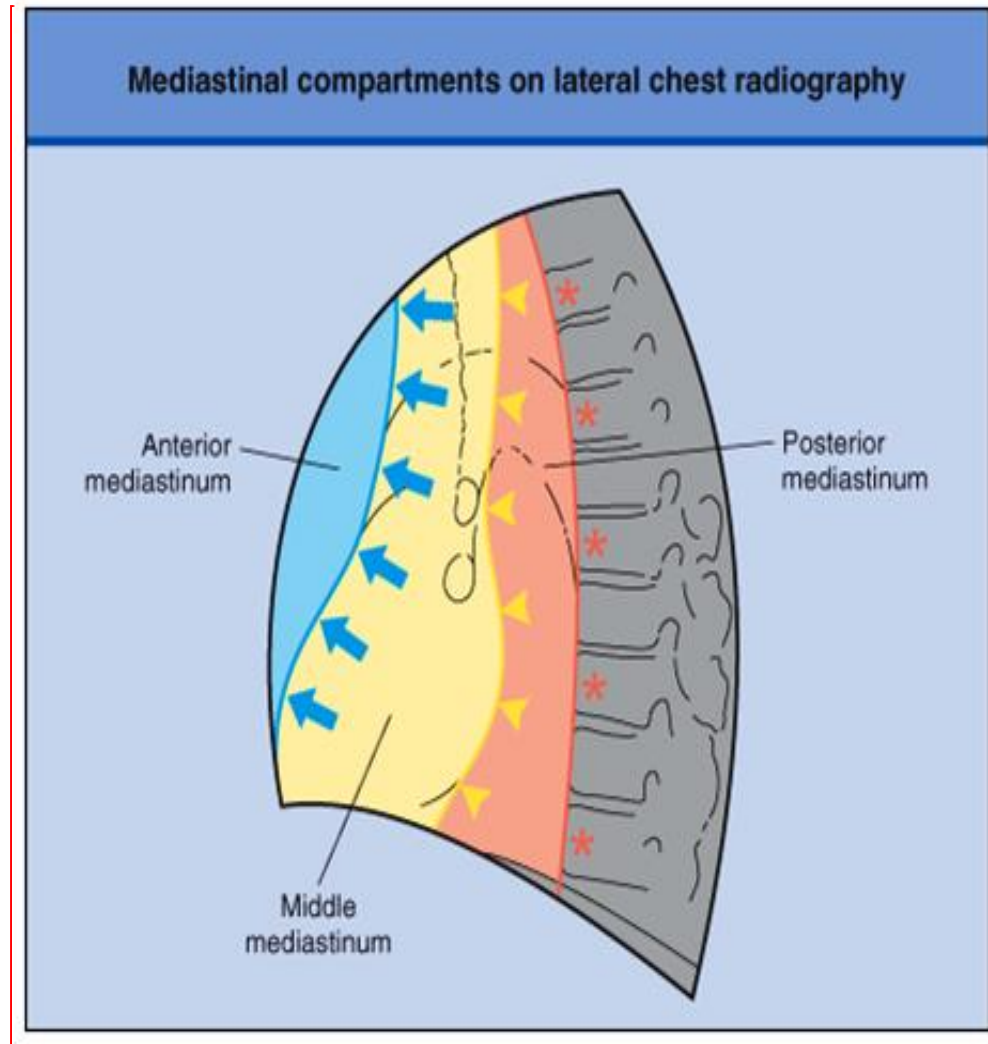


Mediastinal Masses

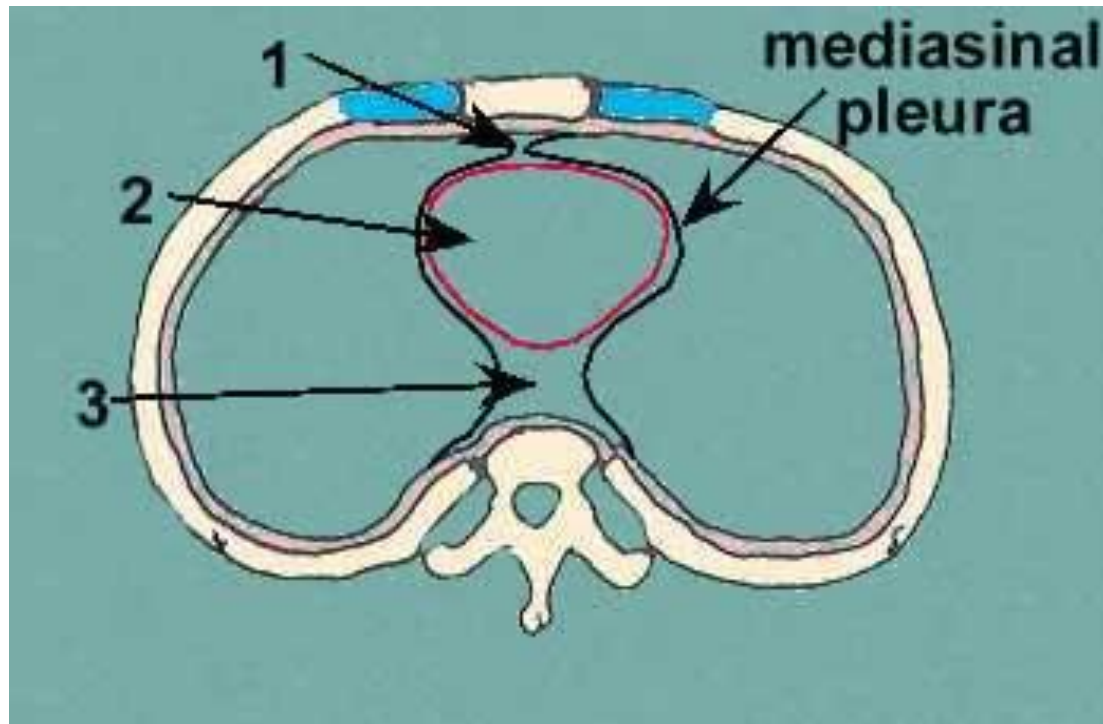
- Normal anatomy and contents of the mediastinum
- Clinical manifestations produced by diseases and lesions in the region
- Diagnostic evaluation and techniques for imaging the mediastinal contents and methods for obtaining tissue for cytologic and histologic examination

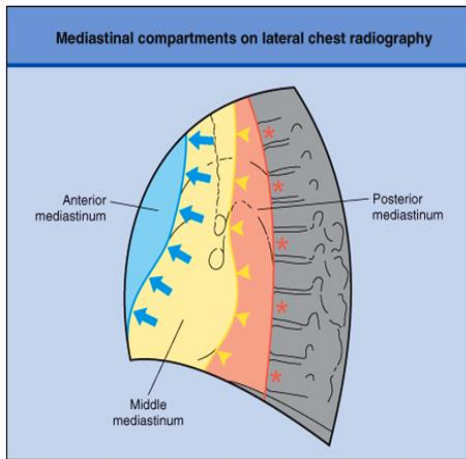
- The mediastinum is the region in the chest between the pleural cavities that contain the heart and other thoracic viscera except the lungs
- Boundaries
 - Lateral - parietal pleura
 - Anterior - sternum
 - Posterior - vertebral column and paravertebral gutters
 - Superior - thoracic inlet
 - Inferior - diaphragm

