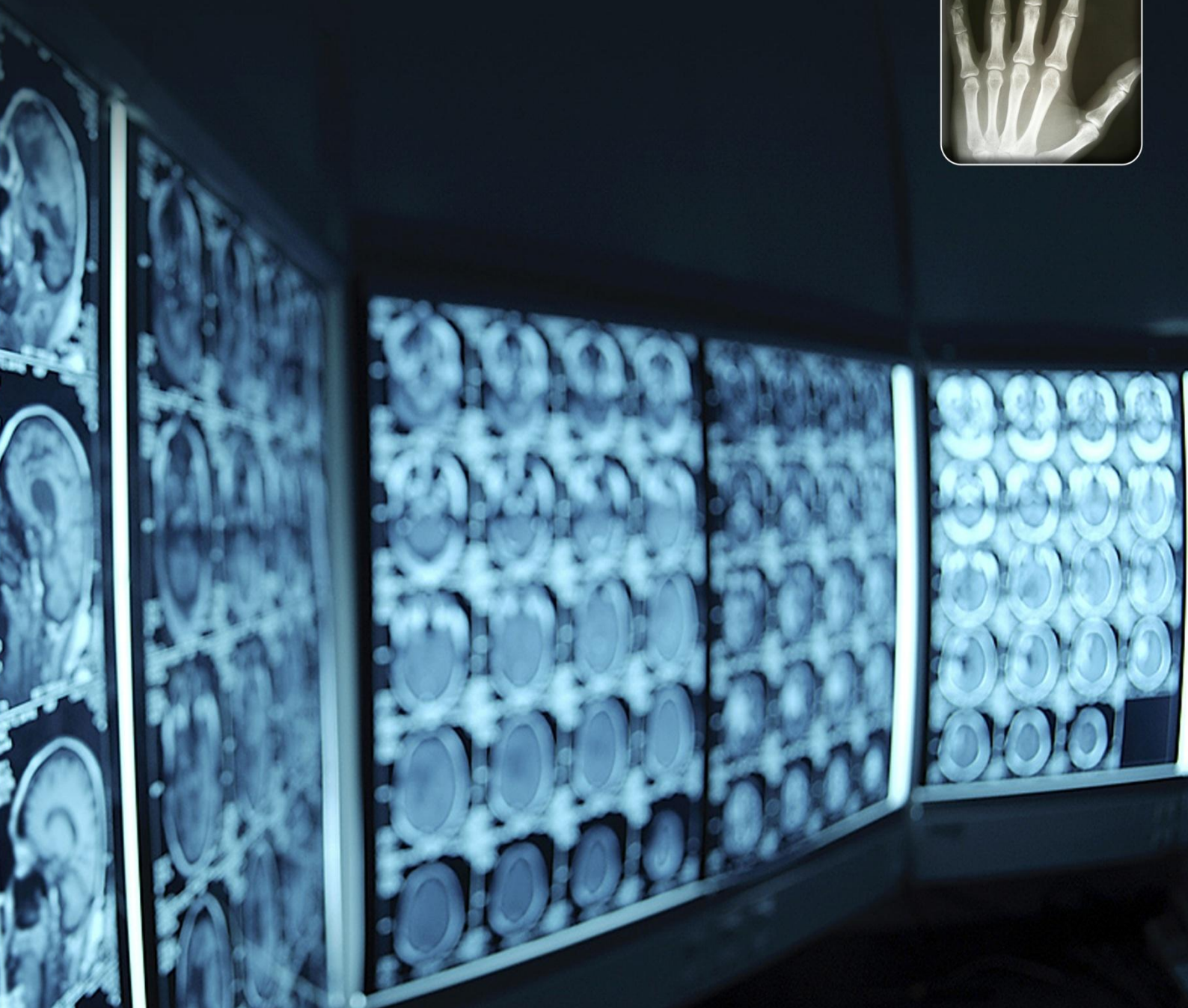


# Radiology Team 429

**Radiologic  
investigation of  
Chest and CVS**



# Radiology team 429

- In this team we used the outlines from the:
  - Dr slides
  - Lecture notes
  - 427 Radiology team
  - Diagnostic Imaging –PETER ARMSTRONG – 6<sup>Th</sup> Edition
- Sorry we don't hold responsibility for any missing information or perhaps – perhaps - wrong material.
- We tried our best to present this lectures in the best way , and we hope that what we wrote is enough to cover the subjects.

Team leaders :

Abdulmajeed Al-Sadhan - Ibrahim Al-Sadhan – Sarah Mahasin

Team members :

Abdullah aleisa – Abdullah Al-Ogayill – Maha balharith- Mashael Al-Towariqi

Best Wishes : )

