AMSER Case of the Month August 2025

Persistent Atypical Chest Pain in a 69-Year-Old Woman with Cholelithiasis

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Patient Presentation

- A 69-year-old African American woman presented for cardiac risk stratification before elective laparoscopic cholecystectomy. She had been experiencing episodic, left-sided chest pain and pressure at rest for over four years. Pain reached 10/10 intensity, lasted several minutes, and resolved spontaneously. A prior stress echo in 2022 was negative.

Symptoms:

- Left-sided chest pain (non-exertional, episodic, severe)
- Denies dyspnea, syncope, palpitations, edema, or exertional symptoms
- Fully independent, functional, and ambulatory

Past Medical History & Medications

- **Medical History:**
  - Thoracic aortic aneurysm (3.3 cm, stable)
  - Abdominal aortic ectasia (2.5 cm, stable)
  - Gallstones and diverticulitis
  - Tubular adenomas (2014, 2018)
  - Anemia
- **Surgical History:** Colonoscopy, D&C, Cyst excision
- **Medications:** Multivitamin (THERAGRAN), Biotin

Pertinent Labs

- Hemoglobin: 11
- WBC: 3.9
- Troponin (HS-cTnI): <4
- BNP: 10

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Revised 2020

American College of Radiology
ACR Appropriateness Criteria®
Acute Nonspecific Chest Pain-Low Probability of Coronary Artery Disease

Variant 1: **Acute nonspecific chest pain; low probability of coronary artery disease. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	☢
CTA coronary arteries with IV contrast	Usually Appropriate	☢☢☢
US echocardiography transthoracic resting	May Be Appropriate (Disagreement)	O
Radiography ribs and thoracic spine	May Be Appropriate	☢☢
CT chest with IV contrast	May Be Appropriate	☢☢☢
CT chest without and with IV contrast	May Be Appropriate	☢☢☢
CT chest without IV contrast	May Be Appropriate	☢☢☢
CTA chest with IV contrast	May Be Appropriate	☢☢☢
V/Q scan lung	May Be Appropriate	☢☢☢
US echocardiography transesophageal	Usually Not Appropriate	O
US echocardiography transthoracic stress	Usually Not Appropriate	O
Arteriography coronary	Usually Not Appropriate	☢☢☢
Fluoroscopy upper GI series	Usually Not Appropriate	☢☢☢
MRA chest without and with IV contrast	Usually Not Appropriate	O
MRA chest without IV contrast	Usually Not Appropriate	O
MRA coronary arteries without and with IV contrast	Usually Not Appropriate	O
MRA coronary arteries without IV contrast	Usually Not Appropriate	O
MRI heart function and morphology without and with IV contrast	Usually Not Appropriate	O
MRI heart function and morphology without IV contrast	Usually Not Appropriate	O

