

AMSER Case of the Month

July 2020

64 year old female with palpable right breast lump and
new right breast skin erythema

Mary Dinh, MS4

Penn State Health Milton S. Hershey Medical Center

Rebecca Sivarajah, MD

Penn State Health Milton S. Hershey Medical Center



Patient Presentation

- **HPI:** 64yo female presents to PCP with right palpable breast mass and slight reddening overlying the skin of the right breast. Denies nipple discharge or retraction.
- **OB/GYN History:** G3P2, menarche was at age 14 and first birth was at age 36, postmenopausal
- **Medical History:** hypertension, hyperlipidemia, multiple sclerosis
- **Surgical History:** Colposcopy and cryotherapy in 1985
- **Medications:** oral contraceptive, glatiramer, hydrochlorothiazide, lisinopril
- **Physical Exam:** ~3-4 cm nontender, firm, irregular mass in the RLO quadrant of breast that is erythematous and nontender
- **No labs**

What Imaging Should We Order?

ACR Appropriateness Criteria for Palpable breast mass in female 40 years or older

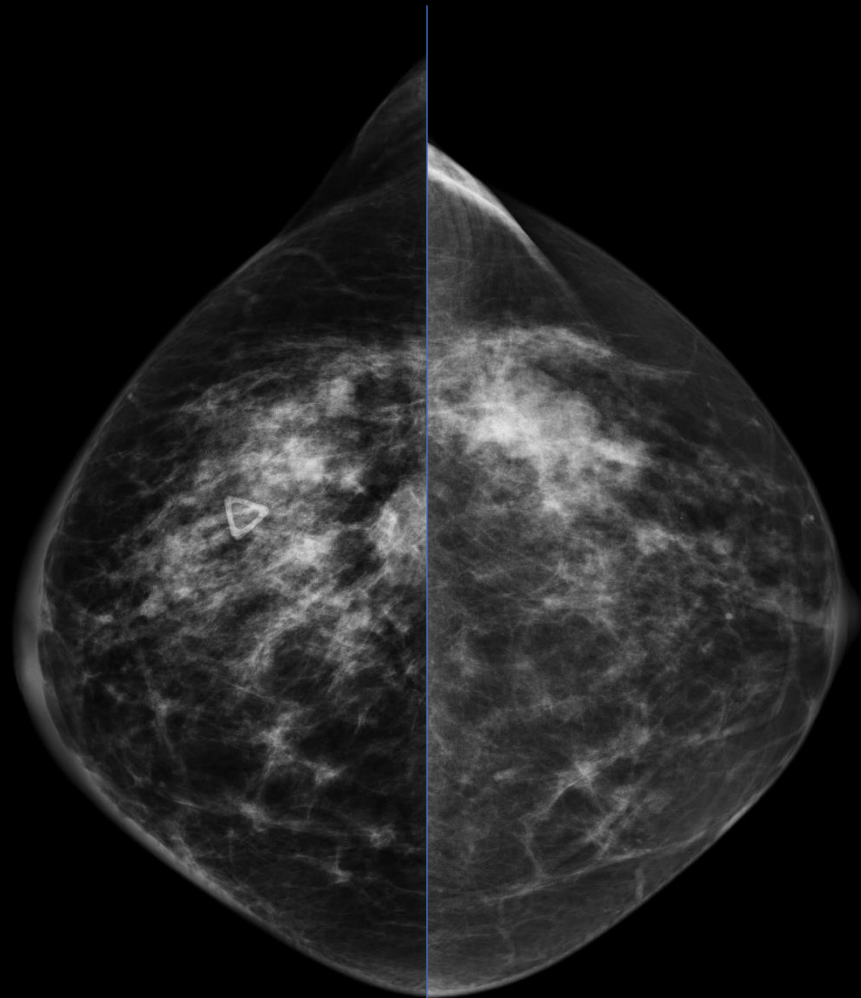
1 Palpable breast mass. Female, 40 years of age or older, initial evaluation. (See Appendices 1A-1B for additional steps in the workup of these patients.) 9

