



ANATOMY TEAM

Lecture (6)

Mediastinum

At the end of the lecture, students should be able to:

- ✓ Define the “*Mediastinum*”.
- ✓ Differentiate between the divisions of the mediastinum.
- ✓ List the boundaries and contents of each division.
- ✓ Describe the relations between the important structures in each division.

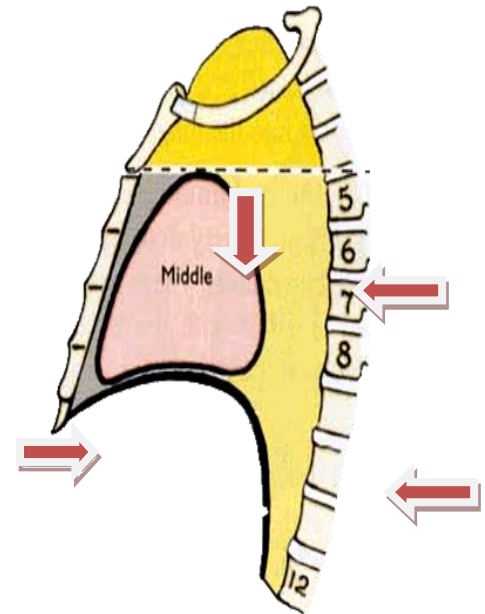
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- **BOUNDARIES OF MEDIASTINUM**

Superior	Thoracic outlet
Inferior	Diaphragm
Anterior	Sternum
Posterior	Thoracic vertebrae
Lateral	Lungs & pleurae



- **DIVISIONS OF THE MEDIASTINUM**

It is divided by a **horizontal plane**

extending from

sternal angle to **lower border of 4th thoracic vertebra** into:

1. Superior mediastinum (S): **above** the plane

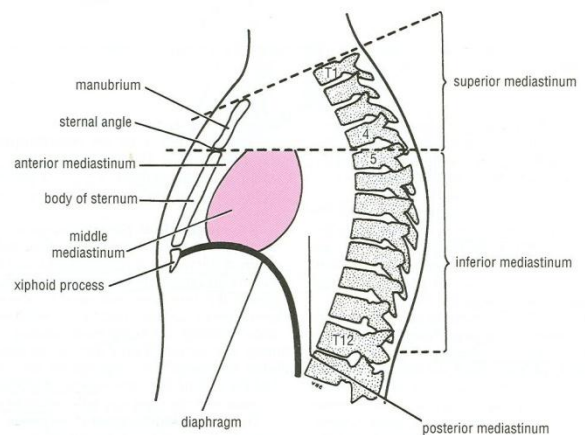
2. Inferior mediastinum: **below** the plane,

Inferior mediastinum is subdivided into:

Middle mediastinum (M): contains heart

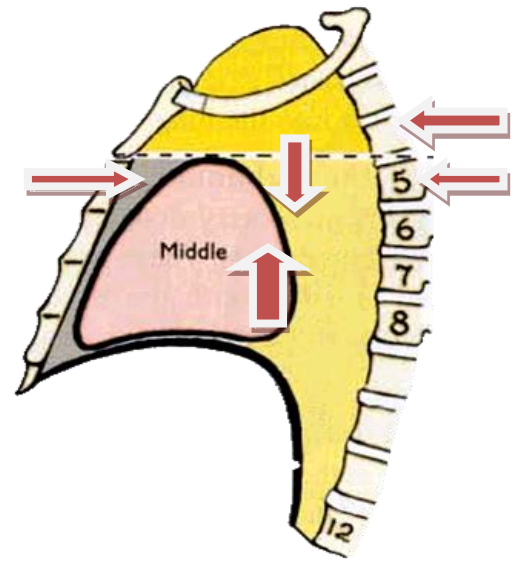
Anterior mediastinum (A): in front of heart

