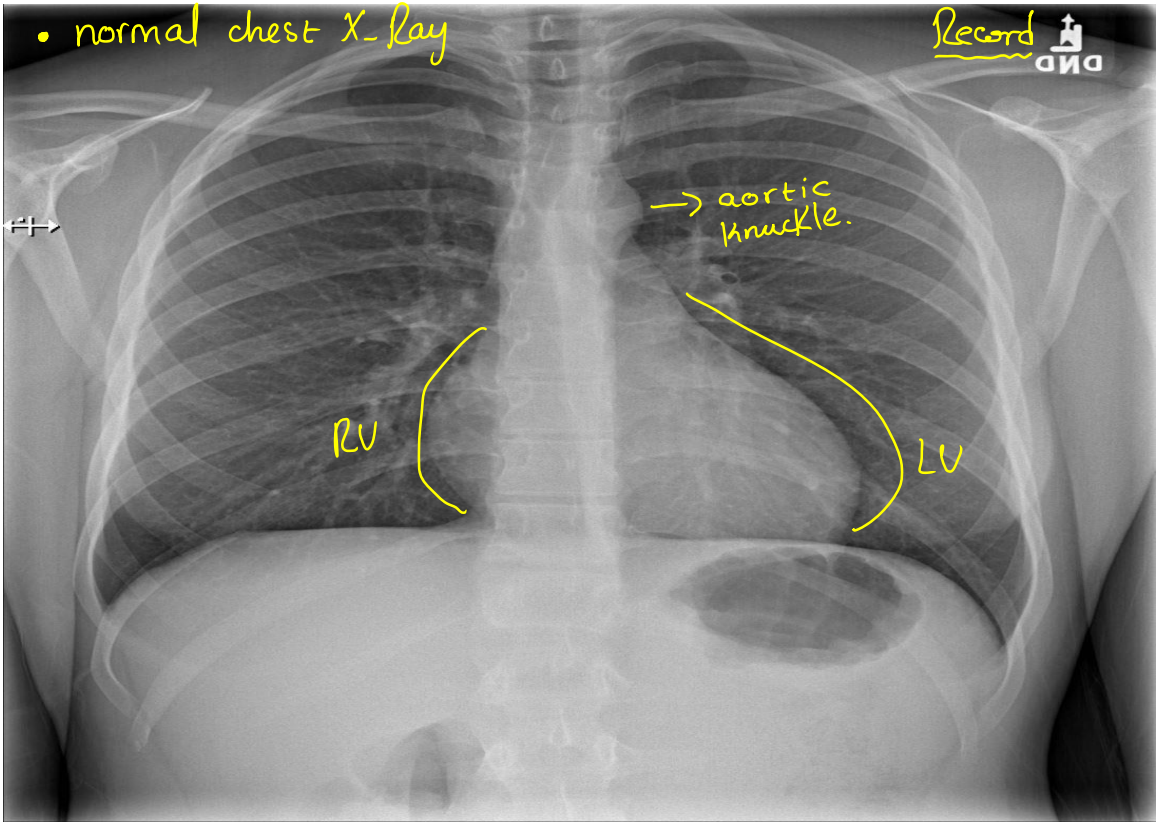
costodiaphragmatic angle / recess should be sharp (not blunted) indicating that it's clear.

Costophrenic angle should be sharp such as wedges , if blunt = effusion

Check diaphragm level or air under it



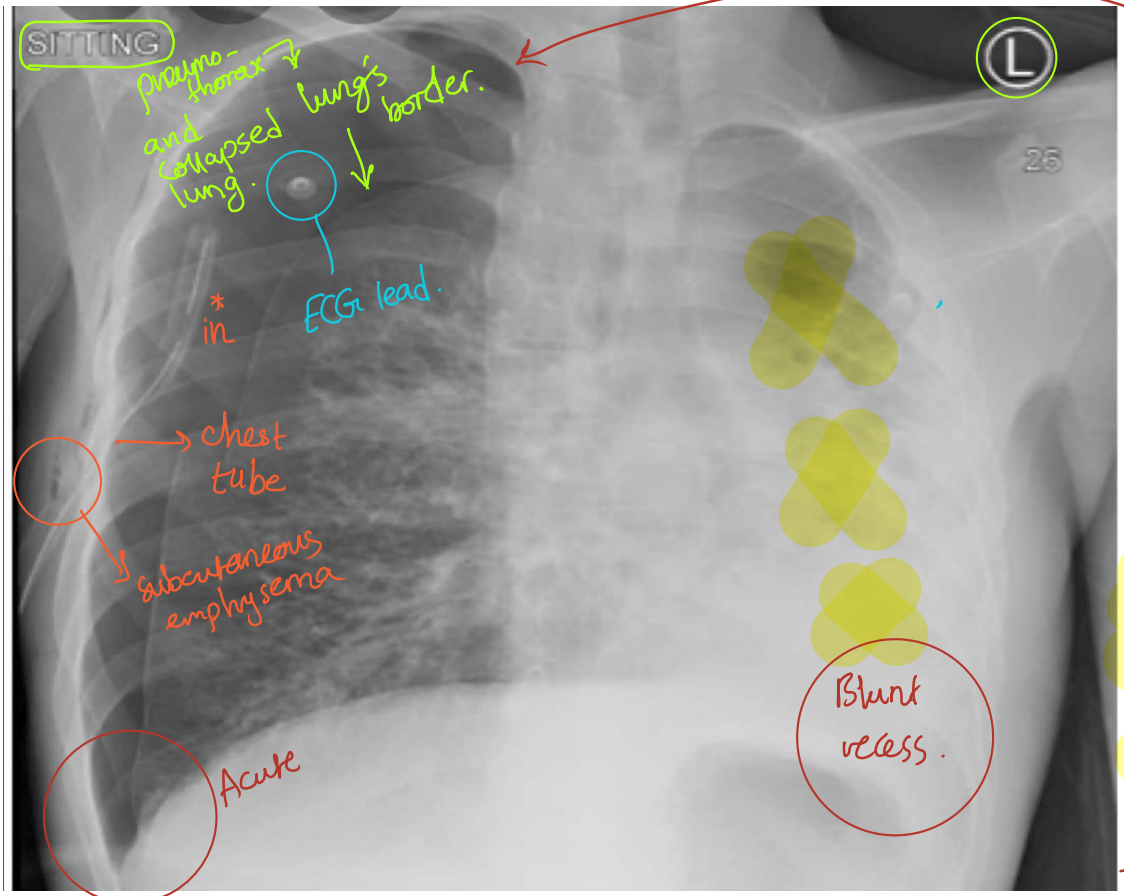




Slight deviation in trachea

Prominent Hilum (vessels are prominent)

