بسم الله الرحمن الرحيم

CXR

for undergraduates

By

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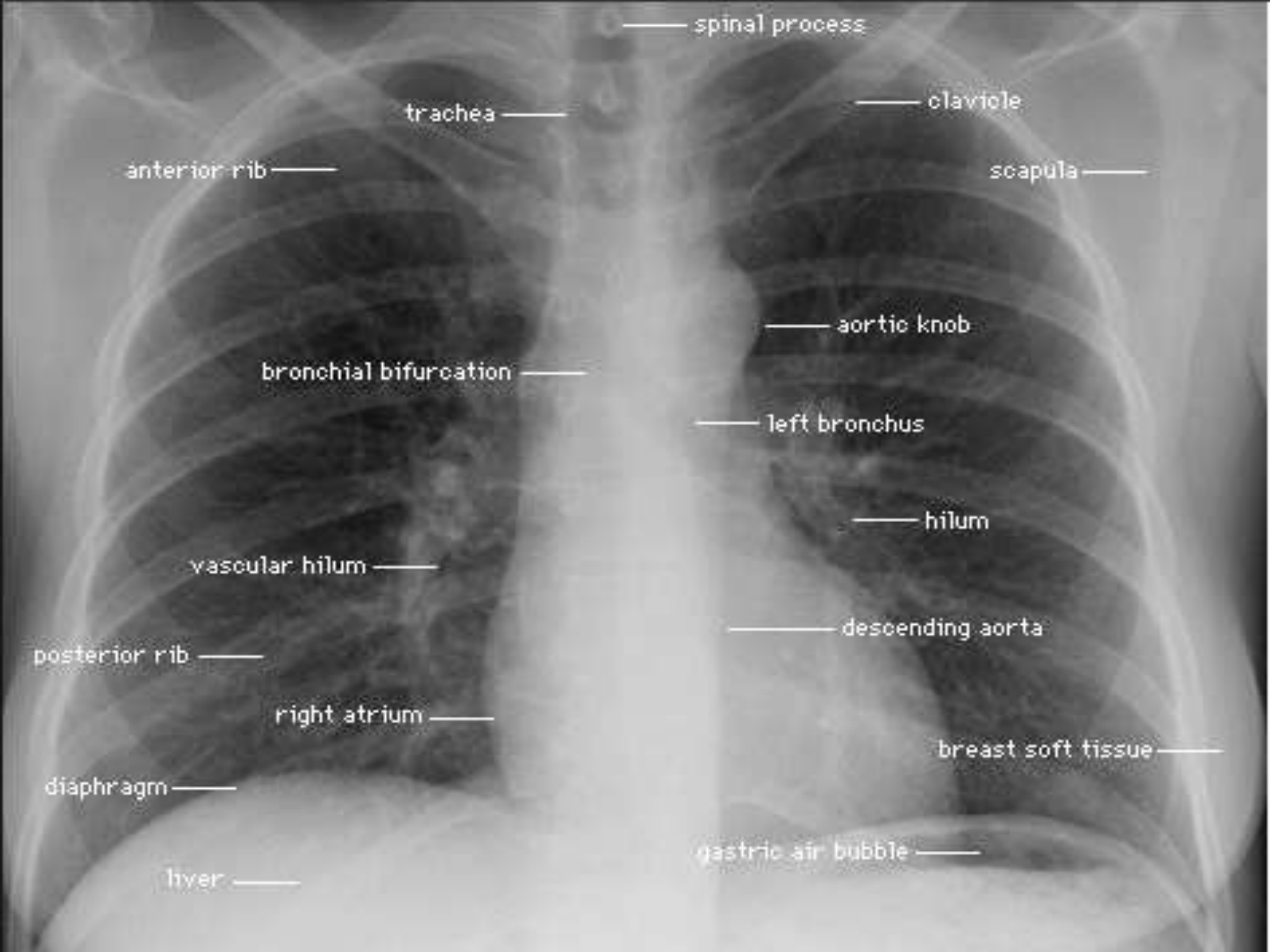
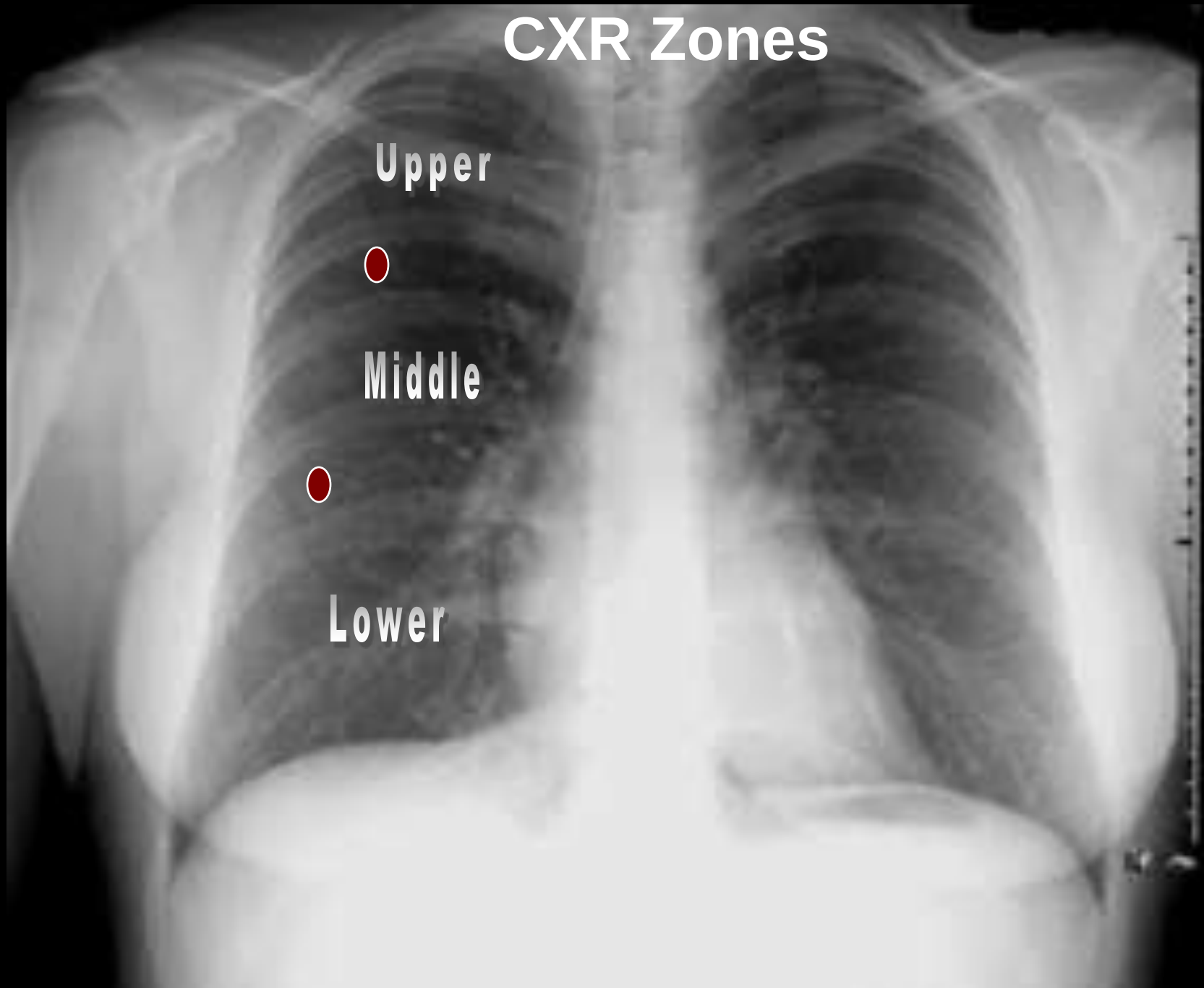
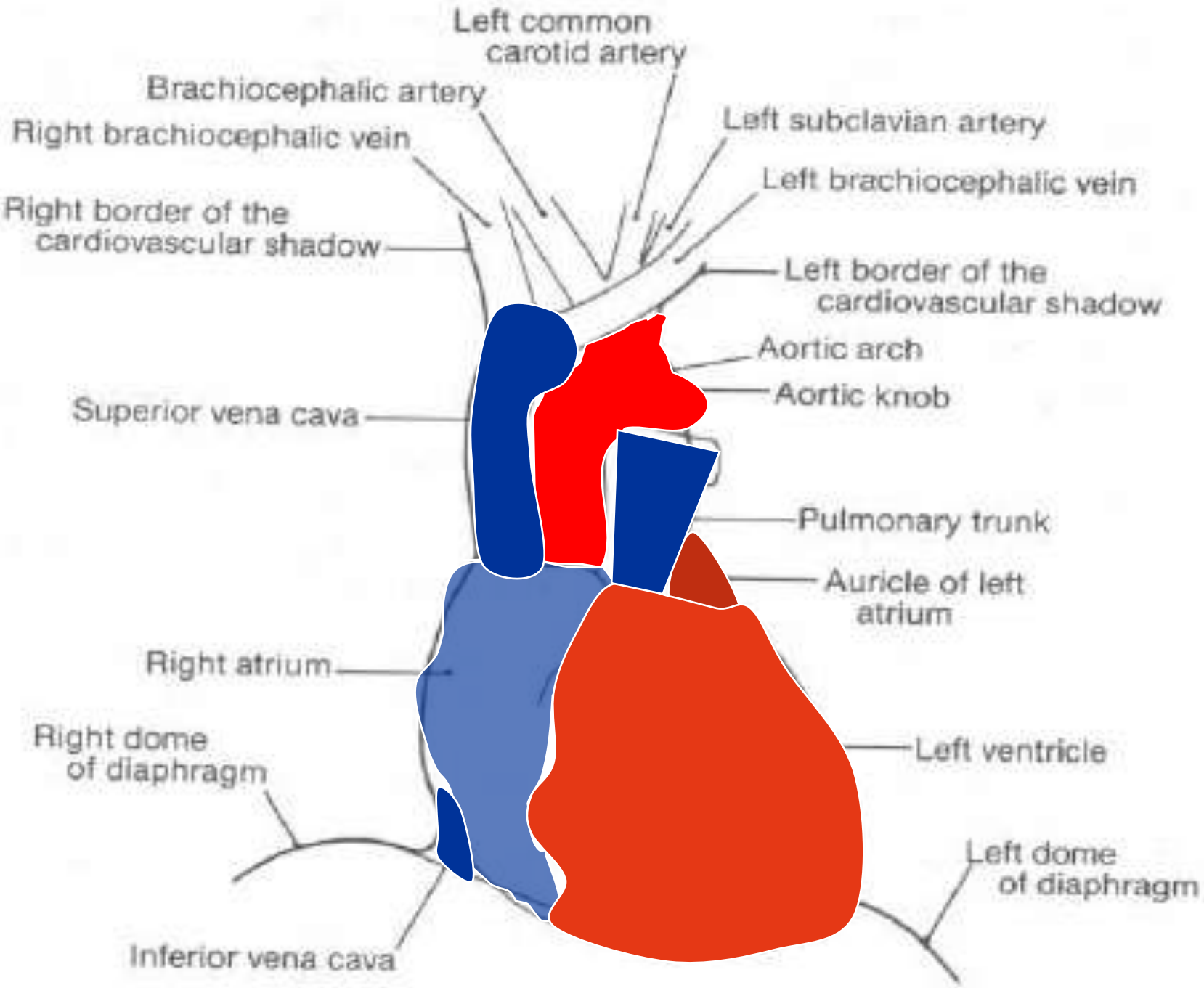
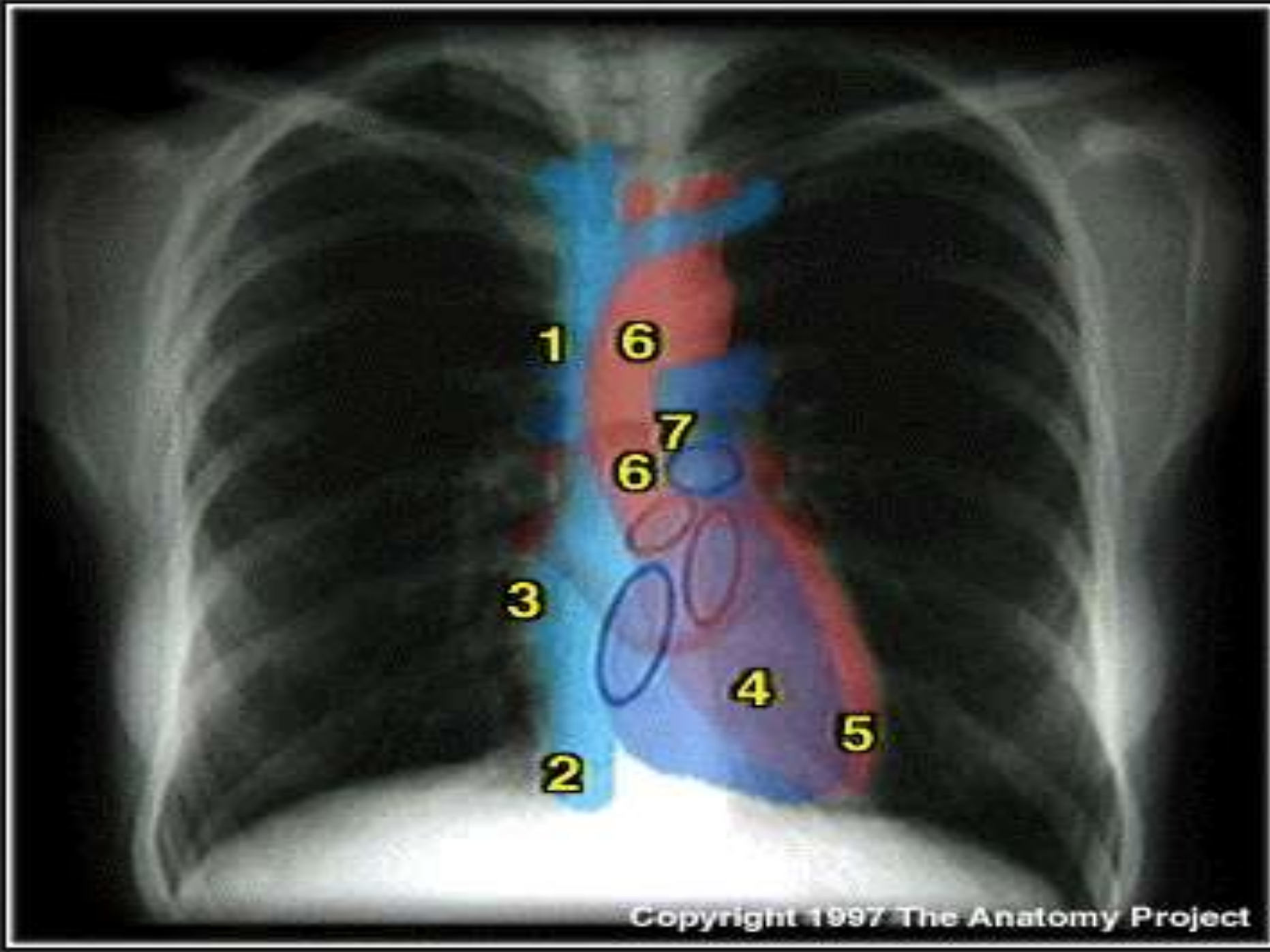
Ass. Lect. Radiology Department

- CXR is the basal radiological examination of the chest.
- It indicated In nearly all pathologies related to the chest.


spinal process
trachea
claviole
anterior rib
scapula
aortic knob
bronchial bifurcation
left bronchus
hilum
vascular hilum
descending aorta
posterior rib
right atrium
breast soft tissue
diaphragm
gastric air bubble
liver

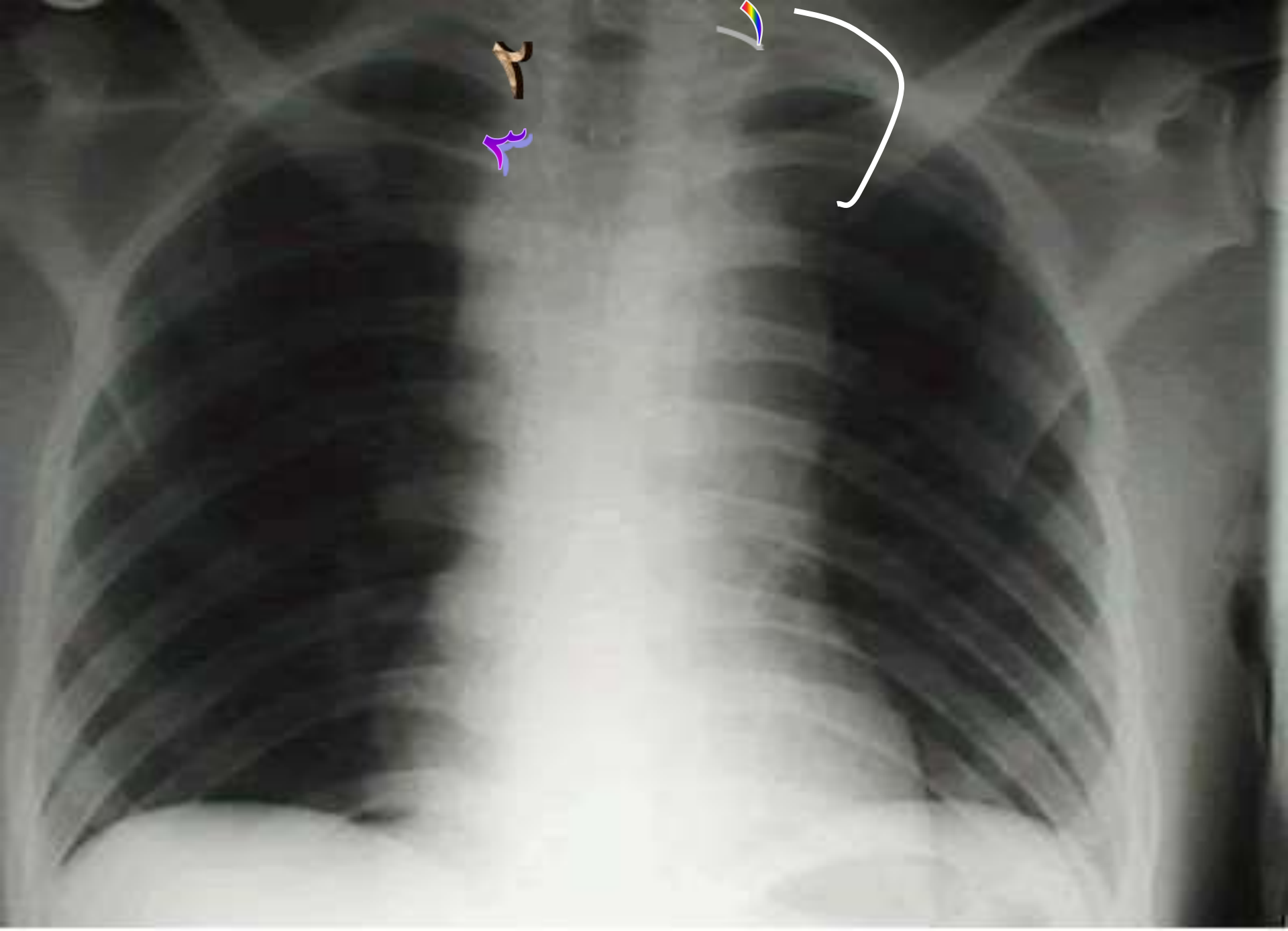

CXR Zones
Upper
Middle
Lower


Left common carotid artery
Brachiocephalic artery
Right brachiocephalic vein
Left subclavian artery
Left brachiocephalic vein
Right border of the cardiovascular shadow
Left border of the cardiovascular shadow
Aortic arch
Aortic knob
Superior vena cava
Pulmonary trunk
Auricle of left atrium
Right atrium
Left ventricle
Right dome of diaphragm
Left dome of diaphragm
Inferior vena cava

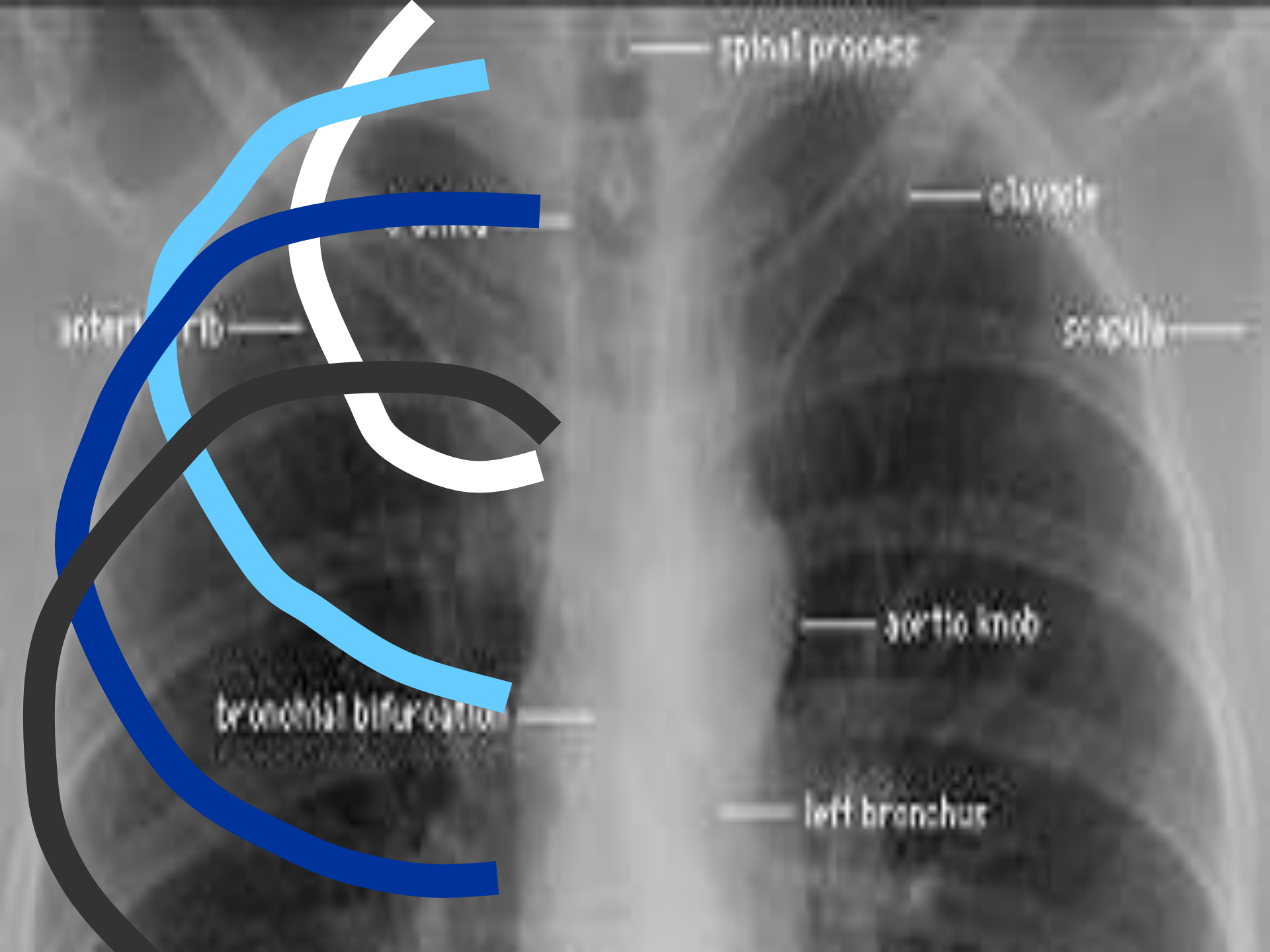

1
6
7
6
3
4
5
2
Copyright 1997 The Anatomy Project

How to Count Ribs?

