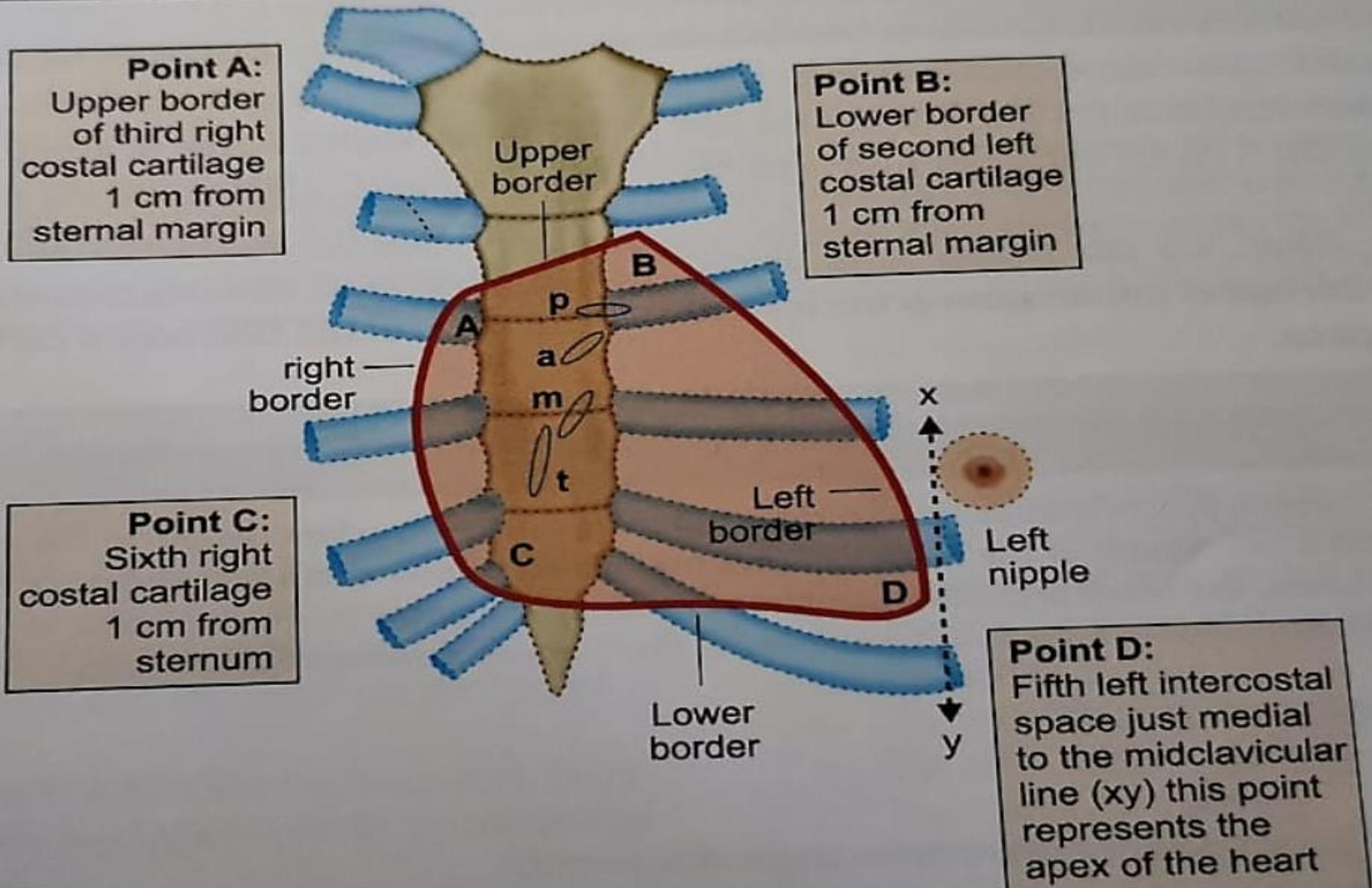
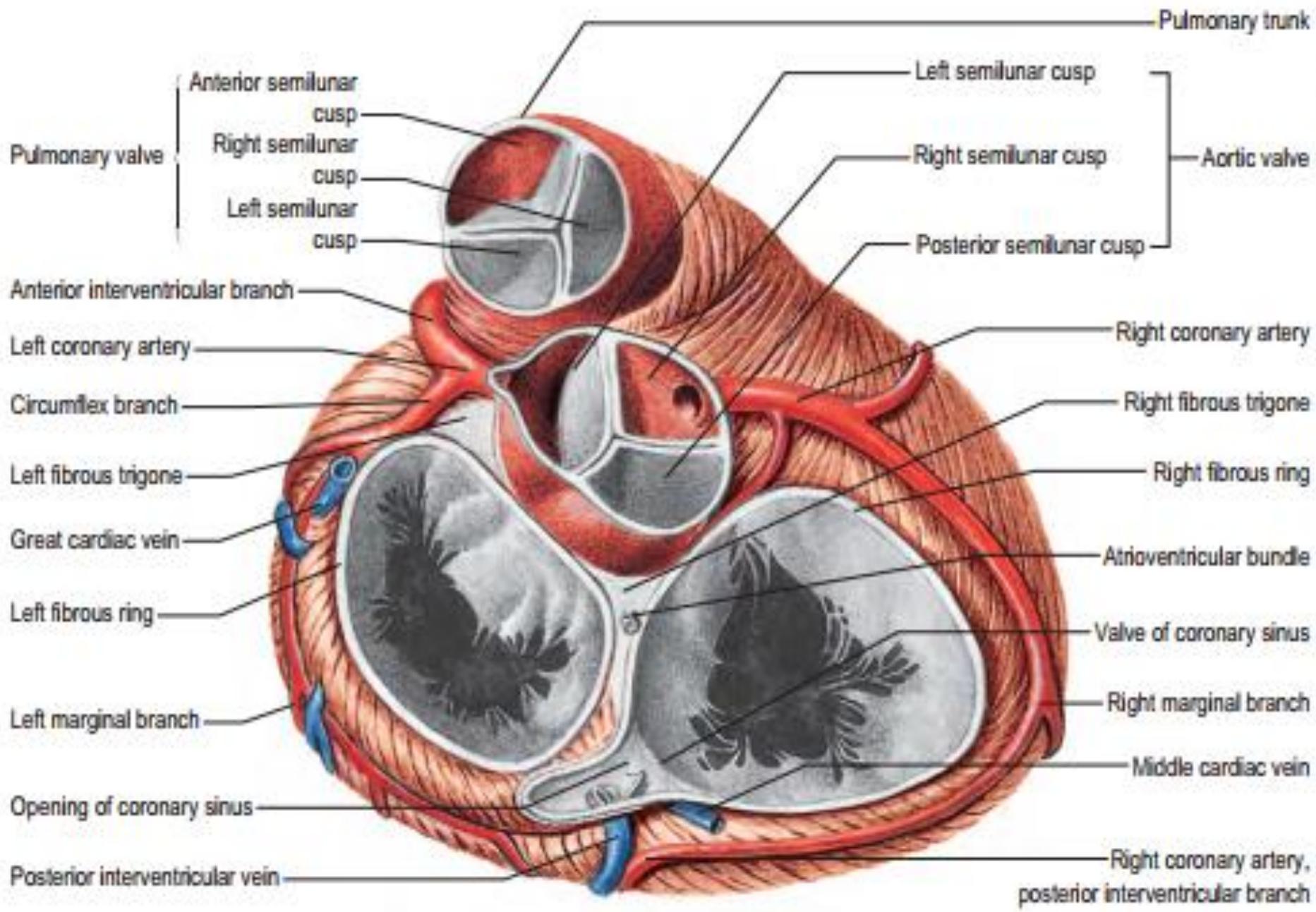


The heart The outline of the heart can be represented on the surface by the irregular quadrangle bounded by the following four points





Surface Anatomy of the Heart Valves

THE TRICUSPID VALVE

lies behind

The right half

of the sternum opposite

The fourth intercostal space

THE MITRAL VALVE

lies behind

The left half

of the sternum opposite

The fourth costal cartilage

THE PULMONARY VALVE

lies behind the medial end of
the third left costal cartilage

and the adjoining part of the
sternum

THE AORTIC VALVE

lies behind the left half of the
sternum opposite the third
intercostal space

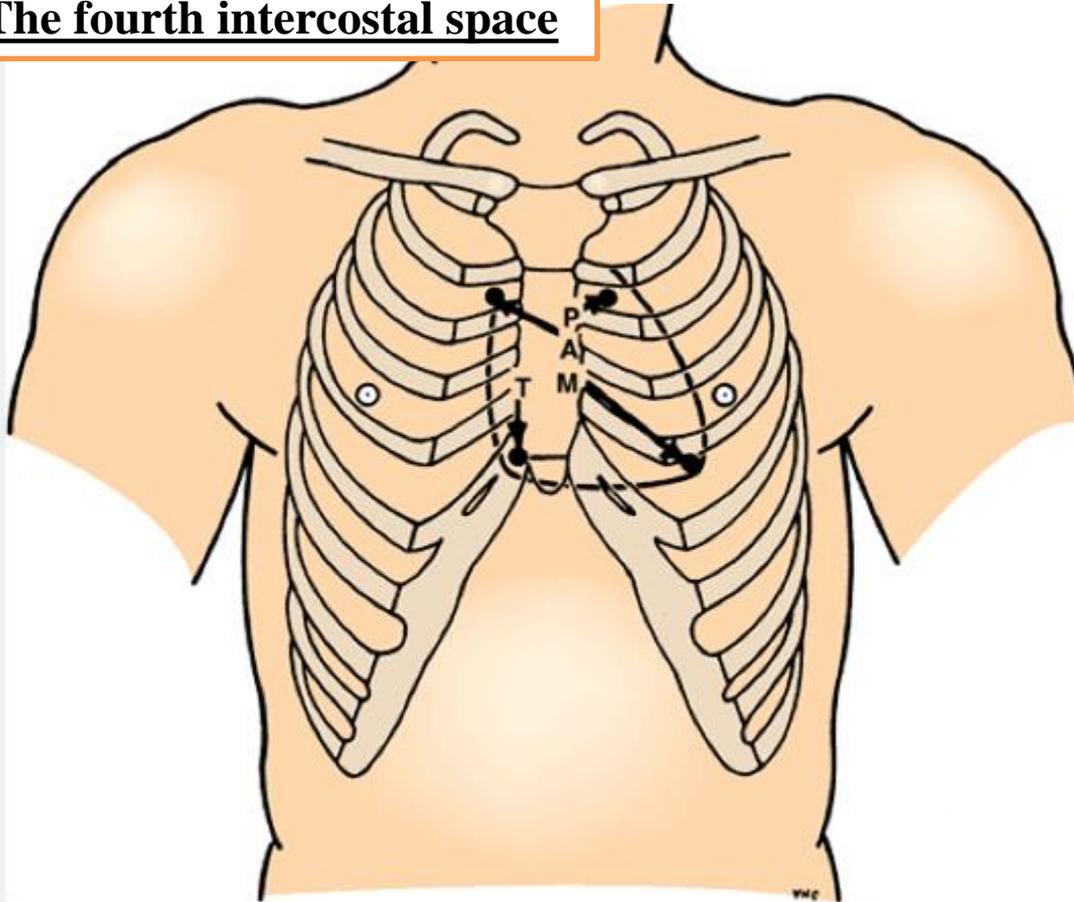
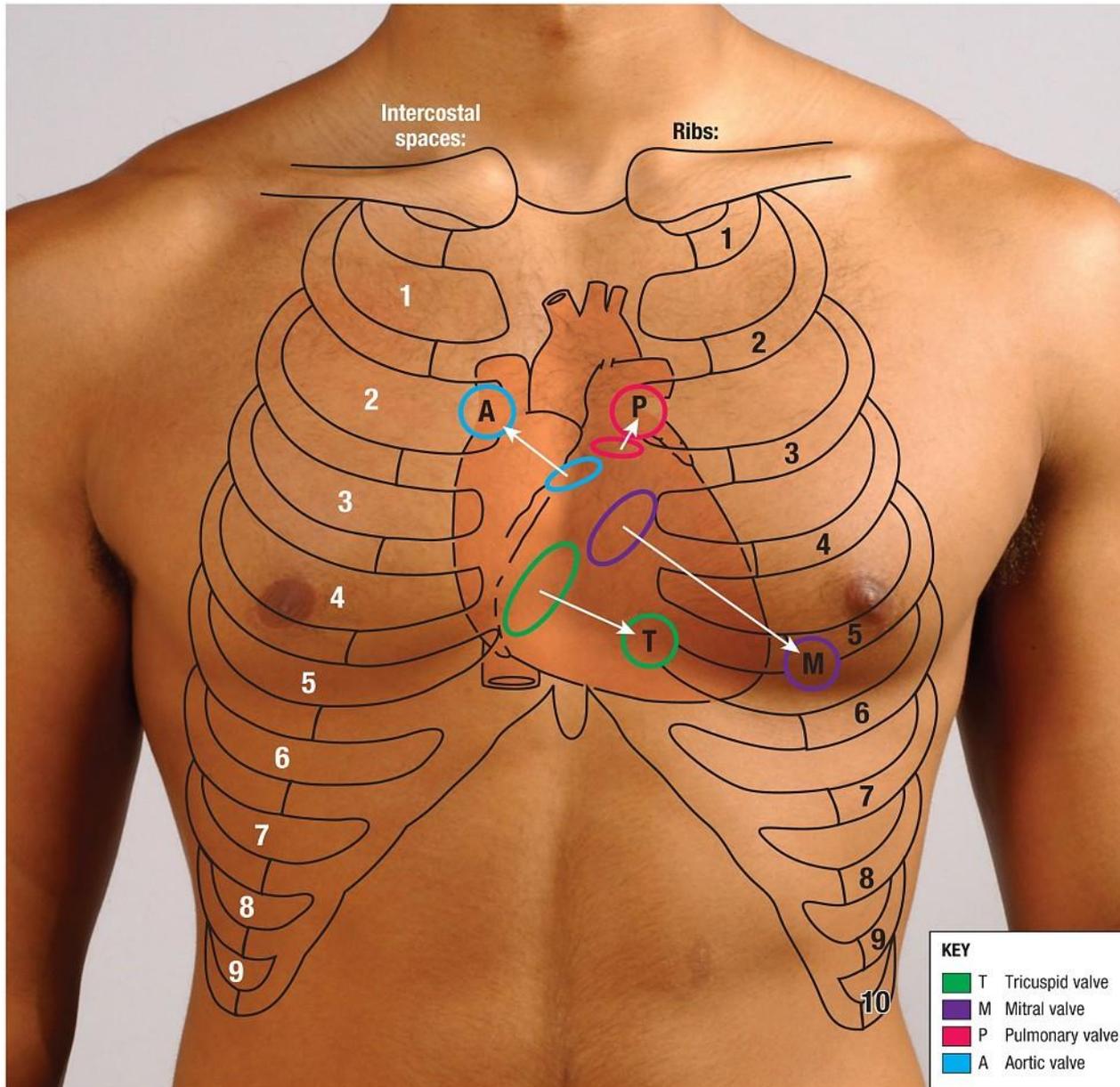