Gastric bubble which is normal



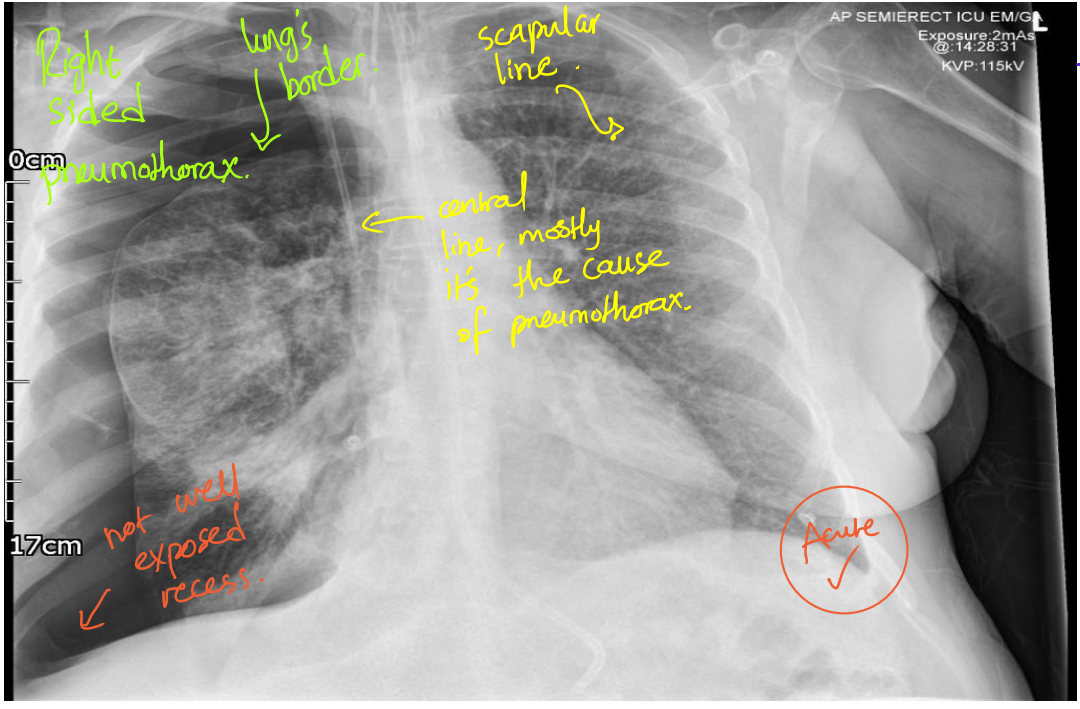
- Rotated.
- Adequate exposure.

- Deviated trachea to the left.

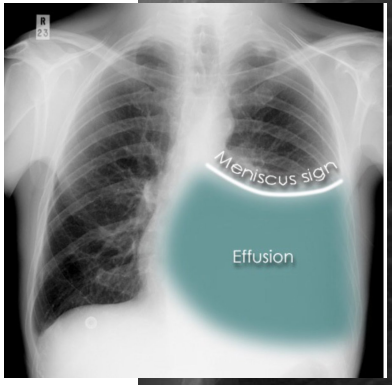
- not prominent hilum.

- Breathing: there's an opacification in the middle + lower zones mainly on the left side (slightly in the upper zone).

- Cardiothoracic ratio cannot be calc.



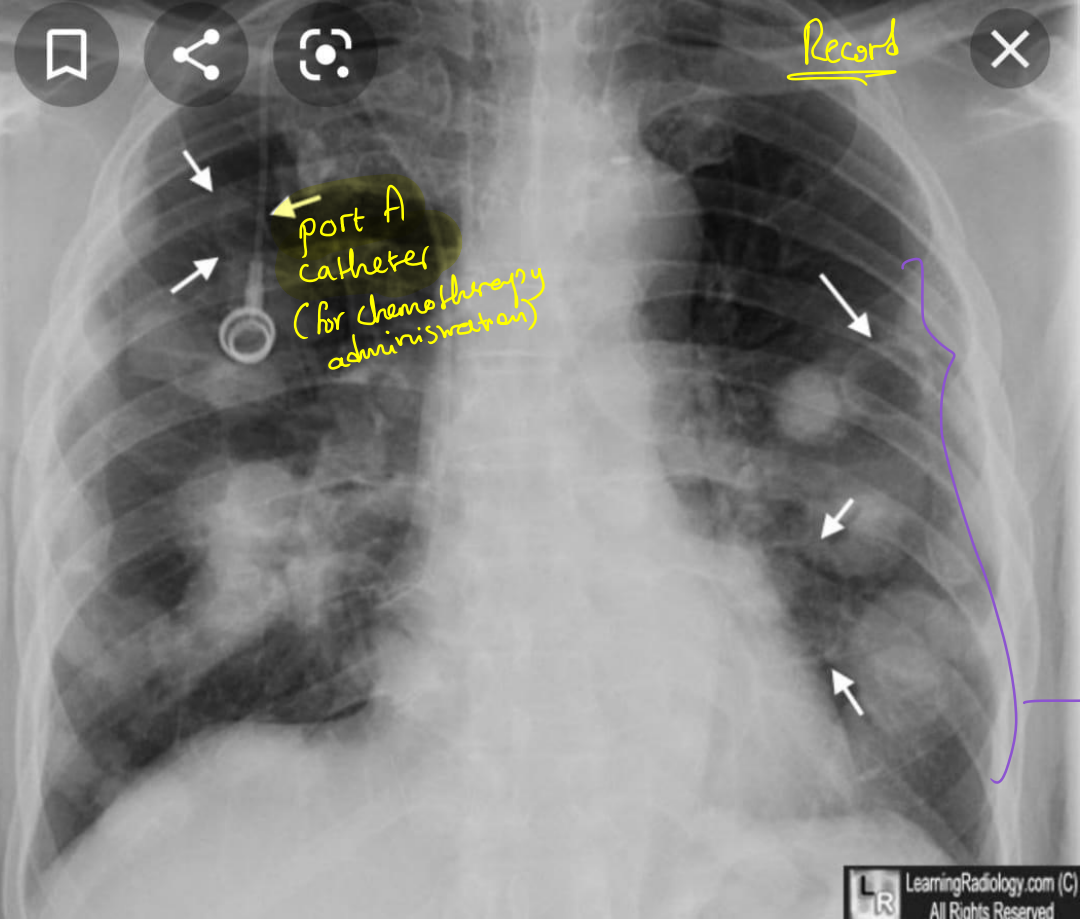
- AP.
- not adequate exposure
- centralized trachea.
- prominent hilum.
- no masses nor infiltrations.
- vascular markings don't reach the chest wall.
- Roughly there's no cardiomegaly
- no AUD (air under diaphragm)