Posterior mediastinum (P): behind heart



SUPERIOR MEDIASTINUM

Superior	Thoracic outlet
Inferior	Horizontal plane
Anterior	Manubrium of sternum
Posterior	Upper 4 thoracic vertebrae
Lateral	Lungs & pleurae



✓ FROM SUPERFICIAL TO DEEP:

1. Thymus gland

2. Veins:

-Right & left brachiocephalic

-Superior vena cava

3. Arteries:

-Arch of aorta (A) & its branches

a-Brachiocephalic artery

b-Left common carotid

c-Left subclavian

4. Nerves:

- Right & left vagus

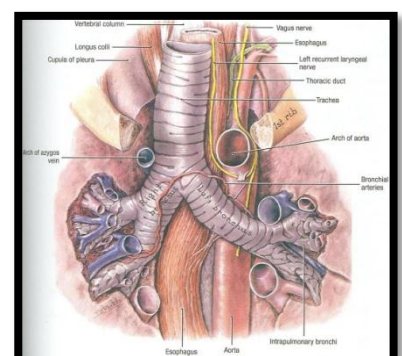
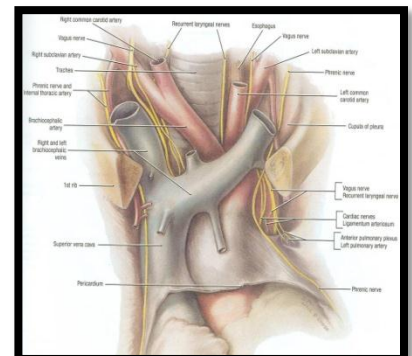
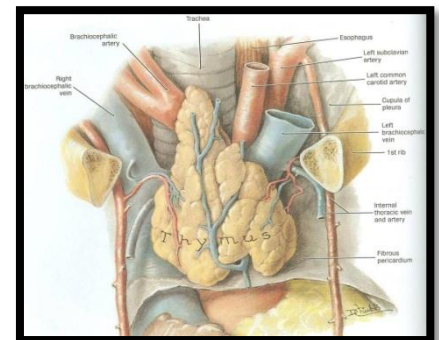
-Right & left phrenic

5. Trachea

6. Esophagus

7. Thoracic duct

8. Lymph nodes

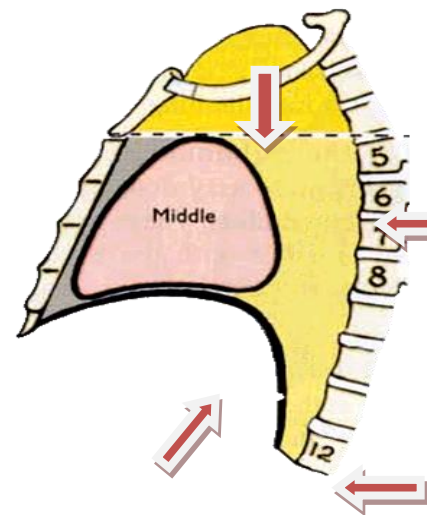


✓ CONTENTS OF SUPERIOR MEDIASTINUM

4 ARTERIES	arch of aorta, brachiocephalic, left common carotid, left subclavian
4 NERVES	right & left vagus, right & left phrenic
3 VEINS	right & left brachiocephalic, SVC
2 TUBES	trachea & esophagus
1 GLAND	thymus
1 DUCT	thoracic duct

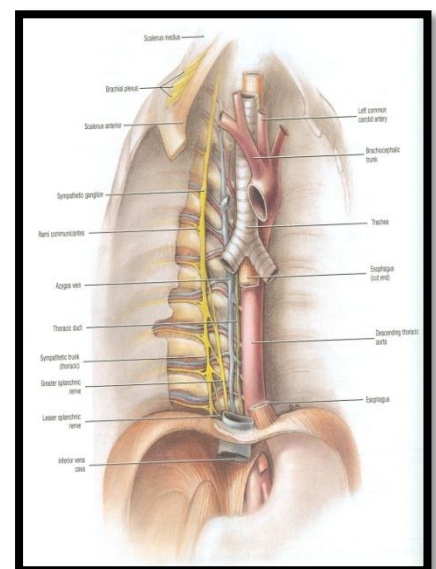
❖ POSTERIOR MEDIASTINUM

Superior	Horizontal plane
Inferior	Diaphragm
Anterior	Heart
Posterior	Thoracic vertebrae from T5 to T12
Lateral	Lungs & pleurae