This imaging modality was ordered by the ER physician

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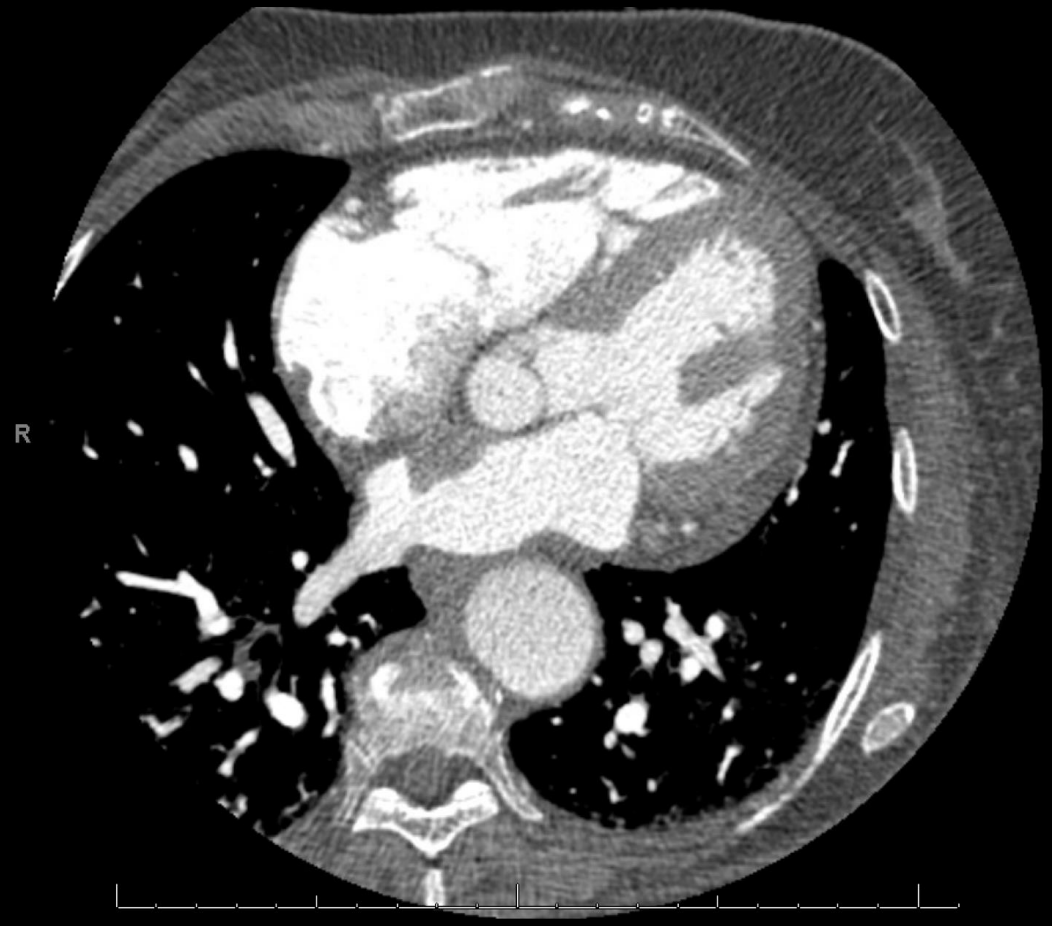
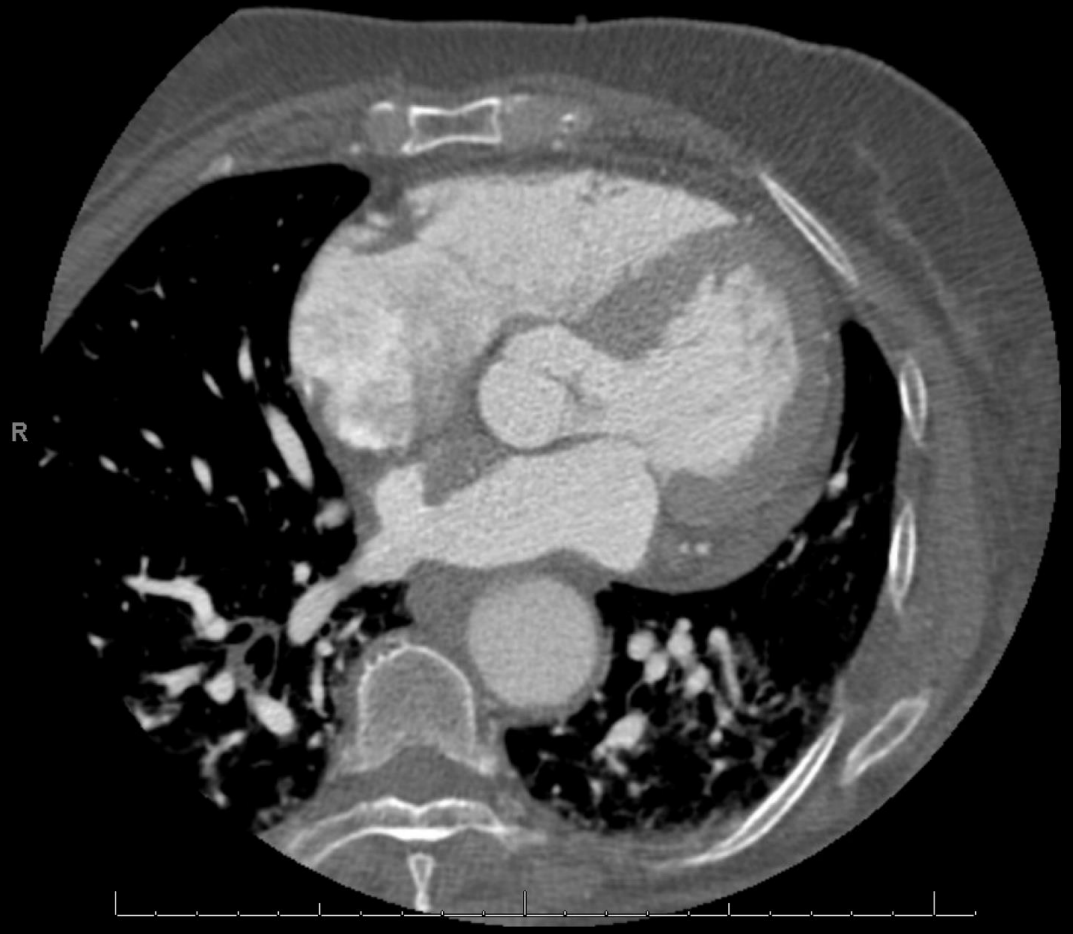
Findings (unlabeled)





