

Dr. Weyrich

**G07: Superior and Posterior Mediastina**

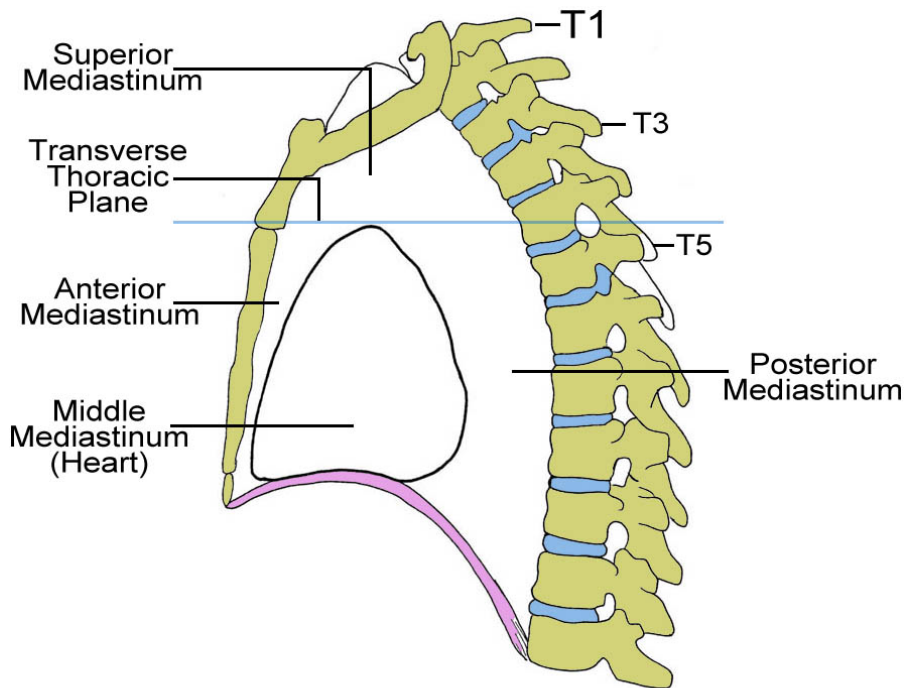
**Reading:** 1. Gray's Anatomy for Students, chapter 3

**Objectives:** 1. Subdivisions of mediastinum  
2. Structures in Superior mediastinum  
3. Structures in Posterior mediastinum

**Clinical Correlate:** 1. Aortic aneurysms

**Superior Mediastinum**

(pp.181-199)



**Mediastina, Lateral view of Thorax**

## Review of the Subdivisions of the Mediastinum

### Superior mediastinum

Comprises area within superior thoracic aperture and transverse thoracic plane

- Transverse thoracic plane – arbitrary line from the sternal angle anteriorly to the IV disk or T4 and T5 posteriorly

### Inferior mediastinum

Extends from transverse thoracic plane to diaphragm; 3 subdivisions

Anterior mediastinum – smallest subdivision of mediastinum

- Lies between the body of sternum and transversus thoracis muscles anteriorly and the pericardium posteriorly
- Continuous with superior mediastinum at the sternal angle and limited inferiorly by the diaphragm
- Consists of sternopericardial ligaments, fat, lymphatic vessels, and branches of internal thoracic vessels. Contains inferior part of thymus in children

Middle mediastinum – contains heart

Posterior mediastinum

## Superior Mediastinum

**Thymus** – lies posterior to manubrium and extends into the anterior mediastinum

- Important in development of immune system through puberty
- Replaced by adipose tissue in adult