meniscus sign

plural effusion

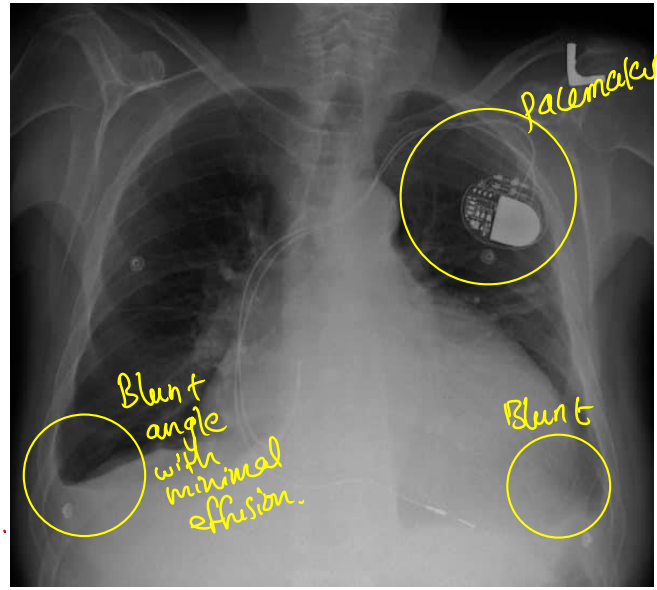
- not prominent hilum on the right side.
- cardiomegaly is not determined.
- obliterated right hilum or right recess



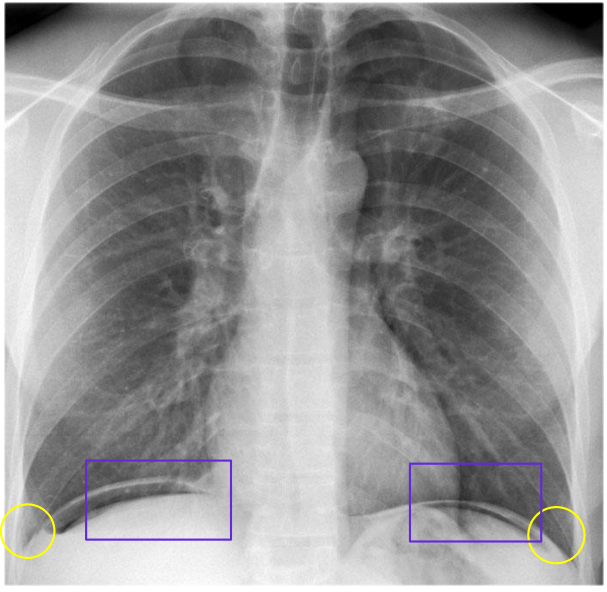
Port A catch = subcutaneous for chemo

Pacemaker
Don't put him to MRI

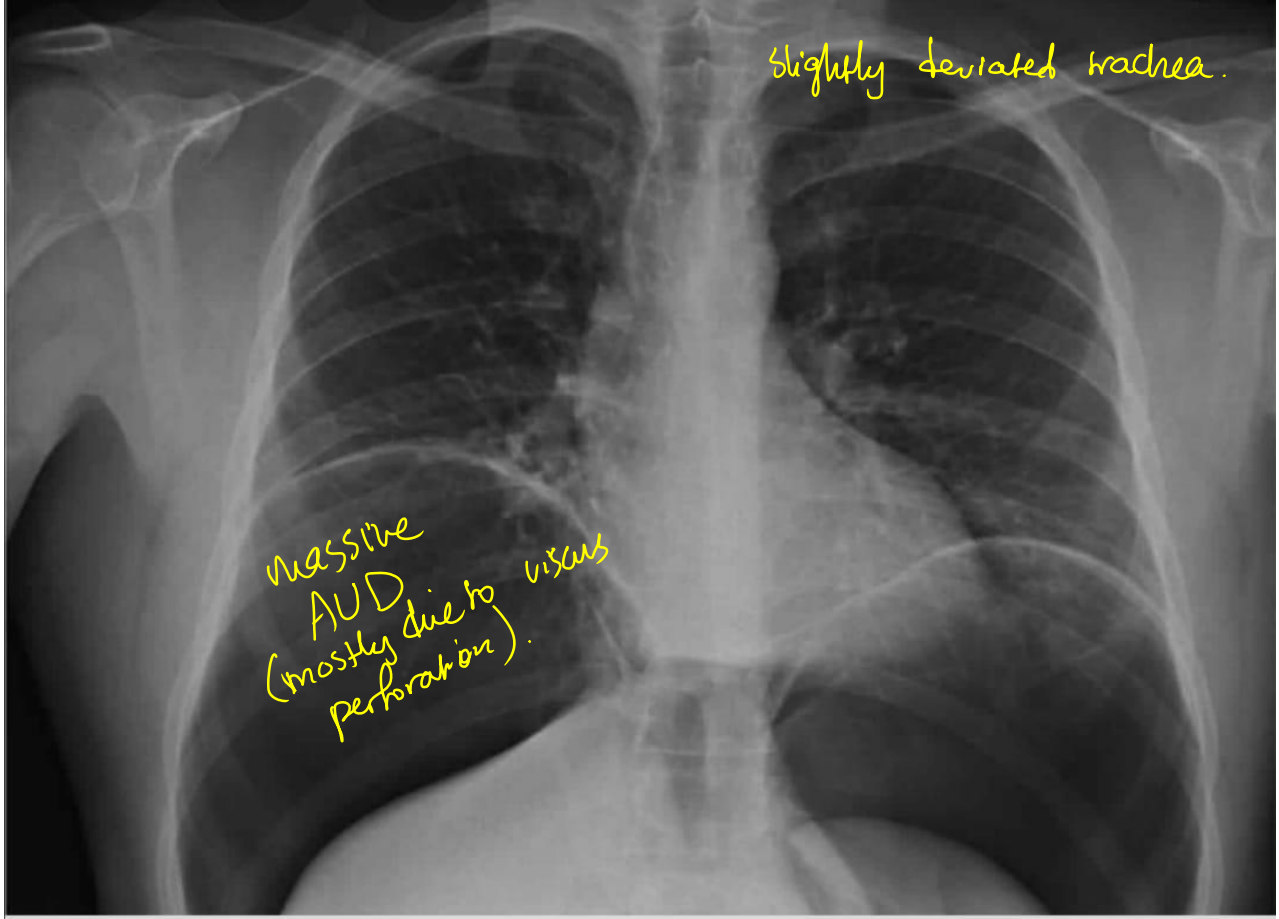
- adequate exposure.
- trachea is slightly deviated to the right.
- Prominent right hilum.
- obliterated lower left lung zone by the heart shadow.
- no evidence of pneumothorax.
- Cardiothoracic ratio > 0.5 ⇒ cardiomegaly
  - no AUD