Coronary CTA

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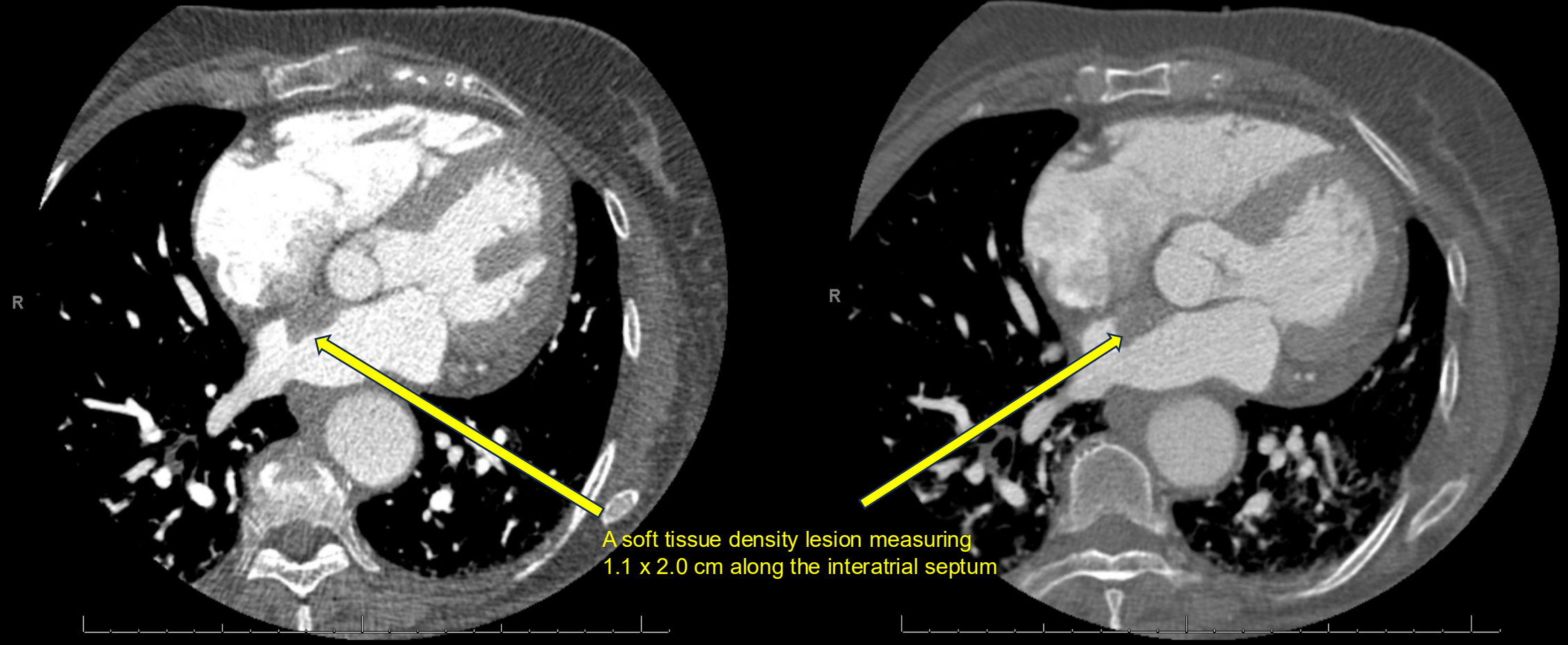
Findings: (labeled)



Coronary CTA

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Select the applicable ACR Appropriateness Criteria

New 2024

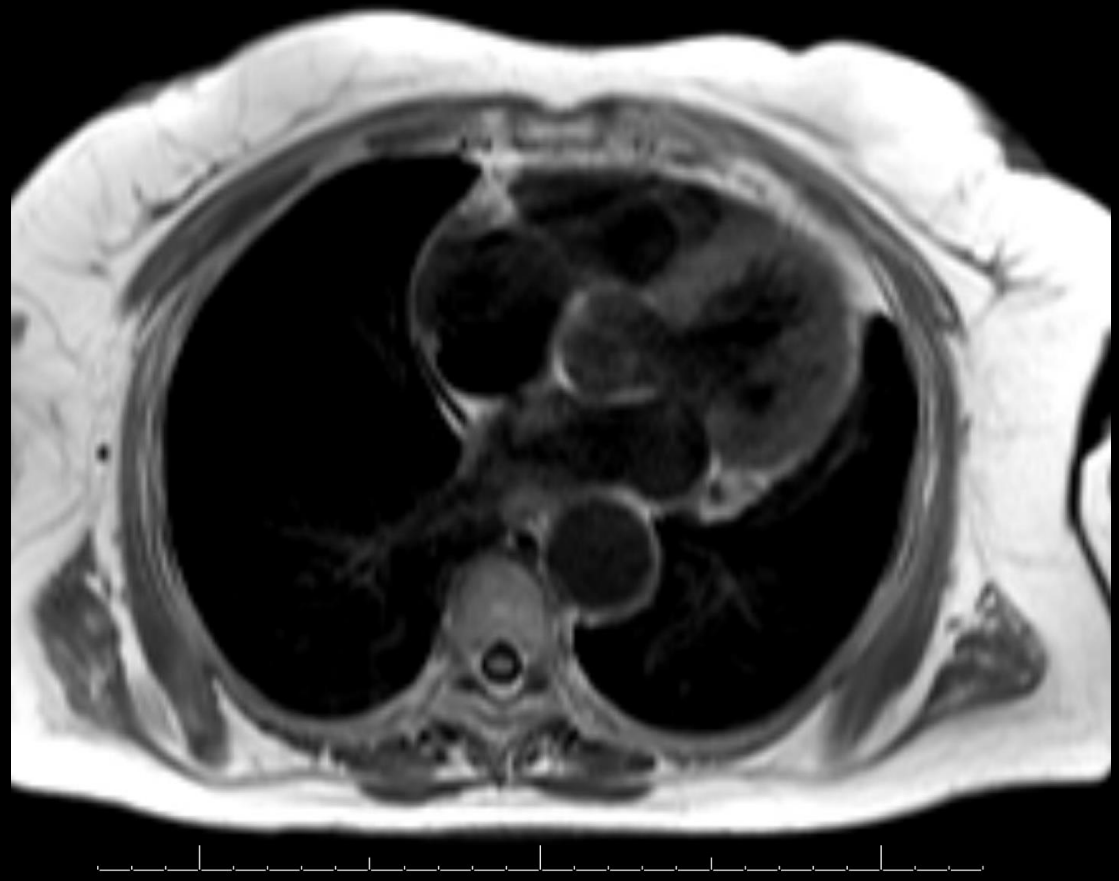
American College of Radiology
ACR Appropriateness Criteria®
Assessment of Cardiac Function and Baseline Cardiac Risk Stratification in Oncology Patients