Figure 3-15 Position of the heart valves. P, pulmonary valve; A, aortic valve; M, mitral valve; T, tricuspid valve. Arrows indicate position where valves may be heard with least interference.



Anterior View

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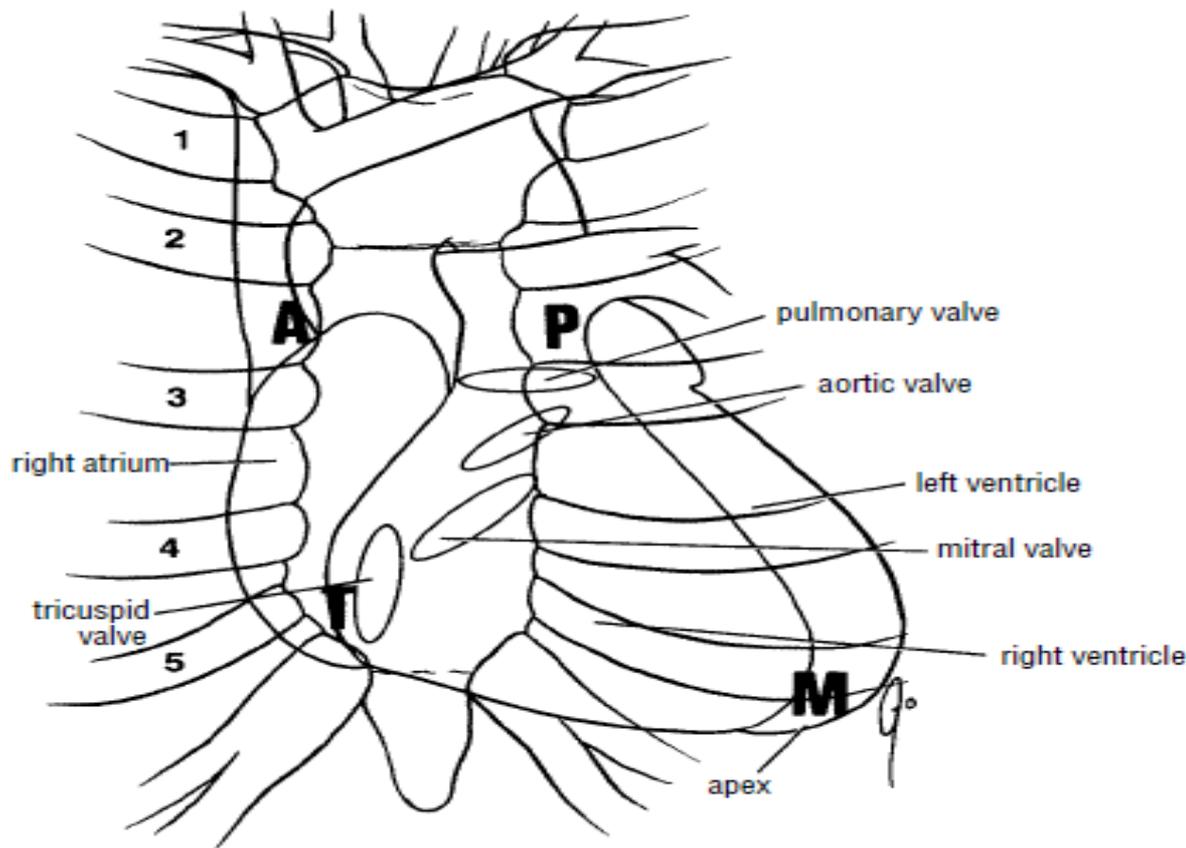
Auscultation of the Heart Valves

The **tricuspid valve** is best heard over the **right half of the lower end of the body of the sternum**

The **mitral valve** is best heard over **the apex** beat (at the level of the fifth left intercostal space, 3.5 in. (9 cm) from the midline)

The **pulmonary valve** is heard over **the medial end of the second left intercostal space**

The **aortic valve** is best heard over **the medial end of the second right intercostal space**



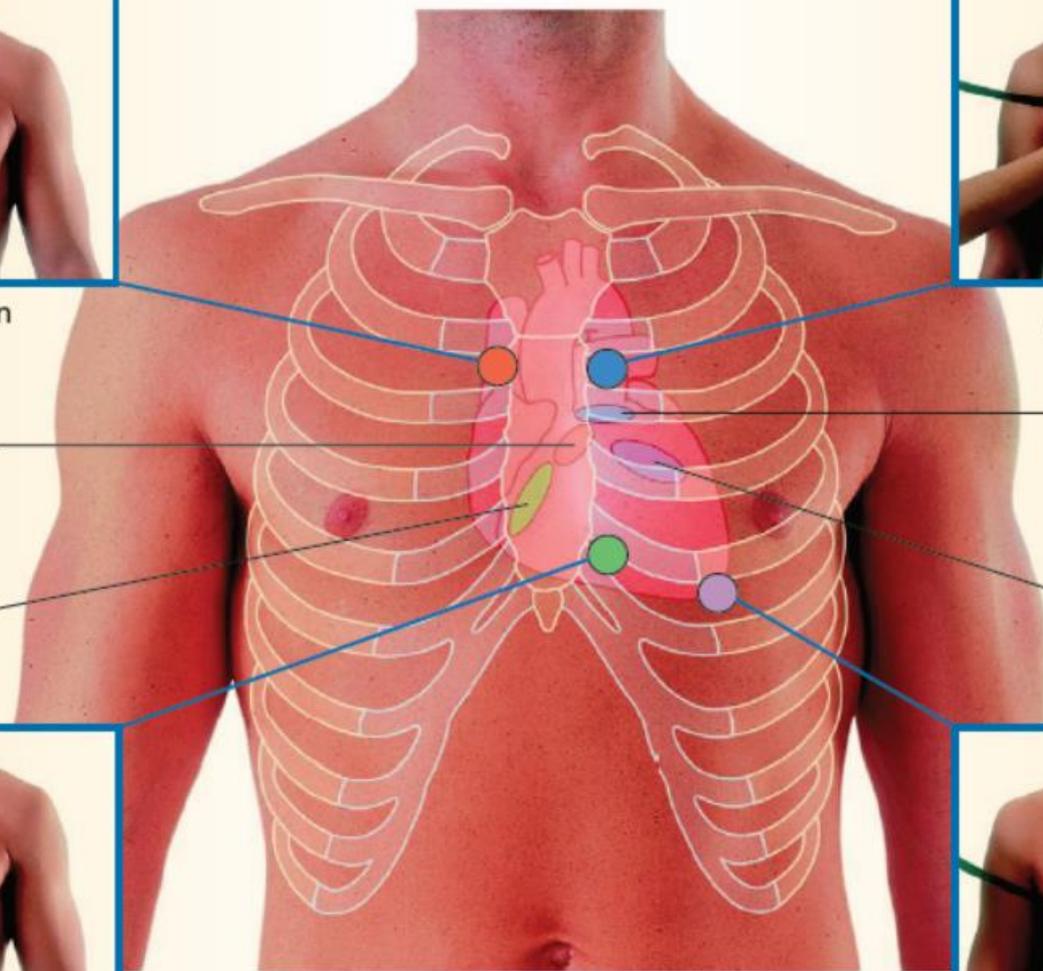
CD Figure 4-2 Surface anatomy of the heart and great blood vessels. Note the position of the heart valves relative to the chest wall. The bold letters indicate positions where valves may be heard with least interference. A = aortic valve, M = mitral valve, P = pulmonary valve, T = tricuspid valve.



