AMSER Case of the Month May 2023

39-year-old female with tender palpable mass in left breast

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Patient Presentation

- 39 yo female c/o "extremely sore left breast and nipple" with a palpable left breast mass
- Family history of breast cancer in paternal aunt
- Cesarean section 2 years prior
- Multiple episodes of mastitis in right and left breasts during and after pregnancy
  - 14 months prior: worked up for left breast lump and tenderness that decreased in size after breastfeeding
    - Negative mammogram and left breast ultrasound at the time
    - Resolved completely after she stopped breast feeding

What Imaging Should We Order?

ACR Appropriateness Criteria

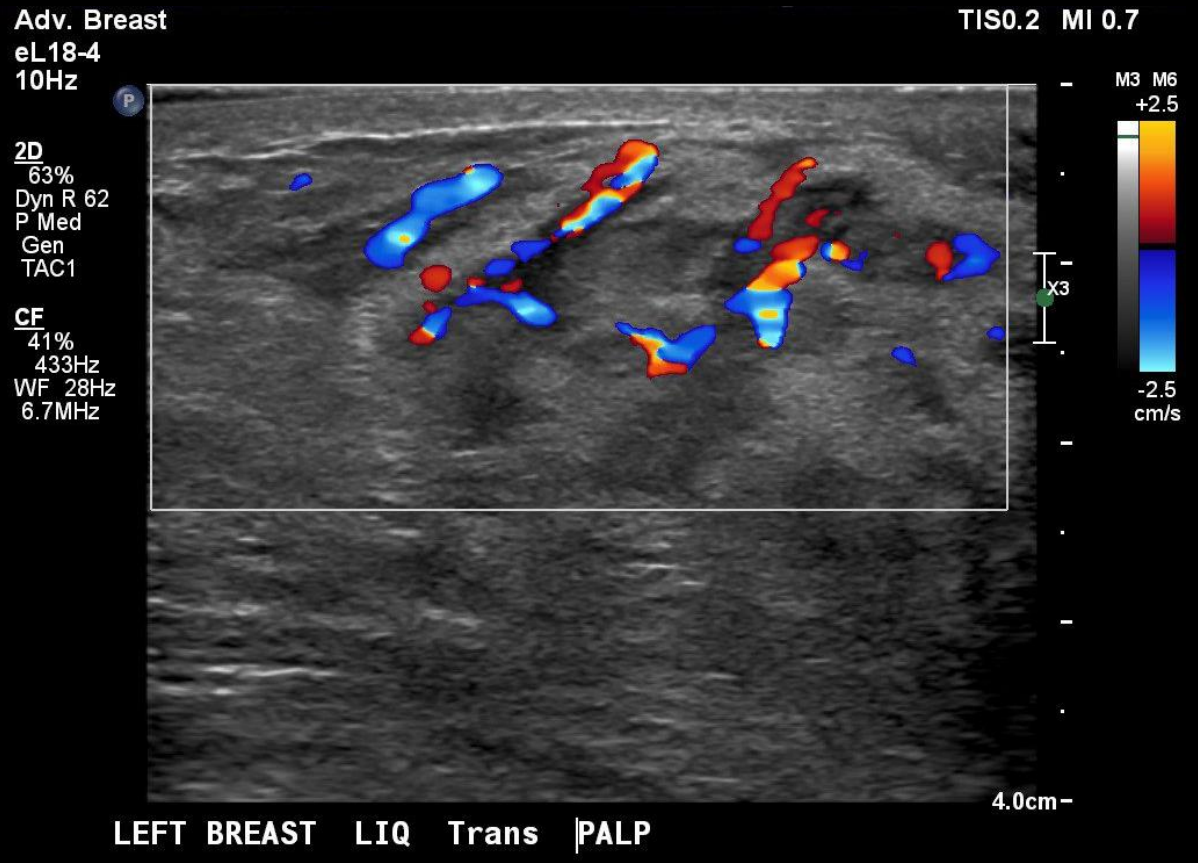
Variant 11: **Palpable breast mass. Female, 30 to 39 years of age, initial evaluation. (See Appendix 3 for additional steps in the workup of these patients.)**

Radiologic Procedure	Rating	Comments	RRL*
US breast	8	If imaged initially with US, see Variants 7-10 for additional imaging.	O
Mammography diagnostic	8	If imaged initially with mammography, see Variants 2-5. See references [14,15].	☢☢
Digital breast tomosynthesis diagnostic	8	See references [16-20].	☢☢
MRI breast without and with IV contrast	2	See references [4,49].	O
MRI breast without IV contrast	1		O
FDG-PEM	1		☢☢☢☢
Sestamibi MBI	1		☢☢☢
Image-guided core biopsy breast	1		Varies
Image-guided fine-needle aspiration breast	1		Varies
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

