

Mediastinal Masses

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A Case Review and Lecture Series
Saturday 15th July - Sunday 16th July - Monday 17th July
27 CPD Points

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Introduction

- Mediastinal masses range from benign cysts to highly malignant neoplasms
- Patients may present with signs and symptoms from compression
- Paraneoplastic syndromes may also cause clinical signs and symptoms

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Objectives

- List differential diagnosis for mediastinal masses
- Illustrate radiographic and CT findings of mediastinal neoplasms
- Combine imaging findings and location to limit differential diagnosis

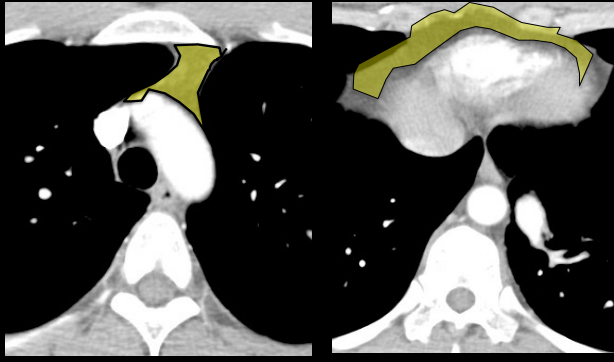
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Normal Mediastinum

- Mediastinal compartments
 - Prevascular (anterior)
 - Visceral (middle)
 - Paraspinal (posterior)
- Arbitrary separation as compartments are contiguous

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Prevascular Mediastinum



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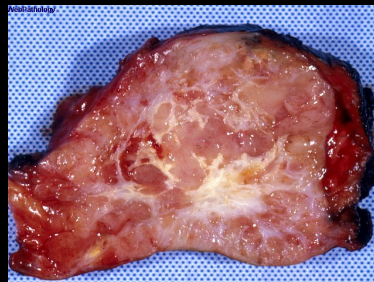
Prevascular Mediastinum

- Prevascular mediastinal tumors account for 50% of all mediastinal masses
- Thymoma most common
- Germ cell tumors more common than thymoma in children

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Thymic Neoplasms

- Epithelial neoplasms
 - Thymoma
 - Thymic carcinoma
 - Thymic carcinoid



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Thymic Neoplasms

- Lymphoma
- Germ cell tumor
- Thymolipoma
- Sarcoma
- Metastases

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Thymoma

- Most common prevascular mediastinal mass
- Most common thymic neoplasm
- 1-5 per 1,000,000 per year

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Clinical Features

- Paraneoplastic syndromes
 - Myasthenia gravis (30%-50%)
 - Hypogammaglobulinemia (10%)
 - Pure red cell aplasia (5%)

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Histologic Classification

- 2021 World Health Organization (WHO)
 - Types A, AB, B1, B2, B3, others



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TNM Staging

	Masaoka-Koga	IASLC/ITMIG
Stage I	Tumor complete encapsulated	T1 N0 M0. T1: encapsulated or unencapsulated, with or without extension into mediastinal fat, or extension into mediastinal pleura.
Stage II	A. Microscopic tumor invasion into capsule B. Tumor invasion into surrounding fat	T2 N0 M0. T2: pericardial involvement. N0: no nodal involvement.

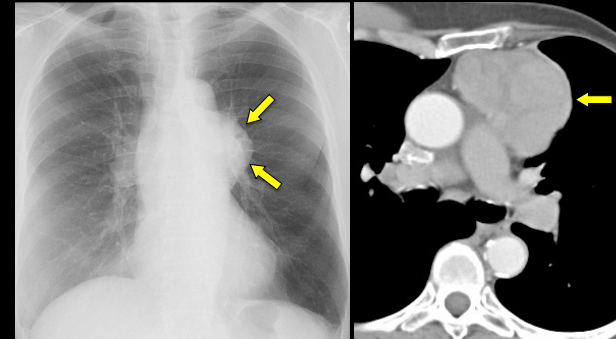
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TNM Staging