Auscultation position for aortic valve



Auscultation position for pulmonary valve

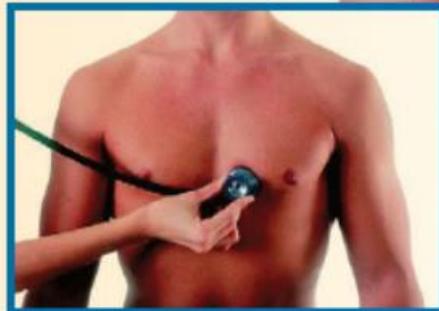


Aortic valve

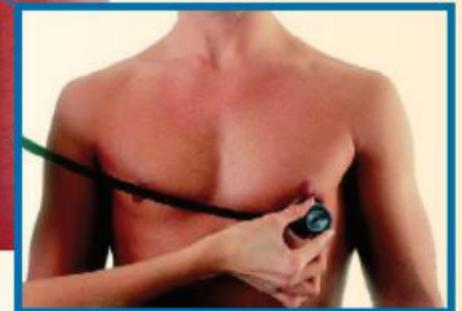
Pulmonary valve

Tricuspid valve

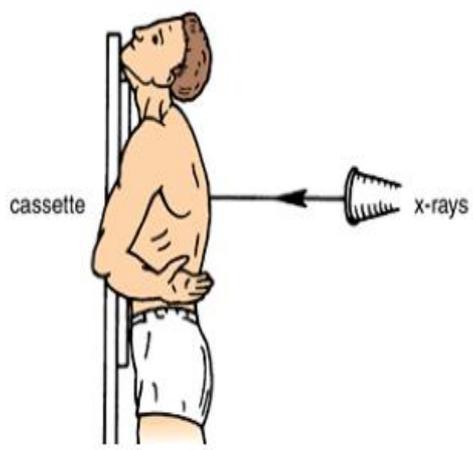
Mitral valve



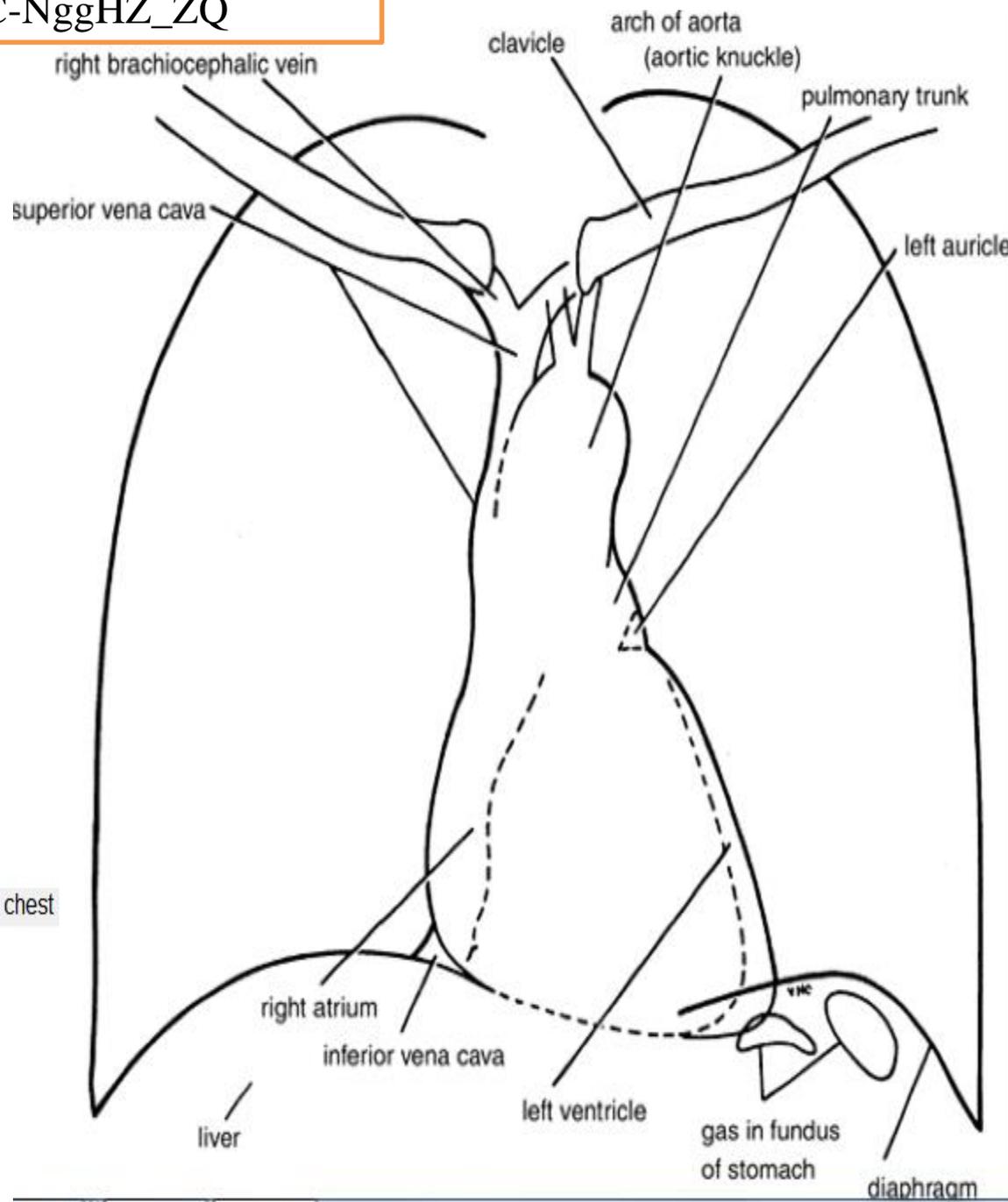
Auscultation position for tricuspid valve



Auscultation position for mitral valve



Main features observable in the posteroanterior radiograph of the chest



A Arch of aorta Pulmonary trunk

THE RIGHT CONTOUR OF THE CARDIAC X-RAY

The upper half of the right contour is formed by the superior vena cava (SVC)

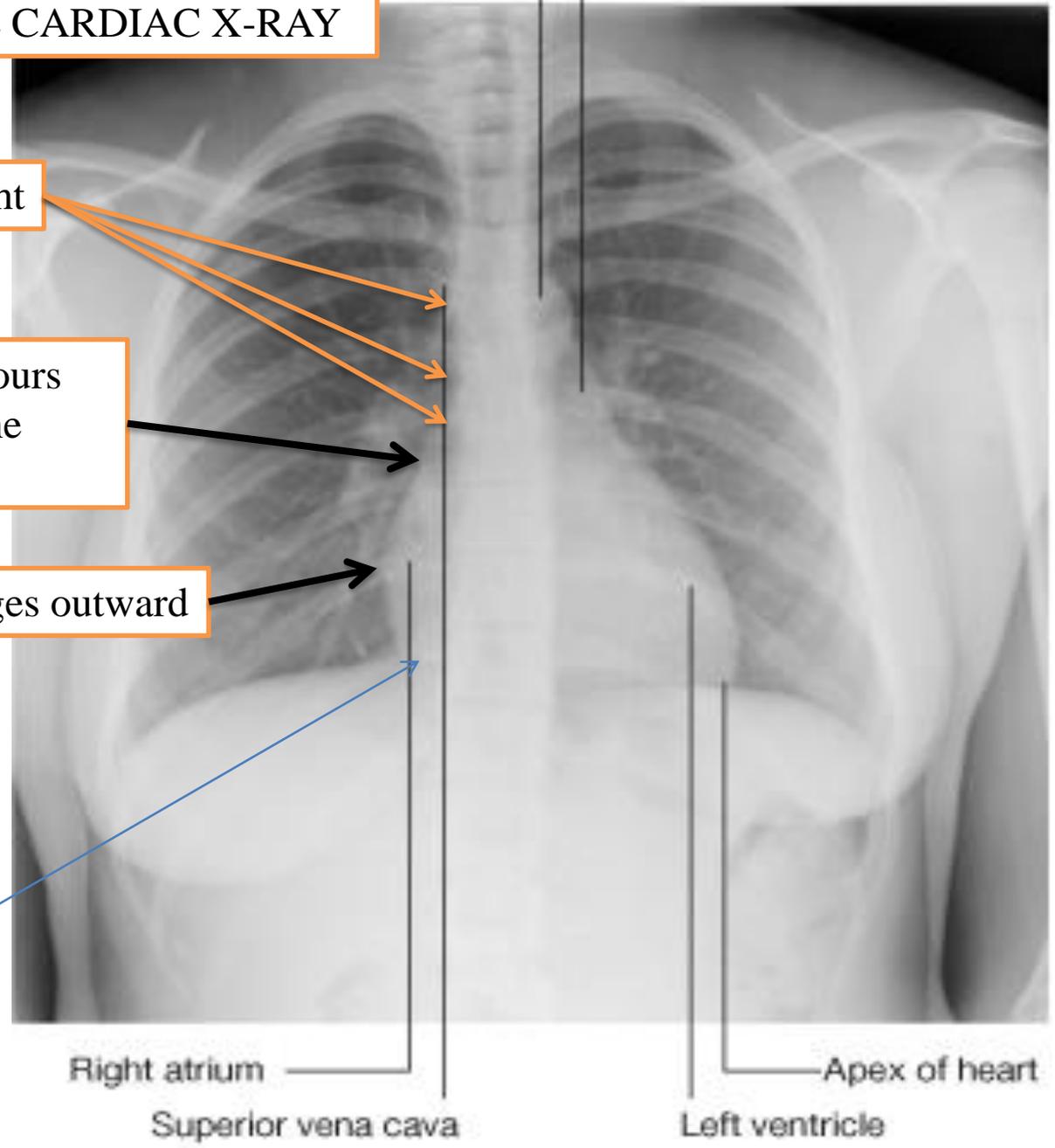
is straight

The angle between these two contours represents the superior aspect of the right atrium

the lower half by the lateral wall of the right atrium

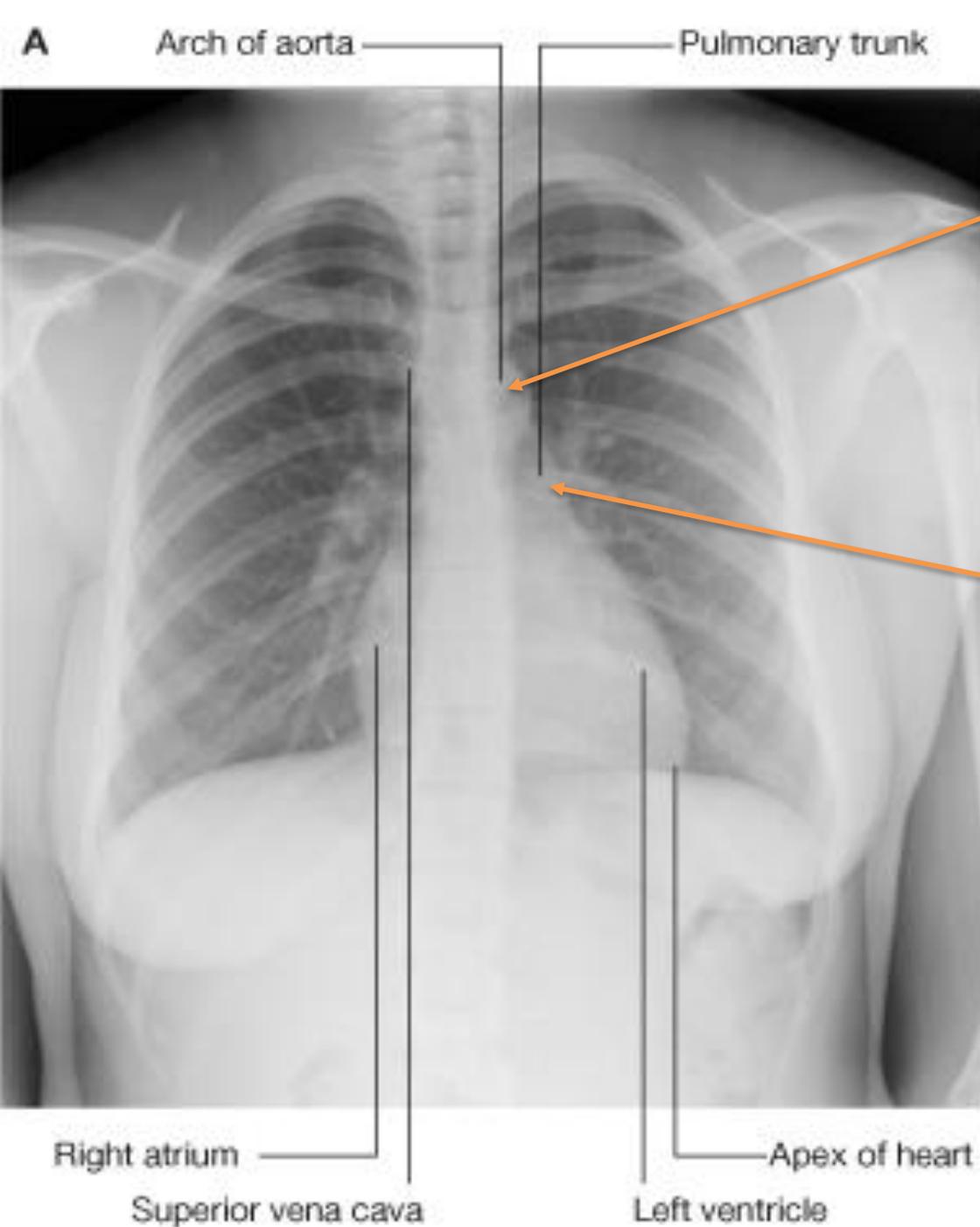
bulges outward

If the patient takes a deep inspiration, an indentation on the right border of the heart can be seen just above the diaphragm, identifying the junction of the inferior vena cava (IVC) and right atrium



