Supplemental Screenings and Diagnostic Imaging for Women With Dense Breasts

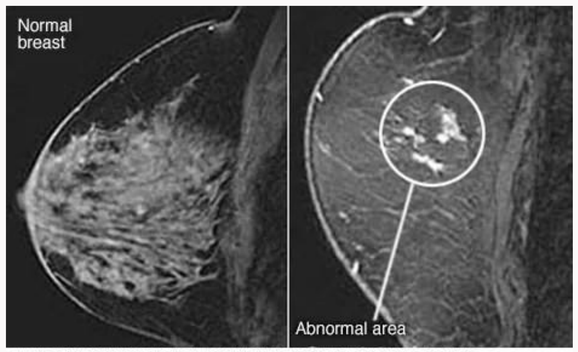
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Introduction

- Breast cancer remains one of the most commonly diagnosed cancers among women worldwide, and early detection is essential.
- Mammography is the most popular screening tool for breast cancer, but there are limitations when it comes to women with dense breasts.
- Because dense tissue and tumors both appear white on a mammogram, dense tissue can mask tumors and lead to false-negative results.
- Supplemental screenings such as breast magnetic resonance imaging (MRI), ultrasound (US), or contrast-enhanced mammography (CEM) are important and can play a crucial role in early and accurate detection of breast cancer in women with dense breasts.

Breast Magnetic Resonance Imaging (MRI)

- An MRI uses a magnetic field and radio waves to create detailed images of the organs and tissues in the body without the use of radiation.



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Why It's Used:
- Abnormalities on a mammogram or ultrasound
- High risk for breast cancer
- Dense breasts
- Personal history of breast cancer

Advantages:
- No radiation
- Superior detail
- Increased detection of abnormalities

Disadvantages:
- Risk of allergic reaction to contrast
- May detect benign lesions leading to more testing
- May be less effective at detecting calcium deposits (microcalcifications)

Statistics

- In 2022, about 2.4 million women were diagnosed with breast cancer worldwide, and 670,000 died from the disease.
- Dense breast tissue is present in roughly 47% of women and is known to be a high risk factor for breast cancer.
- While a screening mammography can effectively detect up to 98% of cancers in fatty breasts, breast cancer can be more difficult to detect in dense breasts.

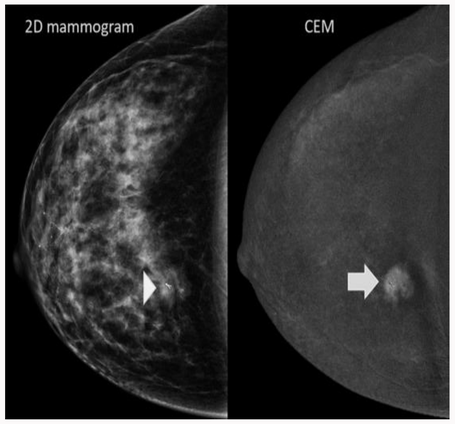
Mammograms and Dense Breasts

- Mammography is the standard screening method for women at average risk beginning at age 40+ and should be performed annually.
- A mammogram is a safe, low-dose X-ray examination of the breast. There are two main types: 2-D and 3-D mammography.
- A 2-D mammogram uses two x-rays images of each breast, while 3-D mammography takes multiple images from different angles.
- Screening mammogram = early detection
- Diagnostic mammogram = more detailed images; used to evaluate abnormalities or areas of concern
- Effective in fatty breasts, but cancers are more easily missed in dense breasts.
- According to the Radiological Society of North America, " Breast cancer masses appear white on a mammogram, and dense tissue also appears white, which makes finding breast cancers within dense breast tissue harder for radiologists."
- When classifying the breast density on a mammogram, the Breast Imaging Reporting and Data System (BI-RADS) uses four categories.
- The fatty and scattered categories are considered "non-dense", whereas the heterogeneously dense and extremely dense categories are considered "dense".



Contrast Enhanced Mammography (CEM)

- CEM combines mammography and iodinated contrast media to highlight areas of unusual blood flow matters that may indicate malignancy.
- The figure below shows the difference between a dense breast imaged with 2-D mammography compared to a CEM. The CEM image shows a tumor that was missed on the mammogram.



Why It's Used:
- Evaluate abnormal mammogram findings
- Determine the spread of cancer
- For patients who are allergic to MRI contrast or cannot tolerate an MRI

Advantages:
- Shorter exam time
- May be more comfortable for claustrophobic patients
- Cost-effective
- Easier for larger breasts

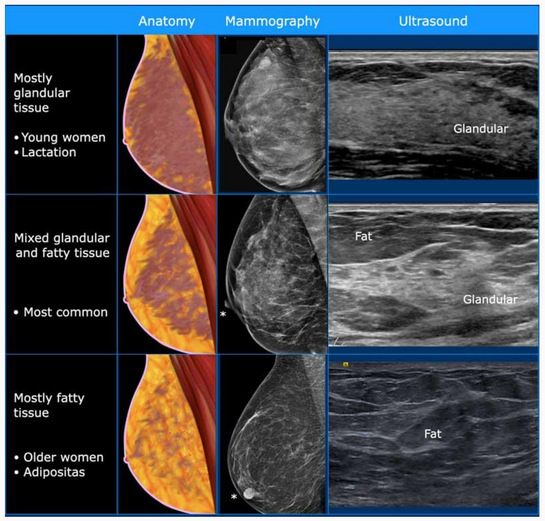
Disadvantages:
- Risk of an allergic reaction to contrast
- Technical factors
- Artifacts like spilled or splattered contrast

Conclusion

- Dense breast tissue presents a challenge for achieving accurate and early detection of breast cancer.
- MRI is a screening method that creates detailed 3-D images of the breast and can detect abnormalities that may not be seen on a mammogram.
- Ultrasound is a noninvasive screening method that uses sound waves to create detailed images of the inside of the breast.
- CEM is an emerging screening method that uses contrast to highlight unusual blood flow patterns that may indicate malignancy.
- While each of these screening methods have unique advantages, MRI has demonstrated high sensitivity for detecting breast cancer.

Breast Ultrasound (US)

- A breast ultrasound uses sound waves to create detailed digital images of the inside of the breast.
- It shows dense tissue differently than a mammogram, which may make some abnormalities easier to detect.



Why It's Used:
- Abnormal mammogram findings
- Dense breasts

Advantages:
- Noninvasive
- No radiation
- No compression
- Cost-effective

Disadvantages:
- Not 100% accurate; results can be affected by factors such as body size and breast size

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