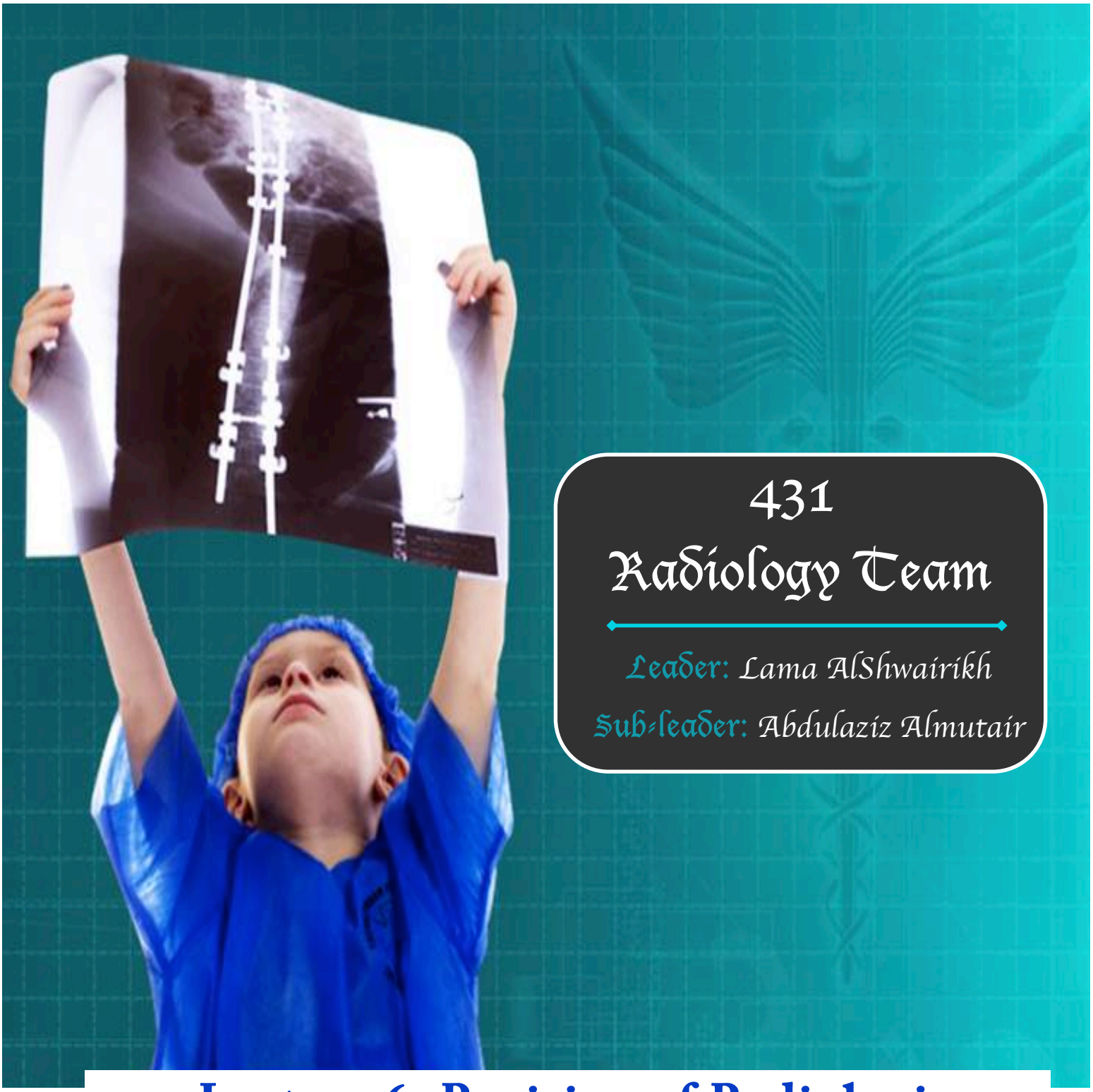

431
Radiology Team

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Lecture 6: Revision of Radiologic Investigations of Chest and CVS Diseases

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Revised By: Lama AlShwairikh

*The doctor had extra slides about HRCT, he said it's extra info and not included in the exam.

*All the images are from the doctor's presentation.

Q: What is the gold standard for diagnosing pulmonary embolism ?

