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.
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.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital breast tomosynthesis diagnostic</td>
<td>Usually Appropriate</td>
<td>🌟🌟🌟</td>
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<tr>
<td>Mammography diagnostic</td>
<td>Usually Appropriate</td>
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<tr>
<td>US breast</td>
<td>May Be Appropriate</td>
<td>O</td>
</tr>
<tr>
<td>Digital breast tomosynthesis screening</td>
<td>Usually Not Appropriate</td>
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<tr>
<td>Mammography screening</td>
<td>Usually Not Appropriate</td>
<td>🌟🌟</td>
</tr>
<tr>
<td>Image-guided core biopsy breast</td>
<td>Usually Not Appropriate</td>
<td>Varies</td>
</tr>
<tr>
<td>Image-guided fine needle aspiration breast</td>
<td>Usually Not Appropriate</td>
<td>Varies</td>
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<tr>
<td>MRI breast without and with IV contrast</td>
<td>Usually Not Appropriate</td>
<td>O</td>
</tr>
<tr>
<td>MRI breast without IV contrast</td>
<td>Usually Not Appropriate</td>
<td>O</td>
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<tr>
<td>Sestamibi MBI</td>
<td>Usually Not Appropriate</td>
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<tr>
<td>FDG-PET breast dedicated</td>
<td>Usually Not Appropriate</td>
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These imaging modalities were ordered by the provider.
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
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.
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

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<td>US area of interest</td>
<td>Usually Appropriate</td>
<td>0</td>
</tr>
<tr>
<td>Image-guided aspiration area of interest</td>
<td>Usually Appropriate</td>
<td>Varies</td>
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<tr>
<td>MRI area of interest without and with IV contrast</td>
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<tr>
<td>MRI area of interest without IV contrast</td>
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<tr>
<td>CT area of interest with IV contrast</td>
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<td>CT area of interest without IV contrast</td>
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<tr>
<td>3-phase bone scan area of interest</td>
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These imaging modalities were already ordered by the provider.

These imaging modalities were ordered additionally by the Medical Physician.
Axial CT image without contrast at the level of the sternum. Intermediate soft tissue density tract from the sternum extends to the skin surface.
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.
MRI Chest with Contrast (unlabeled)

Axial post-contrast images

Sagittal post-contrast images

Coronal post-contrast images
Enhancement of the underlying pleura with involvement of internal mammary neurovascular bundle (red circle).

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

T1-weighted axial

T1-weighted axial post-contrast with fat saturation
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.
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\(^2\)

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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%)\(^4\)

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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:


