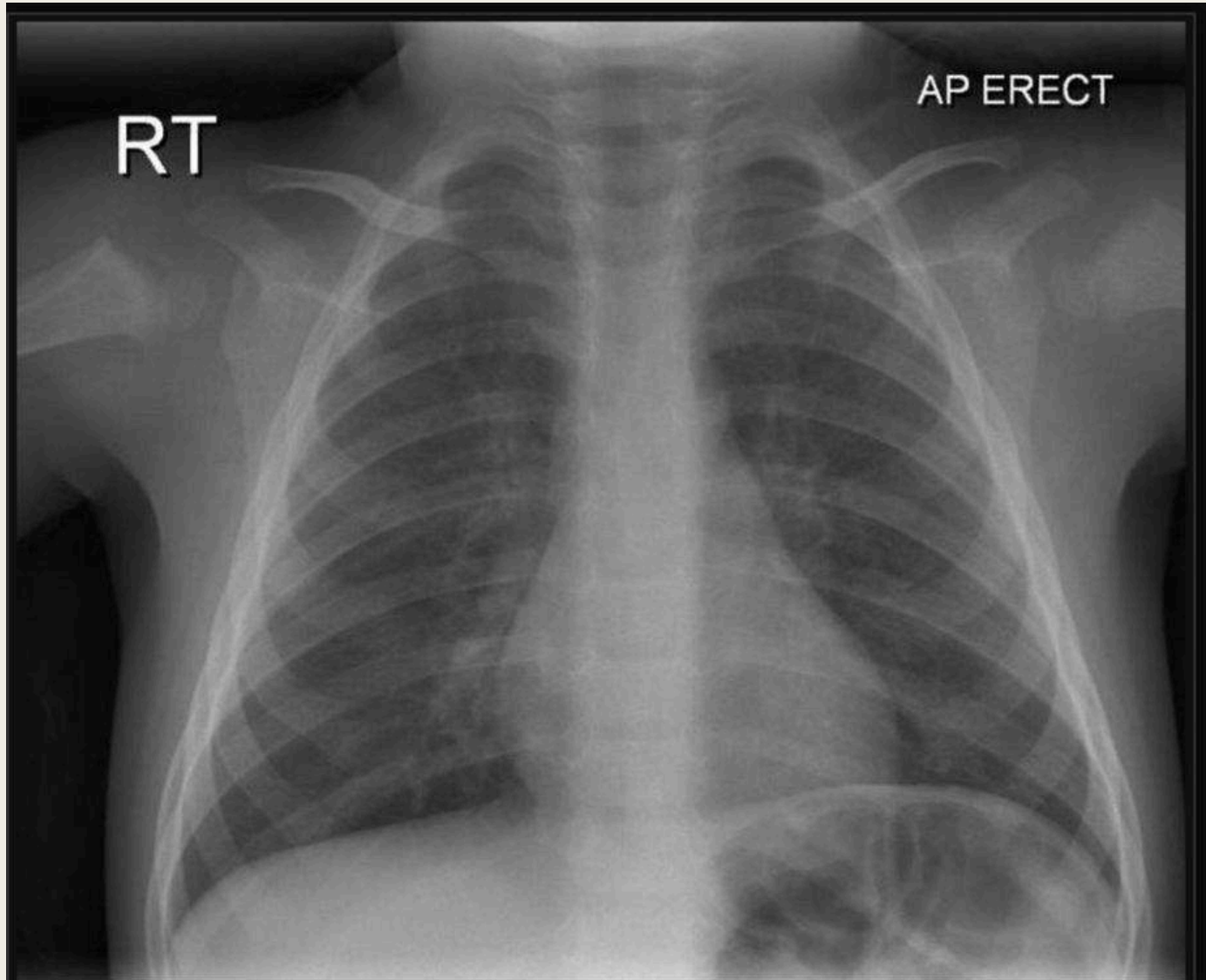
CHEST 3

Dr.Anwar Al-Naimat

Chest radiograph (pediatric)

- Depending on the patients' age, the difficulty of the examination will vary,
- often requiring a specialist trained radiographer familiar with a variety of distraction and immobilization techniques.



Standard projections

- As pediatrics vary in their level of cooperation, various projections can be utilized to suit the patient's needs and age:

- PA erect

performed on older patients (teenage years), not advisable for younger patients due to their attention span (

- AP erect

ideal for cooperative younger children (i.e. Between 3-7 years old) due to the ease of positioning and immobilization

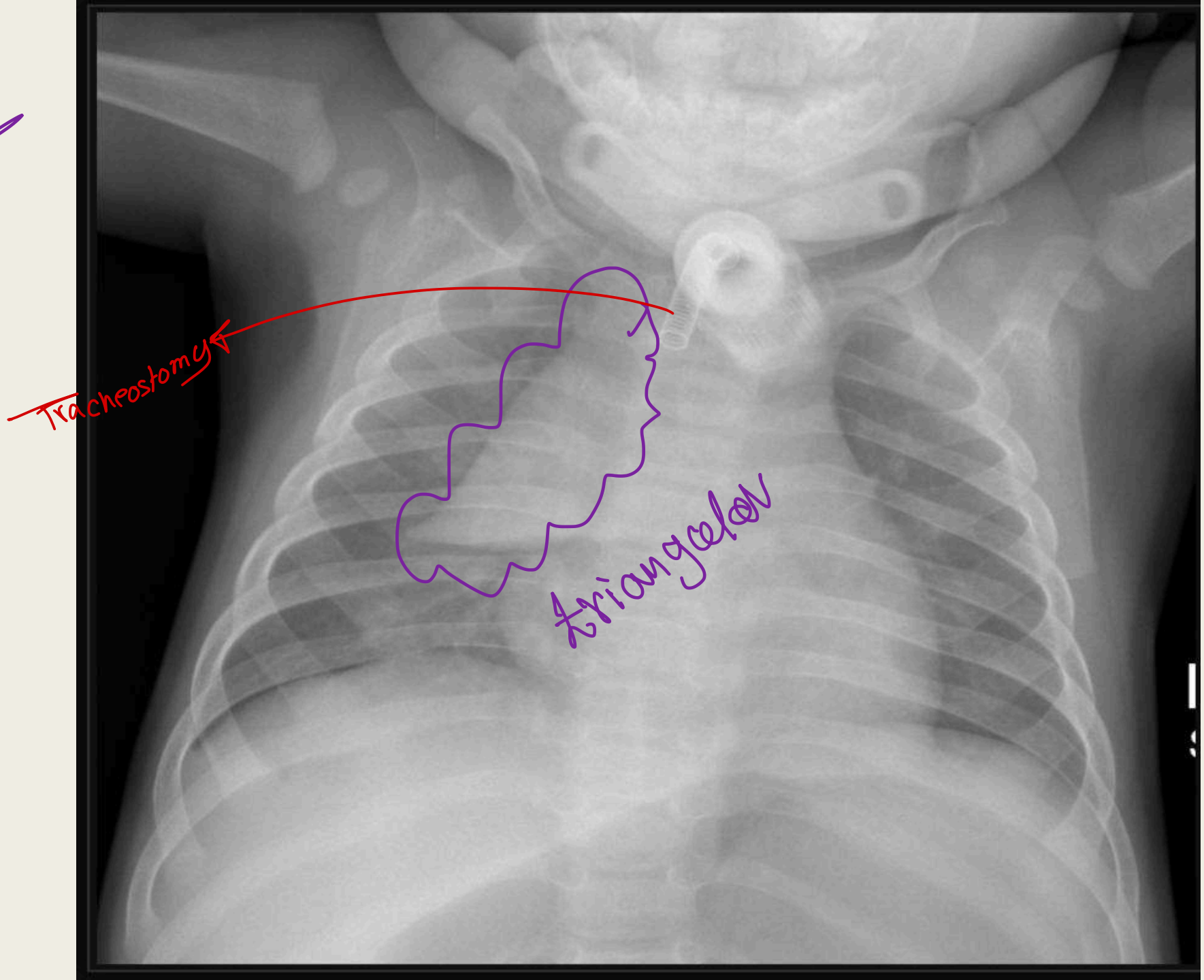
AP supine

performed when imaging unconscious or uncooperative children

- AP supine (neonatal)

performed mobile in the neonate unit

normal



Thymic sail sign ('normal')

- Represents a triangular-shaped inferior margin of the normal thymus seen on a neonatal frontal chest radiograph. It is more commonly seen on the right side, but can also be bilateral. It is seen in 3-15% of all cases.

Respiratory distress syndrome (RDS)

- is a relatively common condition that occurs in preterm neonates resulting from insufficient production of surfactant.
- **Risk factors**

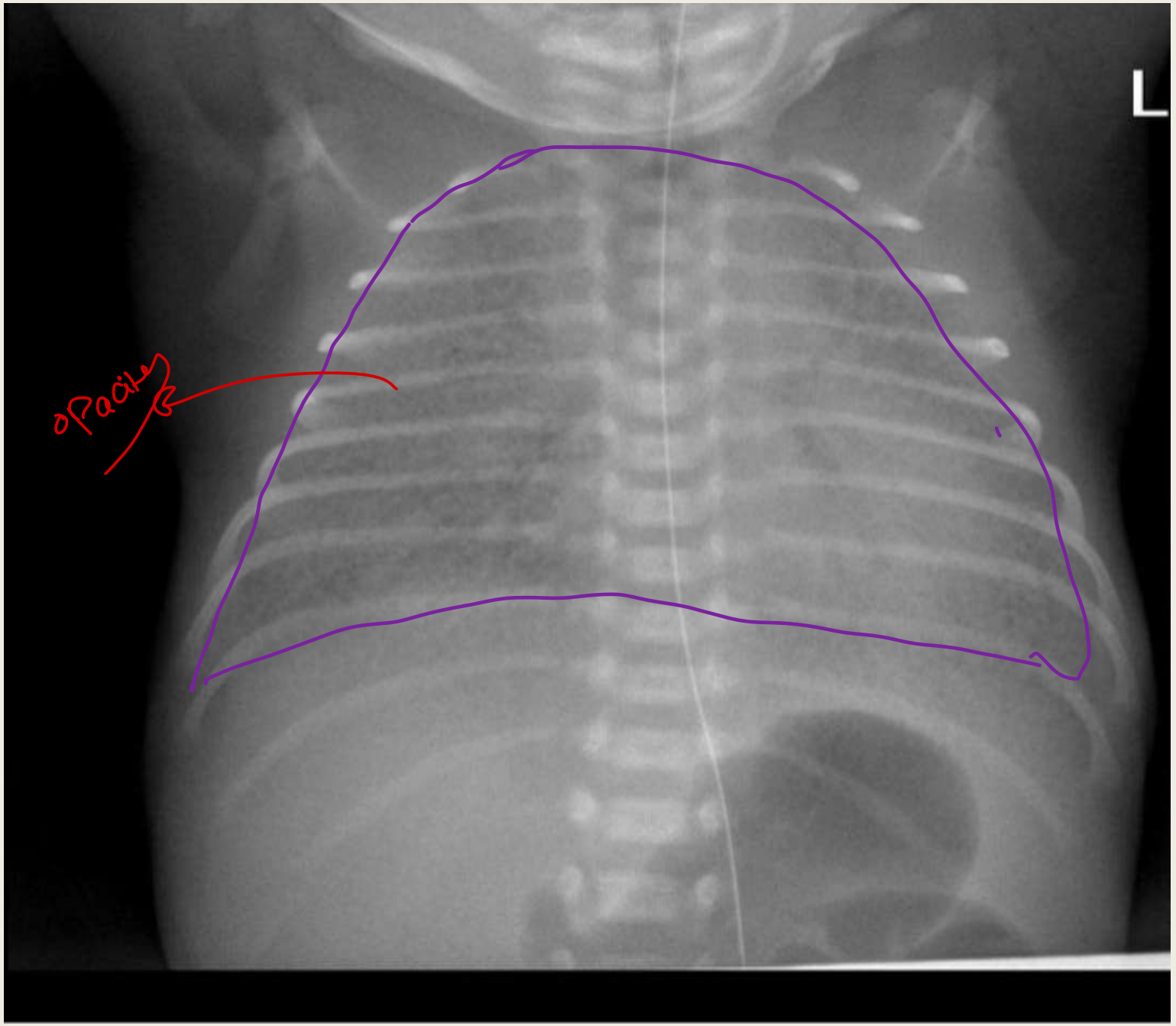
1. maternal diabetes ✓
2. greater prematurity ✓
3. perinatal asphyxia ✓
4. multiple gestations ✓

Pathology

- Immature type II pneumocytes cannot produce surfactant. The lack of surfactant increases the surface tension in alveoli causing them to collapse. Patients have a decreased lecithin to sphingomyelin ratio. Damaged cells, necrotic cells, and mucus line the alveoli.

- As the alveoli are collapsed (microscopically), the lungs are collapsed macroscopically as well. It is a diffuse type of adhesive atelectasis.

Bell shape



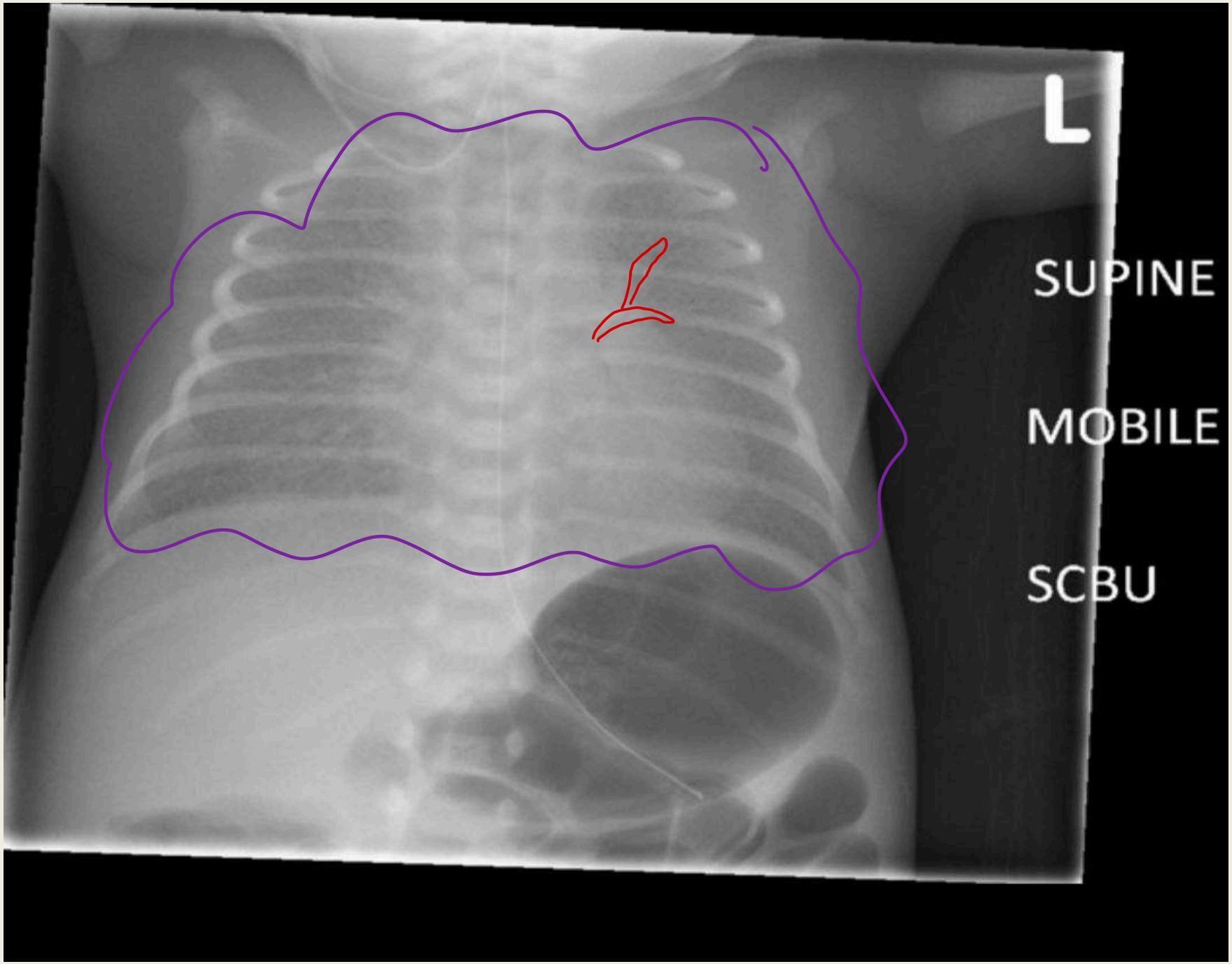
- granular opacity
-

Plain radiograph

1. low lung volumes
2. diffuse, bilateral and symmetrical granular opacities
3. bell-shaped thorax
4. air bronchograms may be evident
5. Hyperinflation makes the diagnosis less likely, unless the patient is intubated.
6. If treated with surfactant therapy, there may be an asymmetric improvement as more surfactant may reach certain parts of the lungs than others.

bell shape

air bronchogram



Low lung volume

Granular opacity

Air bronchogram

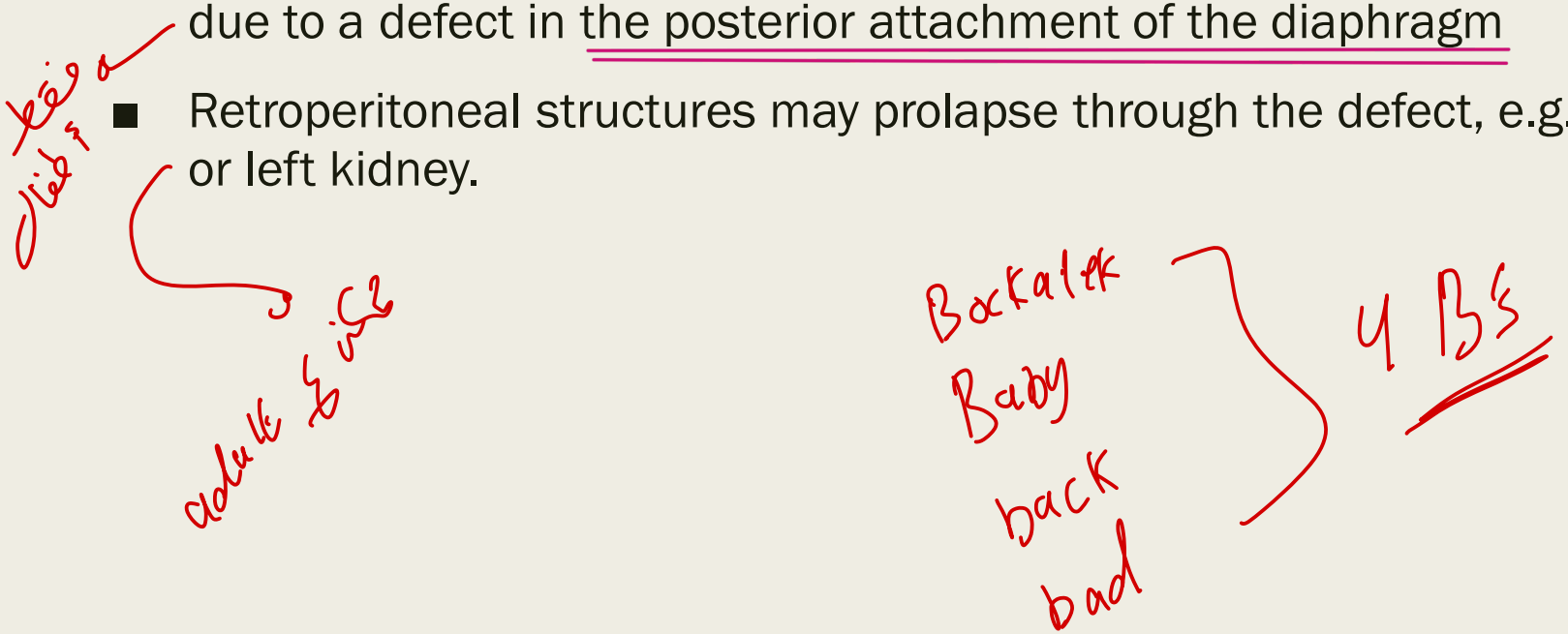
Bell shaped chest

Congenital diaphragmatic hernia

- There are two main types of congenital diaphragmatic hernia (CDH)s which are uncommon yet distinct entities that usually occur on the left side (80%) of the diaphragm
- Bochdalek hernia: most common (95%), located posterolaterally and usually present in infancy
- Morgagni hernia: smaller, anterior and presents later in life, through the sternocostal angles

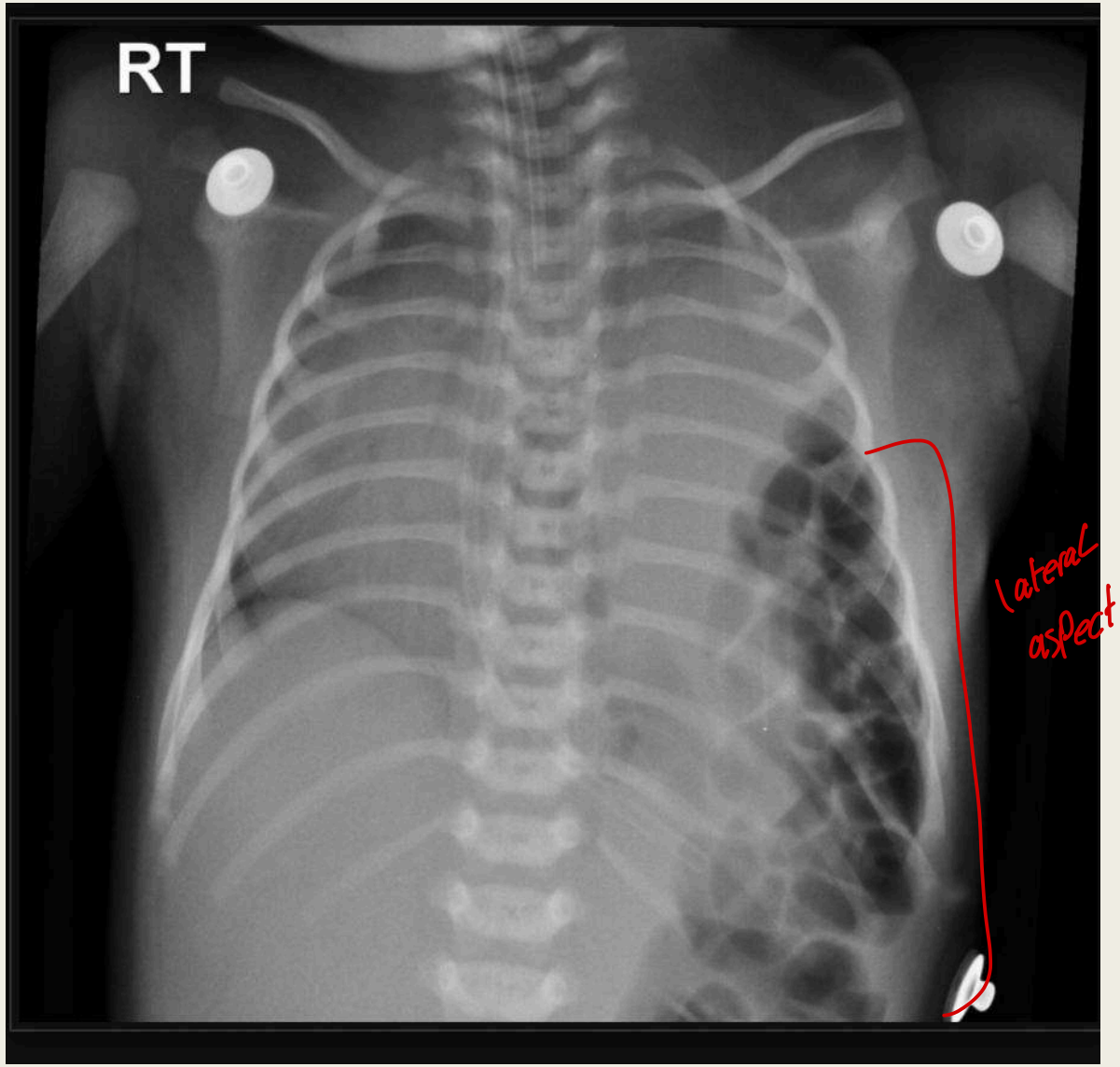
Bochdalek hernias

- , also known as pleuroperitoneal hernias, (alternative plural: herniae) are the commonest type of congenital diaphragmatic hernia. They occur posteriorly and are due to a defect in the posterior attachment of the diaphragm
- Retroperitoneal structures may prolapse through the defect, e.g. Retroperitoneal fat or left kidney.

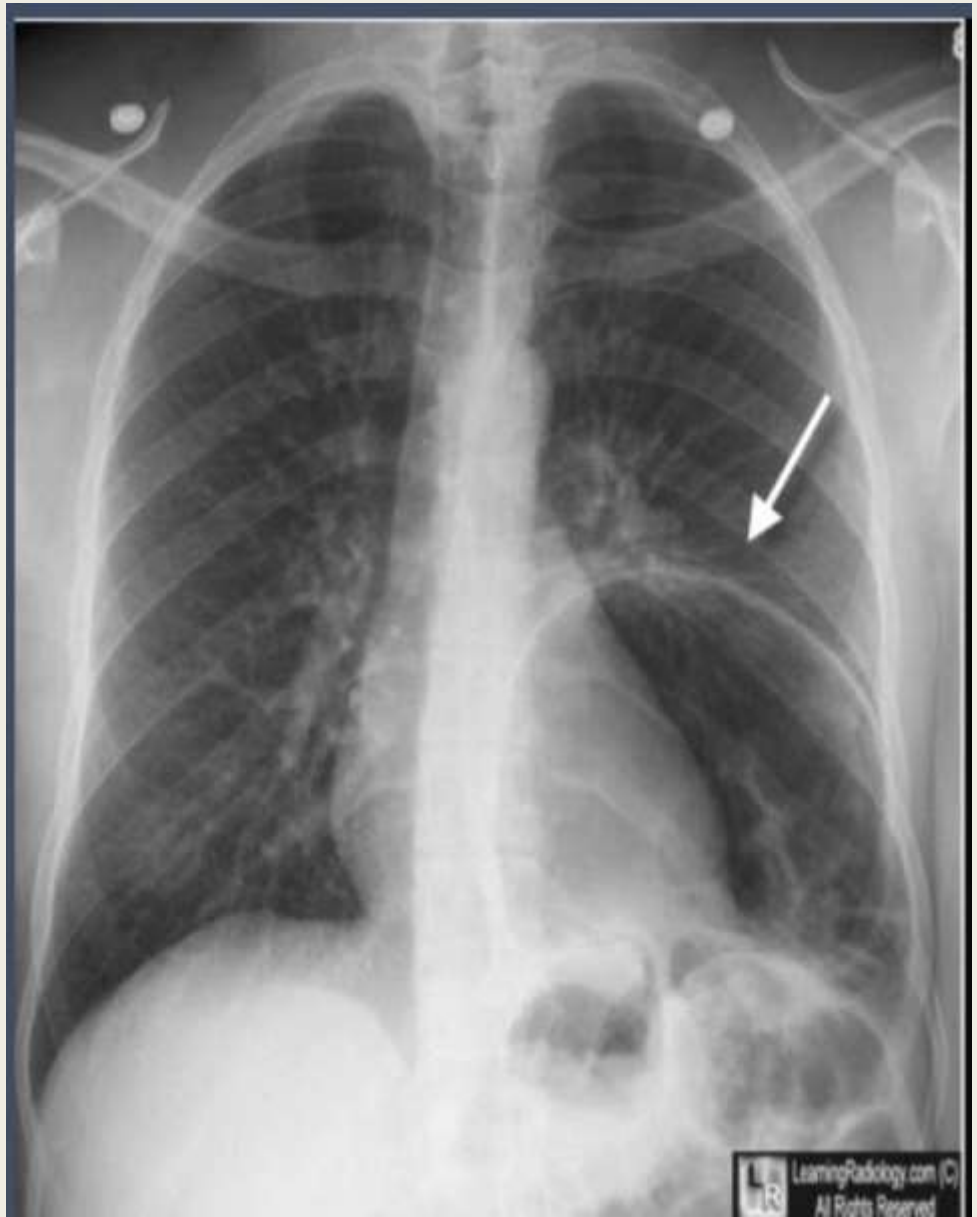


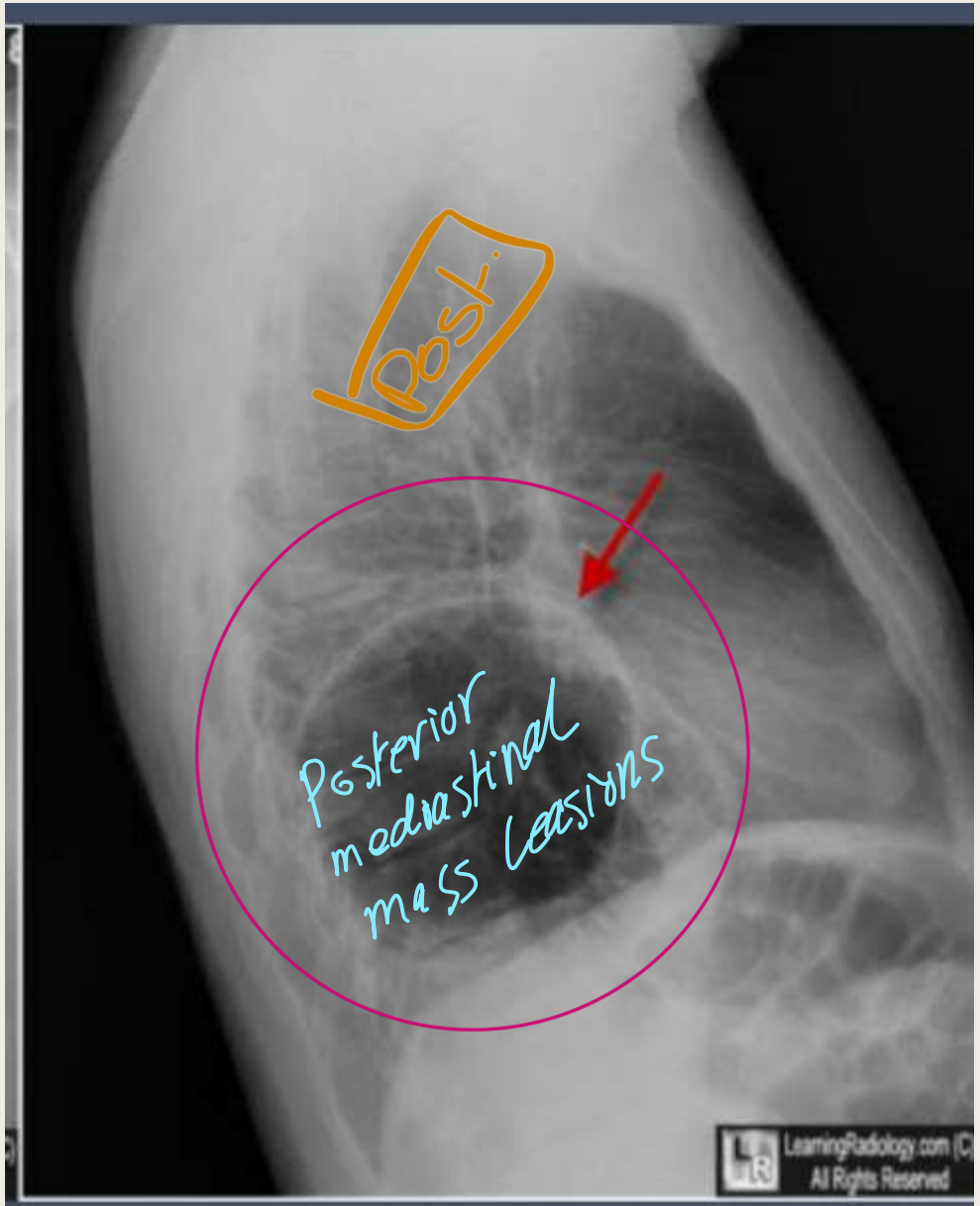
Plain radiograph

On conventional radiographs, the hernia may appear as a lung base soft-tissue opacity lesion seen posteriorly on lateral images.



Left side, elevation of diaphragme.





