AMSER Case of the Month
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64 year old female with palpable right breast lump and new right breast skin erythema

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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

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Adult RRL</th>
<th>Peds RRL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital breast tomosynthesis diagnostic</td>
<td>Usually appropriate</td>
<td>⦿ 0.1-1 mSv</td>
<td></td>
</tr>
<tr>
<td>Mammography diagnostic</td>
<td>Usually appropriate</td>
<td>⦿ 0.1-1 mSv</td>
<td></td>
</tr>
<tr>
<td>US breast</td>
<td>May be appropriate</td>
<td>⦿ 0 mSv</td>
<td>⦿ 0 mSv [ped]</td>
</tr>
<tr>
<td>Image-guided core biopsy breast</td>
<td>Usually not appropriate</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>Image-guided fine needle aspiration breast</td>
<td>Usually not appropriate</td>
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</tr>
<tr>
<td>MRI breast without and with IV contrast</td>
<td>Usually not appropriate</td>
<td>⦿ 0 mSv</td>
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<tr>
<td>Sestamibi MBI</td>
<td>Usually not appropriate</td>
<td>⦿ 1-10 mSv</td>
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<tr>
<td>FDG-PEM</td>
<td>Usually not appropriate</td>
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This imaging modality was ordered by the primary care physician.
Diagnostic Mammogram (unlabeled)
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

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<td>Digital breast tomosynthesis short-interval follow-up</td>
<td>Usually not appropriate</td>
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Ultrasound (unlabeled)
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.
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).

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).

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).
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 is a rare breast cancer with a highly virulent course and poor prognosis (5-year overall survival rate of less than 55%)\textsuperscript{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).\textsuperscript{1,4}

- **Differential diagnosis:**
  - Mastitis – responds to antibiotic treatment within 1-2 weeks, often presents with breast erythema, edema with skin thickening, and fever\textsuperscript{1}
  - 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 diagnosis\textsuperscript{1}
Inflammatory breast cancer - Diagnosis

• **Minimum Clinical Diagnostic Criteria:**
  - Rapid onset of breast erythema and edema + peau d’ orange + warm breast + underlying palpable mass
  - Duration of history ≤6 months
  - Erythema occupying at least 1/3 of breast
  - Pathological confirmation of invasive carcinoma with core biopsy

• **Breast Skin Punch Biopsy**
  - Identification of tumor emboli in dermal lymphatics is pathognomonic for IBC diagnosis.
  - 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 thickening\(^7\)

• Treatment
  • Chemotherapy ± targeted therapy, surgery (mastectomy), and radiation therapy\(^1,4,5\)
References:


