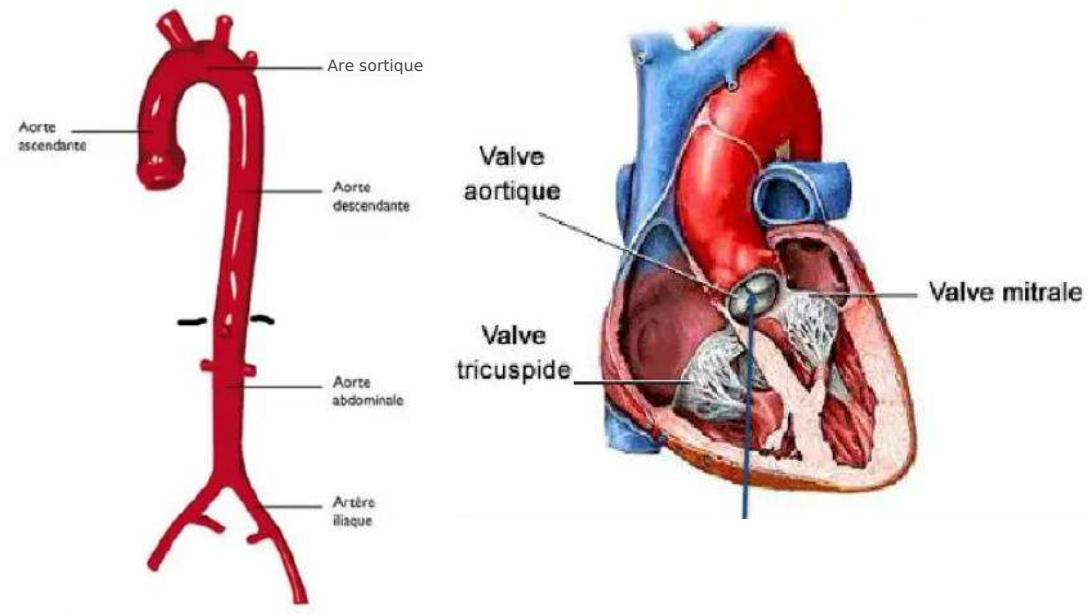
The thoracic aorta Pr Benleghib N

THE THORACIC AORTA

I- INTRODUCTION: :

The aorta is the largest arterial trunk of the human body. It constitutes the main artery of the systemic circulation and transports oxygenated blood to peripheral organs. It begins at the level of the left ventricle and successively traverses the thorax and then the abdominal cavity. It ends, at the level of the fourth lumbar vertebra (L4), with its bifurcation into the two common iliac arteries.

The thoracic aorta represents the intrathoracic segment of the aorta. It is traditionally subdivided into three segments: the ascending aorta, the aortic arch, and the descending thoracic aorta, each with specific anatomical and functional characteristics.



II- DESCRIPTIVE ANATOMY: :

Anatomically, the thoracic aorta comprises three portions: the ascending aorta, the aortic arch,,and the descending thoracic aorta. These different segments have anatomical relationships, collateral branches, and specific vascular territories.

The thoracic aorta includes a relatively mobile segment and a relatively fixed segment. The mobile segment, mainly the aortic arch, accompanies the heart movements. The fixed segment, mainly corresponding to the descending thoracic aorta, is maintained by its relationships with neighboring structures and its branches, notably the posterior intercostal arteries.

- THE AORTIC ARCH:

From the origin to a plane passing through Th4.

- DESCENDING THORACIC AORTA: from a plane passing through Th4 to the diaphragm.

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A) THE ARCH OF THE AORTA: :

This is the initial segment of the aorta describing an arch with a concavity above the left pulmonary pedicle. It comprises two portions: one ascending, the other horizontal.

The ascending aorta:

Born from the ostium of the aorta of the left ventricle, it is at the level of the 3rd left costal cartilage.

With an initially oblique course forward, to the right and upward, then vertical, it is an intrapericardial segment. At the level of the lower end there are 3 small light dilatations (ascending bulbus) located opposite the semilunar valves (of the aortic ostium), these are the aortic sinuses or sinus of VALSAVA.

The aortic arch also presents in the elderly a second dilation located at the junction of the two ascending and horizontal parts called the great aortic sinus, which increases with age.

The horizontal aorta or aortic arch: is extra-pericardial. It bends and moves to the left and backward, at level T4, where it continues by the descending thoracic aorta.

Dimension: :

The Length:

Ascending aorta: 6 to 8 cm.