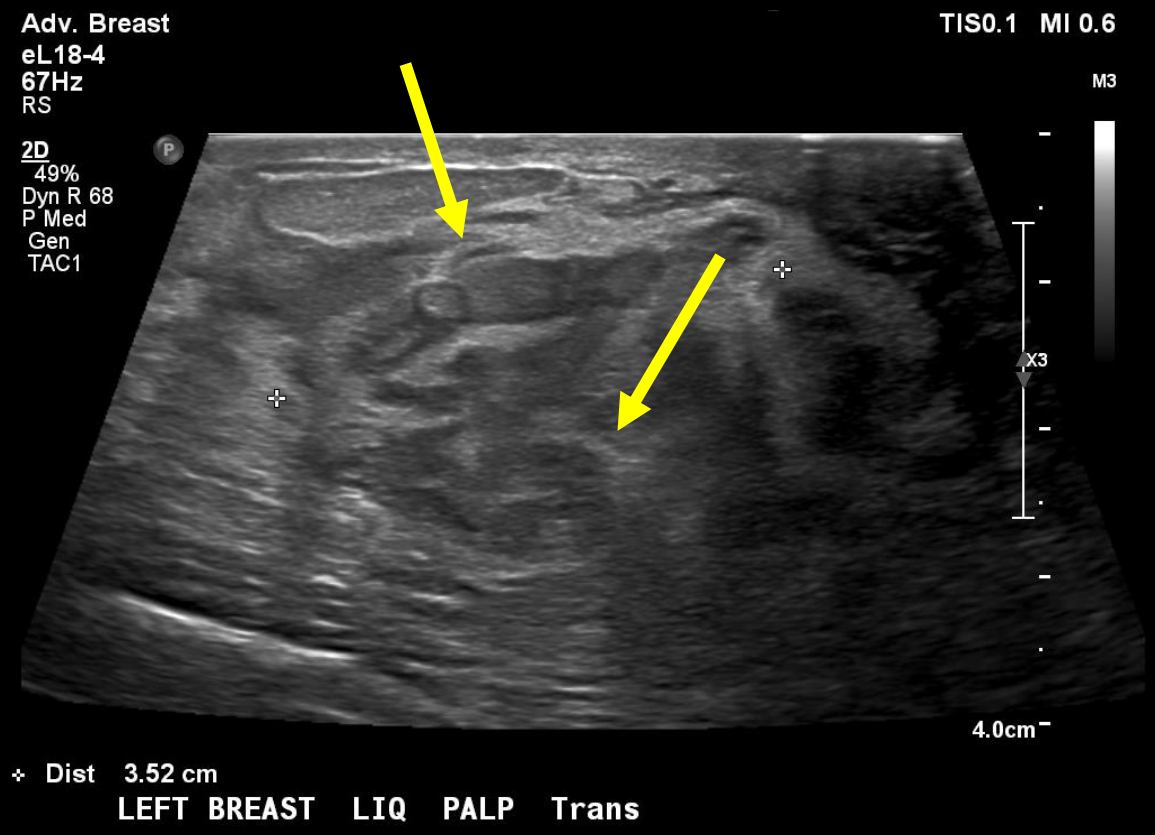
These imaging modalities were ordered

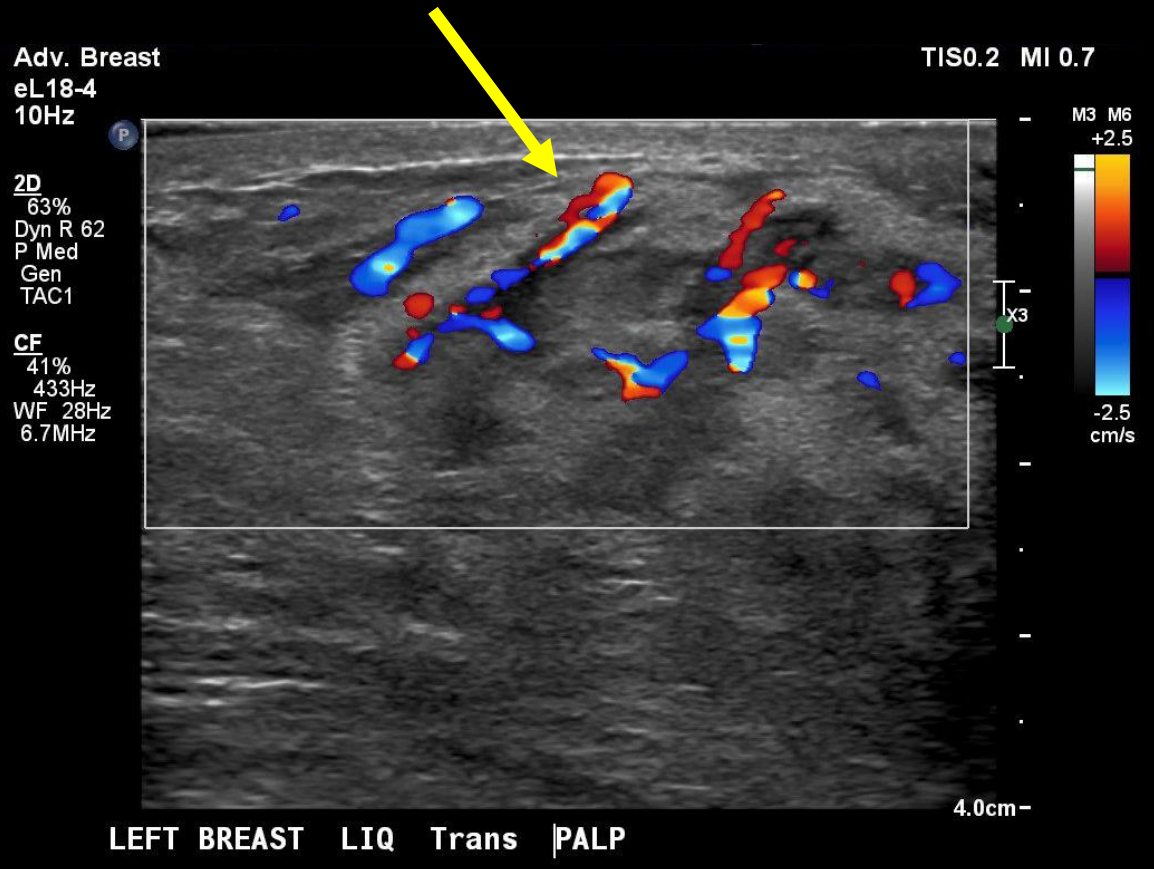
Initial Findings

- Left Breast Ultrasound with and without doppler flow



Findings Labeled





Left breast ultrasound showing heterogeneous 3.5cm mass-like area with tubular extensions, corresponding to multiple dilated ducts with echogenic material (left) and increased blood flow on Color Doppler assessment (right)

