

MRI of the Breast

What is MRI of the Breast?

Magnetic Resonance Imaging (MRI) is a noninvasive, usually painless medical test that helps physicians diagnose and treat medical conditions.

MRI uses a powerful magnetic field, radio waves and a computer to take detailed pictures of organs, soft tissues, bone and virtually all other internal body structures. The images can then be viewed on a computer monitor and/or printed. MRI does not use ionizing radiation (x-rays).

Detailed MRI images allow physicians to better evaluate parts of the body and certain diseases that may not be examined as carefully with other imaging methods such as x-ray, ultrasound or computed tomography (also called CT or CAT scanning).

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



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 for detecting and staging breast cancer and other breast abnormalities. MRI of the breast is performed to:

- evaluate abnormalities detected by mammography
- identify early breast cancer not detected through other means, especially in women with dense breast tissue and those at high risk for the disease
- screen for cancer in women who have implants or scar tissue that might jeopardize an accurate result from a mammogram
- determine the integrity of breast implants
- distinguish between scar tissue and recurrent tumors
- assess multiple tumor locations
- look for multiple tumors prior to breast conservation surgery
- determine whether cancer detected by mammography or ultrasound has spread further in the breast or into the chest wall
- determine how much cancer has spread beyond the surgical site after a breast biopsy or lumpectomy
- assess the effect of chemotherapy
- provide additional information on a diseased breast to make treatment decisions

How should I prepare for the procedure?

The most accurate breast MRI is done during the follicular phase of the patient's menstrual cycle. Unless you are having MRI prior to breast surgery, we want you to be scheduled to come in 7-14 days after the start of your menstrual period if you still have periods. Please call us to reschedule if you expect your appointment will not coincide with this phase of your cycle, 813-745-6769.

The radiologist will compare your MRI images to your mammogram images. Therefore, if your mammogram was not performed at Moffitt or Lifetime Cancer Screening, the radiologist will need a complete set of recent (less than 11 months old) mammogram films or a disc with the images.

We recommend wearing comfortable pants with an elastic waistband or drawstring (that have no metal fasteners such as zippers or snaps) so you only have to remove your top and bra for the exam. We will provide a robe or gown for your comfort and privacy.

Make sure you eat and drink before your exam. Being well hydrated will make it easier for you to get the IV. Unless you are told otherwise, you may follow your regular daily routine and take medications as usual.

During the exam, you will receive an injection of contrast into the bloodstream through an IV. We need to know if you have allergies of any kind including hay fever, hives, allergic asthma, or allergies to food or drugs. However, the contrast material used for MRI examinations, called gadolinium, does not contain iodine and only rarely causes an allergic reaction.

We should also know if you have any serious health problems and what surgeries you have undergone. Some conditions, such as kidney disease and sickle cell anemia, may prevent you from having an MRI with contrast material. Prior to the exam, a simple blood test (to test your kidney function) will be performed.

Women should always inform their physician or technologist if there is any possibility that they are pregnant. Because the risks of an MRI exam to the baby are unknown, pregnant women should not have this exam unless the potential benefit from the MRI is assumed to outweigh the potential risks.

If you have claustrophobia (fear of enclosed spaces) or anxiety, we will discuss with you whether anti-anxiety medication is appropriate for you at the time of your appointment. If you think you may require anti-anxiety medication, we require that you have someone available to drive you home.

Jewelry and other accessories should be left at home if possible, or removed prior to the MRI scan. Because they can interfere with the magnetic field of the MRI unit, metal and electronic objects are not allowed in the exam room. These items include:

- jewelry, watches, credit cards and hearing aids, all of which can be damaged
- pins, hairpins, metal zippers and similar metallic items, which can distort MRI images
- removable dental work and eyeglasses

In most cases, an MRI exam is safe for patients with metal implants, except for a few types. People with the following implants cannot be scanned and should not enter the MRI area:

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- internal (implanted) cardioverter defibrillator (ICD)
 - cochlear (ear) implant
 - magnetically-activated implant or device
 - cardiac pacemaker
 - clips used on brain aneurysms (may be scanned with proper documentation)

You should tell the technologist and bring any cards related to these items if you have medical or electronic devices in your body, as they may interfere with the exam or potentially pose a risk. Examples include:

- artificial heart valves and/or stents
- implanted drug infusion ports
- infusion catheter
- implanted electronic device, including a cardiac pacemaker
- artificial limbs or metallic joint prostheses
- implanted nerve stimulators
- metal pins, screws, plates or surgical staples

In general, metal objects used in orthopedic surgery pose no risk during MRI. However, a recently placed artificial joint may require the use of another imaging procedure. If there is any question of their presence, an x-ray may be taken to detect the presence of any metal objects.

Dyes used in tattoos may contain iron and could heat up during MRI, but this is rarely a problem. Likewise, tooth fillings and braces usually are not affected by the magnetic field.

What does the equipment look like?

The MRI unit is a large cylinder-shaped tube surrounded by a circular magnet. You will lie on a moveable examination table that slides into the center of the magnet. The Breast MRI at Moffitt is a GE Signa with a Sentinelle Vanguard table.

How is the procedure performed?

A nurse or technologist will insert an intravenous (IV) line into a vein in your hand or arm. Then you will be positioned on the moveable examination table. Cushions may be used to help you stay still and maintain the correct position during imaging.