Begin Posteriorly

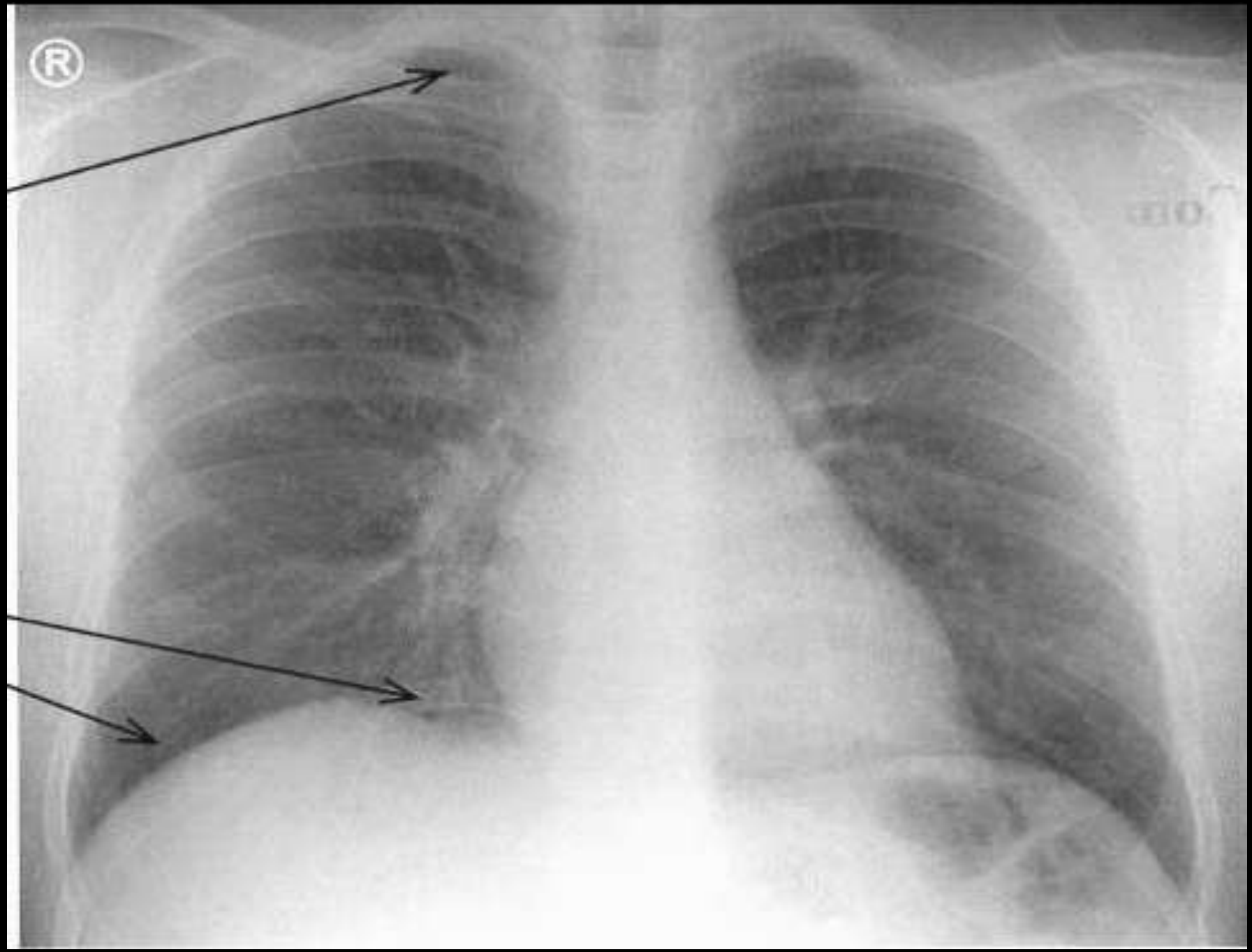


Source: http://www.trauma.org/imagebank/chest/images/chest0033.html


spinal process
clavicle
scapula
aortic knob
left bronchus

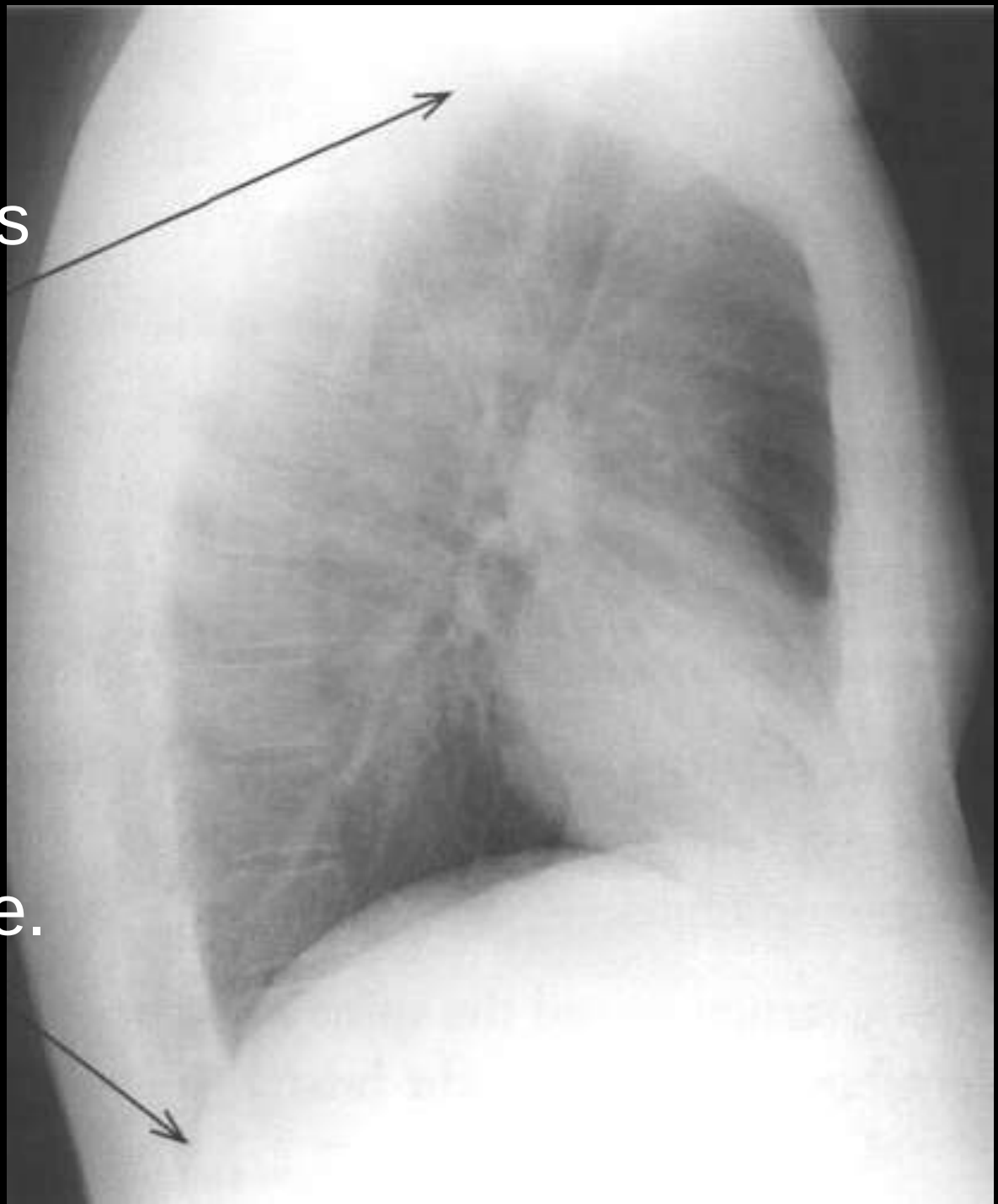
Criteria of Ideal CXR

- Top of the lungs must be visible.
- Full inspiration.
- lower parts of the diaphragm is visible on both sides, including both costophrenic angles.
- Spine must be just seen behind the heart.


R

The top of the lungs must be visible.

Make sure that the lower parts of the diaphragm is visible.



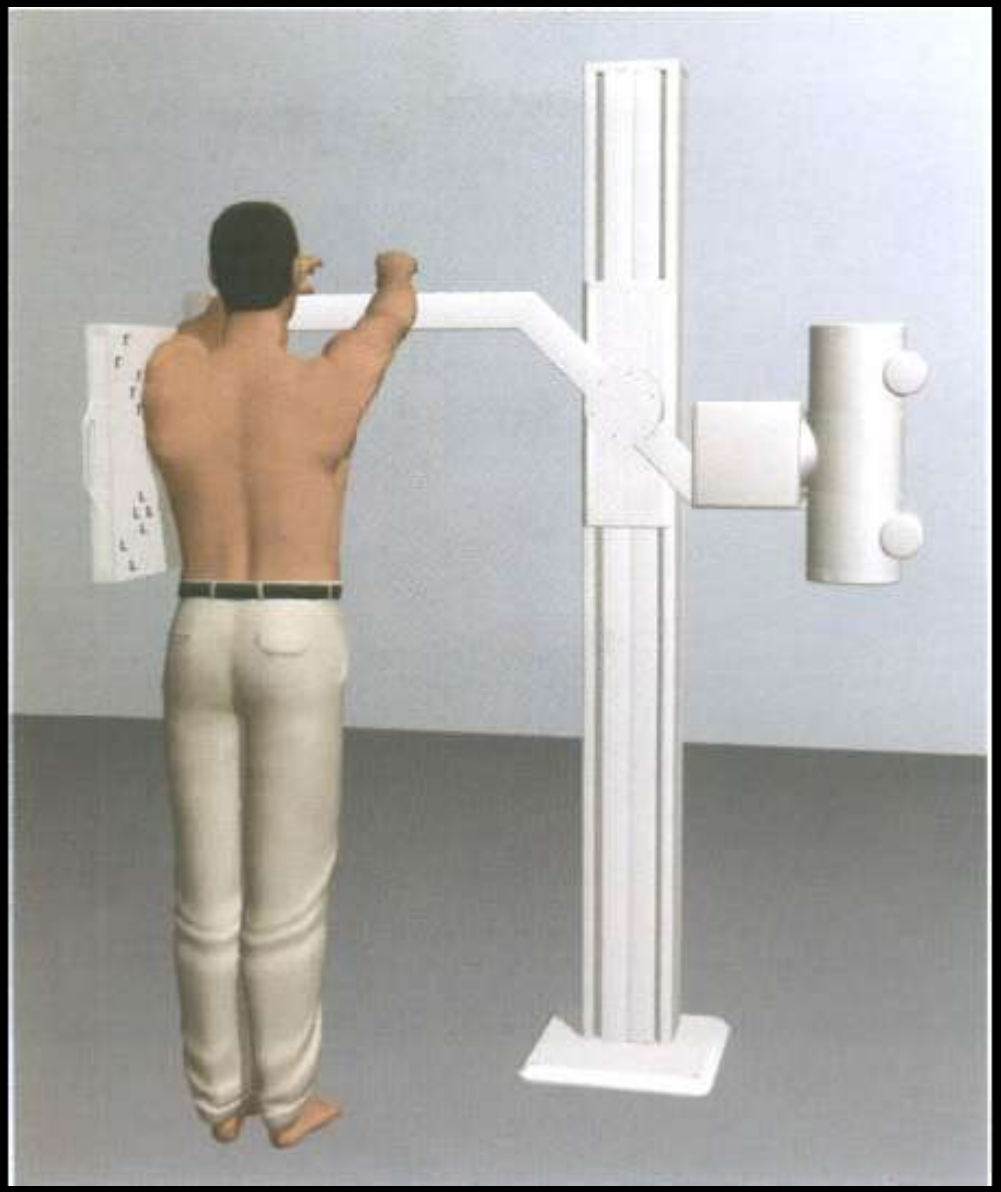
Positions

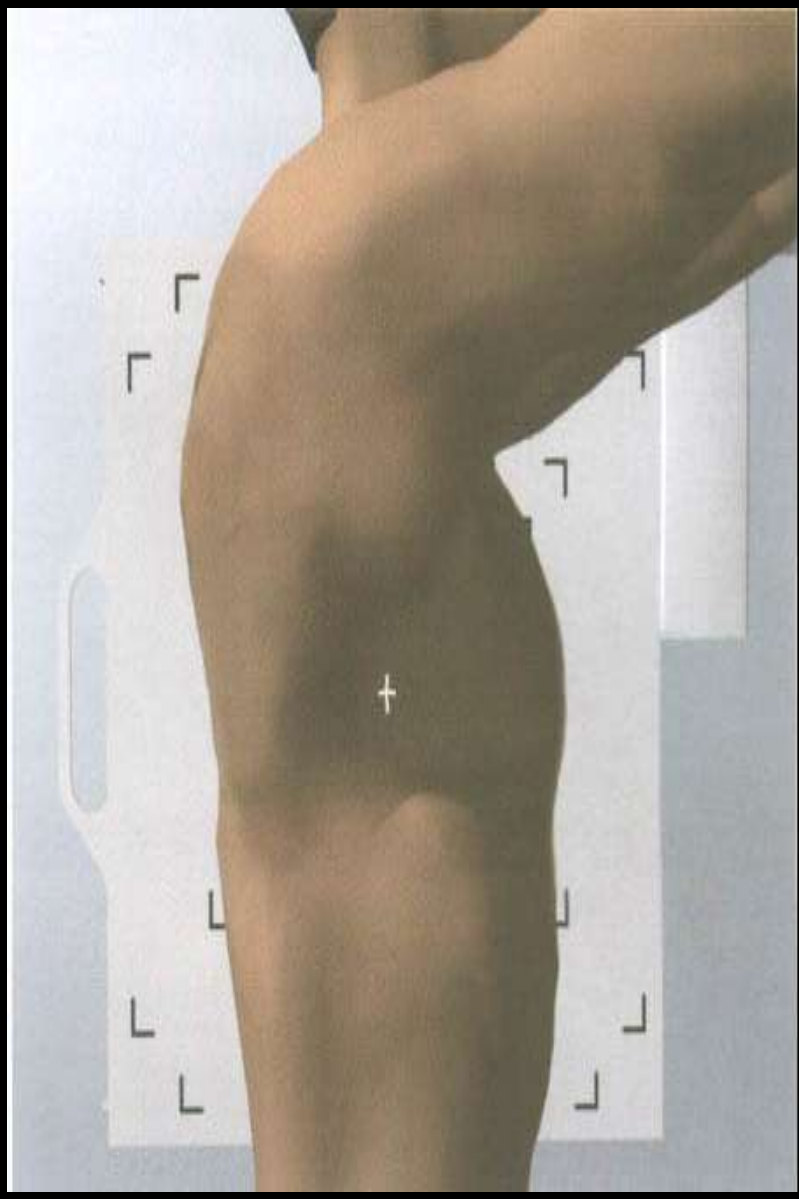
- Basal CXR position is “P-A” then Lateral
- But other positions in CXR are used as :

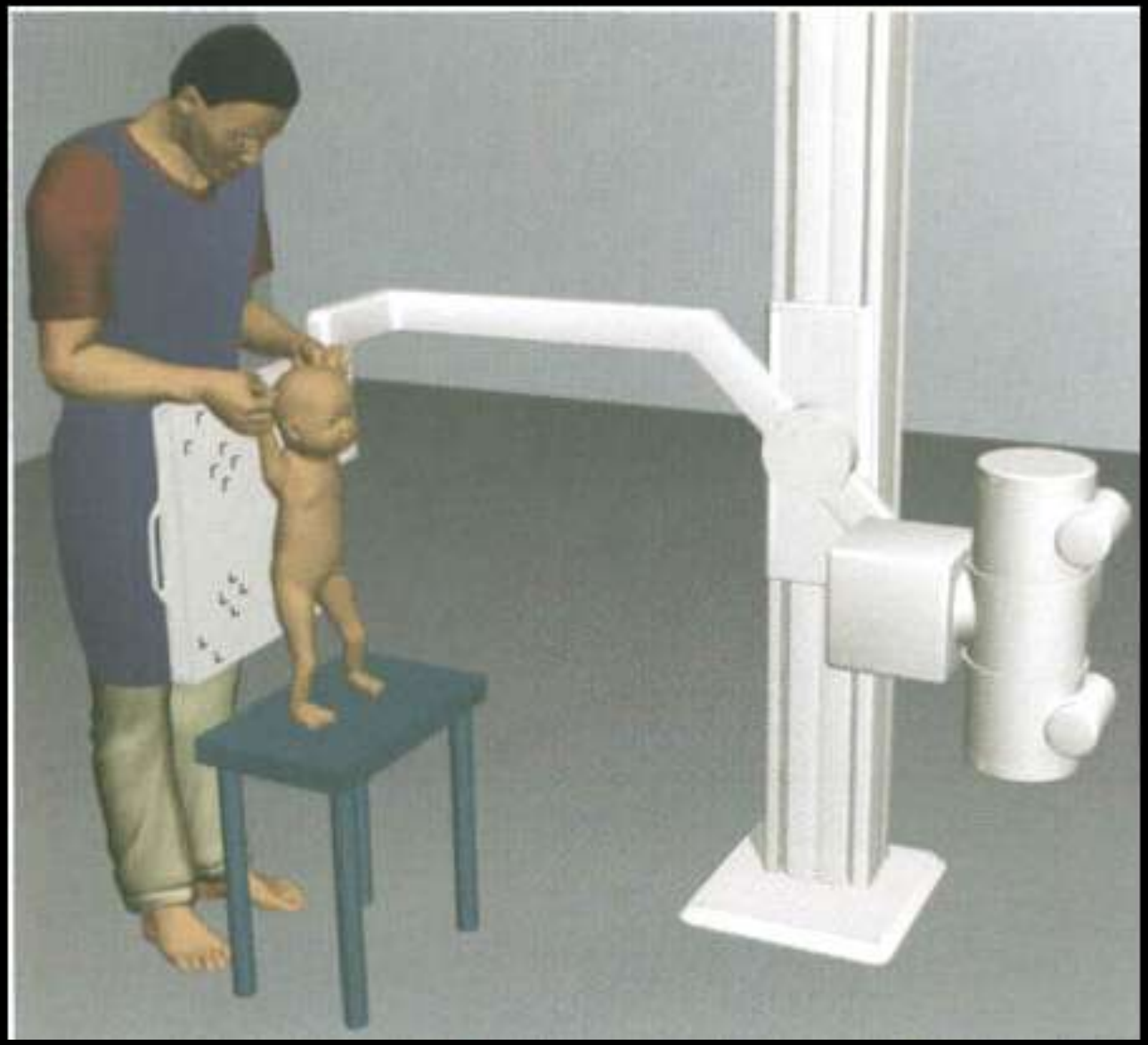
  – A-P
  – Lateral
  – Lordotic A-P.
  – Obliques.
  – Supine

Why CXR is done in postro-anterior view ?

