Radiological Anatomy Of The Chest

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Objectives

By the end of the lecture you should be able to:

1- Identify the bones of the thoracic cage in X-ray film.

2- Identify superficial soft tissues in X-ray film.

3- Identify the trachea and lunge fields in X-ray film.

4- Describe the mediastinum and the cardiac shadows in X-ray film.

5- Describe brief knowledge about **Bronchography.**

6- Describe brief knowledge about **Coronary Angiography.**

Radiography

•Different views of the chest can be obtained by changing the orientation of the body and the direction of the x-ray beams.

•**The most common views are:**

- Posteroanterior (**PA**),
- Anteroposterior (**AP**),
- Lateral.
- NB. It is named according to the direction of the entrance of the X-ray beam.

Radiography

A chest x-ray may be used to **diagnose and to plan the treatment and follow up** for various conditions, **including:**

- **Fractures of the chest bones**, including ribs, sternum, vertebrae, clavicle and scapula.
- **Lung disorders** such as pneumonia, emphysema, pleural effusion, tuberculosis and lung cancer.
- **Heart disorders** such as congestive heart failure ,which causes cardiomegaly (heart enlargement).
- **Chest radiographs** are also used to screen for **job-related lung diseases** in industries such as mining where workers are exposed to dust, (asbestosis, silicosis).
- **Chest x-ray** is also requested as pre-employment demand.

Posteroanterior

Posteroanterior

- For **Posteroanterior** radiograph (**PA**), the following systems must be examined in order.
  - Superficial soft tissues;
  - The nipples in both sexes.
  - The breast in female are seen superimposed on the lung fields.

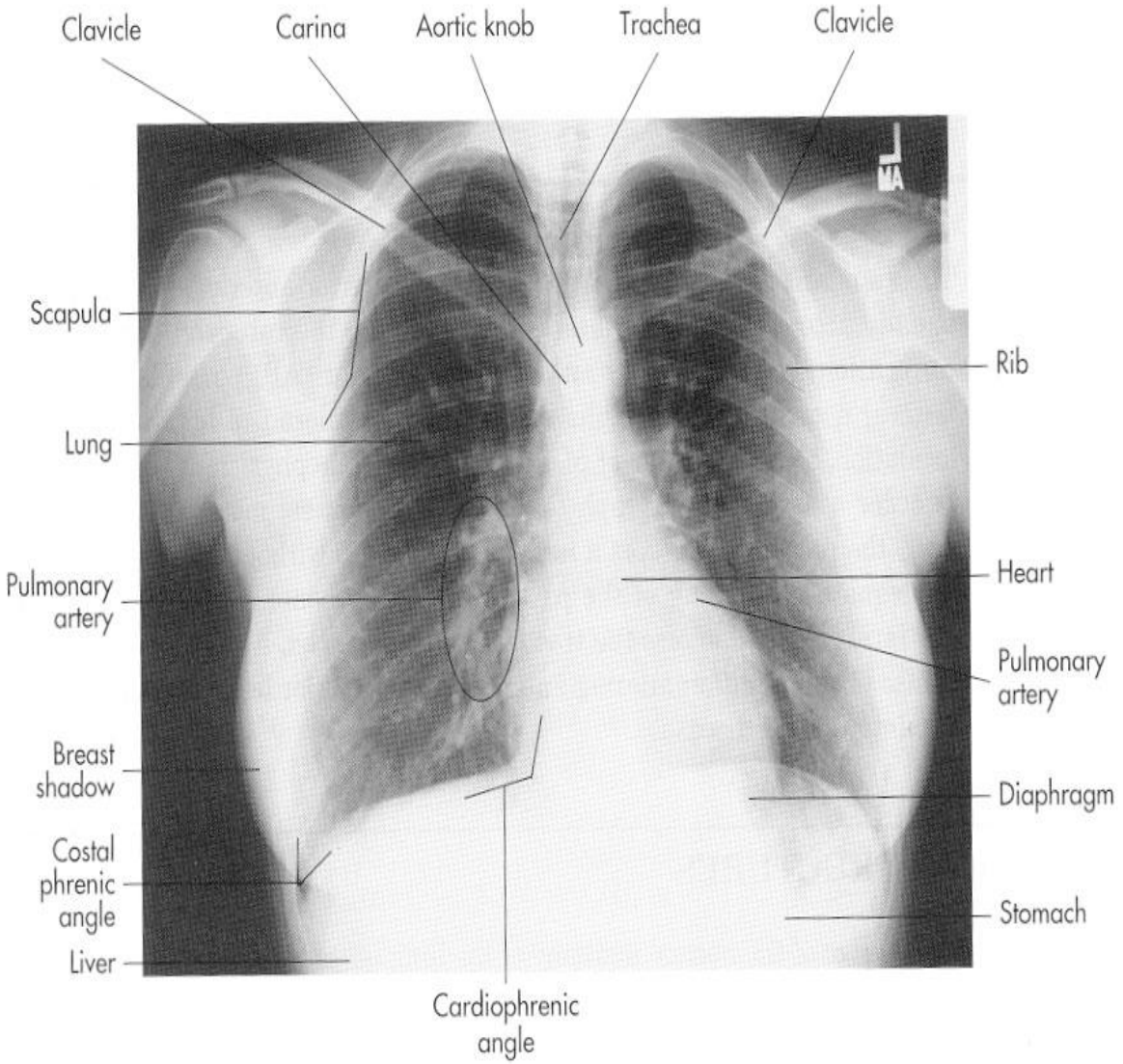
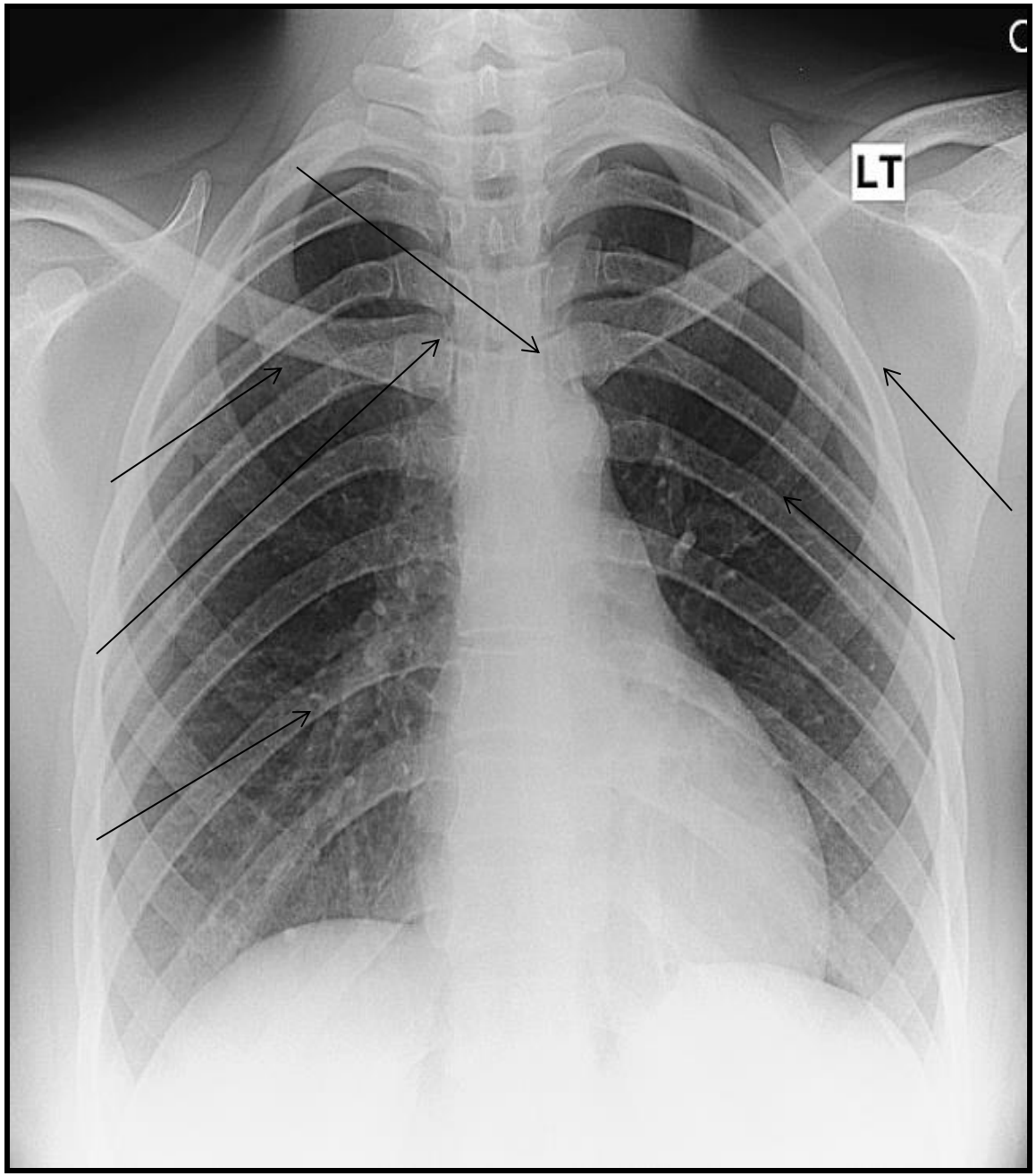


