

# AMSER Case of the Month

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37F with palpable breast mass

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# Patient Presentation

- HPI: 37 year old G2P2002 presenting for a diagnostic mammogram after she was found to have a 1.5cm right breast mass on routine physical exam. She notes a 6lb unintentional weight loss in the last 2 months.
- PMH: fibroadenoma in left breast
- PSH: liposuction, rhinoplasty
- FH: No family history of breast or ovarian cancer
- OB/GYN: G2P2002
  - Age of menarche onset: 11; Age of first delivery: 23
- PE: 1.5cm mass at 11 o'clock on right breast, no nipple changes or palpable axillary lymph nodes
- Pertinent labs: none

What Imaging Should We Order?

# Select the applicable ACR Appropriateness Criteria

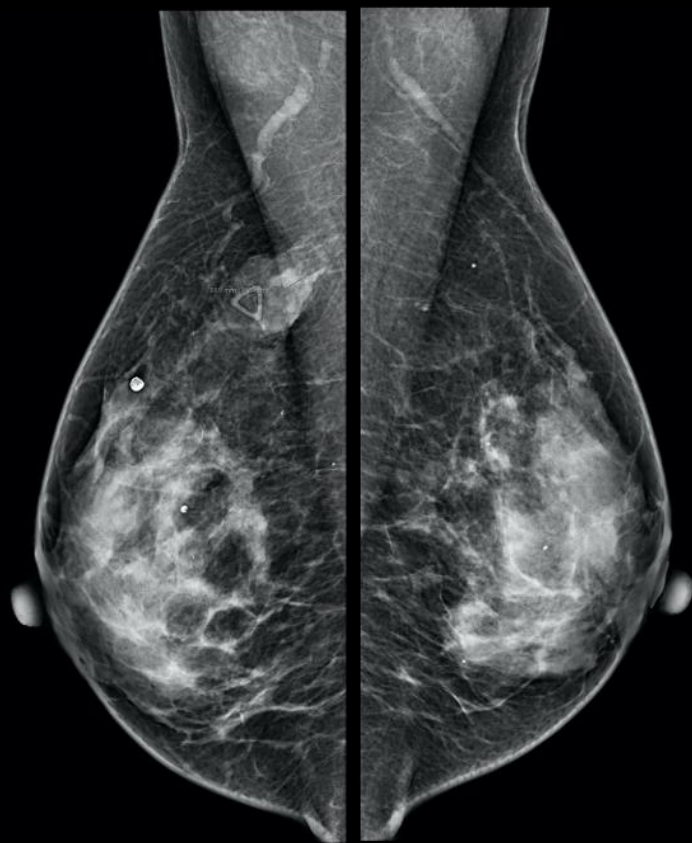
**Variant 11:**

**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.	○
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].	○
MRI breast without IV contrast	1		○
FDG-PEM	1		☢☢☢☢
Sestamibi MBI	1		☢☢☢
Image-guided core biopsy breast	1		Varies
Image-guided fine-needle aspiration breast	1		Varies
<b>Rating Scale:</b> 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

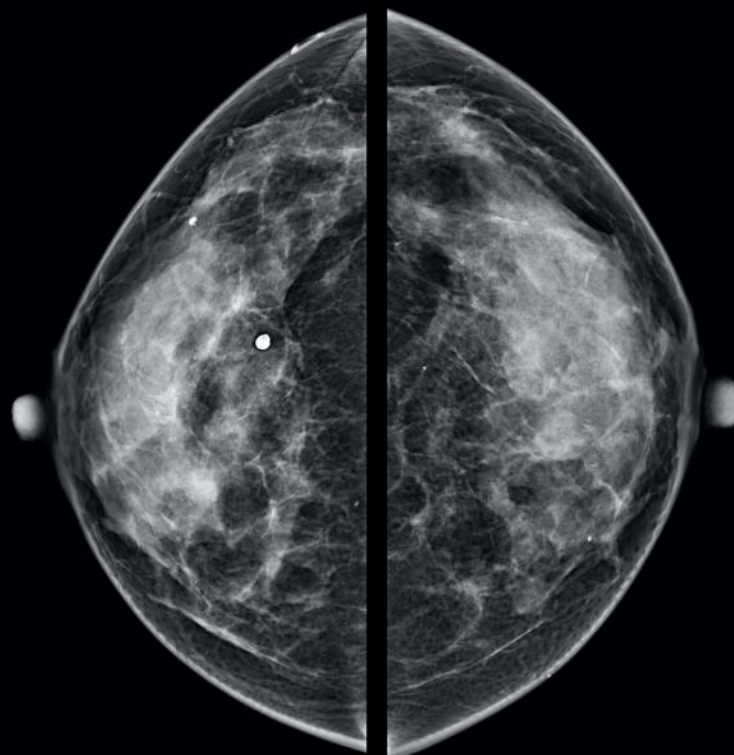
These imaging modalities were ordered by the gynecology NP