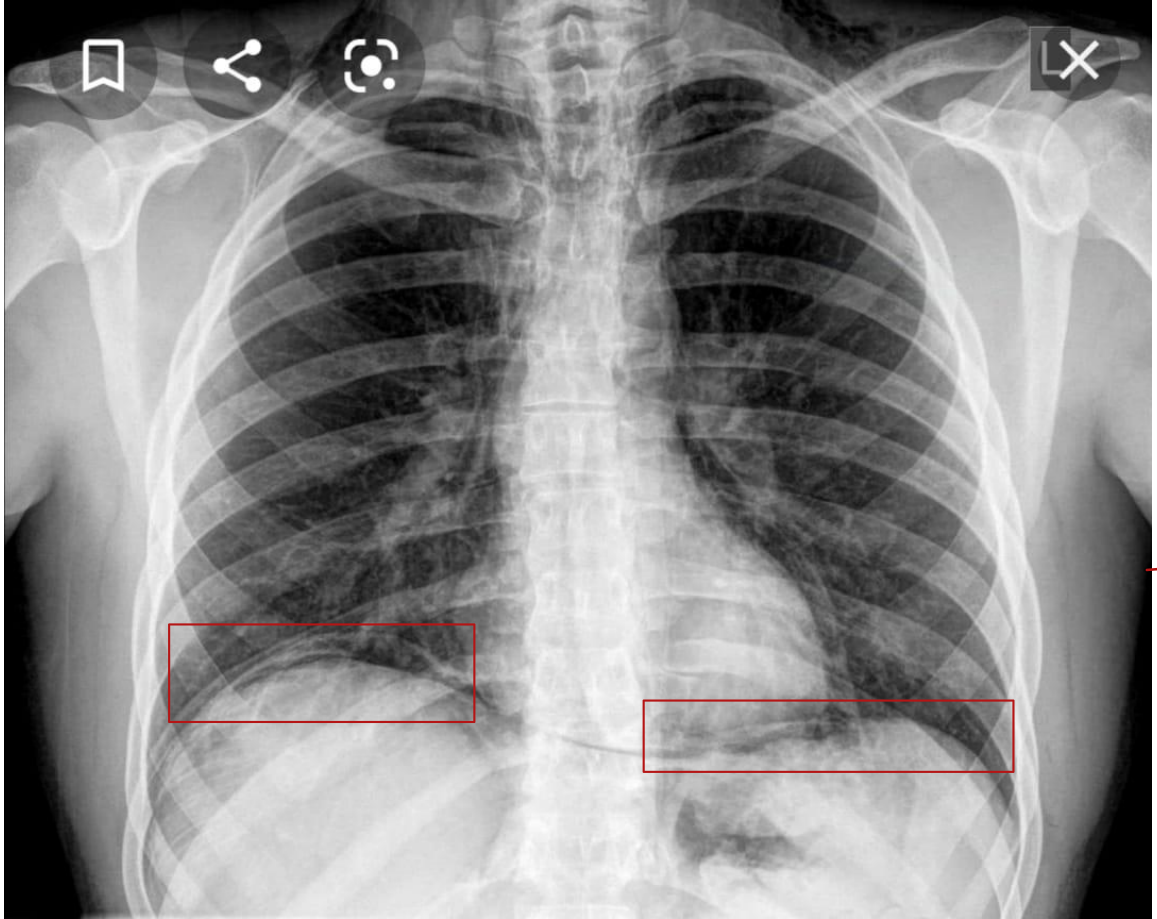
Record



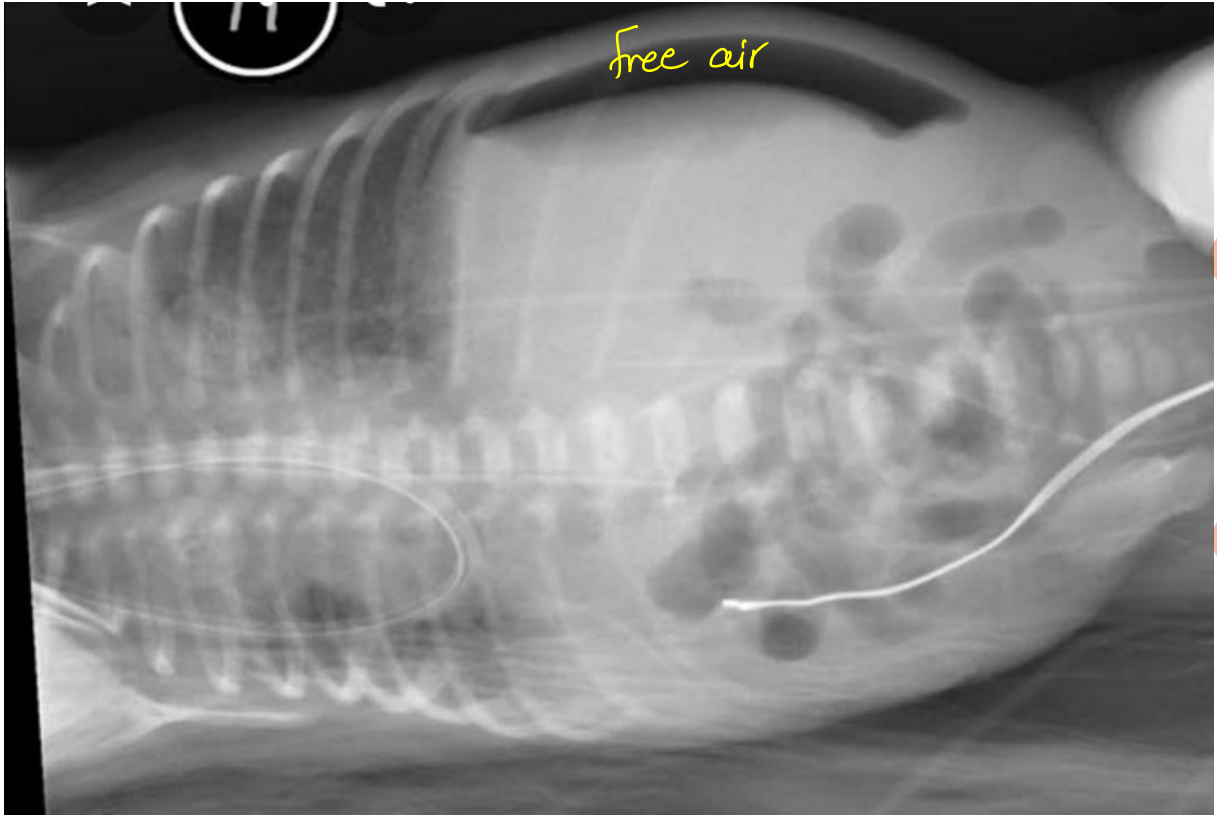
- Acute angles.
- AUD.



Air under diaphragm = post op or perforation



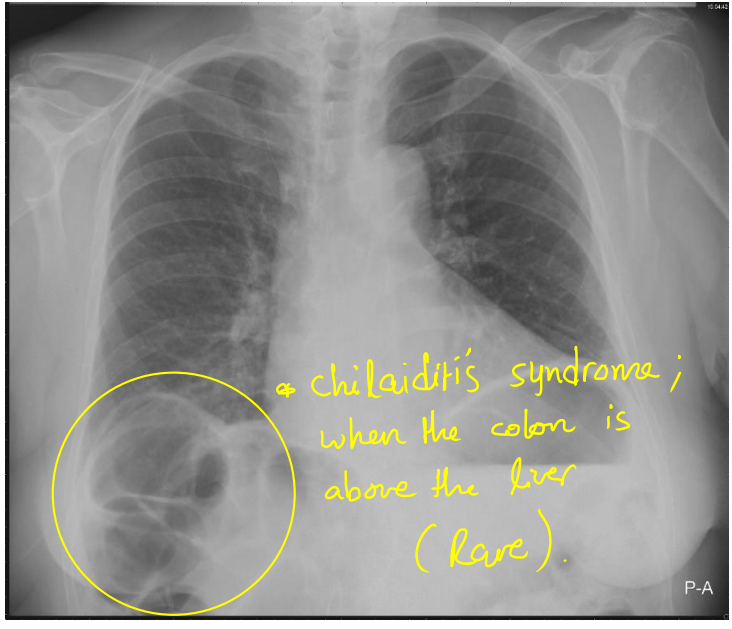
10% of the cases with AUD are not visible on X-Ray so if you are suspicious Do CT-scan.



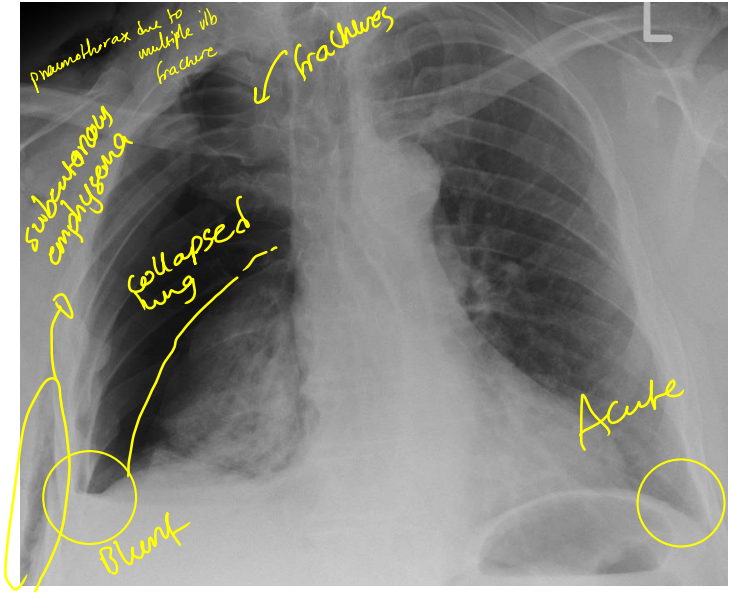
Lateral decubitus : detect air under diaphragm if x ray cant be done

Colon ant to liver

10 % of air under diaphragm can not be detected on x ray. If you suspect air under diaphragm but is not detected on x ray Do CT



Fracture


Pneumothorax due to multiple rib fracture
fractures
subcutaneous emphysema
collapsed lung
Blunt
Acute

