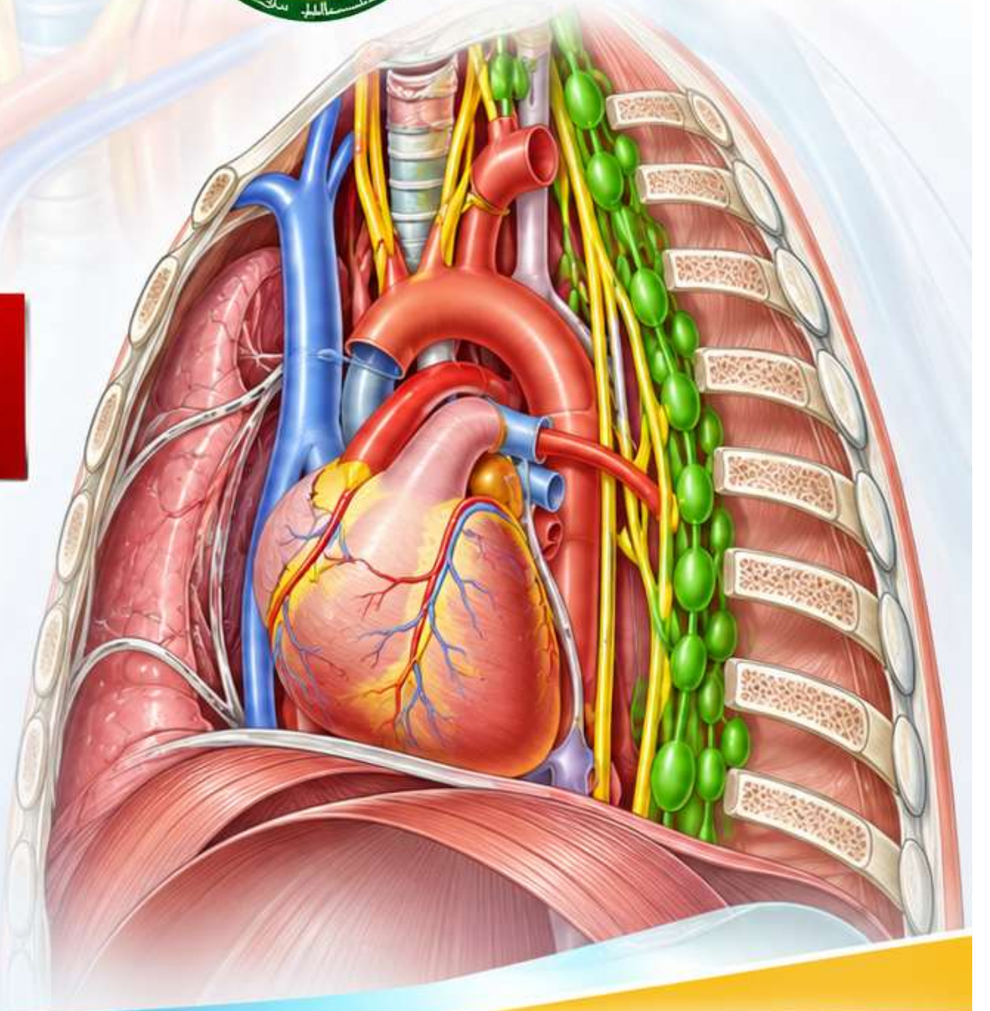
الجامعة المستنصرية
Al-Mustansiriyah University

كلية الطب
College of Medicine

THE MEDIASTINUM



Dr. Saif Sami Al-Mudhaffar

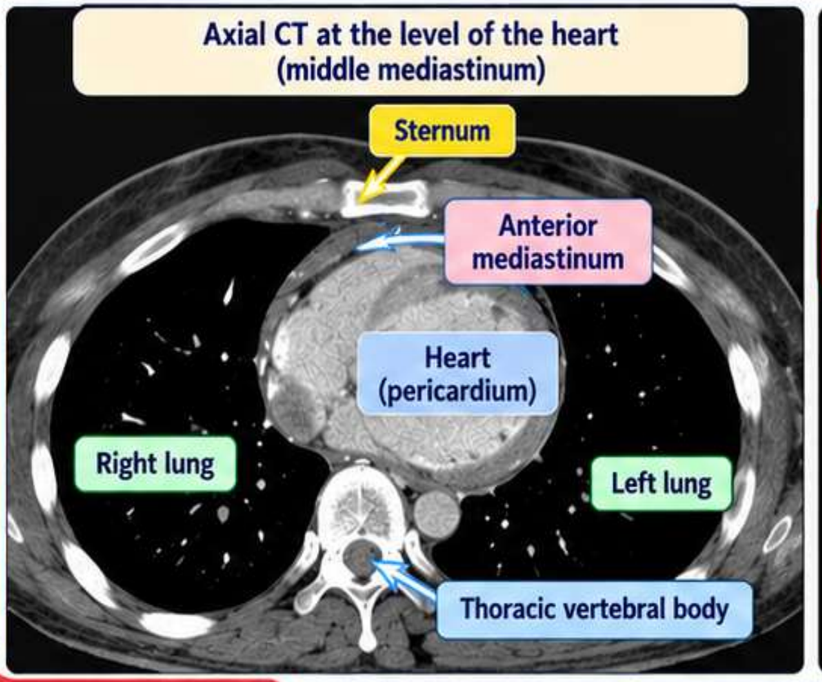
Consultant Cardiac Surgeon and Assistant Professor
Department of Surgery
College of Medicine, Al-Mustansiriyah University

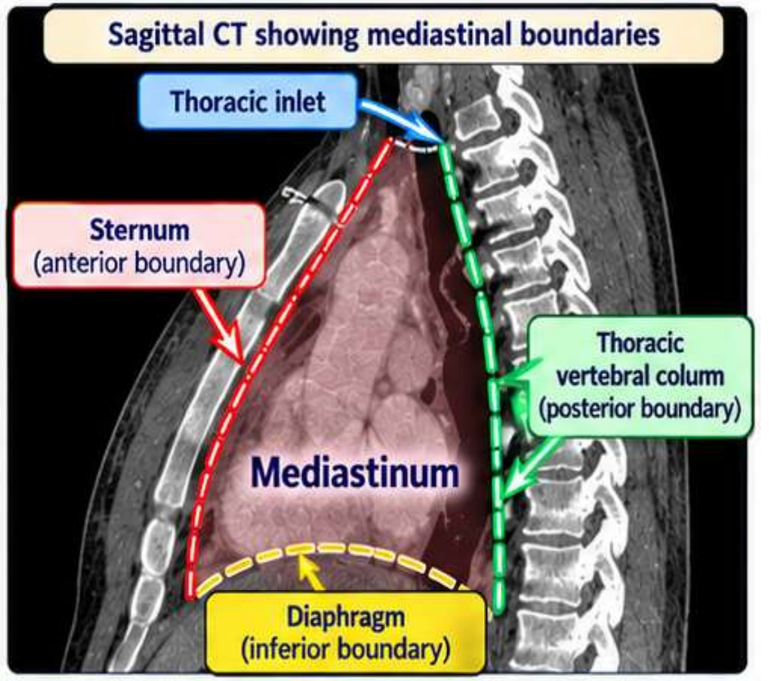
Clinical Scenario

A 25-year-old man is brought to the emergency department after a stab wound to the anterior chest at the **left sternal border, 4th intercostal space**.

On examination:

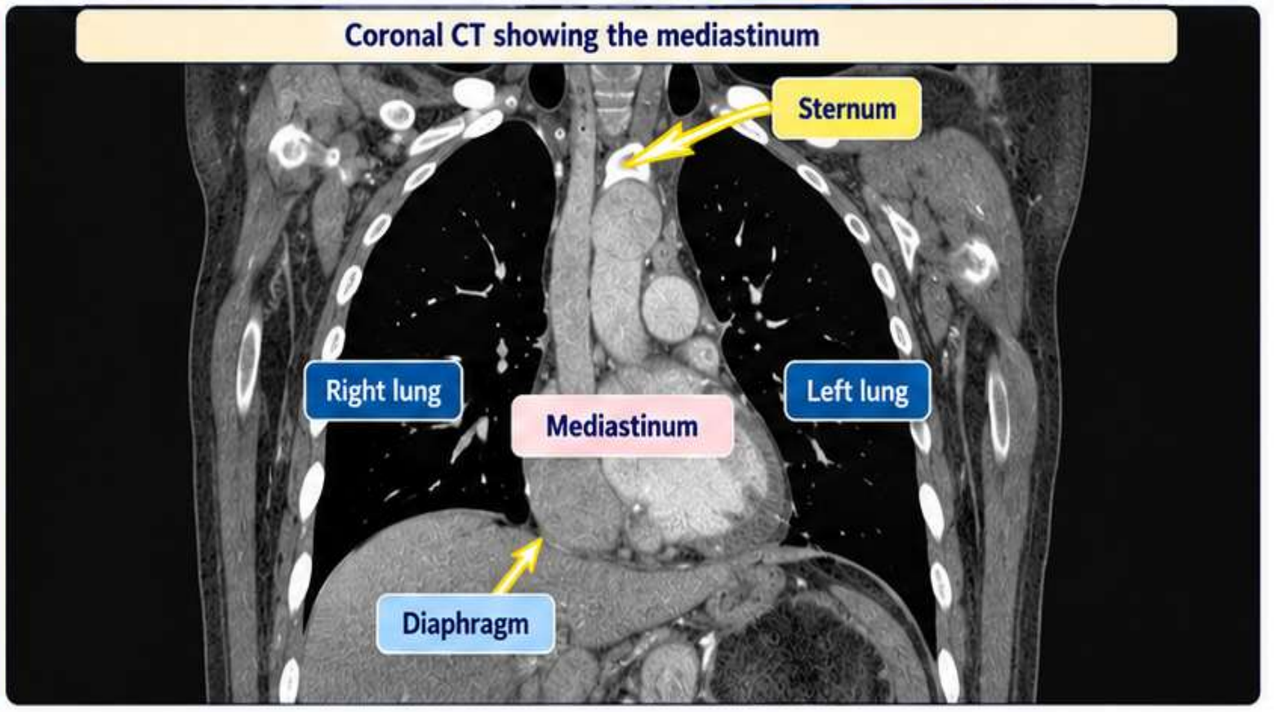
- Blood pressure: 80/50 mmHg
- Heart rate: 130 beats/min
- Distended neck veins
- Muffled heart sounds





Questions for Students

1. Which anatomical compartment of the mediastinum is most likely involved?
2. What is the anterior anatomical boundary of the mediastinum?
3. Which important structures lie immediately posterior to the sternum at this level?
4. Why can a penetrating injury near the sternum cause life-threatening cardiovascular complications?
5. How does knowledge of the mediastinal boundaries help the surgeon in planning emergency intervention?



The Mediastinum

1 Boundaries of the Mediastinum

Superior	Thoracic inlet (root of neck)
Inferior	Diaphraqm
Anterior	Sternum
Posterior	Thoracic vertebral column
Lateral	Mediastinal pleura (covering the lungs)

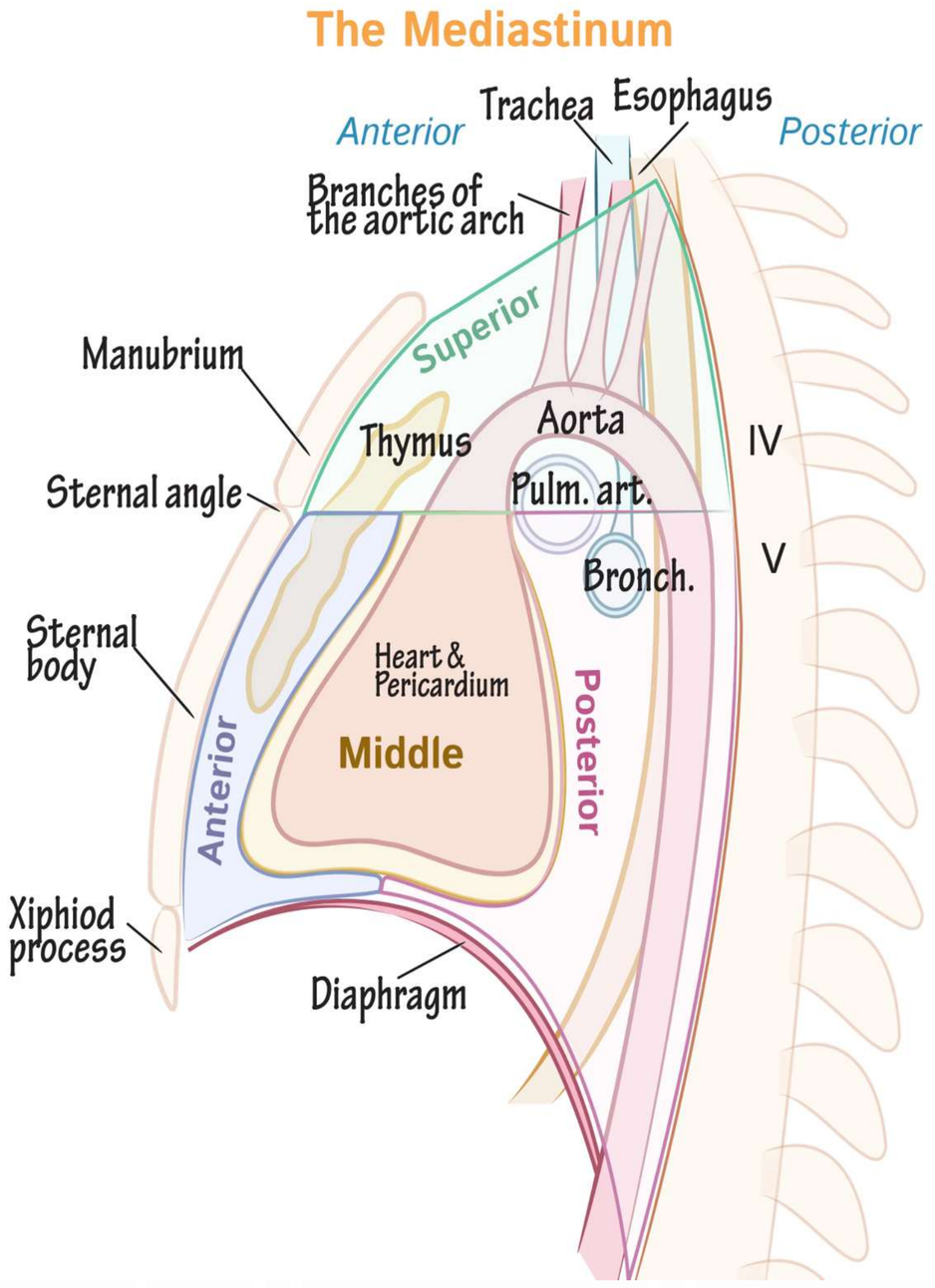
2 Main Divisions

Superior mediastinum	Extends from the thoracic inlet to a transverse plane at the level of the **sternal angle** (to the **T4–T5 intervertebral disc**).
Inferior mediastinum	Extends from this transverse plane to the diaphragm.