# Diagnostic Mammogram (unlabeled)



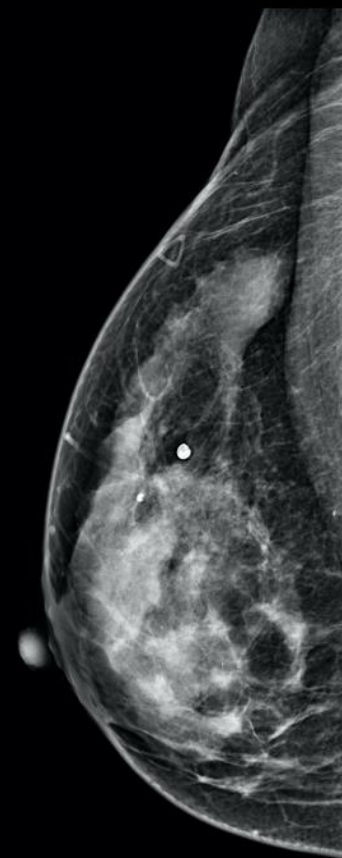
R MLO

L MLO



R CC

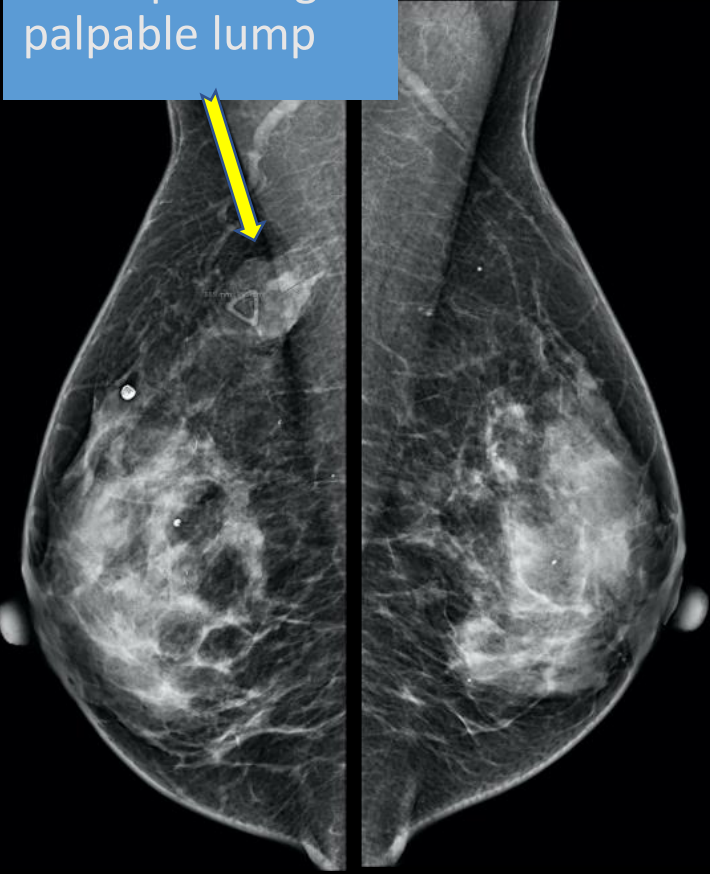
L CC



R CC exaggerated

# Diagnostic Mammogram (labeled)

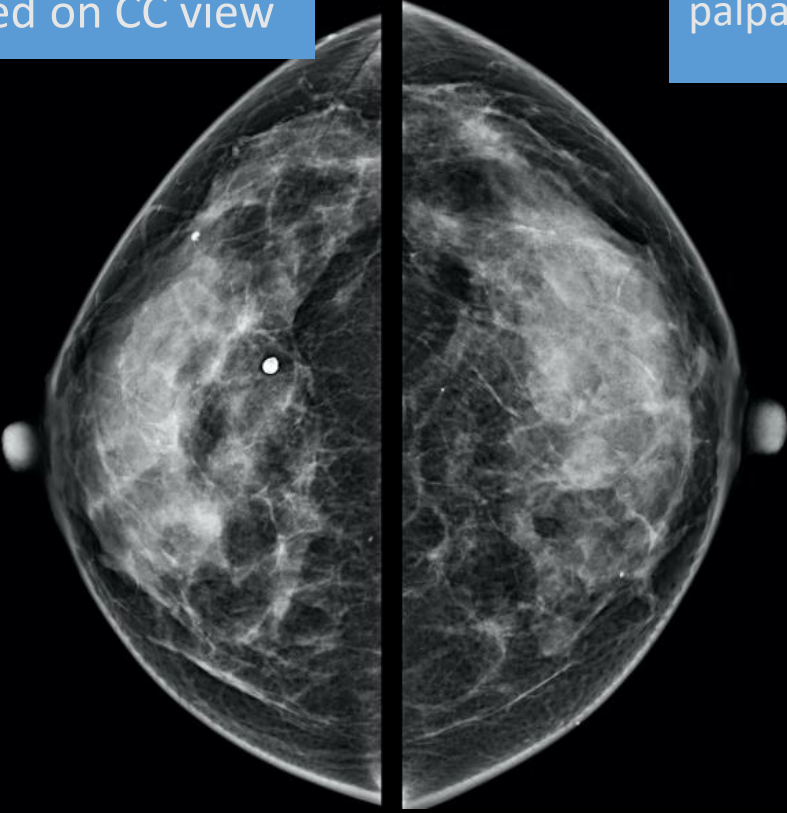
3.4cm mass at posterior depth corresponding to palpable lump



R MLO

L MLO

Dense breast tissue; symmetric. Mass not visualized on CC view



R CC

L CC

Mass seen on exaggerated CC view at posterior depth corresponding to palpable lump



R CC exaggerated

What Additional Imaging Should We Order?

# Select the applicable ACR Appropriateness Criteria

**Variant 2:**

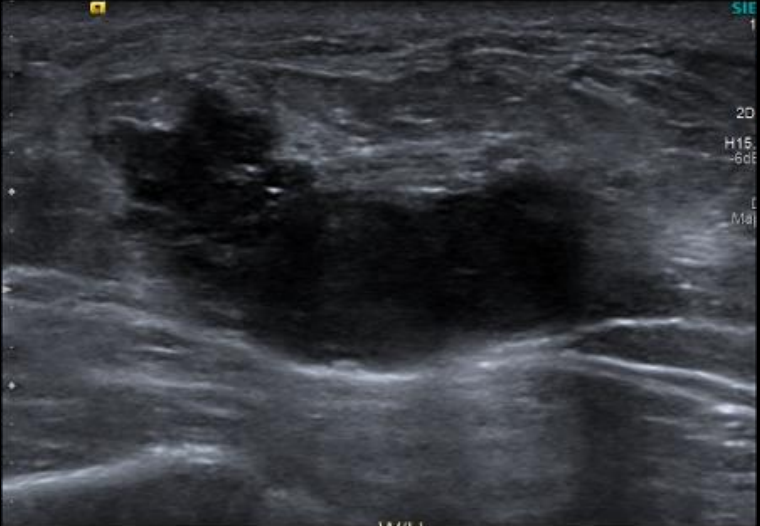
**Palpable breast mass. Female, 40 years of age or older, mammography findings suspicious for malignancy. Next examination to perform. (See [Appendix 1A](#) for additional steps in the workup of these patients.)**

Radiologic Procedure	Rating	Comments	RRL*
US breast	9	See reference [62].	○
MRI breast without and with IV contrast	2	See references [4,49].	○
Image-guided core biopsy breast	2		Varies
Mammography short-interval follow-up	1		☢☢
Digital breast tomosynthesis short-interval follow-up	1		☢☢
MRI breast without IV contrast	1		○
FDG-PEM	1		☢☢☢☢
Sestamibi MBI	1		☢☢☢
Image-guided fine-needle aspiration breast	1		Varies
<b><u>Rating Scale:</u> 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate</b>			<b>*Relative Radiation Level</b>

