

AMSER Rad Path Case of the Month:

68 year old male with chest pain



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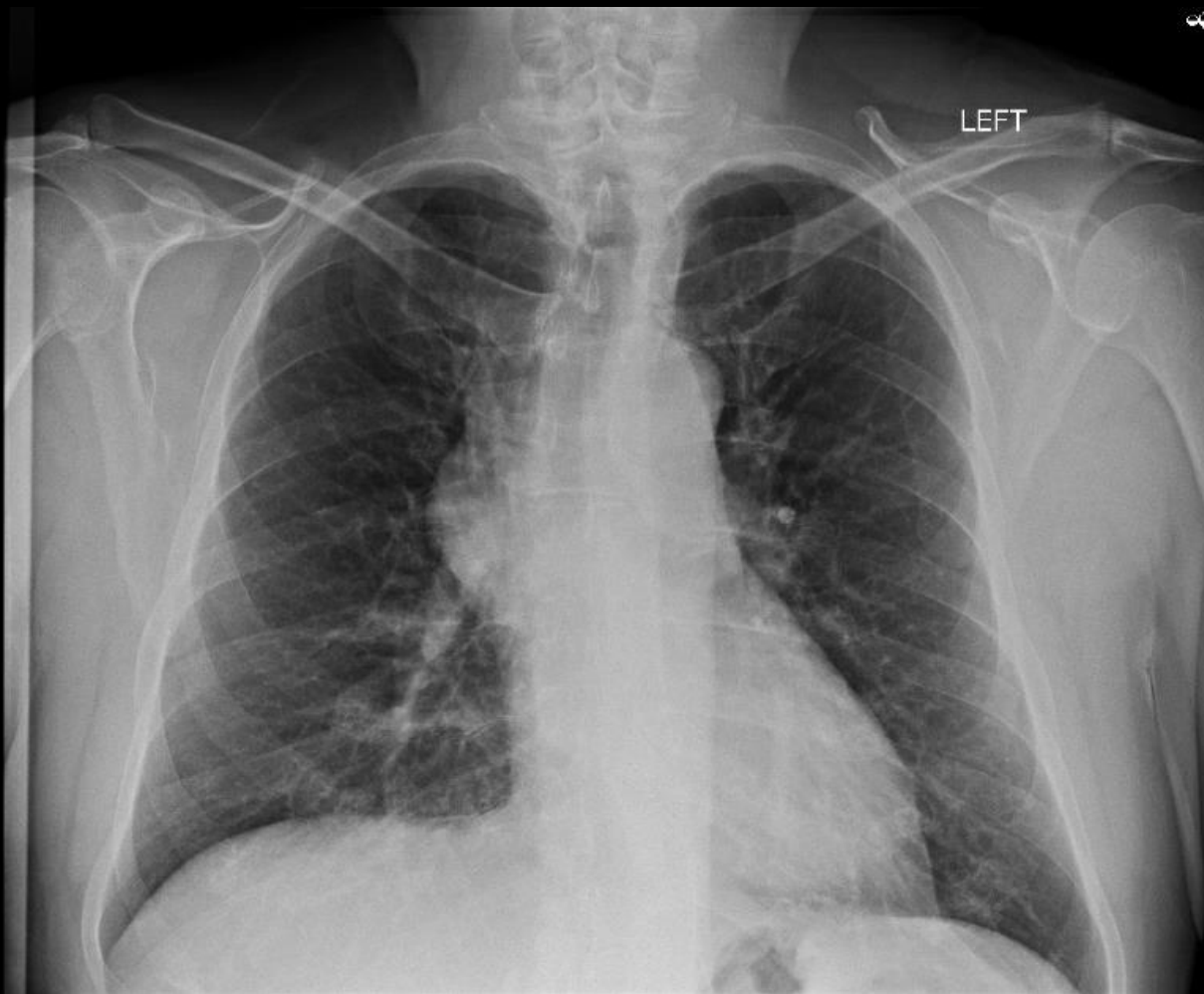
Patient Presentation

- HPI: 68 y/o male with history of HTN and DM who presents with chest pain. Workup for acute coronary syndrome, including stress test, was negative. Chest imaging was performed.
- PMH: HTN on irbesartan; DM on metformin
- SHx: nonsmoker, 1 drink/week
- ROS: Denies fevers, night sweats, headaches, shortness of breath, cough, palpitations. Reports weight loss, fatigue.
- PE: BP 136/90 mmHg, HR 72, lungs clear to auscultation bilaterally, heart normal rate and rhythm

Variant 1:**Chest pain, low to intermediate probability for acute coronary syndrome. Initial imaging.**

