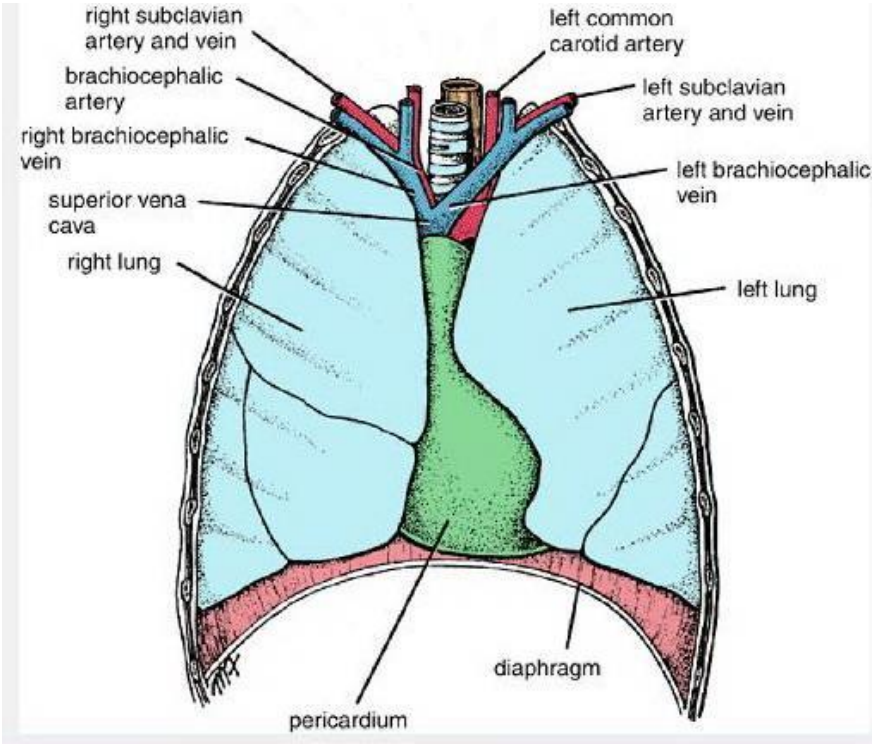
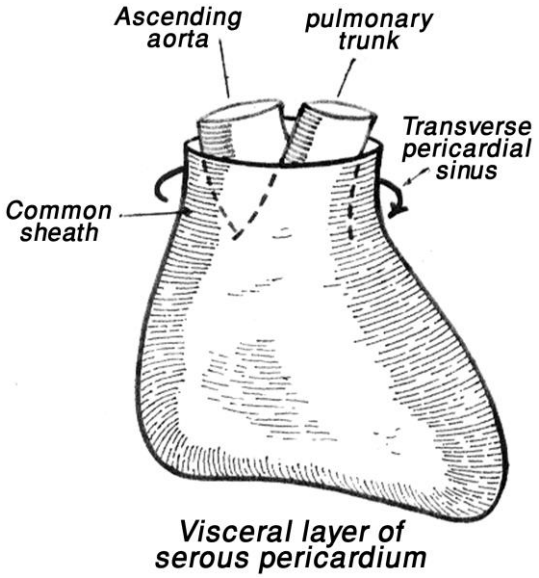
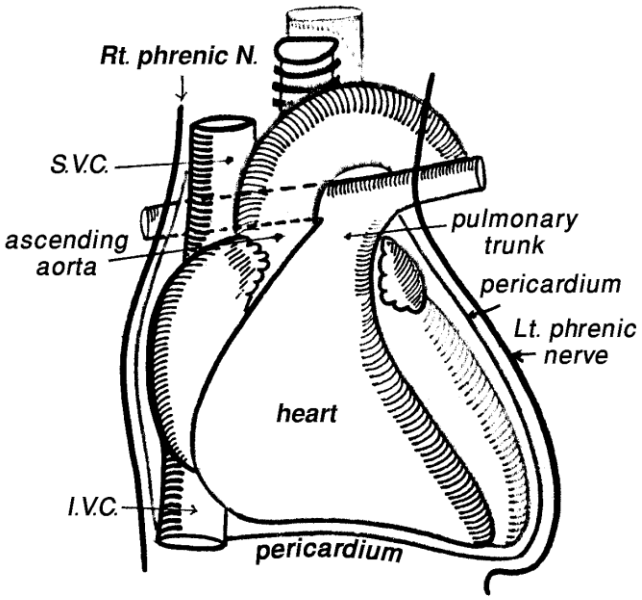
Large Vessels of Thorax