Mediastinal Anatomy



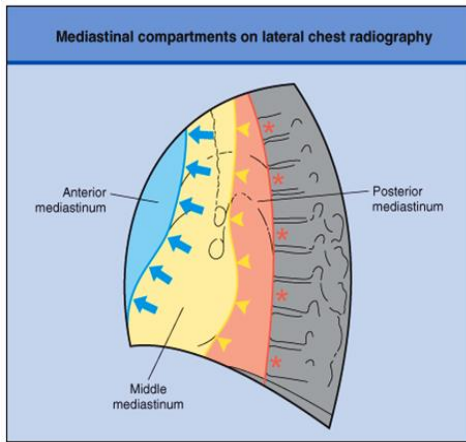
MEDIASTINUM IN CROSS SECTION





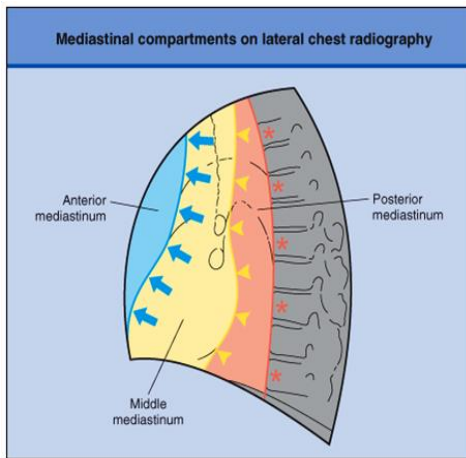
Normal Mediastinum

- Anterior mediastinum
 - Everything lying forward of and superior to the heart shadow
 - Boundaries
 - Sternum, first rib, imaginary curved line following the anterior heart border and brachiocephalic vessels from the diaphragm to the thoracic inlet
 - Contents
 - Thymus gland, substernal extension of the thyroid and parathyroid gland and lymphatic tissues



Normal Mediastinum

- Middle mediastinum
 - Dorsal to the anterior mediastinum, extends from the lower edge of the sternum along the diaphragm and then cephalad along the posterior heart border and posterior wall of the trachea
 - Contents
 - Heart, pericardium, aortic arch and its major branches, innominate veins and superior vena cava, pulmonary arteries and hila, trachea, group of lymph nodes, phrenic and upper vagus nerve