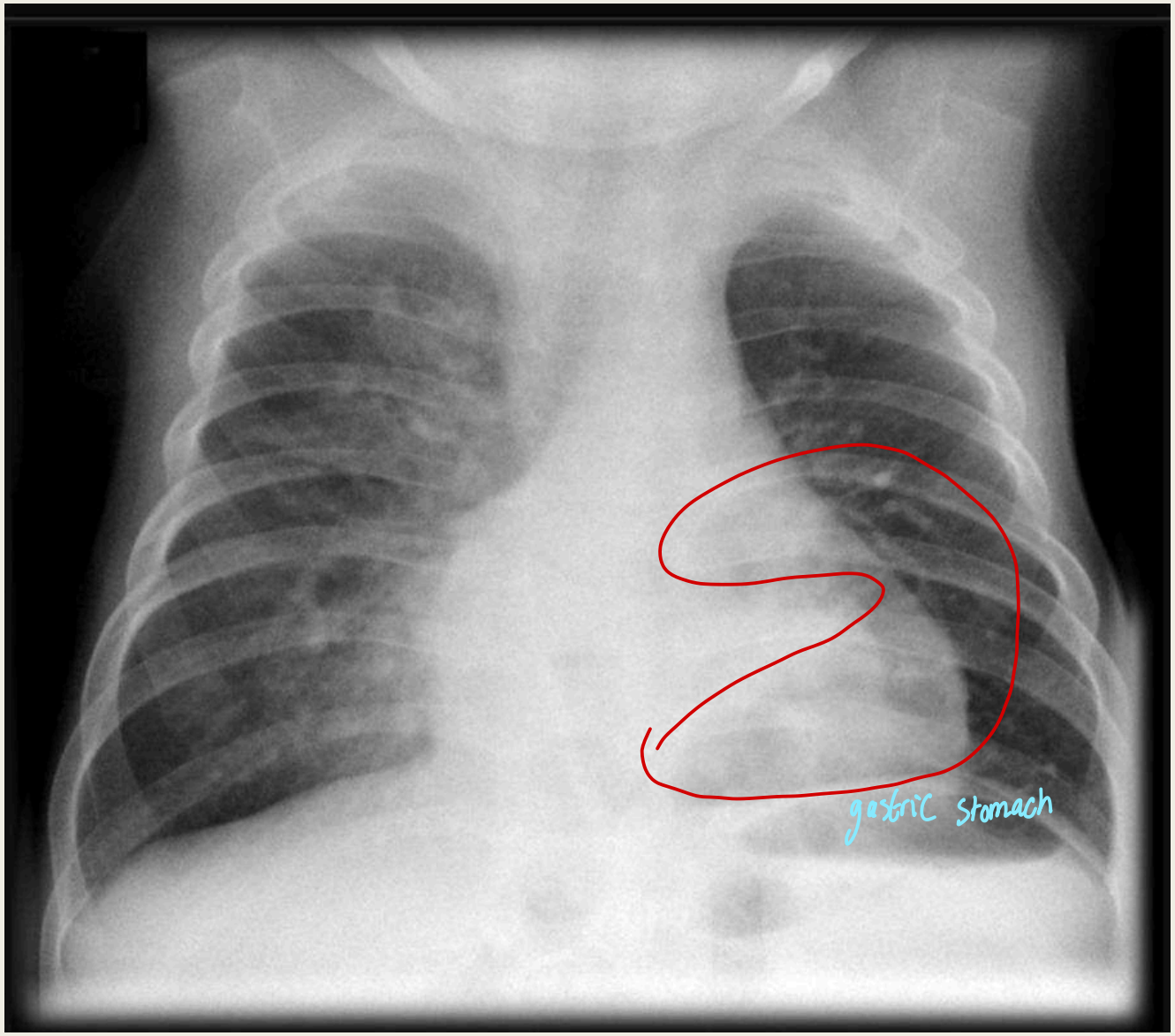
Morgagni hernia

medial and Right Side

- Morgagni hernias (alternative plural: herniae) are one of the congenital diaphragmatic hernias (CDHs) and are characterized by herniation through the foramen of Morgagni.

Sternum

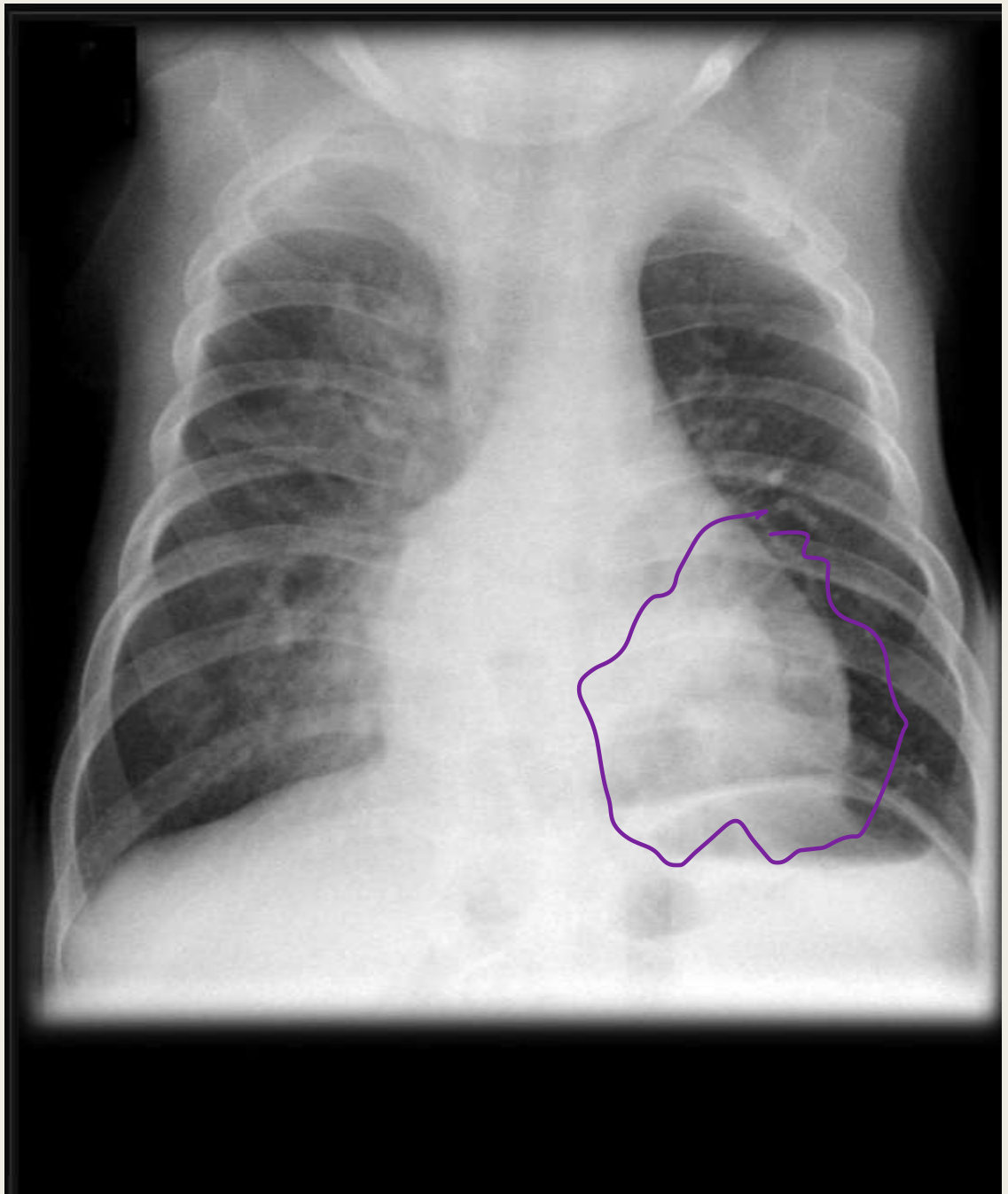
costo-sternal attachment of diaphragm

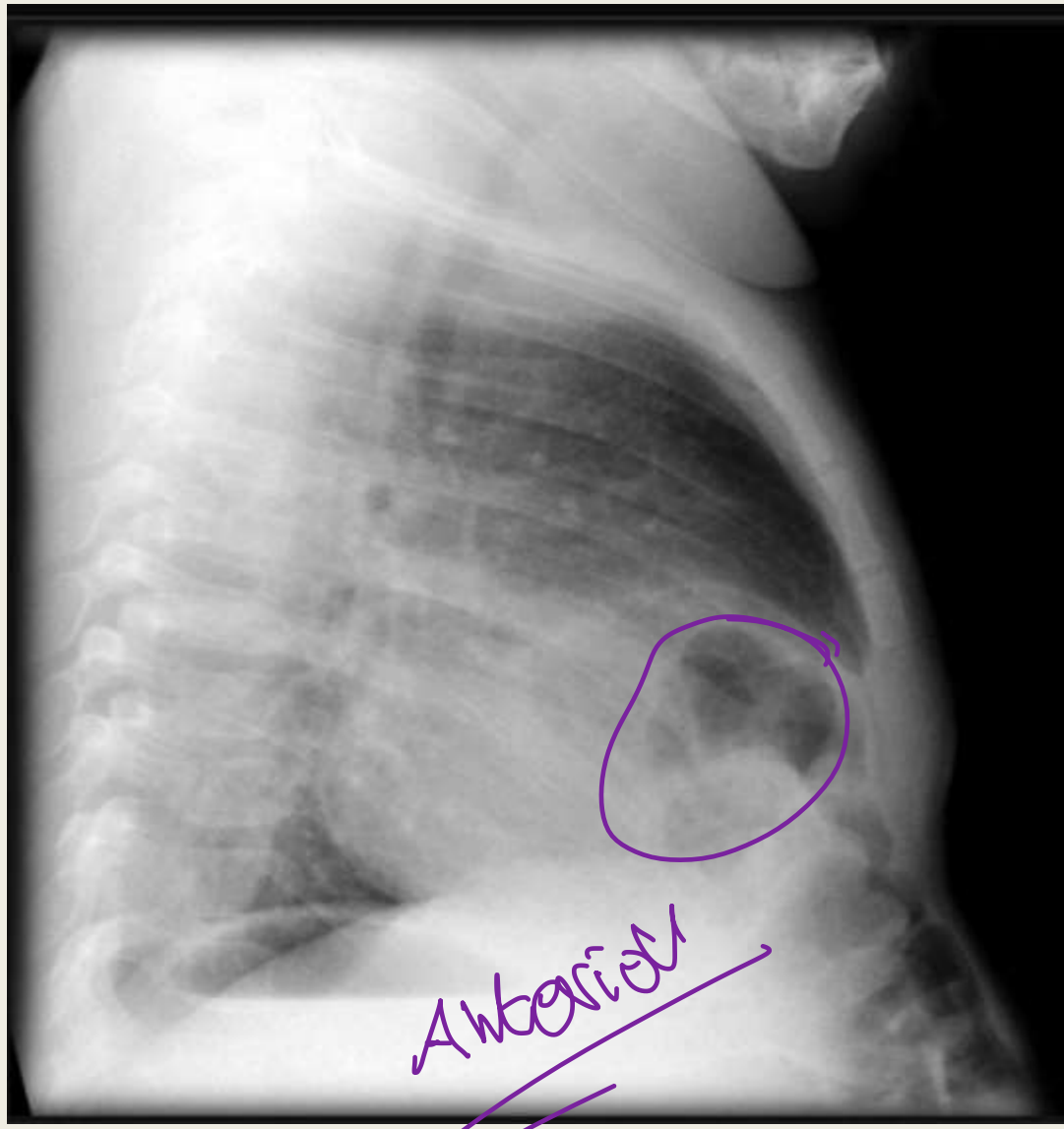


When compared to Bochdalek hernias, Morgagni hernias tend to be:

1. Anterior
2. more often right-sided(90%~)
3. small
4. rare (~2% of CDH)
5. at low risk of prolapse

Asymptomatic in adult age

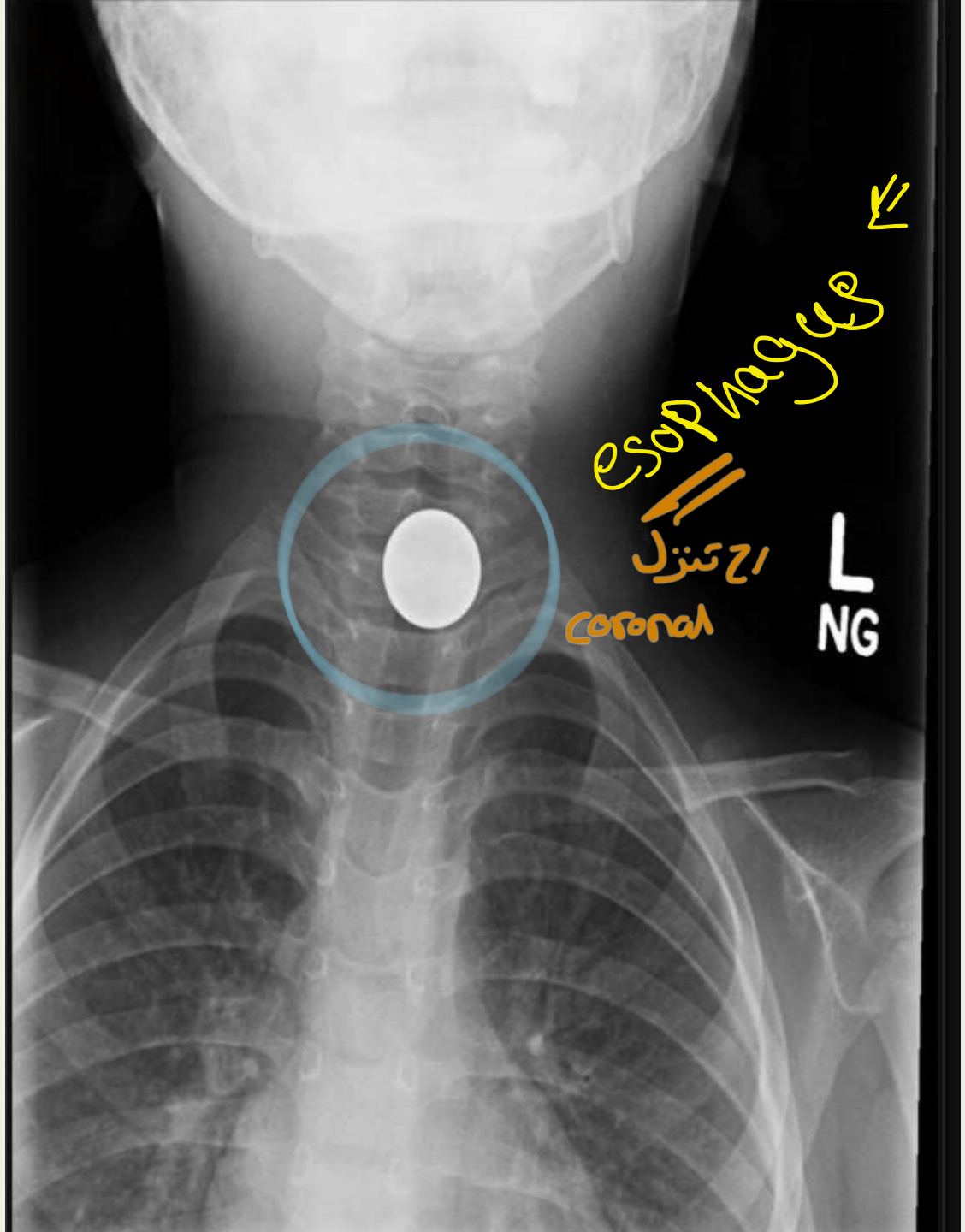


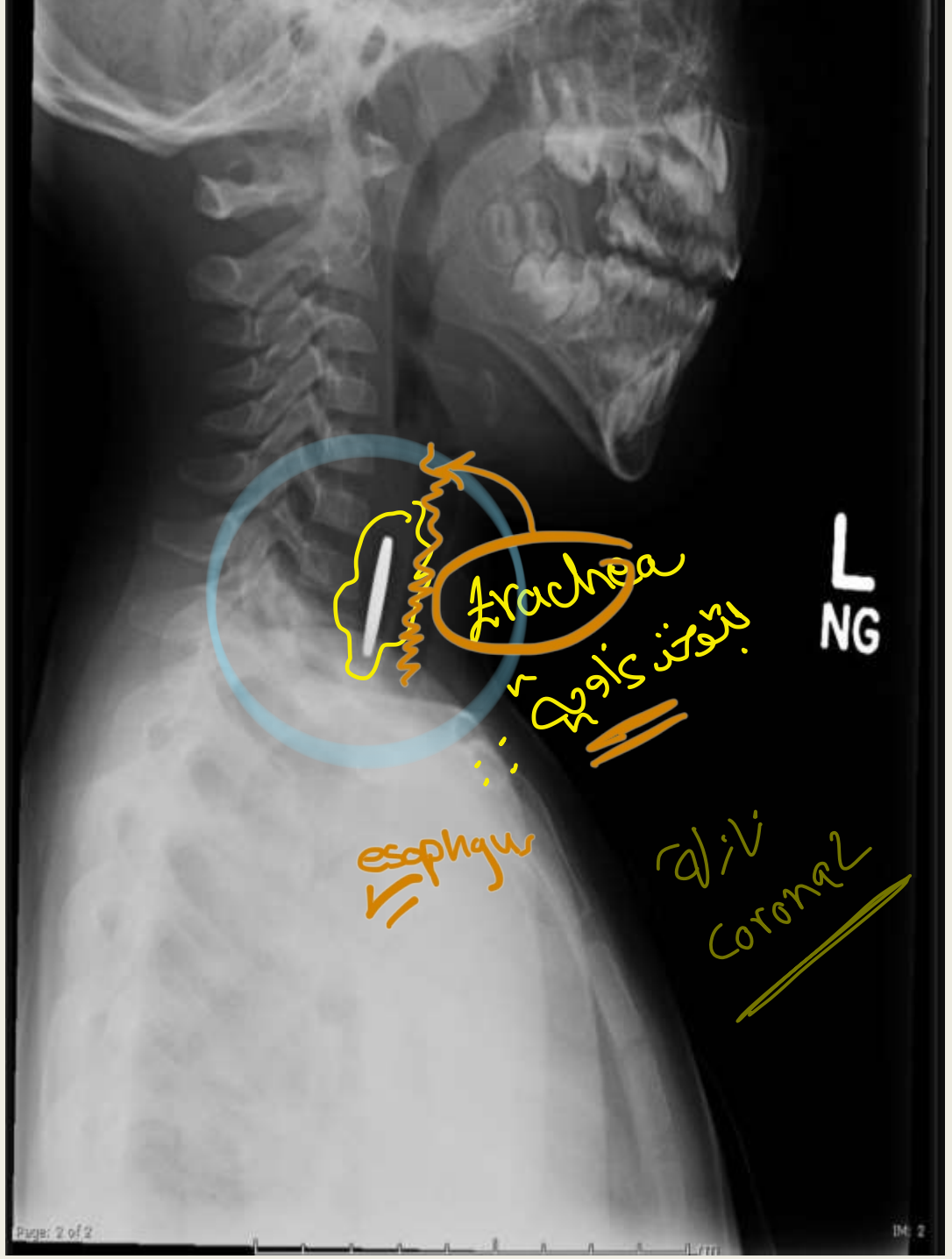

Atelectasis

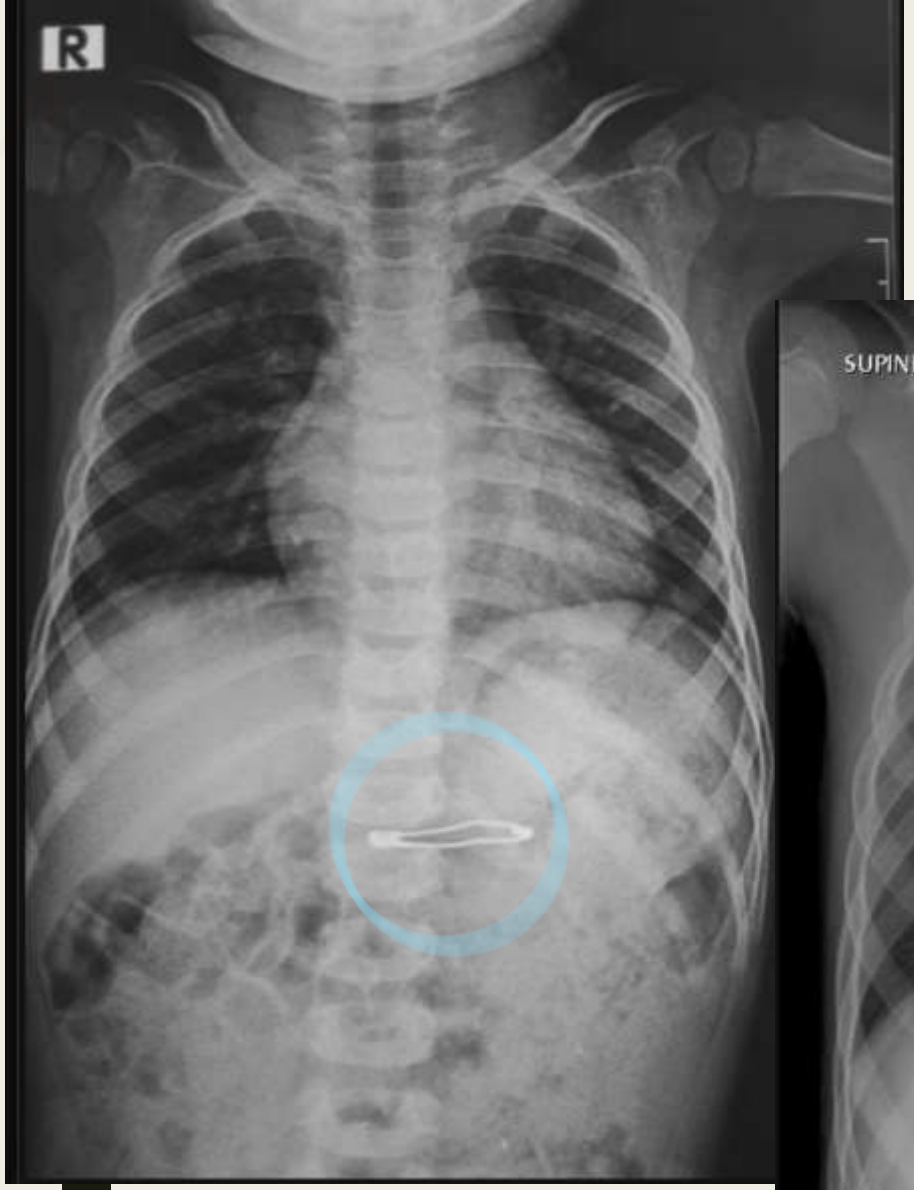
Foreign body ingestion series (paediatric)

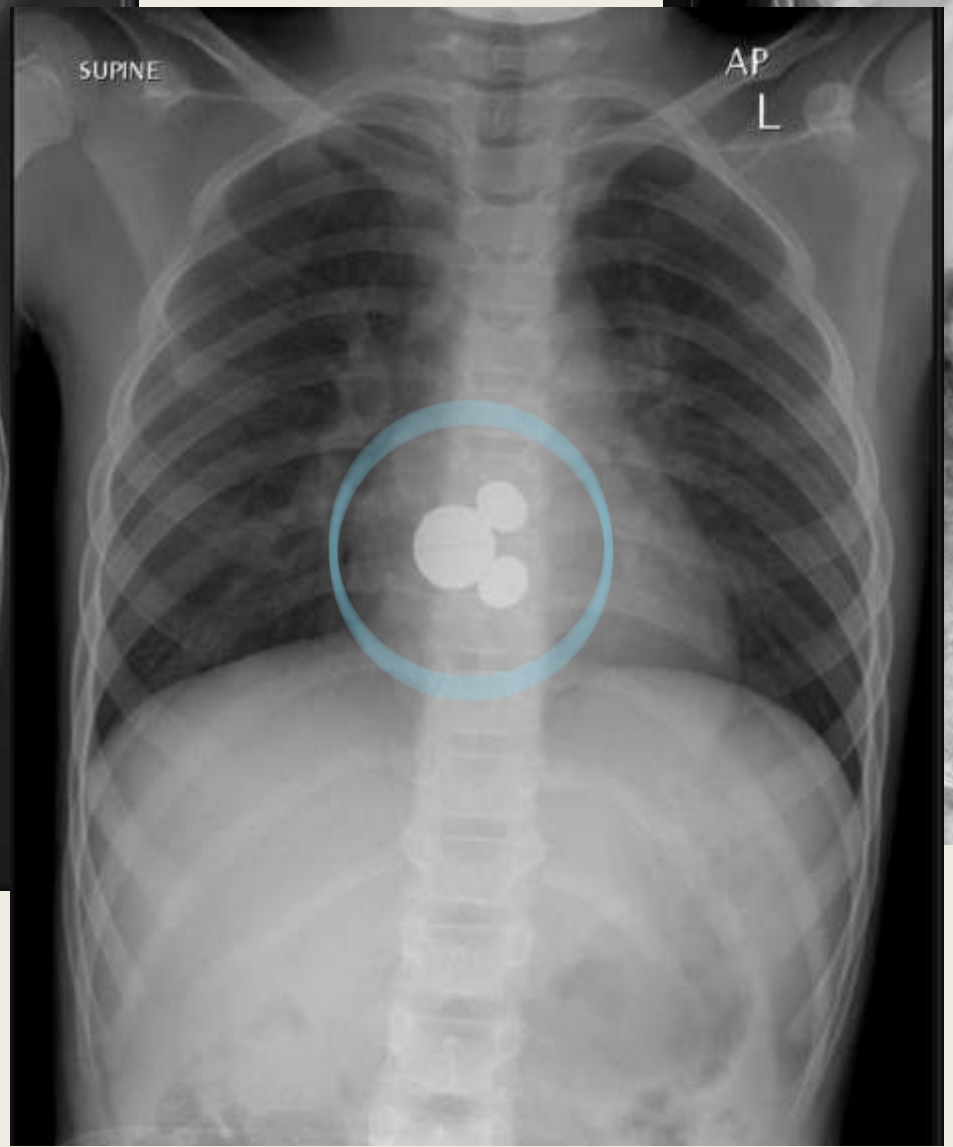
- Coins are the most commonly ingested foreign body 3, along with toys, batteries, bones, and almost anything that can fit into a child's mouth.
- Standard radiographic investigation of foreign bodies in children should include plain radiographs of the neck, thorax and entire abdomen

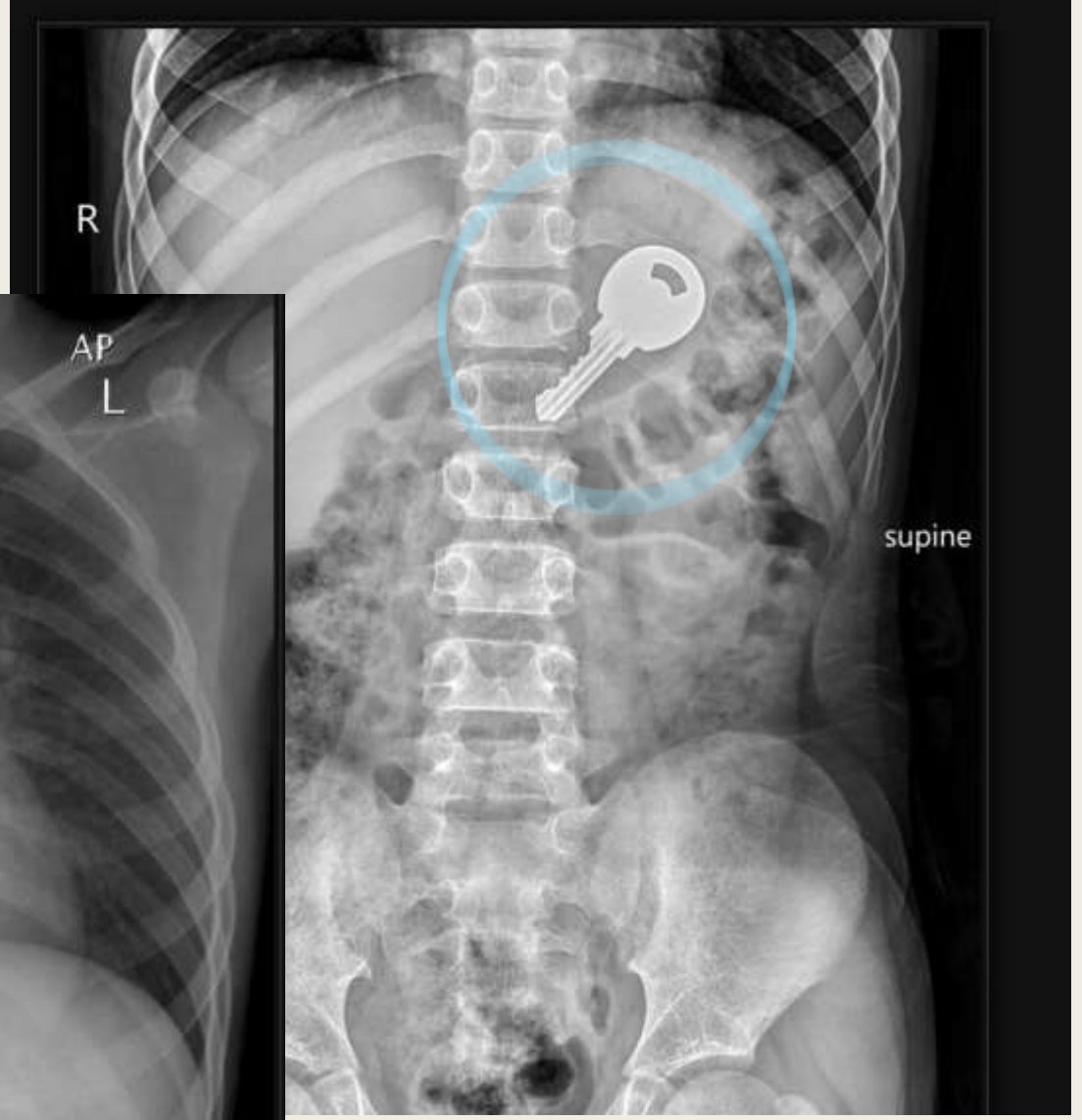
AP
supine <2yrs


Esophagus
تنزل
coronal
L
NG


Trachea
تتوجه ناحية
esophgus
L
NG
Page: 2 of 2


R

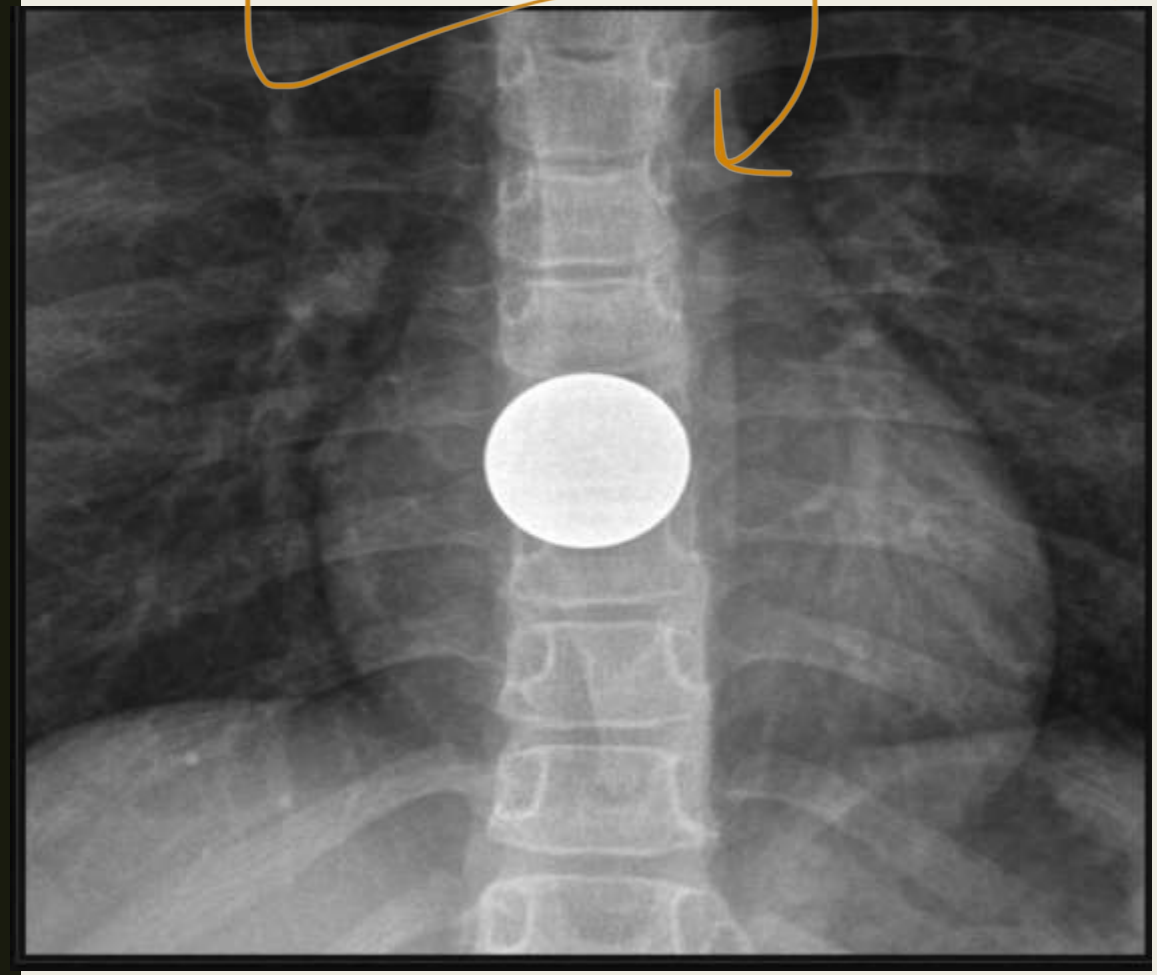

SUPINE
AP
L


R
supine

- Coins:
- Coins visualised in the sagittal plane (acquired while entering through vocal cords) on anteroposterior radiographs are in the trachea
- coins in the oesophagus will have a coronal orientation on frontal chest radiographs.
- Button batteries:
- These are very similar in appearance to coins, but typically have a slight step in profile with an inner ring when viewed en face.

