MED437
King Saud University

RADIOLOGY TEAM 437

Interactive lecture (1)

Radiology of cardiorespiratory disease

Color Index:
- ✓ Important
- ✓ Notes
- ✓ Extra

Editting File

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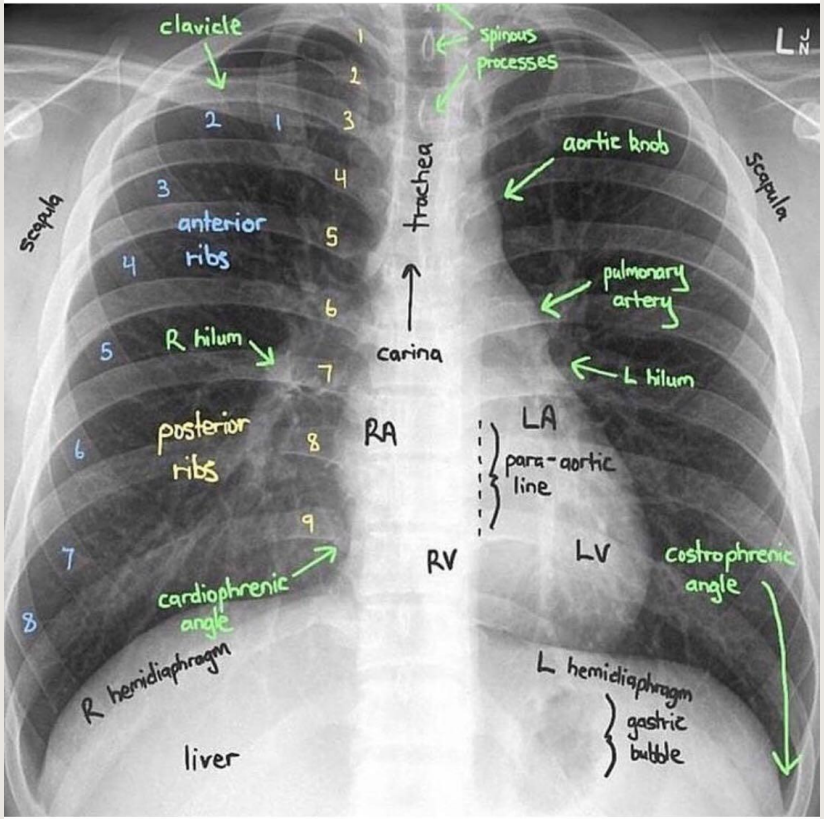
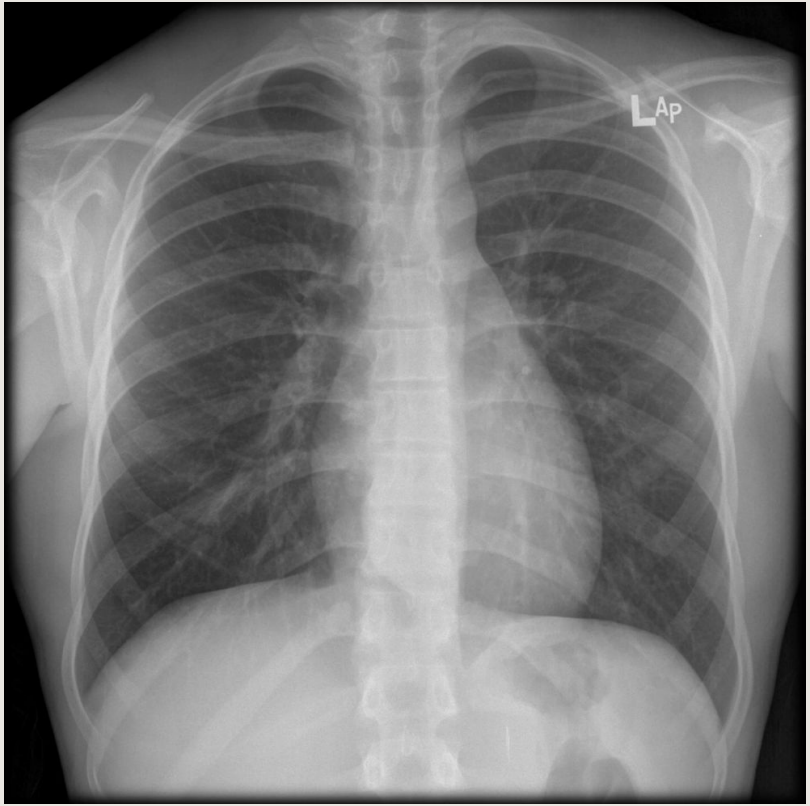
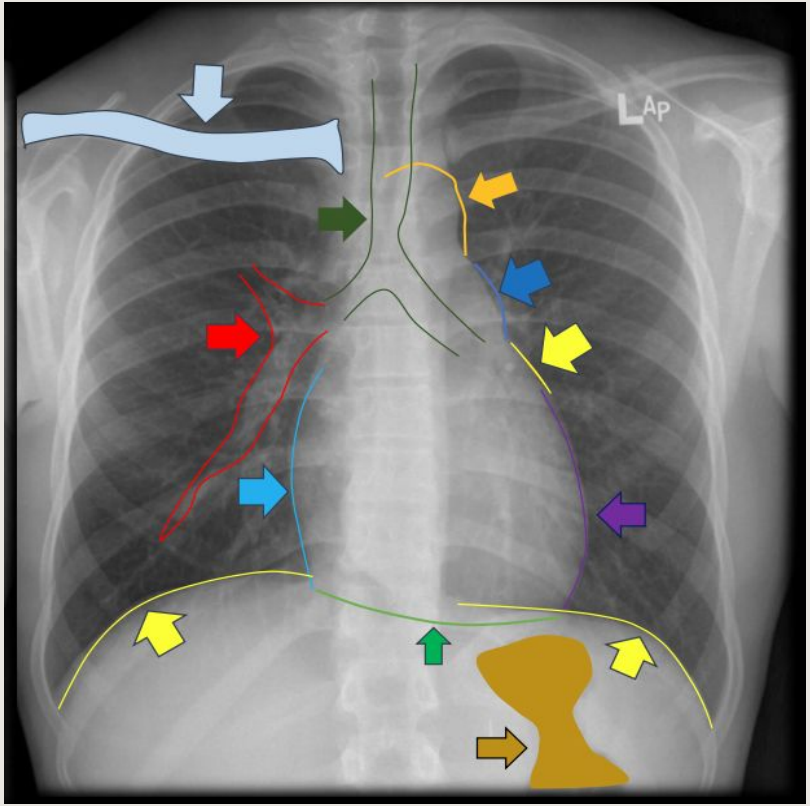
Refresh your memory



Label the structures





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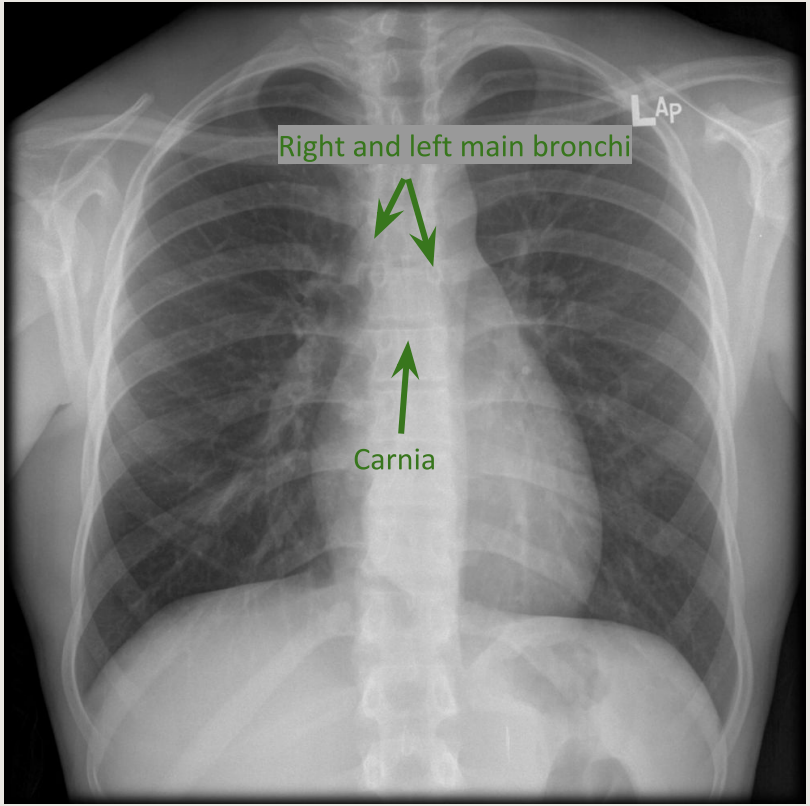
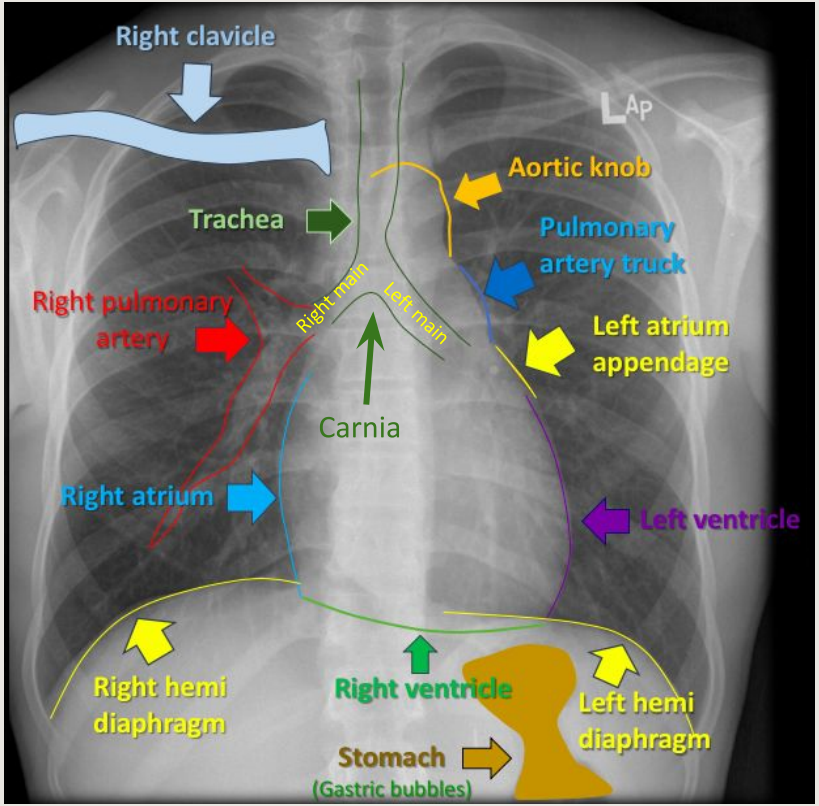


Anterior-posterior & PA are called frontal view



(We are not sure if it is AP or PA view)

For better understanding

All the explanation by
dr. Aljurayyan in one place

Differential diagnosis for the abnormal white (Hyperdense) abnormalities on the radiograph:

1- Pleural effusion.
Check the **costophrenic angle**, is it sharp or blunted?
Look for **meniscus sign**. (Crescent).

2- Lung collapse (Atelectasis).
Is there a **wedge sign** on the lateral view X-ray?
tracheal deviation + **reduced lung volume**

3- Mass.
Does the opacity have **well demarcated margins**?

4- Infiltration/consolidation
Rare. **ill-defined border**

Differential diagnosis for the abnormal black (Hypodense) abnormalities on the radiograph:

1- Emphysema.
Barrel chest (No change in width between the apex and base of the lung).
You can still see some soft tissue (Bronchioles).

2- Pneumothorax.
Super black tissues, no soft tissues at all.

