AMSER Case of the Month October 2023

56-year-old woman presents with a palpable right breast lump

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Patient Presentation

HPI: A 56-year-old female with a past medical history significant for Cystic Fibrosis and bilateral lung transplant 15 years prior who presents with an enlarging, red, swollen lump on her right breast for 4-6 months.

Patient believes the area could be related to a “popped rib” since her lung transplant which was previously mobile but now continuously protrudes.

Patient Presentation

Other PMHx: Insulin dependent diabetes mellitus, Hypertension, Nephrolithiasis, Obstructive sleep apnea on continuous positive airway pressure, Ulcerative Colitis, Squamous Cell Carcinoma of back and chest

Physical exam by the mammographic technologist demonstrated a 1 x 2 cm lump in the right breast upper inner quadrant with overlying red inflamed skin

What Imaging Should We Order?

Select the Applicable ACR Appropriateness Criteria

Palpable Breast Masses

Variant 1: **Adult female, 40 years of age or older. Palpable breast mass. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
Digital breast tomosynthesis diagnostic	Usually Appropriate	☢☢
Mammography diagnostic	Usually Appropriate	☢☢
US breast	May Be Appropriate	O
Digital breast tomosynthesis screening	Usually Not Appropriate	☢☢
Mammography screening	Usually Not Appropriate	☢☢
Image-guided core biopsy breast	Usually Not Appropriate	Varies
Image-guided fine needle aspiration breast	Usually Not Appropriate	Varies
MRI breast without and with IV contrast	Usually Not Appropriate	O
MRI breast without IV contrast	Usually Not Appropriate	O
Sestamibi MBI	Usually Not Appropriate	☢☢☢
FDG-PET breast dedicated	Usually Not Appropriate	☢☢☢☢

These imaging modalities were ordered by the provider

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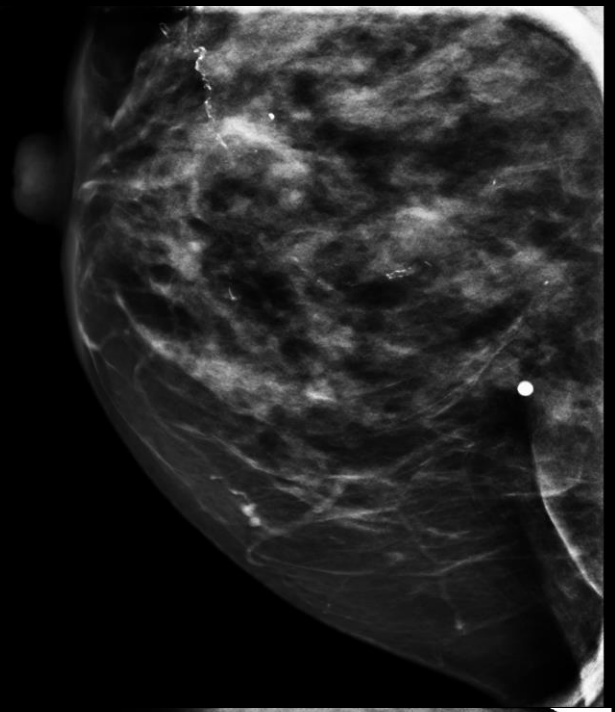
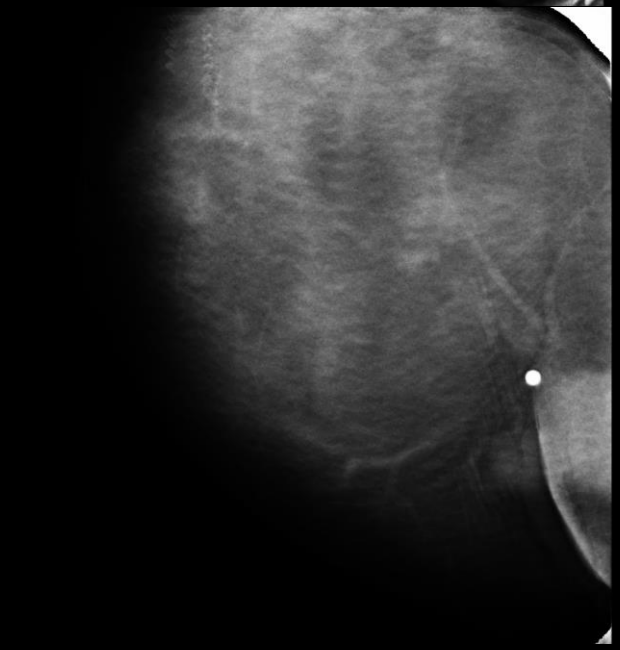
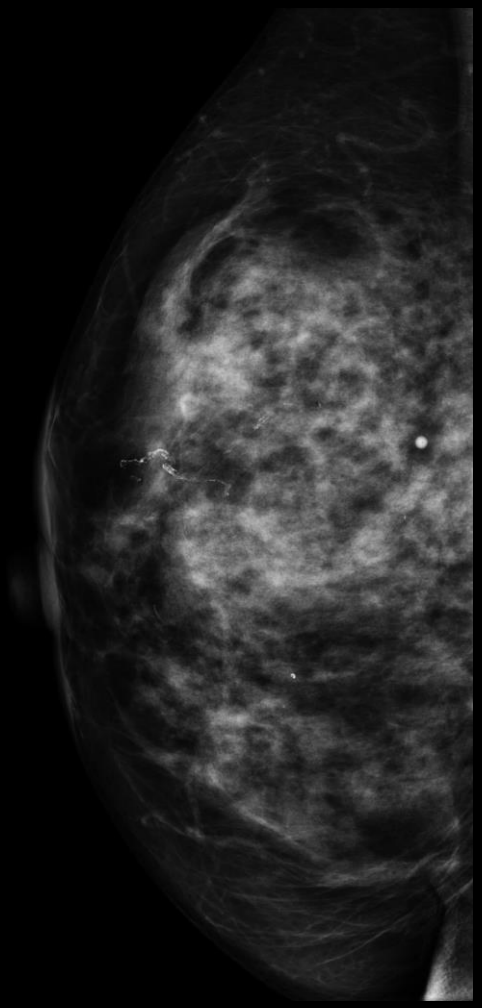
Diagnostic Mammogram (unlabeled)