To avoid magnification







Left oblique

Right oblique

Position for LEFT lateral decubitus

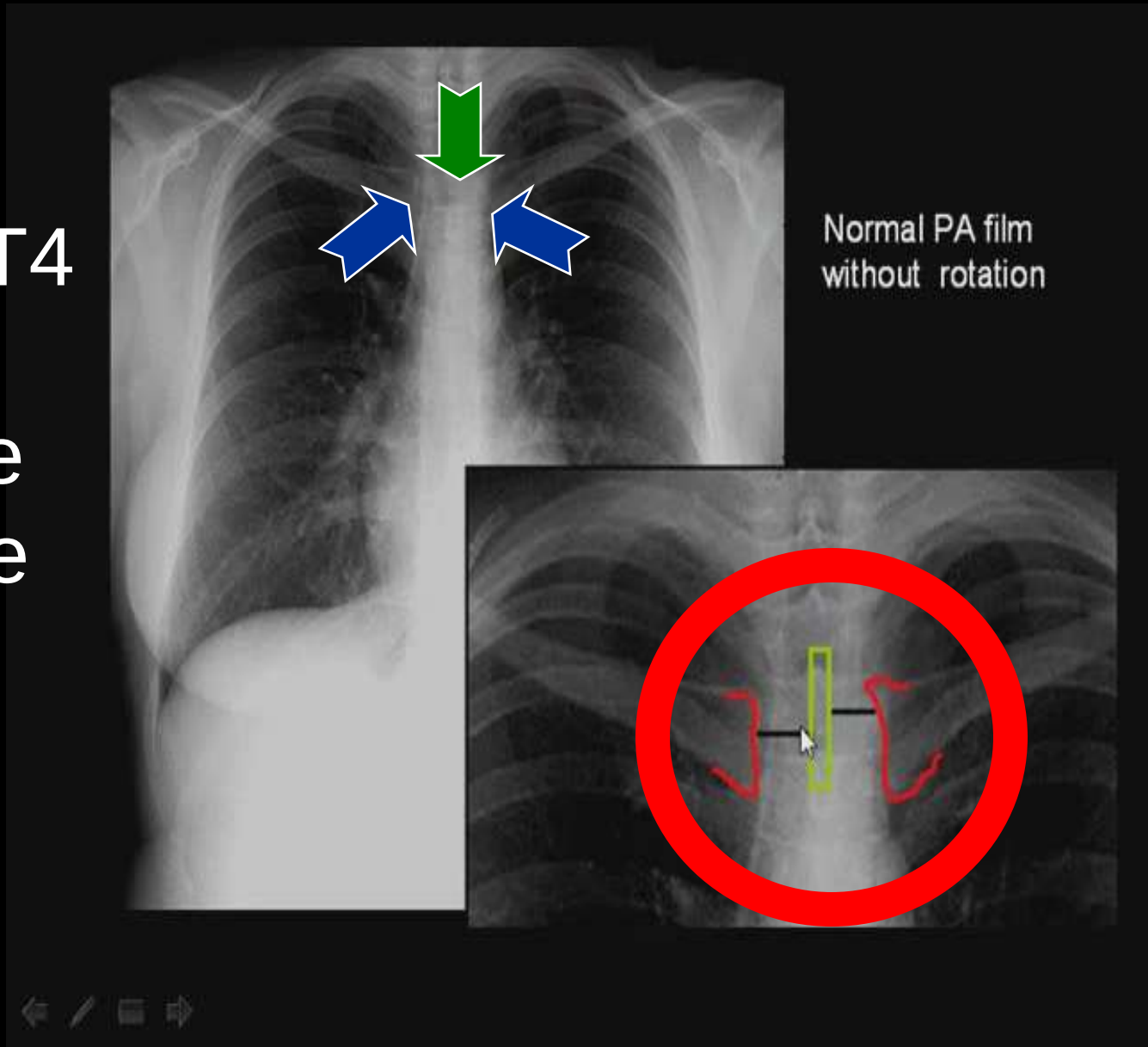
- Identification (name, age, sex, indication for X-ray)
- **M**arkers (differentiate left from right)

• or Any Object = R “Right side”

eg. Kee, coin …etc.

Centralization

- spinous process of T4 should be between the heads of the clavicle.



Exposure

- Exposure = Amount of used X ray to radiograph the Film.
- In MAs & Kv.

- **Effect of :**

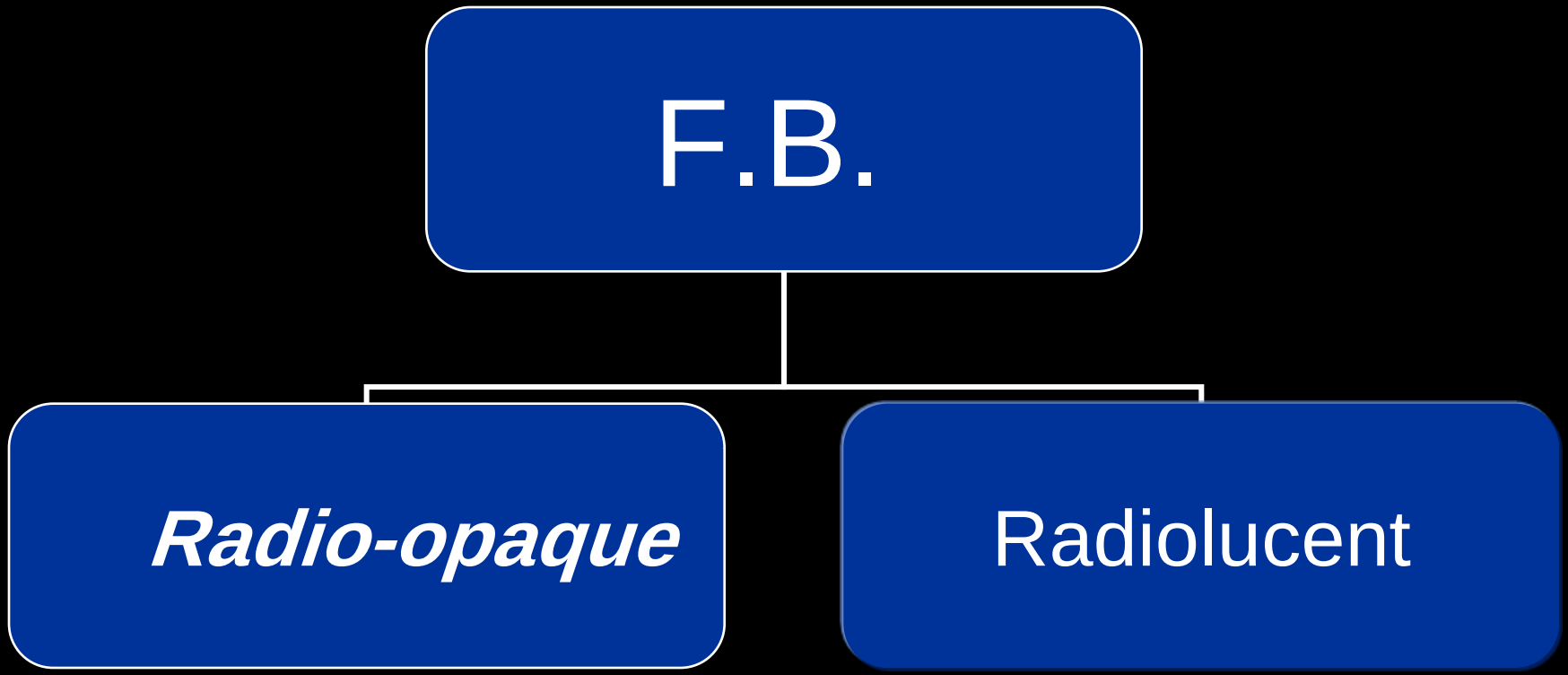
over- & under exposure **on CXR.**

- Overexposure *(A)*

- Underexposure *(B)*

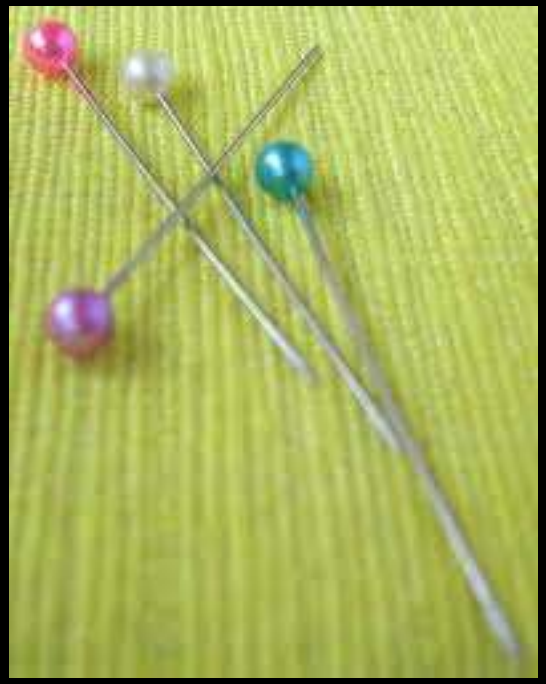
Emergency situations & CXR

F.B. Inhalation

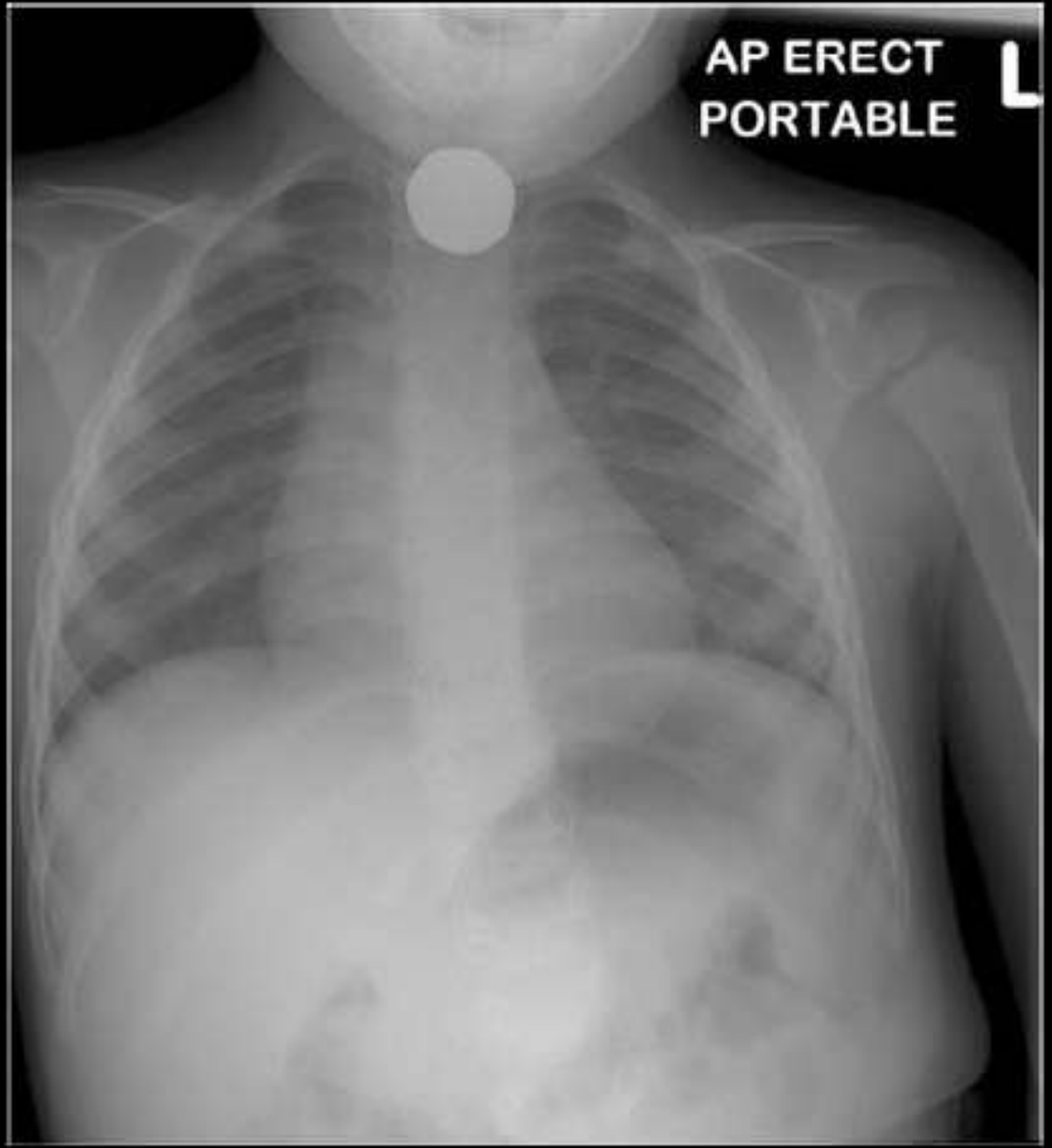

F.B.
Radio-opaque
Radiolucent

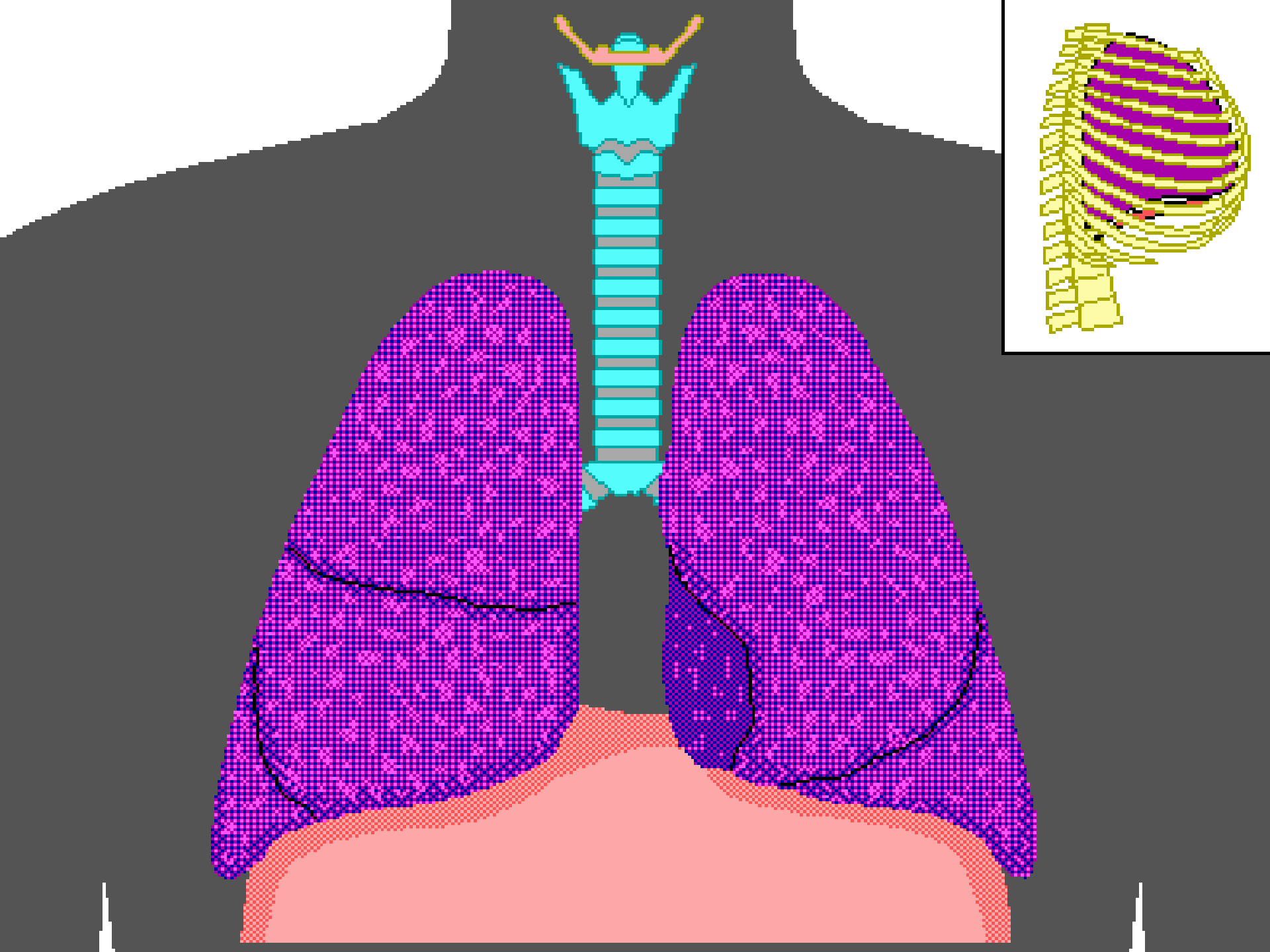
- Usually seen in children or MR.
- Not Uncommon to occur in Normal Adults.

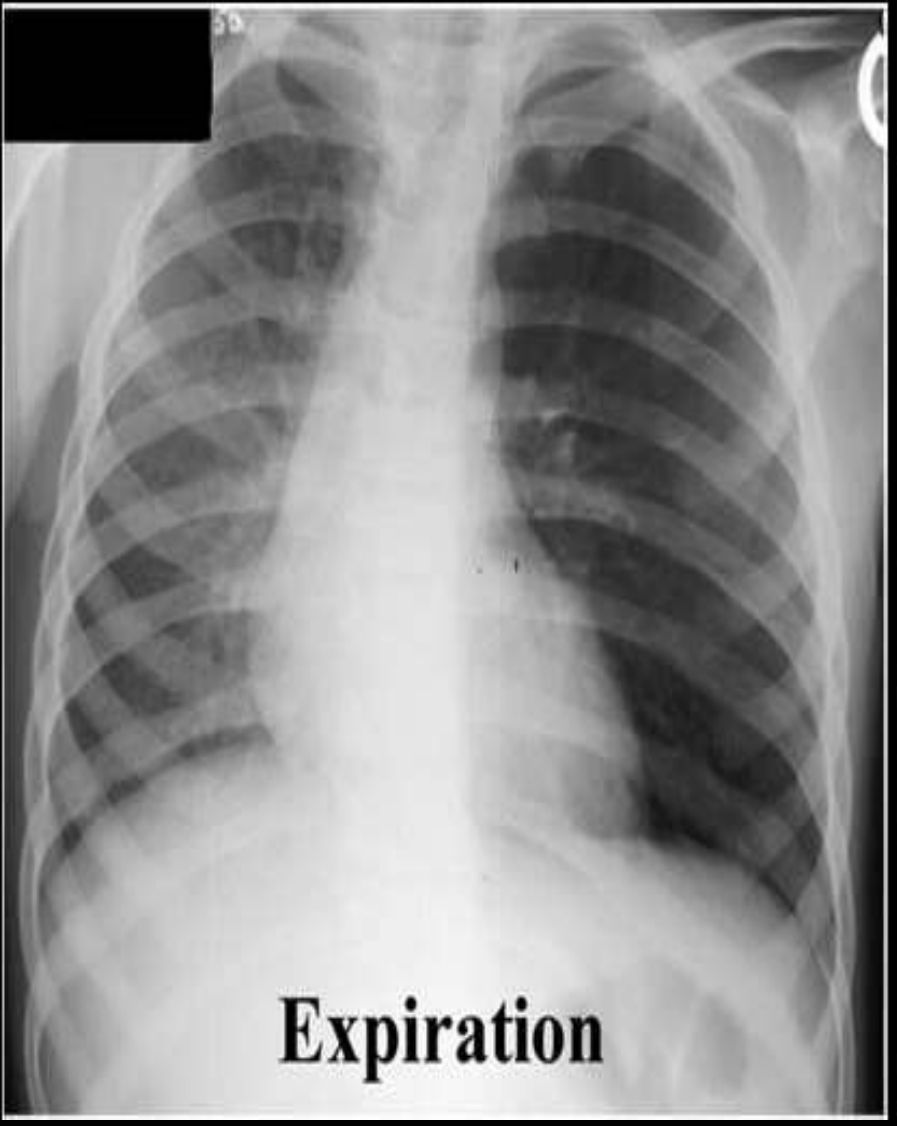
- Considered an emergency as it may result in complete upper airway obstruction → Fatal.

