

# 432 Radiology Team



## (6): Radiology of the Cardiac Diseases

\* Many thanks to 431 team for their helpful notes \*



**Done By:**  
Manar Aleid

**Reviewed By:**  
Member's name  
Member's name

جامعة  
الملك سعود  
King Saud University

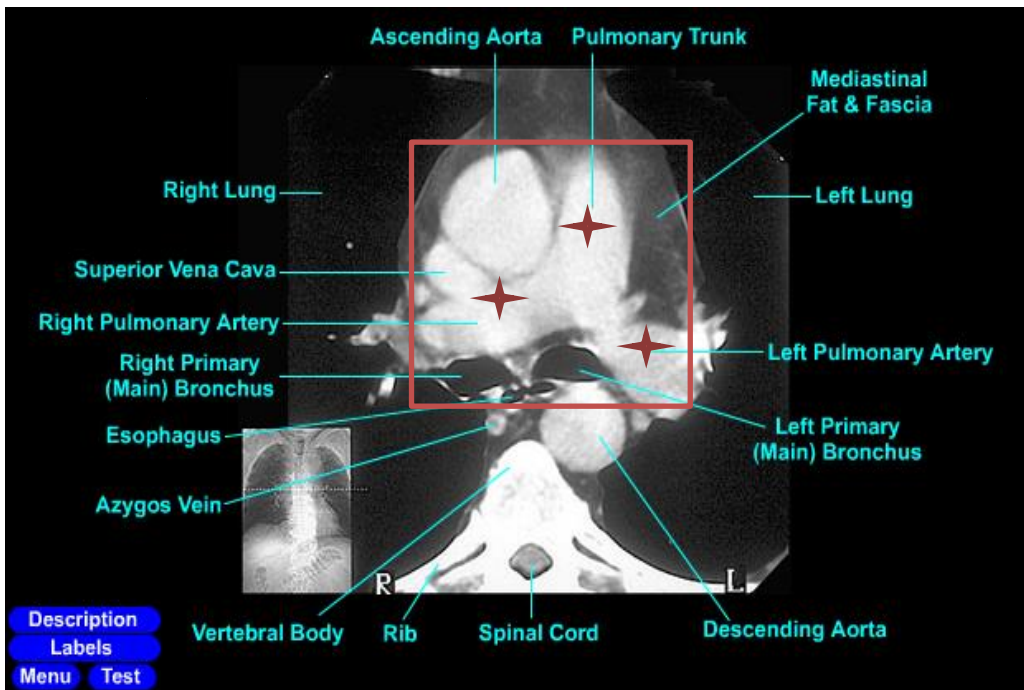


**COLOR GUIDE:** • Females' Notes • Males' Notes • Important • Additional • 431 team

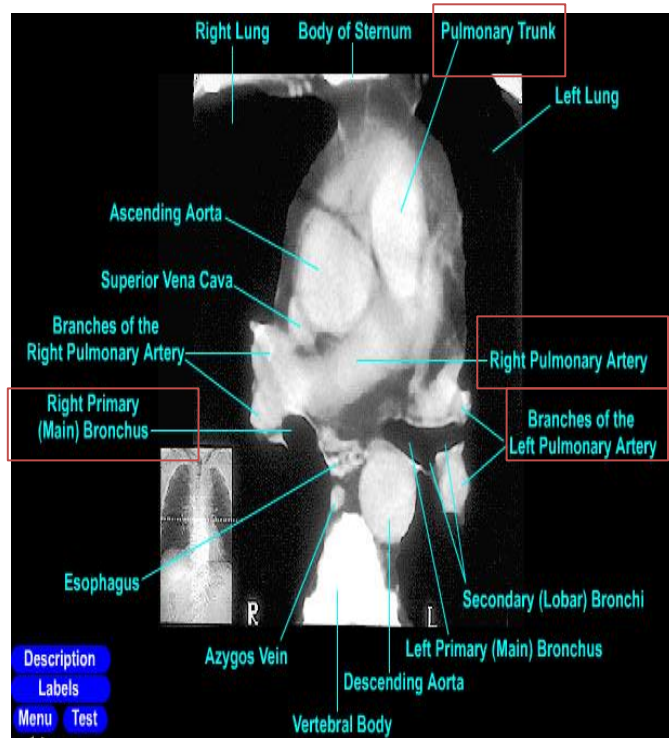
# Objectives

Not given ..!