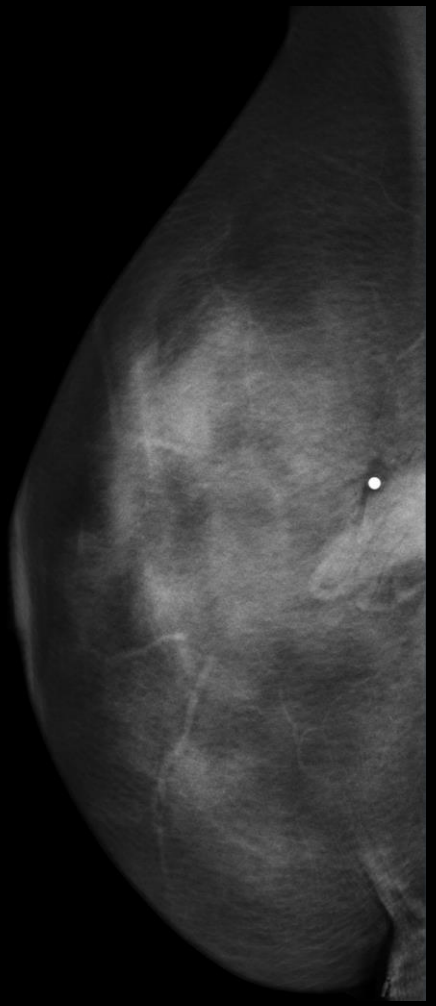
Spot CC View



Spot CC Tomo View



LM view



LM Tomo View

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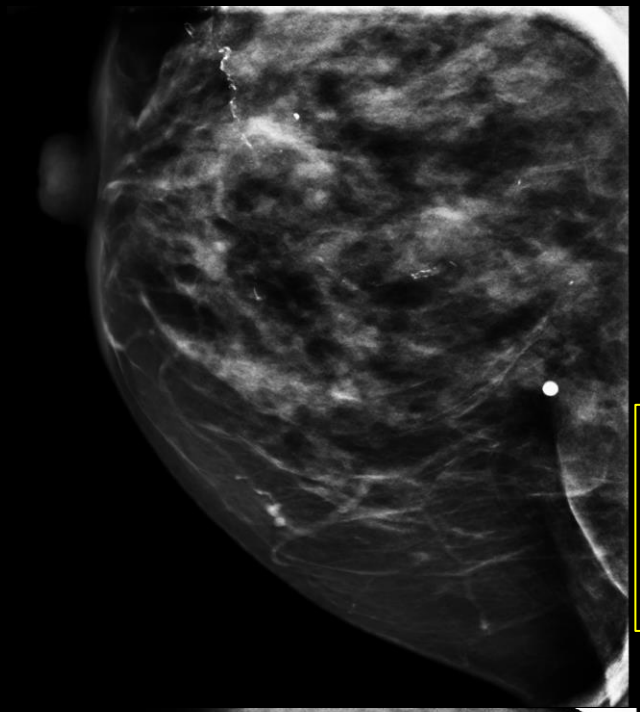
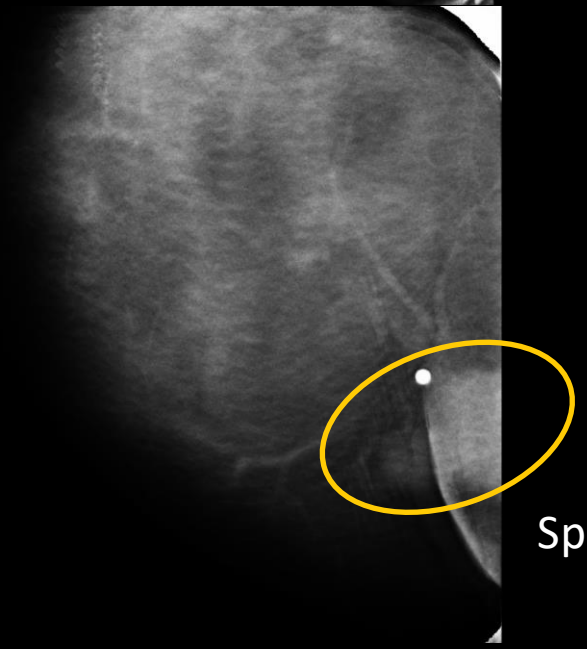
Diagnostic Mammogram (labeled)

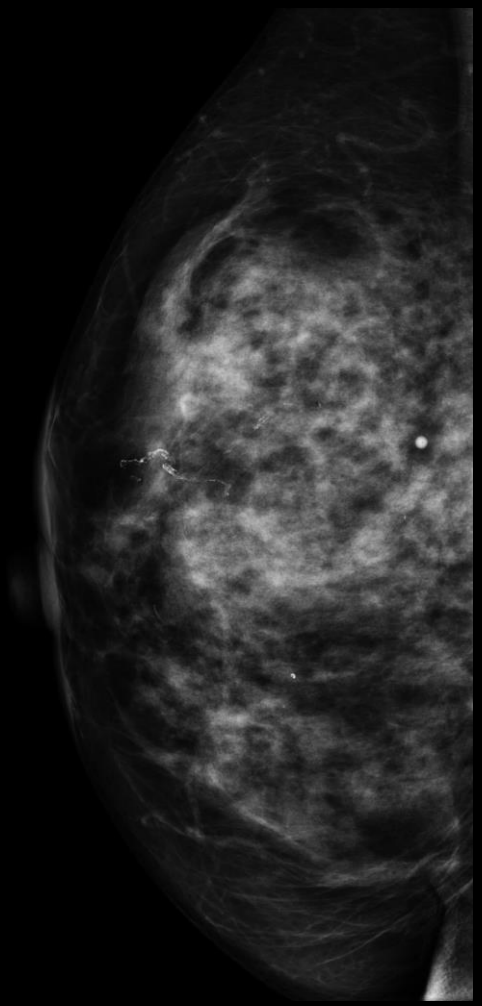


Spot CC View

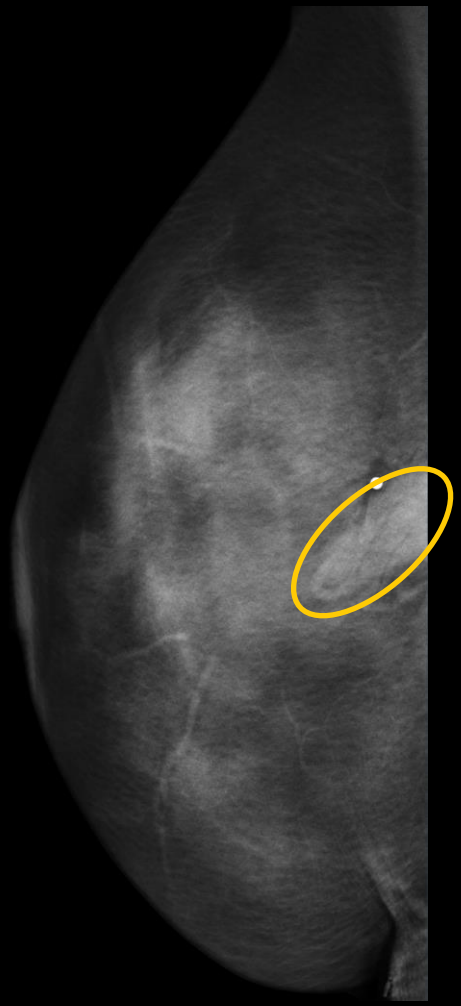
BB marks area of concern where there is focal asymmetry (circled)



