BREAST SCREENING, WHAT’S NEW WITH IMAGING?
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Coordinator High Risk Breast Clinic
UAB

DISCLOSURE STATEMENT:
I have no relevant financial relationships to disclose.

EDUCATIONAL OBJECTIVES:
- Participants will be able to describe breast screening recommendations.
- Participants will be able to distinguish between screening and diagnostic breast imaging with indications for each.
- Participants will be able to identify new imaging modalities at UAB for dense breast tissue.
- Participants will be able to identify supplemental imaging recommendations based on level of breast cancer risk factors
- Participants will be able to identify those who need risk assessment.
SCREENING FOR BREAST CANCER:

- Monthly self breast awareness
- Clinical breast exam every 12 months (start at age 21)
- Family history of breast cancer: Annual screening mammogram to begin 10 years prior to the youngest family member with breast cancer (but not prior to age 25) or age 40 whichever is earlier
- For women with lifetime risk >20% as calculated by risk models largely dependent on family history (Tyrer-Cuzick, Claus, BRCAPRO, BOADICEA)
  - annual breast MRI to begin 10 years prior to the youngest family member
  - with breast cancer (but not prior to age 25) or age 40 whichever is earlier
- Consider whole breast ultrasound (ABUS) or contrast enhanced mammography for those who qualify but do not undergo MRI

RISK ASSESSMENT LIMITATIONS

- Risk models underestimate risk from family history and breast density
- The Gail model underestimates risk from family history and breast density
- The Gail model overestimates risk from breast density
- Most risk models do not account for breast density
- Most risk models do not account for any other mutations outside of BRCA, risk estimates must be used.
- Risk assessment is dependent of reported family history, can change from visit to visit

WHEN IN DOUBT REFER…

UAB Breast Health Clinic
205-801-8266
uabmedicine.org
INDICATIONS FOR DIAGNOSTIC MAMMOGRAPHY:

- Nipple Discharge
  - Suspicious (bloody, unilateral, single duct, spontaneous)
  - Physiologic (bilateral, nonbloody, usually nonspontaneous)
- Focal pain
  - Diffuse due to disease in adjacent to mammography
- Palpable lump (self or clinical exam)
  - Clock location
  - Size
- Palpable mass, lateral breast, and all from biopsy

DIAGNOSTIC BREAST IMAGING:

- Includes targeted mammogram 2D or 3D
  - Excels at calcifications
  - 3D excels at architectural distortion
- Polarization subtraction
  - Extends ac detection of masses and determining if
    - Cystic or solid
- Breast MRI
  - Extends at detecting higher risk breast lesions than
    - Mammography

The challenge of dense breast tissue

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost entirely fatty</td>
<td>Scattered fibroglandular</td>
<td>Heterogeneously dense</td>
<td>Extremely dense</td>
</tr>
</tbody>
</table>
FACTORs THAT AFFECT BREAST DENSITY

- Age
- Medications
- Weight
- Family History
- Genetics

Breast Density is a mammographic finding, not a physical finding.

THE RISKS ASSOCIATED WITH DENSE BREAST TISSUE

- 40% of women in the U.S. have dense breast tissue.
- Up to 50% of breast cancers may be missed in extremely dense breasts.
- Women with dense breasts may be 4-6x more likely to get breast cancer.
- Women with dense breasts have 2x increased risk of development of contralateral breast cancer.
- Women with dense breasts have increased odds of developing an interval breast cancer.
- 71% of breast cancers occur in dense breasts.

EXTREMELY DENSE BREAST TISSUE DRAMATICALLY LOWERS THE SENSITIVITY OF MAMMOGRAPHY BY UP TO 50%.

- Emerging information on dense breast tissue.
- Affects 40%-50% of US women ages 40-74.
- Women over 60 with dense breast tissue.
- About 20-30% of obese women have dense breast tissue compared to 25-30% of obese women.

BREAST DENSITY IS THE LEADING COMMON RISK FACTOR FOR DEVELOPMENT OF BREAST CANCER.

