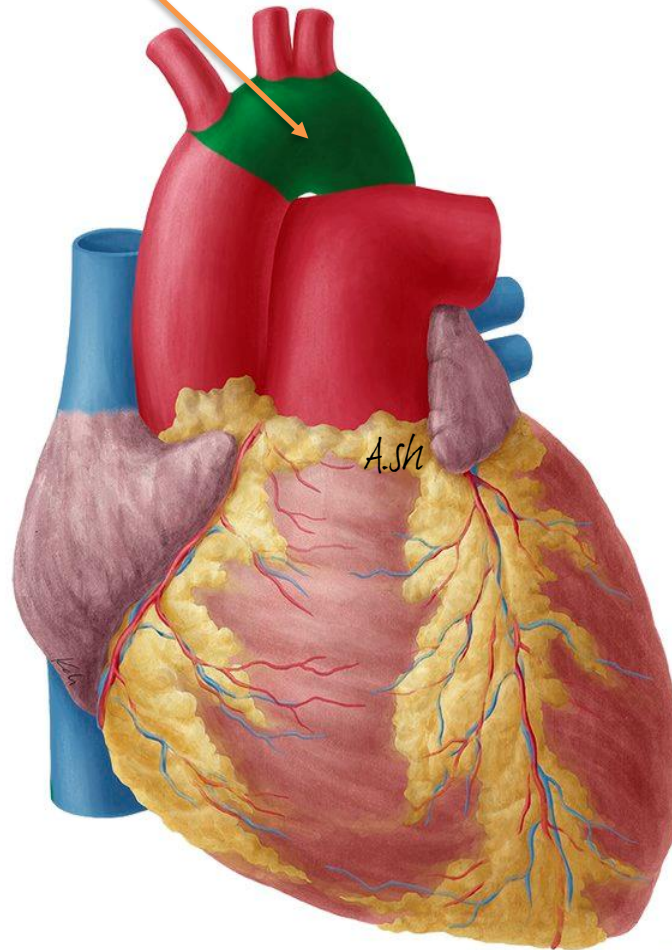


GREAT ARTERIES OF THE SUPERIOR MEDIASTINUM

THE ARCH OF THE AORTA



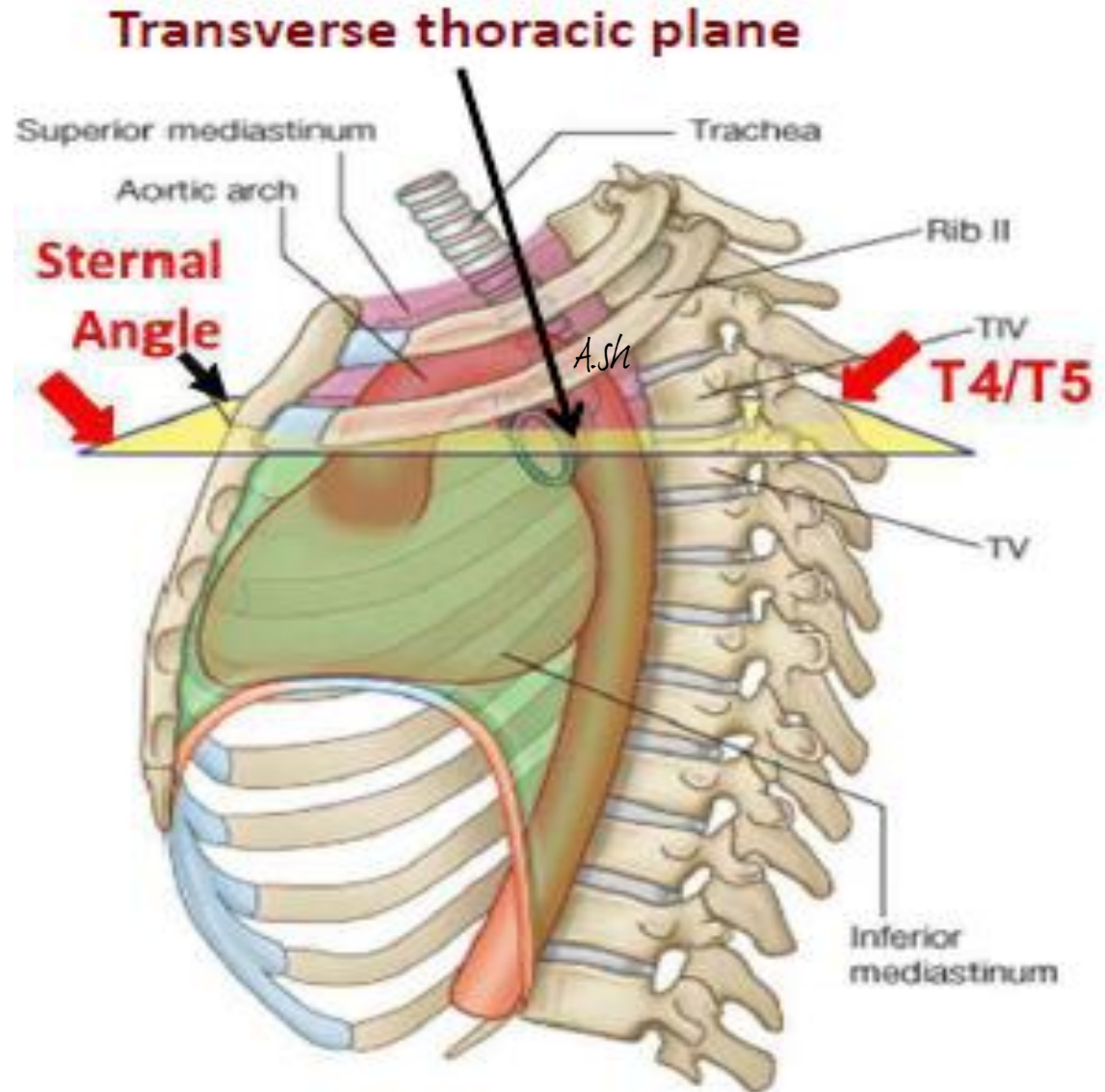
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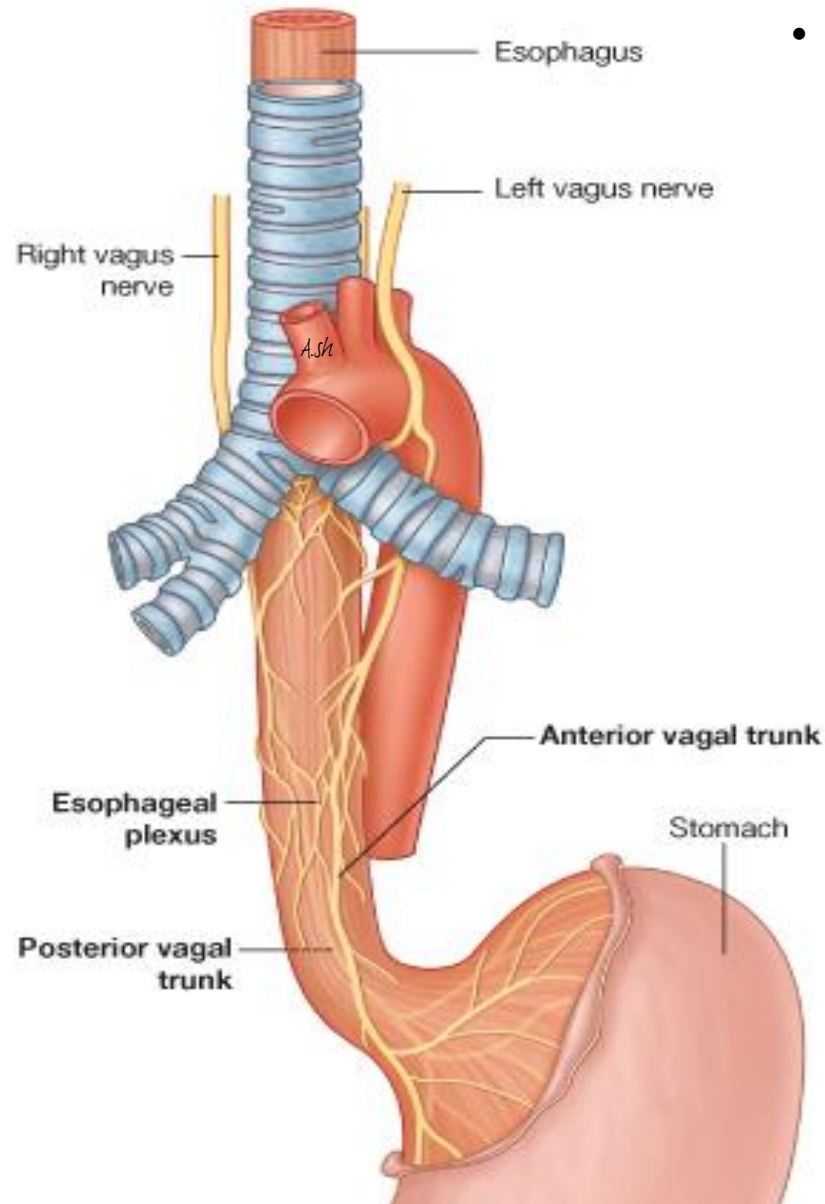


THE ARCH OF THE AORTA

- ❖ The aortic arch continues from the ascending aorta at the imaginary plane (from angle of Luis anteriorly back to the intervertebral disc between 4 and 5 vertebrae).