Spot CC Tomo View



R breast LM view



R LM Tomo

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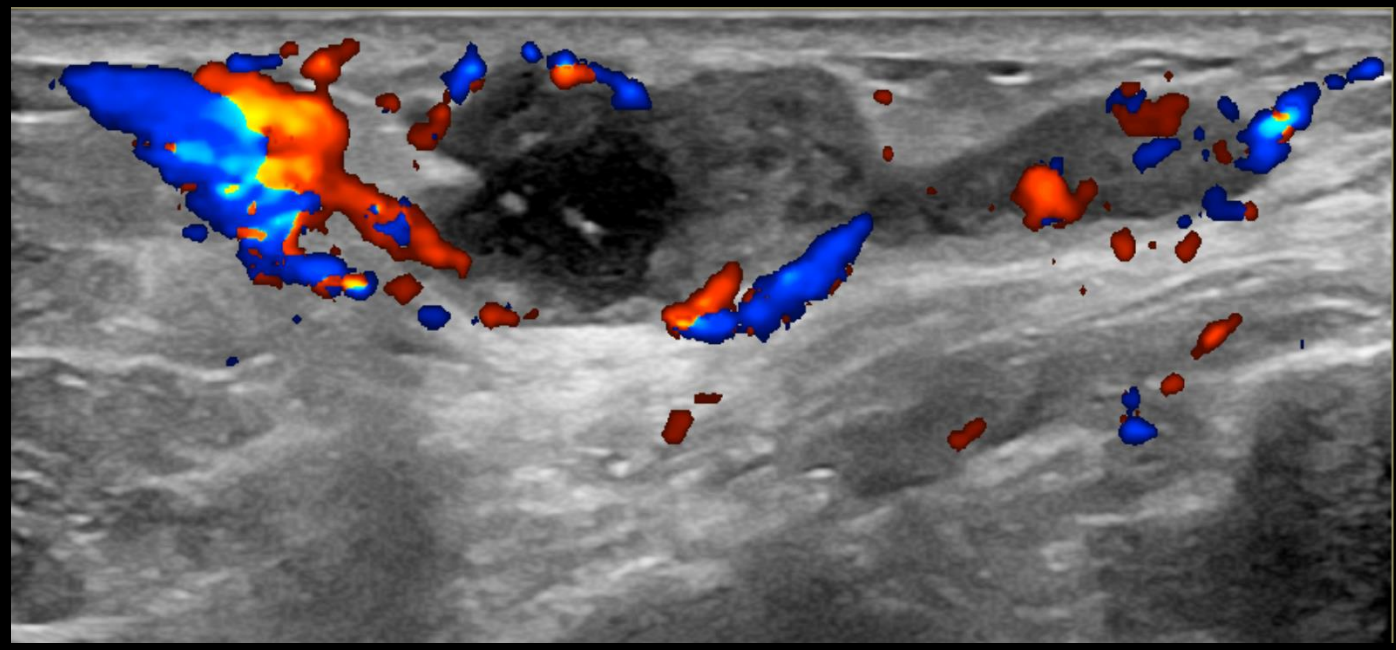
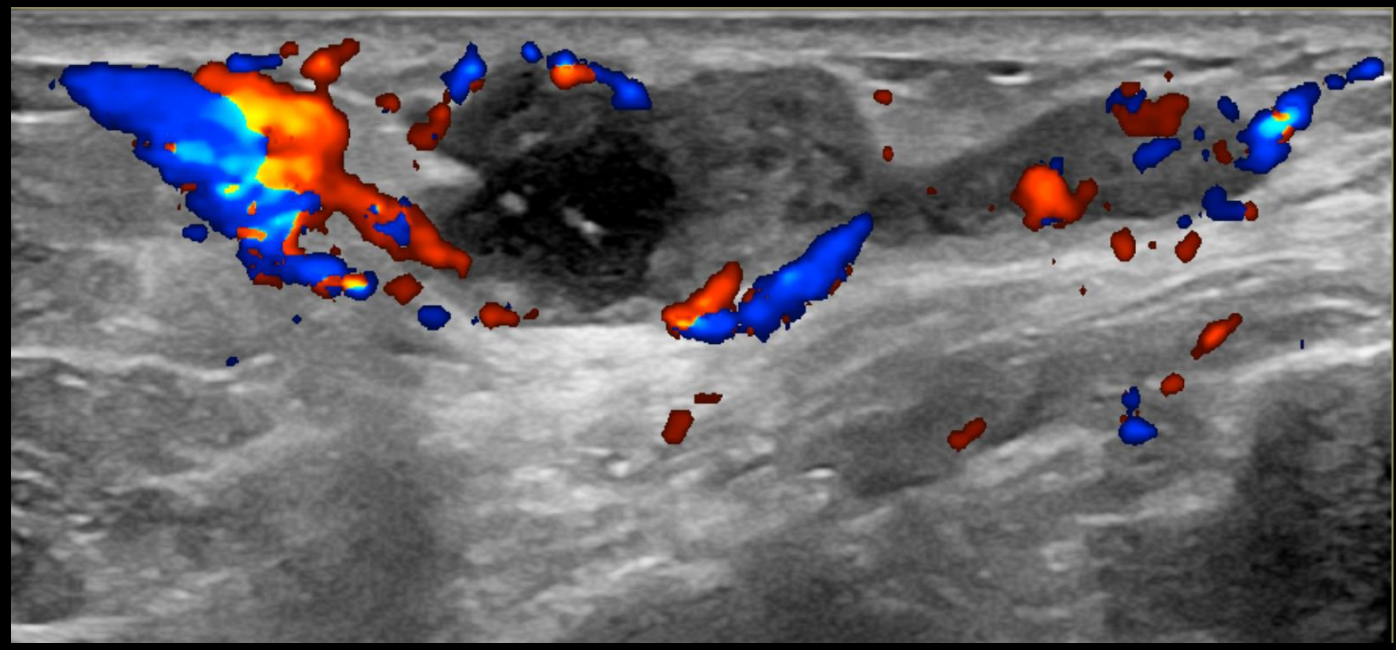
Ultrasound (unlabeled)



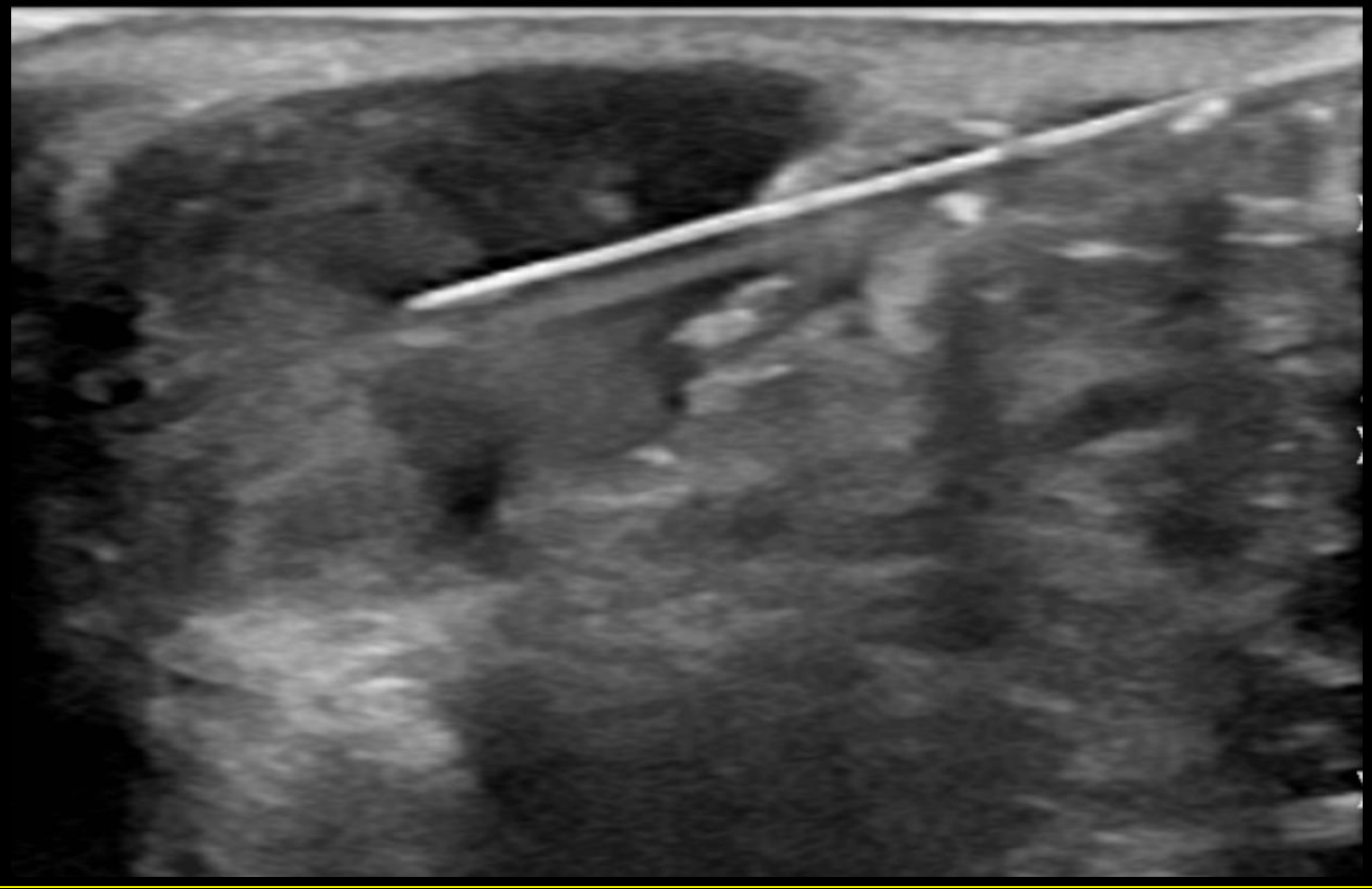
Ultrasound (labeled)



Doppler blood flow shows increased vascularity

Lateral to the sternum, at 1:00 10 cm from the nipple, there is a 3.8 x 1.3 x 3.1 cm complex fluid collection

Fine Needle Aspiration and Culture



A 21-gauge needle was advanced into the breast from a lateral approach. The cavity partially decompressed after aspiration, and 3 purulent samples were sent for cytology and anaerobic and aerobic microbiology.