# Vascular Anatomy of the Chest

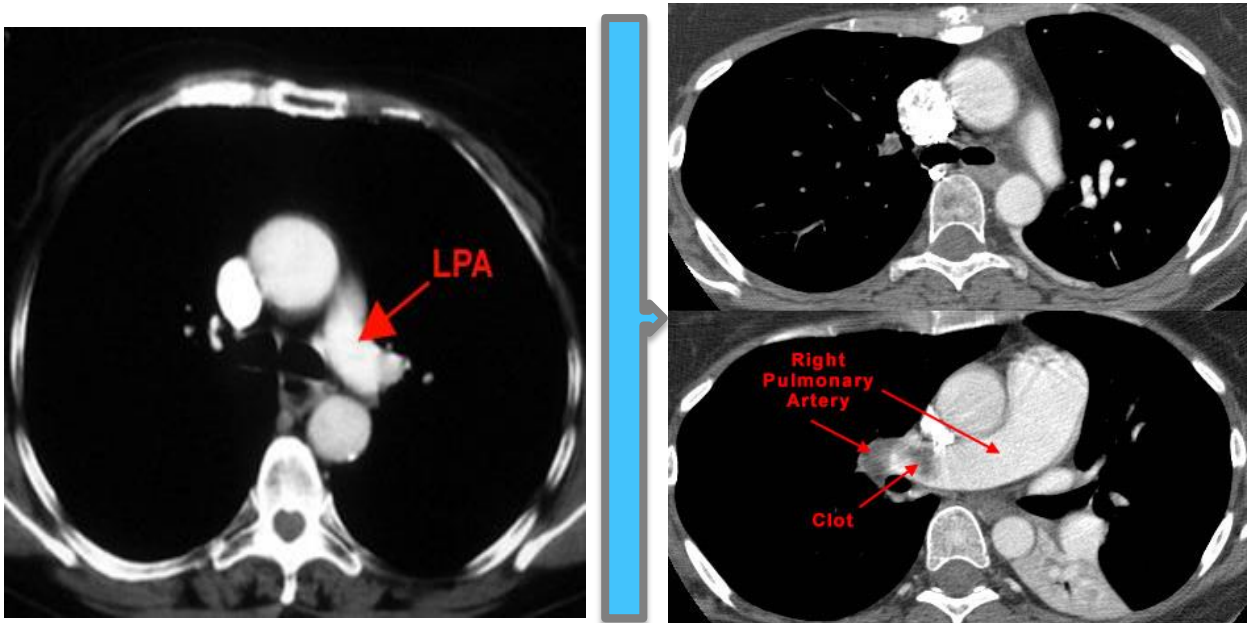


**Note(s):**  
 ~~~~~  
 The Most important vessels here are **pulmonary trunk, right pulmonary artery and left pulmonary artery.** "Mercedes sign=" and if there is an embolus you will see a filling defect.  
 ~~~~~

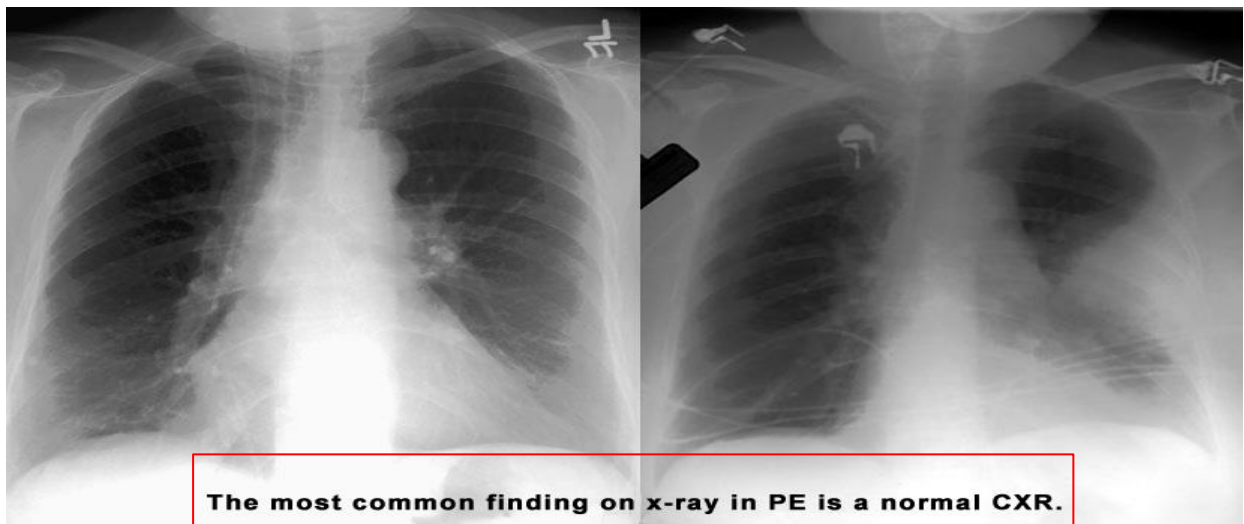


Here, the left pulmonary artery is not clear as the right pulmonary artery because they usually took about 40 sections at different levels.

# Pulmonary Embolism



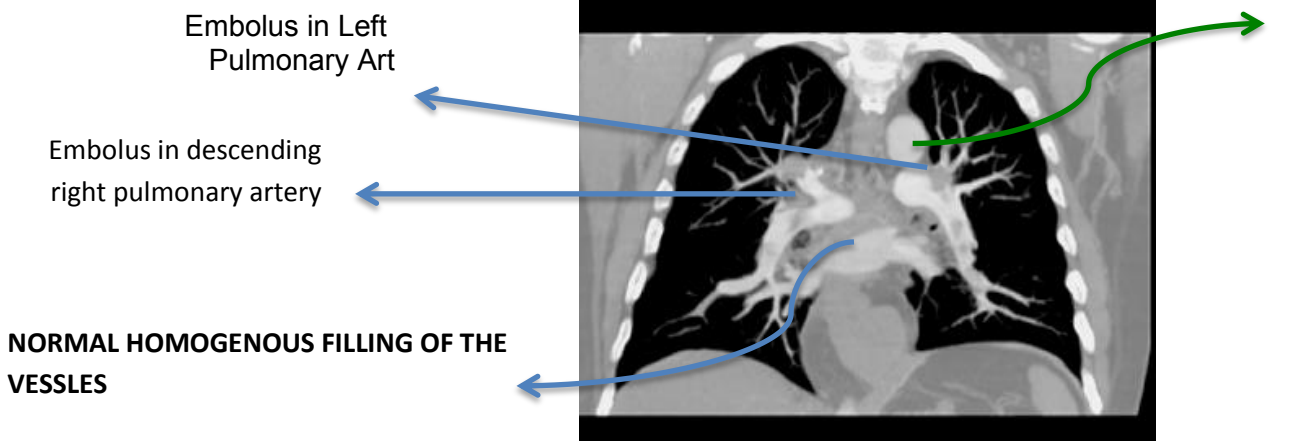
↑ If we don't give a contrast, we would not see the clot.