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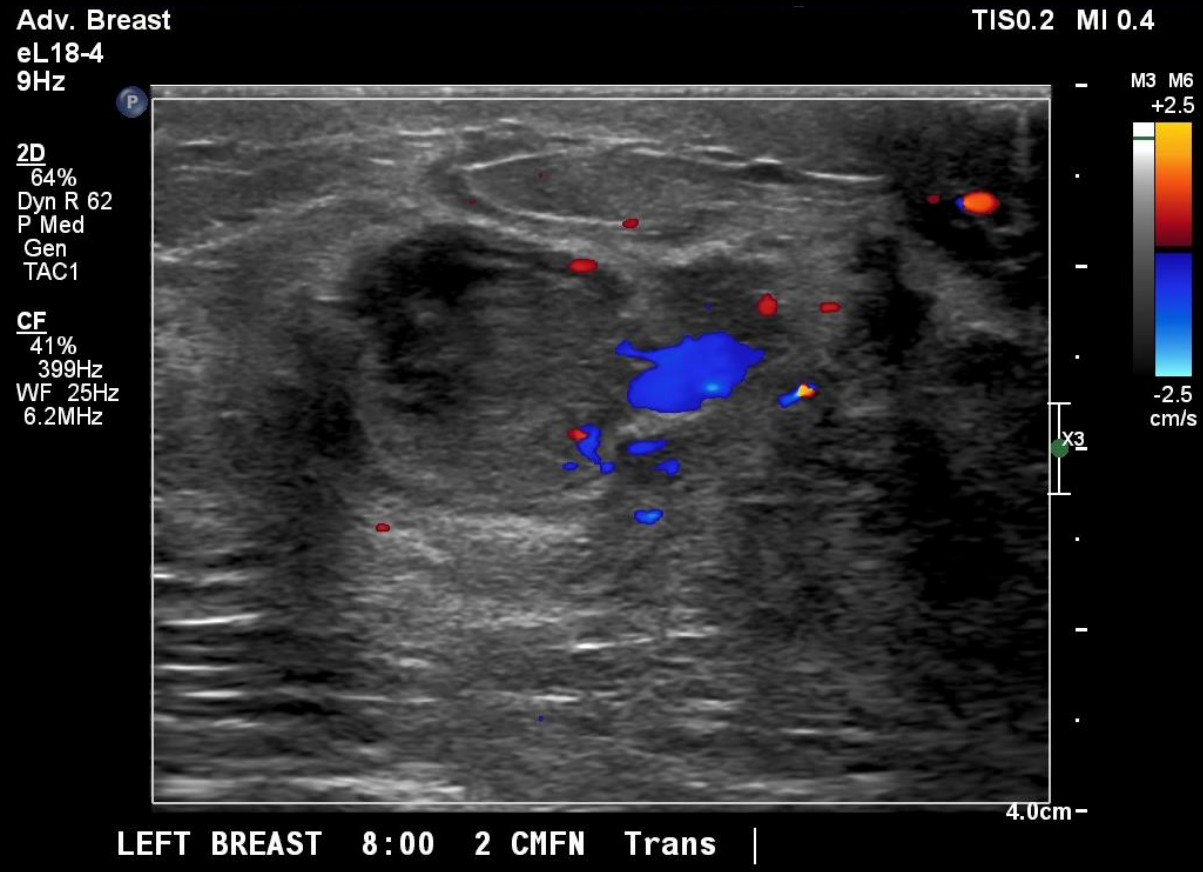
Patient Presentation Continued

- Ultrasound findings were suggestive of possible infection
- Patient was treated with course of amoxicillin and told to follow up in one month
- Patient reported no relief in symptoms upon completion of antibiotics