Right atrium Superior vena cava

Apex of heart Left ventricle

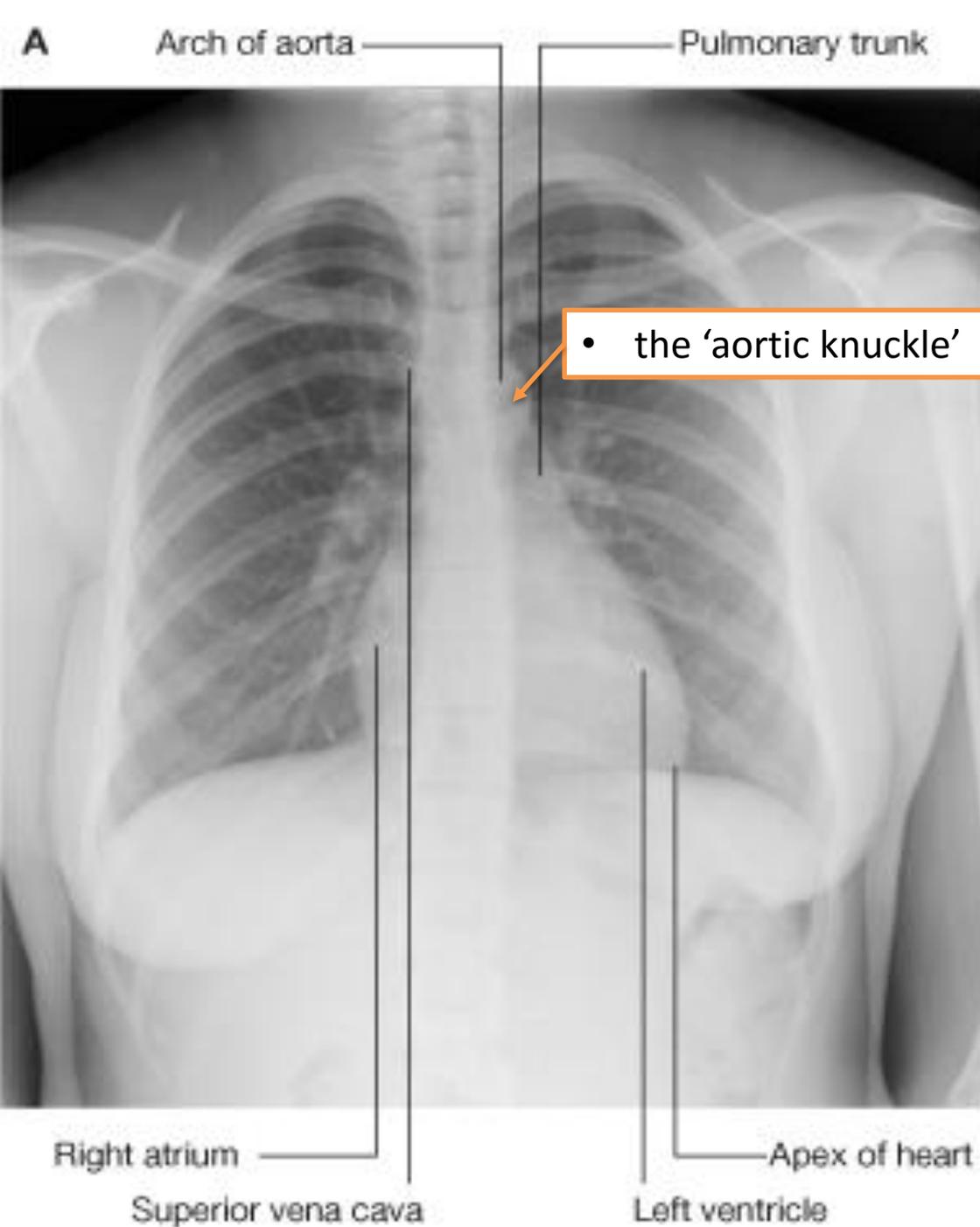


On the left side,

The uppermost part of the cardiovascular is formed by **the distal arch of the aorta** as it curves posteriorly and inferiorly to become the descending thoracic aorta. This is seen as a localized bulge extending from the left side of the mediastinum above the right tracheobronchial angle.

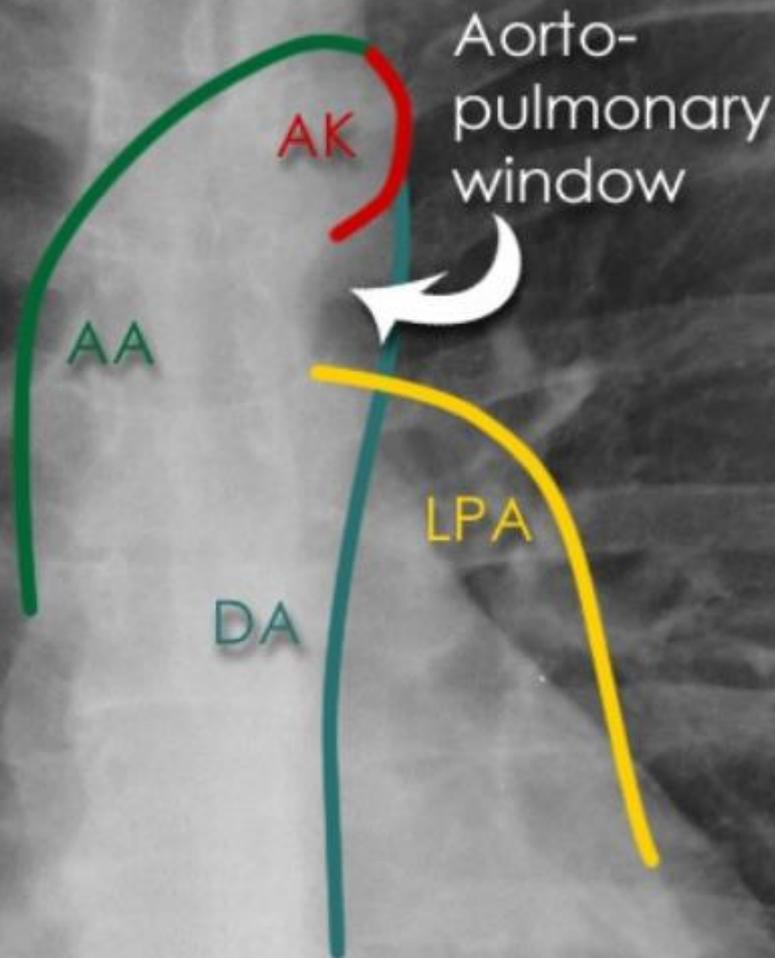
Immediately below the aortic bulge, **the main pulmonary trunk and left main pulmonary artery** are border forming.

A small segment of the left cardiac silhouette below the pulmonary artery is formed by the left atrial appendage. This segment normally is flat or slightly convex and is continuous with the curve of the left ventricle, which forms the largest part of the left border of the cardiac contour.



- The shadow of the arch is easily identified in anteroposterior radiographs and its left profile is sometimes called
- the 'aortic knuckle'

the aortic window



- The arch may also be visible in left anterior oblique views enclosing a pale space,
 - **'the aortic window'**,
 - in which shadows of the pulmonary trunk and its left branch may be discerned

The aorto-pulmonary window lies between the arch of the aorta and the pulmonary arteries.

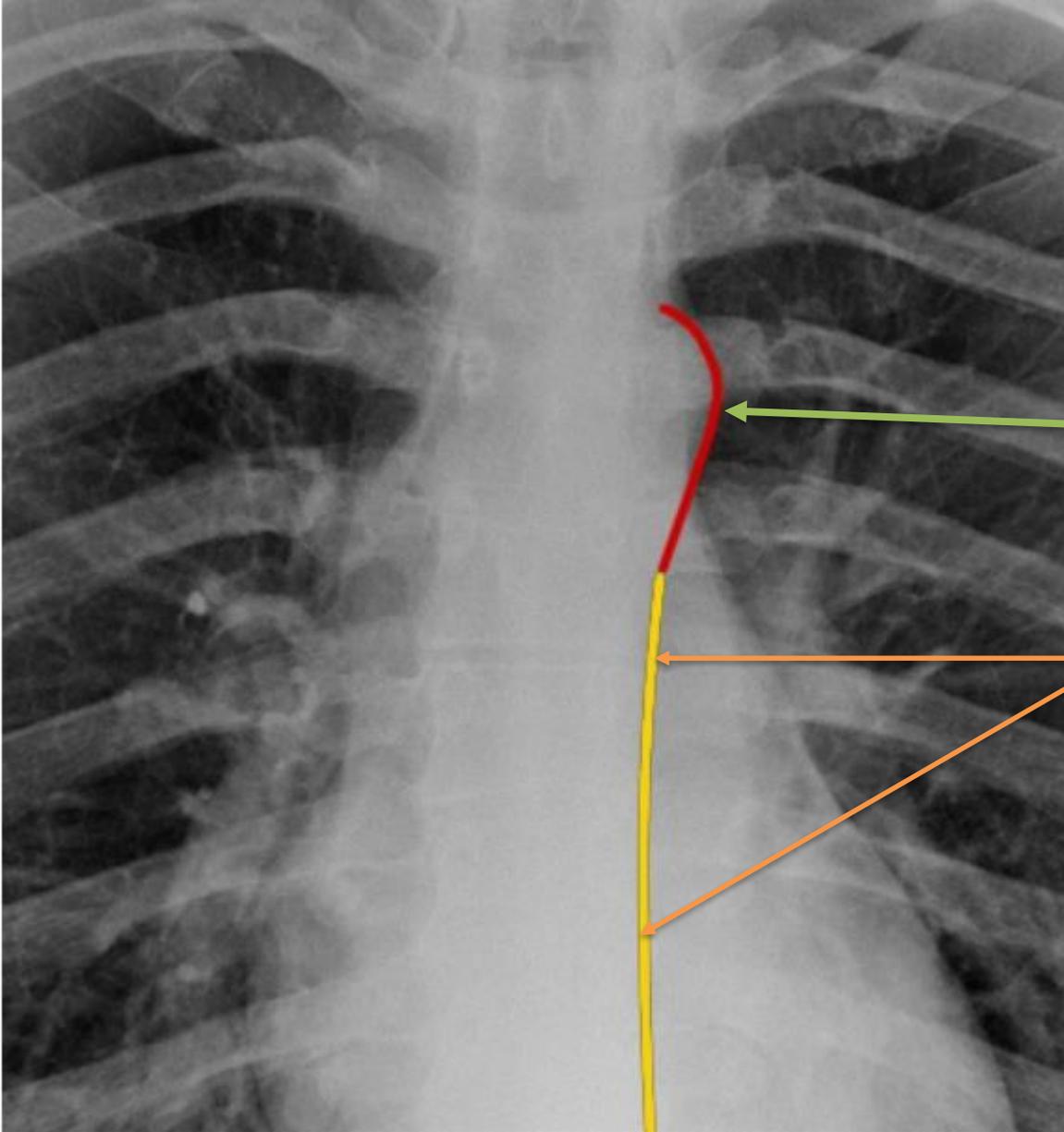
This is a potential space in the mediastinum where abnormal enlargement of lymph nodes can be seen on a chest X-ray.

Aortic Knuckle **AK**

Left Pulmonary Artery (**LPA**)

Ascending Aorta=AA

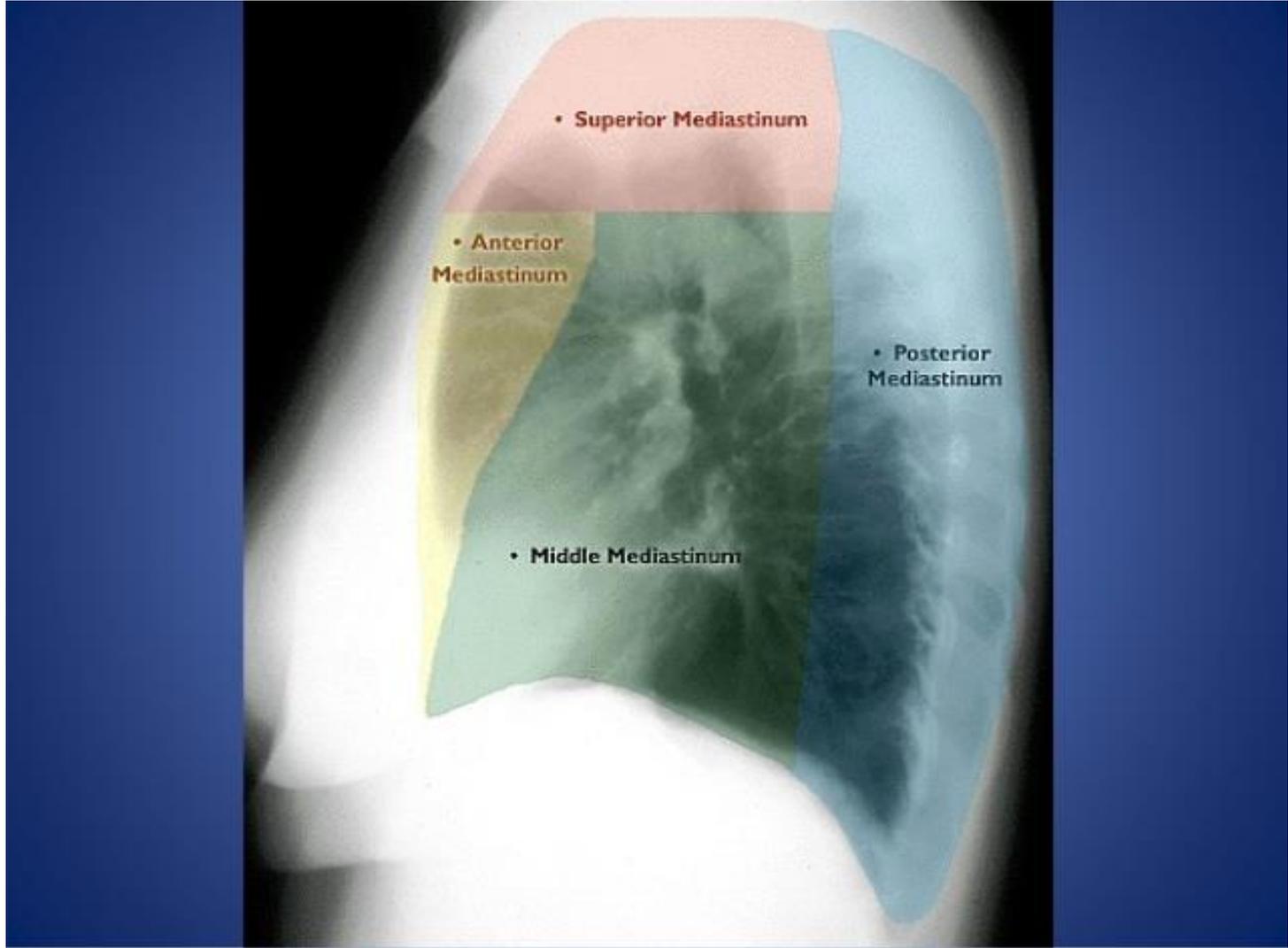
DA atroA gnidnecseD =



The aortic knuckle (**red line**)