The most common finding on x-ray in PE is a normal CXR.

## CTA

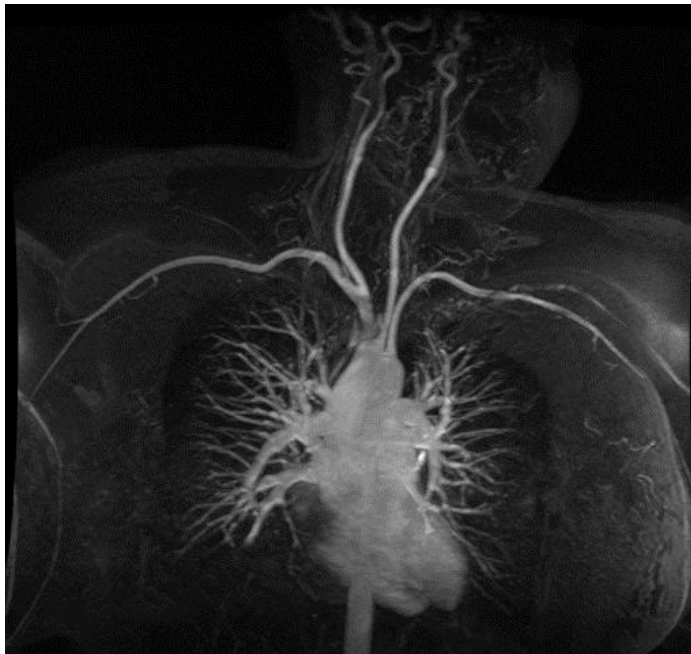
### (Coronal Reconstruction):



## Cardiovascular imaging

- \* Gold standard for diagnosing acute pulmonary embolism: **CT angiogram** (because we need to see the pulmonary artery).
- \* To see the lung parenchyma: high resolution CT of the chest.
- \* To see which chamber of the heart is enlarged and the details of the cardiac muscles: **echocardiogram** (Done by the cardiology department).
- \* To Assess pulmonary vasculature: chest x-ray (the only simple way).

Aortic Arch Anatomy



### Note(s):

\* This is **MRA**=MRI of vessels, here it is **without contrast** but if we wanna see the small vessels we should give contrast.

\*Disadvantages:  
Cost + time.

### Cardio Thoracic Ratio:CTR

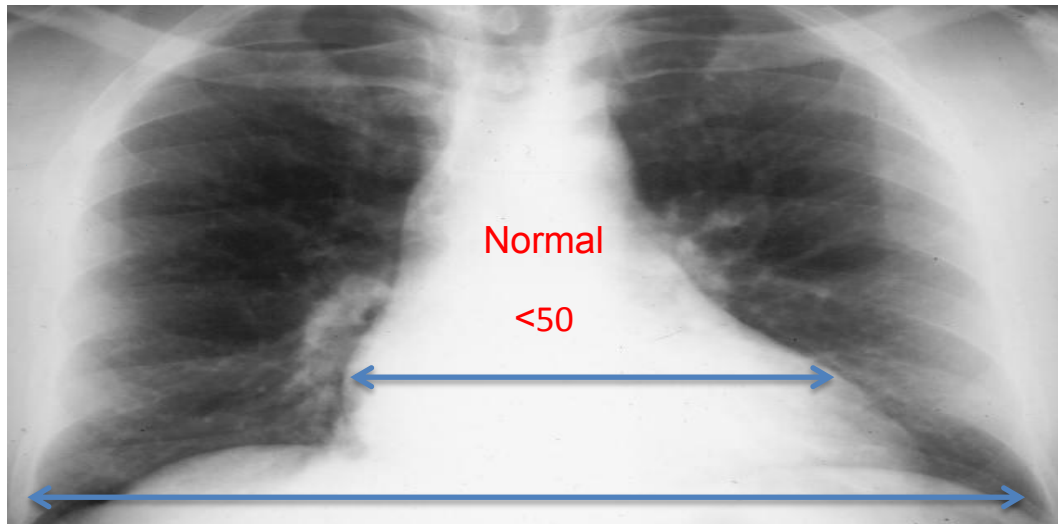
One of the easiest observations to make is something you already know: the cardio-thoracic ratio, which is the widest diameter of the heart, compared to the widest internal diameter of the rib cage and it should be less than 50%. **Go to the next page**

It is a crude assessment of cardiac size and It has to be measured under only **PA view+ erect position with full inspiration**