Name	Category	Adult RRL	Peds RRL
Digital breast tomosynthesis diagnostic	Usually appropriate	☼☼ 0.1-1mSv	
Mammography diagnostic	Usually appropriate	☼☼ 0.1-1mSv	
US breast	May be appropriate	○ 0 mSv	○ 0 mSv [ped]
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	○ 0 mSv	○ 0 mSv [ped]
MRI breast without IV contrast	Usually not appropriate	○ 0 mSv	○ 0 mSv [ped]
Sestamibi MBI	Usually not appropriate	☼☼☼ 1-10 mSv	
FDG-PEM	Usually not appropriate	☼☼☼☼ 10-30 mSv	

This imaging modality was ordered by the primary care physician

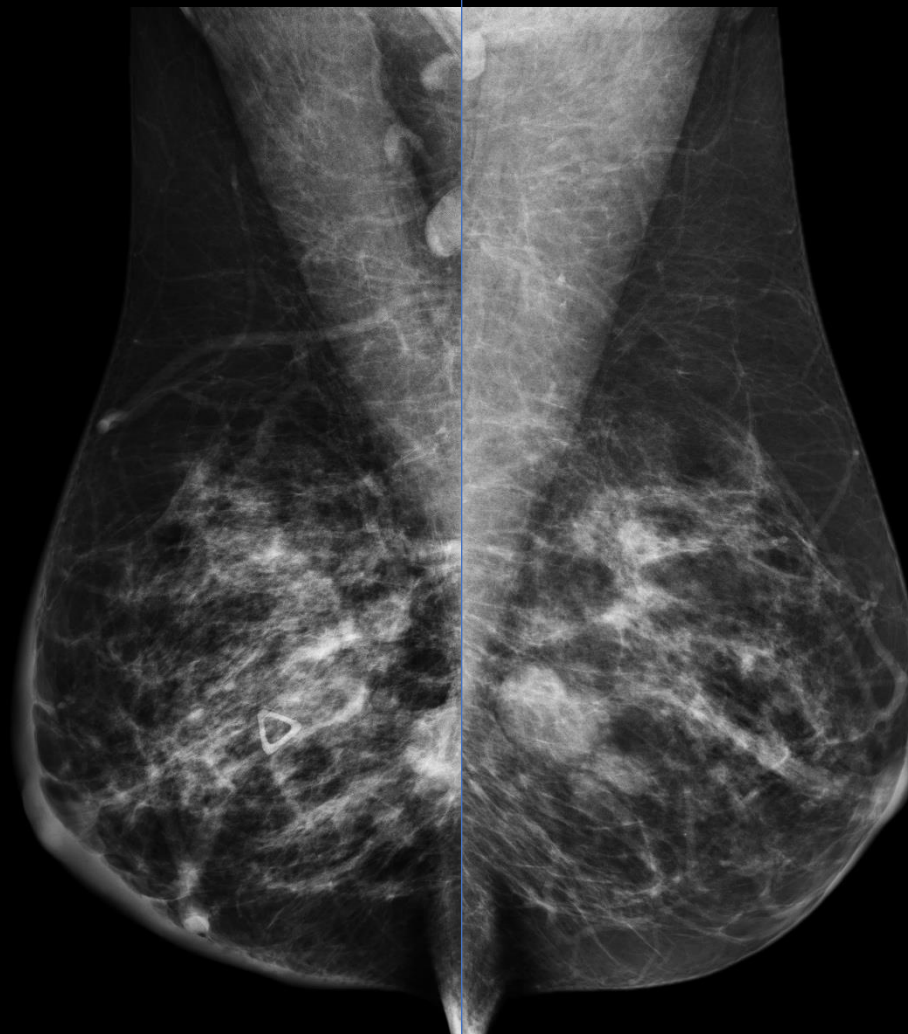


Diagnostic Mammogram (unlabeled)