1. Ascending aorta

- **Begins**: at aortic orifice of left ventricle opposite left 3rd sternocostal junction.
- **Direction:** passes upwards, forwards and to the right in the middle mediastinum. [Intra pericardial].
- **Ends**: opposite 2nd right sternocostal junction by forming the aortic arch.
- **Shape:** its root presents three dilatations [above the cusps of the aortic valve] known as aortic sinuses: one anterior and two posterior (right and left).
- **Relations:**
  - ***On the left side:*** left atrium and pulmonary trunk.
  - ***On the right side:***
    Below: right auricle.
    Above: superior vena cava (S.V.C.).
  - ***Anterior:***
    Above: right pleura and lung.
    Below: root of pulmonary trunk.
  - ***Posterior :*** transverse sinus of pericardium , 2 atria , right pulmonary artery and right bronchus.
- **Branches:** right and left coronary arteries.


right subclavian artery and vein
brachiocephalic artery
right brachiocephalic vein
superior vena cava
right lung
left common carotid artery
left subclavian artery and vein
left brachiocephalic vein
left lung
diaphragm
pericardium


Ascending aorta
pulmonary trunk
Transverse pericardial sinus
Common sheath
Visceral layer of serous pericardium


Rt. phrenic N.
S.V.C.
ascending aorta
pulmonary trunk
pericardium
Lt. phrenic nerve
heart
I.V.C.
pericardium

2. Arch of Aorta

- **Site:** in the superior mediastinum , behind lower ½ of the manubrium sterni.

-Begins: as continuation of ascending aorta at the level of 2nd right sternocostal joint.

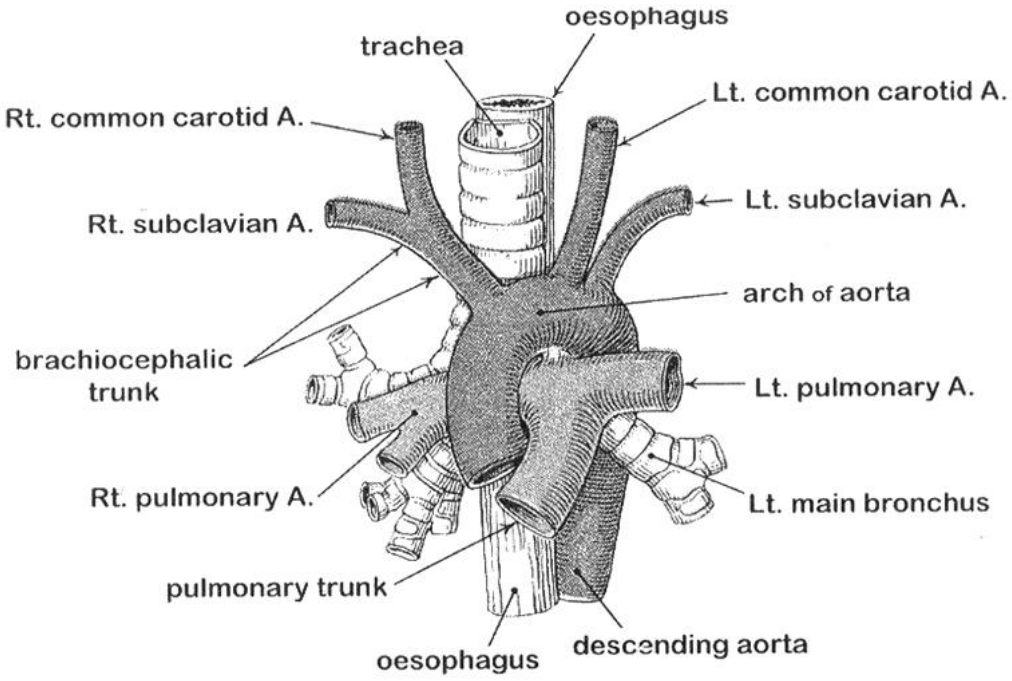
-Ends: on the left side of lower border of **T4** , by continuing as the descending thoracic aorta.