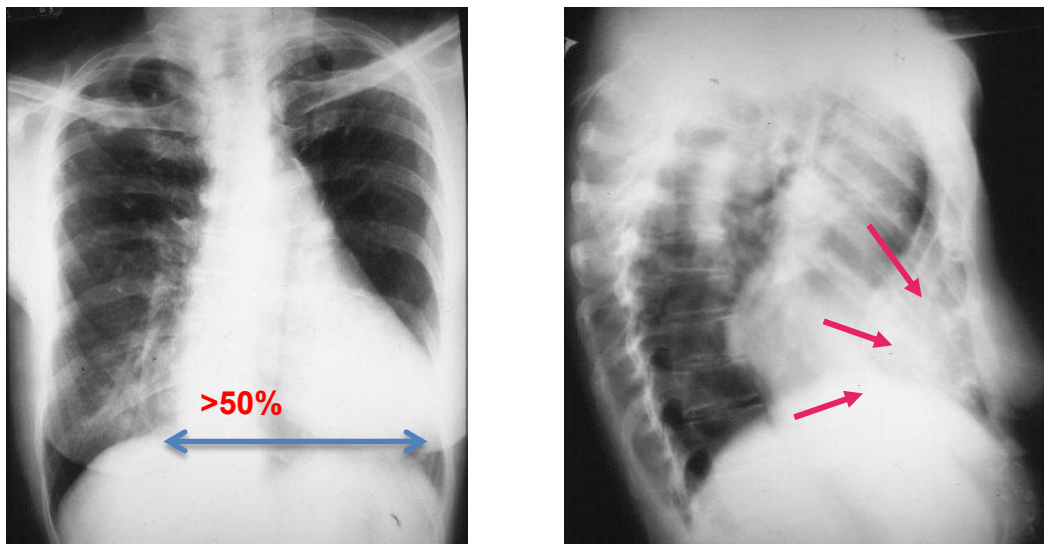


# CTA

1

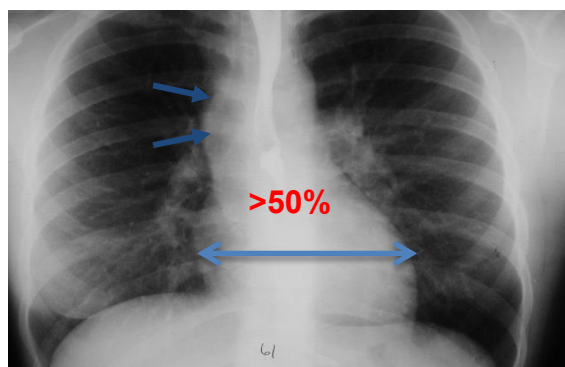


2



Here is a heart that is larger than 50% of the cardiothoracic ratio, but it is still a normal heart. This is because there is an extracardiac cause for the apparent cardiomegaly. On the lateral film, the arrows point to the inward displacement of the lower sternum in a pectus excavatum

3



### Note(s):

Here is an example of a heart which is less than 50% of the CTR in which the heart is still abnormal. This is recognizable because there is an abnormal contour (outline) to the heart (arrows).

## CTA

Sometimes, CTR is more than 50%, But Heart is Normal

### Extracardiac causes of cardiac enlargement

- \*Portable AP films
- \*Obesity
- \*Pregnant
- \*Ascites
- \*Straight back syndrome
- \*Pectus excavatum

Sometimes, CTR is less than 50%  
But Heart is Abnormal

Like In

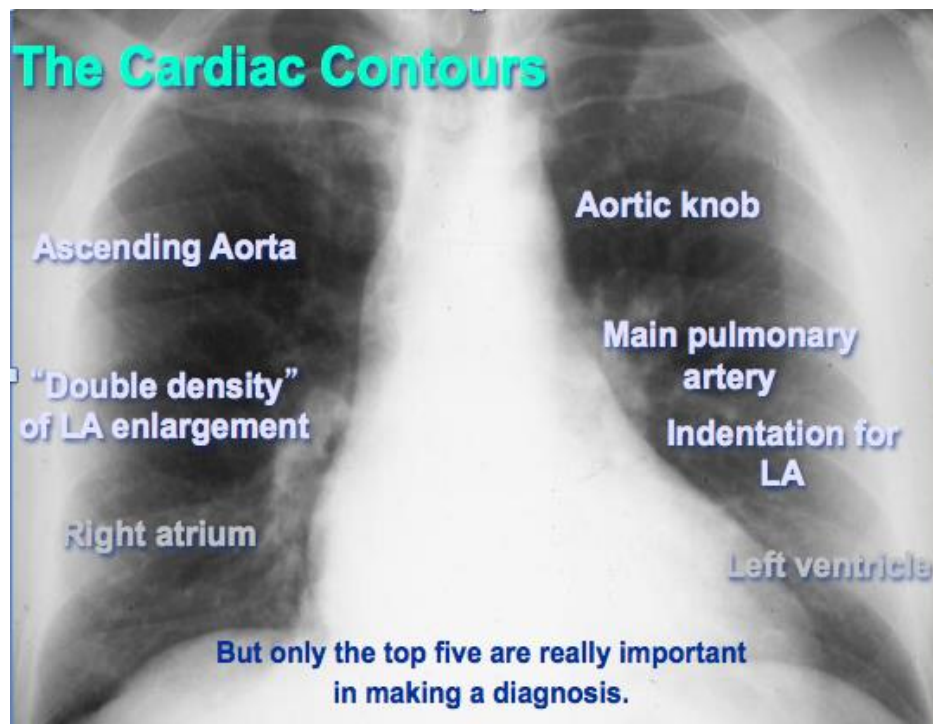
\*Obstruction to outflow of the ventricles

\*Ventricular hypertrophy

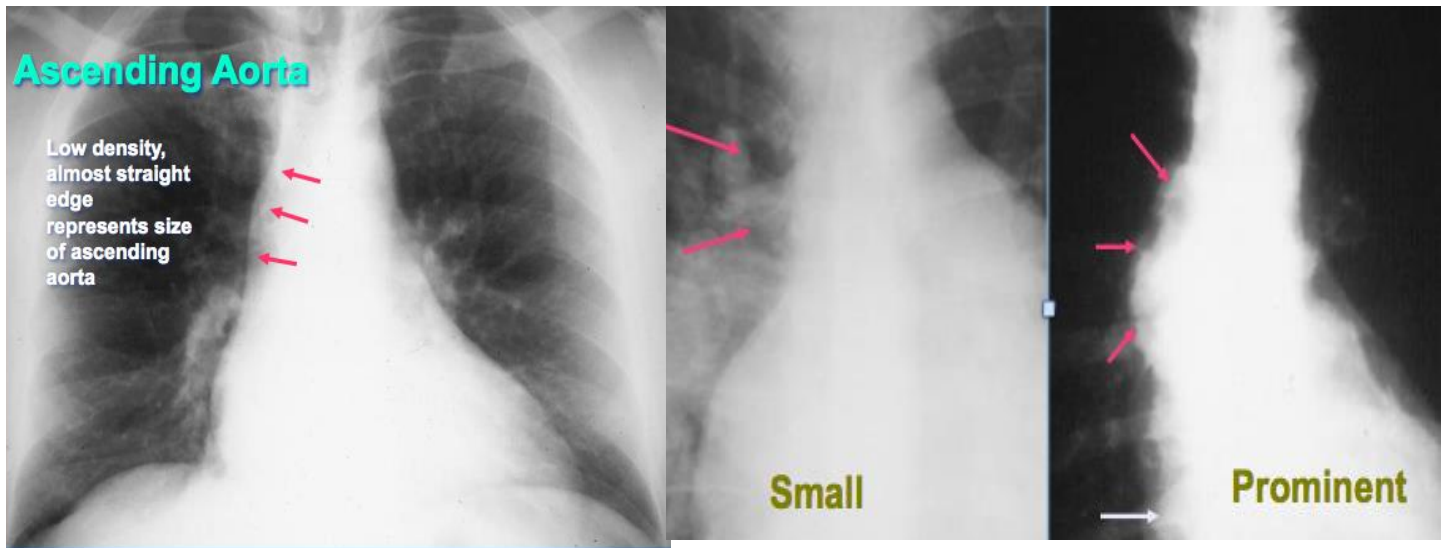
“Must look at cardiac contours”