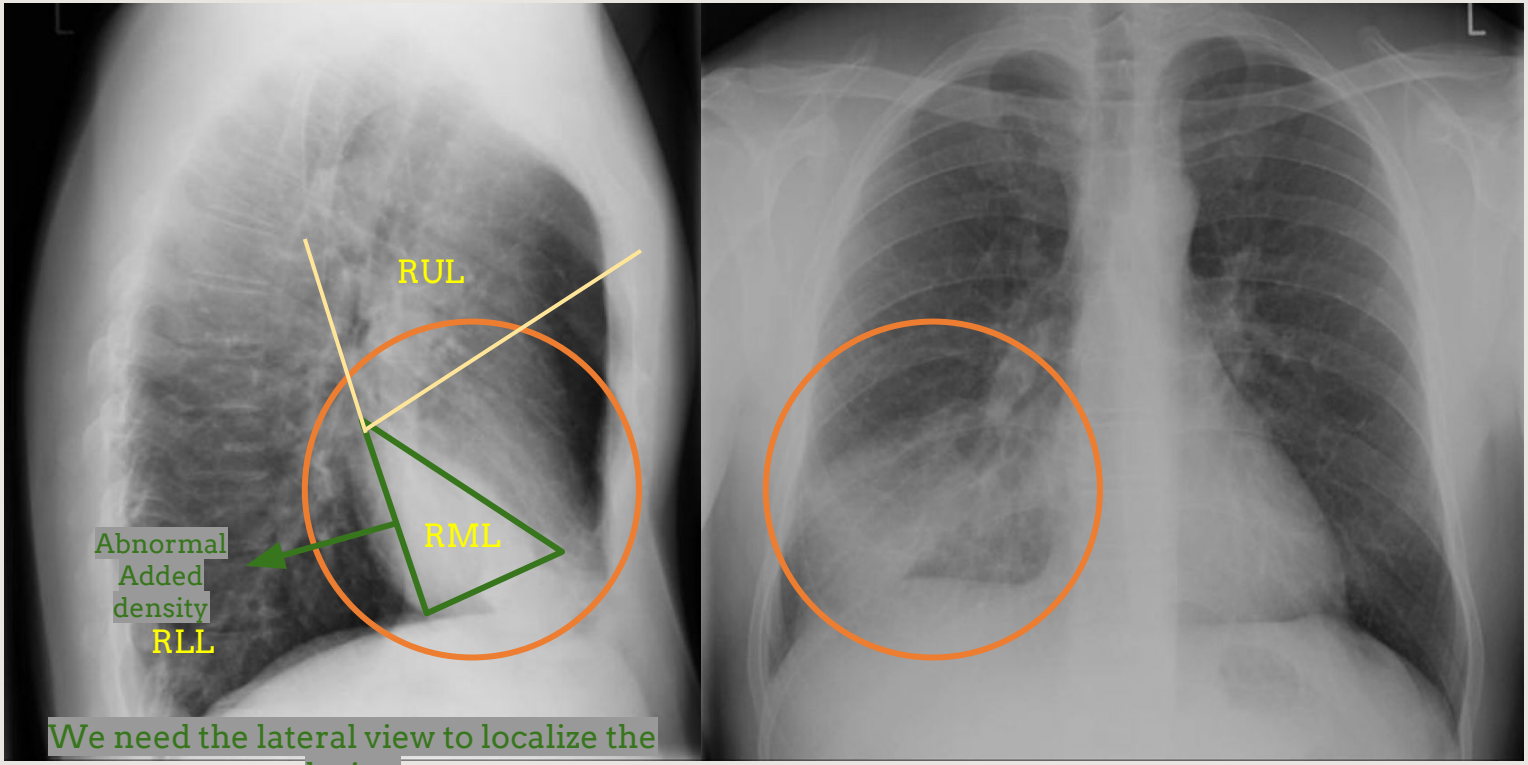
Remember: The history helps a lot, so a history with smoking make us think of a tumor, and history of DVT make us think of PE, and malignancies usually does not present with fever.

30 year-old with fever

30 year-old with fever

- Is it a mass or infiltration?
- Which lung lobe is affected?

30 year-old with fever



We need the lateral view to localize the lesion

Key feature of infiltration = white area with ill-defined borders

- Is it a mass or infiltration? Infiltration/pneumonia. (Air space density) (consolidation)
- Which lung lobe is affected? Right middle lobe.

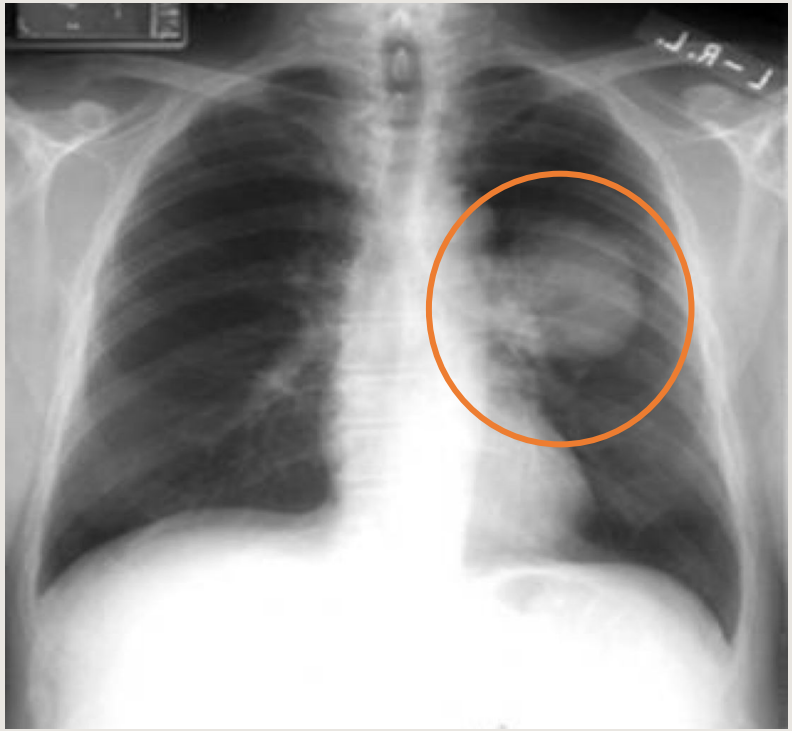
- White abnormality.
- Think about the DDx.

50 year-old smoker

50 year-old smoker

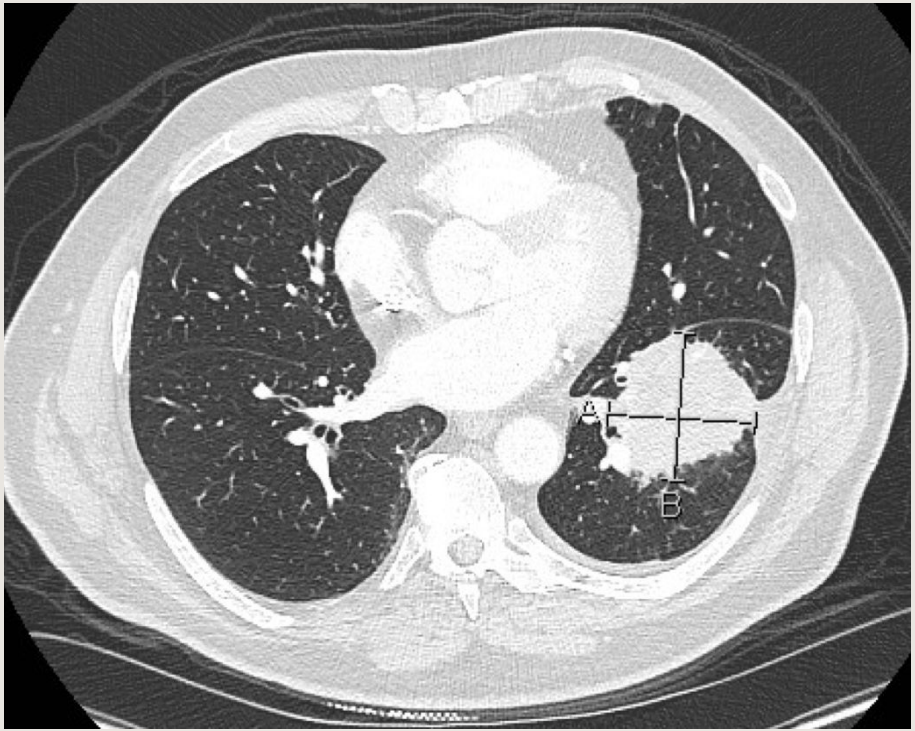
What is the most likely diagnosis?

50 year-old smoker



X-Ray

Side: left, Color: White
Margins are well seen.
Costophrenic angle is seen.
No tracheal deviation.



CT scan

- What is the most likely diagnosis?
- Left lung mass. Read the history, smoking is a risk factor

To confirm lung mass do CT

Remember!

Always look for the borders if clear or not ,CP angle (effusion) and, lung volume (atelectasis), Deviation.

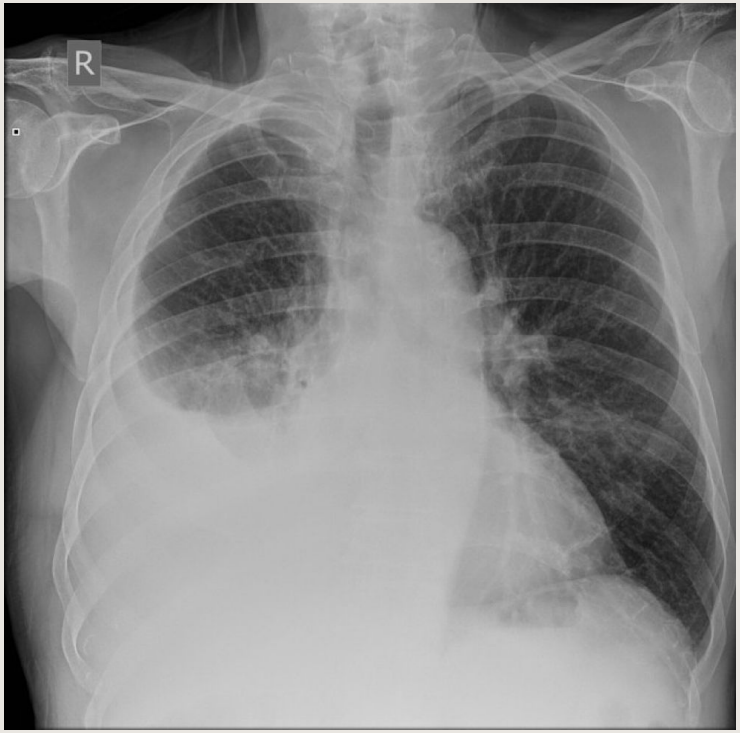
Mass

Pneumonia

infiltration

40 year-old female complaining of dyspnea

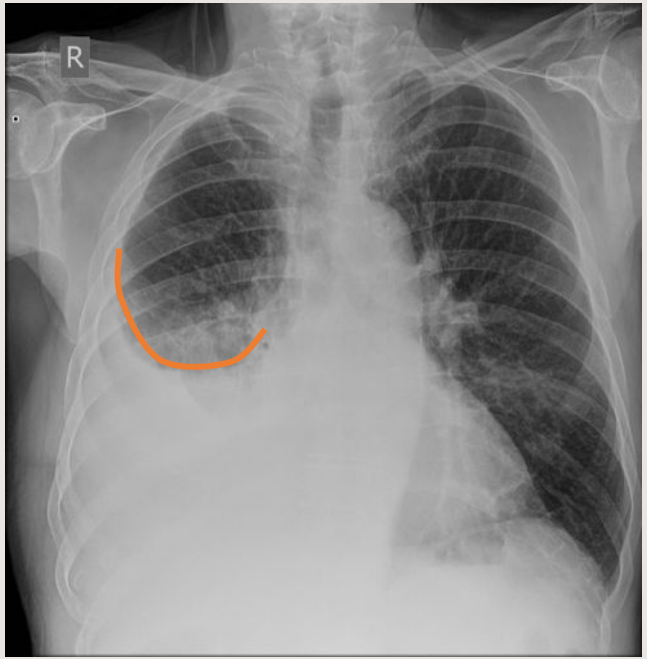
40 year-old female complaining of dyspnea



What is the most likely diagnosis?

40 year-old female complaining of dyspnea

Sometimes the effusion compress the lungs & lead to its collapse which causes tracheal deviation.
Pleural eff can give (1) Air fluid (2) Collapsed part of the lung with mild shift of trachea

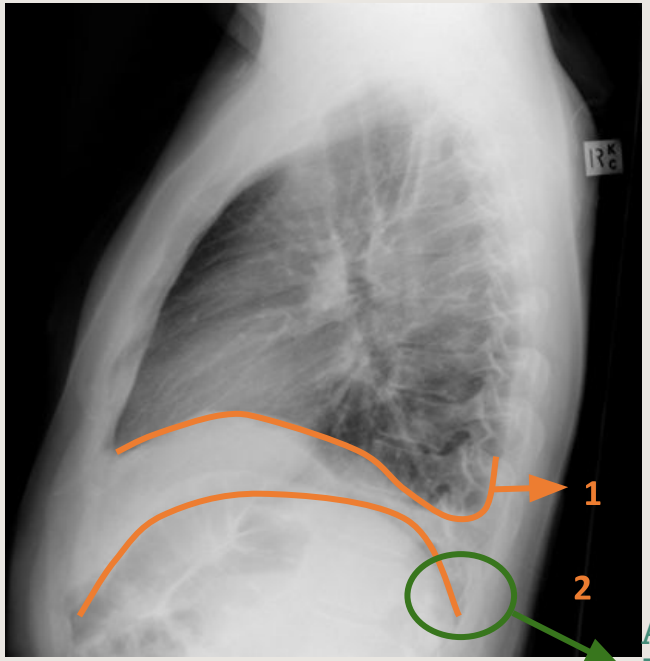


Look for meniscus sign

- What is the most likely diagnosis?
- Right pleural effusion.