# DEXTROCARDIA :

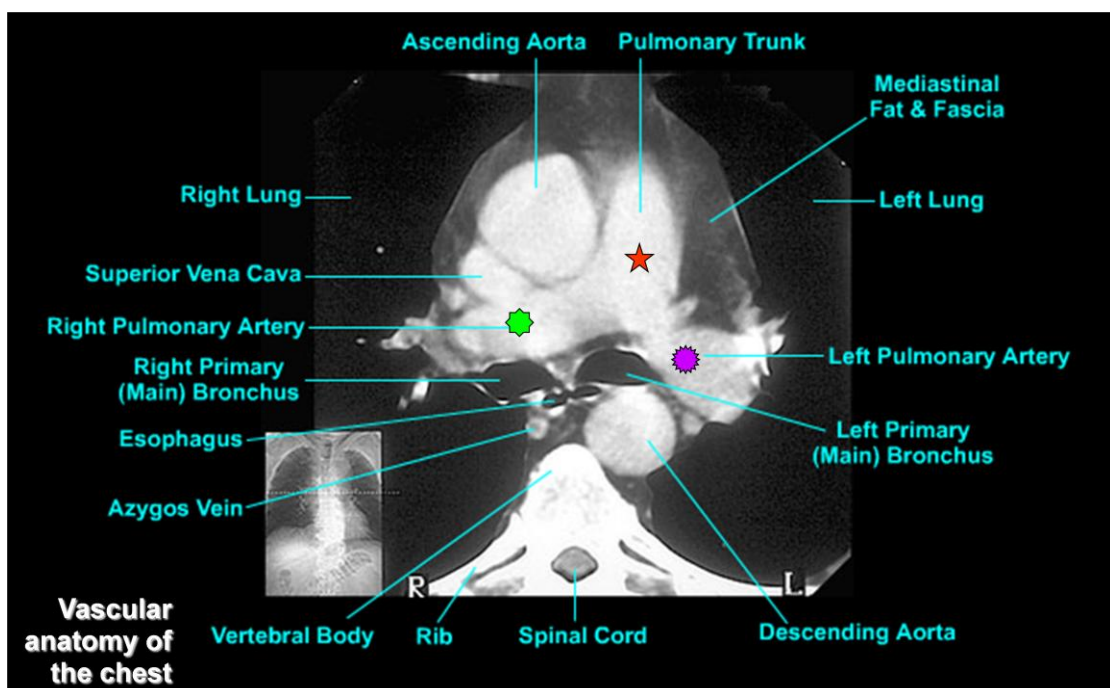


- **Dextrocardia** is a congenital defect in which the heart is situated on the right side of the body
- **Situs inversus** (also called **situs transversus** or **oppositus**) is a congenital condition in which the **major visceral organs are reversed** or mirrored from their normal positions

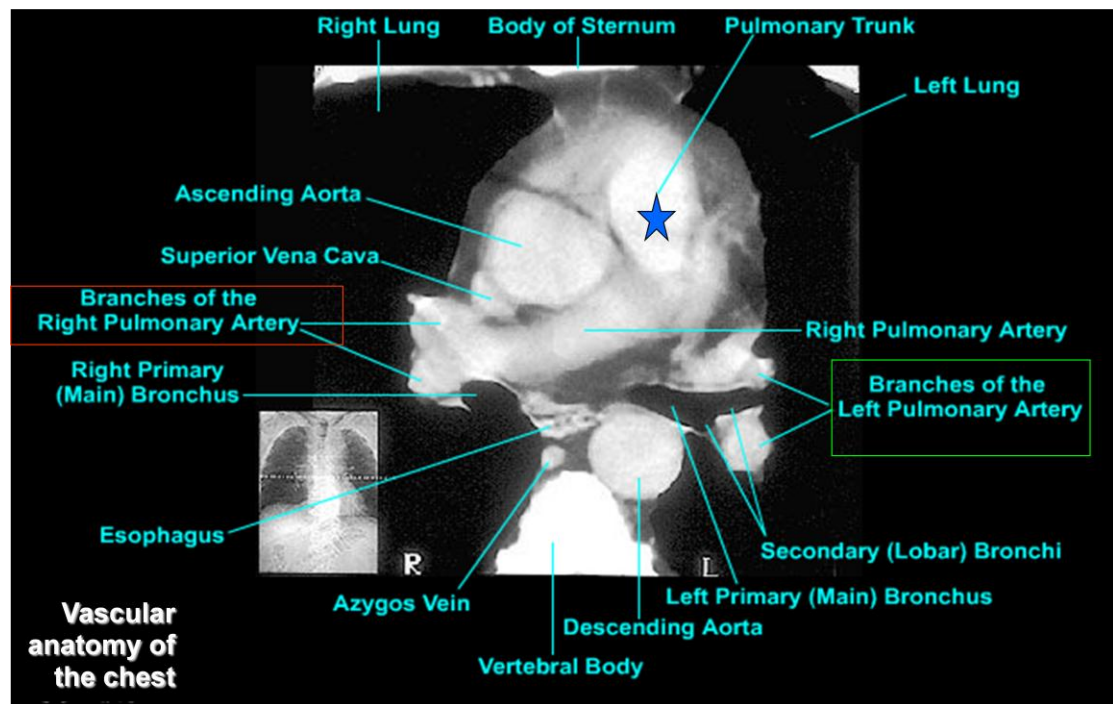
So you should know the difference between Dextro**CARDIA** and Situs inversus

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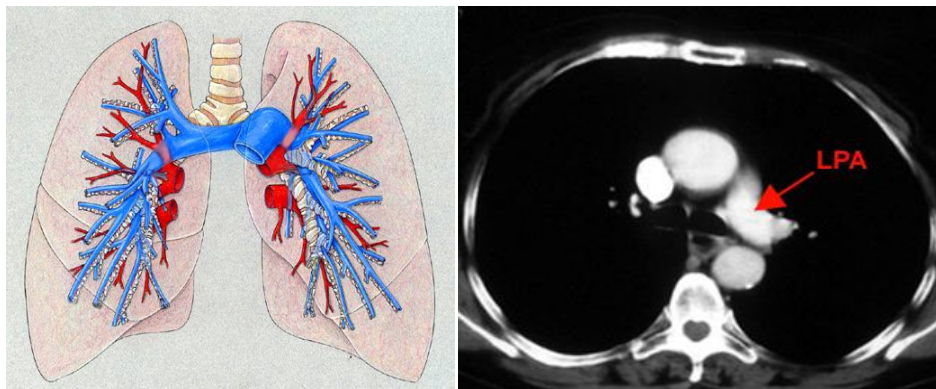
## Vascular anatomy of the chest by CT







## Pulmonary artery :



★★★★★★★★★★

The assessment of the hilar vessels can be more objective since the diameter of the right lower lobe artery can be measured: the diameter at its midpoint is normally between 9 and 16 mm. The size of the vessels within the lungs reflects pulmonary blood flow. There are no generally accepted measurements of normality, so the diagnosis is based on experience with normal films. By observing the size of these various vessels it may be possible to diagnose one of the following haemodynamic patterns.