3 Subdivisions of the Inferior Mediastinum

Inferior mediastinum

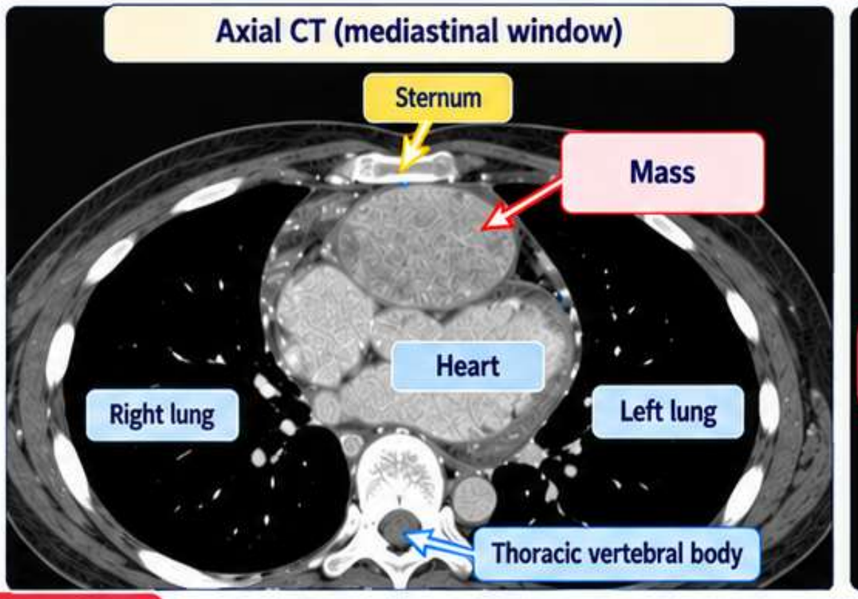
- **Anterior mediastinum**
- **Middle mediastinum**
- **Posterior mediastinum**

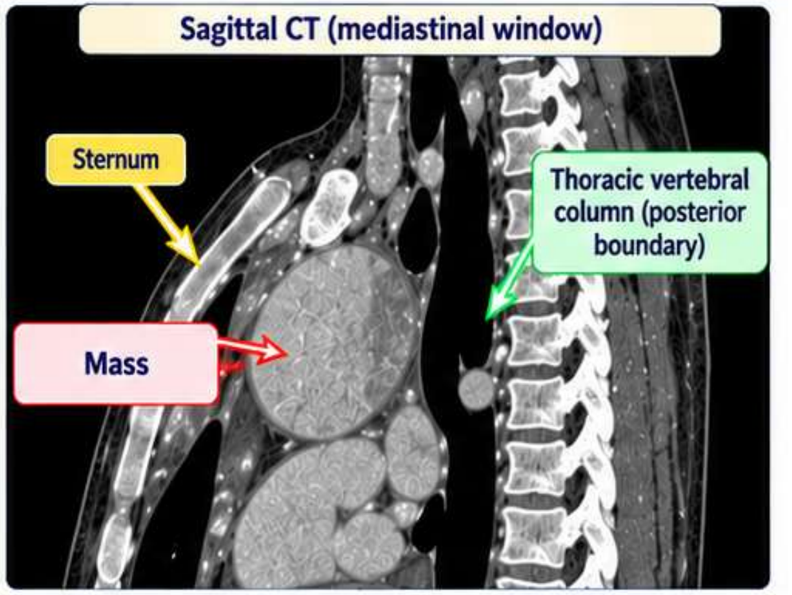


Clinical Scenario

A 45-year-old woman presents with progressive shortness of breath and a dry cough. A chest CT scan shows a well-defined **mediastinal mass**.

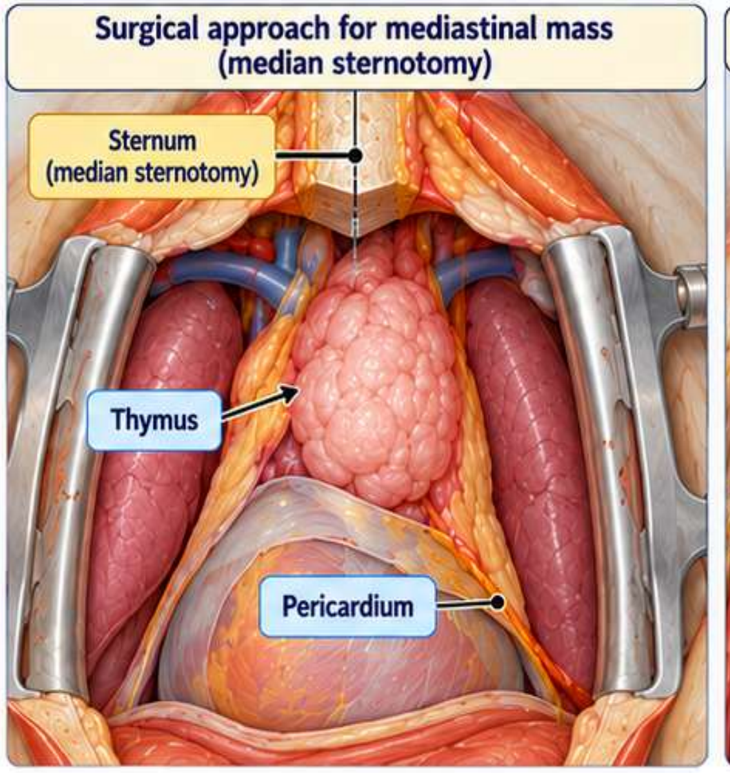
The cardiothoracic surgical team is planning surgical resection and discussing the optimal surgical approach.

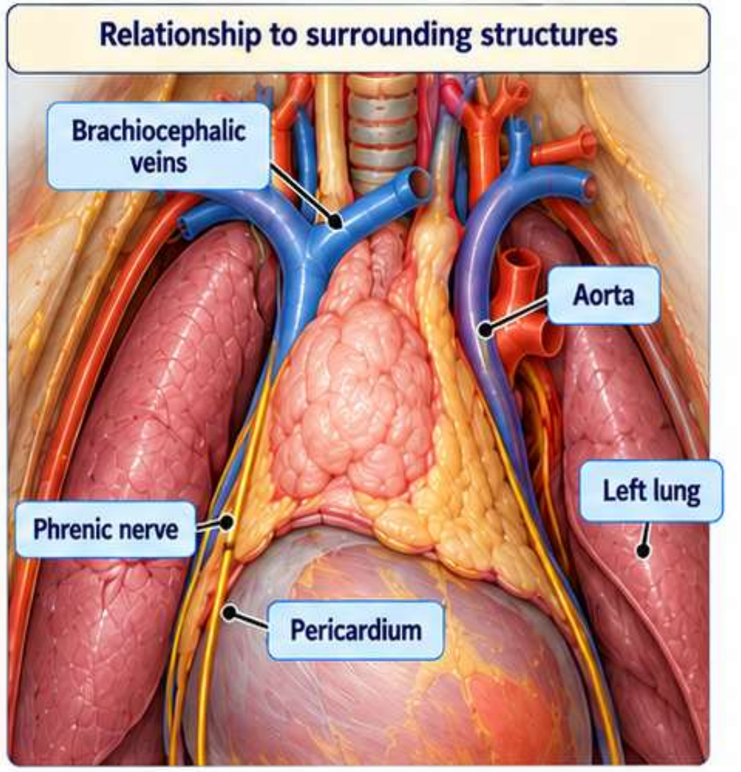




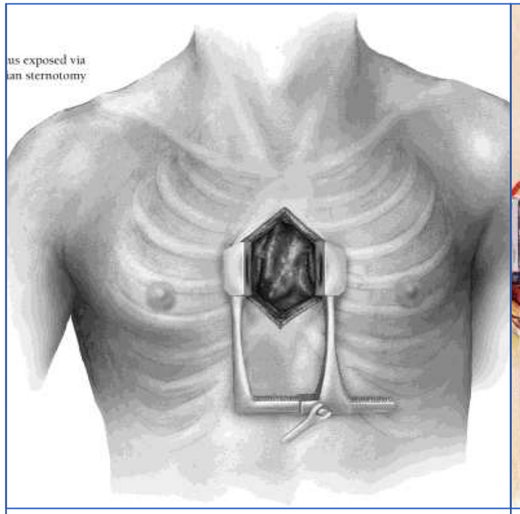
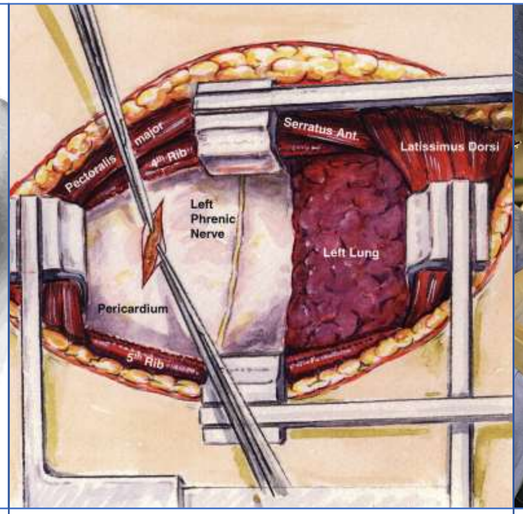
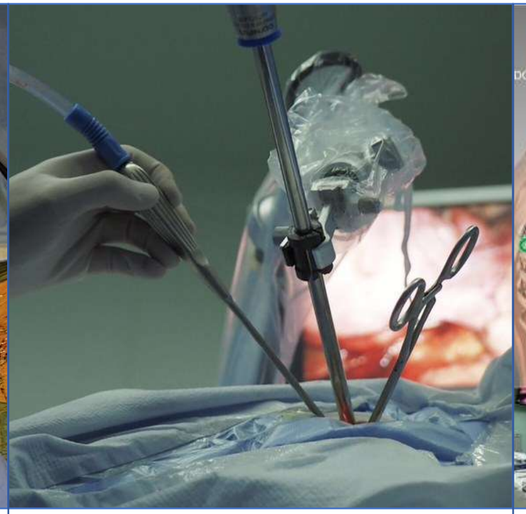
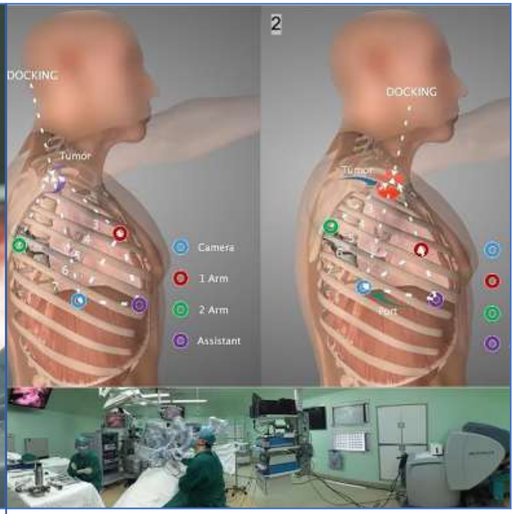
Questions for Students

1. Which compartment of the mediastinum contains this mass?
2. What are the anatomical boundaries of this compartment?
3. What surgical approach would be most appropriate for resecting this mass? Justify your answer based on the anatomy.
4. Which important structures should be considered and protected during this approach?
5. If the mass extended posteriorly or involved the middle mediastinum, how would the surgical approach change?



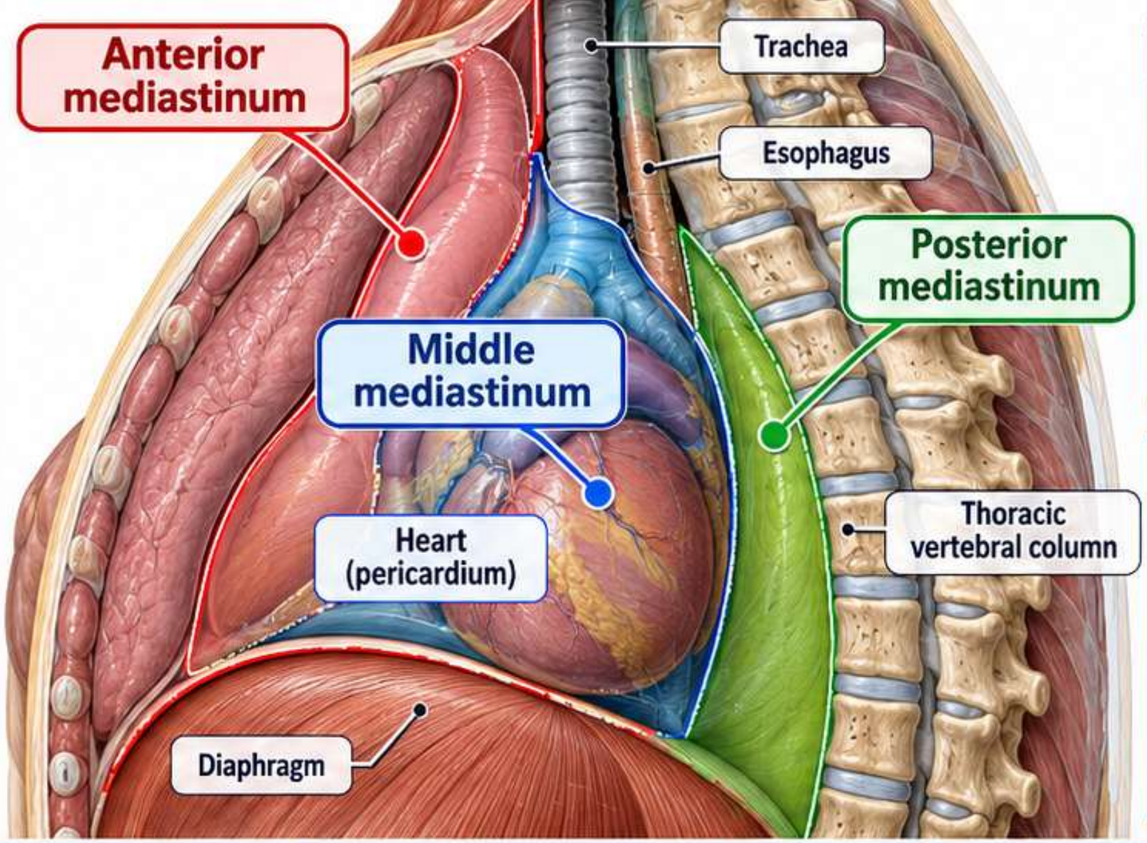


The surgical approach depends on the anatomical location of the tumor and includes

				
median sternotomy for anterior mediastinal pathology	Thoracotomy or VATS for posterior mediastinal pathology	Transcervical (neck incisions) for superior mediastinal pathology.	The middle mediastinum can usually be approached through thoracotomy or VATS.	Increasingly, a robotic or RATS approach is used, particularly for anterior mediastinal tumors such as thymomas.