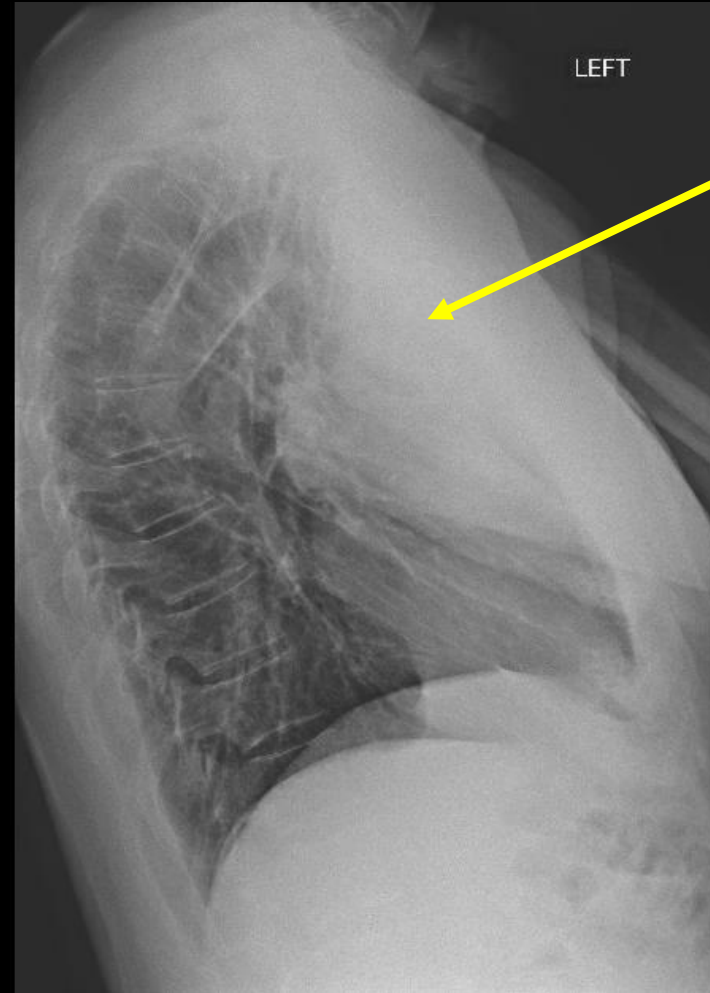
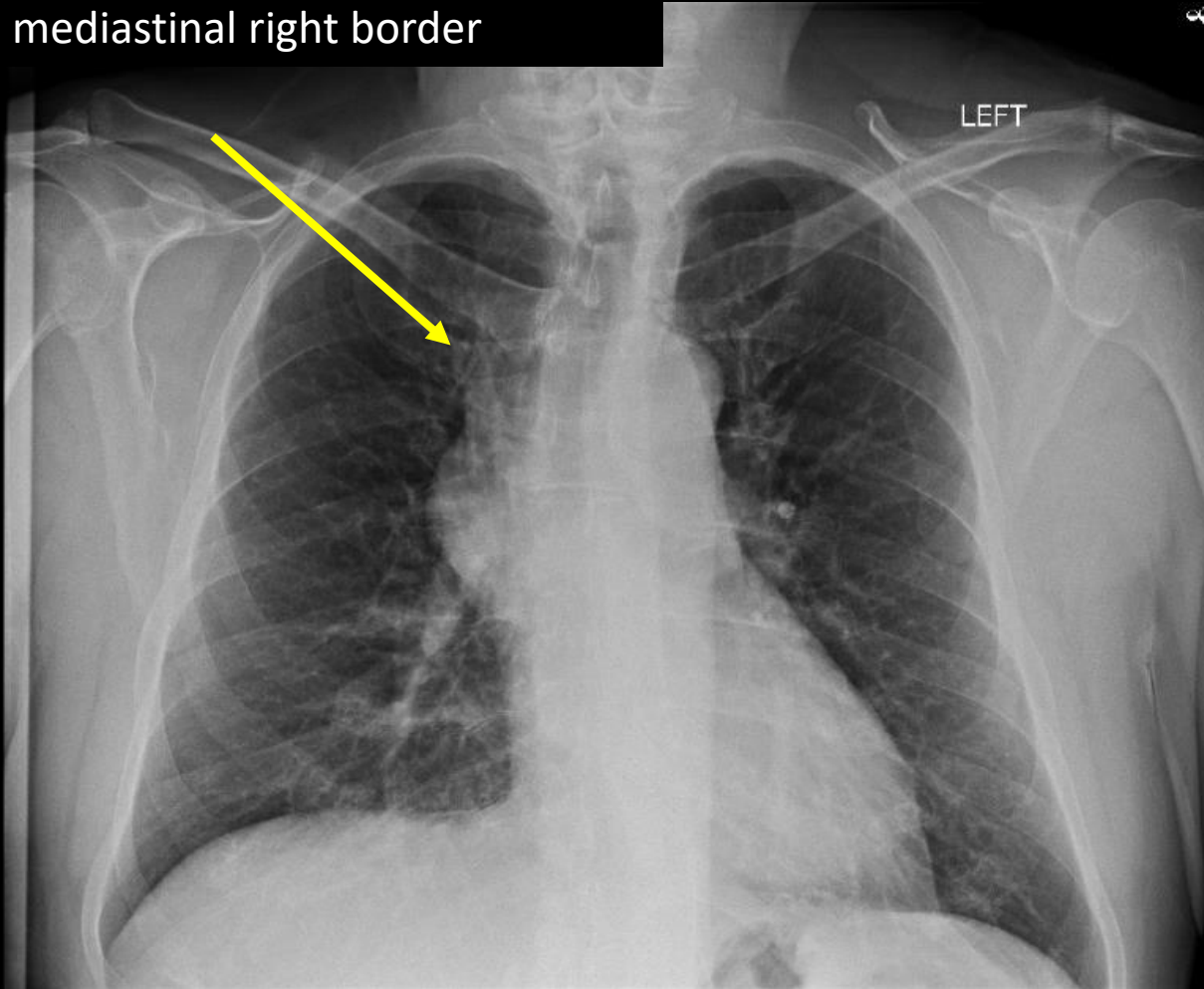
Procedure	Appropriateness Category	Relative Radiation Level
CTA coronary arteries with IV contrast	Usually Appropriate	☼☼☼
Radiography chest	Usually Appropriate	☼
Tc-99m SPECT/CT MPI rest and stress	Usually Appropriate	☼☼☼☼
US echocardiography transthoracic stress	Usually Appropriate	○
MRI heart with function and vasodilator stress perfusion without and with IV contrast	May Be Appropriate	○
Rb-82 PET/CT heart stress	May Be Appropriate (Disagreement)	☼☼☼
Tc-99m SPECT/CT MPI rest only	May Be Appropriate	☼☼☼
US echocardiography transthoracic resting	May Be Appropriate	○
CT coronary calcium	May Be Appropriate	☼☼☼
CTA chest with IV contrast	May Be Appropriate	☼☼☼
MRI heart function and morphology without and with IV contrast	May Be Appropriate	○
MRI heart with function and inotropic stress without and with IV contrast	May Be Appropriate	○
MRI heart with function and inotropic stress without IV contrast	May Be Appropriate	○
CT chest with IV contrast	Usually Not Appropriate	☼☼☼
CT chest without and with IV contrast	Usually Not Appropriate	☼☼☼
MRI heart function and morphology without IV contrast	Usually Not Appropriate	○
Arteriography coronary	Usually Not Appropriate	☼☼☼
CT chest without IV contrast	Usually Not Appropriate	☼☼☼
MRA coronary arteries without and with IV contrast	Usually Not Appropriate	○
MRA coronary arteries without IV contrast	Usually Not Appropriate	○
US echocardiography transesophageal	Usually Not Appropriate	○