	Masaoka-Koga	IASLC/ITMIG
Stage III	Tumor invasion into a neighboring organ such as pericardium, great vessel, or lung	A. T3 N0 M0. T3: invasion of the lung, brachiocephalic vein, superior vena cava, chest wall, phrenic nerve, hilar (extrapericardial) or pulmonary vessels. B. T4 N0 M0. T4: invasion of the aorta, arch vessels, main pulmonary artery, myocardium, trachea, or esophagus.
Stage IV	A. Pleural or pericardial dissemination B. Lymphatic or hematogenous metastasis	A: T any N1 M0 or T any N0,1 M1a. N1: Involvement of anterior (perithymic) nodes. M1a: separate pleural or pericardial nodule(s); B: T any N2 M0,1a or T any N any M1b. N2: involvement of deep intrathoracic or cervical nodes. M1b: pulmonary intraparenchymal nodule or distant organ metastasis

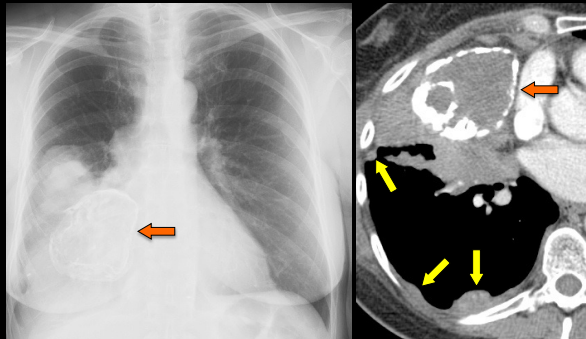
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Thymoma



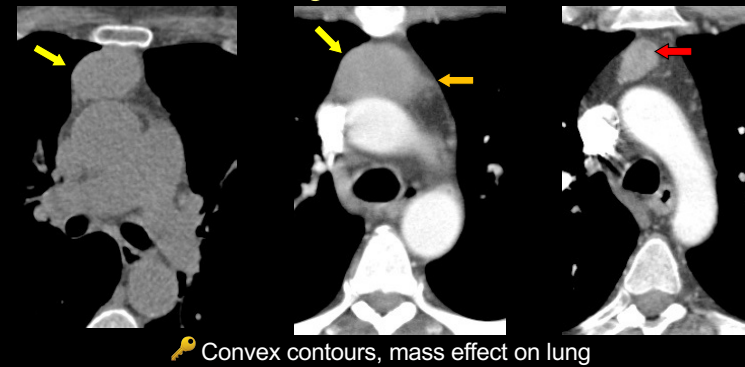
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Thymoma



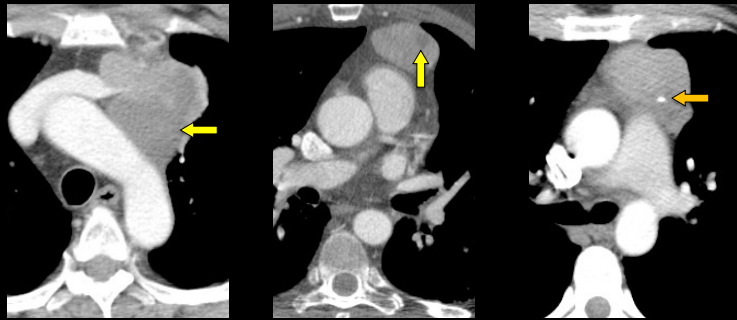
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Thymoma



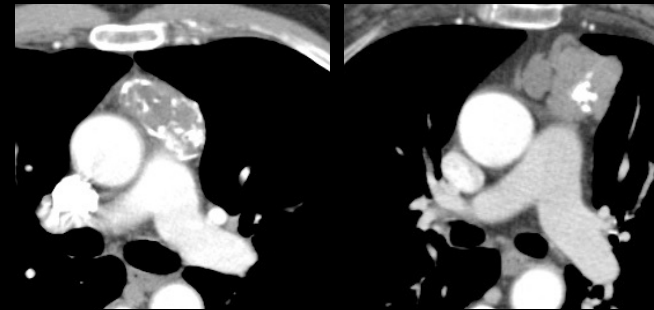
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Thymoma