CT angiography (CTA)

Q: What's the difference between Angiography and CT-Angiography?

Angiography:

- Imaging vessels.
- Requires surgical incision in the groin area. Also requires a catheter to be threaded up the body to the heart through a major artery (pulmonary vessel).
- It takes 30 to 45 minutes.
- 10 to 15 % of patient developed cardiac arrest. Usually, they are resuscitated.

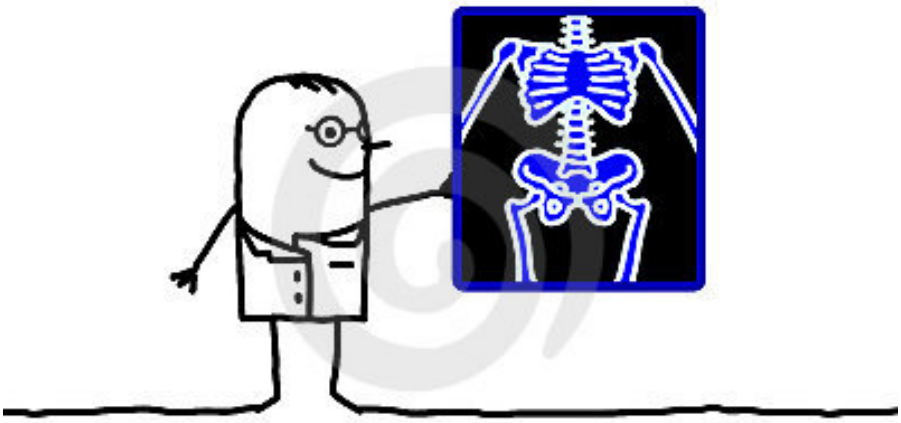
CT-Angiography:

- Seeing vessels using CT with IV contrast.
- Only requires an intravenous line (IV) in the arm. No catheter or other invasive procedure.
- Exam is very short it will take 5 minutes and is very diagnostic.

