Objectives

- Assess tumor location, morphology, and attenuation and associated abnormalities
- Correlate with patient age, sex, symptoms
- Formulate a focused differential diagnosis

The Mediastinum

Definition: a median septum or partition
Tissues or organs separating the lungs
- Thymus, heart, trachea, esophagus, LNs

Boundaries:
- Sternum, vertebra, T-inlet, diaphragm
Arbitrary division into “compartments”
- Focuses differential diagnosis
- Facilitates surgical planning

Mediastinal Compartments

Anterior
- Prevascular: thymus, LNs, fat, left innominate vein
- Vascular: heart, great vessels, thoracic duct

Middle-posterior (visceral)
- Trachea
- Esophagus
- LNs, thoracic duct

Paravertebral: neurogenic structures

Case # 1

Anterior Mediastinal Mass

42-year-old man with weakness and ptosis

Unilateral anterior mass
Lobular contour
Ipsilateral pleural nodules
No pleural effusion
**Case # 1**
**Differential Diagnosis**
- Pre-vascular anterior mediastinal mass
- Ipsilateral pleural nodules
  - Invasive thymoma
  - Thymic carcinoma
- Lymphoma
- Lung cancer
- Metastases

**Diagnosis**
- Invasive Thymoma
- Ipsilateral “Drop” Metastases
- Mediastinoscopy

**Teaching Points: Thymoma**
- No true mediastinal “compartments”
- Anterior, middle – posterior, paravertebral
- Thymic neoplasms arise from one lobe, unilateral growth
- Thymoma: homogeneous unilateral AMM
  - 1/3 locally invasive, drop mets
  - Lymphadenopathy & pleural effusion rare
- Patients > 40 years, 70% parathyroid syndrome
  - Myasthenia gravis - 50%
  - Hypogammaglobulinemia – 10%
  - Pure RBC aplasia – 5%

**Case # 2**
**Differential Diagnosis**
- Ant mediastinal adenopathy, young adult
- Lymphoma
- Primary malignant germ cell neoplasm (male)
- Metastases
- Thymic malignancy
  - Carcinoma
  - Carcinoid

**20-year-old man with weight loss and chest pain**
- Cervical lymphadenopathy
- Bulky heterogeneous invasive AMM crosses midline
Case # 2
Diagnosis

Hodgkin Disease (HD)
Biopsy of cervical LN

Case # 2:
Teaching Points: Lymphoma

- 10 - 20% of mediastinal masses
- May involve any mediastinal compartment
- HD comprises 25% of lymphomas
  - 75% involves mediastinum
  - Spreads via contiguous lymph node groups
  - Mediastinal / cervical LN or large thymic mass
  - 20% exhibit cystic change; ++ pleural effusions
- NHL: unusual & extra-nodal sites
  - May be indistinguishable from HD

Case # 3

55-year-old man with weight loss and dyspnea

Case # 3
Ant & Mid-Post Mediastinal Mass

55-year-old man with weight loss and dyspnea

Case # 3
Differential Diagnosis

Invasive A & M-P Mediastinal Mass
- Lung cancer
- Lymphoma
- Metastases
- Thymic carcinoma

Case # 3
Diagnosis

Small Cell Lung Cancer
(Mediastinoscopy)
Case # 3: Teaching Points: Lung Cancer

Common malignant mediastinal mass
Small cell & squamous cell CA
May involve ant & mid-post compartments
Invasive
Mimics lymphoma or thymic carcinoma
Pulmonary nodule or mass may be present

SCCA Lung Carcinoma

Case # 4
47-year-old woman with hematuria
Thoracic mass found on abdominal CT

Imaging Findings
Mid – post mediastinal mass
Azygoesophageal recess
Paravertebral extension
Well-defined homogeneous
Low attenuation, non-enhancing
No pressure erosion
No intraspinal extension