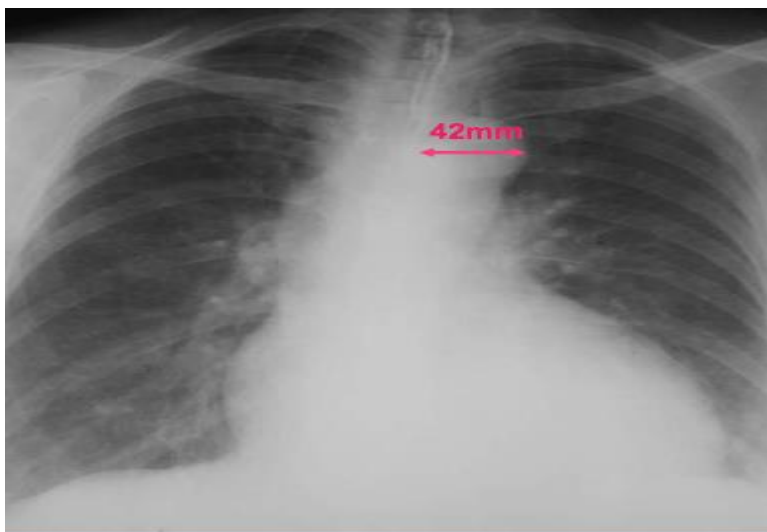
## Cardiac countours



# 1-Ascending Aorta



# 2-Aortic Knob



**Note(s):**

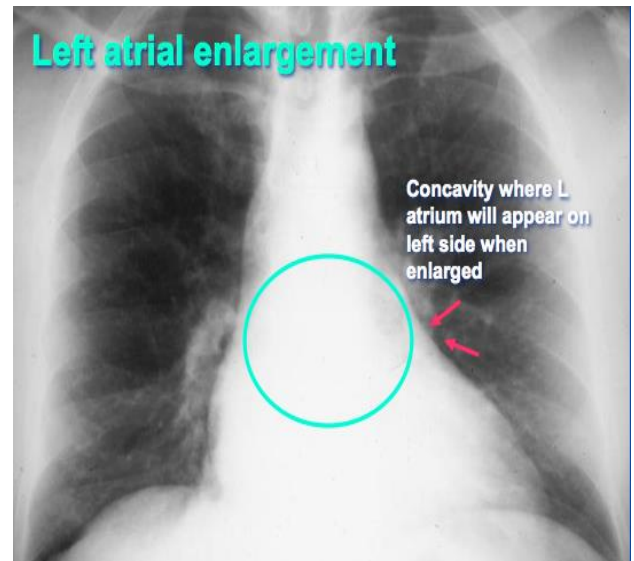
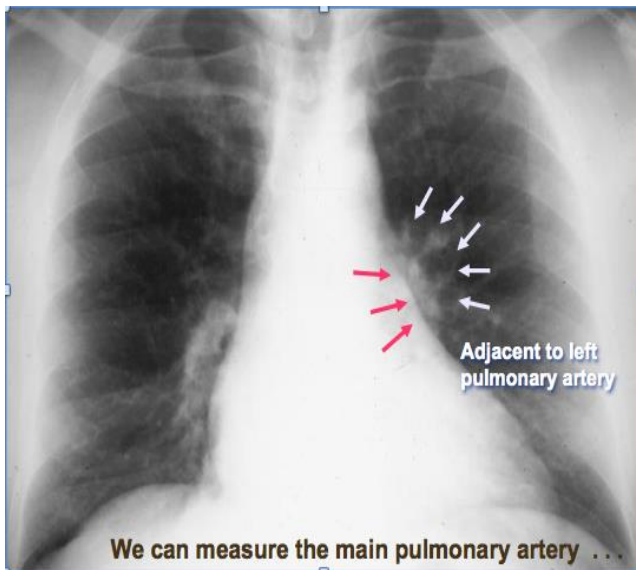
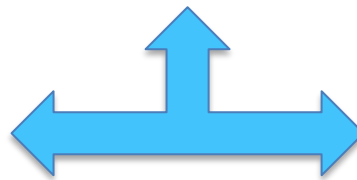
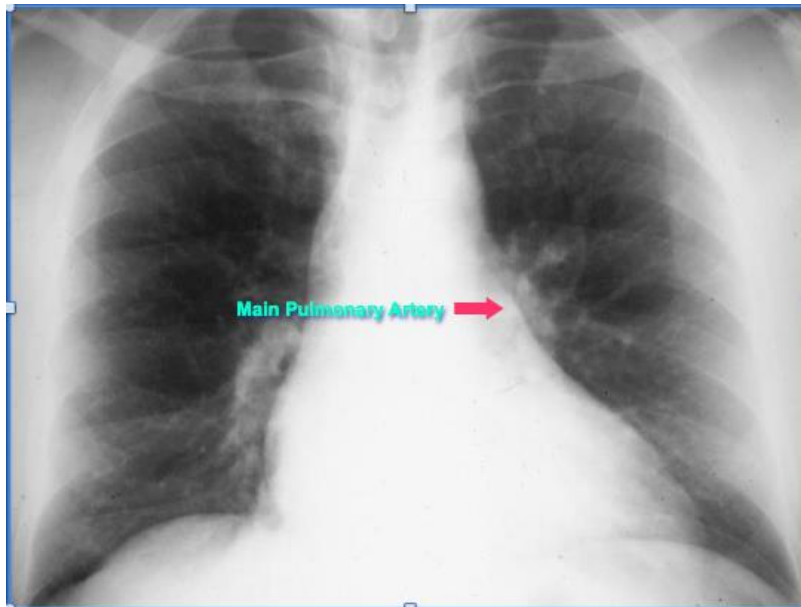
*Aortic Knob enlarged with:*