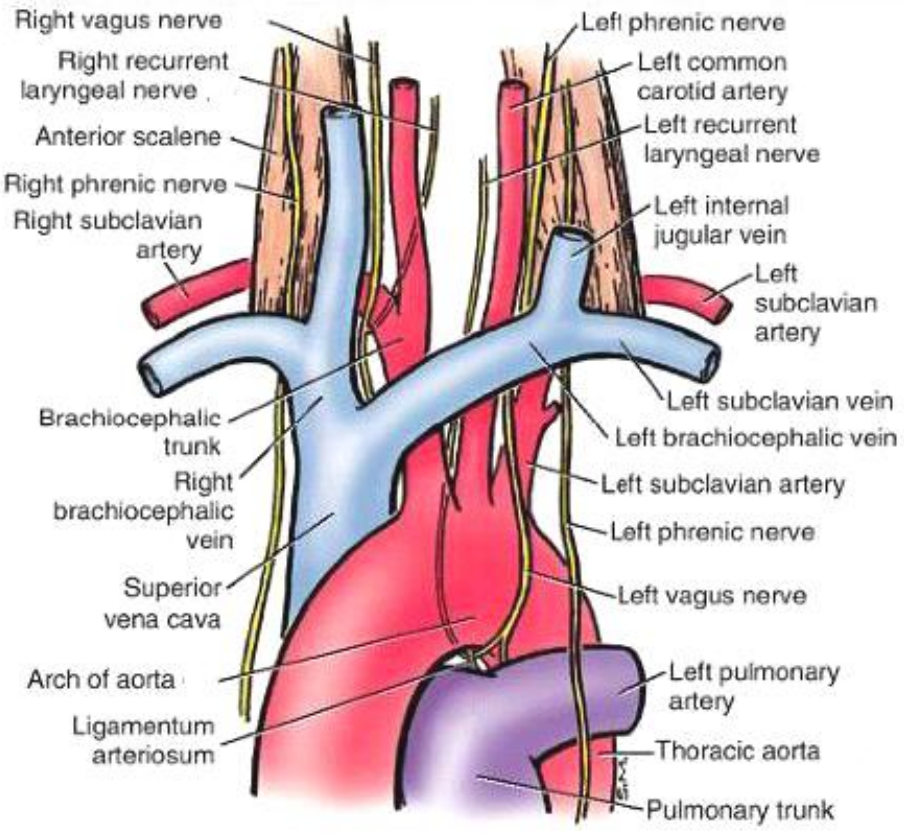
-Direction: it passes upwards and to the left, in front of trachea, then backwards on left side of trachea, then down on left side of body of **T_4.**

-Relations:

1. **Anterior and to the left**:
   - The left pleura and lung.
   - Left vagus and left phrenic nerves.
2. **Posterior and to the right [5]** are:
   - The trachea
   - The esophagus (posterior to the trachea).
   - Left recurrent laryngeal nerve between them.
   - The thoracic duct on left side of esophagus,
   - The 3rd and 4th thoracic vertebrae.
3. **Above [4]** are:
   - Left brachio-cephalic vein.
   - **3** branches of the arch of aorta:

   Brachio-cephalic , left common carotid and left subclavian arteries .





Relations of the arch of aorta

4. **Below the concavity of aortic arch [5]** are:
   - Bifurcation of pulmonary trunk into right & left pulmonary arteries.
   - Root of left lung and left main bronchus.
   - Ligamintum arteriosum [between the arch and left pulmonary artery].
   - Left recurrent laryngeal nerve on left side of Ligamintum arteriosum.
   - Superficial cardiac plexus on right side of Ligamintum arteriosum

-Branches:

1. Brachiocephalic artery
2. Left common carotid artery,
3. Left subclavian artery
4. Sometimes thyroidea ima artery.

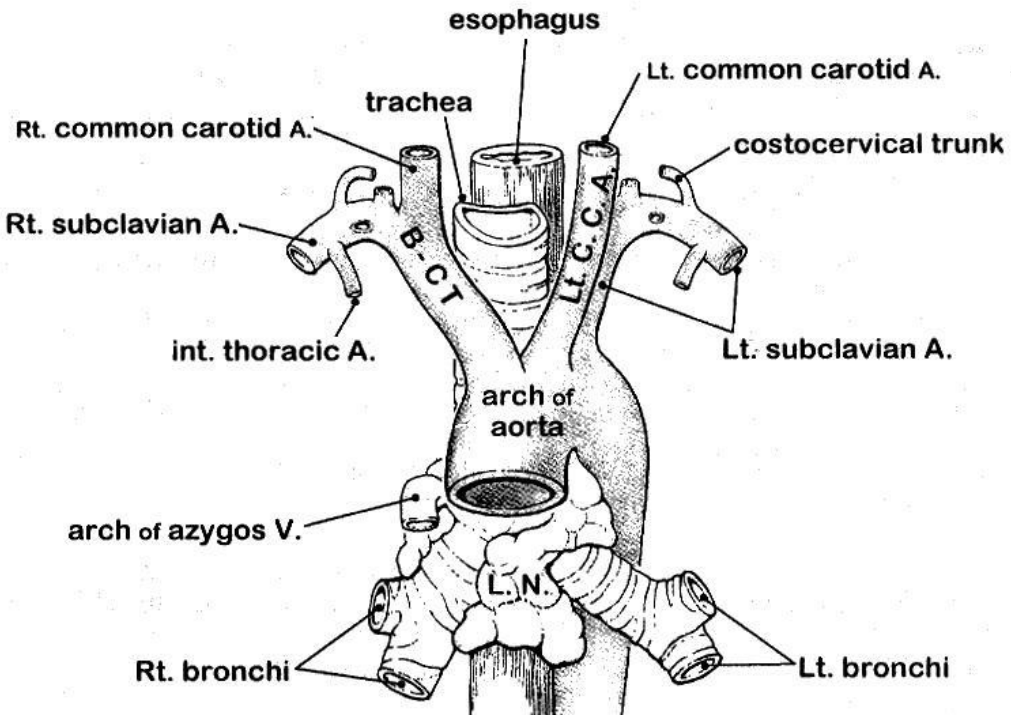
-The three branches of the aortic arch:

These branches ascend through the thoracic inlet to supply the head, neck, upper limb and part of thoracic wall.

1. **Brachiocephalic artery: the largest branch**
   - Arises from aortic arch opposite the center of manubrium sterni and passes to the left of right brachiocephalic vein and behind left brachiocephalic vein being first in front then on right of trachea.
   - Ends behind the right sternoclavicular joint by dividing into right common carotid artery and right subclavian artery.
2. **Left common carotid artery :**
   - Arises from aortic arch between brachiocephalic artery and left subclavian artery.
   - Left pleura and lung lie on its left side.
   - Left brachiocephalic vein crosses in front of it.
   - The left common carotid artery runs first in front then on left side of trachea.
   - It enters the neck behind the left sterno-clavicular joint.

3. Left subclavian artery:

- Begins from aortic arch behind left common carotid artery.
- Passes between trachea and left pleura and lung.
- It enters the neck behind the left sterno-clavicular joint.



Branches of the arch of aorta

3. Descending Thoracic Aorta

- **Begins**: as continuation of aortic arch at the left side of the lower border of T4 vertebra..
- **Ends:** by passing throughout the aortic opening of diaphragm present at level of lower border of T12, continuing as the abdominal aorta .
- **Site :** It lies in posterior mediastinum being related to lower eight thoracic vertebrae.
- **Length:** it is 8 inches long.
- **Relations:**

1) Anterior : from above downwards are:

- Root of left lung and left bronchus.
- Pericardium, oblique sinus separating it from left atrium.
- The oesophagus: crosses in front of it at the level of 7^{th} thoracic vertebra.
- Diaphragm.