Fig. 3-1 Normal position of anatomical structures on a posterior or anterior chest radiograph.

Posteroanterior radiograph (Bones)

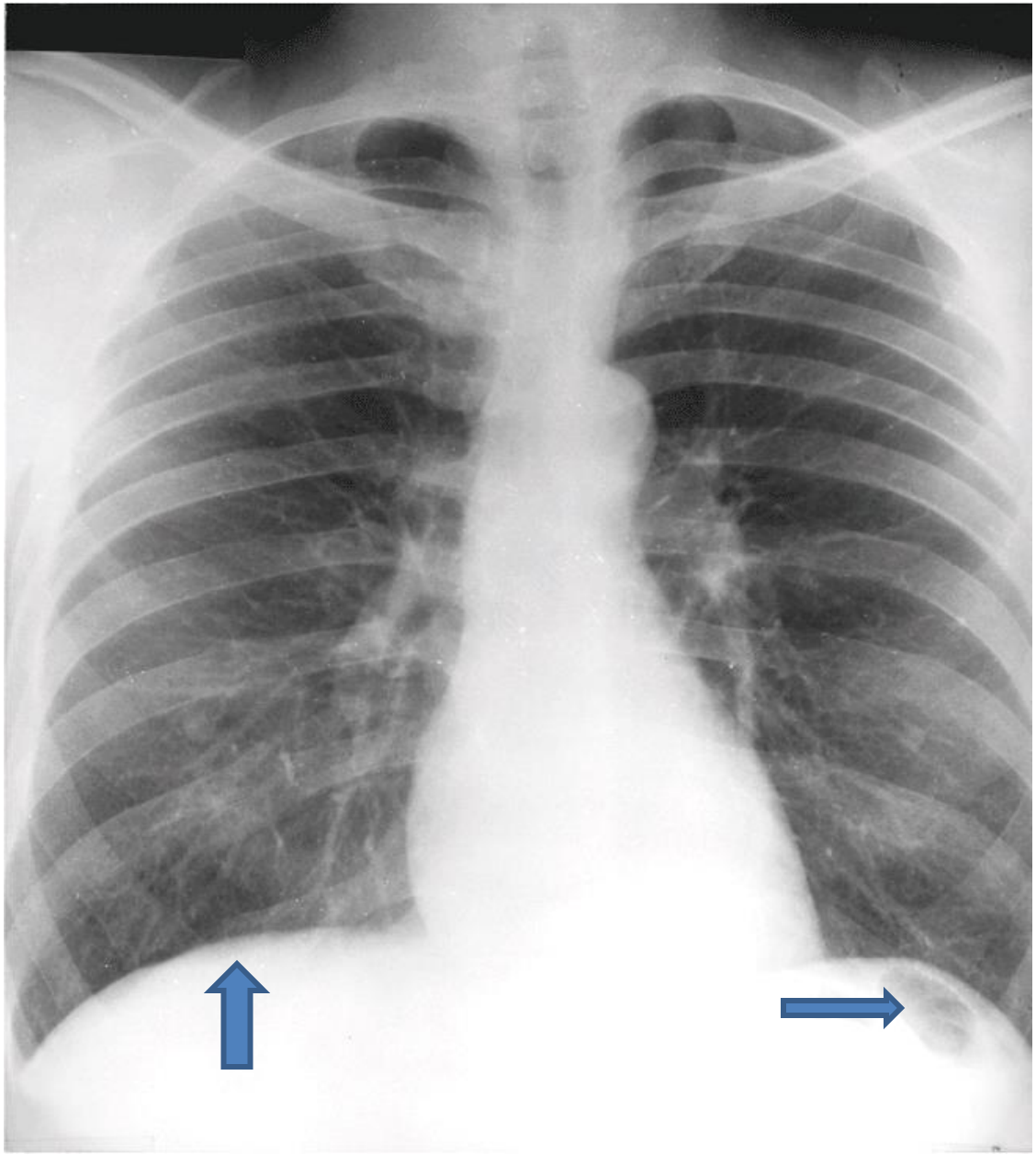
Bones of the thoracic cage, e.g.

- Anterior ribs, Posterior ribs.
- Thoracic vertebrae.
- Cost-transverse joints.
- Clavicles.
- Medial border of the scapula.



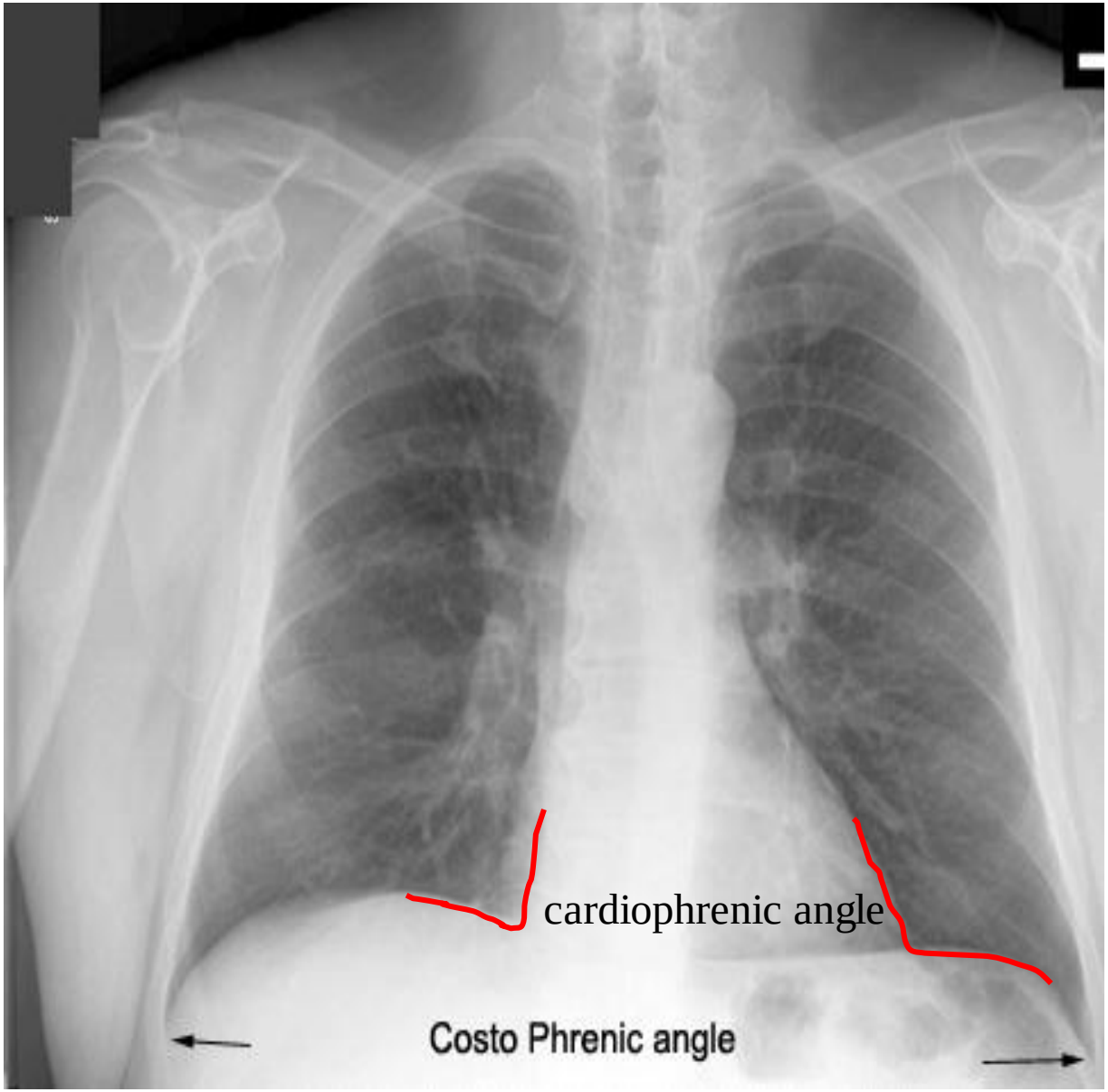
Posteroanterior radiograph (Diaphragm)

