

Making sense out of

**FIFTY SHADES
OF GREY**

...and **BLACK** and **WHITE**

“Reading CXRs With Confidence”

Presented by Jack Judy, RRT-ACCS

First things first....

DISCLOSURE STATEMENT

I, Jack Judy, RRT-ACCS, have nothing to disclose.

I have no financial interests with any company or product that may be mentioned in course of this presentation and will receive no financial gains for it.

I have no financial relationships with or in any products or services described, reviewed, evaluated, or compared in this presentation.

*Mainly because I won't be describing, reviewing, evaluation or comparing any products or services in this presentation!

(And no, I didn't see the movie and have no relationship with the book, author, or movie either.)

Today's Objectives:

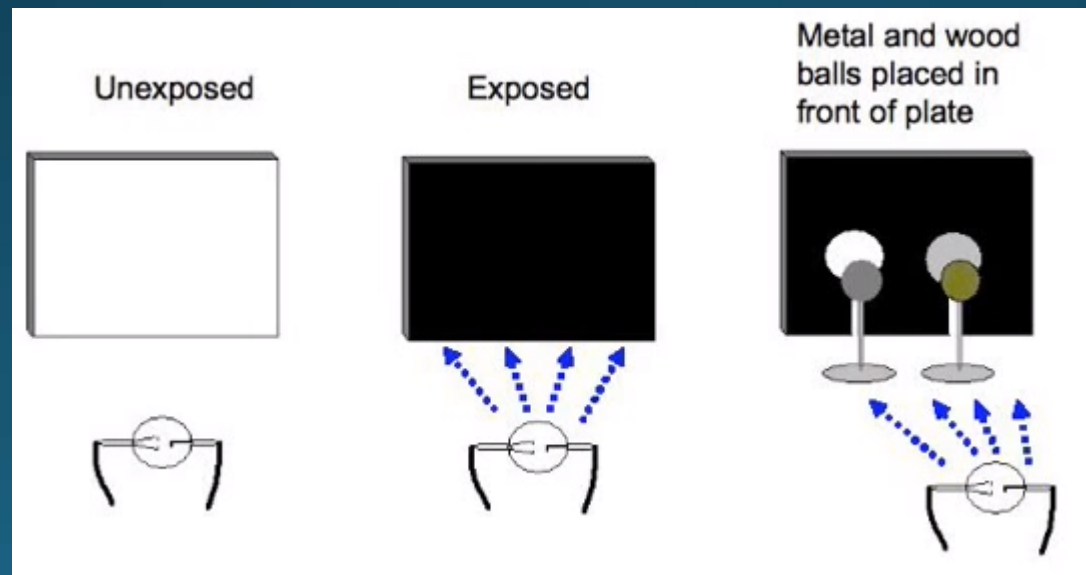
- Discuss reasons of importance for RTs to be adept at evaluating CXRs
- Identify normal anatomical findings on a chest radiograph, and discuss the "R.I.P" and the "A to I" methods for determining abnormalities
- Differentiate between opacities and hyperlucencies on CXRs and correlate those findings with the patient's condition to determine the disease process and an appropriate course of action.

WHY SHOULD RTs READ CXRs?

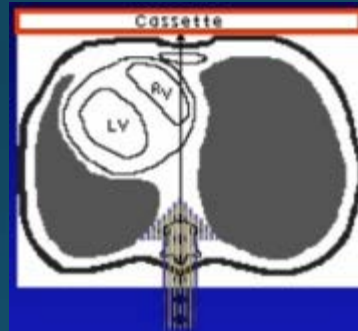
- To have a good idea of what's going on with our respiratory patients
- It's important to be able to see basic abnormalities and observe improvement and/or digression
- We are/should be assessing our patients daily. We need x-ray information to recommend therapy and/or changes.
- We evaluate ETT placements routinely
- We should be able to do a quick emergent read in crisis situations

BASIC CONCEPTS OF X-RAYS

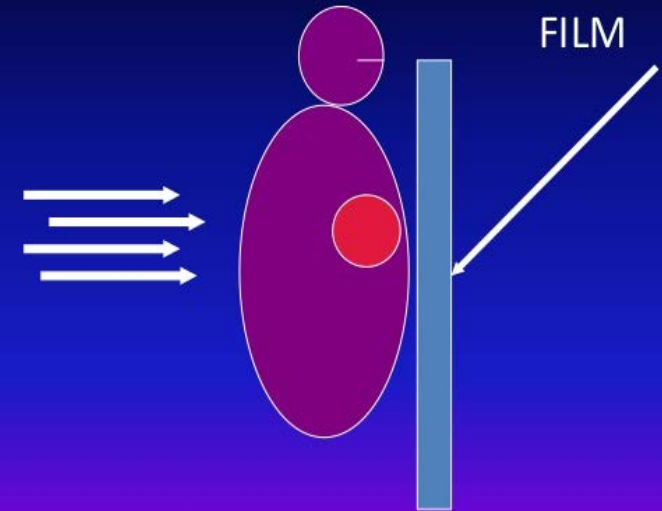
- Cathode Ray tube showers gamma rays in cone shaped pattern
- Specially prepared plate changes from white to black when exposed to these rays
- Gamma rays are absorbed in variable amounts by variable densities



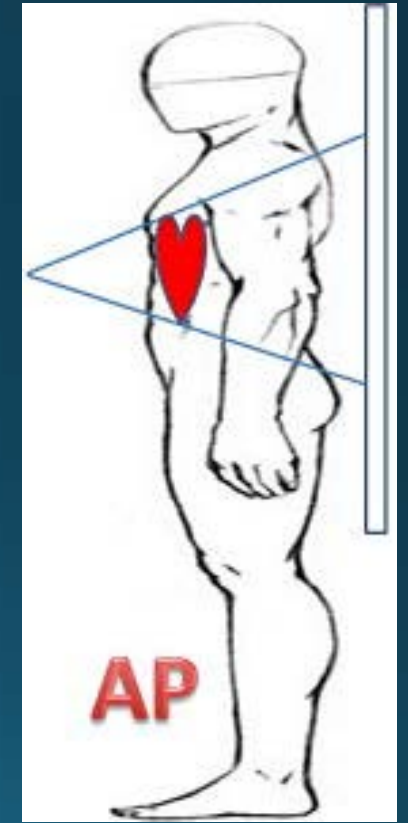
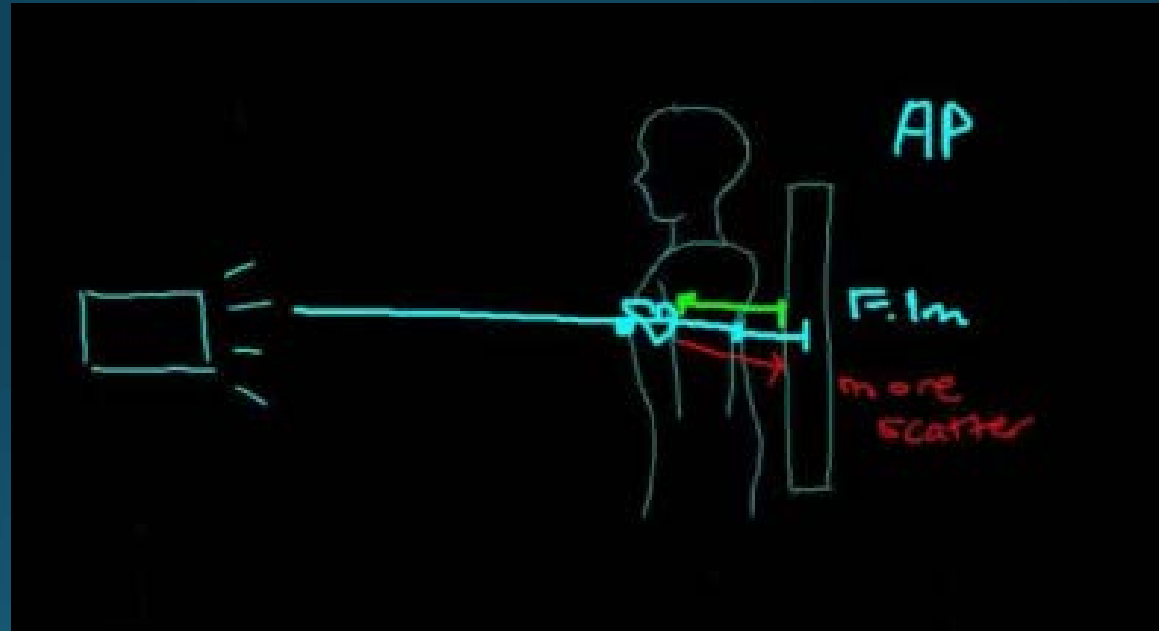
PA (Postero-Anterior) Films



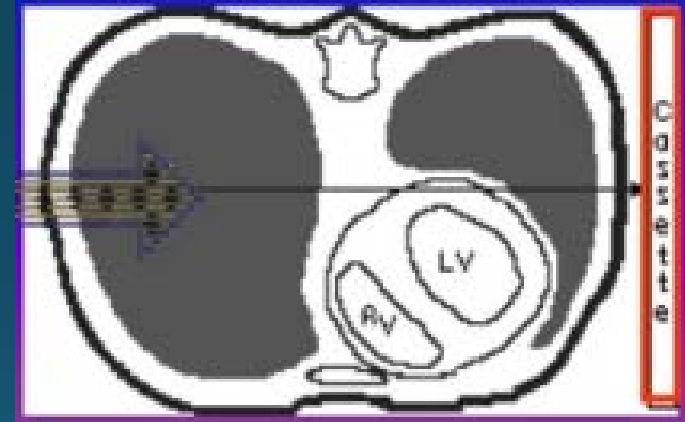
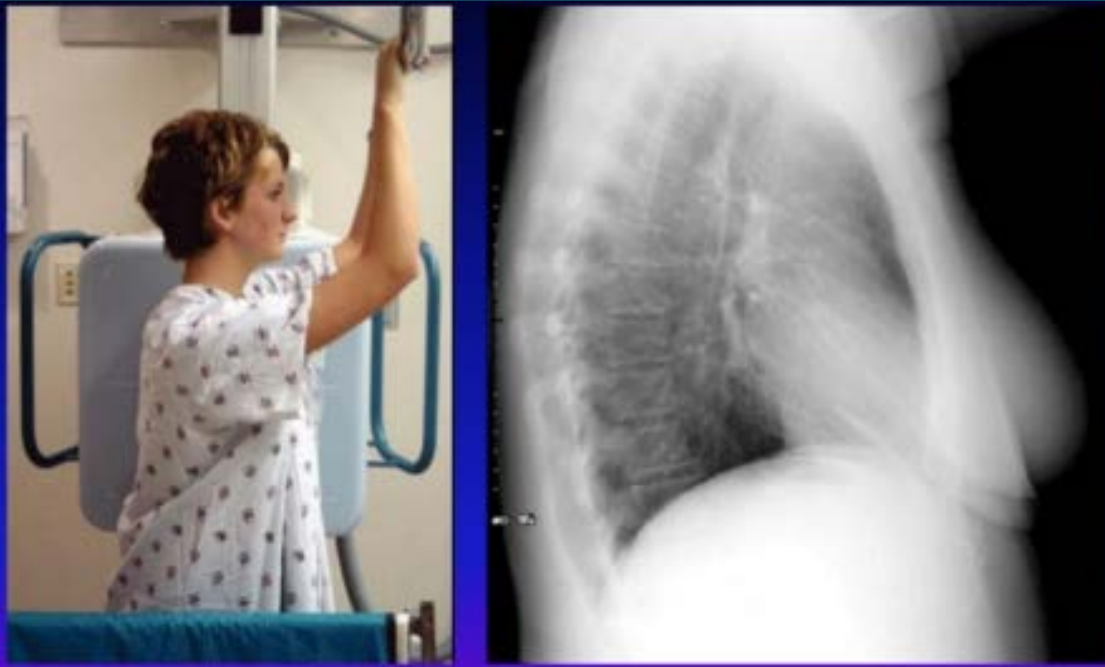
PA (Postero-anterior)



AP (Antero-Posterior) Films



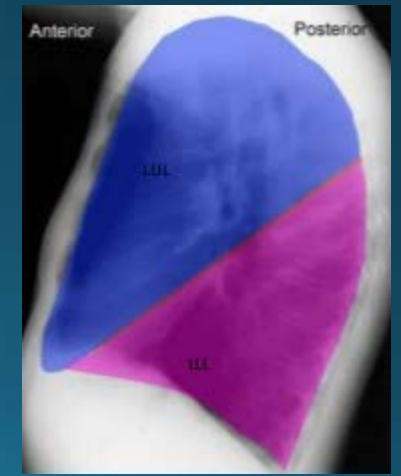
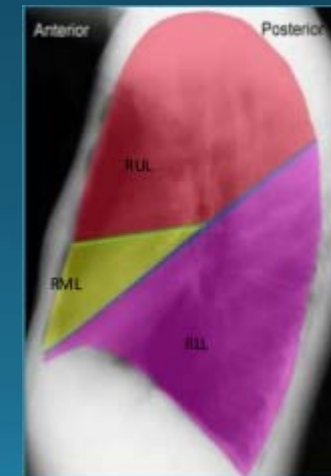
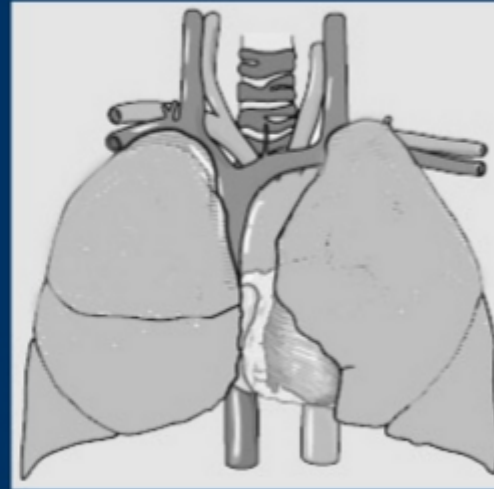
Lateral Film (right to left)



Review of Normal Chest Anatomy

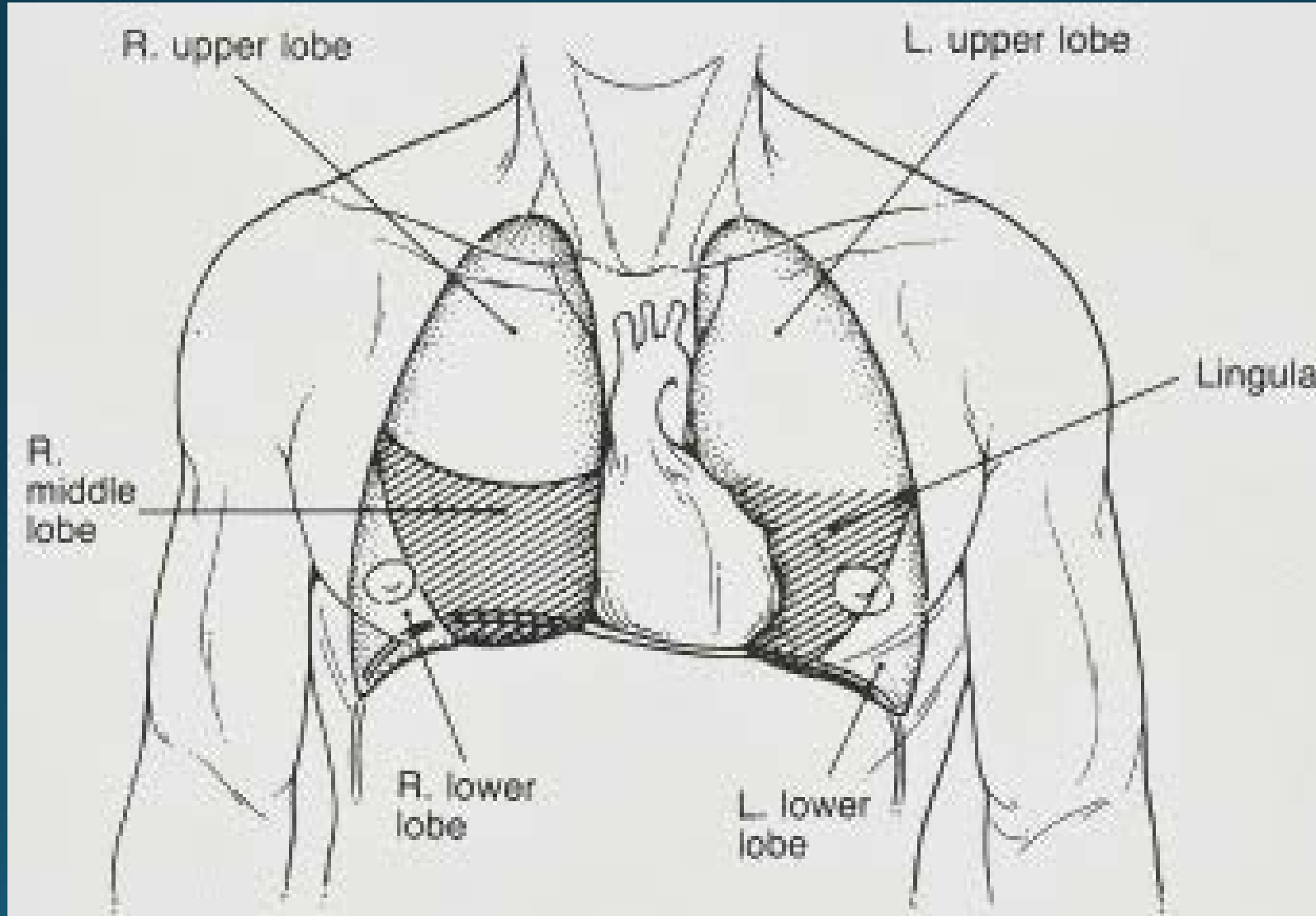
◆ Lungs

Pleura	Closed cavities enveloping each lung. Visceral layer connects with the lung tissue, while the Parietal layer is thicker and attached to the wall of the thorax.
Right Lung	Has 2 fissures separating 3 lobes
Left Lung	Has 1 fissure separating 2 lobes



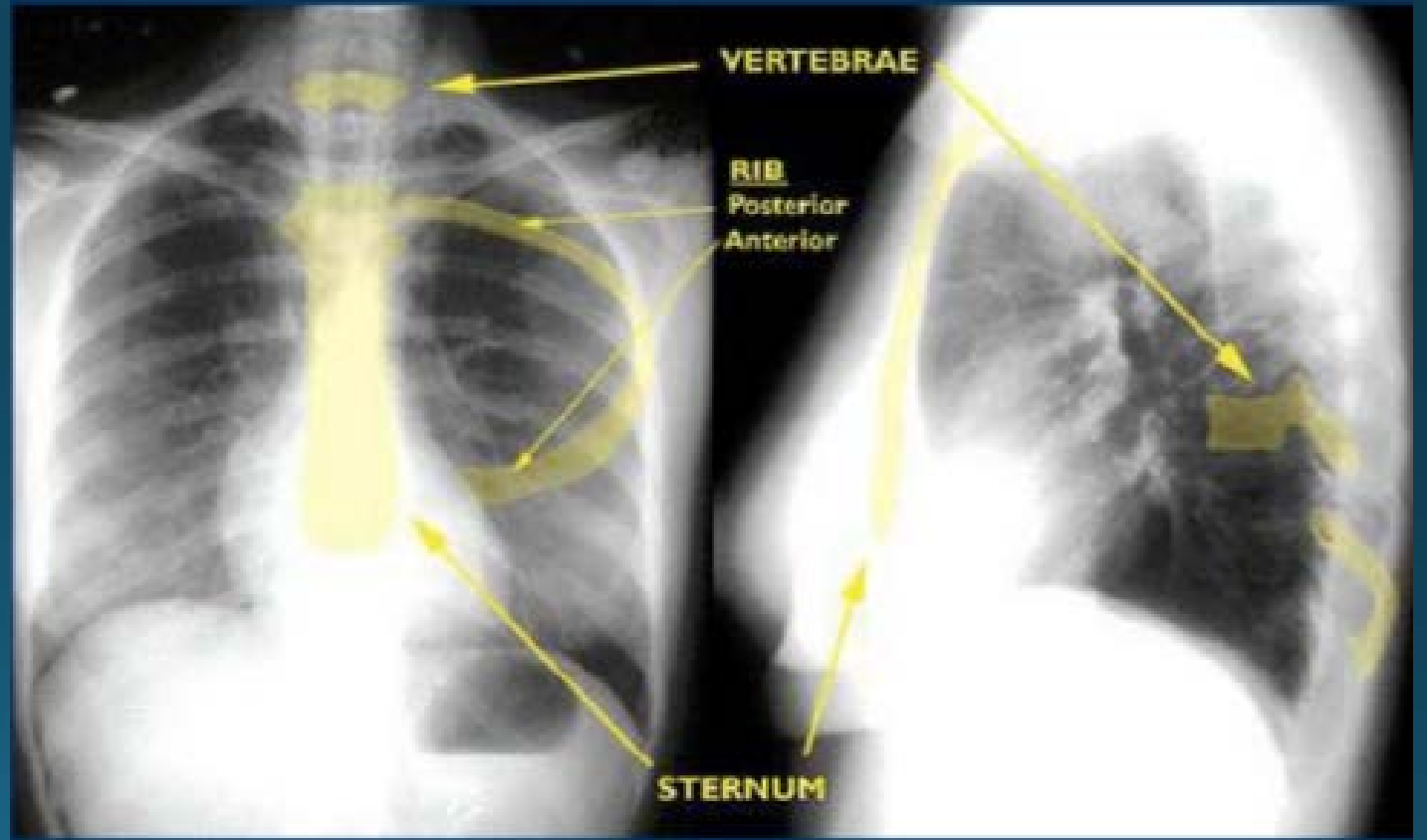
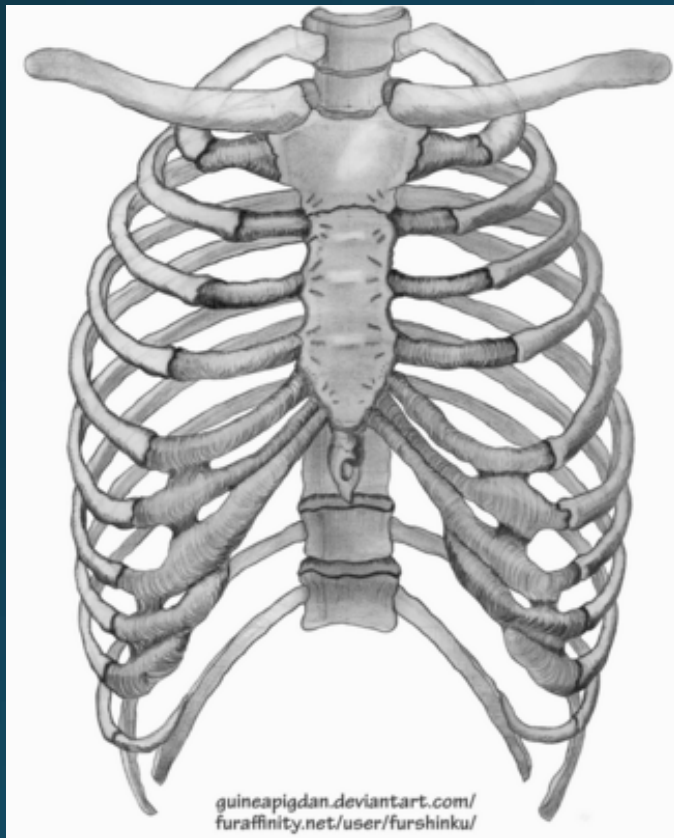
Relationship of Heart & Lungs

- RML
LUL
border
the
heart

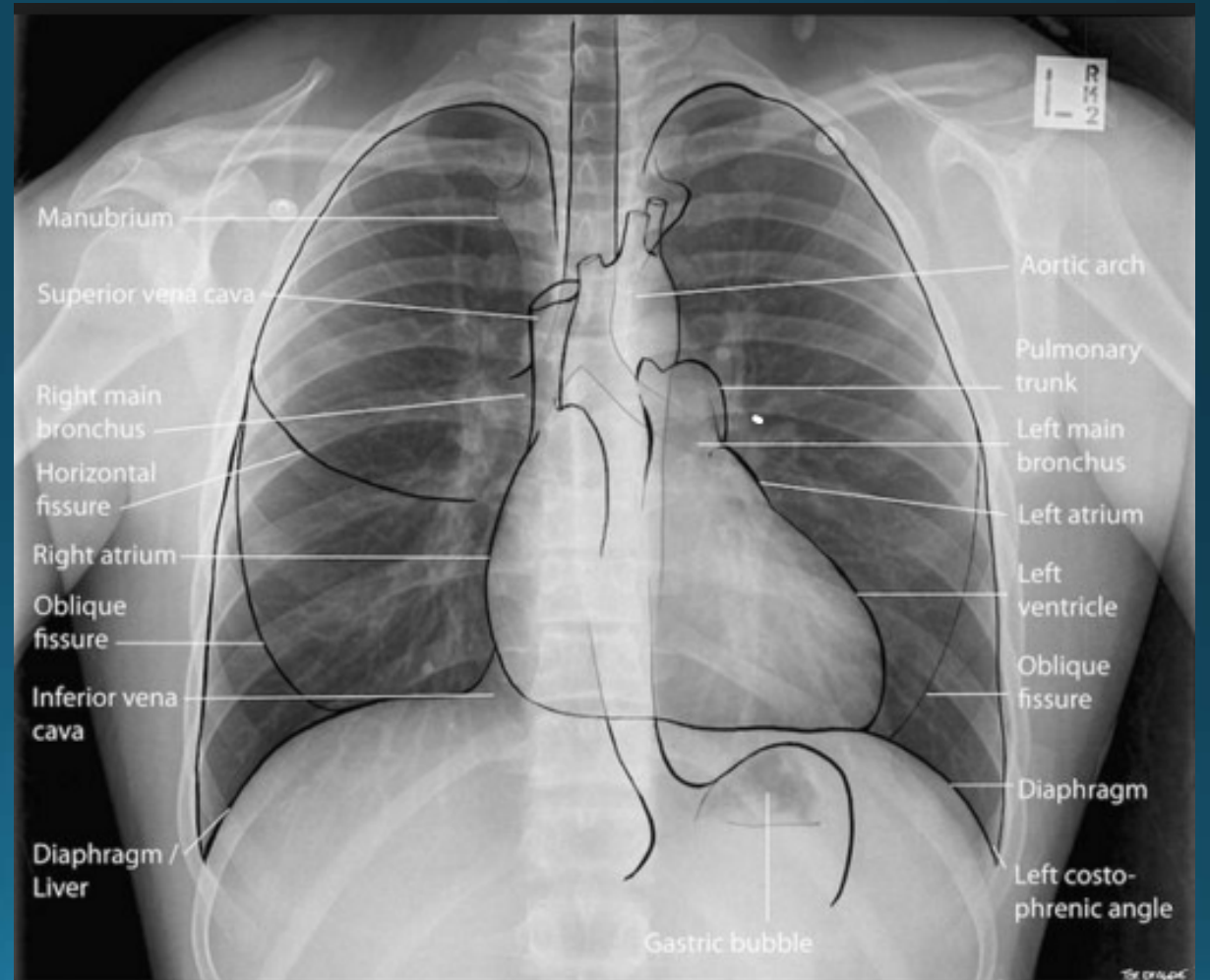
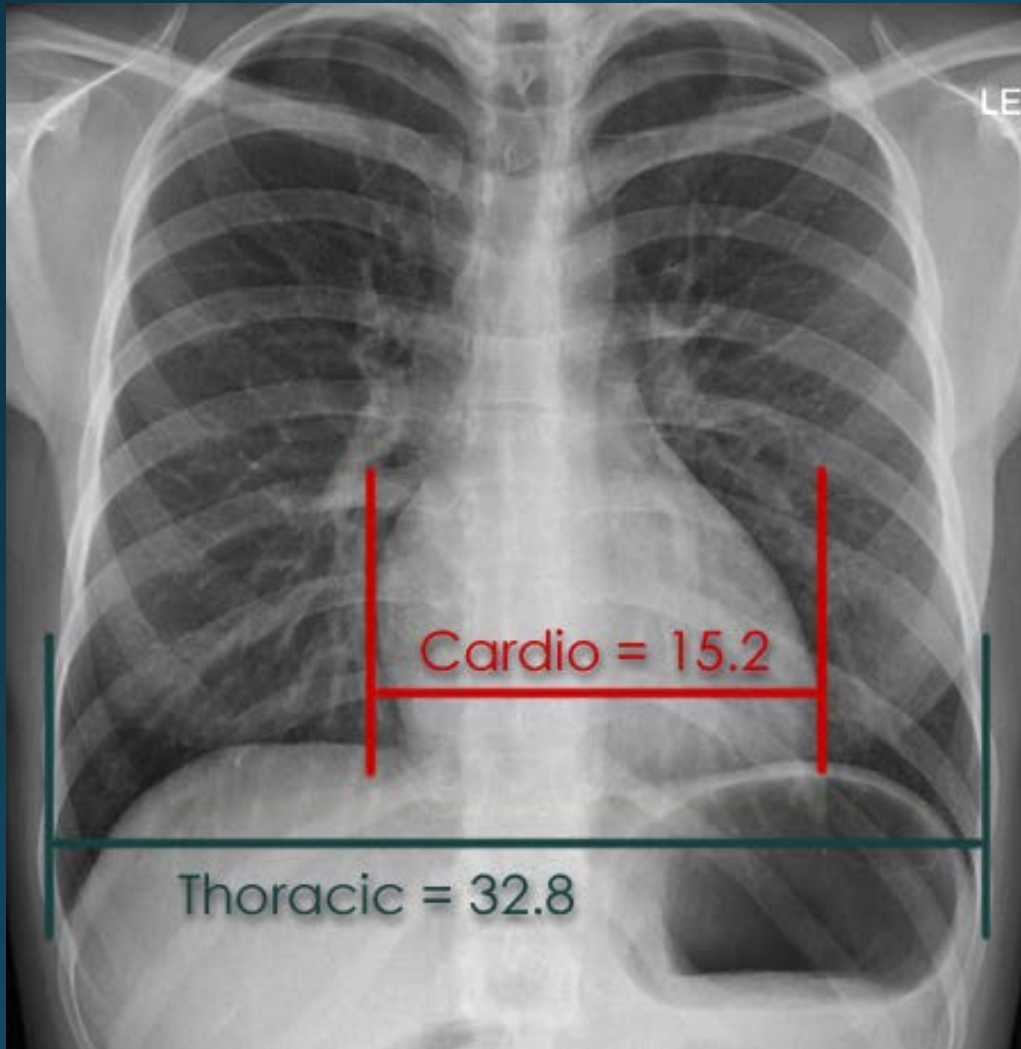