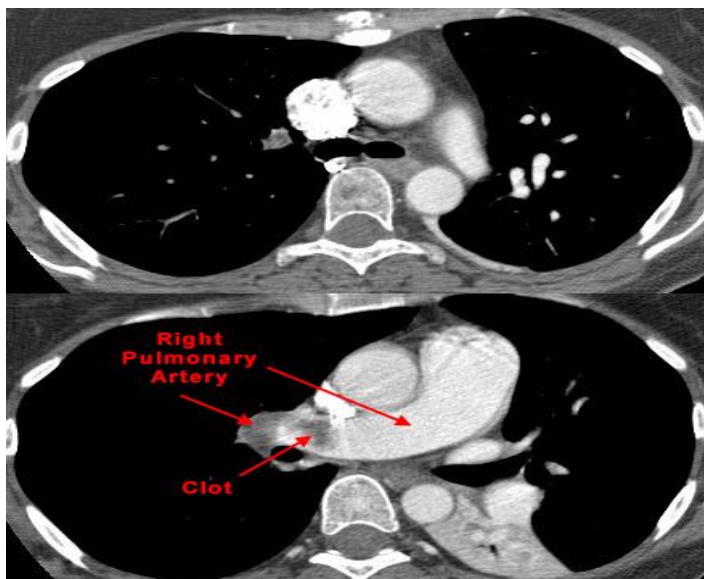
★★★★★★★★★★

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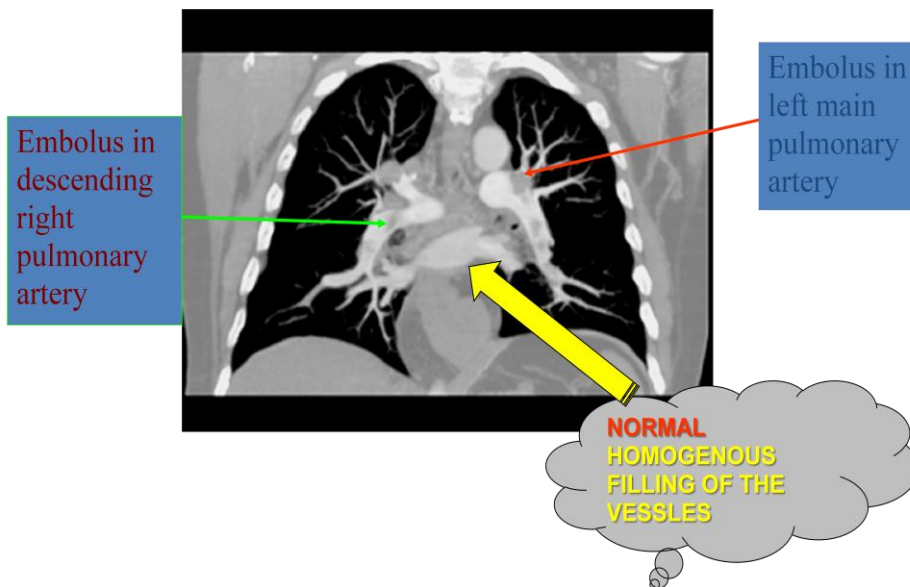
## Pulmonary embolism :



So how can we diagnose PE ?



## CTA (Coronal Reconstruction )



*Computed tomography pulmonary angiography involves imaging the pulmonary arteries during a rapid injection of intravenous contrast agent.*

*It shows the emboli as filling defects within the lumen of the opacified pulmonary arteries*