- **The diaphragm** appears as a dome-shaped shadow on each side; the right side is slightly higher than the left.
- Beneath the right dome is a dense homogeneous, shadow of the **liver.**
- Beneath the left dome a **gas bubble** mostly seen in the fundus of the stomach.

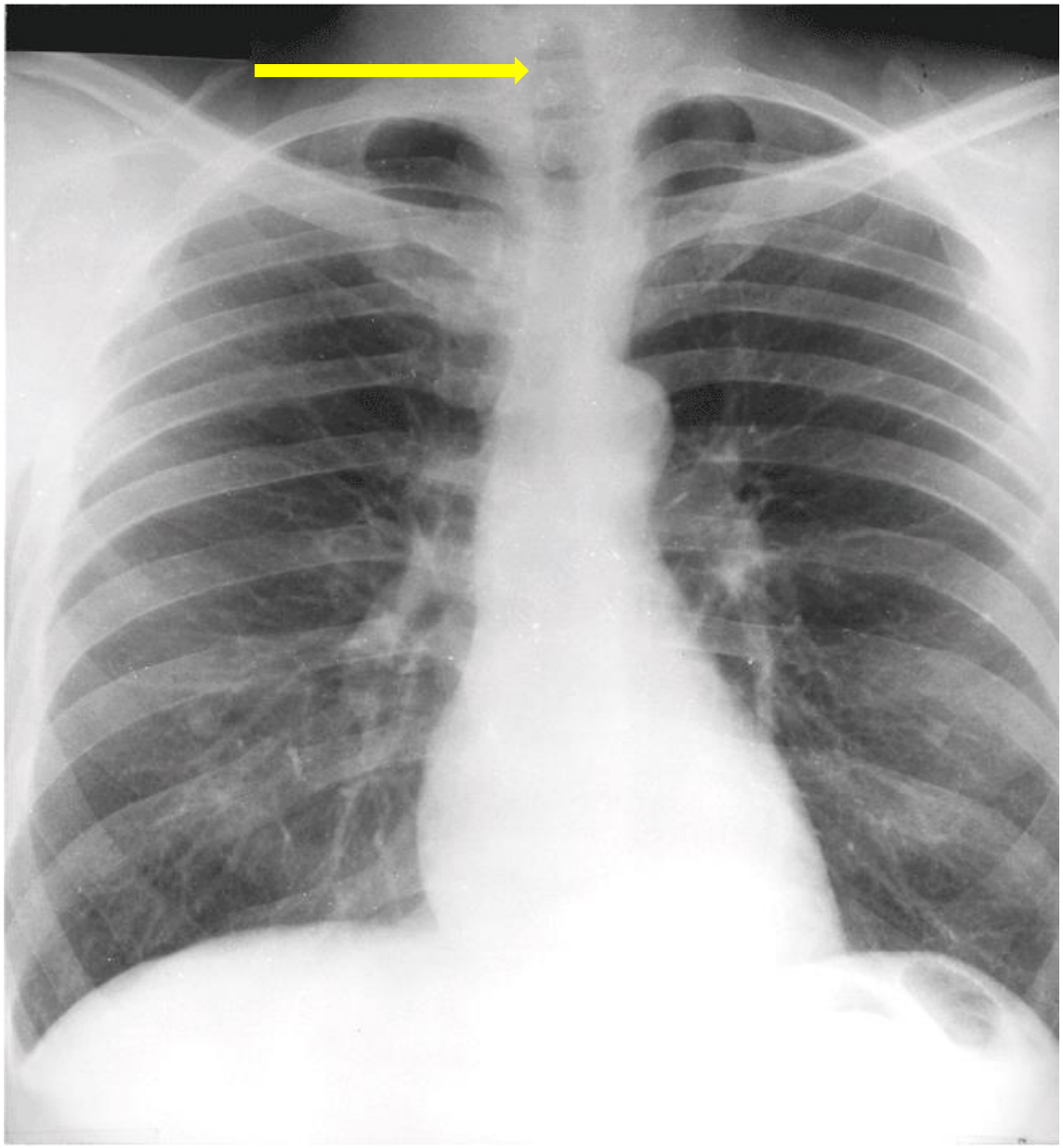


Posteroanterior radiograph (Diaphragm)

- Notice the **costo-phrenic** angle, where the diaphragm meets the thoracic wall.
- The angle becomes blunt or obscured due to minimal **pleural** fluid (**effusion)** or fibrosis.
- Also note the **cardiophrenic** angle where the diaphragm meet the heart.



Posteroanterior radiograph (Trachea)