Right CC

Left CC



Right MLO

Left MLO

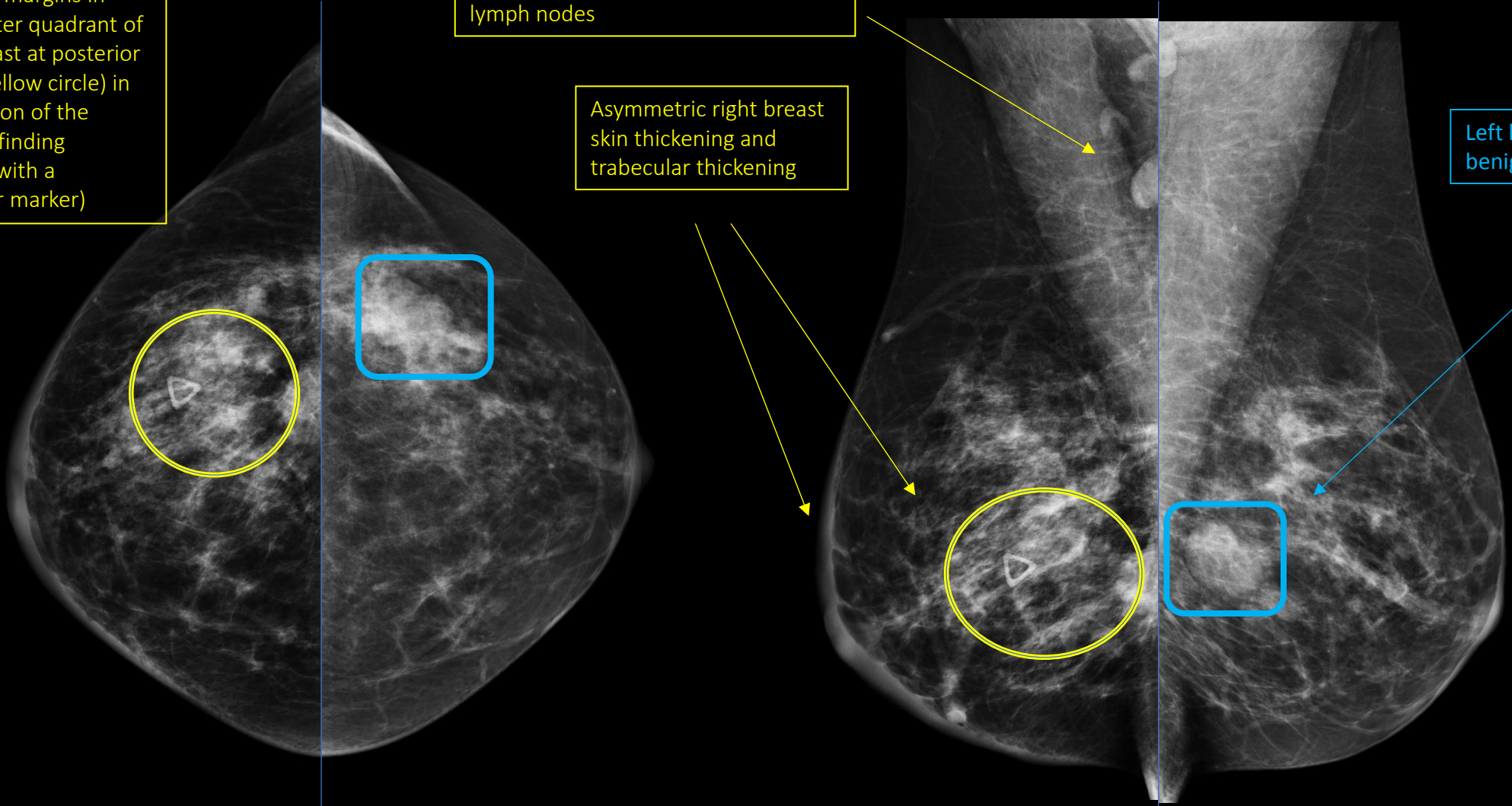
Diagnostic Mammogram Findings (labeled)

Irregular mass with indistinct margins in lower outer quadrant of right breast at posterior depth (yellow circle) in the location of the palpable finding (marked with a triangular marker)

Asymmetric enlarged right axillary lymph nodes

Asymmetric right breast skin thickening and trabecular thickening

Left breast oval mass - benign cyst on ultrasound



Right CC

Left CC

Right MLO

Left MLO

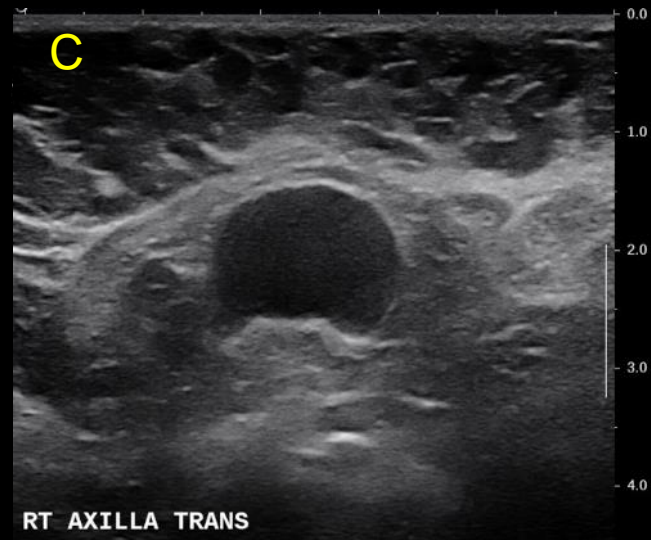
ACR Appropriateness Criteria for Palpable breast mass in female 40 years or older and mammogram suspicious for malignancy