- $\lambda$  **Increased pressure**
- $\lambda$  **Increased flow**
- $\lambda$  **Changes in aortic wall**

# 3-Main Pulmonary Artery

(= Scroll down





The doctor did not explain all the images in page 8 and 9

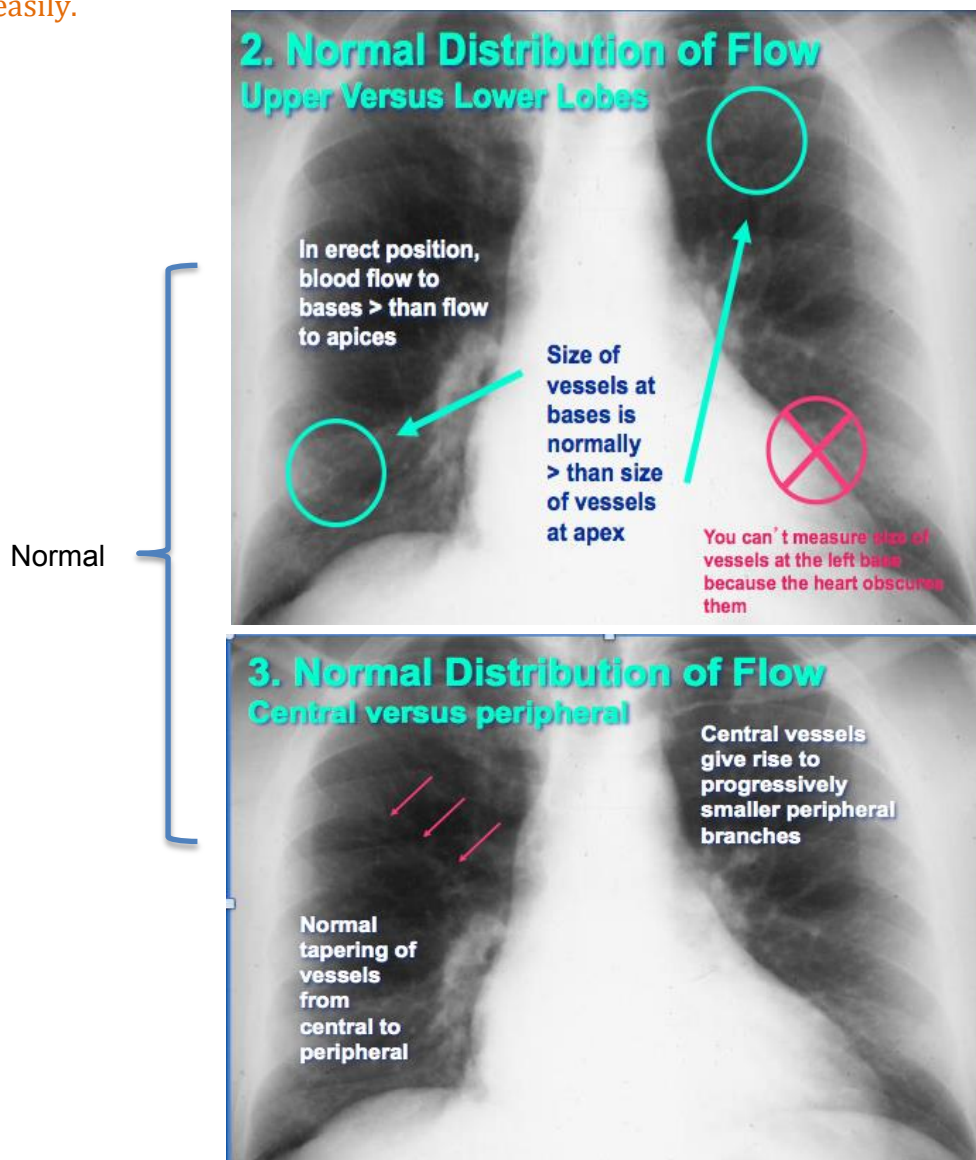
Except Aortic Knob.