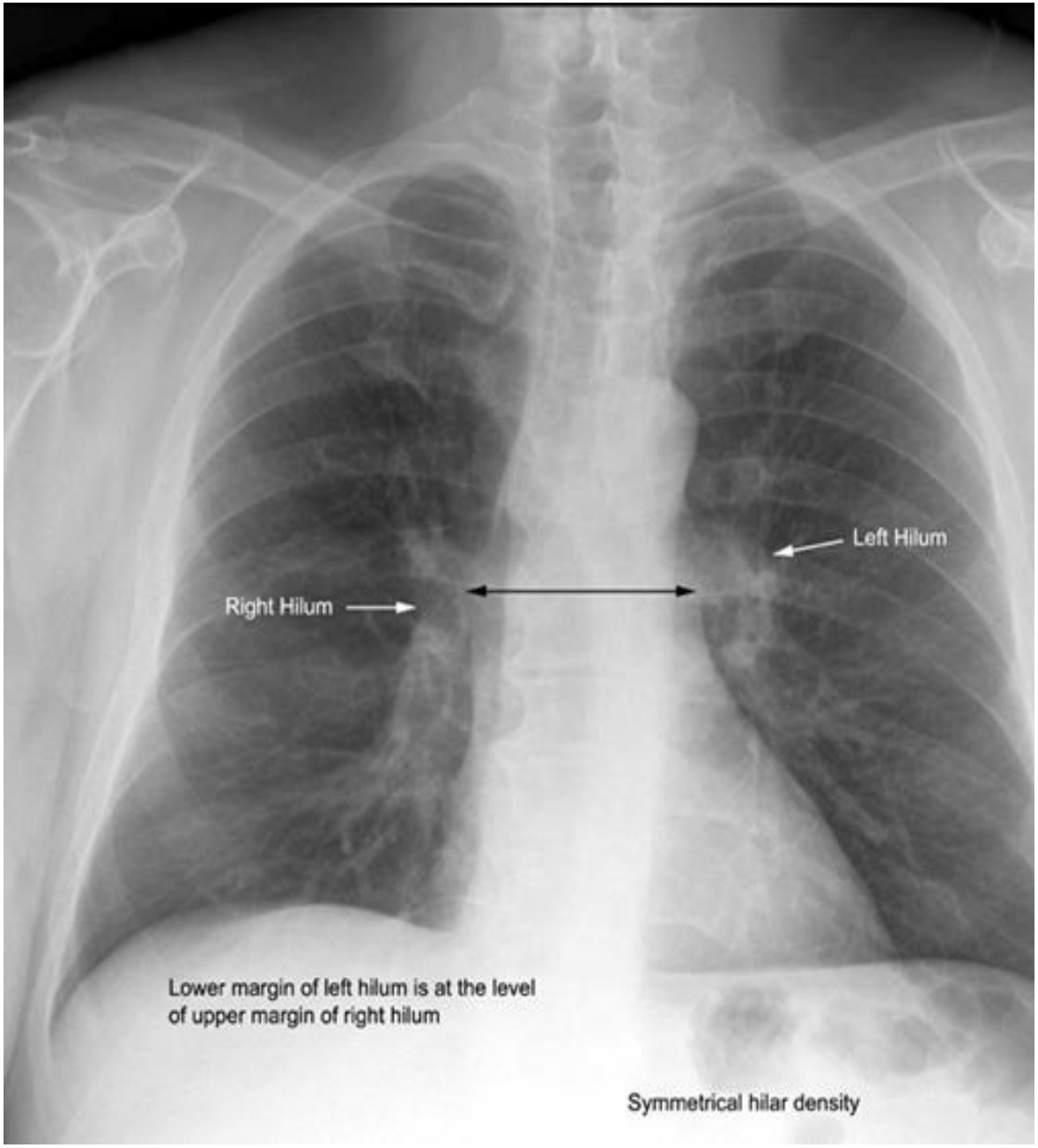
- The radio-translucent, air-filled shadow of the **trachea** is seen in the midline of the neck as a dark area.
- This is superimposed by the lower cervical and upper thoracic vertebrae.

Posteroanterior radiograph (Lungs)

➢**<u>Lung roots</u>:** relatively dense shadows caused by the <u>presence of</u>:

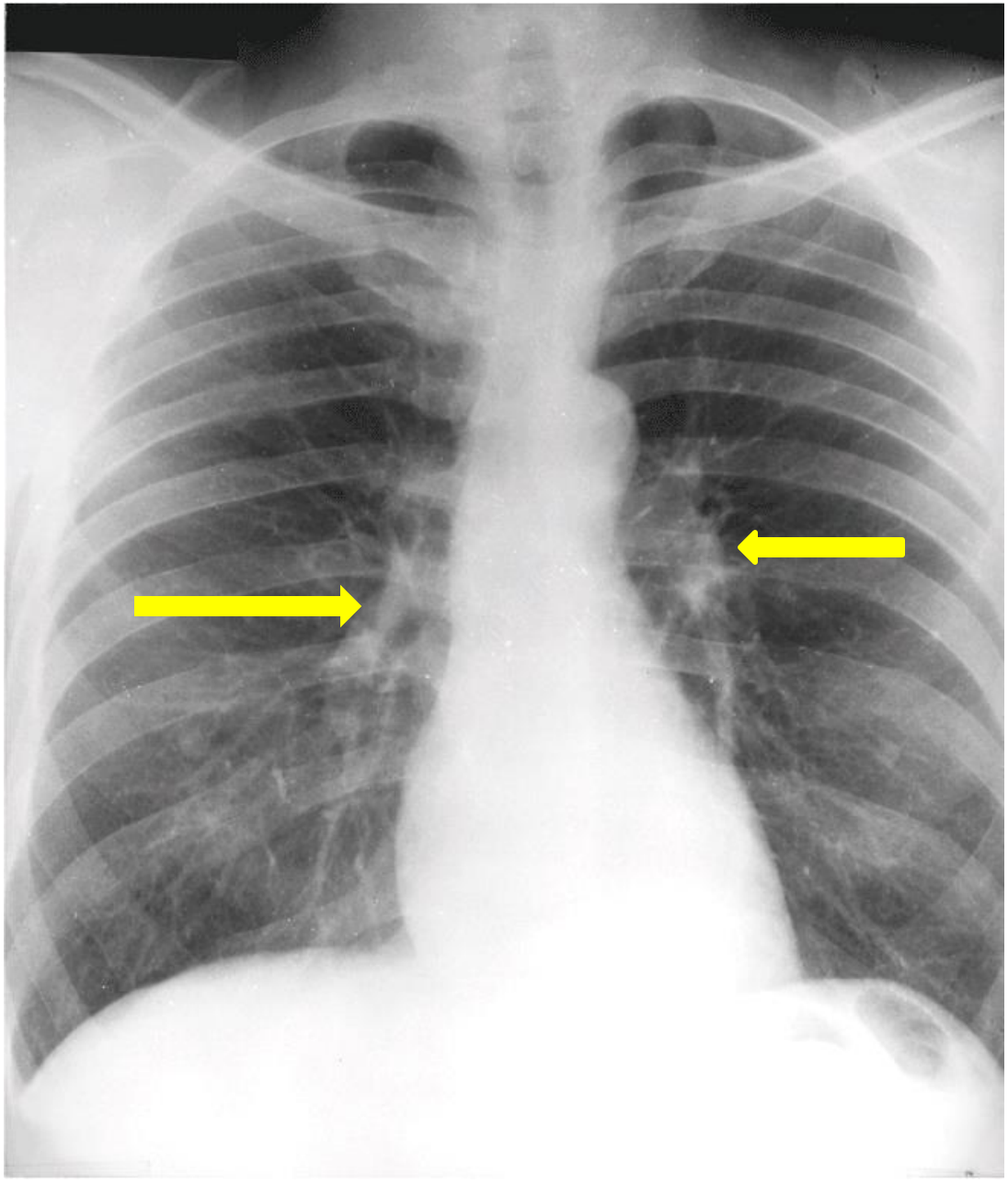
1. Blood-filled pulmonary and bronchial vessels.
2. Large bronchi.
3. Lymph nodes.

➢Notice that the lower margin of left hilum is at the level of upper margin of right hilum.



Posteroanterior radiograph (Lungs)