Pleural effusion key feature = meniscus sign

Effusion appears in lateral view before frontal even little amounts (70-80 ml)while in frontal (200-600 ml)

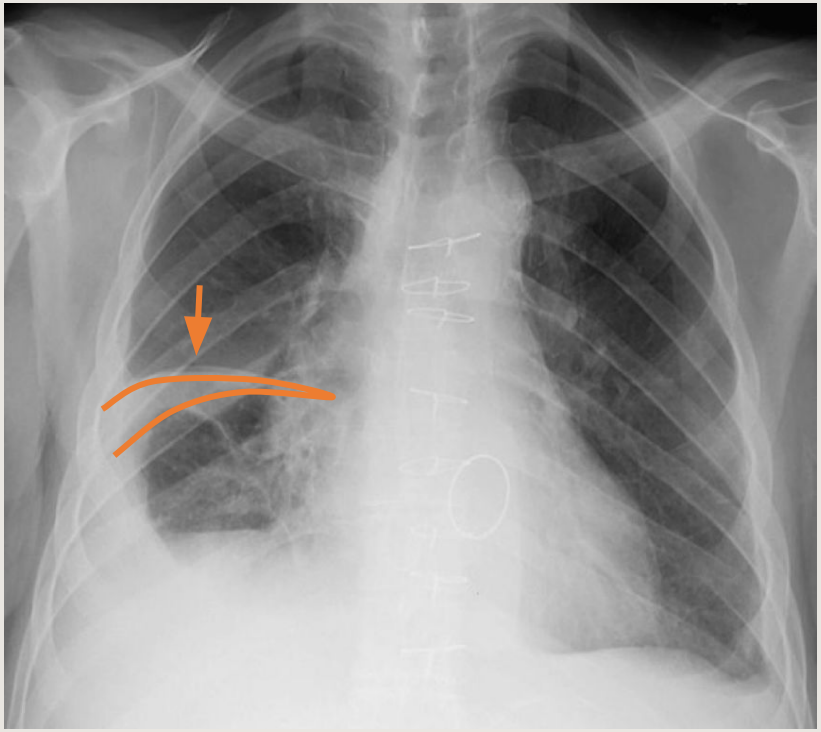


Pleural effusion on lateral view

1- The pleural effusion.
2- Normal side.

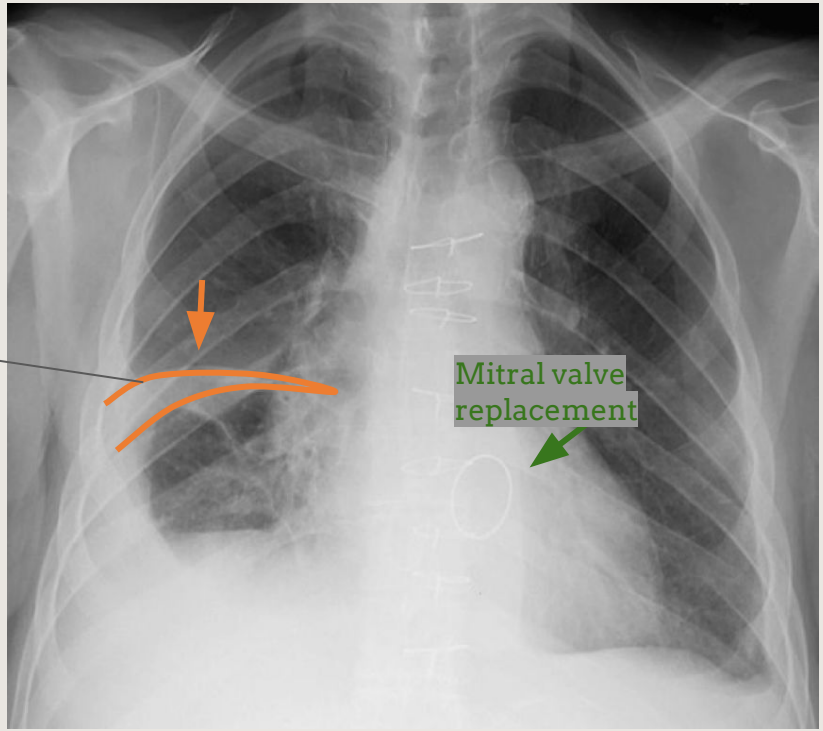
Always look here. Blunted costophrenic angle.

What's this ?



What's this ?

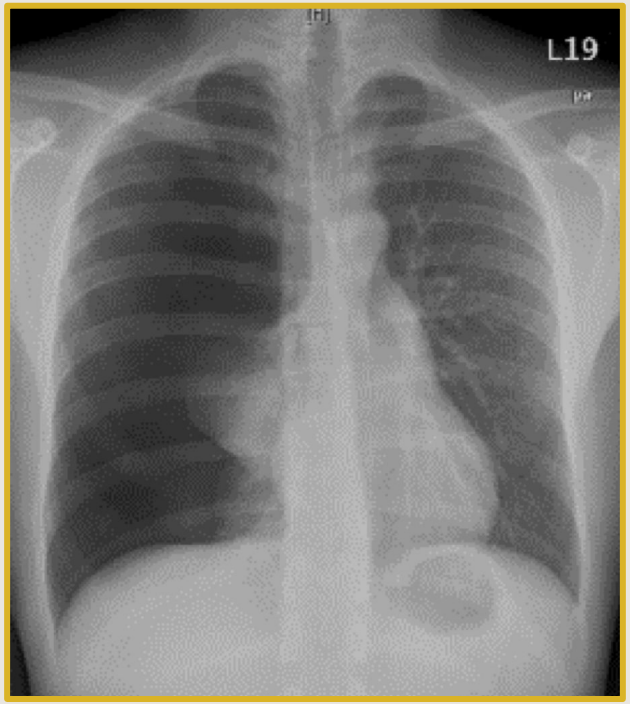
Fluid filling the fissure + effusion (meniscus sign)
Can be exudate because it's thick fill in one space.



Pleural effusion (fluid tracking right horizontal fissure)
(fluid found its way into the fissure)

25 year-old male with chest pain

25 year-old male with chest pain

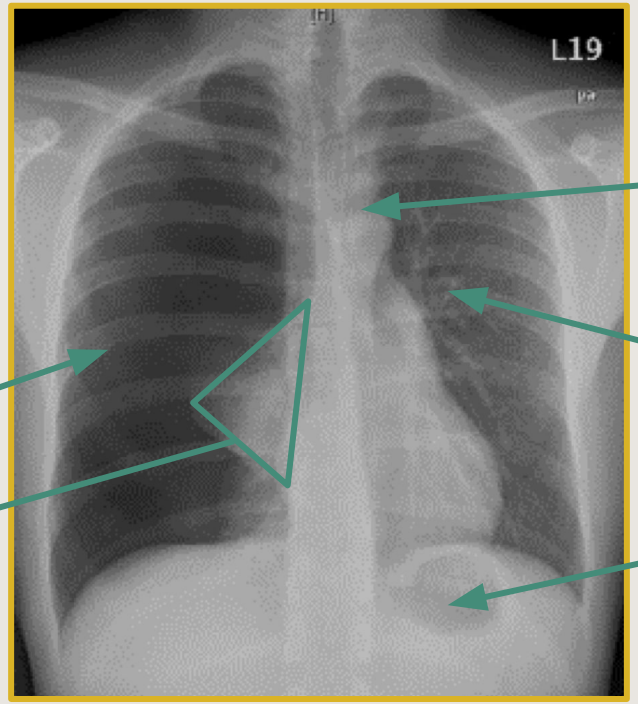


- Which side of the chest is abnormal?
- What is the diagnosis?

25 year-old male with chest pain

Pleural space is normally a closed space and have a negative pressure, this pressure prevents it from collapsing. So, whenever you try to expire all the air you can't, unless there is pleural defect causes loss of lung maintenance.

More black (more air) either:
1- pneumothorax > air around the lung
2- emphysema (COPD) > air inside the lung + more ribs + barrel chest appearance + affects both lungs



Mild displacement of the trachea (pushed to the opposite side).

Normally, Lung is mix of air and soft tissue.

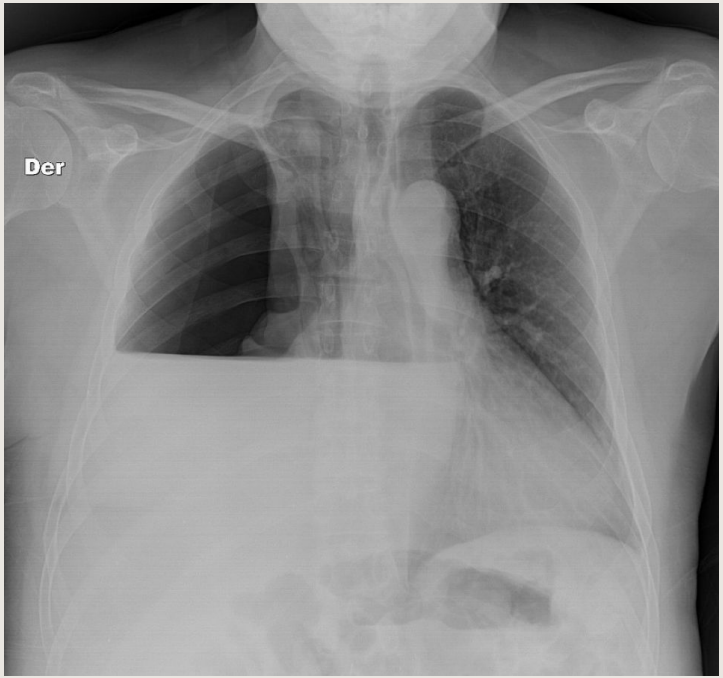
Abnormal
Black: air is either inside/outside the lung

The collapsed lung
Air escape from the lung and compressing it.

Gastric bubble (Normal).

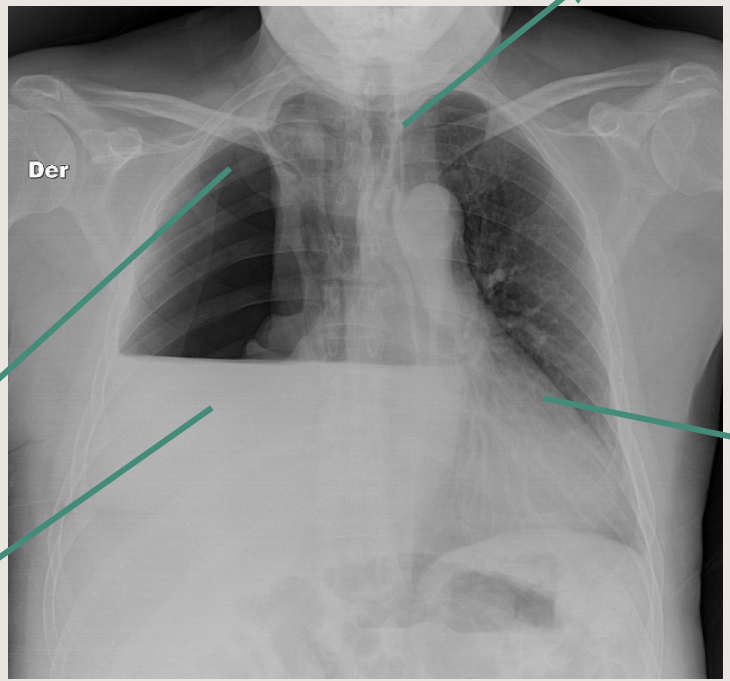
- Which side of the chest is abnormal? Right side.
- What is the diagnosis? Pneumothorax. Emphysema usually affects both sides, but pneumothorax commonly affects only one.

What is the diagnosis?



What is the diagnosis?

Notes on the image:
More Black more white, air fluids in the same area, the line won't be crescent or irregular but will be very regular.
Patient is sitting up so the fluids will be down (gravity).



The trachea is pushed

Why is it a straight line?
Because there is air (like a bottle of water which contains both air and fluid).