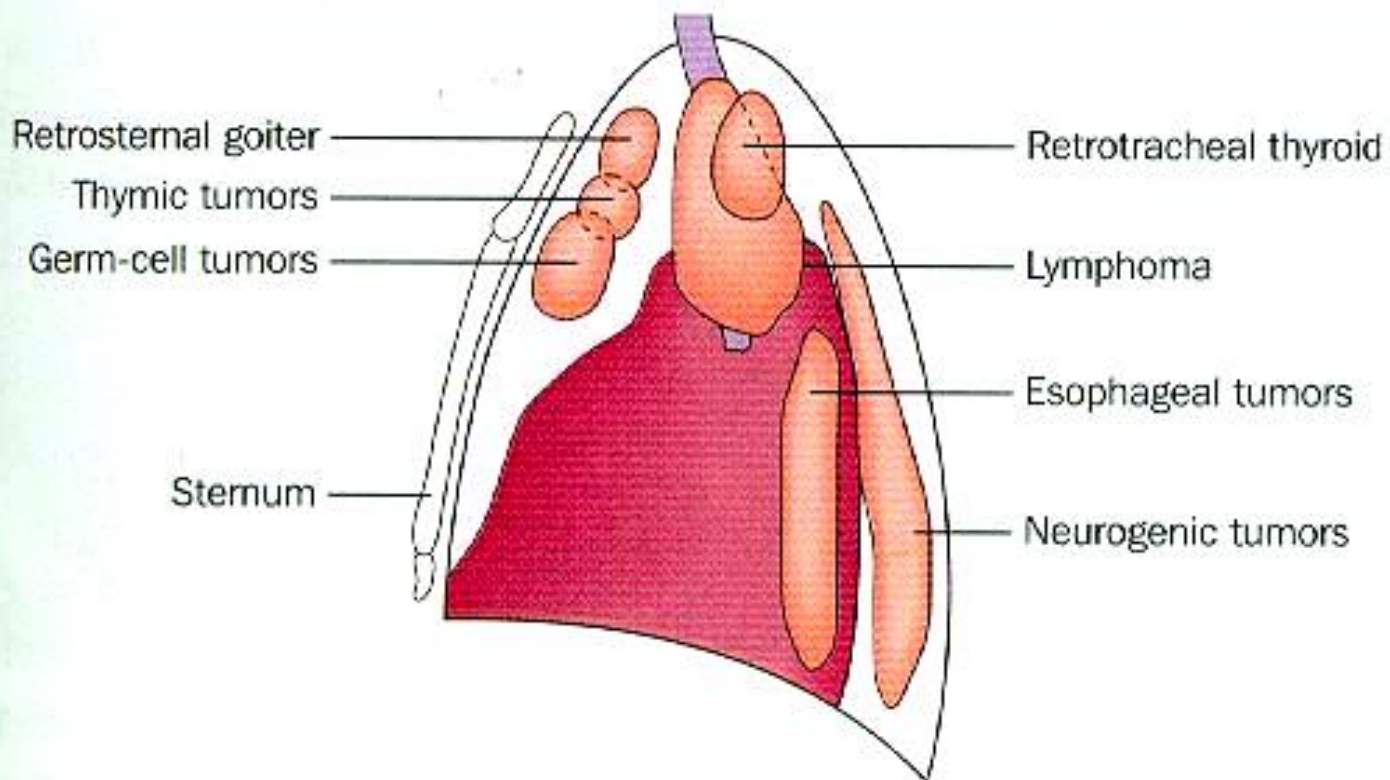


Normal Mediastinum

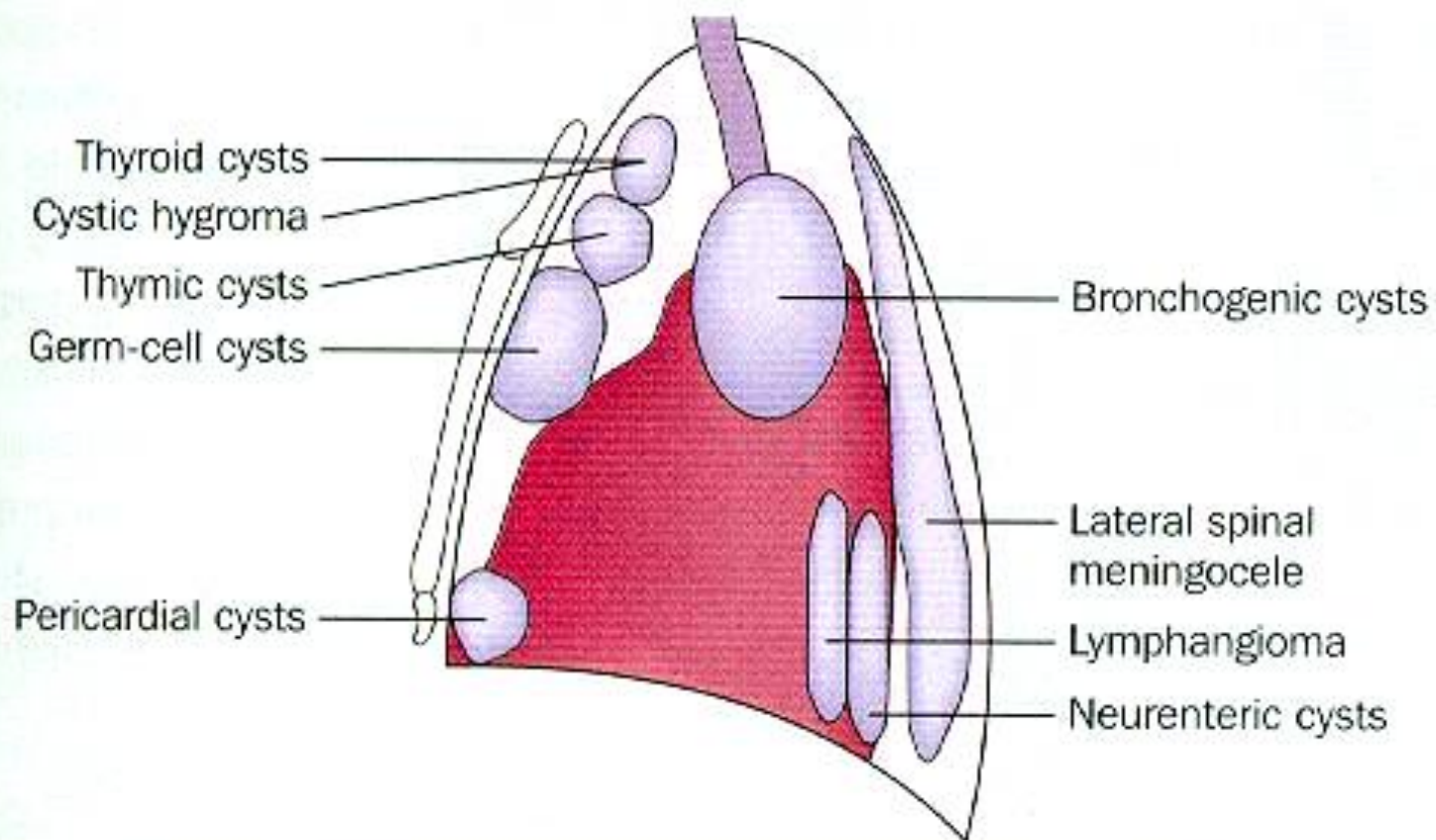
- Posterior Mediastinum
 - Occupies the space between the back of the heart and trachea and the front of the posterior ribs, and paravertebral gutter
 - It extends from the diaphragm cephalad to the first rib
 - Contents
 - Esophagus, descending aorta, azygos and hemiazygos vein, paravertebral lymph nodes, thoracic duct, lower portion of the vagus nerve and the sympathetic chain

Mediastinal masses

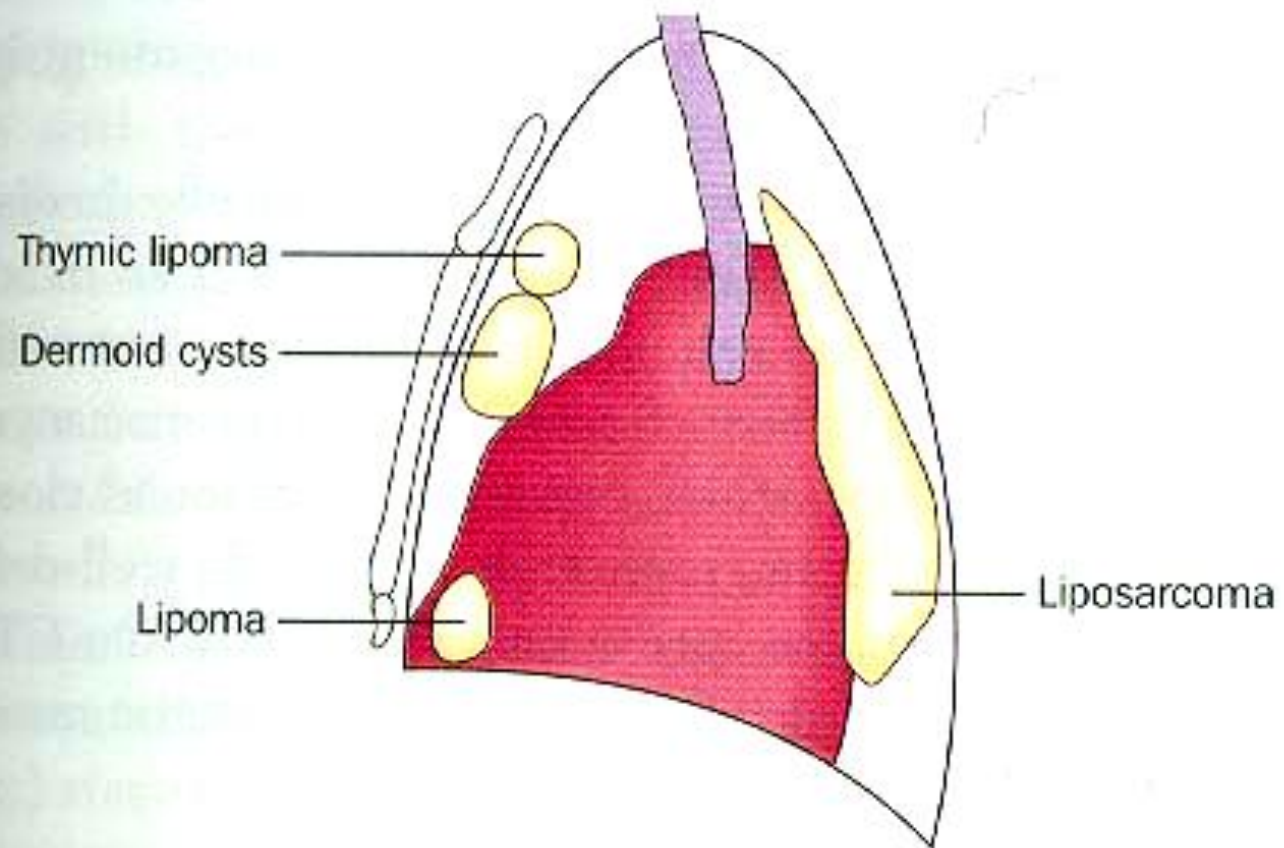
Solid masses



Cystic masses



Fat density masses



Clinical Presentation

● Asymptomatic mass

- Specific disease entities according to anatomical, and embryologic origin
- 50% of all mediastinal mass are asymptomatic
- 80% of such mass are benign
- Incidental discovery – most common (routine CXR)
- Silent in early phase
- Mainly cause pressure symptoms
- More than half are malignant if with symptoms

Clinical Presentation

- Effects on Compression or invasion of adjacent tissues
- Chest pain, from traction on mediastinal mass, tissue invasion, or bone erosion is common
- Cough, because of extrinsic compression of the trachea or bronchi, or erosion into the airway itself
- Hemoptysis, hoarseness or stridor

Clinical Presentation

- Pleural effusion, invasion or irritation of pleural space
- Dysphagia, invasion or direct invasion of the esophagus
- Pericarditis or pericardial tamponade
- Right ventricular outflow obstruction and cor pulmonale