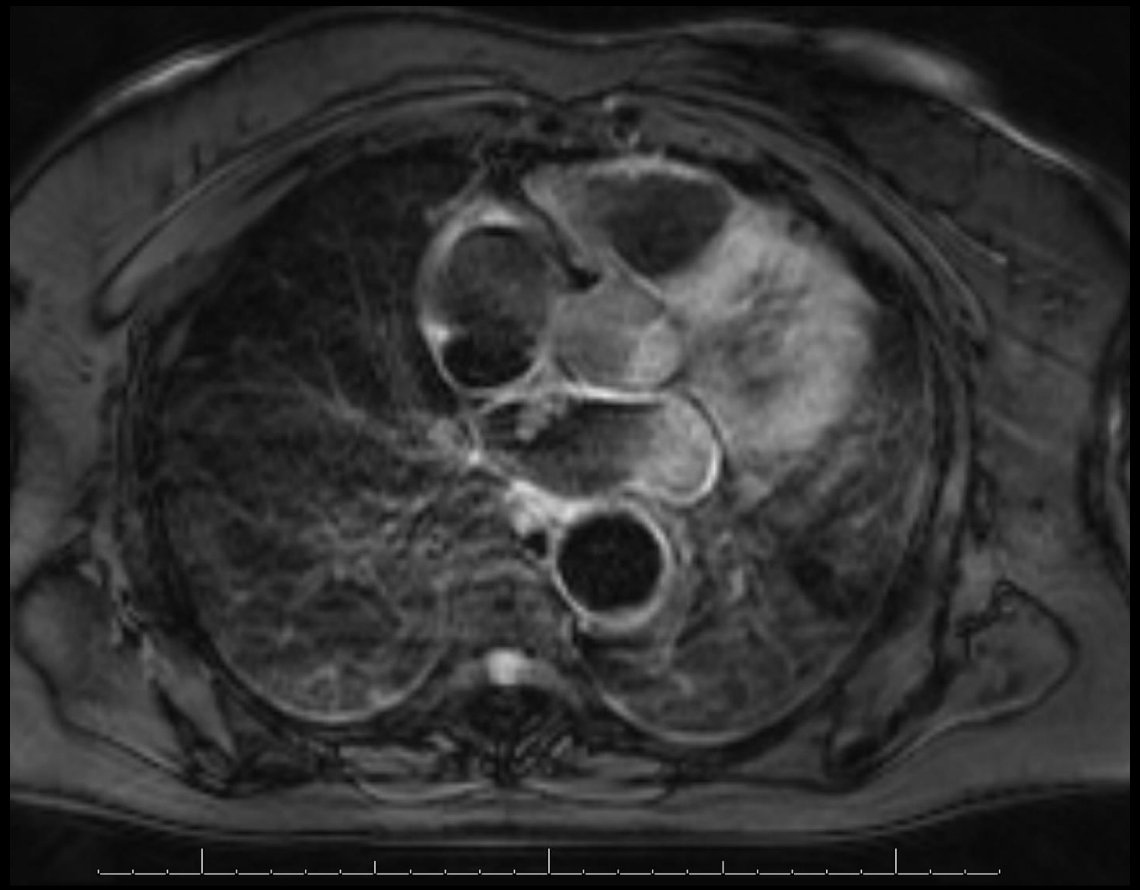
Variant 1: **Adult. Cardiac risk stratification prior to initiation of oncologic therapy. No cardiac symptoms. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
US echocardiography transthoracic resting	Usually Appropriate	O
MRI heart function and morphology without and with IV contrast	Usually Appropriate	O
MRI heart function and morphology without IV contrast	Usually Appropriate	O
Nuclear medicine ventriculography	Usually Appropriate	☢☢☢
US echocardiography transesophageal	May Be Appropriate	O
US echocardiography transthoracic stress	May Be Appropriate	O
MRI heart function with stress without and with IV contrast	May Be Appropriate	O
MRI heart function with stress without IV contrast	May Be Appropriate	O
CT coronary calcium	May Be Appropriate	☢☢☢
CTA coronary arteries with IV contrast	May Be Appropriate	☢☢☢
N-13 ammonia PET/CT heart	May Be Appropriate	☢☢☢
CT heart function and morphology with IV contrast	May Be Appropriate	☢☢☢☢
Rb-82 PET/CT heart	May Be Appropriate	☢☢☢☢
SPECT or SPECT/CT heart	May Be Appropriate	☢☢☢☢
US duplex Doppler lower extremity	Usually Not Appropriate	O
Radiography chest	Usually Not Appropriate	☢
Arteriography coronary	Usually Not Appropriate	☢☢☢
Arteriography coronary with ventriculography	Usually Not Appropriate	☢☢☢
CT chest with IV contrast	Usually Not Appropriate	☢☢☢

