AMSER Case of the Month October 2025

47-year-old male presenting with sore throat, cough, and shortness of breath

Parshva Salvi, MS4

Wayne State University School of Medicine

Caleb Dulak, MD (PGY-2)

Dharshan Vummidi, MD

Henry Ford Hospital

Patient Presentation

- HPI: A 47-year-old male presented to the clinic with complaints of worsening productive cough, sore throat , and shortness of breath for the past 6 months. Pt states that the cough gets worse after eating.
- He notes a new presence of blue markings (varicose veins) on his rib cage and is wondering if that is from coughing too much. He also states that he has been having some facial and neck swelling recently.
- Denies fever, chills, chest pain, sinus tenderness, weight loss, fatigue. He has been taking OTC Benadryl for his allergies for the past 6 months with moderate relief

Patient Presentation

- PMHx: Basal cell carcinoma of back, obstructive sleep apnea, rosacea, irregular heartbeat
- PSHx: Vascetomy, surgical excision of BCC
- Family Hx: Colon cancer in father who died at 48. Lung cancer in grandmother and grandfather
- Social Hx: 3 drinks/week, denies smoking & illicit drug use

Patient Presentation

- Meds: None
- Vitals: BP 116/74, Pulse 76, Temp 36.6, SpO2 96%
- Physical Exam:
  - Rhinorrhea and posterior oropharyngeal erythema present
  - Scant varicose veins on the left side of the chest below the nipples

Pertinent Labs

- CBC: Normal
- BMP: Na 132, otherwise normal

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 1: **Chronic cough lasting more than 8 weeks. No known risk factors for lung cancer. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	☢
CT chest with IV contrast	May Be Appropriate	☢☢☢
CT chest without IV contrast	May Be Appropriate	☢☢☢
MRI chest without and with IV contrast	Usually Not Appropriate	0
MRI chest without IV Contrast	Usually Not Appropriate	0
CT chest without and with IV contrast	Usually Not Appropriate	☢☢☢
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢

This imaging modality was ordered in clinic by the attending physician

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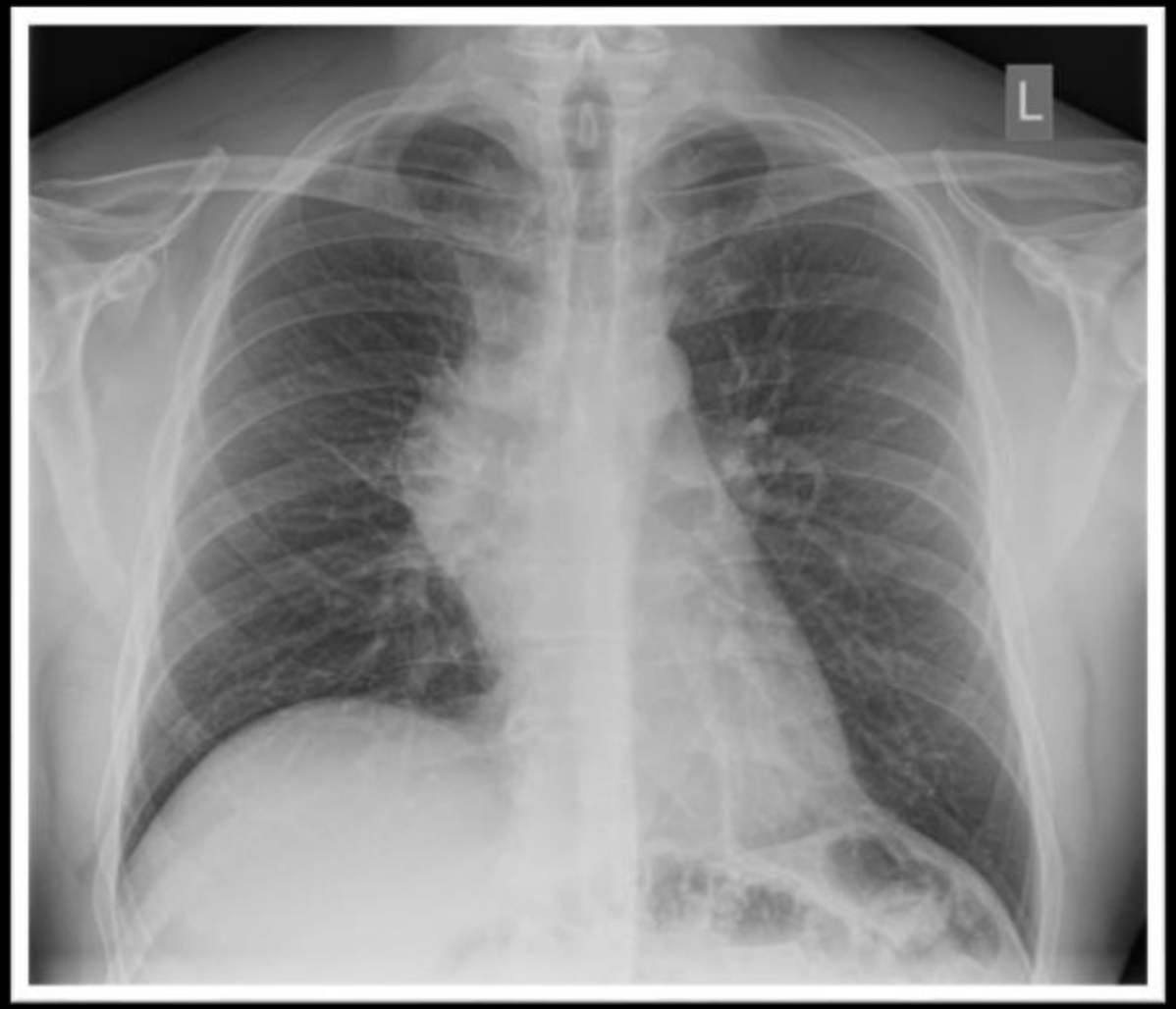
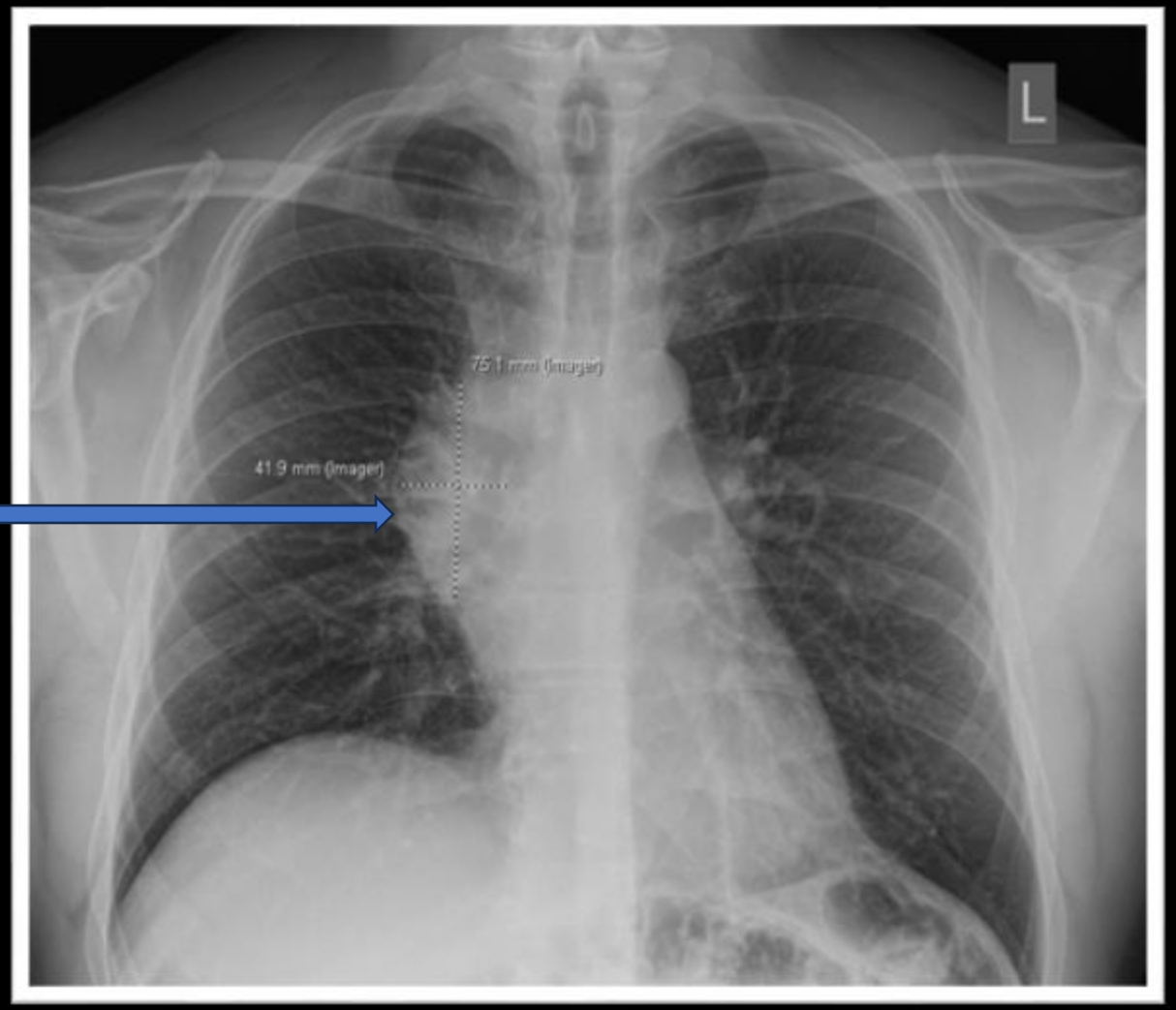
Findings (unlabeled)