Anterior mediastinum

- Thymoma
- Lymphoma
- Germ cell tumor (teratoma)
- Thyroid tumor (ectopic)
- Parathyroid tumor (ectopic)
- Liposarcoma (lipoma)
- Lymph node hyperplasia
- Morgagni hernia
- Pericardial cyst
- Angiomatous tumor
- Aneurysm (e.g. ascending aorta/arch)
- Goiter (retrosternal)



Posterior mediastinum

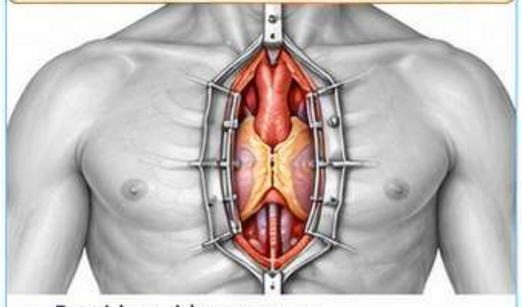
- Neurogenic tumor (schwannoma, neurofibroma, ganglioneuroma)
- Esophageal tumor
- Esophageal diverticulum
- Bronchogenic cyst
- Enteric cyst
- Aneurysm (descending thoracic aorta)

Middle mediastinum

- Bronchogenic cyst
- Bronchogenic tumor
- Lymph node hyperplasia
- Lymphoma
- Pleuropericardial cyst
- Pericardial cyst
- Teratoma (uncommon)

Surgical approach depends on the anatomical location of the tumor and includes

Median sternotomy
(for anterior mediastinal pathology)



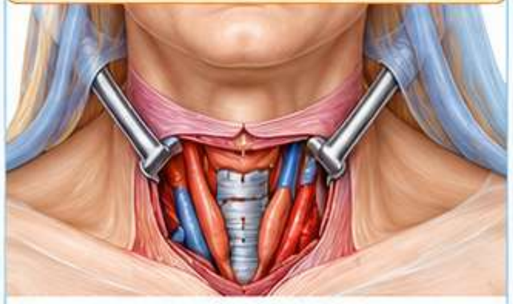
- Provides wide exposure
- Used for most anterior mediastinal masses (e.g. thymoma, germ cell tumors)

Thoracotomy or VATS
(for posterior mediastinal pathology)



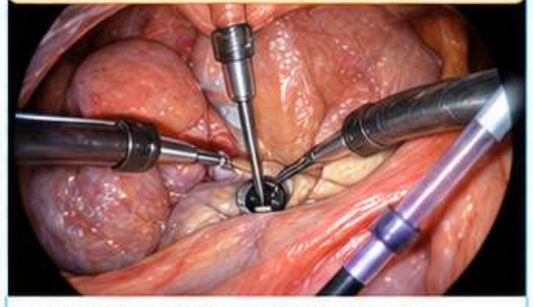
- Used for posterior mediastinal masses (e.g. neurogenic tumors, esophageal tumors)

Transcervical (neck incision)
(for superior mediastinal pathology)



- Used for superior mediastinal masses (e.g. substernal goiter, ectopic thyroid or parathyroid tumors)

Thoracoscopic (VATS)
(for middle mediastinal pathology)



- Used for middle mediastinal masses (e.g. bronchogenic cysts, pericardial cysts)
- Minimally invasive option

Robotic-assisted (RATS)
(especially for anterior mediastinal tumors)

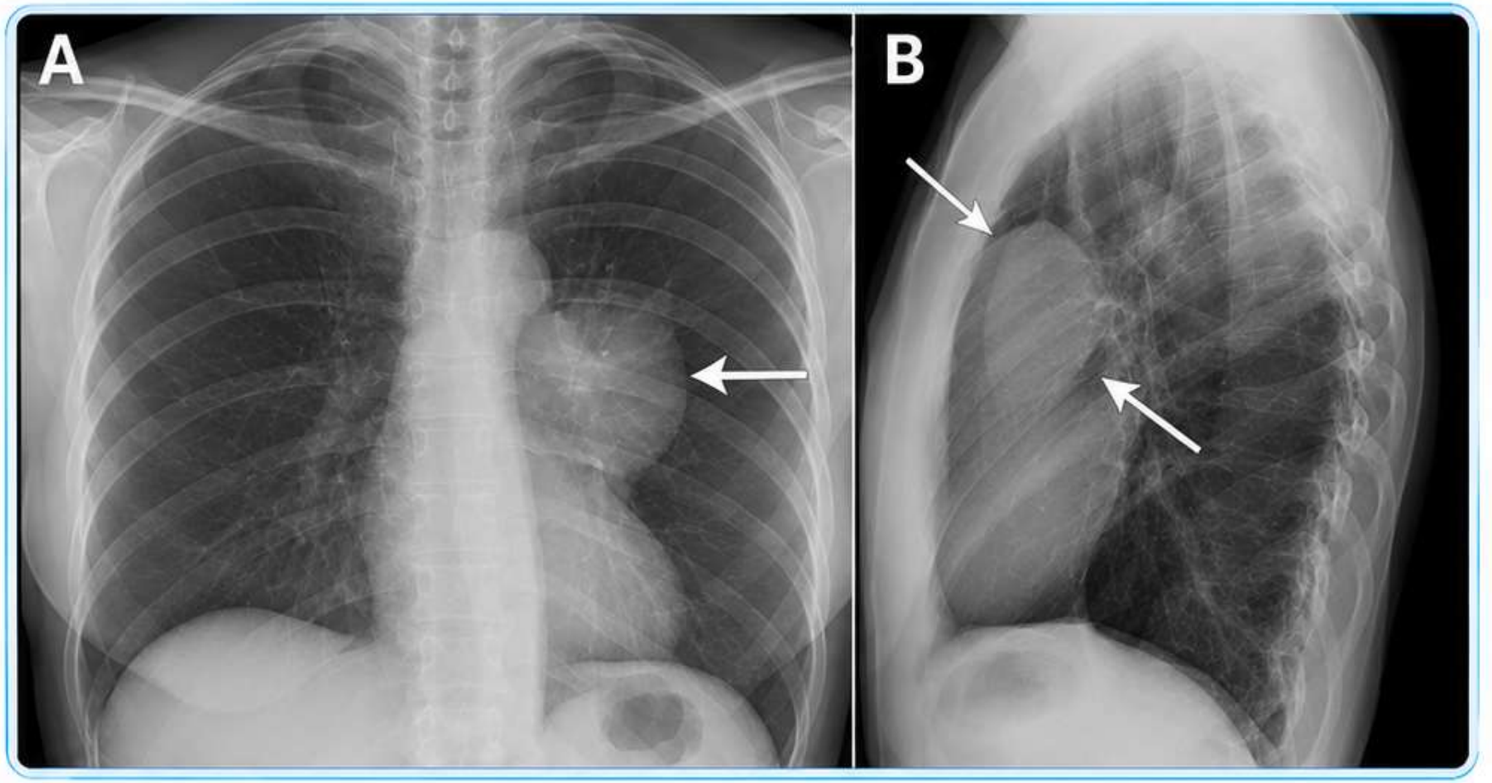


- Increasingly used for anterior mediastinal tumors (e.g. thymomas)
- Provides excellent visualization and minimally invasive access

Case Scenario

History

- A 48-year-old woman presents to the outpatient clinic with a 6-month history of intermittent non-productive cough and mild shortness of breath.
- She also reports fatigue and intermittent discomfort in the anterior chest.
- She has no history of smoking.
- General examination is unremarkable.
- A chest X-ray was performed (shown).



Questions

1. What is the most likely diagnosis based on the chest X-ray findings?
2. What further investigations would you request to confirm the diagnosis and to assess the extent of disease?
3. How would you stage this tumor using an appropriate staging system?
4. What are the main principles of management for this condition?

Primary tumors of the mediastinum:

• Thymoma

- Thymomas are the **most common** thymic epithelial tumor, and approximately **95%** are located in the **anterior mediastinum**.
- They are of surgical interest because **surgical excision** is the primary therapy.
- They have an important association with **myasthenia gravis (MG)**, a disease the clinical course of which can be favorably influenced by thymectomy.
- Thymomas may be completely encapsulated or invasive.

Pathology

- The etiology of thymomas remains undefined without demonstrable risk factors.

Histological classification

- Predominantly lymphocytic
- Predominantly epithelial
- Mixed (most common, ~50%)
- Spindle cell variant (best prognosis)

- Thymomas vary in behavior from benign to aggressively invasive, as reflected in the **Masaoka classification system** (used to stage thymomas) and more recently the **TNM classification**.

Table 41.4 Masaoka-Koga Staging Scheme for Thymoma and Thymic Carcinoma

Masaoka-Koga	Description
Stage I	Encapsulated, tumor may invade into, but not through capsule microscopically.
Stage II	
IIA	Microscopic transcapsular invasion.
IIB	Macroscopic invasion into fat or adherent to but not through pleura or pericardium.
Stage III	Macroscopic invasion of neighboring organs (pericardium, great vessels, lung).
Stage IV	
IVA	Pleural or pericardial dissemination.
IVB	Lymphogenous or hematogenous metastasis.

PRESENTATION

Age
Usually older than 40 years.
No major predominance in men or women.

Symptoms
About **50%** of patients are asymptomatic; the remaining present with either local or systemic symptoms.

Local symptoms
Pain, dyspnea, cough, or hoarseness resulting from locally invasive tumors

Systemic symptoms
Related to associated systemic diseases (especially autoimmune).

Patients with thymomas may present with a number of associated diseases, largely autoimmune in etiology, but the most common associated illness is **MG**. Accumulated experience suggests that **5%** to **15%** of patients with MG are found to have thymomas, and that **30%** to **50%** of thymomas are associated with clinical MG.

Systemic Diseases Most Commonly Associated With Thymoma

- Myasthenia gravis
- Cytopenias (most commonly, red cell hypoplasia)
- Nonthymic malignancies
- Hypogammaglobulinemia
- Systemic lupus erythematosus
- Polymyositis
- Rheumatoid arthritis
- Thyroiditis
- Sjögren syndrome
- Ulcerative colitis



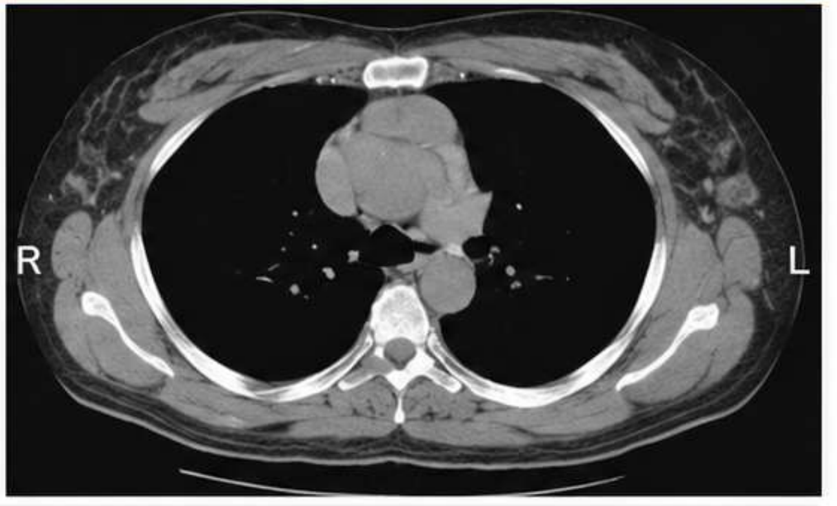
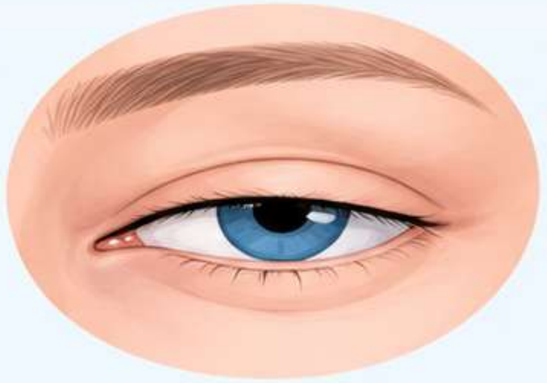


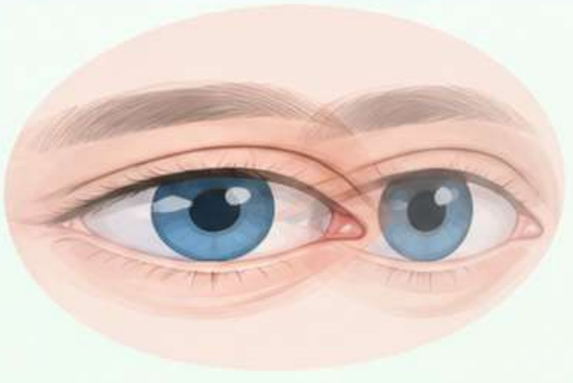
Fig. 41.2 Characteristic CT appearance of a noninvasive thymoma: a well-circumscribed, solid anterior mediastinal mass.