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## Acute PE



## CTA

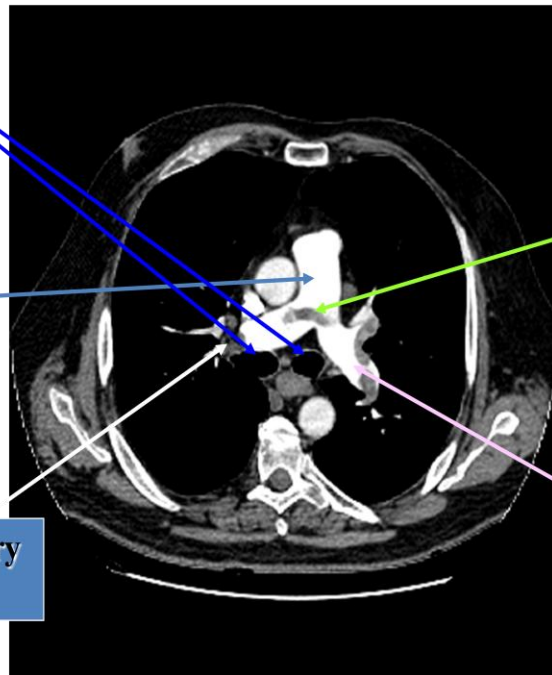
Right and left  
main stem  
bronchi

Main Pulmonary  
Artery

Non-  
obstructive  
saddle  
embolus

Right pulmonary  
artery embolus

Embolus  
extension into  
left pulmonary  
artery



## CTA

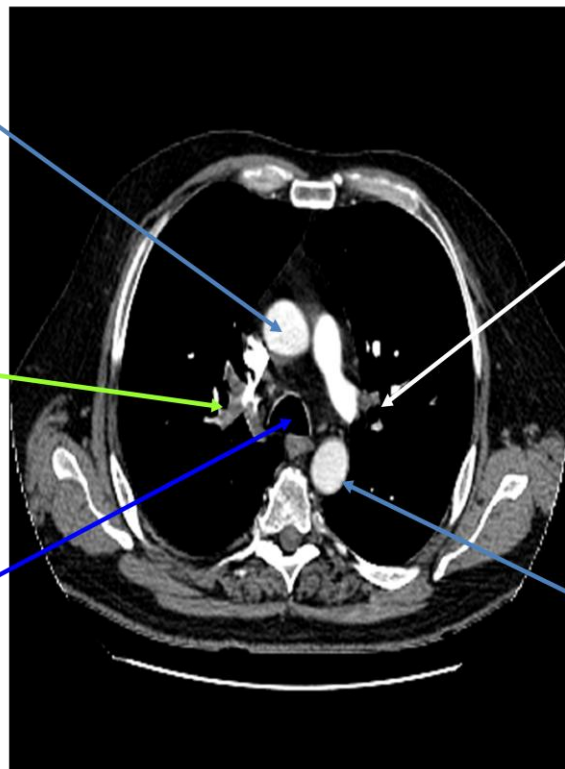
Ascending  
aorta

Embolus in  
right upper  
lobe arterial  
tree

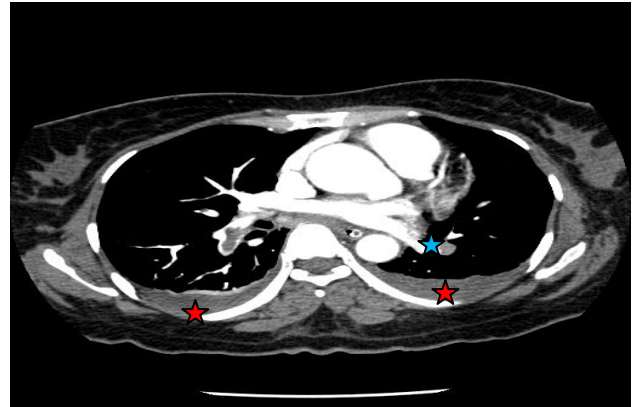
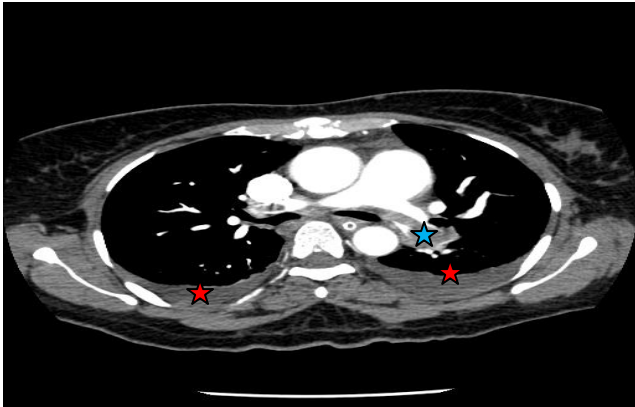
Upper lobe  
branch  
occluded by  
embolus

Trachea

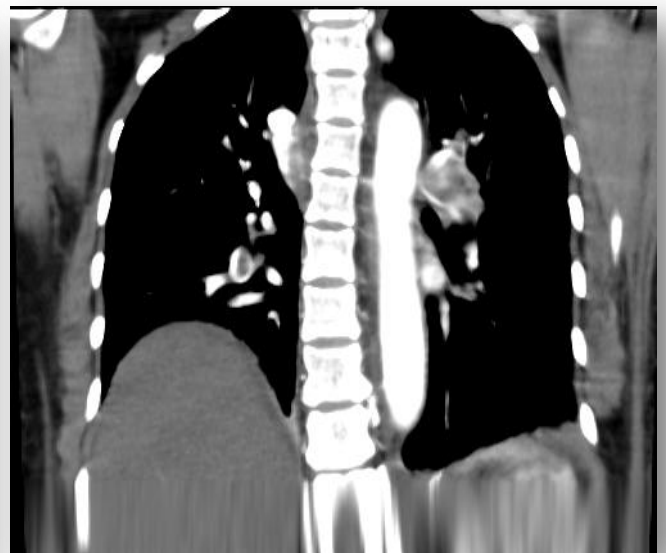
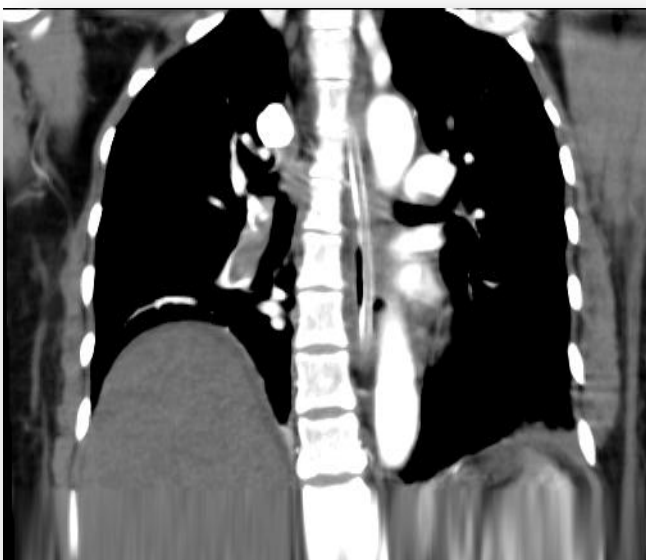
Descending  
aorta



PE



The images above are having left pulmonary artery embolism★ and bilateral pleural effusion★