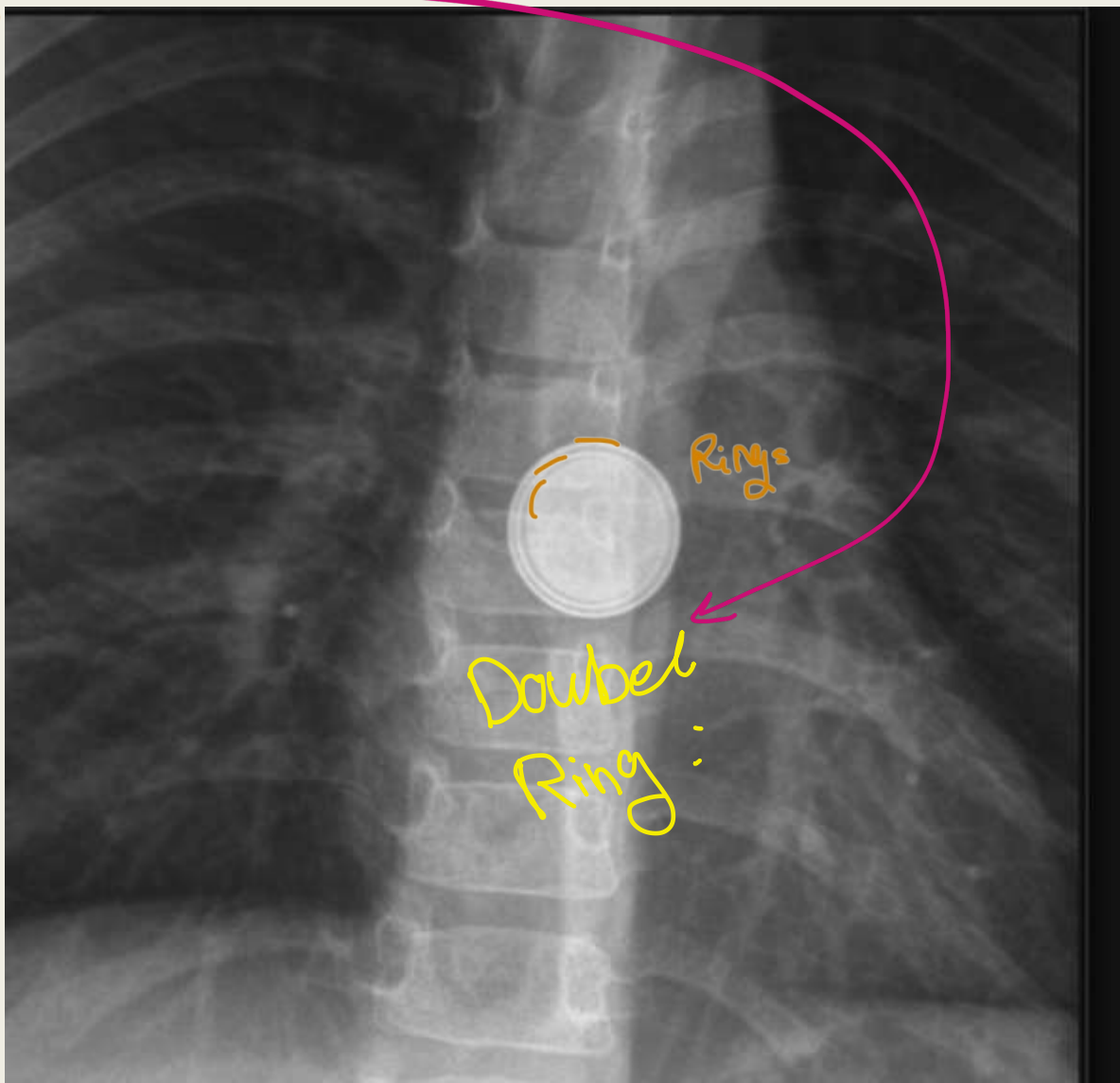
Coin

in esophagus.



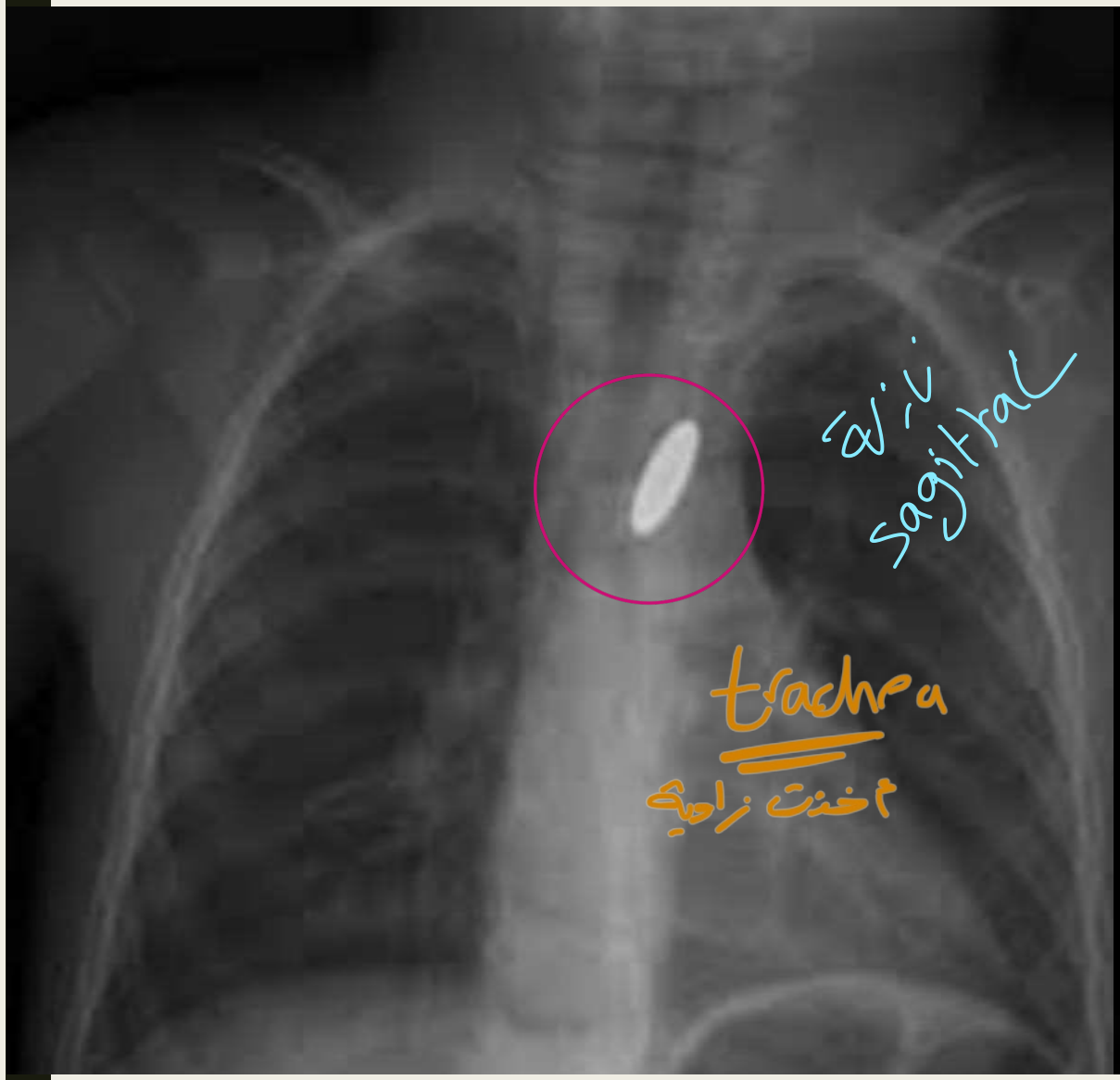
Battery

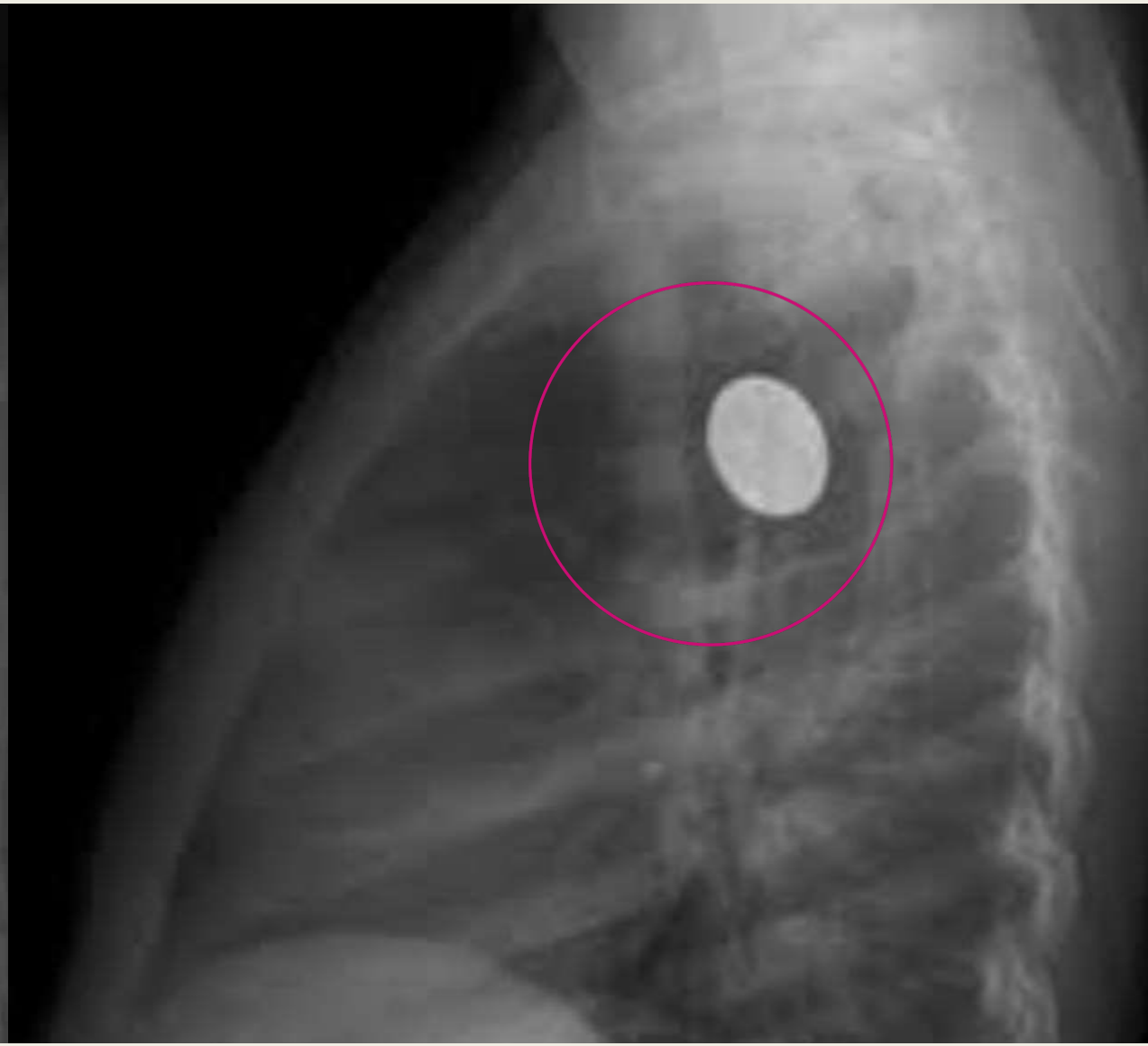
Multiple Rings



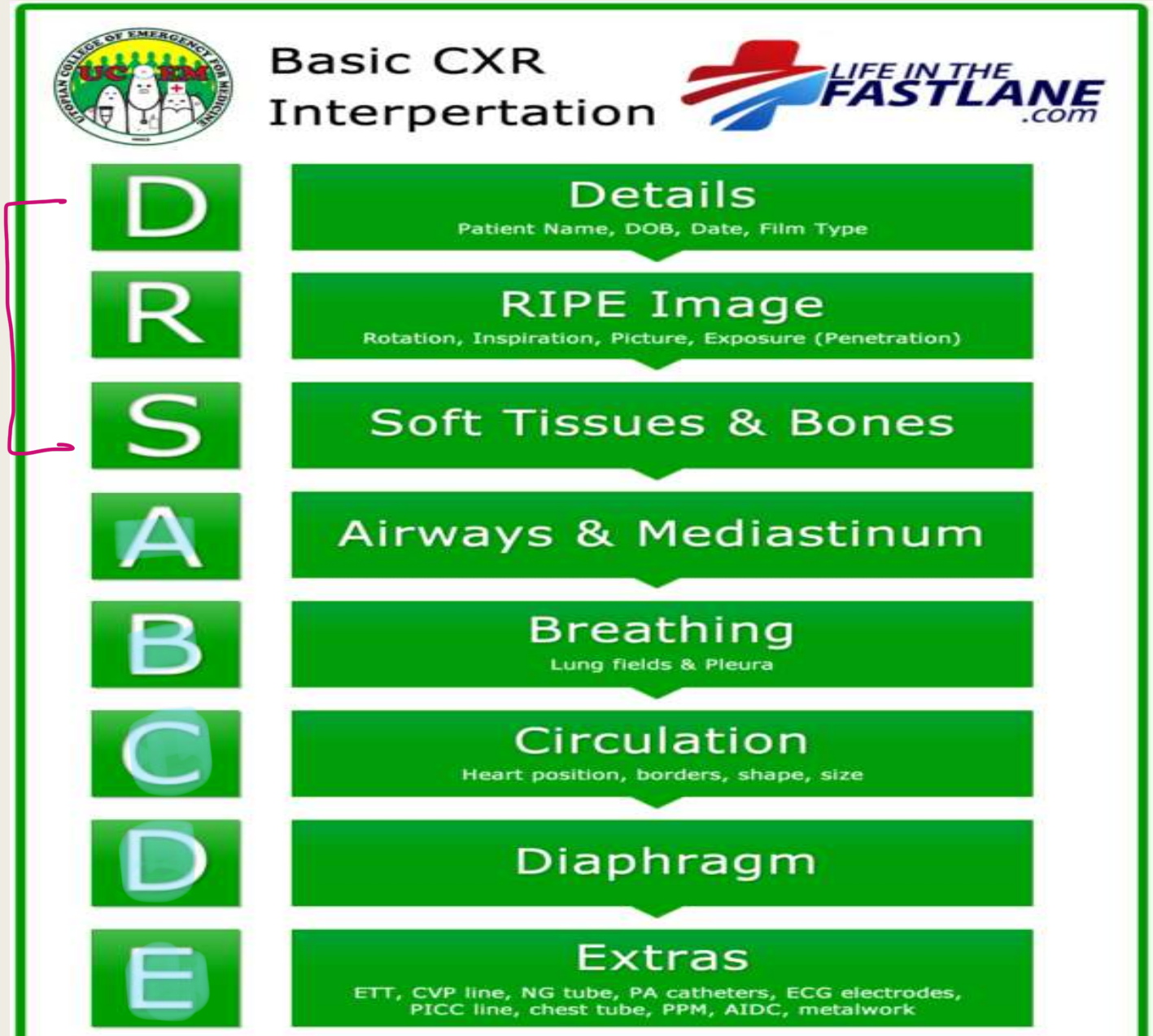
Coin in trachea

عادة بتكون فائدة





DRSABCDE of CXR Interpretation



hyper-inflation کا مطلب heart

D – Detail

- Name
- Date of birth (DOB)
- Type of film
- Study date & time

RIPE

- Rotation
- Inspiration
- Picture
- Exposure

SOFT TISSUES

- Ribs, sternum, spine, clavicles
- Breast shadows
- Calcification

AIRWAY

- Trachea
- Mediastinal width
- Aortic knob
- **Do not miss**: Deviated Trachea

BREATHING

- Lung field outlines ✓
- Symmetry ✓
- Pleural ✓
- **Do not miss:** Pneumothorax ✓

CIRCULATION

- Heart size on PA film ✓
- Heart borders ✓
- Heart shape ✓

DIAPHRAGM

- Hemidiaphragm levels
- Diaphragm shape or contour
- Costophrenic angles
- **Do not miss**: Subdiaphragmatic Free Air (pneumoperitoneum)

EXTRAS

- Nasogastric tube
- Pacemaker
- ECG electrodes
- PICC line
- Foreign body
- ET tube

Lightning Learning: Basic Chest X-rays in Adults

em3.org.uk @EM3FOAMed University Hospitals of Leicester NHS #EM3

DETAIL
- Name
- DOB
- Type of film
- Study date/time

RIPE
- Rotation
- Picture
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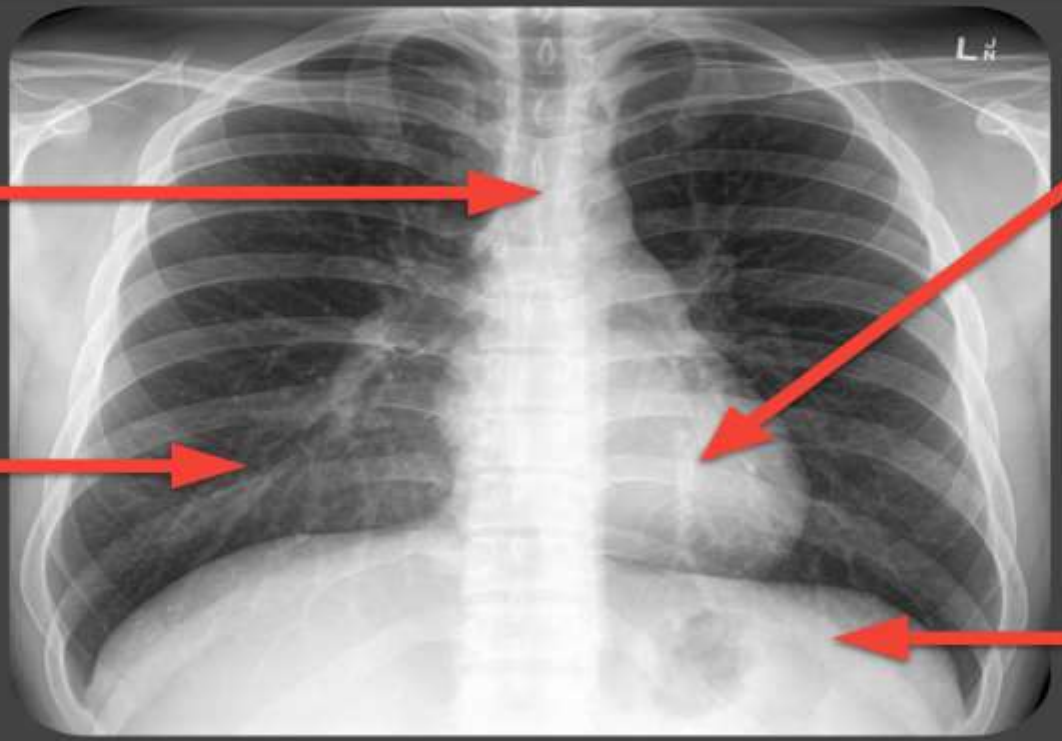
DO NOT MISS:
PNEUMOTHORAX



CIRCULATION
- Heart size on PA film
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DIAPHRAGM
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DO NOT MISS:
SUBDIAPHRAGMATIC FREE AIR (PNEUMO-PERITONEUM)

EXTRAS
- Nasogastric tube
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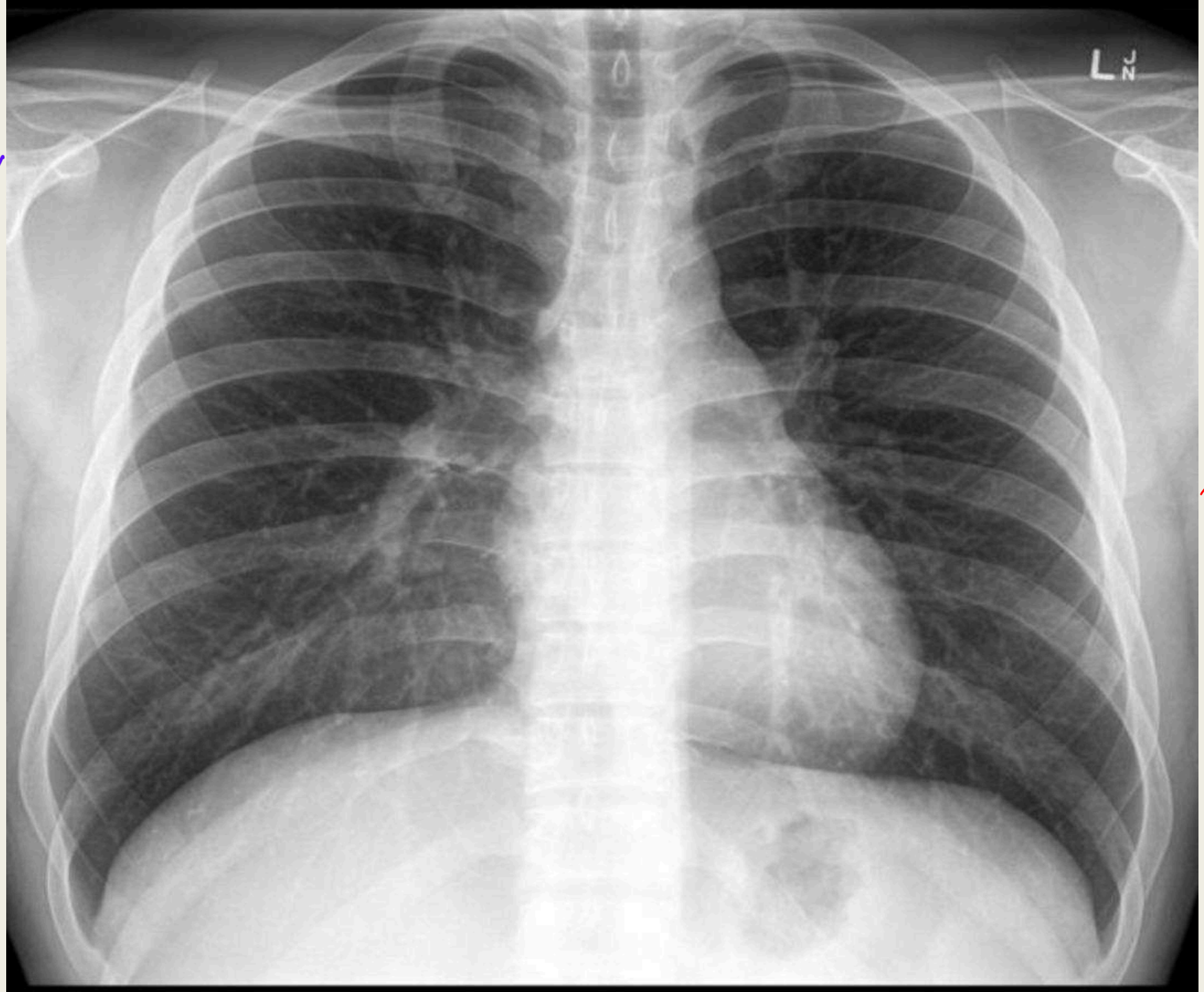
- ET tube

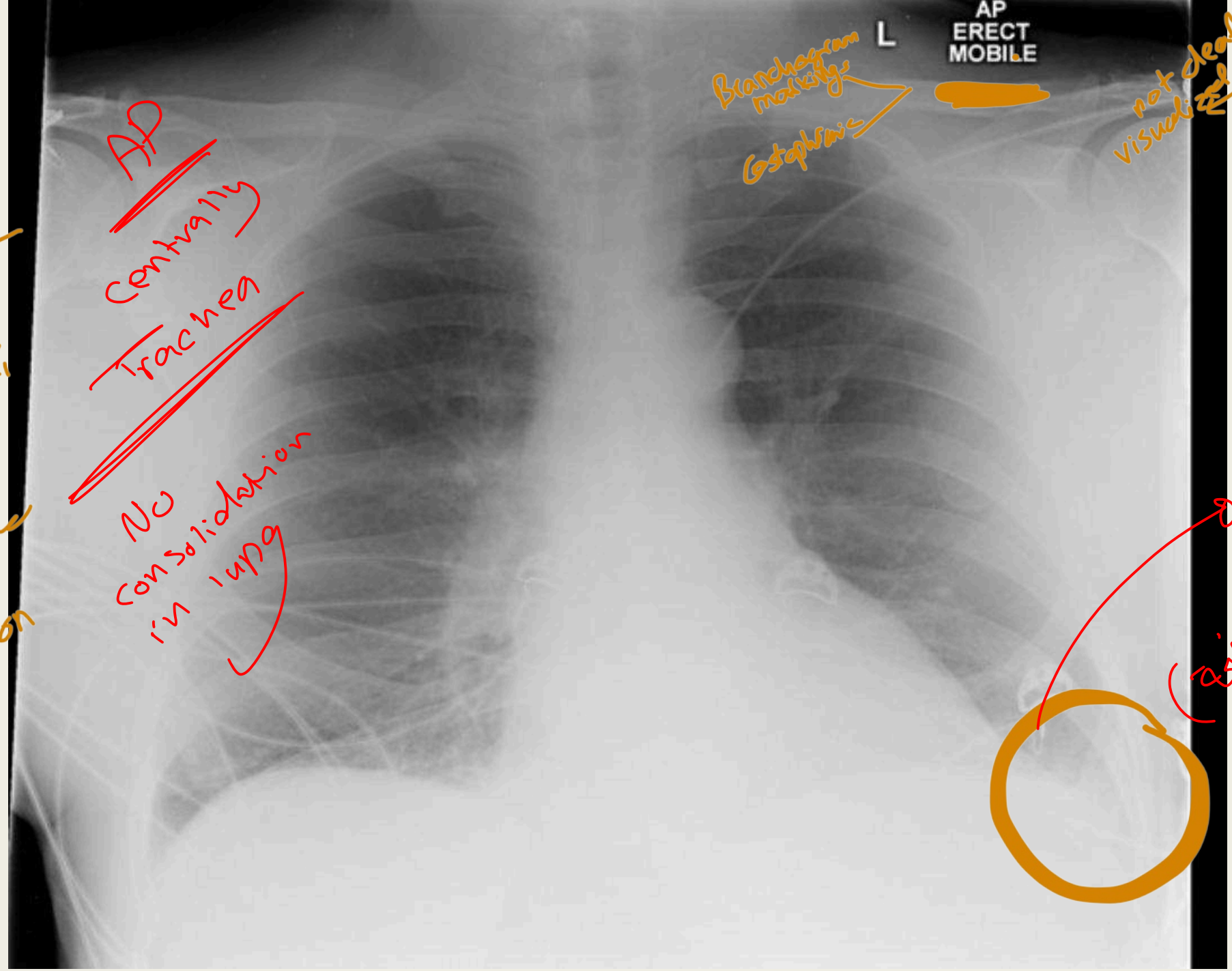
Source: litfl.com/drsabcde-of-cxr-interpretation
Image courtesy of Assoc Prof Frank Gaillard, Radiopaedia.org, rID: 8090

Author: Anuja Chalishazar **Date:** 09.06.2020 **Version:** 1.1

* normal chest x ray, normal costophrenic angel
* trachea centraly localized, body vertebra seen up to four.
* no cardiomegaly



Normal
PA CXR
centrally trachea
No Masses
Clear Posto-phrenic angles



Blanchegram marking
Costophrenic

not clearly visualized

* Chest X ray with under exposure the body of vertebra not seen.