Arterial blood supply

- Anterior intercostals and mediastinal branches of internal thoracic artery

Venous blood supply

- Veins drain into left brachiocephalic, internal thoracic, and thymic veins

**Brachiocephalic Veins** - Formed by the juncture of respective internal jugular and subclavian veins

Right brachiocephalic vein

-Receives lymph from right lymphatic duct

Left brachiocephalic vein

-Over twice as long as the right brachiocephalic vein

-Receives lymph from the thoracic duct

**Left Superior Intercostal Vein**

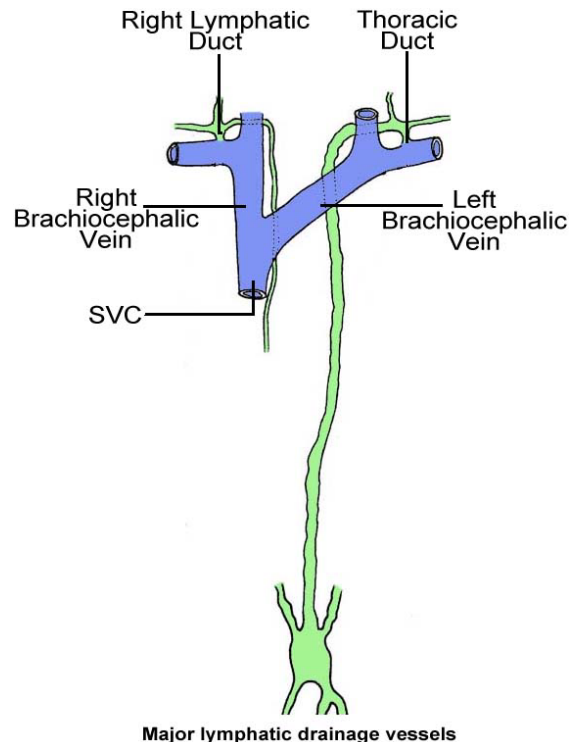
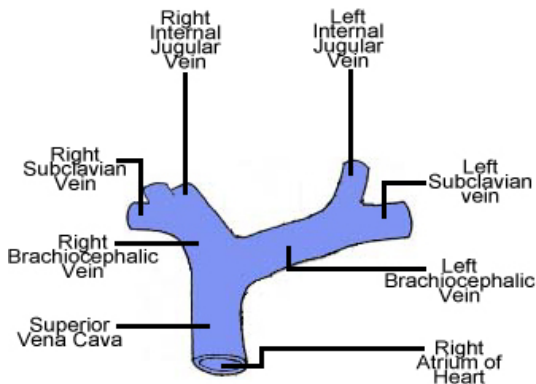
**Superior Vena Cava (SVC)**

Returns blood from all structures superior to diaphragm except the heart and lungs

-Drains into right atrium

-Runs in the right side of the superior mediastinum

-Right phrenic nerve lies between the SVC and mediastinal pleura



## Arch of the Aorta (table 1.6, p. 145)

Ligamentum arteriosum – remnant of fetal ductus arteriosus

- Extends from root of left pulmonary artery to inferior surface of arch of aorta
- Left recurrent laryngeal hooks beneath arch of aorta, adjacent to ligamentum arteriosum

Brachiocephalic trunk – first branch of aorta

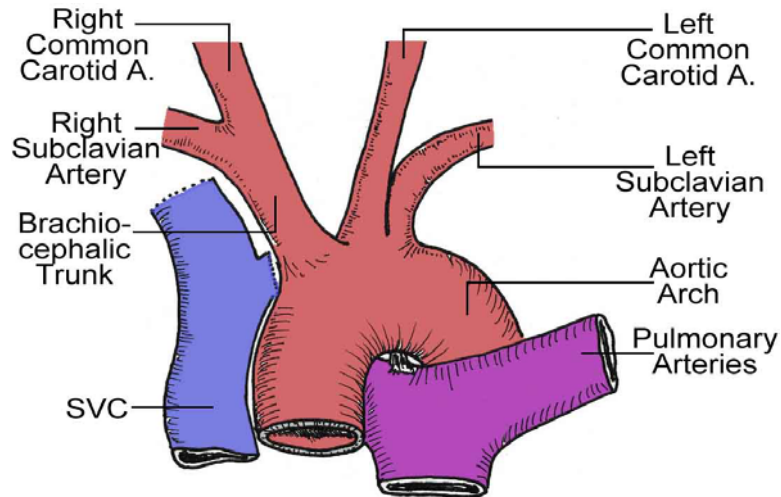
- Divides into right common carotid and right subclavian arteries

Left common carotid artery – 2nd branch of the arch

Left subclavian artery –3rd branch of the arch

## Clinical Correlate (p. 147)

Aortic arch aneurysms



Branches of the Aortic Arch

## Nerves (pp. 188-191)

Vagus nerves – arise from medulla of the brain, exit the cranium, and descend through the neck posterolateral to the common carotid arteries

