Average-risk women with dense breasts—What breast screening is appropriate?

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Question

If a woman has extremely dense breasts and is not otherwise at increased risk for breast cancer, which of the following screening method(s) should be considered in addition to mammography/tomosynthesis?

CHOOSE ONE:

A	MRI; or ultrasound or contrast-enhanced mammography if MRI is not an option
B	Ultrasound, but not MRI
C	Molecular breast imaging
D	No additional screening should be considered if 3D/tomosynthesis is used

Answer

A. For women with extremely dense breasts who are not otherwise at increased risk for breast cancer, screening magnetic resonance imaging (MRI) is preferred, plus her mammogram or tomosynthesis. If MRI is not an option, consider ultrasonography or contrast-enhanced mammography.

The same screening considerations apply to women with heterogeneously dense breasts; however, there is limited capacity for MRI or even ultrasound screening at many facilities. Research supports MRI in dense breasts, and abbreviated, lower-cost protocols have been validated that address some of the barriers to MRI.[1] Although not yet widely available, abbreviated MRI will likely have a greater role in screening women with dense breasts who are not high risk. It is important to note that preauthorization from insurance may be required for screening MRI, and in most US states, deductibles and copays apply.

The exam

Contrast-enhanced MRI requires IV injection of gadolinium-based contrast to look at the anatomy and blood flow patterns of the breast tissue. The patient lies face down with the breasts placed in two rectangular openings, or "coils." The exam takes place inside the tunnel of the scanner, with the head facing out.After initial images are obtained, the contrast agent is injected into a vein in the arm, and additional images are taken, which will show areas of enhancement. The exam takes about 20 to 40 minutes. An "abbreviated" MRI can be performed for screening in some centers, which uses fewer sequences and takes about 10 minutes.

Benefits

At least 40% of cancers are missed on mammography in women with dense breasts.[2] MRI is the most widely studied technique using a contrast agent, and it produces the highest additional cancer detection of all the supplemental technologies to date, yielding, in the first year, 10-16 additional cancers per 1,000 women screened after mammography/tomosynthesis (reviewed in Berg et al.[3]). The cancer-detection benefit is seen across all breast density categories, even

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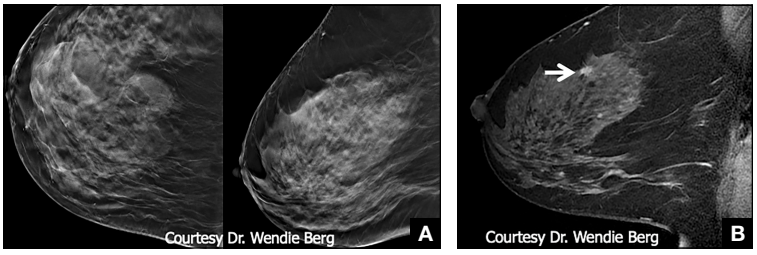
among average-risk women.[4] There is no ionizing radiation, and it has been shown to reduce the rate of interval cancers (those detected due to symptoms after a negative screening mammogram), as well as the rate of late-stage disease. Axillary lymph nodes can be examined at the same screening exam.

While tomosynthesis improves cancer detection in women with fatty breasts, scattered fibroglandular breast tissue, and heterogeneously dense breasts, it does not significantly improve cancer detection in women with extremely dense breasts.[5,6] Current American Cancer Society and National Comprehensive Cancer Network guidelines recommend annual screening MRI for women at high risk for breast cancer (regardless of breast density); however, increasingly, research supports the effectiveness of MRI in women with dense breasts who are otherwise considered average risk. A large randomized controlled trial in the Netherlands compared outcomes in women with extremely dense breasts invited to have screening MRI after negative mammography to those assigned to continue receiving screening mammography only. The incremental cancer detection rate was 16.5 per 1,000 (79/4,783) women screened with MRI in the first round[7] and 6 per 1,000 women screened in the second round 2 years later.[8] The interval cancer rate was 0.8 per 1,000 (4/4,783) women screened with MRI, compared with 4.9 per 1,000 (16/3,278) women who declined MRI and received mammography only.[7]

Screening ultrasound will show up to 3 additional cancers per 1,000 women screened after mammography/tomosynthesis (reviewed in Vourtsis and Berg[9] and Berg and Vourtsis[10]), far lower than the added cancer-detection rate of MRI. Consider screening ultrasound for women who cannot tolerate or access screening MRI.[11] Contrast-enhanced mammography (CEM) uses iodinated contrast (as in computed tomography). CEM is not widely available but appears to show cancer-detection similar to MRI. For further discussion, see Berg et al's 2021 review.[3]

The **FIGURE** shows an example of an invasive cancer depicted on contrast-enhanced MRI in a 53-year-old woman with dense breasts and a family history of breast cancer that was not visible on tomosynthesis, even in retrospect, due to masking by dense tissue.

FIGURE Breast MRI with contrast showing enhancing cancer that was masked on tomosynthesis in a 53-year-old woman with dense breasts and family history of breast cancer



A) Craniocaudal and mediolateral oblique tomosynthesis images show heterogeneously dense tissue. No abnormality detected. **B**) Screening sagittal contrast-enhanced MRI shows 0.9 cm irregular enhancing mass (arrow) determined to be grade 1 node-negative invasive ductal carcinoma.

Considerations

Breast MRI increases callbacks even after mammography and ultrasound; however, such false alarms are reduced in subsequent screening rounds. MRI cannot be performed in women who have certain metal implants—some pacemakers or spinal fixation rods—and is not recommended for pregnant women. Claustrophobia may be an issue for some women. MRI is expensive and requires IV contrast. Gadolinium is known to accumulate in the brain, although the long-term effects of this are unknown and no harm has been shown. ●

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RESOURCES

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