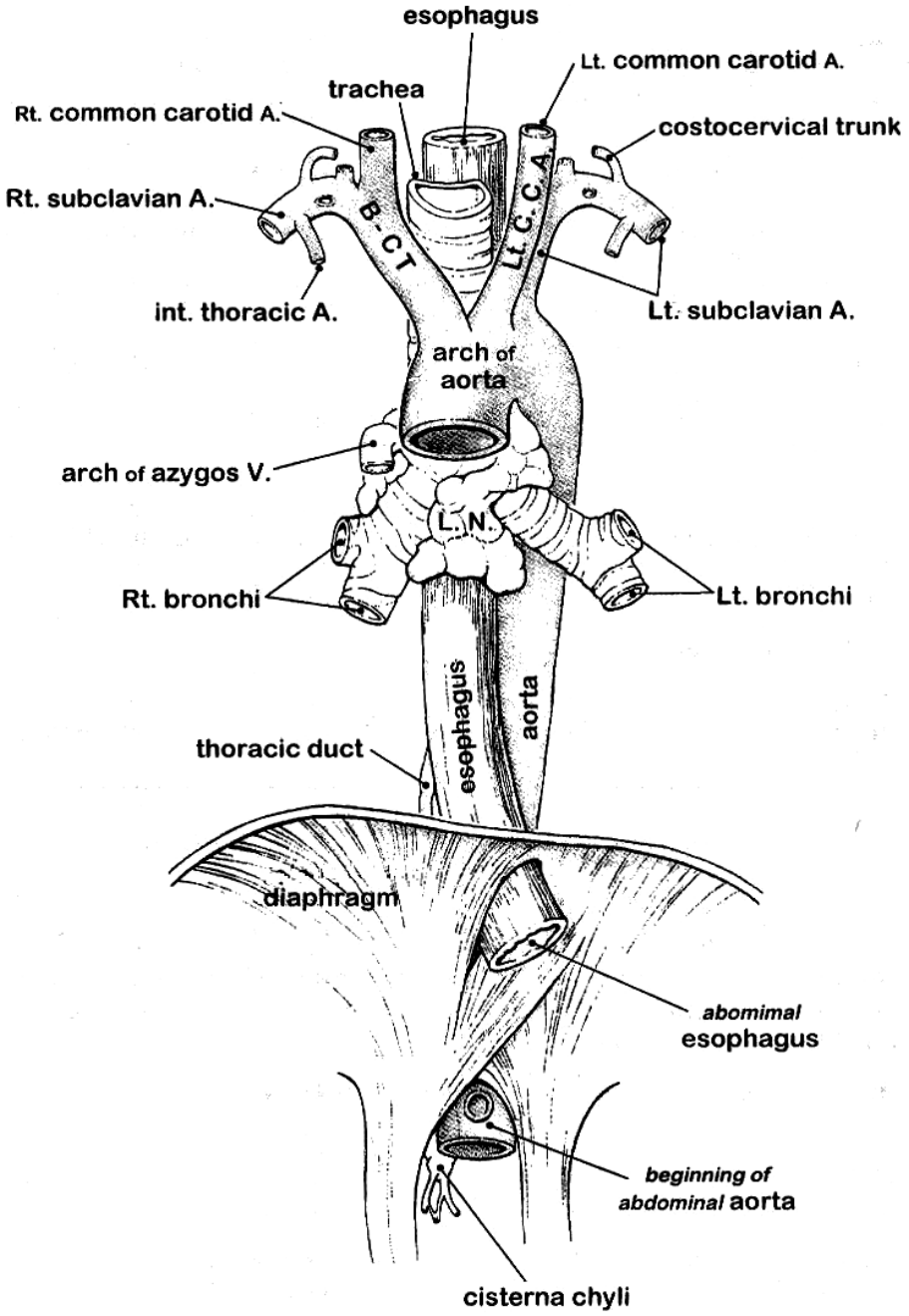
2) Posterior:

- Vertebral column
- Anterior longitudinal ligament
- Two hemiazygos veins at T8 and T9.

3) On right side:

- Thoracic duct and vena azygos.
- The oesophagus: lies on its right side in the upper part.
- Right pleura and lung are on right side of the lower part.