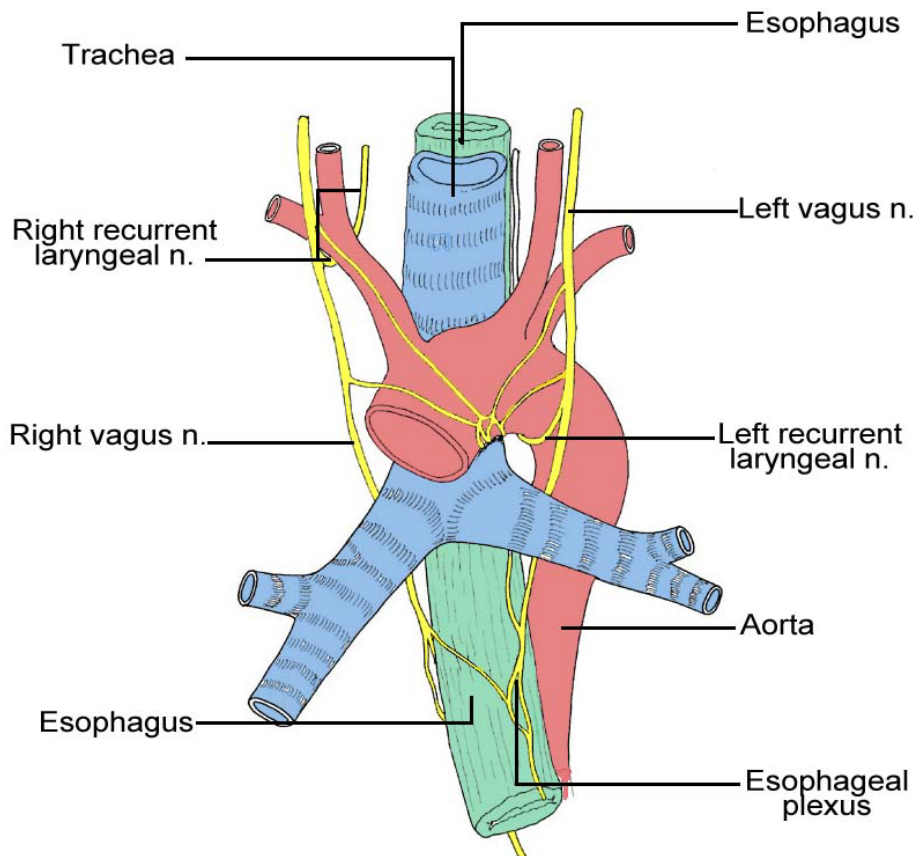
- Right vagus nerve – enters thorax anterior to right subclavian artery
- Right recurrent laryngeal nerve – arises from right vagus and hooks around the right subclavian artery and ascends to larynx
- Contributes to pulmonary, esophageal, and cardiac plexuses
- Left vagus nerve – enters mediastinum between left common carotid and left subclavian arteries
- Left recurrent laryngeal nerve – arises from left vagus and ascends to larynx

Phrenic nerves – supply the diaphragm

- Right phrenic nerve
- Left phrenic nerve

Trachea

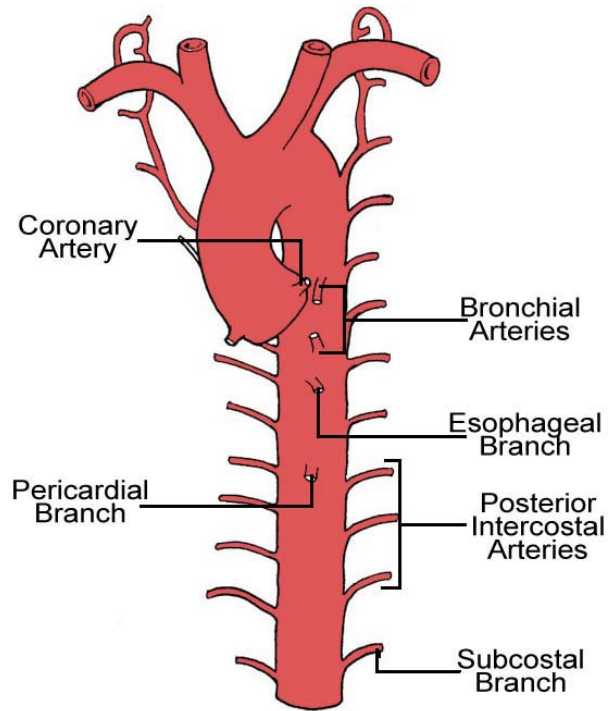
Esophagus



Thoracic contents; anterior view

## Posterior Mediastinum (pp. 150-156)

### Contents



Thoracic Aorta Branches

### Thoracic aorta

Bronchial branches – supply trachea, bronchi and lymph nodes

Pericardial branches – supply pericardium

Posterior intercostal branches

Superior phrenic branches

Esophageal branches

Subcostal branches

## Esophagus

Thoracic duct - largest lymphatic channel in the body; empties into the venous system near the union of the left internal jugular and subclavian veins