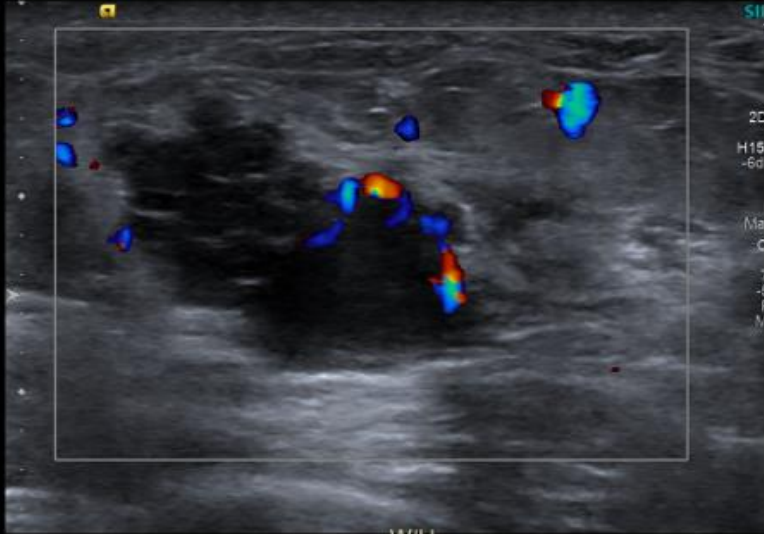
These tests were performed next based on suspicious mammography findings



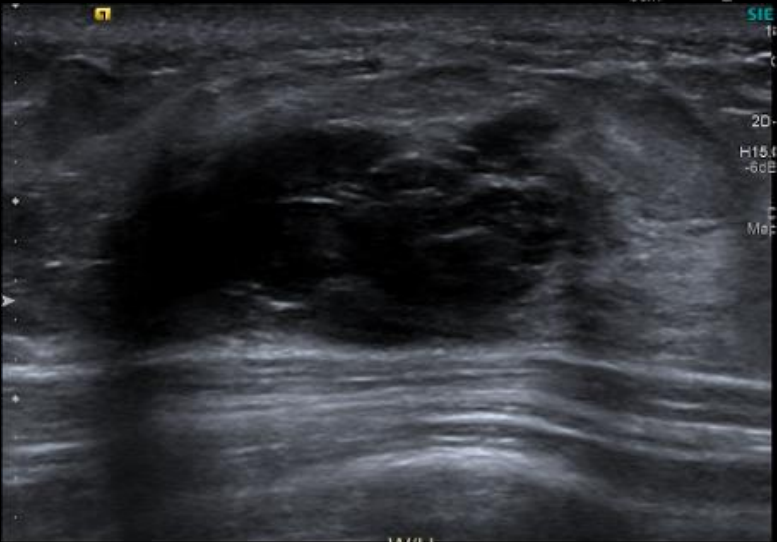
# R Breast Ultrasound Findings (unlabeled)