These are CTA coronal reconstruction showing bilateral pulmonary embolism

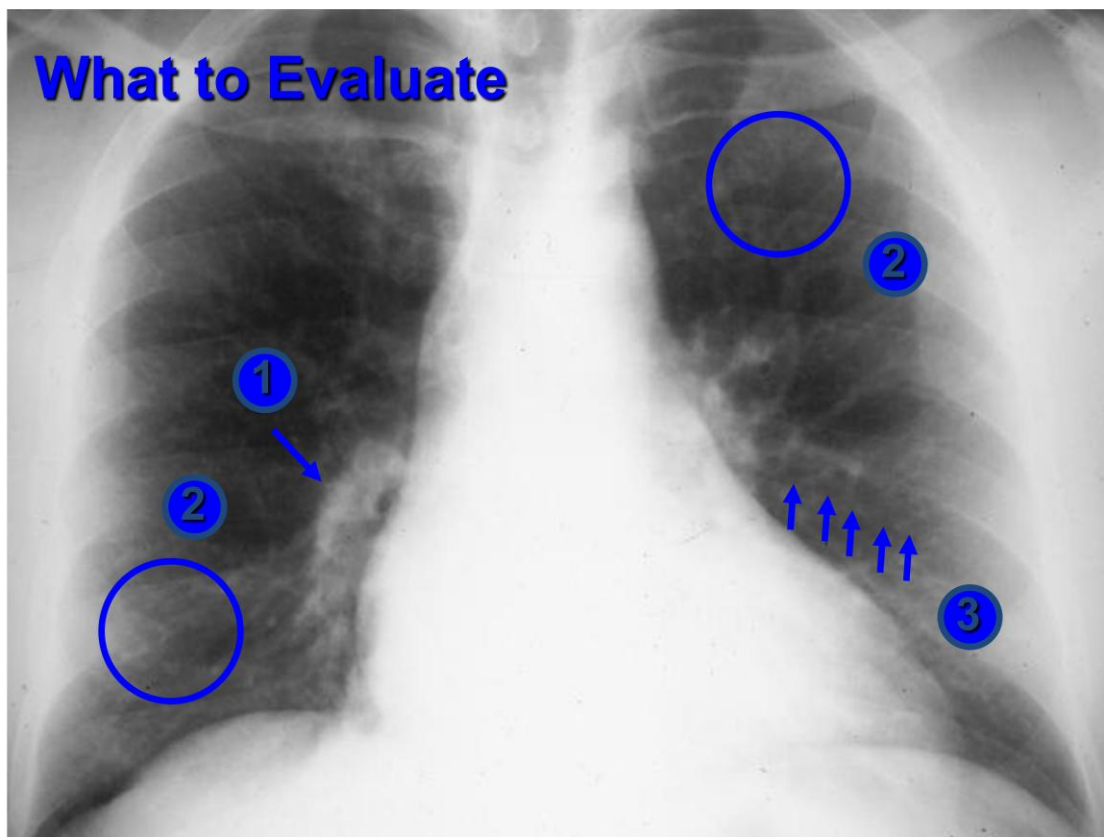


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## The Pulmonary Vasculature

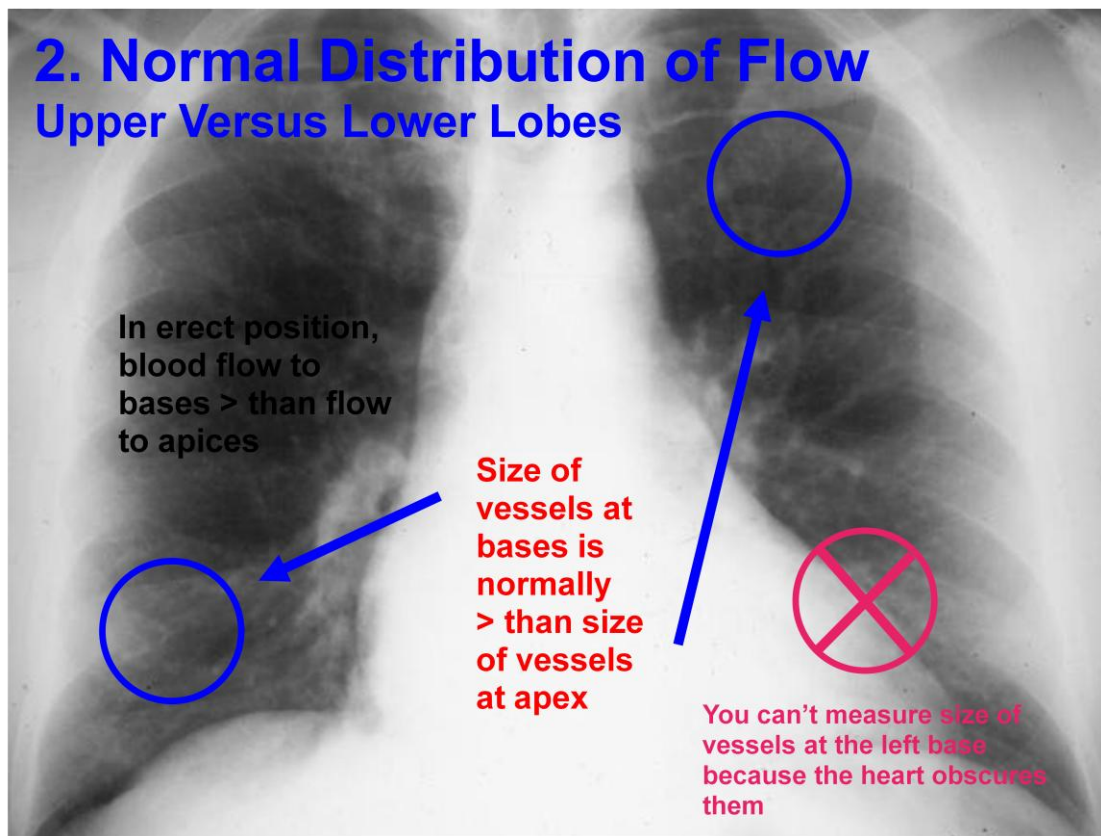
Five States of the Pulmonary Vasculature :

