Clinical Anatmoy of Mediastinum and Mnemomics

Clinical Anatomy — Mediastinum

1. Mediastinal Widening

- Seen on **chest X-ray or CT** when the mediastinum appears broader than normal.
- **Causes:**
  - **Aortic aneurysm** (especially of the arch).
  - **Lymphadenopathy** (tuberculosis, lymphoma, metastasis).
  - **Mediastinal tumors** (thymoma, teratoma, thyroid mass).
  - **Hemorrhage or trauma**.
- Important because it may **compress trachea, esophagus, or great veins**, causing **dyspnea, dysphagia, and venous congestion**.

2. Mediastinal Shift

- Displacement of mediastinal structures toward or away from one lung.
- **Shift toward one side:** due to **lung collapse (atelectasis)** or **fibrosis** pulling the mediastinum.

- **Shift away from one side:** due to **pleural effusion, pneumothorax, or large mass** pushing it.
- **Clinical sign:** displacement of **trachea and apex beat**.

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3. Superior Vena Cava (SVC) Obstruction

- Usually caused by **bronchogenic carcinoma** or **mediastinal lymph node enlargement** .
- Results in **distension of veins of face, neck, and upper limb** with **facial swelling and cyanosis**.
- Collateral venous channels (azygos system, internal thoracic, and vertebral veins) enlarge to bypass obstruction.

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4. Aortic Aneurysm

- **Aneurysmal dilation** of the **arch or descending aorta** may compress surrounding structures:
  - **Trachea** ? Cough and dyspnea
  - **Esophagus** ? Dysphagia
  - **Recurrent laryngeal nerve** ? Hoarseness of voice
  - **Sympathetic trunk** ? Horner’s syndrome
- May present as **mediastinal widening** on radiograph or **pulsatile mass** in the chest.

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5. Mediastinitis

- **Infection or inflammation** of mediastinal connective tissue, often from **esophageal perforation**, **tracheostomy**, or **cardiac surgery**.
- Causes severe **chest pain, fever, and respiratory distress**.
- Can spread rapidly due to the **loose areolar tissue** of the mediastinum.

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6. Mediastinal Emphysema

- Presence of **air in the mediastinum**, usually due to **alveolar rupture**, **tracheobronchial tear**, or **esophageal perforation**.
- Air may spread to the neck and face causing **subcutaneous emphysema** (crackling on palpation).
- Seen on radiographs as streaks of radiolucency in the mediastinum.

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7. Mediastinal Tumors

- Tumors may arise from any mediastinal structure:
  - **Anterior mediastinum:** thymoma, teratoma, thyroid mass, lymphoma.
  - **Middle mediastinum:** pericardial cyst, enlarged lymph nodes.
  - **Posterior mediastinum:** neurogenic tumors, esophageal masses.
- Symptoms result from **compression** of trachea, esophagus, or major vessels.
- **Diagnosis:** CT/MRI or **mediastinoscopy with biopsy**.

8. Thymic Enlargement

- Enlargement of **thymus** (thymoma or thymic hyperplasia) may cause:
  - **Pressure on trachea or SVC**, producing cough or venous congestion.
  - Association with **myasthenia gravis** (autoimmune weakness).

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9. Pericardial Effusion and Cardiac Tamponade

- Accumulation of fluid in the **pericardial cavity** (within middle mediastinum) compresses the heart.
- Causes **distended neck veins, hypotension, muffled heart sounds** (Beck's triad).
- Emergency drainage by **pericardiocentesis** is life-saving.

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10. Esophageal Lesions in Posterior Mediastinum

- **Esophageal carcinoma** may produce **dysphagia** due to encroachment on the lumen and invasion of adjacent structures (trachea, aorta).
- **Hiatus hernia** and **esophageal varices** also relate to this region.

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11. Azygos Vein Dilatation

- Enlargement occurs in **SVC obstruction** or **right heart failure** as a collateral drainage route.
- Visible on X-ray as a **paratracheal shadow** on the right side.

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12. Chylothorax

- Injury to the **thoracic duct** during surgery or trauma causes leakage of **chyle (lymph rich in fat)** into the pleural cavity.
- Leads to **milky pleural effusion** requiring drainage.

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13. Posterior Mediastinal Neurogenic Tumors

- Common in children; arise from **sympathetic ganglia or nerve sheaths**.
- May cause **back pain**, **Horner's syndrome**, or **paraplegia** by spinal compression.

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14. Diagnostic Mediastinoscopy

- Performed through a small incision above the suprasternal notch to **inspect or biopsy mediastinal lymph nodes or masses**.
- Helps diagnose **tuberculosis, sarcoidosis, or metastasis**.

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15. Referred Pain from Mediastinum

- **Pain from pericardium or diaphragmatic pleura** (phrenic nerve) may be referred to the **shoulder tip** (C4 dermatome).
- **Pain from esophagus or heart** may radiate to **substernal or left arm region**.

The mediastinum, though compact, is a **high-risk zone** for **compression syndromes, infections, and tumors**. Its clinical relevance lies in how **pathologies of distinct mediastinal parts** mimic each other through **shared nerve pathways and radiological appearances** —

making thorough anatomical knowledge crucial for accurate diagnosis and management.

Mnemonics — Mediastinum

Mnemonics make the maze-like mediastinum easier to remember. Below are the **simplified and high-yield memory aids** for gross anatomy and clinical recall.