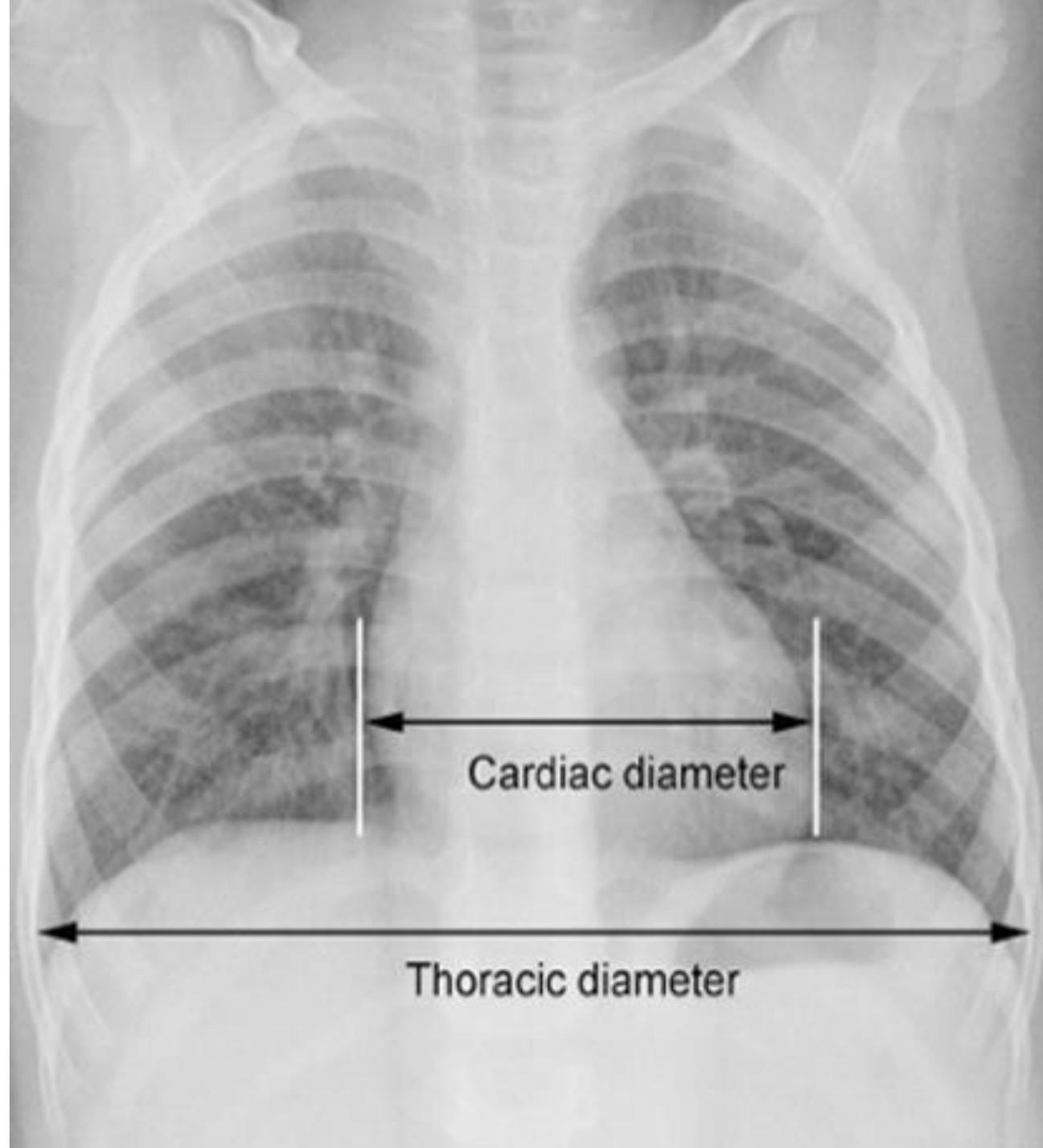
- the 'aortic knuckle'

The contour of the descending thoracic aorta (**yellow line**)



The cardiothoracic ratio (CTR) aids in the detection of enlargement of the heart which is most commonly from cardiomegaly but can be due to other processes such as **Pericardial effusion**

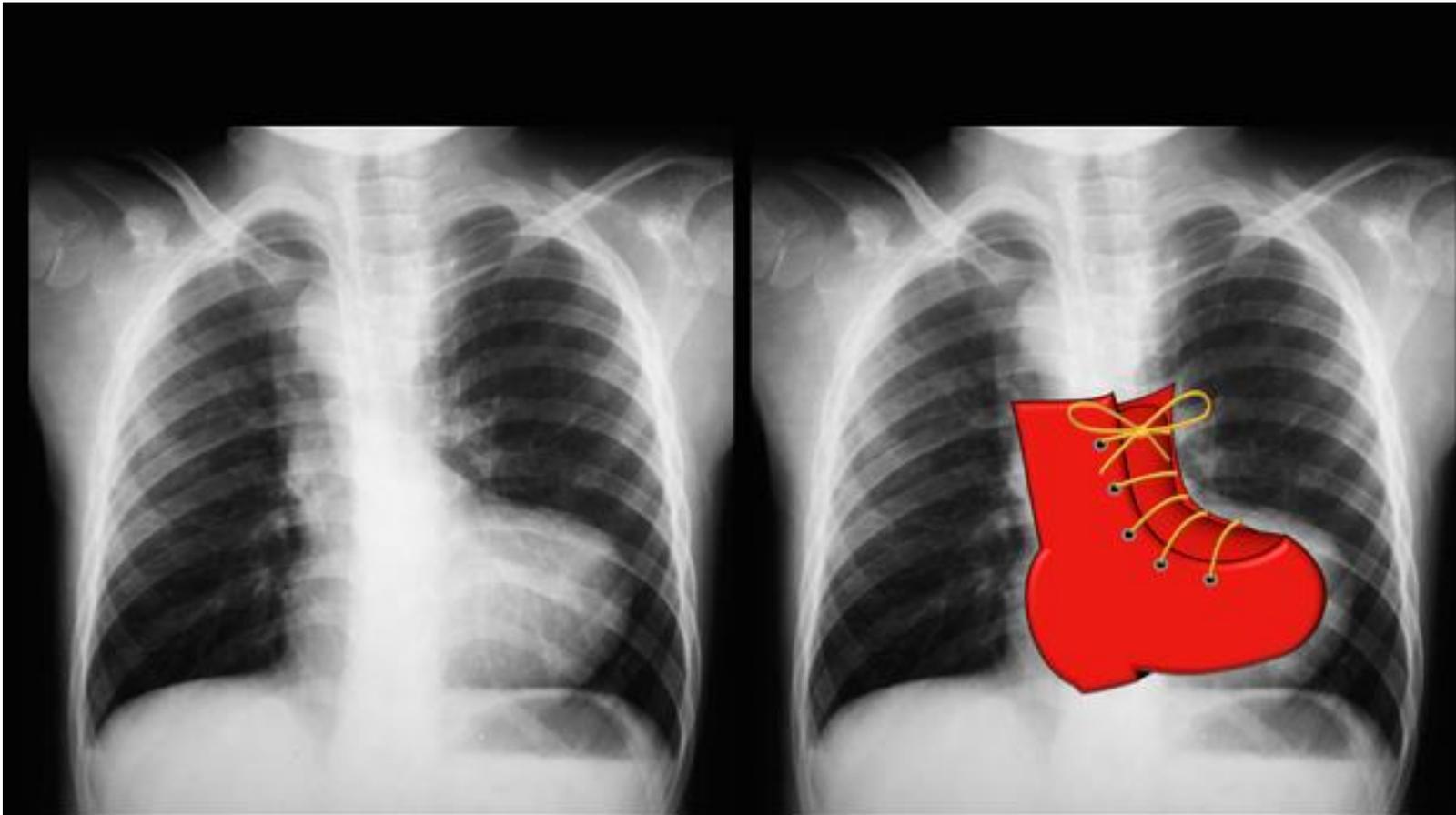
It is the ratio of maximal horizontal cardiac diameter to maximal horizontal thoracic diameter (inner edge of ribs / edge of pleura). A normal measurement should be <0.5 .

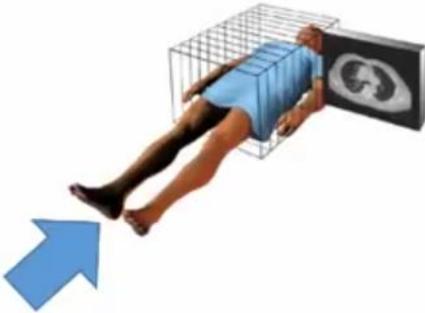


A 'boot-shaped' heart

It is the appearance of the heart on plain film in some cases of [Tetralogy of Fallot](#).

It describes the appearances of an upturned cardiac apex due to right ventricular hypertrophy and a concave pulmonary arterial segment

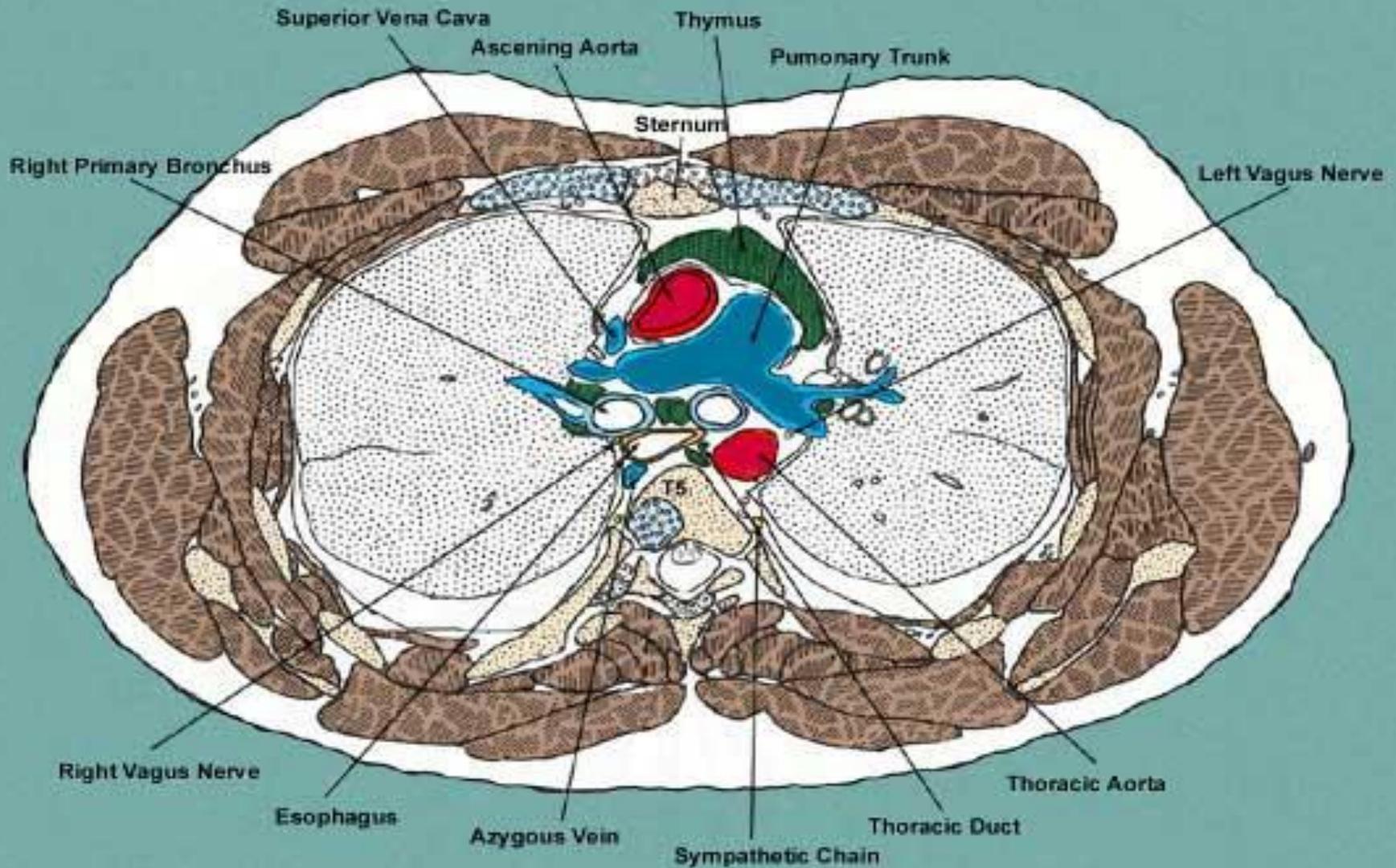




ON the CT scans



You should appreciate the fact that we are evaluating the inferior part of the section (not the superior), therefore, it should be noted right side will be actually on the left side on the scan and vice versa.