Normal

لأنه erect

هاي الصورة لازم أستعاد لما يتحسن المريض.... او أعمل CT

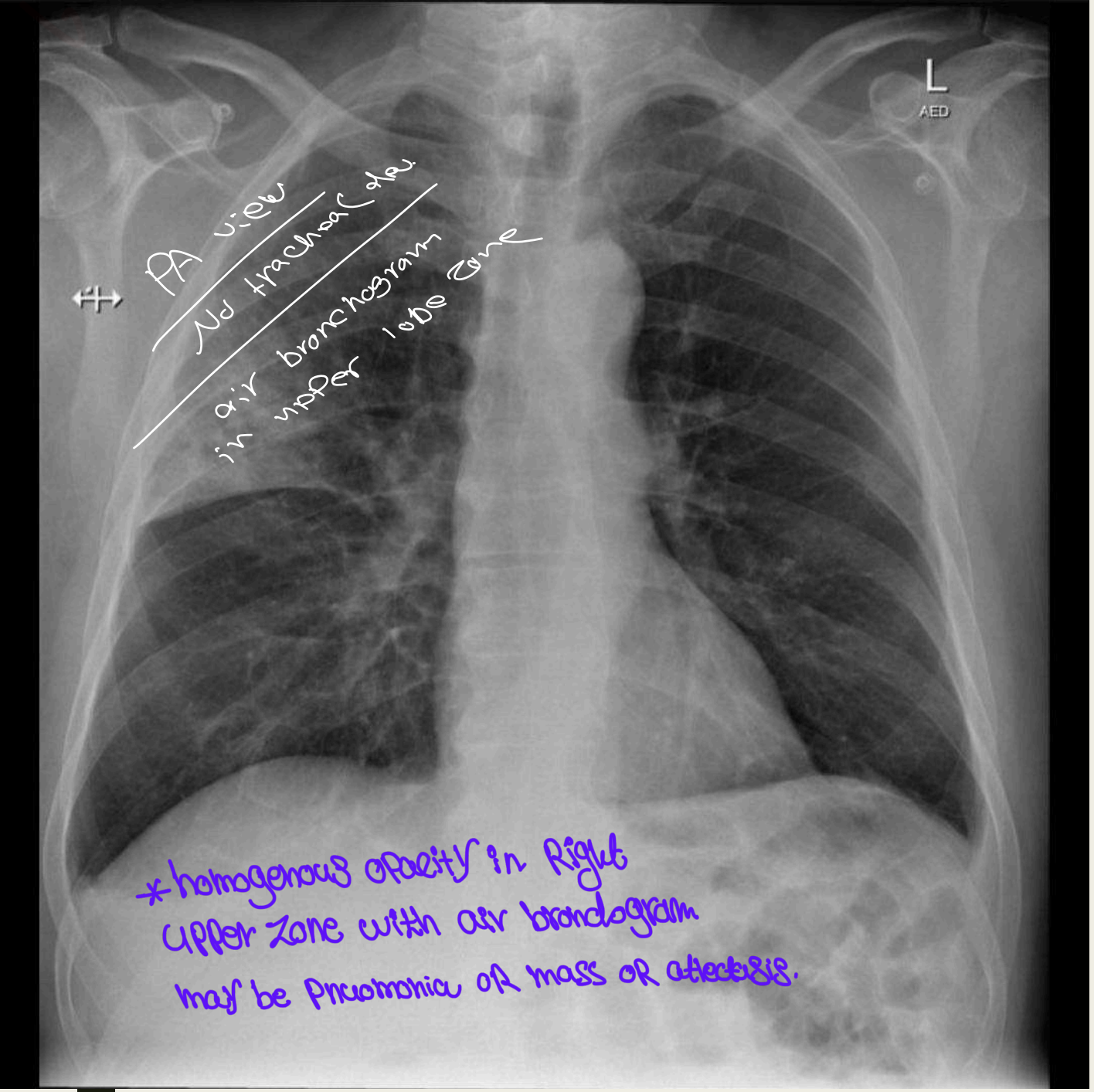
to exclude pleural effusion

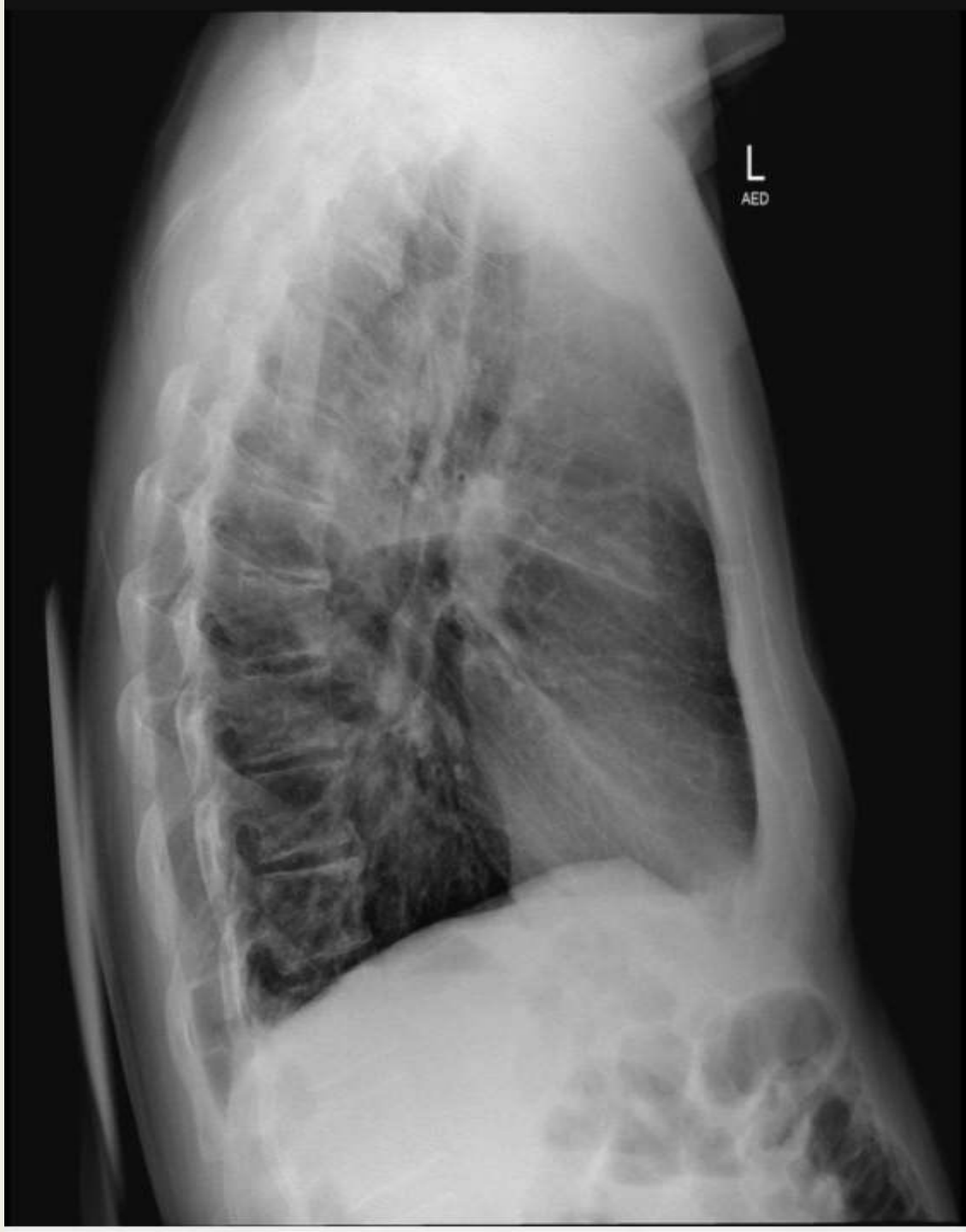
AP
Centrally
Trachea

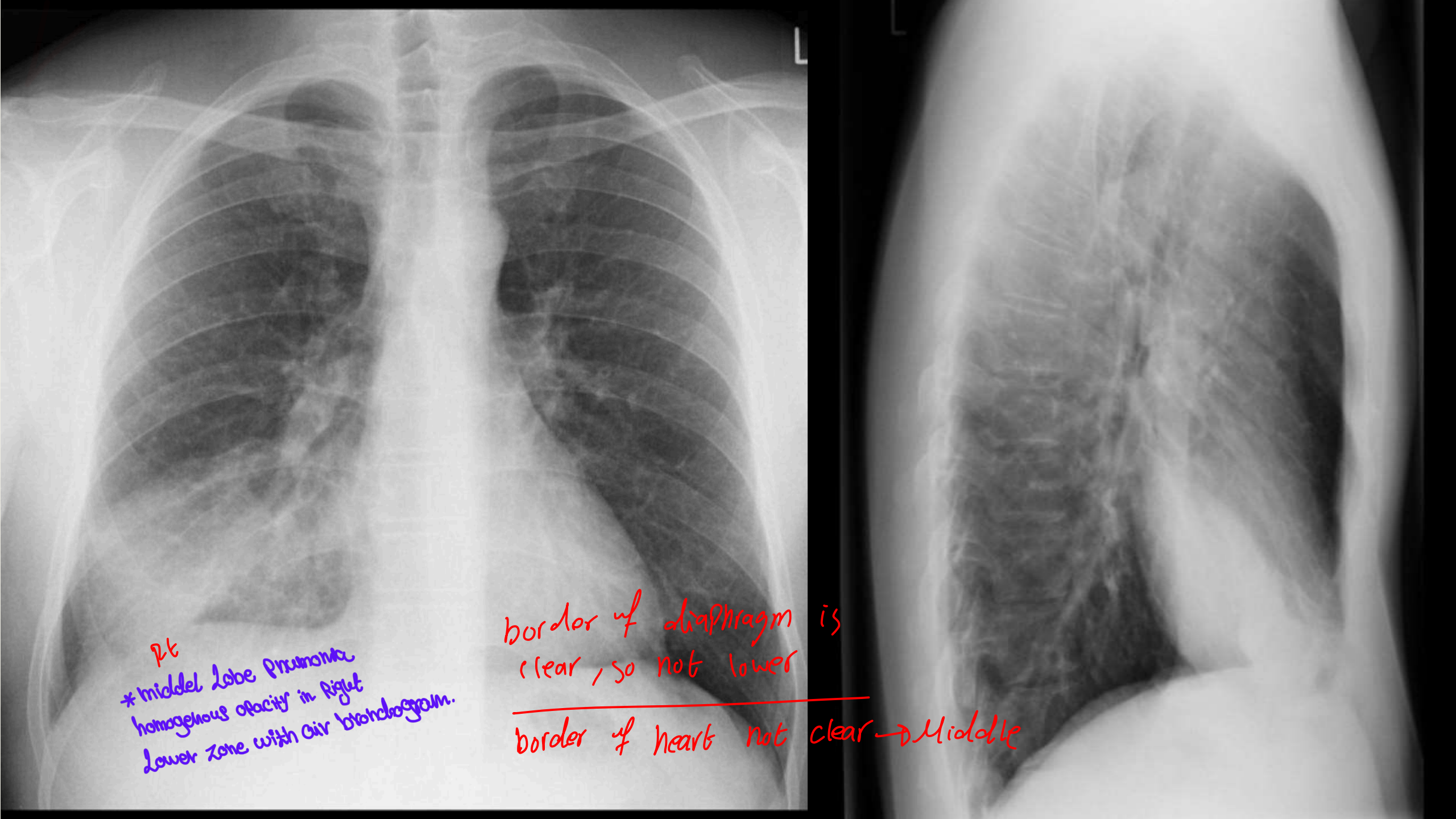
No consolidation in lung

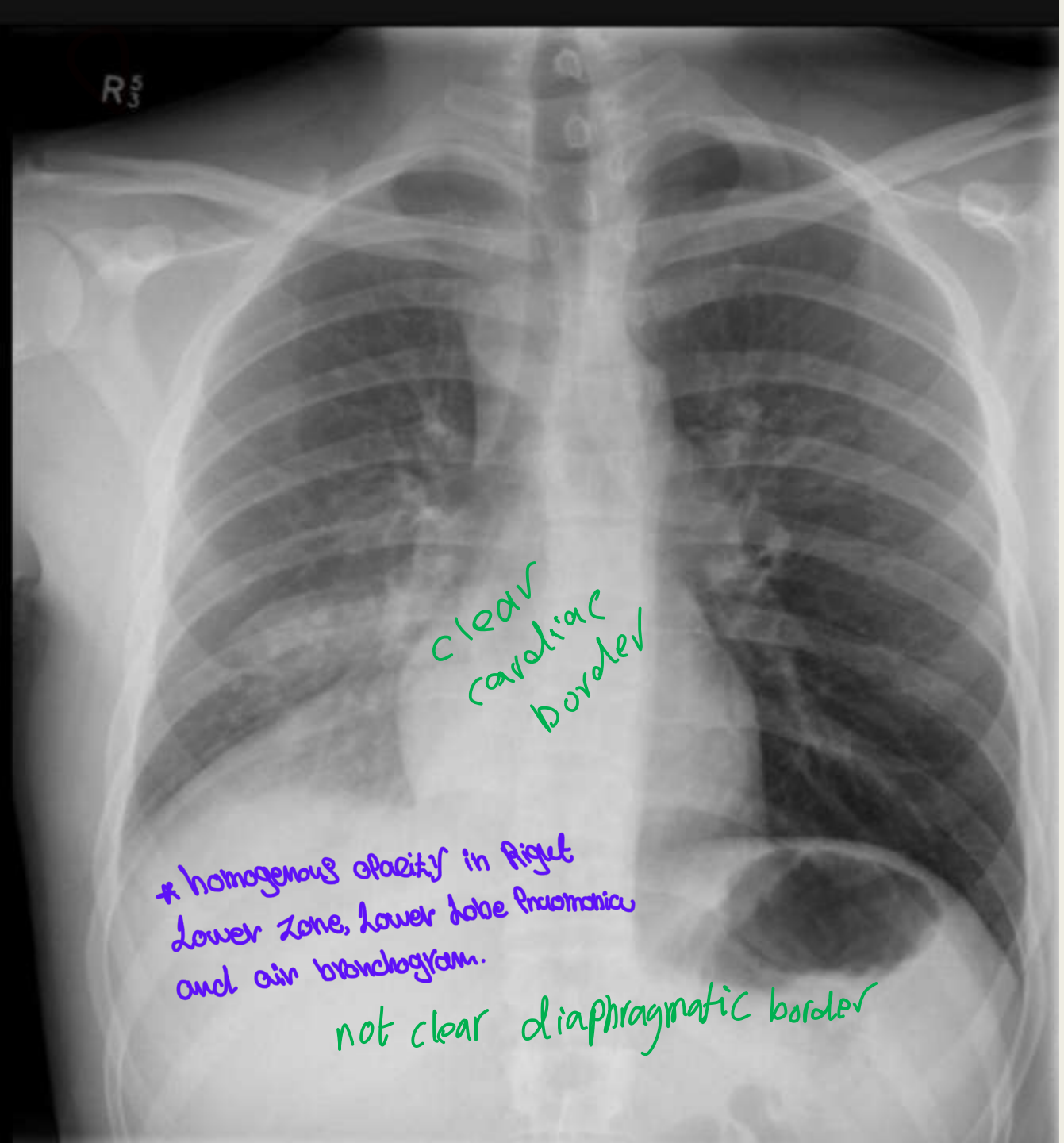
صعب في الكوستوفرينك (زاوية)

Costophrenic

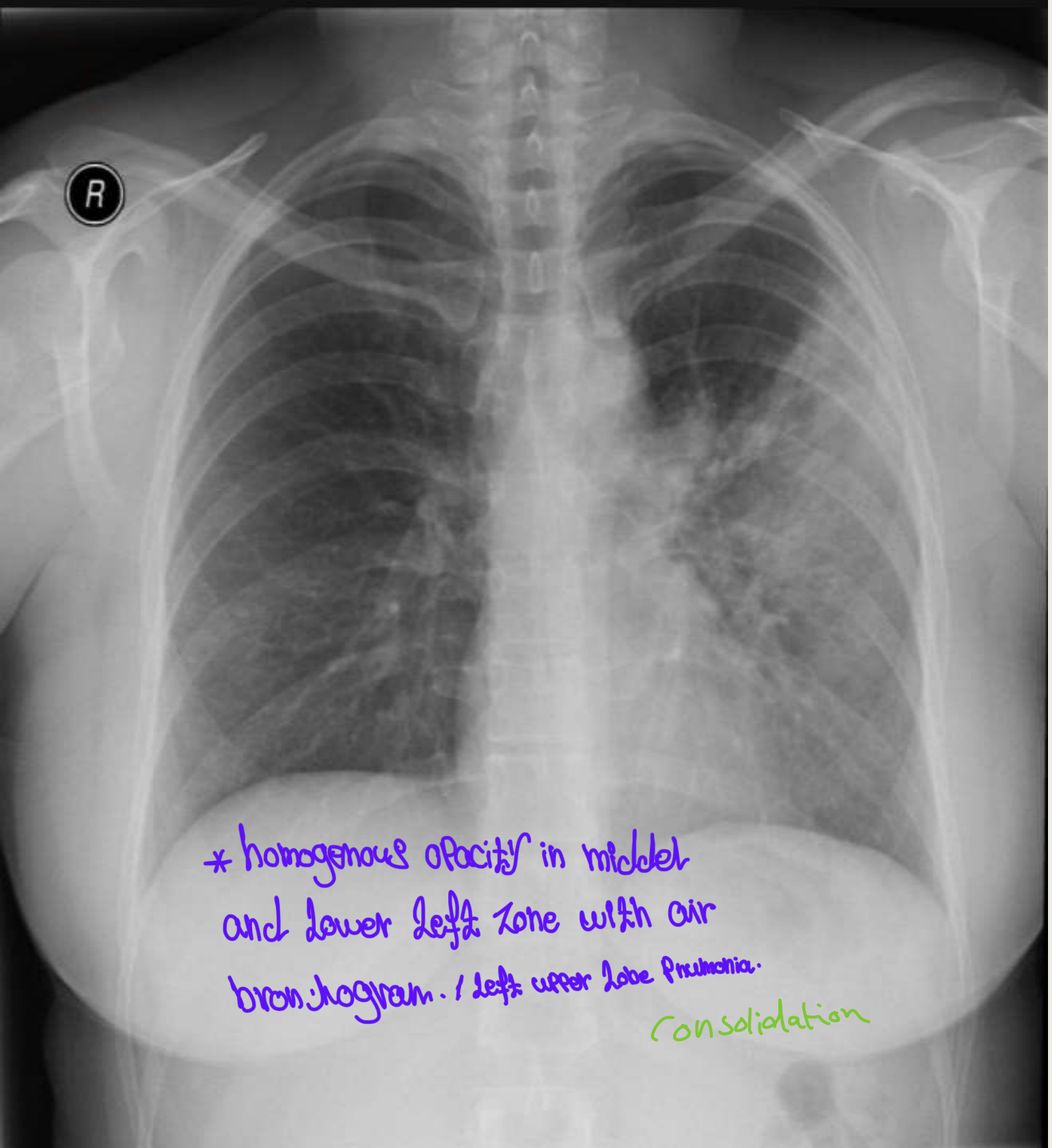

L
AED
PA view
Nd trachea dev.
air bronchogram
in upper lobe zone
*homogenous opacity in Right
Upper zone with air bronchogram
may be Pneumonia or mass or atelectasis.


L
AED


Rt
* middel Lobe Pneumonia
homogenous opacity in Right
Lower zone with air bronchogram.
border of diaphragm is
clear, so not lower
border of heart not clear → Middle

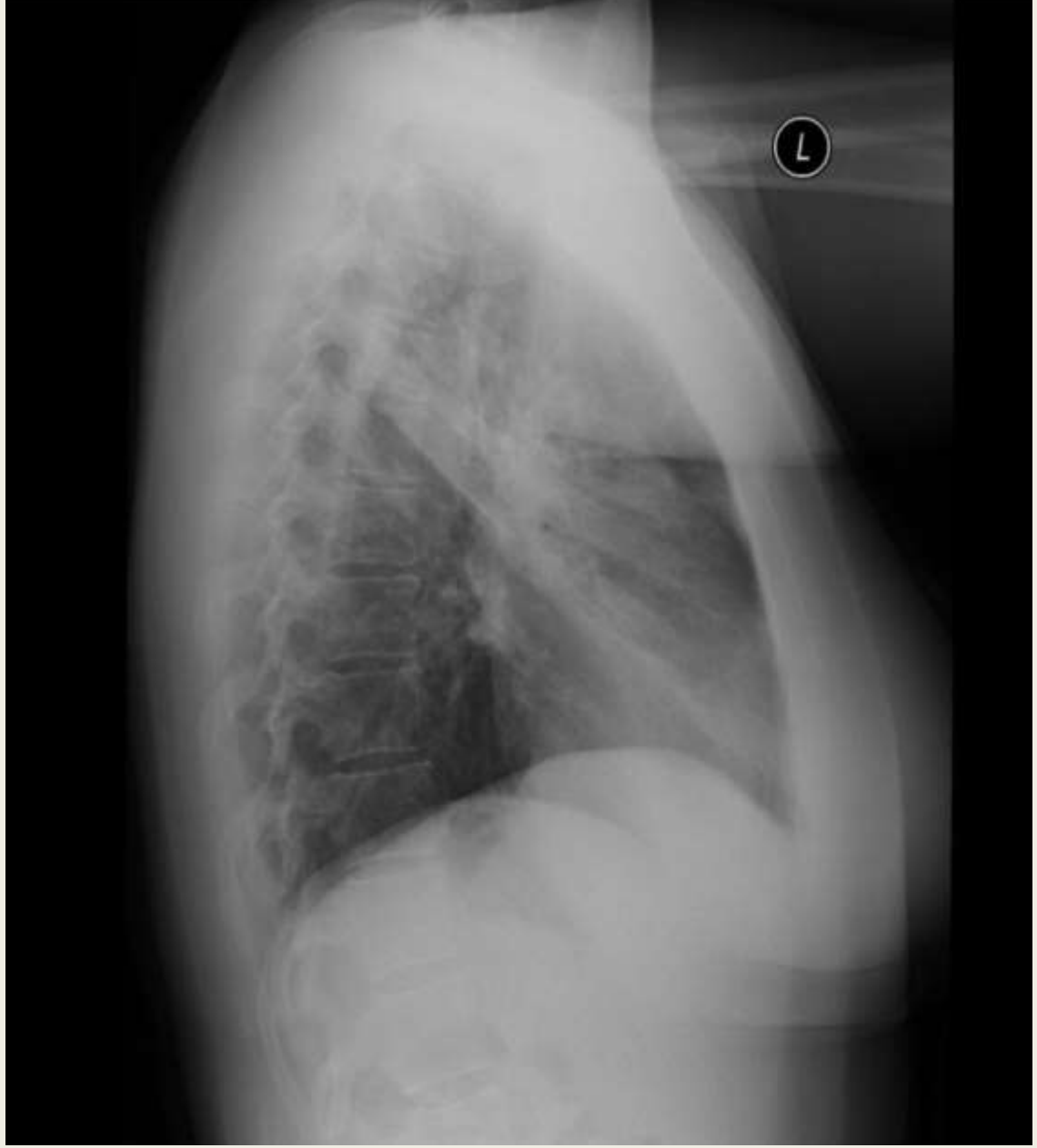

R 5 3
clear cardiac border
* homogenous opacity in Right Lower zone, Lower lobe Pneumonia and air bronchogram.
not clear diaphragmatic border

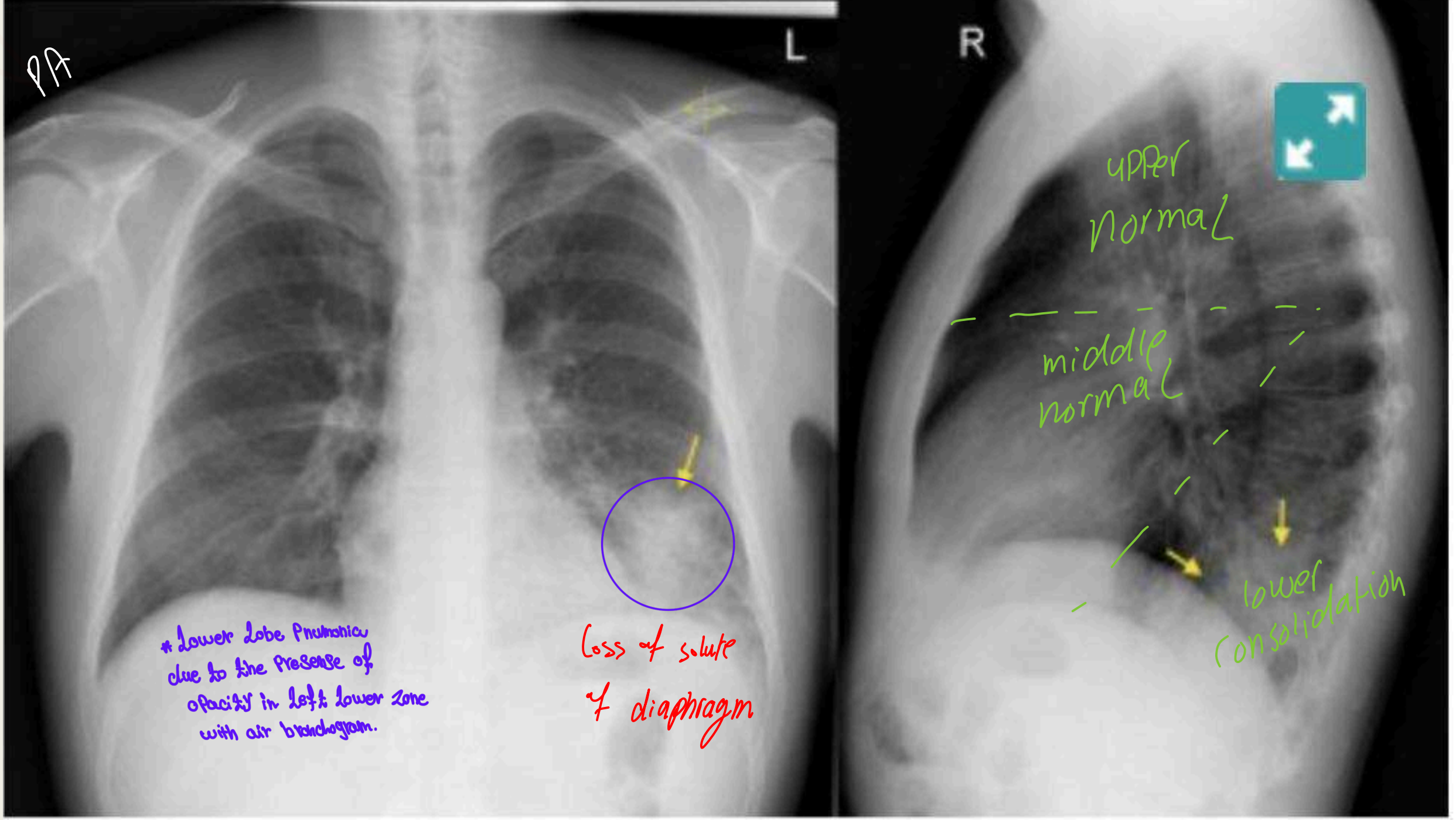

L 53

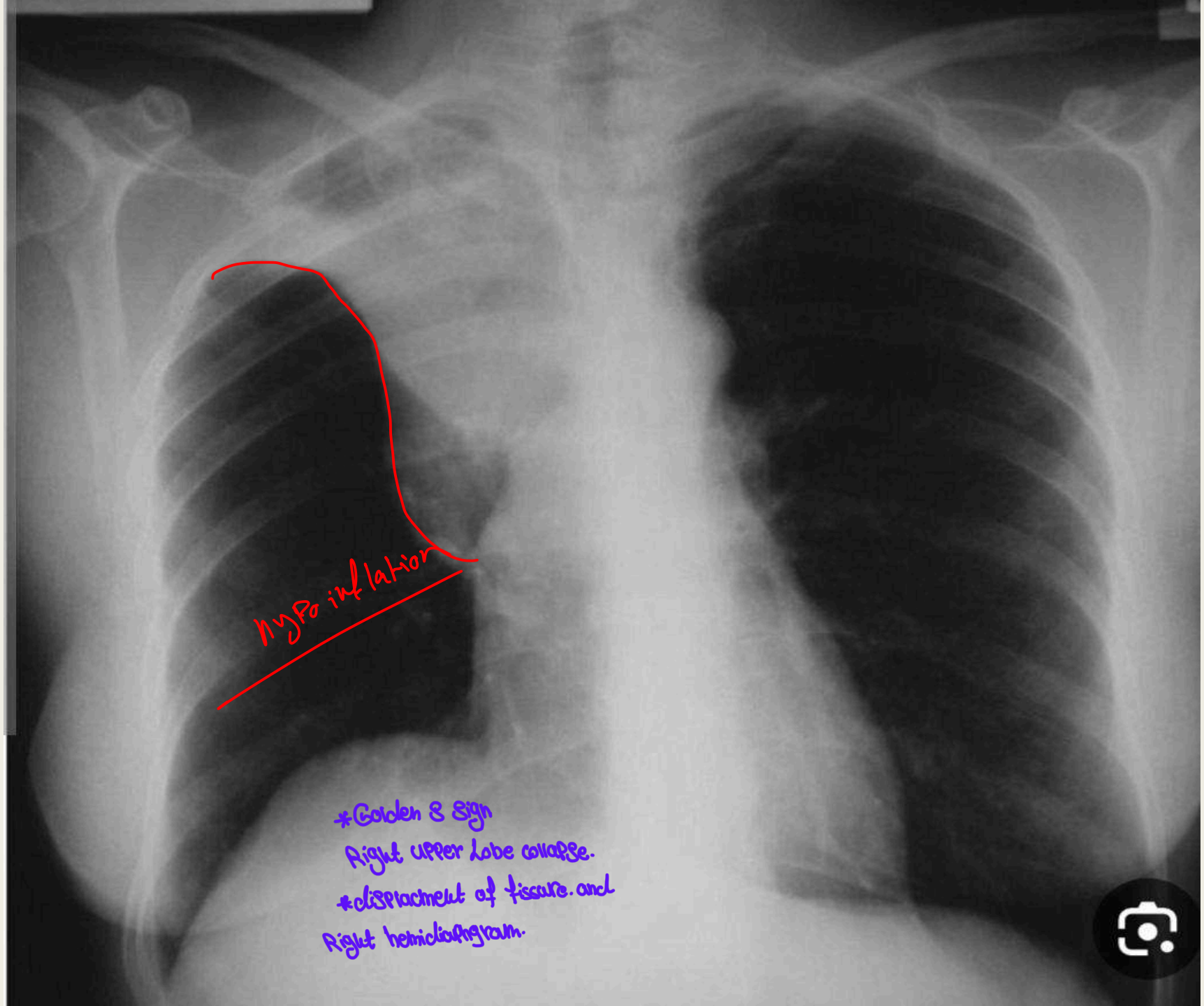


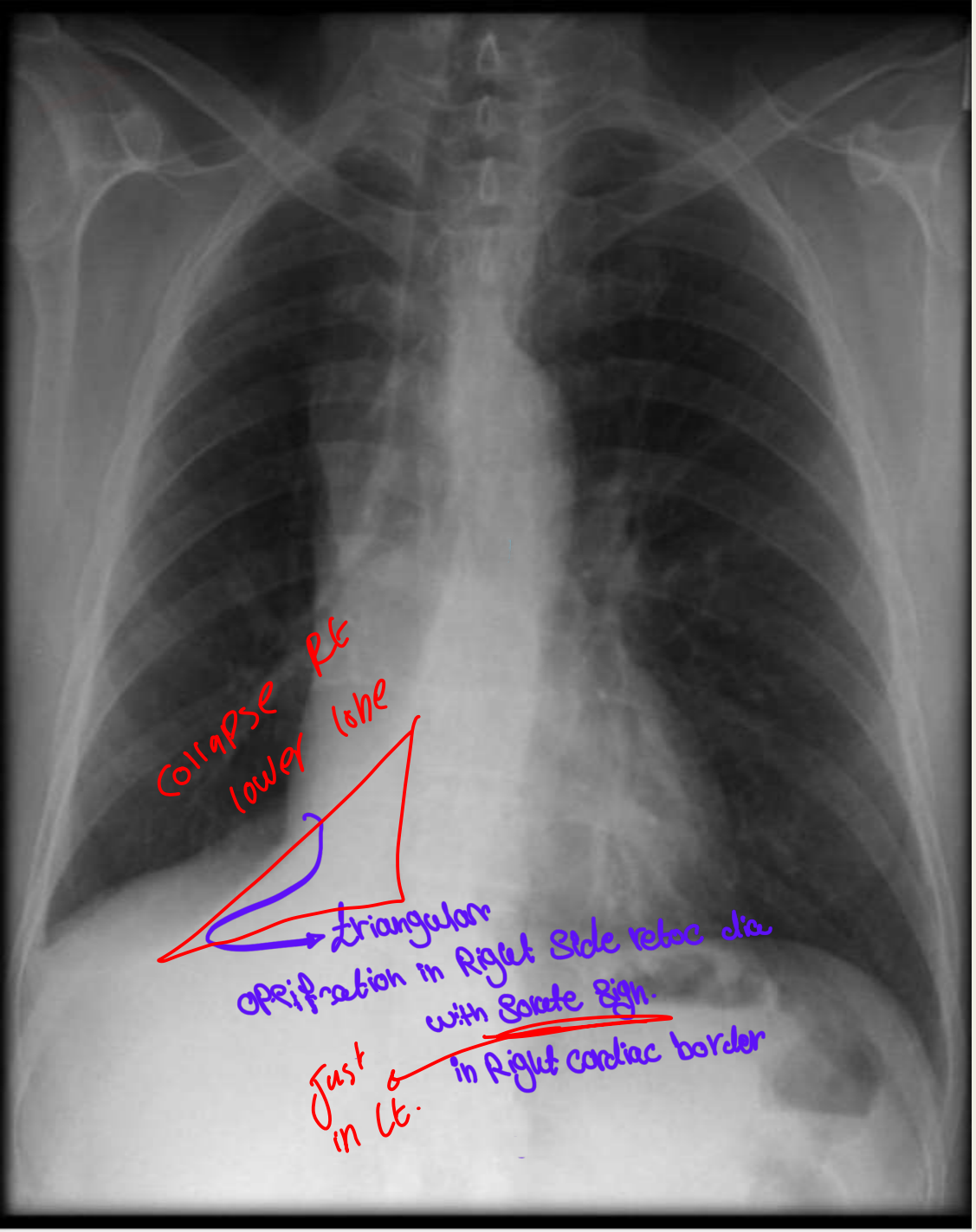
* homogenous opacity in middel and lower left zone with air bronchogram. / left upper lobe Pneumonia.

consolidation

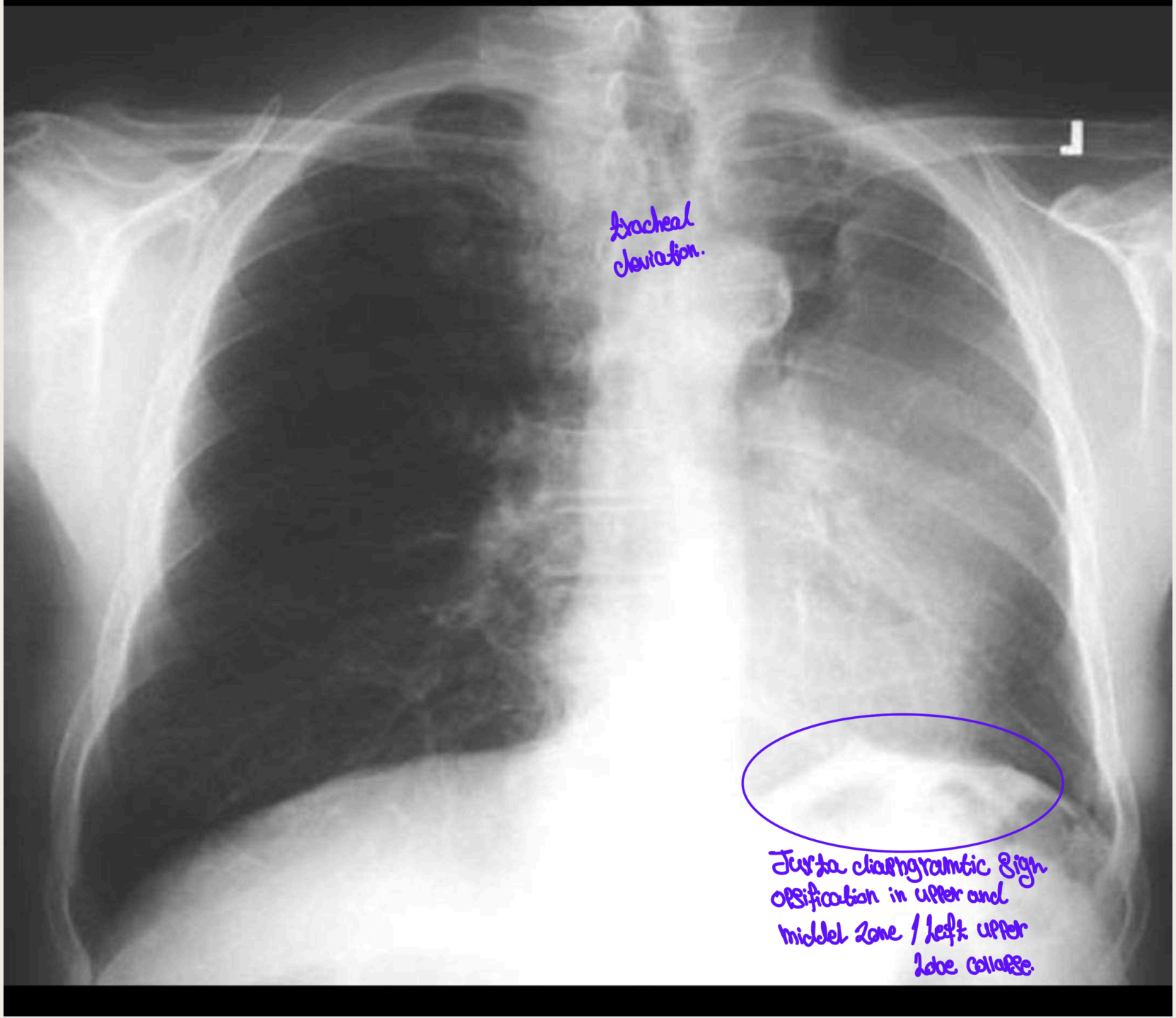



PA
L
R
upper
normal
middle
normal
lower
consolidation
* Lower Lobe Pneumonia
due to the Presence of
opacity in left lower zone
with air bronchogram.
Loss of solute
of diaphragm


Hypo inflation
*Golden S Sign
Right upper lobe collapse.
*displacement of fissure and
Right hemidiaphragm.