Thus the aortic arch lies wholly in the **superior mediastinum**





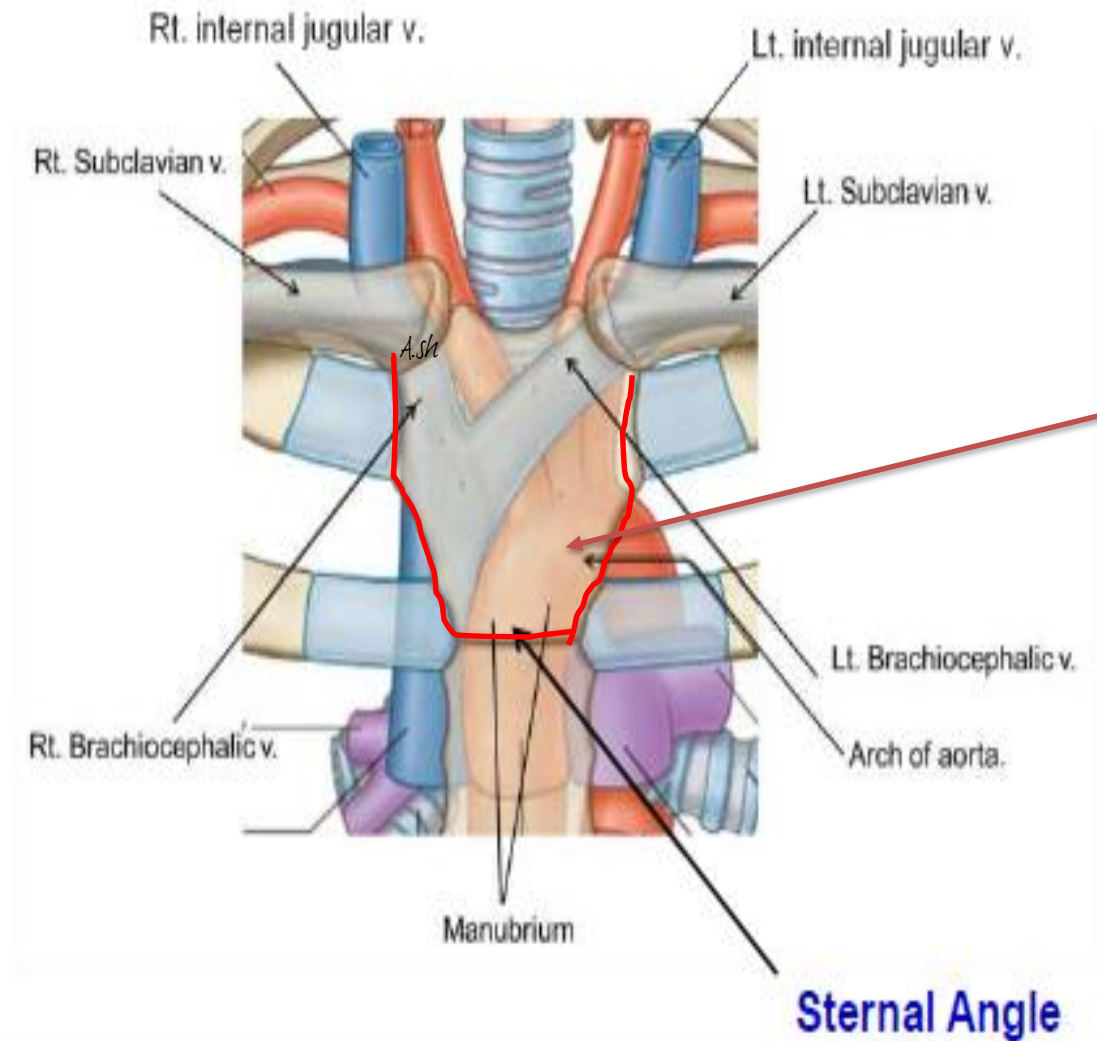
❖ Course;

- The arch first ascends ***diagonally back and to the left*** over ***the anterior surface of the trachea*** ***then back across its left side.***

- It curves around the hilum of the left lung

Finally descends to ***the left of the fourth thoracic vertebral body***, continuing as the descending thoracic aorta.

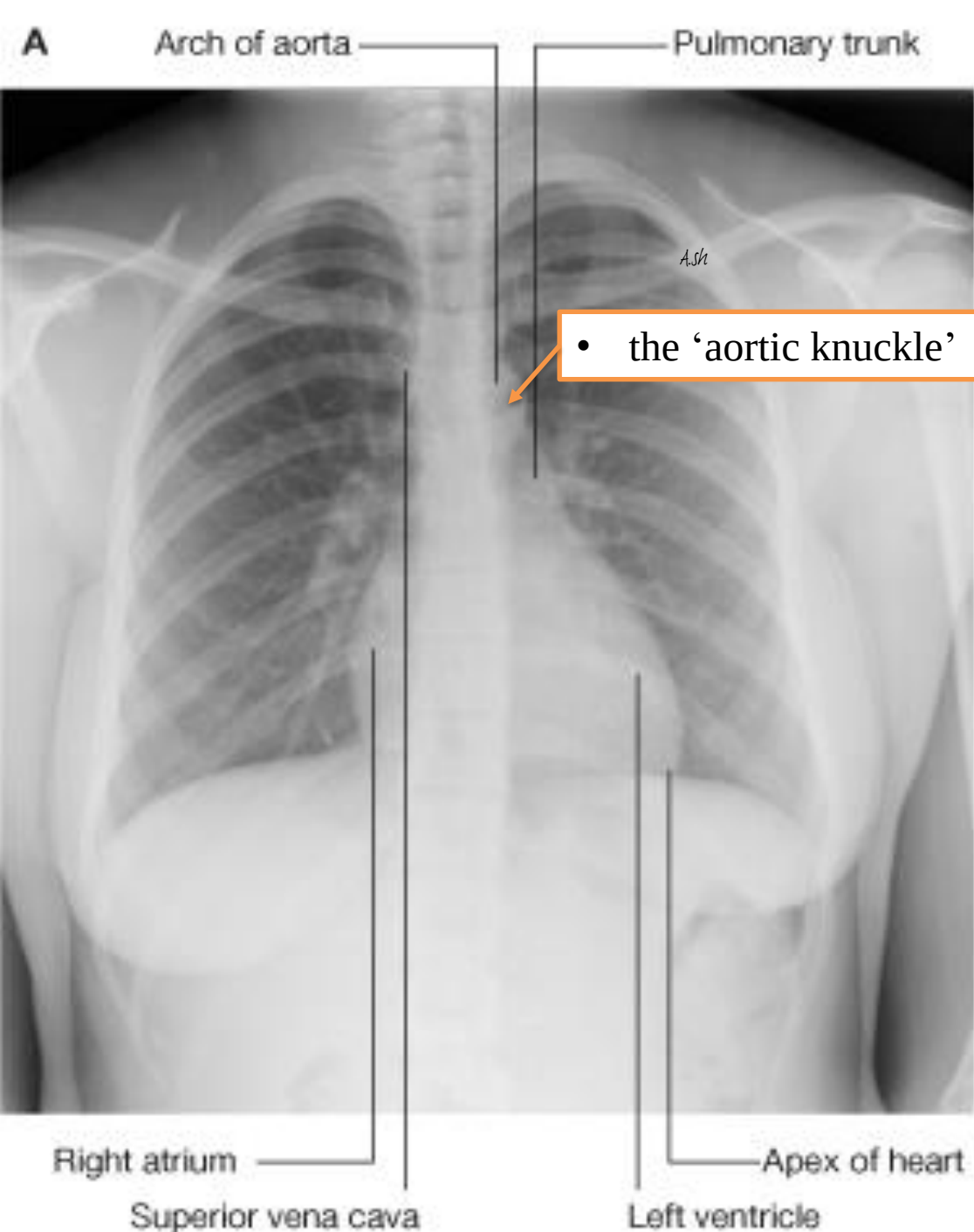
What does this mean to you? what is your final picture of the course of the arch of the aorta?



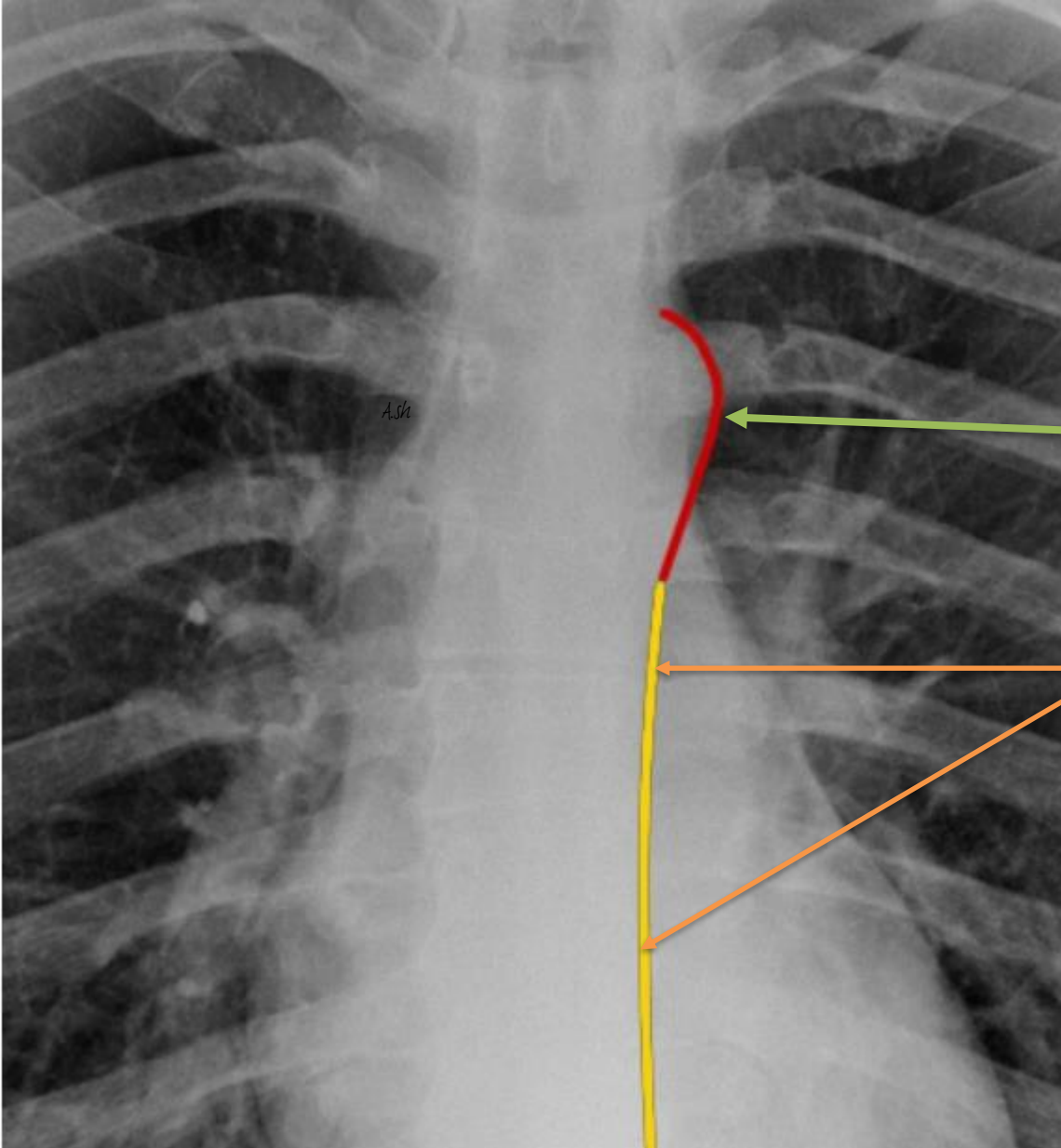
extends upwards to the mid level of the manubrium of the sternum.



Do you remember the shooting story!!!!



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

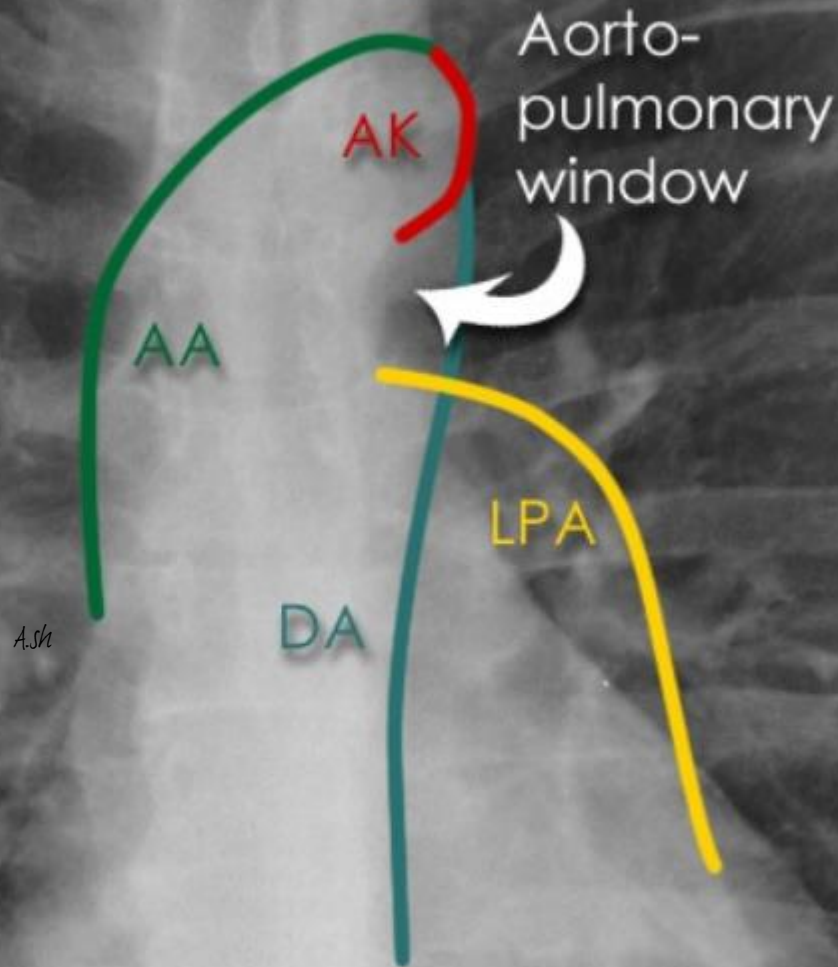


The aortic knuckle (**red line**)

- the 'aortic knuckle'

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

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 =

Relations of the aortic arch

Anteriorly and to the left of the aortic arch is the left mediastinal pleura. Deep to the pleura it is crossed by;

Left phrenic nerve
Left vagus nerve
left superior intercostal vein

The left lung and pleura separate all these from the thoracic wall

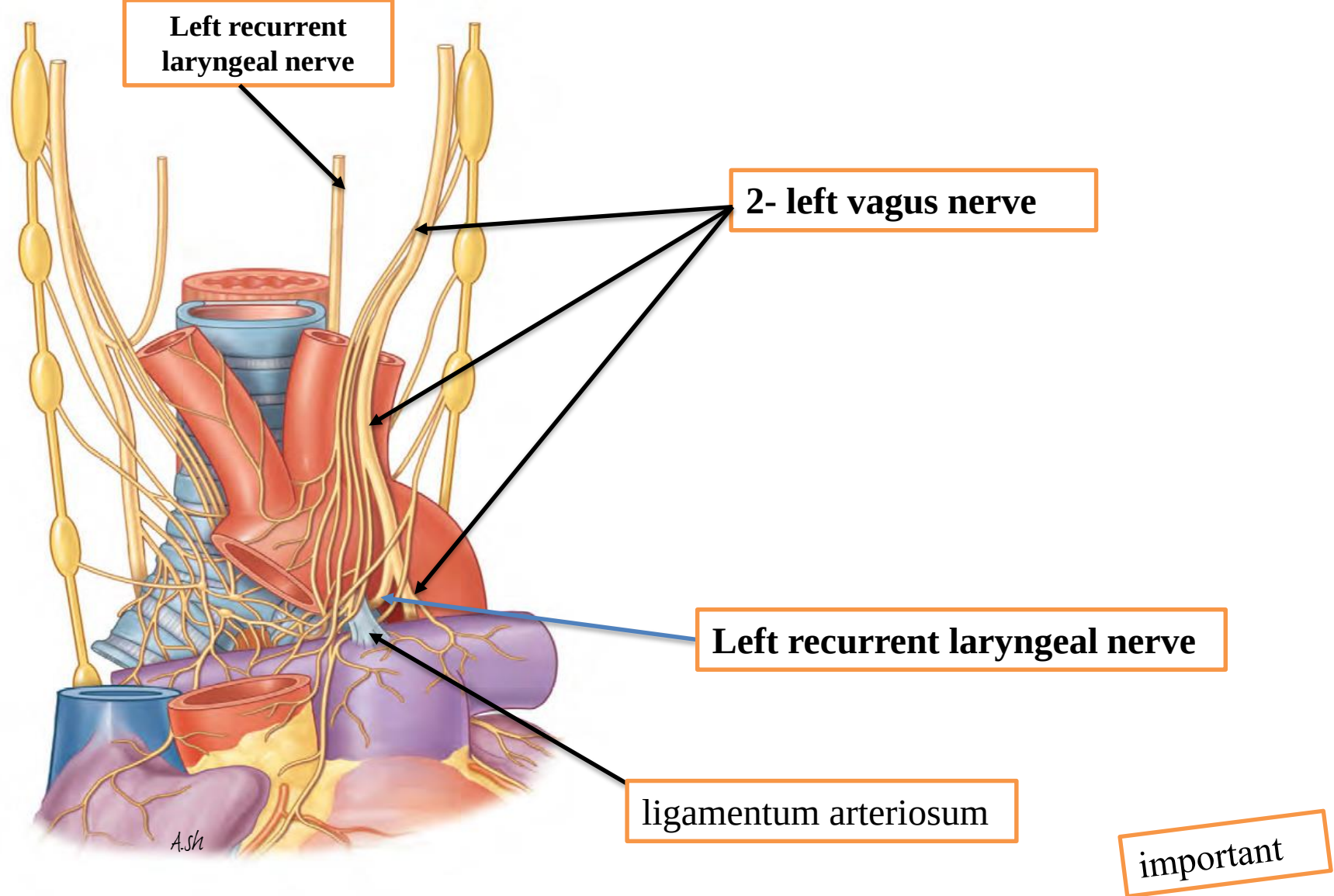


Left phrenic nerve

Relations

Anteriorly and to the left of the aortic arch is the left mediastinal pleura.

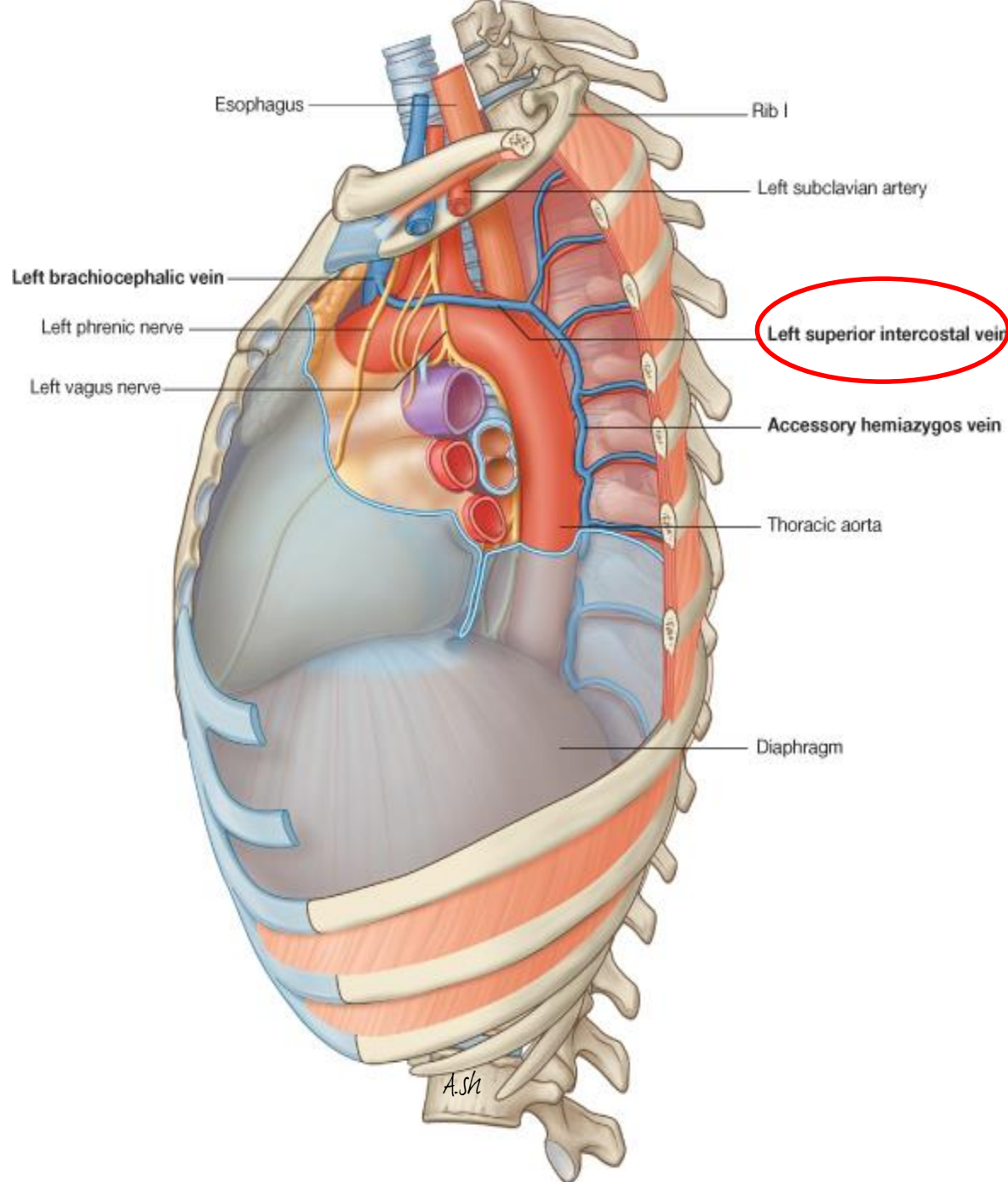
Deep to the pleura it is crossed, in anteroposterior order by:
1-the left phrenic nerve