More black(air)

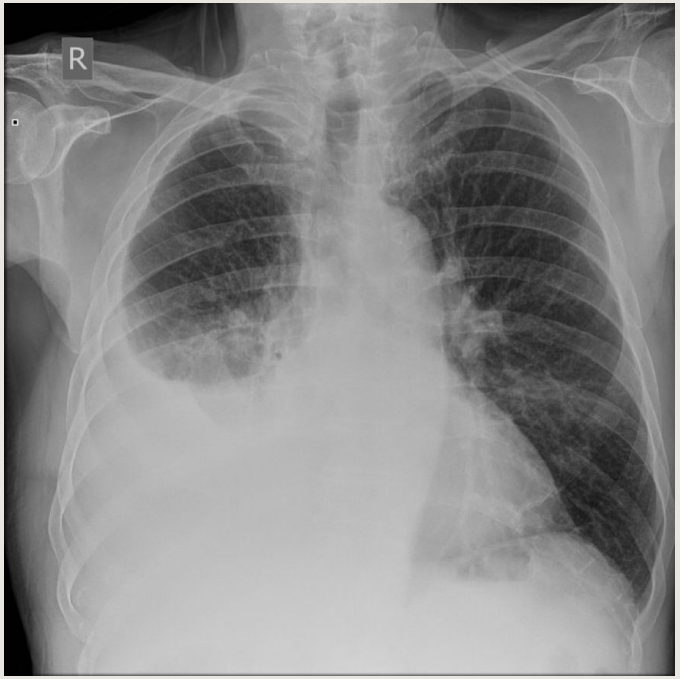
More white (fluid)

The heart is normal in size but pushed

Hydro-pneumothorax

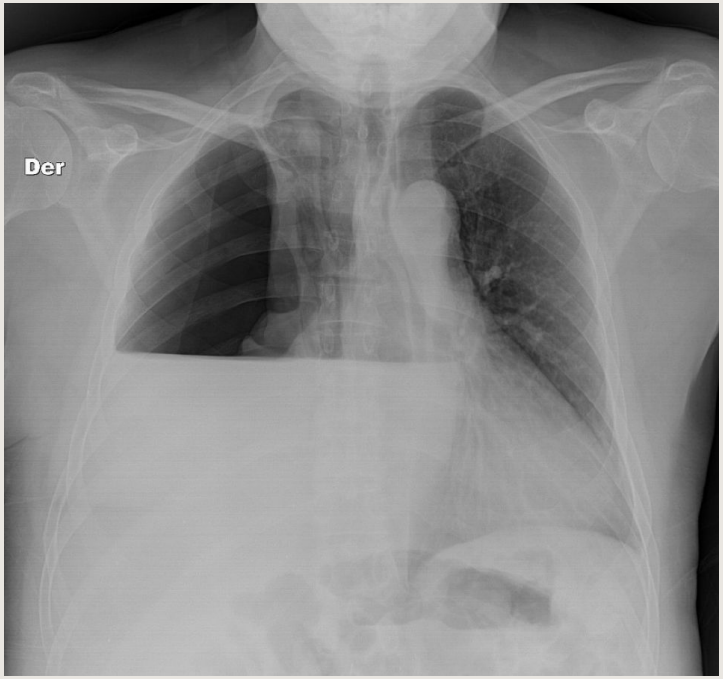
(Look for air/fluid level)

Remember!



Pleural effusion

Curved line = meniscus sign
Irregular (not straight line)

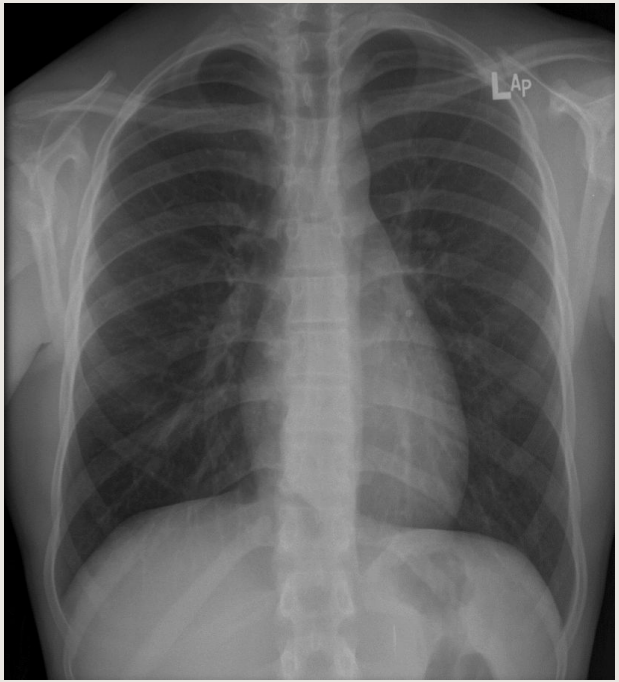


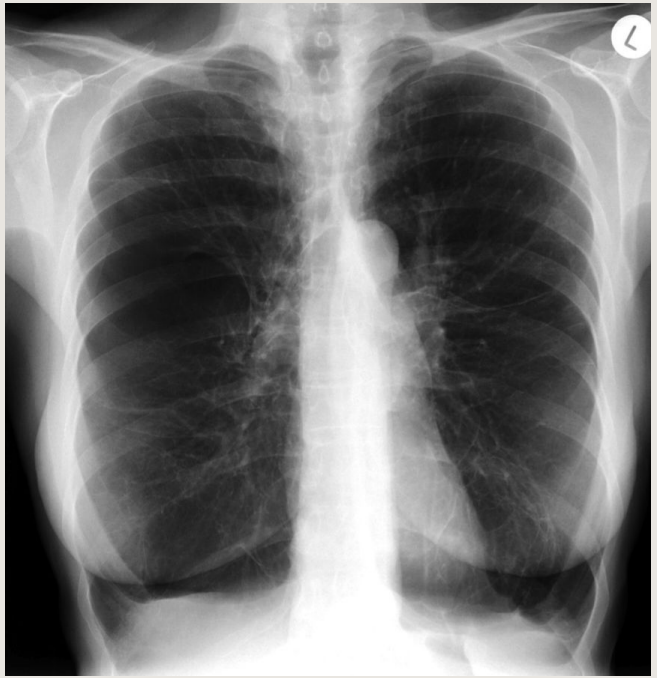
Hydro-pneumothorax

straight line = air fluid level

Which film is abnormal? What is the abnormality?

Which film is abnormal? What is the abnormality?

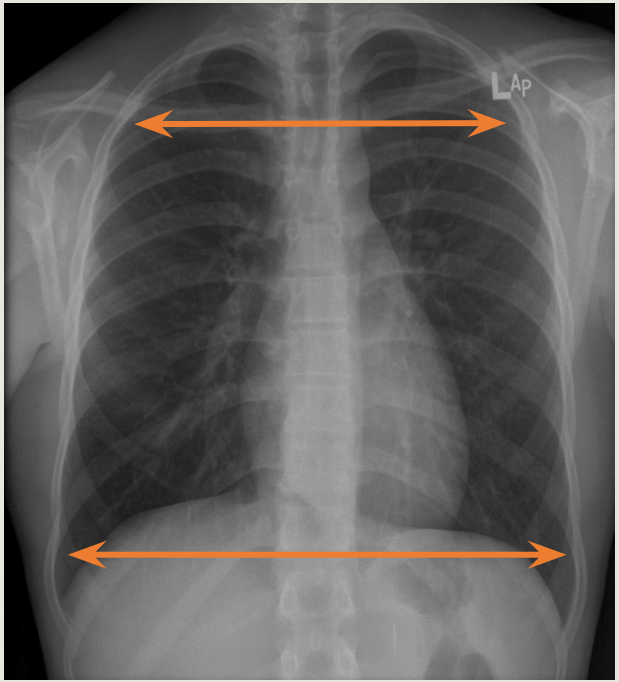




Which film is abnormal? What is the abnormality?

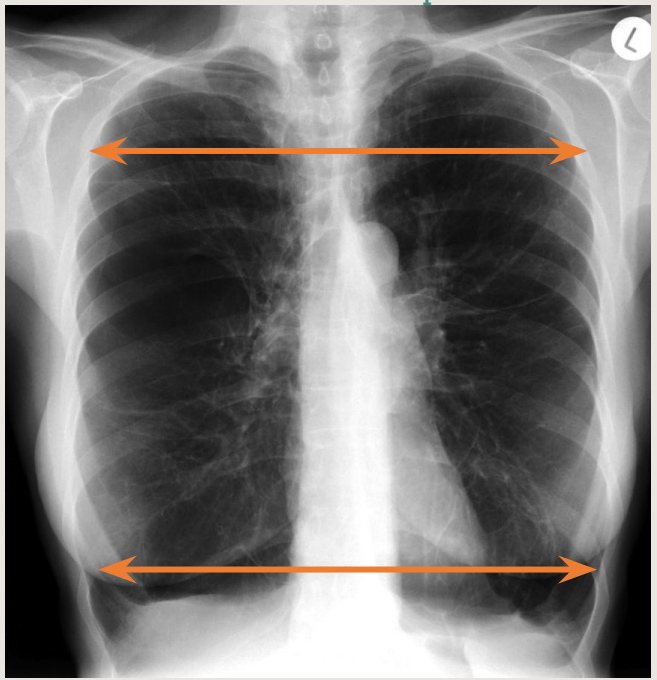
Notes on the image:
(1) Black (2) bilateral (3) we can still see lung tissue (4) Chronic process and shape changes.

شكل الرئة الطبيعي يكون مشابه للجرس واسع من تحت وصغير من فوق ، لكن هنا في الأبنورمال شكلها بنفس العرض فوق وتحت



Normal

The base is wider than the apex



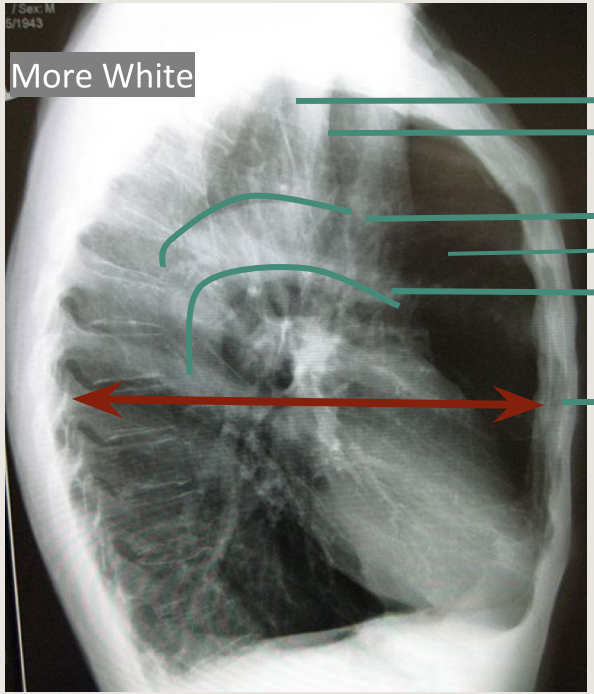
Abnormal emphysema

Both base and apex have the same width> indicates chronicity
Lung tissue Still seen > emphysema

Which film is abnormal? What is the abnormality?

Which film is abnormal? What is the abnormality?