Subsequent MR imaging ordered to confirm diagnosis

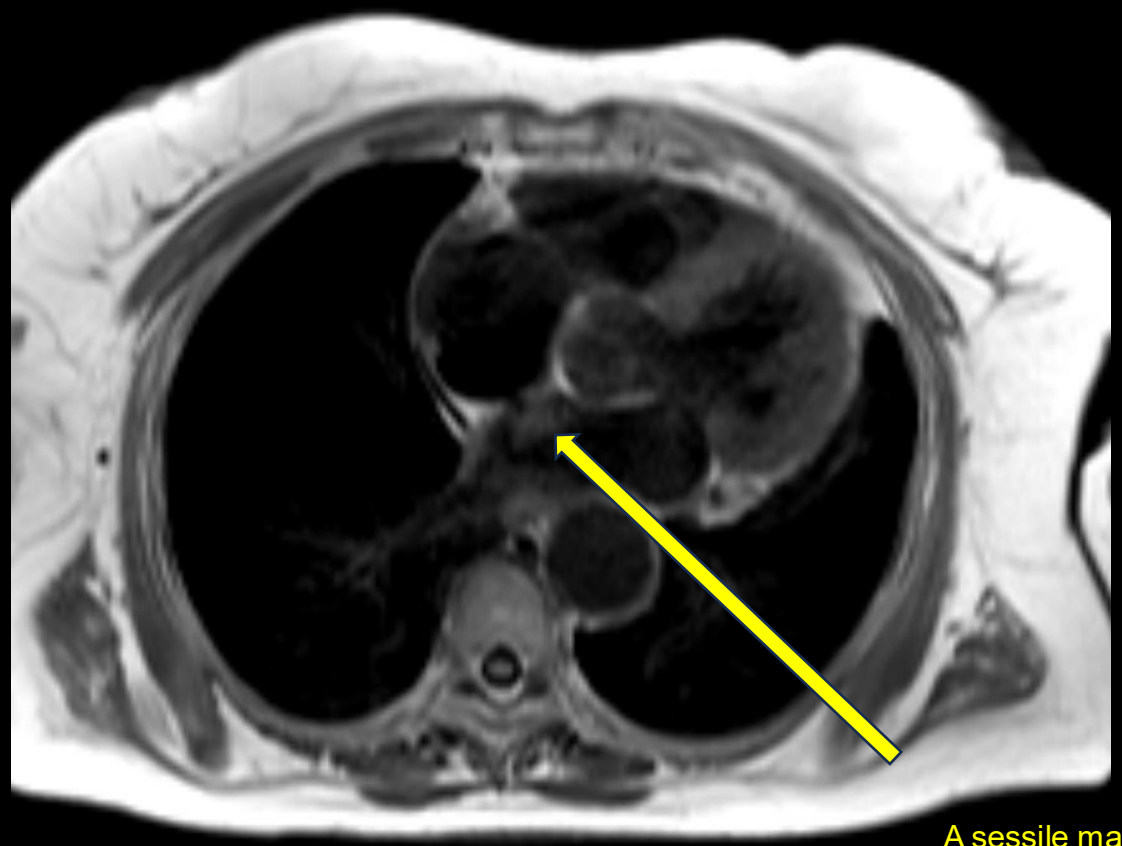
Findings (unlabeled)