7 Common Symptoms of Myasthenia Gravis

1 Drooping eyelid (ptosis)



2 Impaired vision (diplopia)



3 Changes in facial expressions



4 Speech difficulties (dysarthria)



5 Difficulty chewing or swallowing (dysphagia)



6 Breathing issues (dyspnea)



7 Limb weakness (fatigable weakness)



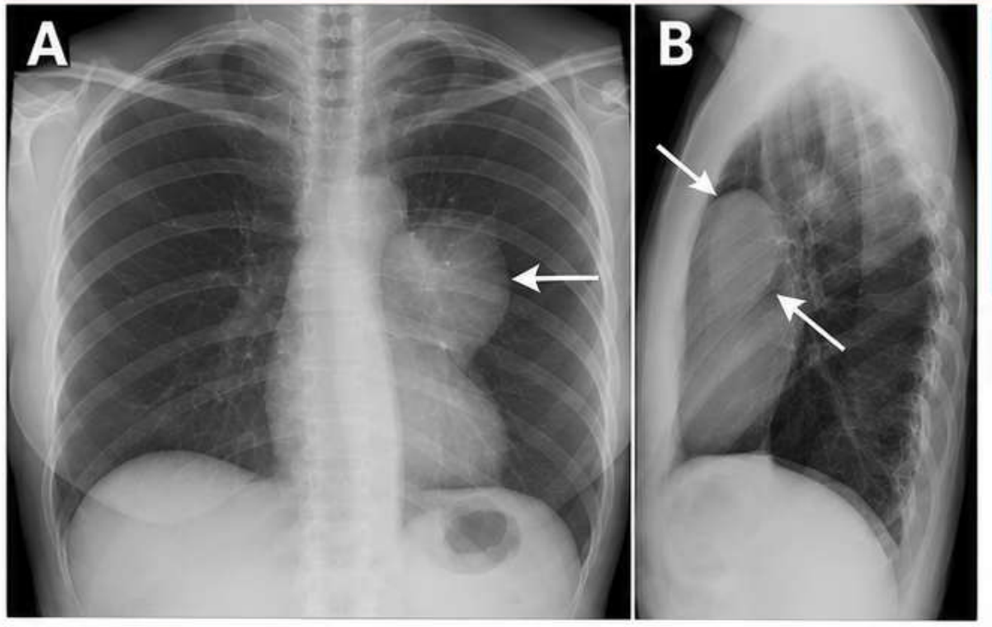
Thymoma: Diagnosis and Management

Most likely diagnosis

- Anterior mediastinal mass consistent with thymoma.

Key points from the images

- Chest X-ray (A): well-circumscribed anterior mediastinal mass (arrow).
- Lateral view (B): retrosternal anterior mediastinal mass (arrows).
- Typical location and appearance for thymoma.



Associated conditions

- Myasthenia gravis (most common)
- Other autoimmune disorders
  (e.g. pure red cell aplasia, hypogammaglobulinemia, SLE, rheumatiod arthritis, thyroiditis, Sjögren syndrome, ulcerative colitis)
- Nonthymic malignancies

Further investigations

- Confirm diagnosis and staging:
  - Contrast-enhanced CT chest (± upper abdomen)
  - MRI (for assessment of invasion)
- Evaluation for Myasthenia gravis:
  - AChR antibodies ± other MG antibodies
  - Pulmonary function tests (if MG suspected)

Masaoka-Koga staging (CT based)



Stage I — Encapsulated, no microscopic capsular invasion



Stage II — **IIA**: Microscopic transcapsular invasion
IIB: Macroscopic invasion into fat or pleura/pericardium



Stage III — Macroscopic invasion of neighboring organs (pericardium, great vessels, lung)

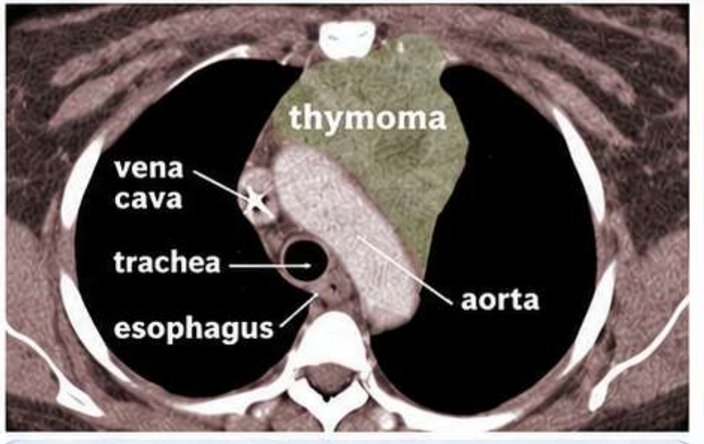


Stage IV — **IVA**: Pleural or pericardial dissemination
IVB: Lymphogenous or hematogenous metastasis

Principles of management

General	• Multidisciplinary team approach (thoracic surgery, oncology, neurology) • Assess and manage associated MG
Preoperative management	• Control of MG (neurology input) • Treat with anti-cholinesterase and/or steroids ± immunosuppression • Consider preoperative radiotherapy in selected cases (e.g. unresectable, SVC obstruction, extensive invasion)
Surgical management	• Complete thymectomy is the mainstay • Preferred approach: median sternotomy (especially for large or invasive tumors)
Adjuvant therapy	• Stage I → thymectomy alone • Stage II & III → thymectomy + radiotherapy • Stage IV → surgery + radiotherapy ± chemotherapy

Imaging example (CT scan)



Contrast-enhanced CT showing a well-circumscribed anterior mediastinal mass consistent with thymoma.

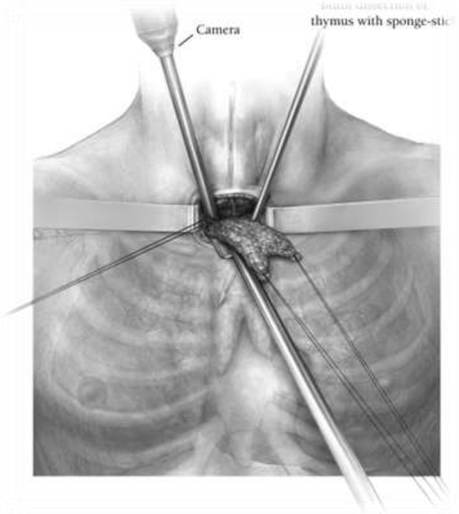
Techniques of thymectomy:

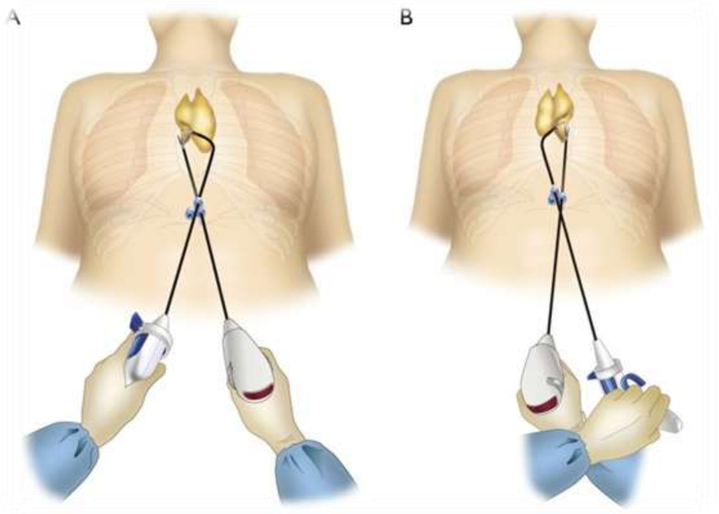
Transcervical thymectomy:

Collar incision

Transsternal thymectomy

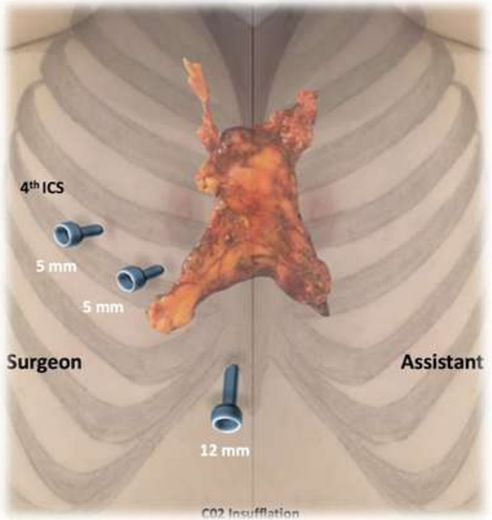
Full sternotomy



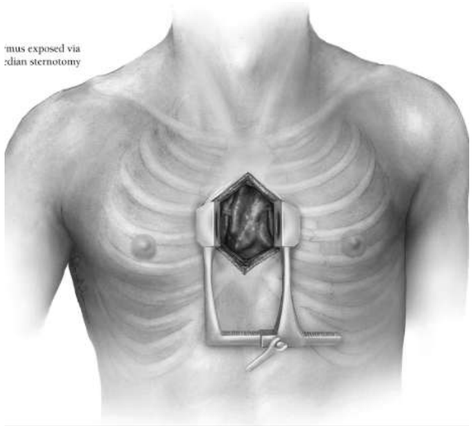


Maximal transcervical – transsternal thymectomy:

Combines a horizontal cervical incision with a median sternotomy to allow removal of all thymic tissue predictably.



VATS thymectomy.



Case Scenario: Mediastinal Lymphoma

Clinical Presentation

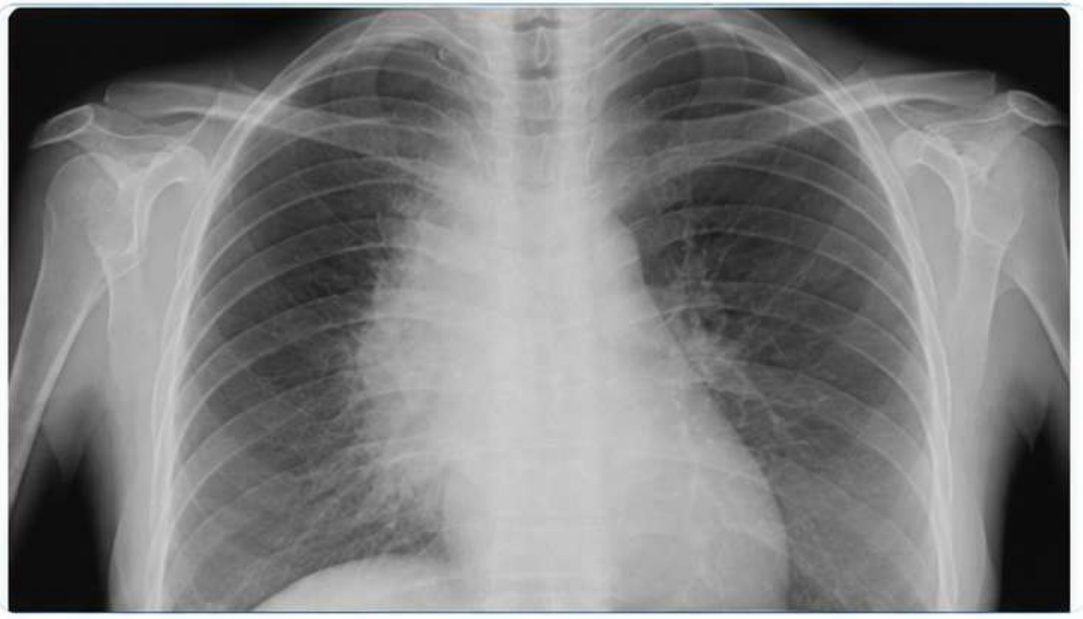
A 26-year-old woman presents with a 3-month history of progressive dry cough, shortness of breath, and intermittent chest discomfort.

She also reports unexplained weight loss, night sweats, and occasional low-grade fever.

On examination, she has palpable, painless cervical lymphadenopathy.

Chest auscultation reveals reduced air entry over the right upper chest.

A chest X-ray is performed (shown).



Chest X-ray: Mediastinal widening with a prominent right-sided mediastinal opacity.

Questions

1. What is the most likely diagnosis based on the clinical presentation and chest X-ray findings?
2. Describe the abnormal radiological findings and identify the likely anatomical compartment involved.
3. What further investigations are required to establish the diagnosis and determine the extent of disease?
4. What is the role of tissue biopsy, and which biopsy technique would you prefer?
5. What are the main principles of management of this patient?
6. What potentially life-threatening complications may occur with a large mediastinal mass?

LYMPHOMA

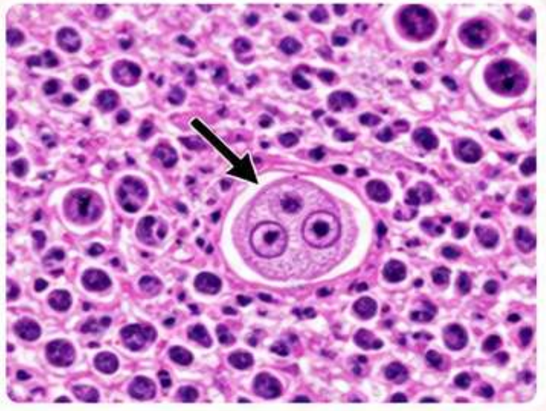
Hodgkin's lymphoma (HL)

Epidemiology

- More common in young adults (15–35 years) and >55 years
- Slight male predominance

Pathological features

- Nodular sclerosis (most common)
- Lymphocyte predominant
- Lymphocyte depleted
- Mixed cellularity



Reed–Sternberg cell ("owl's eye" appearance)

Clinical features



- Painless lymphadenopathy (cervical, mediastinal)
- "B symptoms": fever, night sweats, weight loss
- Itching
- Often presents with a mediastinal mass in young adults

Diagnosis



- Excisional lymph node biopsy (preferred)
- Histology and immunohistochemistry (CD15+, CD30+, PAX5 weak+)
- Staging: PET-CT (preferred)

Treatment



- Stage-based chemotherapy (ABVD)
- Radiotherapy in selected cases (early-stage bulky disease)
- Surgery limited to diagnostic biopsy

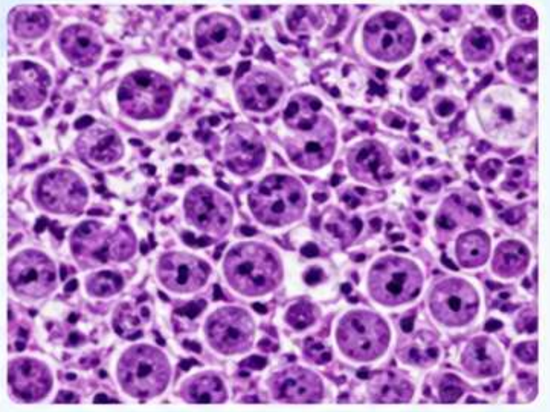
Non-Hodgkin's lymphoma (NHL)

Epidemiology

- Can occur at any age (most common in older adults)
- Slight male predominance

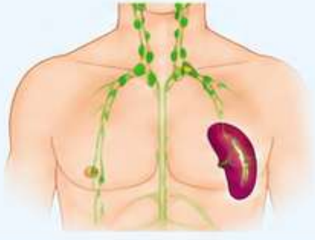
Pathological features

- Lymphoblast morphology (~60%)
- Large cell morphology (~40%)



Diffuse large B-cell lymphoma (typical morphology)

Clinical features



- Painless lymphadenopathy (cervical, axillary, inguinal)
- B symptoms
- May present with extranodal disease (e.g. GI tract, CNS, bone marrow, skin)
- Mediastinal mass can occur (e.g. primary mediastinal large B-cell lymphoma)

Diagnosis



- Excisional lymph node biopsy
- Histology and immunophenotyping (B- or T-cell markers)
- Staging: PET-CT (preferred)
- Bone marrow biopsy in selected cases

Treatment



- Chemotherapy ± rituximab (e.g. R-CHOP for diffuse large B-cell lymphoma)
- Radiotherapy in selected cases
- Surgery limited to diagnostic biopsy and management of complications

Lymphoma – Clinical Presentation

Overview

- Only 5–10% of patients present with symptoms due to local mass effect.
- Common symptoms include chest pain, cough, dyspnea, and superior vena cava (SVC) obstruction.