CXR (unlabeled)



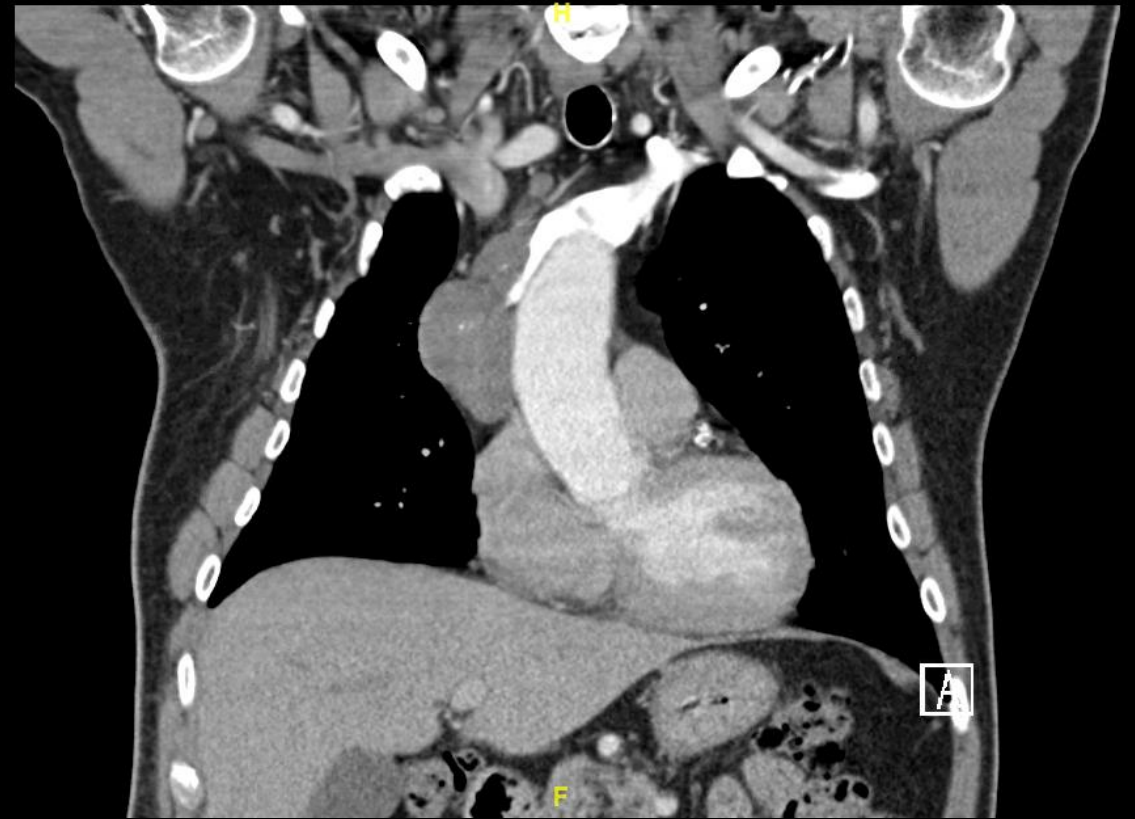
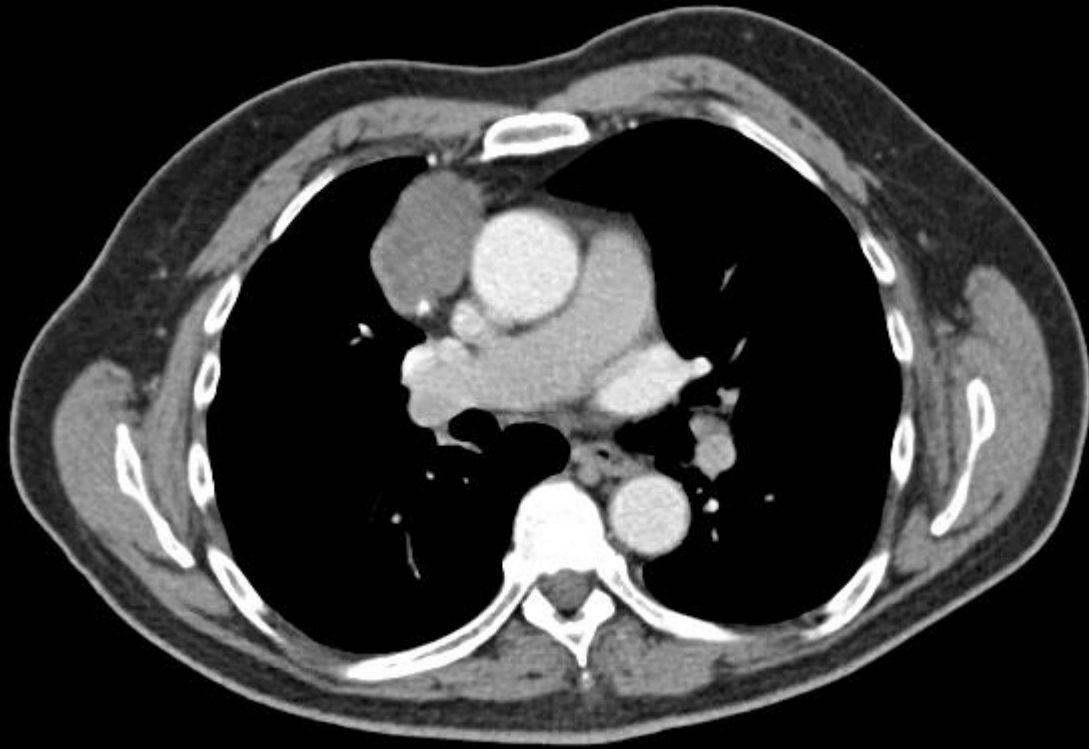
CXR (labeled)

Widened right paratracheal stripe by a radiopaque density which obscures the superior mediastinal right border