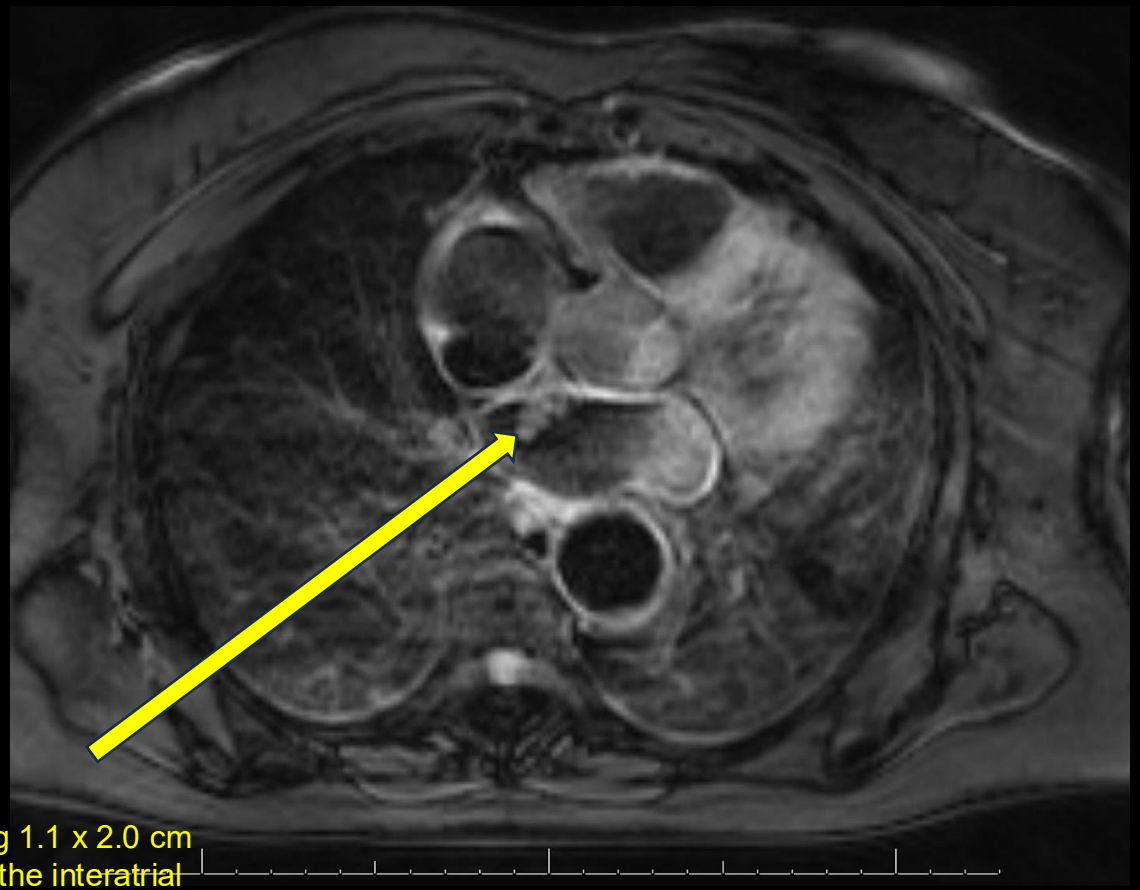




T1/T2 Weighted MR Imaging

Findings: (labeled)





A sessile mass measuring 1.1 x 2.0 cm with broad attachment to the interatrial septum

T1/T2 Weighted MR Imaging

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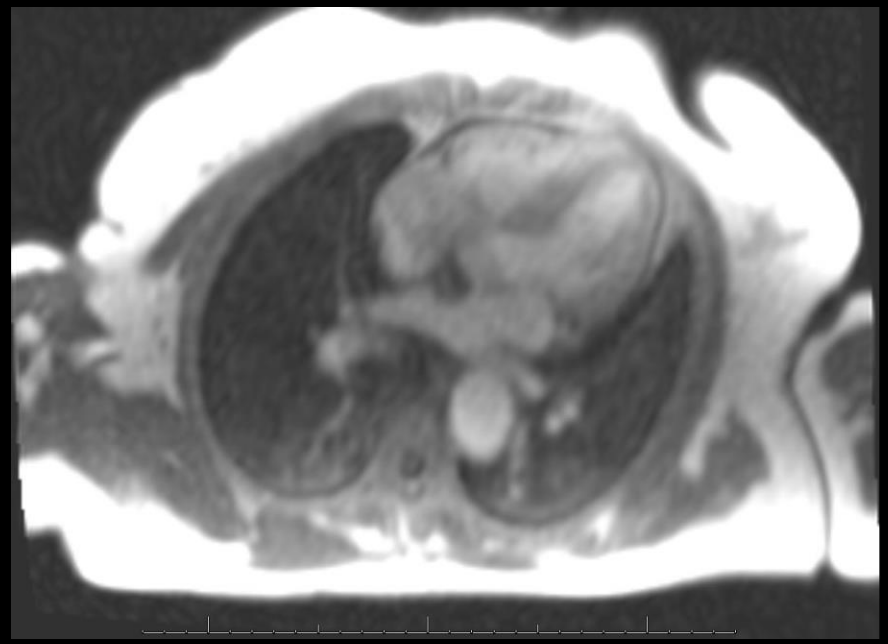
Findings (unlabeled)