Bony Structures to Recognize:

Ribs, Spine, Clavicles, Scapula



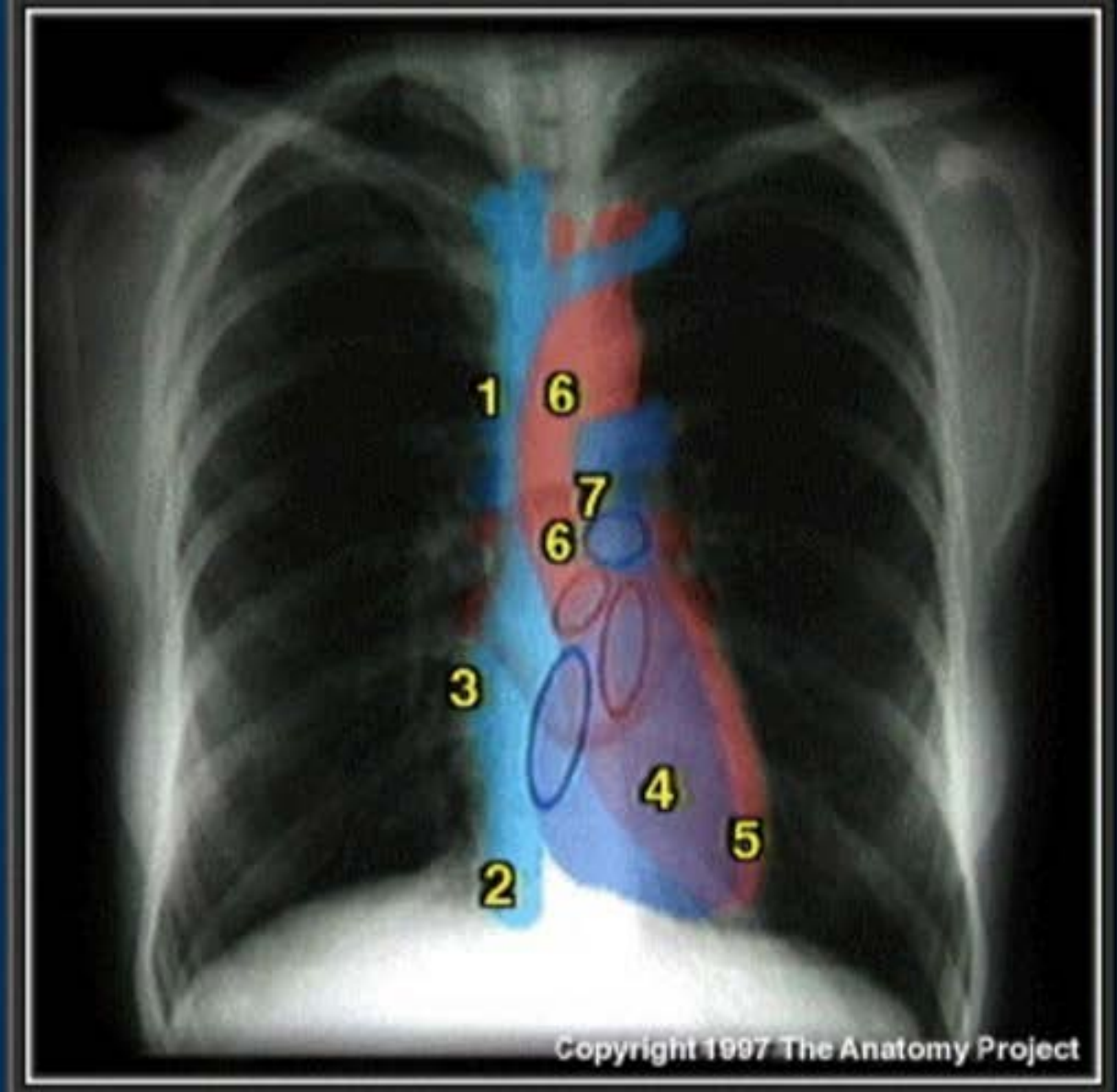
Heart Size: $\frac{1}{3}$ Right, $\frac{2}{3}$ Left, $<50\%$ width



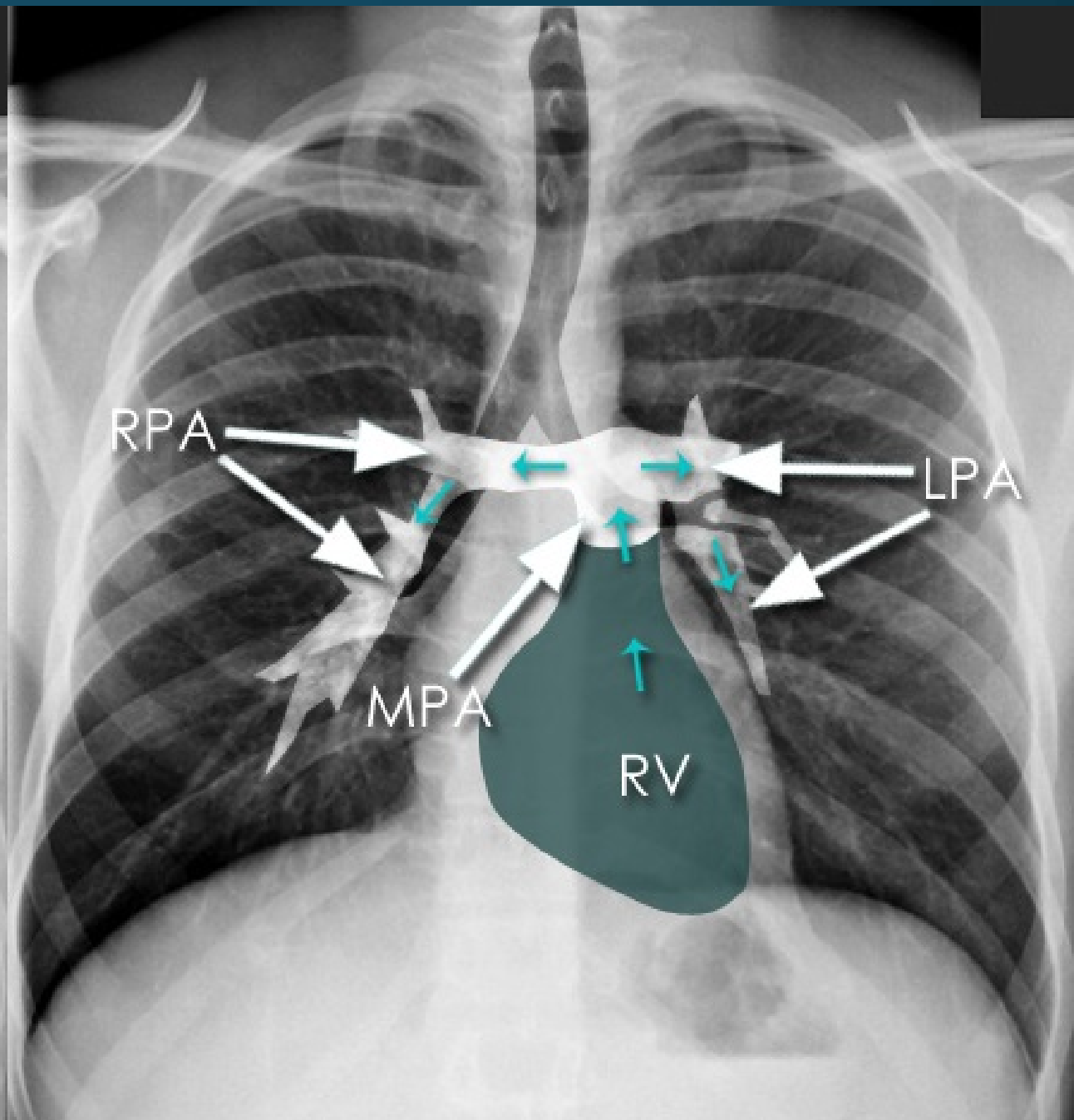
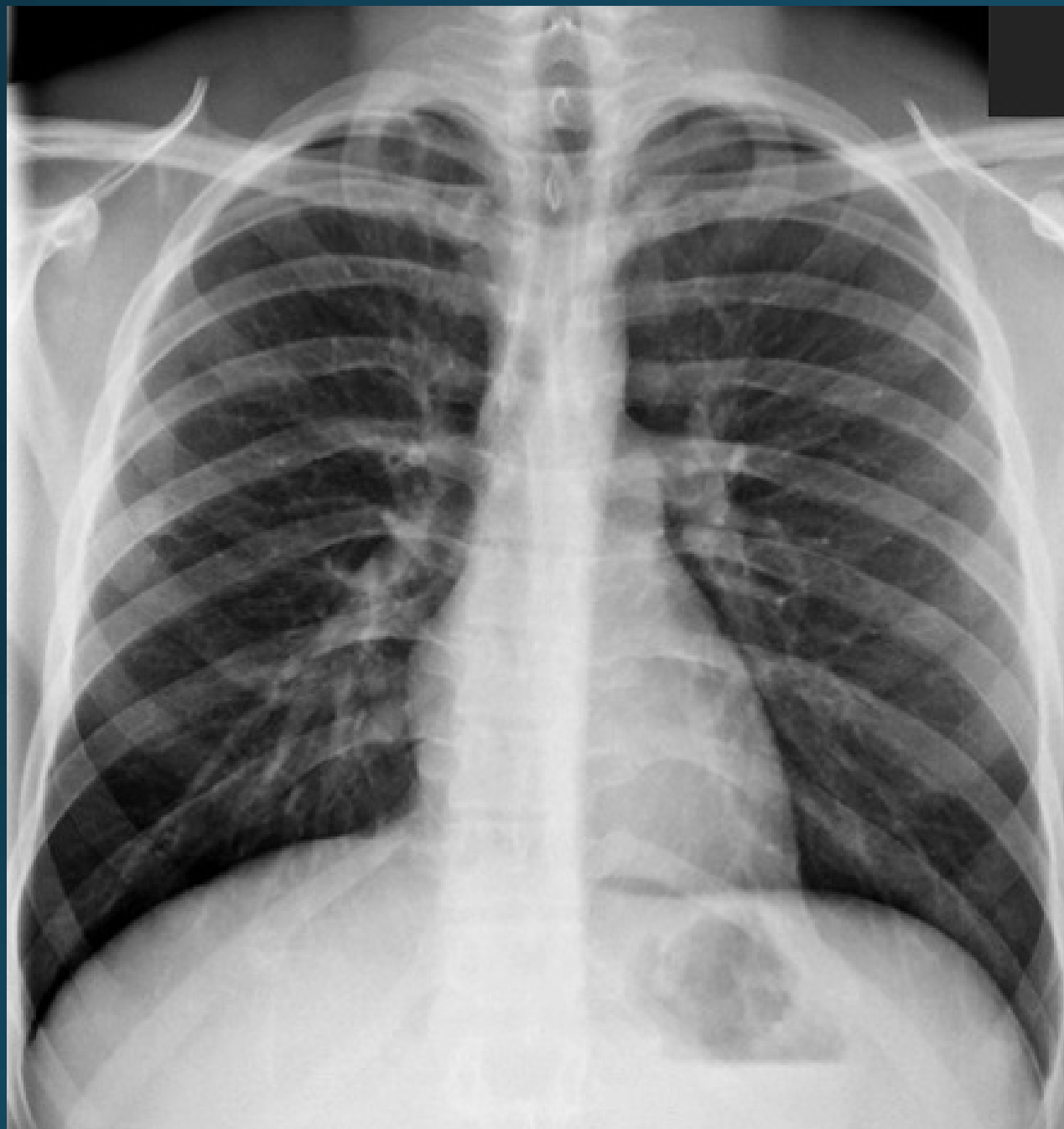
◆ Mediastinum and Heart

■ Left side

- Left ventricle
- Left atrium
- Pulmonary artery
- Aortic arch
- Subclavian artery and vein



Copyright 1997 The Anatomy Project



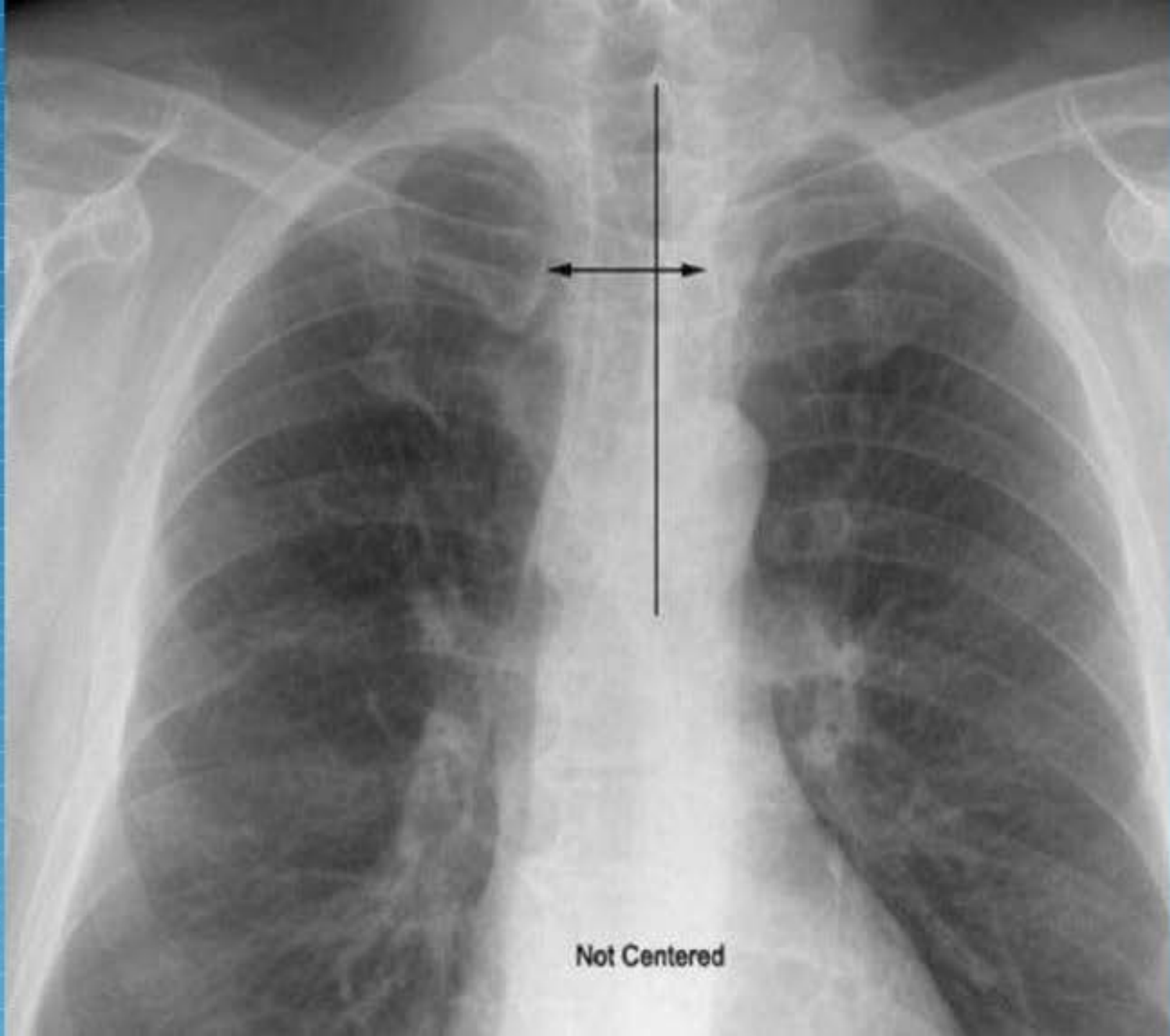
Let's look at a normal CXR



ASSESSING A CHEST X-RAY

(technical aspects)

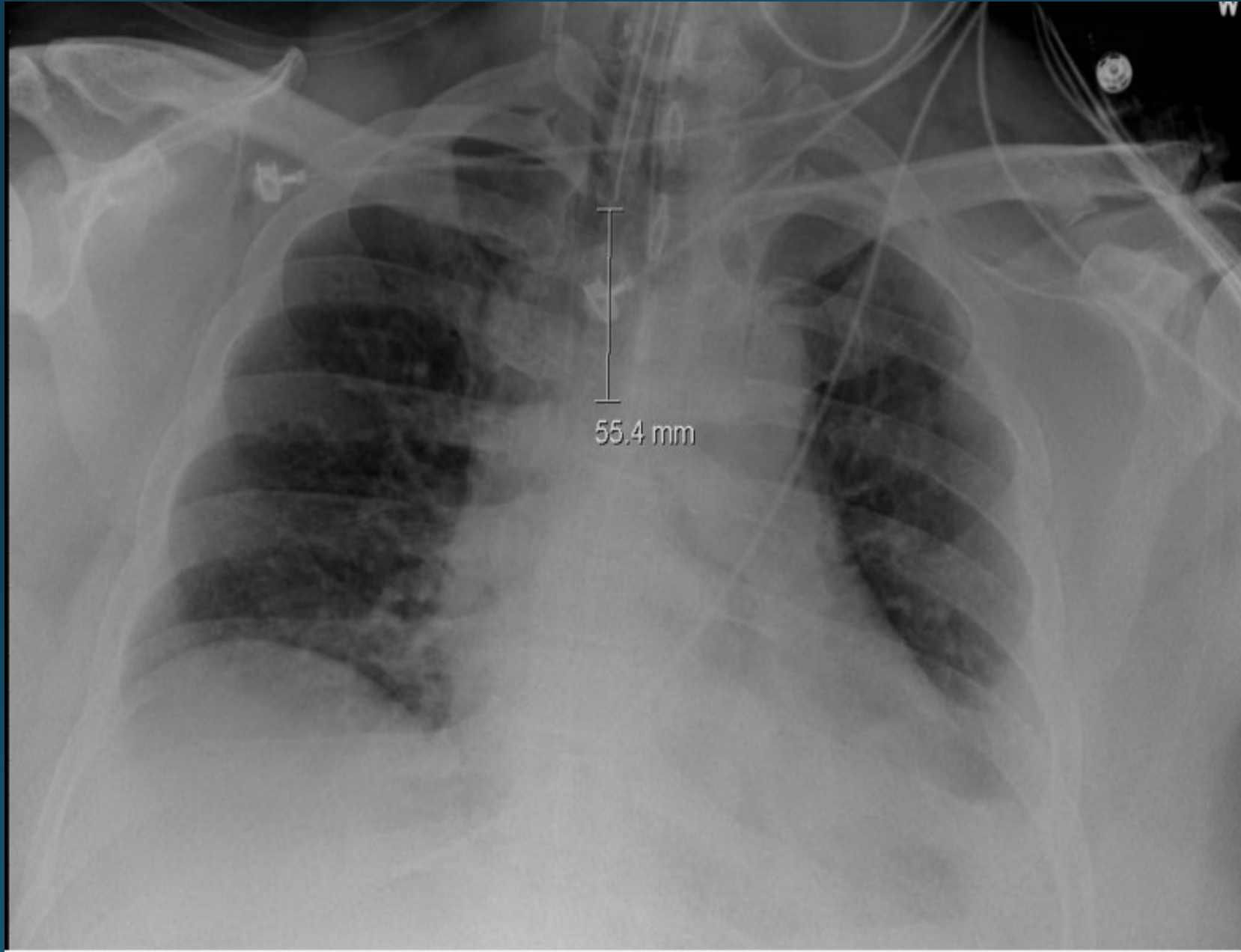
- **R:** Rotation (Is the CXR centered and straight, symmetrical clavicles?)
- **I:** Inspiration (how many ribs are showing? 8, 9, 10? Less?)
- **P:** Penetration (is the film overexposed or underexposed? Can you see spine through the cardiac shadow?)



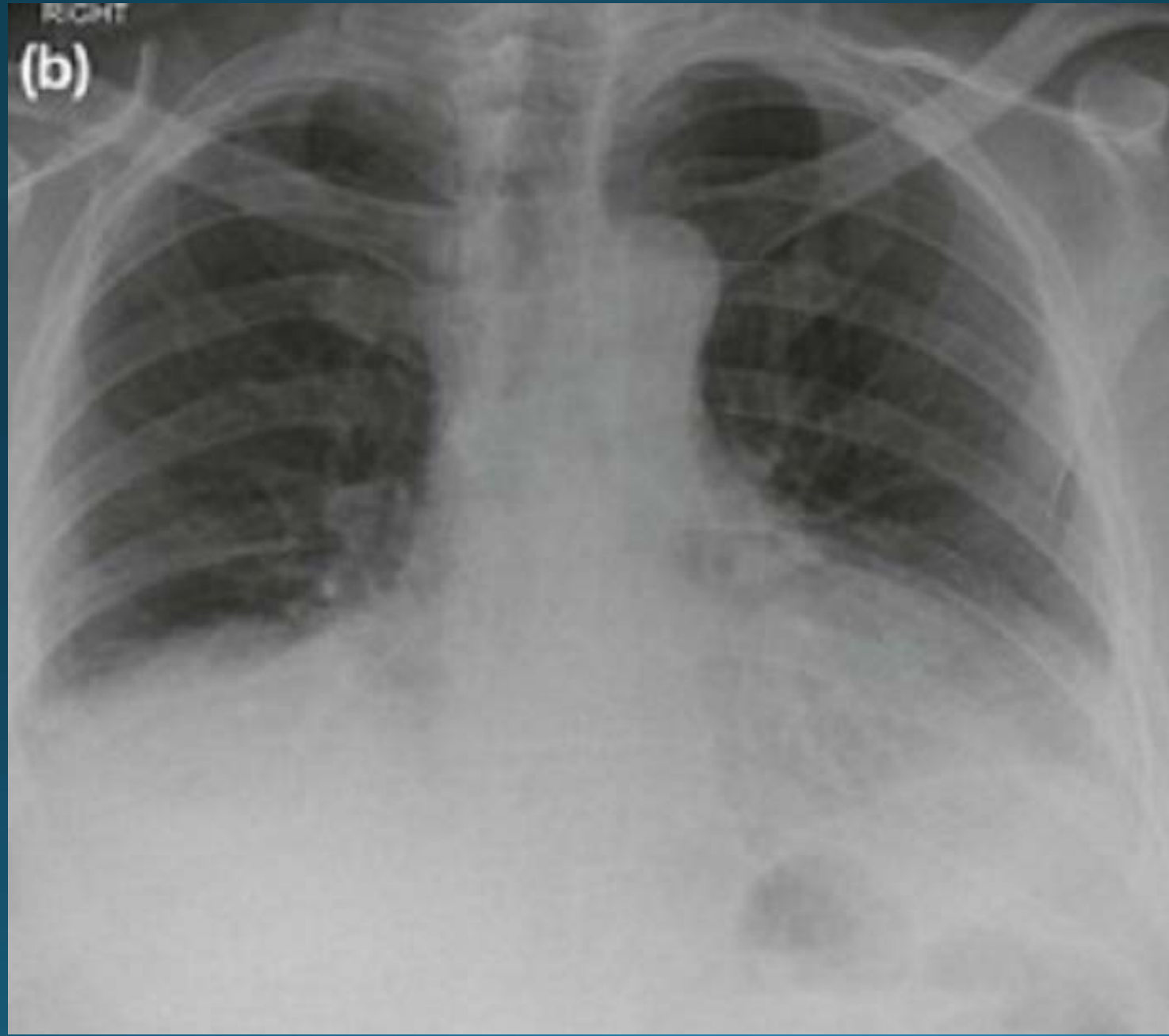
Not Centered

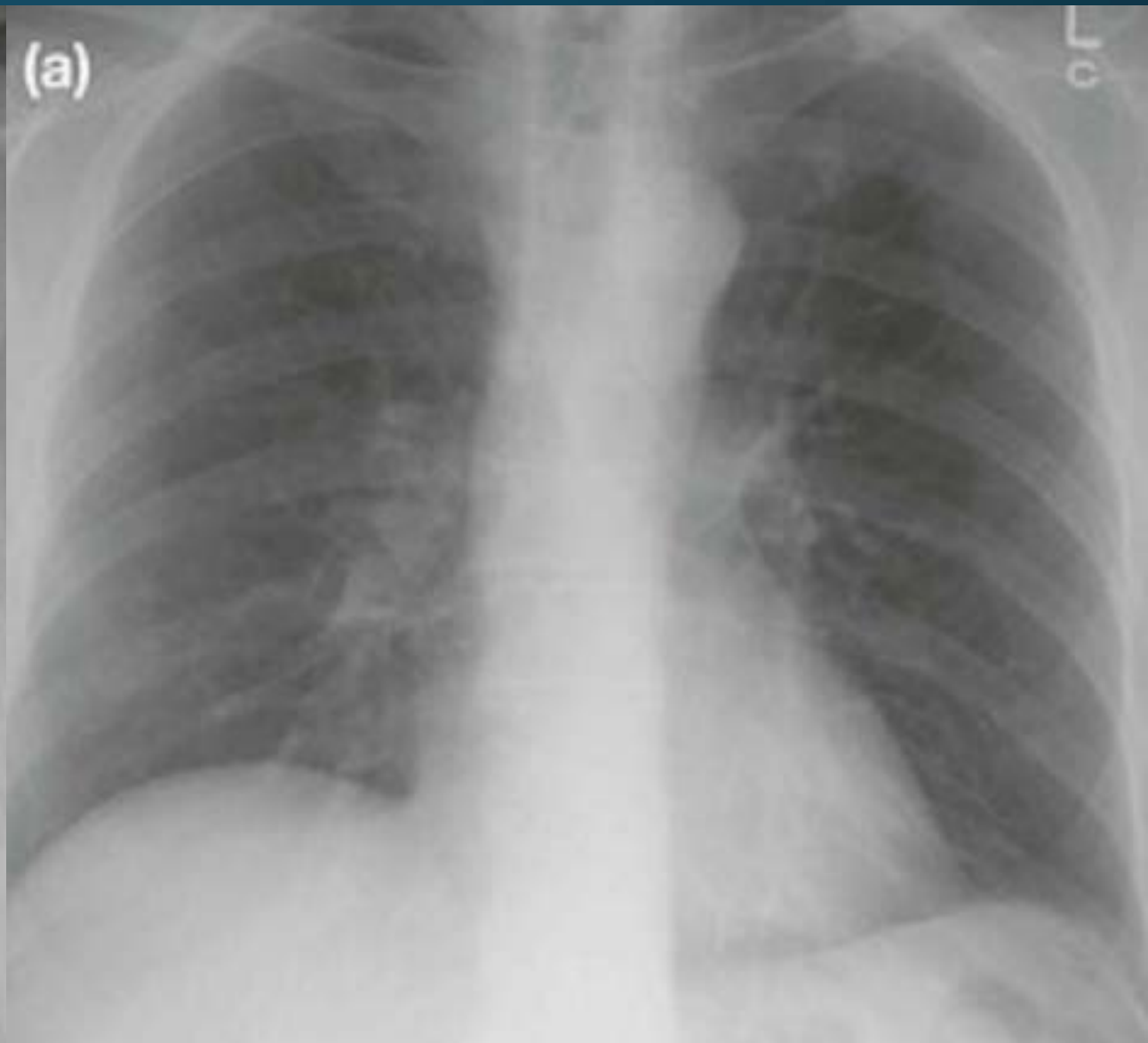
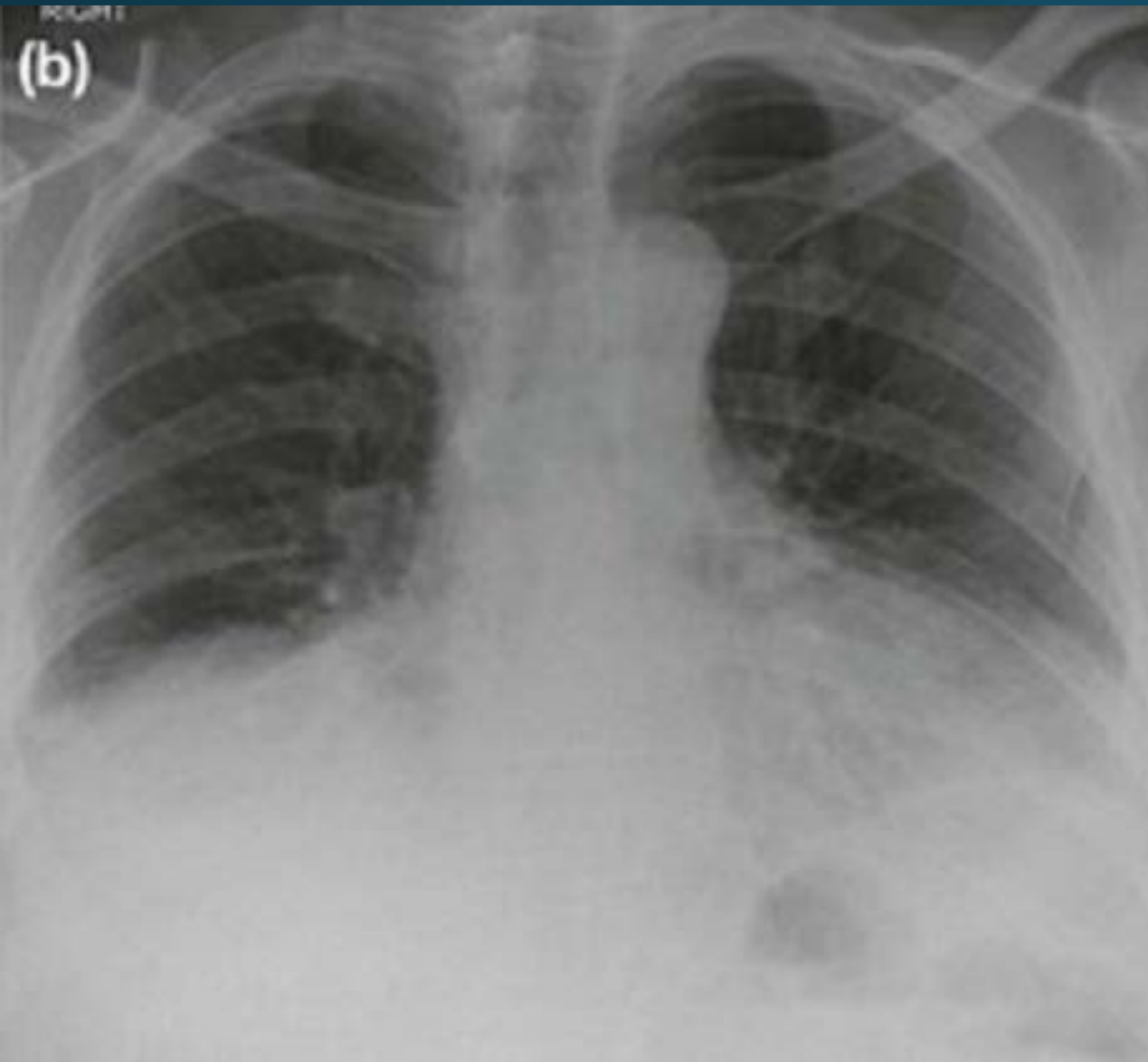