1 General (Systemic) Symptoms



- **Fever** (unexplained, intermittent)
- **Night sweats** (drenching)
- **Weight loss** (>10% of body weight in 6 months)
- **Fatigue and malaise**

2 Local (Mediastinal Compression) Symptoms



- Result from mass effect of the tumor in the **anterior mediastinum** (common in **Hodgkin lymphoma**, especially nodular sclerosis type).

3 Other Manifestations

- **Painless lymphadenopathy** in cervical or supraclavicular region
- **Pleural effusion** or **pericardial effusion** (if tumor extends)
- **Paraneoplastic symptoms** (rare)

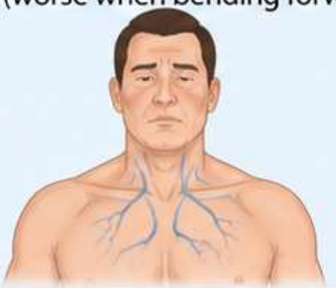
A Respiratory Symptoms

- **Cough** (dry, persistent)
- **Dyspnea** (worse when lying flat (orthopnea))
- **Wheezing** or **stridor** due to **tracheal compression**
- **Chest pain** or **tightness** (due to pressure or invasion)



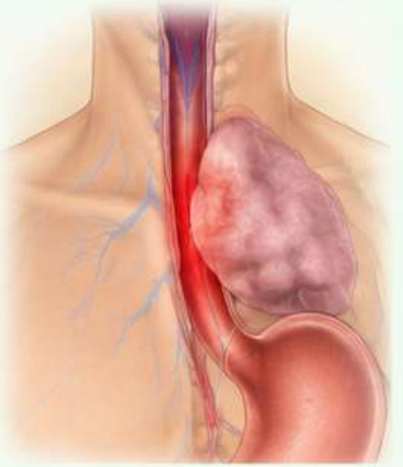
B Superior Vena Cava (SVC) Obstruction

- Facial swelling and neck vein distension
- Upper limb swelling
- Cyanosis or plethora of face and upper chest
- Dilated **veins** over chest wall
- Headache, dizziness (worse when bending forward)



C Esophageal Compression

- **Dysphagia** (difficulty in swallowing)



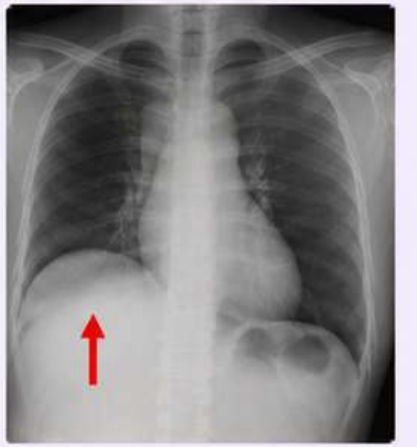
D Recurrent Laryngeal Nerve Compression

- **Hoarseness** of voice



E Phrenic Nerve Involvement

- **Hiccups** or elevated hemidiaphragm



HODGKIN'S LYMPHOMA

- **Epidemiology:** young adults 20-30, older 50-70
- Malignant lymphoma that is typically of B-cell origin
- **Etiology:**
  Immunosuppression(e.g., HIV)
  EBV infection
  Autoimmune diseases
- **Clinical features:**
  -Adenopathy (painless)-localized above the diaphragm,
  -Contiguous spread
  -Lymph nodes in upper portion of the body (the neck, underarms, or chest).
  -B symptoms
  -Pel-Ebstein fever
  -Alcohol-induced pain: Pain in involved lymph nodes
  -Pruritus: (focal or generalized)

- Usually no hepatosplenomegaly
  (Rare but might occur if the spleen or liver are involved)
- No leukemic phase
- Reed sternberg cell



- Prognosis: Good
- ABVD , BEACOPP

DIFFERENTIAL DIAGNOSIS OF B SYMPTOMS

- Non-Hodgkin lymphomas
- Hodgkin lymphomas
- Other hematopoietic malignancies (e.g. CML,ALL)
- Solid tumors
- Tuberculosis
- HIV

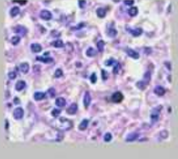
NON- HODGKIN'S LYMPHOMA

- **Epidemiology:** Increases with age (peak > 50 years)
- **Etiology:**
  Infections (HIV, EBV, HTLV-1, HCV, H. Pylori)
  Autoimmune diseases (e.g., Hashimoto thyroiditis, rheumatic disease)
  Chromosomal translocation t(14:18)
- **Types:** Classification based on:
  -Cell type (B cell, T cells,natural killer (NK) cells)
  -Location -(nodal or extranodal)
  -Tumor grade

- Adenopathy + Extranodal (Multiple lymph node groups)
  Lymph nodes throughout the body, but can also arise in normal organs
  Noncontiguous spread

- **Clinical features:**
  -Nodal disease: B symptoms, lymphadenopathy, mass, Hepatosplenomegaly, cytopenias(bleeding)
  -Extranodal disease :GI, neuro, cutaneous involvement
- + leukemic phase
- + hepatosplenomegaly

- Histology: Majority are neoplastic cells of B-cell lineage



- Prognosis: Worse (↑ LDH, ↑ beta2 microglobulin)
- CHOP, radiotherapy

@rav7ks

Germ Cell Tumour (Mediastinal)

Key points

- The anterior mediastinum is the most common site of extragonadal germ cell tumours.
- They account for ~13% of all mediastinal masses and cysts.
- Contain elements from all three germ cell layers (mesoderm, endoderm and ectoderm).
- Usually occur in young adults.
- Approximately 75% are benign and cystic.

Clinical features

- Often asymptomatic and discovered incidentally.
- May present with symptoms due to mass effect:
  - chest pain
  - cough
  - dyspnea
  - superior vena cava (SVC) obstruction.

Imaging

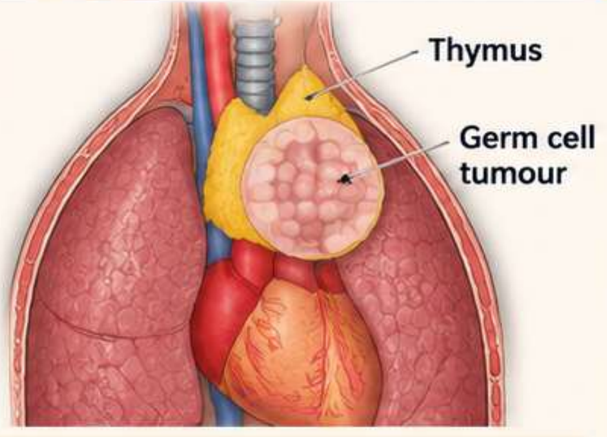


Contrast-enhanced CT: large anterior mediastinal mass with mixed solid and cystic components, consistent with germ cell tumour.

Pathology

- Arise from primordial germ cells.
- Contain elements from all three germ cell layers (mesoderm, endoderm and ectoderm).
- Types include:
  - Teratoma (most common, usually benign, cystic)
  - Malignant non-seminomatous germ cell tumours (e.g. yolk sac tumour, embryonal carcinoma, choriocarcinoma, mixed)
  - Seminoma (rare in mediastinum)

Pathogenesis



Typical location: **anterior mediastinum**

Tumour markers

- Malignancy is suspected if elevated levels of:
  - Alpha-fetoprotein (AFP)
  - Beta-human chorionic gonadotropin (β-hCG)
  - Carcinoembryonic antigen (CEA)
- Useful for diagnosis, monitoring response to therapy and detecting recurrence.

Management

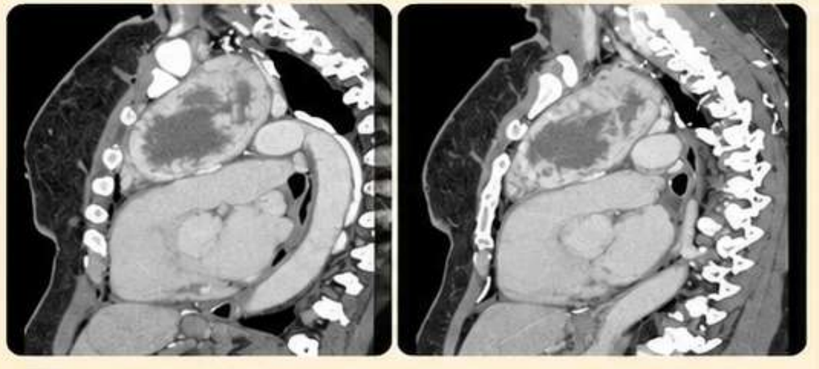
- Benign lesions (e.g. mature teratoma): complete surgical excision (recommended even if asymptomatic to prevent complications).
- Malignant non-seminomatous tumours: platinum-based chemotherapy (e.g. BEP: bleomycin, etoposide, cisplatin).
- Surgical resection if residual mass persists after chemotherapy and tumour markers normalize.
- If tumour markers fail to normalize, further chemotherapy is indicated.

Other Mediastinal Masses – Thyroid and Neurogenic Tumours

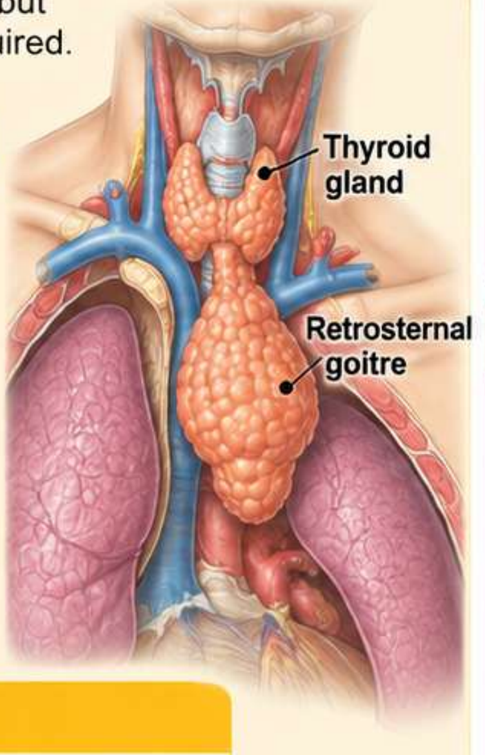
Thyroid

- Ectopic thyroid (and parathyroid) tissue may be found in the anterior mediastinum, but usually the mass is an extension of a thyroid lesion (retrosternal goitre).
- Excision of retrosternal thyroids may be required if there is local airway compression and stridor.
- Can be performed via a transcervical incision, but occasionally a median sternotomy may be required.

Imaging



CT scan (sagittal views) showing a large retrosternal goitre extending from the cervical thyroid gland into the anterior mediastinum.



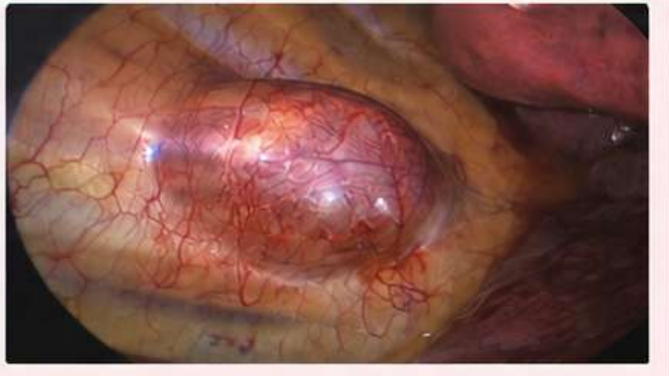
Key management points

- Transcervical excision in most cases.
- Median sternotomy may be required for very large goitres or significant mediastinal extension.

Neurogenic tumours

- Arise from the sympathetic nervous system or peripheral nerves.
- More prevalent in the posterior mediastinum.
- May be painful but are more often discovered incidentally on routine chest radiography and can be quite large.
- Include neuroblastoma (childhood), schwannomas and neurofibromas (adults), which are usually benign.
- Phaeochromocytoma arises from sympathetic chain and produces the characteristic endocrine syndrome.
- Excision is generally recommended, particularly if the patient is developing symptoms.
- Can be performed through a thoracotomy; for smaller tumours a VATS approach can be used.

Intraoperative (VATS) appearance



Video-assisted thoracoscopic surgery (VATS) image of a neurogenic tumour attached to the posterolateral chest wall prior to excision.

Key features

- Posterior mediastinum location.
- Often asymptomatic.
- Radiology: well-circumscribed posterior mediastinal mass.
- Types: neuroblastoma (childhood), schwannoma, neurofibroma (adults), phaeochromocytoma.
- Treatment: surgical excision (thoracotomy or VATS).

Case Scenario: Mediastinal Mass

Clinical scenario

A 58-year-old man presents with progressive facial and neck swelling for 3 weeks. He reports shortness of breath, cough, and a feeling of fullness in the head, especially when lying flat. He also complains of headache and dizziness.

Examination findings



- Facial and periorbital oedema
- Distended neck veins
- Plethora of the face and upper chest
- Engorged superficial chest wall veins
- Bilateral upper limb oedema
- Dyspnea (worse when lying flat)
- No focal neurological deficit

Investigations



Chest X-ray showing widening of the superior mediastinum with a right paratracheal opacity.

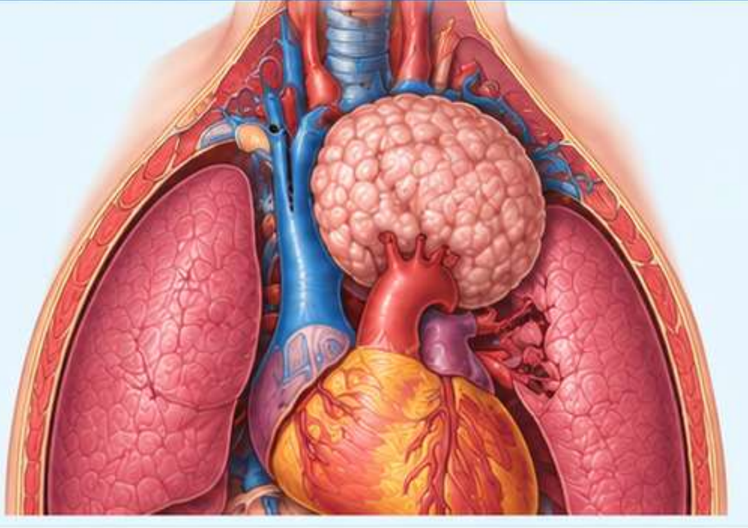


Contrast-enhanced CT scan of the chest showing a large anterior mediastinal mass with mass effect on adjacent mediastinal structures.

