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For patients

Fetal MRI

Fetal magnetic resonance imaging (MRI) uses a powerful magnetic field, radio waves, and a computer to produce detailed pictures of the fetus inside your body.

Tell your doctor about any health problems, recent surgeries, any implanted metal objects in your body, or allergies. 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. You may eat on the day of your test. However, you should avoid sugary and caffeinated drinks and foods that may cause the fetus to be active. Unless your doctor tells you otherwise, take your regular medications as usual. Leave jewelry at home and wear loose, comfortable clothing. You may need to change into a gown. If you have claustrophobia or anxiety, you may bring a companion into the exam room. Please check with the MRI technologist or radiologist for any other restrictions.

What is fetal MRI?

Fetal magnetic resonance imaging (MRI) uses a powerful magnetic field, radio waves, and a computer to produce detailed pictures of the fetus inside your body. MRI does not use radiation, and currently there is no evidence in the medical literature that MRI is harmful to the fetus. However, doctors avoid using intravenous contrast agents for MRI during pregnancy. During the exam, the technologist may use an ultrafast “snapshot” technique to quickly capture images if the fetus is constantly moving.

What are some common uses of the procedure?

Fetal MRI may be appropriate to use in the first trimester of pregnancy in case of a medical emergency. Otherwise, doctors usually perform fetal MRI in the second or third trimester to follow up on fetal abnormalities found during an ultrasound exam.

Doctors use fetal MRI to:

- evaluate abnormalities of your baby’s:
  - brain
  - spine
  - body
  - face and neck
  - chest and lungs
  - abdomen and pelvis, including the bowel, kidneys, and bladder
  - placenta
  - extremities
- confirm a potential abnormality detected by ultrasound
- provide information for diagnosis, therapy, and delivery
- follow up on genetic testing that indicates you have an increased risk for a syndrome

Your doctor may use fetal MRI to confirm a diagnosis or provide additional information for possible birth defects, including (but not limited to):

- Spina bifida
- Congenital heart defects
- Gastroschisis
- Congenital pulmonary airway malformations
- Genetic abnormalities
- Twin-to-twin transfusion syndrome
- Brain abnormalities

How should I prepare for the MRI procedure?

You will need to change into a hospital gown.

Guidelines about eating and drinking before a fetal MRI vary. Unless your doctor tells you otherwise, take your medications as usual.

Tell the technologist or radiologist if you have any serious health problems or have recently had surgery.

You should eat breakfast the day of your exam. Avoid coffee, caffeinated soda, and sugary foods that might make the fetus more active.

If you have claustrophobia (http://www.radiologyinfo.org) (fear of enclosed spaces) or anxiety, ask if your doctor can prescribe a mild sedative prior to your exam. Your doctor may offer you oxygen and allow you to bring a companion into the exam room with you after they undergo screening for any metal objects.

Leave all jewelry and other accessories at home or remove them prior to the MRI scan. Metal and electronic items are not allowed in the exam room. They can interfere with the magnetic field of the MRI unit, cause burns, or become harmful projectiles. 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
- pens, pocketknives, and eyeglasses
- body piercings
- mobile phones, electronic watches, and tracking devices.

In most cases, an MRI exam is safe for patients with metal implants, except for a few types. People with the following implants may not undergo scanning and should not enter the MRI scanning area without first being evaluated for safety:

- some cochlear (ear) implants
- some types of clips used for brain aneurysms (http://www.radiologyinfo.org)
- some types of metal coils placed within blood vessels
- some older **cardiac defibrillators (http://www.radiologyinfo.org)** and pacemakers (http://www.radiologyinfo.org)
- vagal nerve stimulator

Tell the technologist if you have any type of medical or electronic devices in your body. These devices may interfere with the exam or pose a risk to you. Many implanted devices will have a pamphlet explaining the MRI risks for that device. If you have the pamphlet, bring it to the attention of the scheduler before the exam. The technologist cannot perform the MRI exam without confirming and documenting the type of implant and MRI compatibility. You should also bring any pamphlet to your exam in case the radiologist or technologist have questions.

If there is any question, an x-ray can detect and identify most metal objects. Metal objects used in orthopedic surgery generally pose no risk during MRI. However, a recently placed artificial joint may require the use of a different imaging exam.

Tell the technologist or radiologist about any shrapnel, bullets, or other metal in your body. Foreign bodies near and especially lodged in the eyes are very important because they may move or heat up during the scan and cause blindness. Dyes used in tattoos may contain iron and could heat up during an MRI scan. This is rare. Remove magnetic eyelashes prior to the MR exam. The magnetic field will usually not affect tooth fillings, braces, eyeshadows, and other cosmetics. However, these items may distort images of the facial area or brain. Tell the radiologist (http://www.radiologyinfo.org) about them.