Clinical Presentation

- Superior vena cava
 - Vulnerable to extrinsic compression and obstruction because it is thin walled and its intravascular pressure is low, and relatively confined by lymph nodes and other rigid structures
- Superior vena cava syndrome
 - Results from the increase venous pressure in the upper thorax , head and neck
 - characterized by dilation of the collateral veins in the upper portion of the head and thorax and edema and phlethora of the face, neck and upper torso, suffusion and edema of the conjunctiva and cerebral symptoms such as headache, disturbance of consciousness and visual distortion
- Bronchogenic carcinoma and lymphoma are the most common etiologies

Clinical Presentation

- Hoarseness, invading or compressing the nerves
- Horner's syndrome, involvement of the sympathetic ganglia
- Dyspnea, from phrenic nerve involvement causing diaphragmatic paralysis
- Tachycardia, secondary to vagus nerve involvement
- Clinical manifestations of spinal cord compression

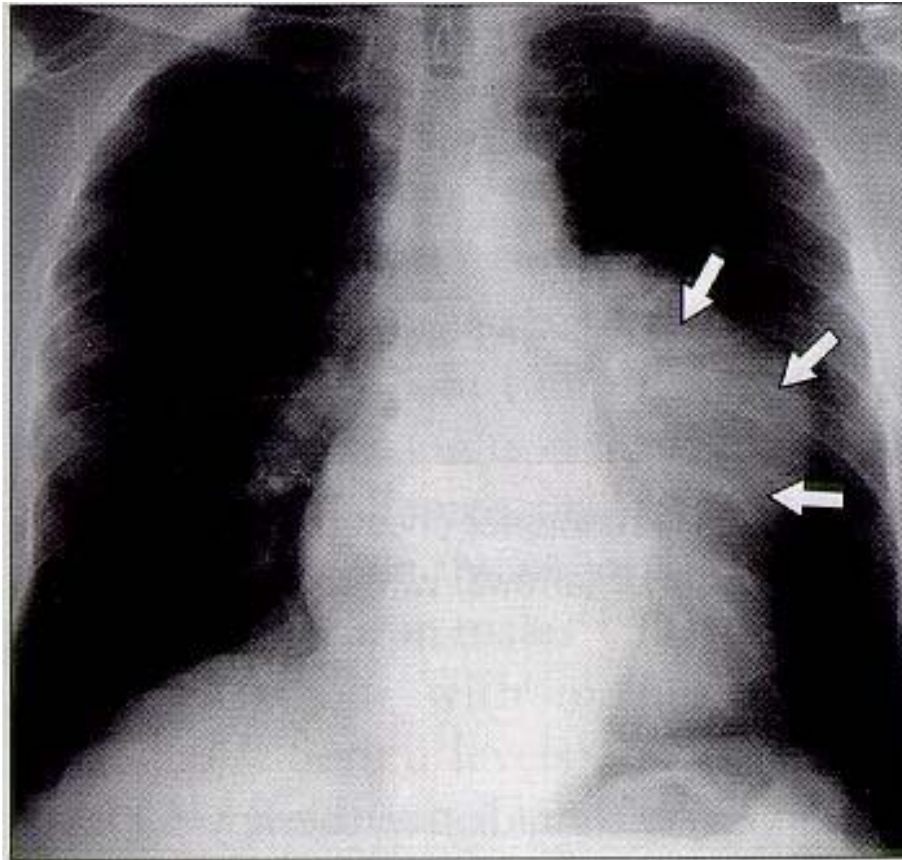
Clinical Presentation

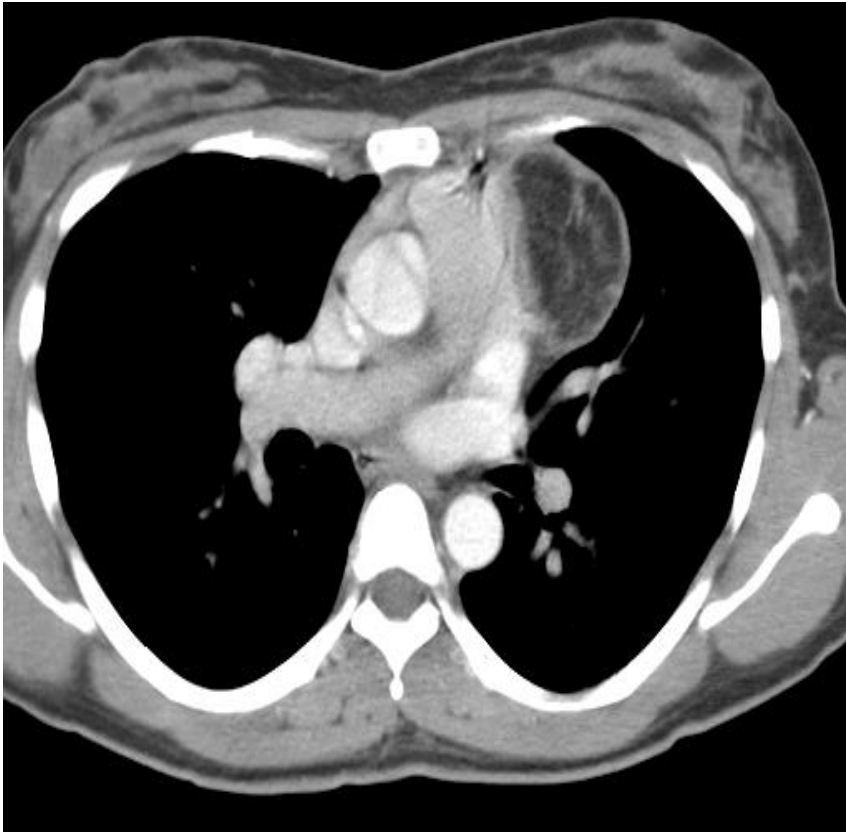
- Systemic symptoms and syndromes
- Fever, anorexia, weight loss and other non specific symptoms of malignancy and granulomatous inflammation

Techniques for visualizing the mediastinum and its content & obtaining tissue Bx

- **Chest PA & Lateral**
- **Chest Ct with oral & i/v contrast**
- **Fluoroscopy**
- **Bronchoscopy**
- **Esophagogram (Barrium swallow)**
- **Isotope Scanning**
- **FNA**
- **True cut Needle Bx**
- **Medistinoscopy**
- **VATS**
- **Thoracotomy**

43 y/o female w/ Hx of asthma presents with progressive SOB, dysphagia , fatigability for 5 months. No wheeze or cough, EKG normal. CXR showed





- **FILM FINDINGS:**
 - Mass just lateral to main pulmonary artery
 - thick-walled smoothly-marginated
 - No calcification

Thymoma

- Anterior mediastinum
- Most common (20%) of mediastinal tumor in adults but rarely seen in children
- Equal frequency in males and females
- 30 – 50 yrs
- 50% are asymptomatic
- Various Classification : Lymphocytic, Epithelial, Spindle Cell
- Most encapsulated; 35% invasive (but histologically benign!)
- Parathymic syndromes – 30-50% myasthenia gravis,
 - less common– hypogammaglobulinemia (10%), pure red cell aplasia (5%)