# Pulmonary Vasculature

## Five States of the Pulmonary Vasculature

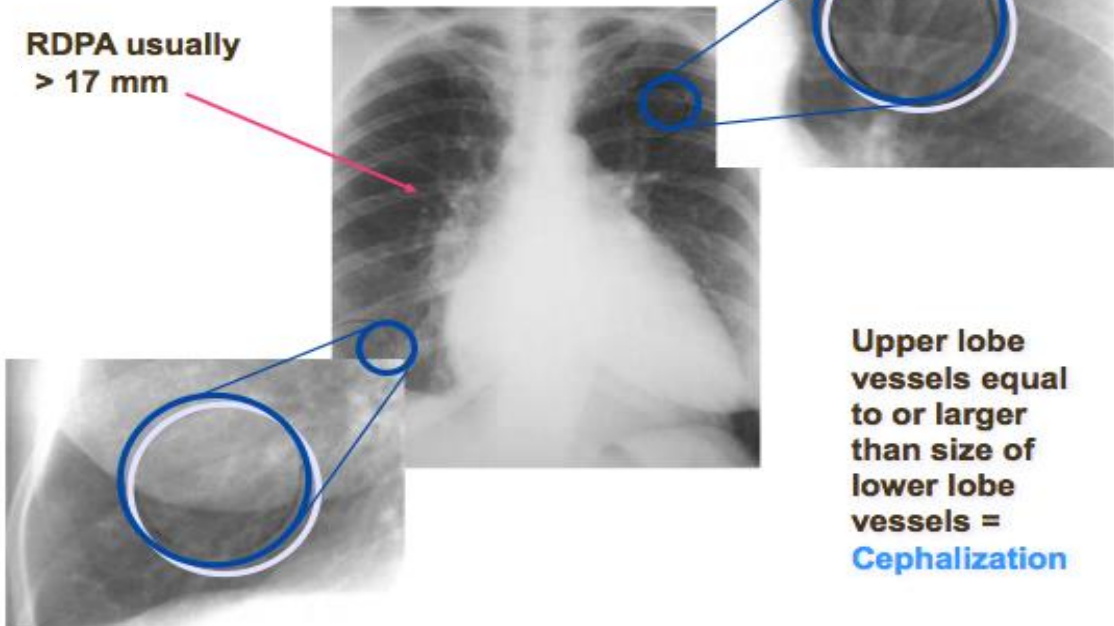
- Normal
- Pulmonary venous hypertension
- Pulmonary arterial hypertension
- Increased flow
- Decreased flow mostly unrecognizable even when it is present

How to evaluate? *If you know the normal vasculature, you can detect any abnormality easily.*