2 Palpable breast mass. Female, 40 years of age or older, mammography findings suspicious for malignancy. Next examination to perform. (See Appendix 1A for additional steps in the workup of these patients.) 9

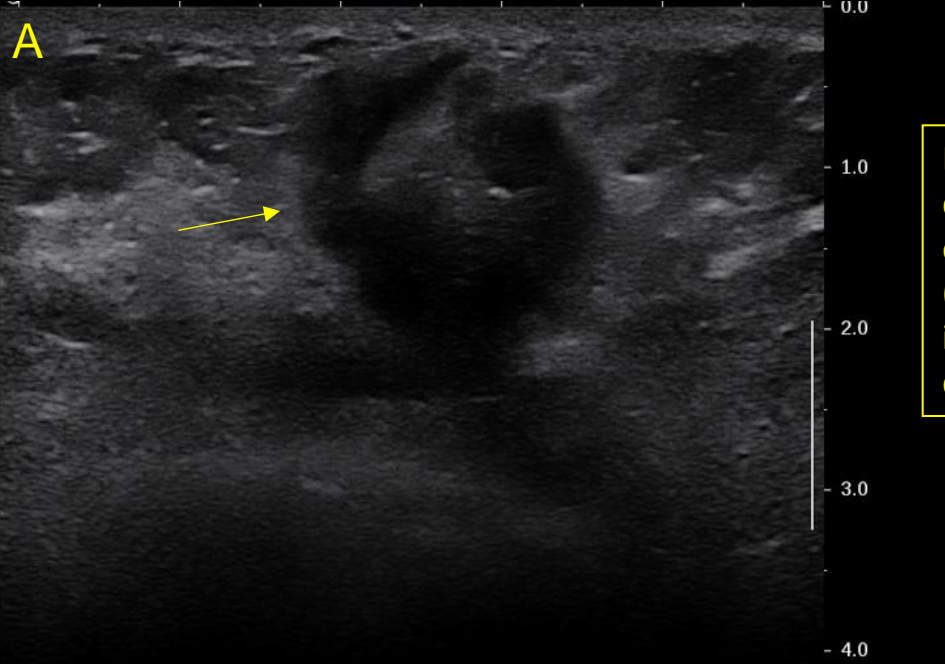
Name	Category	Adult RRL	Peds RRL
US breast	Usually appropriate	0 0 mSv	0 0 mSv [ped]
Digital breast tomosynthesis short-interval follow-up	Usually not appropriate	☹☹ 0.1-1mSv	
Mammography short interval follow-up	Usually not appropriate	☹☹ 0.1-1mSv	
Image-guided core biopsy breast	Usually not appropriate	Varies	
Image-guided fine needle aspiration breast	Usually not appropriate	Varies	
MRI breast without and with IV contrast	Usually not appropriate	0 0 mSv	0 0 mSv [ped]
MRI breast without IV contrast	Usually not appropriate	0 0 mSv	0 0 mSv [ped]
Sestamibi MBI	Usually not appropriate	☹☹☹ 1-10 mSv	
FDG-PEM	Usually not appropriate	☹☹☹☹ 10-30 mSv	

This imaging modality was ordered by the primary care physician

Ultrasound (unlabeled)