Questions (Student Challenge)

1. What is the most likely diagnosis based on the clinical presentation and imaging findings?
2. Explain the mechanism of the patient's facial and upper body swelling.
3. List the main clinical features seen in this condition.
4. What investigations are required to confirm the diagnosis and determine the extent of disease?
5. Discuss the principles of management in this patient.

Anatomical illustration



Superior Vena Cava (SVC) Obstruction / SVC Syndrome

Definition

- Partial or complete obstruction of blood flow through the **superior vena cava (SVC)** to the **right atrium**, leading to **venous congestion** in the head, neck, and upper limbs.

Causes

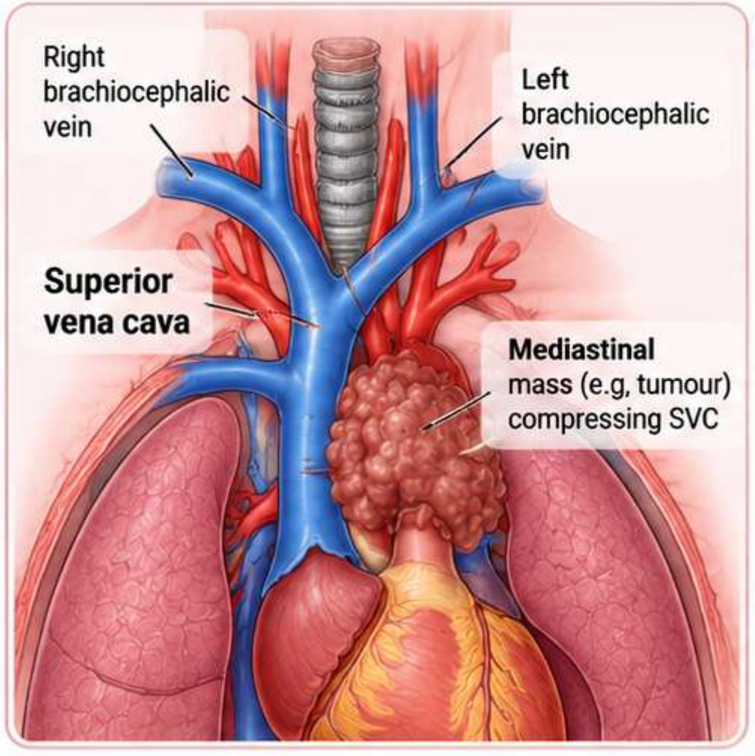
1 Malignant (≈80–90%)

- **Bronchogenic carcinoma** (especially small-cell lung cancer) – most common
- **Lymphoma** (especially non-Hodgkin's lymphoma)
- **Metastatic mediastinal tumours**
- **Thymoma**

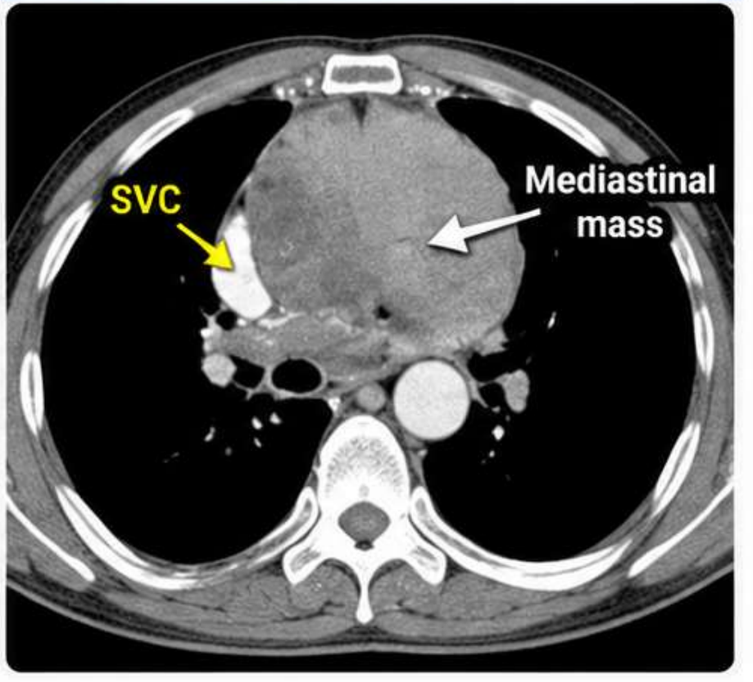
2 Benign (≈10–20%)

Thrombosis due to:

- Central venous catheters or pacemaker leads
- Fibrosing mediastinitis (post-radiation, histoplasmosis, TB)
- Post-surgical scarring



CT scan (mediastinal mass with SVC obstruction)



Clinical features (venous congestion)

- Facial and periorbital oedema
- Distended neck veins
- Plethora of the face and upper chest
- Engorged superficial chest wall veins
- Bilateral upper limb oedema
- Headache, dizziness, dyspnea (worse when lying flat)
- No focal neurological deficit

Investigations

- Chest X-ray (widened mediastinum)
- Contrast-enhanced CT chest (to identify cause and extent)
- ± PET-CT (for malignancy staging)
- Venography (if intervention planned)
- Tissue diagnosis (biopsy) according to the suspected cause

Management (principles)

- Treat the underlying cause (e.g. chemotherapy, radiotherapy, or surgical resection for tumours)
- Endovascular stenting (for severe or refractory cases)
- Anticoagulation if thrombosis
- Symptomatic measures: head elevation, oxygen, analgesia, diuretics (selected cases)
- Surgical bypass (rarely, for selected cases)

Pathophysiology and Manifestations of SVC Obstruction

1. Obstruction
Impaired venous flow through the superior vena cava.

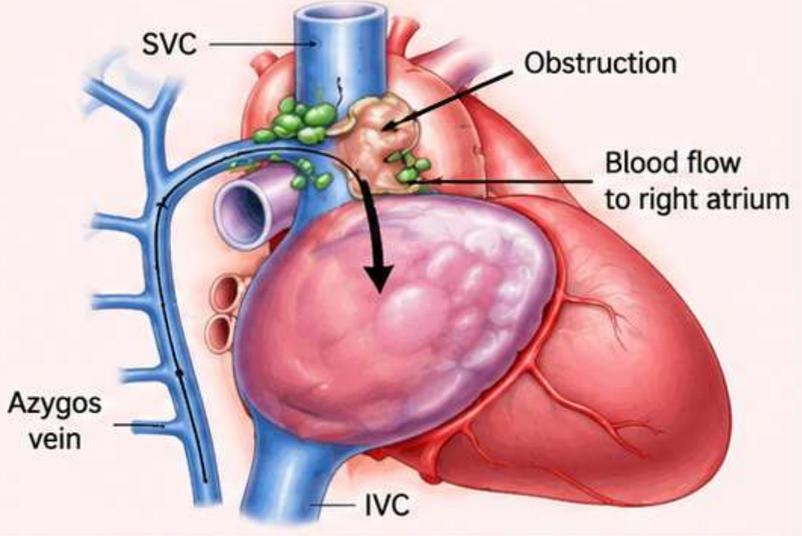
2. Increased venous pressure
↑ Venous pressure in the head, neck and upper limbs proximal to the obstruction.

3. Venous dilation and oedema
Dilation of collateral veins, fluid extravasation → facial and upper limb oedema.

4. Collateral circulation
Development of alternative venous pathways (e.g. azygos system, chest wall and vertebral plexus).

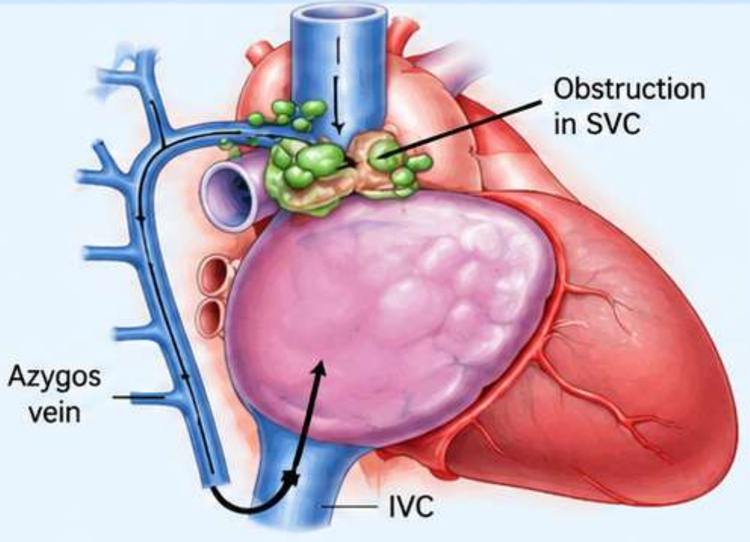
5. Venous return from lower body
Usually unaffected as it drains via the inferior vena cava.

A. Obstruction above junction of SVC and azygos vein (distal to entrance of SVC)



Manifestations of supra-azygos SVC obstruction
- Distended veins in the head, neck and upper limbs
- Facial and upper limb oedema
- Congested mucous membranes (e.g. mouth)
- Dilated, tortuous chest wall veins (collaterals)

B. Obstruction in SVC (proximal to entrance of SVC)



Manifestations of infra-azygos SVC obstruction
- More severe symptoms (all features on the left)
- Prominent chest wall and abdominal collaterals (e.g. via azygos system)
- Dilation of collateral veins on anterior and posterior abdominal wall
- Blood flow drains into IVC and then to the heart

Key points
- SVC obstruction leads to increased venous pressure in structures draining to the right atrium.
- Causes venous dilation, oedema and collateral circulation in the upper body.
- Venous return from the lower body is usually unaffected.
- The level of obstruction (above or below the azygos vein) determines the pattern and severity of manifestations.

Common causes
- Malignant: bronchogenic carcinoma, lymphoma, metastatic tumours, thymoma.
- Benign: thrombosis (central venous catheters or pacemaker leads), fibrosing mediastinitis (post-radiation, histoplasmosis, TB), post-surgical scarring.

Clinical Features of a Mediastinal Mass (SVC Syndrome)

Symptoms

- **Facial swelling** and fullness
- **Neck** and **upper limb swelling**
- **Dyspnea, cough, orthopnea**
- **Headache, dizziness, visual disturbances** (due to cerebral oedema)
- **Dysphagia or hoarseness** (compression of oesophagus or recurrent laryngeal nerve)

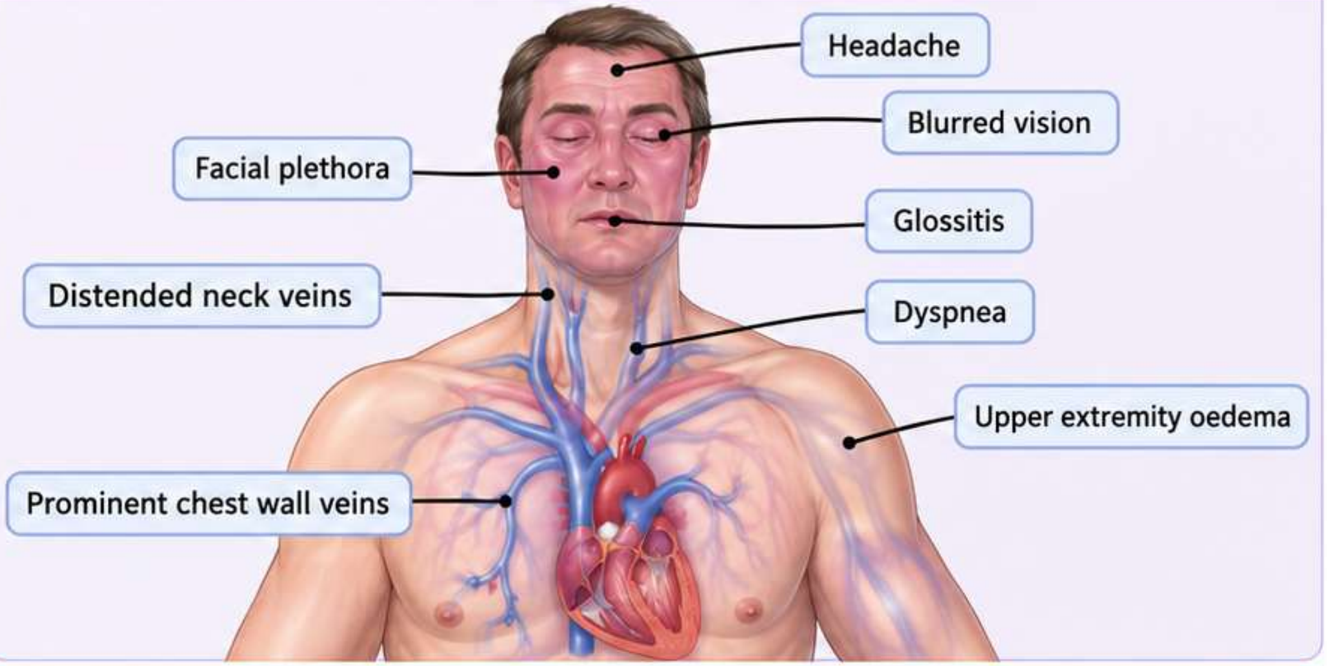
Signs

- **Distended neck veins** and **chest wall veins**
- **Facial plethora and oedema**
- **Cyanosis** of face, neck and upper chest
- **Non-pulsatile elevated jugular venous pressure**

Severe / Late Features

- **Stridor** (airway compression), **confusion, coma** (in severe cases)

Common Clinical Features



Clinical Appearance





Investigations

Chest X-ray

- Mediastinal widening or mass
- Collateral vessels



CT scan (chest with contrast)

- Defines level, cause, and extent of obstruction
- Evaluates collateral veins



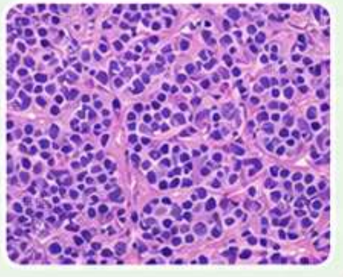
MRI venography (if CT contraindicated)