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Thymoma



🔑 Calcifications favor thymoma

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Thymoma

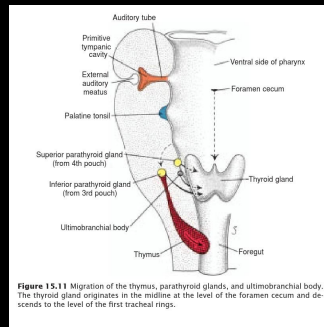
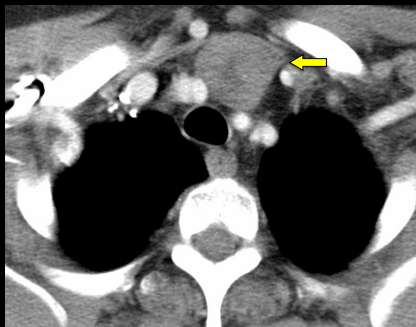
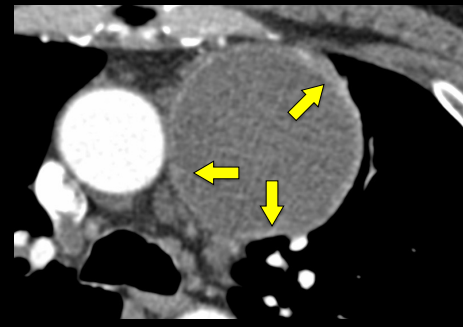


Figure 15.11 Migration of the thymus, parathyroid glands, and ultimobranchial body. The thyroid gland originates in the midline at the level of the foramen caecum and descends to the level of the first tracheal rings.

Langman's Medical Embryology

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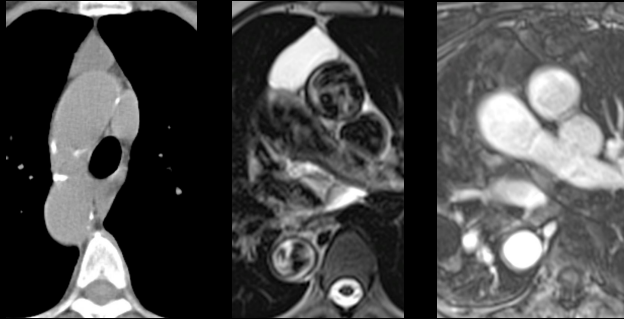
Cystic Thymoma



🔑 MRI can be used to distinguish thymic cyst from thymoma

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Thymic Cyst



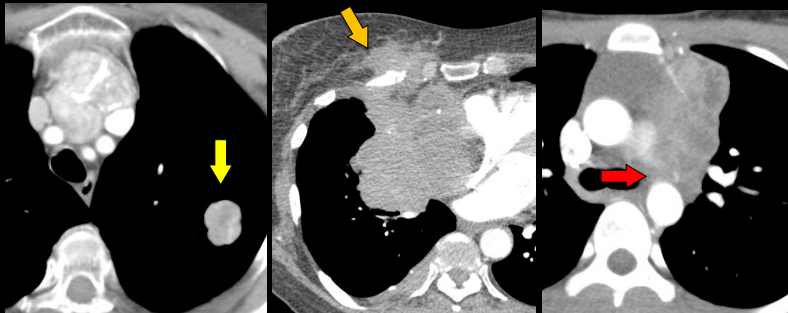
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Thymic Carcinoma

- Highly malignant, rare neoplasm of thymus
- Classified based on cell type (squamous, small cell, etc.)
- Poor prognosis
- Survival depends on complete resection

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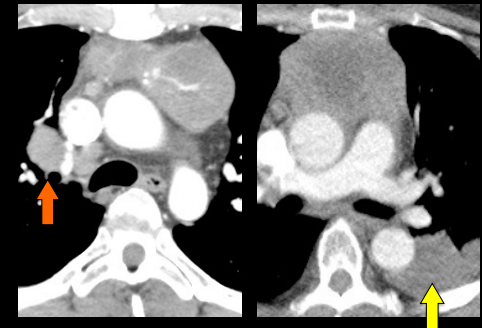
Thymic Carcinoma



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Thymic Carcinoid

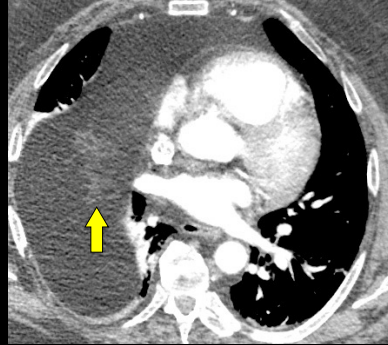
- More aggressive than pulmonary carcinoids
- Indistinguishable from other thymic malignancies



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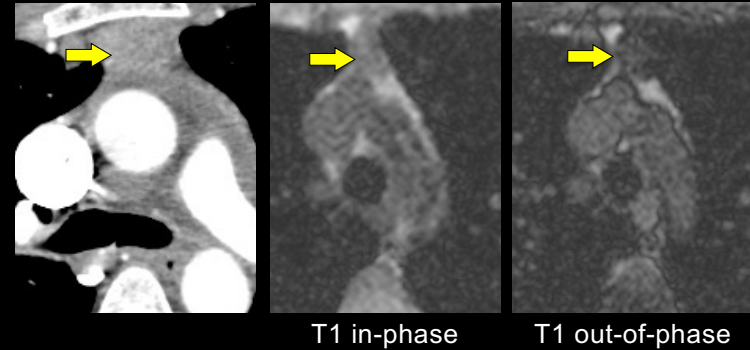
Thymolipoma

- Rare, predominantly fatty mass containing thymic tissue
- Patients usually asymptomatic



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Thymic Hyperplasia



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Germ Cell Tumor

- Mediastinum is the most common extragonadal site
- 25% of prevascular mediastinal tumors in children
- 10%-15% anterior mediastinal tumors in adults

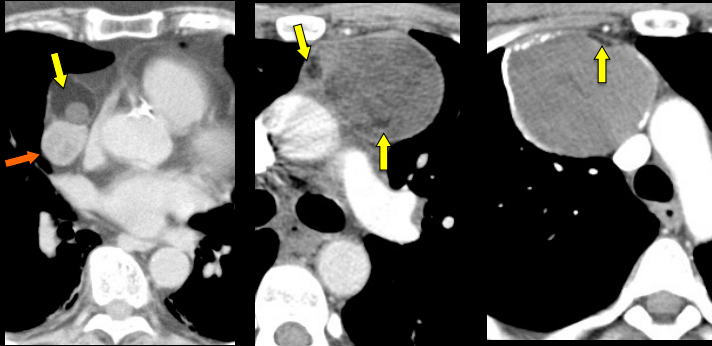
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Germ Cell Tumor

- Teratomas
- Seminomas
- Nonseminomatous germ cell tumors

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Teratoma



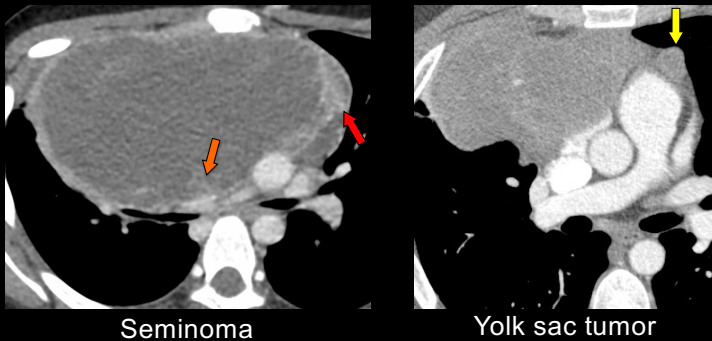
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Non-Teratomaous GCT

- Rare
- Malignant
- Majority occur in young males
- Rapid growth with local invasion and metastases

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Non-Teratomaous GCT



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Lymphoma

- Primary mediastinal lymphoma usually occurs in the prevascular mediastinum
- 20% of mediastinal neoplasms in adults
- 50% of mediastinal neoplasms in children