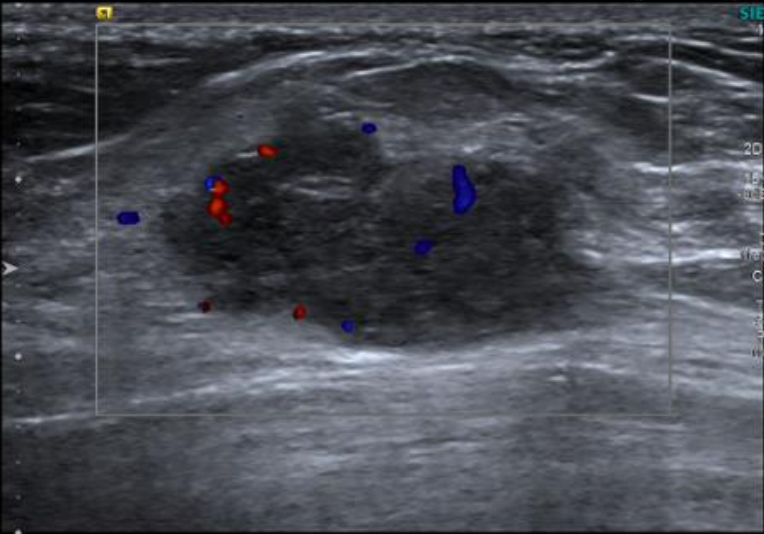
W/H  
RT ANTI RADIAL 10:00 8 CMFN |



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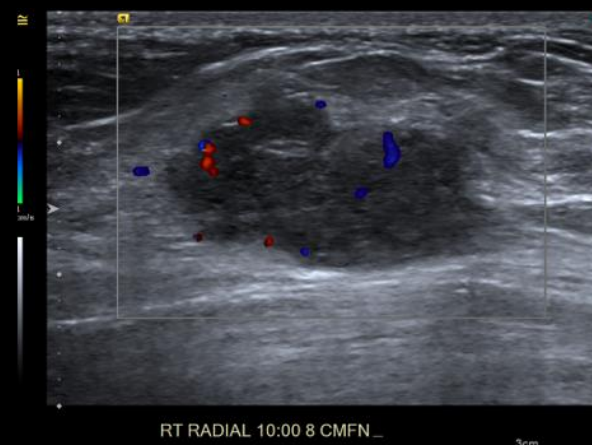
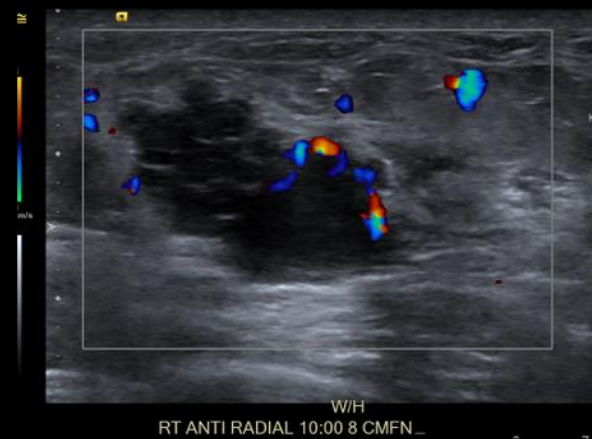


W/H \_  
RT RADIAL 10:00 8 CMFN



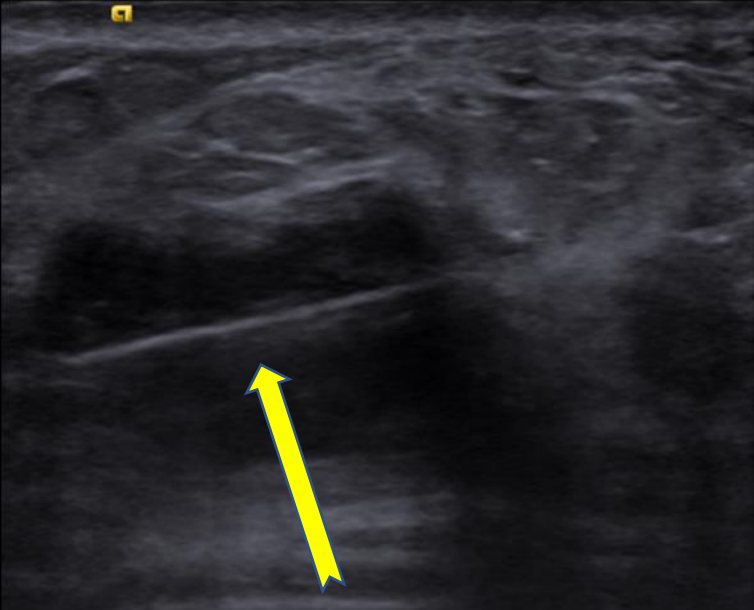
RT RADIAL 10:00 8 CMFN \_

# R Breast Mass Ultrasound Findings

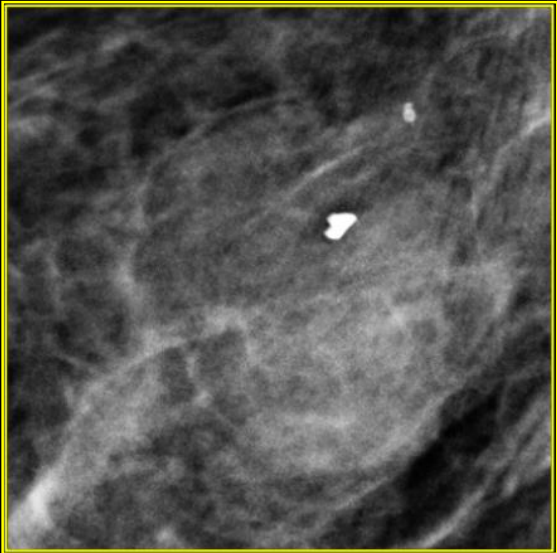


Ultrasound demonstrated a 2.9cm x 1.3cm x 3.3cm irregularly shaped, hypoechoic mass with indistinct margins in the right breast at 10 o'clock in the posterior depth, 8cm from the nipple, with internal vascularity. This mass correlated with the palpable mass reported by the patient.