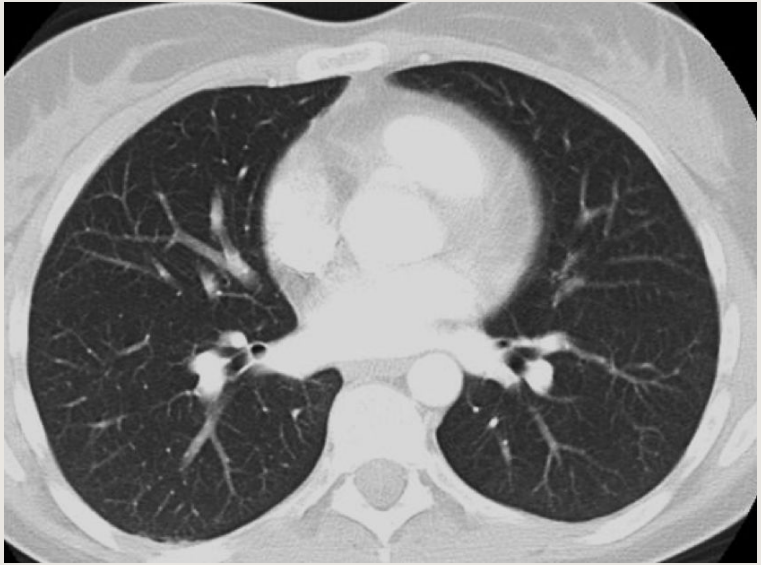
Normal

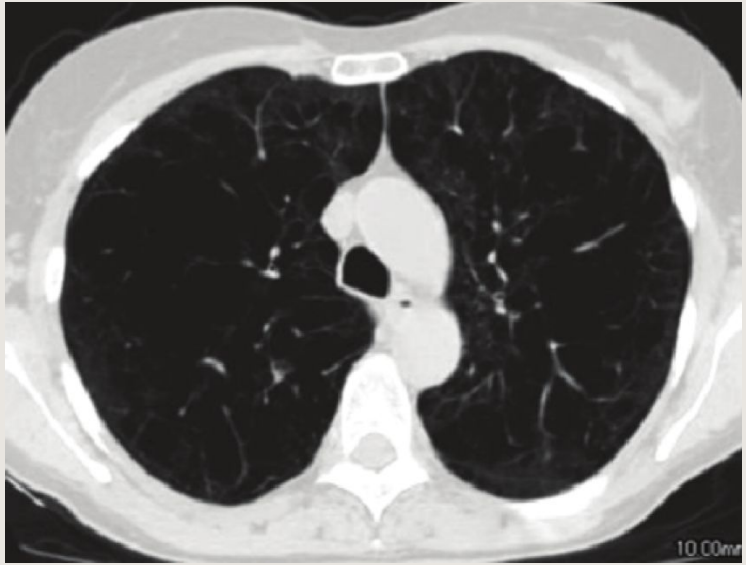


Abnormal emphysema

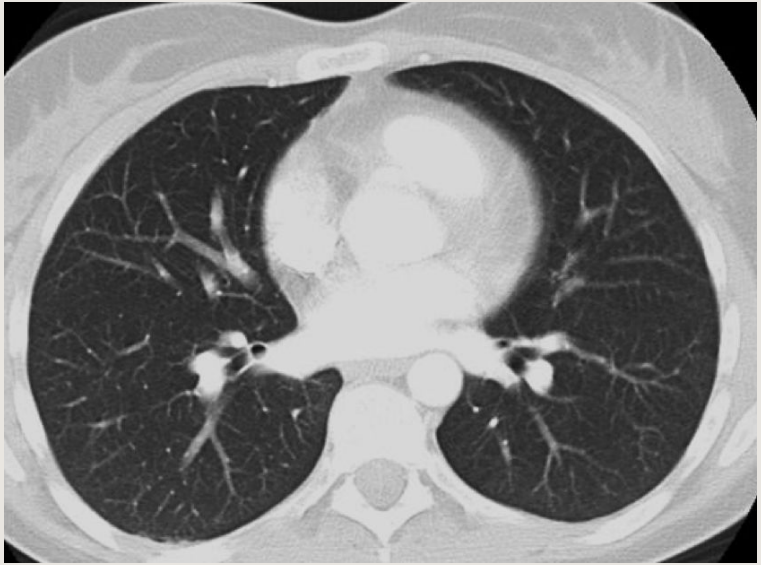
More black and the top almost same to the bottom in width

Which CT-scan film is abnormal? What is the abnormality?



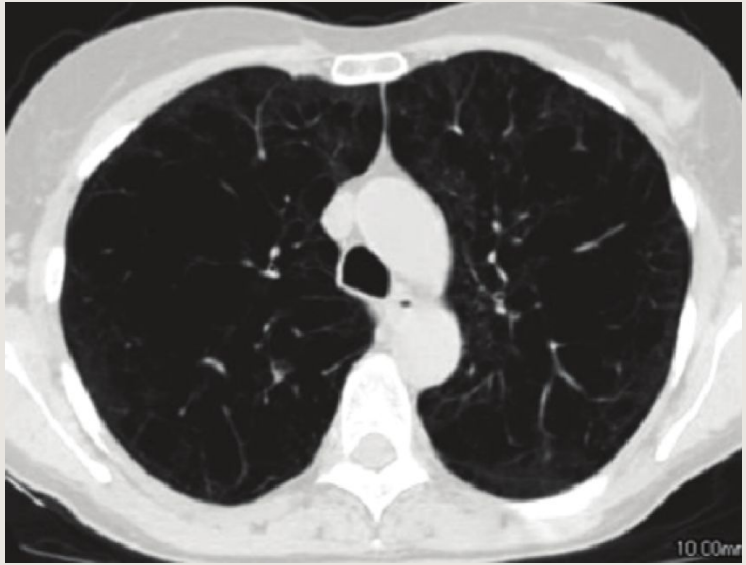


Which CT-scan film is abnormal? What is the abnormality?



Normal

In normal you still see fine grey lines and vessels

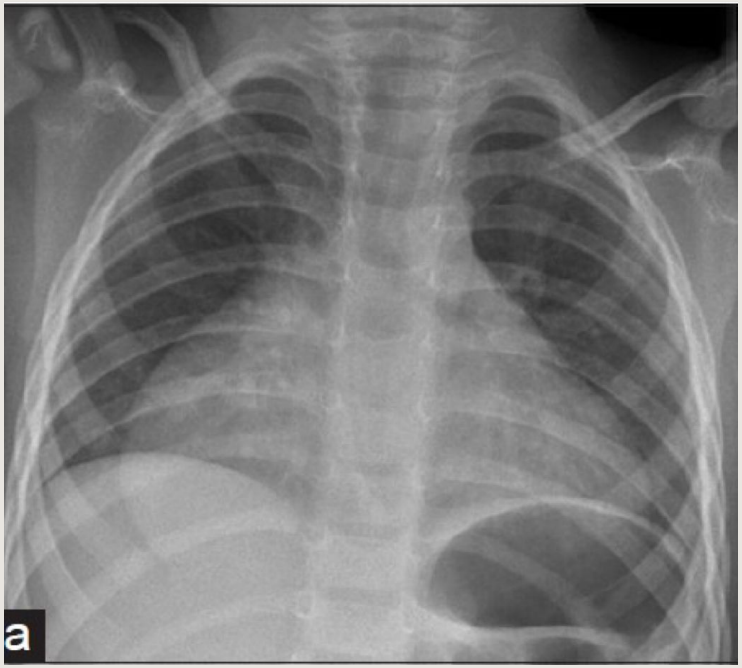


Abnormal emphysema

Most of the lung is distorted and replaced by air

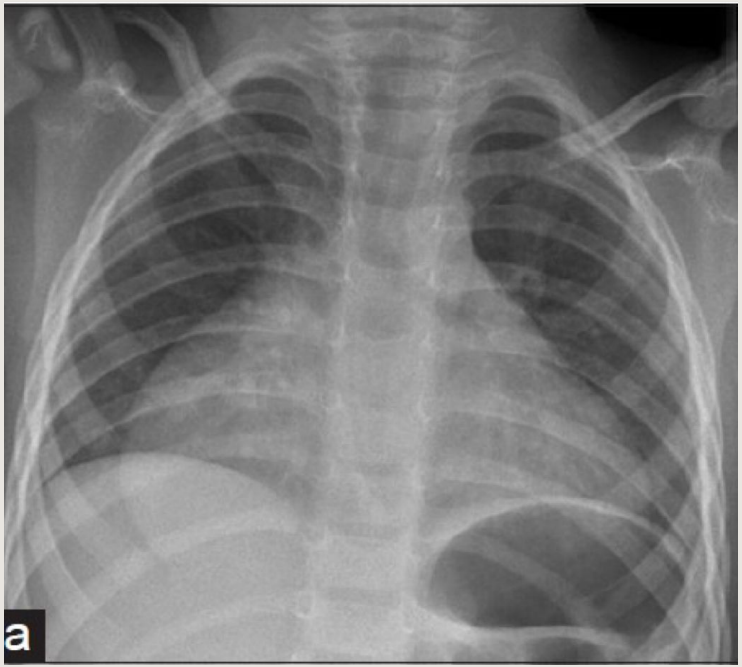
Only vessels and air are seen and small amount of tissues

1- What is Abnormal?



2- Can you figure out which heart chamber is enlarged?

1- What is Abnormal?



1- Heart shadow is enlarged.

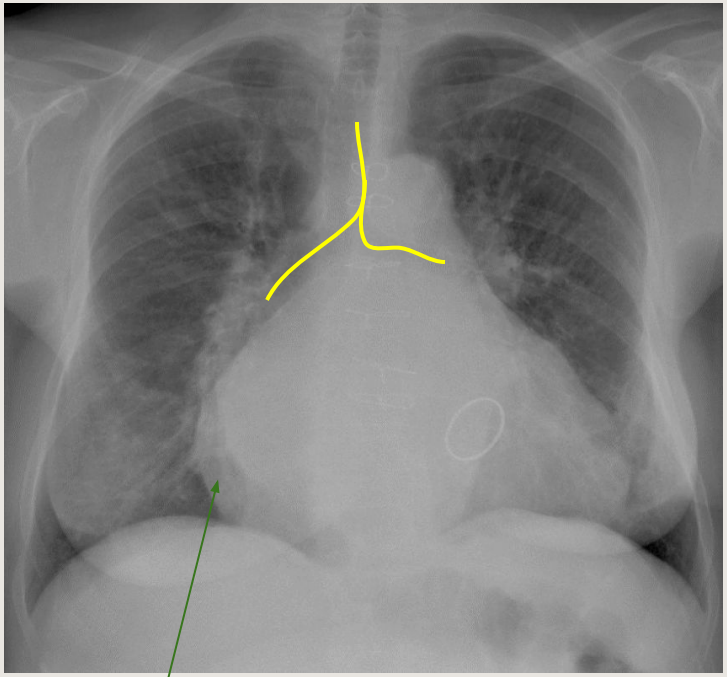
In order to diagnose Left atrium enlargement we need to see right double border sign

2- Can you figure out which heart chamber is enlarged?

Right atrium.

Remember!

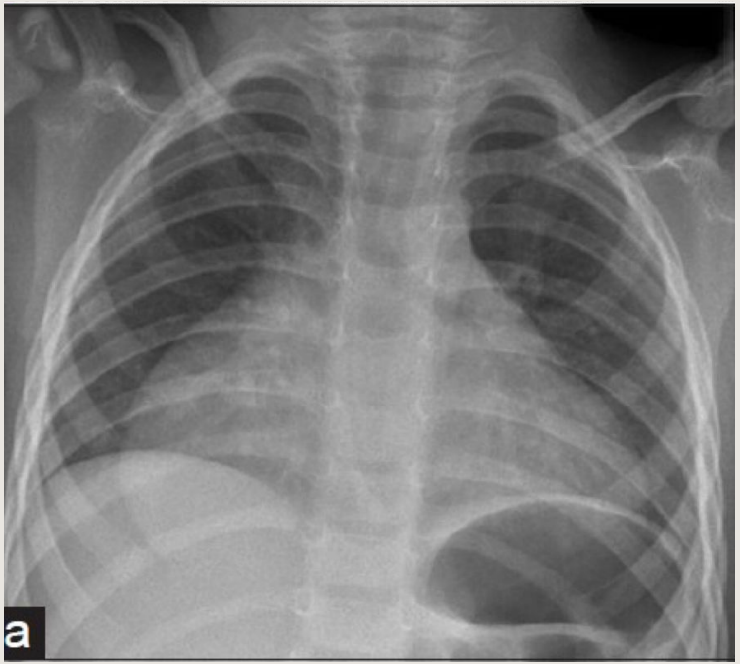
Both show enlarged heart size



Left atrium enlargement

Double border sign

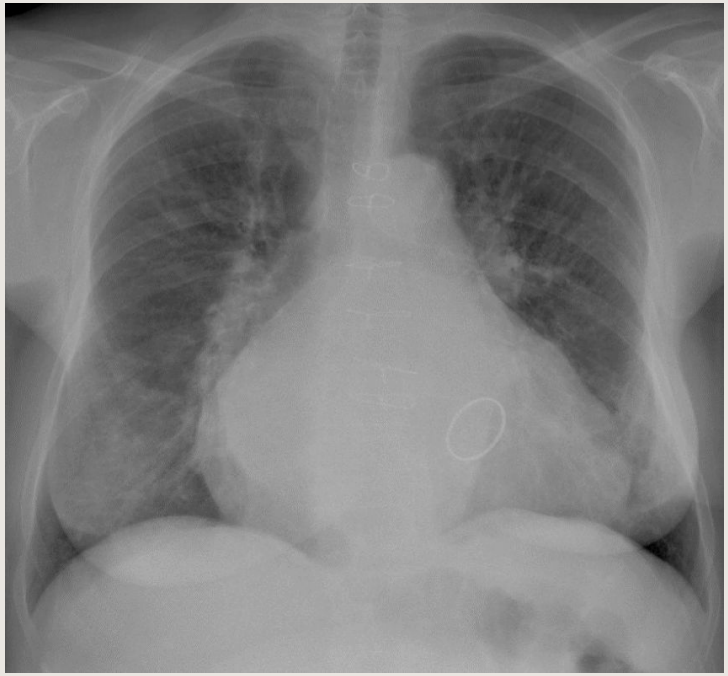
Widening of the aorta + Pushed airways + carina wide