Findings: Microbiology and Cytology Results

- Aspirated culture grew Aspergillus Fumigatus
- Anaerobic cultures negative
- Cytology negative

Further Investigation: Select the Applicable ACR Appropriateness Criteria

Suspected Osteomyelitis, Septic Arthritis, or Soft Tissue Infection (Excluding Spine and Diabetic Foot)

Variant 2: **Suspected septic arthritis or soft tissue infection. Initial radiographs normal or with findings suggestive of joint effusion or soft tissue swelling. Next imaging study.**

Procedure	Appropriateness Category	Relative Radiation Level
US area of interest	Usually Appropriate	O
Image-guided aspiration area of interest	Usually Appropriate	Varies
MRI area of interest without and with IV contrast	Usually Appropriate	O
MRI area of interest without IV contrast	Usually Appropriate	O
CT area of interest with IV contrast	Usually Appropriate	Varies
CT area of interest without IV contrast	May Be Appropriate	Varies
3-phase bone scan area of interest	Usually Not Appropriate	☢☢☢
CT area of interest without and with IV contrast	Usually Not Appropriate	Varies

These imaging modalities were already ordered by the provider

These imaging modalities were ordered additionally by the Medical Physician

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CT (unlabeled)

Axial

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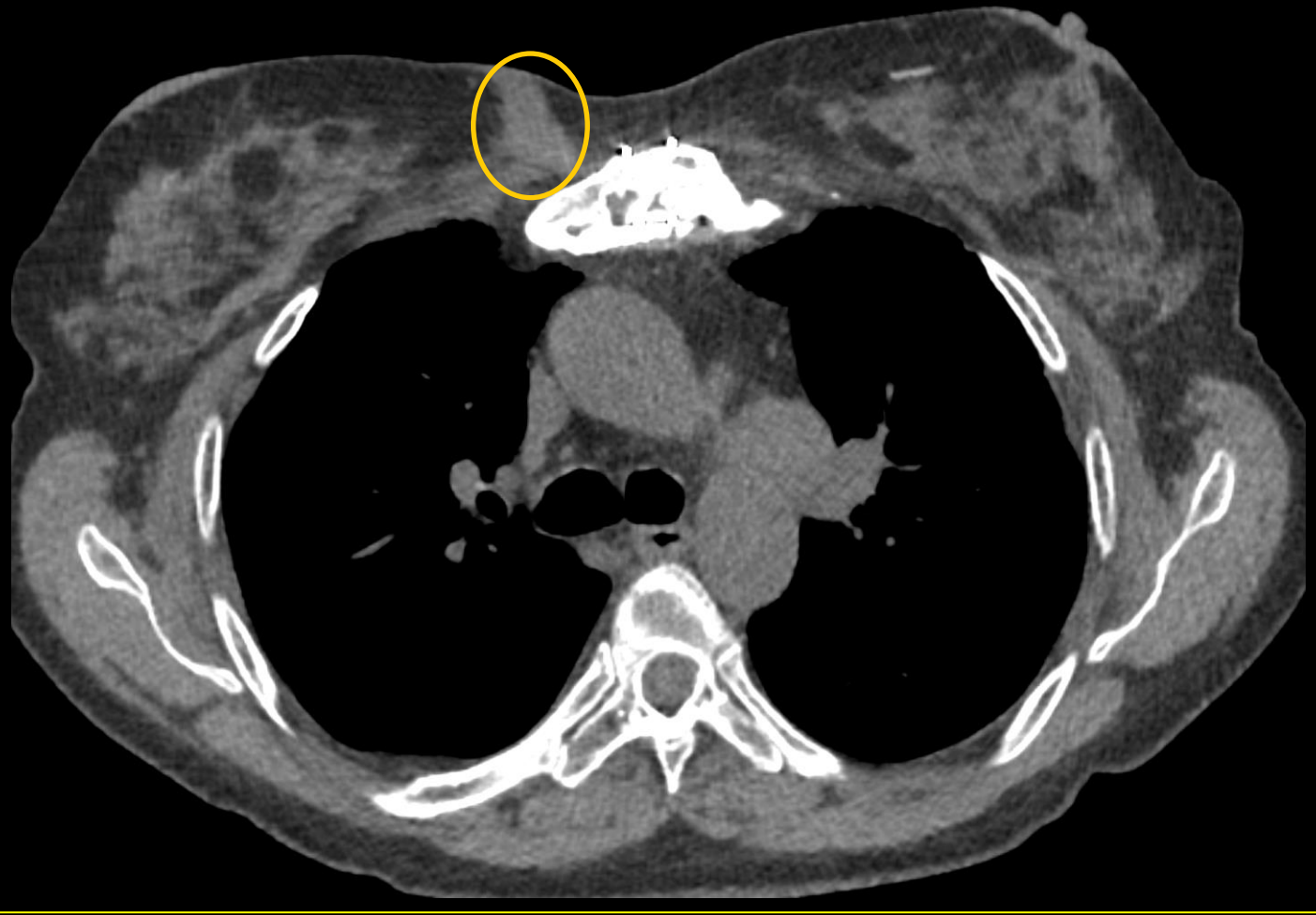
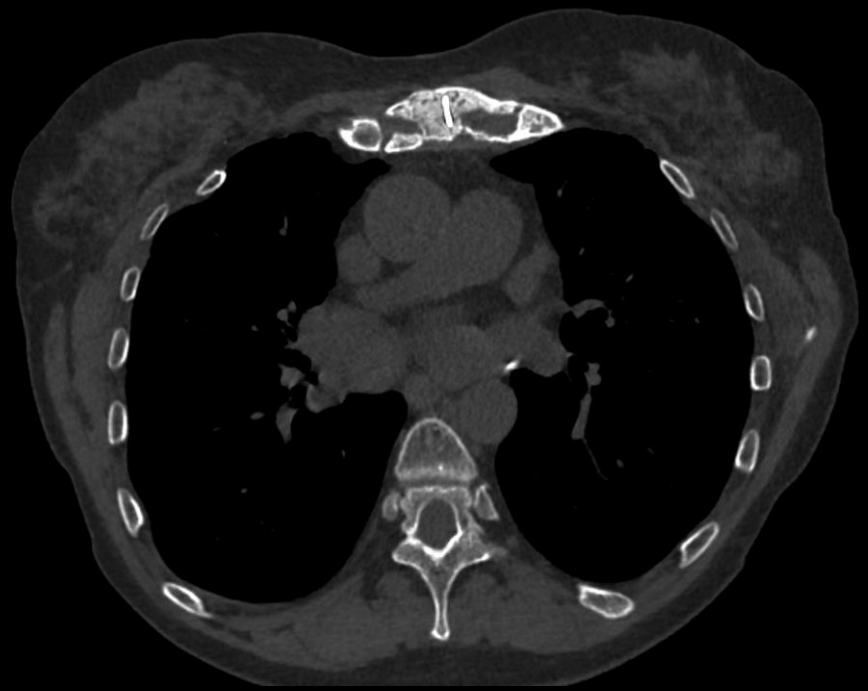
CT (labeled)