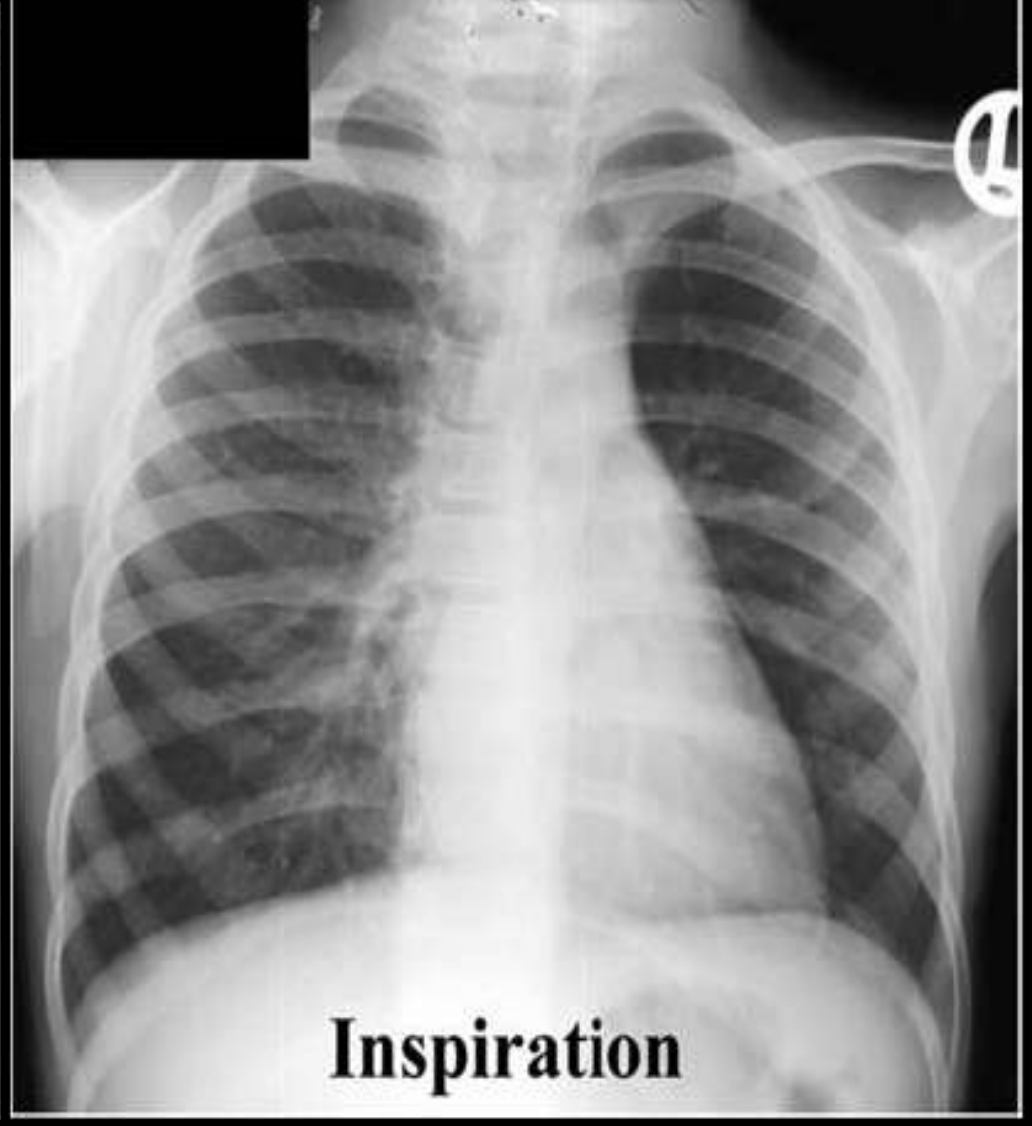


هـــام Imaging of FB Swallow must be from ***Mouth to Anus***!!!


AP ERECT
PORTABLE
L







‘Ball valve’ effect due to an inhaled foreign body. The air trapping is much more apparent on the expiratory scans.

Thoracic Trauma

Trauma

Blunt

eg. Box,
Blunt objects

Penetrating

-Stab
-Fire Arm

Rib / Sternal fracture

•**<u>Etiology:</u>**

•Usually following direct trauma.

•May be pathological.

● Associated injuries:

– ***Clavicle/1st or 2nd rib*** *fractures* → great vessel, tracheo-bronchial or spinal injury.

– ***Sternal injuries*** → myocardial contusion.

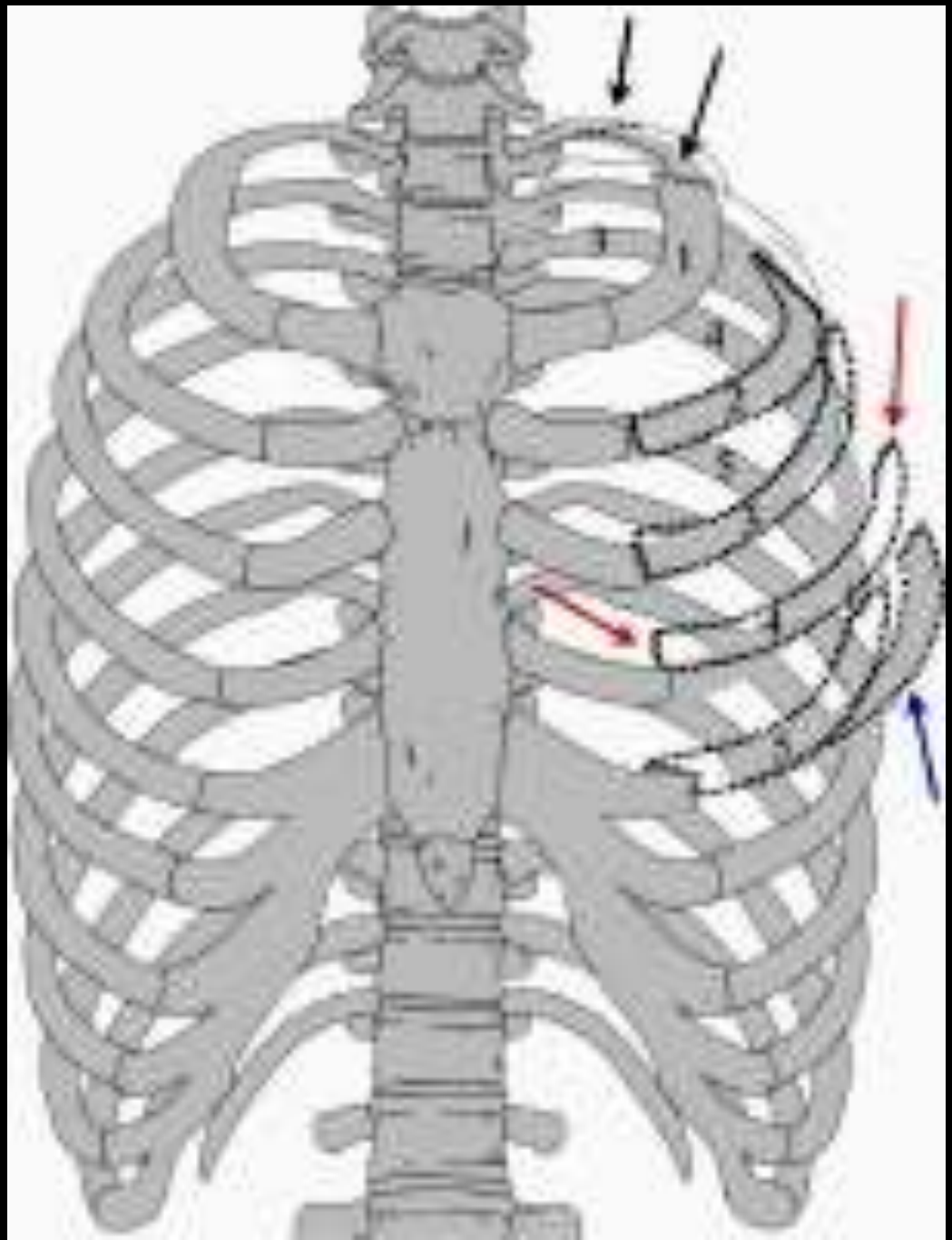
–L***ower rib fractures*** →Abdominal visceral injury, such as liver, spleen or kidney, may occur.

Sternal fracture.

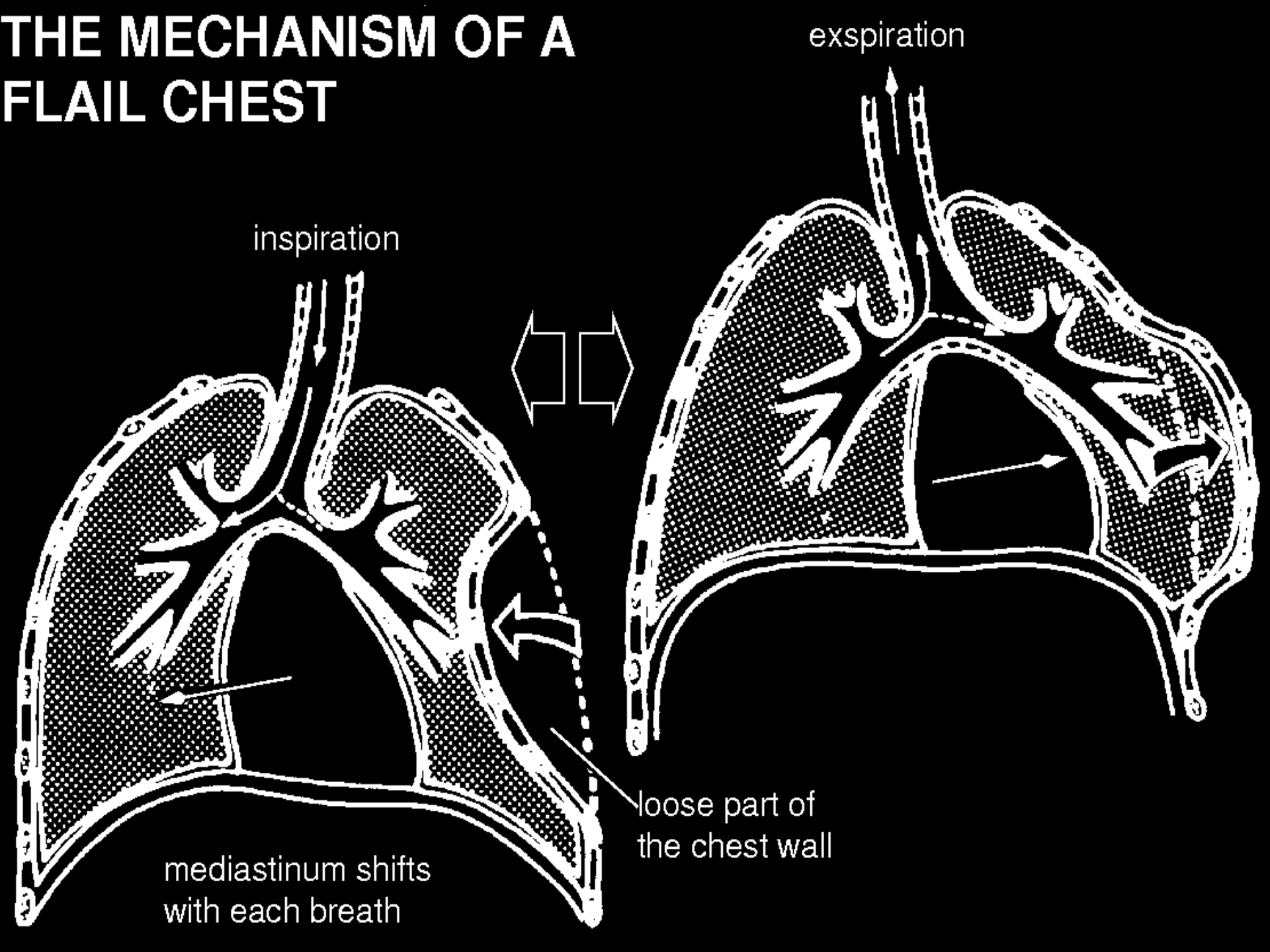
Should be evaluated in ***AP*** & ***Lat*** views

Flail chest

- A segment of chest wall *Loss its continuity* with the rest of the thoracic cage.
- Usually traumatic.
- **Two** or more ribs fractured in ***two*** or more places.
- Results in disruption of normal chest wall movements, → *paradoxical movement* "may be seen".
- Always consider underlying lung injury (pulmonary contusion).



THE MECHANISM OF A FLAIL CHEST



PNEUMO

- *Pneumo* = Air “in abnormal site”.

- *Pneumo*
  - thorax,
  - pericardium,
  - peritoneum,
  - cephaly

Pneumothorax

- Accumulation of air within the pleural cavity.
- A common complication of chest trauma (15–40%).
- Divided into *three categories*:

(i) *Simple*:

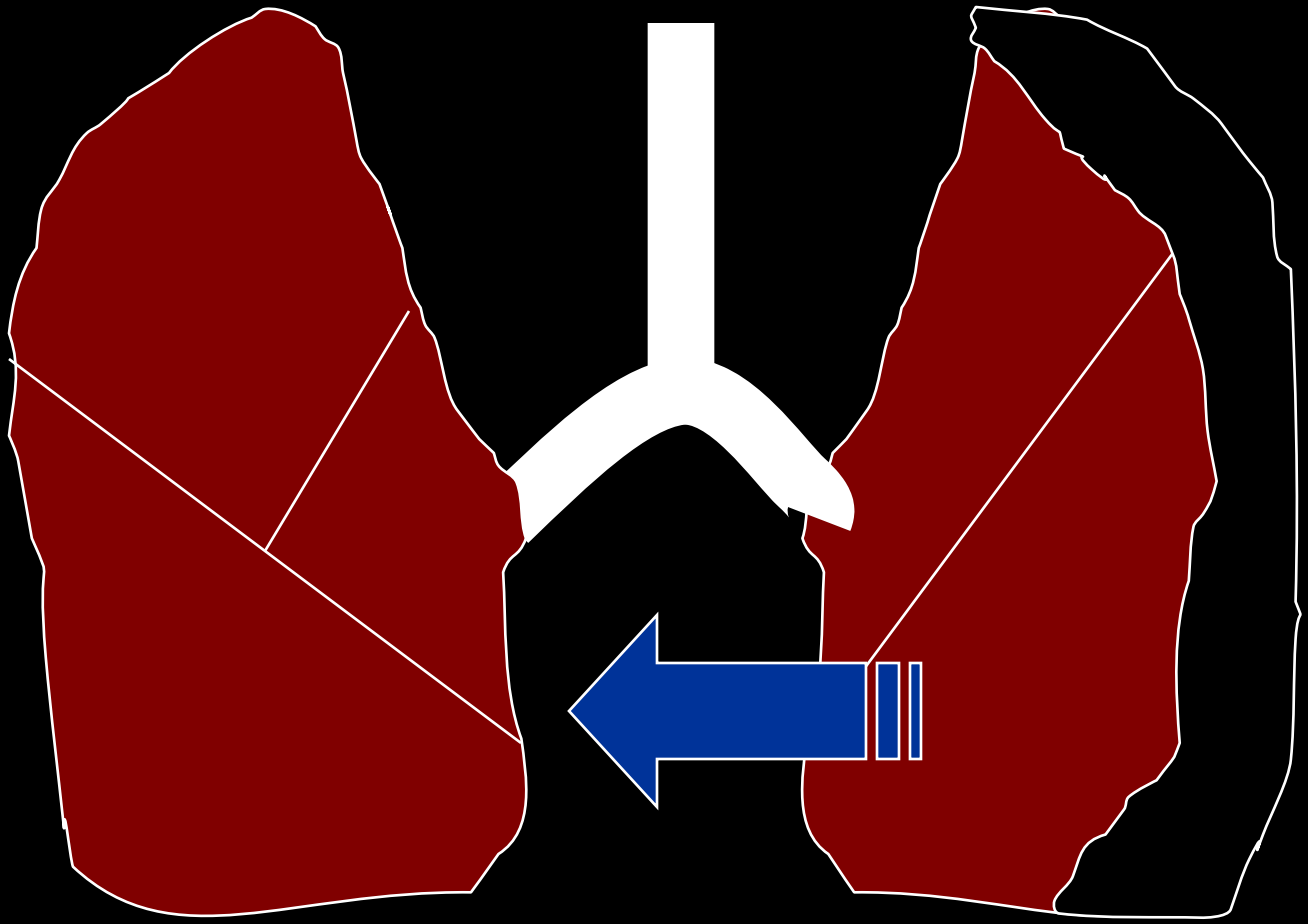
  - No communication with the atmosphere or mediastinum.
  - No mid-line shift.

(ii) ***Communicating***: Associated with chest wall defect.

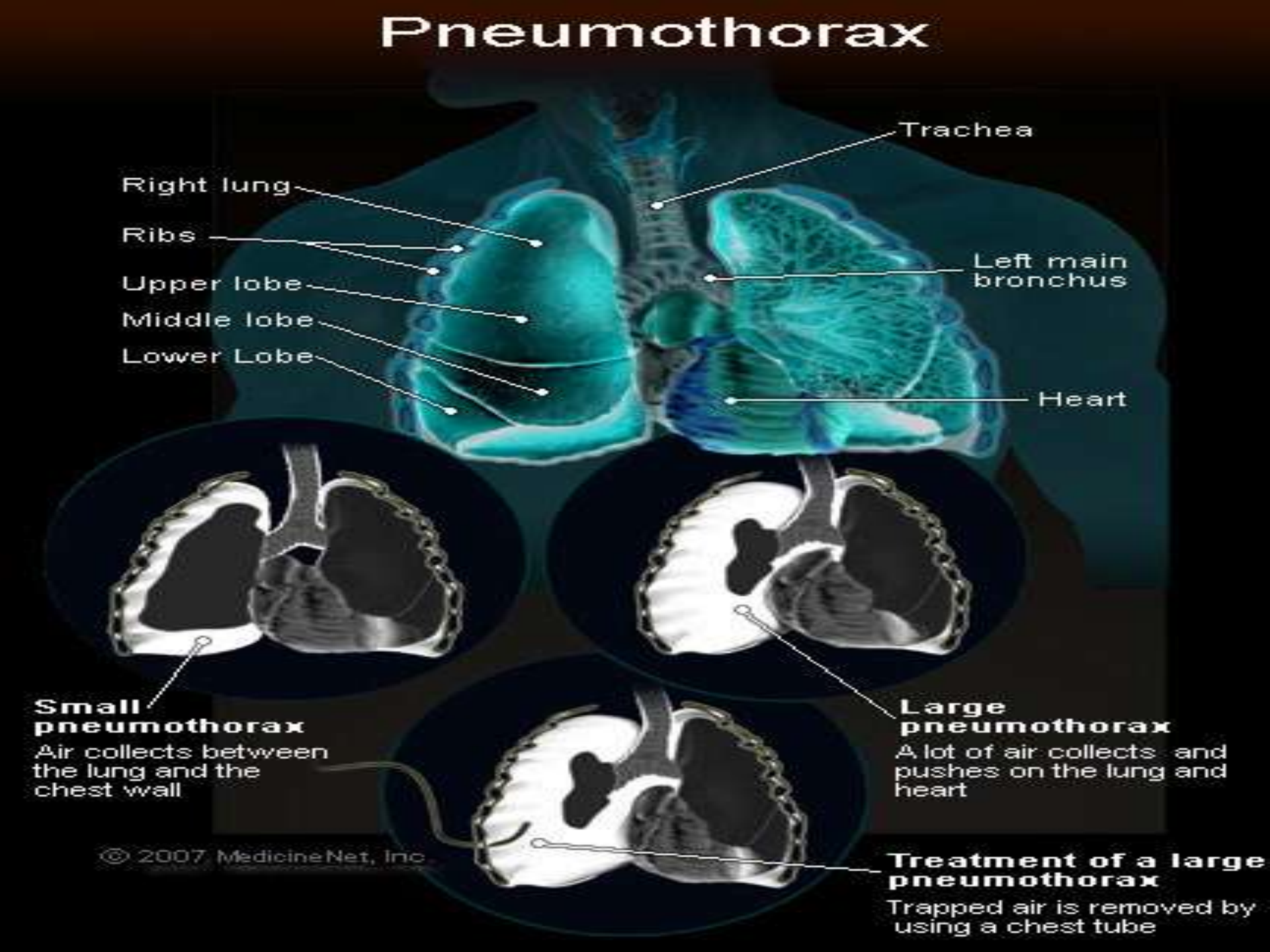
(iii) ***Tension***:

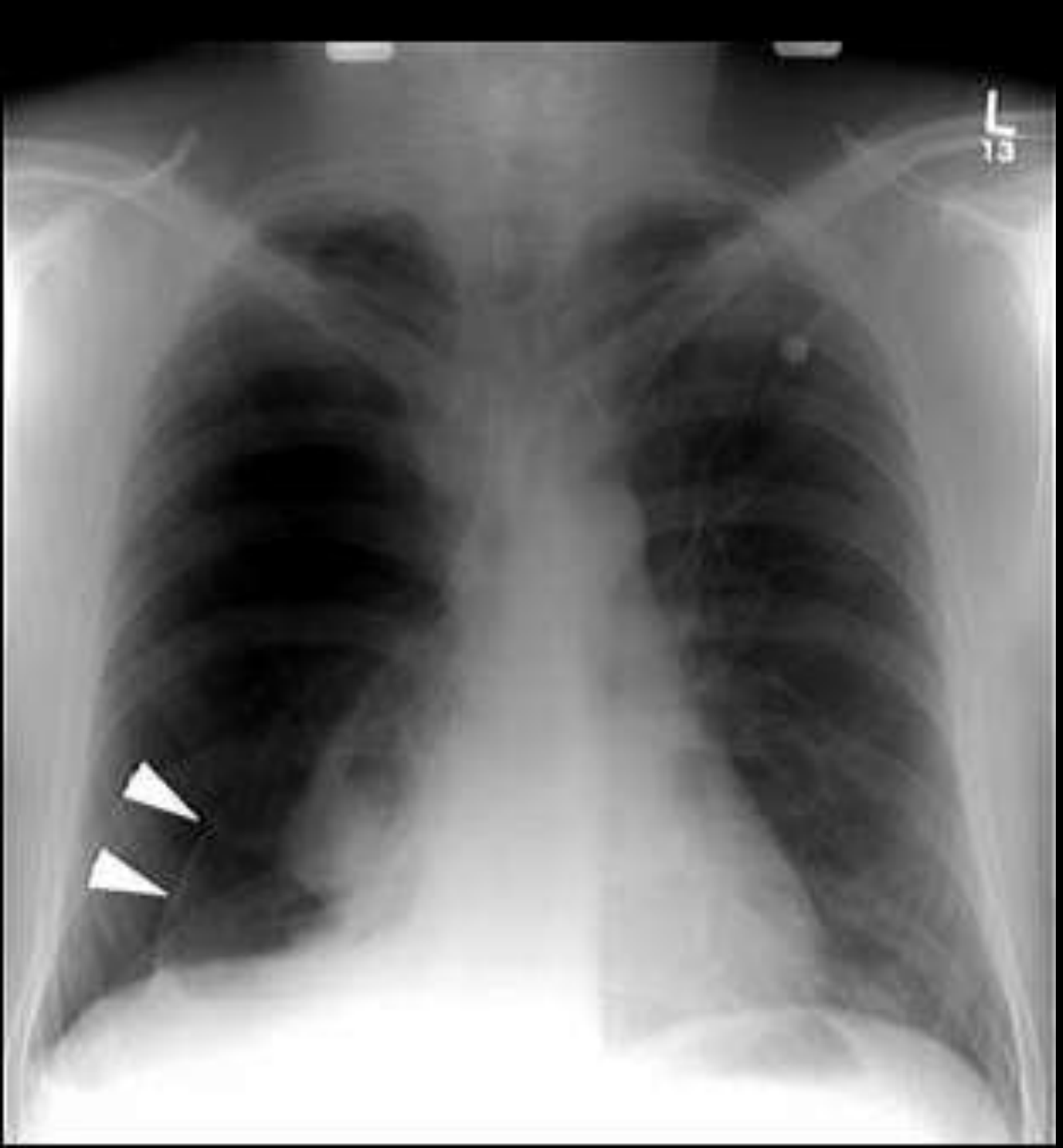
- Progressive accumulation of air under pressure within the pleural cavity

→ mediastinal shift + with compression of the contra-lateral lung and great vessels.



Pneumothorax





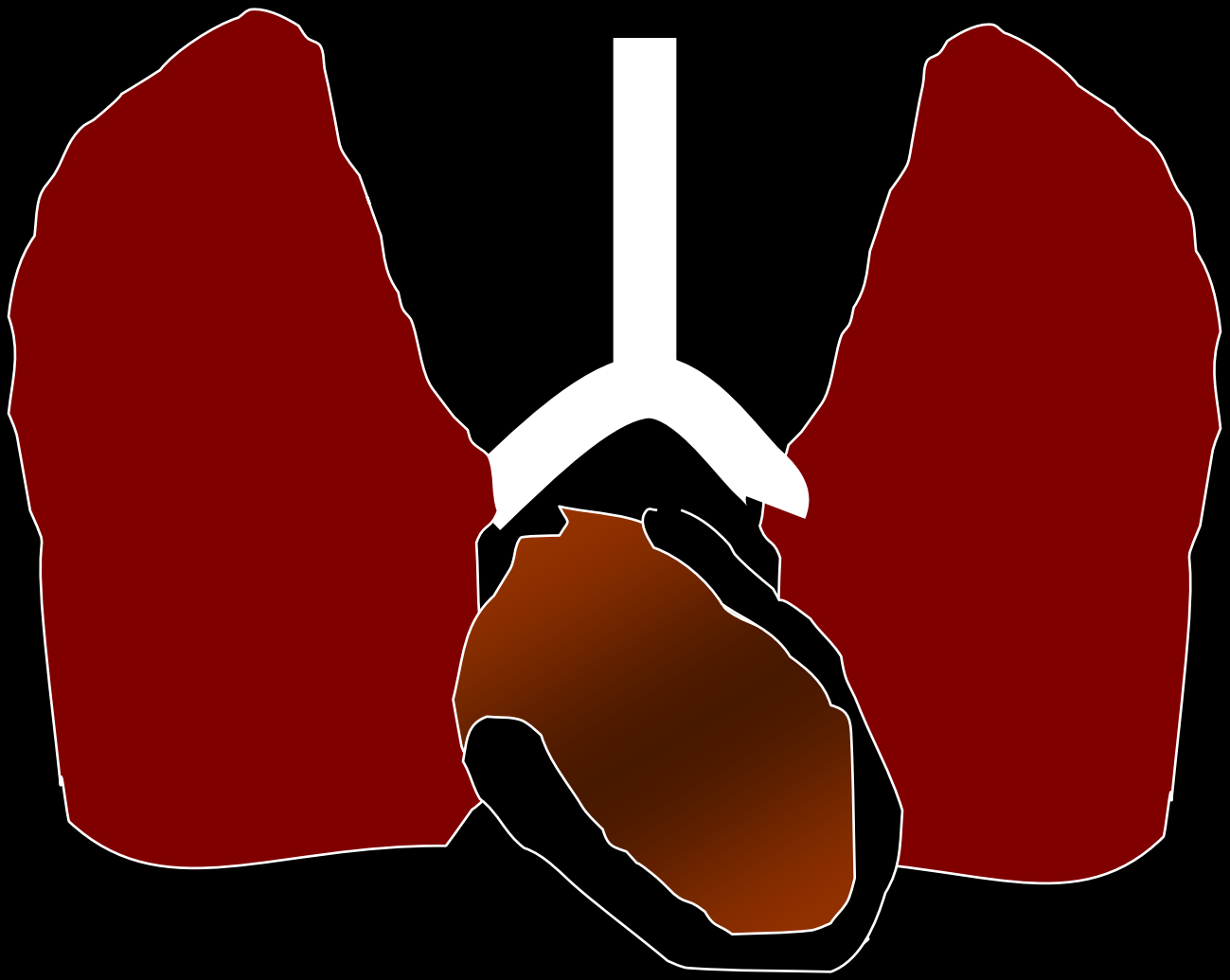
Simple pneumothorax: the edge of the right lung is clearly seen (arrows)

-Devoid of peripheral lung markings.
-No mediastinal shift occurs.

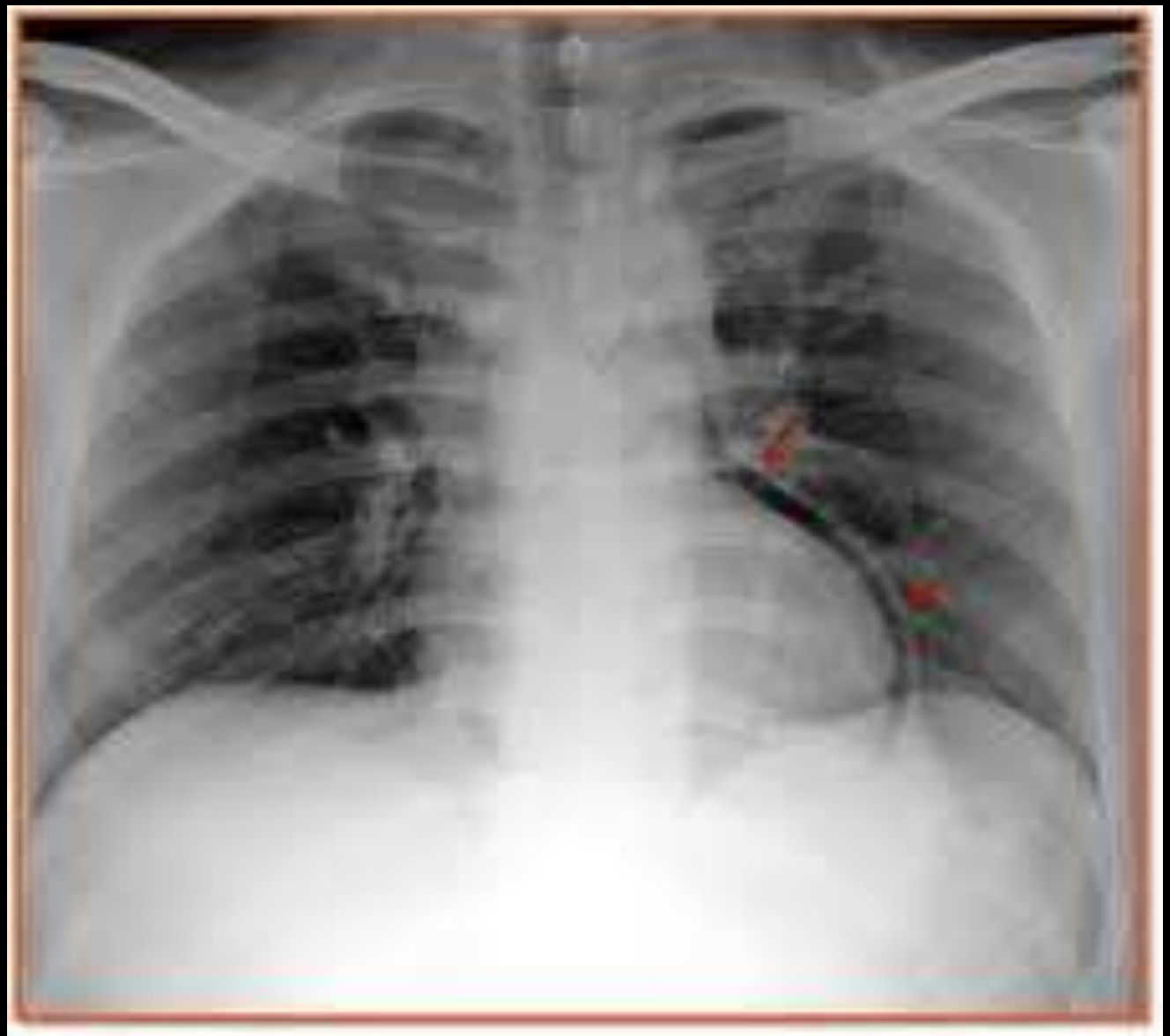
***<u>Iatrogenic tension pneumothorax</u>*.**

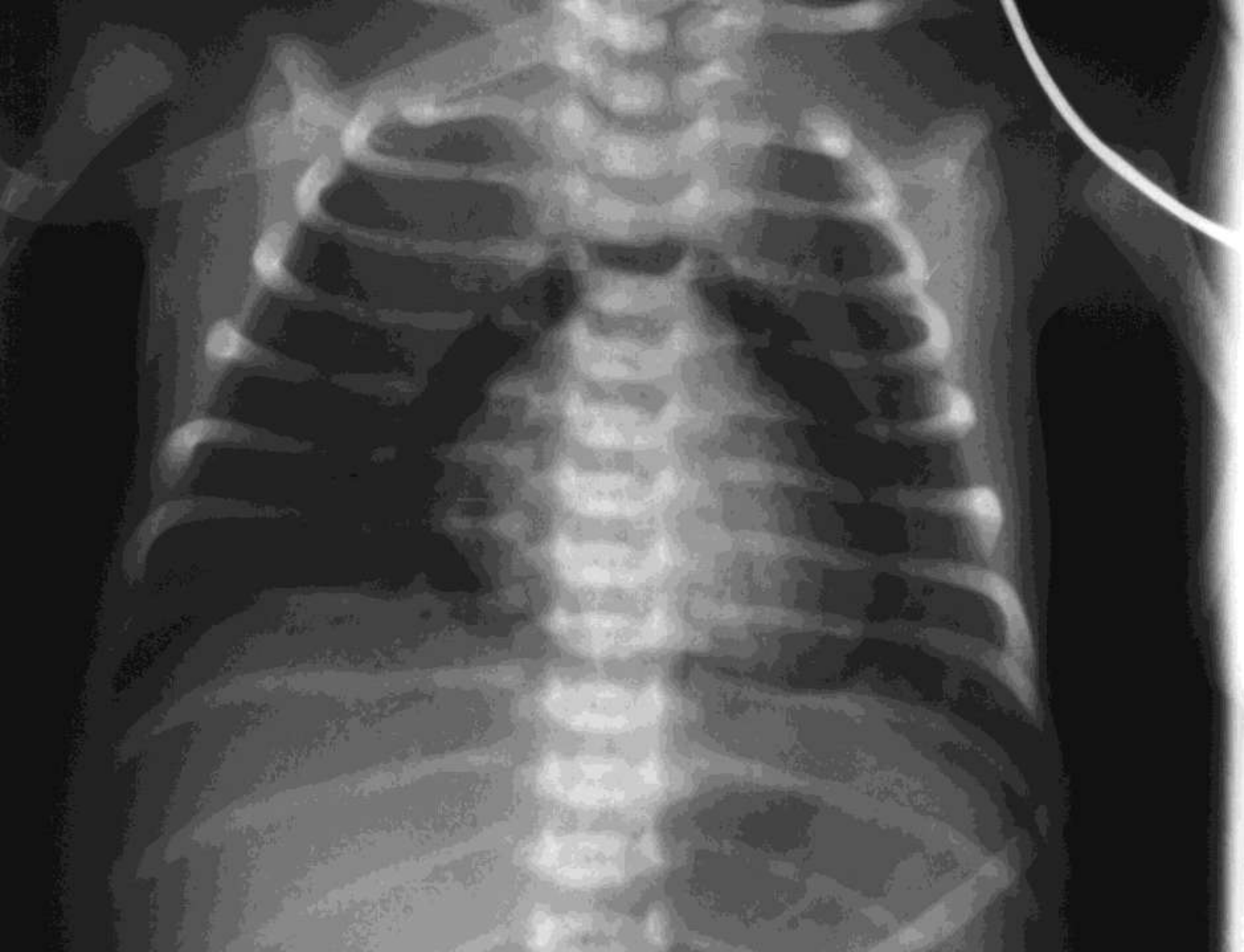
-Secondary to the high intra-thoracic pressures generated during ventilation → rupture of a pleural bleb.

-Progressive mediastinal shift to the right.