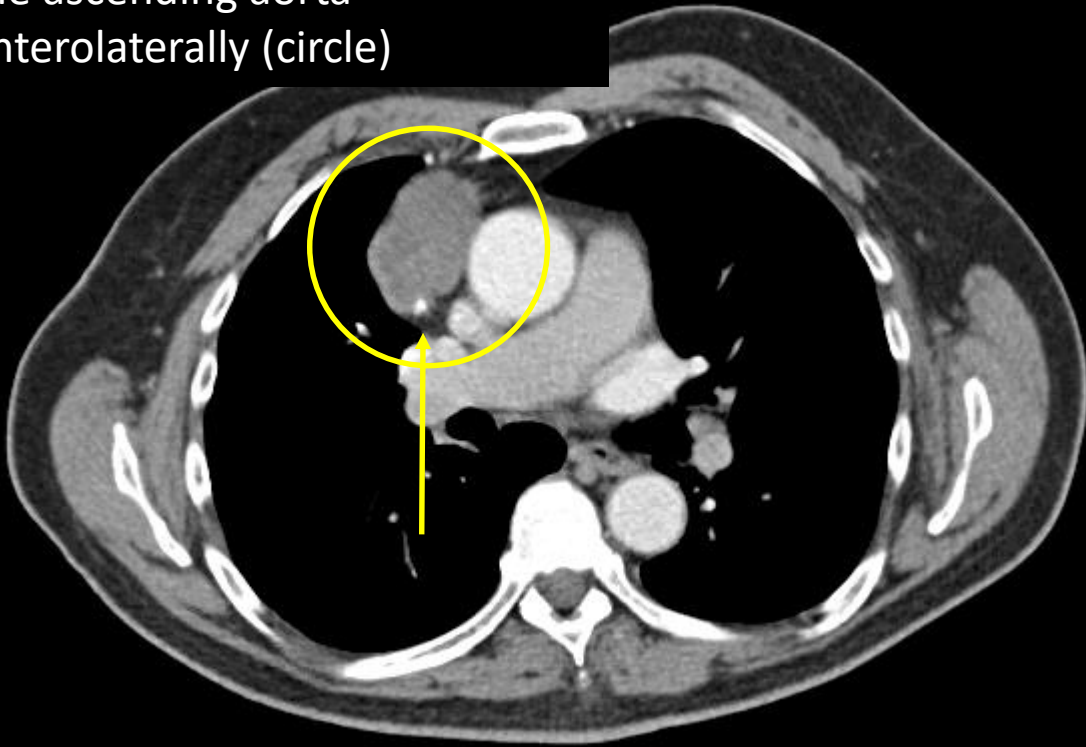
Effacement of retrosternal clear space

CT Chest w/ IV contrast (unlabeled)

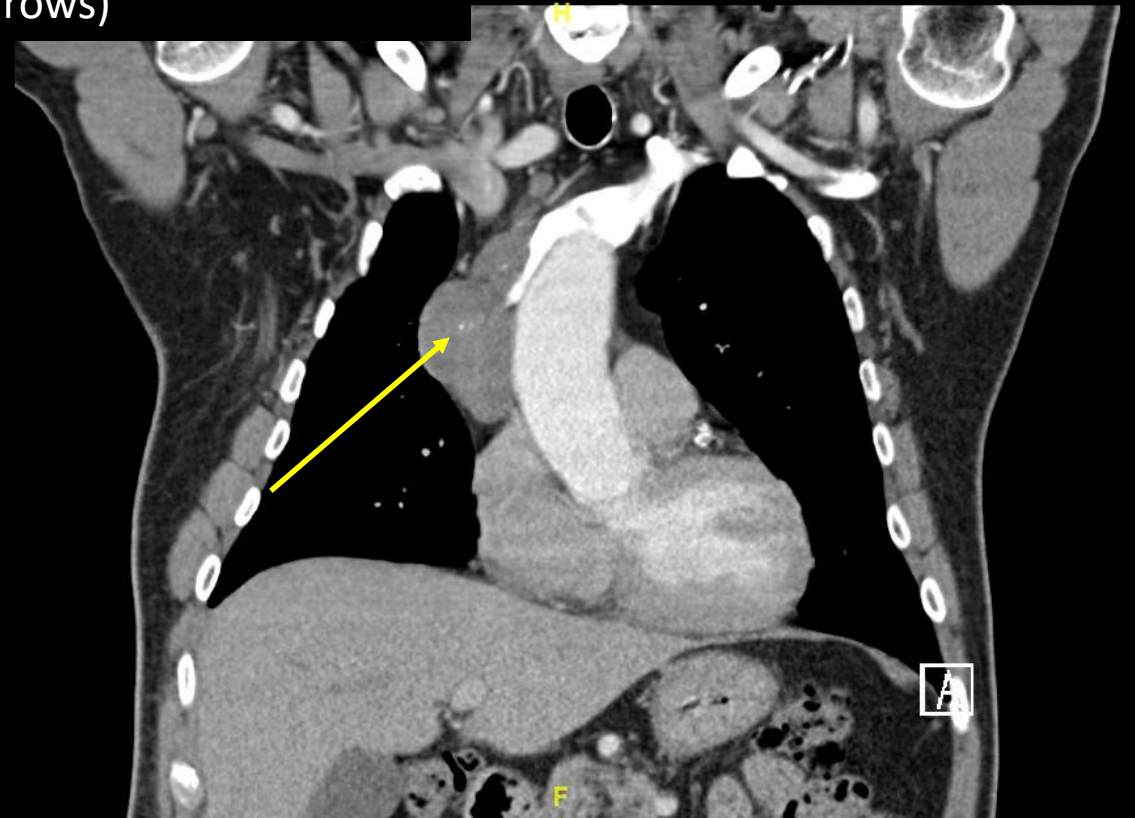


CT Chest w/ IV contrast (labeled)

Hypodense, lobulated anterior mediastinal mass which abuts the ascending aorta anterolaterally (circle)



The mass shows punctate hyperdense foci internally (arrows)