Collapse Rt lower lobe
Triangular opacification in Right Side reloc dia with Sonde Sign.
Just in Lt.
in Right cardiac border

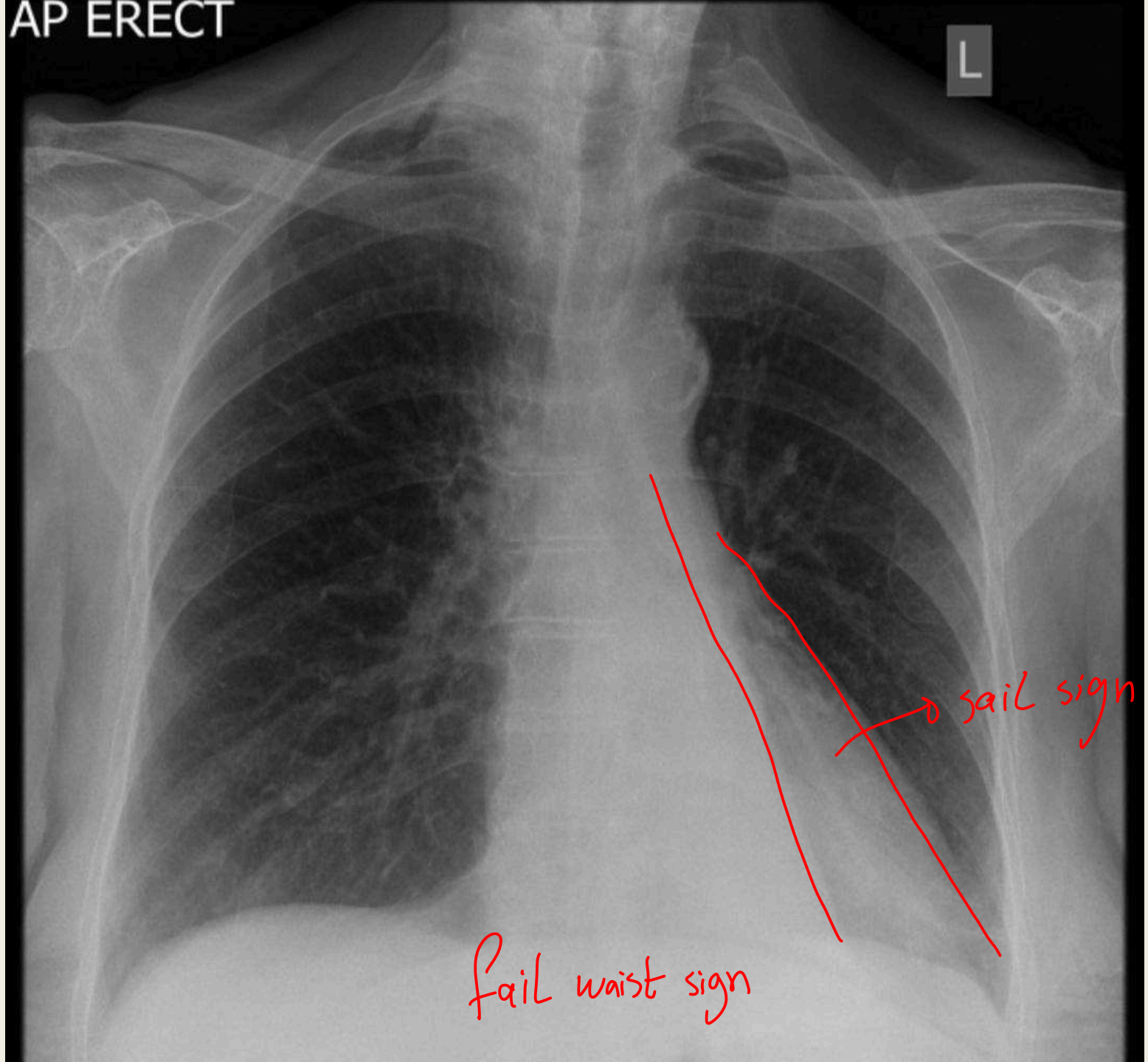

Right lower lobe collapse.



Left sical sign

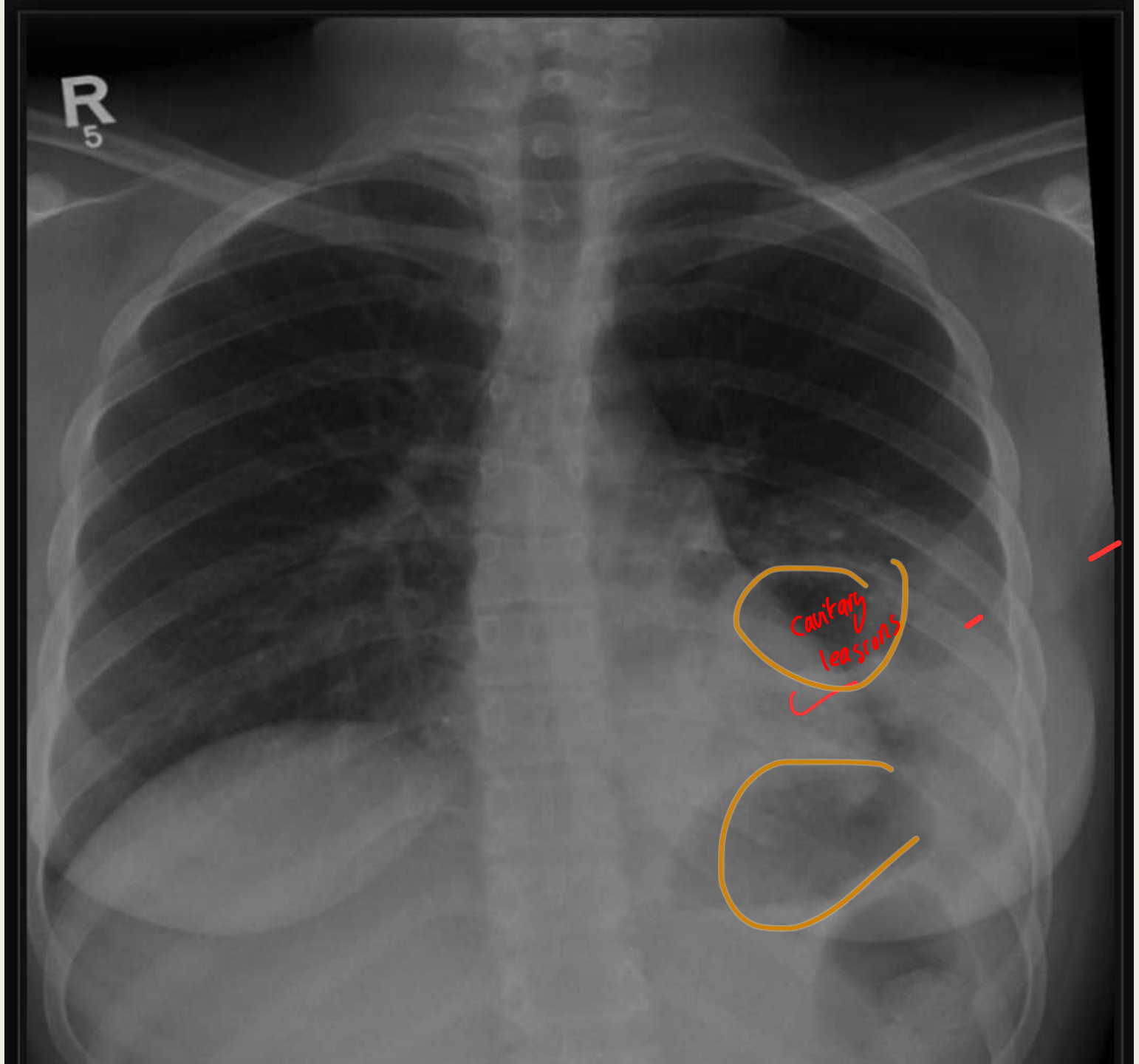
Lt upper lobe collapse

Schiff sign



CE:
* double heart border, flat water sign.
* Left lower lobe collapse.

flat heart border



If it was TB :-
its 2ry TB Not primary

Post-primary

TB

cavity

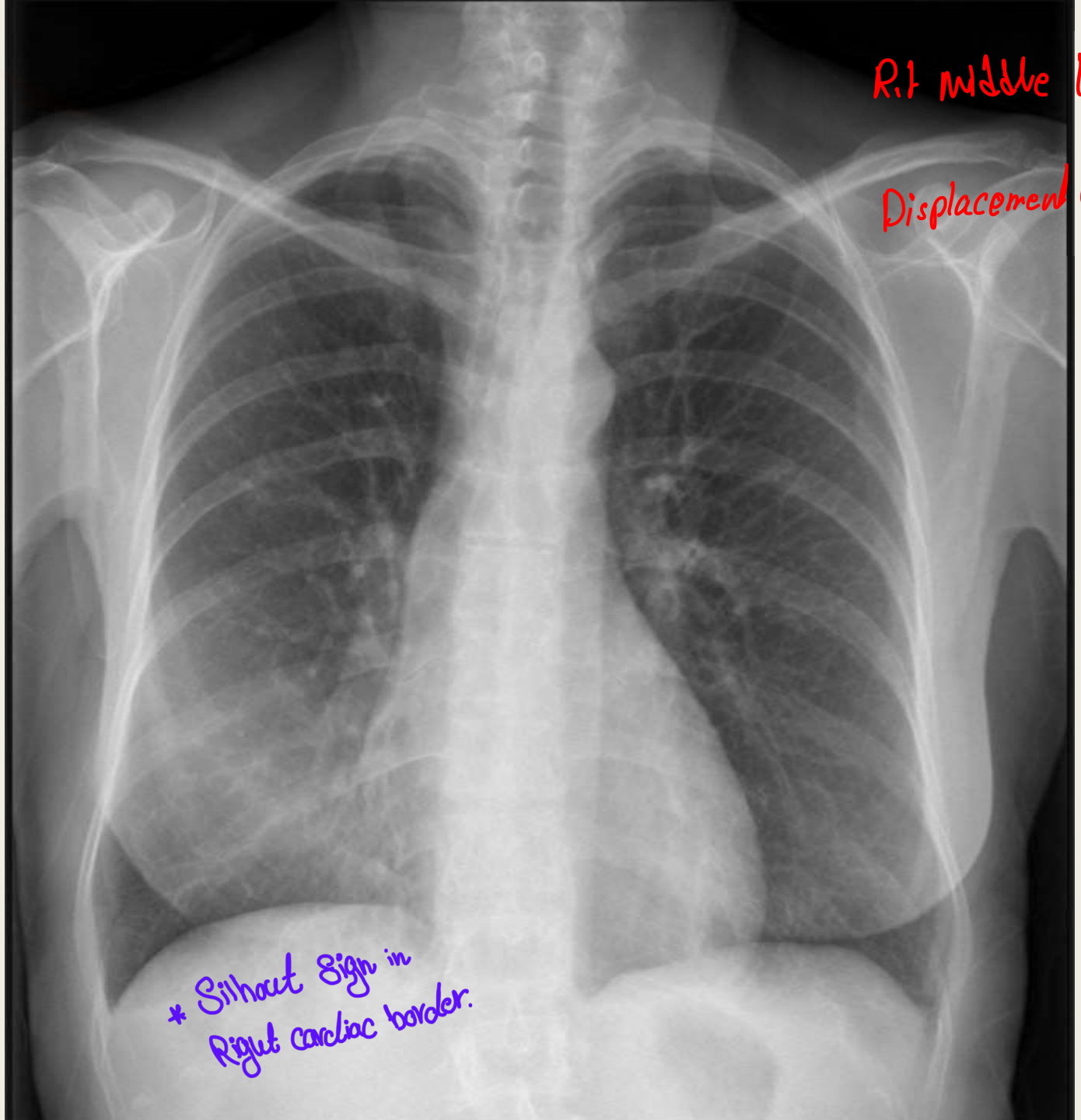
opacity
cavitation

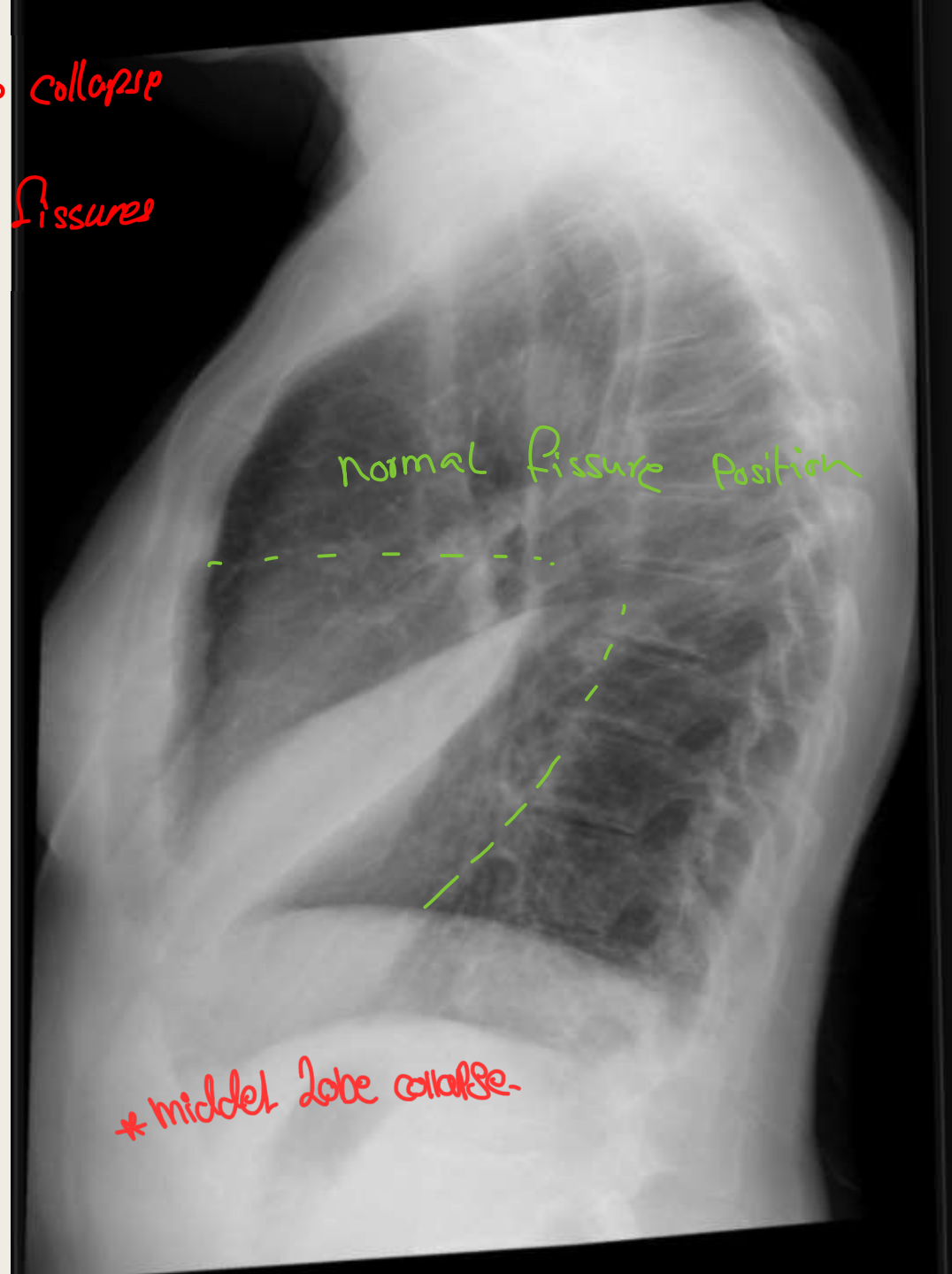
→ left middel zone.

*obliteration of costo Phrinch angeh

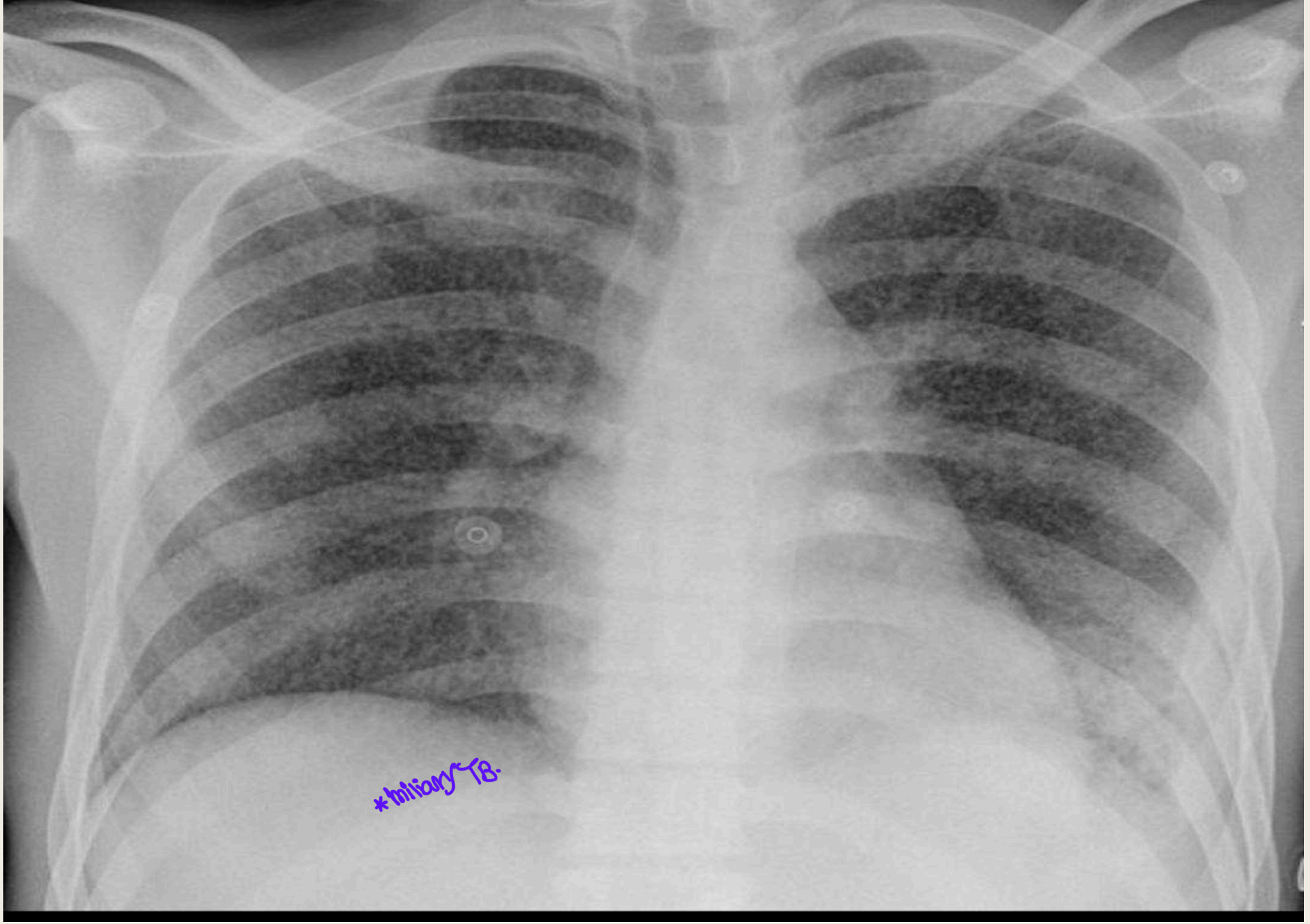
Not abscess

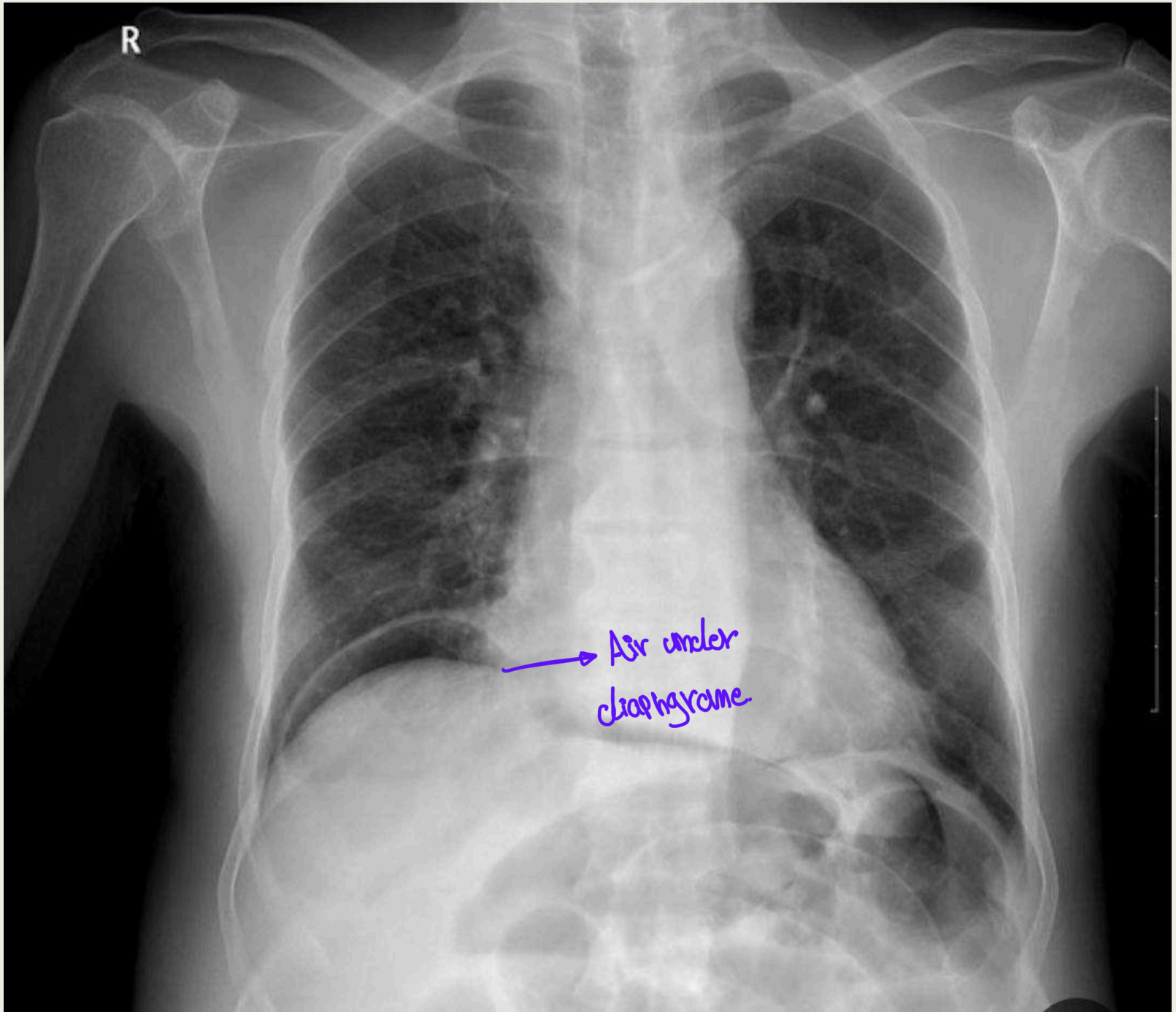
associated with air-fluid level

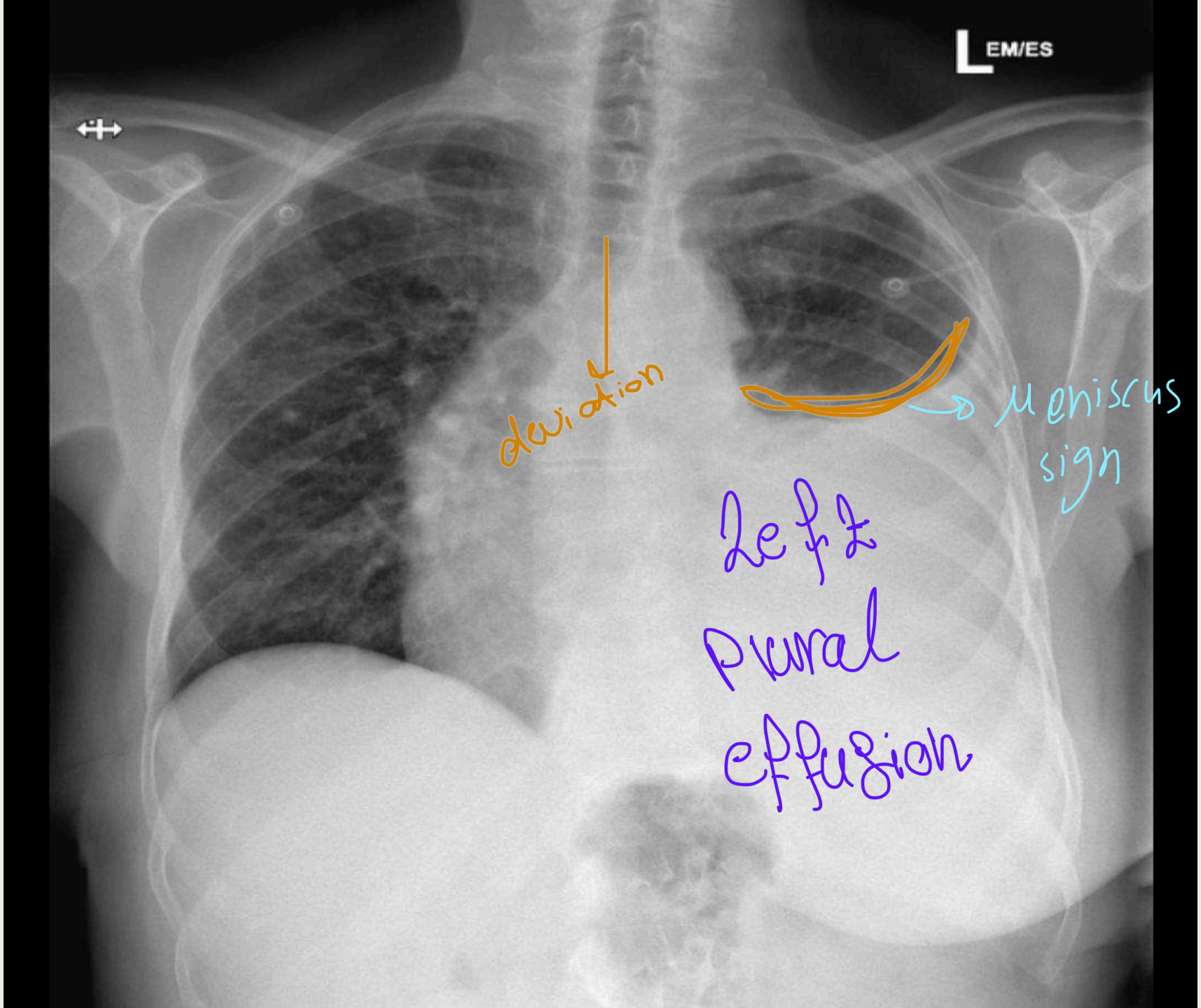

R.t Middle lobe collapse
Displacement of fissures
* Silhouet Sign in
Rigut cardiac border.

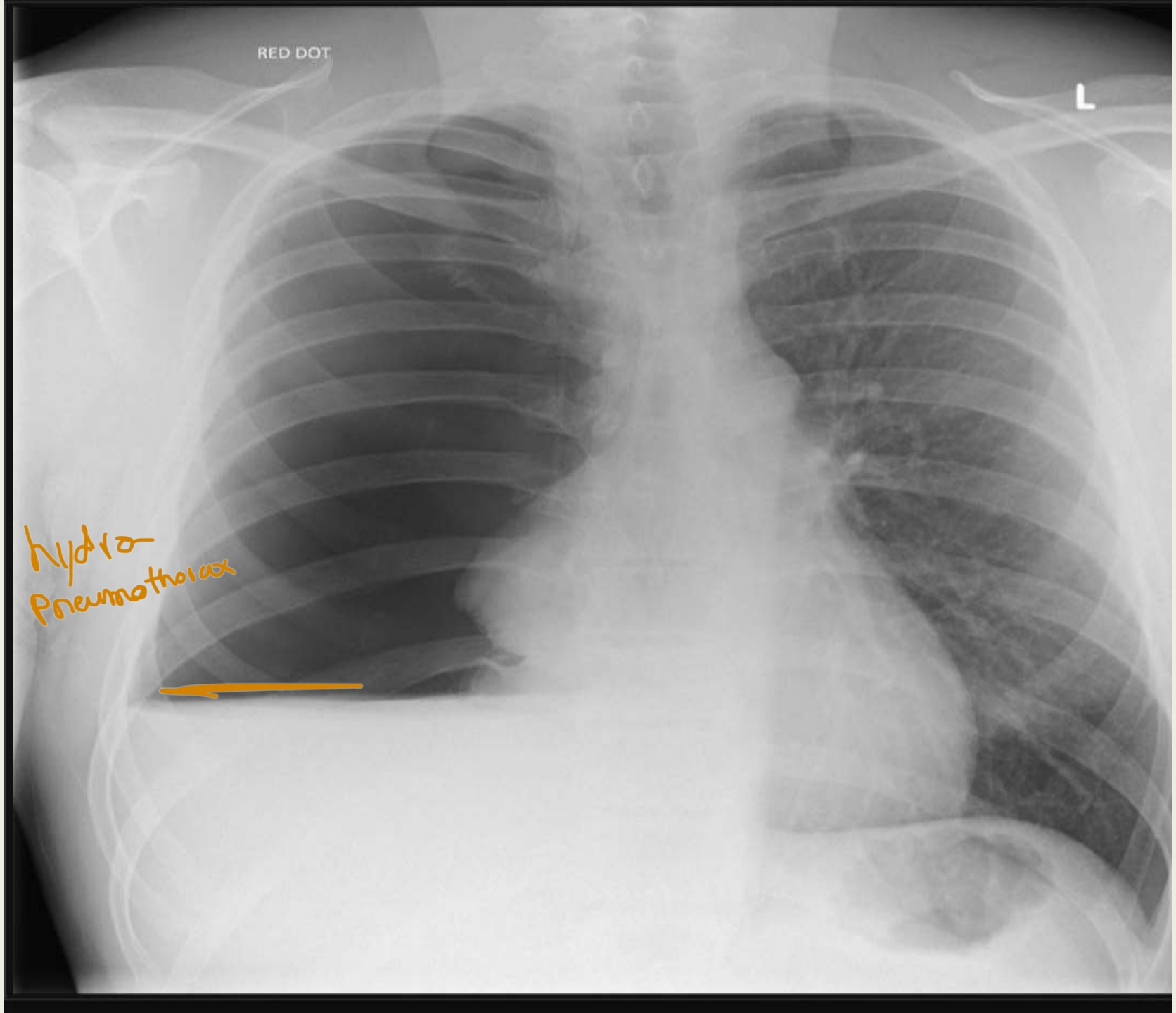

normal fissure position
* middel lobe collapse.

