AMSER Case of the Month
January 2021

Change in Breast Density

Lauren Finch CMSRU

Pauline Germaine, DO
Cooper University Hospital
Patient Presentation

Patient is currently a 46 yo with PMHx of invasive ductal carcinoma of the right breast s/p right mastectomy with sentinel lymph node biopsy in 2007 who presents for routine scheduled annual evaluation of the left breast

Disease History/Course:

• Pathology: 1.8cm invasive ductal carcinoma. Lymph node 0.9cm. Comedo-type DCIS. Micrometastasis in 1 lymph node
• ER positive, PR weekly positive, HER-2/neu positive
• S/p adjuvant Adriamycin/Cytoxan, followed by Taxol, s/p 1 year Herceptin. Treatment with Tamoxifen from 2009 – 2019 & Lupron 2009-2013
What Imaging Should We Order?

• Routine Annual Mammography
• Diagnostic Mammogram as needed for palpable masses and/or pain
• Ultrasound as needed for screening in the setting of dense breast tissue, areas of concern and/or palpable masses and/or pain
Select the applicable ACR Appropriateness Criteria

**Variant 2:** Breast cancer screening. Intermediate-risk women: women with personal history of breast cancer, lobular neoplasia, atypical ductal hyperplasia, or 15% to 20% lifetime risk of breast cancer.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammography screening</td>
<td>Usually Appropriate</td>
<td>🍂🍂</td>
</tr>
<tr>
<td>Digital breast tomosynthesis</td>
<td>Usually Appropriate</td>
<td>🍂🍂</td>
</tr>
<tr>
<td>MRI breast without and with IV</td>
<td>May Be Appropriate</td>
<td>🍂</td>
</tr>
<tr>
<td>US breast</td>
<td>May Be Appropriate</td>
<td>🍂</td>
</tr>
<tr>
<td>FDG-PET breast dedicated</td>
<td>Usually Not Appropriate</td>
<td>🍂🍂🍂</td>
</tr>
<tr>
<td>Sestamibi MBI</td>
<td>Usually Not Appropriate</td>
<td>🍂🍂</td>
</tr>
<tr>
<td>MRI breast without IV contrast</td>
<td>Usually Not Appropriate</td>
<td>🍂</td>
</tr>
</tbody>
</table>

These imaging modalities were ordered by the patients oncologist.

This patient falls under variant 2, given her personal history of breast cancer without BRCA genetic mutation.
Annual mammograms - Density Levels

2017: Scattered
2018: Scattered
2019: Scattered
2020: Heterogeneously Dense
Final Dx:

Increasing Breast Density after the cessation of chronic Tamoxifen use
Discussion

• Women with progesterone and estrogen receptor positive breast cancer, adjuvant endocrine therapy is indicated
  • Shown to improve the rates of recurrence, second breast cancers, and survival

• Tamoxifen is a selective estrogen receptor modulator
  • Works as an antagonist on the estrogen receptors in the breast
  • Adjuvant endocrine therapy of choice in premenopausal women (our patient)
  • Used in postmenopausal women with a contraindication to aromatase inhibitors
Discussion

• Complications of Tamoxifen therapy include osteoporosis, endometrial adenocarcinoma, uterine sarcoma, stroke, pulmonary embolism

• Tamoxifen can have an impact on breast density. Due to its antagonist effects on estrogen in the breast and the idea that estrogen can increase density in breast tissue (as seen in premenopausal women and women on HRT), tamoxifen use can reduce breast density from baseline

• There are some studies that show an increase in breast density after the cessation of tamoxifen (as shown in our patient case)
  • One study showed 48% of patients saw an increase in breast density after the cessation of tamoxifen treatment
References:

- https://acsearch.acr.org/docs/70910/Narrative/
- https://www.uptodate.com/contents/adjuvant-endocrine-therapy-for-postmenopausal-women-with-hormone-receptor-positive-breast-cancer?search=tamoxifen%20breast%20cancer&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1#H631834246
- https://www.uptodate.com/contents/adjuvant-endocrine-therapy-for-premenopausal-women-with-hormone-receptor-positive-breast-cancer?sectionName=LOW-TO-AVERAGE-RISK,%20HORMONE%20RECEPTOR-POSITIVE%20CANCERS&search=tamoxifen%20breast%20cancer&topicRef=749&anchor=H1508165867&source=see_link#H2580928607
- https://www.clinicalimaging.org/article/S0899-7071(01)00329-1/fulltext