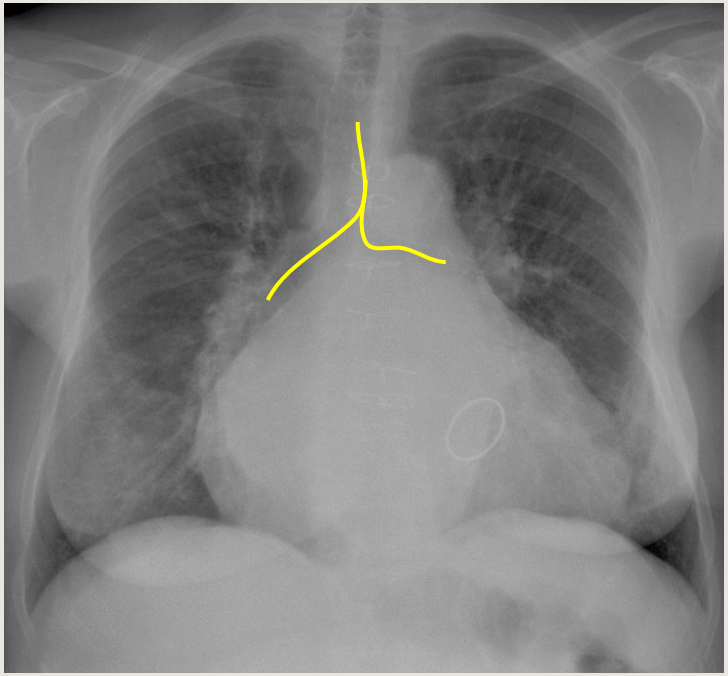


Right atrium enlargement

Carina + Airways are normal

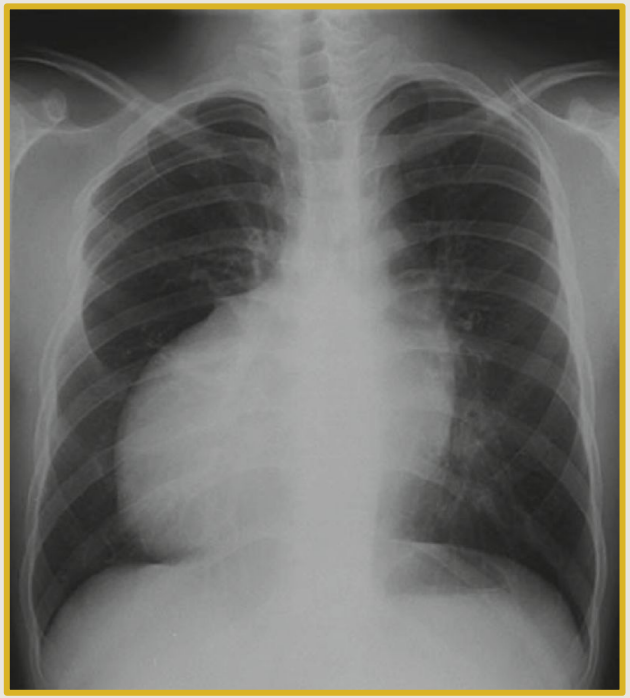
For better understanding

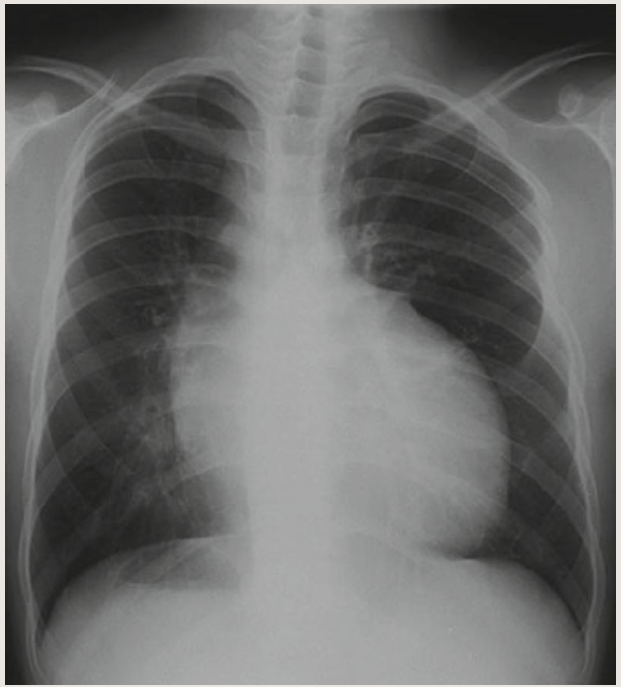




Notice the carina

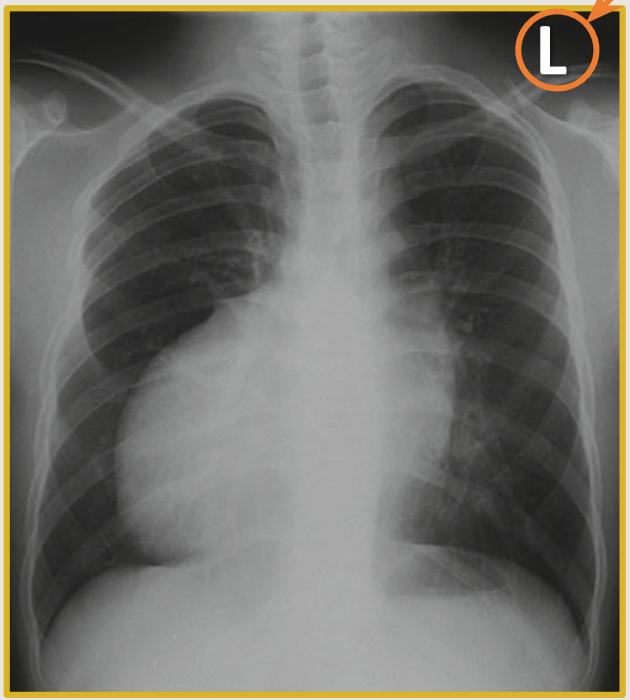
1- What is the diagnosis?

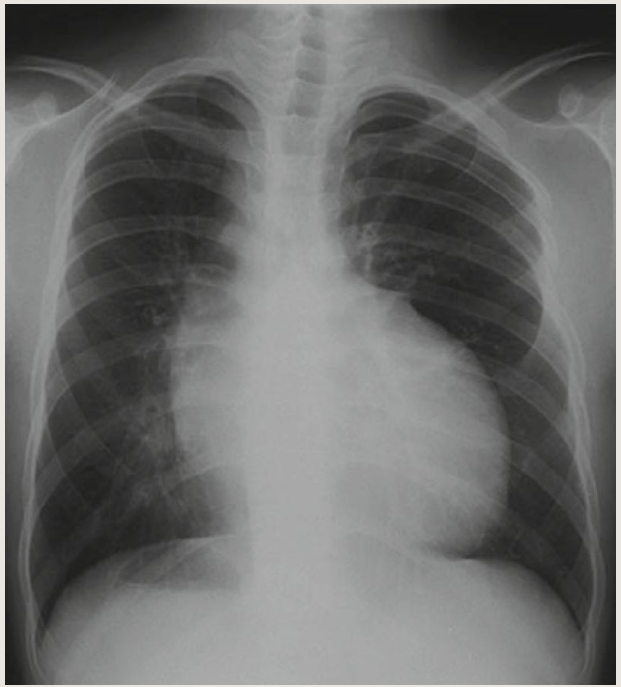




1- What is the diagnosis?

Always check for the side label (L or R)



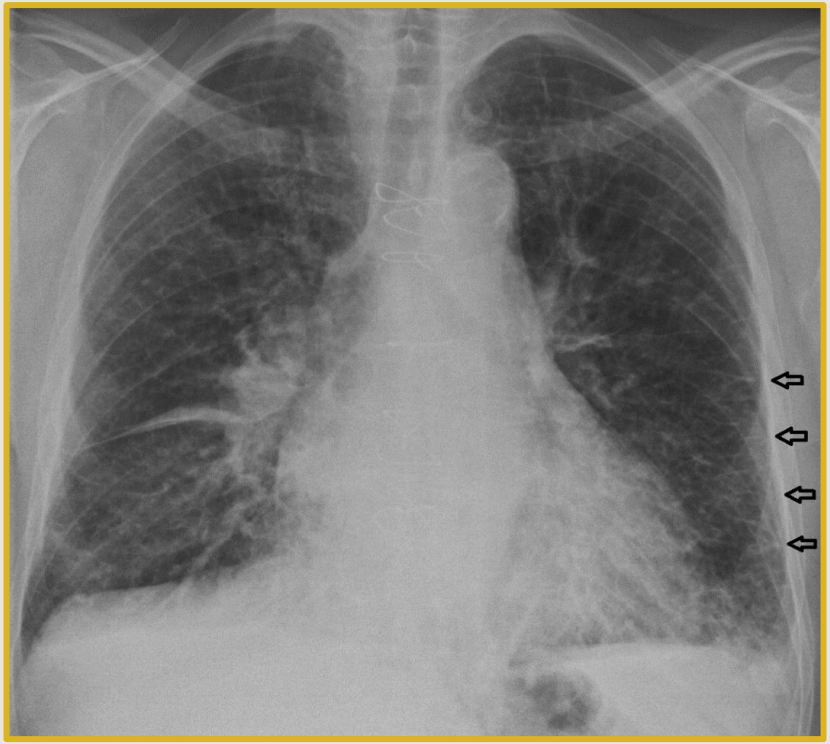


Dextrocardia

The apex is pointing to the other side
& there is cardiomegaly.

60 year-old male with difficulty in breathing

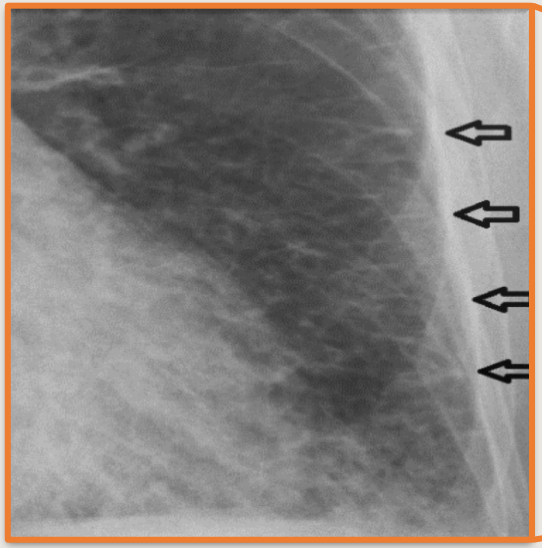
60 year-old male with difficulty in breathing



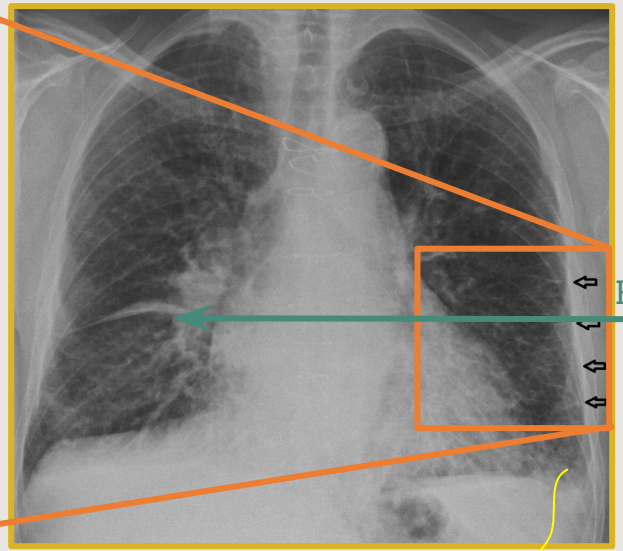
- What is the most likely diagnosis?

60 year-old male with difficulty in breathing

Notes on the image:
(1) Lung is abnormal
(2) white lines
(3) cardiomegaly
(4) cardiogenic edema



Kerley B lines



Slight pleural effusion.
Enlarged heart.