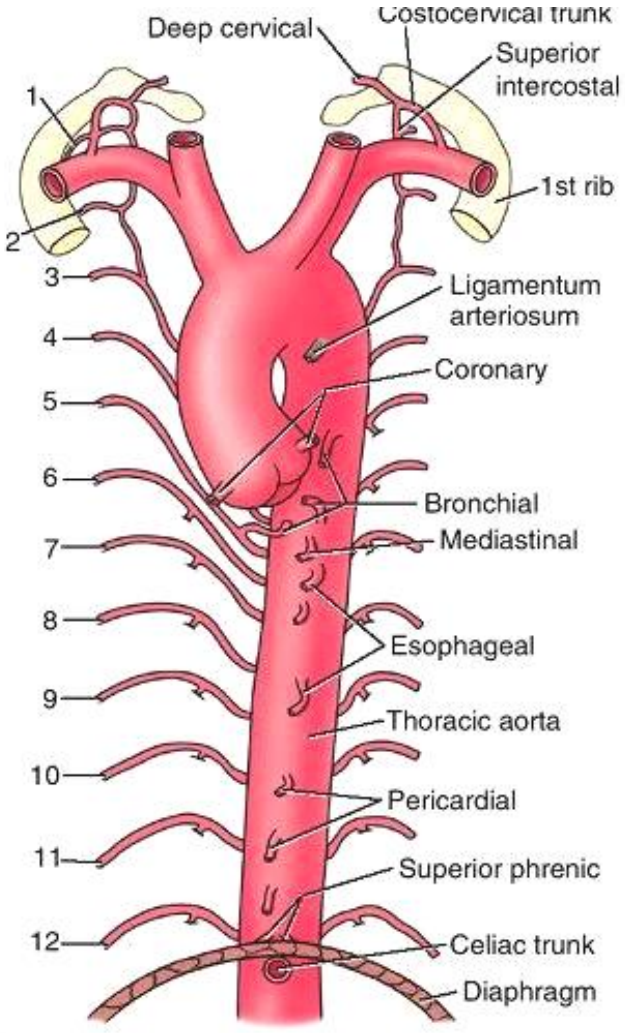
4) On left side: left pleura and lung.



Relations of the descending aorta

Branches:

1) Lower nine pairs of posterior intercostal arteries
2) One pair of subcostal artery [right and left]
3) Two left bronchial arteries.
4) Four or five oesophageal arteries.
5) Branches to pericardium, mediastinum and diaphragm.



Branches of descending thoracic aor

Veins of the thorax

1. Right and left brachiocephalic veins :

-Begins: behind the medial end of clavicle by union of internal jugular vein and subclavian vein.

-Ends: the right and left brachiocephalic veins unite to form the superior vena cava at the level of lower border of the right 1st costal cartilage.

-Length: Right brachiocephalic vein is one inch long .
Left brachiocephalic vein is 3 inches long .

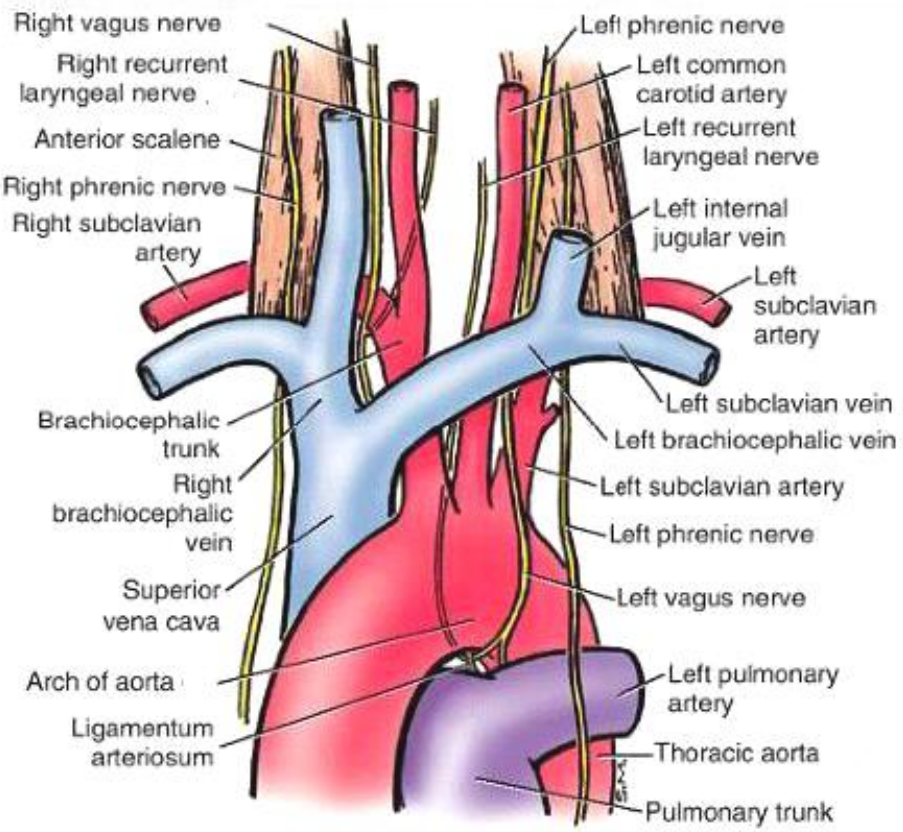
-Relations:

a) Right brachiocephalic vein:

- **Right side:** right pleura, right lung and right phrenic nerve.
- **Left side**: brachiocephalic artery.

b) Left brachiocephalic vein:

- **Below:** aortic arch.
- **Behind**: the 3 branches of aortic arch, left vagus and left phrenic nerves.
- **Anterior**: manubrium , sternohyoid, sternothyroid and thymus gland.



-Tributaries of the brachiocephalic veins:

1- Vertebral veins.
2- Inferior thyroid veins.
3- Internal thoracic veins.
4- 1st posterior intercostal vein.

NB. The left brachiocephalic vein receives also:

5- Left superior intercostal vein.
6- Thoracic duct.

2. The Superior Vena Cava (S.V.C.)

-Begins: Formed by union of 2 brachiocephalic veins opposite lower border of 1st right costal cartilage.

-Course:

- Its upper 1/2 is in superior mediastinum , its lower 1/2 is inside pericardium i.e. In the middle mediastinum
- Its only tributary is ***azygos vein*** opposite medial end of 2nd right costal cartilage.

-Ends: It ends in superior part of posterior wall of right atrium at level of right 3rd costal cartilage.

-Length: It is about 2 inches long.

-Relations:

a.On its right side

- Right phrenic nerve.
- Right pleura and lung

b. On left side:

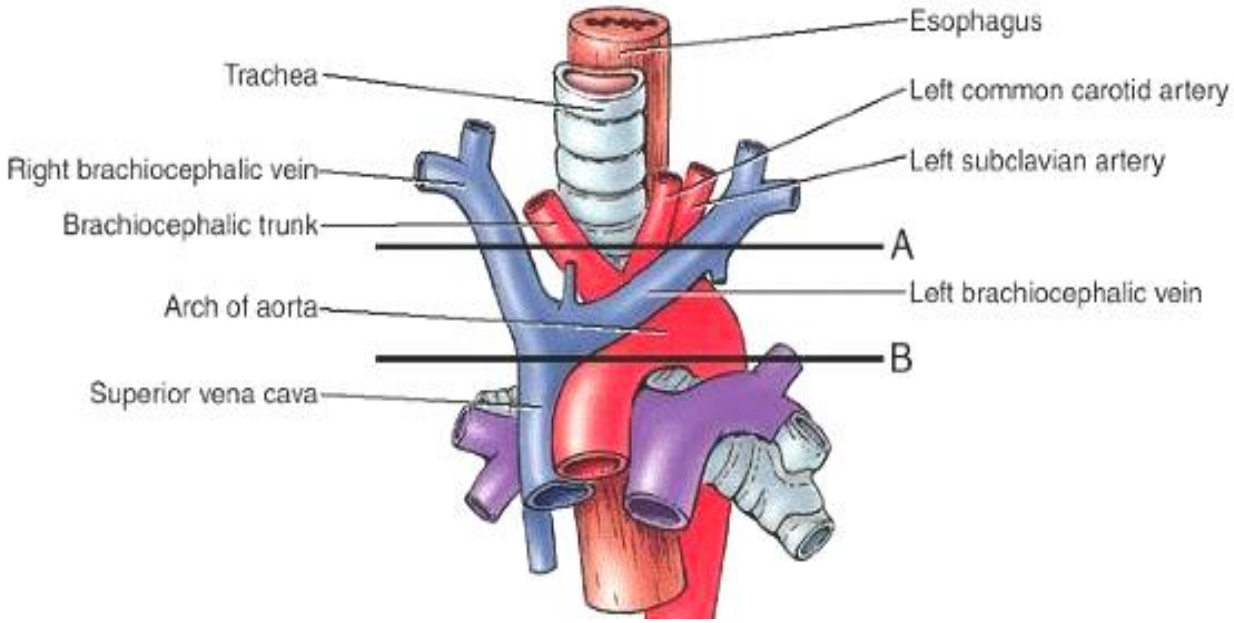
- Transverse sinus of pericardium
- The trachea.

