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For patients

Breast MRI



Magnetic resonance imaging (MRI) of the breast uses a powerful magnetic field, radio waves and a computer to produce detailed pictures of the structures within the breast. It is primarily used as a supplemental tool to breast screening with mammography or ultrasound. It may be used to screen women at high risk for breast cancer, evaluate the extent of cancer following diagnosis, or further evaluate abnormalities seen on mammography. Breast MRI does not use ionizing radiation, and it is the best method for determining whether silicone breast implants have ruptured.

Tell your doctor about any health problems, recent surgeries or allergies and whether there's a possibility you are pregnant. The magnetic field is not harmful, but it may cause some medical devices to malfunction. Most orthopedic implants pose no risk, but you should always tell the technologist if you have any devices or metal in your body. Guidelines about eating and drinking before your exam vary between facilities. Unless you are told otherwise, take your regular medications as usual. Leave jewelry at home and wear loose, comfortable clothing. You may be asked to wear a gown. If you have claustrophobia or anxiety, you may want to ask your doctor for a mild sedative prior to the exam.

What is a breast MRI?

Magnetic resonance imaging (MRI) is a noninvasive test doctors use to diagnose medical conditions.

MRI uses a powerful magnetic field, radiofrequency pulses, and a computer to produce detailed pictures of internal body structures. MRI does not use radiation (x-rays).

Detailed MR images allow doctors to examine the body and detect disease.

MRI of the breast offers valuable information about many breast conditions that cannot be obtained by other imaging modalities, such as mammography or ultrasound.

For most MRI exams of the breast, an IV will be placed in your forearm or hand and contrast will be injected during the scan. The contrast is necessary when breast MRI is being performed to detect cancer or to evaluate for cancer treatment response. If the breast MRI is being performed only to evaluate for possible breast implant rupture, contrast is not typically necessary.

What are some common uses of the procedure?

MRI of the breast is not a replacement for mammography or ultrasound imaging but rather a supplemental tool that has many important uses, including:

- Screening in women at high risk for breast cancer

  For women at high risk for breast cancer, typically because of a strong family history, MRI may be an appropriate tool to screen for breast cancer. A strong family history is usually a mother or sister who has had breast cancer before age 50. It can also be aunts or cousins, including those on your father's side. Relatives who have had ovarian cancer also increase your

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risk. Your radiologist or primary care doctor can look at your family history and determine if screening MRI may be appropriate for you. Depending on your family history, genetic counseling may also be recommended.

- Determining the extent of cancer after a new diagnosis of breast cancer

  After being diagnosed with breast cancer, a breast MRI may be performed to determine:
  - how large the cancer is and whether it involves the underlying muscle.
  - if there are other cancers in the same breast and whether there is an unsuspected cancer in the opposite breast.
  - if there are any abnormally large lymph nodes in the armpit, which can be a sign the cancer has spread to that site.

- Further evaluating hard-to-assess abnormalities seen on mammography

  Sometimes an abnormality seen on a mammogram cannot be adequately evaluated by additional mammography and ultrasound alone. In these rare cases, MRI can be used to definitively determine if the abnormality needs biopsy (http://www.radiologyinfo.org) or can safely be left alone.

- Evaluating lumpectomy (http://www.radiologyinfo.org) sites in the years following breast cancer treatment

  Scarring and recurrent cancer can look identical on mammography and ultrasound. If a change in a lumpectomy scar is detected by either mammography or a physical exam, MRI can help determine whether the change is normal maturation of the scar or a recurrence of the cancer.

- Following chemotherapy (http://www.radiologyinfo.org) treatment in patients receiving neoadjuvant chemotherapy

  In some cases, breast cancer will be treated with chemotherapy before it has been removed by surgery. This is called neoadjuvant chemotherapy. In these cases, MRI is often used to monitor how well the chemotherapy is working and to reevaluate the amount of tumor (http://www.radiologyinfo.org) still present before the surgery is performed.