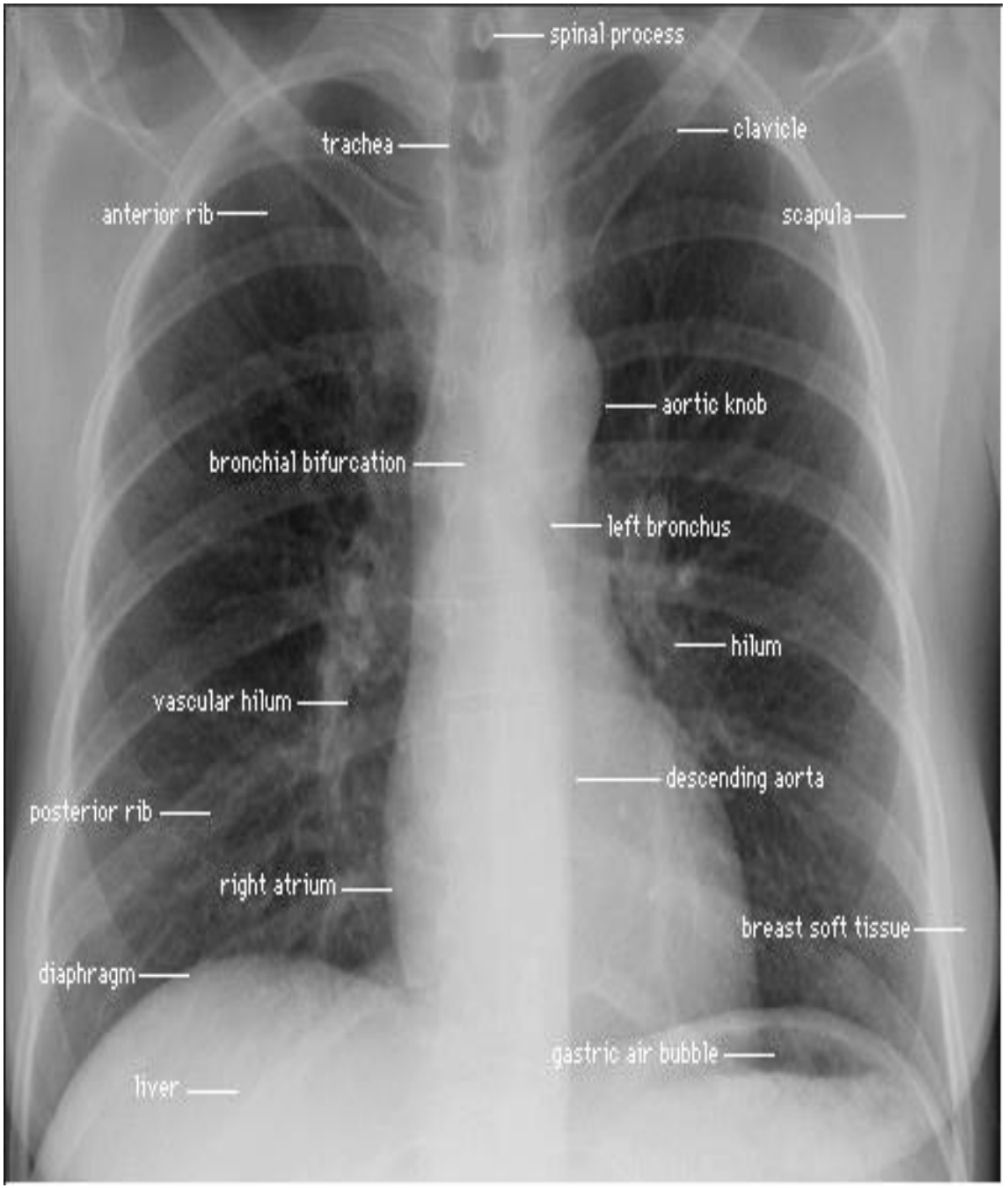
- The lung fields, by the air so they are more translucent on full inspiration than on expiration.
- The pulmonary blood vessels are seen as a series of small, rounded, white shadows radiating from the lung root.
- The large bronchi, are seen as similar round shadows.
- The smaller bronchi are not seen.



Posteroanterior radiograph

(Mediastinum)

- The right border of the mediastinum is formed of:
- Right brachiocephalic vein,
- Superior vena cava,
- Right atrium, and
- Inferior vena cava.



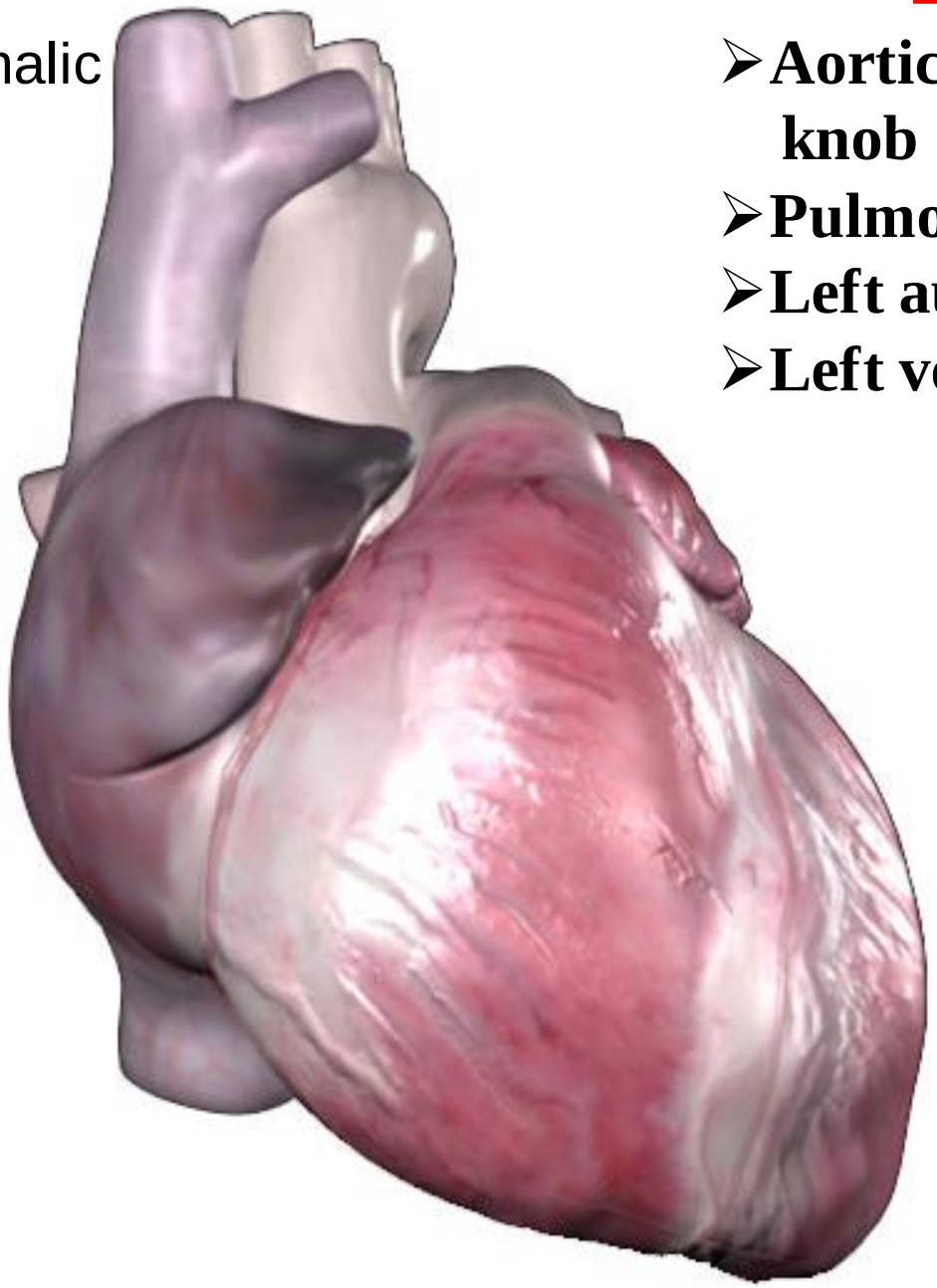
Right

Rt. Brachiocephalic vein.

Superior vena cava.

Rt. atrium.

Inferior vena cava.