ROTATED



POOR INSPIRATION





Poor Penetration





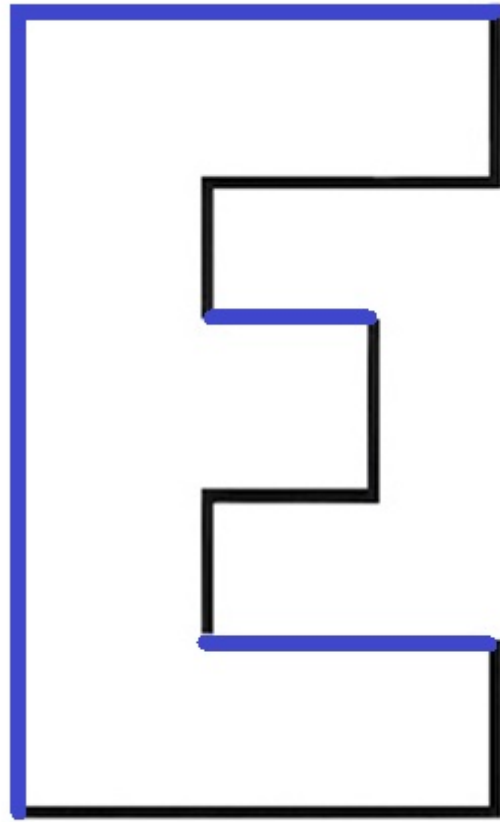
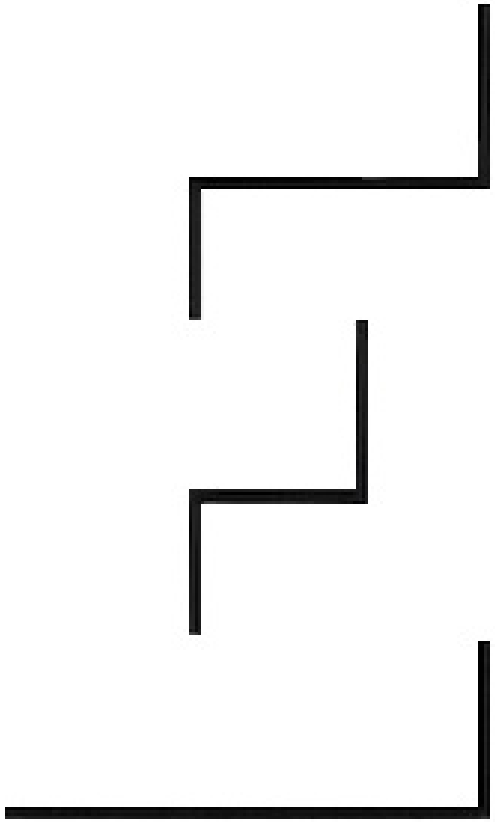
The Systematic ABCDEFGHI Approach

- **A:** Airways (look at location, patency, ?artificial airway)
- **B:** Bones and soft tissue (look for abnormalities, fxs, etc.)
- **C:** Cardiac Structures (positioning, size, prosthetics, borders)
- **D:** Diaphragms (positioning, blurring, flattening, elevation)
- **E:** Effusions (loss of costo-phrenic angle, obvious fluid line)
- **F:** Fields & Fissures (check for infiltrates, air loss, free air, pleura, etc)
- **G:** Gastric Bubble (presence, location)
- **H:** Hilum (size, deviation, lymphadenopathy, calcifications, & masses)
- **I:** Instrumentation (wires, lines, prosthetics, fixation devices, etc.)

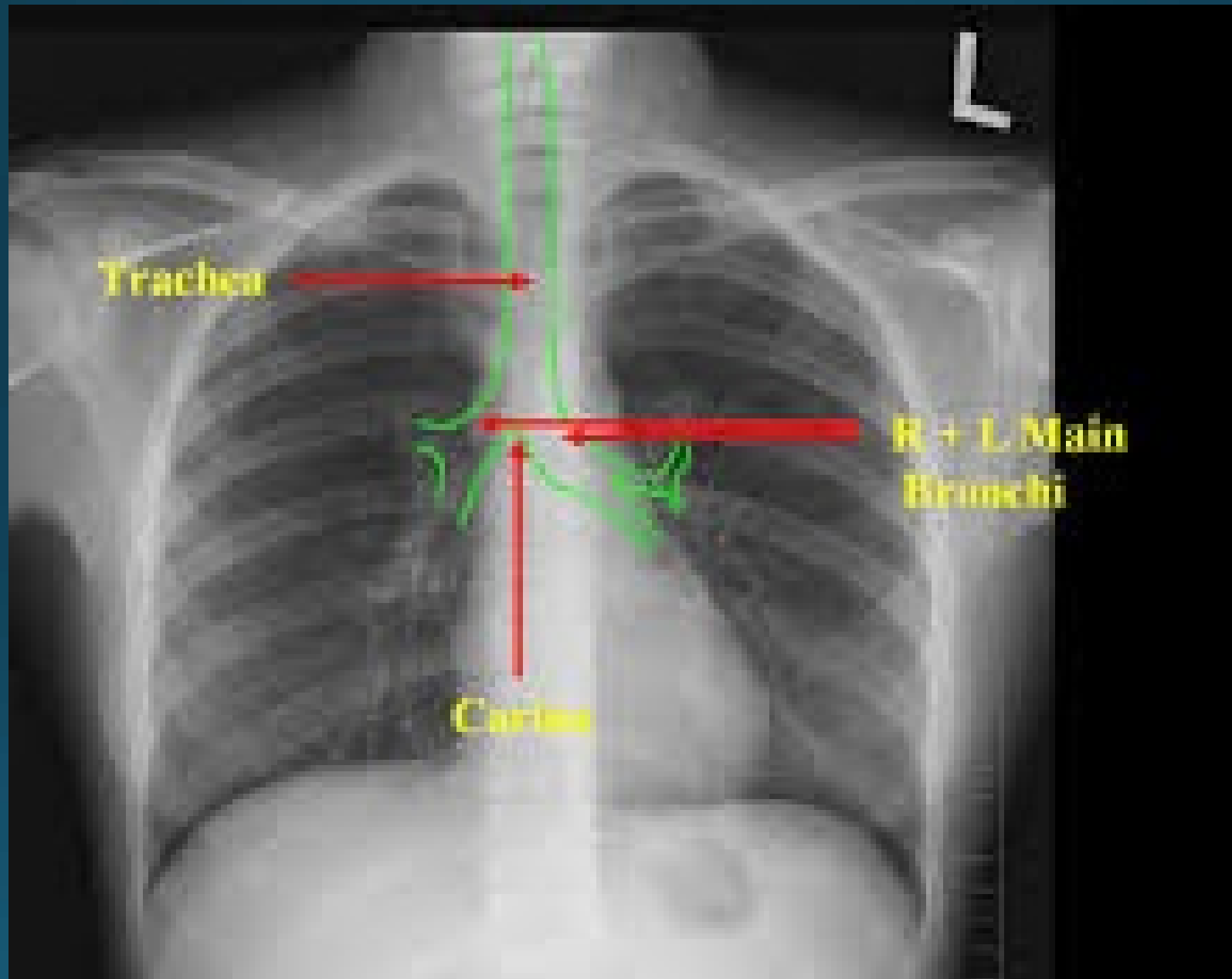
"I've learned that two people can look at the exact same thing and see something totally different."

(from the poem "I've Learned", credited to Omer B. Washington)

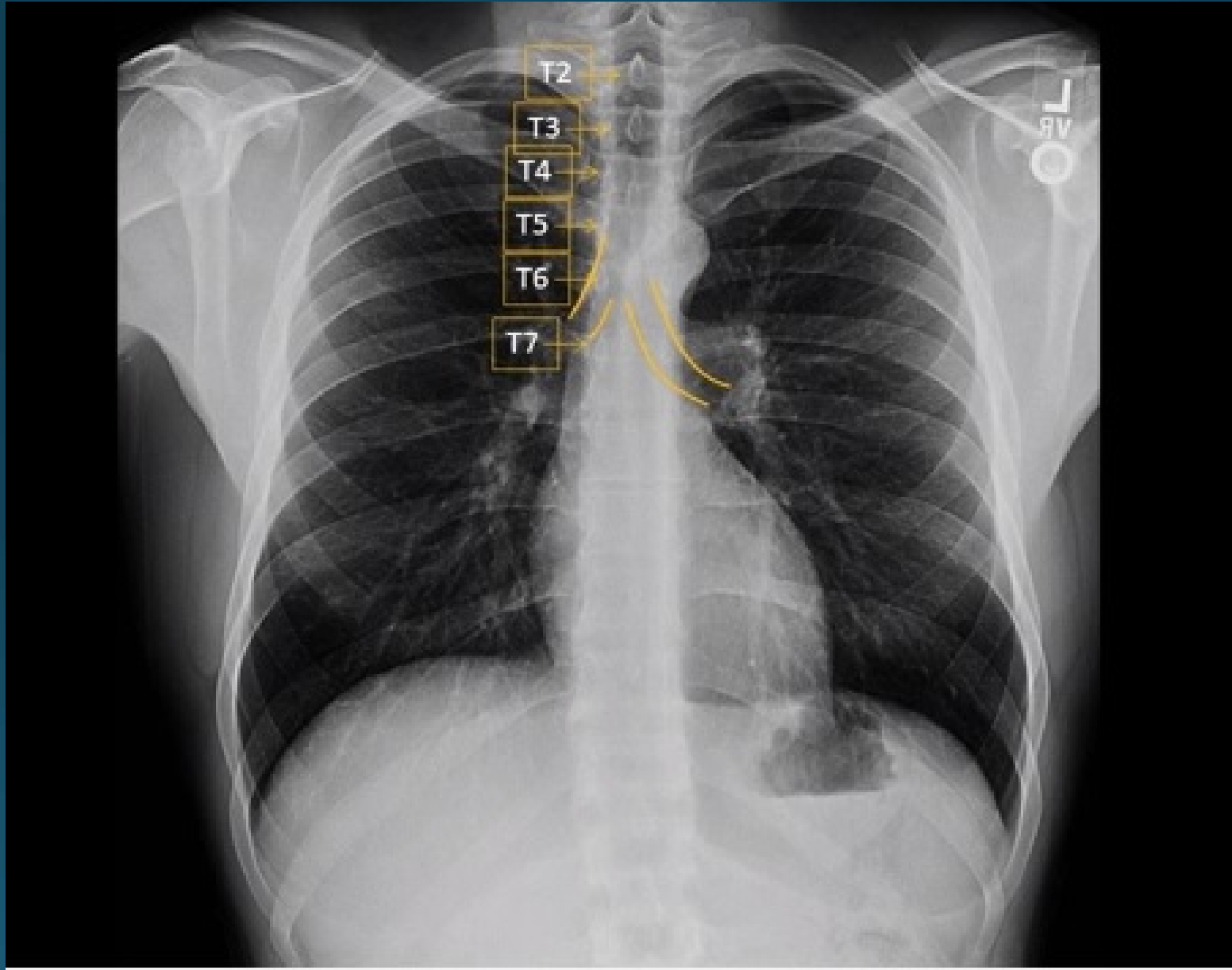
Remember....people see things differently