- Evaluating breast implants

  MRI is the best test for determining whether silicone implants have ruptured.

Who interprets the results and how do I get them?

A radiologist, a doctor trained to supervise and interpret radiology exams, will analyze the images. The radiologist will send a signed report to your primary care or referring physician, who will share the results with you.

You may need a follow-up exam. If so, your doctor will explain why. Sometimes a follow-up exam further evaluates a potential issue with more views or a special imaging technique. It may also see if there has been any change in an issue over time. Follow-up exams are often the best way to see if treatment is working or if a problem needs attention.

What are the benefits vs. risks?

Benefits

- MRI is a noninvasive imaging technique that does not involve exposure to radiation.
- MRI has proven valuable in detecting and staging breast cancer, particularly when other imaging studies (mammography, ultrasound, etc.) fail to provide adequate information.
- MRI as an addition to mammography has been shown to be useful in evaluating women at high risk for breast cancer.
- MRI can successfully image the dense breast tissue common in younger women, and it can successfully image breast

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implants. Both of these are difficult to image using traditional mammography.

- If a suspicious lesion is seen with MRI only, MRI can provide guidance for biopsy.
- The MRI gadolinium contrast material is less likely to cause an allergic reaction than the iodine-based contrast materials used for x-rays and CT scanning.

Risks

- The MRI exam poses almost no risk to the average patient when appropriate safety guidelines are followed.
- If sedation is used, there is a risk of using too much. However, your vital signs will be monitored to minimize this risk.
- The strong magnetic field is not harmful to you. However, it may cause implanted medical devices to malfunction or distort the images.
- There is a very small risk of an allergic reaction if your exam uses contrast material. Such reactions are usually mild and controlled by medication. If you have an allergic reaction, a doctor will be available for immediate assistance.
- If you have poorly functioning kidneys or are on dialysis, make sure your doctor and the facility are aware. In general, the contrast agent currently in use is safe for patients with poorly or no kidney function.
- Although there are no known health effects, evidence has shown that very small amounts of gadolinium can remain in the body, particularly the brain, after multiple MRI exams. This is most likely to occur in patients receiving multiple MRI exams over their lifetime for monitoring chronic or high-risk health conditions.
- IV contrast manufacturers indicate mothers should not breastfeed their babies for 24-48 hours after contrast material is given. However, the most recent American College of Radiology (ACR) Manual on Contrast Media reports that studies show the amount of contrast absorbed by the infant during breastfeeding is extremely low.

What are the limitations of breast MRI?

High-quality images depend on your ability to remain still while the images are being recorded. If you are anxious, claustrophobic or in severe pain, you may find it difficult to lie still during imaging. Your doctor may wish to prescribe a medication for relaxation.

A person who is very large may not fit into certain types of MRI machines. There are weight limits on the scanners.

Implants and other metallic objects can make it difficult to obtain clear images. Patient movement can have the same effect.

Present data show no evidence that non contrast MRI harms the fetus of a pregnant woman. However, if the need for the exam is not time sensitive your doctor may delay the exam until after delivery. MRI gadolinium contrast agents are generally avoided during pregnancy except in very specific circumstances. Your doctor will discuss the benefits and risks of any MRI procedure with you. Doctors may perform MRI after the first trimester to assess the fetus for findings that are not fully evaluated by ultrasound.

An MRI exam typically costs more and may take more time than other imaging exams. Talk to your insurance provider if you have concerns about the cost of MRI.

Sometimes a benign (http://www.radiologyinfo.org) (non-cancerous) piece of tissue in the breast can take up the contrast material and show up as a bright spot on the image. Often, the radiologist can tell by the appearance of the tissue whether it is cancer or not. When it is not possible, other testing such as ultrasound of that specific spot or a biopsy may be needed. If additional testing or biopsy shows no cancer, it is called a false-positive test result (http://www.radiologyinfo.org) .

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