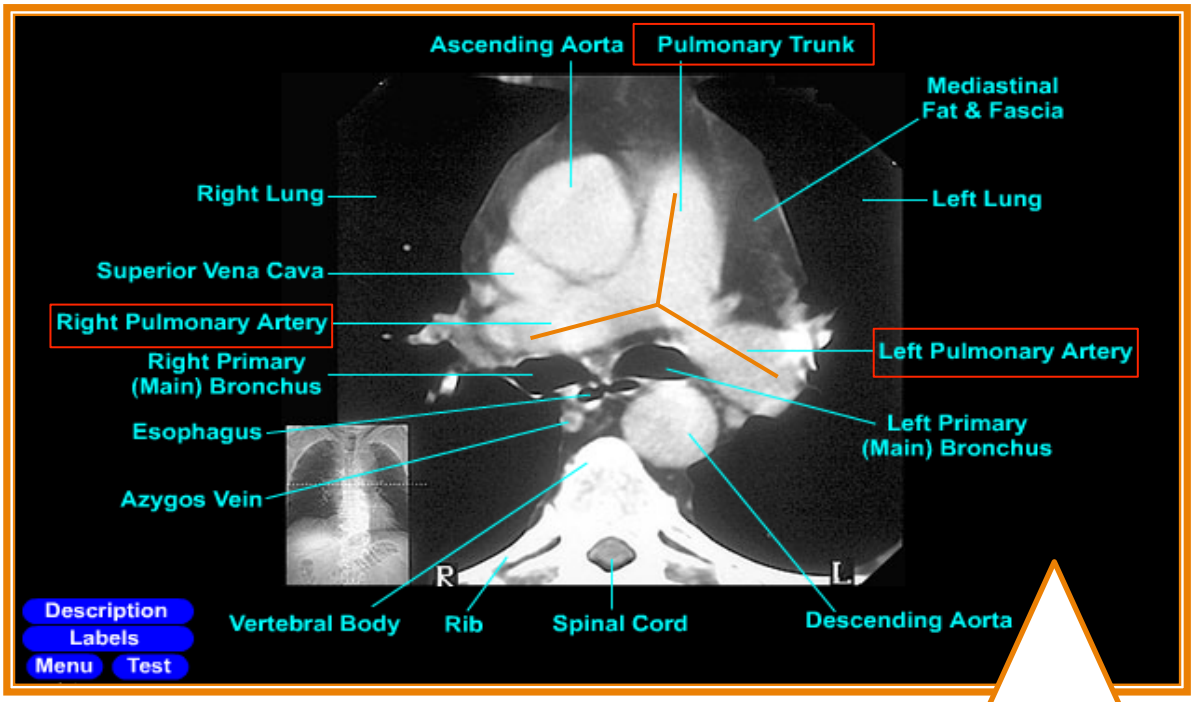
★EXTRA

	Angiogram	Computed Tomography Angiogram
What is the procedure?	An X-ray imaging examination of blood vessels. The images produced are called an angiogram.	A non-invasive imaging examination to help physicians determine if fatty or calcium deposits have built up in coronary arteries.
Who needs the procedure?	Patients whose physicians suspect they may have enlarged arteries, called aneurysms; narrow or blocked arteries; or malformed arteries.	Patients who have moderate to high-risk profiles for coronary artery disease, but who do not have typical symptoms (chest pain, shortness of breath, fatigue, etc.); unusual symptoms for coronary artery disease but low to intermediate risk profiles; or unclear or inconclusive stress test results.
Why is the procedure performed?	To view the heart and arteries. Also called a coronary angiogram or cardiac catheterization. Physicians perform angiograms if they suspect abnormal blood flow. When contrast is injected through the catheter into vessels and X-ray images are taken, radiologists can visualize a problem to enable the physician to determine an appropriate treatment.	To study narrow, blocked, enlarged or malformed arteries without invasive surgery. Information obtained during the CTA examination is used to identify the arteries and any blockages that may exist non-invasively, by creating 3D images on a computer. This enables the physician to determine appropriate treatment.
Procedure Requirements	Requires surgical incision in the groin area. Also requires a wire (catheter) to be threaded up the body to the heart through a major artery.	No incisions. Normally only requires an intravenous line (IV) in the arm. No catheter or other invasive procedure.
What does it see?	Only allows for the analysis of the lumen (the hollow space within the blood vessels).	In addition to analysis of the lumen, CTA provides information about the nature of blockages (soft plaque vs. hard calcified plaque) and the wall of the vessel.
How long does the procedure take?	Procedure requires an average of 30 minutes, plus a minimum of 24 hours recovery time.	Only 10 minutes from scan to diagnosis, with the actual CT scan only lasting for approximately 10 seconds. Patient can return to normal activity immediately after the procedure

What happens during the procedure?	The patient is positioned on an X-ray table, and the heart and blood pressure are monitored. An IV is started so the patient receives fluids and medications. A small amount of X-ray dye (contrast) is injected into the vessels, which makes blood vessels visible on X-ray images. The catheter is inserted into the patient's body, typically the groin, and is guided with the assistance of a fluoroscope, a special X-ray viewing tool. This allows the physician to determine how well blood moves through vessels of the body, commonly the heart, brain, lung, abdomen, arms and legs. Images are projected on a video screen to enable a diagnosis and treatment to be determined.	No incisions. Normally only requires an IV in the arm. No catheter or other invasive procedure. The patient is positioned on the CT scanner's table, and the heart and blood pressure are monitored. An IV is started so the patient receives fluids and medications. A small amount of X-ray dye (contrast) is injected into the vessels, which makes blood vessels visible on X-ray images. The part of the patient's body to be examined is placed inside the opening of the CT scanner. X-rays pass through the body from several angles via a rotating device, and are picked up by special detectors in the scanner, creating cross sectional images without invasive surgery. Typically, higher numbers (16 up to 64) of these detectors result in clearer final images, so Coronary CTA often is referred to as "multi-detector" or "multi-slice" CT scanning.



Vascular anatomy of the chest



This is the most important image in CT-angiography because it shows the normal anatomy of pulmonary arteries where the embolus will be seen