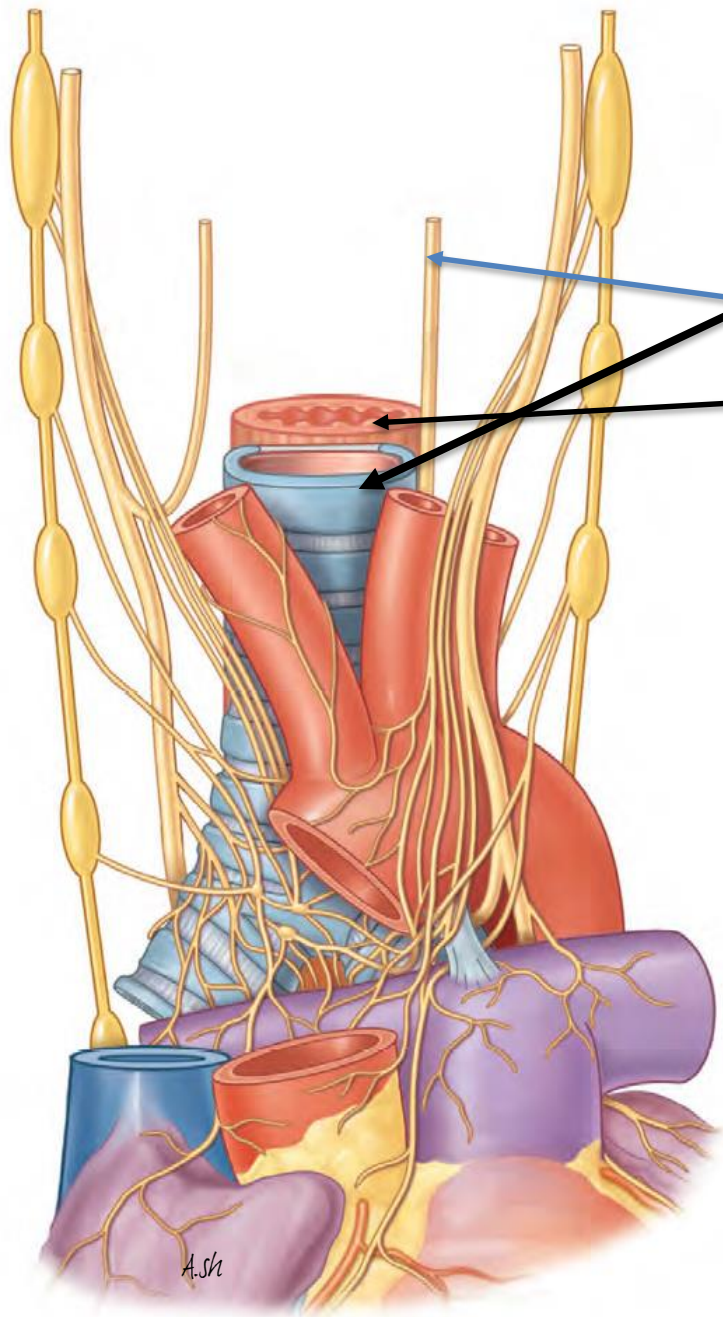
Note

The left vagus nerve just crosses the arch of the aorta, however, its branch **the left recurrent laryngeal nerve** passes on the left side of the **Aortic arch and then hooks** below it and behind the **ligamentum arteriosum** to ascend on the right of the arch and up to the larynx

3-Left superior intercostal vein

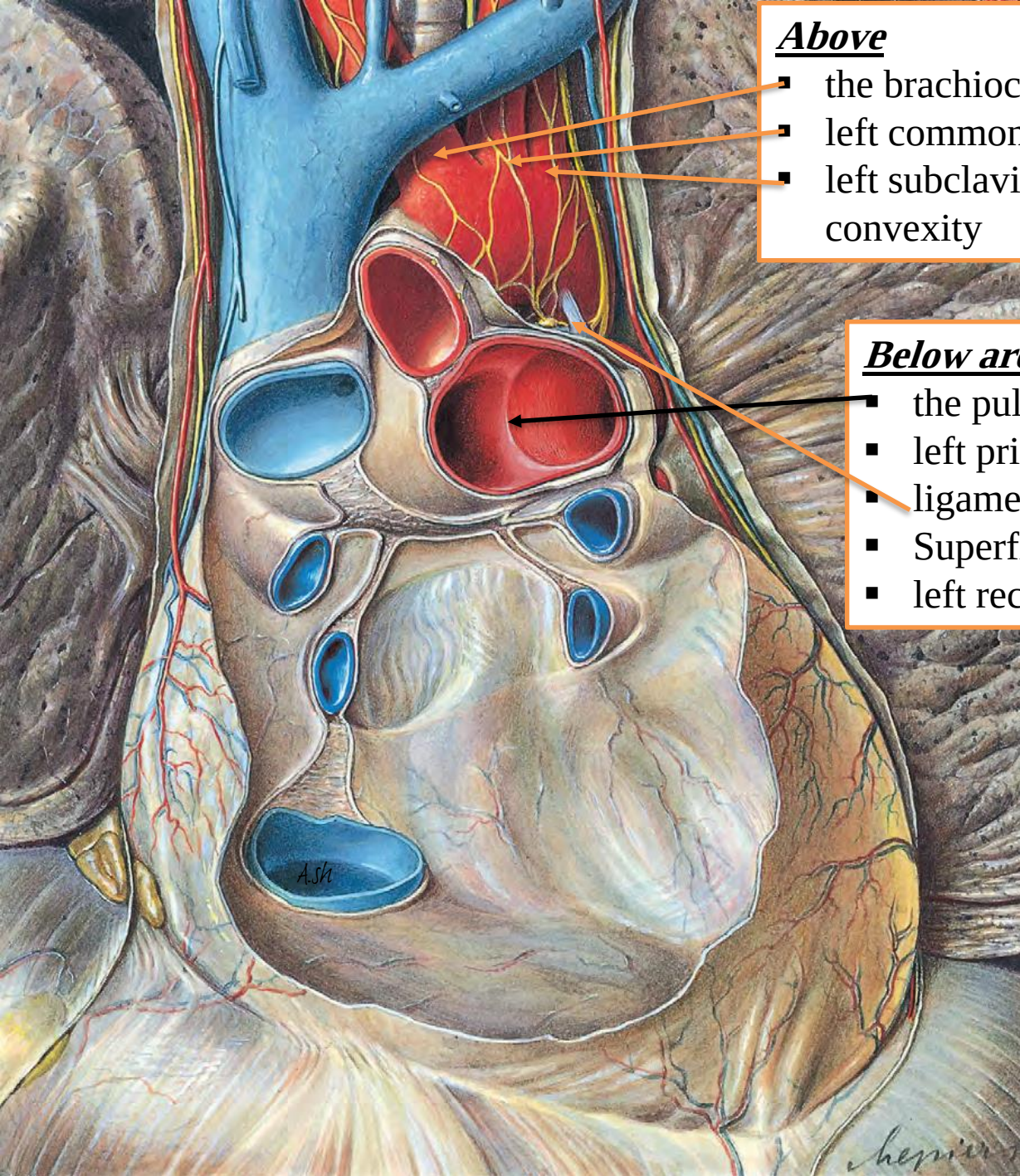


10/26/2019



Posterior and to the right are

- the trachea
- deep cardiac plexus
- the left recurrent laryngeal nerve
- Oesophagus
- thoracic duct and vertebral column.