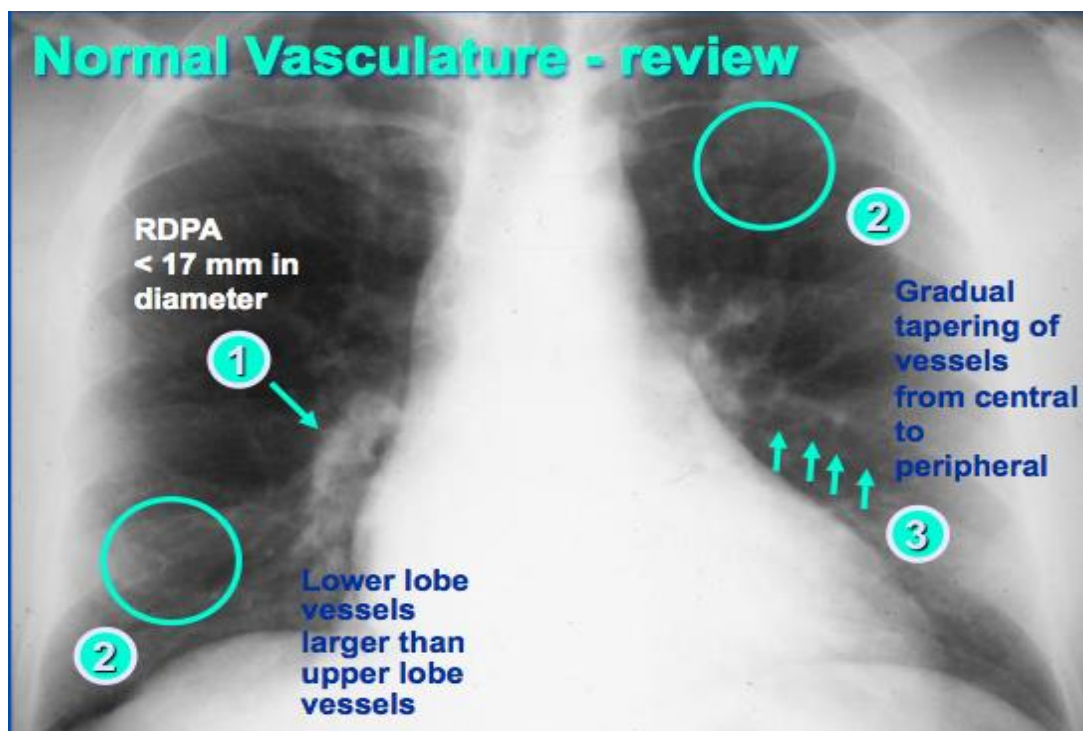


## Venous Hypertension

RDPA usually > 17 mm

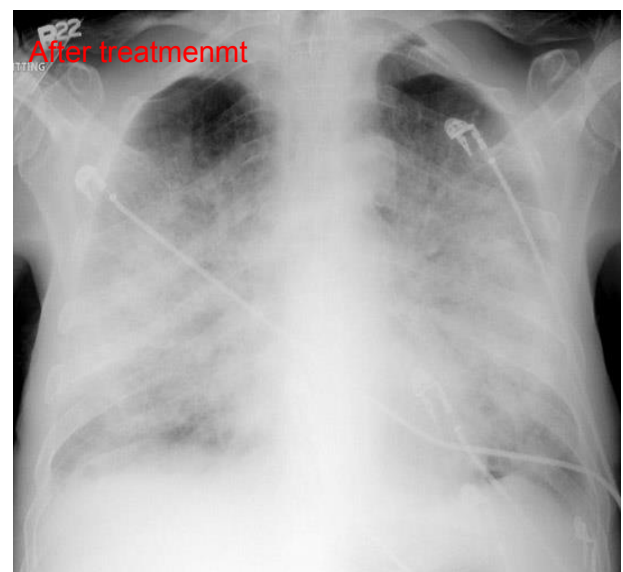
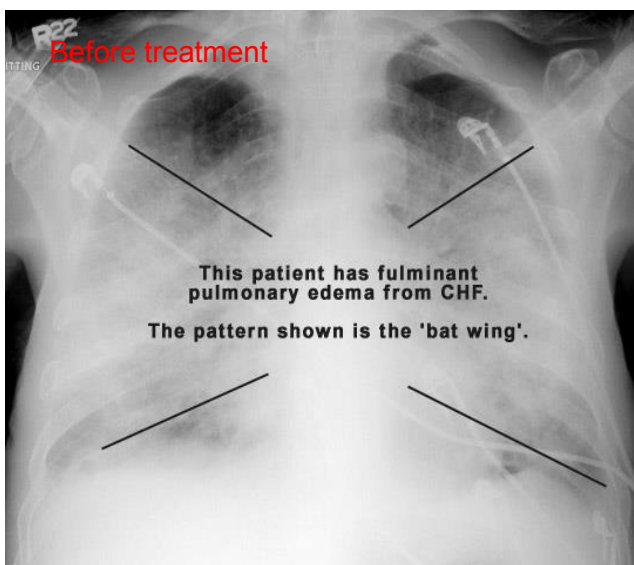
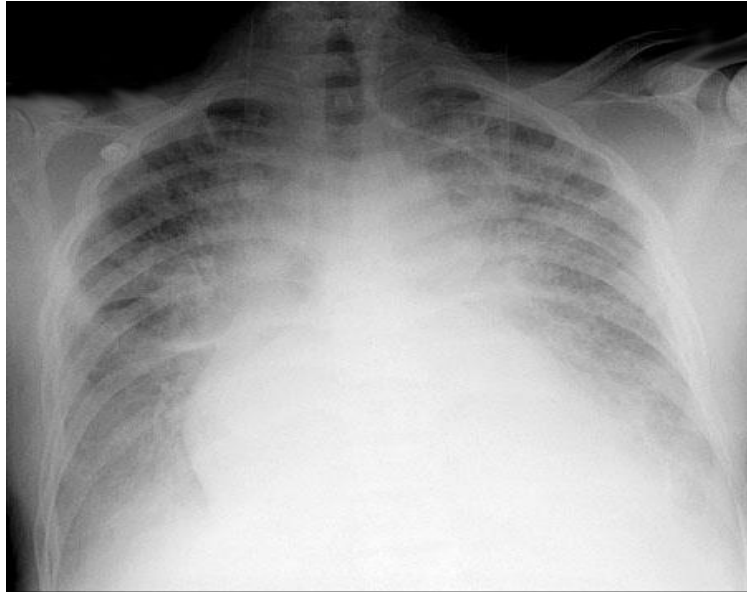


Compare



## Congestive heart failure: (consolidation + Pulmonary Edema)

**CHF with Cardiomegaly**



**So, we can differentiate between Pneumonia and CHF by giving the patient HF treatment, IF they improved after 2 to 3 h ..> this is differently CHF.**

Pneumonia and CHF sometimes look similar in CXR. So "history" (feverish or not) is very important as fever suggest pneumonia, not CHF.

**Always remember:** Diagnosis= History + physical examination + investigations.

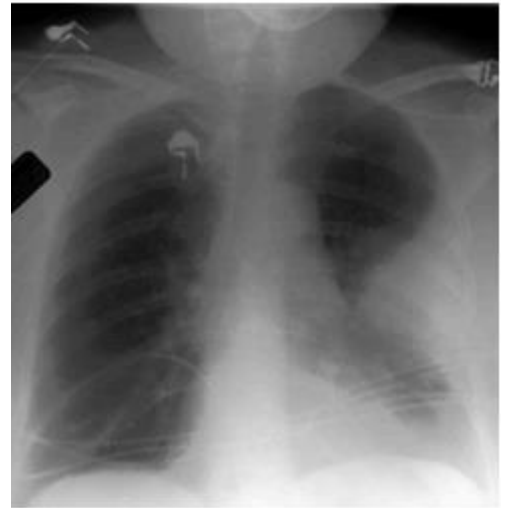
### SUMMARY

1. The common sites for PE are pulmonary trunk, right pulmonary artery and left pulmonary artery "Mercedes sign" and if there is an embolus you will see a defect in the filling.
2. The most common finding on X-ray in PE is normal finding.
3. Gold standard for diagnosing acute pulmonary embolism: CT angiogram (because we need to see the pulmonary artery).
4. Cardio Thoracic Ratio: which is the widest diameter of the heart, compared to the widest internal diameter of the rib cage and it should be less than 50%." It is a crude assessment of cardiac size".
5. In CHF, there will be consolidation + Pulmonary edema.



## Questions

- 1) What is the gold standard imaging for diagnosing acute pulmonary embolism?
  - a. Echocardiogram
  - b. High resolution CT
  - c. CXR
  - d. CT angiography
  
- 2) A 45 years old patient bed-ridden for 4 weeks after spine surgery. He Came presenting to emergency room with sever sustained chest pain??
  - a. Cardiomegaly with pleural effusion due to HF
  - b. Left pulmonary infarction
  - c. Pneumothorax with left sided effusion
  - d. Left malignant lung mass



### 432 Radiology Team Leaders

*Eman AlBedaie*  
Emansaleh202@gmail.com

*Basil AlSuwaine*  
Basil.als@hotmail.com



#### Answers:

1st Questions: D

2nd Questions: B