Cross section through the thorax at vertebra T5. This section cuts through the anterior, middle and posterior mediastina. You now see the ascending and descending aortae as well as the pulmonary trunk

Read this paper

**Sex-Specific Parameters of
Ascending Aorta, Descending
Aorta
and Pulmonary Trunk by
Computed Tomographic
Angiography
with Impact of Age,
Hypertension, Smoking and
Diabetes**

**Amjad S. Shatarat^{*}; Maher T. AL-
Hadidi[†]; Darwish H. Badran[‡]; Faraj F.
Bustami[§]; Azmy M. AL-Hadidy^{**}; Emad
S. Tarawneh^{**}; Nathir M. Obeidat^{***} &
Sherin W. Abd El Malek**

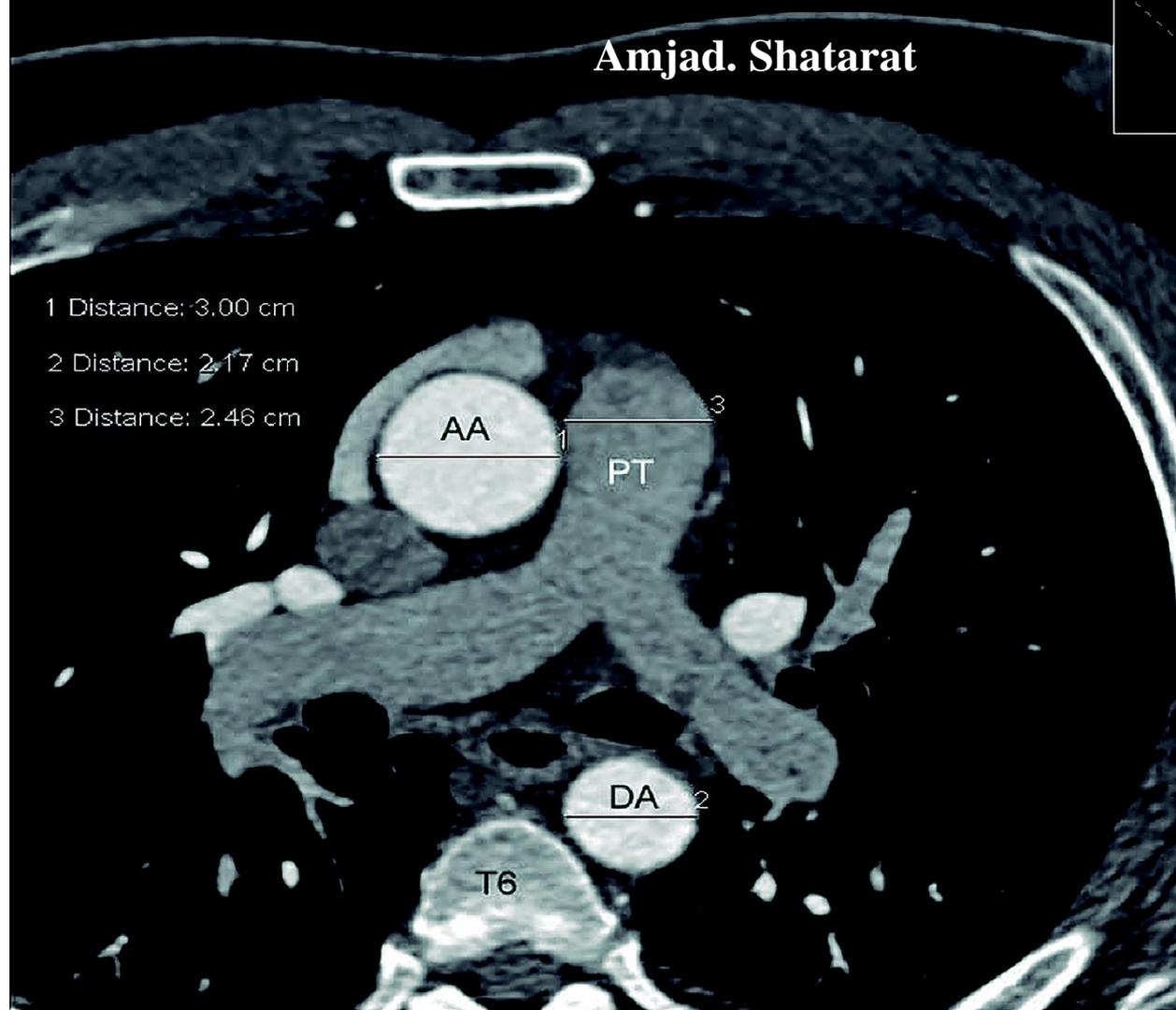


Fig. 1. Axial CTA image of the thorax, demonstrates ascending aorta, descending aorta and pulmonary trunk at the **upper border of the sixth thoracic vertebra**. AA=ascending aorta, DA=descending aorta, PT= pulmonary trunk