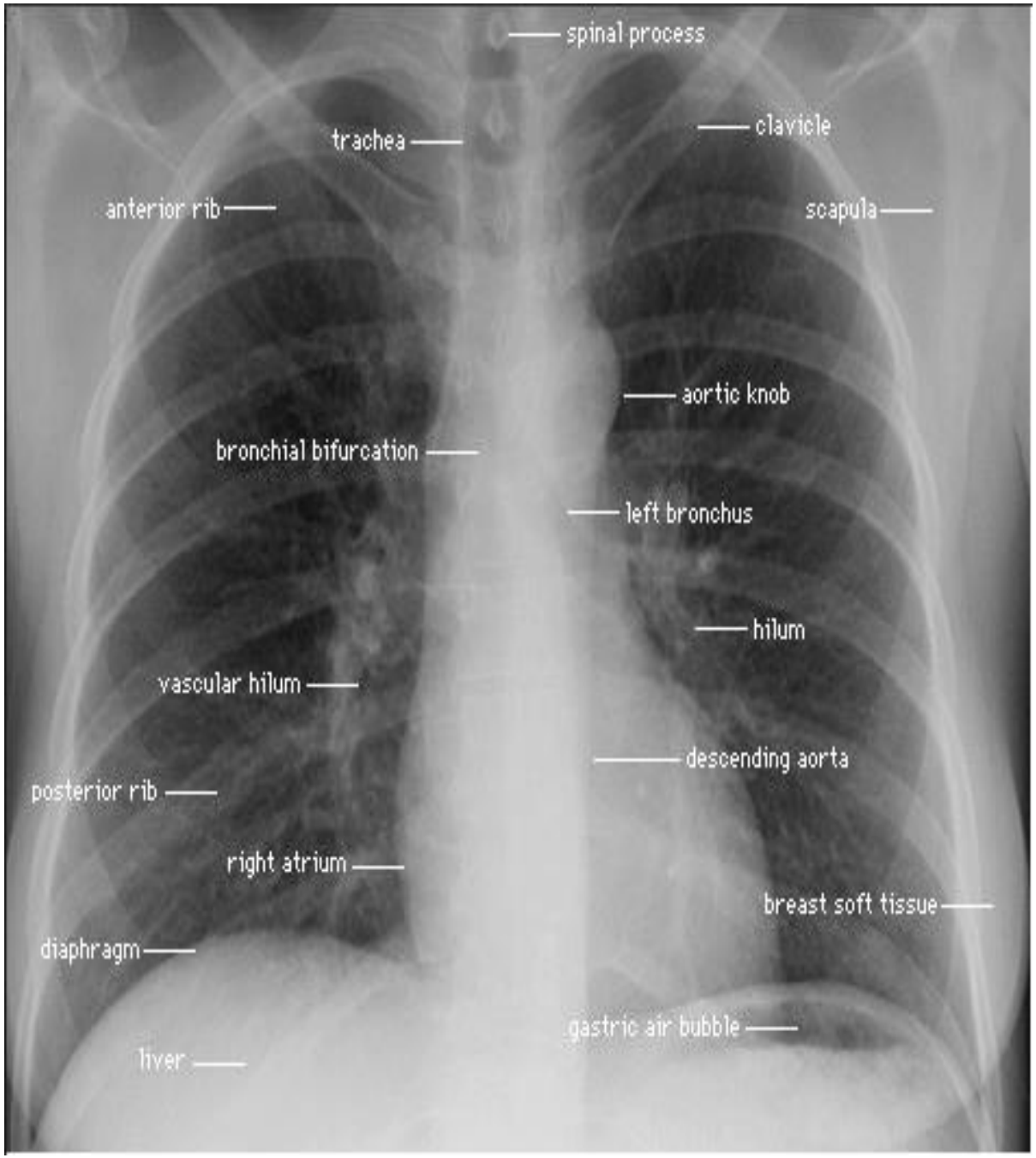
Left

- **Aortic knuckle, or knob (aortic arch).**
- **Pulmonary trunk,**
- **Left auricle,**
- **Left ventricle.**

Posteroanterior radiograph

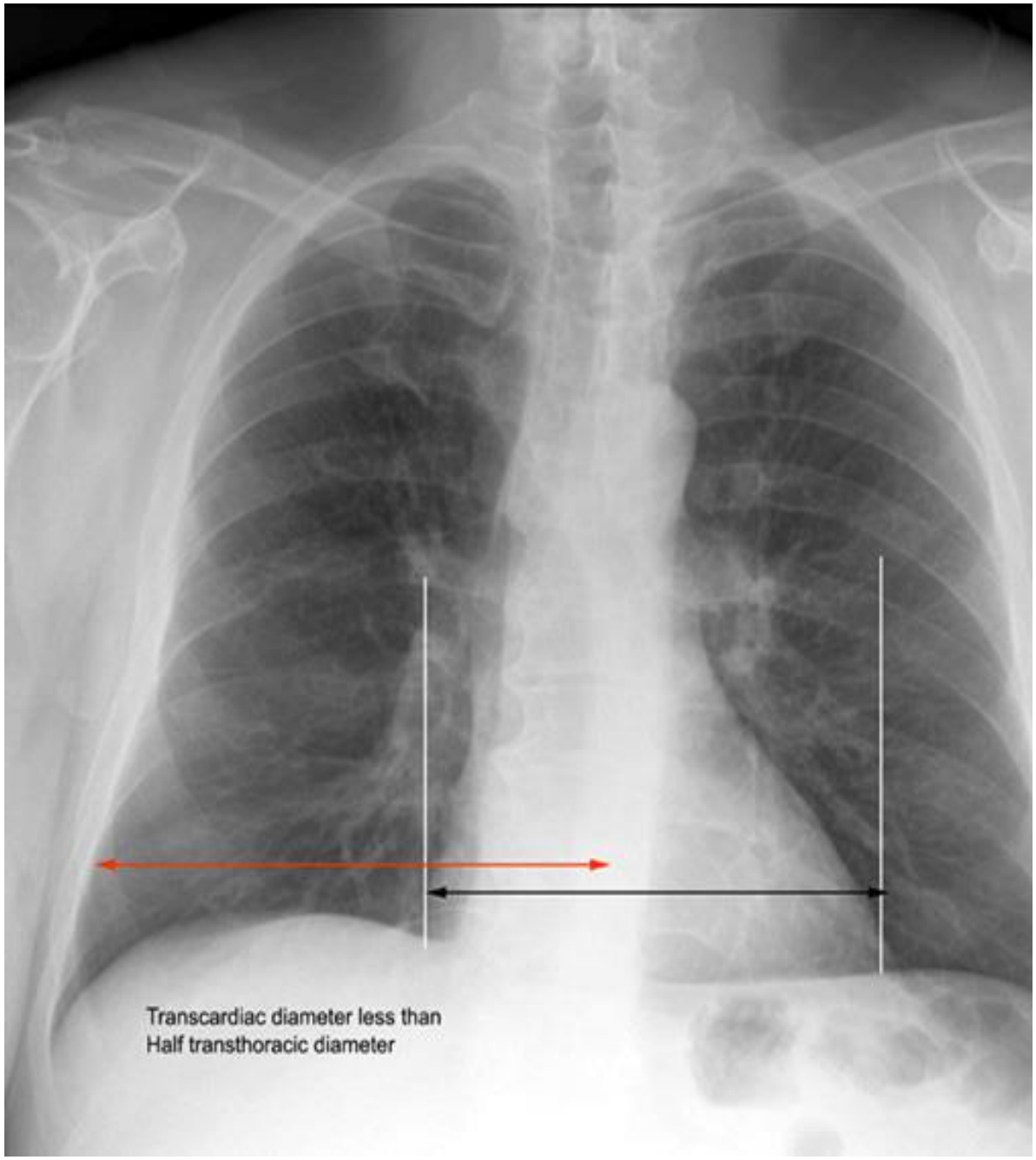
(Mediastinum)

- The left border of mediastinum consists of:
- Aortic knuckle, or knob (aortic arch),
- Pulmonary trunk,
- Left auricle,
- Left ventricle.