✓ CONTENTS OF POSTERIOR MEDIASTINUM

- 1 Esophagus
- 2 Vagus nerves: around esophagus
- 3 Thoracic duct: posterior to esophagus
- 4 Azygos vein: posterior & to the right of esophagus
- 5 Descending aorta: posterior & to the left of esophagus
- 6 Right & left sympathetic trunks
- 7 Lymph nodes



❖ MIDDLE MEDIASTINUM

CONTENTS:

- 8 Heart & pericardium
- 9 Ascending Aorta
- 10 Pulmonary trunk
- 11 Superior & inferior vena cava
- 12 Right & left pulmonary veins
- 13 Right & left phrenic nerves
- 14 Lymph nodes

❖ ANTERIOR MEDIASTINUM

Superior	Horizontal plane
Inferior	Diaphragm
Anterior	Body & xiphoid process of sternum
Posterior	Heart
Lateral	Lungs & pleurae

❖ CONTENTS of ANTERIOR MEDIASTINUM

- 1 Thymus gland
- 2 Lymph nodes

right vagus	left vagus
Descends to the right side of trachea	Descends between left common carotid & left subclavian arteries
Forms the posterior esophageal plexus & continues in abdomen as posterior gastric nerve.	Forms the anterior esophageal plexus & continues in abdomen as anterior gastric nerve.

PHRENIC NERVE: spinal nerve, C3,4,5. The right phrenic descends on the right side of heart. The left phrenic descends on the left side of heart. Both terminate in the diaphragm. Supply: 1- Motor & sensory fibers to diaphragm. 2- Sensory fibers to pleurae & pericardium (Mediastinal and diaphragmatic parts of parietal pleura.)

THORACIC DUCT:

- 1- Continuation of the upper end of cisternachili. (cisternachili is place that contains lymph from lower half of body, under diaphragm).
- 2- Passes through aortic opening. **P**osterior to esophagus in **p**osterior mediastinum, **l**eft of esophagus in **s**uperior mediastinum (because it will drain in left brachiocevalic vein).
- 3- receives from all body except right side of thorax, right upper limb & right side of head & neck. (drain in right lymphatic duct)

AORTA:

	Beginning	Course	End
ASCENDING AORTA	Aortic orifice of left ventricle	Middle mediastinum	Continues as arch of aorta.(level of T4)
ARCH OF AORTA	Level of T4	Superior mediastinum	Continues as descending thoracic aorta. (level of T4).
DESCENDING AORTA	Level of T4	posterior mediastinum	Continues as abdominal aorta through diaphragm.

Arch of aorta has 3 branches: brachiocephalic trunk, left common carotid artery, left subclavian artery.

• NOTE

- ❖ The most anterior structure in the POSTERIOR MEDIASTINUM is Esophagus **BUT** in the SUPERIOR MEDIASTINUM it is the most posterior structure .
- ❖ Thoracic duct posterior to esophagus In the POSTERIOR MEDIASTINUM **BUT** in the SUPERIOR MEDIASTINUM is the left side .
- ❖ Azygos vein: posterior & to the right of esophagus and Descending aorta: posterior & to the left of esophagus .

ASCENDING AORTA	middle mediastinum
ARCH OF AORTA	superior mediastinum
DESCENDING AORTA	posterior mediastinum

MNEMONIC:

The contents of posterior mediastinum

"**DATES**" for **D**escending aorta, **A**zygos vein and hemiazygos vein, **T**horacic duct, **E**sophagus, **S**ympathetic trunk/ganglia

Cont. Notes (girls)

1-Thoracic outlet (before it was called thoracic inlet), it is a space between thorax and neck and it has its own Boundaries. .(manubrium, 1st rib & 1st thoracic v)

2-horizontal (transverse) plane divides the mediastinum into superior and inferior.