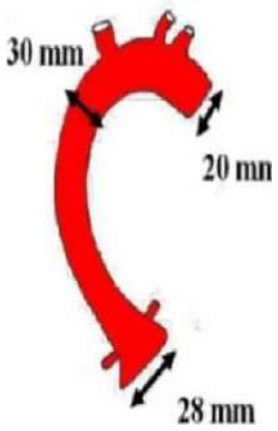
Horizontal aorta: 4 to 5 cm.

The diameter of the aorta is about 25 mm and presents two dilations:

The aortic bulb: about 28 mm.

The great aortic sinus: 30 to 35 mm, at the junction between the ascending aorta and the aortic arch.

It also has a Stahel constriction, with a diameter of about 20 mm.



- Relation: :

a. **Aortic ostium: :**

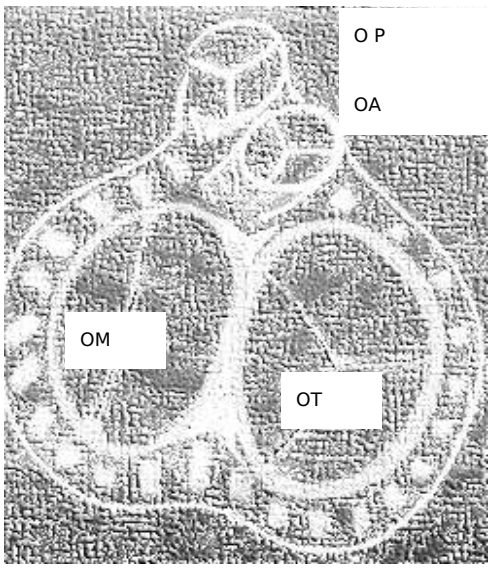
Hollowed in the base of the left ventricle closed by 3 semilunar valves posterior, anterolateral right and left.

It corresponds to:

- Anterior and to the left: the pulmonary orifice or pulmonary ostium
  Posterior and to the left: the left atrioventricular ostium (mitral orifice)
- Posterior and to the right: the right atrioventricular ostium (tricuspid orifice)
  Inferiorly: left ventricle

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- Top: the aorta and the ostium of the coronary arteries.



b. **The ascending part of the aorta:**

Contained in the arterial serous sheath of the pericardium with the pulmonary trunk.

➔ **b-Ascending aorta:**

A- Intra-pericardial relations:

The pulmonary artery is anterior and then to the left

Anterior and to the right: the right auricle.

Posterior: At the transverse sinus of Theile

On the right:

✓ to the right orifice of the transverse sinus,

✓ to the superior vena cava.

➔B- Through the pericardium:

⇨ **On the right: :**

- - Superior vena cava

The right phrenic nerve

⇨ **On the left:**

The Wrisberg quadrilateral containing the Wrisberg ganglion

⇨ **In front : :**

- - The thymus
- - The pleuro-costomediastinal recesses

Anterior borders of the lungs

And the sternum

⇨ **Behind: :**

- - The right pulmonary artery

C- The horizontal portion: :

It is extra-pericardial, describes 4 faces:

➔The anterior and left face, it corresponds to:

- - The left vagus nerve

The left phrenic nerve

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- - The nerves of the anterior cardiac plexus and the sympathetic
  Pleuro-mediastinal face of the left lung

➔The posterior and right face: crosses from front to back:

- - The trachea
- - Left inferior laryngeal nerve
- The thoracic esophagus
  Thoracic duct (thoracic canal)
  Left superior tracheobronchial lymph nodules

➔The superior face: :

Gives rise from front to back to three arterial trunks: :

- - The brachiocephalic trunk
- Left common carotid artery
  Left subclavian artery

It responds to the left brachiocephalic venous trunk.

➔The inferior face of the arch: responds from front to back: :

- - To the pulmonary trunk and its two bifurcation branches
- - The ligamentum arteriosum (between the left pulmonary artery and the aorta)
  Left inferior laryngeal nerve
  The Wrisberg quadrilateral containing the Wrisberg ganglion

The Collateral Branches: :