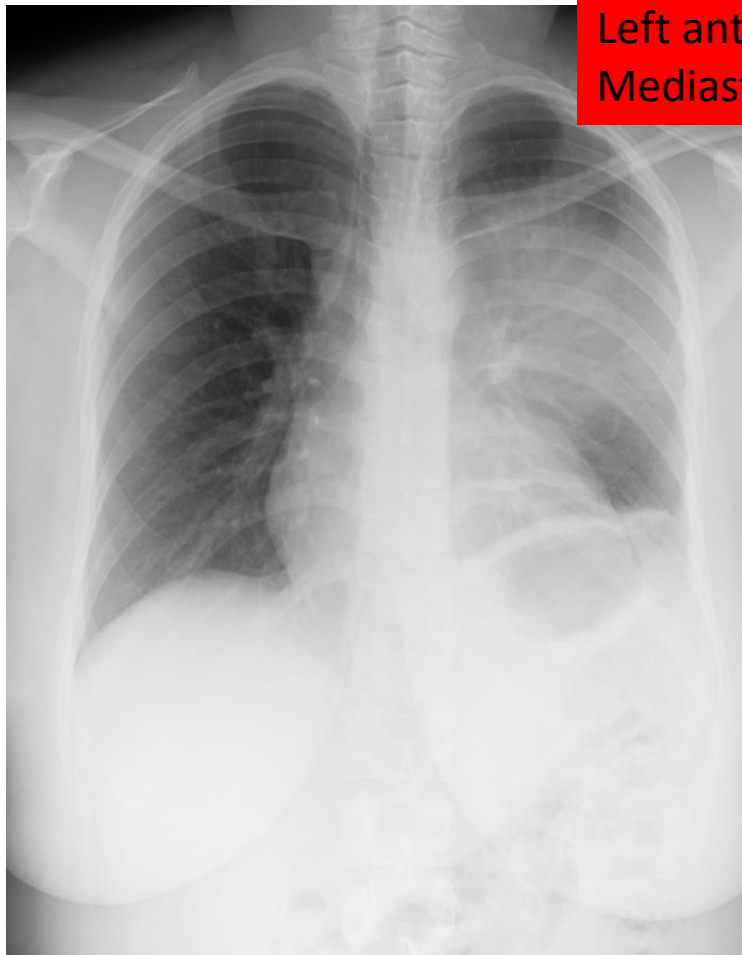
Thymoma (Staging)

- Stage I : contained within an intact capsule
- Stage II: extension through the capsule to surrounding fat, pleura, pericardium
- Stage III : Intrathoracic metastasis
- Stage IV: Extrathoracic Metastasis

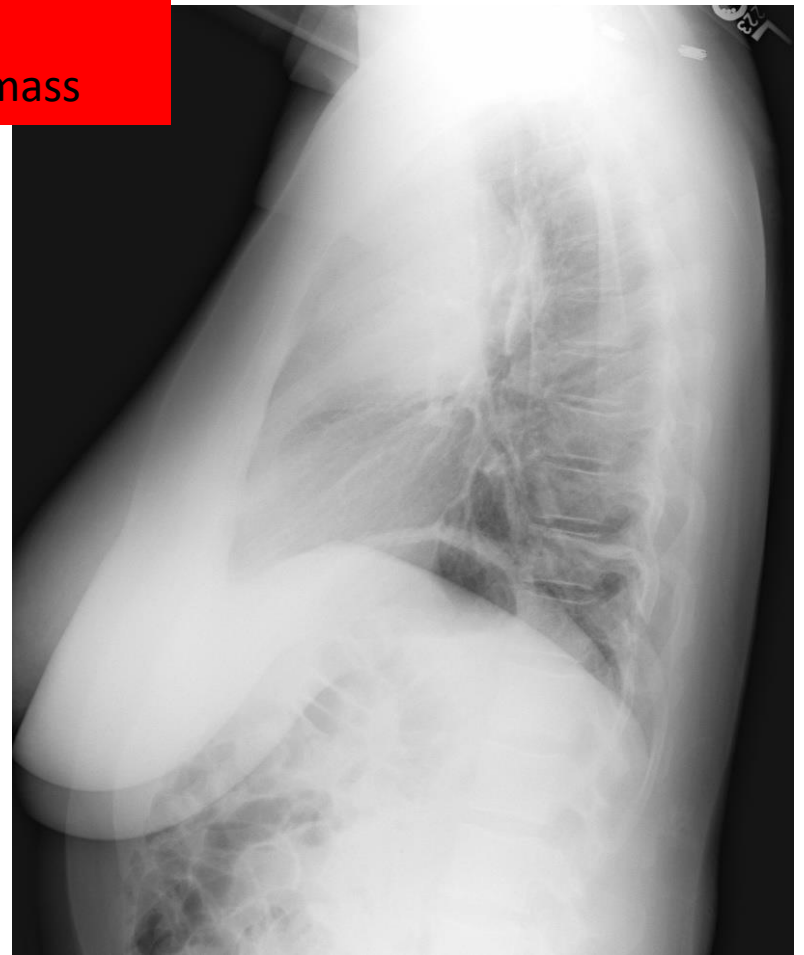
Thymoma(Treatment)

- Stage I : Surgical resection → Recurrence 2-12%
- Stage II & III : Surgery + Radiotherapy
- Stage IV : Multimodality → Induction chemotherapy, surgery + post op Radiotherapy
- complete surgical resection – usually good prognosis
- 2-12% of resected encapsulated thymomas recur
- invasive thymoma has much worse prognosis– 50% 5-yr survival, compared to 75% in noninvasive.
- Survival not affected by the presence of Myasthenia Gravis

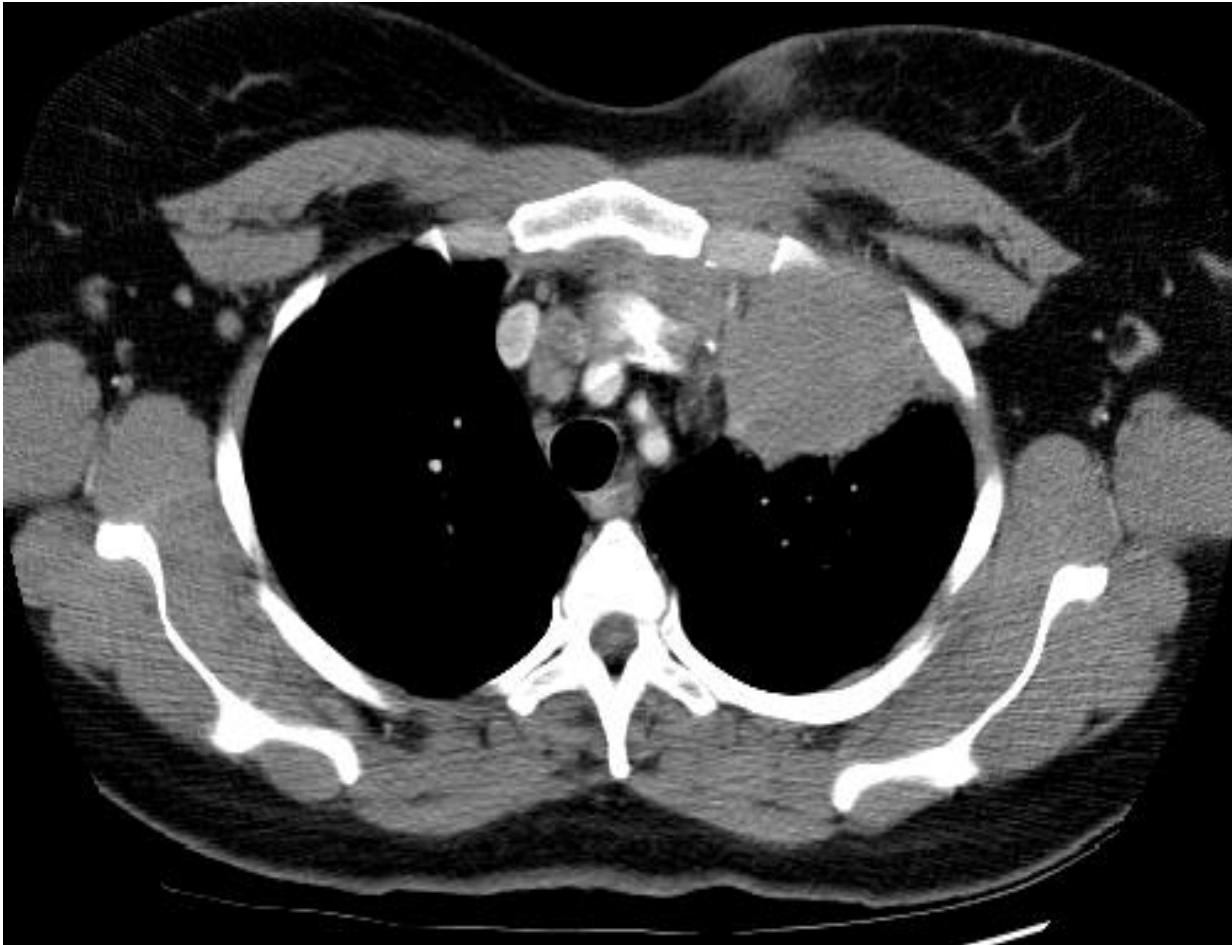
23-year-old female had a 8-week history of fever and night sweats accompanied by a 8kg weight loss