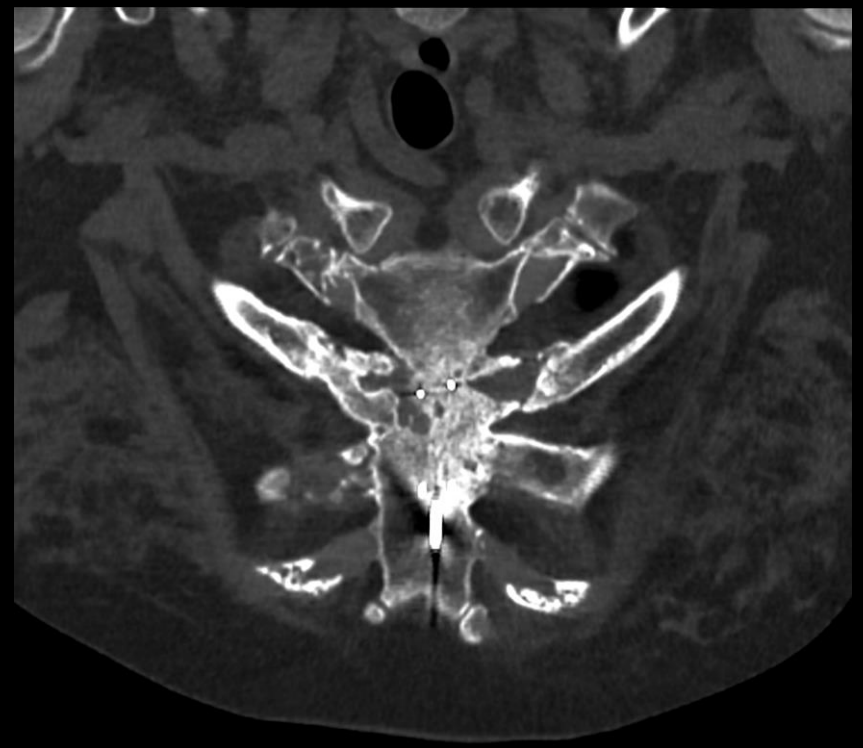
Axial CT image without contrast at the level of the sternum. Intermediate soft tissue density tract from the sternum extends to the skin surface.

CT Bone/Hardware (unlabeled)



Axial

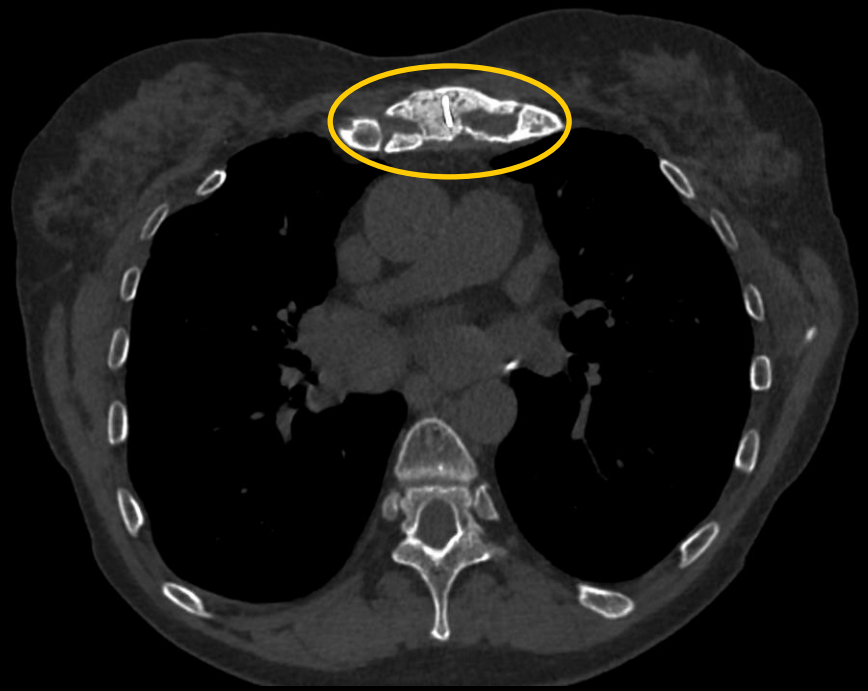
Sagittal



Coronal

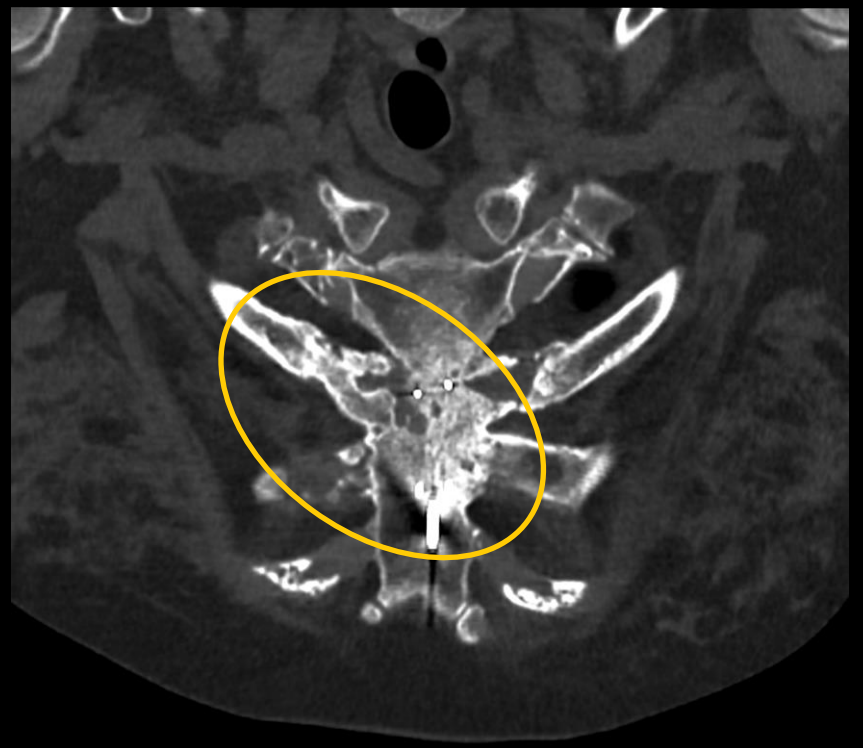
CT Bone/Hardware (labeled)

Sternal hardware from previous lung transplant



Axial

Sagittal



Coronal

Since last CT, increase in the degree of sclerosis in the sternum, centered on the sternomanubrial joint, which now extends more inferiorly to involve the sternal body around the superior aspects of the sternal tendon hardware.