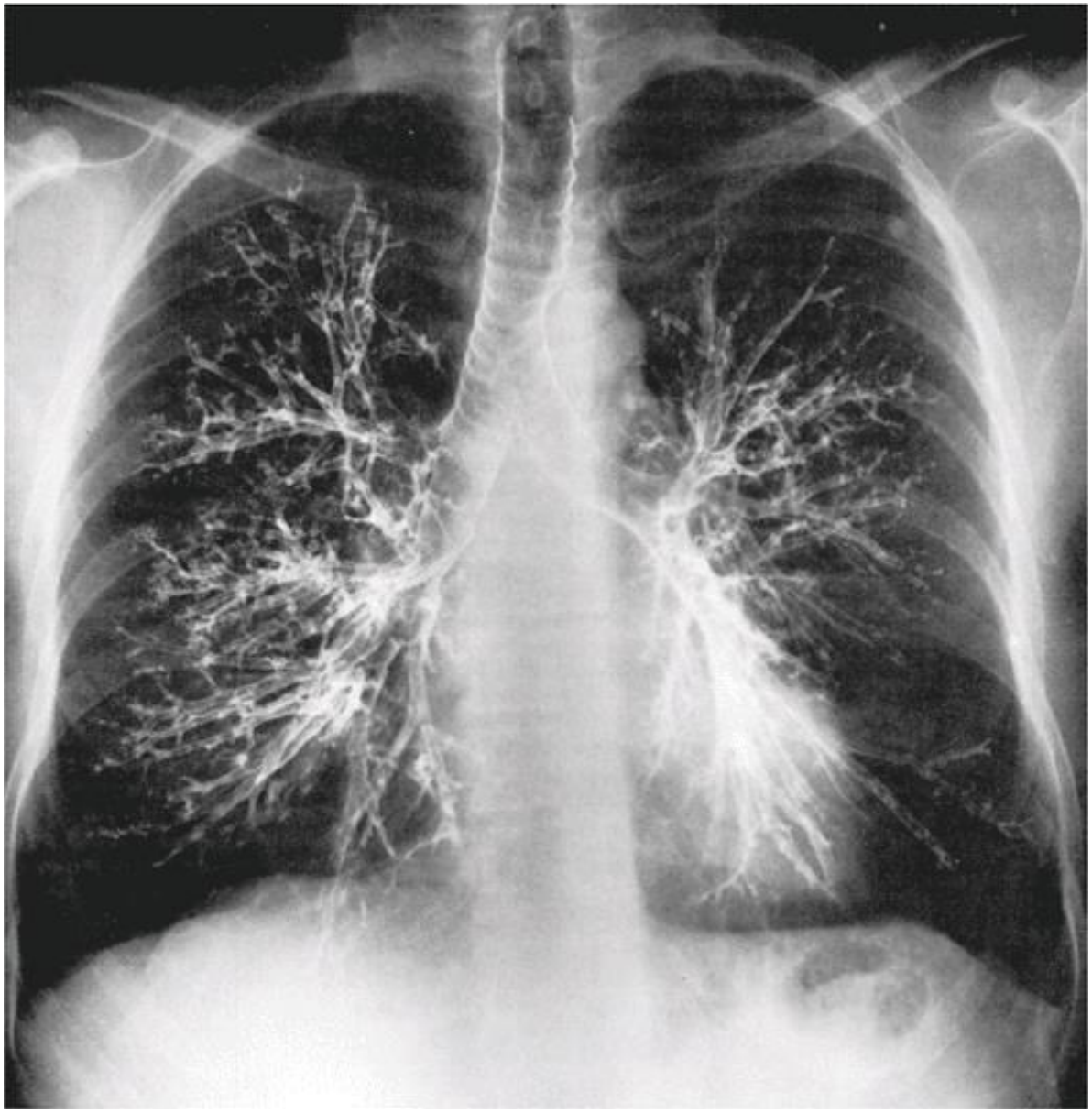


Posteroanterior radiograph (Mediastinum)

- The transverse diameter of the heart **should not** exceed half of the width of thoracic cage.
- On **deep** inspiration, when the diaphragm **descends**, the vertical length of the heart increases and the transverse diameter is narrowed.



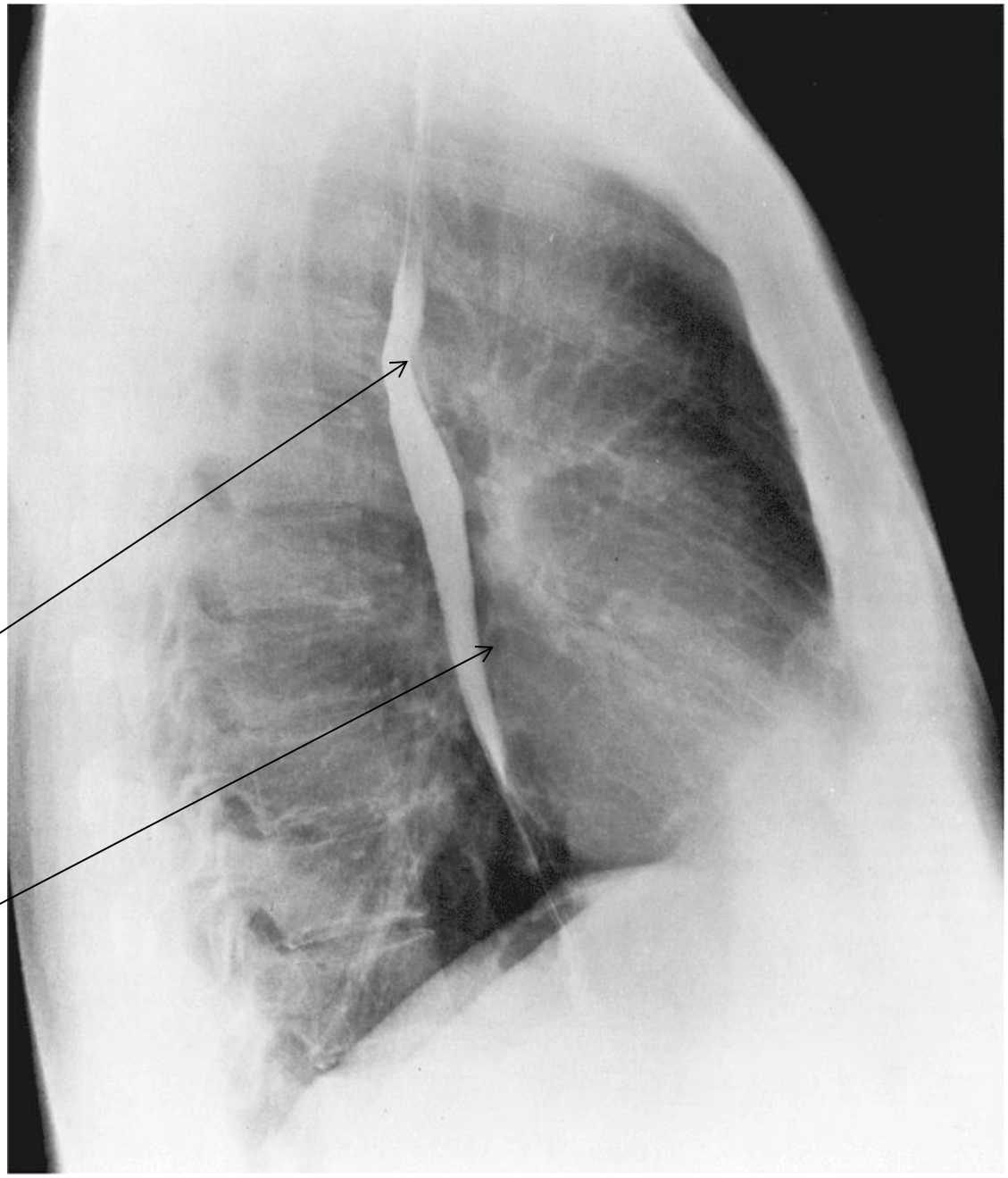
Bronchography and contrast visualization of the esophagus



- **Bronchography;**
  - It is special study of the bronchial tree by introduction of contrast medium into a particular bronchus.
  - Usually done by inhalation of a contrast substance.