Left anterior
Mediastinal mass



A CT was ordered to further characterize the mass:



- Film findings:
-large,
Inhomogeneous
solid, antero
left
mediastinal
Mass.No calcium.
No fat.

PATHOLOGY

- A percutaneous CT guided truecut biopsy was performed
- Pathology reported the presence of Reed-Sternberg cells.
- *What is the diagnosis?*

Lymphoma

- 5-10% is mediastinal primary
- Second most common Anterior Mediastinal Mass in Adults
- Malignant > Hodgkin's & non-Hodgkin's
- Surgeon's primary role is to provide sufficient tissue for diagnosis and to assist in pathologic staging.
- Dx: Mediastinoscopy, thoracotomy ,True cut Bx
- Rx: Chemotherapy or XRT
- Prognosis: Varies with tumor histology

18 y/o female with R upper chest and shoulder pain x 1 month. Exacerbated by movement and inspiration. No findings on PE. Working Dx is musculoskeletal injury. A CXR done



CHEST CT



- CT shows mass
with areas of:

- fat
- fluid
- soft tissue

Likely diagnosis
?

Germ Cell Tumors

- The mediastinum is the most common location for extragonadal germ cell tumors (GCTs) in adults
- GCTs can be either benign (teratomas, dermoid cysts) or malignant (seminomas, non-seminomatous GCTs).
- Mature teratoma – most common mediastinal germ cell tumour.
- All ages – particularly young adults (F>M)
- Presentation – mostly asymptomatic , incidentally diagnosed on X-ray, CT., may cause cough, dyspnea, pain
- CXR: well-circumscribed, round or lobulated, calcifications in up to 26%
- CT: well-marginated, lobulated, cystic component 88%, fat 50-75%,calcification 25-50%, fat-fluid levels diagnostic, but rare (<10%)
- Surgical excision is curative

Malignant Nonteratomatous Germ Cell Tumors

- Usually in the third and fourth decades of life
- Symptoms: chest pain, cough, dyspnea, and hemoptysis
- The superior vena cava syndrome occurs commonly
- Diagnostic imaging: A large anterior mediastinal mass
- Serologic measurements (α -fetoprotein and β -hCG) useful for:
 - differentiating seminomas from nonseminomas tumors,
 - assessing response to therapy,
 - diagnosing relapse or failure of therapy
- Seminomas rarely produce β -hCG and never produce α -fetoprotein
- More than 90% of nonseminomas secrete one or both of these hormones
- seminomas are radiosensitive and nonseminomas are relatively radiosensitive

A 46-year-old woman came to you with complain of a persistent cough for the past 3 weeks and mild dysphagia. O/E she has no respiratory distress. There is an enlarged left lobe of the thyroid gland, without any cervical adenopathy.



- Film Findings :
- Trachea deviated to right. Left anterosuperior Mediastinal mass extending into Cervical region

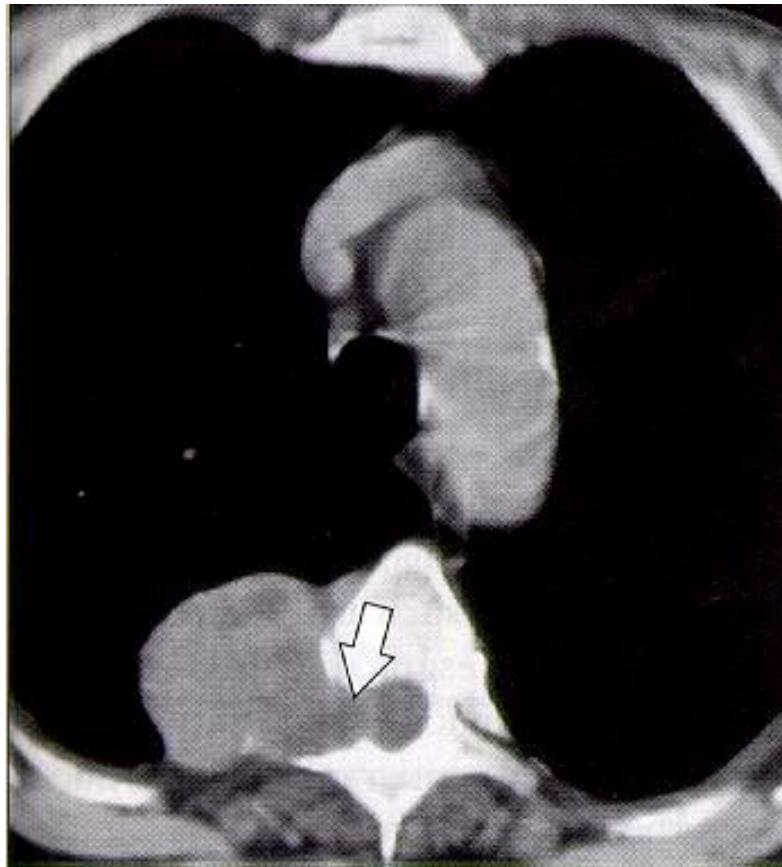
Substernal Thyroid Tissues

- Goiters usually are considered substernal (also referred to as *mediastinal*, *intrathoracic*, or *retrosternal*) when more than 50% of the thyroid parenchyma is located below the sternal notch
- Mediastinal goiters are classified as *primary* or *secondary*
- Primary mediastinal goiters, also referred to as *ectopic* or *aberrant goiters*, uncommon, 1% of all surgically excised goiters
- Secondary mediastinal goiters are a much more common, 5–15% of all goiters demonstrate some extension into the mediastinum

