

BREAST IMAGING

Picturing the Latest Breast Cancer Detection Methods

Mammography has been, and remains, the gold standard in the detection of early breast cancer. However, additional imaging methods that can be used to help detect or diagnose breast cancer are now available or under study.

Here's more of what you need to know about current imaging techniques.

Standard screening

The most recognized screening test for breast cancer is mammography, a procedure in which X-rays are taken of your breasts to look for suspicious masses or breast tissue changes before they can be seen or felt. The American Cancer Society has long recommended annual screening mammograms for all women over age 40.

Mammograms also are regularly used to help diagnose breast changes such as a lump, nipple thickening, clear or bloody nipple discharge, a difference in breast size or shape, or redness or dimpling of overlying skin. Still, mammograms aren't perfect.

According to the National Cancer Institute, 10 percent to 20 percent of breast cancers are missed during mammography screening. The accuracy of the procedure depends, in part, on the quality of the film, the technique used and the skill of the radiologist examining the X-ray. A woman's age and breast density also can impact the results.

Dense breast tissue is known to make abnormalities difficult to see on a mammogram. Breast cancers even can look like normal breast structures when they appear on a mammogram, or be located in areas of the breast that are difficult to include on a mammogram film.

Beyond mammography

Efforts are ongoing to improve mammogram technology and interpretation. In the meantime, other imaging techniques are beginning to play an important role.

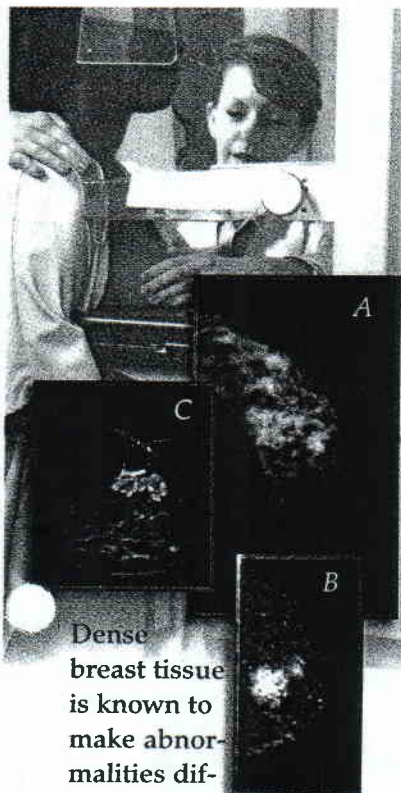
Digital mammography

What it is: Like film mammography, digital mammography uses X-rays to produce an image of your breast. But in digital mammography, images are recorded in a computer instead of on X-ray film. The images can then be displayed on a computer monitor and can be enhanced (lightened and darkened) at the time of interpretation. Images also can be manipulated. For instance, a radiologist can magnify or zoom in on an area, making it easier to identify subtle differences in breast tissue.

When it's used: Digital mammography is a relatively new and expensive technology, so only a small number of facilities currently offer it for screening. In addition, results from clinical trials comparing digital with film mammography have so far shown no difference in detecting breast cancer in the majority of women, including those in their postmenopausal years. However, at least one major study found that women with dense breasts who are younger than age 50 may benefit from having a digital rather than film mammogram.

Ultrasound

What it is: Ultrasound is a procedure that uses high-frequency sound waves to display images of the inside of your body on a computer screen. To produce images of the inside of your breasts,



Dense breast tissue is known to make abnormalities difficult to see on a mammogram (A). Imaging methods such as molecular breast imaging (B) and magnetic resonance imaging (C) may offer a more clear view of a tumor.

sound waves are bounced off the curves and variations of your breast tissue. The returning waves are then visually translated into a pattern of light and dark areas on a computer screen.

When it's used: Ultrasound is used to determine if a lump or suspicious area found by a mammogram or during a clinical breast exam is a cyst or a solid mass. Cysts, which are sacs of fluid, aren't cancerous. But a solid mass may be. Research suggests that ultrasound may help screen women with dense breast tissue. It also can be useful for evaluating masses in women with breast implants because the technology can distinguish between the implant materials and breast tissue. However, ultrasound currently isn't used for routine breast cancer screening. It's also not recommended as a substitute for mammography. The main reason: It doesn't reliably detect small calcium deposits in the breast (microcalcifications), which can be an early sign of breast cancer.

Magnetic resonance imaging (MRI)

What it is: This technique uses a magnet linked to a computer to create detailed pictures of areas inside your body — without the use of radiation. MRI can produce hundreds of images of your breast from side to side, top to bottom and front to back. A contrast agent also may be used. In this procedure, a special dye is injected into a vein just before or during the MRI to enhance areas of breast tissue that may have abnormal blood vessels, which could indicate cancer.

When it's used: MRI is used to assess abnormal areas that are seen on a mammogram. It also can be used after breast cancer is diagnosed to determine the extent of a tumor, a process known as staging, and to screen for second cancers in either breast. Studies have found that MRI can be a valuable screening tool for young women with dense breast tissue who are at high risk of breast cancer. But MRI currently isn't recommended for routine screening because it's expensive, not readily available, and it has a high rate of false-positive results

(indicating that cancer might be present when it's not).

Molecular breast imaging (MBI)

What it is: This technique tracks the movement of a short-lived radioactive agent that's injected into your arm. (The radiation exposure is similar to the amount you receive during a mammogram.) A special camera highlights areas in your breast where this injected material accumulates. Tumors tend to absorb more of this material than healthy tissue does, which helps illuminate abnormalities in breast tissue.

When it's used: Several MBI procedures used for breast imaging are under study and are available only to those enrolled in clinical trials. However, some researchers believe MBI ultimately may aid in the detection of breast cancer, especially in women with dense breast tissue. Concerns have been raised about the ability of MBI to detect extremely small or slow-growing tumors. Yet in preliminary studies using an MBI camera, Mayo Clinic researchers found some small tumors that were missed by both mammography and ultrasound.

Choices, choices

Mammography is still recommended as the main breast-imaging test for most women, particularly postmenopausal women. Nevertheless, for some, other imaging techniques may offer advantages when added to mammography in breast cancer screening and diagnosis. ■

Additional Testing

Most women will receive normal mammogram results. Yet, according to the American Cancer Society, about 10 percent of women receive results showing an abnormality that requires further testing. These abnormalities may include:

- Calcium deposits
- Masses
- Distorted tissue
- Dense areas in only one breast
- Dense areas not seen on your last mammogram ■