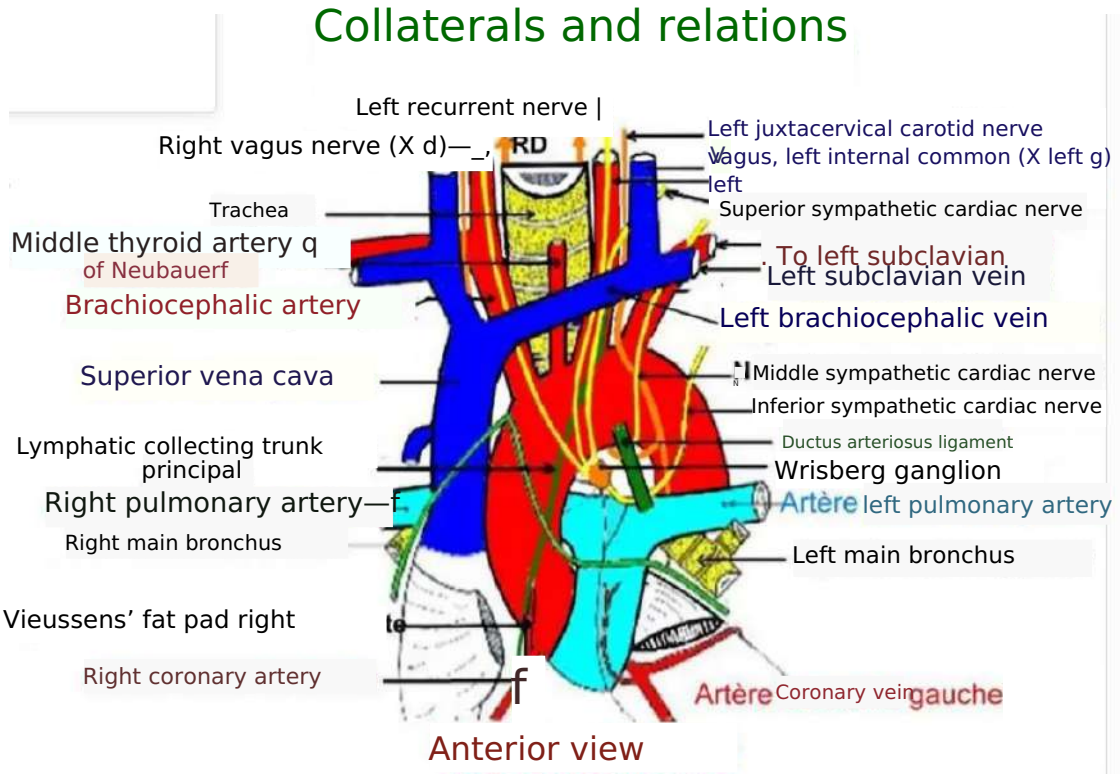
- - The ascending aorta gives rise to the coronary arteries at its origin
  The aortic arch: on its superior face are born the subclavian artery

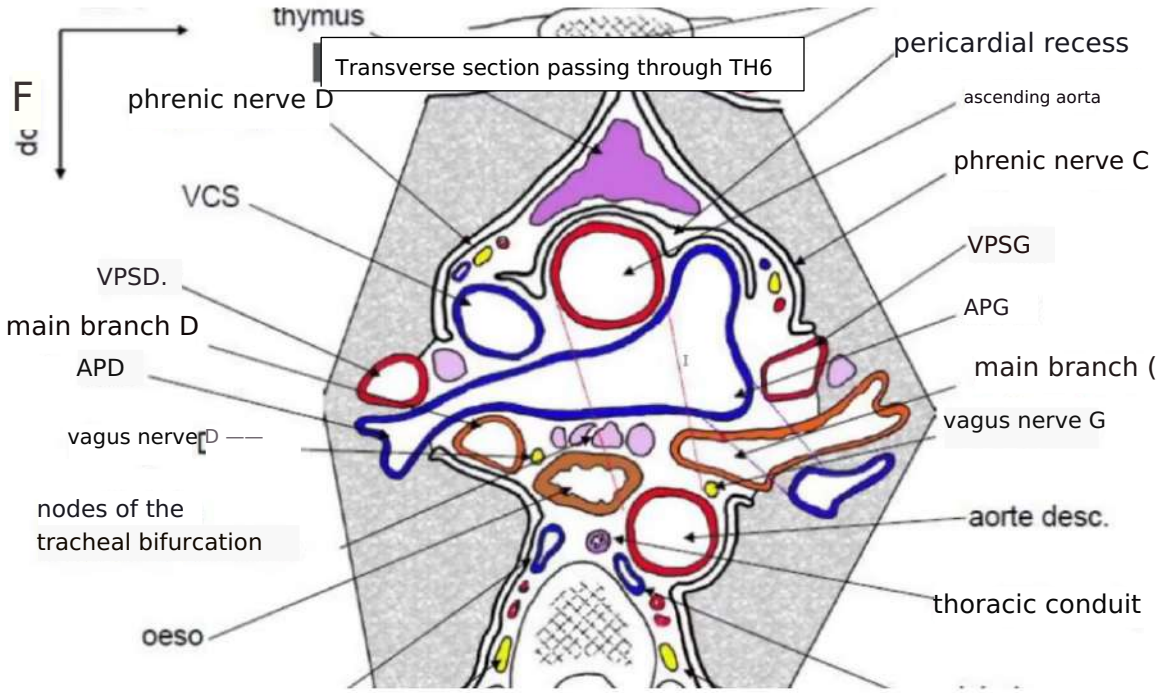
left, the brachiocephalic trunk, the left common carotid artery, all arteries are constant.