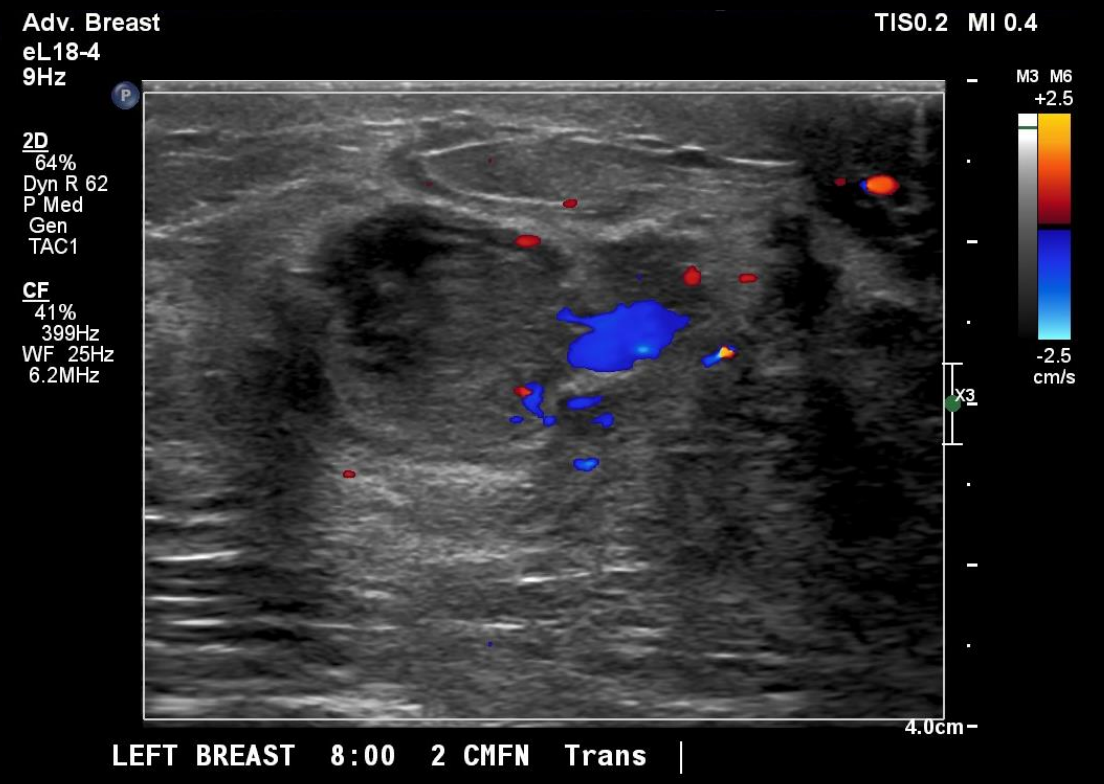
Follow-up ultrasound: 1 month later

- Left Breast Ultrasound with and without doppler flow



Findings Labeled

Hypoechoic mass with cystic component with floating debris corelates to the area seen on previous U/S and the area of persistent palpable lump



No internal color flow on Doppler image, vascularity in adjacent tissue

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Differential Diagnosis

- Granulomatous mastitis
- Inflammatory breast cancer
- Periductal mastitis
- Non-lactational abscess
- Infectious mastitis

Ultrasound guided core biopsy was performed...

- Due to persistent nature of the palpable mass and because it did not respond to antibiotics

- Pathology demonstrated:
  - Organizing fat necrosis, several open cystic spaces with variable degrees of inflammation and more neutrophilic inflammation
  - Rare Gram-positive bacilli – most likely Corynebacterium

Final Dx:

Granulomatous Mastitis

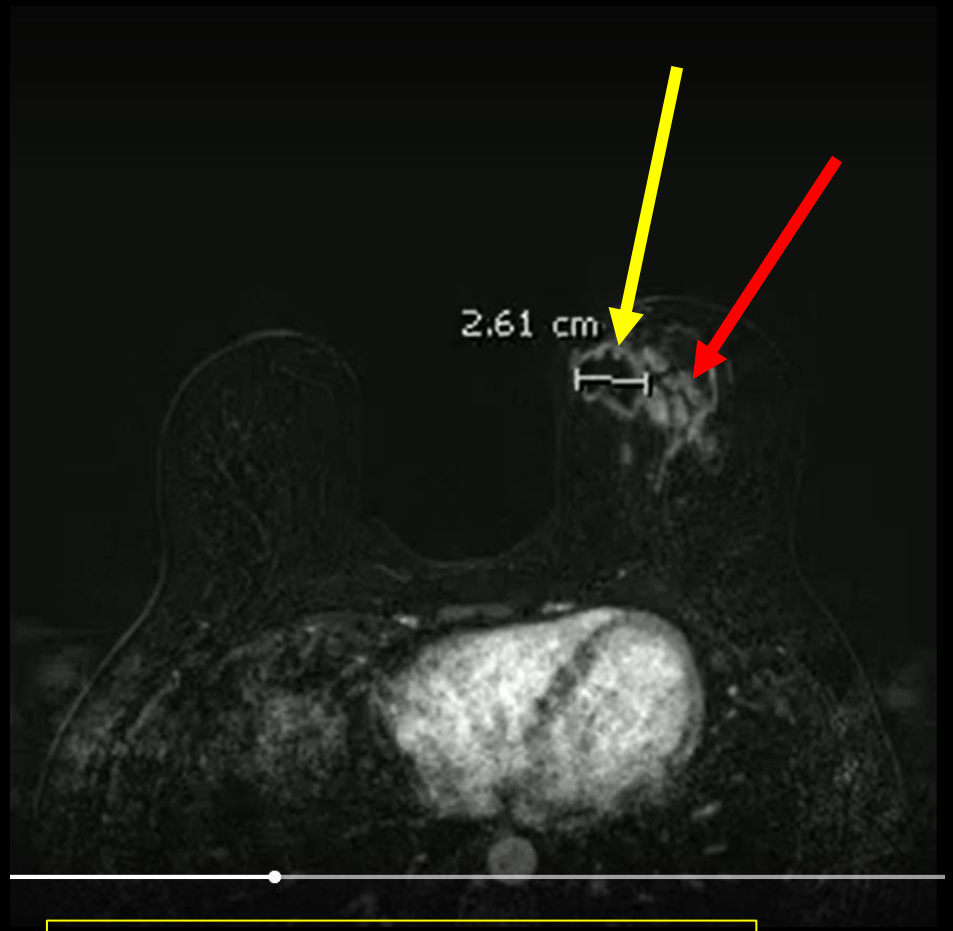
Patient Presentation Continued

- Patient was treated with a course of doxycycline
  - Initially reported improvement in symptoms
- Patient reported worsening with similar symptoms about 4 months after initial diagnosis
- Patient received her regularly scheduled screening MRI
  - *Patient met criteria for screening MRI due to breast tissue density and family history of breast cancer

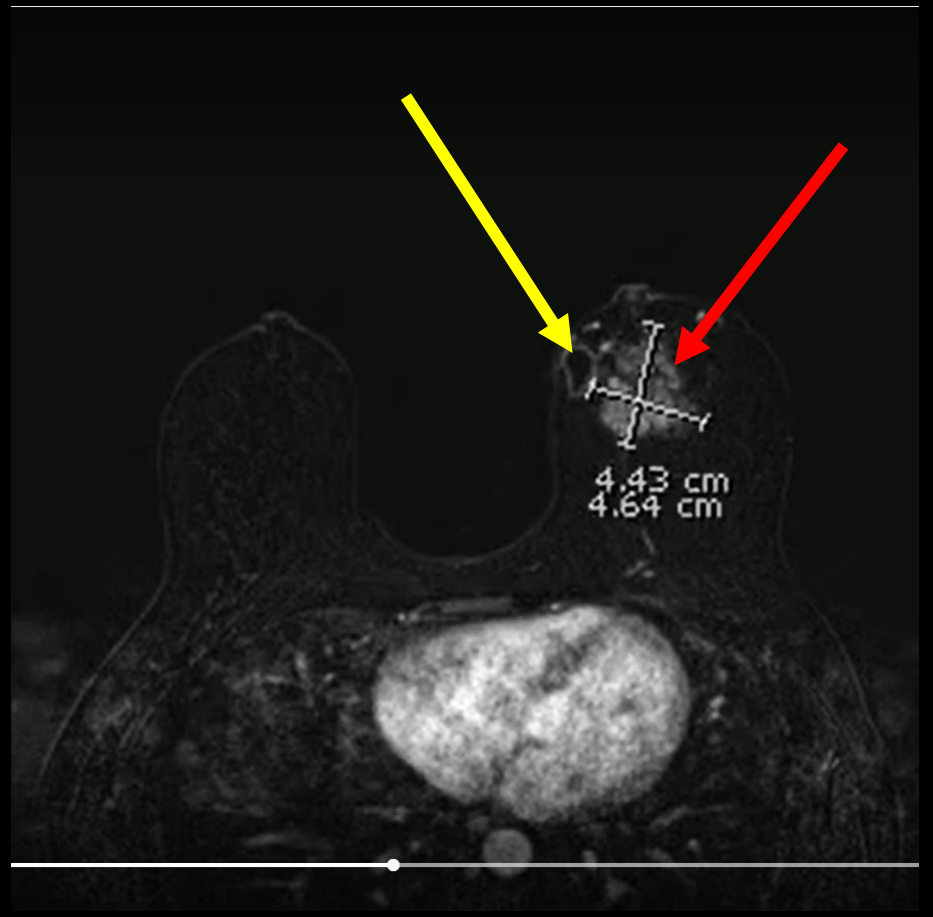
Follow up Findings: 4 months later

- Screening MRI

Findings Labeled



Fluid collection with peripheral enhancement in lower inner aspect of left breast, anterior-middle depth (yellow arrows)

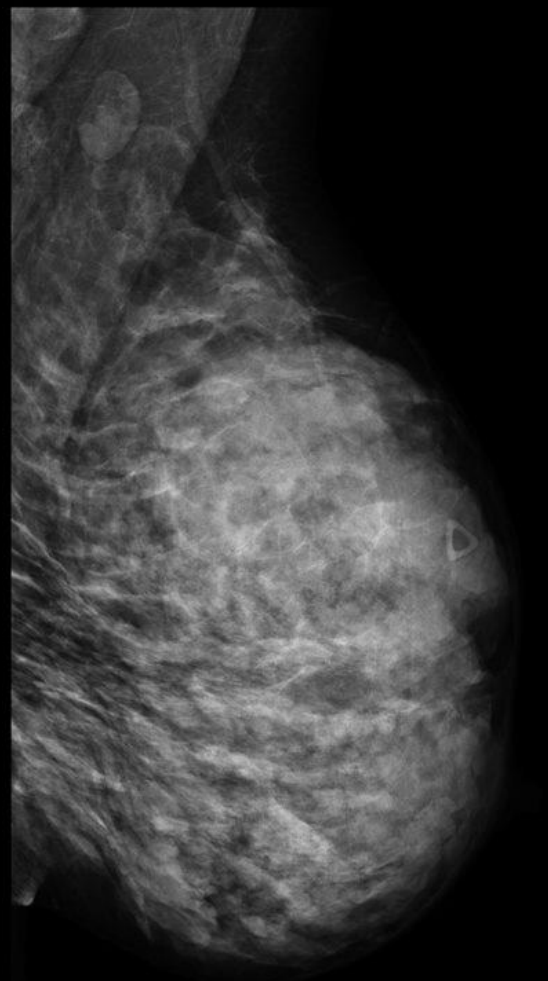


Non-mass enhancement in the central aspect of the left breast, anterior-middle depth (red arrows)