Findings: (labeled)

Ill-defined soft tissue prominence in the right hilum, measuring 7.5 x 4.2 cm concerning for mass or lymphadenopathy



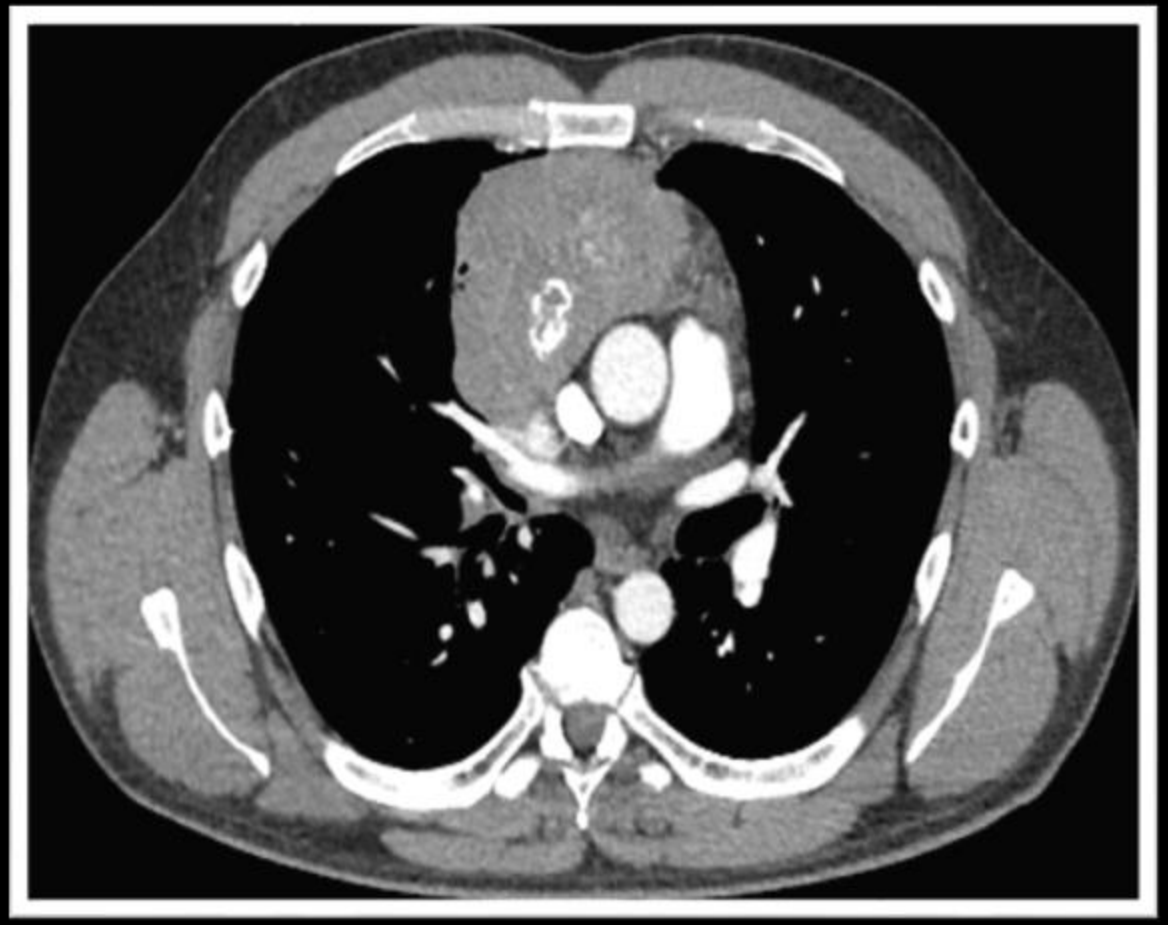
Select the applicable ACR Appropriateness Criteria