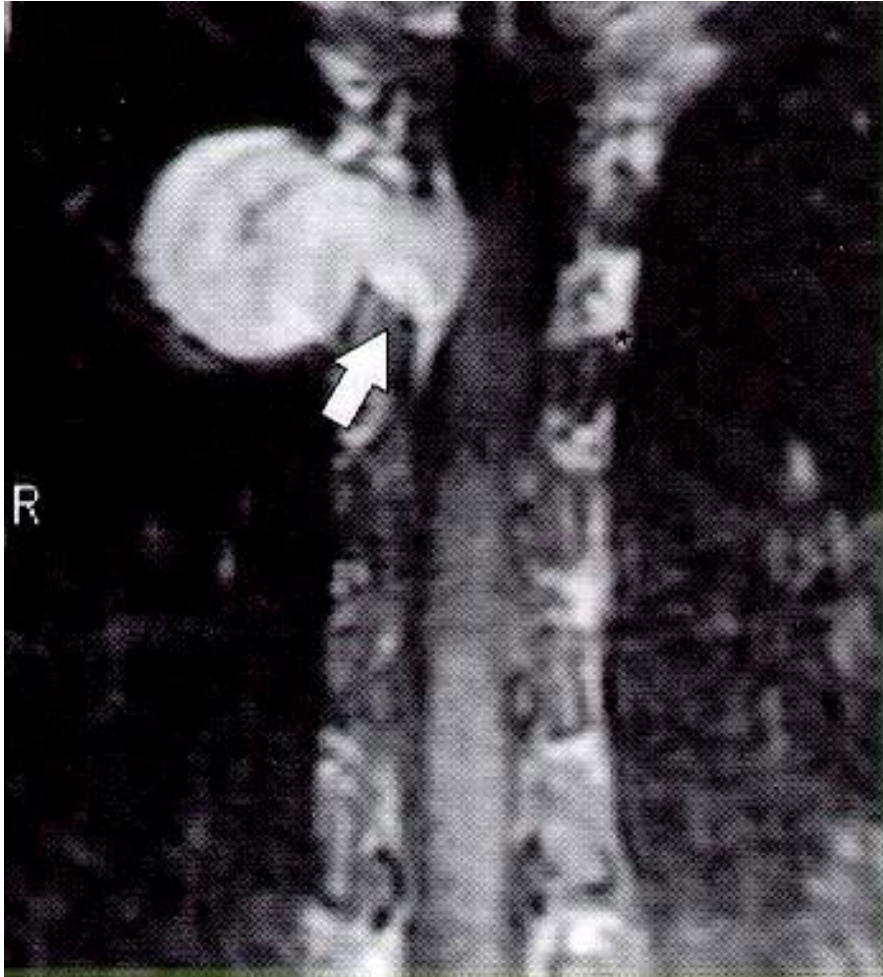
- Radiographic:
 - Chest x-ray → mediastinal mass, superior mediastinal widening, tracheal deviation or compression
 - Chest CT scans → define the full extent and anatomic relationships of the substernal thyroid to surrounding structures and to facilitate preoperative planning
- serum thyroid-stimulating hormone measurement → If hyperthyroidism is present → antithyroid medications and beta blockade should be undertaken before elective resection

A 25-year-old man incidentally discovered, asymptomatic, isolated, rounded paravertebral mass on CXR and further CT scan showed following findings. The most likely diagnosis is

“Dumb-bell”
Tumor



Neurilemmoma(Schwannoma)



Neurogenic tumours

- most common tumours to arise in the posterior mediastinum.
- **peripheral nerves** –
 - neurofibroma,
 - schwannoma,
 - malignant tumours of nerve sheath origin.
- **Tumours arising from sympathetic ganglia.**
- **Peripheral nerve tumours** typically originate in an intercostal nerve in the paravertebral region.
- Neurofibromas and Schwannomas present as well-defined round or oval posterior mediastinal masses.

Mesenchymal Tumors

- **Lipoma, Fibroma, Mesothelioma**
- **Superior or Anterior mediastinal location**
- **Diagnosis with CT scan**

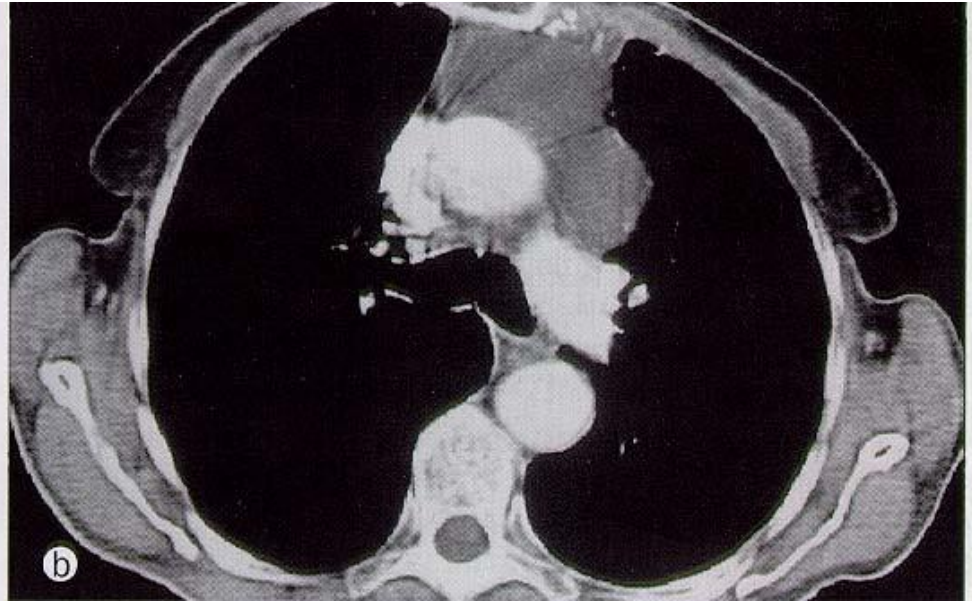
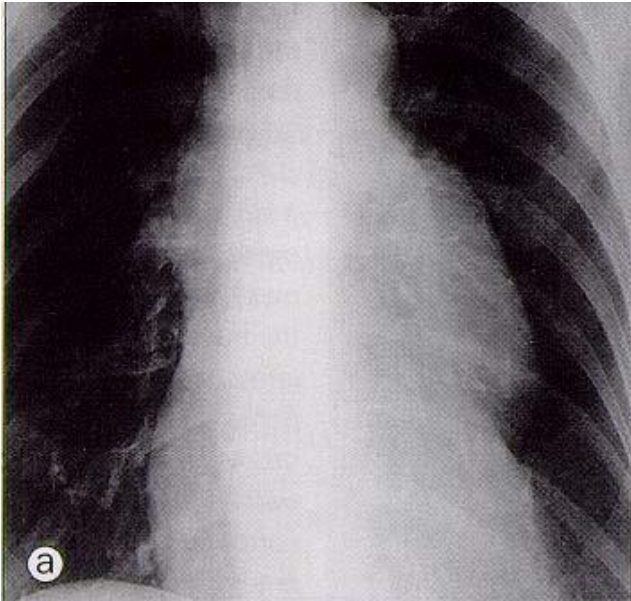
Benign Cysts

- **Most Common in Middle mediastinum**
- **20% of mediastinal masses**
- **Usually asymptomatic**
- **Bronchogenic cyst(32%), pericardial cyst(35%), enteric cyst(12%), thymic cyst, and thoracic duct cyst**