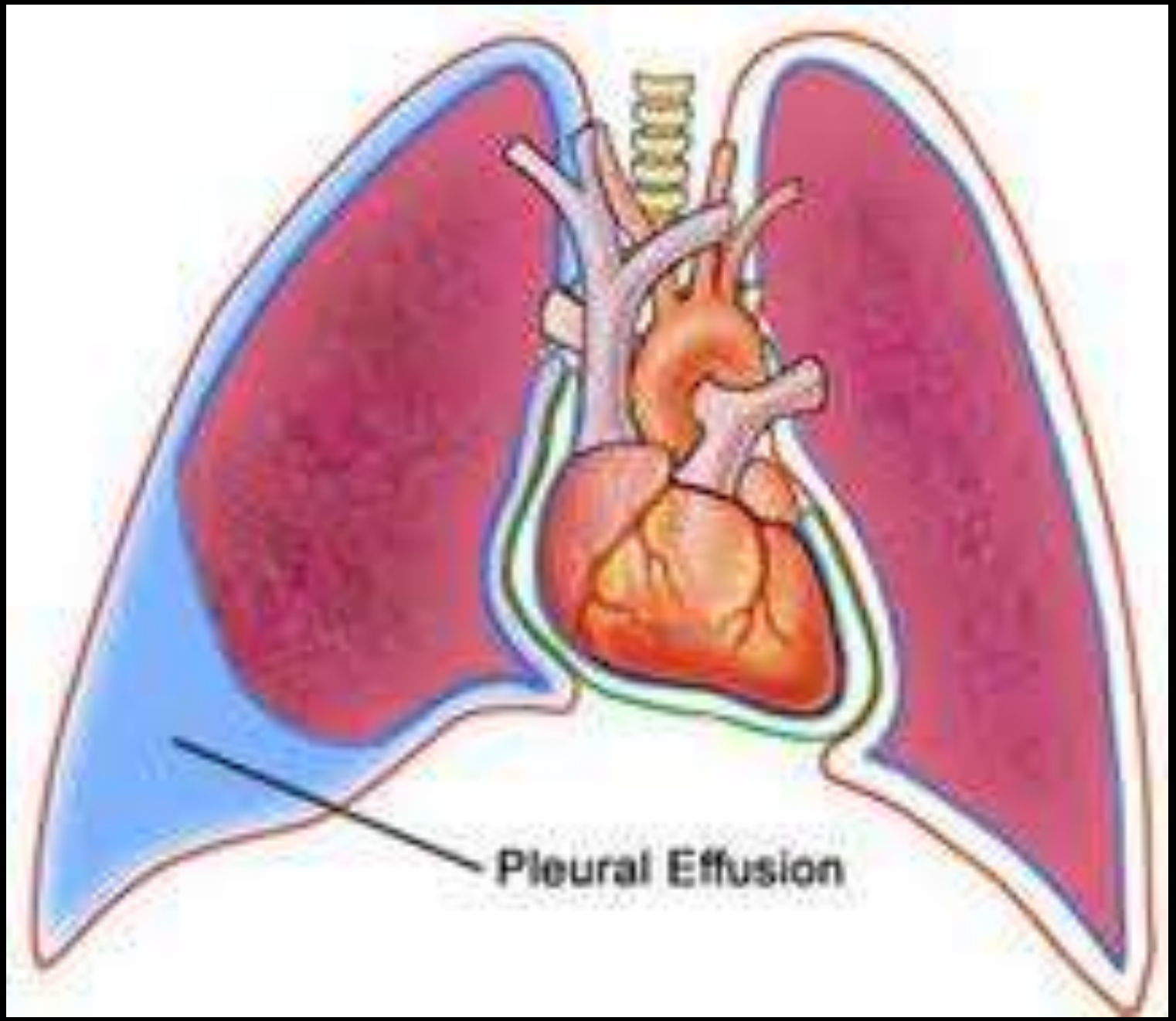
Pneumo-pericardium

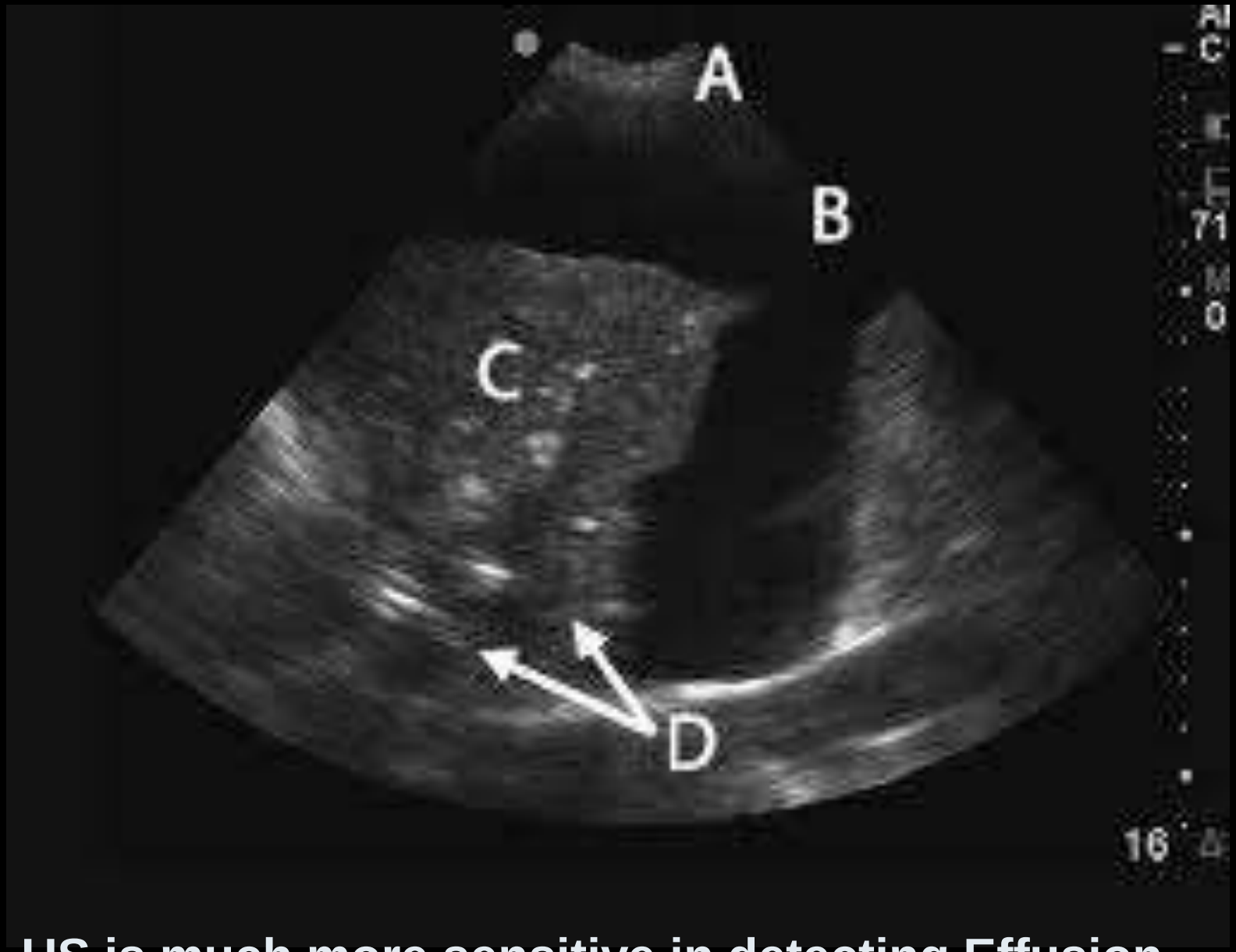




EFFUSIONS

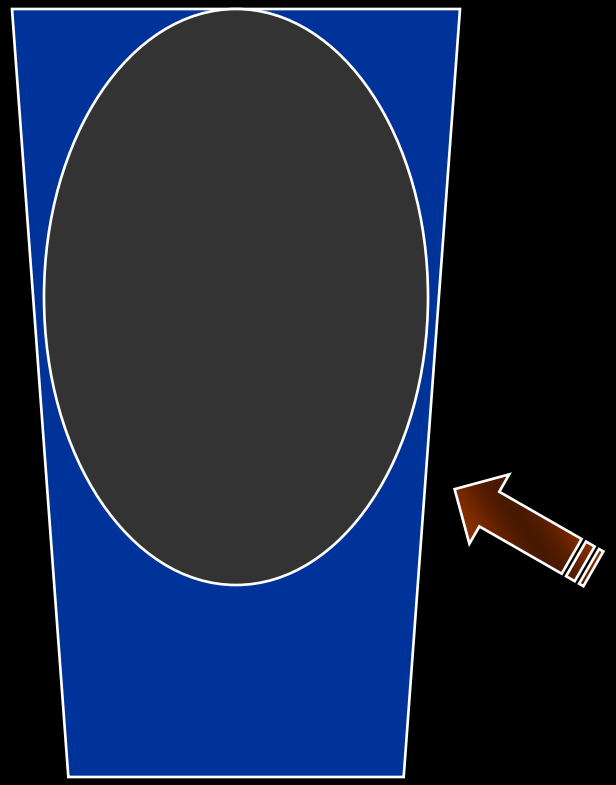
- Hydro = Fluid “Exudates”
- Hemo = Blood
- Chyl = lymph

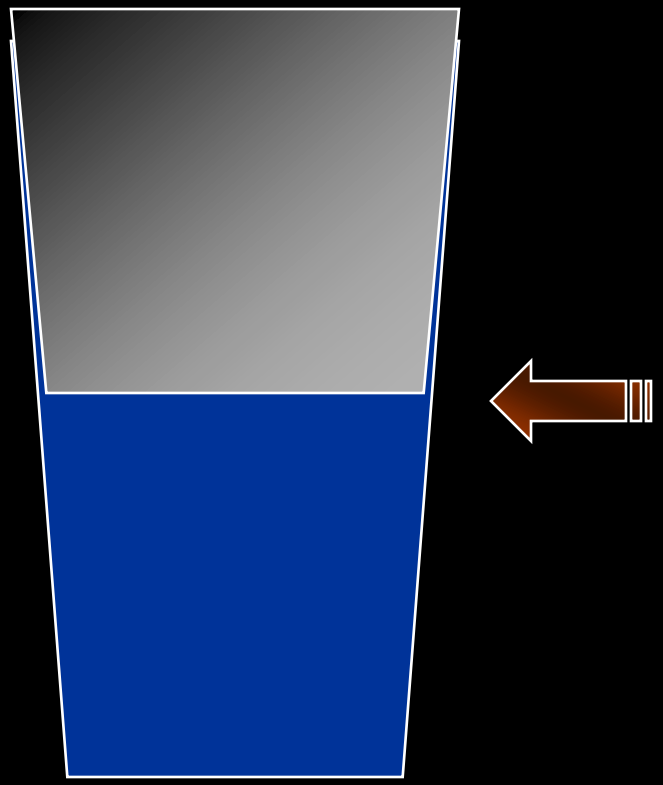

Pleural Effusion

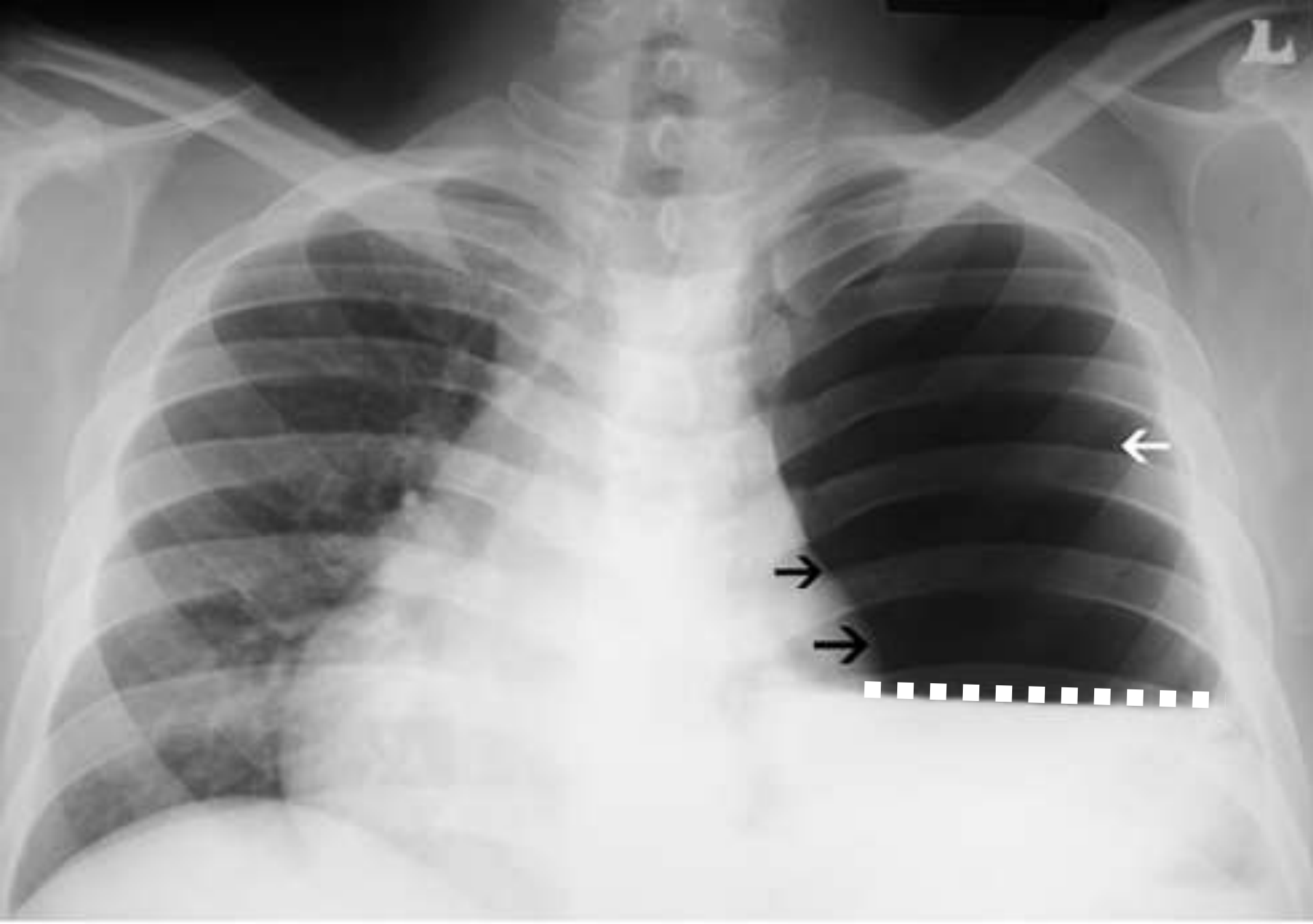


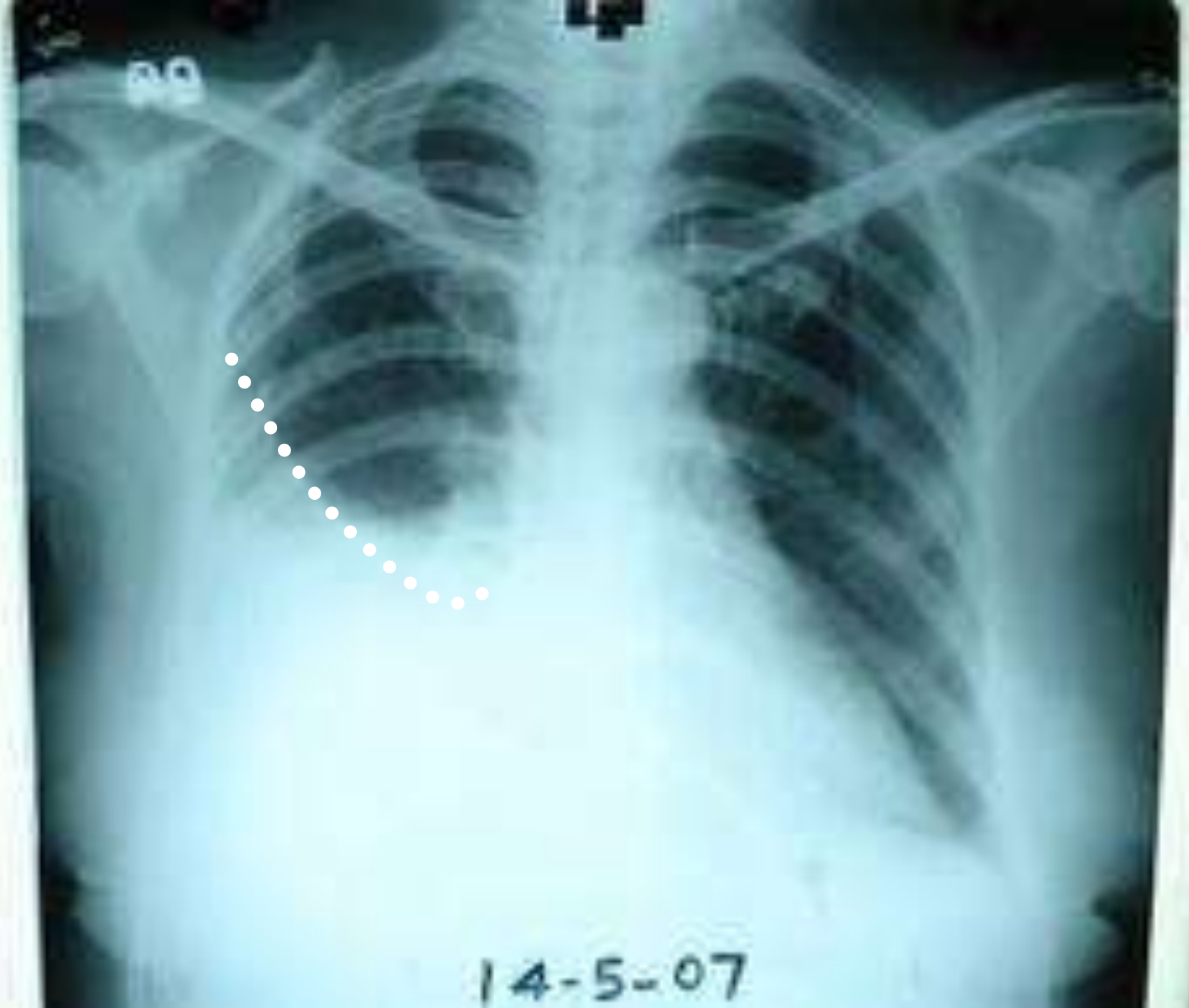
US is much more sensitive in detecting Effusion.

Hydrothorax Vs Hydro-Penumothorax



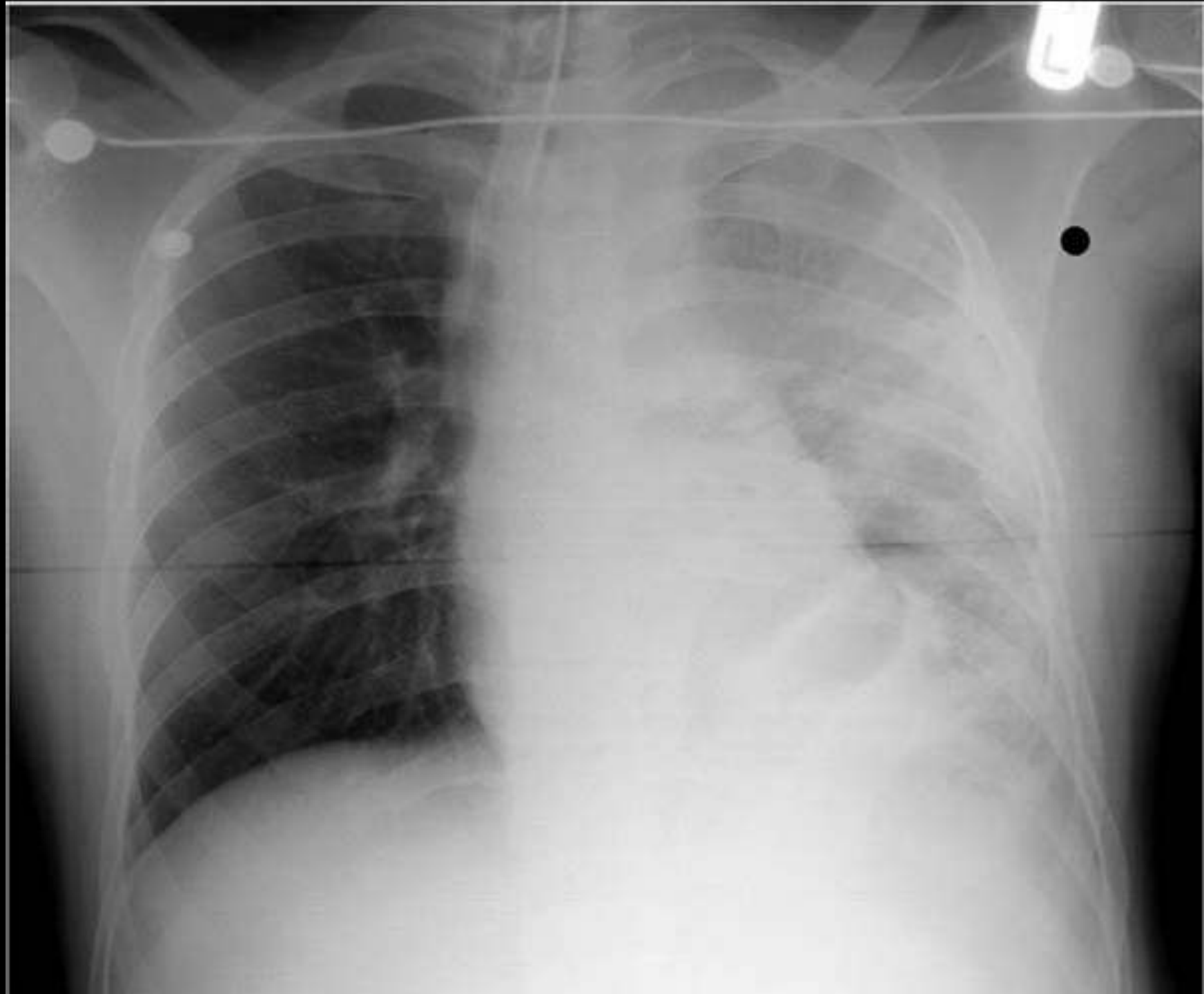


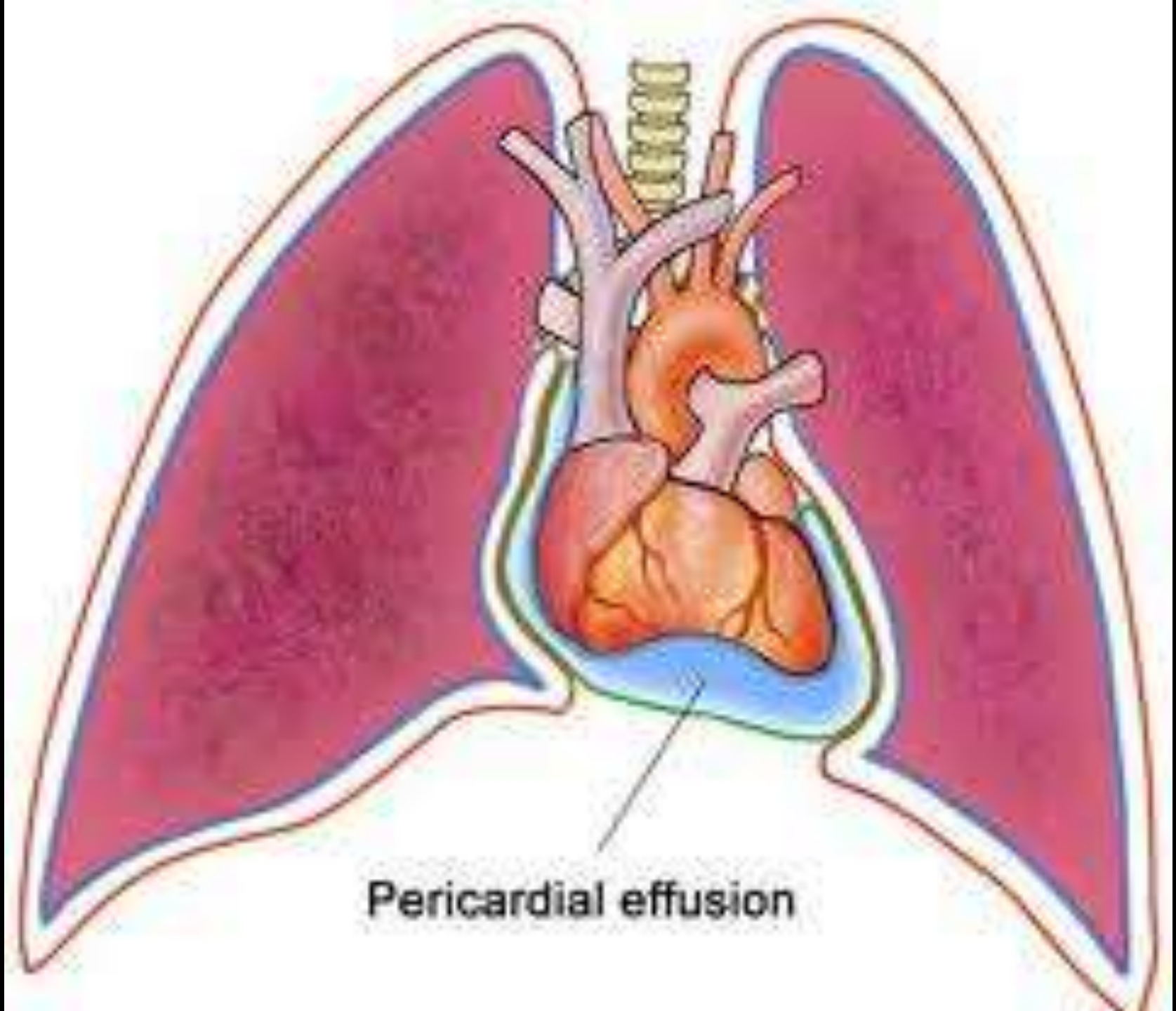

L


14-5-07

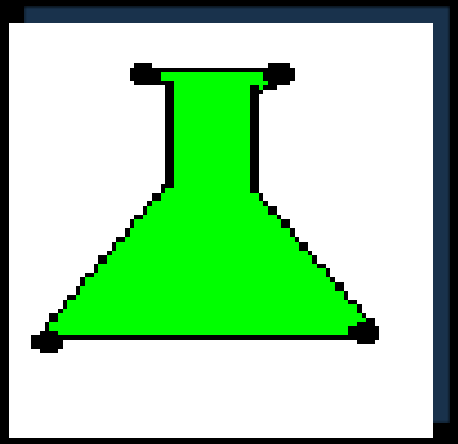
Haemothorax

- Accumulation of blood within the pleural space.
- Following blunt or penetrating trauma.
- Commonly associated with a pneumothorax and other extra-thoracic injuries.
- *Mammary vessels* are more commonly injured than the hilar or great vessels.