Post Gadolinium MR Imaging

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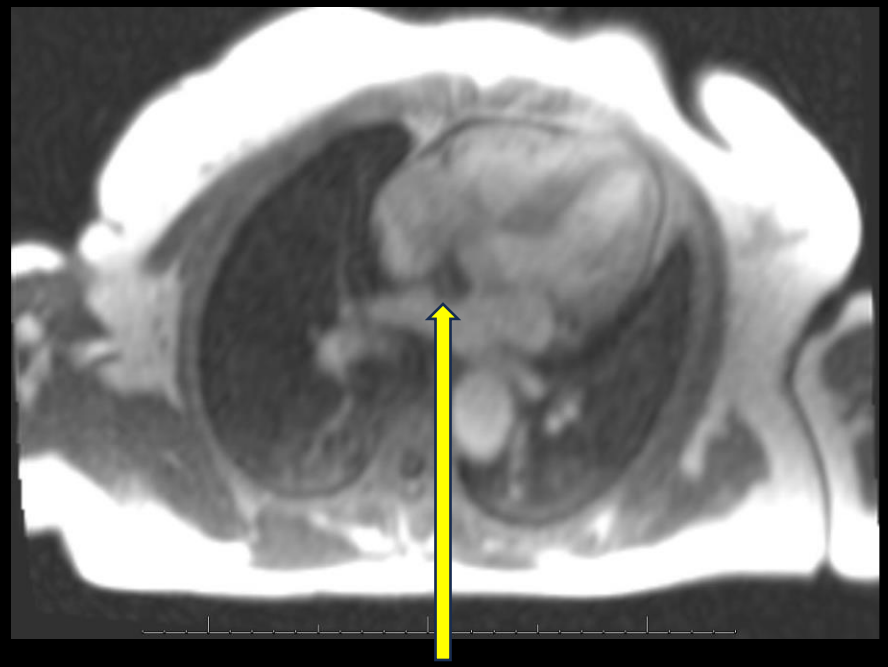
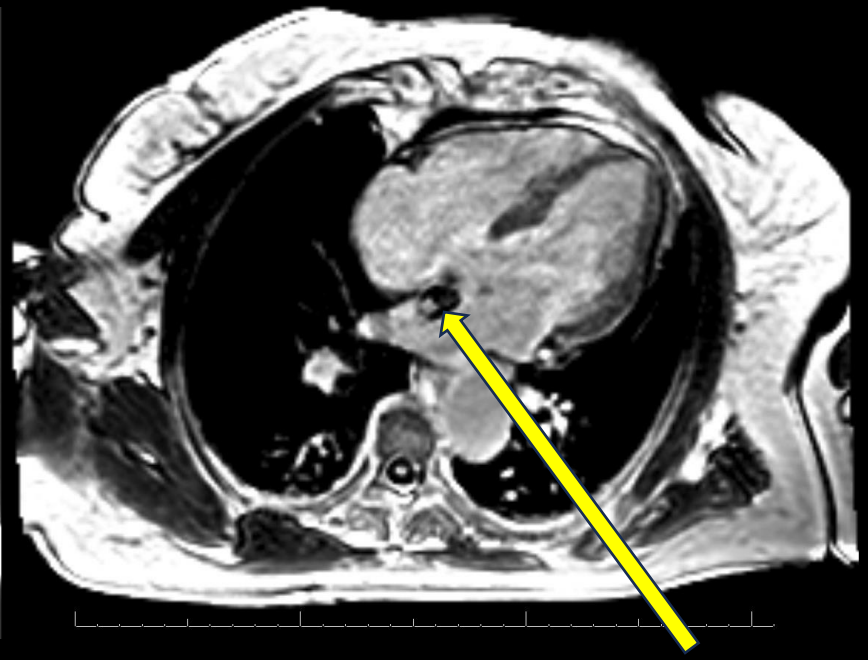
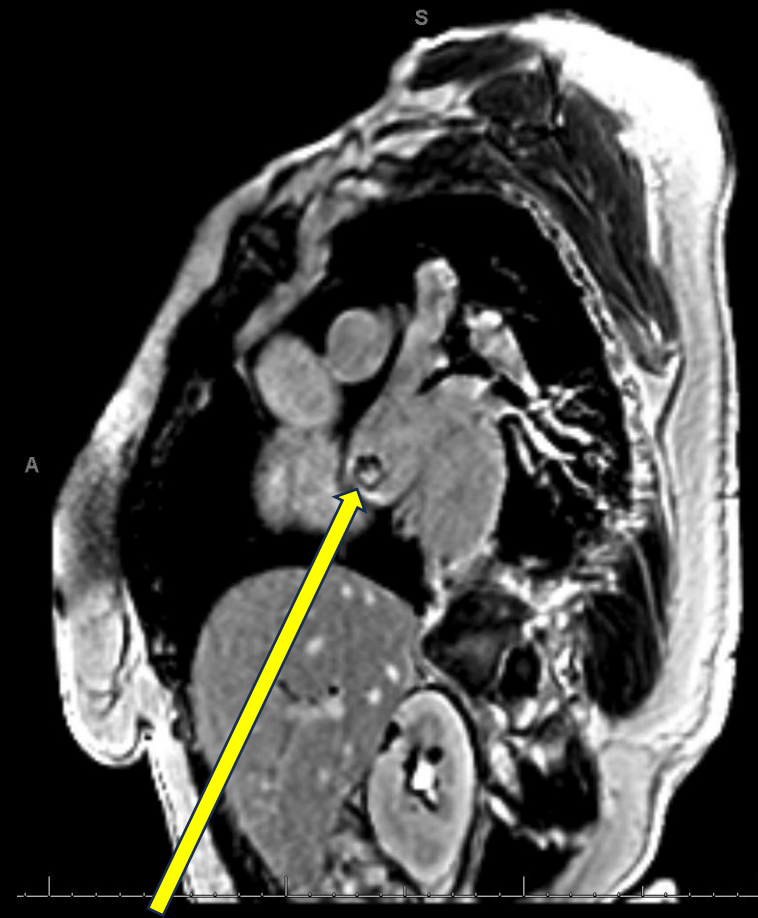
Findings: (labeled)