3-horizontal plane extend from sterna angle to lower T4

4-Level of T4 is an important **land mark** (or we can say level of sternal angle)

5-The MAIN structure in the inf compartment is the heart (middle mediastinum).

6-**largest** compartment in the inf mediastinum is the **middle**

Middle>post>ant

7-Anterior boundary of the superior mediastinum is manubrium and **NOT** all the sternum.

8-**phrenic nerve** gives sensory innervations to partiel pleura

-**Autonomic** gives to visceral pleura

9-posterior boundary for **anterior mediastinum** is **HEART**.(don't say vertebrae)

10-all the vessels that go **in & out** the heart are included in the **middle mediastinum**.

11- from T1-T4 (**superior mediastinum**)

From T5-T12(**posterior mediastinum "from the inferior part of mediastinum"**)

12-**esophagus** was on the superior and when it gets down it will be in the post.

13- if there is an injury in **T4** it will effect the structures in the **posterior mediastinum**. Causing hoarseness of the voice and difficulty swallowing.

“wont effect the trachea and diaphragm (**cuz there innervations by phrenic nerve**)”

14- **Cisterna Chyli**= white sac

15- if the surgeon wants to do an abdominal surgery he will do a **vagotomy (excision of vagus nerve)** for the left vagus nerve because it will give the anterior gastric nerve.

16-all parts of body receive lymphatic from the **thoracic duct** . **EXCEPT**: Right side of thorax, Right upper limb & Right side of head & neck are From the **right lymph trunk**.

• Review

What structures continue to posterior mediastinum?

- 1-esophagus
- 2-thoracic duct
- 3-vagus nerve

What is the CONTENTS OF POSTERIOR MEDIASTINUM?

1. Esophagus
2. Vagus nerves: **around esophagus**
3. Thoracic duct: **posterior to esophagus**
4. Azygos vein: posterior & to the **right of esophagus**
5. Descending aorta: posterior & to the **left of esophagus**
6. Right & left sympathetic trunks
7. Lymph nodes

What is the BOUNDARIES OF POSTERIOR MEDIASTINUM ?

1. Superior: Horizontal plane
2. Inferior: Diaphragm
3. Anterior: Heart
4. Posterior: Thoracic vertebrae from T5 to T12
5. Lateral: Lungs & pleurae

What is the site of MIDDLE MEDIASTINUM ?

Between anterior & posterior mediastinum

What is the content of MIDDLE MEDIASTINUM ?

Heart & pericardium , Ascending Aorta ,Pulmonary trunk
Superior & inferior vena cava ,Right & left pulmonary veins , Right & left phrenic nerves ,Lymph nodes

What is the BOUNDARIES OF ANTERIOR MEDIASTINUM ?

- ❖ Superior: Horizontal plane
- ❖ Inferior: Diaphragm
- ❖ Anterior: Body & xiphoid process of sternum
- ❖ Posterior: Heart
- ❖ Lateral: Lungs & pleurae

What are the origins that found at level of T4 (horizontal plane)?

A1: Sternal angle, Second costal cartilage, Bifurcation of trachea, Bifurcation of pulmonary trunk, Beginning & termination of arch of aorta.

What are the course of right vagus and left vagus?

A1: 1- Right vagus: descends to the right side of trachea >> posterior esophageal plexus >>in abdomen as posterior gastric nerve.

2- Left vagus: descends between left common carotid & left subclavian arteries >> anterior esophageal plexus >> in abdomen as anterior gastric nerve.

What is the course of phrenic nerve?

A3: The right phrenic descends on the right side of heart. The left phrenic descends on the left side of heart. Both terminate in the diaphragm.