- Evaluates venous anatomy
- Assess extent of obstruction and collateral pathways



Biopsy (lymph node or mediastinal mass)

- For histological diagnosis (essential before therapy)



Management

Emergency Measures (for symptomatic relief)

- Elevate head end to reduce venous pressure
- Oxygen therapy
- Corticosteroids (if lymphoma suspected)
- Diuretics (for symptomatic relief)

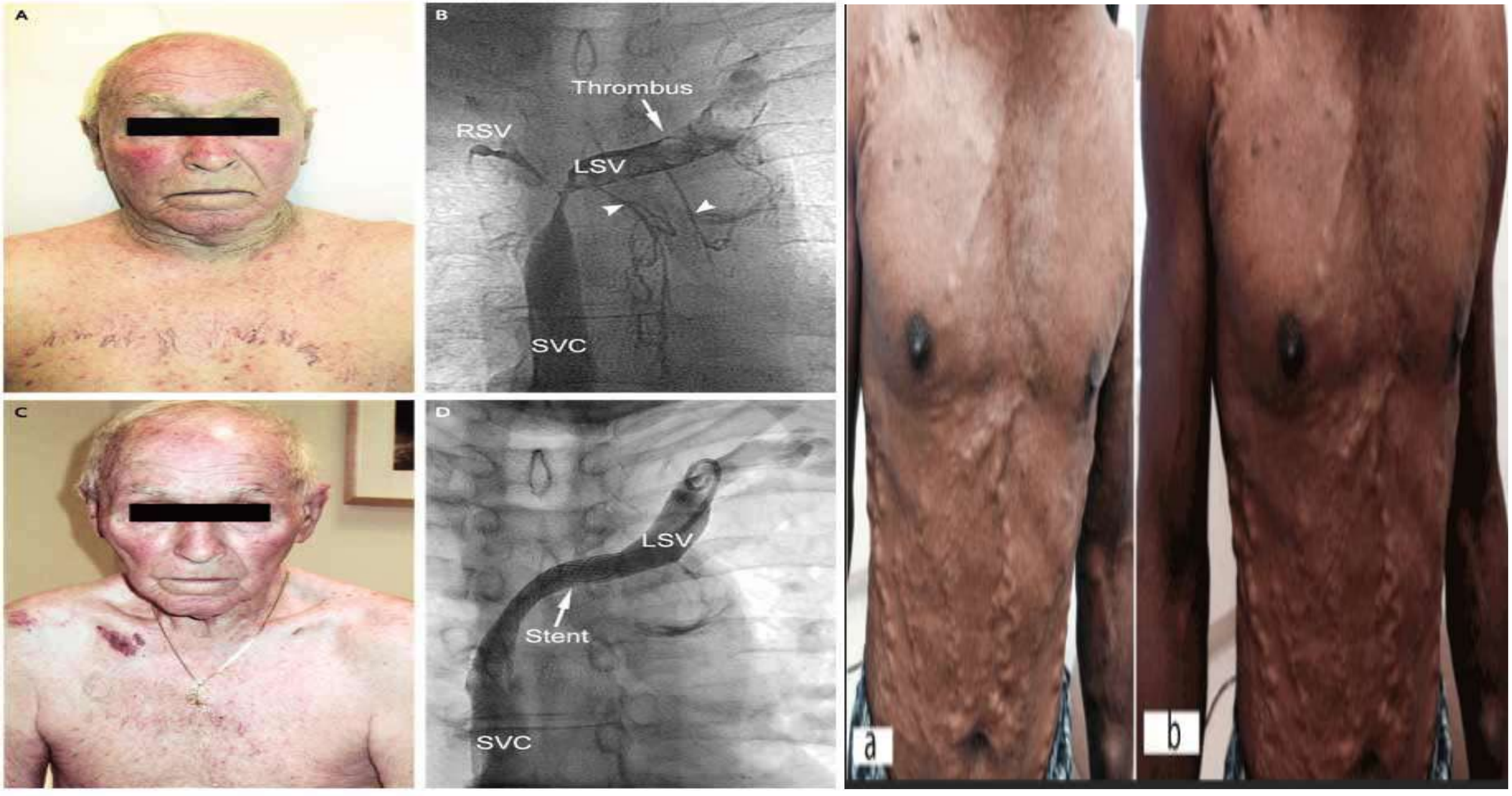
Definitive Treatment (depends on cause)

Malignant causes

- Chemotherapy (e.g. small-cell lung cancer, lymphoma)
- Radiotherapy (if urgent relief needed)
- Endovascular stenting (for rapid symptom relief)
- Anticoagulation (if thrombotic component)

Benign causes

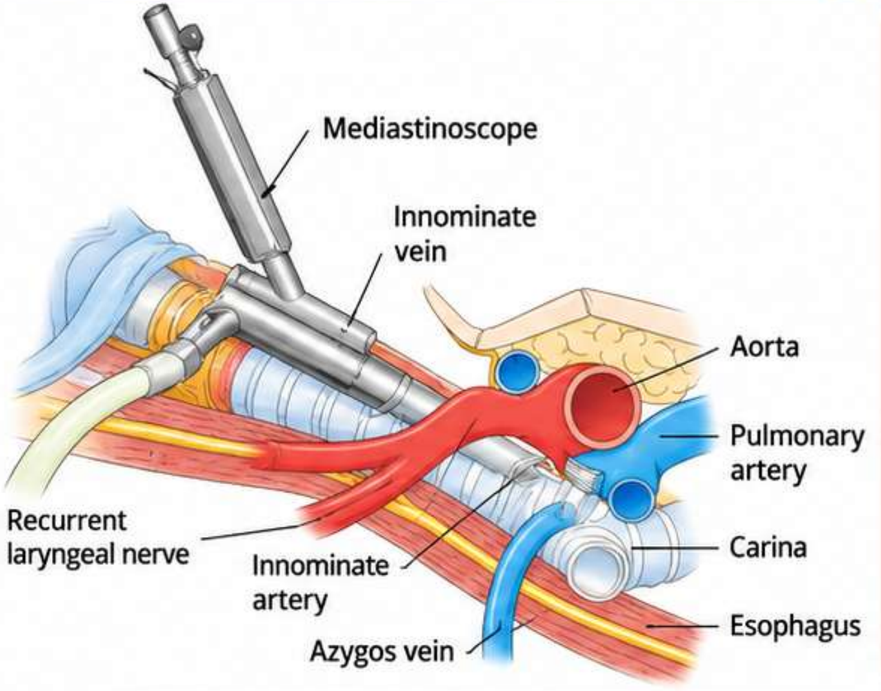
- Anticoagulation or thrombolysis (for thrombosis)
- Balloon angioplasty and stenting
- Surgical bypass (rare, last resort)
- Treat underlying cause (e.g. fibrosing mediastinitis)


A
B
Thrombus
RSV
LSV
SVC
C
D
LSV
Stent
SVC
a
b

Mediastinoscopy

Definition

- Minimally invasive surgical procedure to visualize and biopsy lymph nodes and structures in the superior and anterior mediastinum.
- Performed through a small suprasternal incision using a mediastinoscope.





Mediastinoscopy. The mediastinoscope slides down immediately in front of the trachea, behind the aortic arch, and between the great vessels of the head and neck.

Indications

- Tissue diagnosis and staging of mediastinal lymphadenopathy (e.g. lung cancer, lymphoma).
- Assessment of mediastinal masses.
- Detection of metastases.
- Evaluation of granulomatous diseases (e.g. tuberculosis, sarcoidosis).

Technique (steps)

1. Small suprasternal incision above the sternal notch.
2. Blunt dissection to pretracheal space.
3. Insertion of mediastinoscope behind the sternum, in front of trachea, between great vessels.
4. Visualisation of mediastinal structures and lymph node sampling/biopsy.
5. Specimens sent for histology.

Advantages and Limitations

Advantages

- Direct visualisation and targeted biopsy.
- High diagnostic yield.
- Useful for staging.

Limitations

- Limited to superior and anterior mediastinum.
- Invasive procedure (requires general anaesthesia).
- Cannot access posterior mediastinum or para-aortic nodes.

Case Scenario: Use of Mediastinoscopy in Lung Cancer

Patient Presentation



62-year-old man

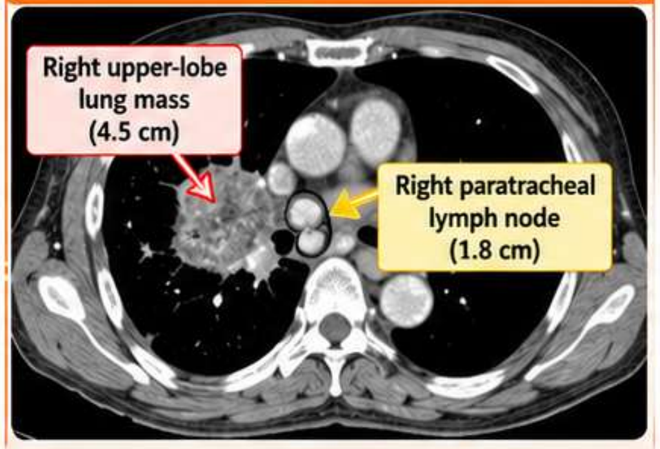


Heavy smoker
(40 pack-years)



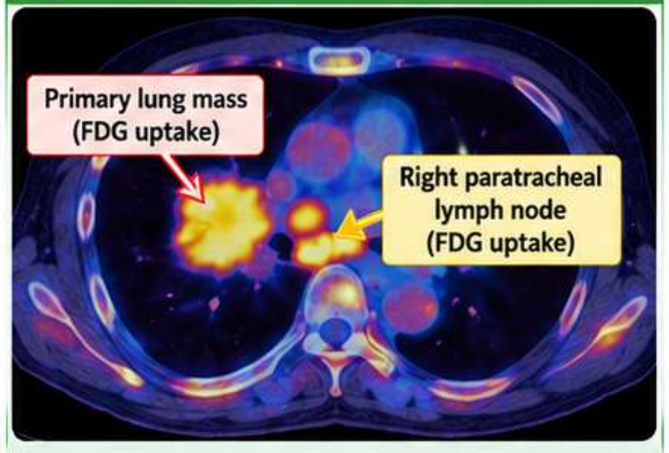
- Persistent cough
- Intermittent hemoptysis
- Unintentional weight loss (3 months)

Chest CT



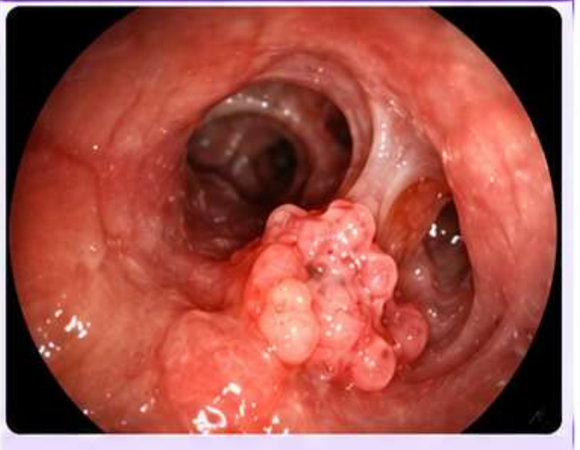
CT shows a 4.5 cm right upper-lobe lung mass with enlarged right paratracheal lymph node (station 4R, 1.8 cm).

PET-CT



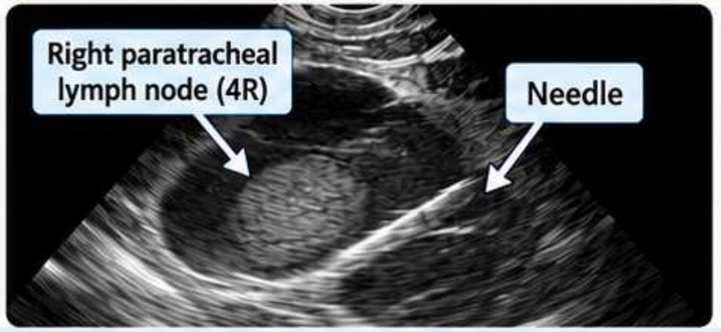
PET-CT shows increased FDG uptake in the primary lung mass and right paratracheal lymph node. No distant metastasis.

Bronchoscopy with biopsy



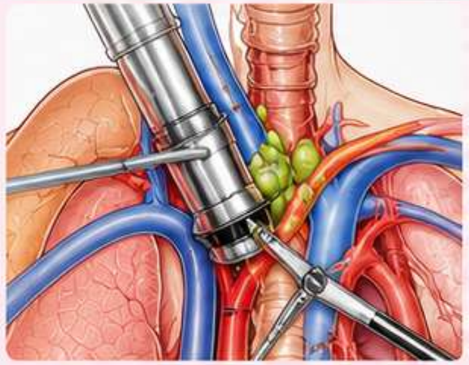
Bronchoscopic biopsy confirms non-small-cell lung carcinoma (NSCLC).

EBUS-TBNA



EBUS-TBNA is performed, but the lymph-node sample is insufficient for a definitive diagnosis.