What does the equipment look like?

The traditional MRI unit is a large cylinder-shaped tube surrounded by a circular magnet. You will lie on a table that slides into a tunnel towards the center of the magnet.

Some MRI units, called short-bore systems (http://www.radiologyinfo.org) , are designed so that the magnet does not completely surround you. Some newer MRI machines have a larger diameter bore, which can be more comfortable for larger patients or those with claustrophobia. "Open" MRI units are open on the sides. They are especially helpful for examining larger patients or those with claustrophobia. Open MRI units provide high-quality images for many types of exams. However, certain exams cannot use open MRI. For more information, consult your radiologist.

How does the procedure work?

Unlike x-ray and computed tomography (CT) exams, MRI does not use radiation. Instead, radio waves re-align hydrogen atoms that naturally exist within the body. This does not cause any chemical changes in the tissues. As the hydrogen atoms return to their usual alignment, they emit different amounts of energy depending on the type of tissue they are in. The scanner captures this energy and creates a picture using this information.

In most MRI units, the magnetic field is produced by passing an electric current through wire coils. Other coils are inside the machine and, in some cases, are placed around the part of the body being imaged. These coils send and receive radio waves, producing signals that are detected by the machine. The electric current does not come into contact with the patient.

A computer processes the signals and creates a series of images, each of which shows a thin slice of the body. The radiologist can study these images from different angles.

In specific circumstances, MRI is able to tell the difference between diseased tissue and normal tissue better than x-ray, CT, and ultrasound.

How is fetal MRI performed?

MRI exams may be done on an outpatient basis. The technologist will ask you to empty your bladder.

The technologist will position you on the moveable exam table. You will lay on your back or on your side. The technologist will use straps and bolsters to help you stay still and maintain your position.

The exam table will move into the magnet of the MRI unit. The technologist will perform the MR imaging from a computer

outside of the room.

MRI exams generally include multiple runs (sequences), some of which may last several minutes. Each run will create a different set of noises. At times, the technologist may ask you to hold your breath for a short period of time while acquiring images.

When the exam is complete, the technologist may ask you to wait while the radiologist checks the images in case more are needed.

Depending on the type of exam and the equipment used, the entire procedure is usually completed in 30 to 50 minutes.

What will I experience during and after the procedure?

Most MRI exams are painless. However, some patients find it uncomfortable to remain still. Others may feel closed-in (claustrophobic) while in the MRI scanner. The scanner can be noisy.

It is normal for the area of your body being imaged to feel slightly warm. If it bothers you, tell the radiologist or technologist. It is important that you remain perfectly still while the technologist captures the images. This 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 and feel loud tapping or thumping sounds. The coils that generate the radio waves make these sounds when they are activated. You will be provided with earplugs or headphones to reduce the noise made by the scanner. You may be able to relax between imaging sequences. However, you will need to keep the same position as much as possible without moving.

You are usually alone in the exam room during the MRI procedure. However, the technologist will be able to see, hear and speak with you at all times using a two-way intercom. Many MRI centers allow a friend or parent to stay in the room as long as they are also screened for safety.

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 final report to your primary care or referring physician, who will share and discuss the results with you.

What are the benefits vs. risks?

Benefits

- MRI is a noninvasive imaging technique that does not involve exposure to radiation.
- Sometimes ultrasound may show a placental or fetal abnormality that cannot be fully characterized; MRI can provide more information on therapy, delivery, or prognosis.
- Fetal MRI provides information on a fetus that is at significant risk for an abnormality.

Risks

- There is no documented, known risk related to MRI exams when appropriate safety guidelines are followed.
- Fetal MRI may be appropriate for use in the second or third trimester as prescribed by your doctor.
- Your exam may use sedation. Depending on the type and amount, a sedation specialist may need to monitor your vital signs to minimize any risk.
- The strong magnetic field is not harmful to you. However, it may cause implanted medical devices to malfunction or distort the images.

What are the limitations of fetal MRI?

High-quality images depend on your ability to remain perfectly still and follow breath-holding instructions while the images are

being recorded. A very active fetus can result in poor quality images or limited evaluation.

A person who is very large may not fit into certain types of MRI machines. Scanners have weight limits.

There is currently no evidence that non-contrast MRI harms the fetus of a pregnant woman. However, if the exam is not time sensitive, your doctor may delay MR imaging until after delivery.

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