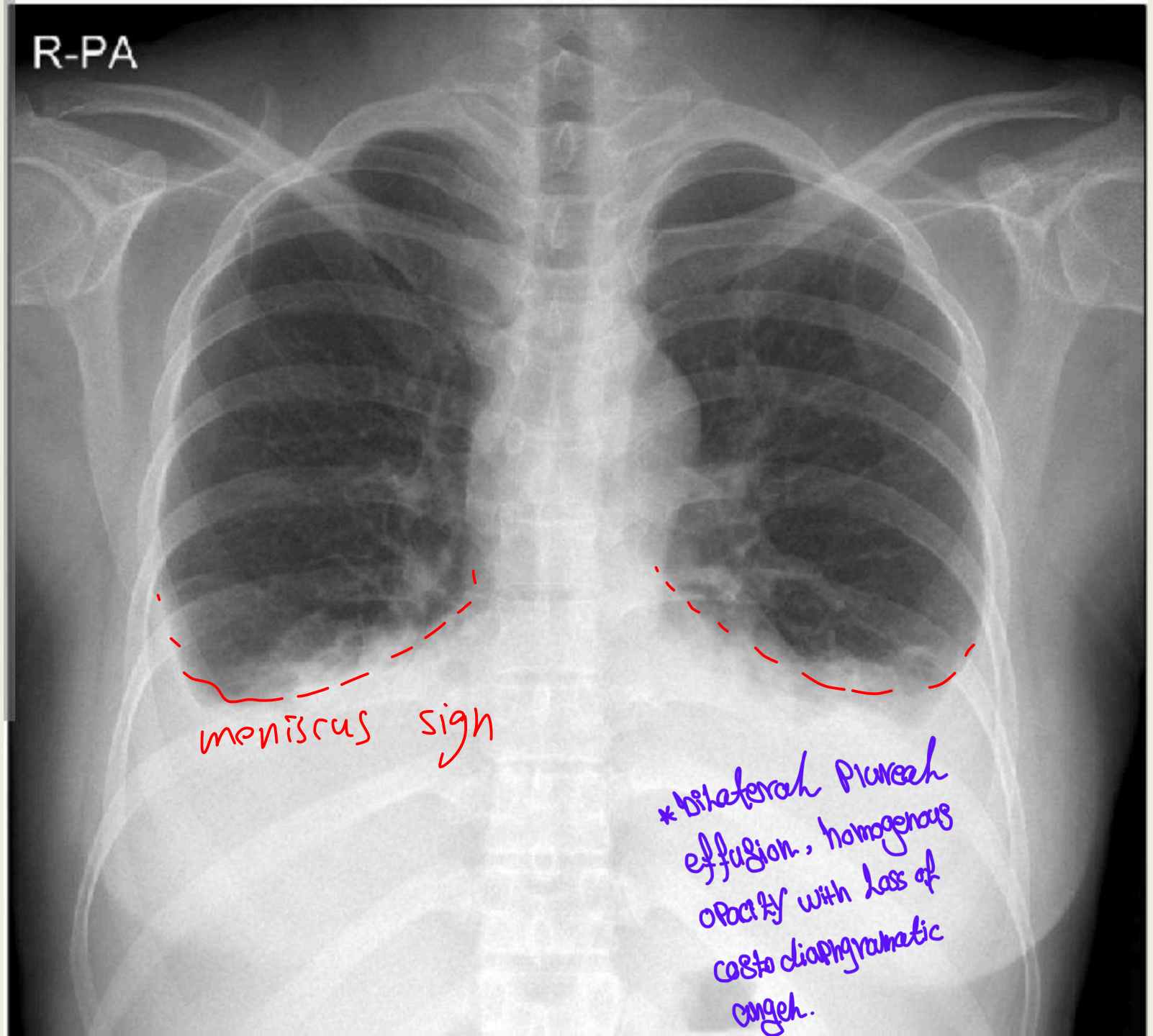
PA

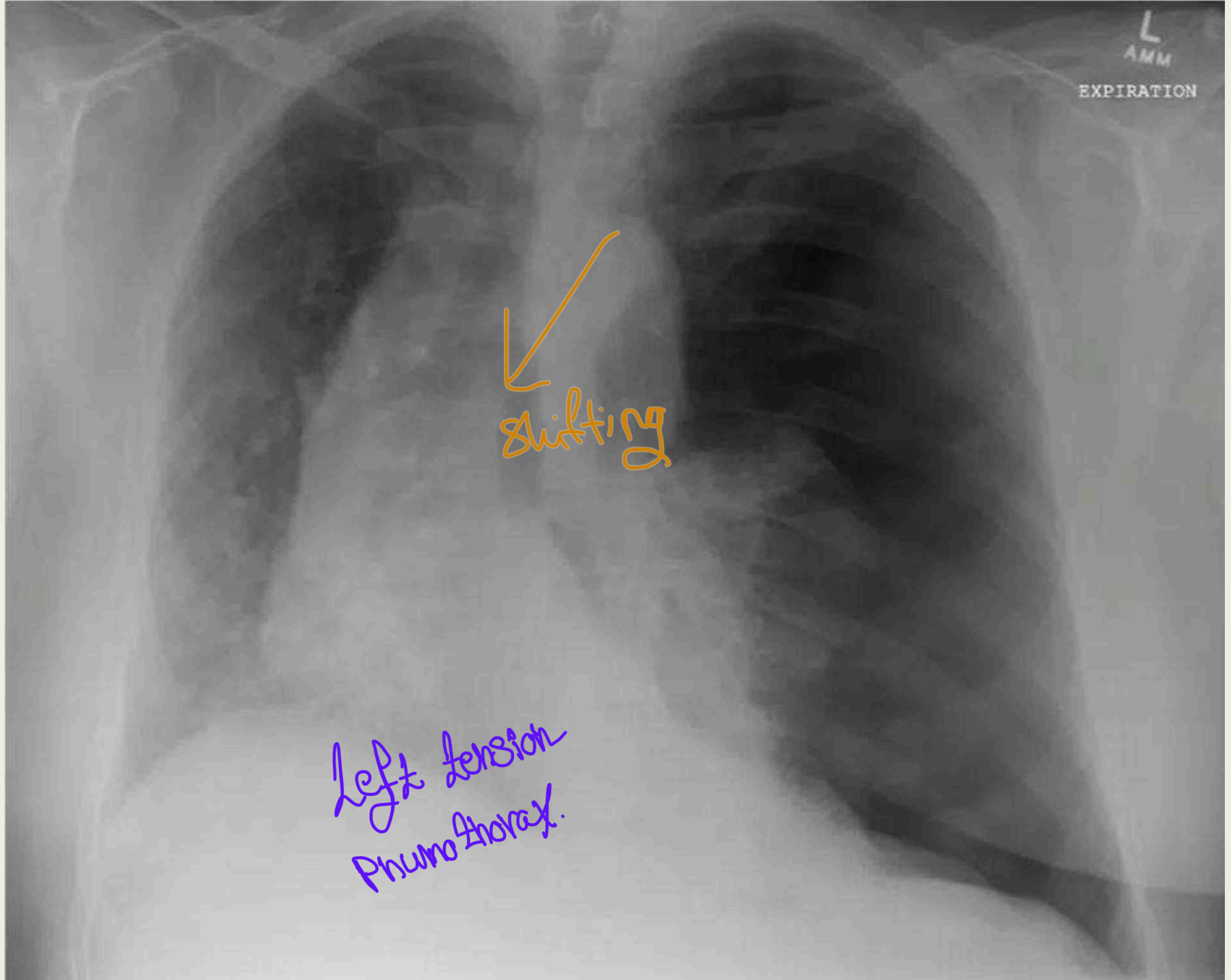


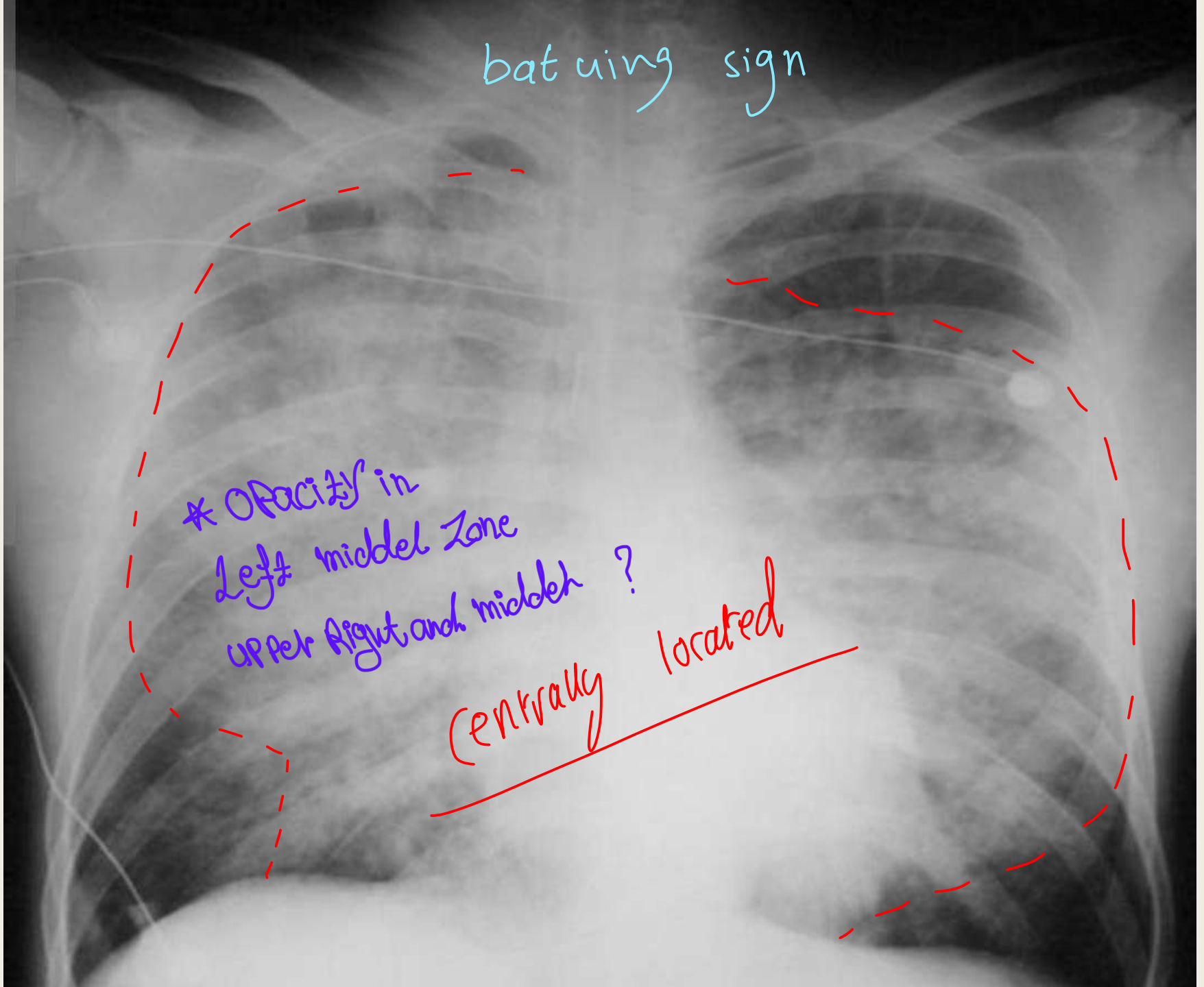

R
Air under diaphragm

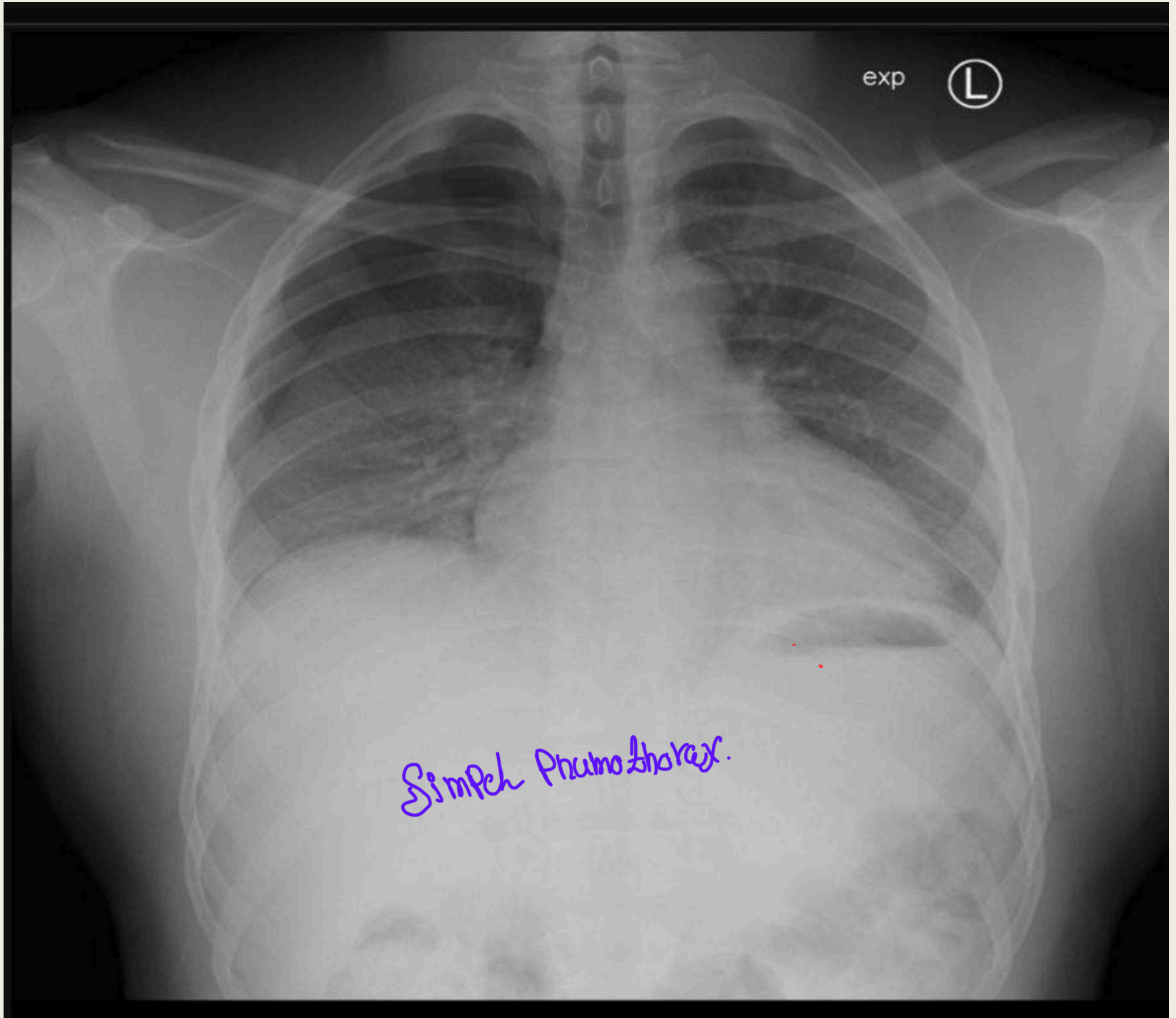

L EM/ES
deviation
meniscus sign
left pural effusion

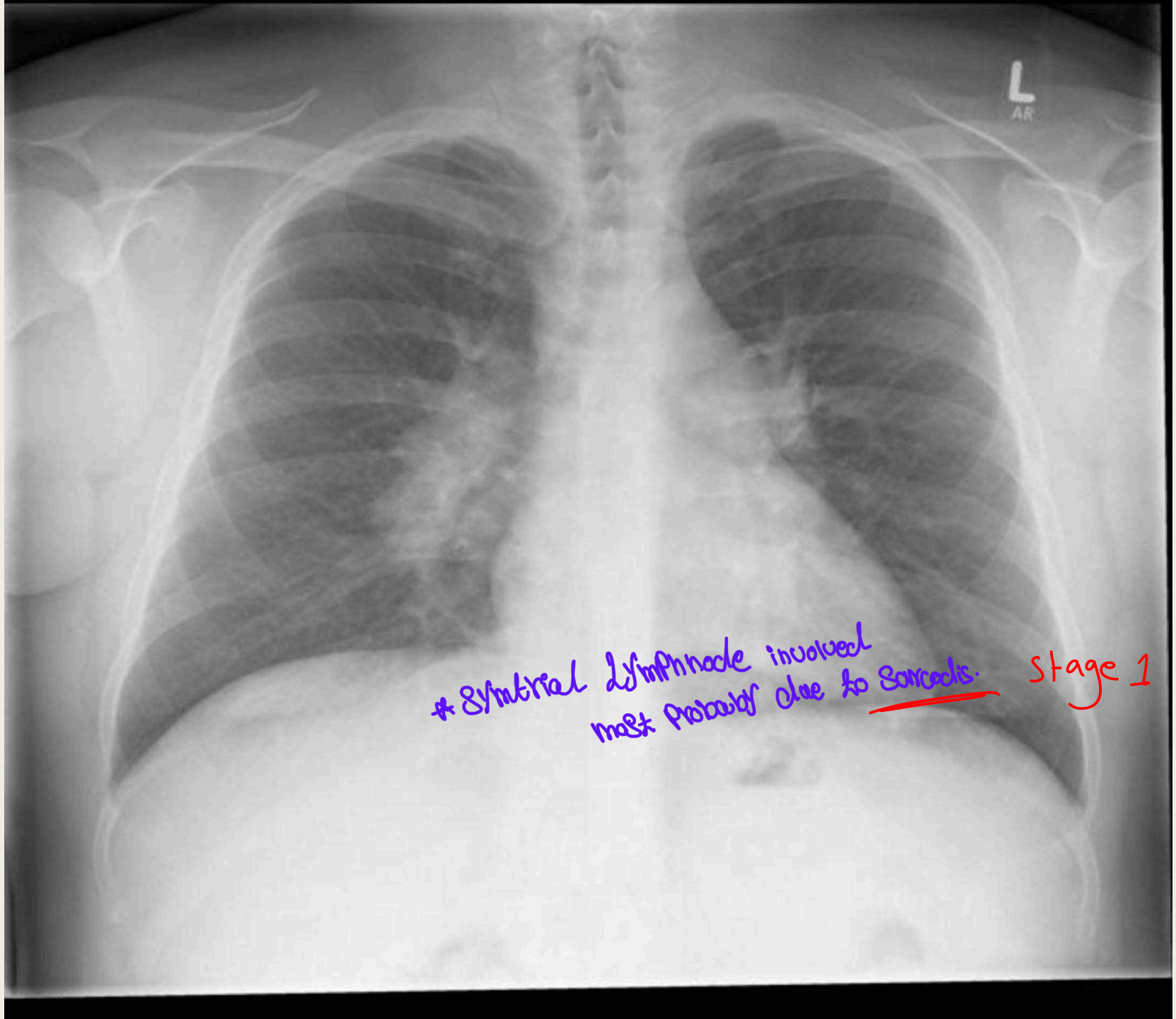

RED DOT
L
Hydro
Pneumothorax

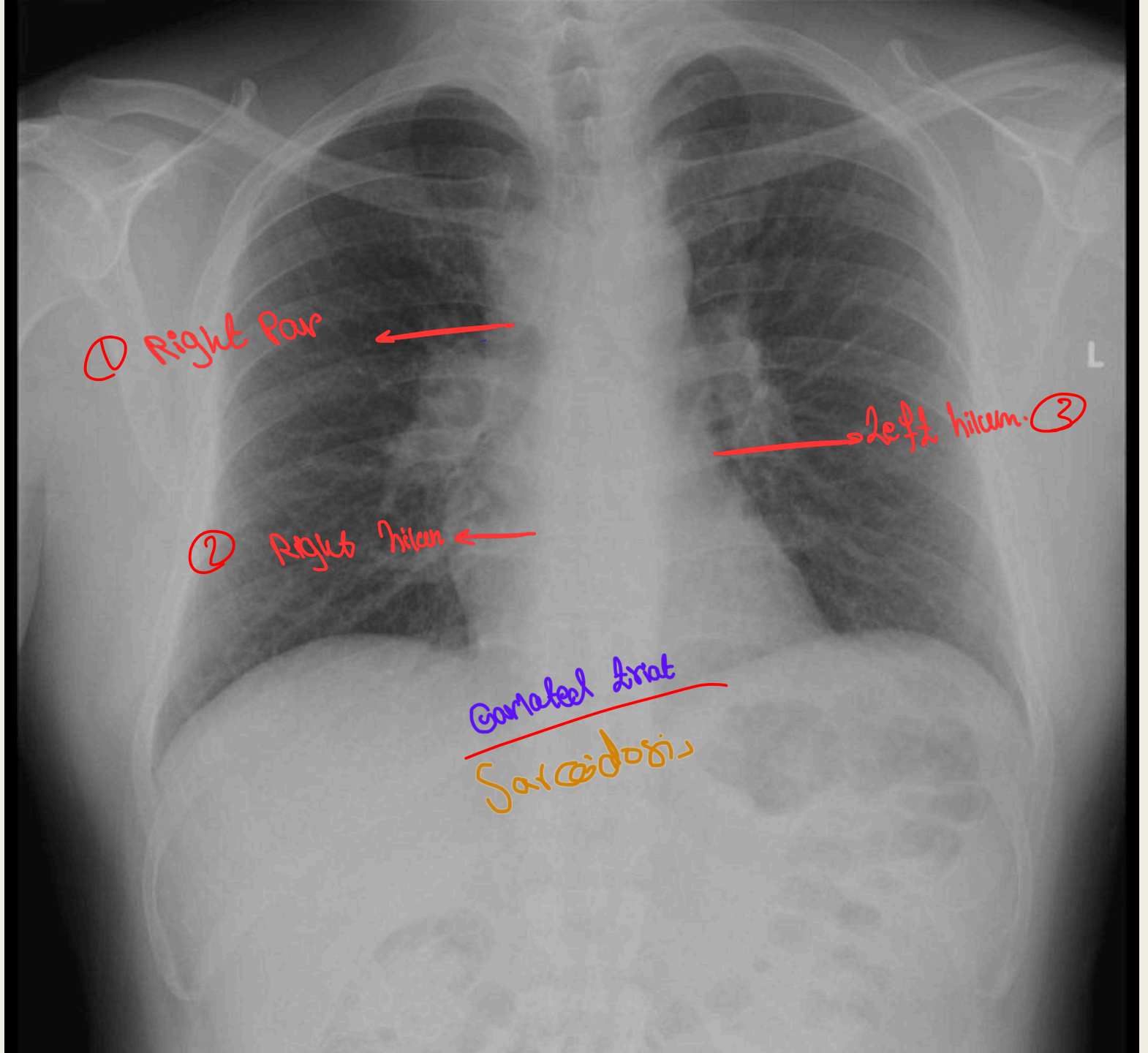

R-PA
meniscus sign
*bilateral Pleural effusion, homogenous opacity with loss of costo diaphragmatic angel.

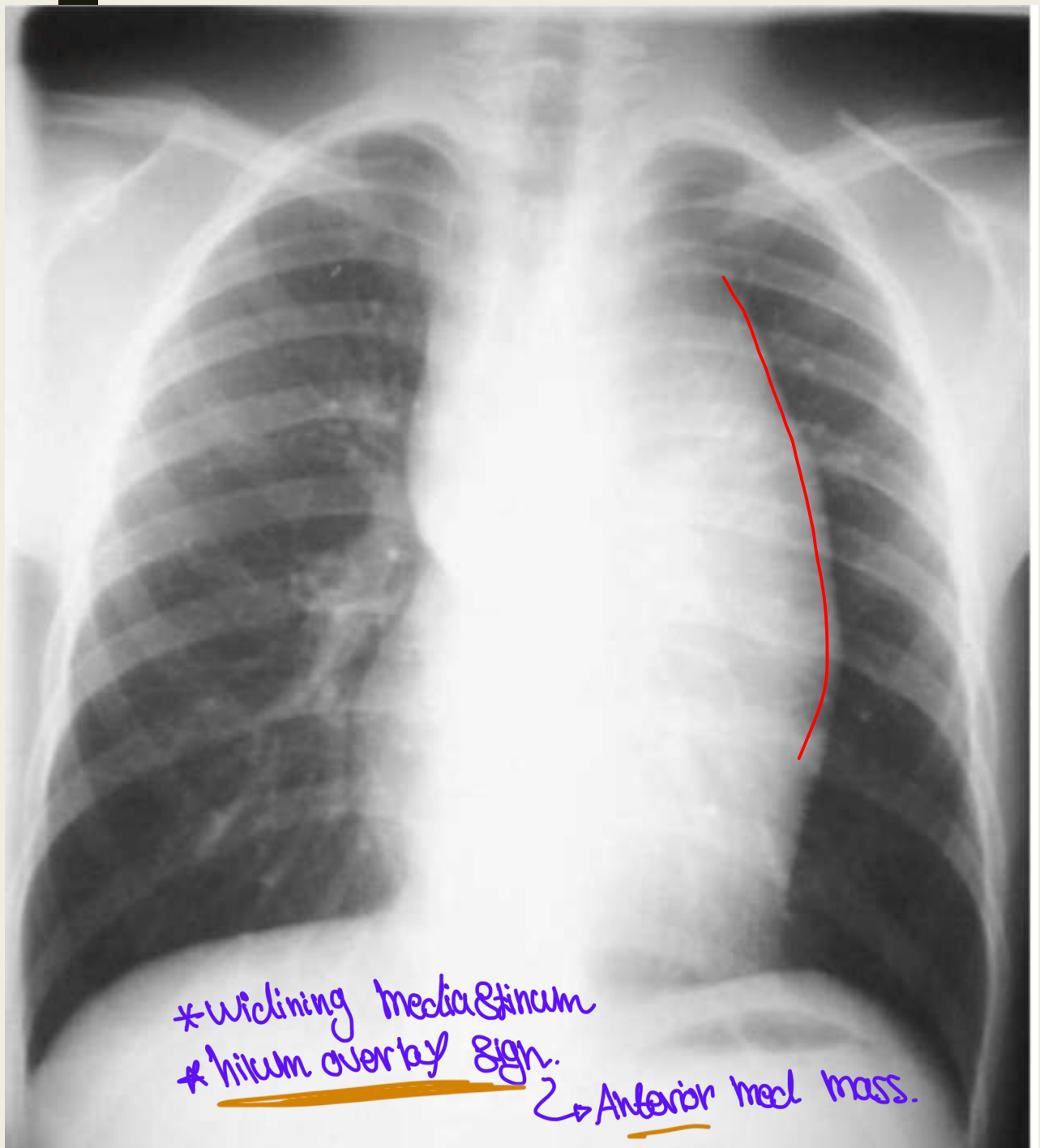

L
AMM
EXPIRATION
shifting
Left tension
Pneumothorax.

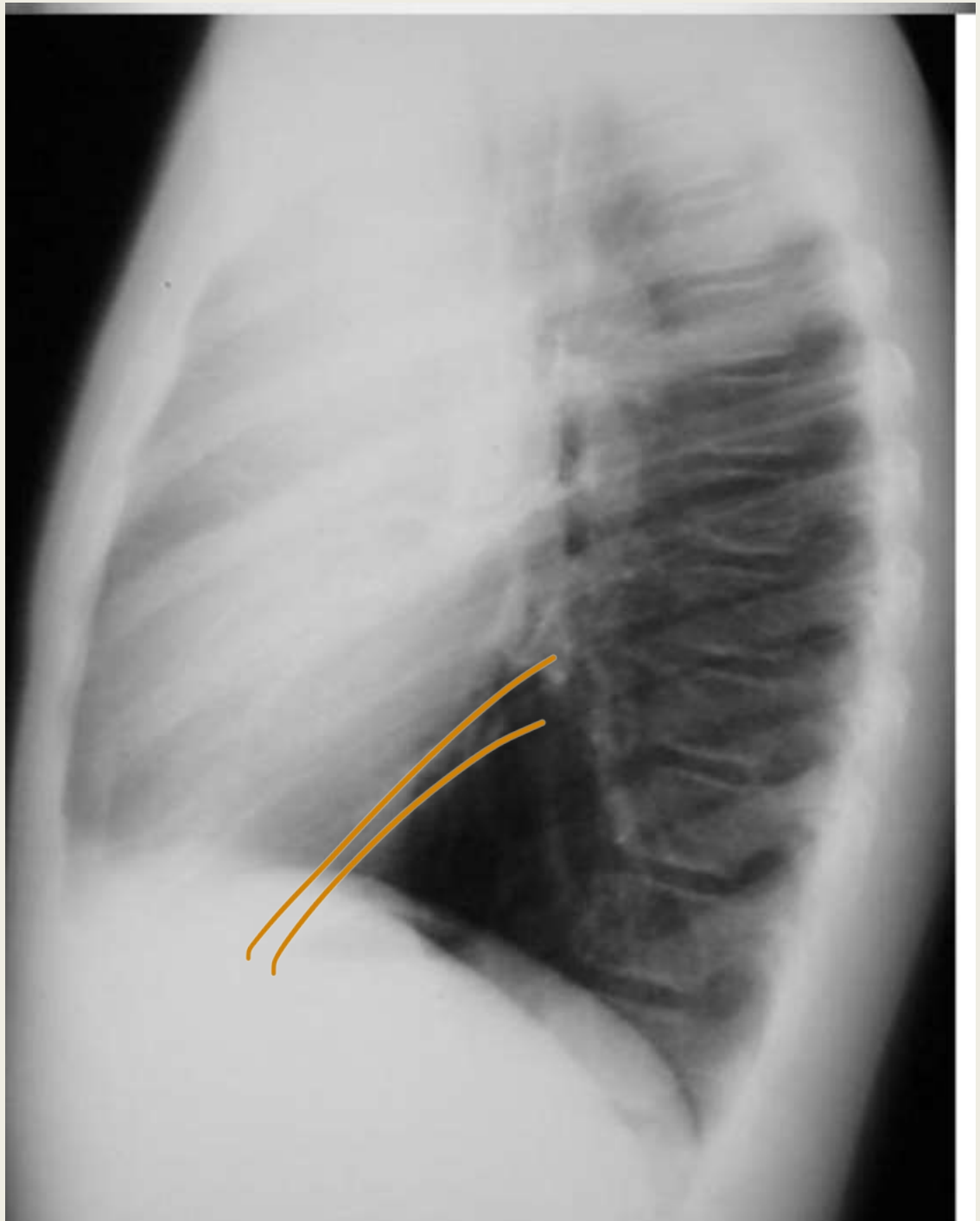

bat wing sign
* Opacity in
Left middel Zone
upper Right and middel ?
centrally located

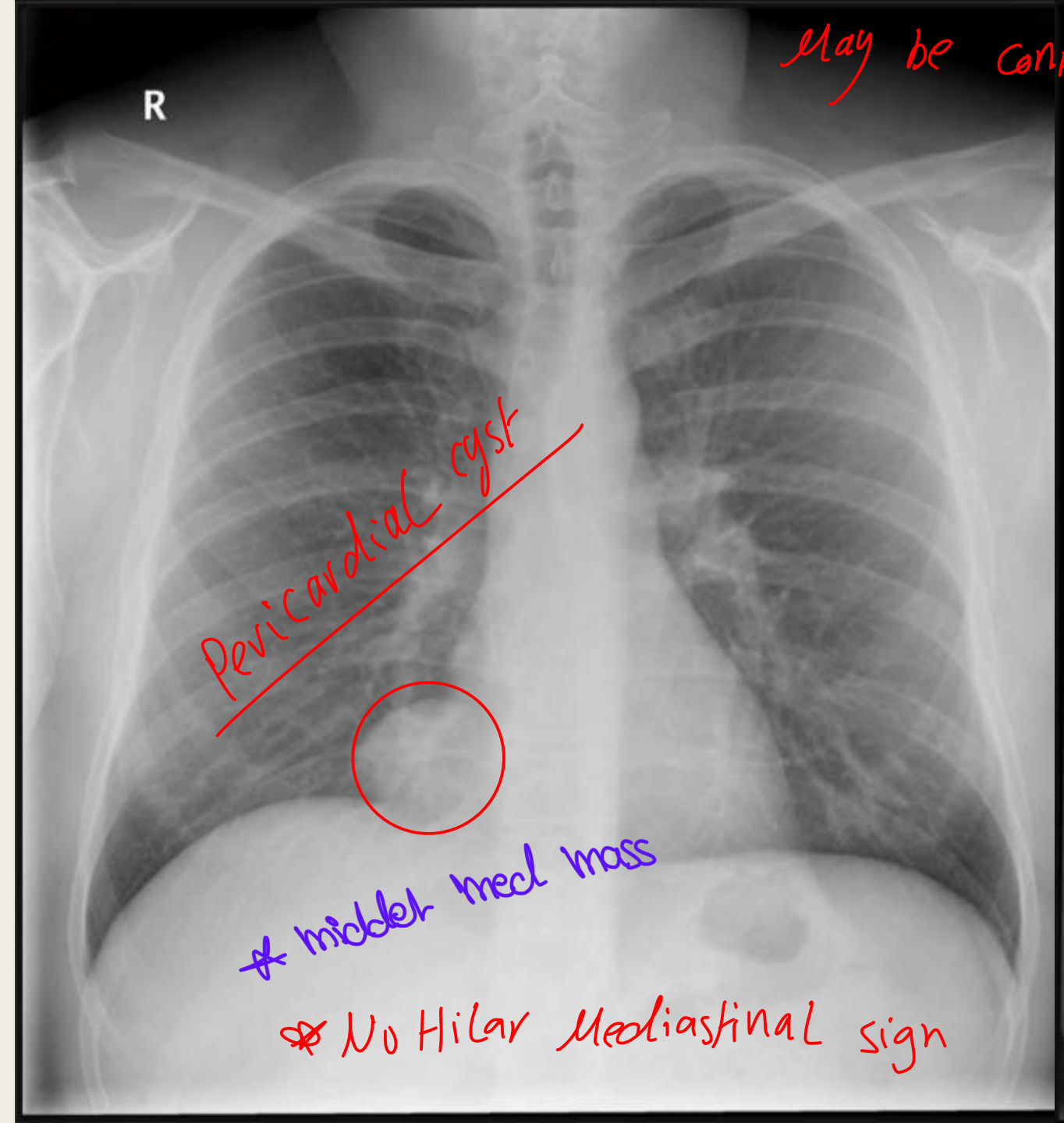

exp
L
Simple Pneumothorax.