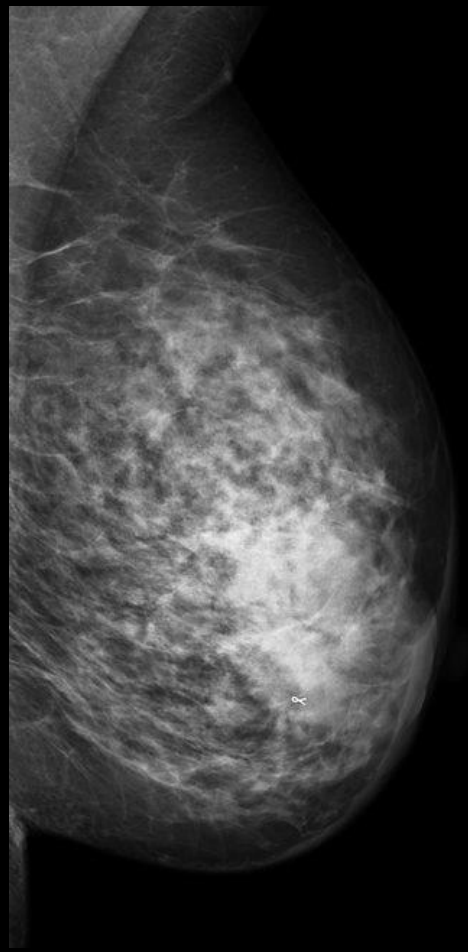
Patient Presentation Continued

- MRI findings were consistent with previous diagnosis of granulomatous mastitis
- Patient had a diagnostic mammogram and ultrasound about 1 month later to follow-up after the abnormal MRI

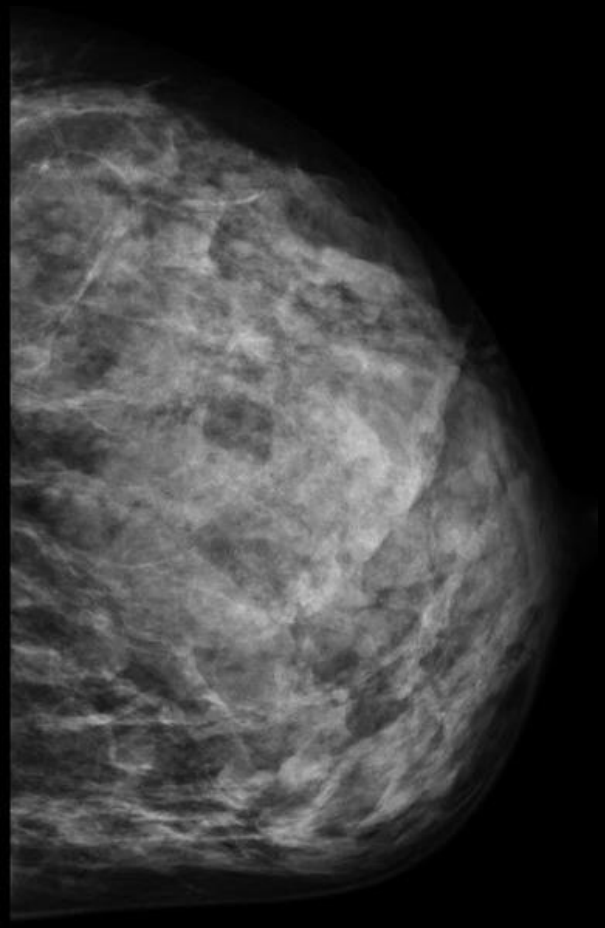
Follow up Findings



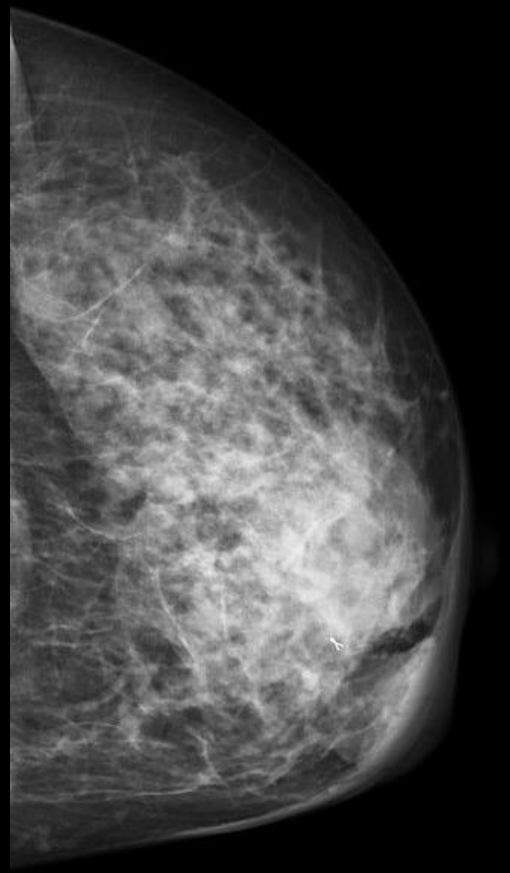
Diagnostic mammogram of Left Breast, MLO view from 19 months prior