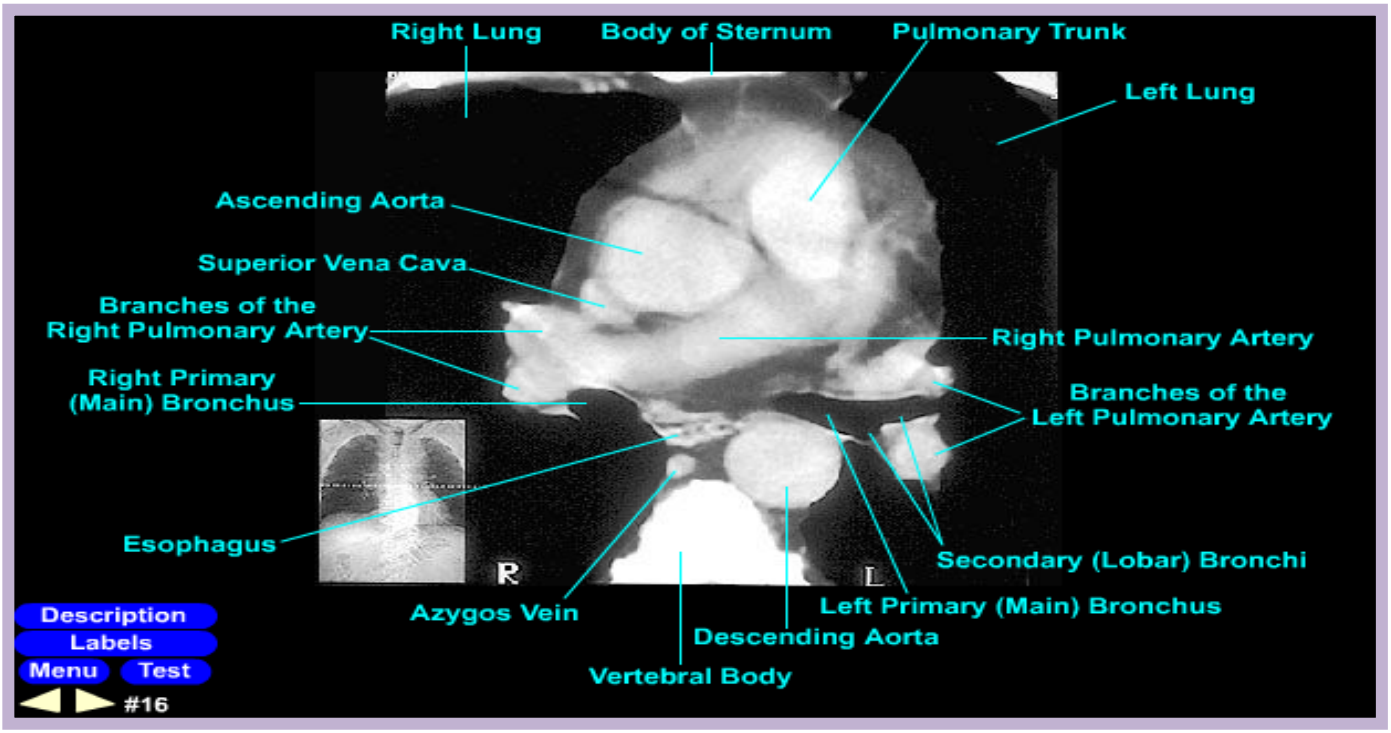
IMPORTANT

Mercedes sign

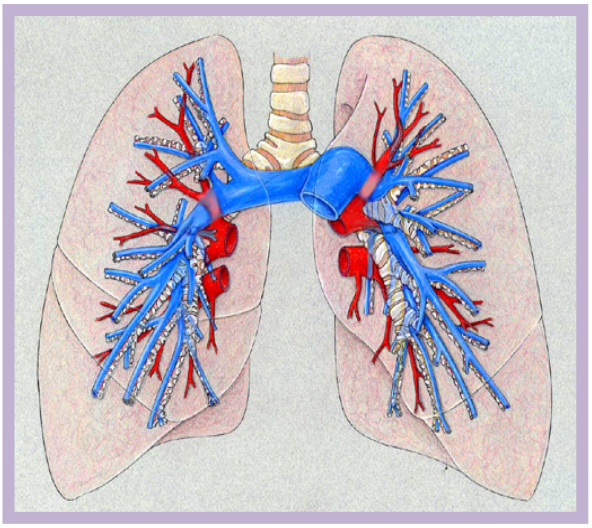
Upper limp: pulmonary trunk

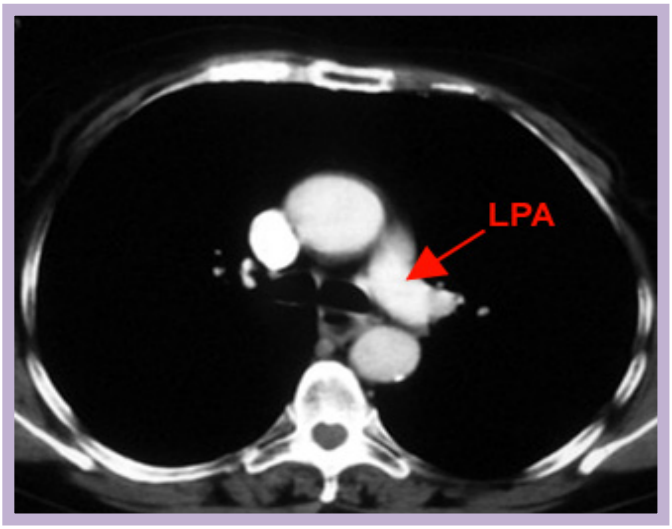
Left limp: right pulmonary artery

Right limp: left pulmonary artery

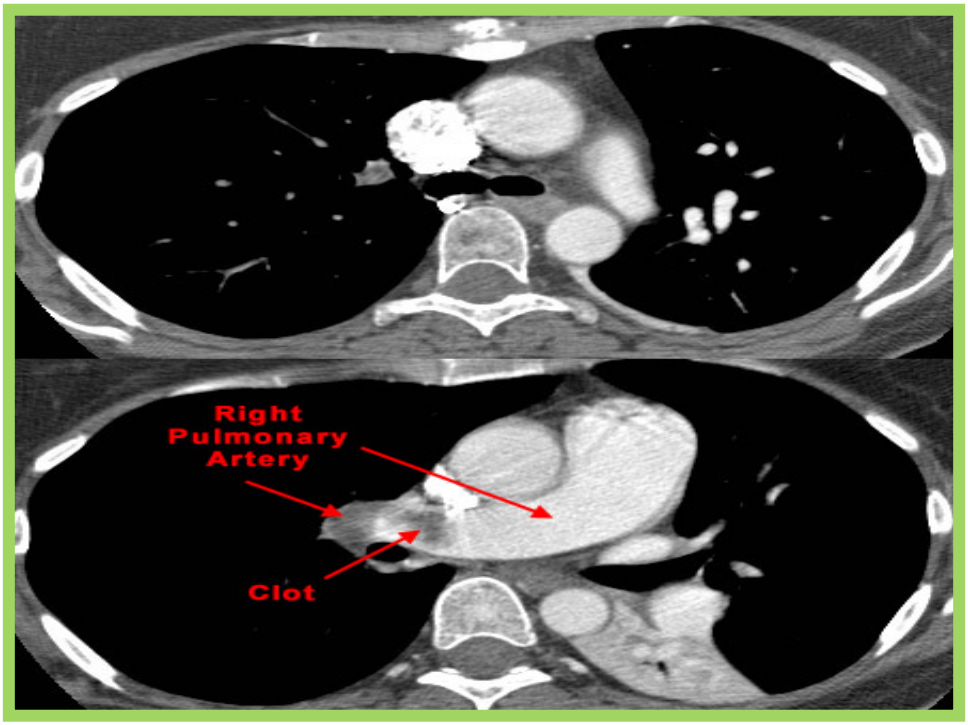


You can see the right lung, part of the left lung and the pulmonary trunk



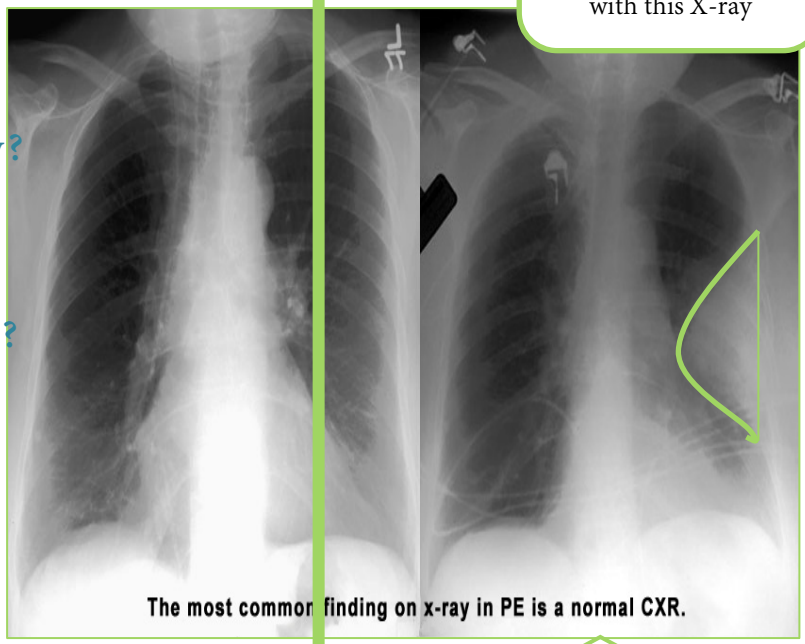


This is the level where you only see the left pulmonary artery



A patient came to the emergency unit with severe chest pain and was clinically diagnosed with pulmonary embolism. CT-angiography was ordered for him.

50 % of patient with acute pulmonary embolism present with this X-ray



Q: How do we describe the abnormality?

Pulmonary embolism in the right side.

Q: How do we describe it radiologically?

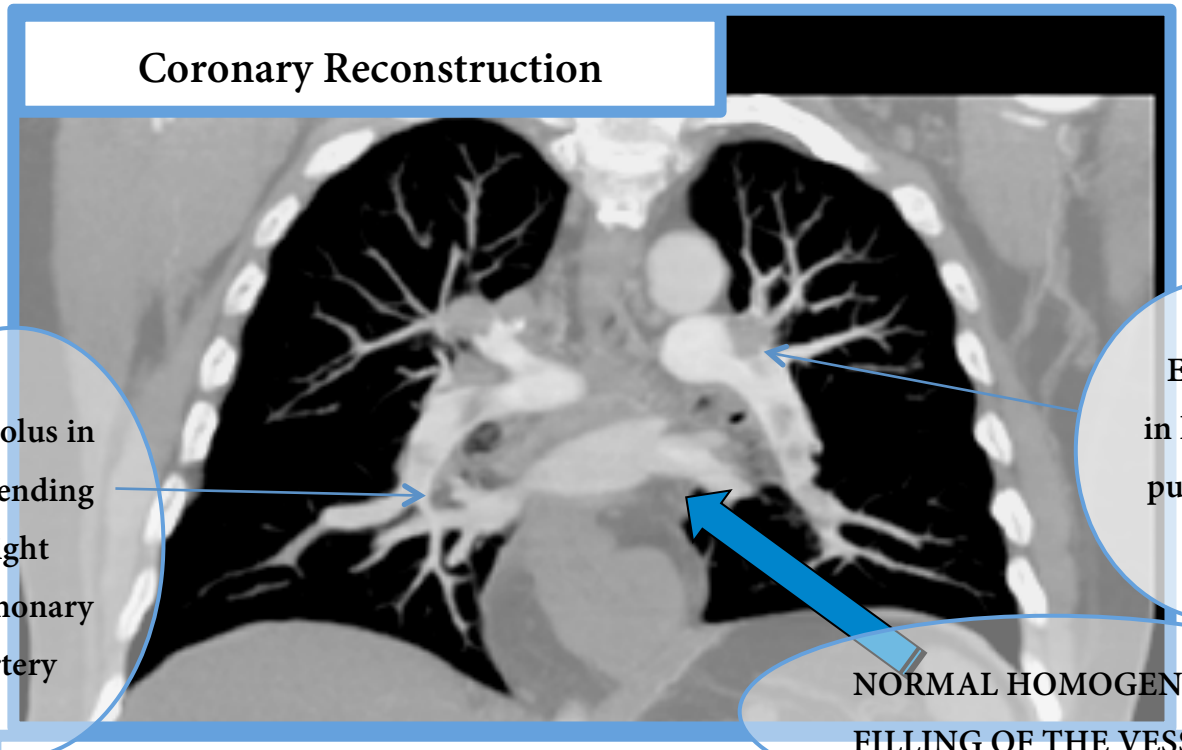
Filing defect.

Q: Why is CT important in these kind of patients?

Because the most common finding in acute pulmonary embolism on chest X-ray is normal chest X-ray.

In the left side we have this triangular area of opacity, which is due to pulmonary infraction

Coronary Reconstruction



Q: What is the abnormality?

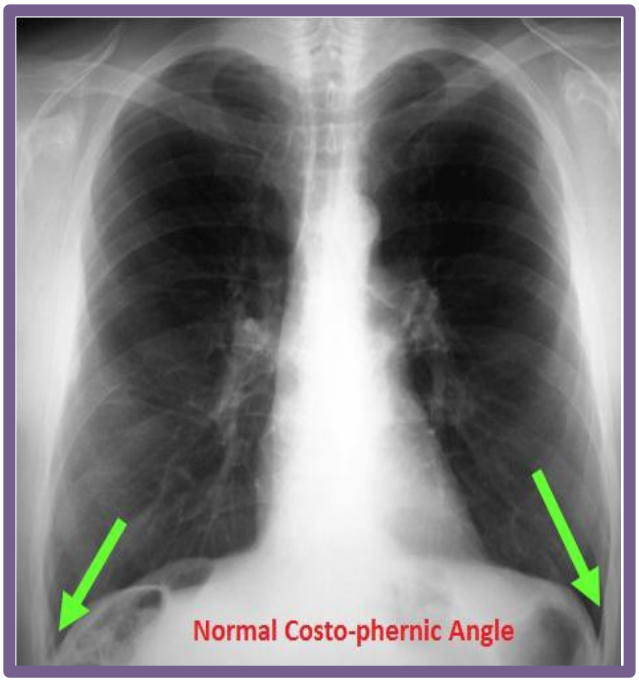
Multiple filing defect in the pulmonary arteries (Massive pulmonary embolism)

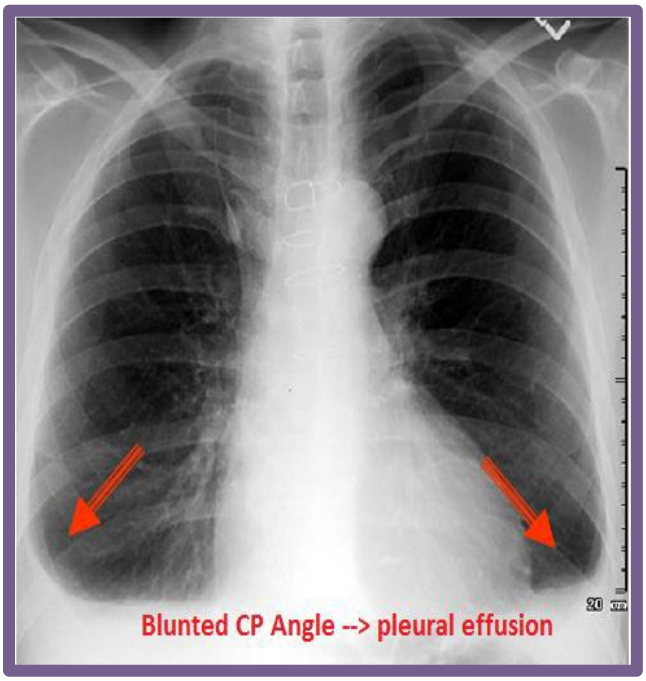
Pneumothorax

You can see the difference between the **lung** (which is having the lung marking) and **air** (black air)