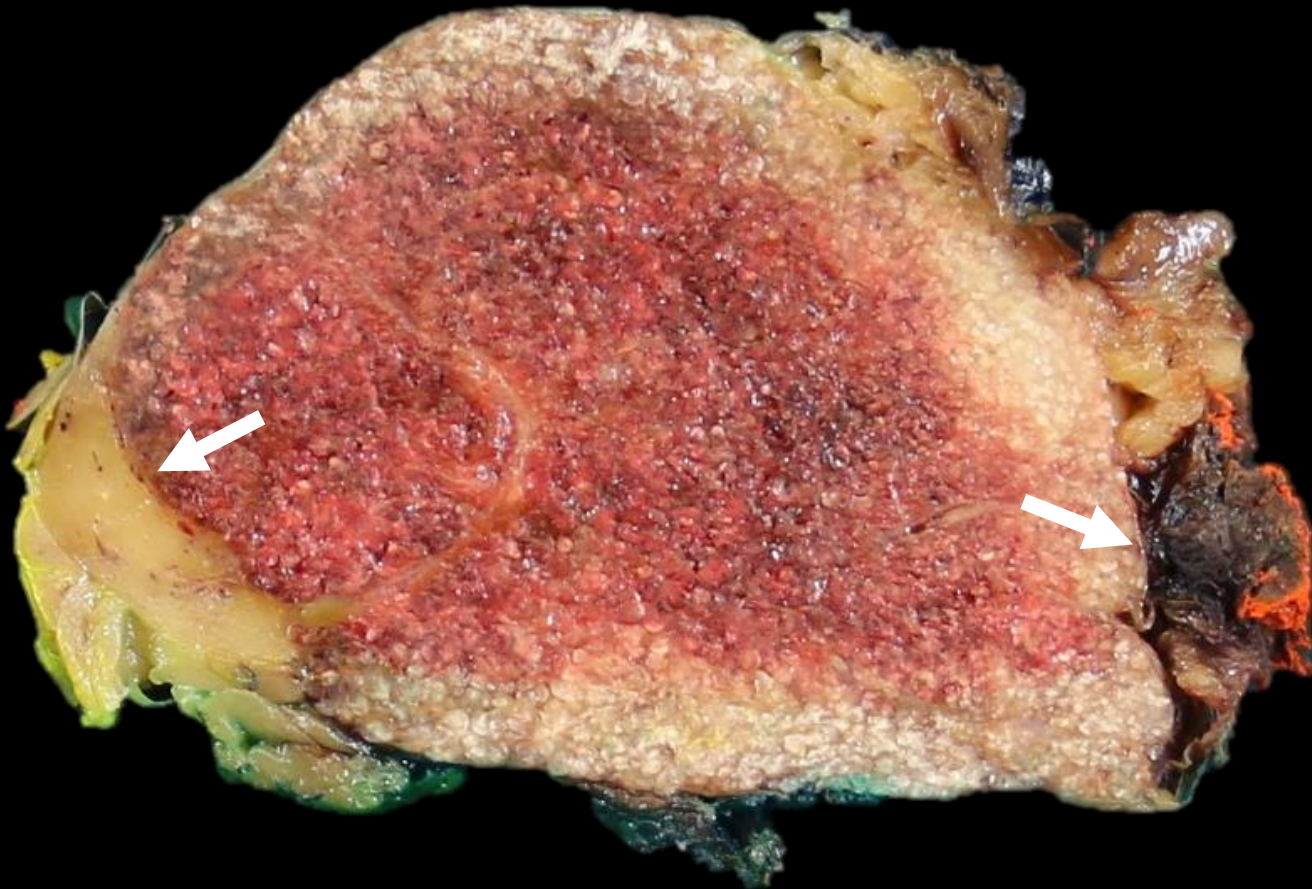


DDx of Anterior Mediastinal Mass: Terrible T's

- Thymoma
- Terrible lymphoma
- Thyroid
 - Ectopic or goiter
- Teratoma
 - And other germ cell tumors
- Thoracic aortic aneurysm
- **Other rare causes**