- Greater than:
  - Family history
  - Personal history of benign lesions
  - First full term pregnancy after age 30
  - Early menarche
  - Late menopause
  - Young pregnancy

YOUR PATIENT SAYS SHE WAS TOLD SHE HAS DENSE BREASTS.

Now what?

CURRENT IMAGING OPTIONS

- Digital mammography, preferably with 3D tomosynthesis
- Contrast enhanced mammography (CEM)
- Supplemental screening with ultrasound (handheld or automated)
- In adjunct to mammography or MRI
- For women with dense breast tissue
- Supplemental screening with MR
- Women with a high risk of breast malignancy regardless of tissue density (>20% lifetime risk)
- New ACR recs 2018: women with history of breast cancer and dense breast tissue who are diagnosed with breast cancer at age 50 or less

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WHAT IS ABUS?

- Provides additional information to mammography
- Used with women who have dense breast tissue
- Provides additional accuracy in breast cancer detection

Risk assessment based on Tyrer-Cuzick Lifetime Risk Model (to be included in mammography reports, as well as breast density). There remains considerable controversy in the management of patients in the intermediate and high risk categories. Evaluation and management of these patients should be undertaken by physicians with expertise in breast cancer risk models.

ABUS would be an alternative in patients with contraindications to MRI. Recommendations for MRI are based on the American Cancer Society recommendations.

WHAT IS CONTRAST ENHANCED MAMMOGRAPHY?

- Uses contrast with mammogram images to evaluate neovascularity in the breast, providing both anatomic and physiologic information similar to breast MRI
- Contrast agent similar to that used for CT exams
- Good alternative in high risk women when MRI not an option
- More cost effective than breast MRI
- Good for women with dense breast tissue
- Limited study data
- Emerging role

Personalized Screening Approach
COST OF SCREENING OPTIONS

<table>
<thead>
<tr>
<th></th>
<th>DX MAMMOGRAM</th>
<th>MRI</th>
<th>CEM</th>
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<tbody>
<tr>
<td>COST</td>
<td>$171</td>
<td>$545</td>
<td>$210</td>
</tr>
<tr>
<td>CDR</td>
<td>3-7/1000</td>
<td>17/1000</td>
<td>16/1000</td>
</tr>
<tr>
<td>RR</td>
<td>7-17%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>BR</td>
<td>2%</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>PPV1</td>
<td>3-8%</td>
<td>9%</td>
<td>21%</td>
</tr>
</tbody>
</table>

CDR: CANCER DETECTION RATE PER 1000 SCREENS  
RR: RECALL RATE  
BR: BIOPSY RATE  
PPV1: CANCERS/RECALLS

COST OF DIAGNOSTIC WORK UP

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Diagnostic Mammogram</strong></td>
<td></td>
</tr>
<tr>
<td>Unilateral</td>
<td>$135</td>
</tr>
<tr>
<td>Bilateral</td>
<td>$171</td>
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<tr>
<td><strong>Breast Ultrasound</strong></td>
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<tr>
<td>Targeted</td>
<td>$90</td>
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<tr>
<td>Complete</td>
<td>$129</td>
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<tr>
<td><strong>Typical Diagnostic Work Up</strong></td>
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</tr>
<tr>
<td>Unilateral MMG/US</td>
<td>$225</td>
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<tr>
<td>Core Biopsy (MMG/US)</td>
<td>$900</td>
</tr>
</tbody>
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Diagnostic Mammography Outcomes...

60-80% OF BIOPSIES SHOULD BE BENIGN
REFERENCES

- Invenia ABUS 2.0 Customer Presentation 2019
- NCCN Guidelines
- Breast Cancer: Screening and Staging
- Recurrent Induced Deleterious Indicators
- Population-Attributable Risk Proportion of Clinical Risk Factors for Breast Cancer, Lancaster et al., JAMA Internal Medicine, 2017
- Risks and benefits of supplemental breast MRI vs. including mammographic BI-RADS UH and other, JAMA, Oncology, 2018

REFERENCES

- Medicare Fee Schedule
- Liao et al. Radiology, 2017
- Song et al. Radiology, June 2019

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