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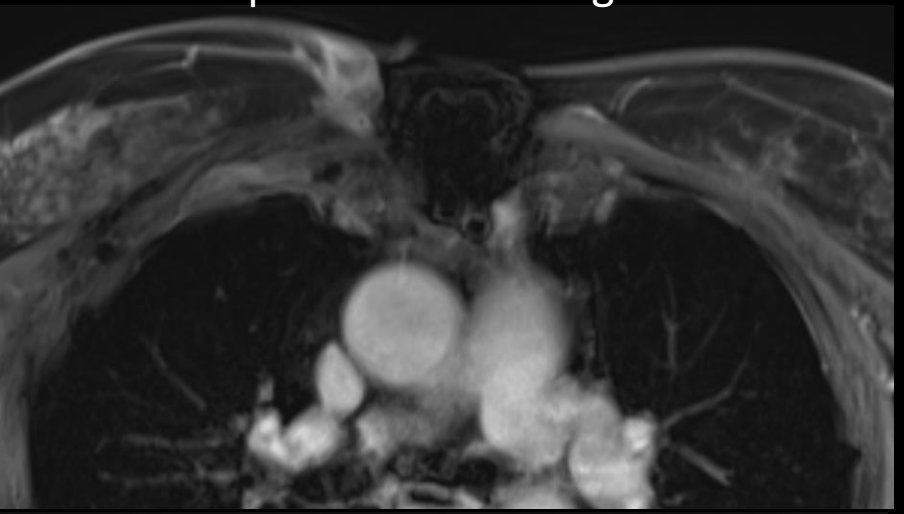
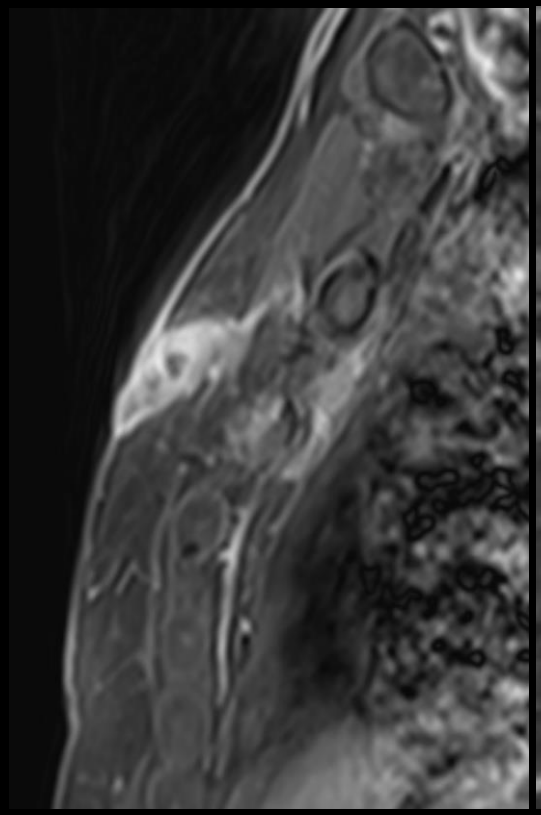
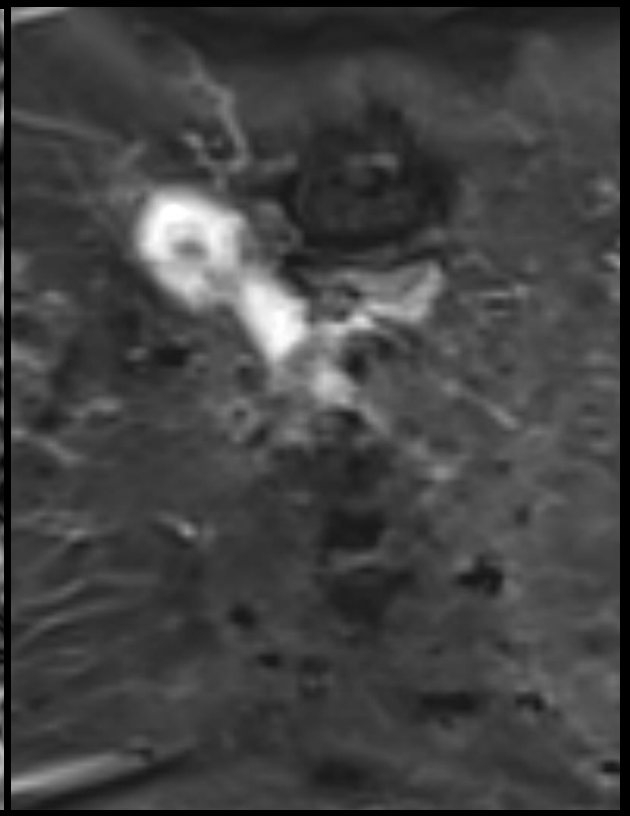
MRI Chest with Contrast (unlabeled)

Axial post-contrast images





Sagittal

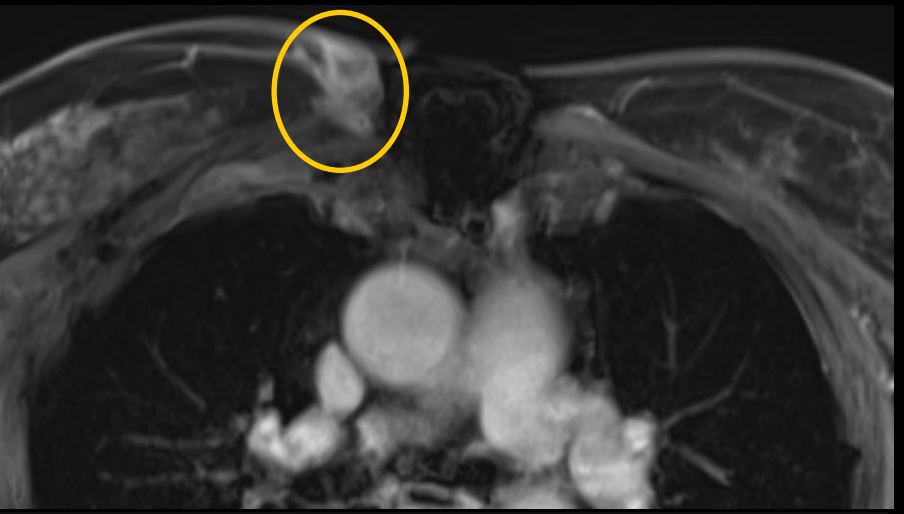


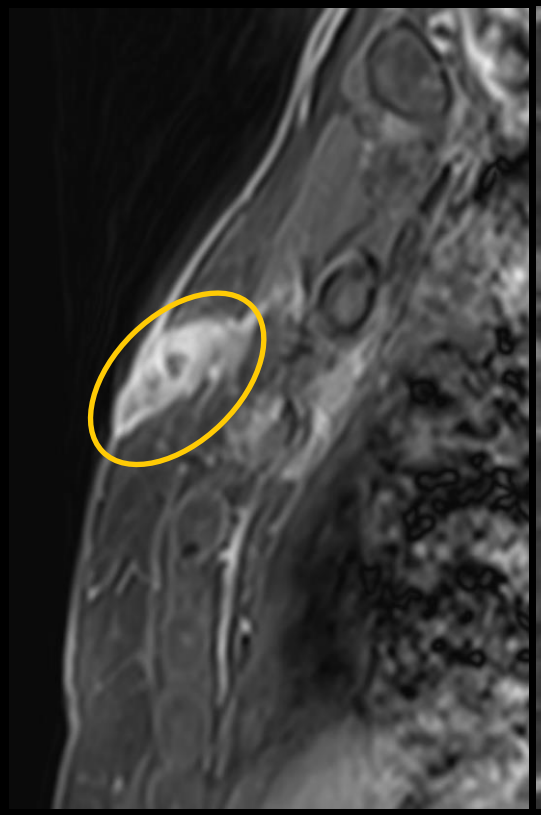
Coronal

post-contrast images

MRI Chest Contrast (labeled)

Axial





Sagittal

Coronal

Fluid distended subcutaneous/intramuscular tract with rim-enhancement at the level of the second and third sternocostal joints (yellow circles).

Enhancement of the underlying pleura with involvement of internal mammary neurovascular bundle (red circle).