Mediastinum wide

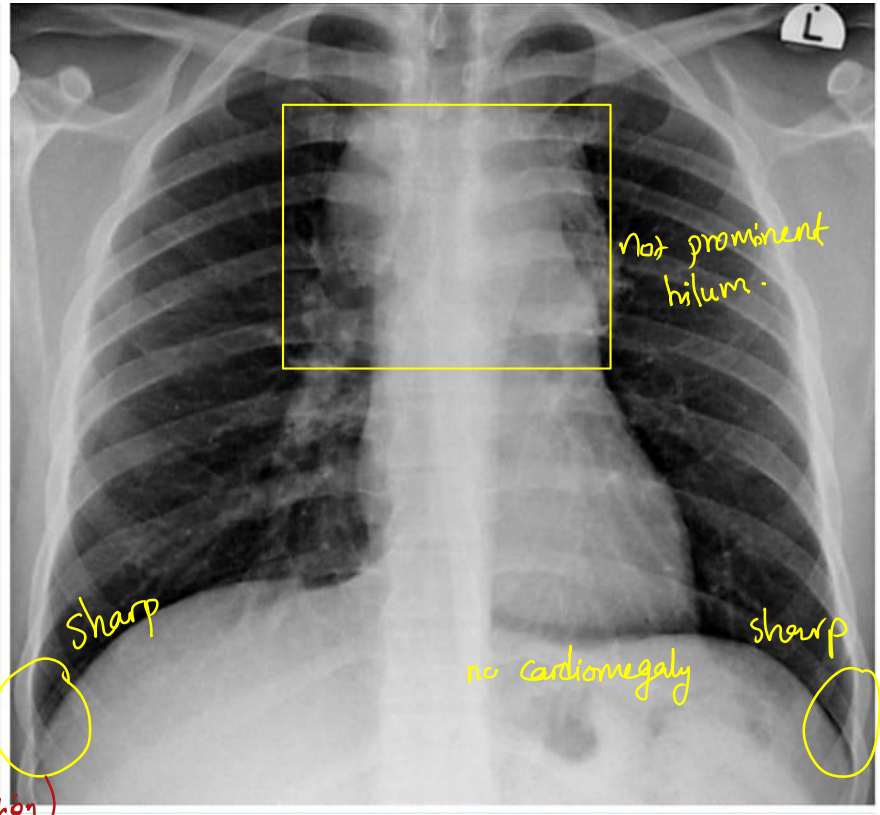
when the mediastinum dimension (above the carina) exceeds 8-10 cm

∴ this is mediastinum widening

DDx:

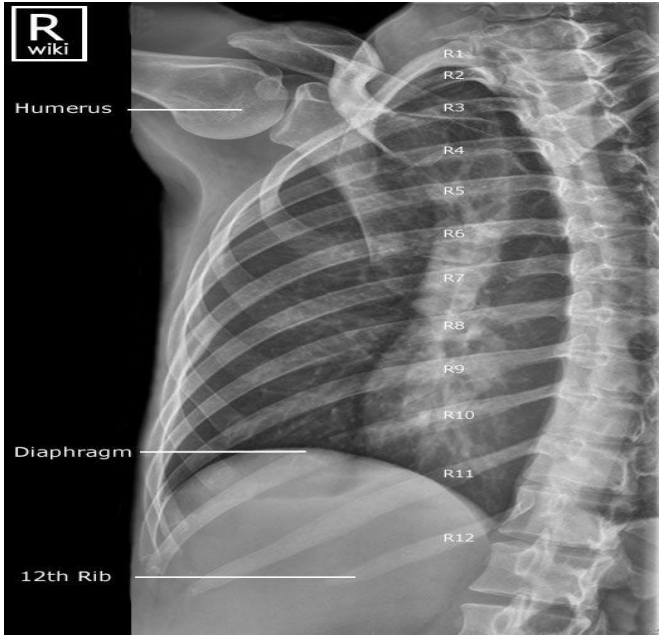
1- Retrosternal goiter.
2- Thymus enlargement.
3- Ascending aortic aneurysm.
4- Aortic dissection.

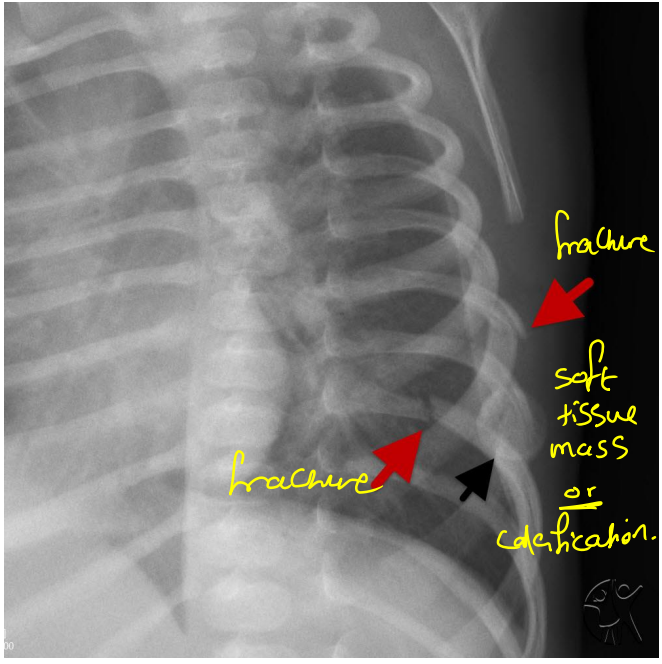
(If the patient has severe hypertension and came to the ER → ∴ mostly aortic dissection)