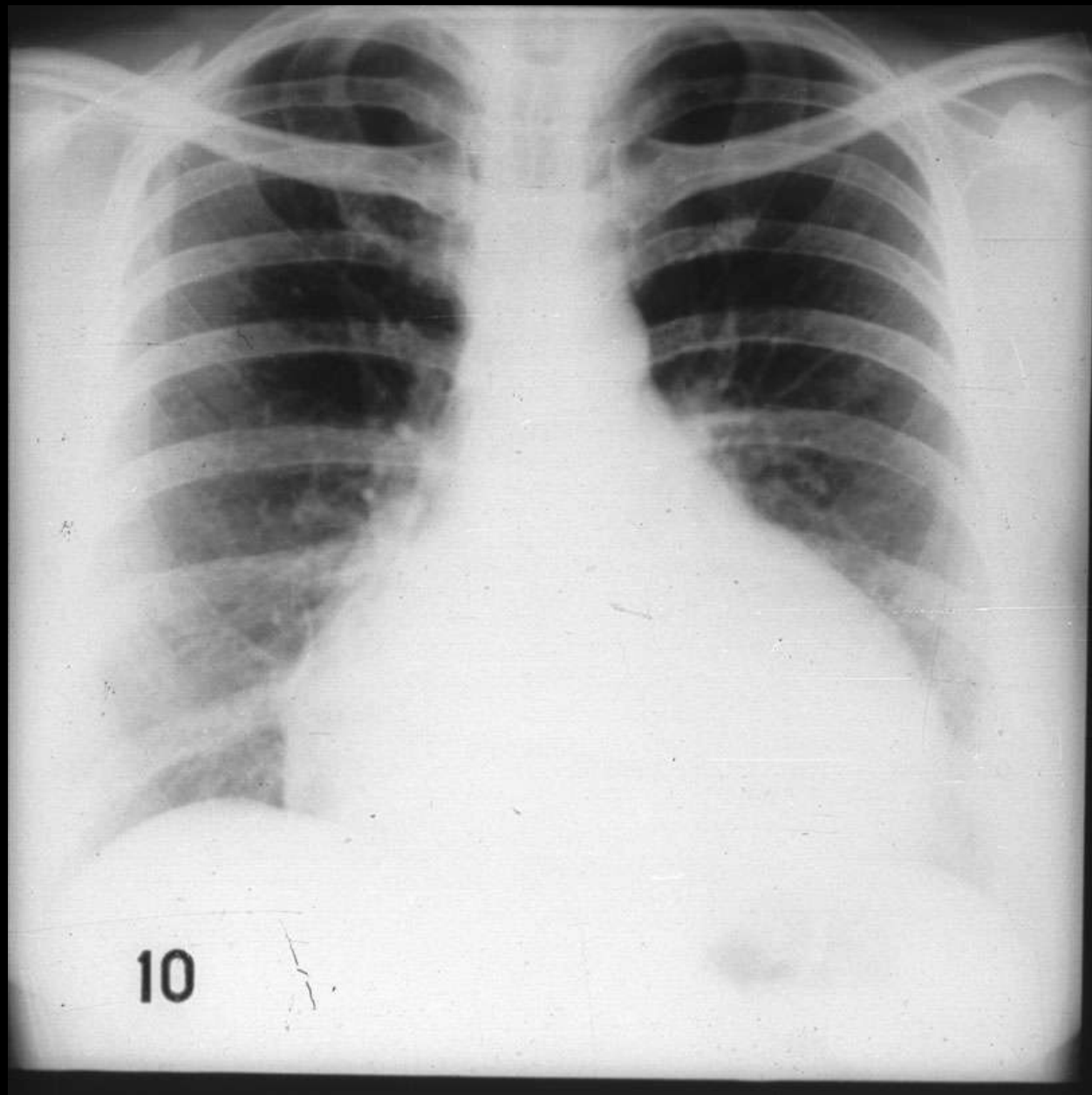


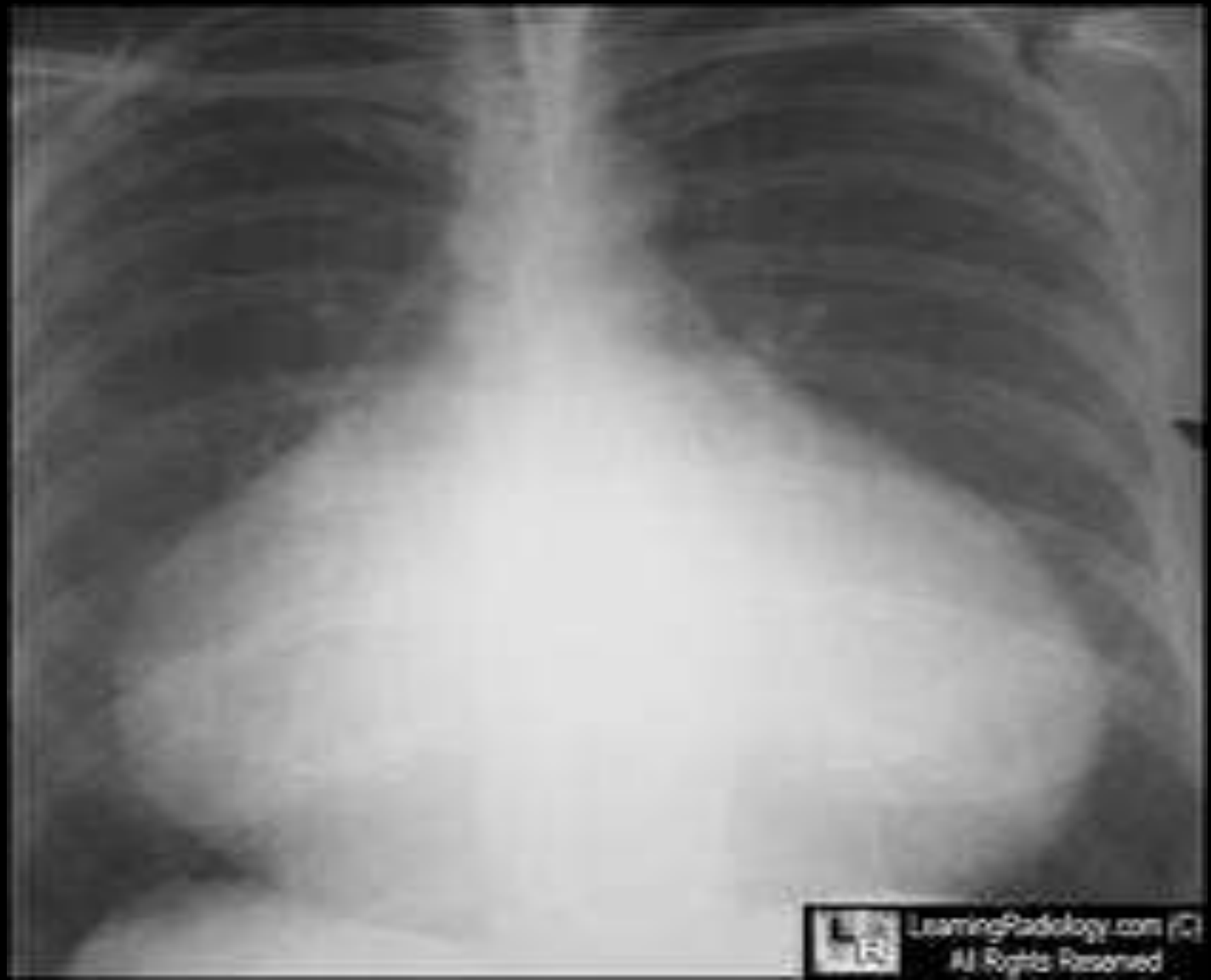

Pericardial effusion

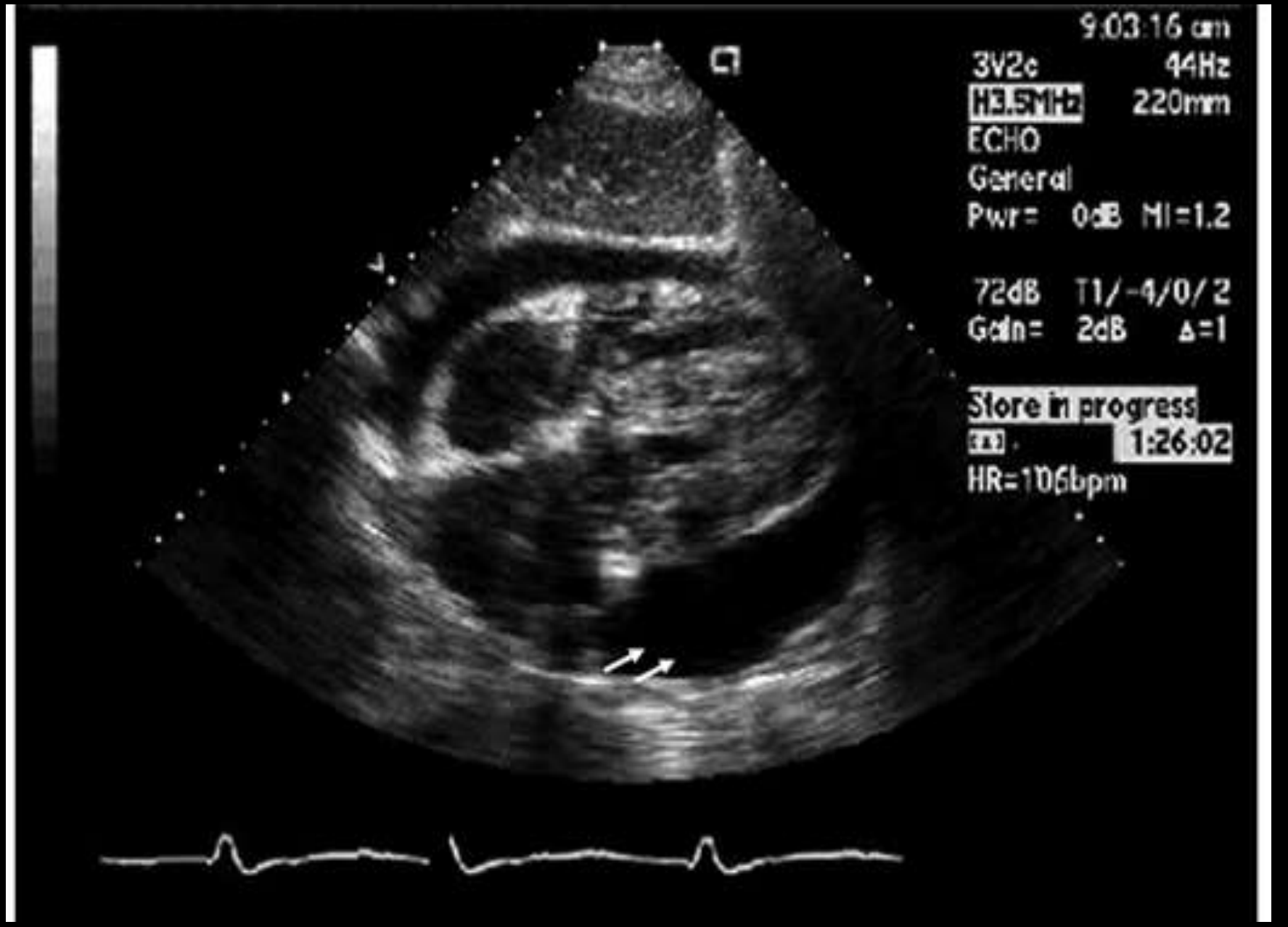
Pericardial effusion



Flask shape



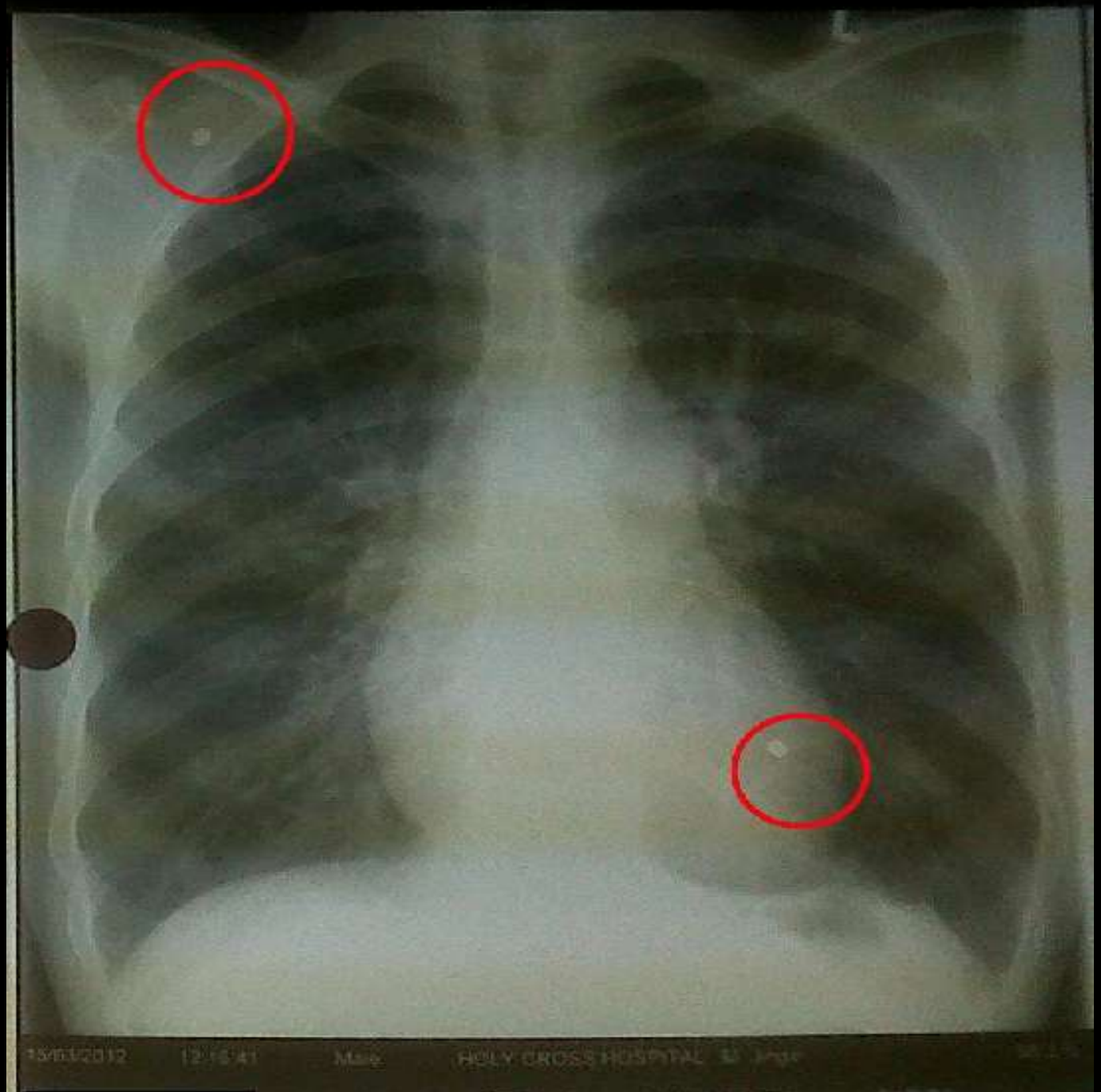


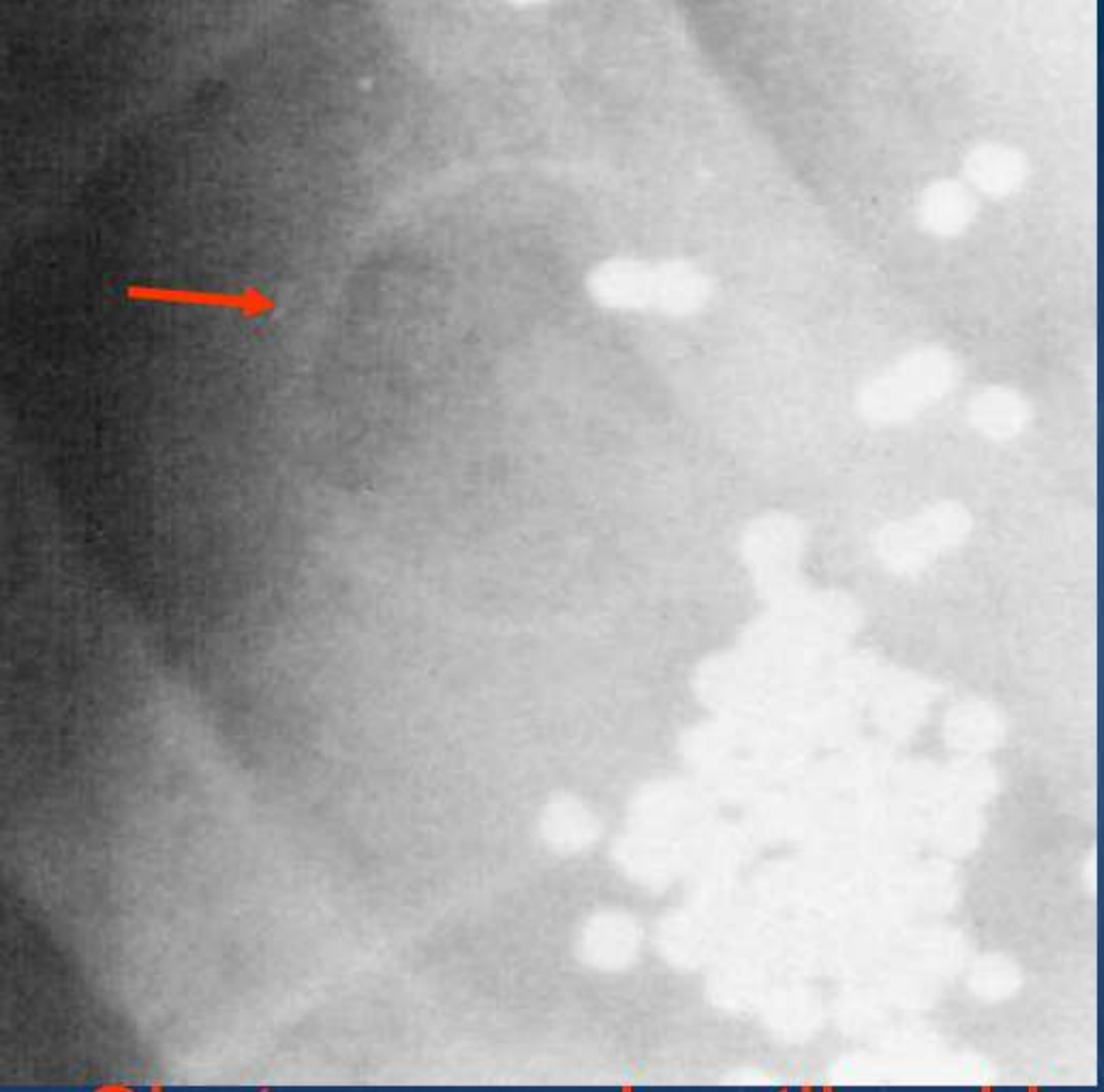

9:03:16 am
3V2c
44Hz
H3.5MHz
220mm
ECHO
General
Pwr= 0dB MI=1.2
72dB T1/-4/0/2
Gain= 2dB Δ=1
Store in progress
1:26:02
HR=106bpm