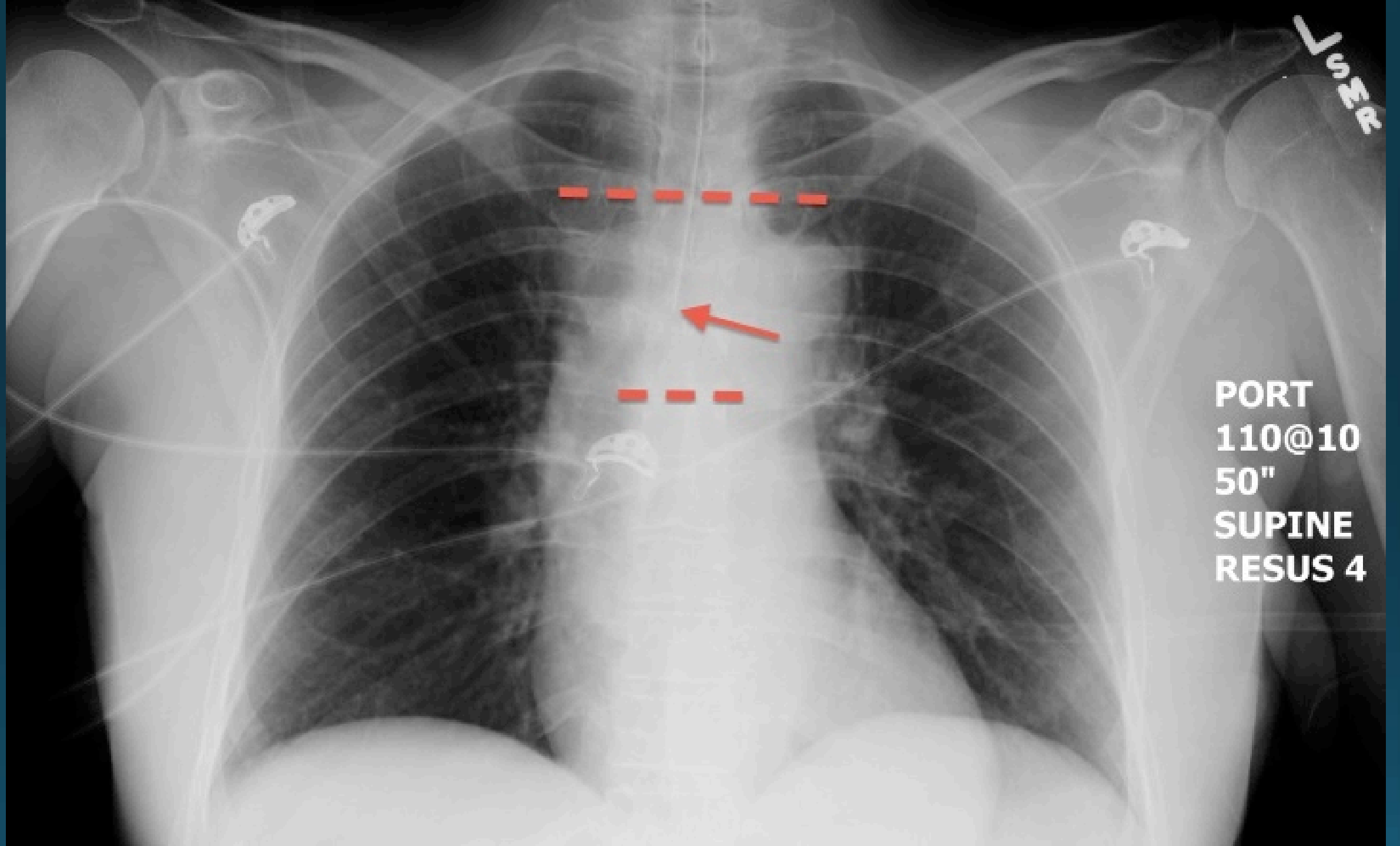


ETT PLACEMENT

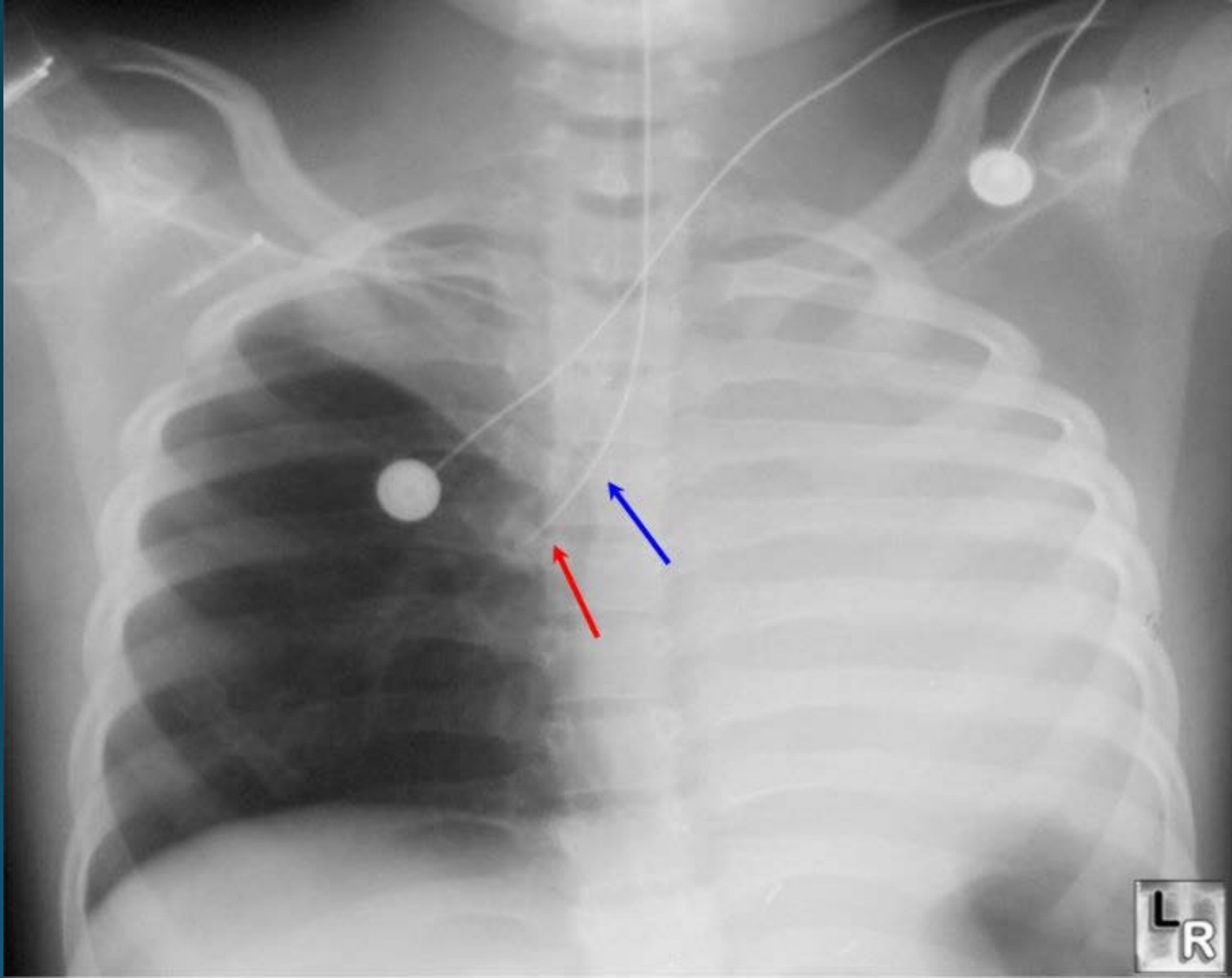


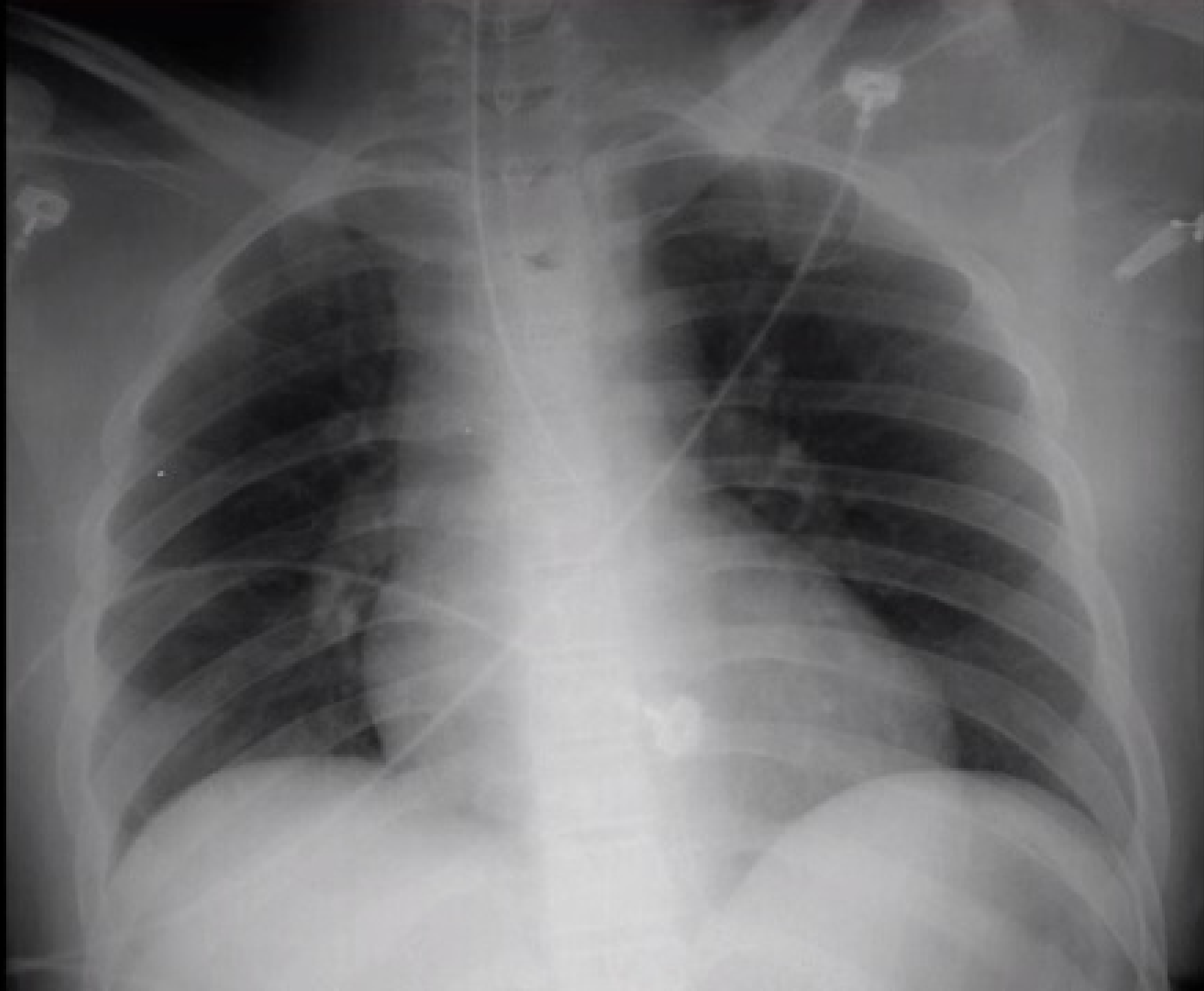
Carina lies at level of T5-T7





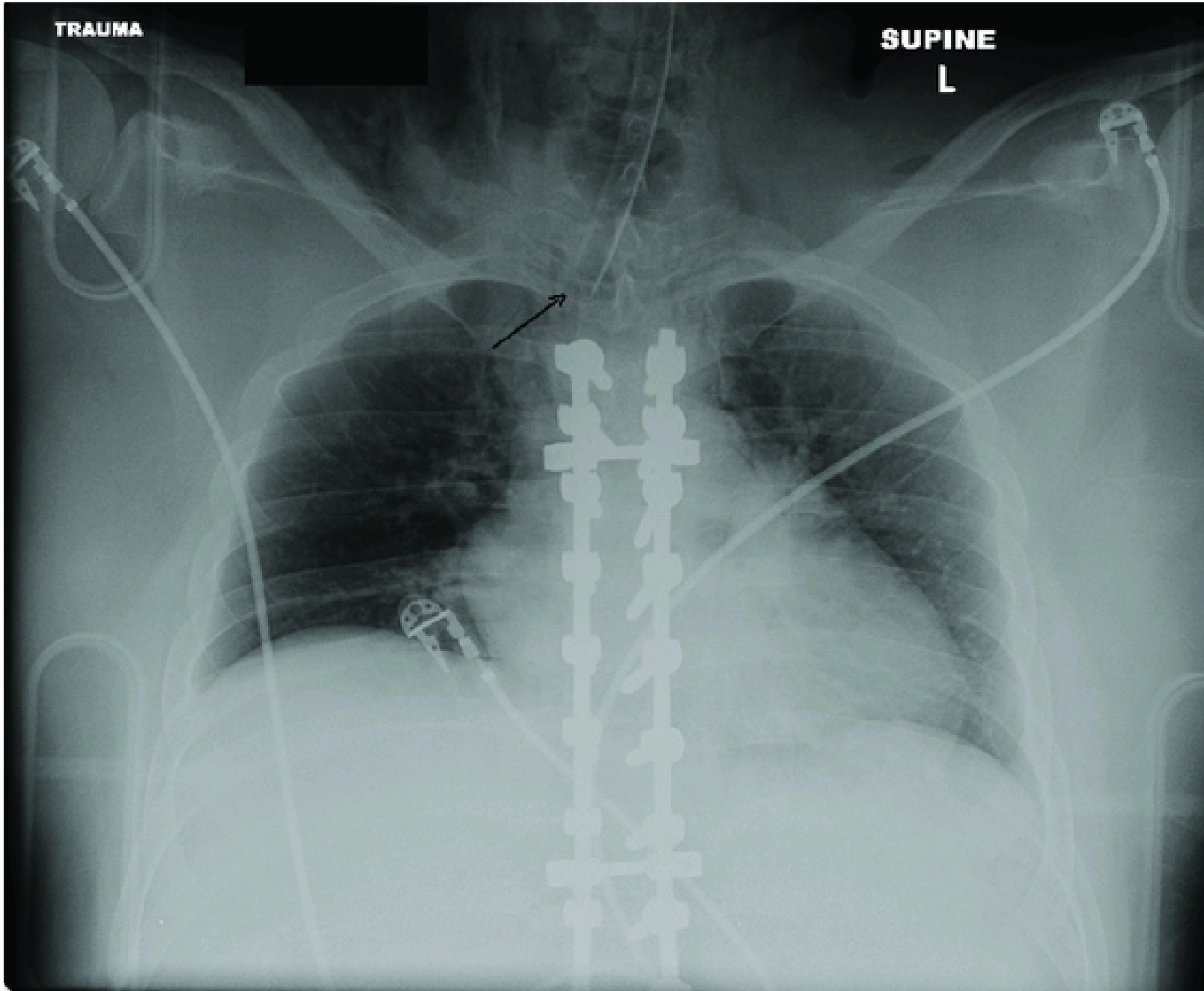
PORT
110@10
50"
SUPINE
RESUS 4

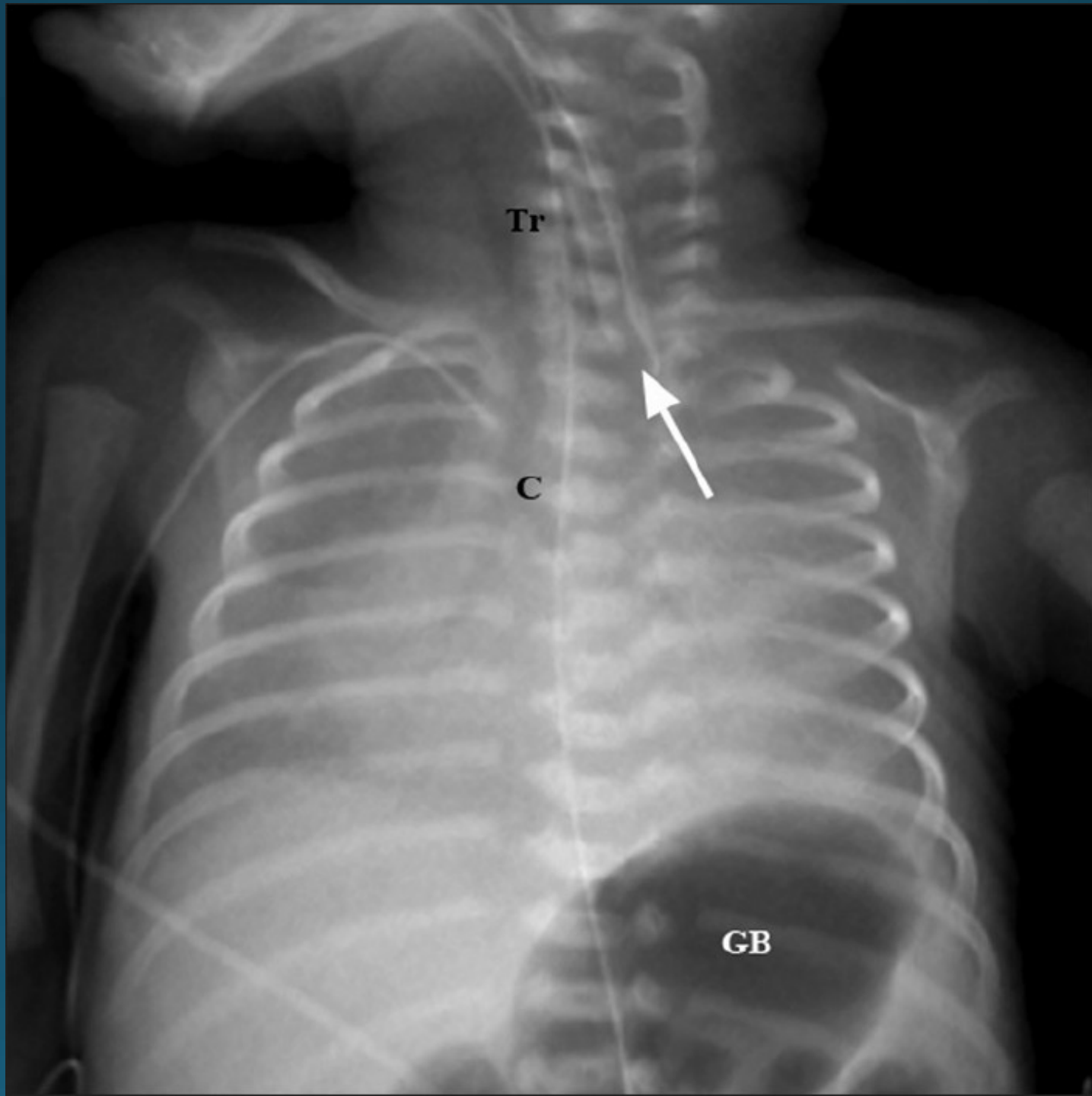




TRAUMA

SUPINE
L





Tr

C

GB

Infiltrate vs Atelectasis vs Pneumonia vs Consolidation...

How do you know what's what?

Major differentiating factors between atelectasis and pneumonia

Atelectasis	Pneumonia
Volume Loss	Normal or Increased Volume
Associated Ipsilateral Shift	No Shift, or if Present Then Contralateral
Linear, Wedge-Shaped	Consolidation, Air Space Process
Apex at Hilum	Not Centered at Hilum

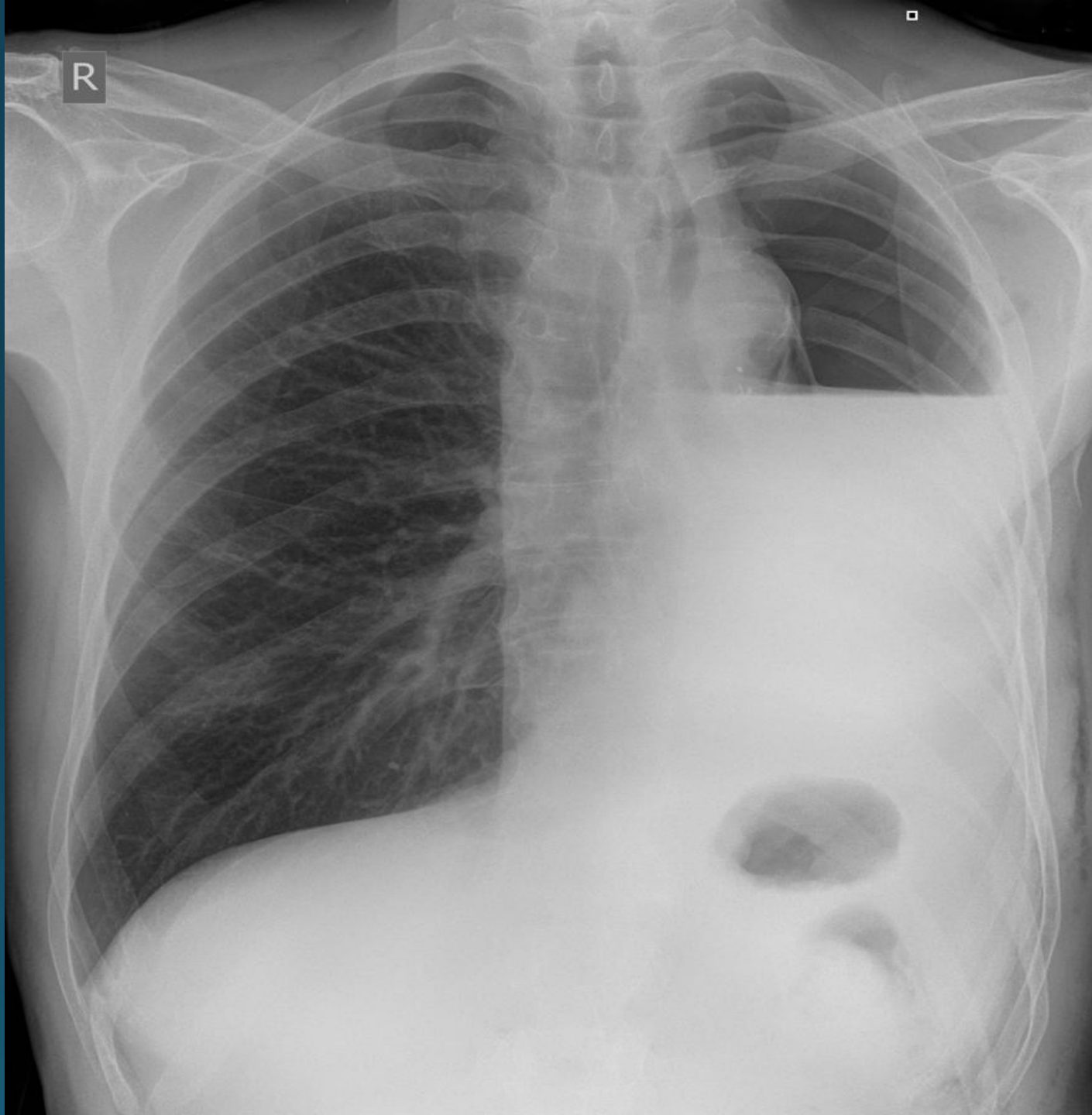
Air bronchograms can occur in both.

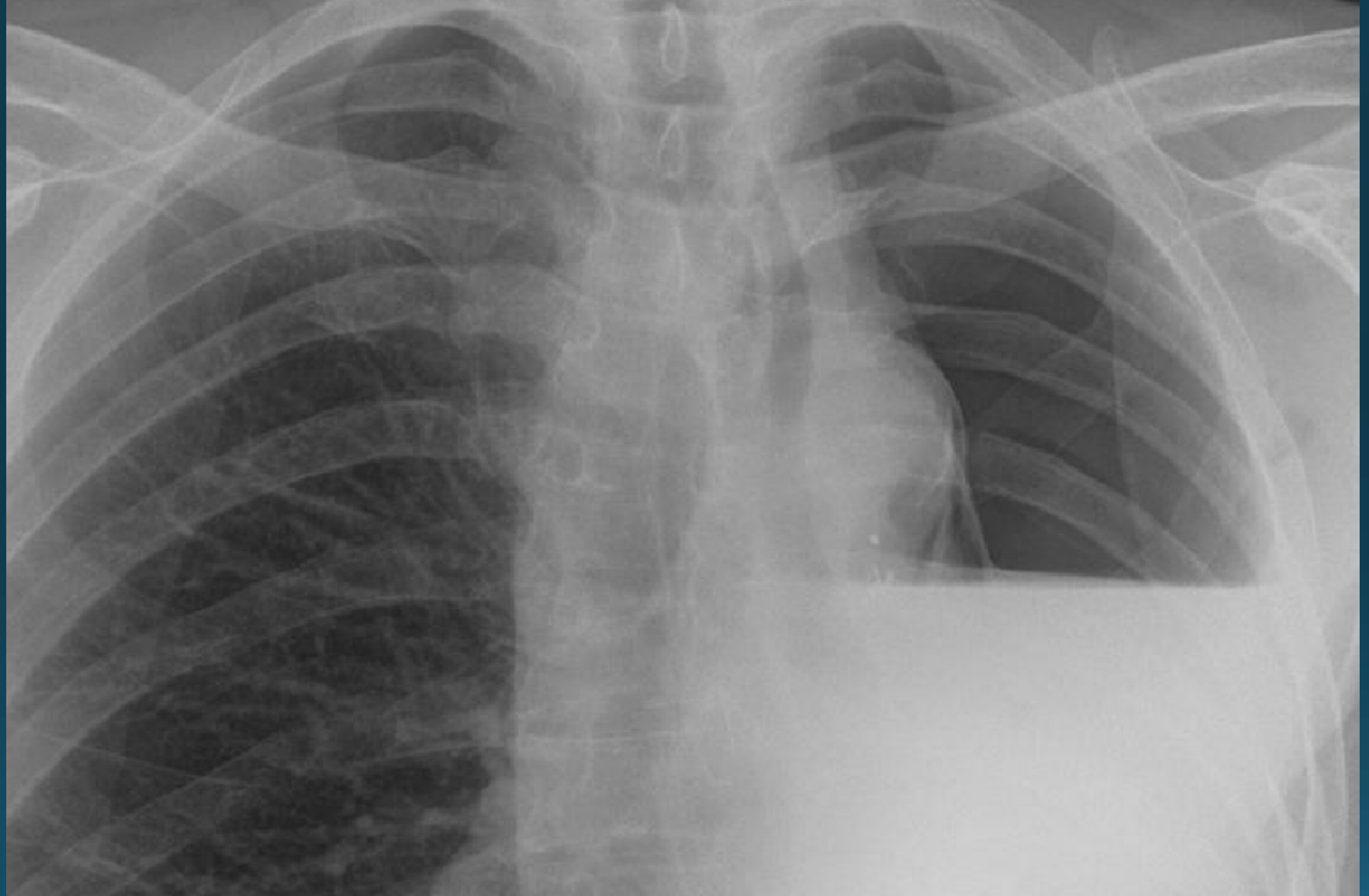
RUL collapse w/ shifting upwards

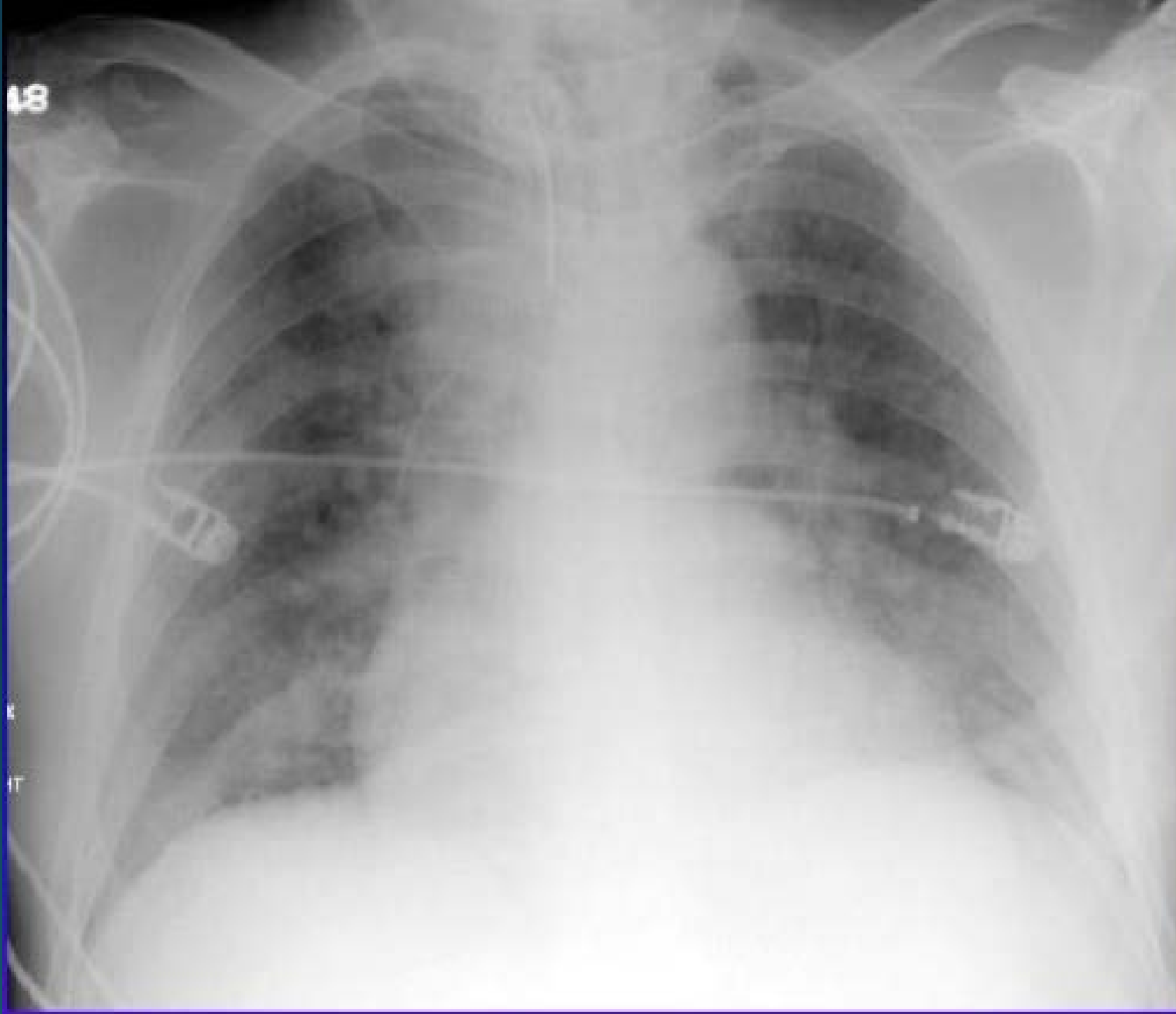


RML Pneumonia (indistinct borders, no volume loss)









CHF w/
vascular
congestion

72 male

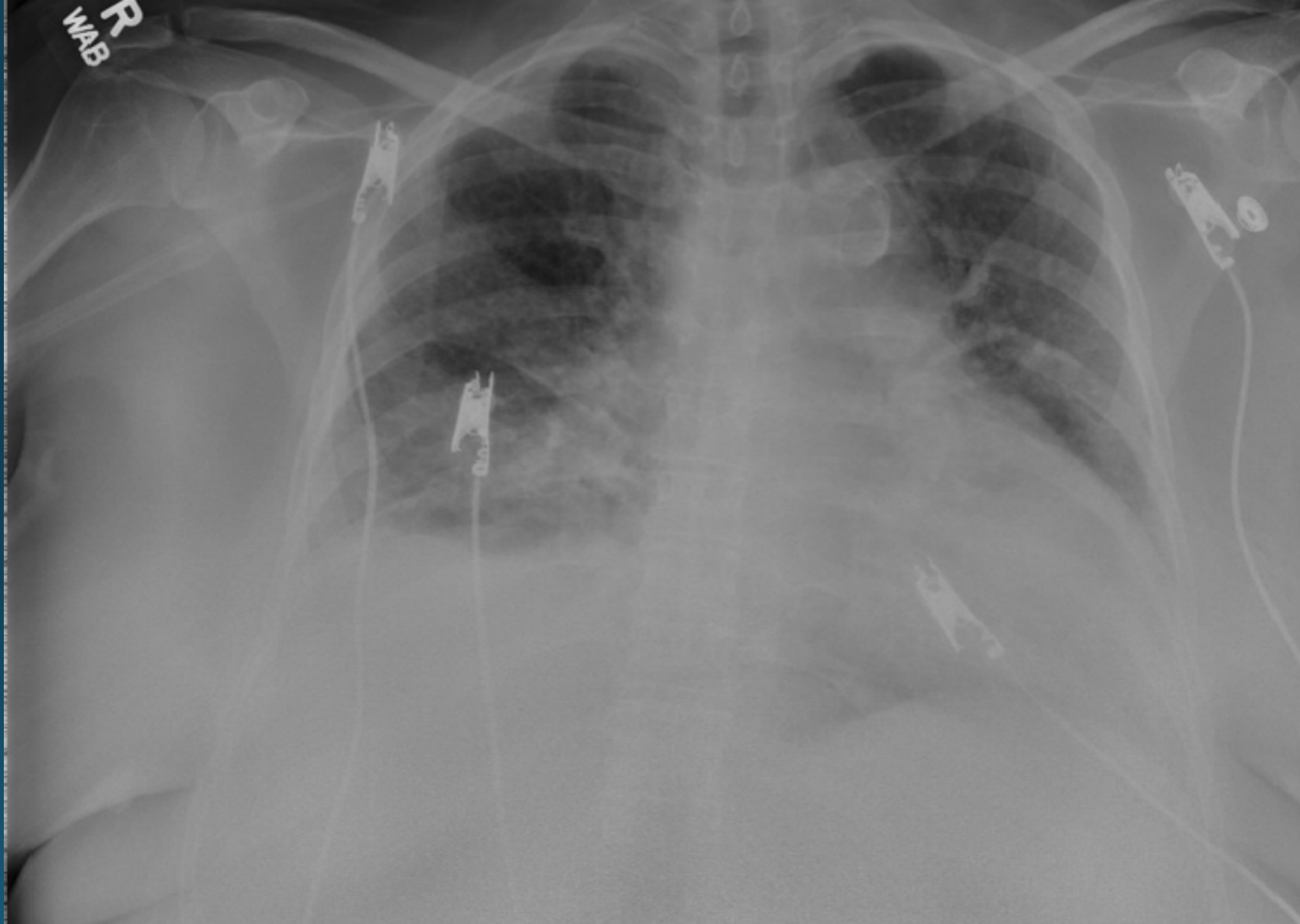
CHF?

Pulmonary
Edema?

Effusion?

Pneumonia?

Atelectasis?



1 08/31/2018
08/31/2018
Show image
05/21/2018



COMPARISON: Chest radiograph from 08/23/2018.

TECHNIQUE: Chest 2 views.

FINDINGS:

There is cardiomegaly, pulmonary vascular congestion and pulmonary edema. Aortic knob calcifications. Bilateral perihilar, lower lobe airspace opacities, consistent with atelectasis versus early pneumonic infiltrate. RIGHT hemidiaphragm elevation, with slight interval progression. Possibility of pleural effusion not excluded. No pneumothorax.

IMPRESSION:

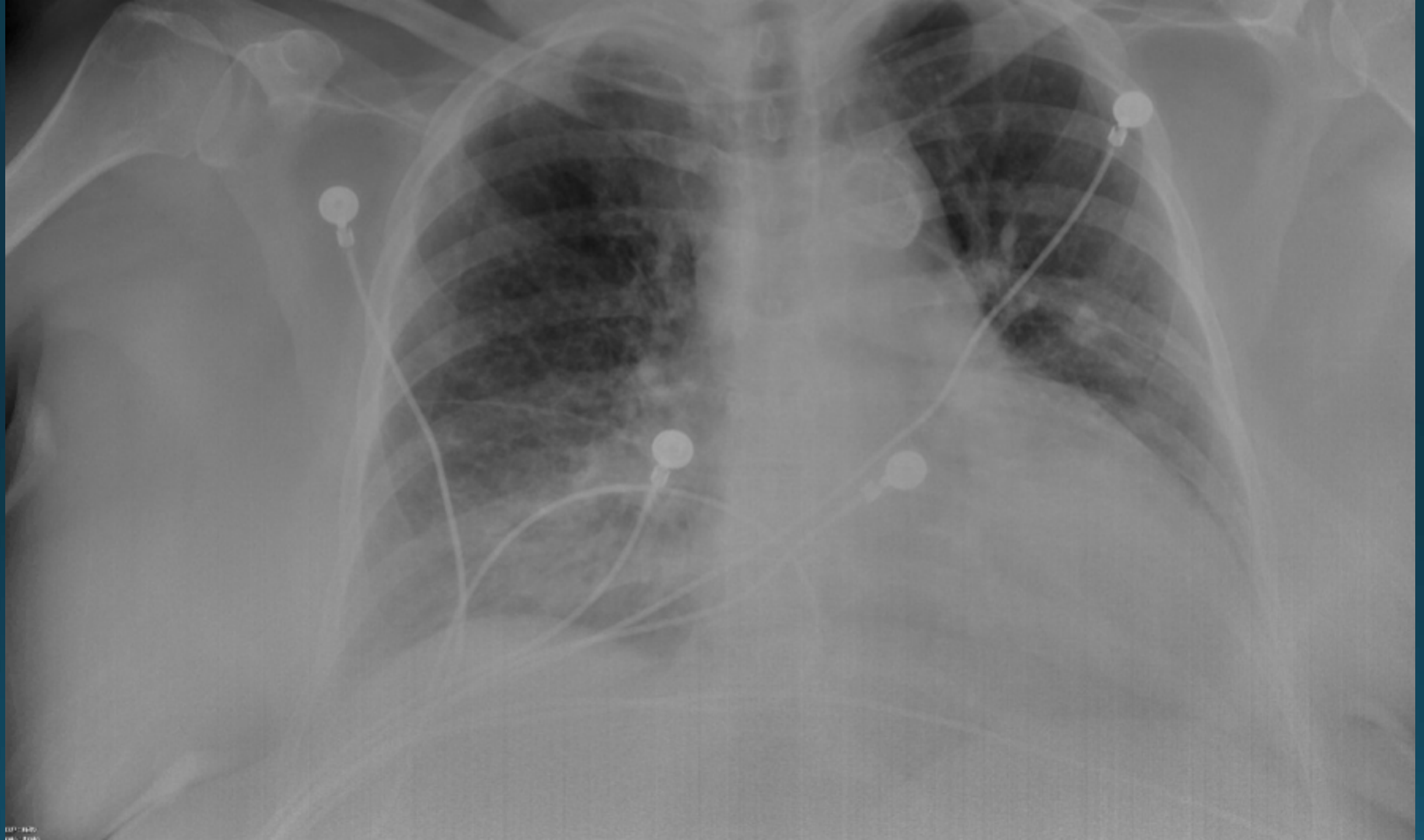
1. Cardiomegaly, pulmonary vascular congestion pulmonary edema.
2. Bilateral perihilar, lower lobe airspace opacities, consistent with atelectasis versus pneumonic infiltrate.

WS: 127670-RAD

Signed By: [REDACTED] on 8/31/2018 2:47 PM

Imaging

XR Chest PA and Lateral (Order #143210576) on 8/31/2018 - Imaging Information

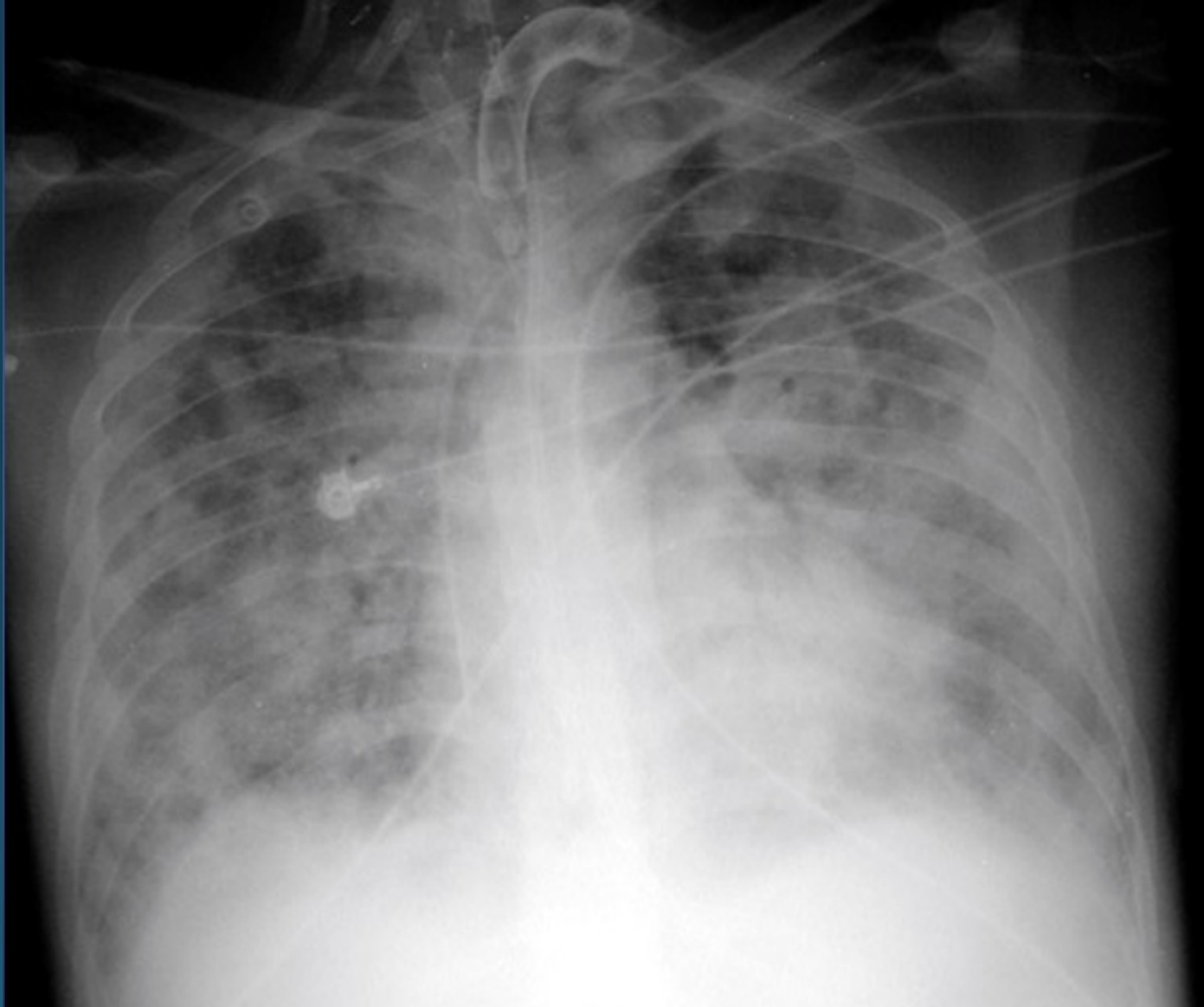




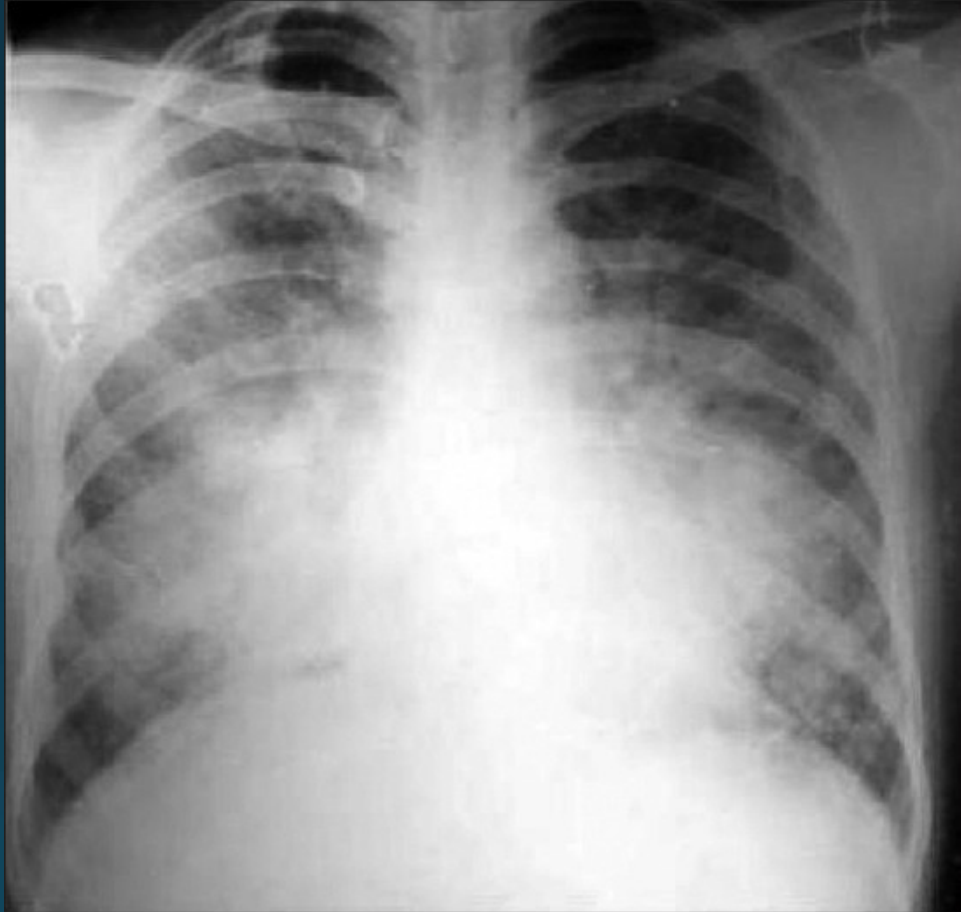
Let's look at some specific disease processes & their typical CXR presentation