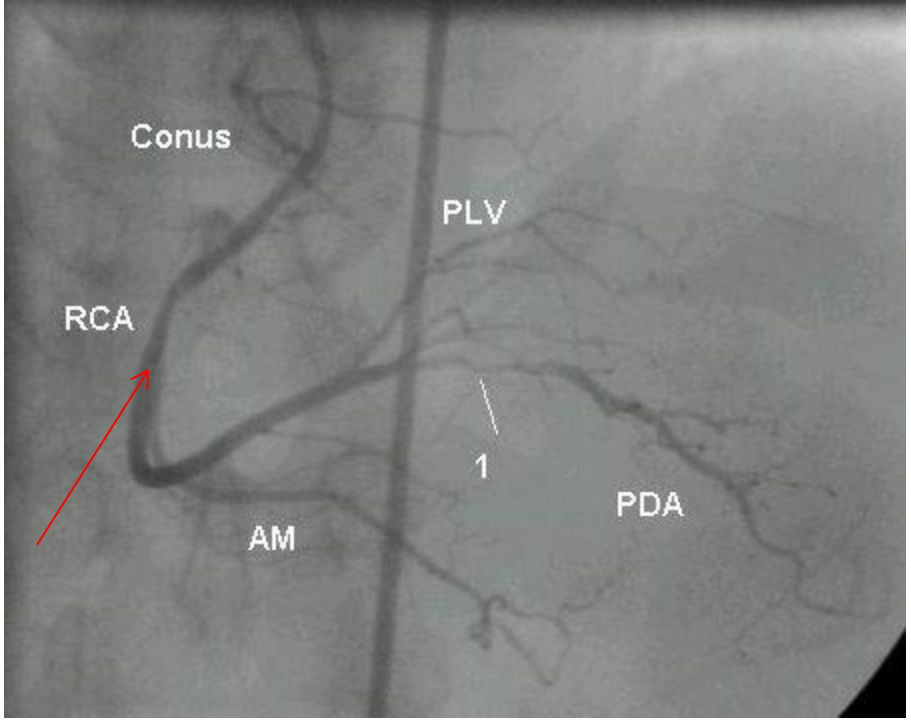
Bronchography and contrast visualization of the esophagus

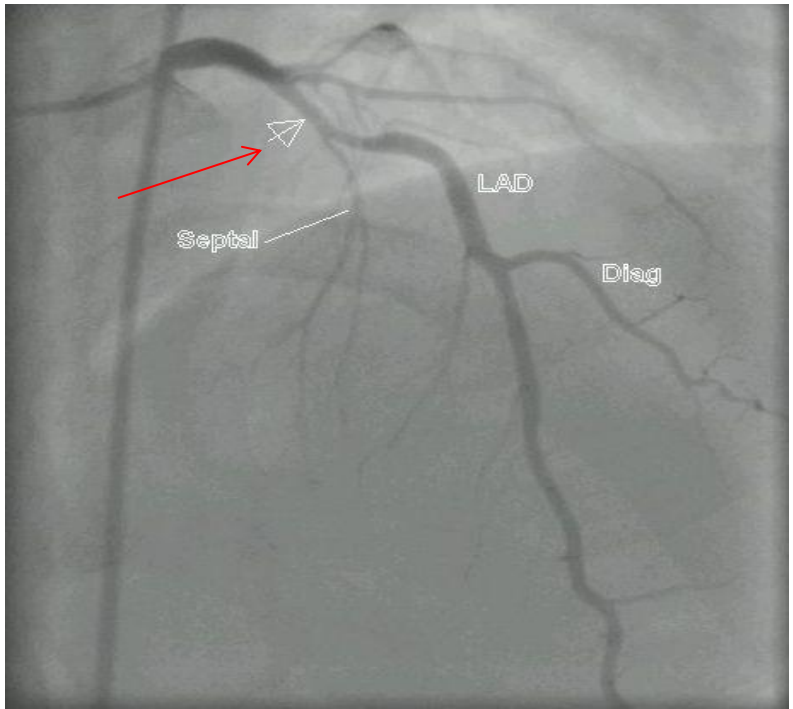
- Contrast visualization of the esophagus by swallow a contrast media, (barium swallow).
  - Identification of the aortic arch and left bronchus.
  - Identification of enlargement of left atrium.

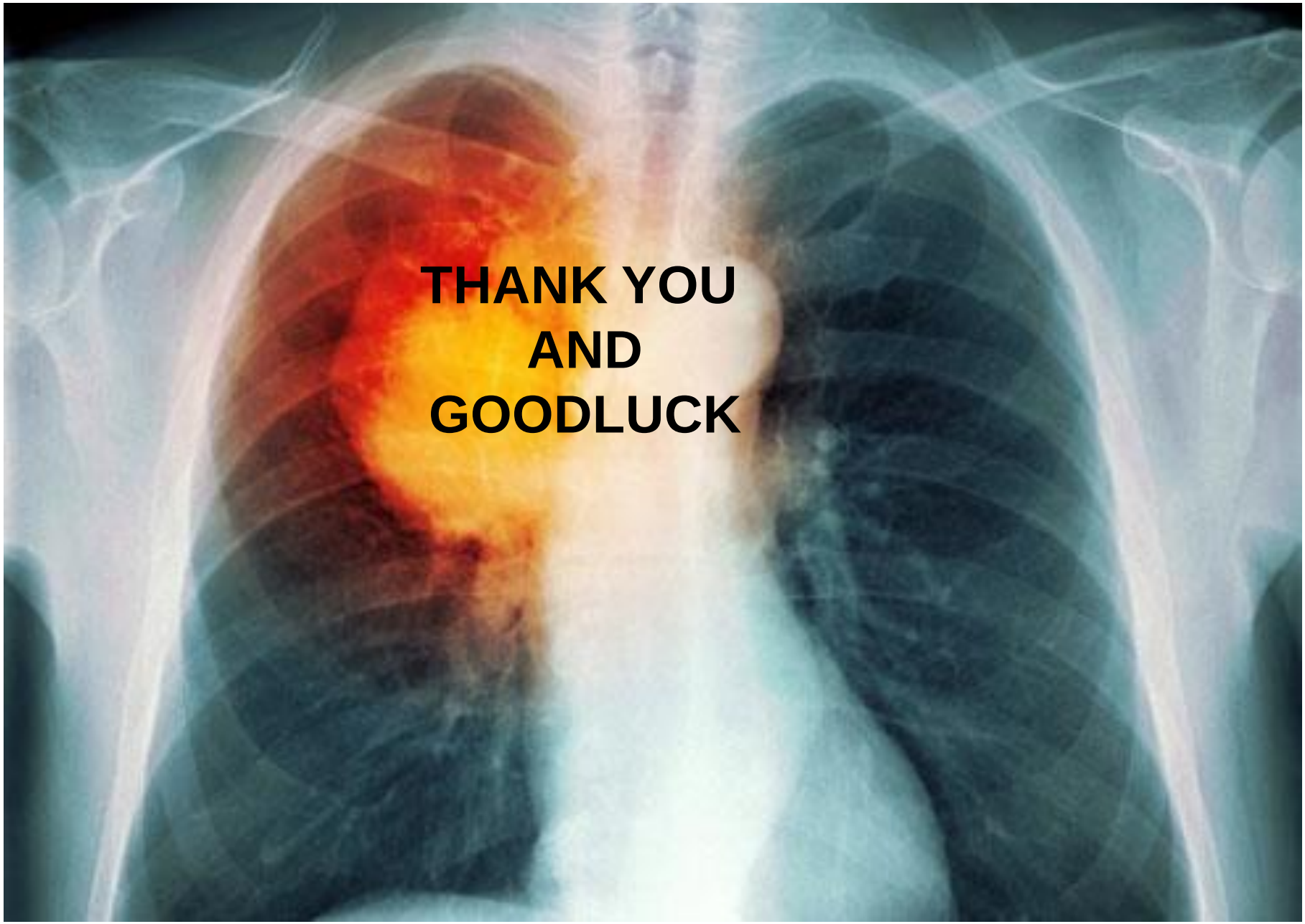


Coronary Angiography

- The coronary arteries are visualized by introduction of radio-opaque material into their lumen.
- Pathological narrowing or blockage of coronary artery can be identified.



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