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



Always compare the upper circle and the lower circle

## 2. Normal Distribution of Flow Upper Versus Lower Lobes



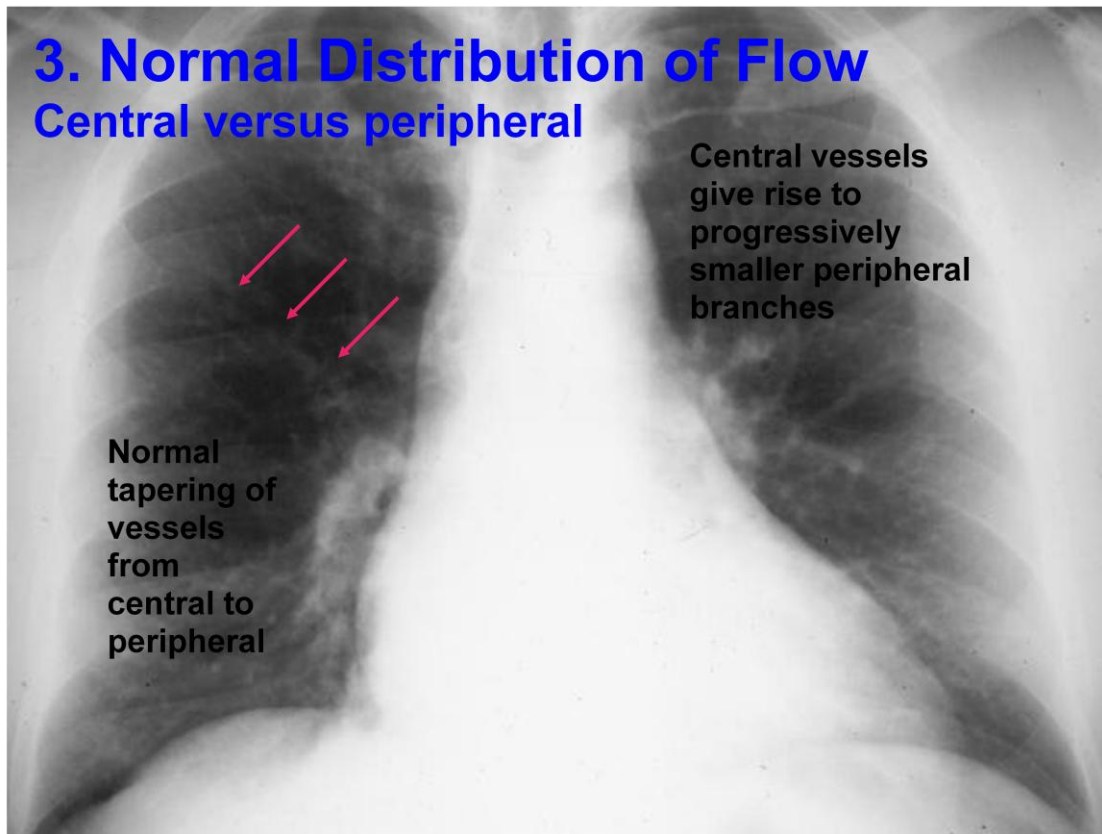
*The plain chest film provides a simple method of assessing the size of the main pulmonary artery and the pulmonary vasculature.*

*Even though it is not possible to measure the true diameter of the main pulmonary artery on plain film, there are degrees of bulging that permit one to say that it is indeed enlarged.*

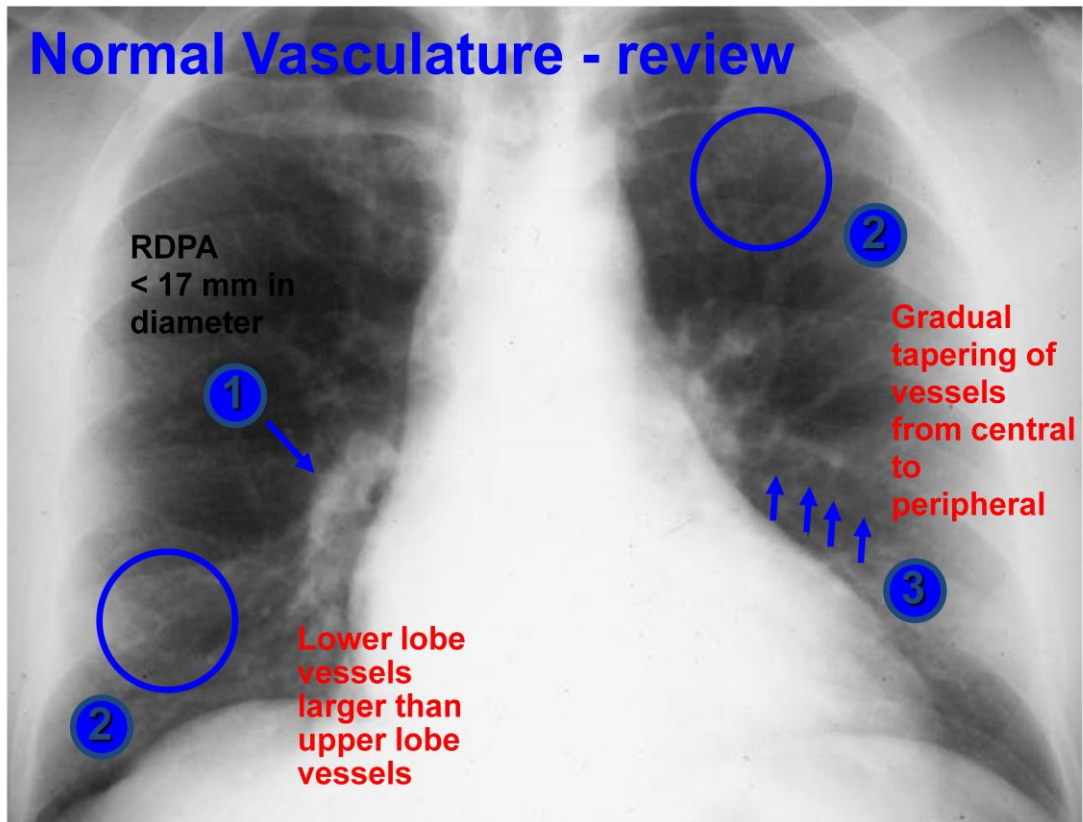
*The assessment of the hilar vessels can be more objective since the diameter of the right lower lobe artery can be measured: the diameter at its midpoint is normally between 9 and 16 mm. The size of the vessels within the lungs reflects pulmonary blood flow. There are no generally accepted measurements of normality, so the diagnosis is based on experience with normal films. By observing the size of these various vessels it may be possible to diagnose one of the following haemodynamic*