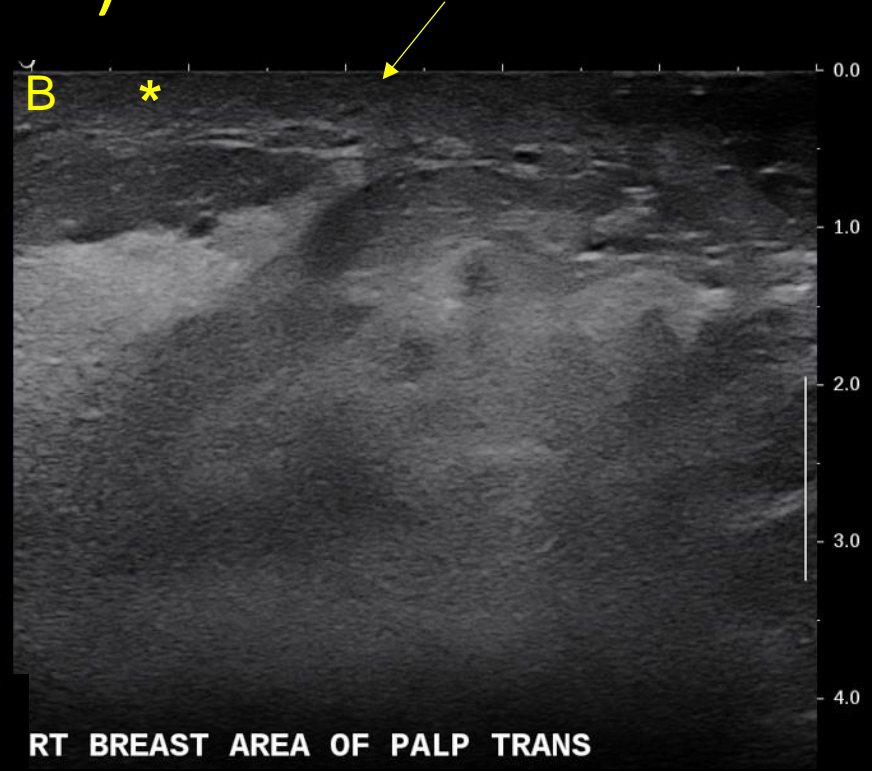


Ultrasound (labeled)

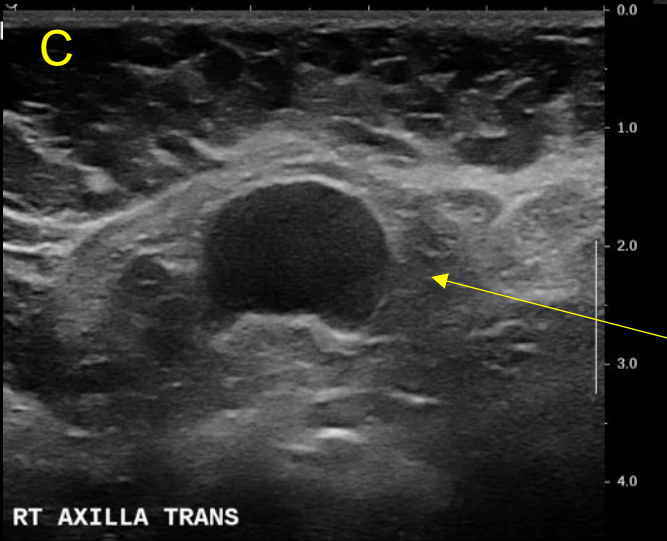


A. Ultrasound of the palpable finding demonstrates a heterogeneously hypoechoic, irregular mass with angular margins. Multiple satellite nodules (not shown) were also seen.

B. Ultrasound of the right breast also demonstrates diffuse increased echogenicity, thickened skin (asterisk), and small anechoic spaces in the skin consistent with dilated dermal lymphatics (thin arrow).