- The inconsistent and variable branches:

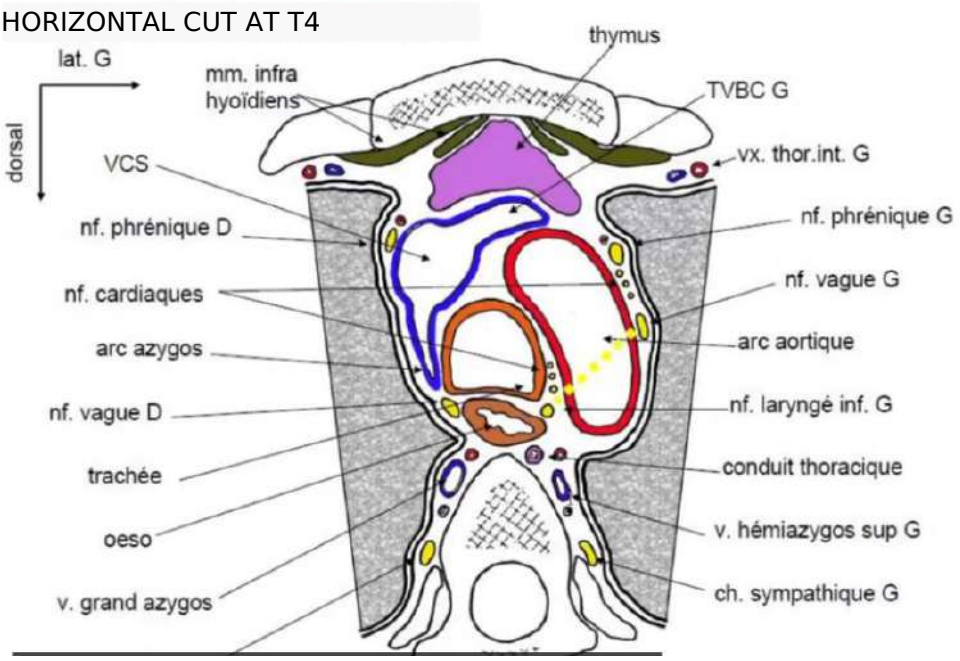
- Middle thyroid artery.
- Vieussens' fat arterial (right and left)
- Bronchial artery numbering 03
- Esophageal artery

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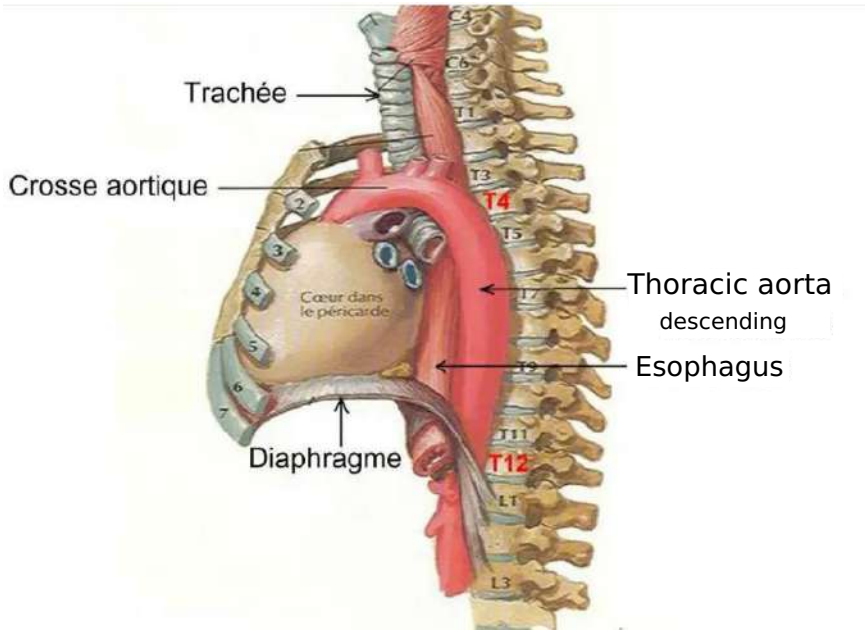
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Transverse section passing through T4

B- THE DESCENDING THORACIC AORTA: :

it continues from the aortic arch at the level of D4, descends into the posterior mediastinum and ends at the aortic opening of the diaphragm at the level of D12.