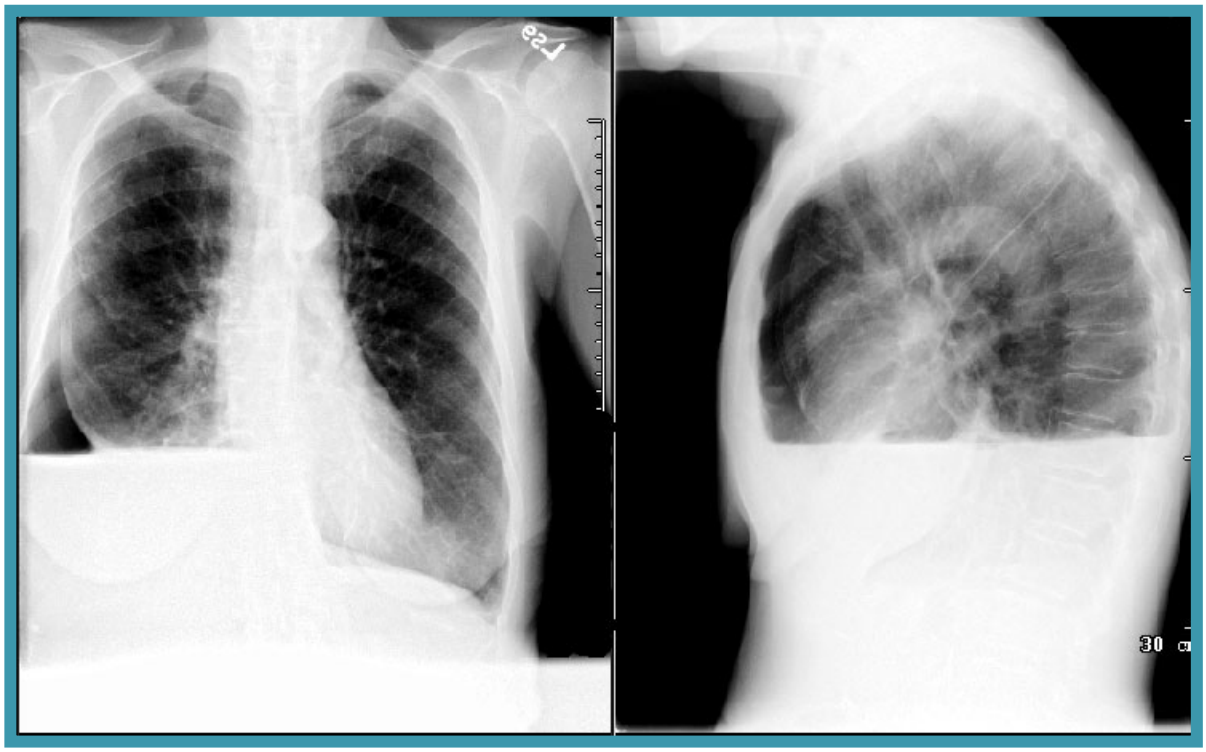
Pleural Effusion "Hydrothorax":

Fluid in the plural spaces



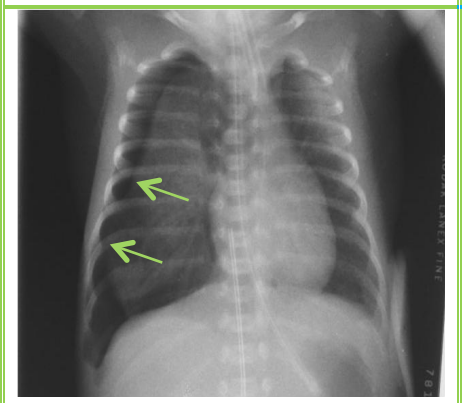
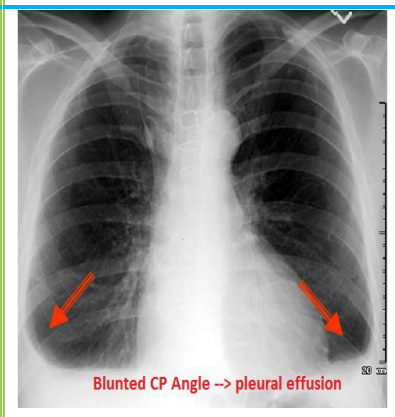
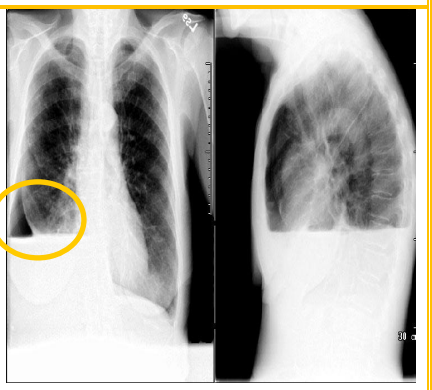


Hydro-pneumo-thorax



Pneumo: air

Hydro: fluid

	Pneumothorax	Hydrothorax	Hydropneumothorax
Definition	Air inside the thoracic cavity but outside the lung.	Pleural effusion is excess fluid that accumulates between the two pleural layers, the fluid filled space that surrounds the lungs.	Presence of both air and fluid in the pleural space
Sign	The diagnosis depends on recognizing a line of pleura due to the lung edge being separated from the chest wall, mediastinum or diaphragm by air.	Blunting of the costophrenic angle "best seen at erect position PA"	An erect chest x-ray will show the air fluid level. The horizontal fluid level is usually well defined and extends across the whole length of hemithorax.
Image			

Good Luck!