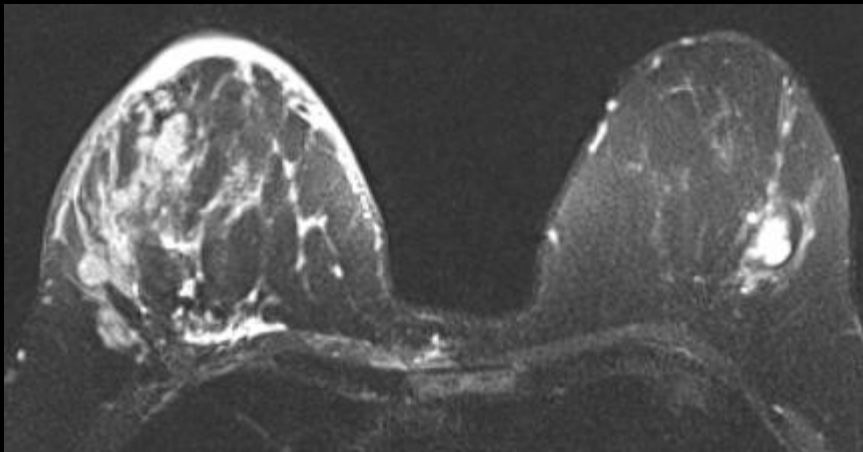
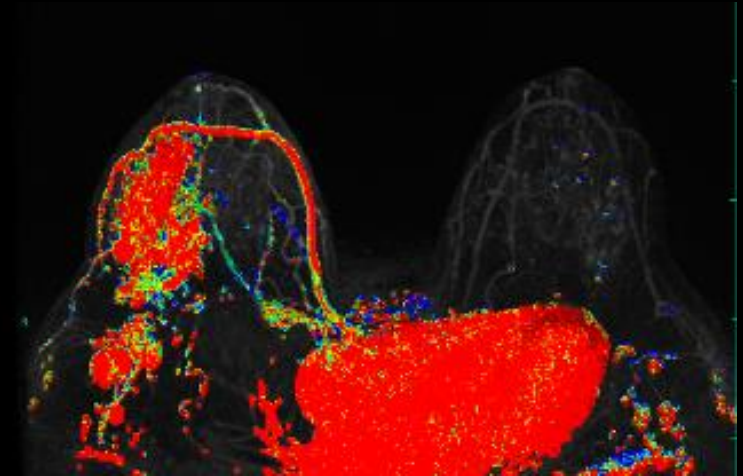
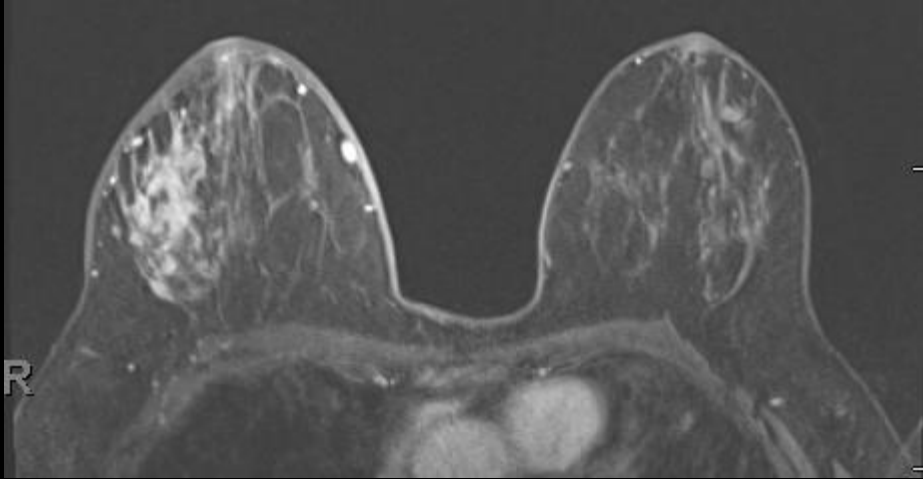


C. Ultrasound of the right axilla demonstrates an abnormal enlarged right axillary lymph node with a rounded shape and loss of the normal hyperechoic fatty hilum.



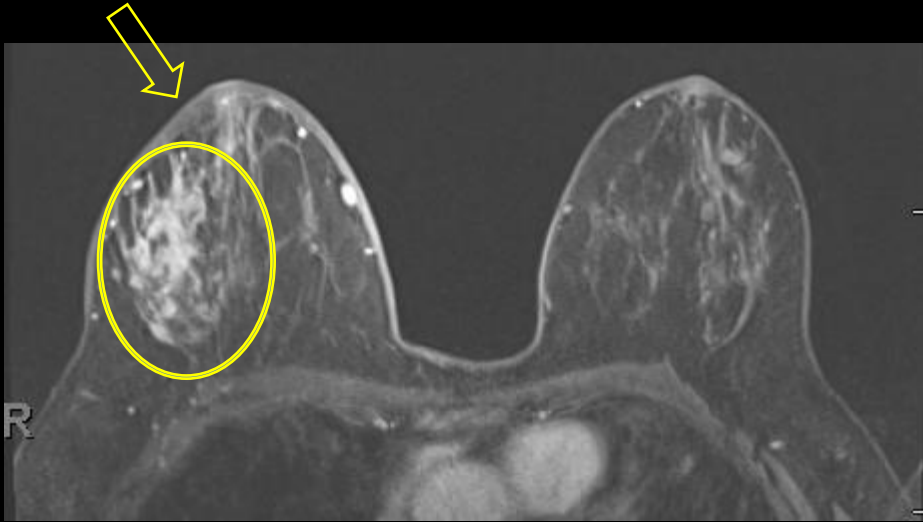
Breast MRI

(performed to evaluate extent of disease and screen the other breast)