Cisterna chyli – origination of thoracic duct

Azygos system of veins – drains back and thoracoabdominal walls

Azygos (*i.e.*, paired) vein – forms collateral pathway between the SVC and IVC

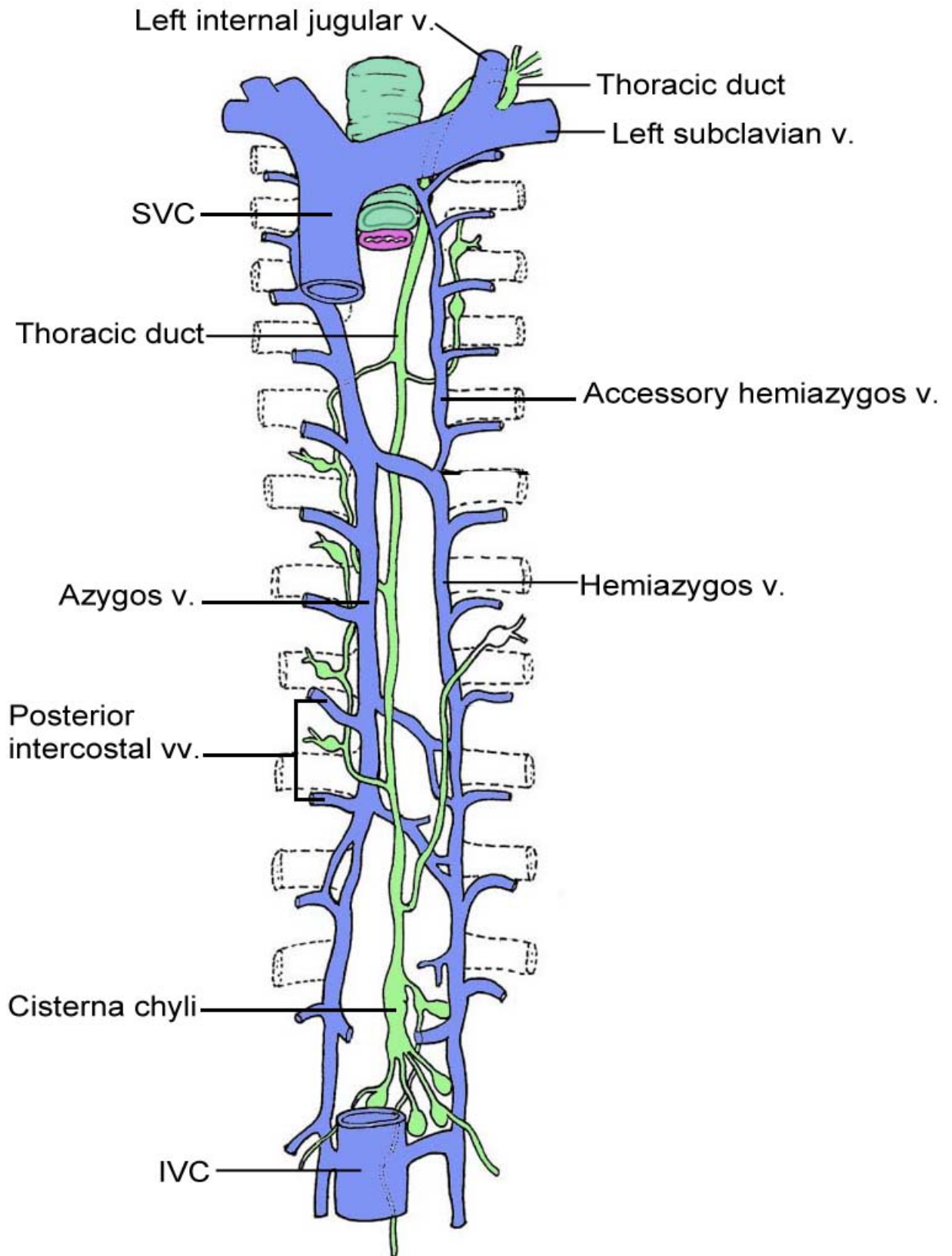
-Receives the posterior intercostal, mediastinal, esophageal, and bronchial veins. Also receives vertebral venous plexuses

Hemiazygos vein – ascends on the left side of the vertebral column; crosses to the right side (~ T9 vertebra) and joins azygos vein