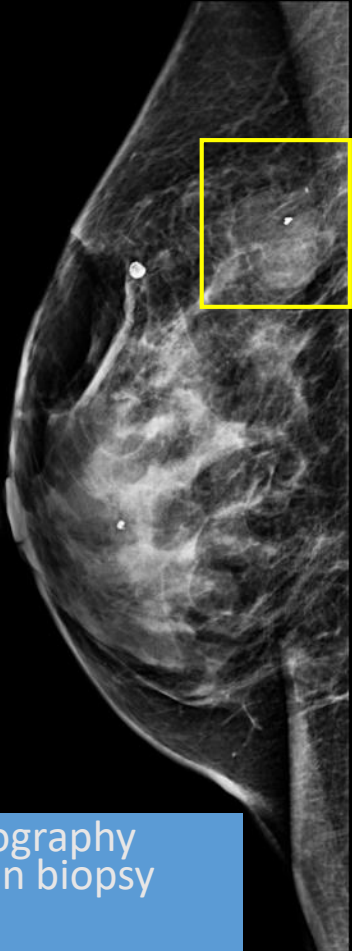
# Ultrasound-Guided Core Biopsy and Post-Biopsy Clip Placement



12 G needle from vacuum-assisted device seen in mass during biopsy



Post biopsy mammography demonstrating clip in biopsy site



Final Dx:

Invasive ductal carcinoma, ER/PR/HER2 negative

# Discussion: Workup of Palpable Breast Lump

- **Differential is broad and includes benign entities (incl. normal tissue), infectious/inflammatory, and malignant causes**
- **Initial imaging workup:**
  - Women age >40: diagnostic mammography, often with ultrasound correlation
  - Women age <30: ultrasound only
  - Women age 30-39: diagnostic mammography or ultrasound considered equally appropriate for initial evaluation
- **Clinical presentation of triple negative breast cancer:**
  - Overall more aggressive course and worse prognosis than hormone receptor positive breast cancers
  - Presents with rapid growth; discovery more likely to be clinical than mammographic

# Discussion: Triple Negative Breast Cancer

## Epidemiology:

- 15-20% of breast cancers diagnosed worldwide
- More common in women under 40 and among Black women compared to White women
- 20% of patients with TNBC have a BRCA mutation as compared to <6% of patients with all breast cancers

## Pathology and Molecular classification:

- Heterogeneous group of cancers that lack ER, PR, and HER2 receptors
- Ongoing efforts to determine subtypes suggest 2 groups: luminal and basal
- Androgen receptor expression is a potential prognostic indicator/therapeutic target
- Most common histology is infiltrating ductal carcinoma

## Management:

- BRCA testing for patients age <60
- Locoregional disease: surgical management + radiation; neoadjuvant chemotherapy for tumors >0.5cm
- Metastatic disease: chemotherapy is mainstay of treatment; research surrounding targeted therapies is ongoing. Potential targets include PD-L1 and androgen receptor

# Imaging Features of Triple Negative Breast Cancer

- Mammography: irregular mass with ill-defined or spiculated margins, without calcifications; can also mimic benign entities such as fibroadenoma
- Ultrasound: hypoechoic, irregular mass with circumscribed margins (up to 57% of cases)
- MRI: detects TNBC with higher sensitivity than in other tumor types and may be useful for assessing chemotherapy response
- Newer studies suggest imaging features may vary by androgen receptor (AR) status, with AR+ tumors significantly associated with heterogeneously dense breast composition, high mass density on mammography, and irregular mass shape on ultrasound

# References:

- Expert Panel on Breast Imaging:, Moy L, Heller SL, Bailey L, D'Orsi C, DiFlorio RM, Green ED, Holbrook AI, Lee SJ, Lourenco AP, Mainiero MB, Sepulveda KA, Slanetz PJ, Trikha S, Yepes MM, Newell MS. ACR Appropriateness Criteria® Palpable Breast Masses. *J Am Coll Radiol*. 2017 May;14(5S):S203-S224. doi: 10.1016/j.jacr.2017.02.033. PMID: 28473077.
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- Dogan BE, Gonzalez-Angulo AM, Gilcrease M, Dryden MJ, Yang WT. Multimodality imaging of triple receptor-negative tumors with mammography, ultrasound, and MRI. *Am J Roentgenol*. 2010;194(4):1160-1166. doi:10.2214/AJR.09.2355
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