Current Diagnostic mammogram of Left Breast, MLO view



Diagnostic mammogram of Left Breast, CC view From 19 months prior



Current Diagnostic mammogram of Left Breast, CC view

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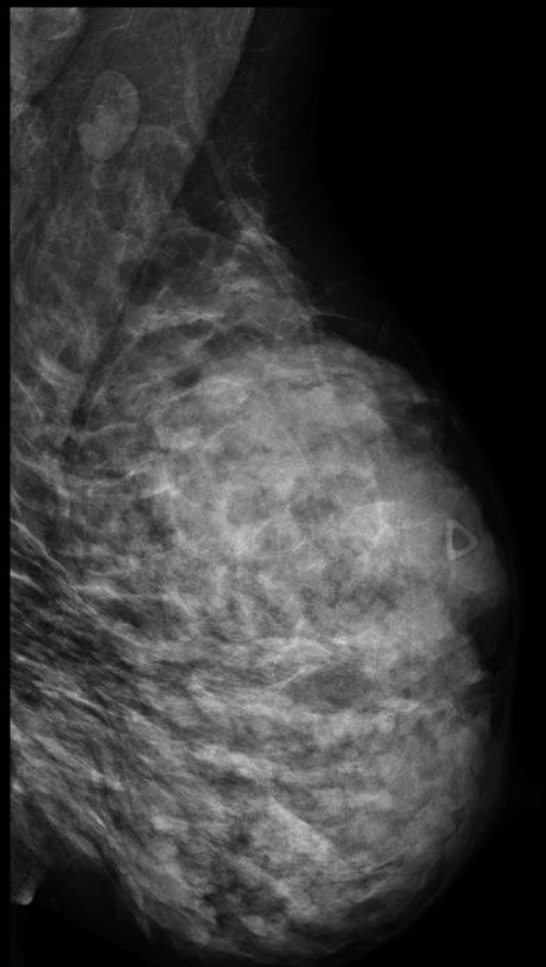
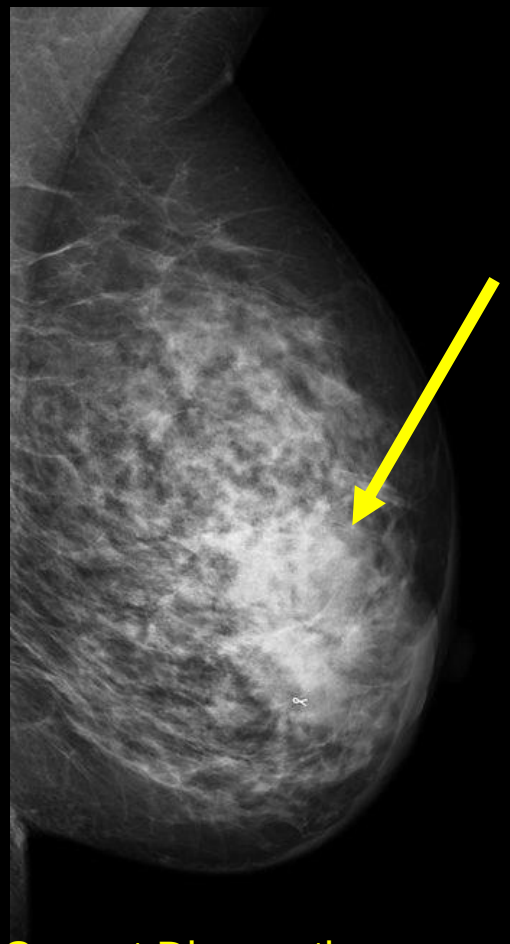
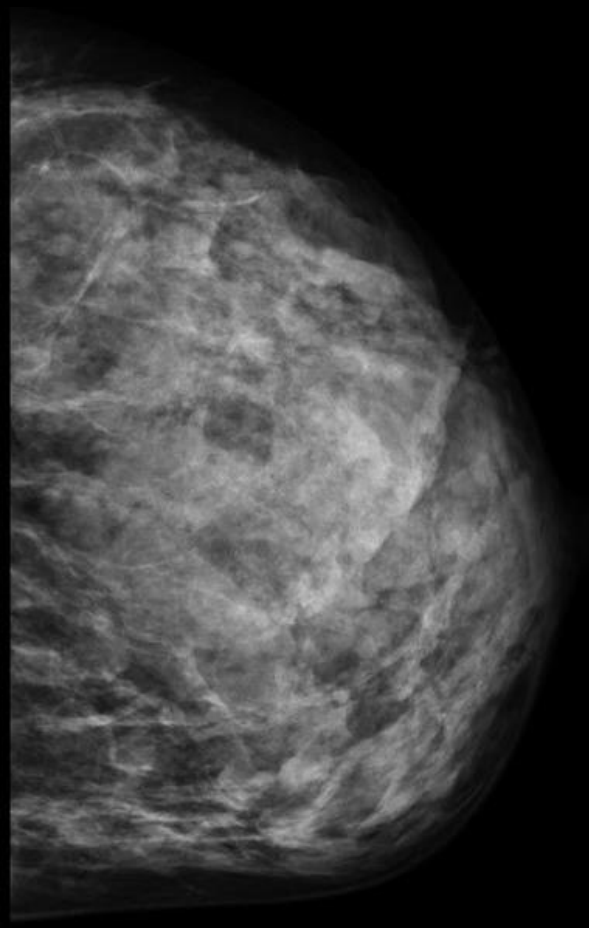
Findings Labeled