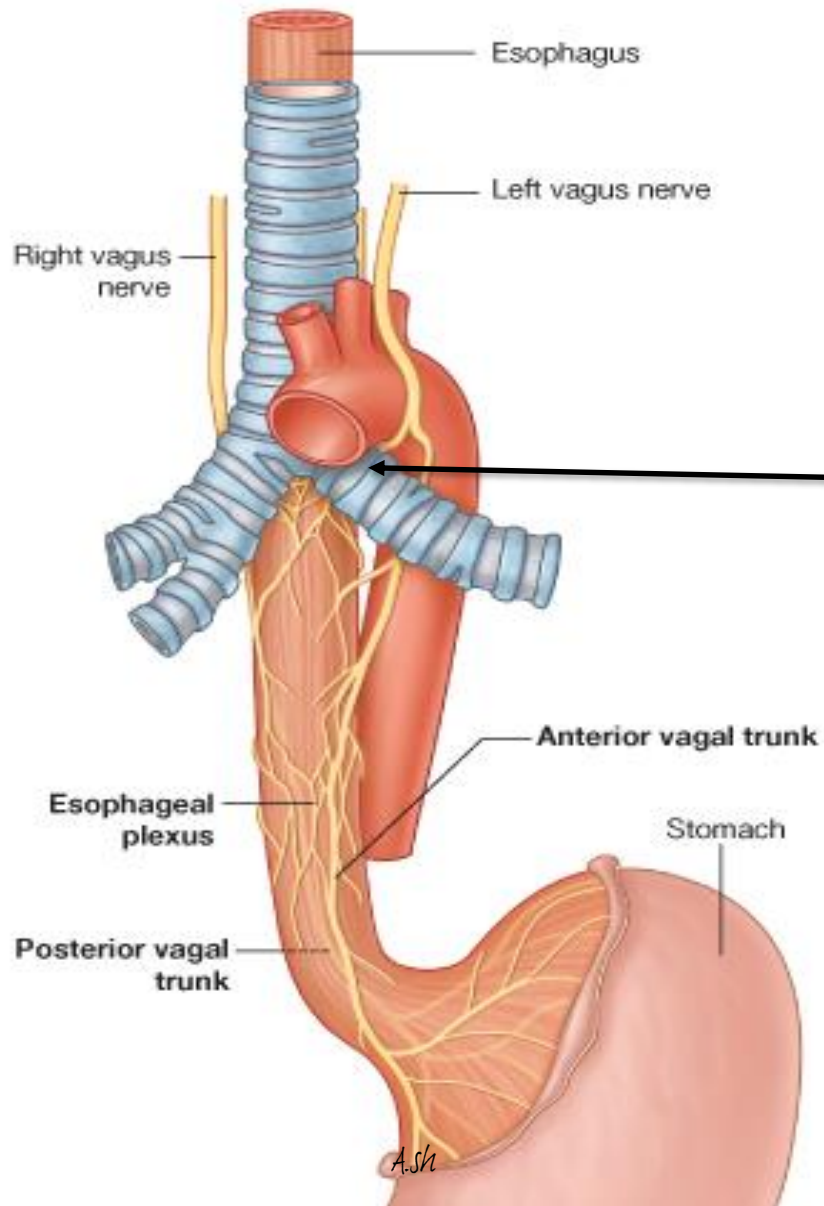


Above

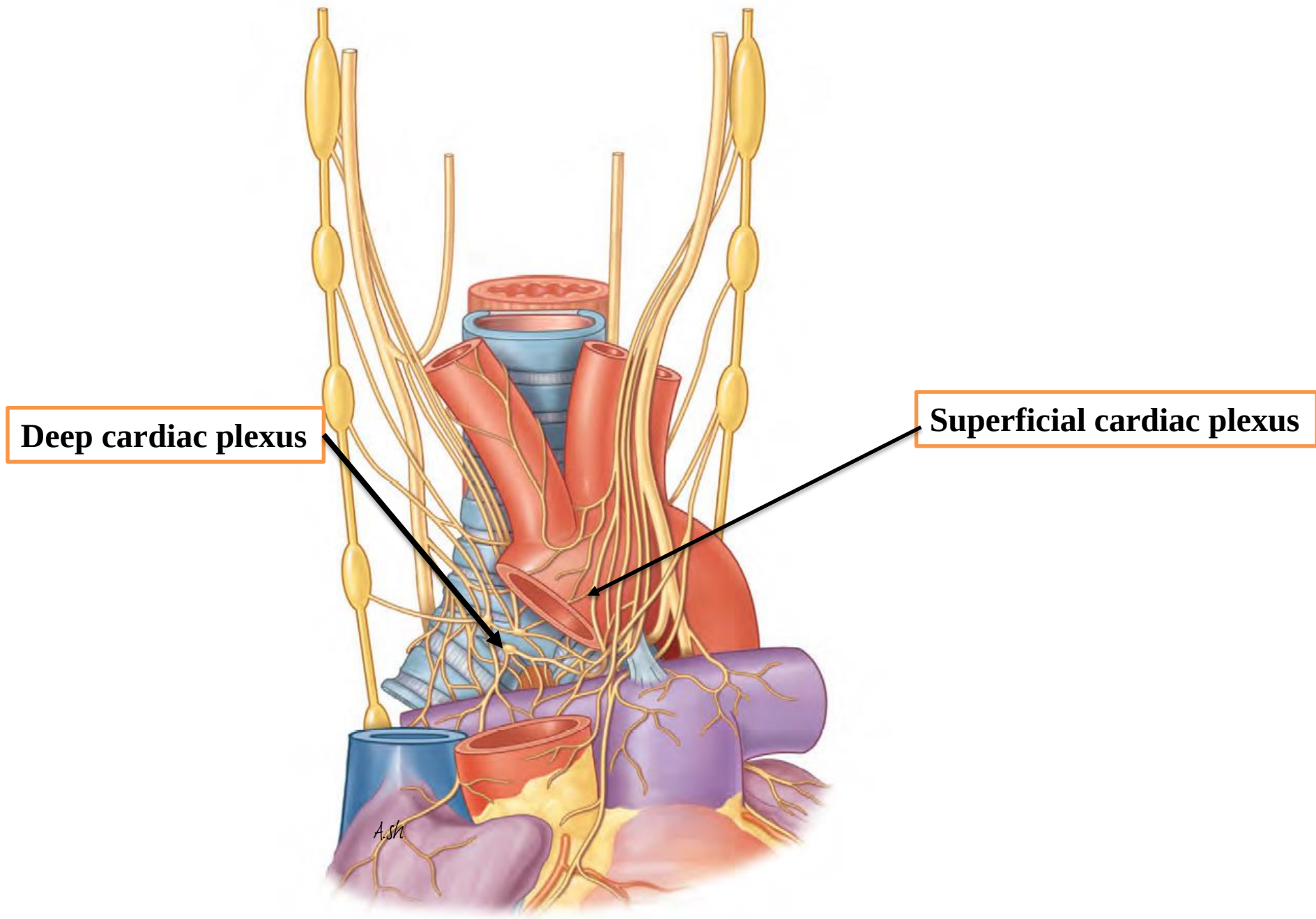
- the brachiocephalic
- left common carotid
- left subclavian arteries arise from its convexity

Below are

- the pulmonary bifurcation
- left principal bronchus
- ligamentum arteriosum
- Superficial cardiac plexus
- left recurrent laryngeal nerve



■ left principal bronchus



Arch of the Aorta

Branches

Brachiocephalic trunk

Left common carotid artery

Left subclavian artery

Arch of aorta

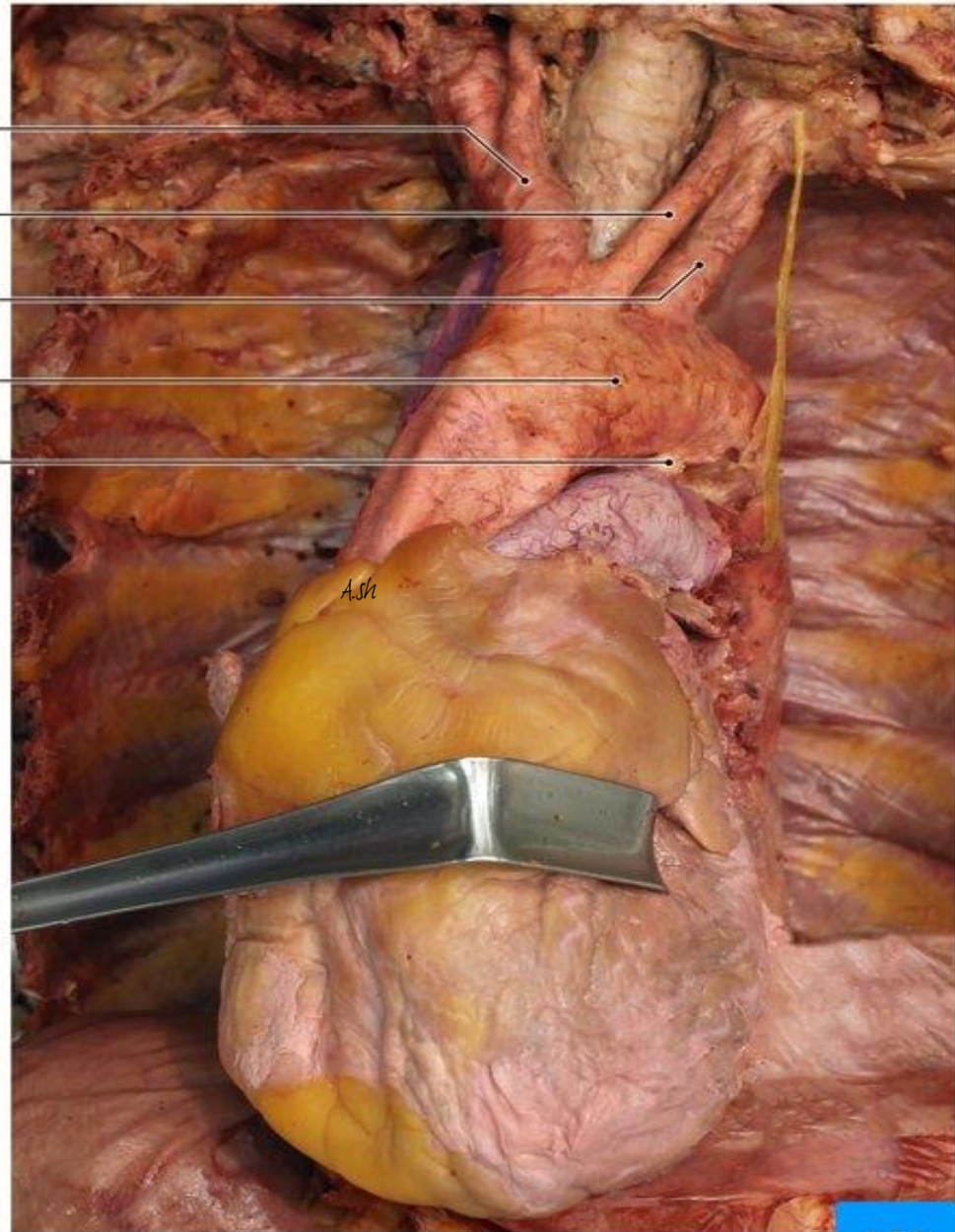
Ligamentum arteriosum

A-THE BRACHIOCEPHALIC ARTERY

B-The left common carotid artery

C-The left subclavian artery

Occasionally, the brachiocephalic trunk has a small branch, the **thyroid ima artery**, which contributes to the vascular supply of the thyroid gland