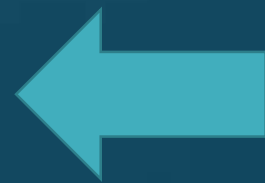
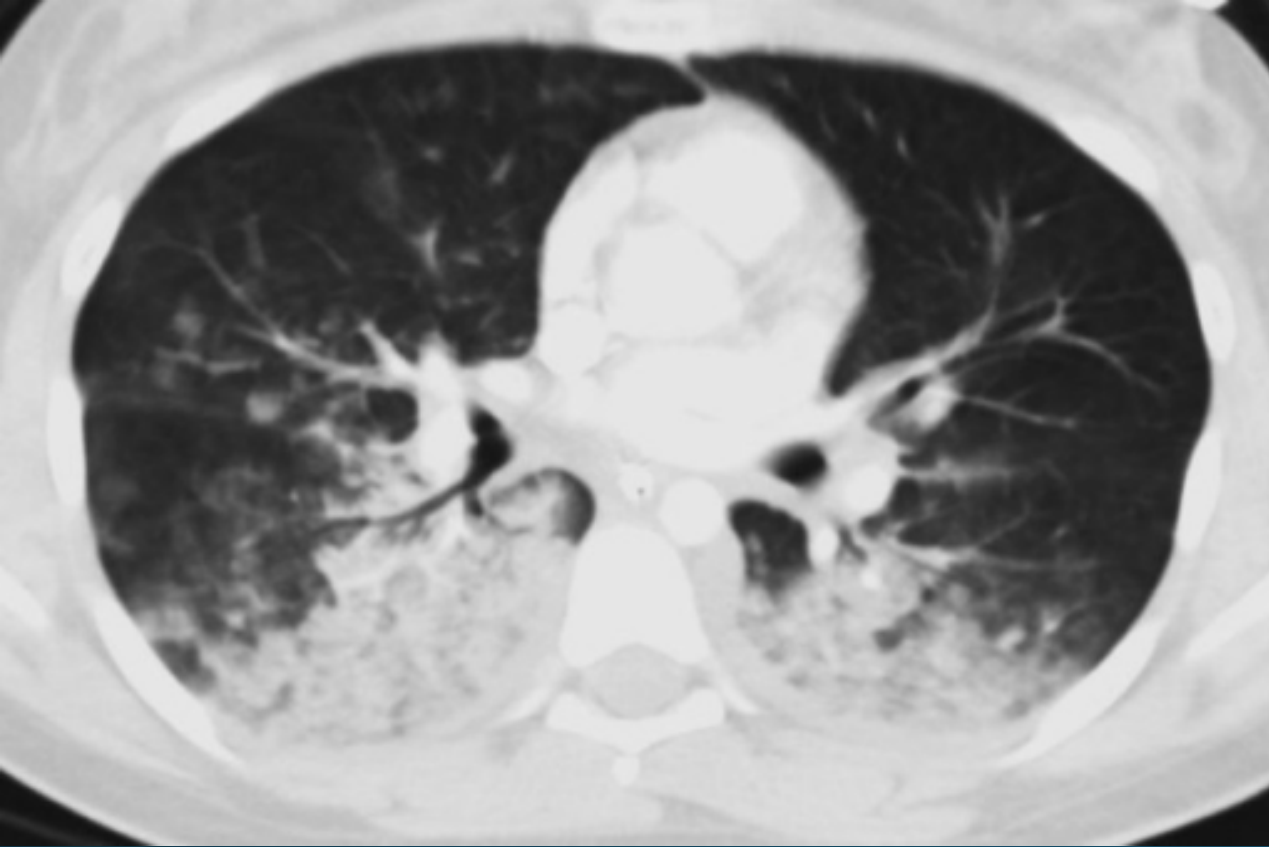
- Pulmonary Edema
- CHF
- ARDS
- Emphysema
- TB
- Pneumothorax (PTX)
- Foreign Body Aspiration
- Interstitial Lung Disease
- Effusions

Pulmonary Edema (cloudy, cottony, fluffy appearance, typical of fluid overload, pulmonary hemorrhage, alveolar filling diseases)



ARDS (patchy, fluffy or ground glass infiltrates, often LL's)





EARLIER



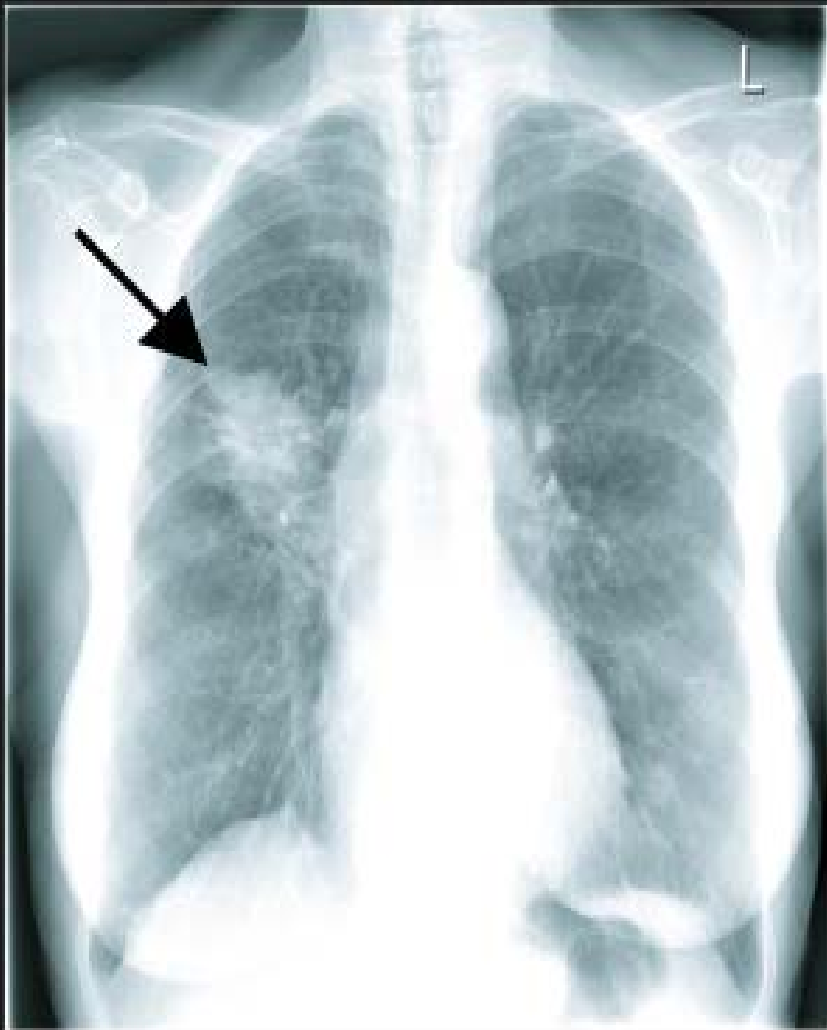
LATER



COPD/EMPHYSEMA (flat diaphragms, wide intercostal spaces, barrel chest, teardrop heart)



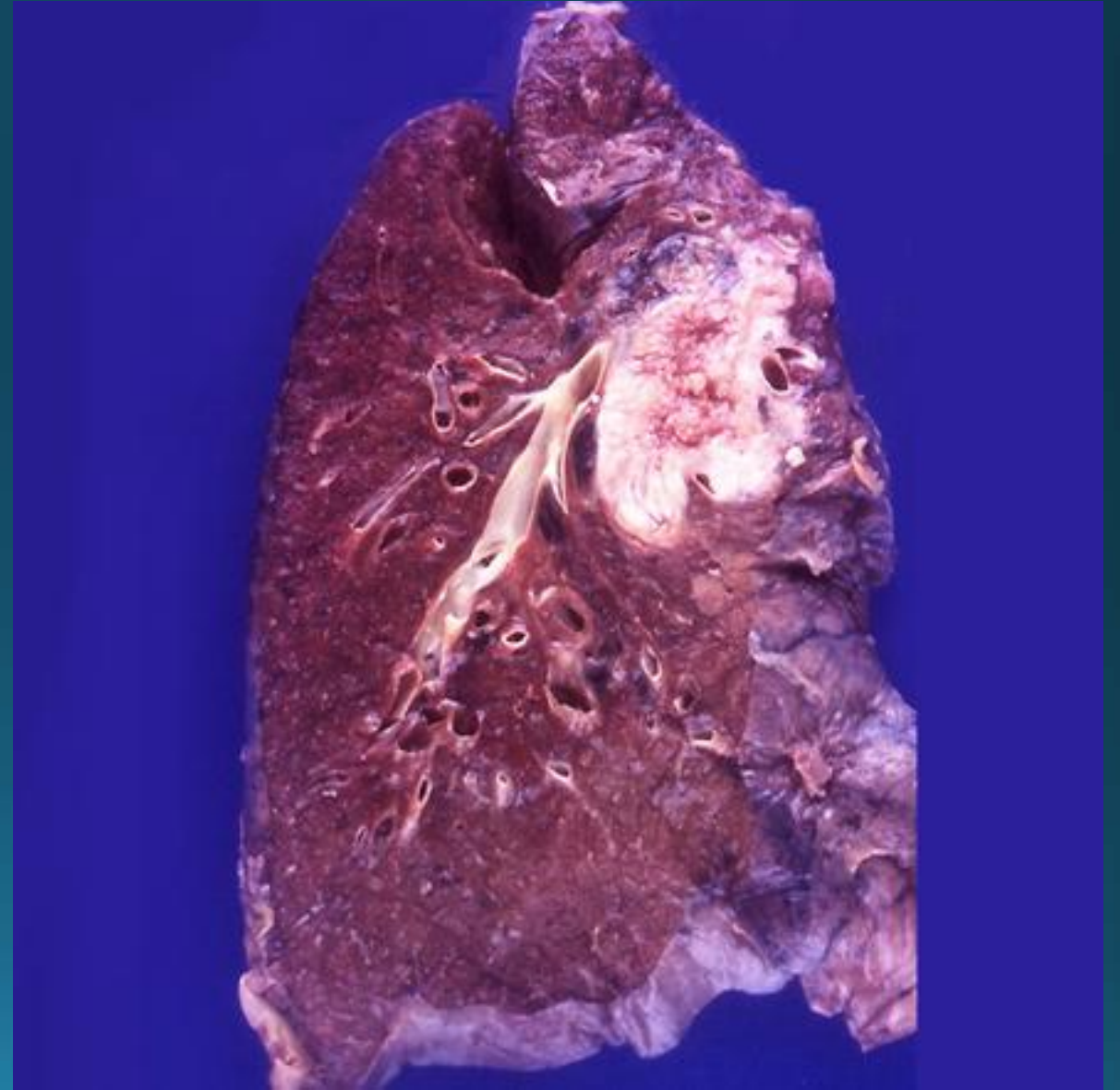
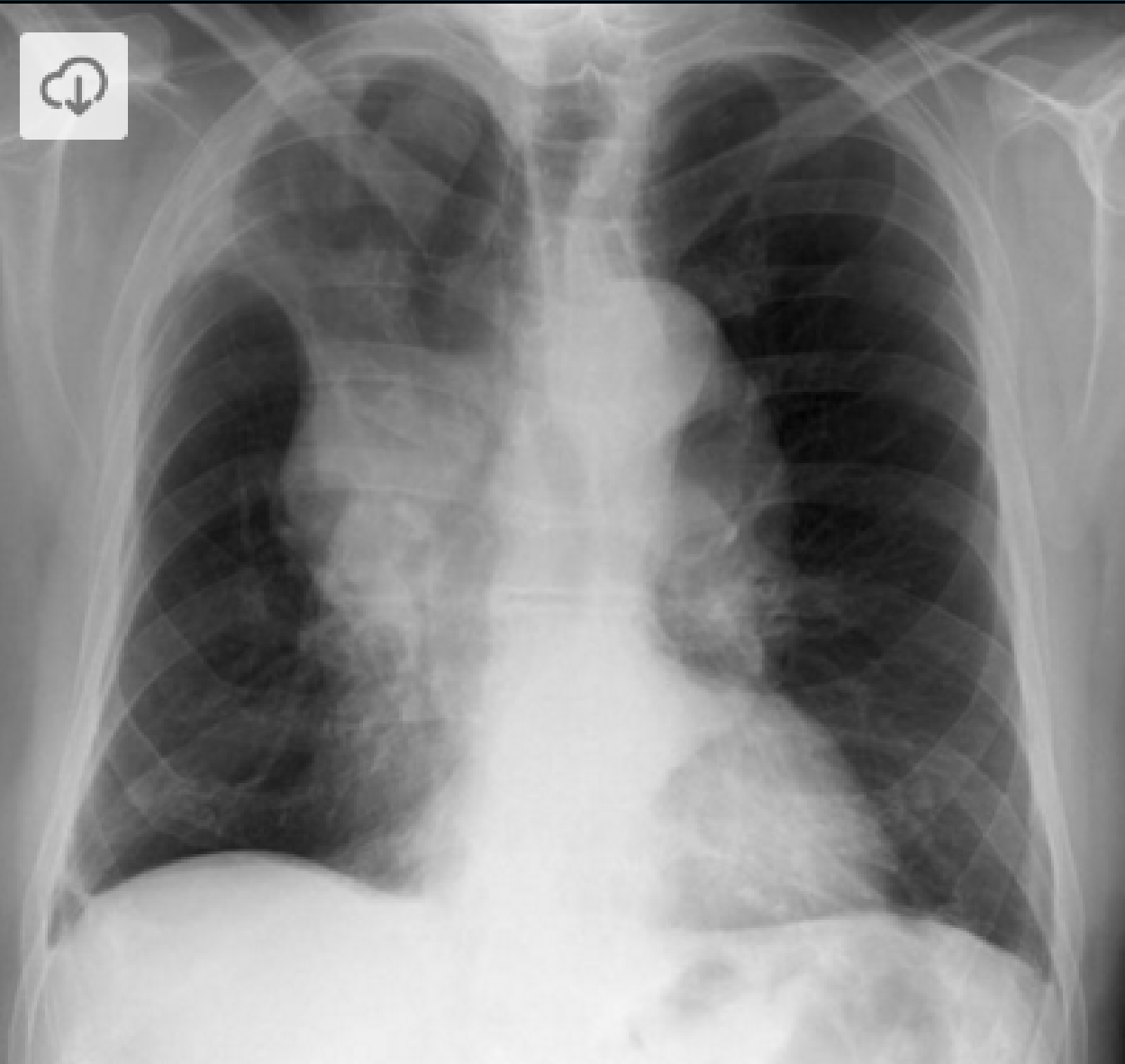
Adenocarcinoma (often well defined nodules)



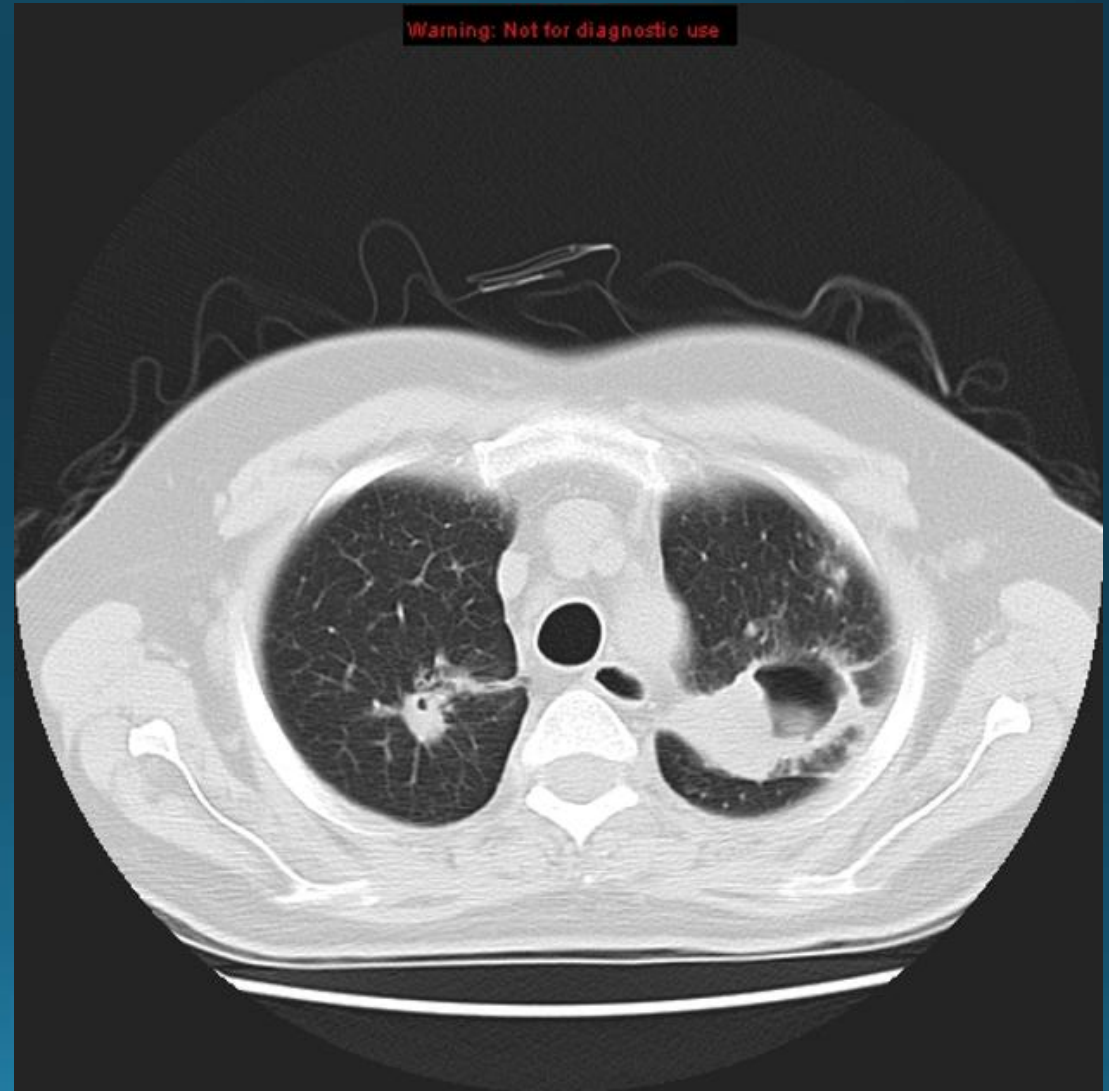
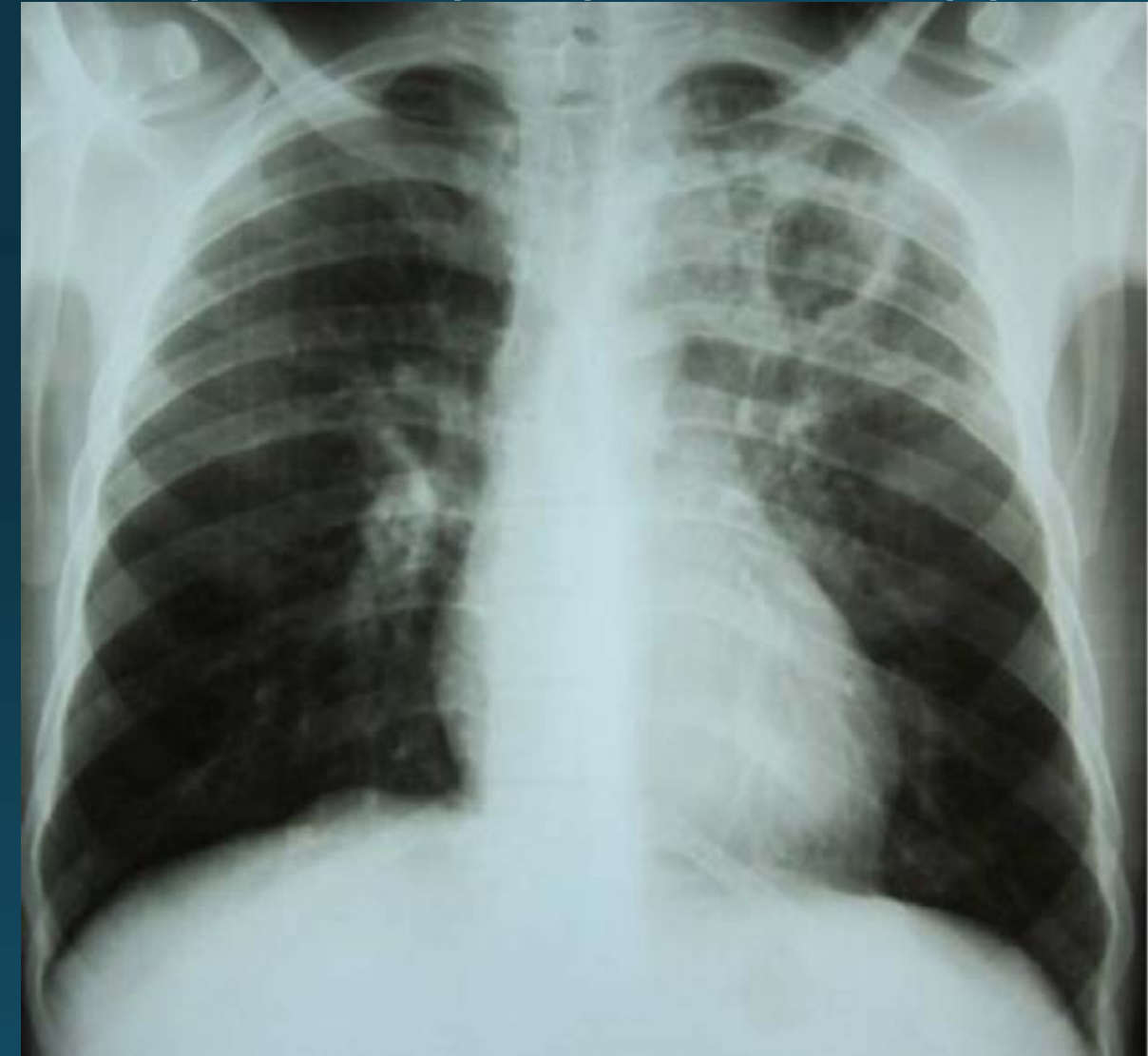
Squamous Cell CA (usually related to smoking, high death rate, often cavitates, tends to start in larger bronchi)



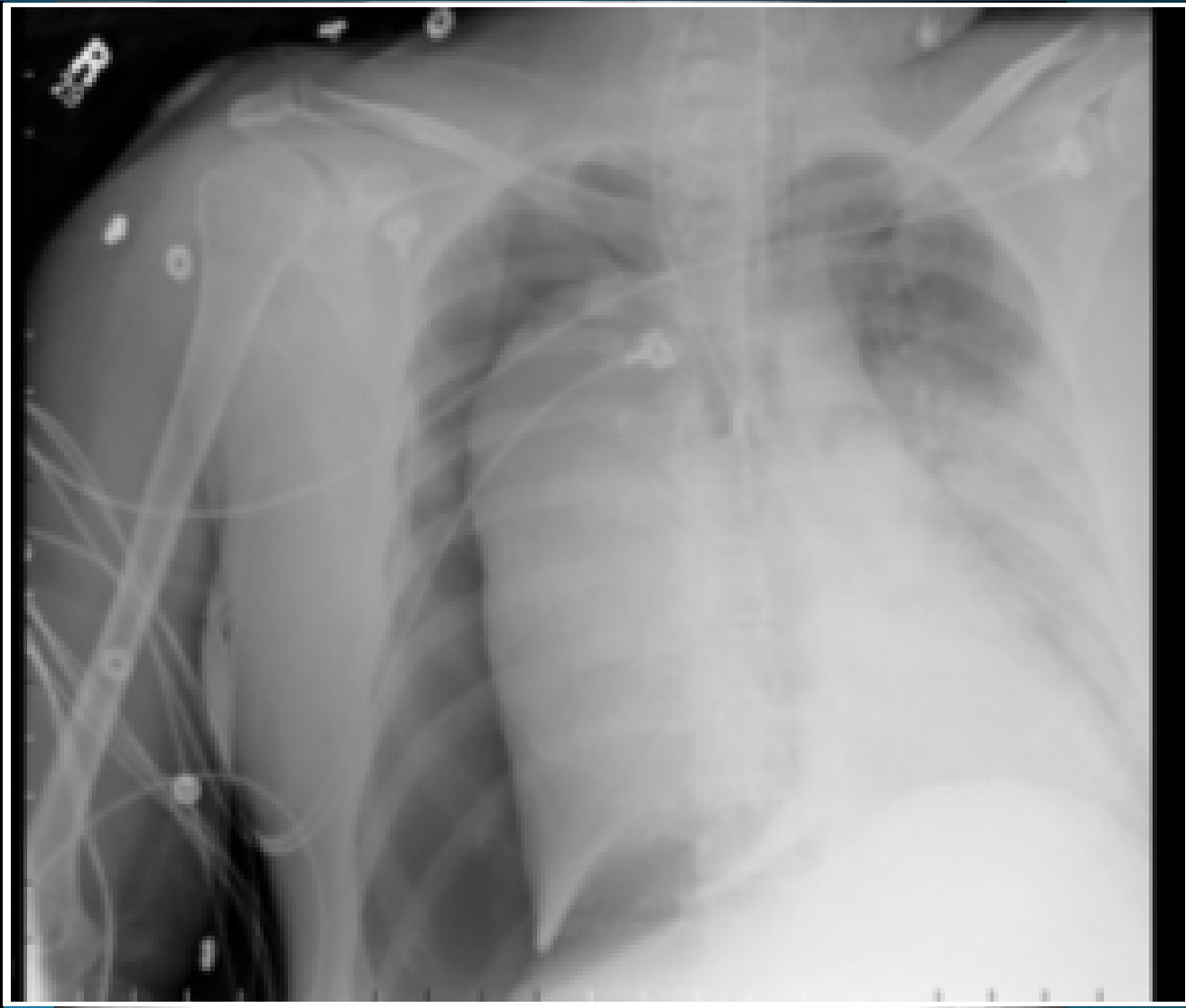
Often causes bronchial collapse and atelectasis