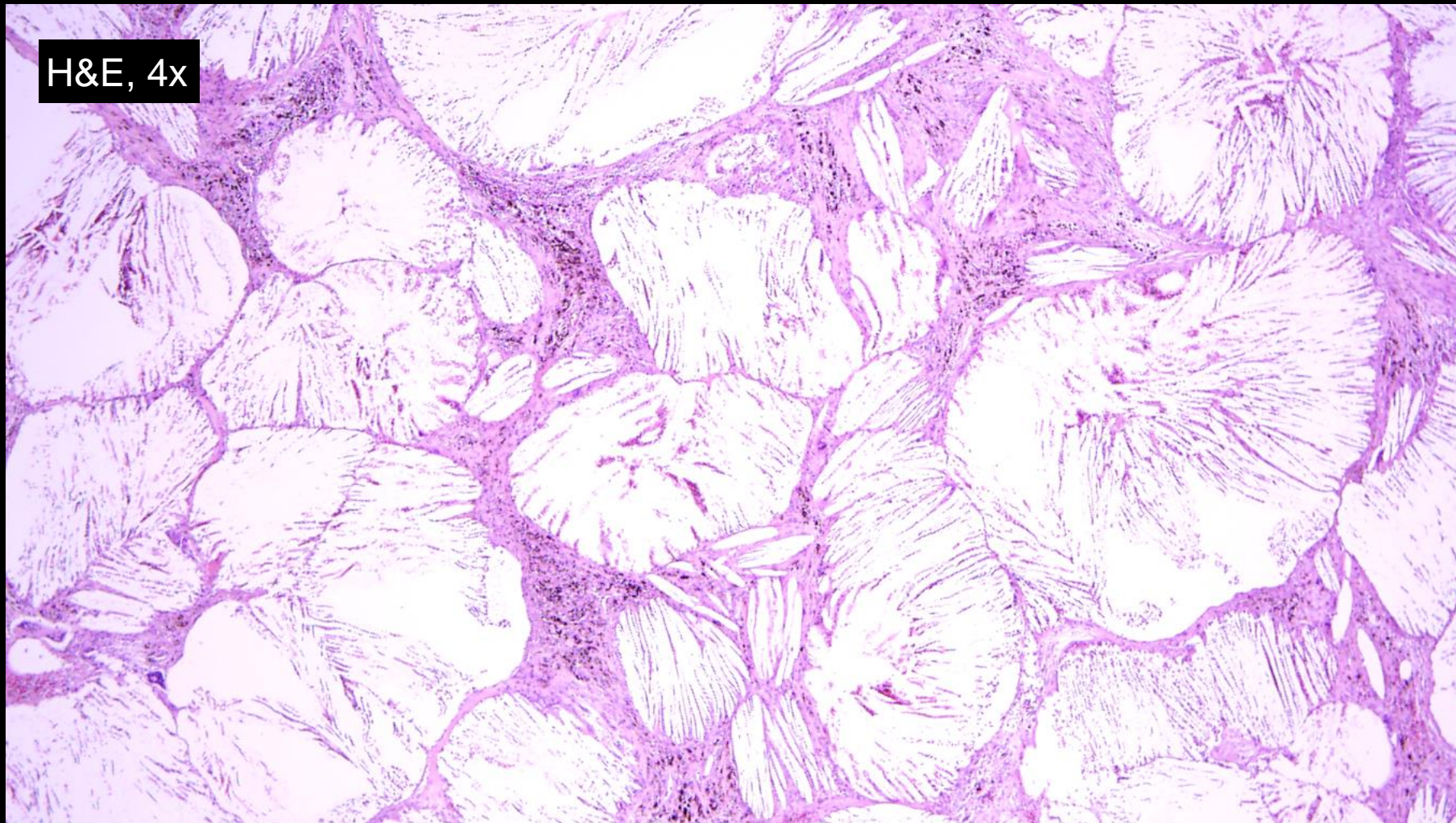
The mass was resected and sent to pathology.

Gross Specimen (labeled)



- Well-circumscribed, lobulated, red-tan mass (10.0 x 8.8 x 4.0 cm) with granular cut surfaces
- Mass is not grossly infiltrative into surrounding adipose or soft tissue (white arrows highlight distinct border)