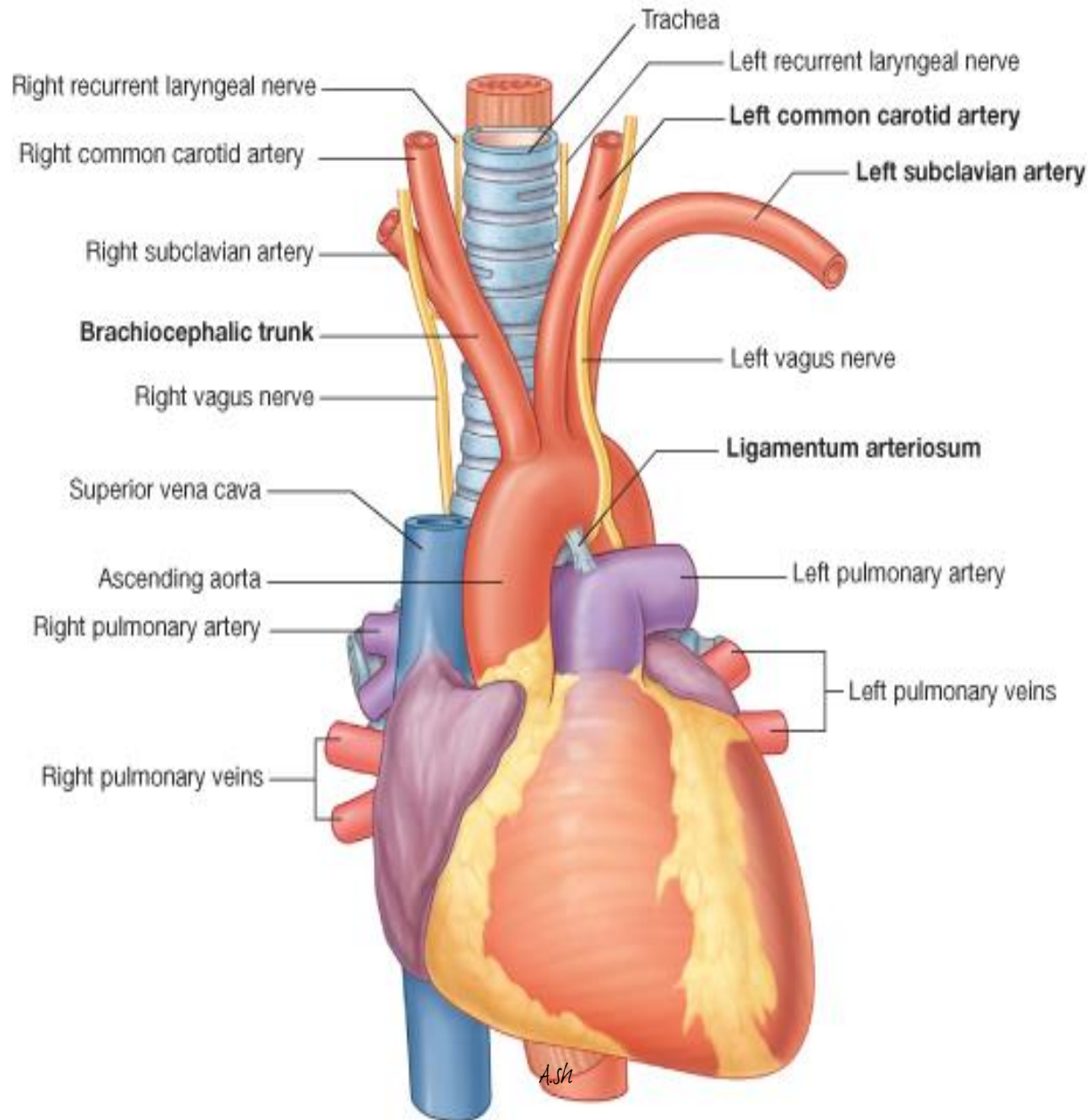


A-THE **BRACHIOCEPHALIC** **ARTERY**

- ❖ The first branch of the arch of aorta from the right side
- ❖ It is the largest of the three branches
- ❖ **arises** from the convex surface of the aortic arch
 - ***Behind the right sternoclavicular joint***

It divides into:

- 1-THE RIGHT SUBCLAVIAN ARTERY***
- 2-RIGHT COMMON CAROTID ARTERY***



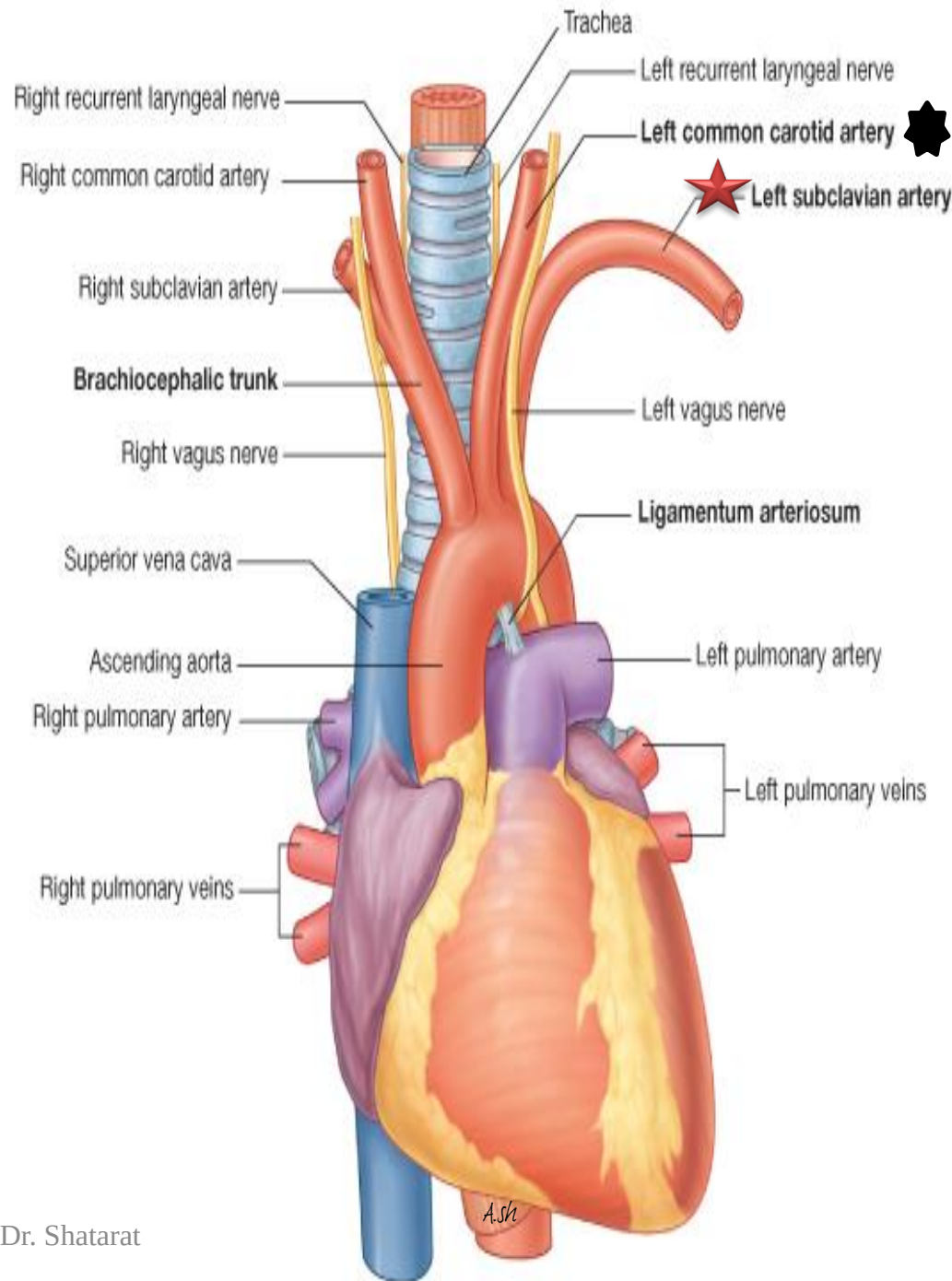
b-The left common carotid artery ☆

- Arises from the convex surface of the aortic
- It runs upward and to the left of the trachea and enters the neck behind the left sternoclavicular joint.

☆ ***c-The left subclavian artery***

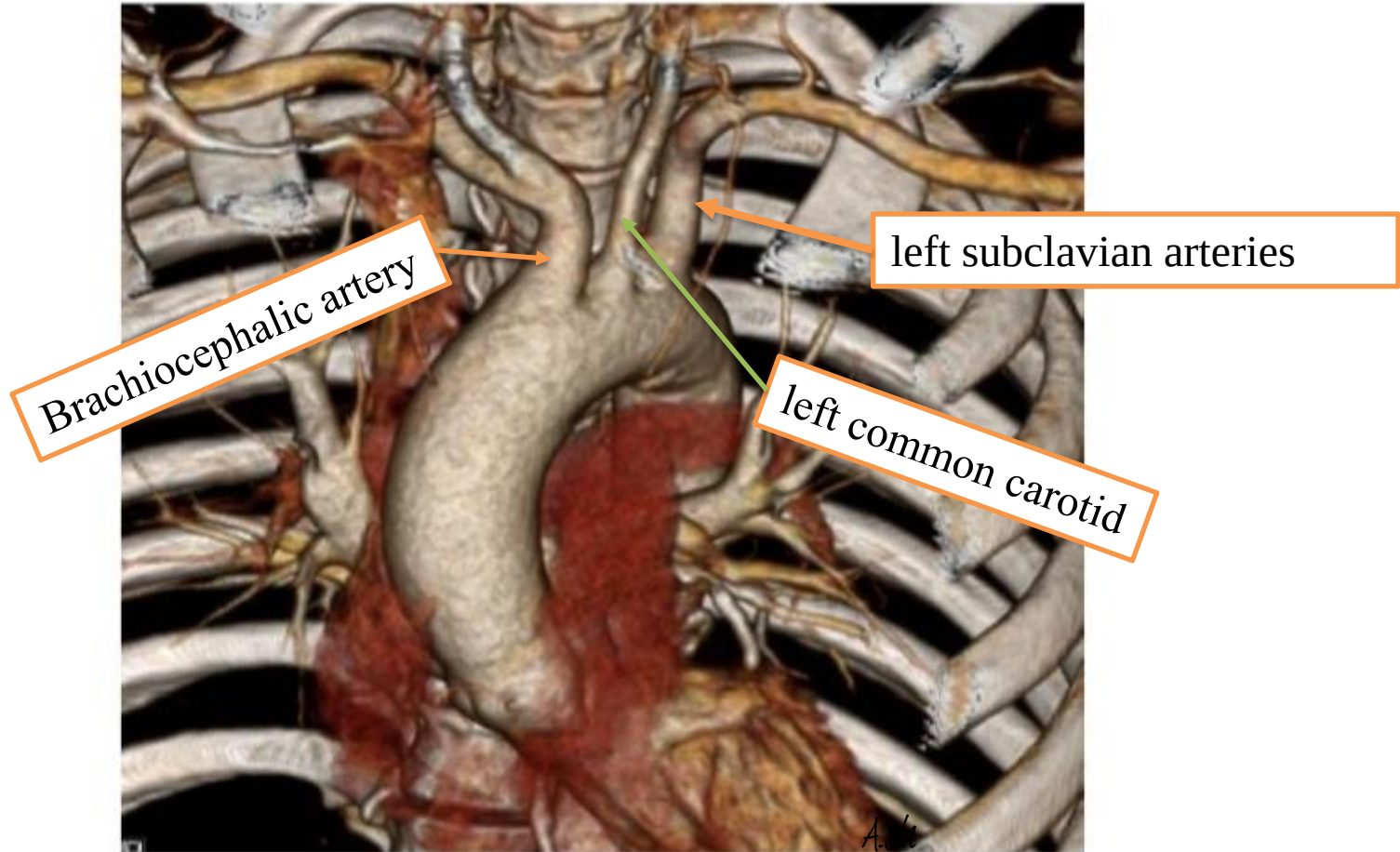
Why we call it subclavian?