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1. Divisions of the Mediastinum

Mnemonic: *"SAMI divides the chest"*

- **S** ? Superior mediastinum
- **A** ? Anterior mediastinum
- **M** ? Middle mediastinum
- **I** ? Inferior mediastinum (posterior part included)

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2. Boundaries of Mediastinum

Mnemonic: *"SAD PALS"*

- **S** ? Sternum (anterior)
- **A** ? Aorta and vertebral column (posterior)
- **D** ? Diaphragm (inferior)
- **P** ? Pleura (lateral)
- **A** ? Aperture (thoracic inlet, superior)

- **L** ? Lungs (on each side)
- **S** ? Sternum (repetition helps with orientation in cross sections)

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3. Superior Mediastinum — Contents (Anterior ? Posterior)

Mnemonic: *“Thymus Veins Arteries Trachea Esophagus Duct Spine”*
? Thymus ? Great Veins ? Arch of Aorta and its branches ? Trachea ? Esophagus ? Thoracic Duct ? Vertebral column.

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4. Branches of Arch of Aorta

Mnemonic: *“ABC”*

- **A** ? Arch of Aorta
- **B** ? Brachiocephalic trunk
- **C** ? Left Common carotid and Left subclavian arteries

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5. Relations of Left Recurrent Laryngeal Nerve

Mnemonic: *“ALAS”*

- **A** ? Arch of aorta (nerve hooks under it)
- **L** ? Ligamentum arteriosum (nerve passes behind it)
- **A** ? Ascends in tracheoesophageal groove
- **S** ? Supplies larynx (intrinsic muscles except cricothyroid)

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6. Contents of Inferior Mediastinum

Mnemonic: *“A Middle Posterior — AMP”*

- **A** ? Anterior mediastinum (Thymus remnants, fat, lymph nodes)
- **M** ? Middle mediastinum (Heart, pericardium, great vessels)
- **P** ? Posterior mediastinum (Aorta, Azygos, Thoracic duct, Esophagus, Sympathetic trunks)

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7. Posterior Mediastinum — Major Contents

Mnemonic: *“DATE VSS”*

- **D** ? Descending aorta
- **A** ? Azygos and hemiazygos veins
- **T** ? Thoracic duct
- **E** ? Esophagus
- **V** ? Vagus nerves (forming esophageal plexus)
- **S** ? Sympathetic trunk
- **S** ? Splanchnic nerves

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8. Greater, Lesser, and Least Splanchnic Nerves

Mnemonic: *“Great 5-9, Less 10-11, Least 12”*

- **Greater splanchnic** ? T5–T9 ? Celiac ganglion
- **Lesser splanchnic** ? T10–T11 ? Aorticorenal ganglion
- **Least splanchnic** ? T12 ? Renal plexus

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9. Anterior Mediastinal Tumors — The “4 Ts”

Mnemonic: *“4 Ts”*

- **T**hymoma
- **T**eratoma
- **T**hyroid (ectopic or retrosternal goitre)
- **T**errible lymphoma

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10. Middle Mediastinal Contents

Mnemonic: *“Heart Pumps Vital Power”*

- **H** ? Heart and pericardium
- **P** ? Phrenic nerves with pericardiacophrenic vessels
- **V** ? Great vessels (ascending aorta, pulmonary trunk, SVC, IVC)
- **P** ? Pulmonary veins and arteries
- **B** ? Main bronchi (Roots of lungs)

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11. Superior Vena Cava Obstruction — Collateral Pathways

Mnemonic: *“A.I.V.”*

- **A** ? Azygos vein
- **I** ? Internal thoracic veins
- **V** ? Vertebral venous plexus

These form alternate routes to drain blood into the **inferior vena cava** when the **SVC** is compressed.

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12. Mediastinal Layers (Anterior ? Posterior)

Mnemonic: *“Pretty Tall Attractive Elegant Spine”*
? **P**ericardium ? **T**rachea ? **A**orta ? **E**sophagus ? **S**pine

Helps visualize cross-sectional anatomy on CT or MRI.

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13. Structures Passing Through Diaphragm

Mnemonic: *“I Ate 10 Eggs At 12”*

- **I (8)** ? Inferior vena cava (T8)
- **Ate (10)** ? Esophagus (T10)
- **12 (12)** ? Aorta (T12)

These correspond to their vertebral levels and mediastinal associations.

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14. Causes of Mediastinal Widening

Mnemonic: *“3 A’s + 3 M’s”*

- **Aortic aneurysm**
- **Aortic dissection**
- **Azygos vein enlargement**
- **Mediastinal tumor**
- **Metastasis**
- **Massive lymphadenopathy**

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15. Mediastinal Pain Radiation

Mnemonic: *“MEDI-ASTINUM”*

- **M** ? Myocardial ischemia
- **E** ? Esophageal spasm
- **D** ? Diaphragmatic irritation
- **I** ? Inflammatory pericarditis
- All can radiate to **left shoulder, neck, or arm** via **phrenic or sympathetic nerves**.

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16. Levels of Key Openings in Posterior Mediastinum

Mnemonic: *“VET”*

- **V** ? Vena cava (T8)

- **E** ? Esophagus (T10)
- **T** ? Thoracic aorta (T12)

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17. Referred Pain in Mediastinal Disorders

Mnemonic: *“Phrenic feels the Pain”*
? Any inflammation involving **pericardium or diaphragmatic pleura** produces **shoulder pain (C3–C5 dermatomes)** via **phrenic nerve**.

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18. Orientation Trick for Mediastinal Imaging

Mnemonic: *“Vessels-Vagus-Vertebra”*
From **front to back** in CT sections — great **vessels**, then **vagus/esophagus**, then **vertebral bodies**.

These mnemonics neatly compress the mediastinum’s **complicated anatomy, divisions, and clinical associations** into **memorable cues**, perfect for **viva and rapid recall before exams**.