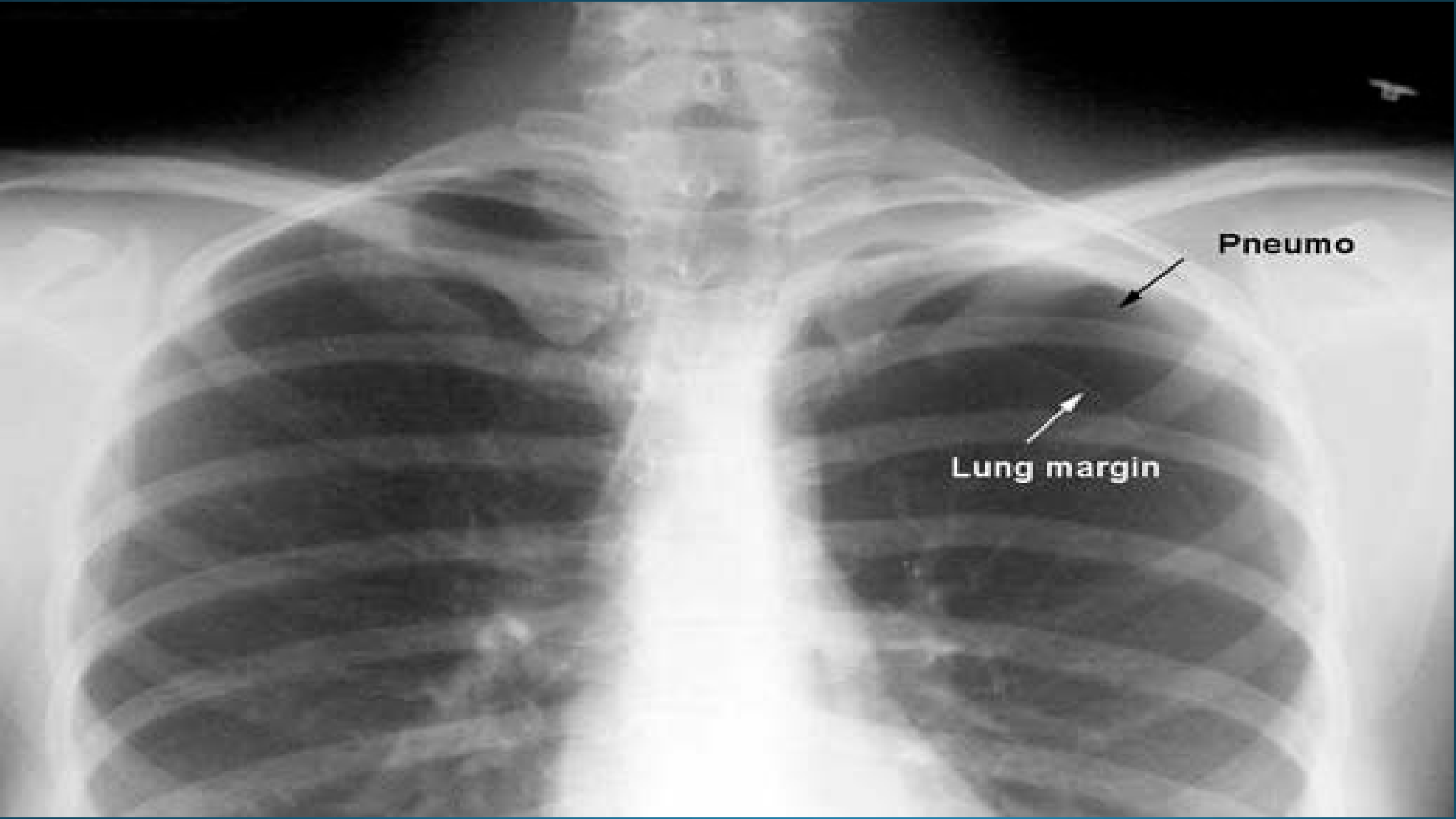


TB (Characterized by cavitary, calcified, fibrotic lesions, primarily in posterior upper or superior lower lung fields)



Pneumothorax (air in the plueral space, can have subcutaneous emphysema, can be simple or tension)

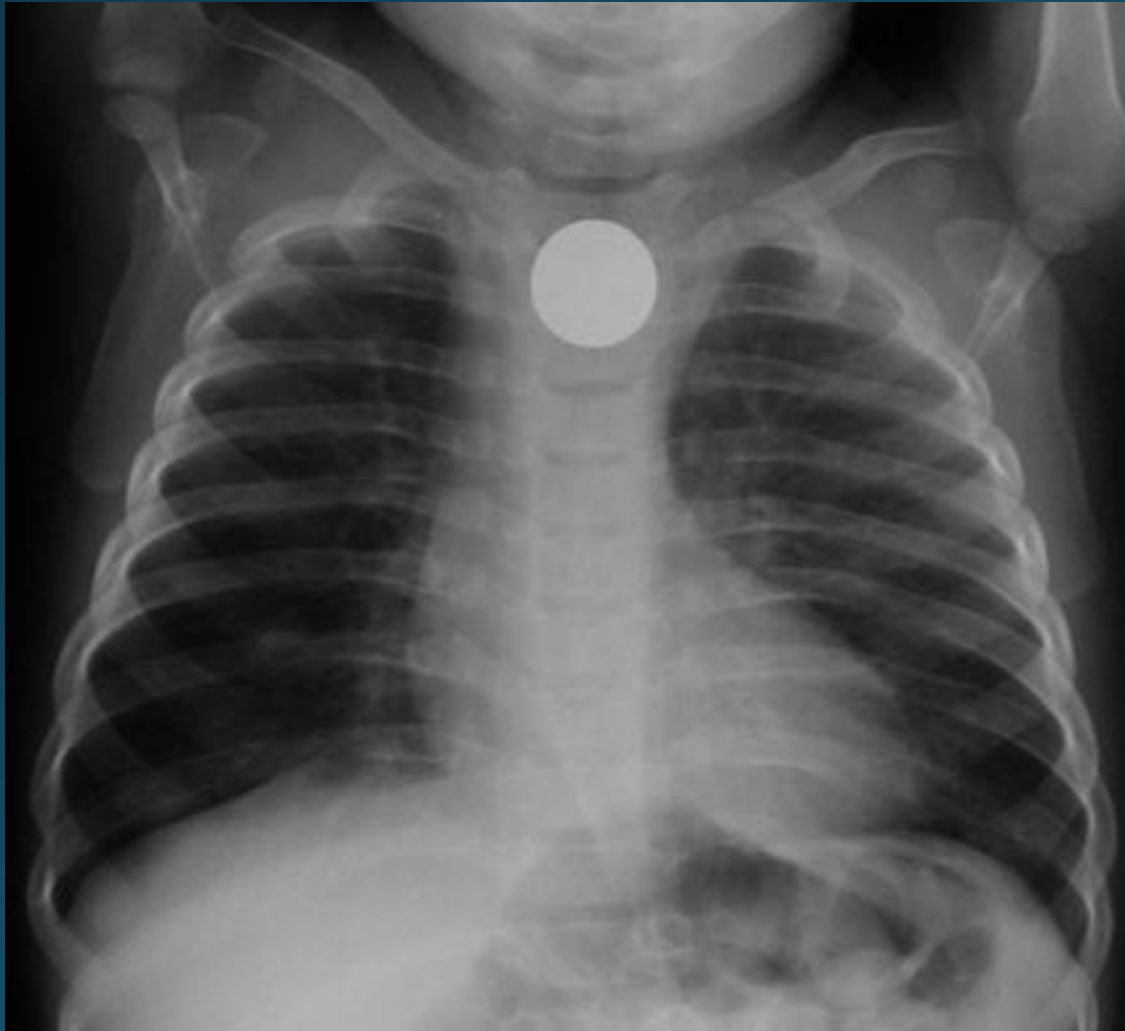




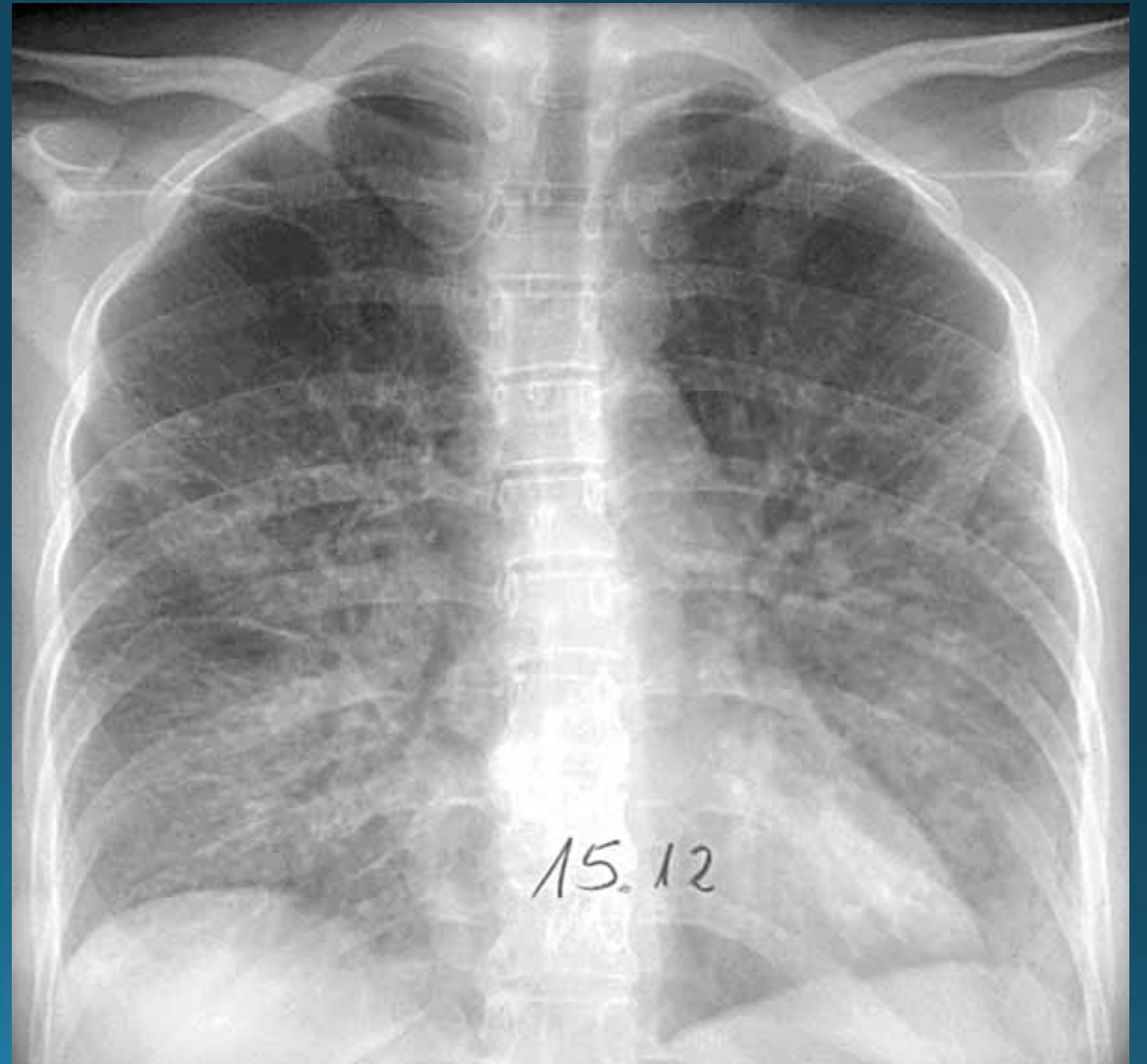
Pneumo

Lung margin

Foreign Body on CXR

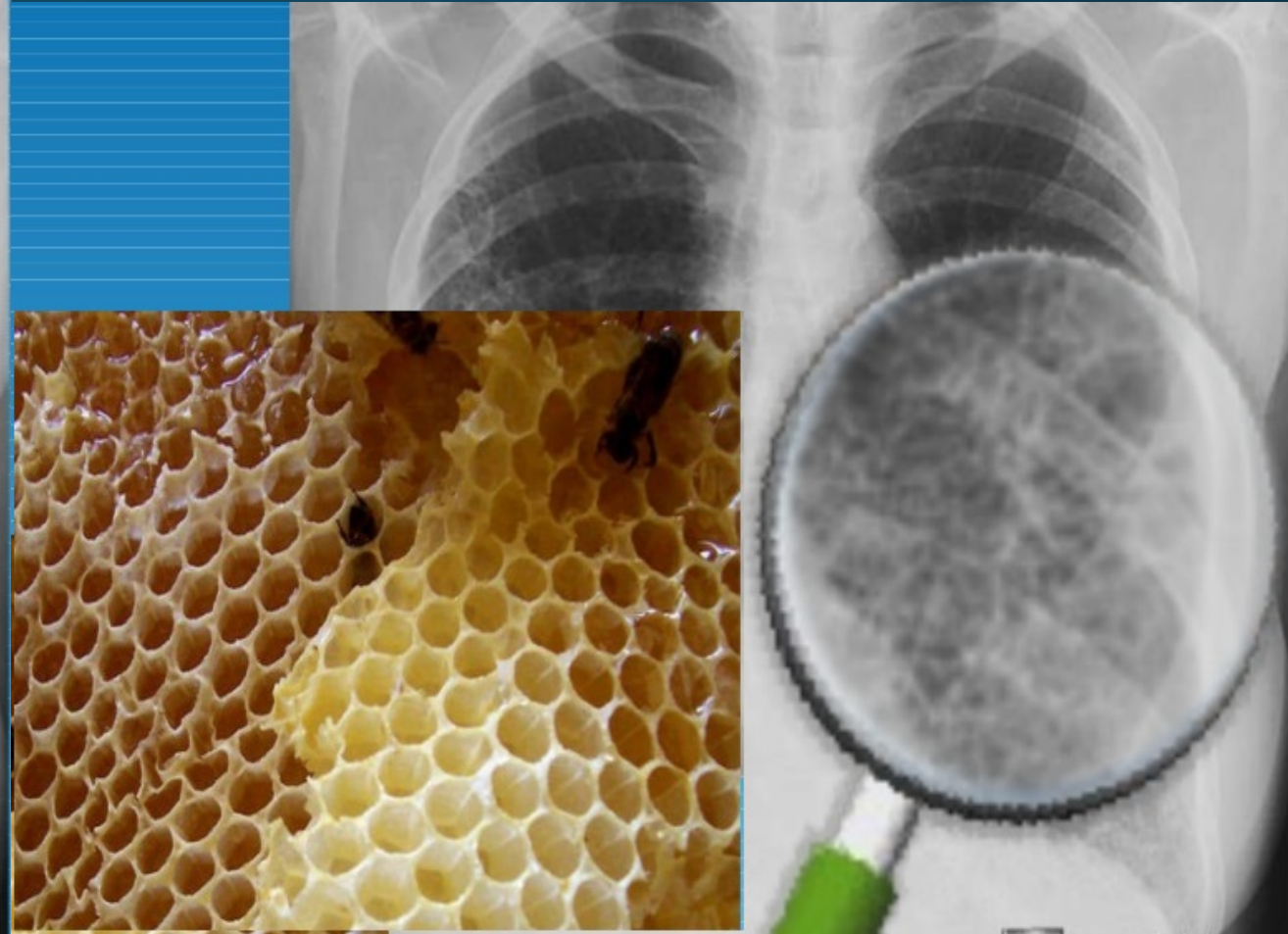


Interstitial Lung Disease (can present as linear, reticular "net-like", or nodular pattern, or in combination)



ILD/Interstitial Pulmonary Fibrosis

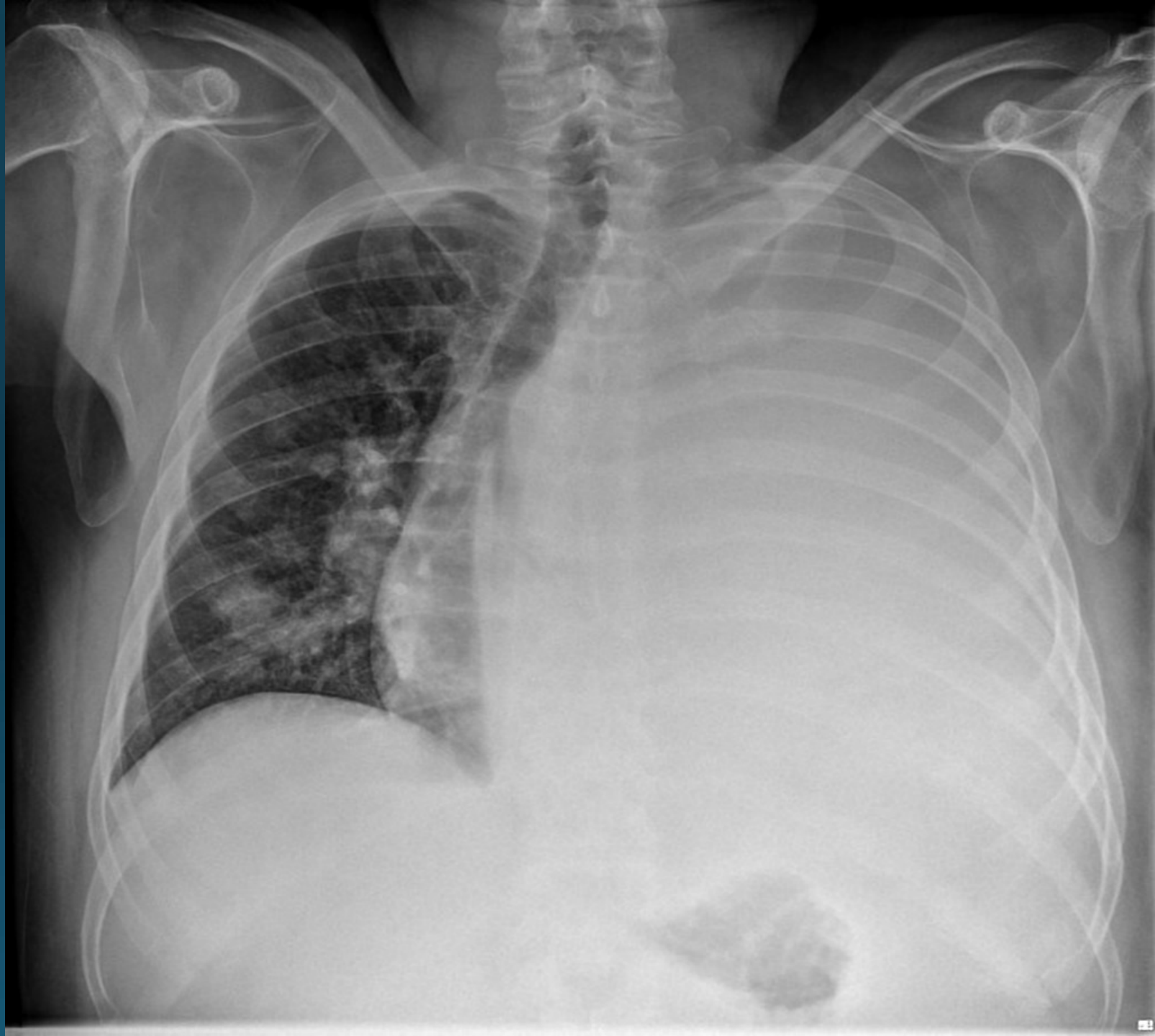
(reticular "honeycomb" pattern)





Pleural Effusions





Now YOU try to Read!

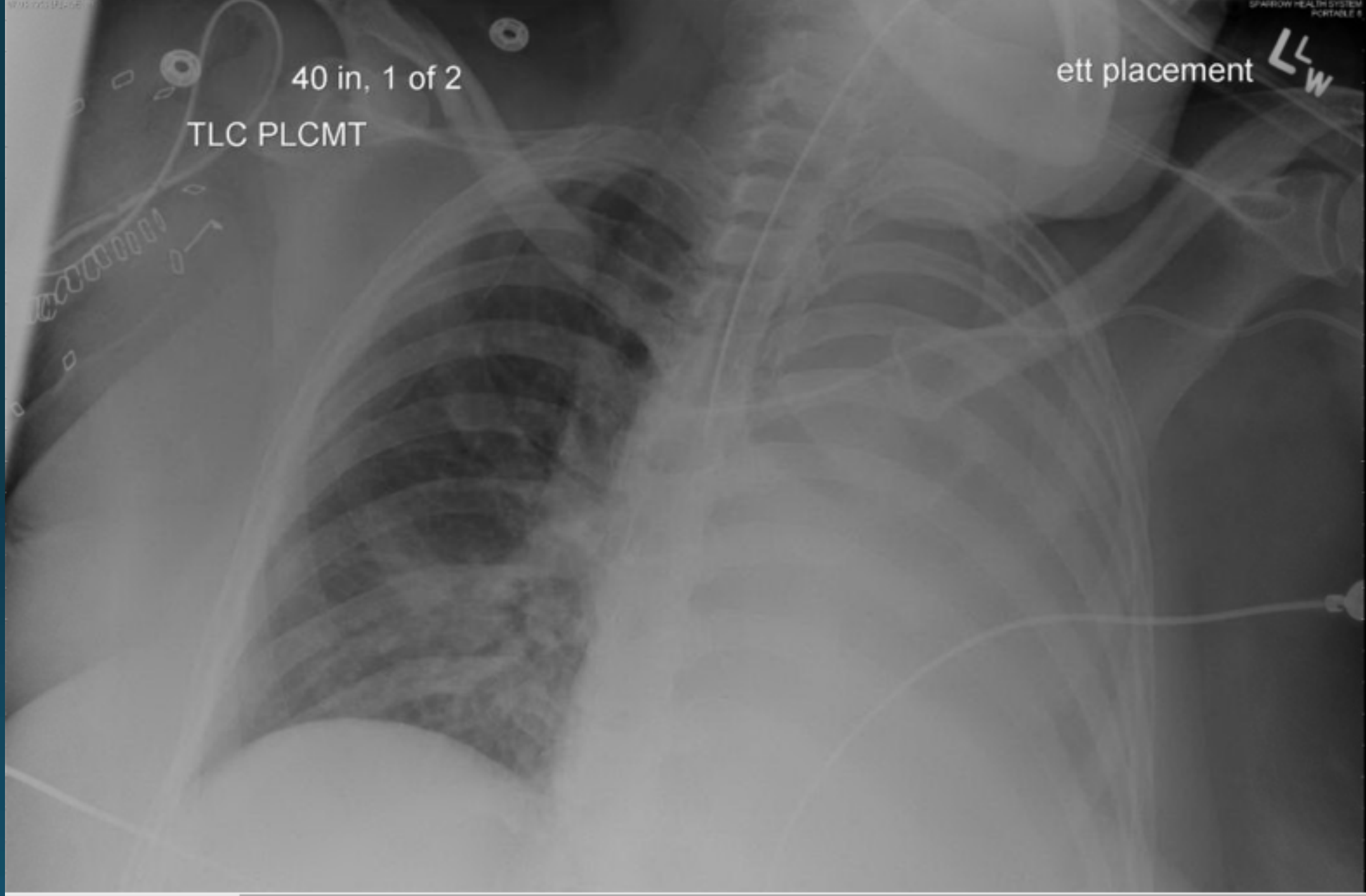
- We'll observe several CXRs, most are former patients @ Sparrow
- Look for opacity and hyperlucency
- Look for abnormal densities
- Look for shifts
- Look for tube placements
- Remember the R.I.P. and A-I methods