- arises from the aortic arch
- Runs in a groove in the first rib



Aorta CTA (M. Malinzak).

Identify: brachiocephalic trunk, left common carotid, left subclavian, right common carotid, right subclavian



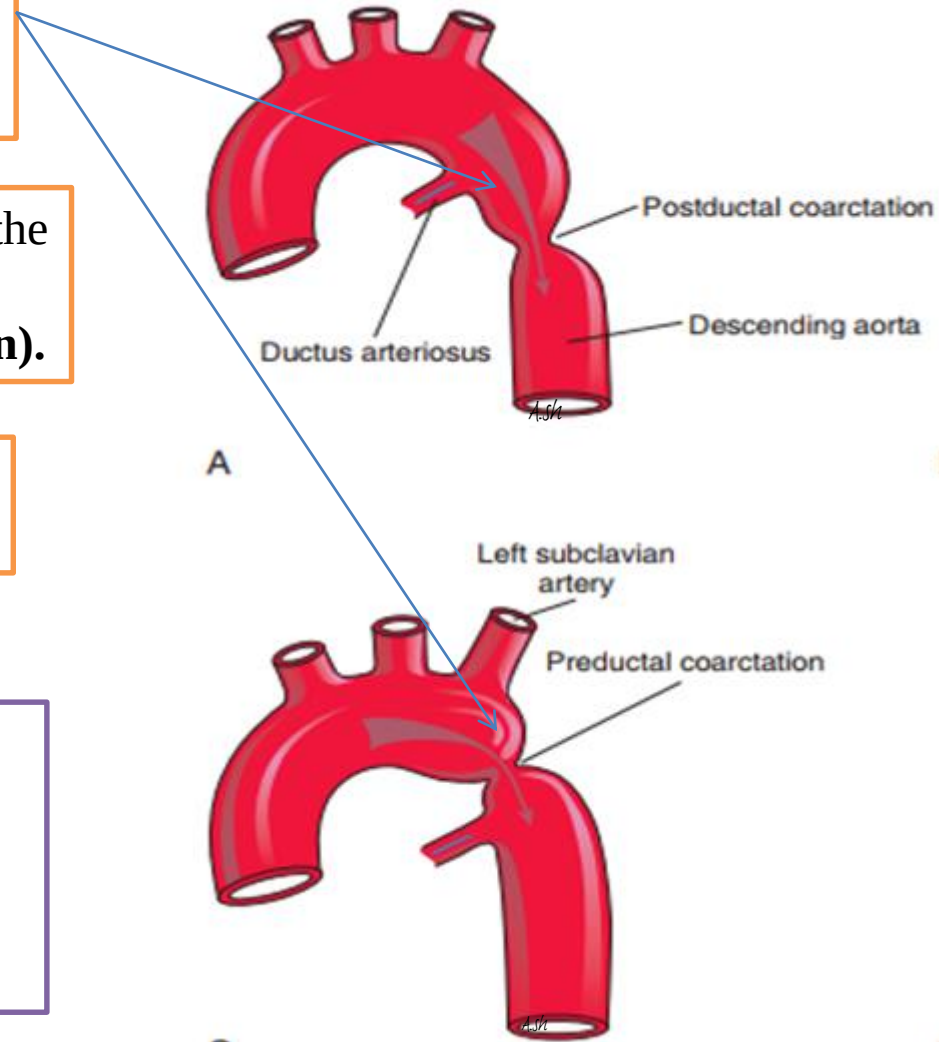
Coarctation of the aorta

❖ is a congenital narrowing of the aorta just proximal, opposite, or distal to the **site of attachment of the ligamentum arteriosum**..

❖ However, most constrictions occur distal to the origin of the left subclavian artery, at the entrance of the DA (**juxtaductal coarctation**).

❖ occurs in approximately 10% of children with CHDs.

A classification system of preductal and postductal coarctations is commonly used; however, in 90% of cases, the coarctation is directly opposite the DA. Coarctation occurs two times as often in males as in females,

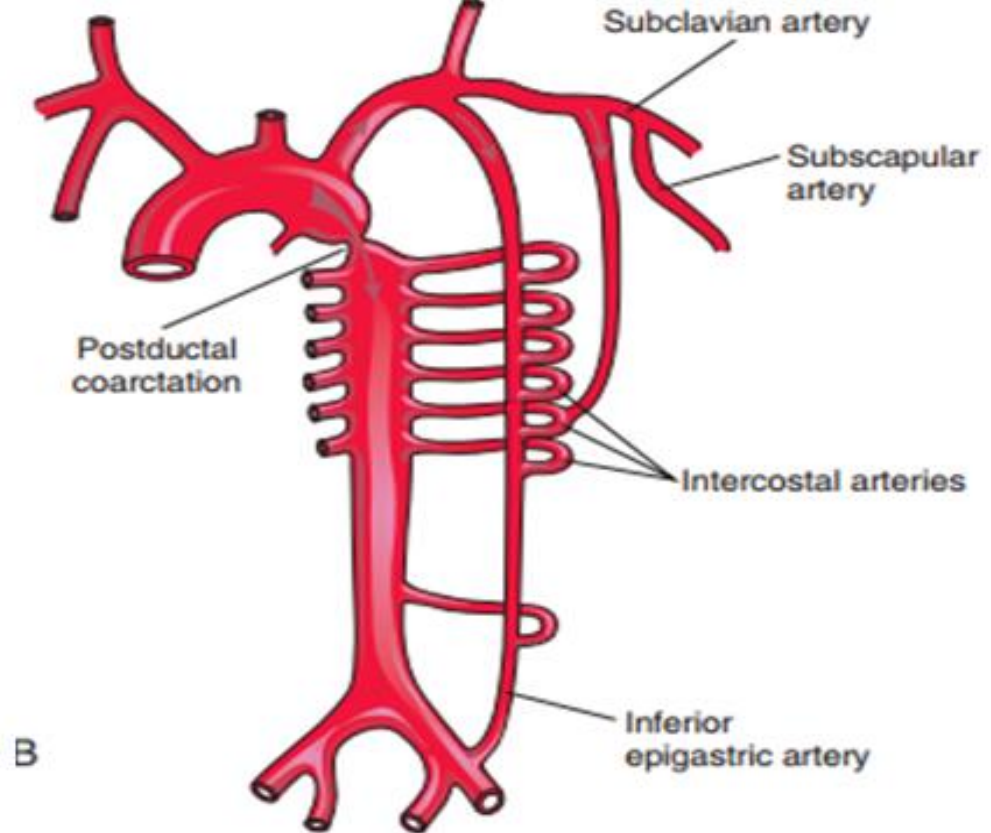


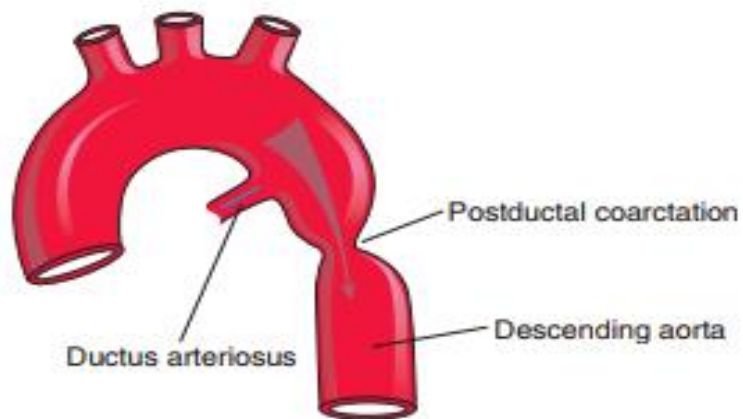
Cause: this condition is believed to result from an unusual quantity of ductus arteriosus muscle tissue in the wall of the aorta.

When the ductus arteriosus contracts, the ductal muscle in the aortic wall also contracts, and the aortic lumen becomes narrowed. Later, when fibrosis takes place, the aortic wall also is involved, and permanent narrowing occurs

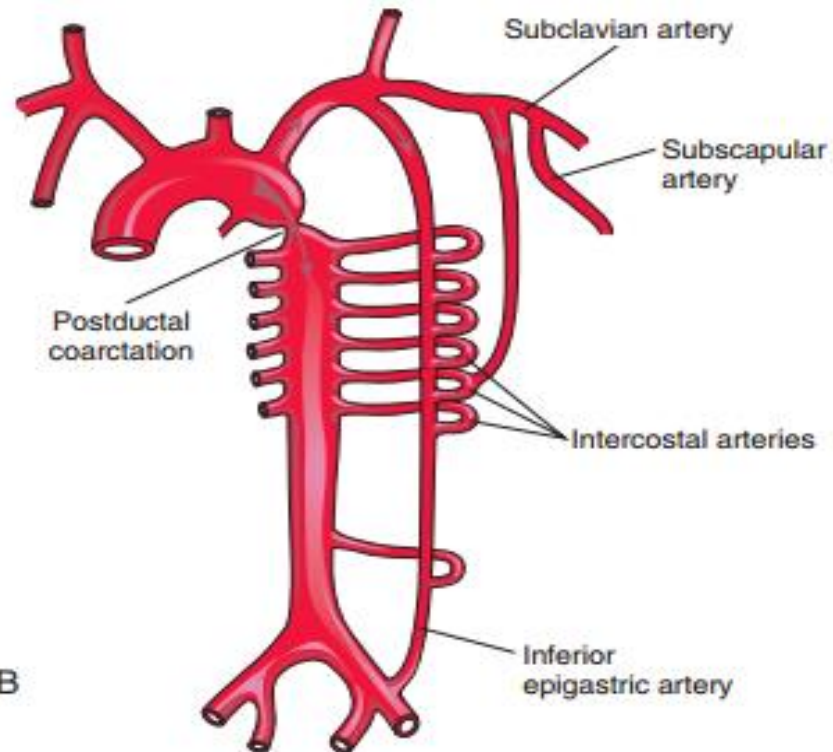
Clinically, the cardinal sign of aortic coarctation is **absent or diminished pulses in the femoral arteries of both lower limbs.**

To compensate for the diminished volume of blood reaching the lower part of the body, an enormous **collateral circulation develops, with dilatation of the internal thoracic, subclavian, and posterior intercostal arteries.** The dilated intercostal arteries erode the lower borders of the ribs, producing characteristic notching, which is seen on radiographic examination. The condition should be treated surgically