Differential Diagnosis
Middle – Posterior Mediastinal Mass
Foregut duplication cyst
Bronchogenic
Esophageal
Pericardial cyst
Diaphragmatic hernia
Left atrial enlargement + double density
Aneurysm – proximity to heart & aorta
Case # 4
Diagnosis
Bronchogenic Cyst
Surgical Resection

Teaching Points: Foregut Cysts
Congenital mediastinal cysts
Typically middle – post mediastinum
Bronchogenic cyst contiguous to central airway
- paratracheal or subcarinal
- unilocular cyst
- homogeneous non-enhancing contents
- variable attenuation or signal intensity
- mural enhancement

Bronchogenic Cyst Mimic a mass
High attenuation contents
Milk of calcium
Courtesy of Joel Shockley, M.D.

Pericardial Cyst

Left Atrial Enlargement
May mimic a mass

Case # 5
75-year-old woman with chest pain
Case # 5
Differential Diagnosis

Middle – Posterior Mediastinal Mass
- Aneurysm
- Lymphoma
- Metastases
- Hiatus hernia
- Esophageal mass / dilation

Case # 5
Diagnosis
Thoraco-Abdominal Aneurysm

Case # 5
Teaching Points: Vascular
- ~10% of mediastinal masses
- Typically middle-aged and elderly adults
- Ascending aortic aneurysm mimics AMM
- Arch or descending aneurysm mimics mid-post mass
- Cross-sectional imaging establishes diagnosis

Case # 6
57-year-old woman with dysphagia

Case # 6
Differential: Paravertebral Mass
- Neurogenic neoplasm
- Aneurysm
- Meningocele
- Malignancy
  - Lymphoma
  - Lung cancer
  - Metastases
  - Bronchogenic cyst
  - Extra-medullary hematopoiesis
  - Osteomyelitis

Spherical heterogeneous mass
Vertebral pressure erosion, neuroforaminal extension
**Case # 6**

**Diagnosis**

Schwannoma

Surgical Resection

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**Case # 6 Paravertebral**

**Teaching Points**

- Not true part of mediastinum
- Neurogenic tumors common
- 90% benign, 10% multiple
- Slow growing → bone pressure erosion
- 10% intraspinal extension
- Peripheral nerve origin: spherical
  - Schwannoma & neurofibroma
  - Homogeneous or heterogeneous, cystic change
- Sympathetic ganglia tumors: oblong

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**Summary: Anterior Med Masses**

Primary thymic neoplasms
- Thymoma > 40 years old
- Malignant: carcinoma, carcinoid
- Thymolipoma
- Non-neoplastic thymic enlargement
- Germ cell neoplasms
- Arise from one lobe, unilateral growth
- Benign thymic cyst is rare, exclude cystic neoplasm

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**Summary: Ant-Middle Med Masses**

- May involve more than one compartment
- Intra-thoracic goiter: cervico-thoracic mass
- Lymphoma: 10 – 20% of mediastinal masses
- Lung cancer
- Mediastinal lymphadenopathy
  - Malignant - lymphoma
  - Benign - sarcoidosis, silicosis

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**Summary: Mediastinal Cysts**

- Thymic cyst
- Pericardial cyst
- Foregut duplication
- Meningocele

**Fat-containing Lesions**

- Lipoma, pericardial fat
- Lipomatous herniations
- Thymolipoma
- Mature teratoma

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**Summary: Middle – Post Med Masses**

- Mediastinal LAN
  - Benign (sarcoid) or malignant (lymphoma)
- Congenital cysts
- Vascular lesions (10%)
- Esophageal: carcinoma, achalasia
- Tracheobronchial
### Summary: Paravertebral Masses

- Neurogenic neoplasms most common
- Spherical morphology: peripheral nerve
  - Schwannoma, NF
  - Lateral thoracic meningocele
  - Multiplicity - neurofibromatosis
- Elongate: sympathetic ganglion
  - Ganglioneuroma, neuroblastoma
- Extramedullary hematopoiesis