Pericardial Cyst

- **Thin-walled, mesothelial cell lining**
- **most common in Right C-P angle**
- **Simple cysts are almost always asymptomatic**
- **Rare cardiac impingement**

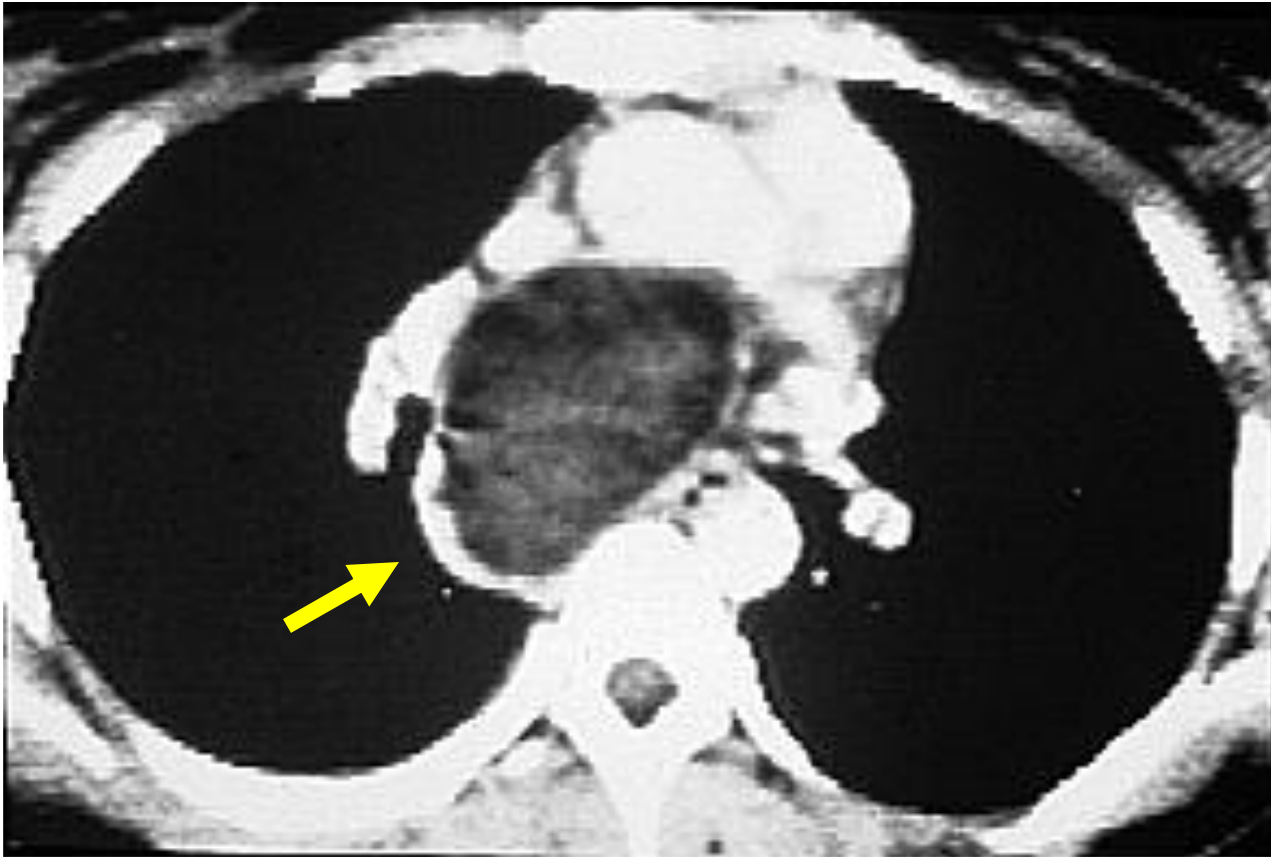
Pericardial Cyst



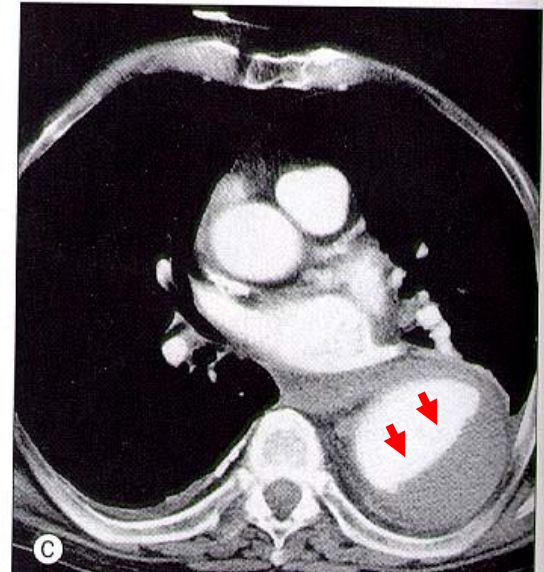
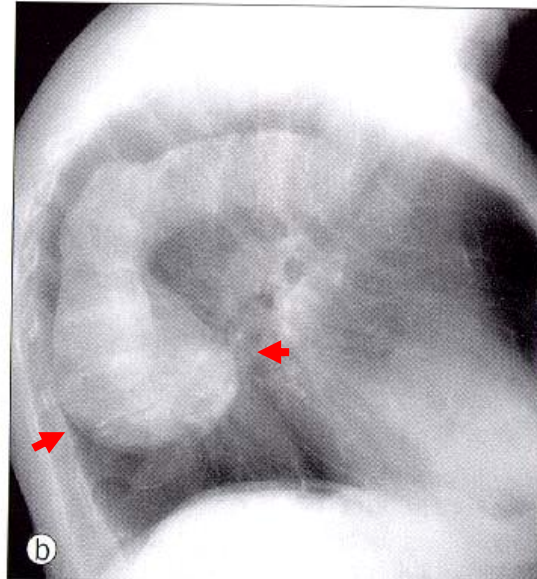
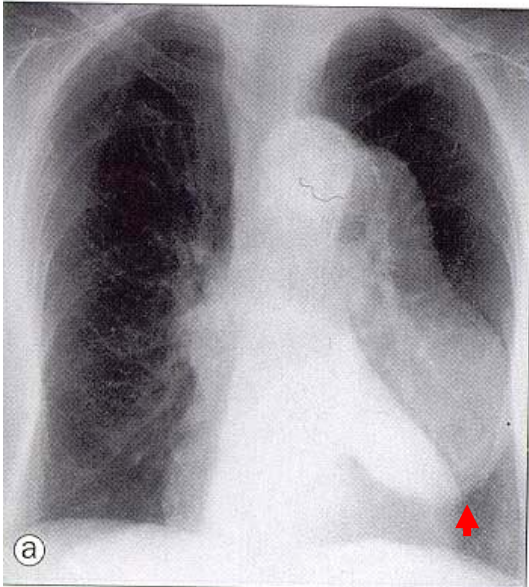
Bronchogenic Cysts

- **30 - 60% of all mediastinal cysts**
- **Lined by ciliated respiratory epithelium**
- **May contain cartilages or mucous**
- **Communicate with tracheobronchial trees**
- **May become infected**
- **Wheezing, dyspnea, recurrent pulmonary infections**

Bronchogenic Cyst



Aortic Aneurysm



Paratracheal Lymphadenopathy