Mediastinoscopy



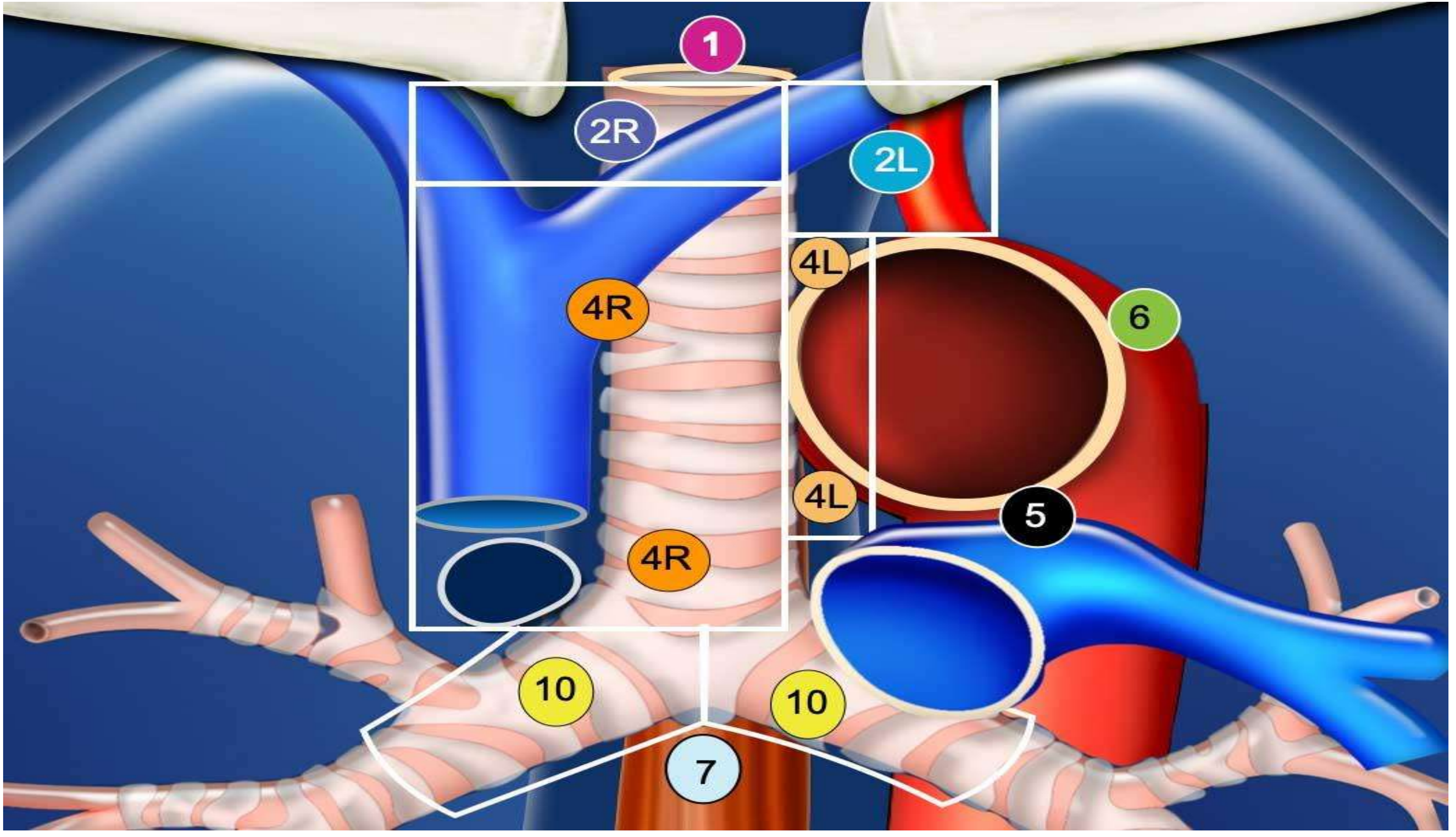


Mediastinoscopy is performed to obtain a tissue sample from the mediastinal lymph nodes.

Management Plan



The thoracic surgical team considers mediastinoscopy before deciding on definitive treatment.

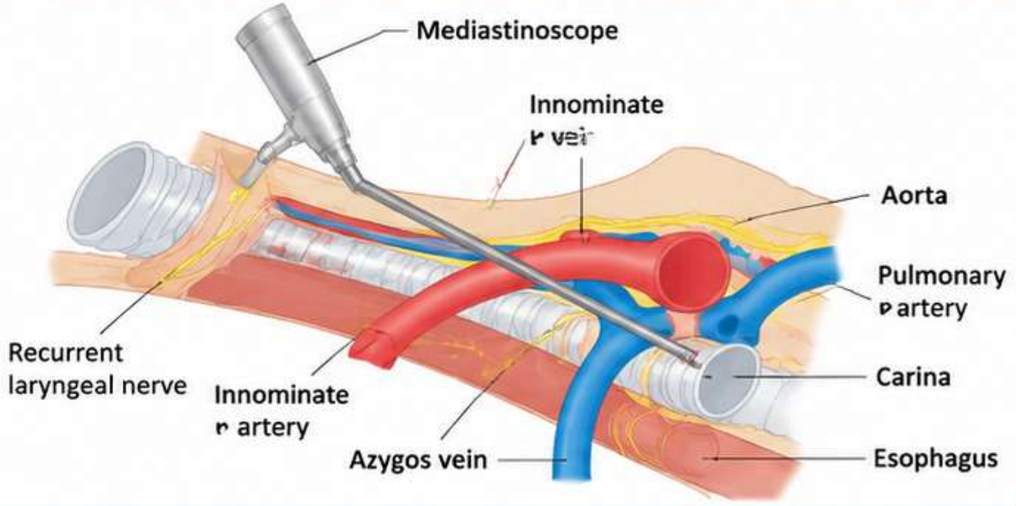

1
2R
2L
4L
4R
6
4L
5
4R
10
10
7

Mediastinoscopy is a surgical procedure that enables **visualisation** of the contents of the mediastinum, usually for the purpose of **obtaining a biopsy**.

Mediastinoscopy is often used for **staging of lymph node in lung cancer** or for diagnosing other conditions affecting structures in the mediastinum such as **sarcoidosis or lymphoma**.

Mediastinoscopy is used to explore the **superior and middle part of the mediastinum**.

Anatomical approach



Operative photograph



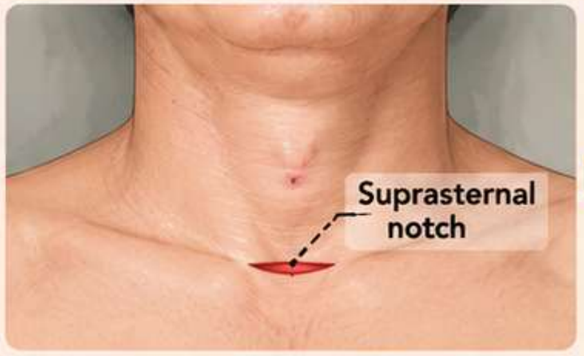
Mediastinoscopy – Procedure (Steps)

1 Setting and anaesthesia



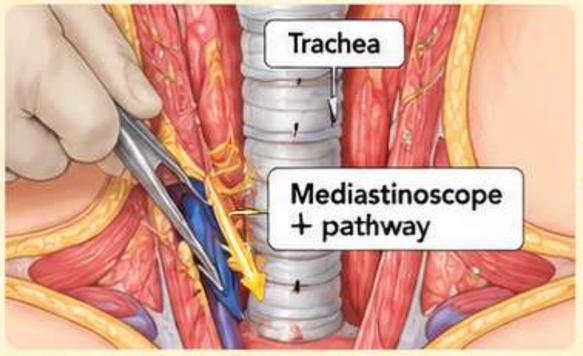
- Performed in a hospital under general anaesthesia.

2 Incision



- A small incision is made, usually just below the neck or at the notch at the top of the sternum.

3 Dissection



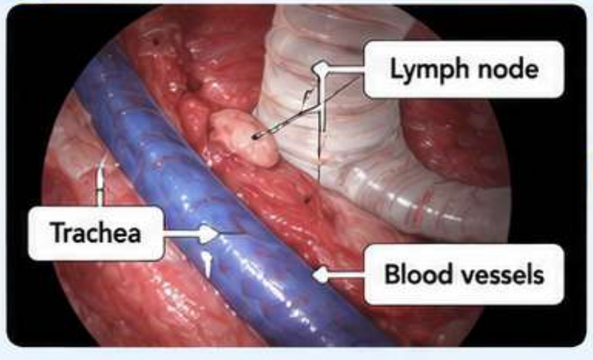
- The surgeon may clear a path and feel the person's lymph nodes first to evaluate any abnormalities.

4 Insertion of mediastinoscope



- The mediastinoscope is inserted through the incision.

5 Visualization



- The scope is a narrow, hollow tube with an attached light that allows the surgeon to see inside the area.

6 Biopsy



- The surgeon can insert tools through the hollow tube to help perform biopsies.

7 Tissue sampling



- A tissue sample from the lymph nodes or a mass can be removed and sent for study under a microscope, or to a laboratory for further testing.

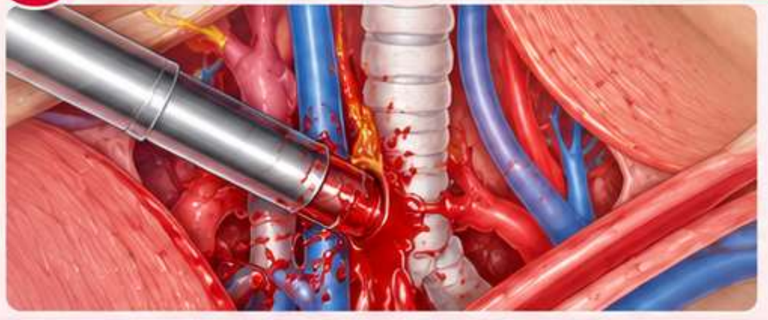
8 Key point

Mediastinoscopy is a safe, thorough, and cost-effective diagnostic tool with less risk than some other procedures.

Mediastinoscopy – Risks and Complications

Complications from mediastinoscopy are relatively rare.
The overall complication rates in various studies have been reported in the range of **1.3–3%**.
However, the following complications, in decreasing order of frequency, have been reported:

1 Haemorrhage



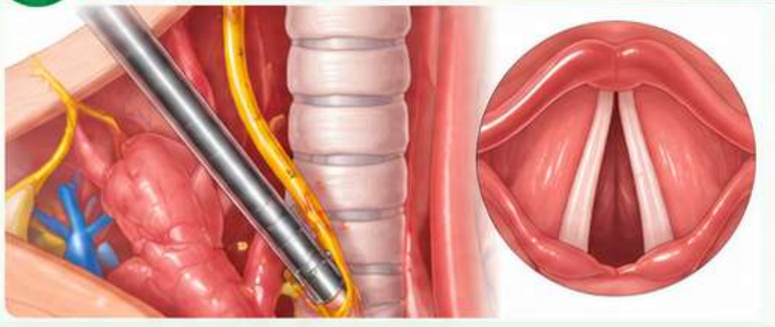
Bleeding from mediastinal vessels (e.g. veins, small arteries).

2 Pneumothorax



Air in the pleural space due to pleural injury.

3 Recurrent laryngeal nerve injury



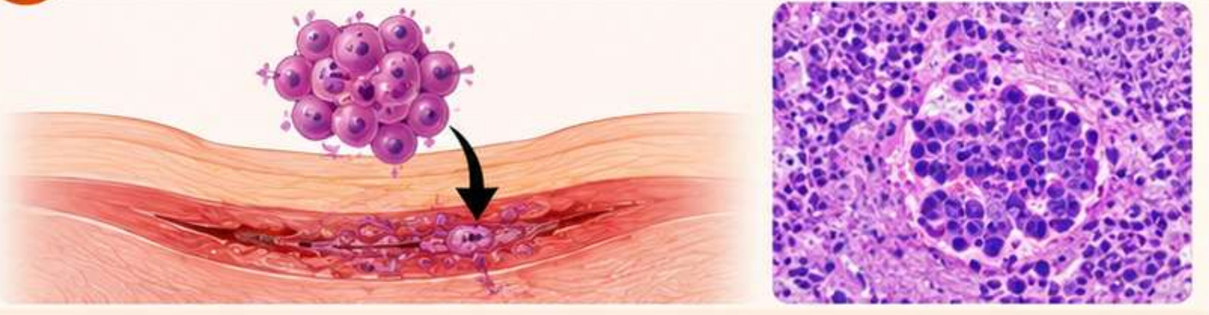
Injury to the recurrent laryngeal nerve, causing hoarseness.

4 Infection

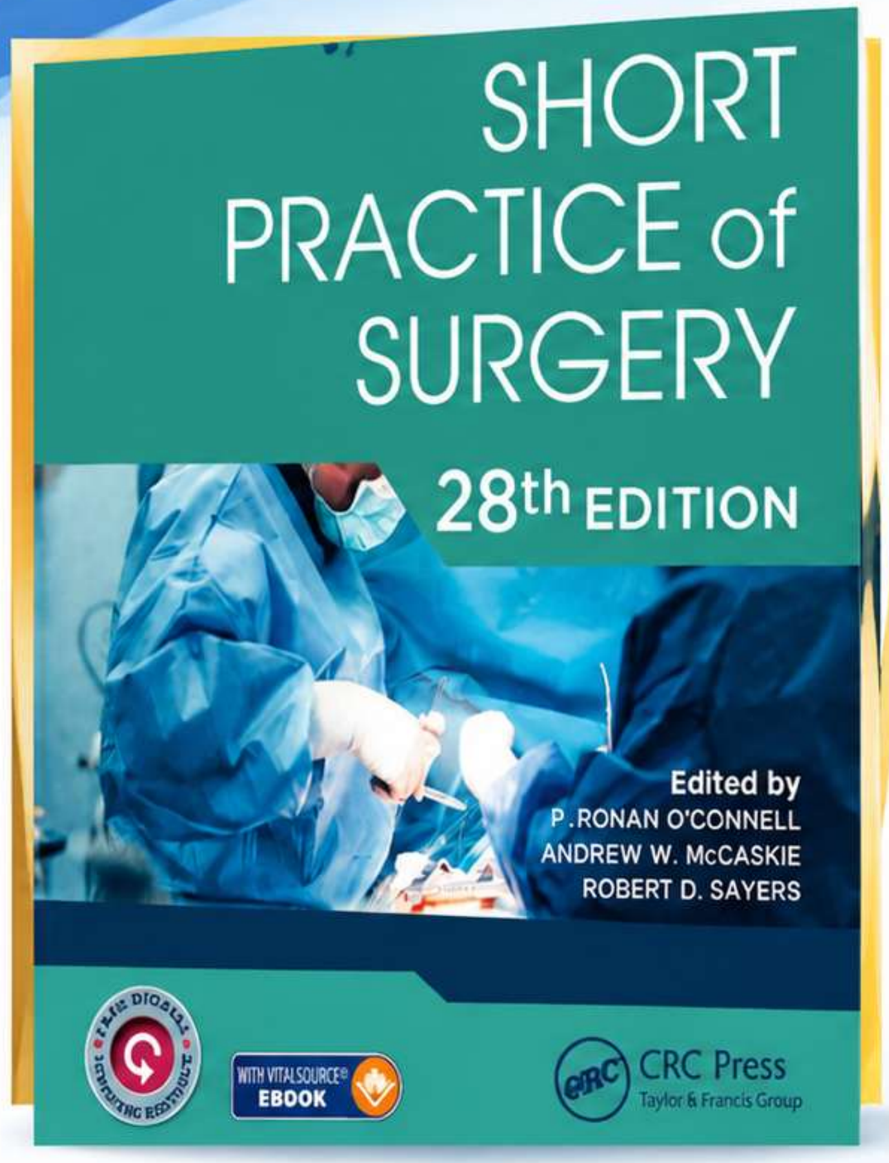


Wound infection or mediastinitis (rare).

5 Tumour implantation in the wound



Seeding of malignant cells in the surgical wound (rare).



Thank You

for Your Attention

Mediastinal Surgery Lecture

Reference: Short Practice of Surgery, 28th Edition