### 3. Normal Distribution of Flow

#### Central versus peripheral

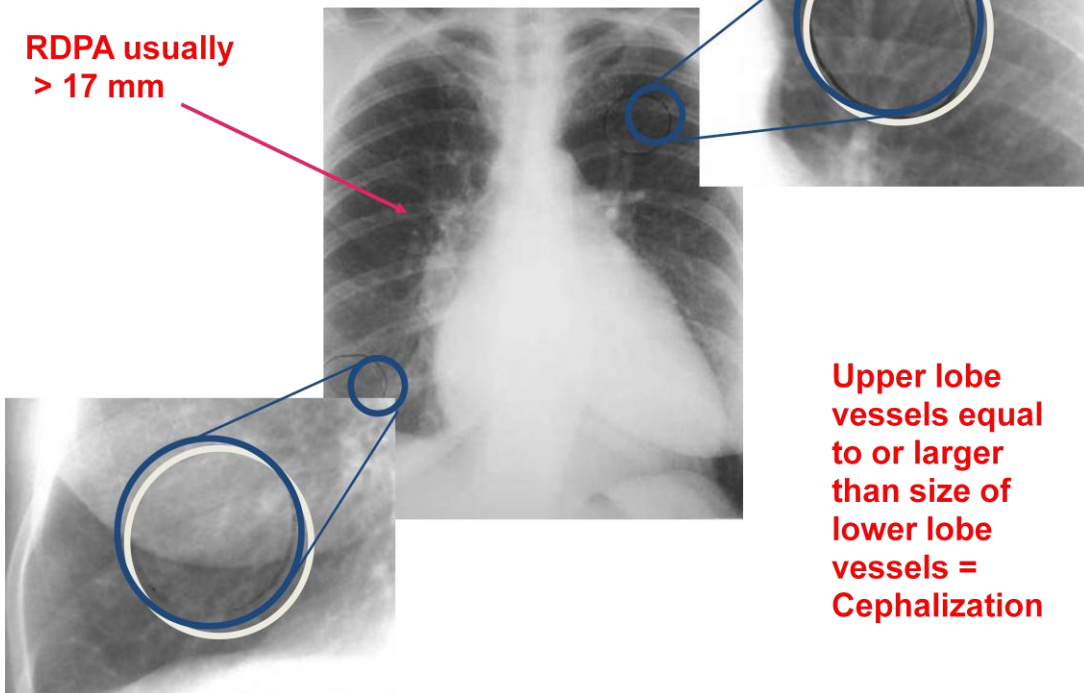


### Normal Vasculature - review



# Venous Hypertension

RDPA usually  
> 17 mm



Upper lobe  
vessels equal  
to or larger  
than size of  
lower lobe  
vessels =  
Cephalization

## *Pulmonary arterial hypertension*

The conditions that cause significant pulmonary arterial hypertension all increase the resistance of blood flow through the lungs. There are many such conditions including:

- various lung diseases (cor pulmonale)
- pulmonary emboli
- mitral valve disease
- left to right shunts
- idiopathic pulmonary hypertension.

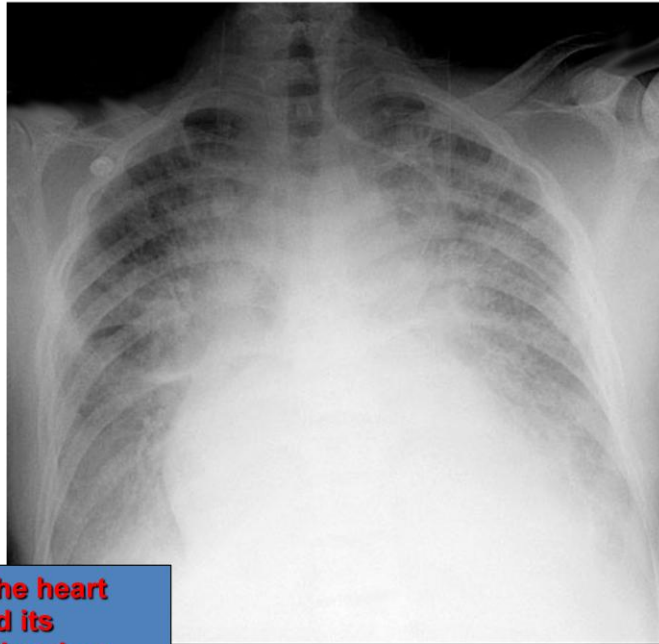
Pulmonary arterial hypertension has to be severe before it can be diagnosed on plain films