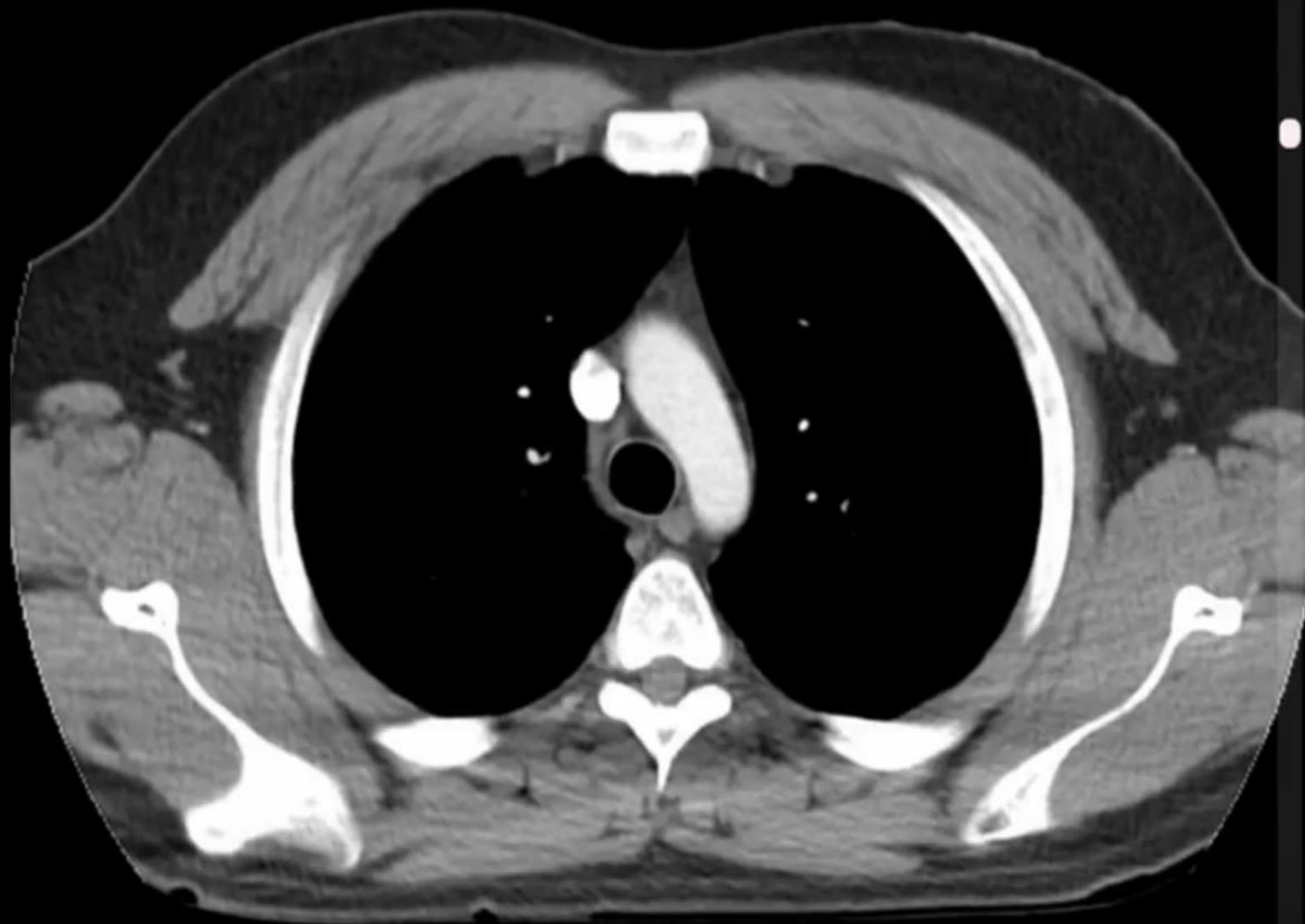


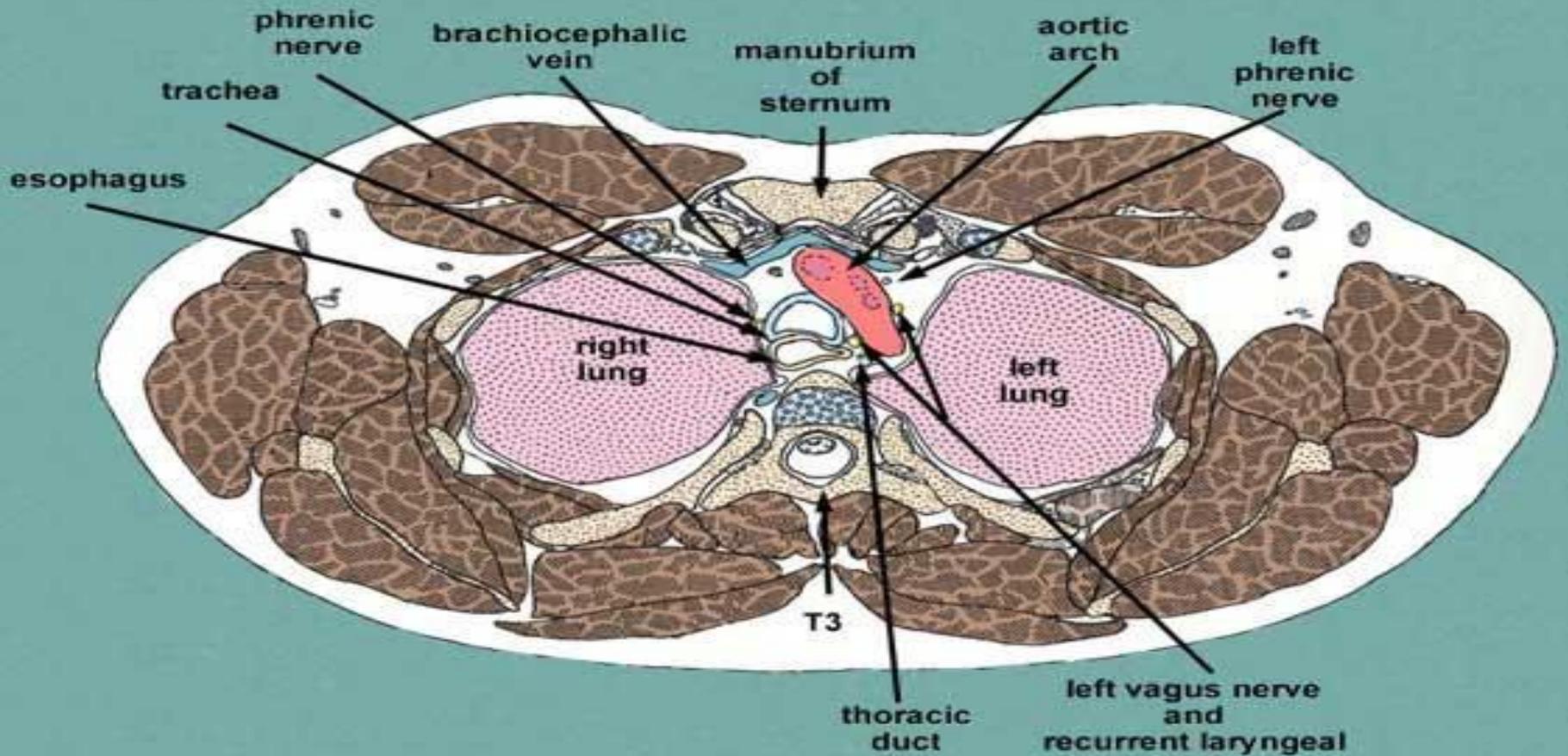
Dr. Shatarat





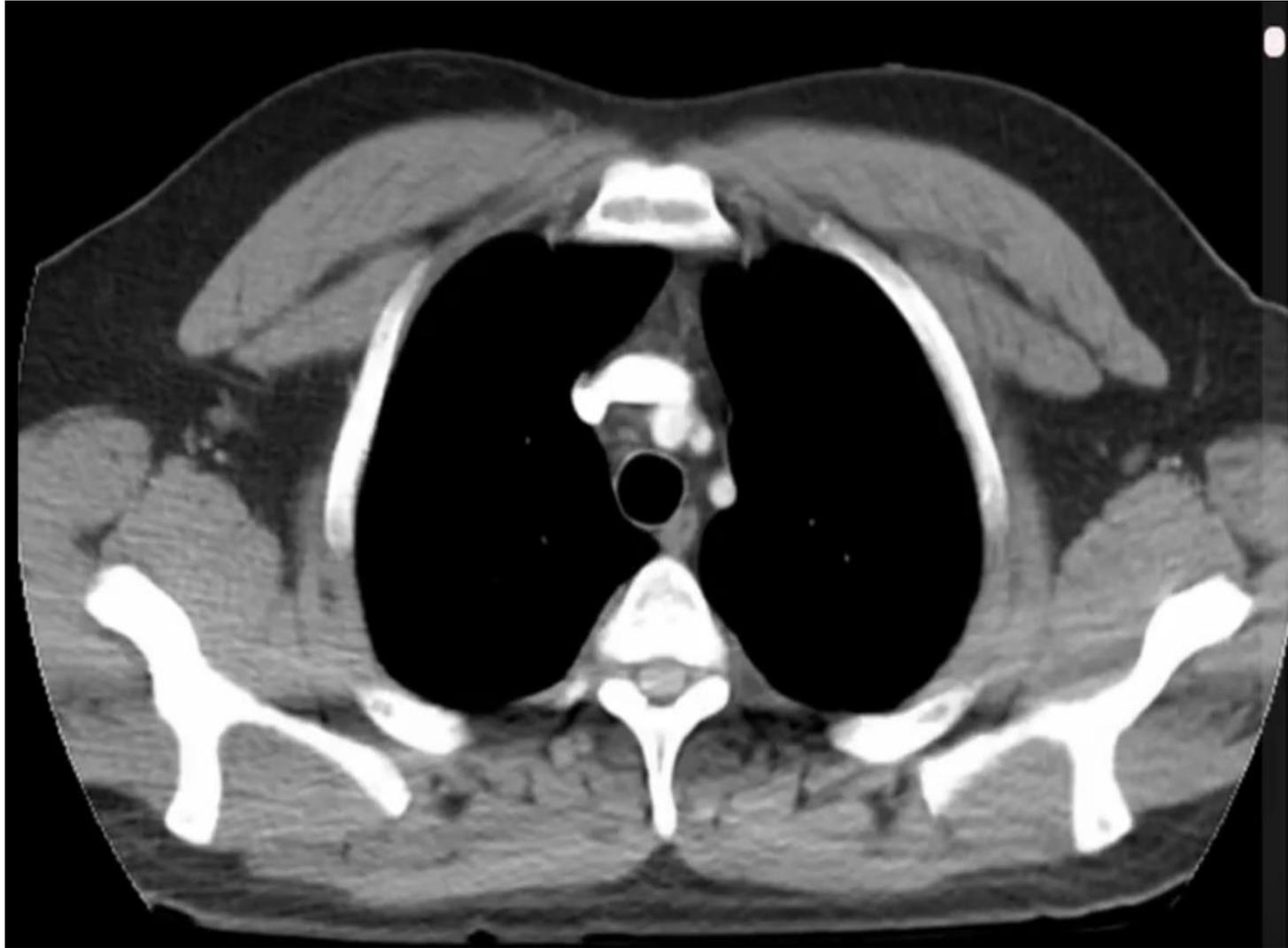
Dr. Shatarat





Cross section through the thorax at vertebra T3. This section is also through the superior mediastinum but a little lower than the one above. You are looking up and into the aortic arch. Although not labeled, you should be able to make out the openings of the brachiocephalic, left common carotid and left subclavian arteries.



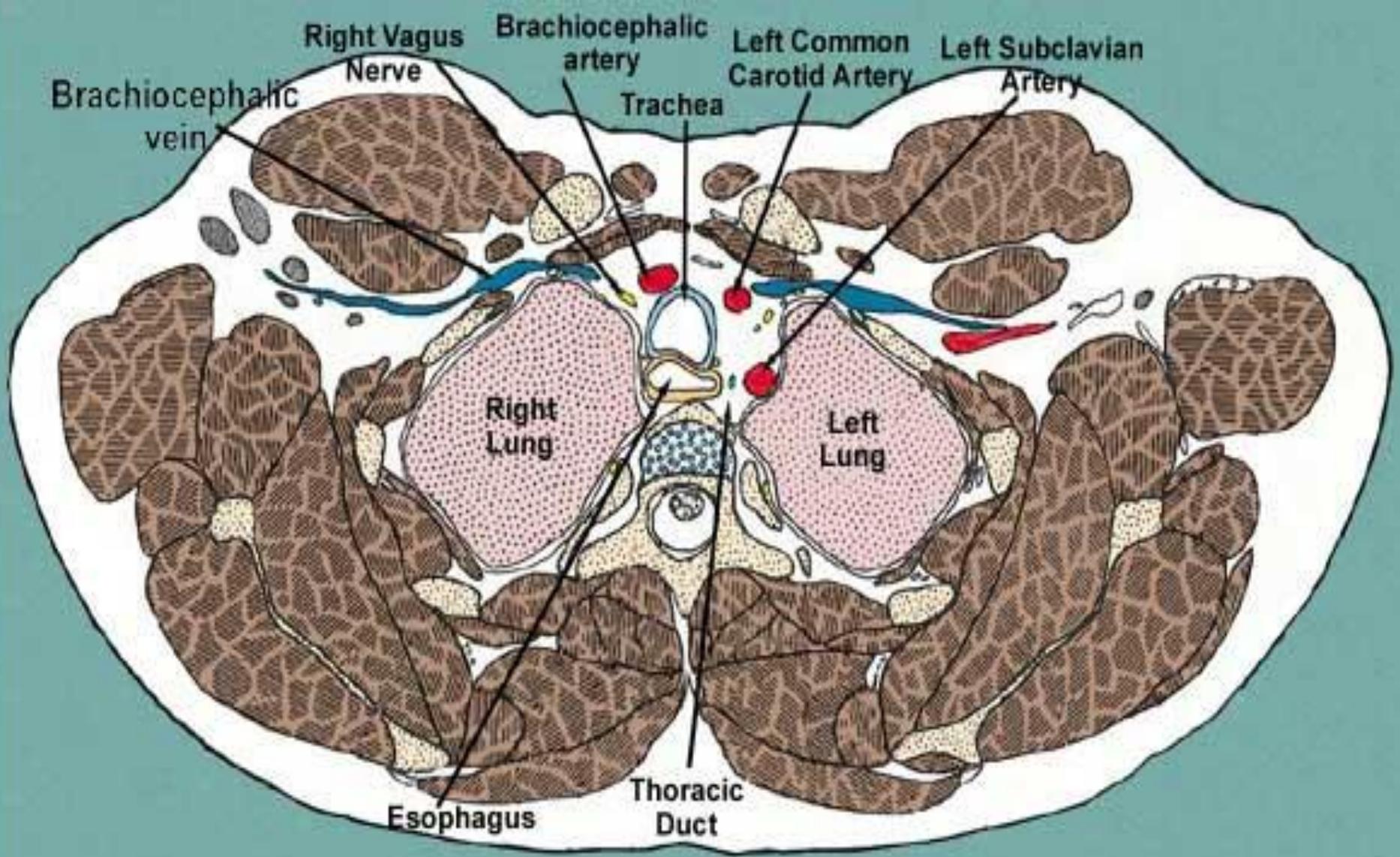




12/4/2020

Dr. Shatarat





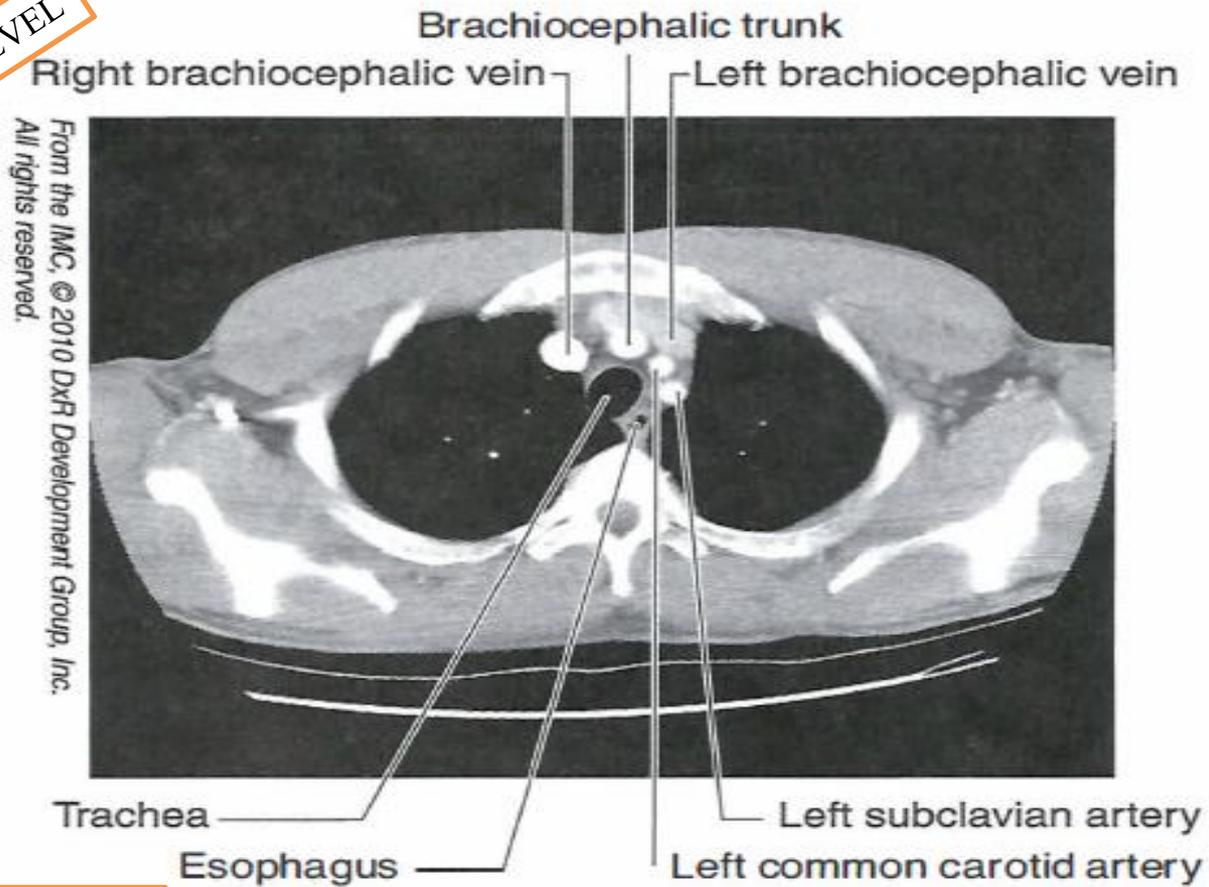
Cross section through the thorax at vertebra **T2** This section cuts through the superior mediastinum above the aortic arch