2



3



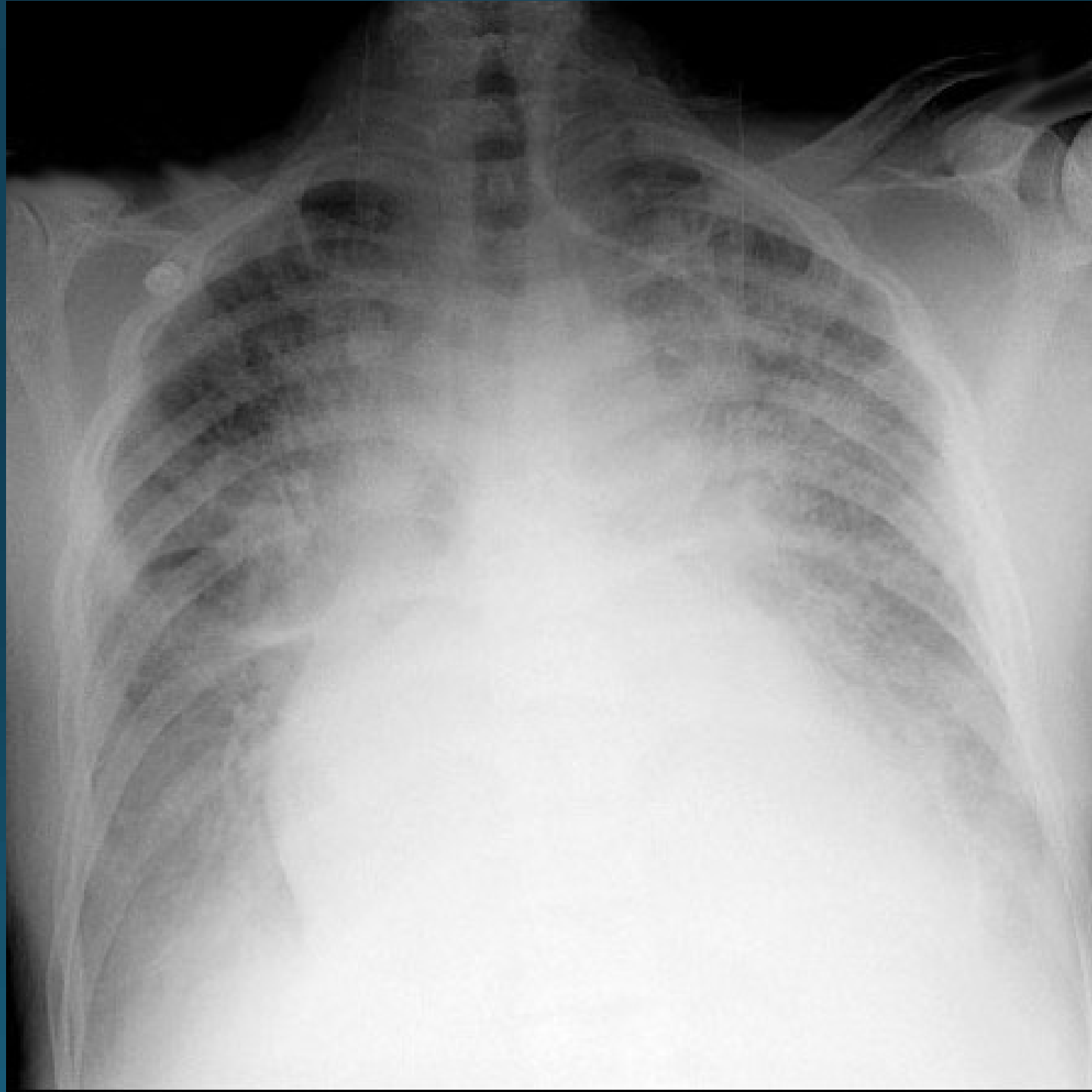
40 in, 1 of 2

TLC PLCMT

ett placement

L

4



5



03.24.1951
M

R
S
A
R



6



7



APR 7

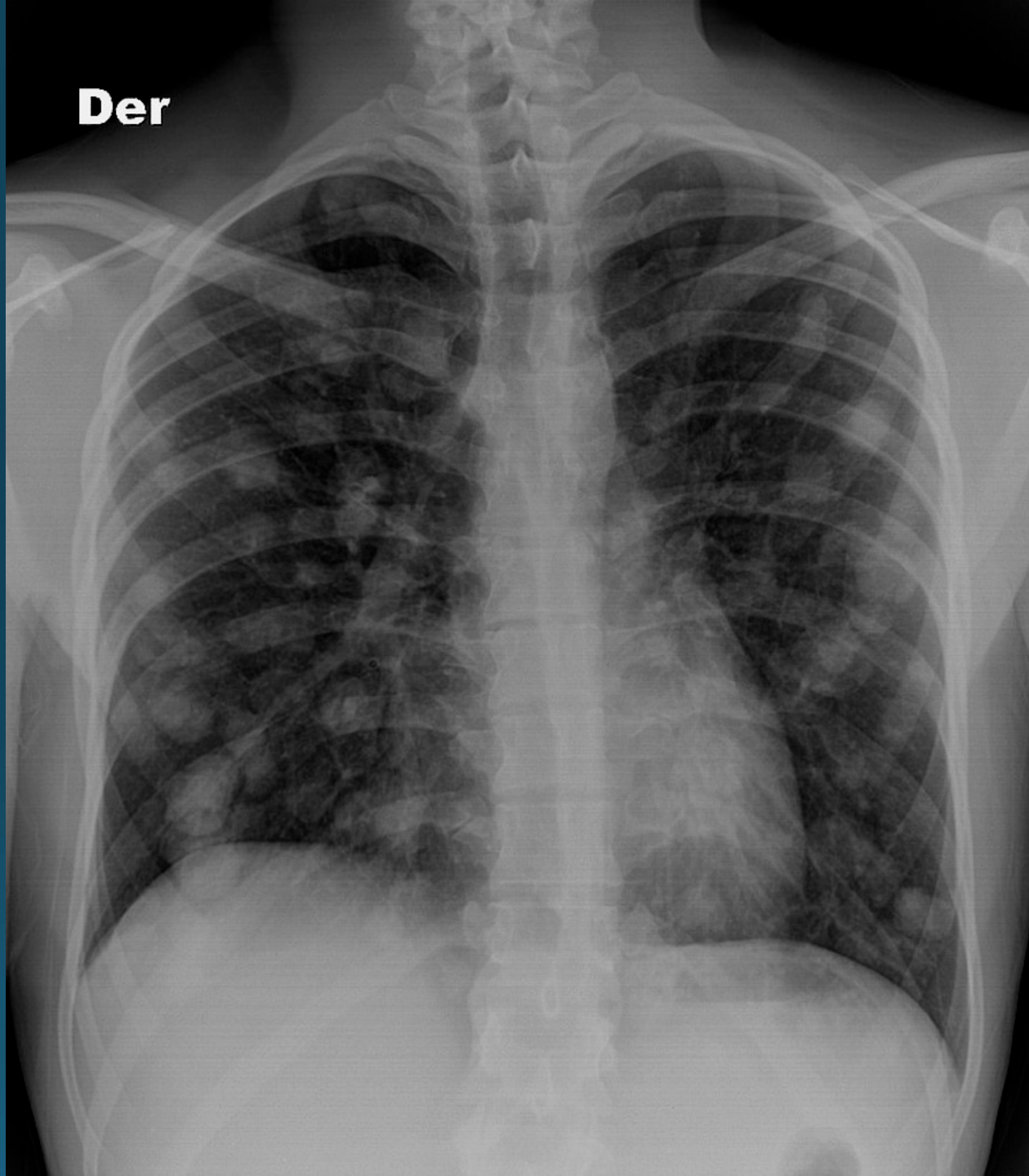
R

9.19 cm



9

Der



10

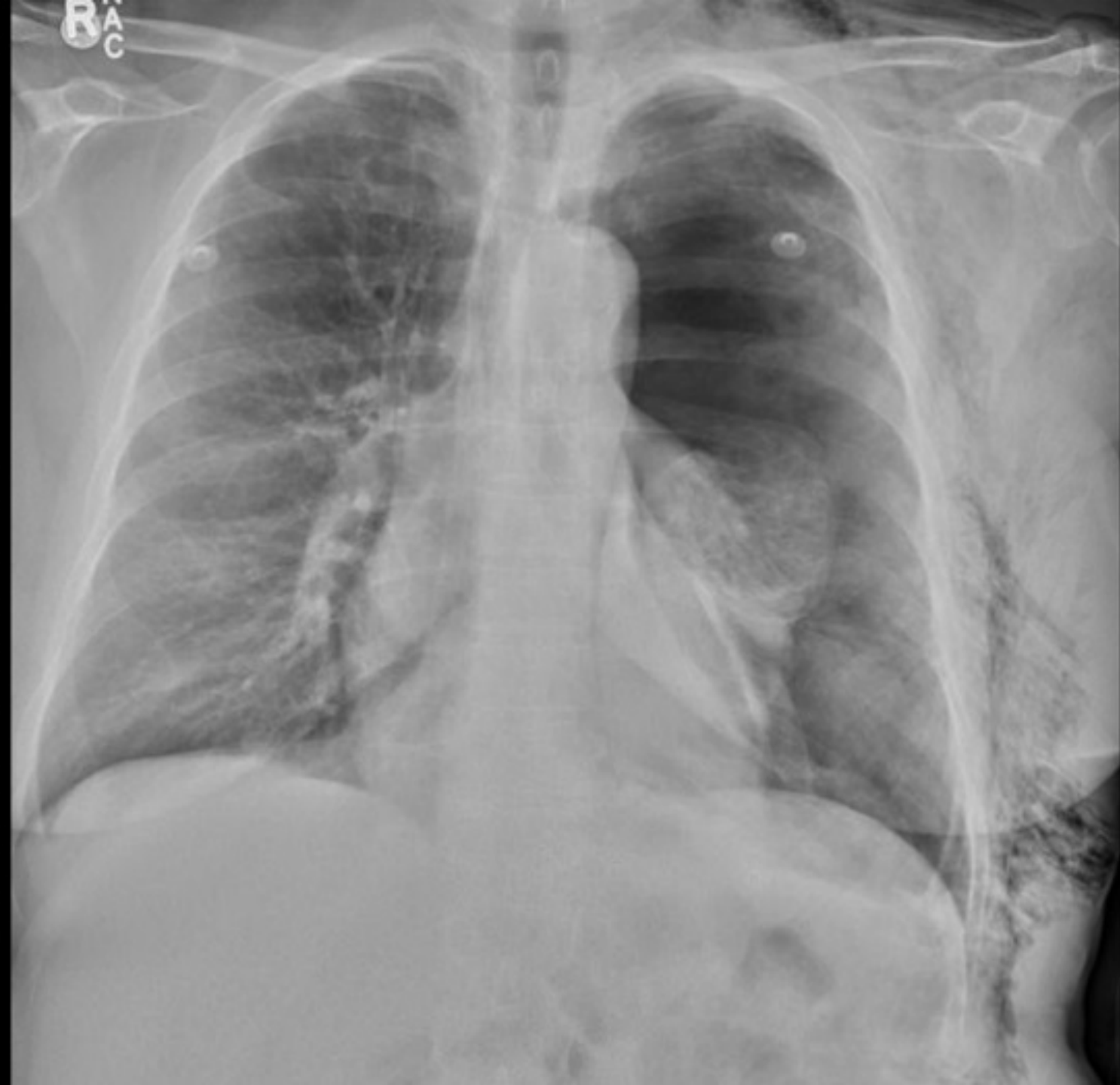


10/10/10
10/10/10
10/10/10

11



12



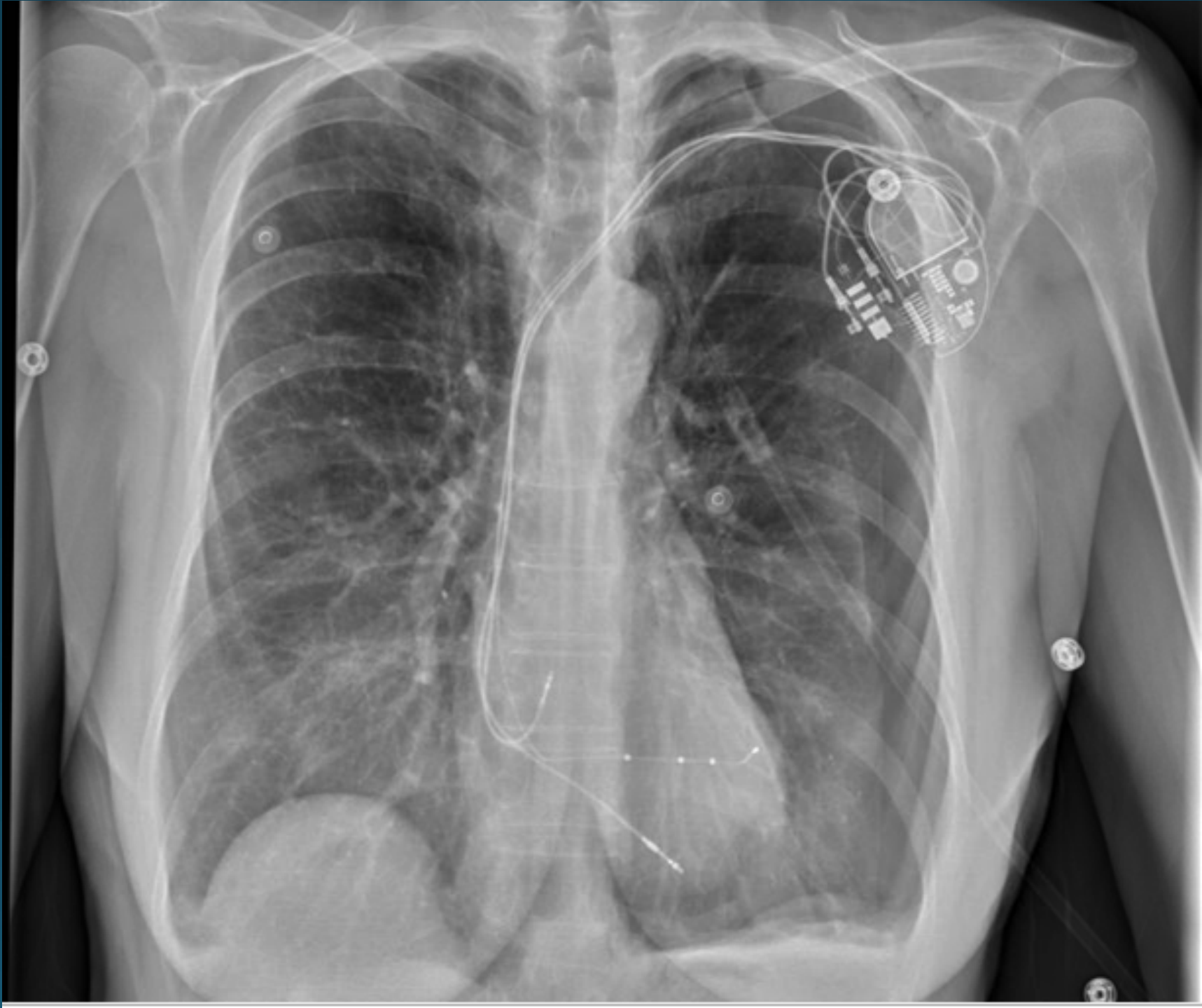
13



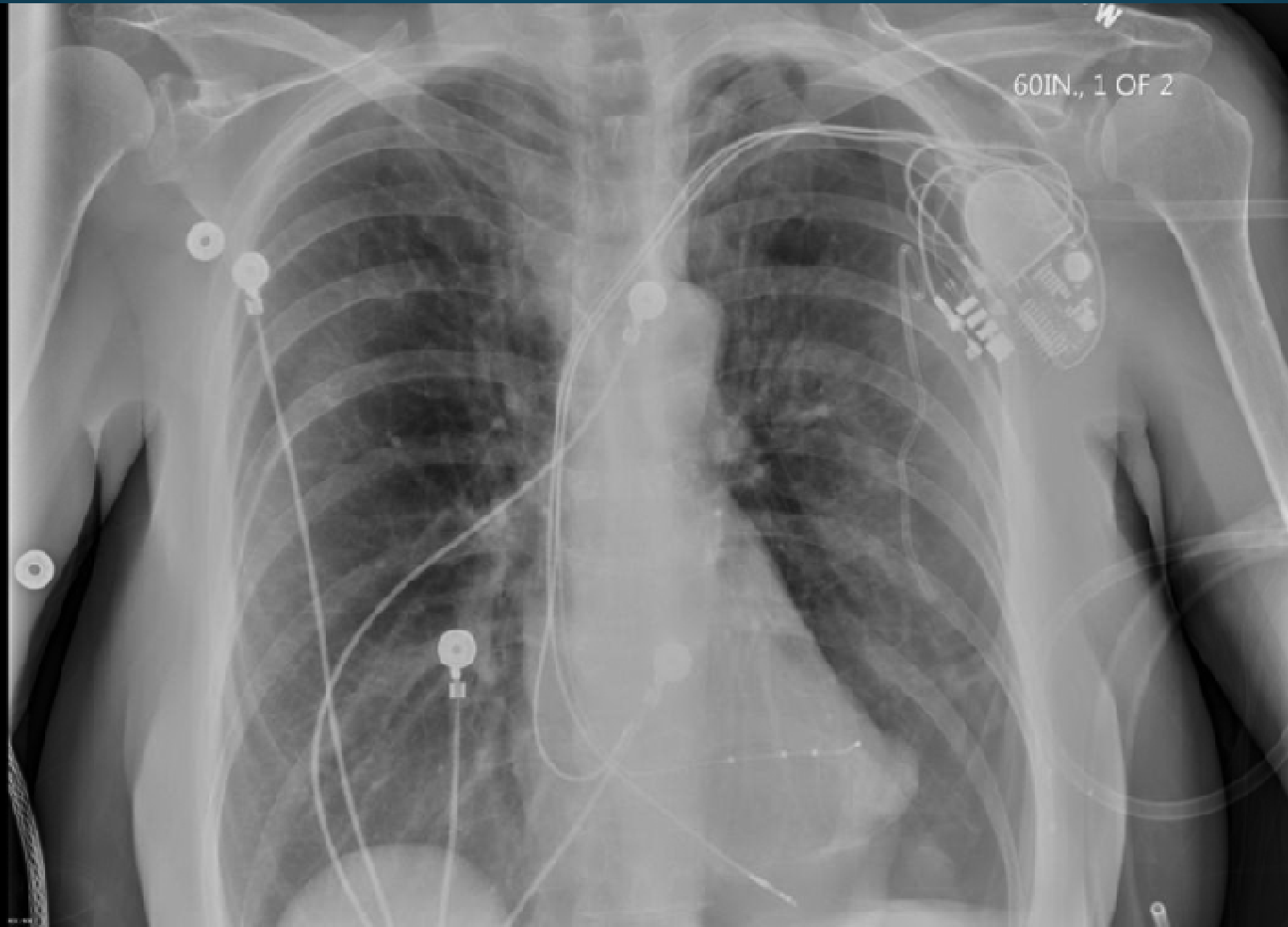
REX 281
MAS 4 98

QUEST

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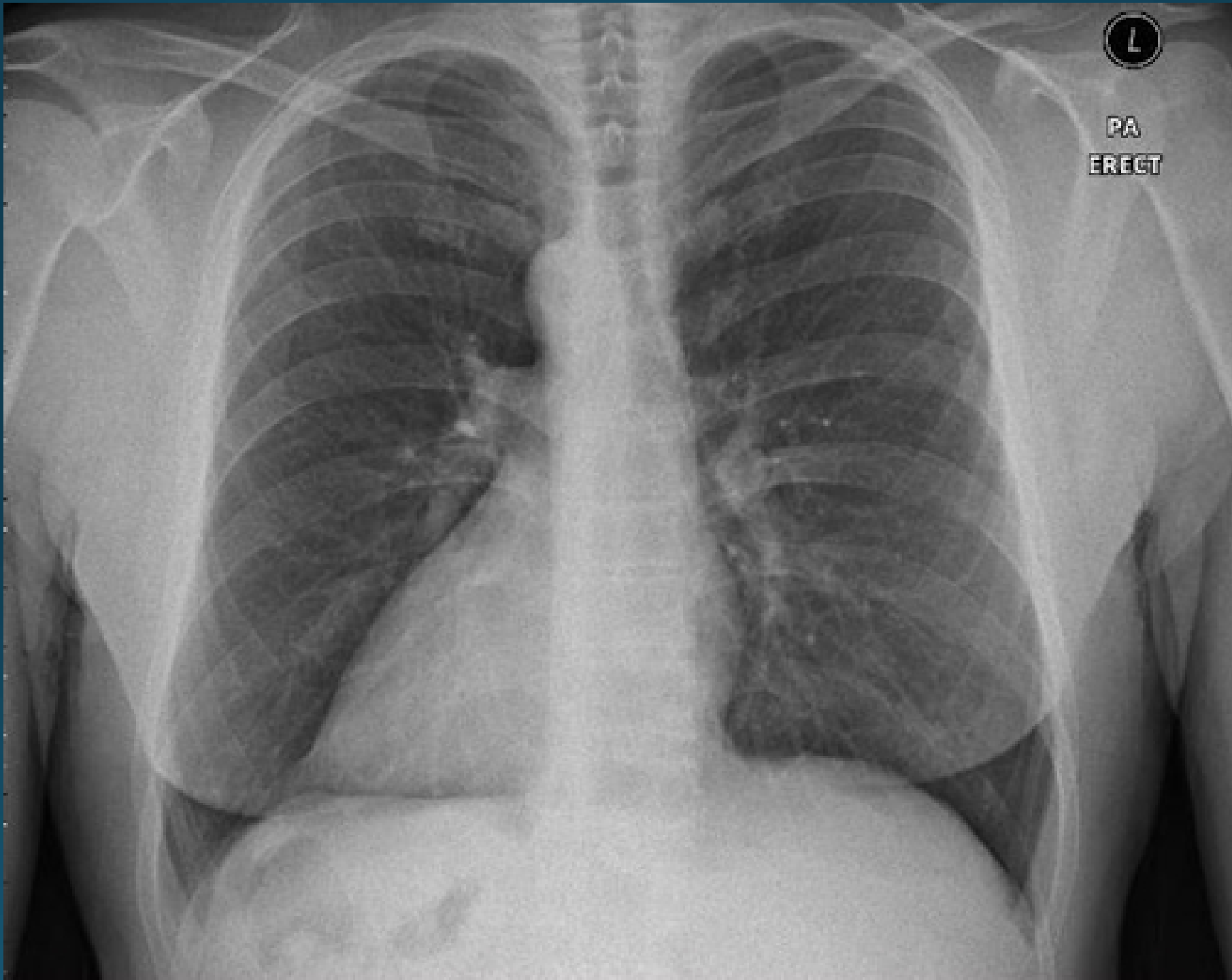


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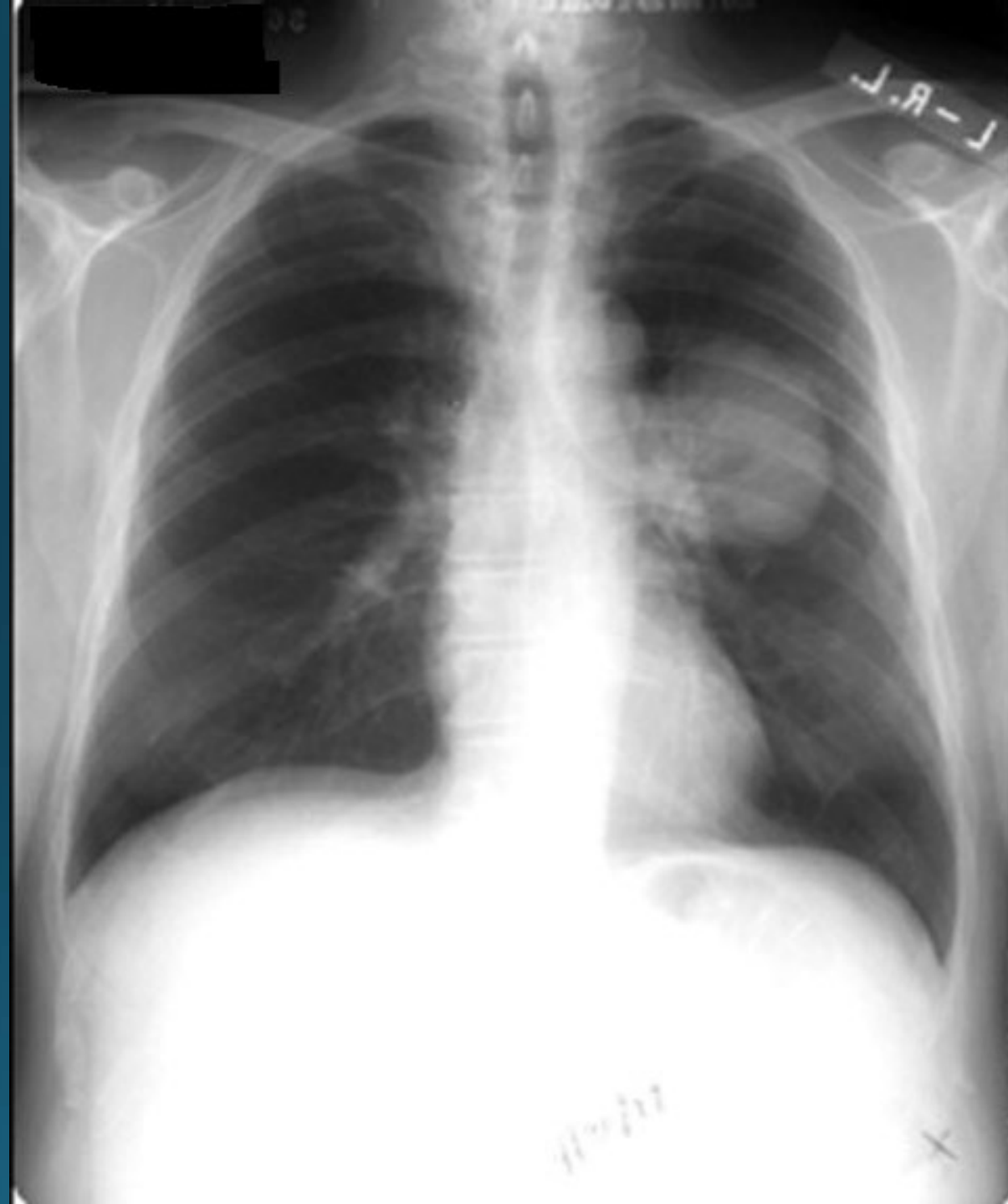


16

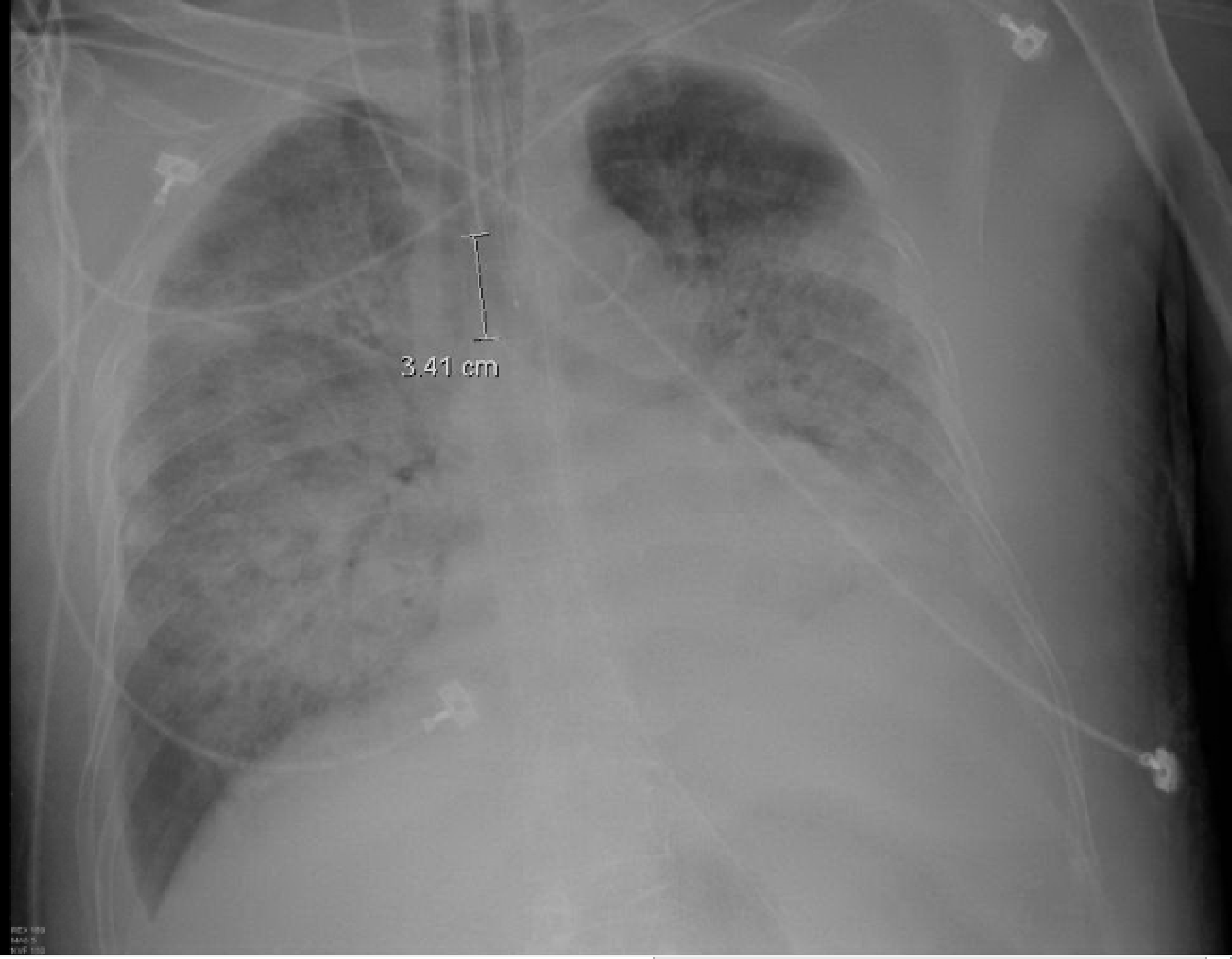
Any ideas what is up with this one?



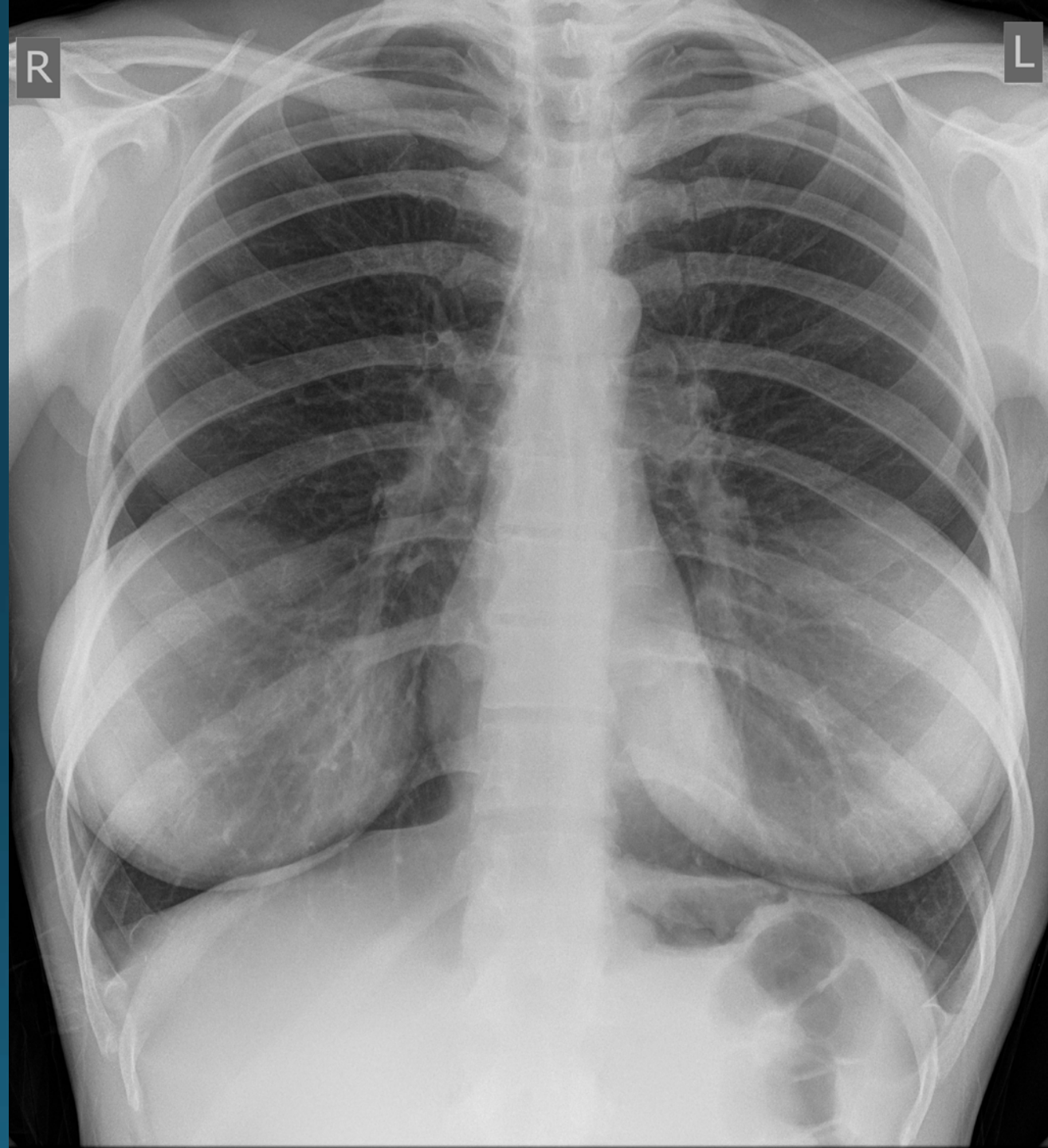
17



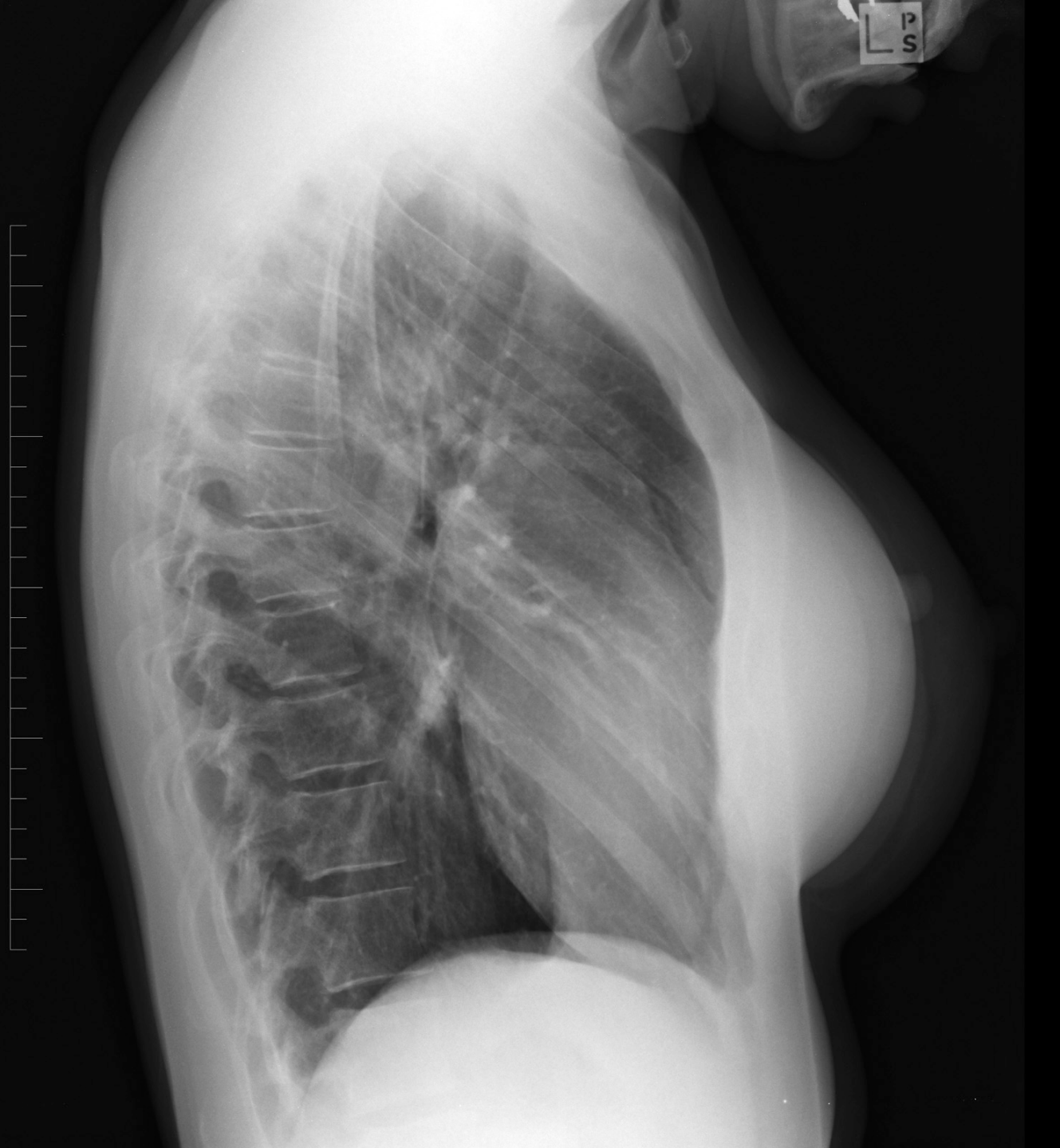
18



19



20



21



22



Basic densities in an x-ray

Gas	Black
Fat	Dark grey
Soft tissues/fluid	Light grey
Bone/ calcification	White
Metal	Intense white