## *Pulmonary venous hypertension*

Mitral valve disease and left ventricular failure are the common causes of elevated pulmonary venous pressure. In the normal upright person, the lower zone vessels are larger than those in the upper zones



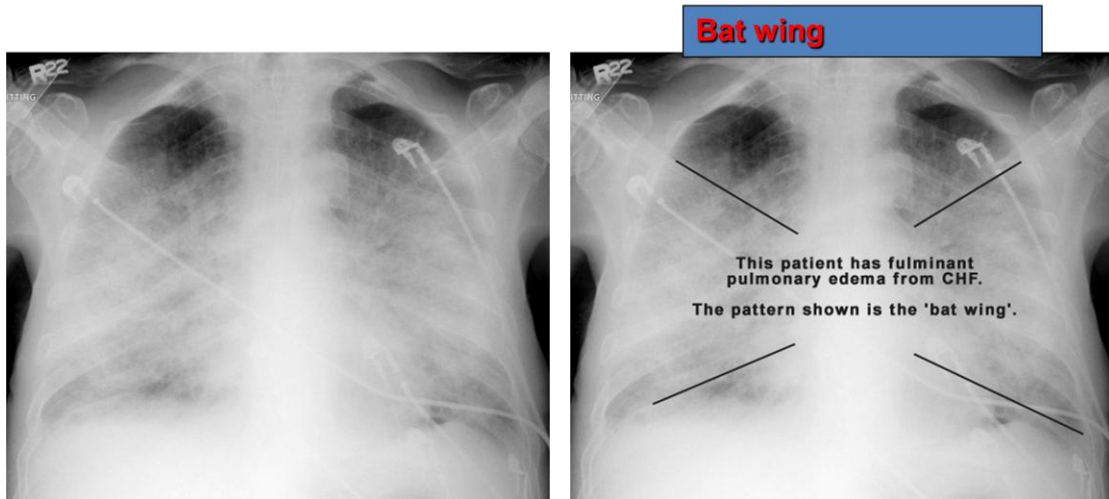
# CHF



In heart failure the heart will be enlarged and its borders will not be clear

- Cardiac enlargement, with or without specific chamber enlargement

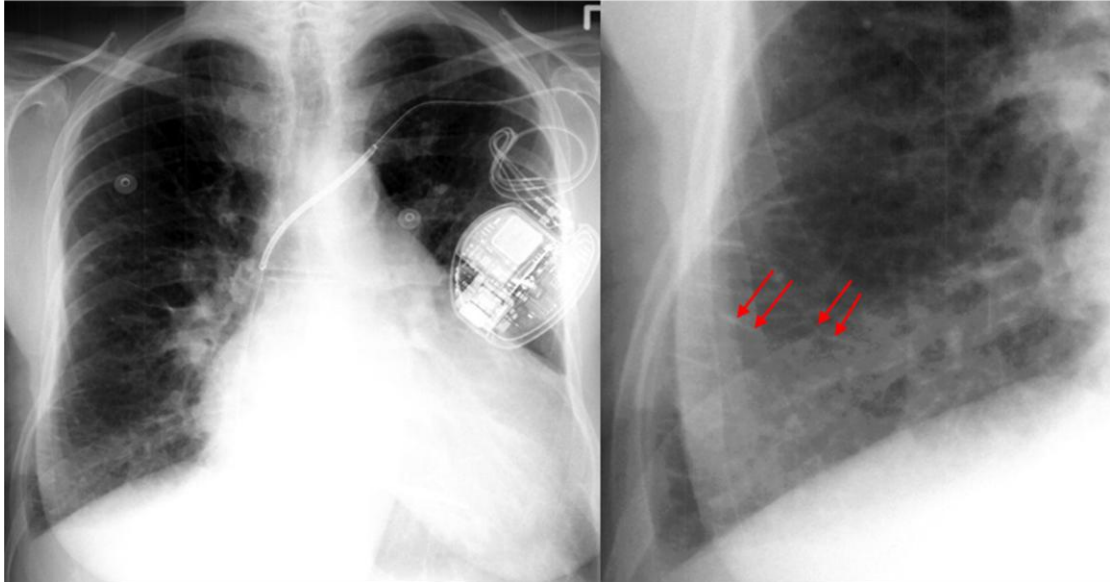
# ACUTE PULMONARY EDEMA



*There are two radiographic patterns of cardiogenic pulmonary oedema: alveolar and interstitial. As oedema initially collects in the interstitial tissues of the lungs, all patients with alveolar oedema also have interstitial oedema.*

- 1. Interstitial oedema: There are many septa in the lungs which are invisible on the normal chest film. When thickened by oedema, the peripherally located septa may be seen as line shadows. These lines are known as Kerley B lines. Another sign of interstitial oedema is that the outline of the blood vessels may become indistinct owing to oedema collecting around them.*
- 2. Alveolar oedema is a more severe form of oedema in which the fluid collects in the alveoli. It is always acute and almost always bilateral, involving all the lobes bilaterally. The pulmonary shadowing is usually maximal close to the hila and fades out peripherally, leaving a relatively clear zone that may contain septal lines around the edge of the lobes. This pattern of oedema is sometimes referred to as the 'butterfly' or 'bat's wing' pattern. Later on, the shadowing becomes more widespread, but is often most obvious in the lower zones.*

# KERLEY'S B-LINES



*Kerley B lines, named after the radiologist who first described them, are horizontal lines never more than 2 cm long seen laterally in the lower zones. They reach the lung edge and are, therefore, readily distinguished from blood vessels, which never extend into the outer centimeter of the lung*