Variant 2: **Indeterminate mediastinal mass on radiography. Next imaging study.**

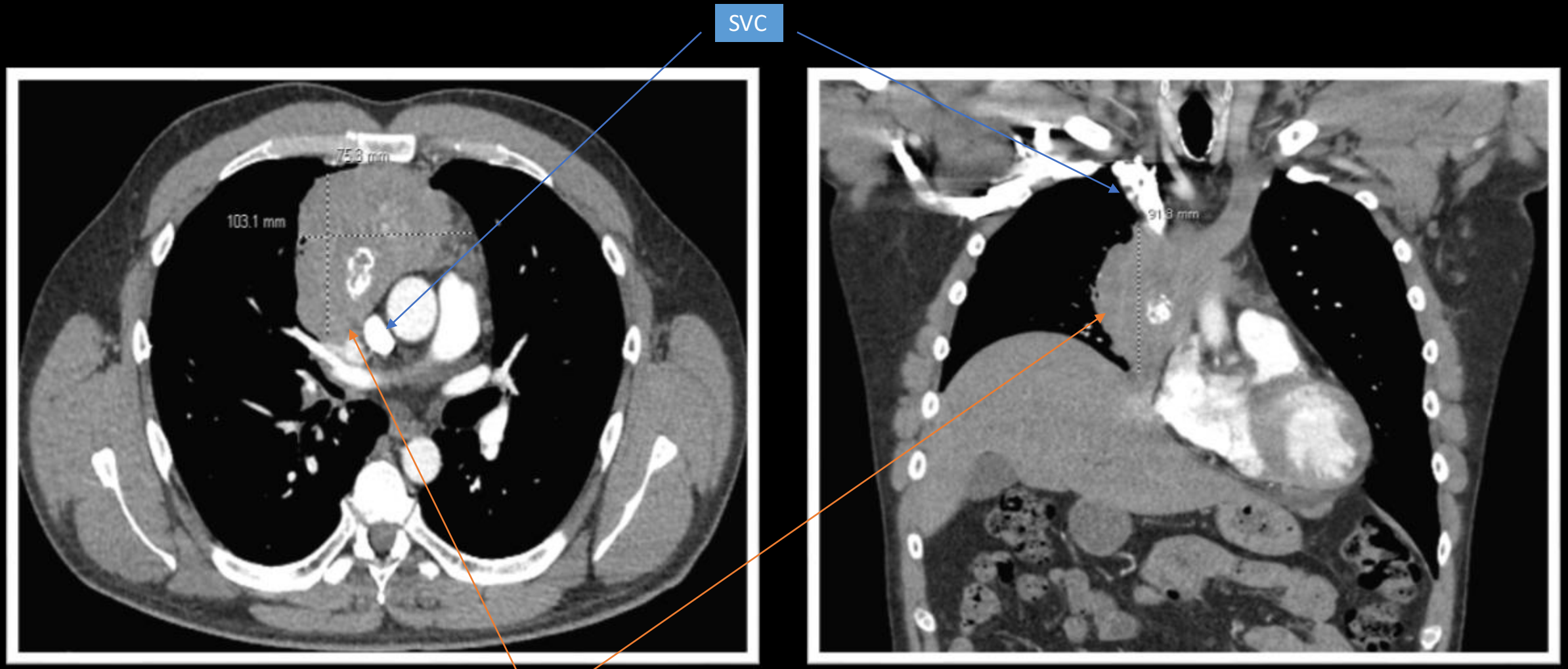
Procedure	Appropriateness Category	Relative Radiation Level
MRI chest without and with IV contrast	Usually Appropriate	0
MRI chest without IV contrast	Usually Appropriate	0
CT chest with IV contrast	Usually Appropriate	☢☢☢
CT chest without IV contrast	Usually Appropriate	☢☢☢
US chest	Usually Not Appropriate	0
Image-guided transthoracic needle biopsy	Usually Not Appropriate	Varies
CT chest without and with IV contrast	Usually Not Appropriate	☢☢☢
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢

This imaging modality was ordered to further characterize the mediastinal mass

Findings (unlabeled)



Findings: (labeled)



Heterogeneous partially calcified mass within the anterior mediastinum measuring 10.3 x 7.5 x 9.1 cm with broad-based pericardial contact and encasement of the SVC resulting in significant narrowing

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Mediastinum Biopsy Findings

- CT-guided biopsy of the mediastinal mass was done
- Pathology results were significant for thymic carcinoma

Final Dx:

Thymic Carcinoma

Case Discussion

- Differential Diagnosis[1]

Diagnosis (4 T's)	Key Features
Thymic Tumors	Thymoma (benign), **Thymic carcinoma** (malignant, invasive)
Teratoma	Germ cell tumor; can contain fat, calcifications
Terrible Lymphoma	Often in younger patients; B symptoms; homogeneous mass
Thyroid	Substernal/ectopic goiter: continuity with thyroid; OR Thyroid carcinoma

- Other possible diagnosis: Pericardial or thymic cyst[2], Parathyroid adenoma/hyperplasia (ectopic)[3]

Case Discussion

- Epidemiology and Pathophysiology[4-8]
  - Thymic Carcinoma is a rare, aggressive epithelial malignancy of the anterior mediastinum
  - Accounts for approximately 0.4–0.5 cases per million annually, with a mean age at diagnosis in the sixth decade.
  - Characterized by overt cytologic atypia, a lack of organotypic thymic features, and an absence of immature T lymphocytes (thymocytes), which are typically present in thymomas
  - Histologically, thymic carcinoma demonstrates malignant epithelial cells with marked nuclear atypia, increased mitotic activity, necrosis, and a desmoplastic stroma.
  - The most common histologic subtype is squamous cell carcinoma, but other variants exist.

Case Discussion

- Diagnostic workup[9-11]
  - Serum tumor markers (essential to exclude other diagnoses)
    - Measure AFP and β-hCG to rule out germ cell tumors, and TSH, T3, and T4 to exclude ectopic thyroid tissue
    - CYFRA 21-1 is often elevated in thymic carcinoma
  - Imaging:
    - CT w/ contrast: Lobulated, infiltrative anterior mass; necrosis or calcification common
    - PET-CT: High FDG uptake, helpful for staging
  - Biopsy: Needed for definitive diagnosis (CT-guided core or mediastinoscopy)

Case Discussion

- Radiologic features of anterior mediastinal masses

Diagnosis	CT Features	Differentiating Clues
Thymoma[14]	Well-circumscribed, round or lobulated mass; mild to moderate homogeneous enhancement; calcification uncommon; rarely invasive.	Encapsulated; lacks significant lymphadenopathy; mild enhancement.
Thymic Carcinoma[14]	Large, irregular, poorly marginated mass; heterogeneous enhancement; frequent necrosis/cystic change; lymphadenopathy common.	More invasive than thymoma; invades vessels; distant metastases.
Germ Cell Tumor (Teratoma)[15]	Well-defined, lobulated mass with soft tissue, fat, fluid, and calcification (e.g., teeth or bone).	Fat-fluid levels highly specific; macroscopic fat + calcification = teratoma.
Lymphoma[16]	Large, homogeneous soft-tissue mass; may envelop but not invade mediastinal structures; necrosis uncommon.	Encases vessels without invasion; mediastinal lymphadenopathy; compressive symptoms.
Substernal/Ectopic Thyroid Goiter[17]	High attenuation on non-contrast CT (iodine); intense heterogeneous enhancement; calcifications and cysts may be present.	Continuity with thyroid gland; well-defined margins; tracheal deviation possible.
Thyroid Carcinoma[17]	Solid, irregular mass with calcifications; invasive behavior; possible lymphadenopathy.	Invasive margins; continuity with thyroid; intense enhancement.

Case Discussion

- Management and Prognosis:
  - **resectable, non-metastatic:** complete surgical resection with open thymectomy and mediastinal nodal dissection, with adjuvant radiation
    - most significant favorable prognostic factor.[12]
  - **unresectable, locally advanced, or metastatic:** platinum-based chemotherapy (commonly carboplatin plus paclitaxel) is standard first-line therapy, with or without concurrent radiotherapy.[13]
- Requires multidisciplinary team approach (surgery, oncology, radiation)
- Prognosis is poor compared to thymoma, with 5-year survival rates of 30–50% due to frequent advanced-stage presentation and higher rates of recurrence and metastasis.[10]

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