Now we are at the neck



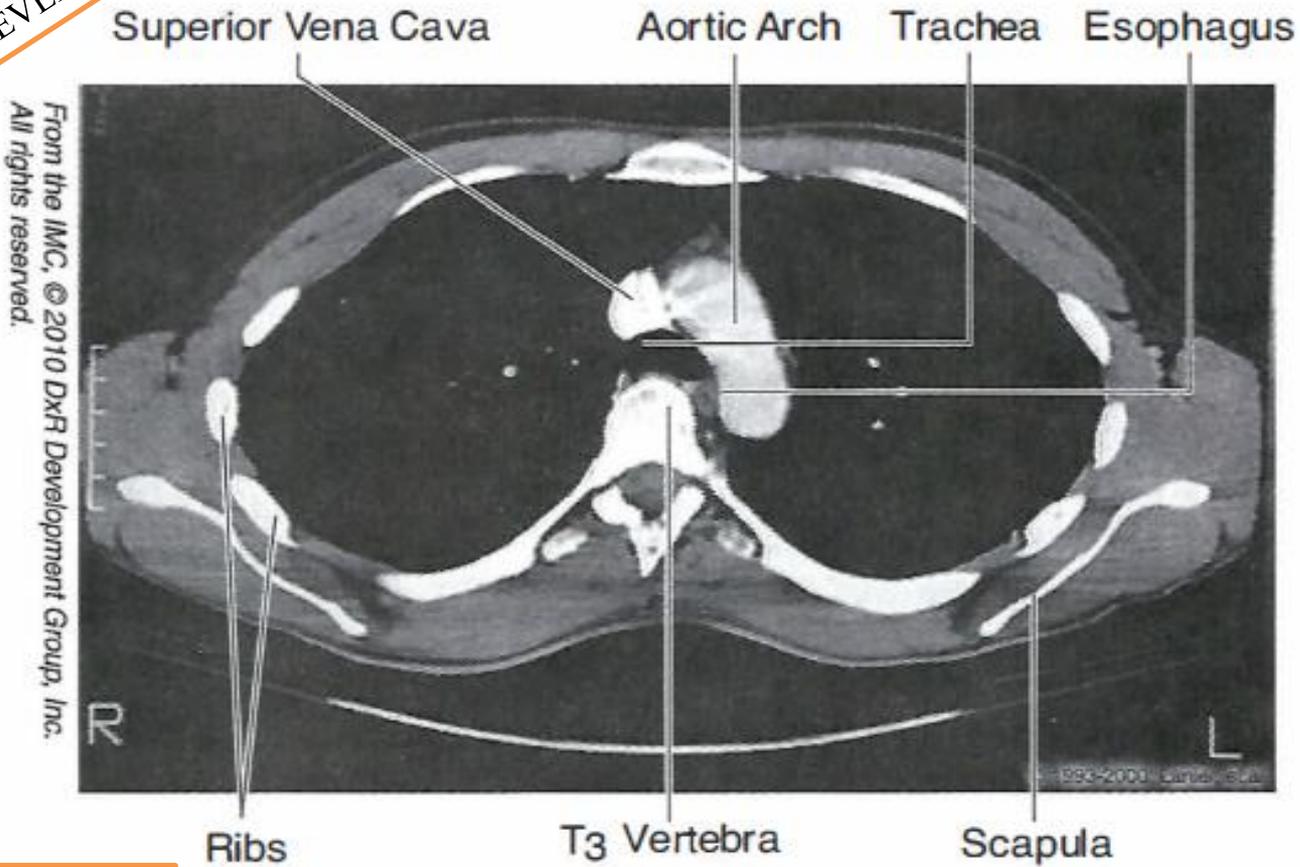
T2 LEVEL



Exam material

Figure III-2-39. Chest: CT, T2

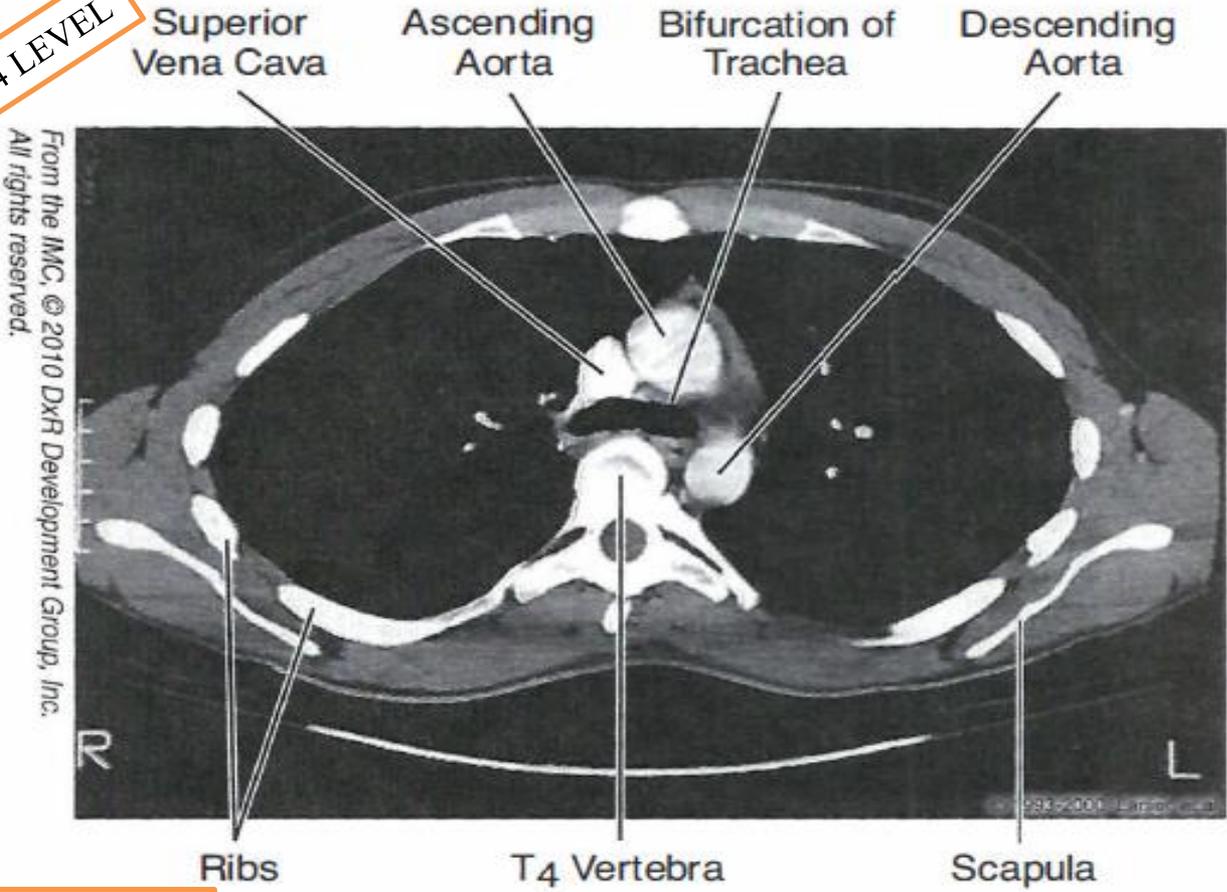
T3 LEVEL



Exam material

Figure III-2-40. Chest: CT, T3

T4 LEVEL



Exam material

Figure III-2-41. Chest: CT, T4

Pulmonary Embolism

- ❖ Obstruction of a pulmonary artery by a blood clot (embolus) is a common cause of morbidity (sickness) and mortality (death).

An embolus in a pulmonary artery forms when a blood clot, fat globule, or air bubble travels in the blood to the lungs from a leg vein.

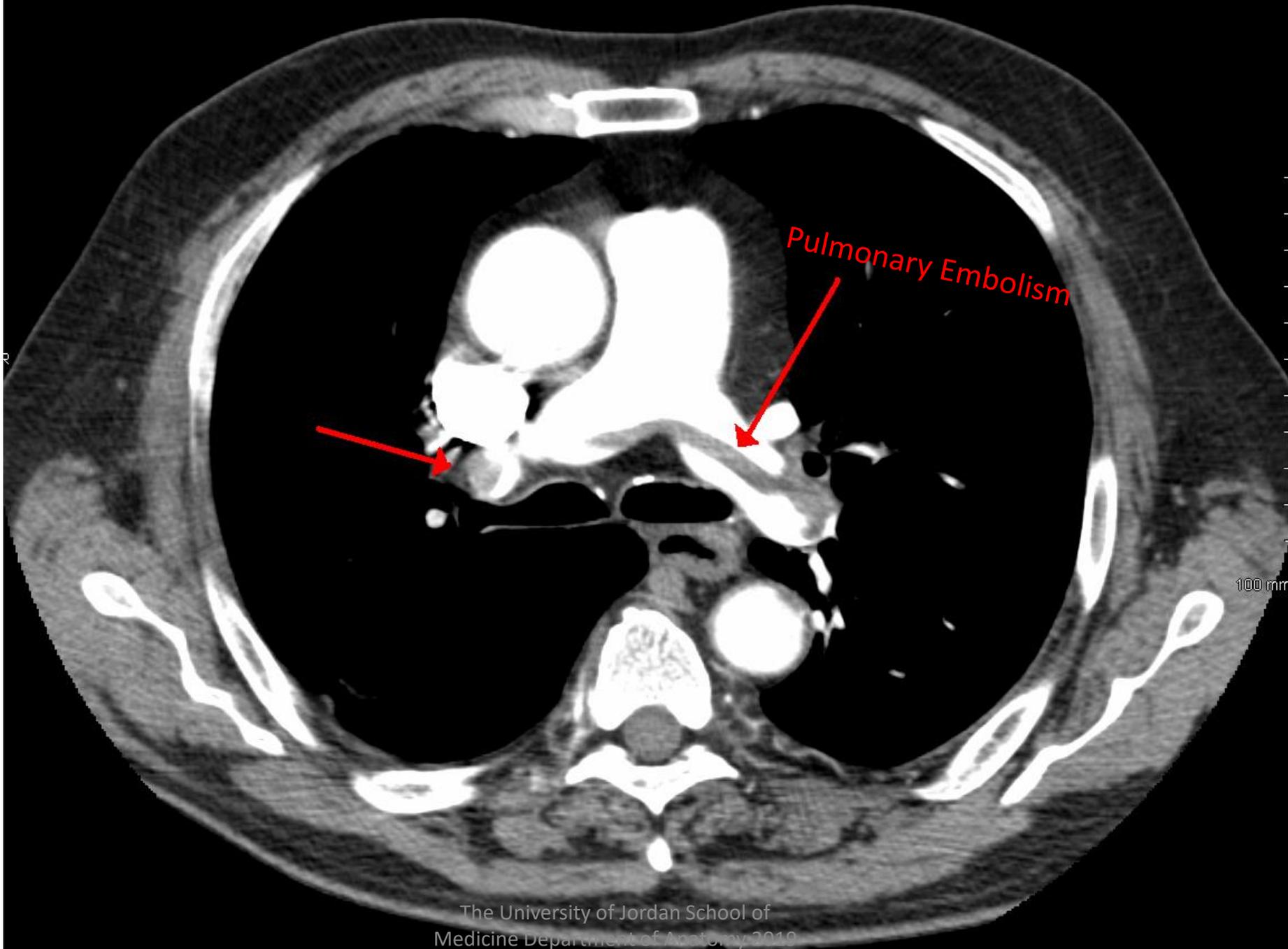
The embolus passes through **the right side of the heart to a lung through a pulmonary artery.**

The embolus may block a pulmonary artery—pulmonary embolism—or one of its branches.

The immediate result is partial or complete obstruction of blood flow to the lung.

The obstruction results in a sector of lung that is ventilated but not perfused with blood.

When a large embolus occludes a pulmonary artery, the person suffers acute respiratory distress because of a major decrease in the oxygenation of blood owing to blockage of blood flow through the lung. A medium-size embolus may block an artery supplying a bronchopulmonary segment, producing a pulmonary infarct, an area of necrotic (dead) lung tissue.



Pulmonary Embolism

100 mm