- What is the most likely diagnosis?
- Cardiogenic pulmonary edema (interstitial).key sign = kerley B lines

60 year-old male with difficulty in breathing

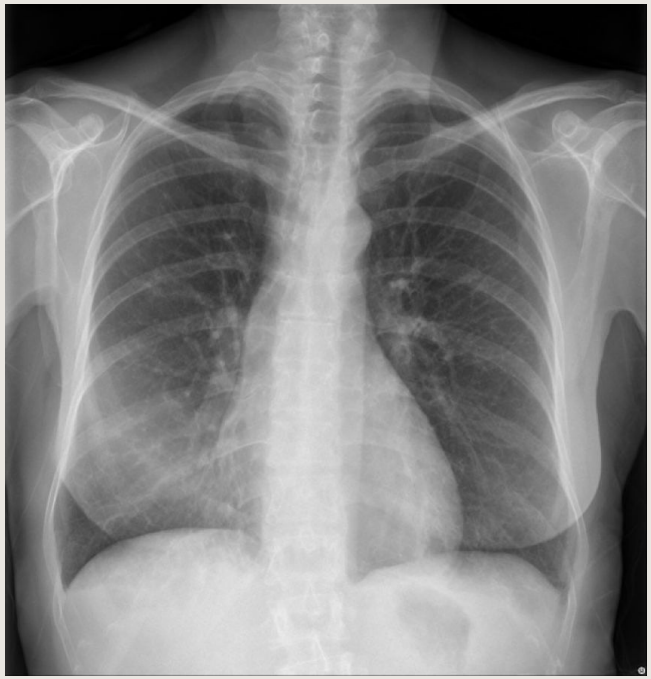
Peribronchial cuffing

Ring around the airway

- What is the most likely diagnosis?

Cardiogenic pulmonary edema (interstitial).

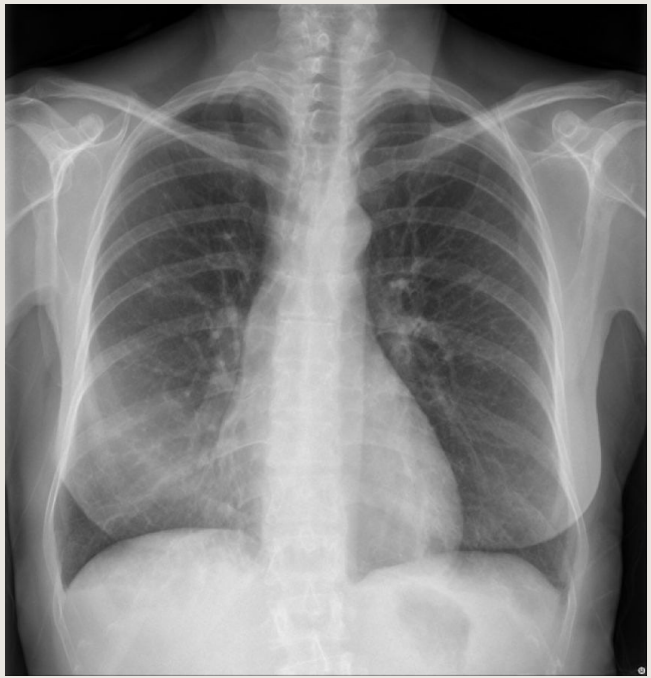
What do you see in this X ray?

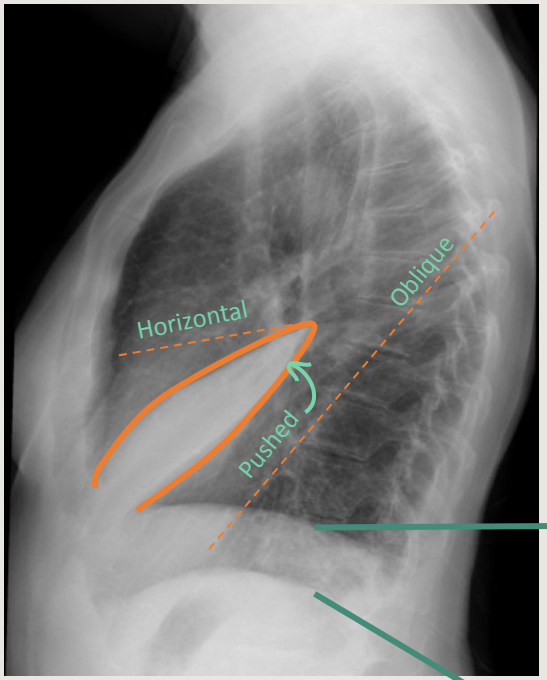


What do you see in this X ray?

Right lung abnormal = more white

When lung collapsed its volume decreased and the space between the ribs will also decreased compared to the other side. (Normally left lung is smaller than the right lung because of the heart. Here both lungs have the same size meaning the right lung is collapsed)





Right middle lobe collapse

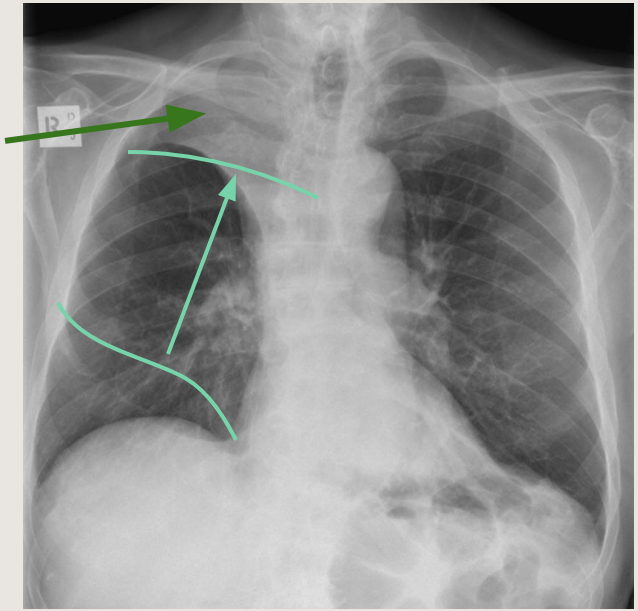
Displacement of the fissures with collapsed RML of the lung

Right hemidiaphragm

Left hemidiaphragm

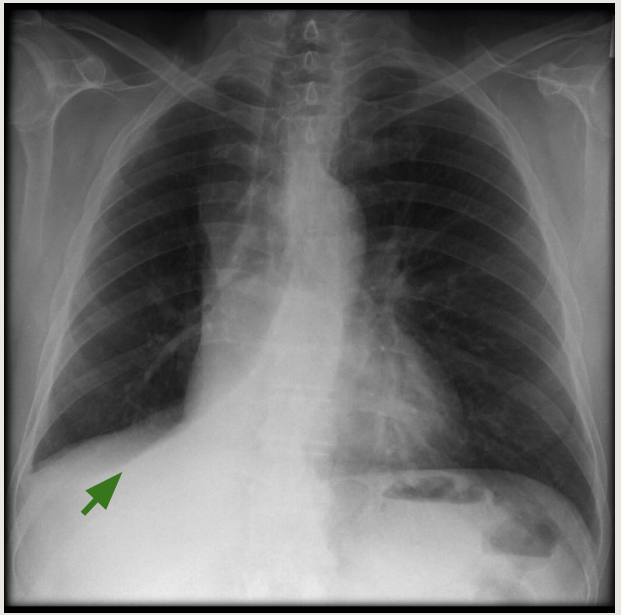
Remember!

Upper lobe is big, so when it collapses the other lobes try to occupy the space and pulls the diaphragm up.



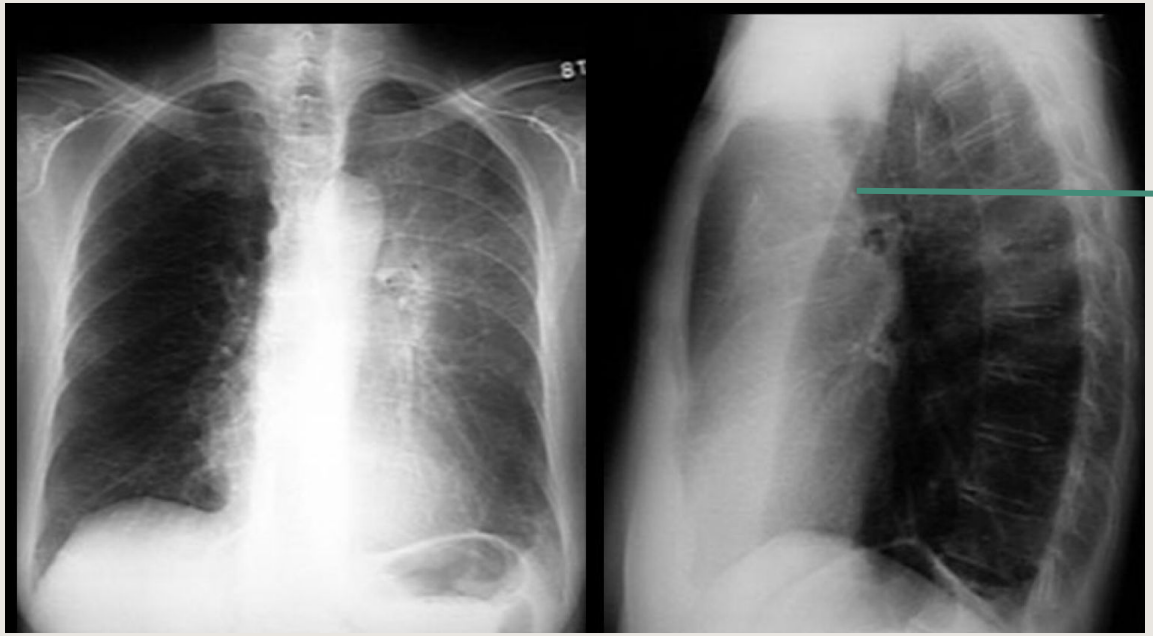
Right upper lobe collapse

Transverse fissure pulled up



Right lower lobe collapse

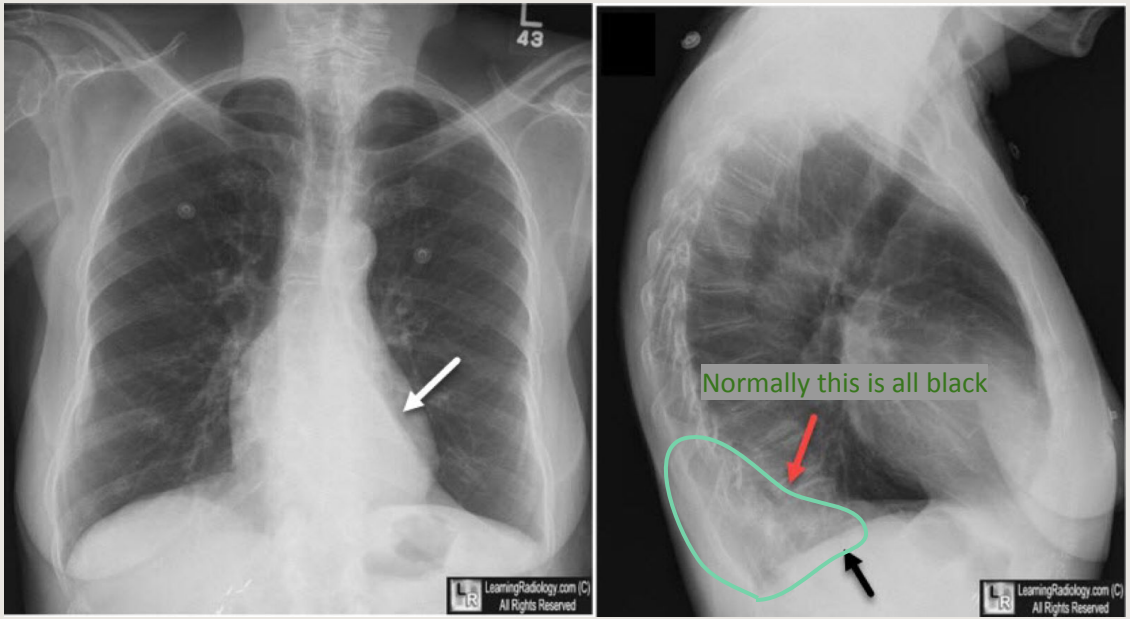
Remember!



The oblique fissure is clear due to the collapse and the white density caused by the collapsed tissue. Anything anterior to the collapsed part will be white Anything posterior will be black.

Left upper lobe collapse

Remember!



Left lower lobe collapse

Notice the triangular shape behind the heart

50 year-old with severe chest pain

50 year-old with severe chest pain

- What is abnormal?
- What will you do next?

50 year-old with severe chest pain

- What is abnormal? The aorta is enlarged.
- What will you do next? CT scan (CT aortogram).