oblique view

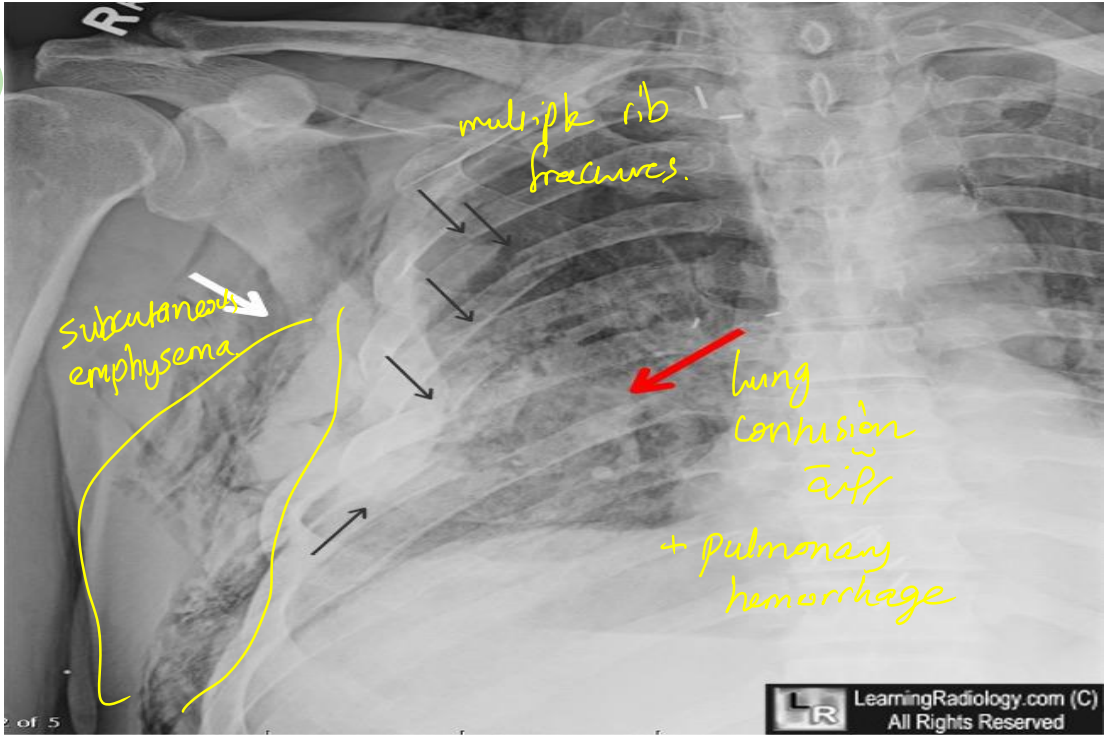
Rip view = if you suspect rip fracture

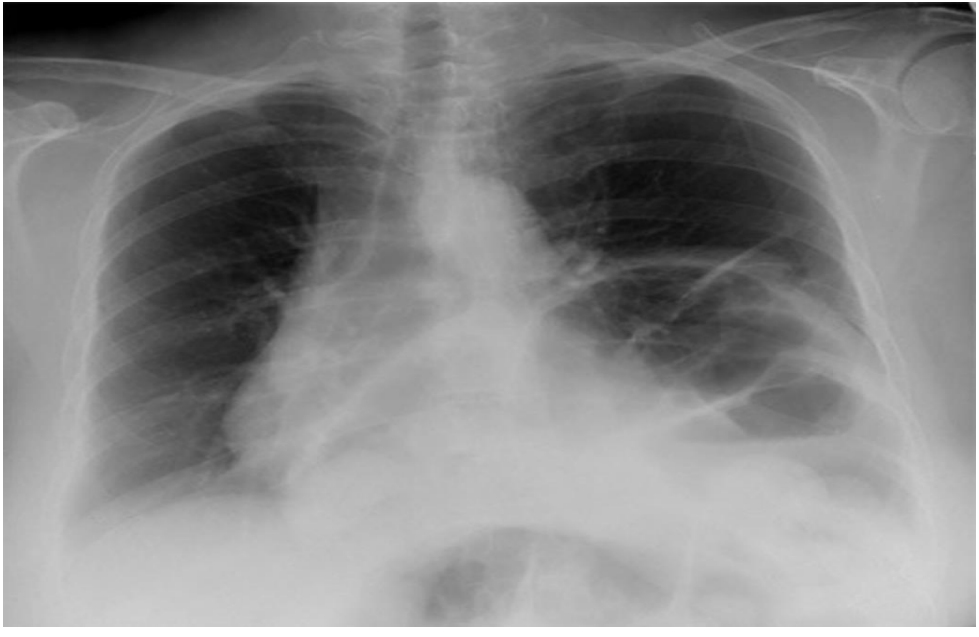


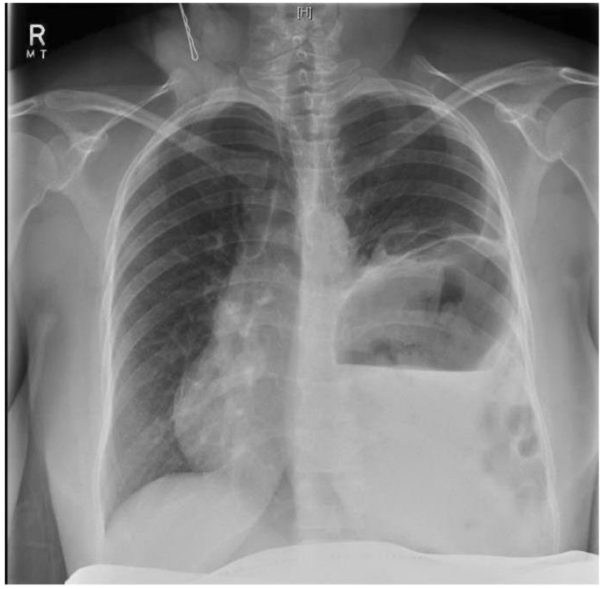


Friel segment : more than one rip fractured

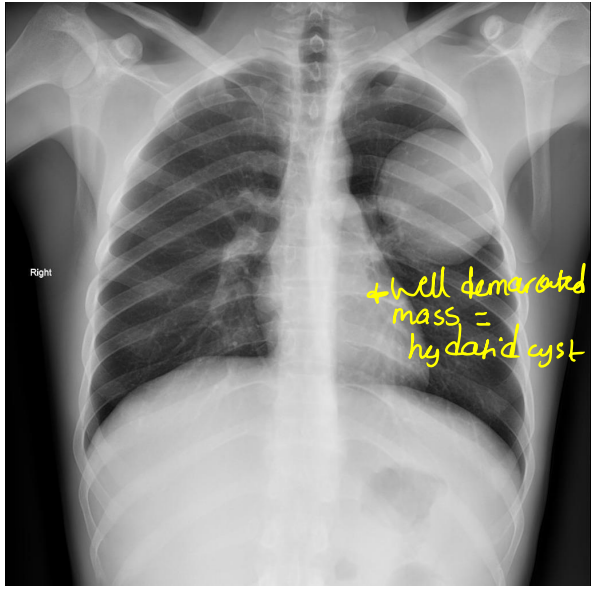
Those rips injured the lung



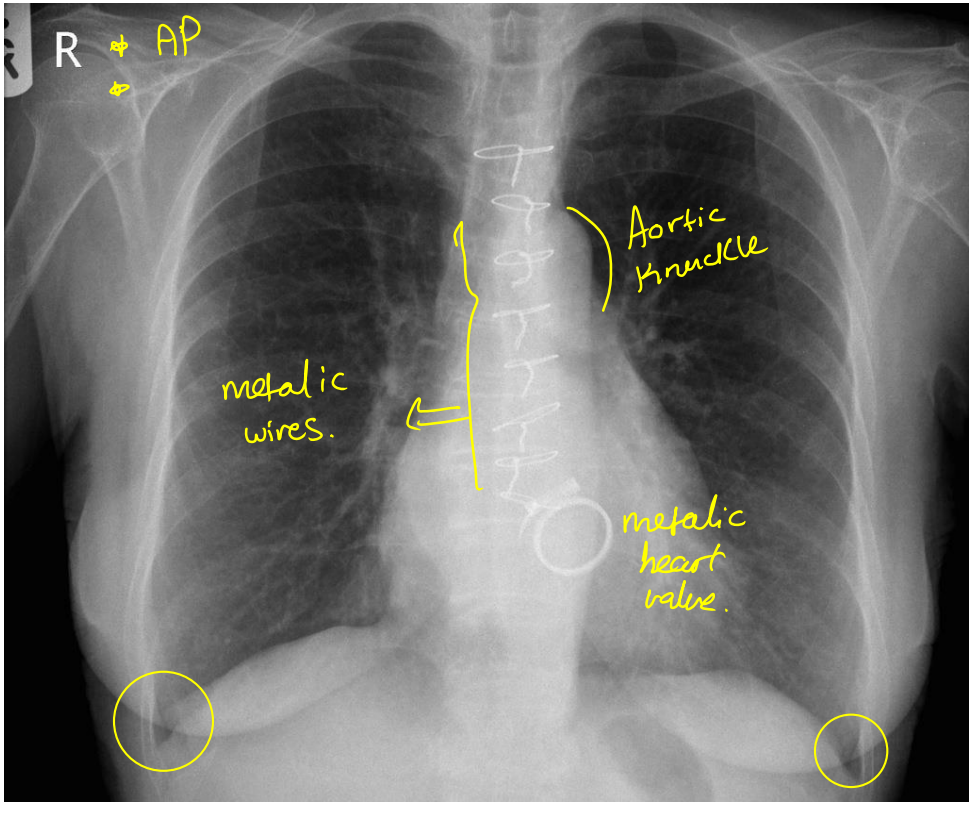