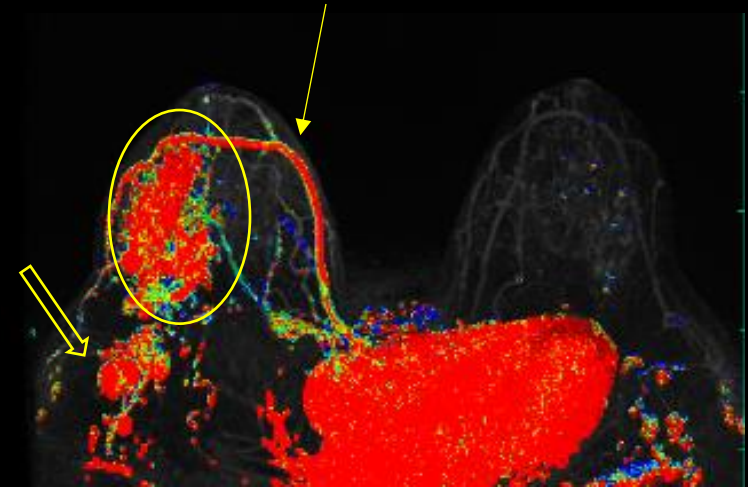


*For women with personal histories of breast cancer and dense breast tissue, or those diagnosed before age 50, annual surveillance with breast MRI is recommended. Breast Cancer Screening in Women at Higher-Than-Average Risk: Recommendations From the ACR.⁸

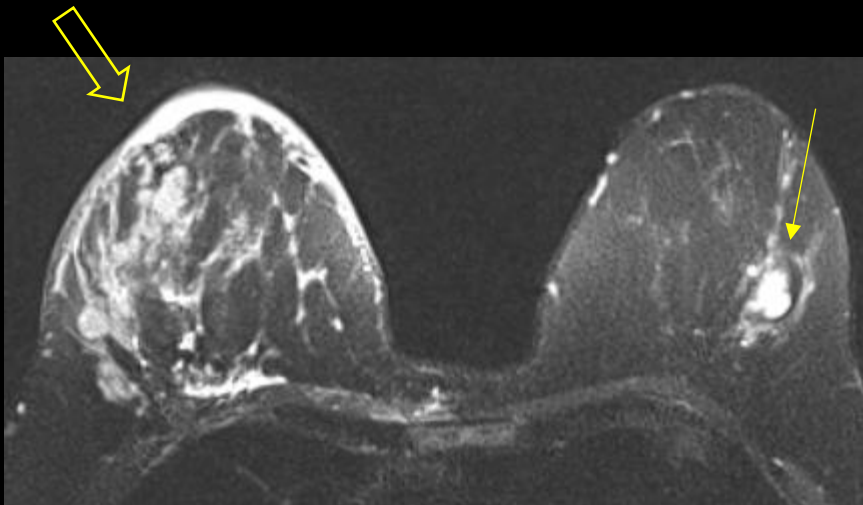
Breast MRI



Axial T1 enhanced MRI through both breasts demonstrates multiple contiguous enhancing masses and non mass like enhancement in the lateral right breast (circle) with associated trabecular thickening and skin thickening (open arrow).



MIP (maximum intensity projections) again demonstrate the abnormal enhancement in the lateral right breast (circle) with recruitment of vessels (arrow). Enlarged right axillary lymph nodes are also noted (open arrow).