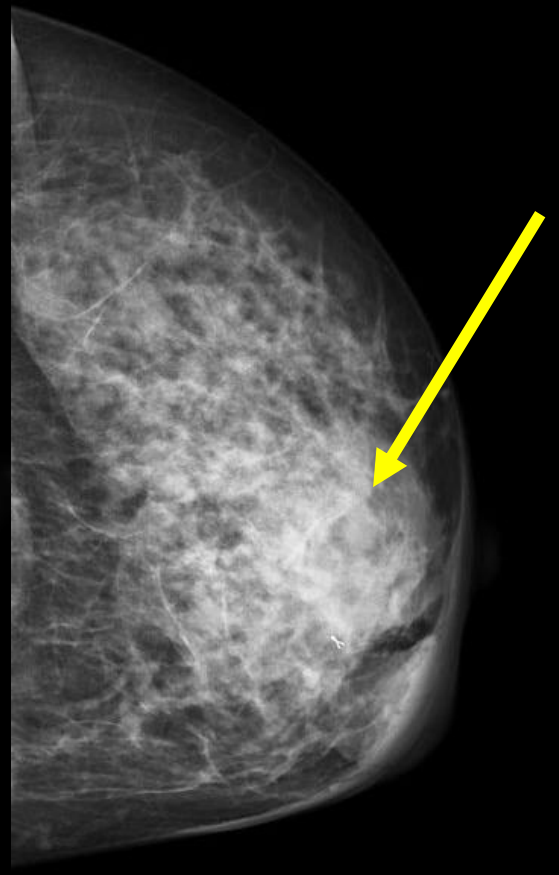
Diagnostic mammogram of Left Breast in MLO From 19 months prior: read as negative, functioning here as patient's baseline



Current Diagnostic mammogram of Left Breast in MLO: global asymmetry in the lower inner aspect, anterior depth



Diagnostic mammogram of Left Breast in CC From 19 months prior: read as negative, functioning here as patient's baseline



Current Diagnostic mammogram of Left Breast in CC: global asymmetry in the lower inner aspect, anterior depth

Case Discussion

- About
  - BENIGN chronic inflammatory breast disease
  - Rare – can go unrecognized leading to patients being prescribed multiple courses of antibiotics without response
- Cause - Unknown
  - By definition, a sterile process, but an association with Corynebacterium has been noted
    - *Corynebacterium kroppenstedtii* associated with cystic neutrophilic granulomatous mastitis specifically
- Risk factors
  - Parous, premenopausal women with history of lactation
    - Median age of 35yo
  - Can be associated with hyperprolactinemia
- Clinical Presentation
  - Tender, palpable unilateral breast mass

Case Discussion

- Diagnosis
  - Core biopsy histopathology, classically shows non-caseating granulomas, but not a requirement for the diagnosis
- Treatment – no consensus on the "right way" to treat
  - Conservative / supportive care
  - Prednisone and/or methotrexate
  - Abscess aspiration
  - Surgical excision
  - If Corynebacterium species (or other microbes) are present – antibiotics should be prescribed
- Prognosis
  - Benign – lesions usually go away on their own
  - Recurrent or prolonged natural disease course
    - may be bothersome to patients

Case Discussion

- Imaging characteristics – variable, may mimic malignant process
  - Mammography - Variable
    - No findings in patients with dense breasts
    - Mass with benign or malignant features (i.e. irregularly shaped or obscured mass)
    - Focal asymmetric density
  - US - Variable
    - Irregular mass of mixed heterogeity – mimic breast cancer
    - Mass-like appearance
    - Tubular/nodular hypoechoic structures
    - Focal decreased parenchymal echogenicity with acoustic shadowing
  - MRI
    - Focal or diffuse asymmetrical signal intensity changes w/o mass effect
    - T1: tend to be hypointense
    - T2: tend to be hyperintense
    - Can show mass-like enhancement

Significance

- Granulomatous mastitis can mimic breast cancer in the patient presentation and imaging characteristics
- Can be difficult to diagnose due to overlapping characteristics with other disease processes
  - Ex: Infective mastitis can be associated with Corynebacterium infection
- With little being known about the cause, treatment can be difficult
- The chronic and recurrent nature of the disease can affect patient's mental health

References:

1. Pluguez-Turull CW, Nanyes JE, Quintero CJ, et al. Idiopathic Granulomatous Mastitis: Manifestations at Multimodality Imaging and Pitfalls. RadioGraphics 2018;38(2):330-356. https://doi.org/10.1148/rg.2018170095

2. Brennan ME, Morgan M, Heilat GB, Kanesalingam K. Granulomatous lobular mastitis: Clinical update and case study. Aust J Gen Pract. 2020 Jan-Feb;49(1-2):44-47. doi: 10.31128/AJGP-08-19-5042. PMID: 32008263.

3. ACR Appropriateness Criteria – Palpable Breast Masses\

4. Radiopaedia: Granulomatous mastitis