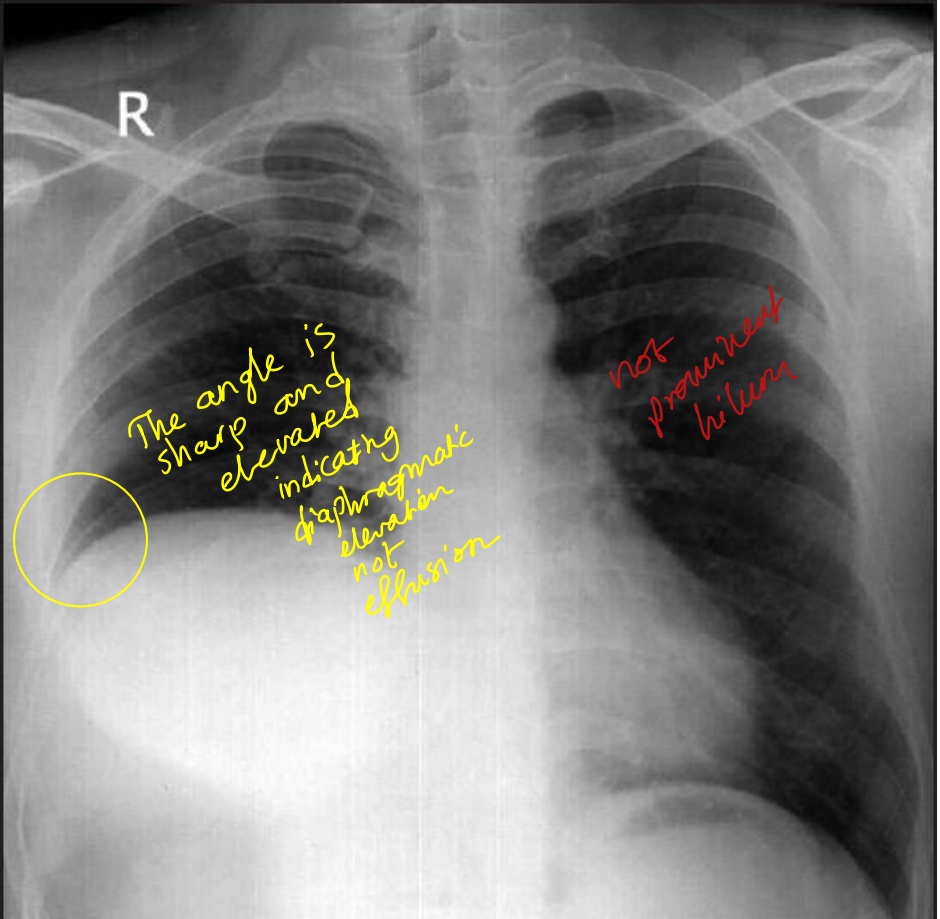

R
M T

If half black half white = air fluid level, secondary to infection in Cyst or due to an abscess?



Open heart surgery





Phrenic nerve injury

- lung zones (right middle and lower ones) aren't visible
- Right hemidiaphragm is significantly elevated

- Diaphragmatic eventration.

* If hepatomegaly → liver enlarges downwardly.