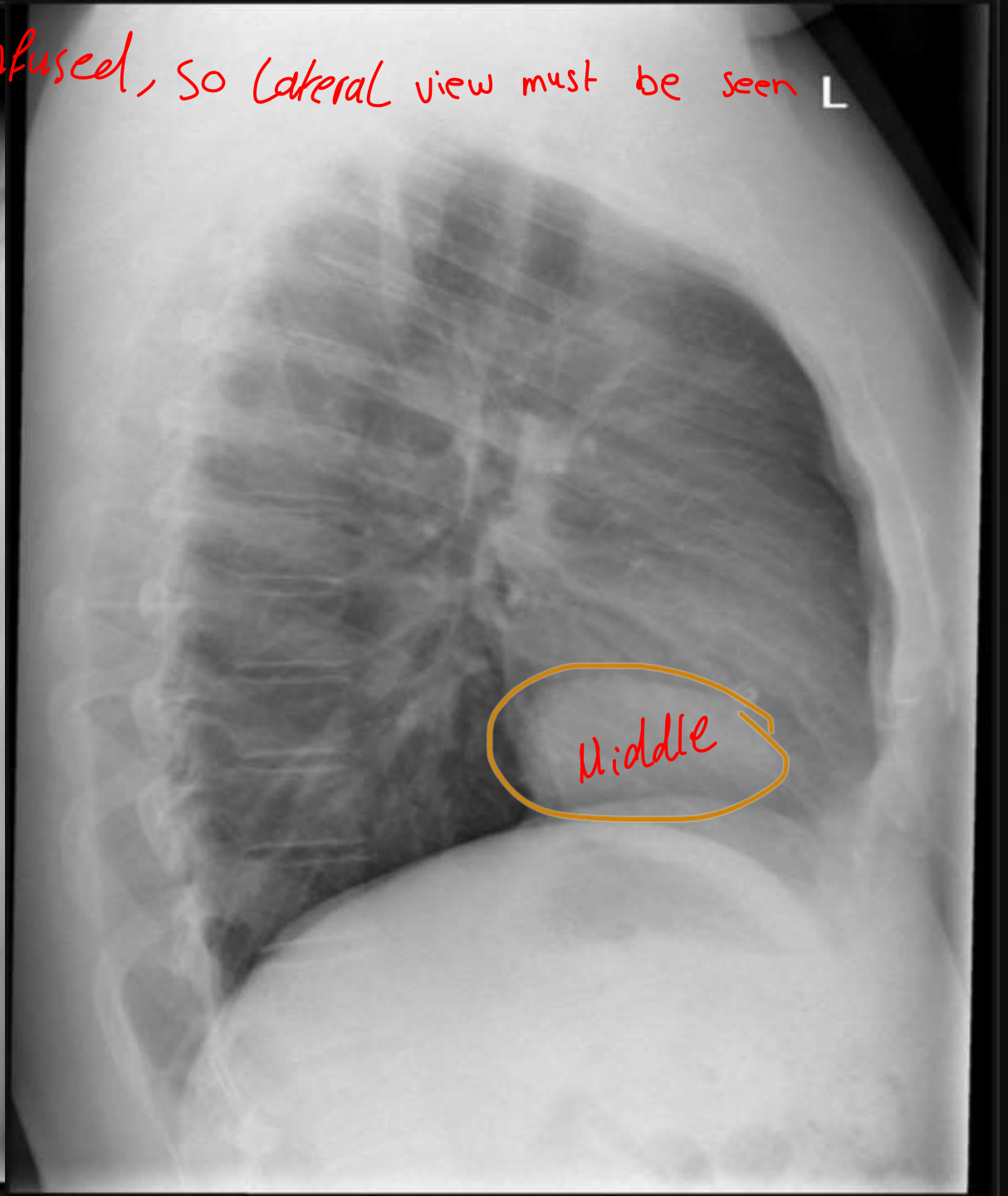

L
AR
* Symtrical Lymphnode involved
most Probably due to Sarcoidis.
Stage 1

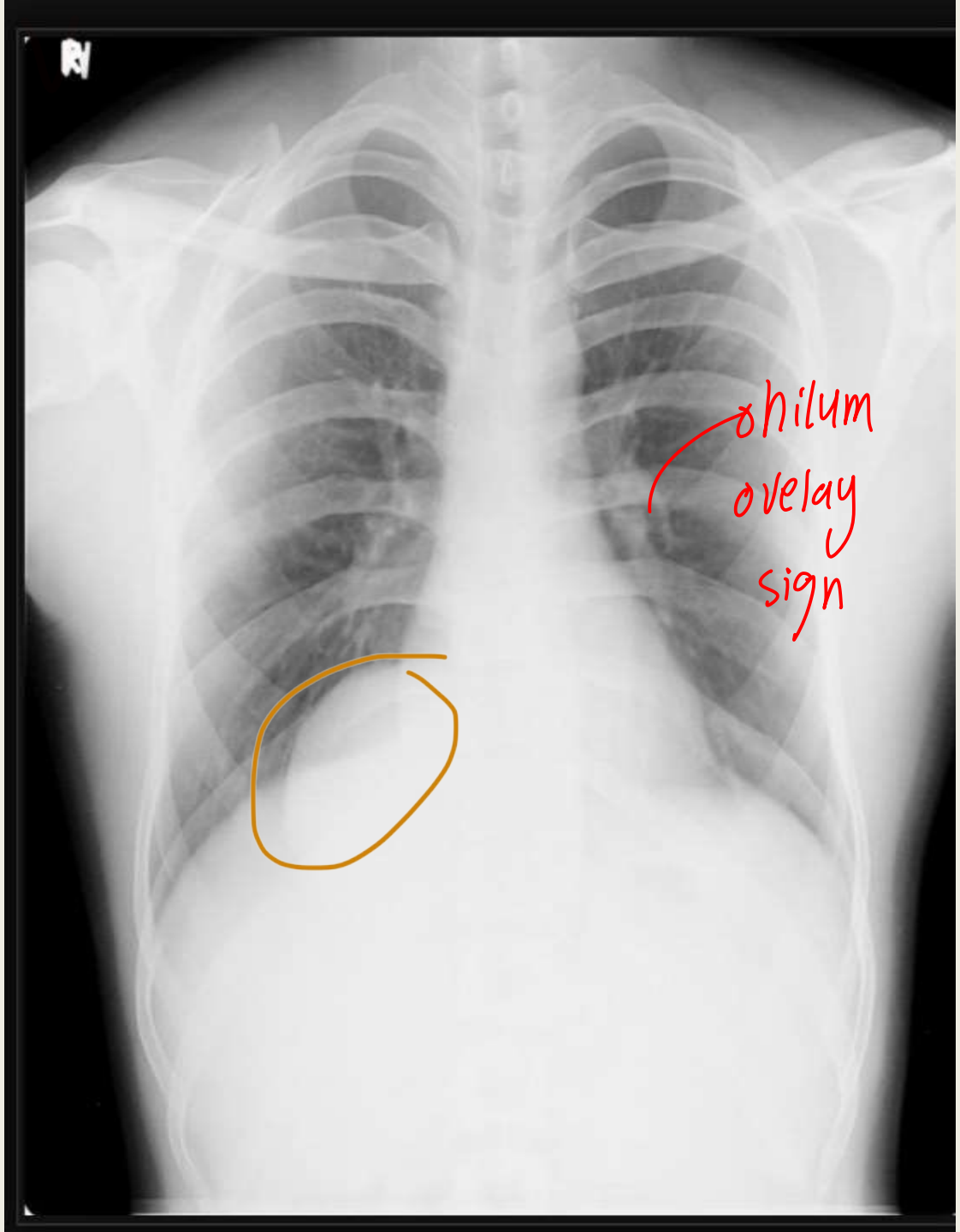

① Right Par
② Right hilum
③ Left. hilum.
Granuloma
Sarcoidosis

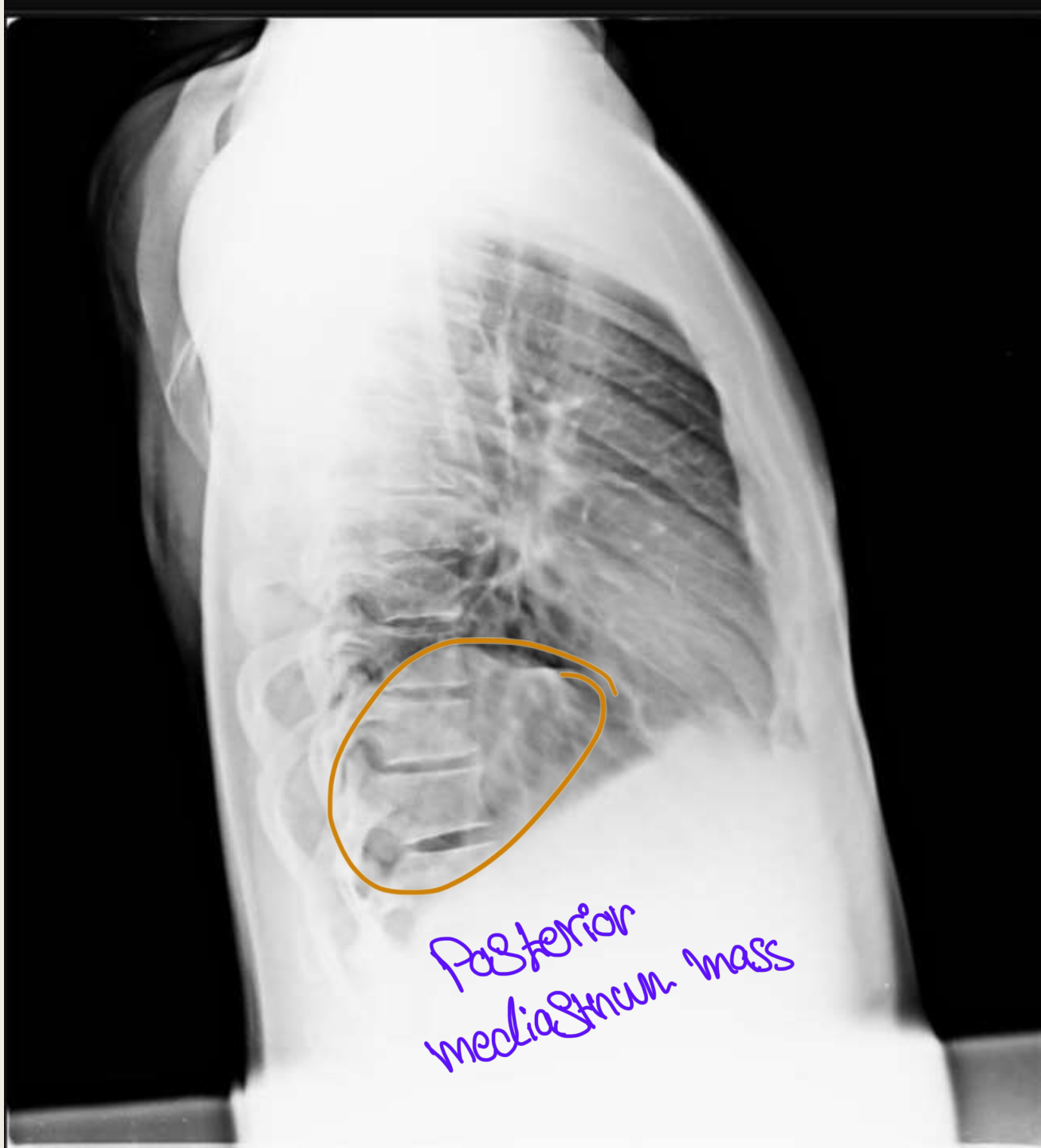

*widening mediastinum
*hilum overlay sign.
→ Anterior med mass.

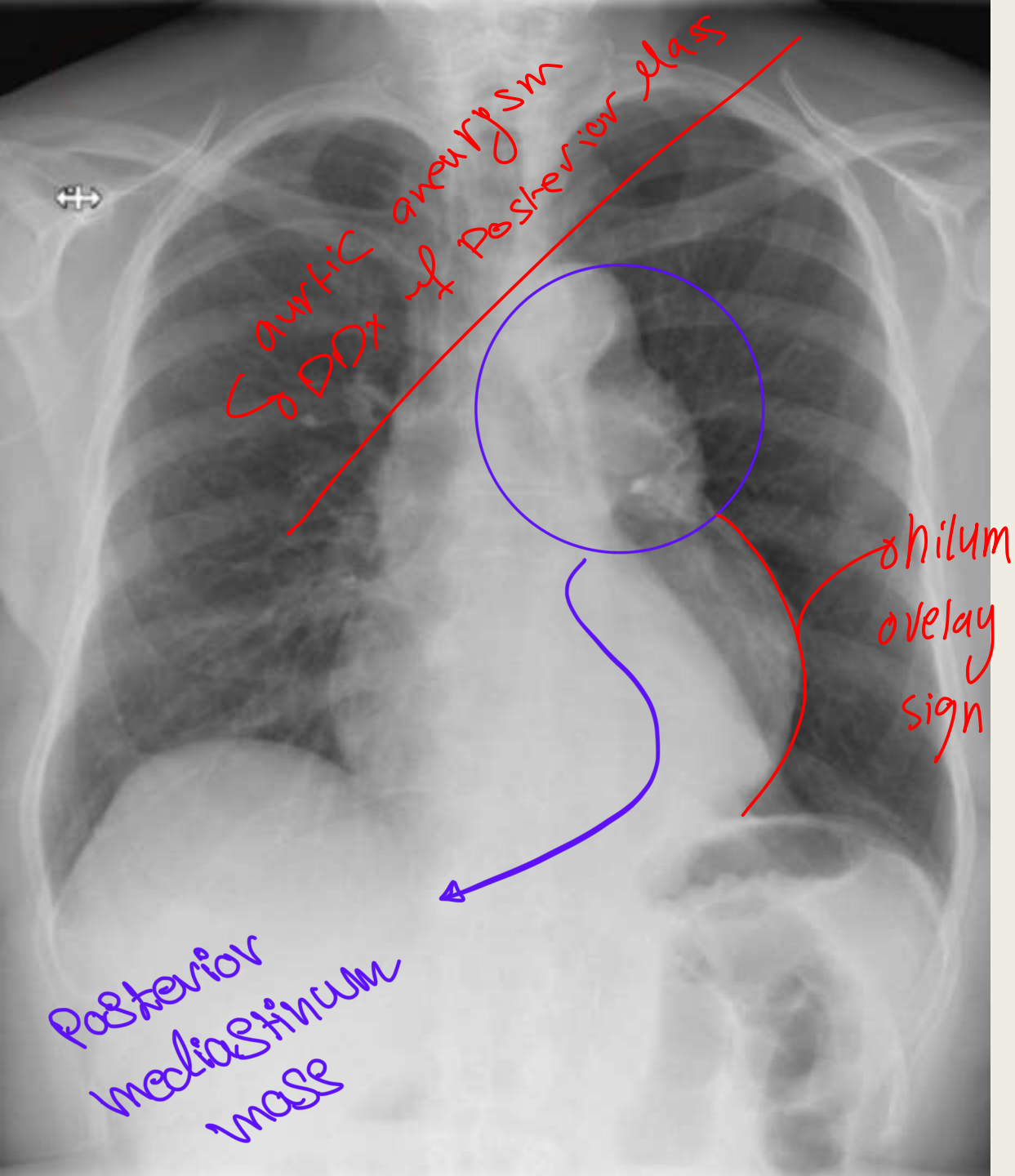


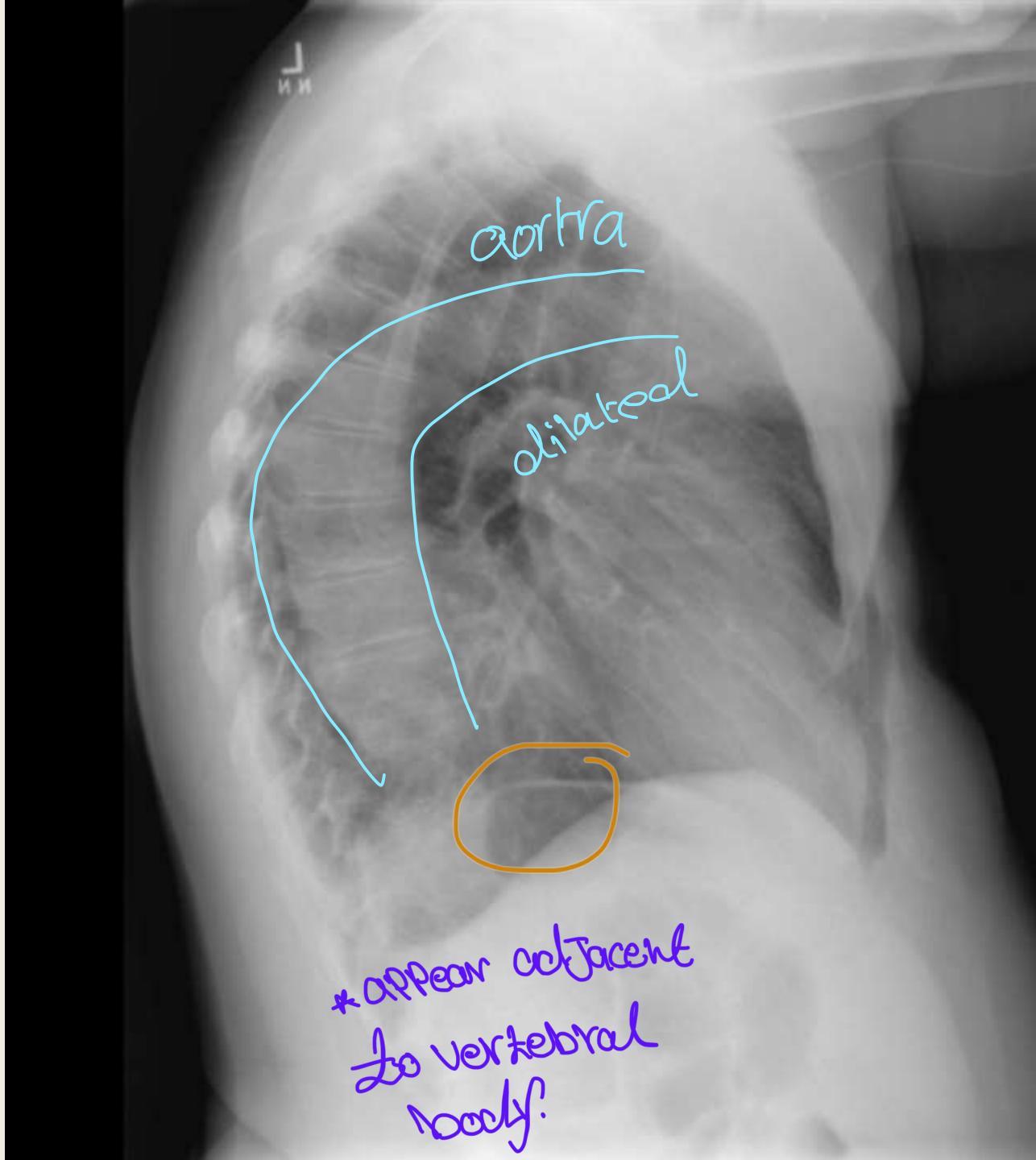

R
May be confused, so Lateral view must be seen
Pericardial cyst
* middel med mass
* No Hilar Mediastinal sign

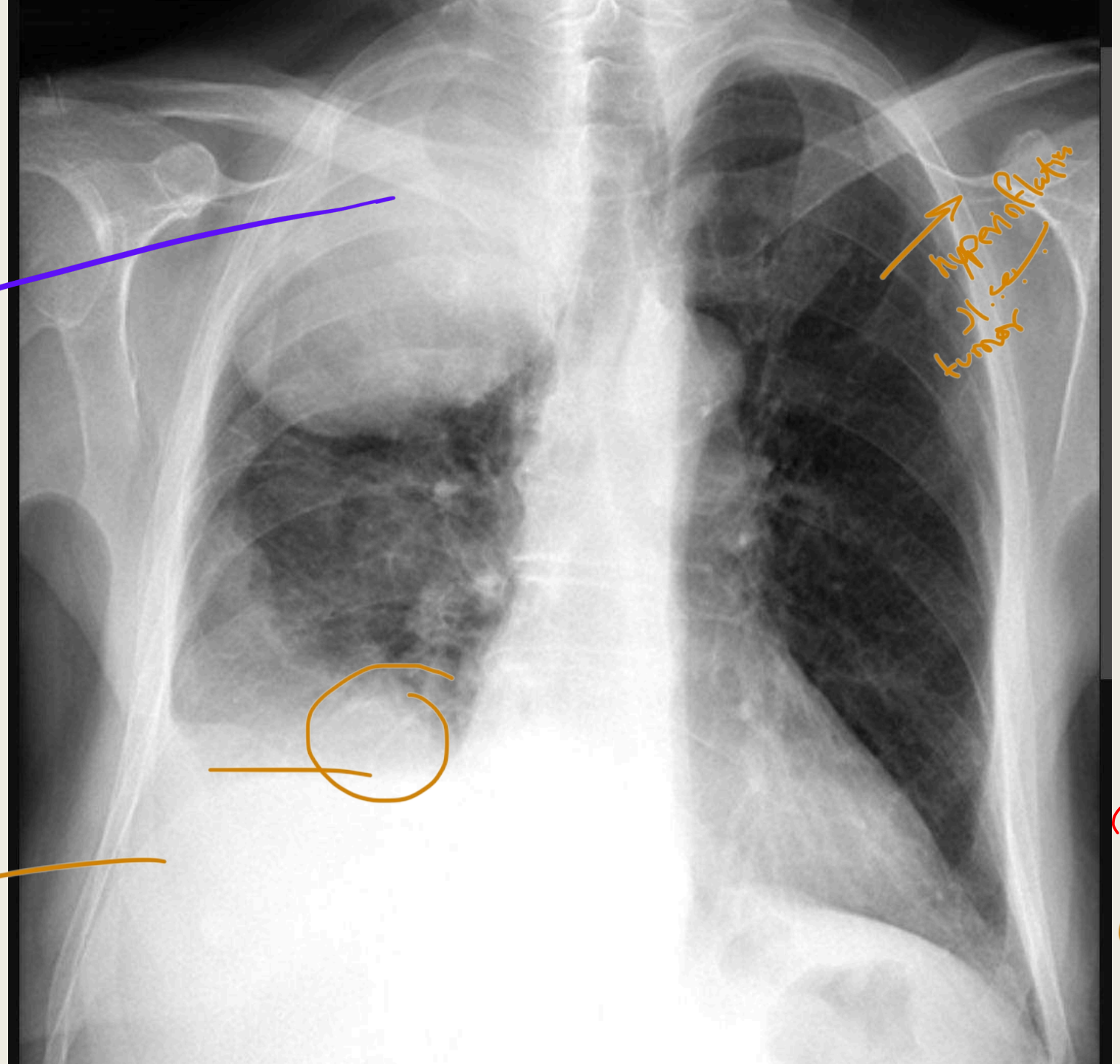

L
Middle

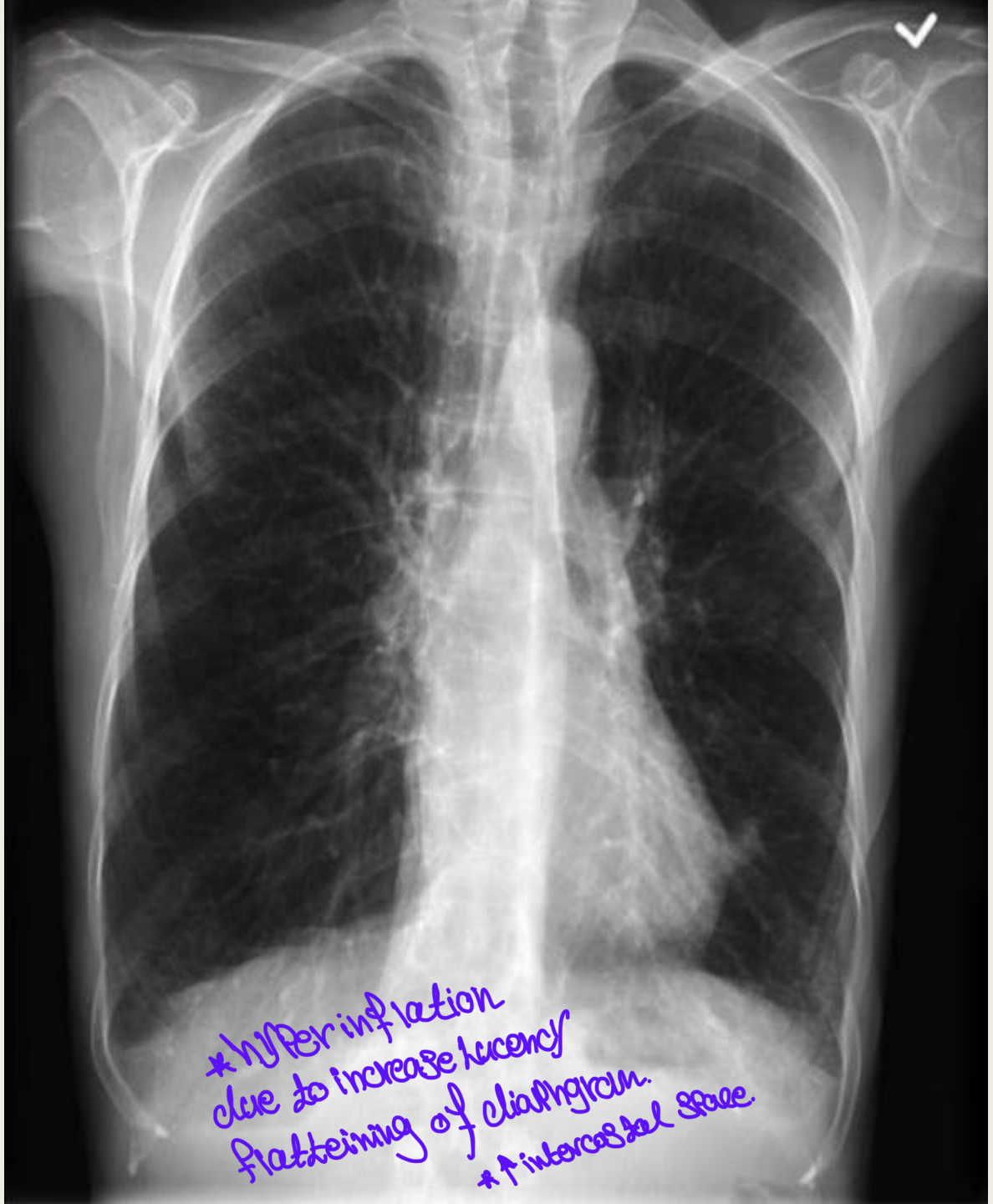

hilum
ovelay
sign

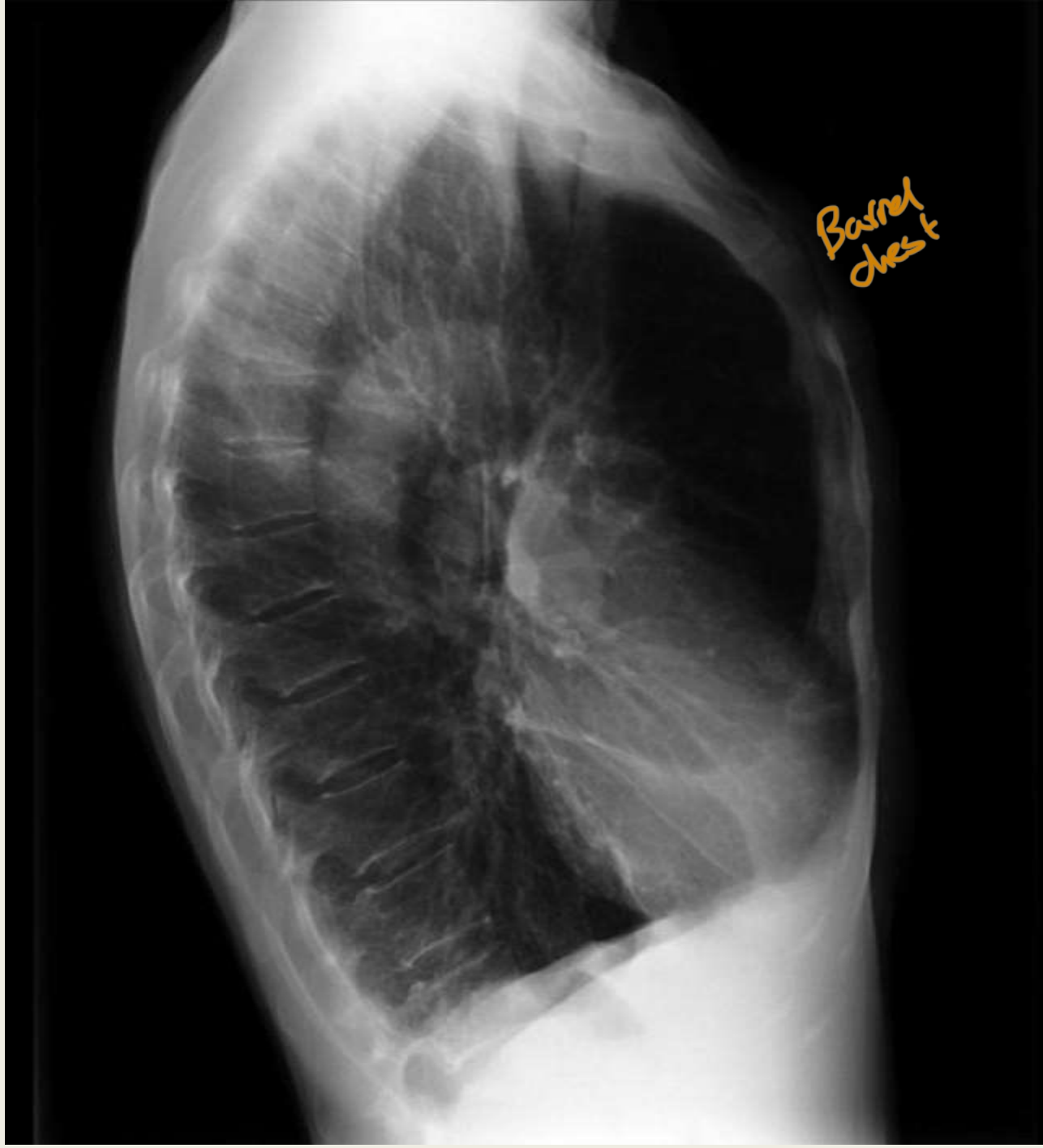

Posterior
mediastinum mass

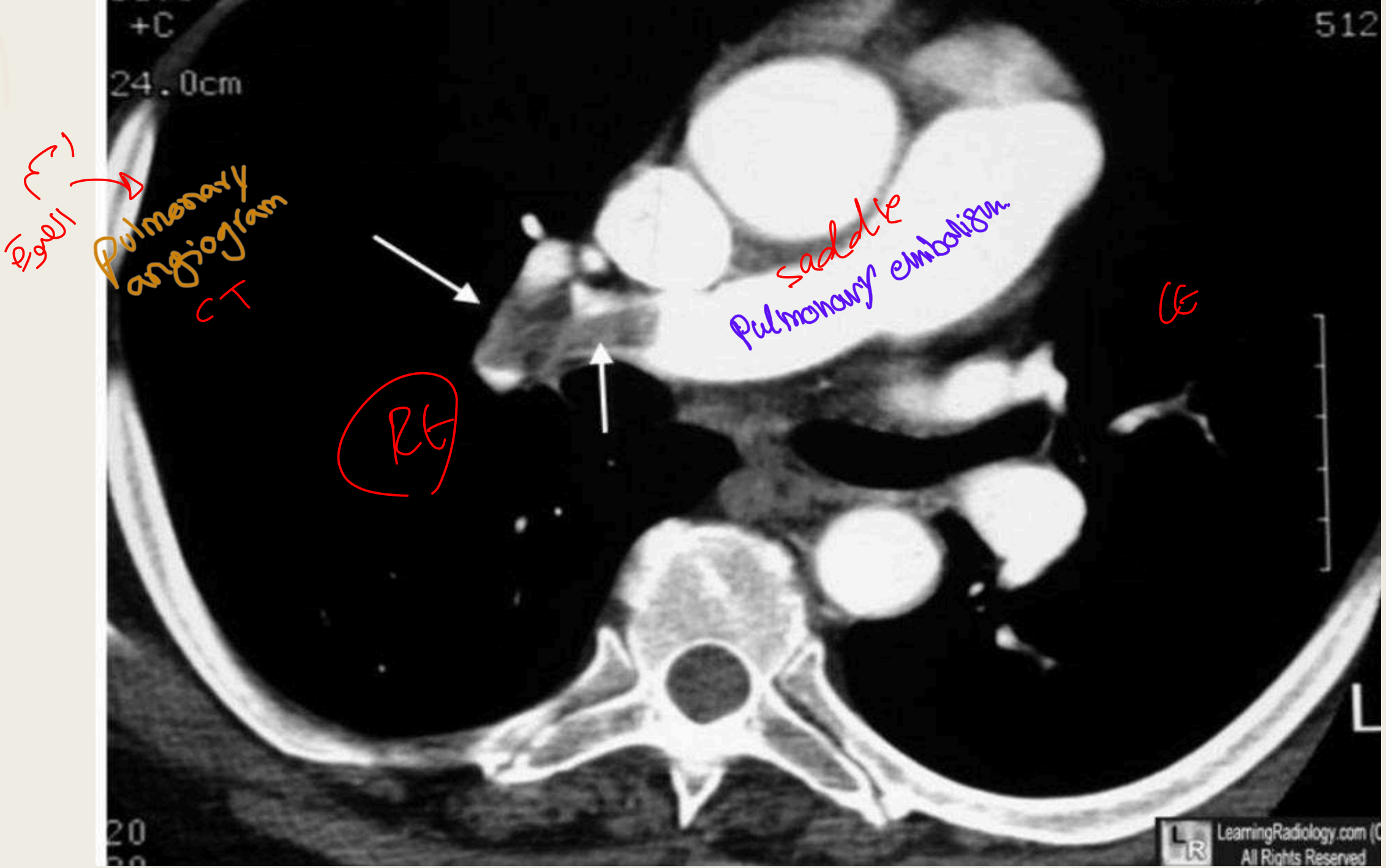

aortic aneurysm
DDx of posterior mass
hilum overlay sign
Posterior mediastinum mass


aorta
dilated
*appear adjacent to vertebral body.


opacity in Right upper zone
hyperinflation
tumor
need CT
pleural effusion
may confused with Consolidation
cancer


*Hyperinflation
due to increase lucency
flattening of diaphgram.
*↑intercostal space.