X-Ray Densities

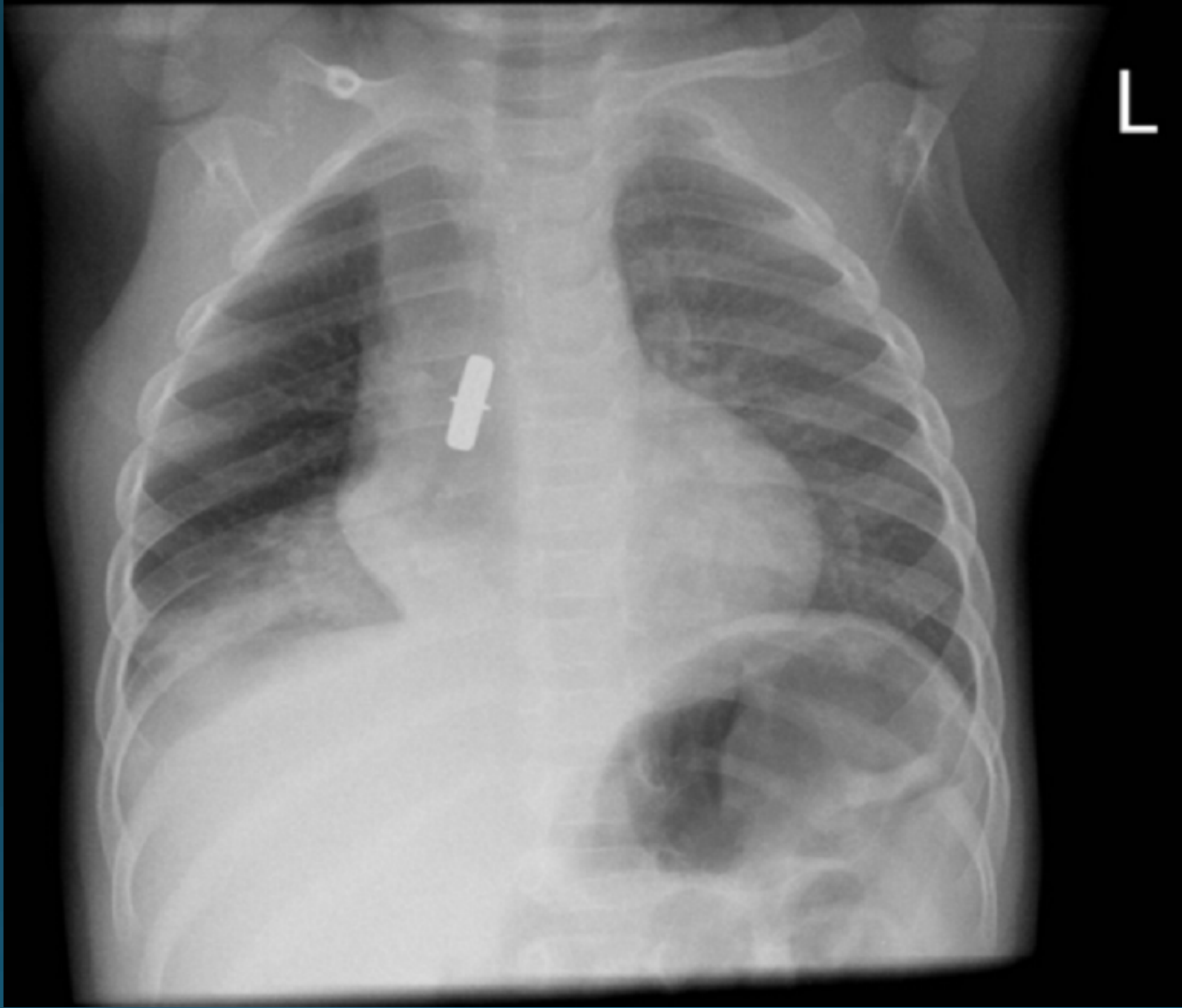


Let's look at some "high density" foreign bodies/objects on CXRs

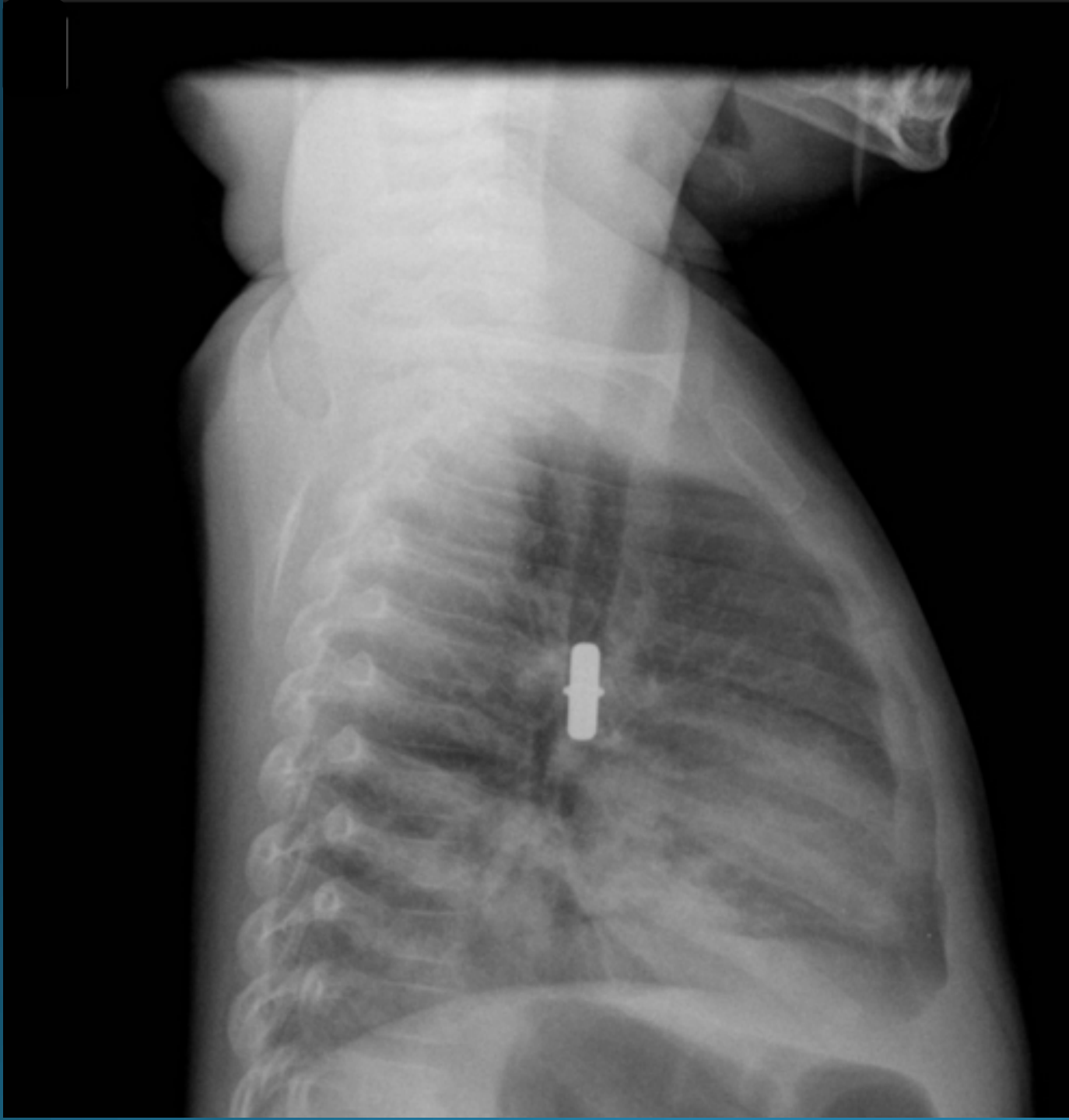
24



25



26



27

The graspers are deployed, and the object is removed.



28



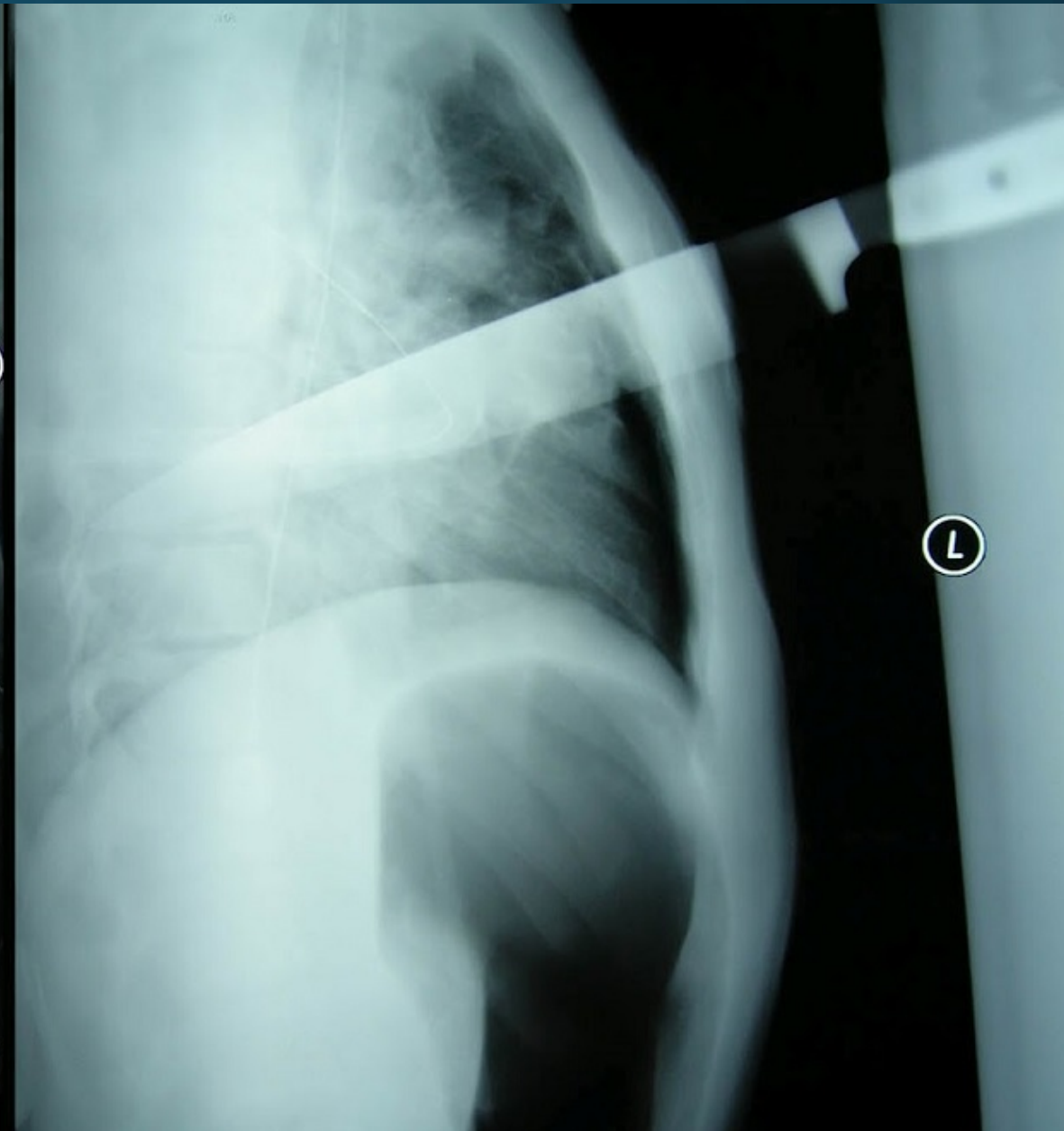
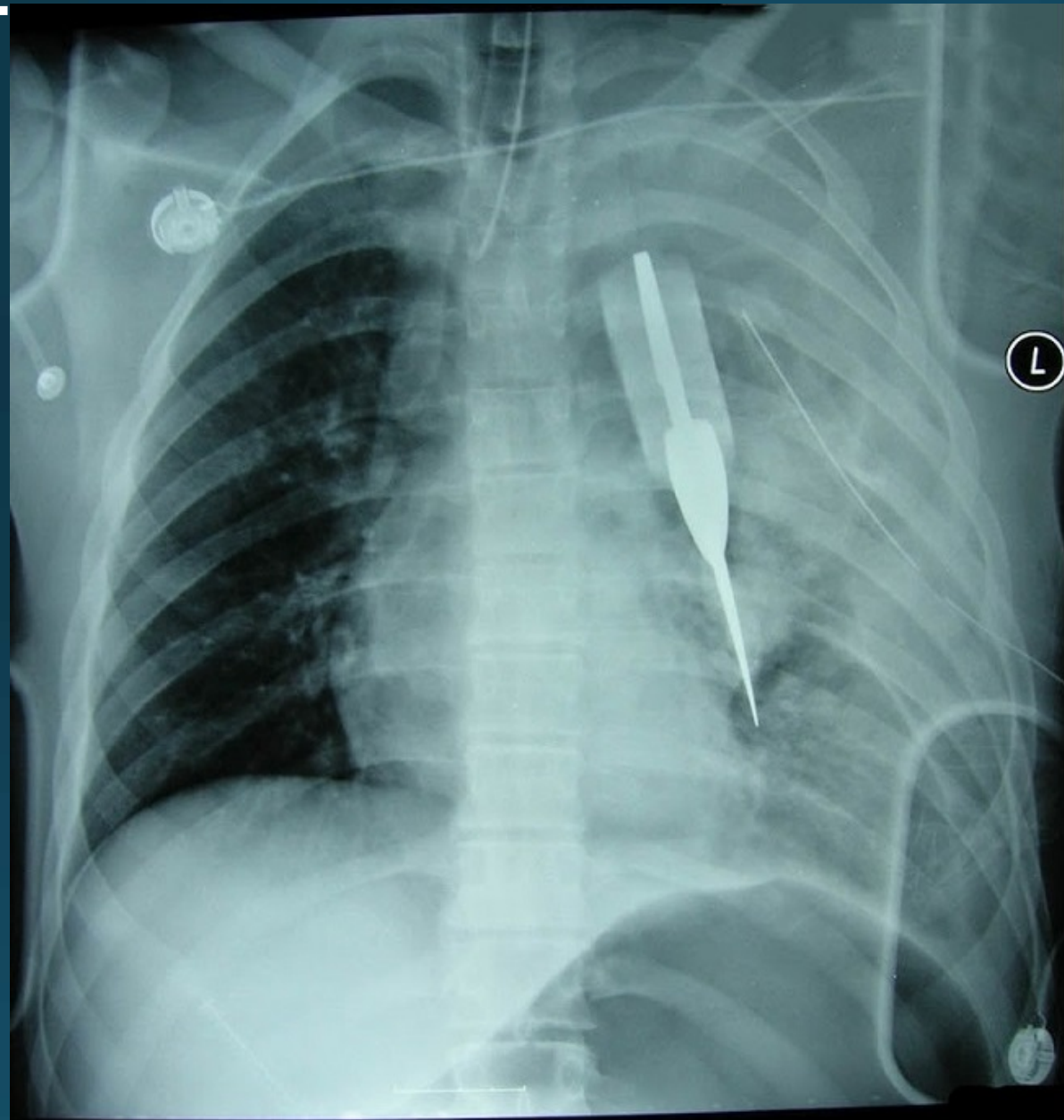
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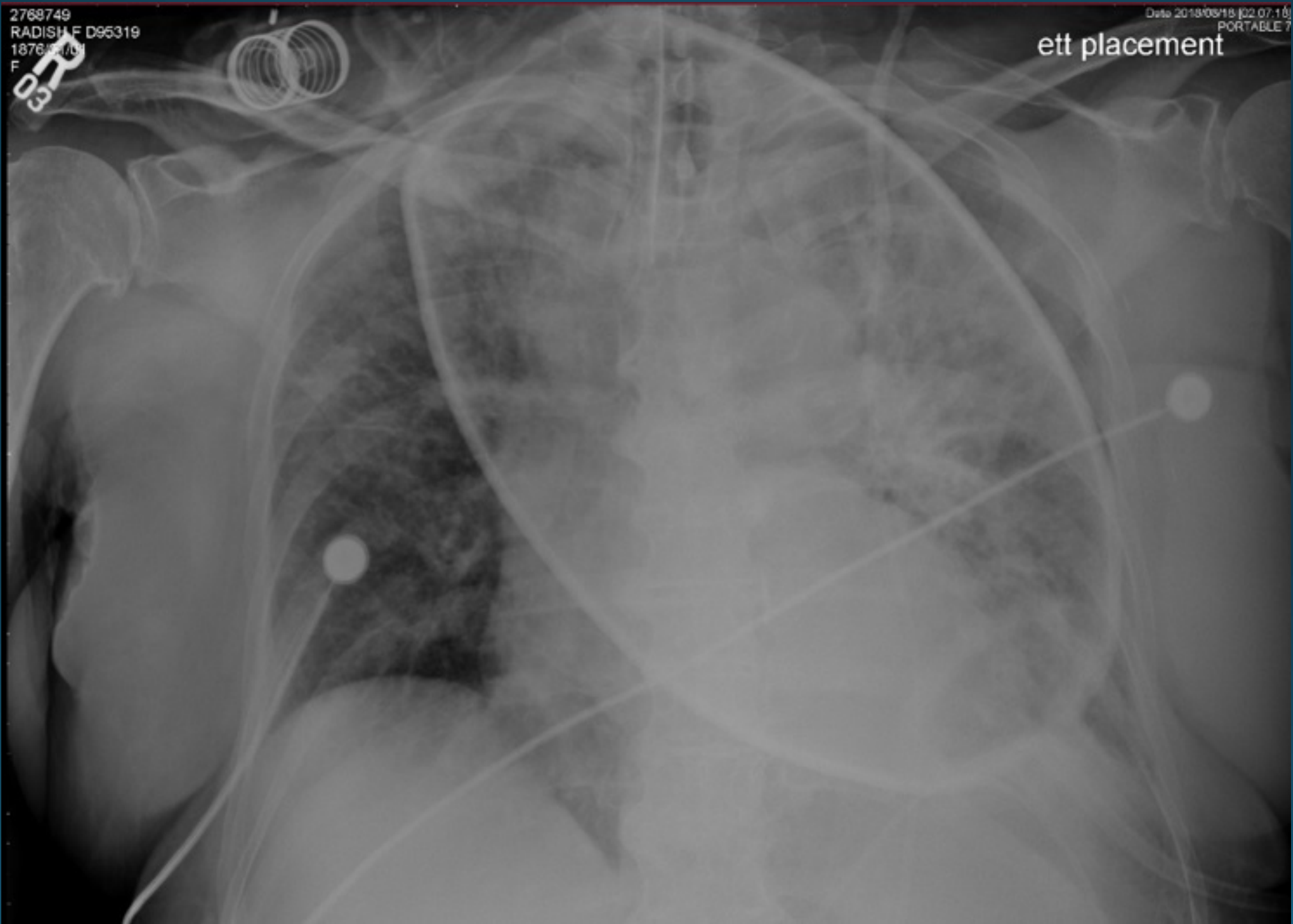
30



31



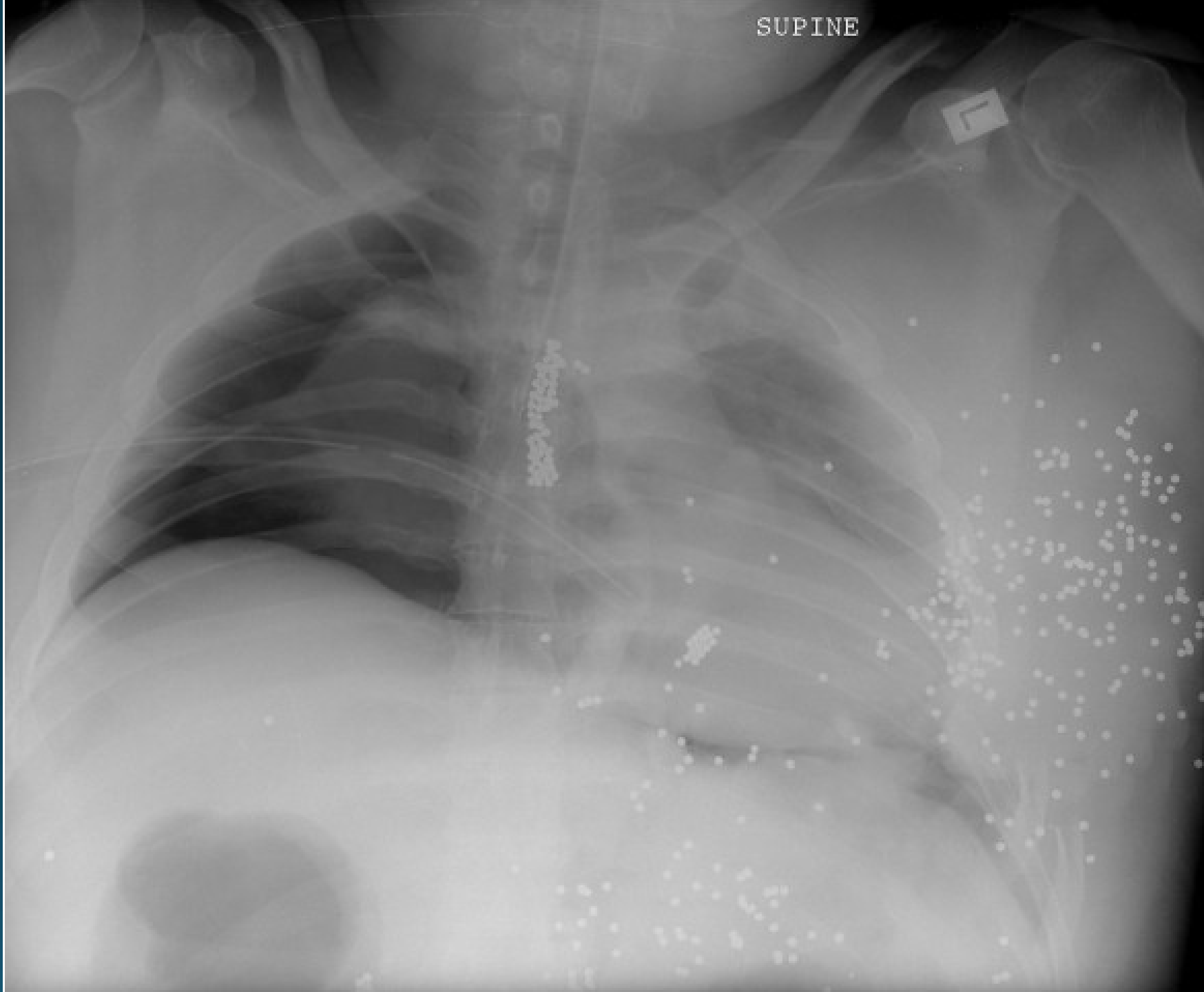
32



2768749
RADISH, F D95319
1876/01/01
F

Date 2018/08/18 (02:07:18)
PORTABLE 7
ett placement

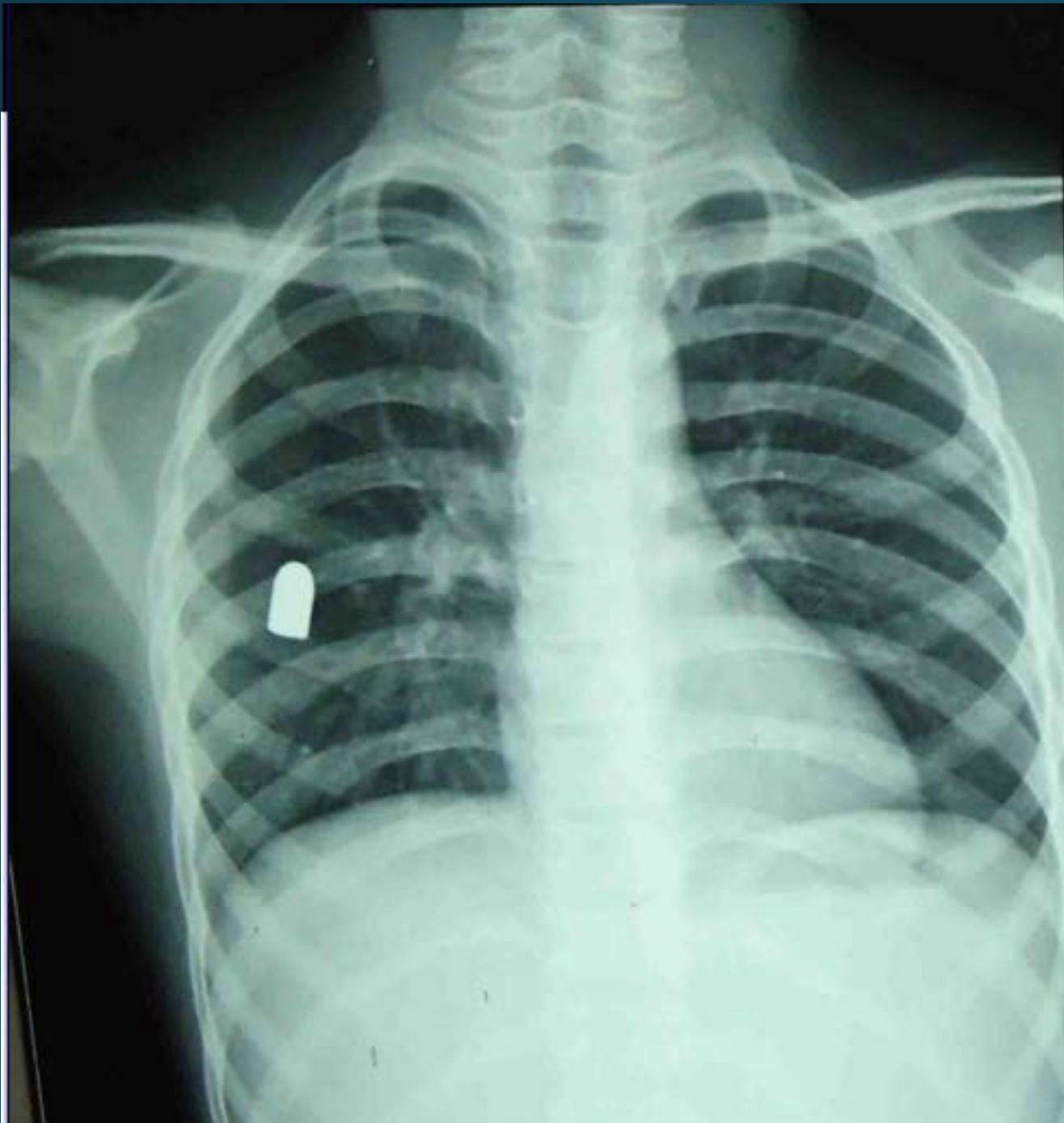
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Thanks for attending!