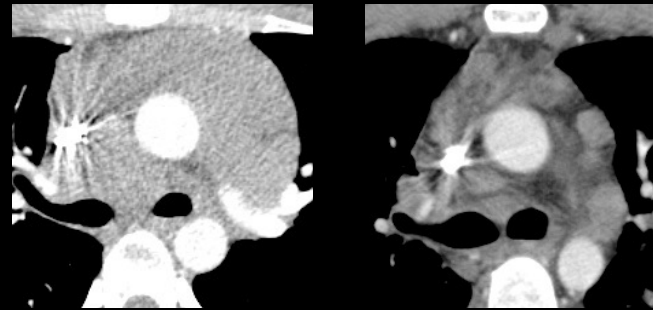
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Lymphoma

- Hodgkin lymphoma 50%-70%
- Non-Hodgkin lymphoma 15%-25%
 - Diffuse large B cell lymphoma (adults)
 - T-cell lymphoblastic lymphoma (children)

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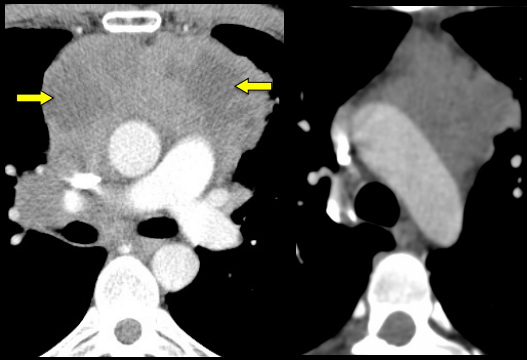
Hodgkin Lymphoma



Discrete nodal involvement favors Hodgkin lymphoma over non-Hodgkin

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Non-Hodgkin Lymphoma



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Thyroid Masses

- Most often extension of hyperplastic thyroid tissue into the mediastinum
- Associated with cervical thyroid enlargement
- Symptoms usually result from mass effect on trachea and esophagus

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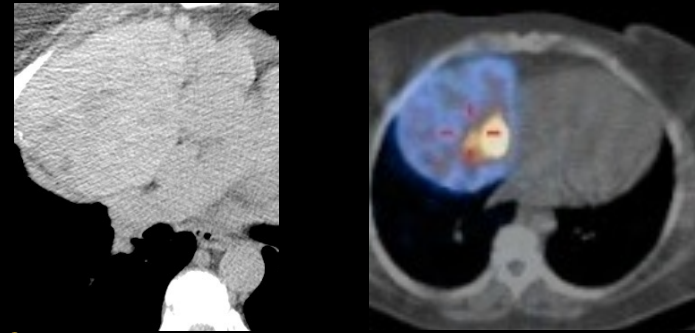
Thyroid Goiter



🔑 Thyroid tissue often hypervascular

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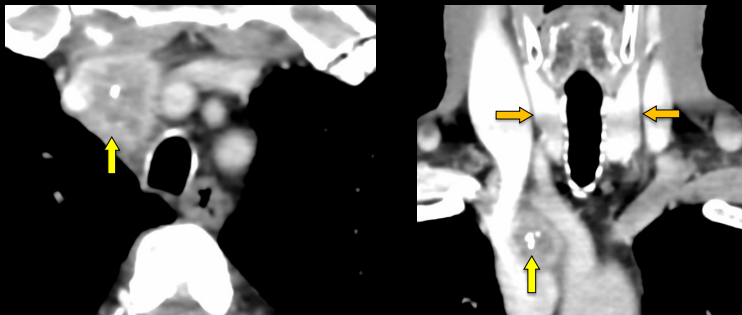
Ectopic Thyroid



🔑 Thyroid tissue often hyperattenuating because of iodine content

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Ectopic Thyroid Carcinoma



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Parathyroid Adenoma

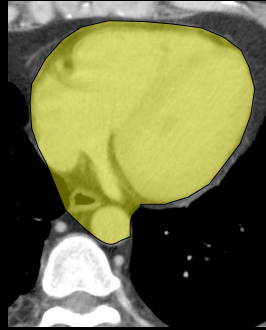
- Mediastinum most common site of ectopic parathyroid tissue
- Small mass on CT
- Tc-99m sestamibi scans useful for localizing



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Visceral Mediastinum

- Pericardium and its contents
- Everything between prevascular space and paraspinal space