-Receives the inferior three posterior intercostal, inferior esophageal, and some mediastinal veins

Accessory hemiazygos vein – passes on the left side of the vertebral column through the medial end of 4<sup>th</sup>-5<sup>th</sup> intercostal space to T7-T8 where it crosses to the right side and joins the azygos vein

•NOTE – The azygos system exhibits tremendous variation from person to person



Azygos system of veins and thoracic duct



## Nerves

Thoracic sympathetic trunks

Lower thoracic splanchnic nerves

- Greater (arises from sympathetic trunk at T5-T9)

  - Conveys preganglionic sympathetic fibers to the celiac ganglia

- Lesser (arises from sympathetic trunk at T10-T11)

  - Conveys preganglionic sympathetic fibers to the superior mesenteric ganglia

- Least (arises from sympathetic trunk at T12)

  - Conveys preganglionic sympathetic fibers to the aorticorenal ganglia

## Nerves of the Thorax

Nerve	Origin	Course	Distribution
<b>Vagus (CN X)</b>	8 to 10 rootlets from medulla of brainstem	Enters superior mediastinum posterior to sternoclavicular joint and brachiocephalic vein; gives rise to recurrent laryngeal nerve; continues to abdomen	Pulmonary plexus; esophageal plexus; cardiac plexus
<b>Phrenic</b>	Ventral rami of C3-C5 nerves	Passes through superior thoracic aperture and runs between mediastinal pleura and pericardium	Central portion of the diaphragm
<b>Intercostals</b>	Ventral rami of T1 to T11 nerves	Run in intercostal spaces between internal and innermost layers of intercostal muscles	Muscles and skin over intercostal space; lower nerves supply muscles and skin of anterolateral abdominal wall
<b>Subcostal</b>	Ventral ramus of T12 nerve	Follows inferior border of 12 <sup>th</sup> rib and passes into abdominal wall	Abdominal wall and skin of gluteal region
<b>Recurrent laryngeal</b>	Vagus nerve	Loops around subclavian on right; on left runs around arch of aorta and ascends in tracheoesophageal groove	Intrinsic muscles of larynx (except cricothyroid)
<b>Cardiac Plexus</b>	Cervical and cardiac branches of vagus nerve and sympathetic trunk	From arch of aorta and posterior surface of heart; fibers extend along coronary arteries and to SA node	Impulses pass to SA node
<b>Pulmonary Plexus</b>	Vagus nerve and sympathetic trunk	Forms on root of lung and extends along bronchial subdivisions	Bronchial subdivisions
<b>Esophageal Plexus</b>	Vagus nerve; sympathetic trunk; greater splanchnic nerve	Distal to tracheal bifurcation, the vagus and sympathetic nerves form a plexus around the esophagus	Vagal and sympathetic fibers to smooth muscle and glands of inferior two-thirds of esophagus

## Aorta and Branches in the Thorax

Artery	Origin	Course	Branches
<b>Ascending aorta</b>	Aortic orifice of left ventricle	Ascends approximately 5 cm to sternal angle where it becomes arch of aorta	Right and left coronary arteries
<b>Arch of aorta</b>	Continuation of ascending aorta	Arches posteriorly on left side of trachea and esophagus and superior to left main bronchus	Brachiocephalic; left common carotid; left subclavian
<b>Thoracic aorta</b>	Continuation of arch of aorta	Descends in posterior mediastinum to left of vertebral column; gradually shifts to right to lie in median plane at aortic hiatus	Posterior intercostal; bronchial; esophageal; pericardial; superior phrenic; subcostal arteries
<b>Posterior intercostal</b>	Posterior aspect of thoracic aorta	Pass laterally, and then anteriorly parallel to ribs	Lateral and anterior cutaneous branches
<b>Bronchial</b>	Anterior aspect of aorta or posterior intercostal artery	Run with tracheobronchial tree	Bronchial and peribronchial tissue; visceral pleura
<b>Esophageal</b>	Anterior aspect of thoracic aorta	Run anterior to esophagus	To esophagus
<b>Pericardial</b>	Anterior aspect of thoracic aorta	Send twigs to pericardium	To pericardium
<b>Superior Phrenic</b>	Anterior aspects of thoracic aorta	Arise at aortic hiatus and pass to superior aspect of diaphragm	To diaphragm
<b>Subcostal</b>	Posterior aspects of thoracic aorta	In series with posterior intercostal arteries just inferior to the 12 <sup>th</sup> rib	Lateral and anterior cutaneous branches