Poor contrast enhancement after gadolinium injection





Heterogenous late gadolinium enhancement of the mass

Post Gadolinium MR Imaging

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Follow Up

- An intracardiac mass measuring 1.1 x 2.0 cm was found incidentally on coronary CTA.
- Cardiac MRI showed a sessile mass that was isointense on T1 images and isointense to mildly hyperintense on T2 images, consistent with a left cardiac myxoma.
- Post gadolinium imaging showed a heterogeneously enhancing mass, supporting a vascularized tumor rather than a thrombus.
- Patient was scheduled for surgical excision via right thoracotomy.

Final Diagnosis:

Cardiac Myxoma (CM)

Case Discussion

- Definition: CM is a primary neoplasm that most commonly develops in the left atrium. The term myxoma is used to describe the tumor's gelatinous, benign morphology. However, it can cause numerous symptoms depending on its location and size. If untreated, CM can lead to complications such as heart valve obstruction, embolism, or heart failure[1].

- Epidemiology: CM is a rare primary heart tumor with a prevalence of 0.3% of the population and an incidence of 0.5-1 cases per million individuals. The tumor most commonly arises in middle aged adults with a female-to-male ratio of 3:1. There are two forms of CM, familial and sporadic. The sporadic epidemiological CM occurs 95% of the time[1].

Case Discussion

- Pathophysiology: Precise etiology is still unclear, however several studies investigating the origin include
    - Derivation from entrapped embryonic foregut tissue (multipotent mesenchymal cells)
    - Cardiac progenitor cells, which possess stem-like properties
    - Thrombi that undergo dysplastic changes, where chronic stress transforms endothelial cells into proliferative, supported by their common location in low-flow areas
    - Mechanical stress or inflammation that cause cellular metaplasia[2]

Case Discussion

- Radiographic features:
  - Location: Most commonly in the left atrium, typically attached at the fossa ovalis
  - Attachment: Narrow and often pedunculated
  - Mobility: Very mobile
  - Functional impact: May prolapse through the atrioventricular valve
  - T1 signal (MRI): Heterogeneous intermediate signal
  - T2 signal (MRI): Heterogeneous hyperintense signal
  - Gadolinium enhancement: Commonly shows a heterogeneous enhancement pattern
  - Inversion time on late gadolinium sequences: 200–300 ms[3]

Case Discussion

- Differential diagnosis:
  - Cardiac thrombus, Papillary fibroelastoma, Cardiac sarcoma, Infective endocarditis, Lipoma[4]
- Management:
  - Surgical excision is the mainstay of CM management
  - Emerging therapies include like Tyrosine Kinase Inhibitor in recurrent cases
- Prognosis:
  - Excellent long-term prognosis after complete surgical removal, but regular follow-up with echocardiography is recommended[2]

References:

1) Islam AKMM. Cardiac myxomas: A narrative review. *World J Cardiol.* 2022;14(4):206–219. doi:10.4330/wjc.v14.i4.206

2) Okongwu CC, Olaofe OO. Cardiac myxoma: a comprehensive review. *J Cardiothorac Surg.* 2025;20:151. doi:10.1186/s13019-024-03333-2

3) Abbas A, Garfath-Cox KA, Brown IW, Shambrook JS, Peebles CR, Harden SP. Cardiac MR assessment of cardiac myxomas. *Br J Radiol.* 2015;88(1045):20140599. doi:10.1259/bjr.20140599

4) Pino PG, Moreo A, Lestuzzi C. Differential diagnosis of cardiac tumors: General consideration and echocardiographic approach. *J Clin Ultrasound.* 2022;50(8):1177–1193. doi:10.1002/jcu.23309