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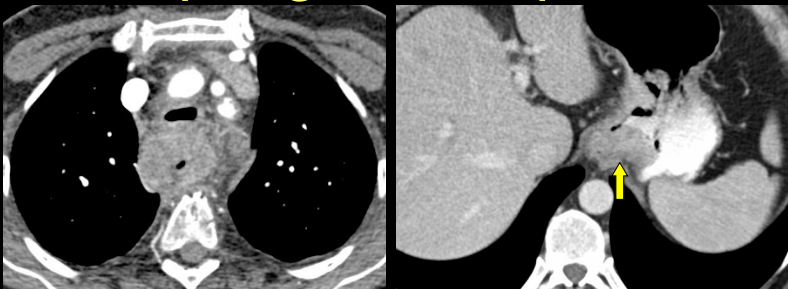
Pericardial Cyst

- 5%-10% of all mediastinal masses
- Most in right cardiophrenic space
- Most patients are asymptomatic



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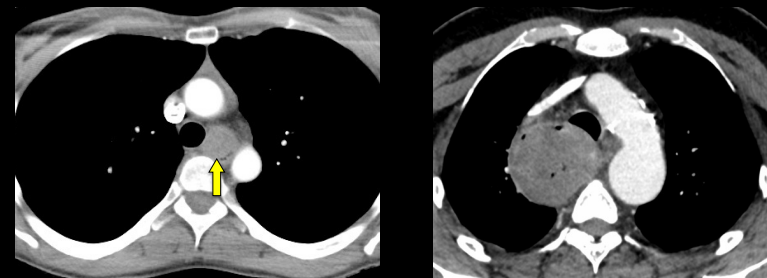
Esophageal Neoplasms



🔑 Adenocarcinomas more common near the esophagogastric junction

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Esophageal Neoplasms



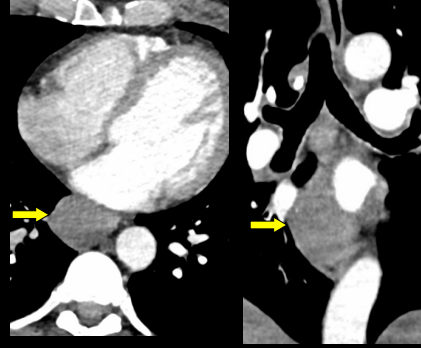
Leiomyoma

GI stromal tumor

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Esophageal Duplication Cyst

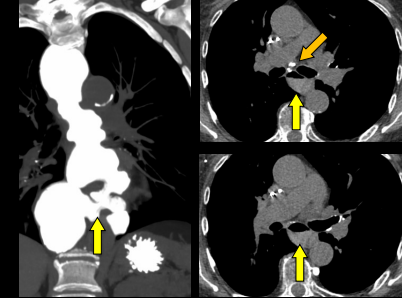
- Lined by esophageal mucosa
- Indistinguishable from bronchogenic cyst on CT and MRI



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Esophageal Diverticulum

- Pulsion
 - Epiphrenic
 - Hypopharynx
- Traction
 - Mid esophagus
 - Tuberculosis
 - Histoplasmosis



Pulsion diverticulum

Traction diverticulum

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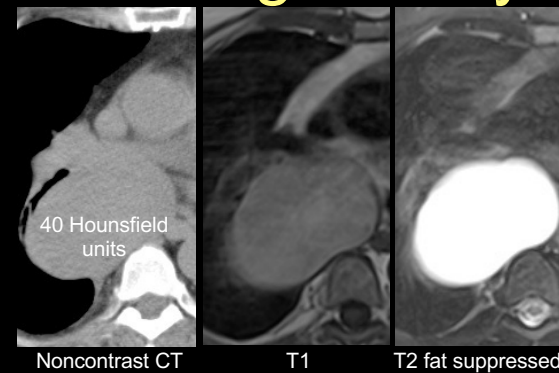
Bronchogenic Cyst

- 50% near carina
- 20% paratracheal
- Well circumscribed mass
- Water attenuation
- Higher attenuation from proteinaceous fluid