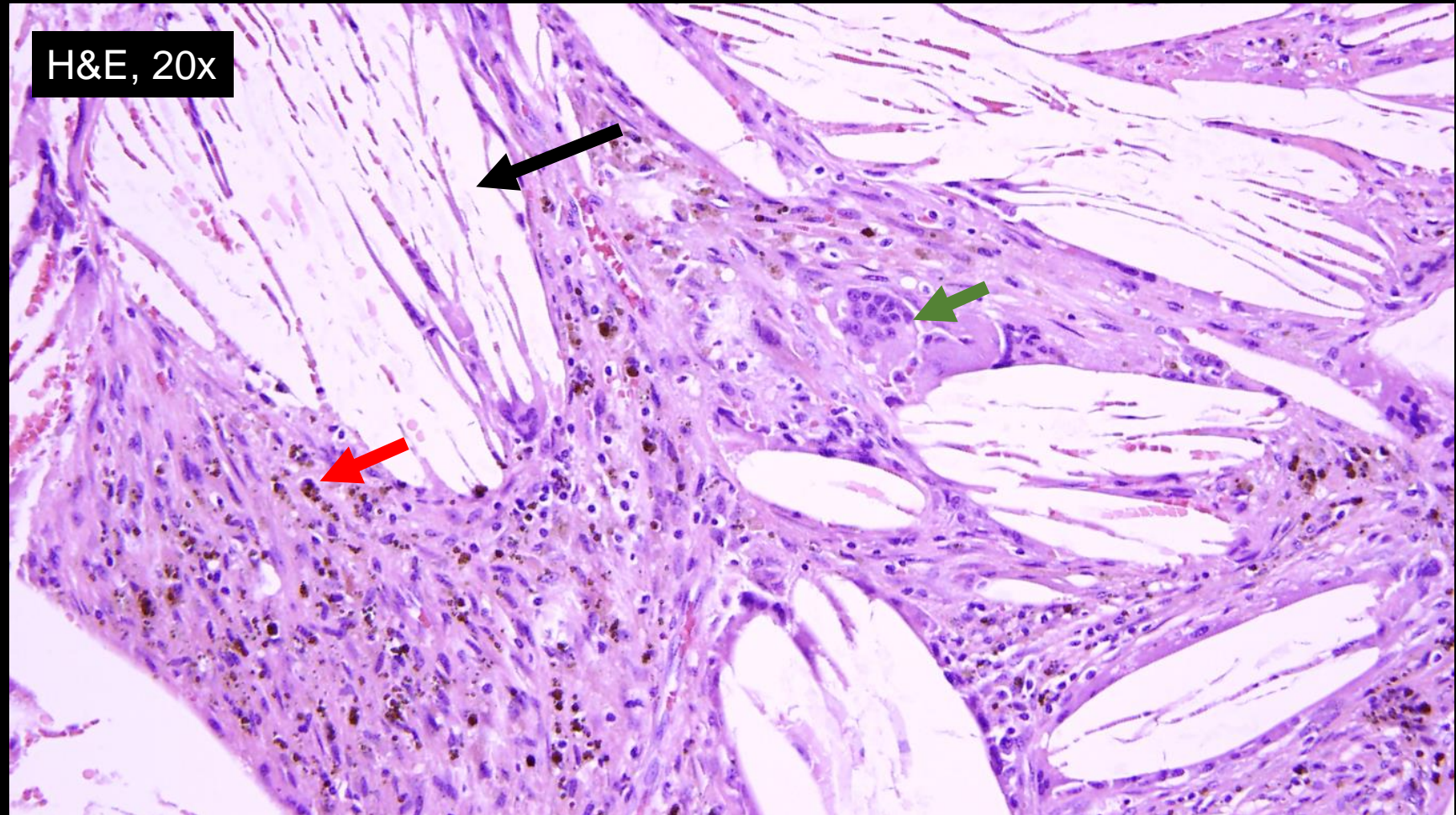
Histopathology (labeled)



- Histology reveals numerous cholesterol clefts embedded in a collagenous stroma with hemosiderin deposition
- There is no evidence of malignancy

Histopathology (labeled)

- A higher magnification image more readily demonstrates abundant cholesterol clefts (black arrow) within a collagenous stroma containing bland fibroblasts and prominent hemosiderin deposition (red arrow)
- Associated foreign-body giant cells (green arrow) are present



Final Dx:

Cholesterol Granuloma

Cholesterol Granuloma

- Rare, benign entity
- Pathogenesis:
 - Not necessarily linked with serum cholesterol levels
 - Form due to giant cell reaction to cholesterol crystals, resulting in granuloma formation
 - Can develop in any region of body where cholesterol crystal deposition can occur
 - Most commonly found in middle ear granulation tissue in chronic otitis media
 - Also can affect the facial skeleton, skull, or any location affected by trauma
 - Source of cholesterol is suggested to be from degenerated cells due to inflammation or transudate from serum
 - Anterior mediastinal cholesterol granulomas have been associated with prior trauma and multilocular thymic cysts
- Can be incidental or symptomatic due to mass effect

Cholesterol Granuloma

- Imaging findings:
 - CT:
 - Expansile, sharply marginated lesions with or without thin, calcified rim
 - Do not enhance with contrast
 - May be aggressive in appearance if located at petrous apex, but appear more benign in other locations
 - MRI:
 - Hyperintense on T1
 - Due to cholesterol crystals and accumulation of free methemoglobin
 - May or may not have low signal rim
 - Hyperintense on T2
 - Central high signal with or without peripheral low signal
 - Do not attenuate on FLAIR

Cholesterol Granuloma

- Histopathology:
 - Gross examination:
 - May appear solid to cystic, with red-brown to yellow-tan granular cut surfaces
 - May contain central degeneration and/or yellow-brown fluid
 - Microscopic examination:
 - Granulation tissue associated with cholesterol clefts, hemosiderin, histiocytes, and foreign body giant cells
 - Cholesterol clefts may be extracellular or within giant cells
 - May be surrounded by a fibrous capsule
- Management:
 - Dictated by location, size, and presentation of lesion
 - If symptomatic, surgical excision

References

- ACR Appropriateness Criteria: Chest Pain – Possible Acute Coronary Syndrome
- Krishnan TR, Sinha SK, Kejriwal NK. A rare case of cholesterol granuloma in the anterior mediastinum. *Heart Lung Circ.* 2013;22:303–4. doi: 10.1016/j.hlc.2012.07.009
- Luckraz, Heyman et al. Cholesterol Granuloma of the Superior Mediastinum. *The Annals of Thoracic Surgery*, Volume 81, Issue 4, 1509 – 1510
- Gaillard, Frank. “Cholesterol Granuloma.” *Radiopaedia*, <https://radiopaedia.org/articles/cholesterol-granuloma?lang=us>.