You will lie face down on your stomach with your breasts hanging freely into cushioned openings, which are surrounded by a breast coil. The breast coil is a signal receiver that works with the MRI unit to create the images. Your IV will be hooked up to a power injector that drips a saline solution through the IV to prevent blockage of the IV line until the contrast material is injected. You will be moved, feet first, into the magnet of the MRI unit and the technologist will leave the room while the MRI examination is performed.

The contrast material used during the examination will be injected into the IV after an initial series of scans. An additional series of images will be taken following the injection.

When the examination is completed, you may be asked to wait until the technologist checks the images to ensure they are adequate.

Your IV will then be removed. The total time you will spend on the MRI table will be between 30 and 60 minutes.

What will I experience during and after the procedure?

Most MRI exams are painless. Some patients, however, find it uncomfortable to remain still during MRI. Others experience a sense of being closed-in (claustrophobia). It is normal for the area of your body being imaged to feel slightly warm, but if it bothers you, notify the radiologist or technologist. It is important that you remain perfectly still while the images are being recorded, which is typically only a few seconds to a few minutes at a time. You will know when images are being recorded because you will hear tapping or thumping sounds when the coils that create the magnetic field are turned on. You will be able to relax between imaging sequences.

You will be alone in the exam room during the MRI, however, the technologist will be able to see, hear and speak with you at all times using a two-way intercom. You may request earplugs to reduce the noise of the MRI scanner, which produces loud thumping and humming noises during imaging. Our MRI scanner is air-conditioned, well-lit and music is provided to help you pass the time.

When the contrast material is injected, it is normal to feel coolness and a flushing for a minute or two. The intravenous needle may cause you some discomfort when it is inserted; once it is removed, you may experience some bruising. There is also a very small chance of irritation or infection of your skin at the site of the IV tube insertion.

You may resume your usual activities and normal diet immediately after the exam. A few patients experience side effects from the contrast material, including nausea and local pain. Very rarely, patients are allergic to the contrast material and experience hives and itchy eyes.

It is recommended that nursing mothers not breastfeed for 36 to 48 hours after MRI with a contrast material.

Who interprets the results and how do I get them?

A radiologist, a physician specifically trained to supervise and interpret radiology examinations, will analyze the images and send a report to your personal physician who will share the results with you. If you haven't heard from your physician within 7 days, please call them or call our office at 813-745-6769.

What happens if my MRI is abnormal?

There are several types of abnormalities that can be picked up by the MRI. Sometimes MRI will show a benign (non-cancerous) lesion that cannot be seen on mammography or ultrasound. In these cases, the radiologist will recommend you have another MRI in six months to ensure that the lesion is not changing (which may indicate it is cancer). When a lesion is seen that the radiologist thinks is more suspicious, the radiologist will recommend you either have an ultrasound targeting the area of abnormality or MRI-guided biopsy.

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 diagnosing a broad range of conditions, including detecting and staging breast cancer, particularly when other imaging studies (mammography, ultrasound, etc.) fail to provide adequate information.

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- MRI enables the detection of abnormalities that might be obscured by bone with other imaging methods.
 - MRI has been shown to detect small breast lesions that are sometimes missed by mammography.
 - MRI can successfully image the dense breast common in younger women, as well as breast implants, both of which are difficult to image using traditional mammography.
 - Because MR imaging does not involve radiation, the procedure could be used to screen women younger than 40 and to increase the number of screenings per year for women at high risk for breast cancer.
 - If a suspicious lesion is seen with MRI only, MRI can provide guidance for biopsy.

Risks

- The MRI examination poses almost no risk to the average patient when appropriate safety guidelines are followed.
- Although the strong magnetic field is not harmful in itself, medical devices that contain metal may malfunction or cause problems during an MRI exam.
- There is a very slight risk of an allergic reaction if contrast material is injected. Such reactions usually are mild and easily controlled by medication. There also is a very small risk of skin infection at the site of injection. Nephrogenic systemic fibrosis is currently a recognized, but rare, complication of MRI believed to be caused by the injection of certain (but not all) MRI contrast material in patients with poor kidney function.

What are the limitations of MRI of the Breast?

High-quality images are assured only if you are able to remain perfectly still while the images are being recorded. If you are anxious, confused or in severe pain, you may find it difficult to lie still during imaging.

Some larger persons may not fit into the opening of the MRI machine.

The presence of an implant or other metallic object often makes it difficult to obtain clear images and patient movement can have the same effect.

Although there is no reason to believe that magnetic resonance imaging harms the fetus, the effects of a strong magnetic field are not well understood. For this reason pregnant women usually are advised not to have an MRI exam unless medically necessary.

MRI may not always distinguish between tumor tissue and edema fluid. It cannot detect calcium present in a tumor. Detection of calcium (in tumors or other tissues) is limited with MRI.

MRI typically costs more and may take longer to perform than other imaging modalities.

MRI of the breast cannot always distinguish between cancer and benign breast disease (such as fibroadenomas), leading to a false positive result. A false positive is a result that indicates cancer when there is in fact no cancer present.

For more information please contact Lifetime Cancer Screening & Prevention Center at (813) 745-6769 or The Center for Women's Oncology at: (813)745-8410.