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Bronchogenic Cyst



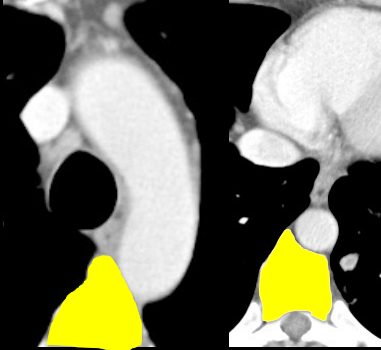
Noncontrast CT

T1

T2 fat suppressed

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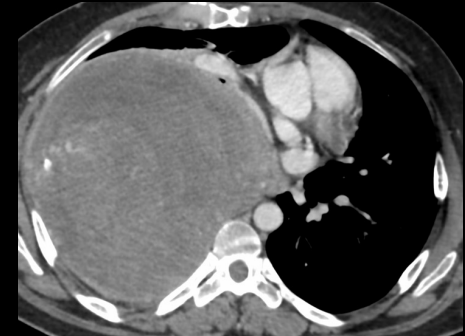
Paraspinal Mediastinum



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Paraspinal Mediastinum

- Neurogenic neoplasms
- Lymphoma



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Neurogenic Neoplasms

- 20% of mediastinal tumors in adults
- 35% of mediastinal tumors in children
- 75%-80% benign

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Neurogenic Neoplasms

- Peripheral nerve tumors (70%)
 - Schwannoma
 - Neurofibroma
 - Malignant peripheral nerve sheath tumor

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Neurogenic Neoplasms

- Sympathetic ganglion tumors (25%)
 - Ganglioneuroma
 - Ganlgioneuroblastoma
 - Neuroblastoma
- Paraganglioma (rare)

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Schwannoma

- Most common mediastinal neurogenic tumor, accounting for 50%
- Multiple schwannomas associated with NF-2



🔑 "Dumbbell lesion" favors schwannoma

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Ganglioneuroma

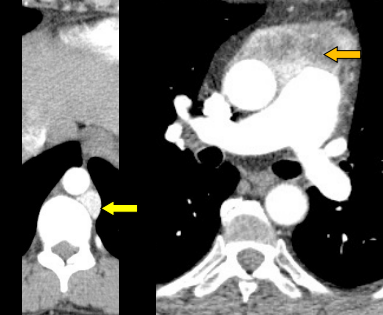
- Smoothly margins
- Span several vertebral bodies in craniocaudad dimension



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Paraganglioma

- 1%-2% of extra-adrenal paragangliomas occur in the chest



🔑 Paragangliomas are usually hypervascular and can have necrosis

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Lymphoma



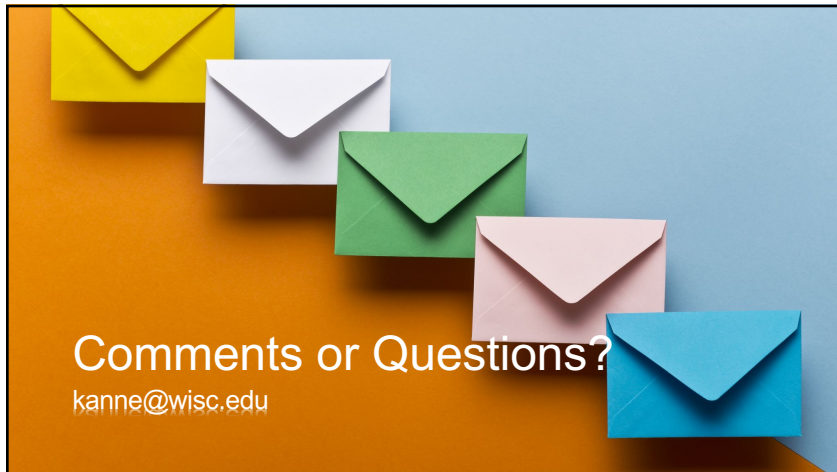
🔑 Lymphomas are often infiltrative and high attenuation

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Summary

- Differential diagnosis for mediastinal masses relies on combination of location, age, and imaging findings
- Most mediastinal neoplasms are malignant and require resection
- Most mediastinal neoplasms arise in the prevascular mediastinum

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