1- Origin: :

Continuing from the aortic arch at the lower border of T4

2- Course:

In the posterior mediastinum it courses obliquely downward and inward and slightly anterior, approaching the midline.

Then it lies in front of the vertebral column in the aortic hiatus of the diaphragmatic muscle

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3- Endings: :

At the level of T12.

4- Relation: :

It responds: :

⇨ **In front: :**

- To the left pulmonary pedicle
- Left vagus nerve
- The thoracic esophagus

⇨ **Behind: :**

- Thoracic spine (D4 – D12)
- The accessory hemiazygos vein
- Great sympathetic nerve

⇨ **On the left: :**

- Left mediastinal pleura and left lung
- - Thoracic sympathetic trunk
  Left sympathetic chain
- Left hemiazygos vein

⇨ **On the right: :**

- The thoracic esophagus
- Thoracic duct
- The great azygos veins

5- COLLATERAL BRANCHES: :

⇨ **Visceral branches: :**

- - Right and left bronchial
  Esophageal
- Mediastinal

⇨ **Parietal branches.**

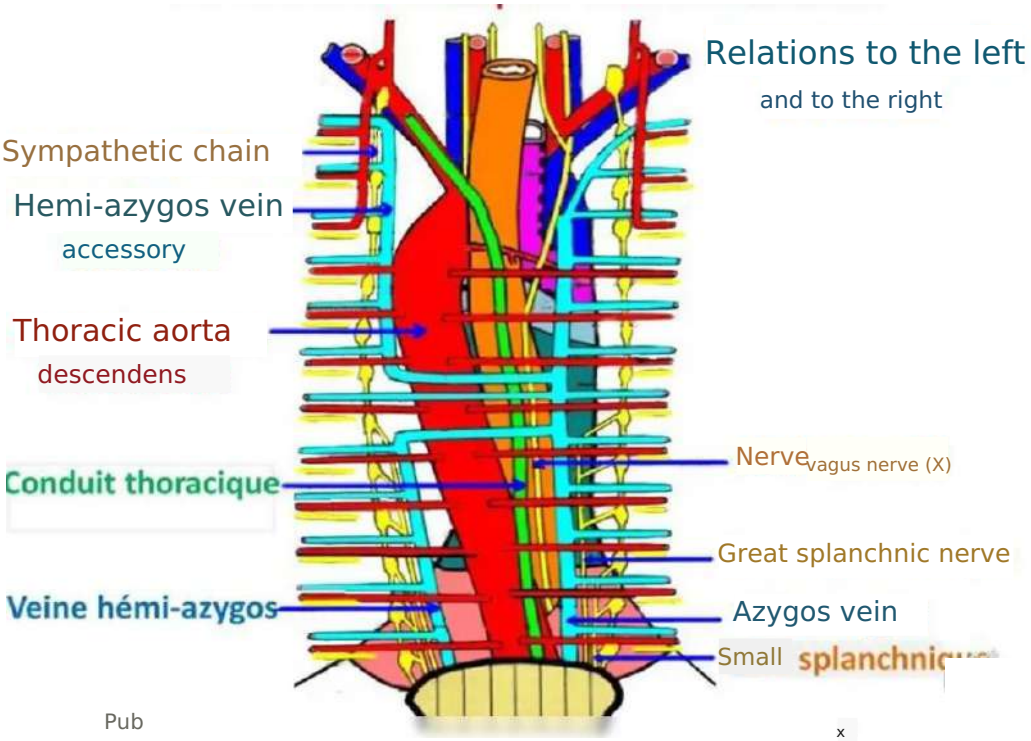
⇨ The superior phrenic arteries,

⇨ The last 9 intercostal arteries: they originate from the posterior surface of the aorta; once reaching the posterior end of the intercostal space, it bifurcates into two terminal branches: the dorso-spinal artery and the proper intercostal artery

named.

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