Barrel chest


+C
512
24.0cm
Pulmonary angiogram CT
saddle Pulmonary embolism.
RT
LT
L
20
LearningRadiology.com
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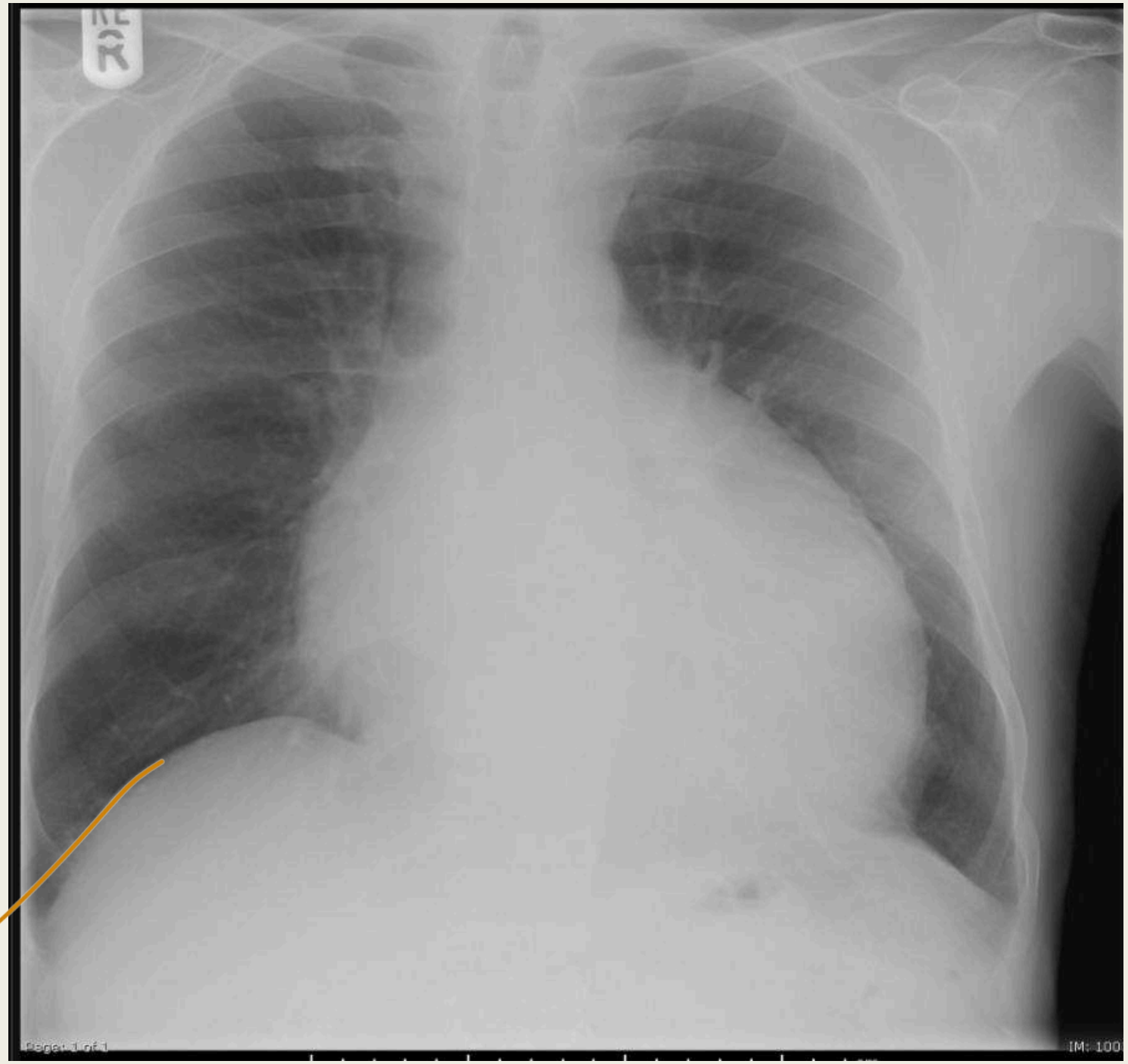
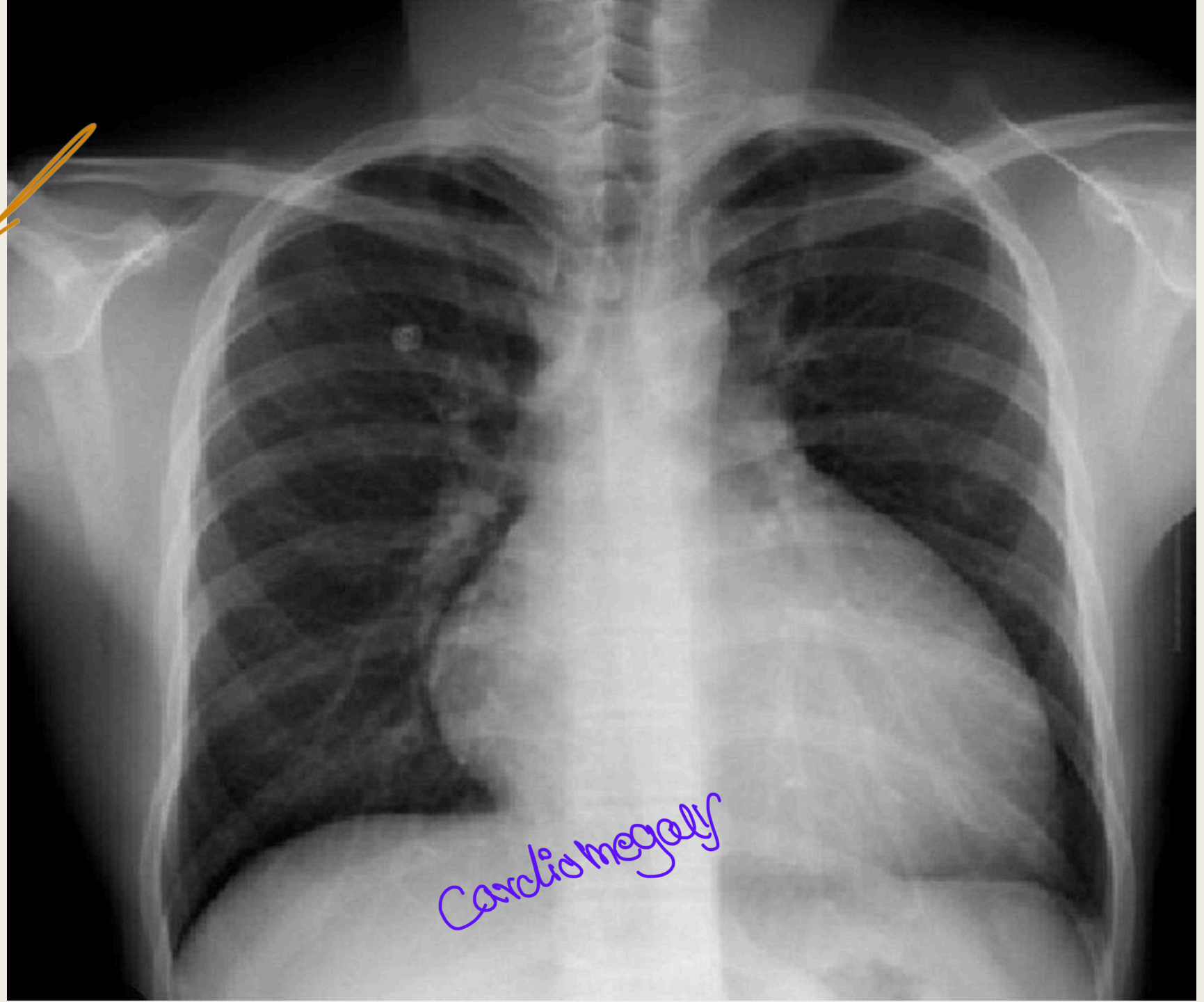
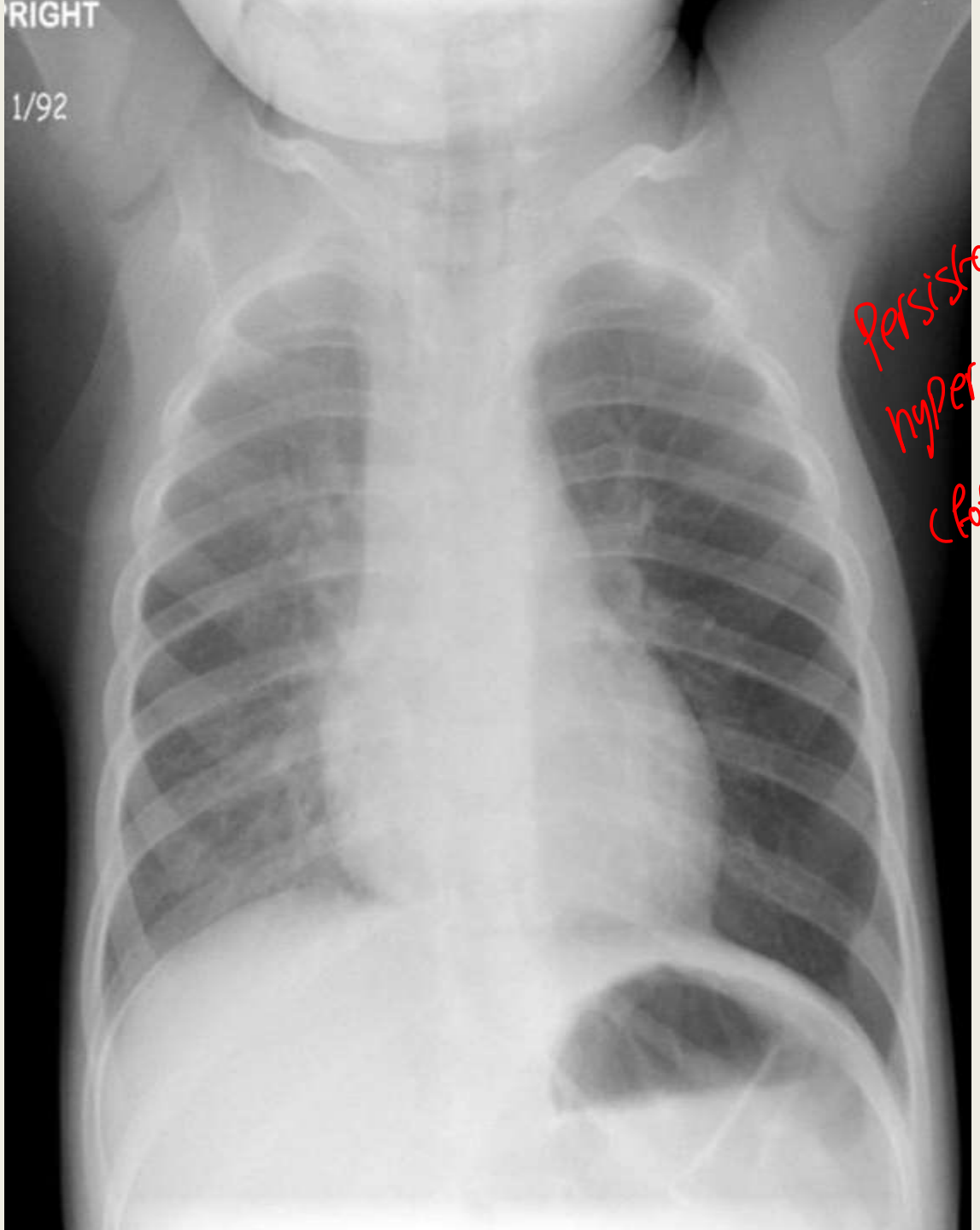


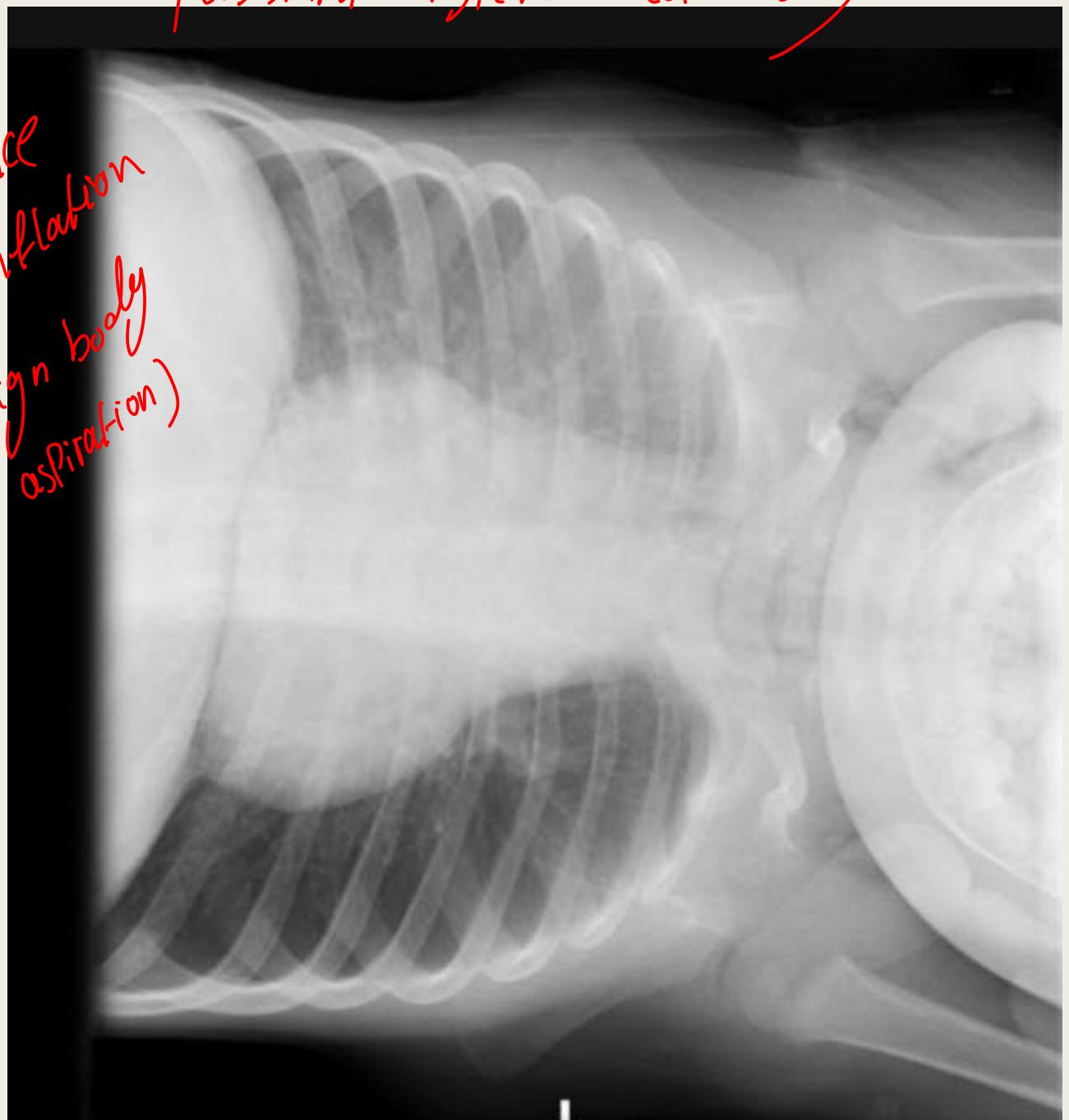
Cardio thoracic ratio

Pericardial effusion, water bottel sign (flask shape)


Cardiomegaly

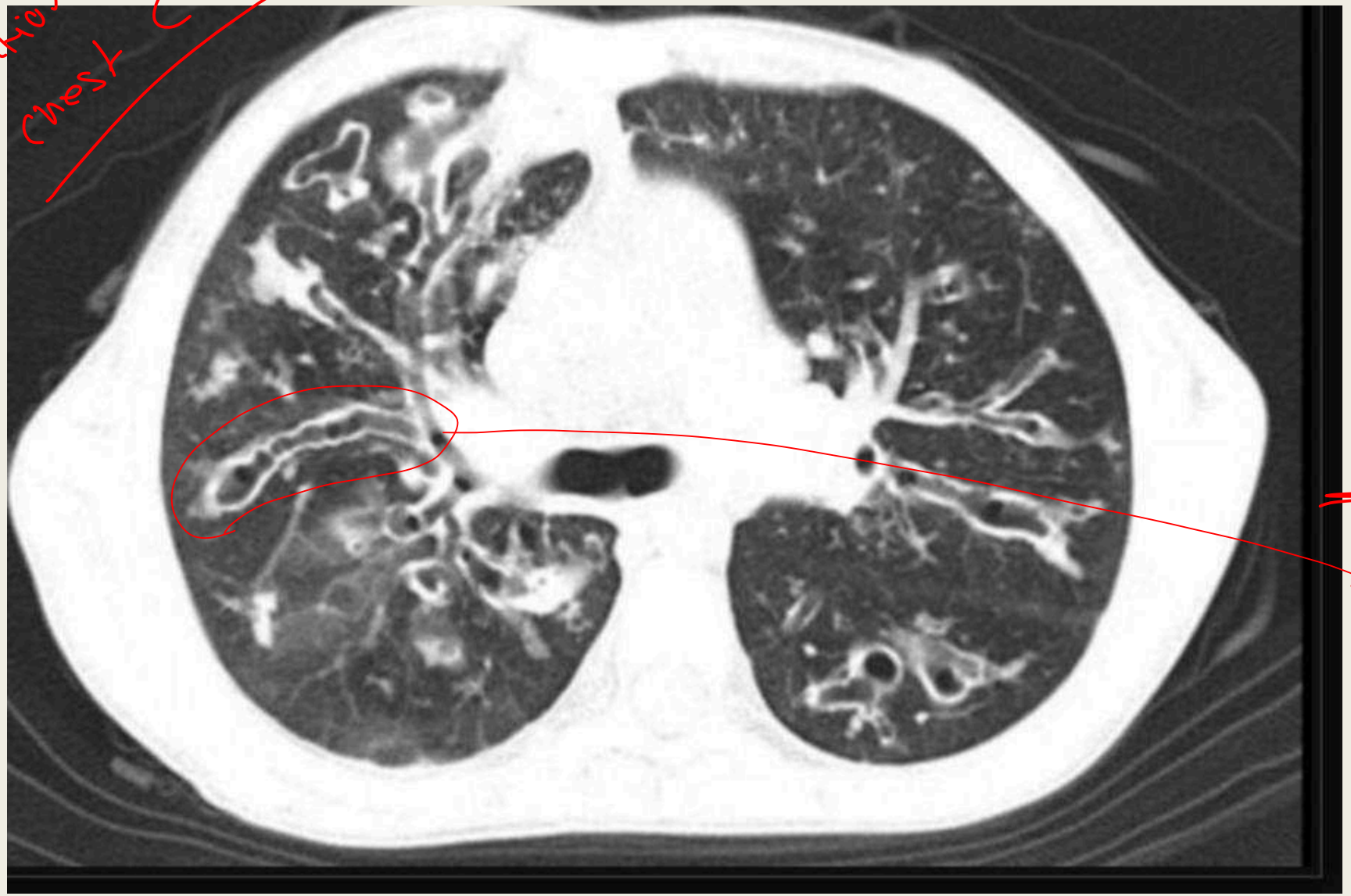


Persistance hyperinflation (foreign body aspiration)



Persistant hyperinflated lung

high resolution chest CT

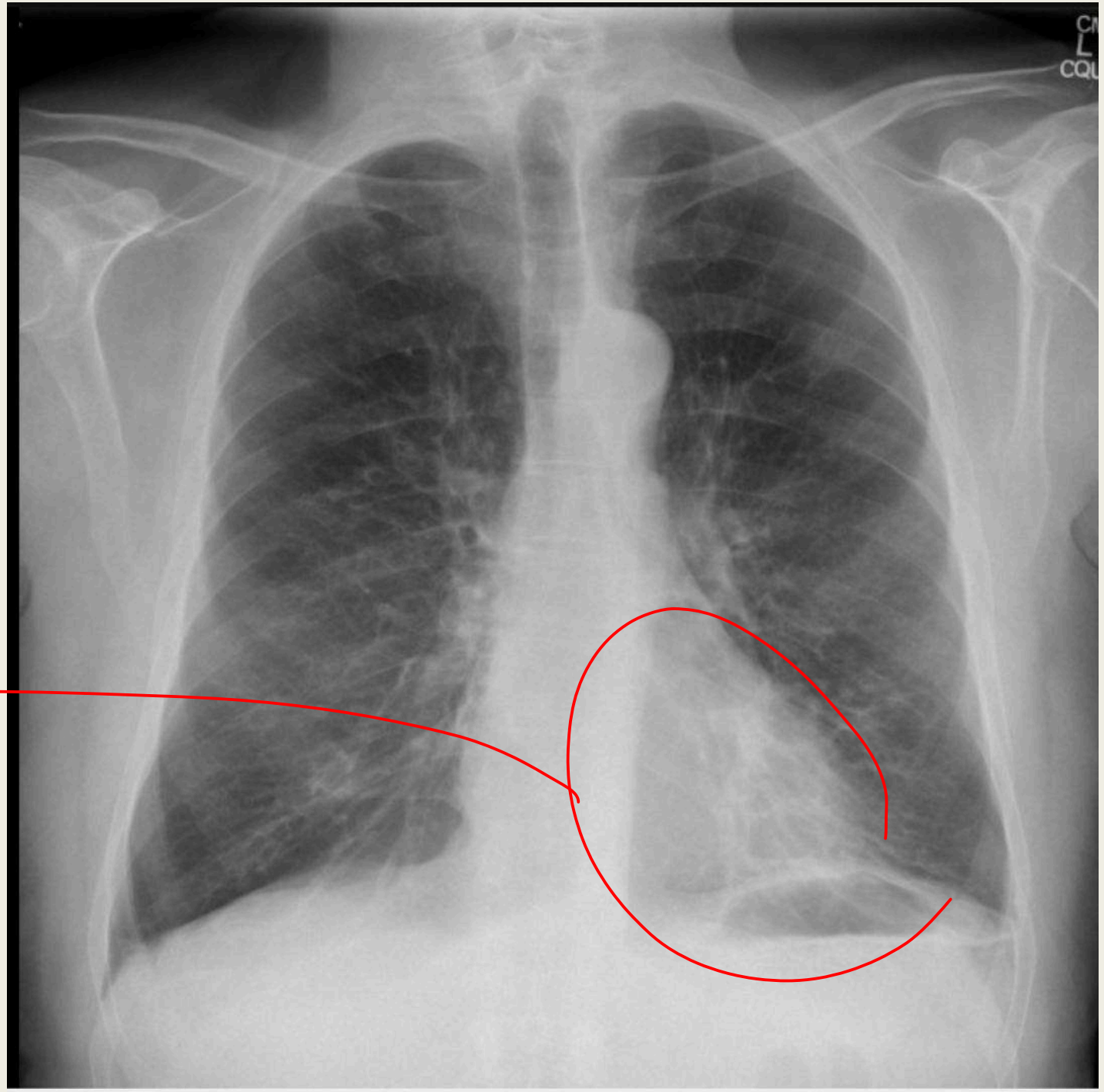


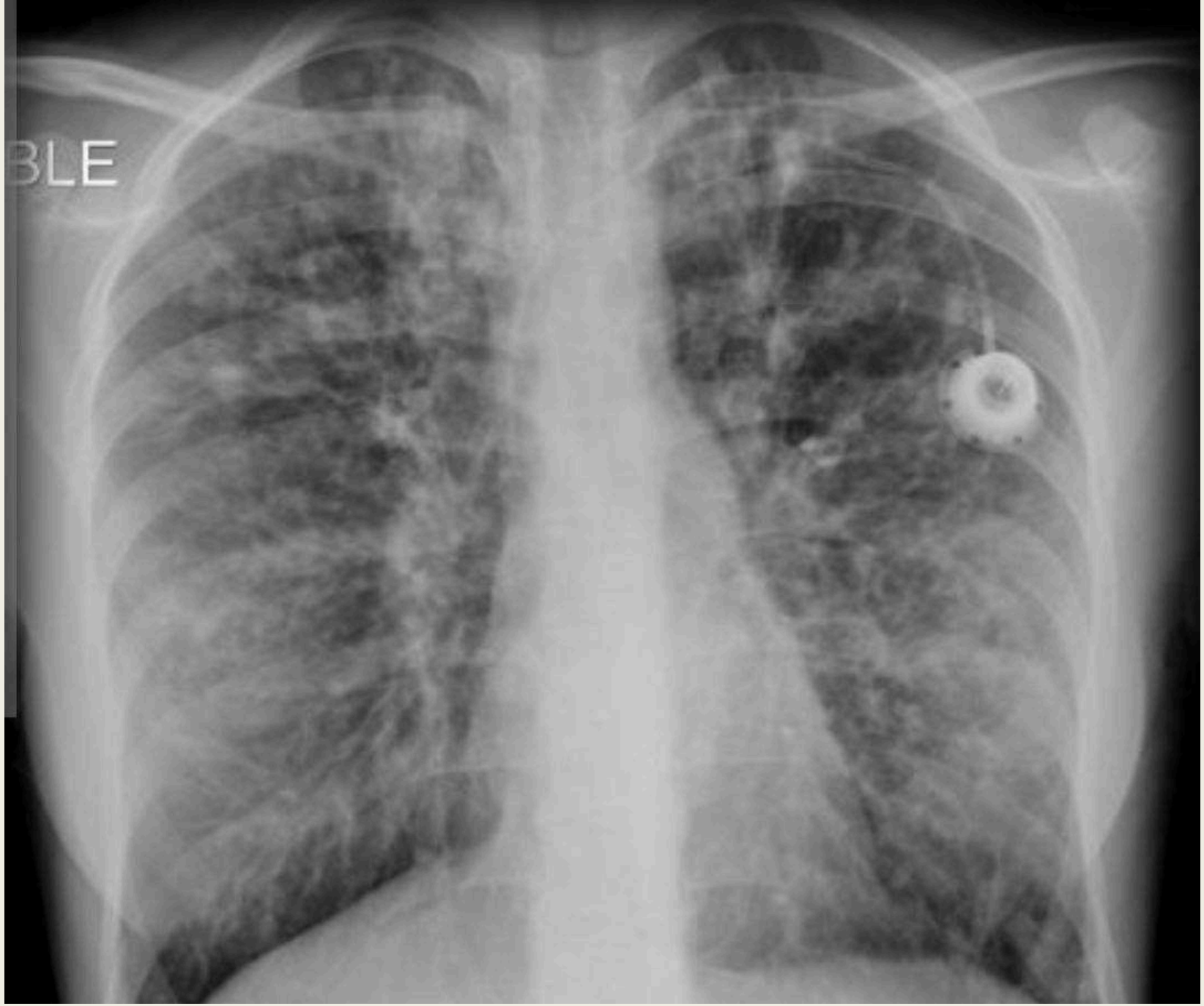
CT Scan Study:

* Mild cylindrical form from bronchiectasis

varicose ?

* Tram - Track appearance in bronchiectasis.





bronchiectasis in both

↳ Cystic Fibrosis

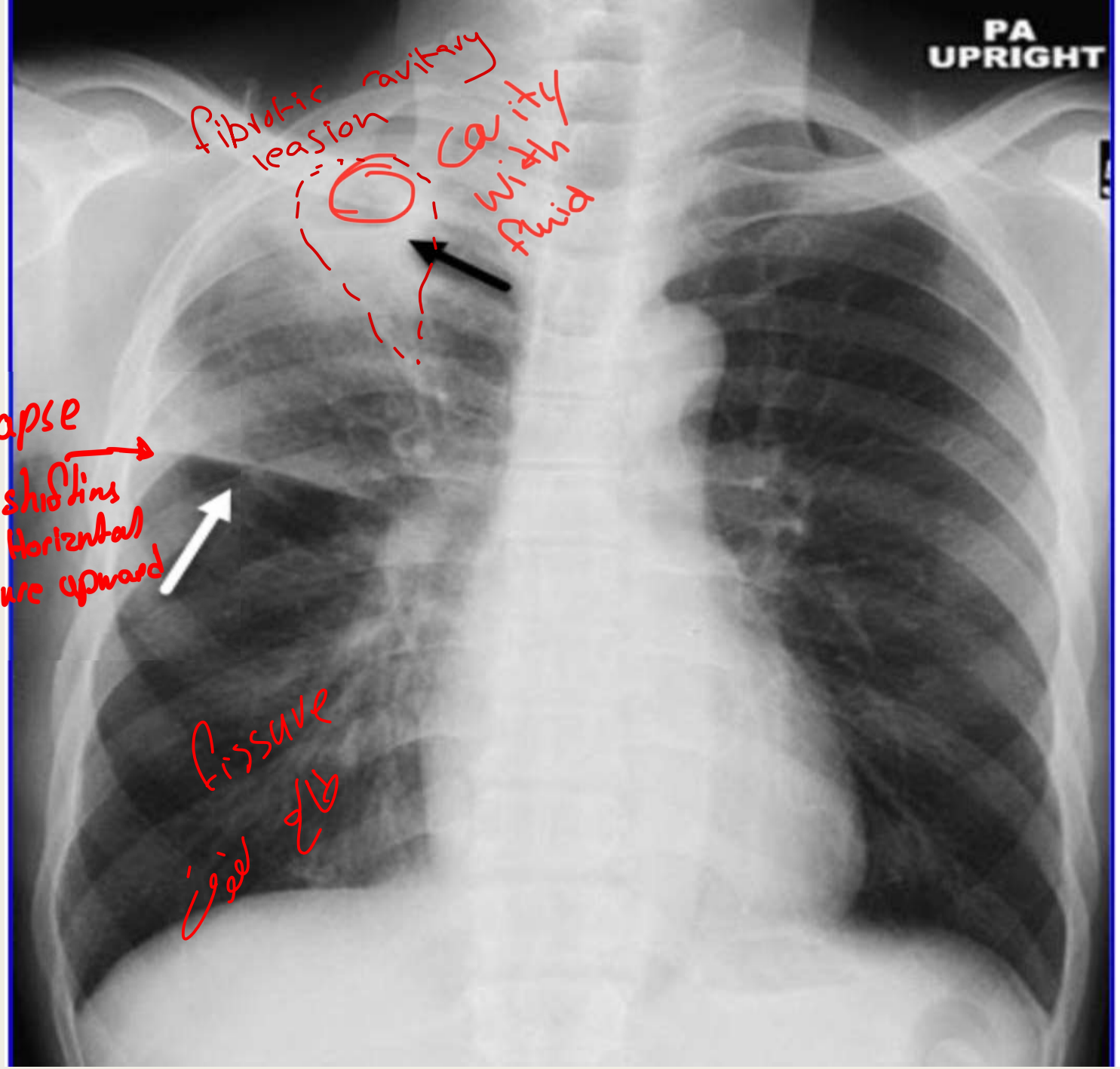
Cystic fibrosis

(Autosomal Recessive disease)

Bronchiectasis signs

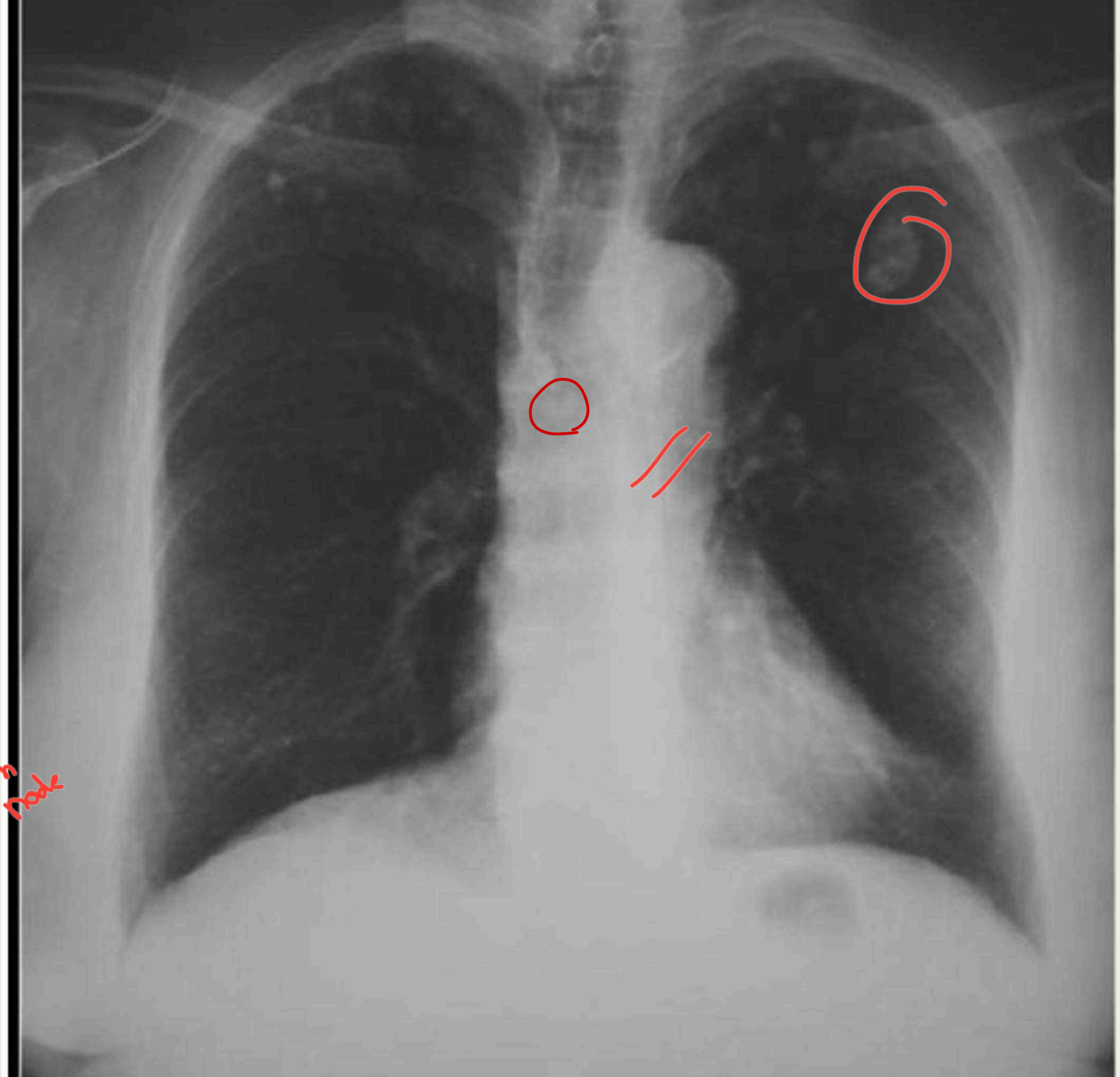
* collapse with cavitation Secondary TB.

loss of lung volume



TB post primary Healed

when fibrosis occur cusing shiffting of near structure toward fibrotic Area



healed TB due to calcification.

Ranke complex
= + calcification of lymph node

Calcification in Apex of lung

history of TB

Metis

Canon ball

Bochdalek hernia

L.t sided posterolateral

Morgagni hernia

Rt side