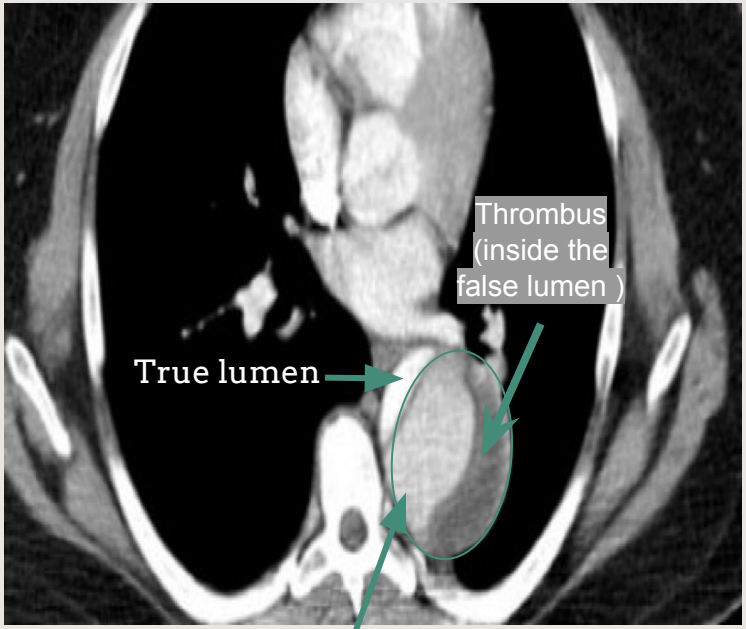
(aortic knuckle abnormal)
Differential diagnosis:

- Aneurysm.
- Aortic dissection.

What is the diagnosis?

What is the diagnosis?

False lumen usually appears less dense than the true lumen

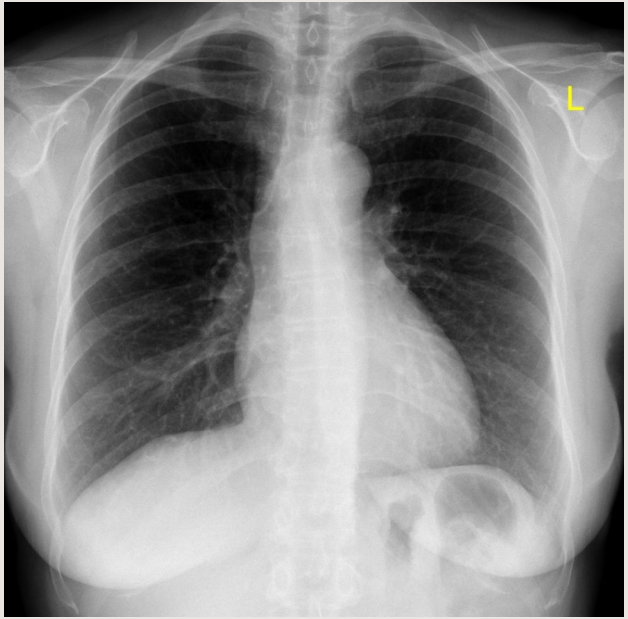


False lumen
Caused by the blood entering the abnormal damaged lumen

Aortic dissection

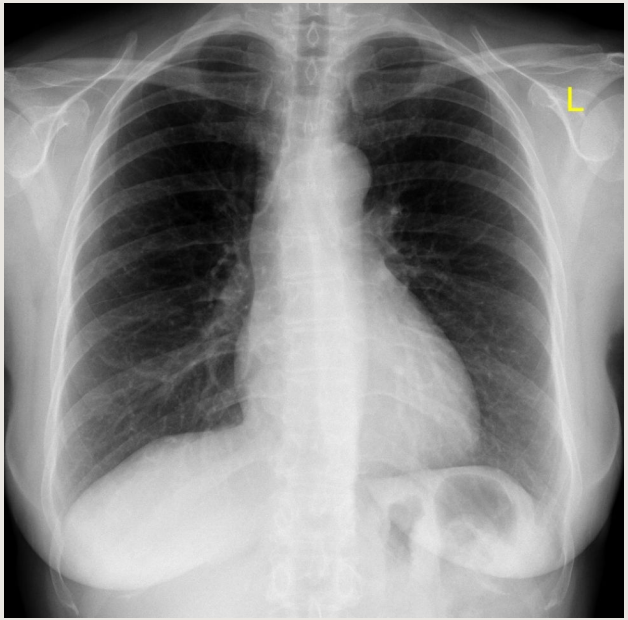
40 year-old female with chest pain after a 7 hours flight.
She had previous deep vein thrombosis in her lower limbs.

40 year-old female with chest pain after a 7 hours flight.
She had previous deep vein thrombosis in her lower limbs.



- What are you suspecting this patient has?
- Do you see any abnormality in this chest x ray?
- What to do next?

40 year-old female with chest pain after a 7 hours flight.
She had previous deep vein thrombosis in her lower limbs.



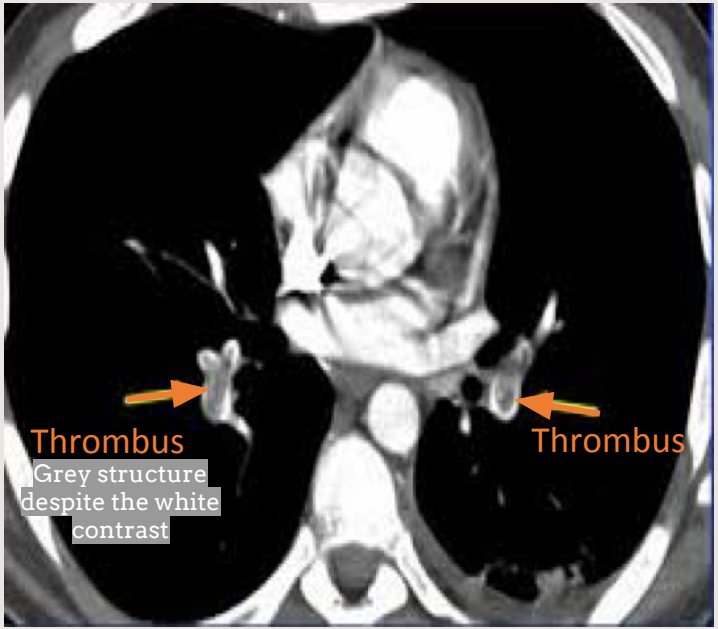
From the history

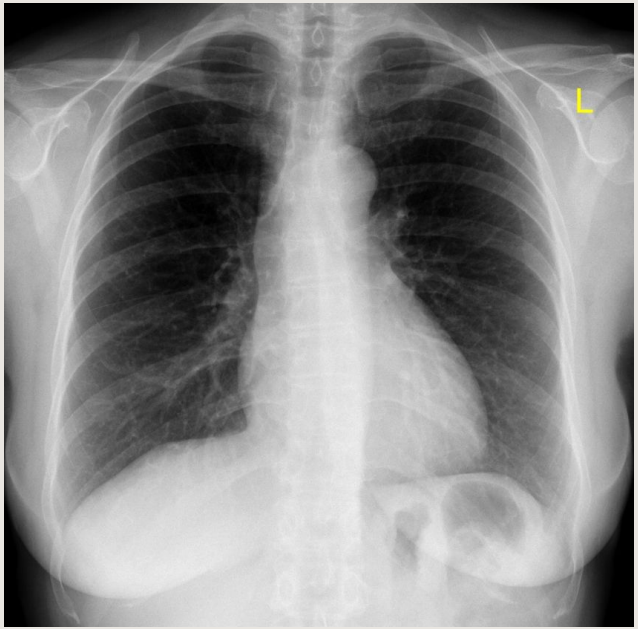
- What are you suspecting this patient has? Pulmonary embolism.

- Do you see any abnormality in this chest x ray? No.

- What to do next? CT pulmonary angiogram.

Pulmonary Embolism



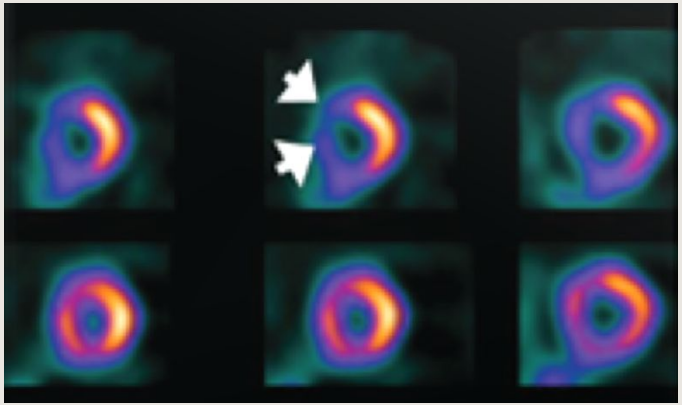


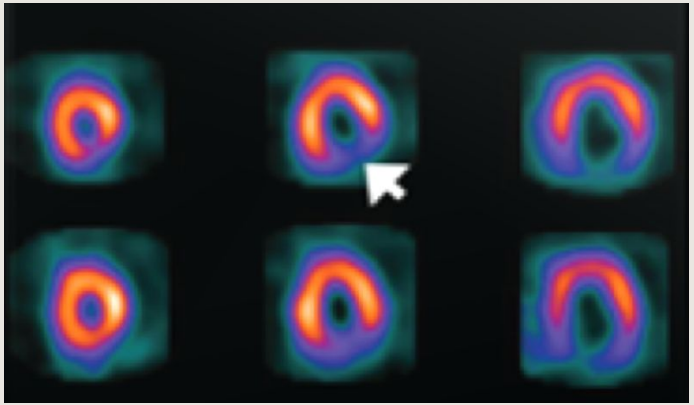
- CT pulmonary angiogram is the gold standard exam to diagnose PE.
- The most common x ray finding in PE is "NORMAL".

What is the diagnosis?

Stress

Rest

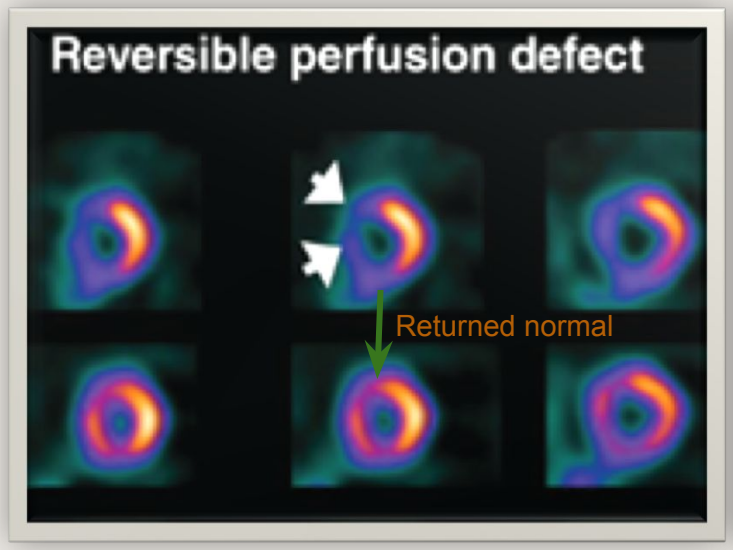




What is the diagnosis?

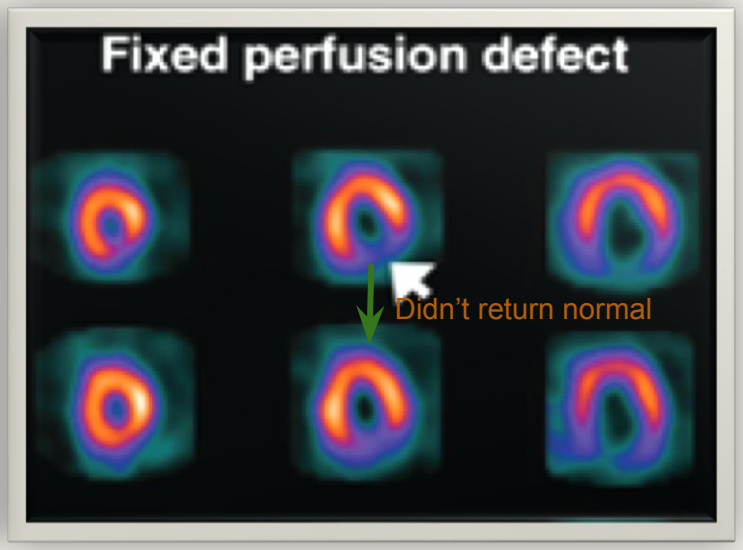
Stress

Rest



Myocardial ischemia

Ischemia > reversible at rest



Myocardial infarction

Infarction > irreversible (dead tissue)

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References

✓ Slides

✓ 436 Teamwork

THANK YOU FOR CHECKING OUR WORK