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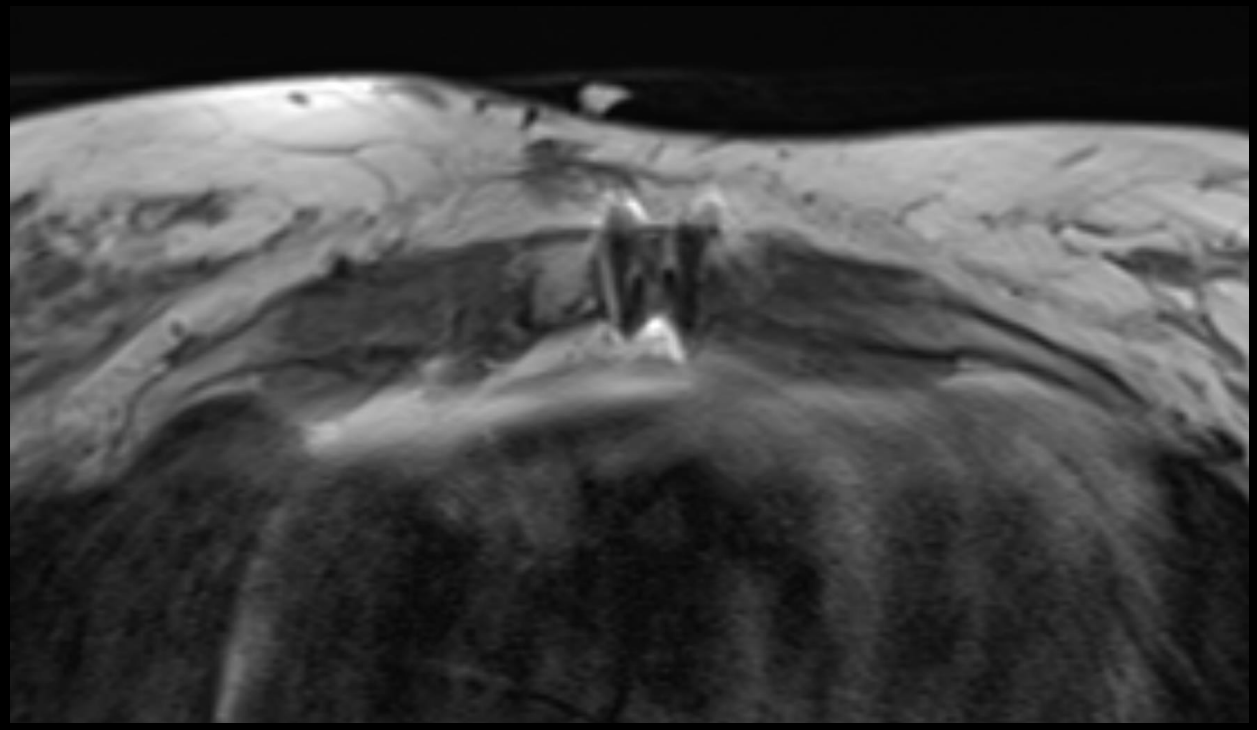
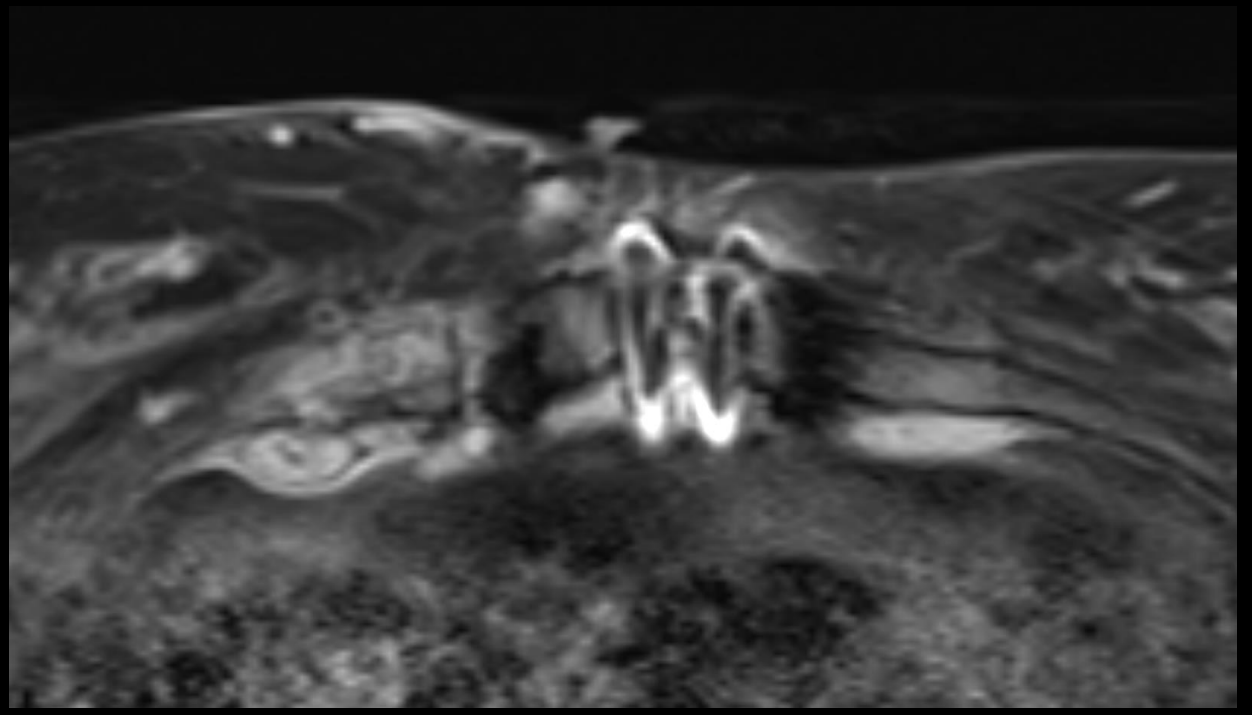
More MRI Findings (unlabeled)



T1-weighted axial



T1-weighted axial post-contrast with fat saturation

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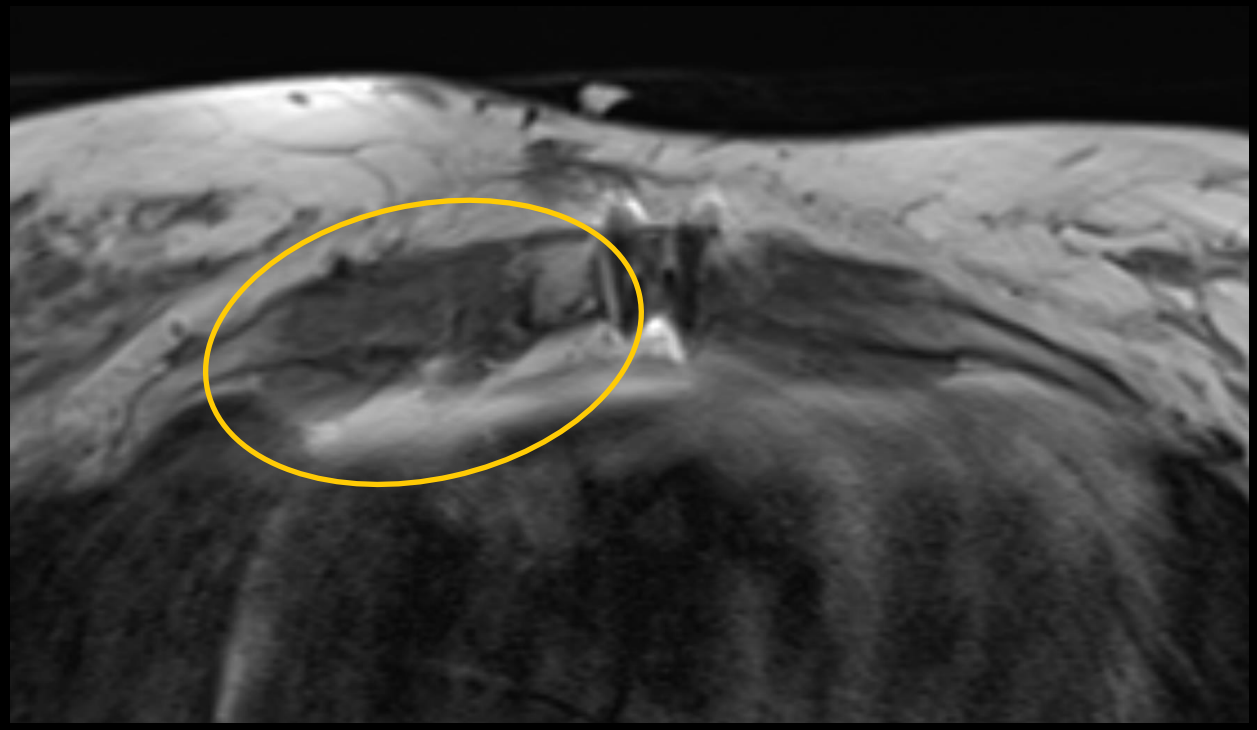
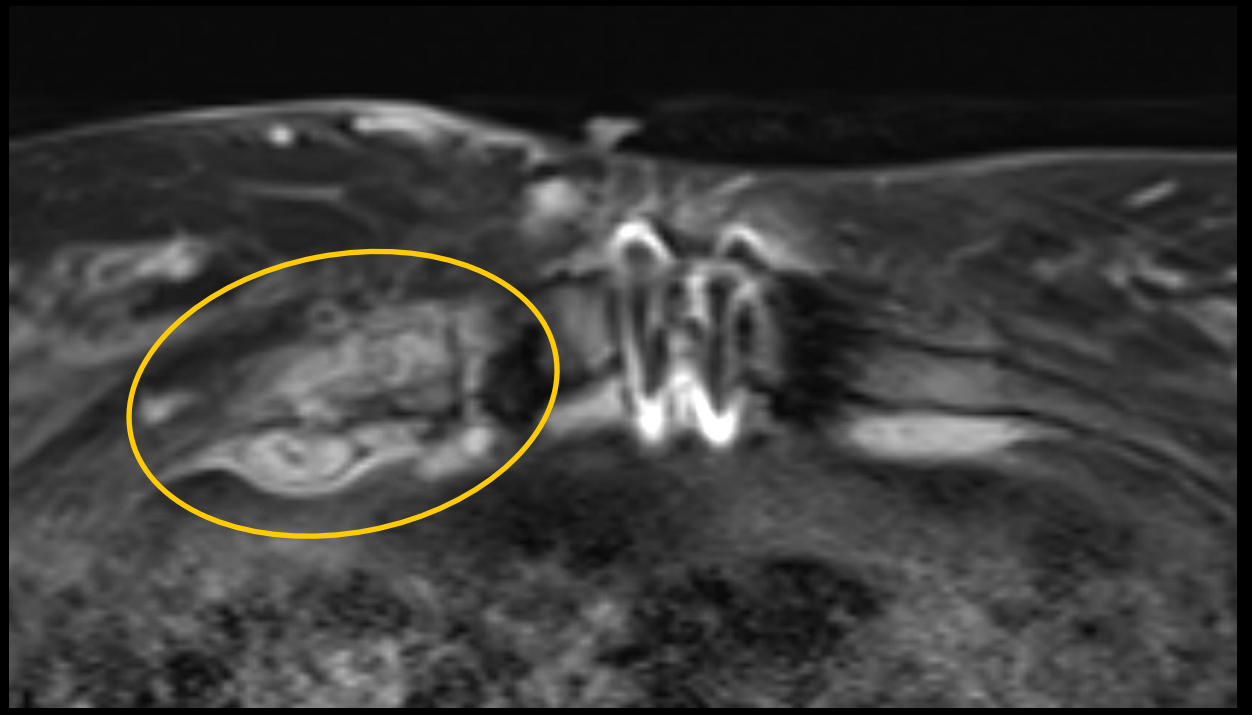
More MRI Findings (labeled)

Irregularity of the osseous cortex at level of the second and third sternocostal joint with T1- weighted marrow replacement corresponding to postcontrast enhancement concerning for osteomyelitis and destruction



T1-weighted axial



T1-weighted axial post-contrast with fat saturation

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Final Dx:

Chest Wall Aspergillus Fumigatus Abscess with Sternocostal Osteomyelitis

Case Discussion

Chest Wall Aspergillus Fumigatus Abscess:

- *A. fumigatus* is a saprophytic fungus found in soil that commonly produces disease in immunodeficient people[1]
- A mediastinal abscess was found in another 45-year-old immunocompromised patient in China which presented on CT as a low-density necrotic area[2]

1. Latgé JP, Chamilos G. Aspergillus fumigatus and Aspergillosis in 2019. Clinical Microbiology Reviews. 2019;33(1). doi:https://doi.org/10.1128/cmr.00140-18

2. Wu S, Hu W, Xiao W, Li Y, Huang Y, Zhang X. Metagenomic Next-Generation Sequencing Assists in the Diagnosis of Gardnerella vaginalis in Males with Pleural Effusion and Lung Infection: A Case Report and Literature Review. Infection and Drug Resistance. 2021;Volume 14:5253-5259. doi:https://doi.org/10.2147/idr.s337248

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Case Discussion

Sternal Osteomyelitis:

- Inflammation/infection of the bone most often caused by bacteria and less commonly fungi or other germs[3]
  - Chronic osteomyelitis develops after months to years of persistent infection with presence of necrotic bone and fistulous tracts from skin to bone
  - MRI with or without contrast is most sensitive
  - Surgical debridement indicated
- Although rare, most common sites of osteomyelitis are the spine (49%), base of the skull, paranasal sinuses and jaw (18%), ribs (9%), long bones (9%), sternum (5%), and chest wall (4%)[4]

3. Bury DC, Rogers TS, Dickman MM. Osteomyelitis: Diagnosis and Treatment. American Family Physician. 2021;104(4):395-402. https://www.aafp.org/pubs/afp/issues/2021/1000/p395.html

4. Gabrielli E, Fothergill AW, Brescini L, et al. Osteomyelitis caused by Aspergillus species: a review of 310 reported cases. Clinical Microbiology and Infection. 2014;20(6):559-565. doi:https://doi.org/10.1111/1469-0691.12389

Case Discussion

Antifungal Treatment Plan: Intended preoperative and post-operative use of Voriconazole for 3 months

Procedure: Surgery performed on the right sternocostal area for wound debridement, sternal wire removal, and suture removal form a non-purulent pocket

Complications: Intolerable GI and nausea/vomiting symptoms across Voriconazole, Posaconazole, and Isavuconazol

20lb weight loss overall in 8 weeks, anti-fungal treatment course was not completed, but surgical site was well-healed without swelling or tenderness

2-year follow-up: The abscess has not recurred, and the surgical site is well-healed

References:

Latgé JP, Chamilos G. Aspergillus fumigatus and Aspergillosis in 2019. Clinical Microbiology Reviews. 2019;33(1). doi:https://doi.org/10.1128/cmr.00140-18

Wu S, Hu W, Xiao W, Li Y, Huang Y, Zhang X. Metagenomic Next-Generation Sequencing Assists in the Diagnosis of Gardnerella vaginalis in Males with Pleural Effusion and Lung Infection: A Case Report and Literature Review. Infection and Drug Resistance. 2021;Volume 14:5253-5259. doi:https://doi.org/10.2147/idr.s337248

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