What are origins that phrenic nerve supplies?

A1: 1- Motor & sensory fibers to diaphragm. 2- Mediastinal and diaphragmatic parts of parietal pleura.

What is the course of thoracic duct?

A5: continuation of the upper end of cystemachili>> Passes through aortic opening of the diaphragm posterior to esophagus in posterior mediastinum, left of esophagus in superior mediastinum >> End in the left brachiocephalic

what are tributaries of thoracic duct?

A6: It receives Lymphatics from: 1- Left side of head & neck. (Jugular trunk). 2- Left upper limb. (Subclavian trunk). 3- Left side of thorax. (branchomediastinal trunk).4- right and left side of lower limb

What is course of ascending aorta?

A7: Beginning at aortic orifice of left ventricle in middle mediastinum, continues as arch of aorta.

What is course of arch of aorta?

A8: Beginning at level of T4 in superior mediastinum, continues as descending thoracic aorta.

What is course of descending aorta?

A9: Beginning at level of T4 in posterior mediastinum, continues as abdominal aorta through diaphragm.

• Quiz:

Q1: Which of these at level of T4:

- 1- Sternal angle.
- 2- Xiphoid process.
- 3- Jugular notch.

Q2: Vagus nerve is cranial nerve.

- 1- Ninth.
- 2- Tenth.
- 3- Third.

Q3: What is the root value of phrenic nerve?

- 1- C3,4,5.
- 2- C3,4.
- 3- T3,4,5.

Q4: Phrenic nerve supply to diaphragm.

- 1- Motor.
- 2- Sensory.
- 3- Motor and sensory.

Q5: Thoracic duct passes through:

- 1- Caval opening.
- 2- Aortic opening.
- 3- Esophageal opening.

Q6: Thoracic duct in posterior mediastinum is:

- 1- Posterior to esophagus.
- 2- Left of esophagus.
- 3- Right of esophagus.

Q7: Thoracic duct ends in:

- 1- Brachiocephalic vein.
- 2- Right brachiocephalic vein.
- 3- Left brachiocephalic vein.

Q8: Where is ascending aorta beginning?

- 1- At Level of T4.
- 2- At aortic orifice of left ventricle.
- 3- At aortic orifice of right ventricle.

Q9: Where is arch of aorta?

- 1- Superior mediastinum.
- 2- Middle mediastinum.
- 3- Posterior mediastinum.

Q10: Descending aorta ends as:

- 1- Left subclavian artery.
- 2- Abdominal aorta.
- 3- Brachiocephalic trunk.

Q11: Content of ANTERIOR MEDIASTINUM ?

- 1-Thymus gland , Lymph nodes
- 2-Thymus gland , Lymph nodes , Ascending Aorta
- 3-Pulmonary trunk
- 4-1+3

Q12:Which one is posterior to(POSTERIOR MEDIASTINUM) ?

- 1-Heart
- 2-Thoracic vertebrae from T5 to T11
- 3-Thoracic vertebrae from T5 to T12
- 4-Upper 4 thoracic vertebrae

Q13:Which statement is right about CONTENTS OF POSTERIOR MEDIASTINUM :

- 1-Descending aorta: posterior & to the right of esophagus
- 2-Azygos vein: posterior & to the left of esophagus
- 3-Descending aorta: Anterior & to the right of esophagus
- 4-Descending aorta: posterior & to the left of esophagus

Q14:Site of MIDDLE MEDIASTINUM ?

1-Between anterior & posterior mediastinum

2-Posterior of mediastinum

3-Anterior of mediastinum

4-Between anterior & inferior mediastinum

Q15:Content of MIDDLE MEDIASTINUM ?

1-Thymus gland

2- Ascending Aorta

3-Descending Aorta

4-Arch of Aorta

• Answers

1	1
2	2
3	1
4	3
5	2
6	1
7	3
8	2
9	1
10	2
11	1
12	3
13	4
14	1
15	2