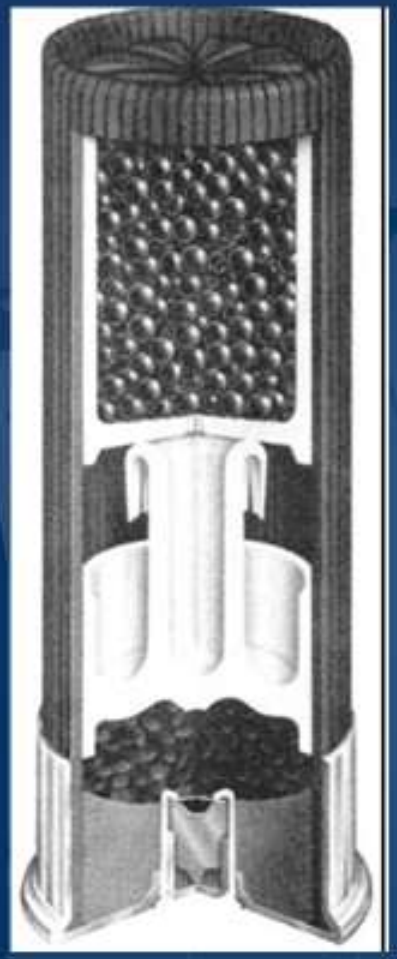
Fire arm injury

- **Fire arm injury can cause wide Varity of finding ….. Fractures, effusions , & the bullet it self may be retained.**


SCIENCEphotoLIBRARY


HOLY CROSS HOSPITAL





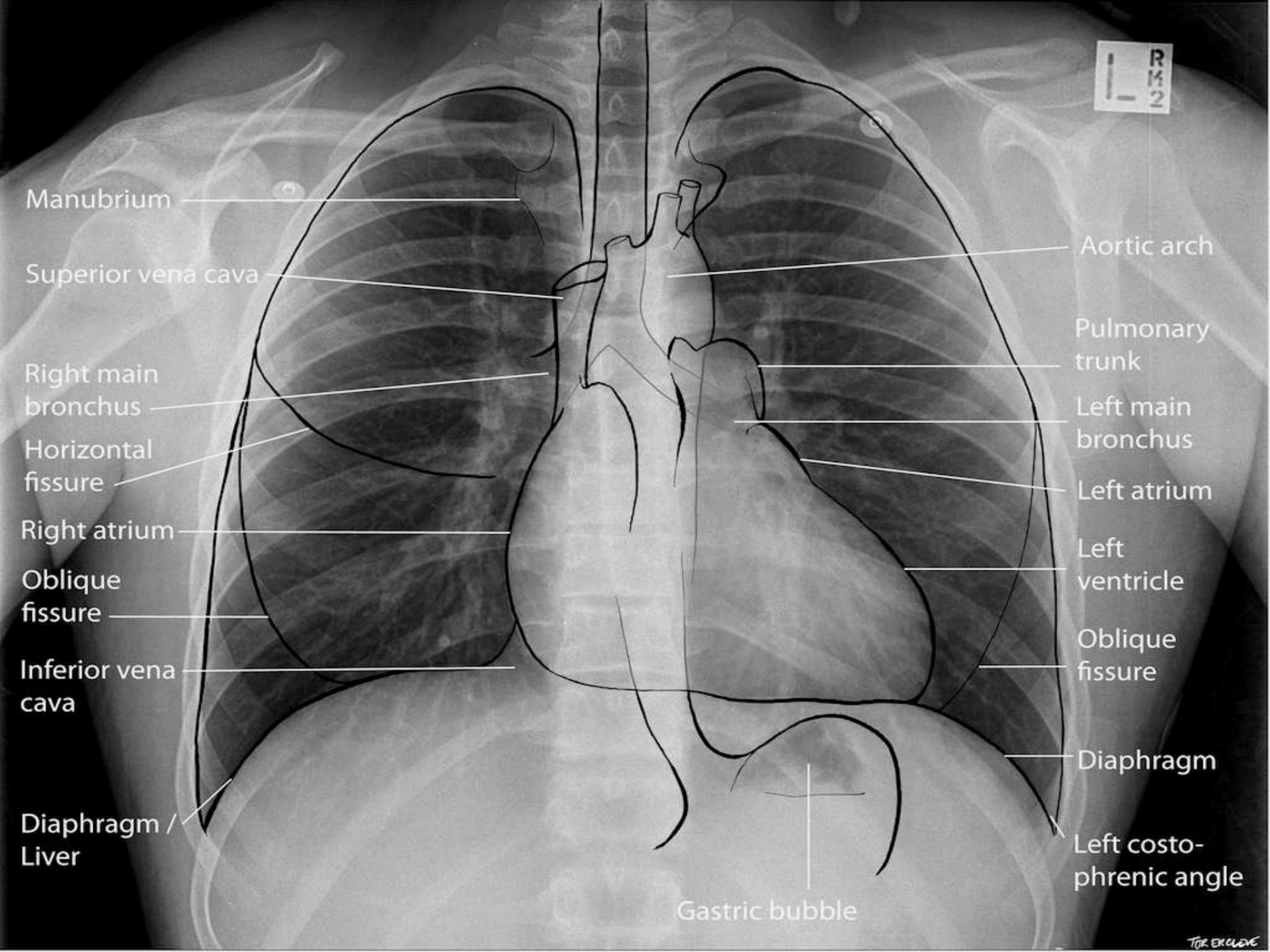
Shotgun wad outlined by thin coat of lead

STAB Chest

Although handle of the knife seems to be small Radiograph showing its deepness

Retained piece of glass after stabbing by a broken bottle

Effusion & Stab ……. Work Case!!


Manubrium
Superior vena cava
Right main bronchus
Horizontal fissure
Right atrium
Oblique fissure
Inferior vena cava
Diaphragm / Liver
Aortic arch
Pulmonary trunk
Left main bronchus
Left atrium
Left ventricle
Oblique fissure
Diaphragm
Left costo-phrenic angle
Gastric bubble

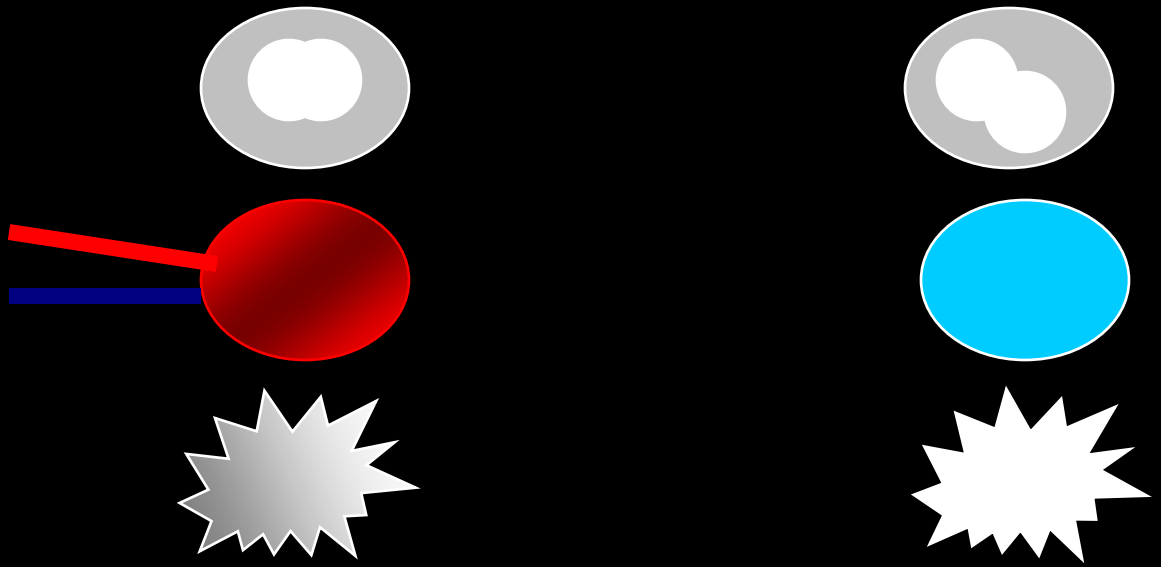
➔ Focal Lung Lesions

- ***6 Main D.D. of Lung Nodules*** ***"< 3 cm"***

1-Tuberculoma ***2-Hamartoma***

3-AVM ***4-Hydatid***

5-Malignant ***6-Metastasis***



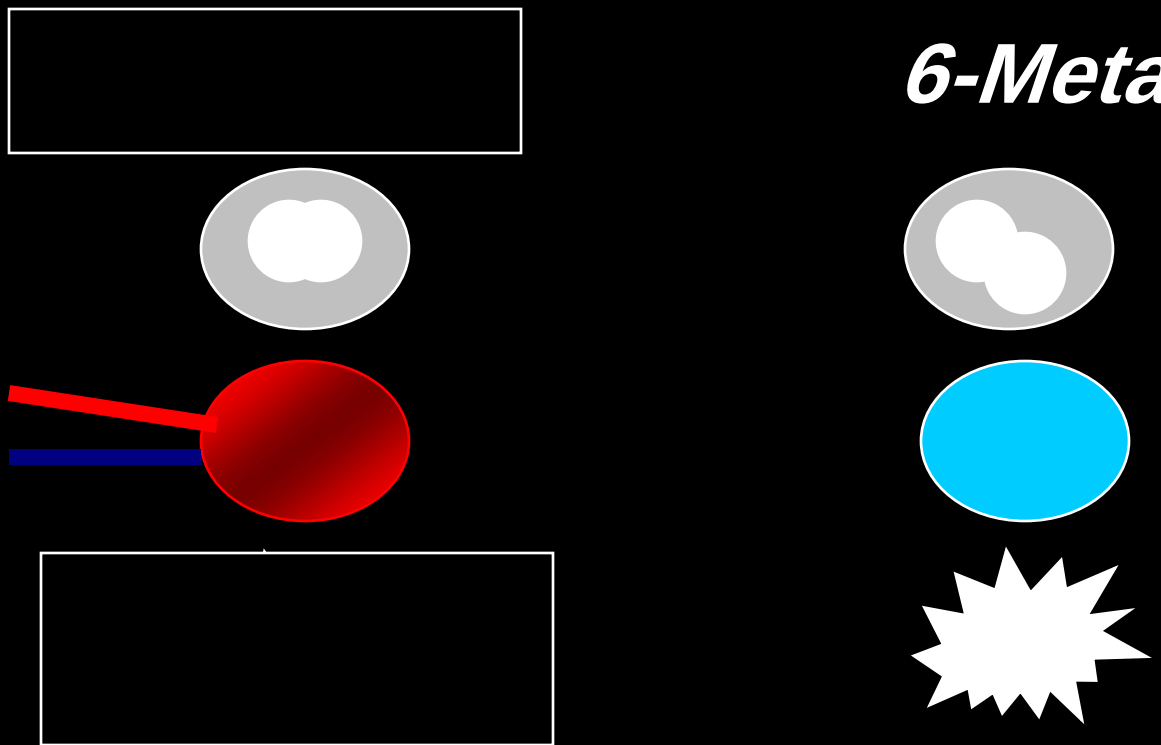
➔ Nodules in “Pediatric”

- ***6 Main D.D. of Lung Nodules “< 3 cm”***

1-Tuberculoma ***2-Hamartoma***

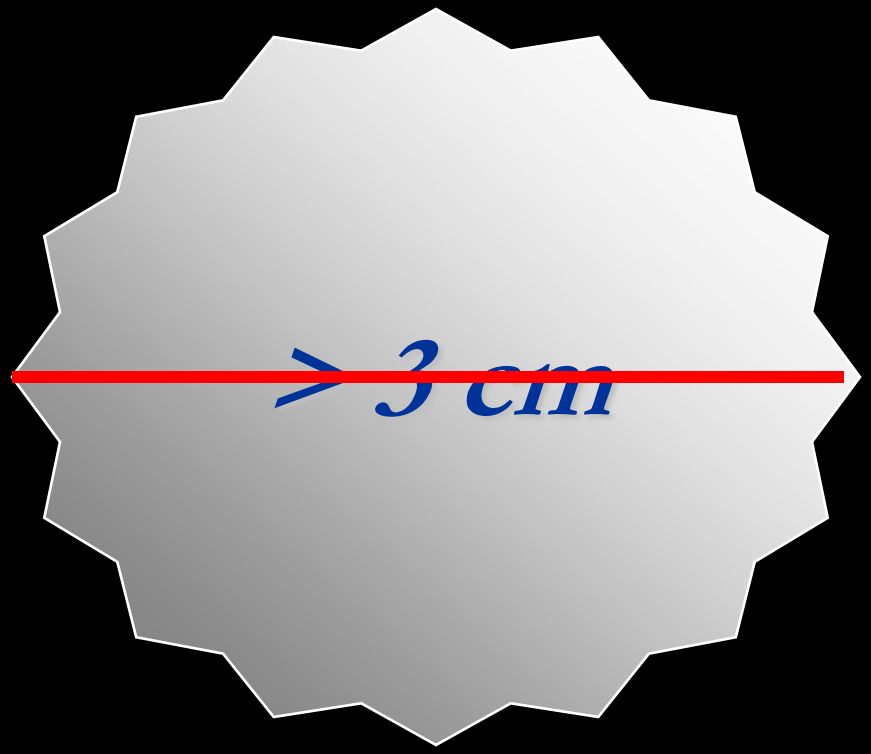
3-AVM ***4-Hydatid***

6-Metastasis



Lung Mass > 3 cm

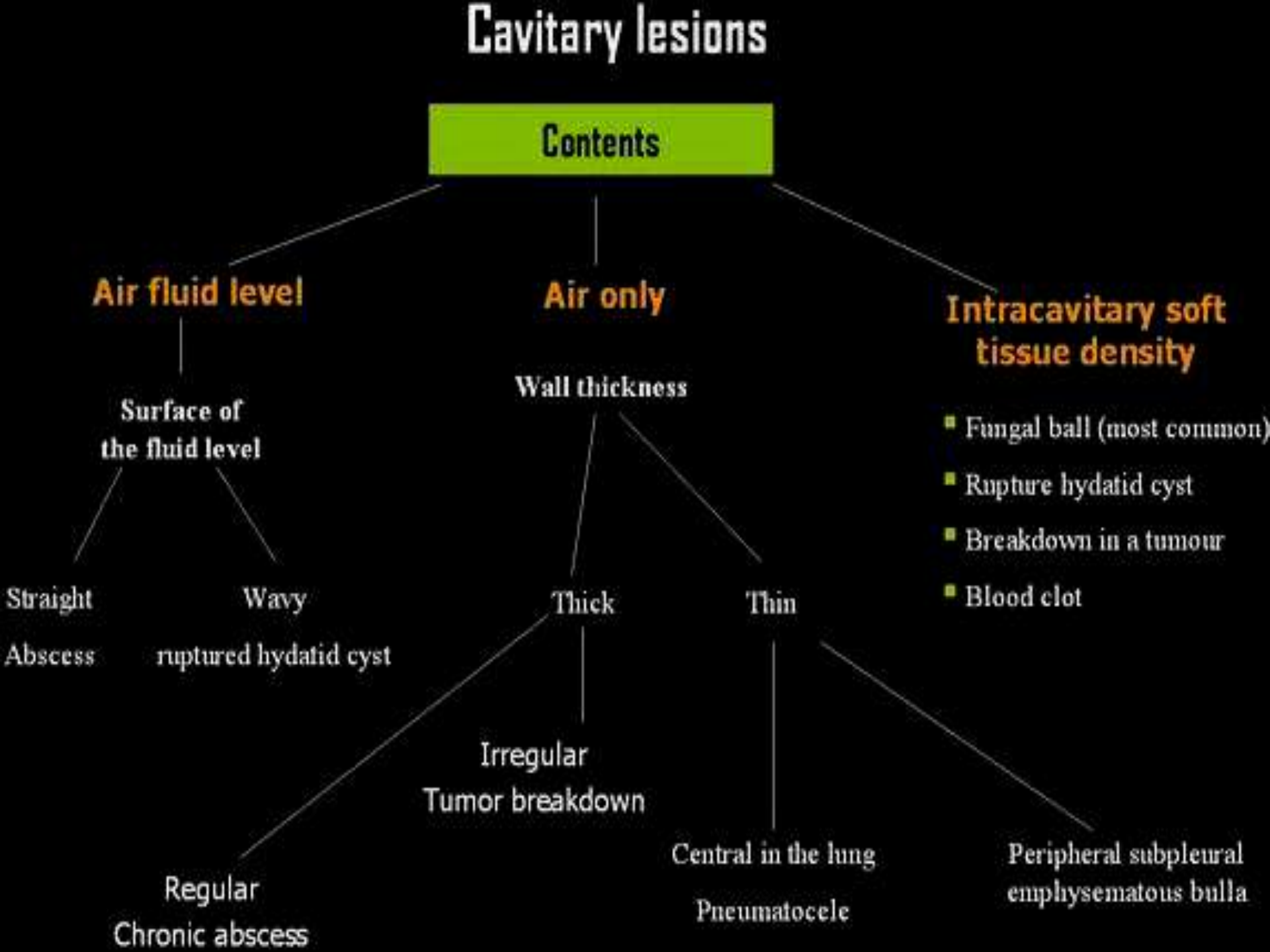
- ***B.C. Until Proved other wise***



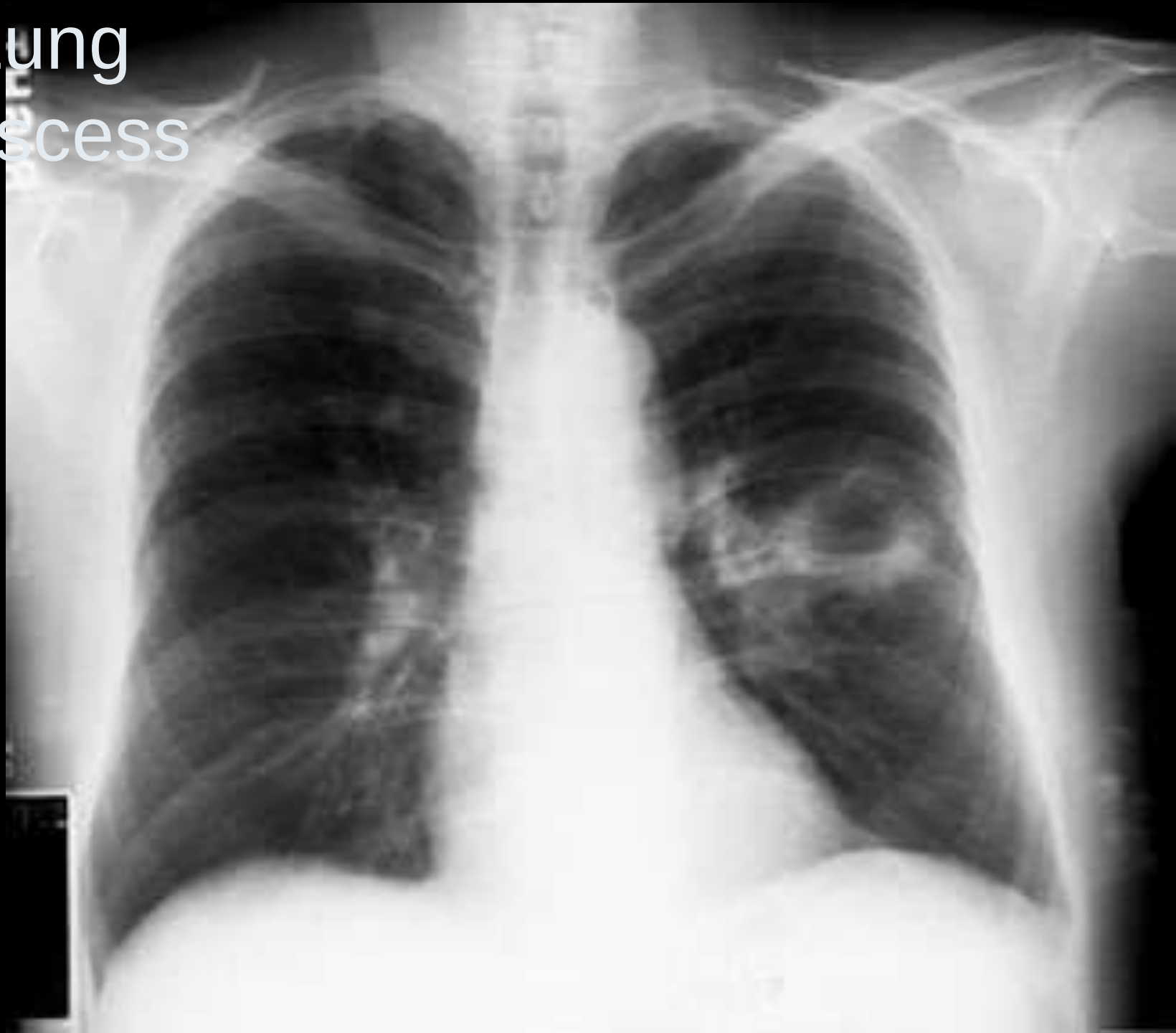
Lung mass

Mediastinal mass

Cavitary lesions



Lung Abscess



DON'T FORGET TO SAY THANKS


THANK YOU