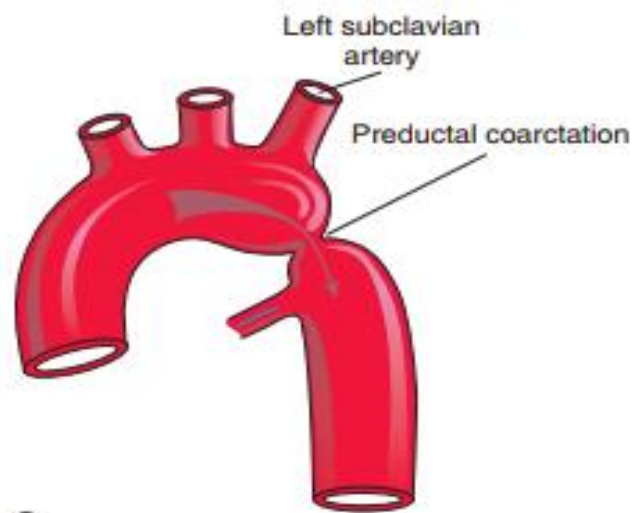




A



B



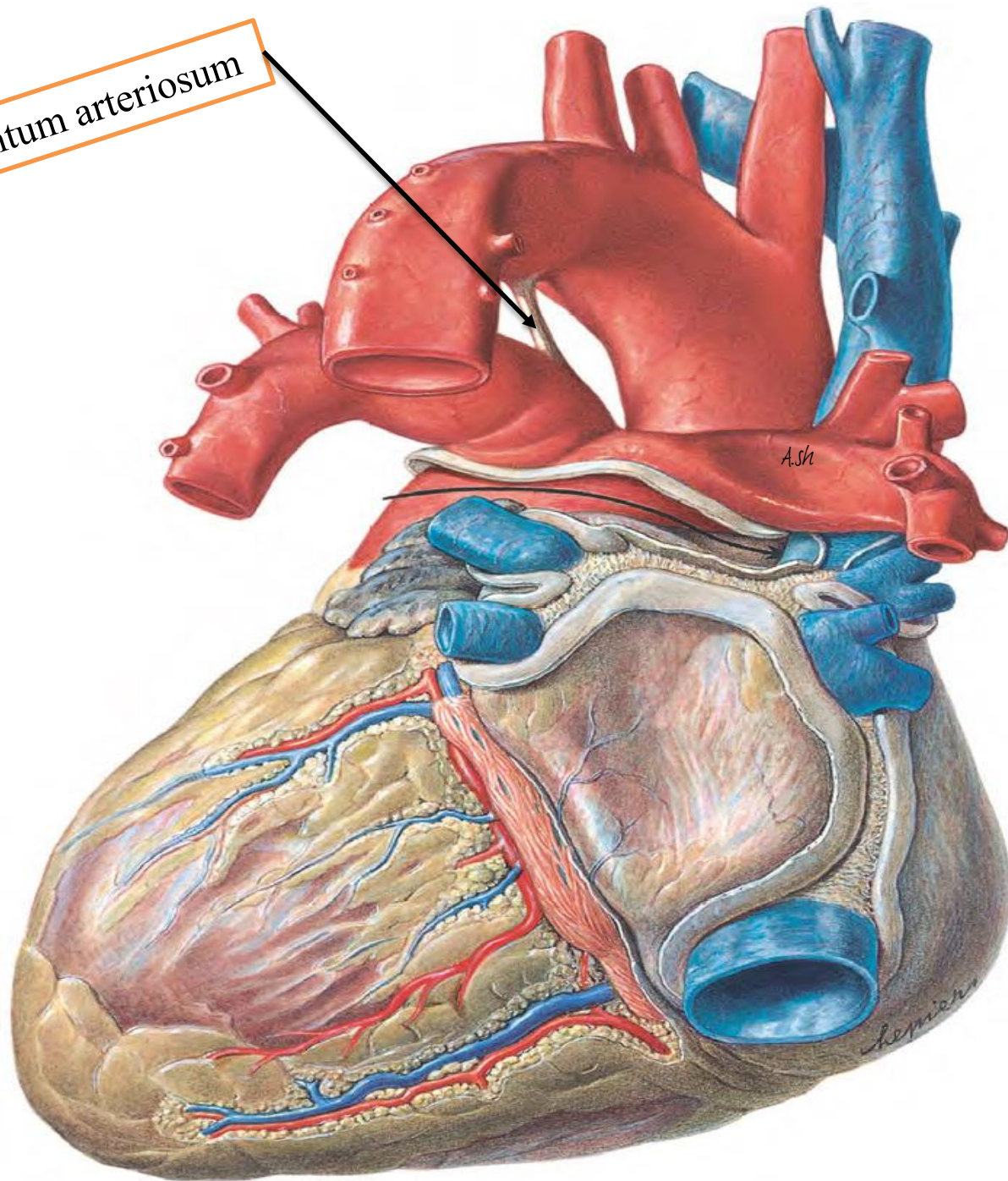
C



D

Figure 14-28 A, Postductal coarctation of the aorta. B, Common routes of the collateral circulation that develop in association with postductal coarctation of the aorta. C, Preductal coarctation. Arrows indicate flow of blood. D, Preductal coarctation (arrow) in the aorta in an adult.

Ligamentum arteriosum



Venous access for central and dialysis lines

Large systemic veins are used to establish central venous access for administering large amounts of fluid, drugs, and blood. Most of these lines (small bore tubes) are introduced through venous puncture into the axillary, subclavian, or internal jugular veins

Brachiocephalic veins: an overlooked approach for central venous catheterization.

[Badran DH¹](#), [Abder-Rahman H](#), [Abu Ghaida J](#)
<https://www.ncbi.nlm.nih.gov/pubmed/12203378>

How about
Reading this

Doppler ultrasound-guided brachiocephalic central line insertion in cardiac surgery: An overlooked approach revisited

Massad I.M., Alhadidy A.M., Elsmady M.M., Abu-Abeeleh M.M., Attyat B.A., Abu-Ali H.M., Abder-Rahman H., Abu-Ghaida J.H., Badran D.H.

<http://eurjanat.com/web/paper.php?id=08030153>

Because the superior and inferior vena cava are oriented along the same vertical axis, a guide-wire, catheter, or line can be passed from the superior vena cava through the right atrium and into the inferior vena cava. This is a common route of access for procedures such as:

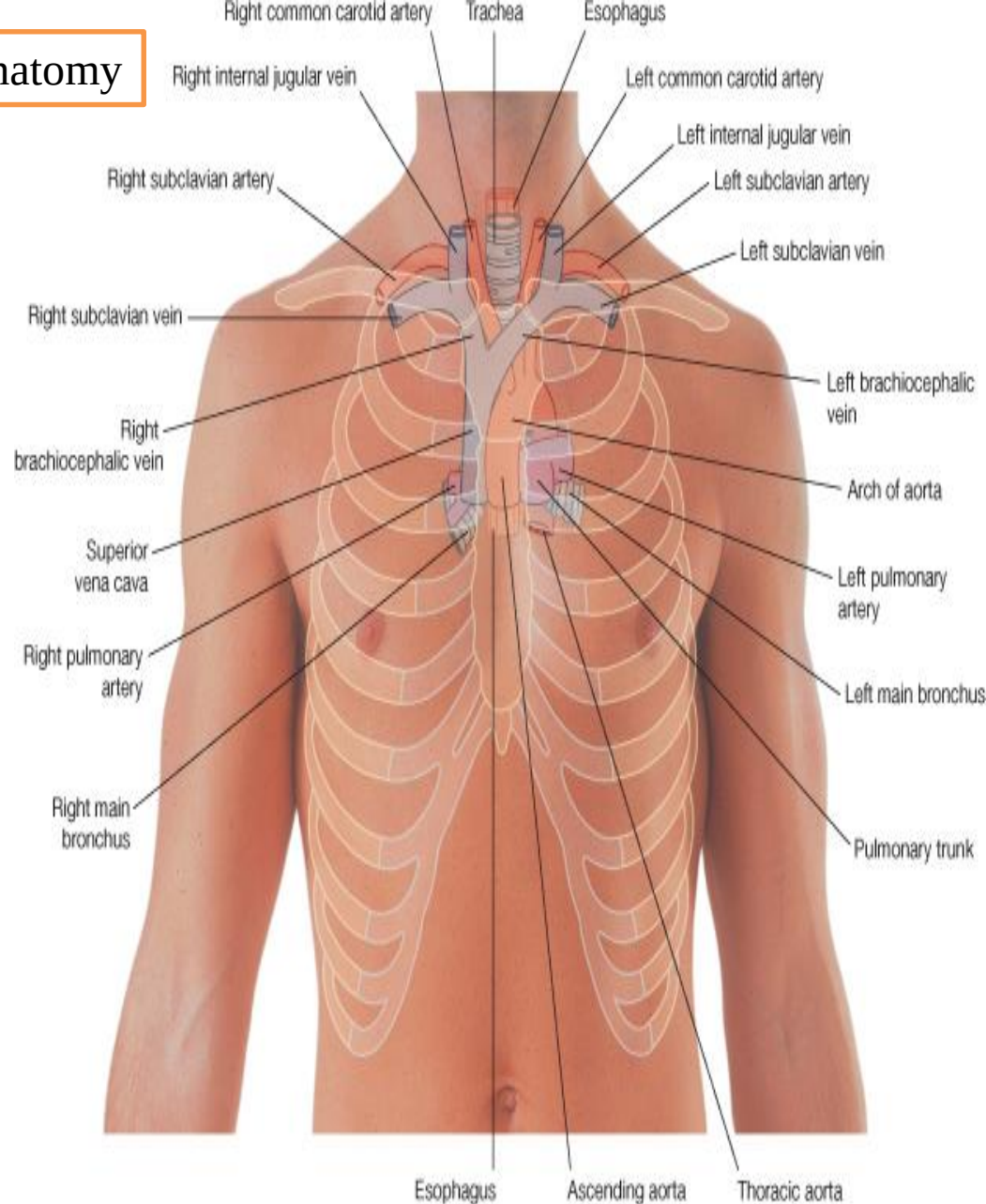
transjugular liver biopsy

Surface anatomy

On each side,
the internal jugular and subclavian veins
join to form
the brachiocephalic veins
behind the sternal ends of the clavicles
near the
sternoclavicular joints

The brachiocephalic veins unite to form
the **superior vena cava**
behind the lower border of the costal
cartilage of the right first rib.

The arch of aorta begins and ends at the
transverse plane between the sternal
angle anteriorly and vertebral level
TIV/V posteriorly. The arch may reach
as high as the midlevel of the
manubrium of sternum.



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