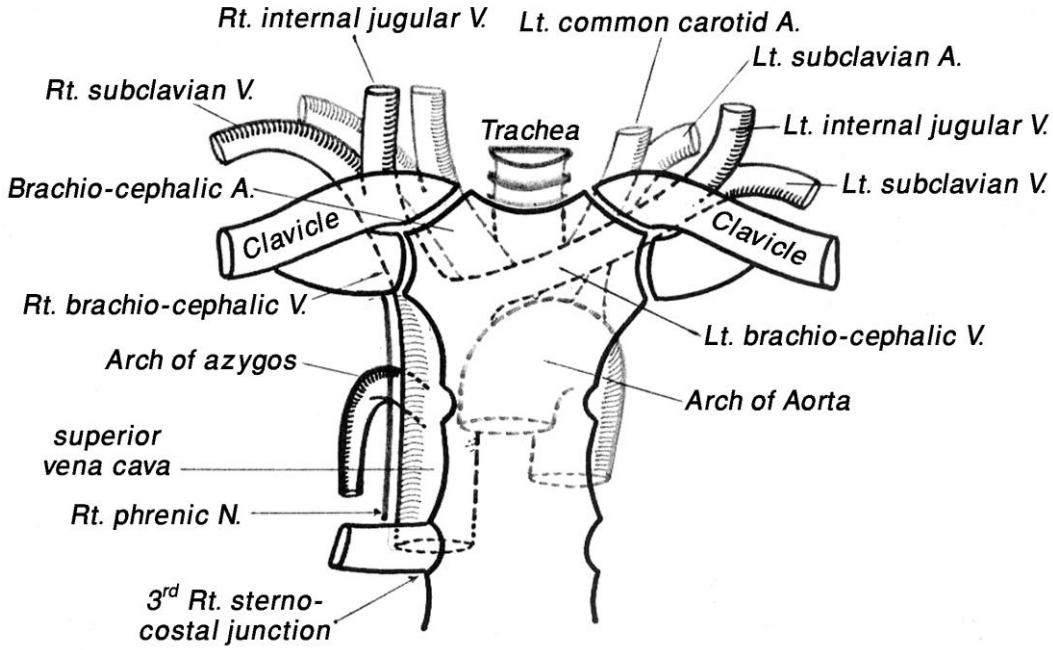
c.Anterior:

- Right pleura and lung
- Costal cartilage and intercostal spaces.

3. The Inferior Vena Cava (I.V.C.) :

A very short segment ($1^1/_2$ cm) of I.V.C. is found in the thorax after it pierces the central tendon of the diaphragm (at the level of T_8) to enter the right atrium. The I.V.C. drains all parts of the body below the diaphragm.





Veins of the thorax

4. The pulmonary trunk:

- Begins: at the pulmonary orifice from the right ventricle opposite left third sternocostal cartilage.

- Course:

- It lies in front of the ascending aorta, and then runs upwards backwards and to the left until it reaches the concavity of the aortic arch, where it ends by dividing into right and left pulmonary arteries.
- The right and left pulmonary arteries lie along the upper border of right and left atria.
- The two pulmonary arteries lie in front of the bronchi .