Axial T2 images further demonstrate the skin and trabecular thickening (open arrow) and edema (hyperintense signal) in the right breast. Incidentally noted is a T2 hyperintense cyst in the left breast (arrow)

Final Dx:

Invasive Ductal Carcinoma with Lobular Features, Grade III with metastatic right axillary lymph node. This diagnosis combined with clinical findings are consistent with: **Inflammatory Breast Carcinoma.**

Inflammatory breast cancer

Inflammatory breast cancer is a rare breast cancer with a highly virulent course and poor prognosis (5-year overall survival rate of less than 55%)^{1,2,3}

- **Clinical presentation:** Rapid onset of breast erythema, edema, warmth, and **peau d'orange** (pitted, dimpling skin caused by tumor emboli that obstruct the dermal lymphatics and mimic an inflammatory process).^{1,4}
- **Differential diagnosis:**
 - Mastitis – responds to antibiotic treatment within 1-2 weeks, often presents with breast erythema, edema with skin thickening, and fever¹
 - Non-IBC locally advanced breast cancer (LABC) – longer onset of symptoms (>3 months), no erythema or edema, older age at diagnosis (avg age, 66 yo), slower progression, 10% vs 20-40% risk of distant metastasis at diagnosis¹

Inflammatory breast cancer - Diagnosis

- **Minimum Clinical Diagnostic Criteria:**

- Rapid onset of breast erythema and edema \pm peau d' orange \pm warm breast \pm underlying palpable mass
- Duration of history \leq 6 months
- Erythema occupying at least 1/3 of breast⁵
- Pathological confirmation of invasive carcinoma with core biopsy⁵

- **Breast Skin Punch Biopsy**

- Identification of tumor emboli in dermal lymphatics is pathognomonic for IBC diagnosis¹.
- However, dermal lymphatic invasion is identified in <75% of patients with IBC, therefore, not an absolute requirement for diagnosis.

Inflammatory Breast Cancer

• Imaging Findings

- Diagnostic mammogram:
 - Diffuse enlargement of the breast, stromal coarsening, diffuse increased density, skin thickening, trabecular distortion and enlarged lymph nodes. A distinct mass may not be seen. ^{1,3,4}
- Ultrasound:
 - Findings: Skin thickening most commonly seen, small anechoic spaces in skin (dilated dermal lymphatics), diffuse increased echogenicity due to edema. ⁶
 - Helps guide biopsy and evaluate axillary lymph nodes. ^{1,4,5}
- MRI:
 - Multiple small, confluent, heterogeneously enhancing masses
 - Global skin thickening⁷

• Treatment

- Chemotherapy \pm targeted therapy, surgery (mastectomy), and radiation therapy^{1,4,5}

References:

1. Yeh E, Jacene H, Bellon J, et al. What Radiologists Need to Know About Diagnosis and Treatment of Inflammatory Breast Cancer: A Multidisciplinary Approach. *Radiographics : a review publication of the Radiological Society of North America, Inc.* 2013;33(7).
2. Fouad T, Kogawa T, Liu D, et al. Overall Survival Differences Between Patients With Inflammatory and Noninflammatory Breast Cancer Presenting With Distant Metastasis at Diagnosis. *Breast cancer research and treatment.* 2015;152(2).
3. Fouad TM, Barrera AMG, Reuben JM, et al. Inflammatory breast cancer: a proposed conceptual shift in the UICC-AJCC TNM staging system. *Lancet Oncol.* 2017;18(4):e228-e232. doi:10.1016/S1470-2045(17)30192-4.
4. Yamauchi H, Woodward W, Valero V, et al. Inflammatory Breast Cancer: What We Know and What We Need to Learn. *The oncologist.* 2012;17(7).
5. Dawood S, Merajver S, Viens P, et al. International Expert Panel on Inflammatory Breast Cancer: Consensus Statement for Standardized Diagnosis and Treatment. *Annals of oncology : official journal of the European Society for Medical Oncology.* 2011;22(3).
6. Abeywardhana DY, Nascimento VC, Dissanayake D, et al. Review of ultrasound appearance in inflammatory breast cancer: A pictorial essay. *J Med Imaging Radiat Oncol.* 2016;60(1):83-87. doi:10.1111/1754-9485.12418
7. Le-Petross HT, Cristofanilli M, Carkaci S, et al. MRI features of inflammatory breast cancer. *AJR Am J Roentgenol.* 2011;197(4):W769-W776. doi:10.2214/AJR.10.6157
8. Monticciolo DL, Newell MS, Moy L, Niell B, Monsees B, Sickles EA. Breast Cancer Screening in Women at Higher-Than-Average Risk: Recommendations From the ACR. *J Am Coll Radiol.* 2018;15(3 Pt A):408-414. doi:10.1016/j.jacr.2017.11.034.