

## **Nuclear magnetic resonance (MRI)**

MRI is a specialized test that employs powerful magnetic waves and computer technology to generate images of the body's internal structures. These images are very detailed and can allow the doctor to view organs, muscles and tissues that cannot be seen with other imaging techniques. Most MRI images are immobile and show cross-sections through the body. Some new MRI equipment, which is more powerful and sophisticated, is able to take moving video images of the body. An MRI of the heart allows doctors to be able to see detailed images of the heart and of its internal structures, including the coronary valves and arteries. It can also evaluate the heart's functioning while it beats.

MRI can be used to evaluate:

- The anatomy and functioning of the heart, the large vessels (the large blood vessels that go in and out of the heart) and the pericardium (the sac that envelops the heart).
- The presence of diseases affecting the heart. These include heart disease, diseases affecting the heart's valves, and diseases affecting the heart muscle. It can also evaluate structural problems with the heart, such as cardiac tumors, congenital heart defects, and aneurysms.

Most patients do not require any special preparation before an MRI of the heart. Before the procedure, you will be asked questions about your health. When the MRI uses magnetic fields to generate the images, metal objects can be affected during the examination. Patients who have a metal object in the body must inform the technician of it. Metal objects that are fixed in the body or that are not movable do not tend to pose any problem. Since the magnets are very powerful, other metal objects may move and damage the surrounding area of the body. The metal objects that can cause damage include:

- Surgical clips (metal clips used in surgery), especially those used in the brain, any metal object in the eye or in the ocular orbit, metal implants used in ear surgeries, metal fragments deriving from injuries that could be near vital organs or the spinal column, and some cardiac stents.
- The magnets can affect other medical devices and make them stop working. These include pacemakers and implantable cardio defibrillators. Implantable pumps that are employed to administer medications subcutaneously or in the body can also be affected.

The metal objects that do not tend to cause problems include articular prostheses, metal plates and screws used to solve orthopedic (bone) problems, and sternal wires used to close up the thorax after open-heart surgery. Before the MRI, do not forget to talk to your doctor and to the technician about all the metal objects you have in your body.

Some patients may suffer claustrophobia (fear of closed spaces) during the procedure. Inform your doctor if you have a history of having suffered claustrophobia or if you get very anxious in closed spaces. You may have to receive a sedative before the procedure.

- If you are not claustrophobic, you can eat normally and take medications as usual before the examination.
- If you suffer from claustrophobia and your doctor decides that you should receive a sedative before the exam, a medication will be prescribed to you before the MRI. On some occasions, the doctor will give you a pill to take an hour or two before the MRI. Sometimes an intravenous line is placed and the medication is administered through a vein before the exam. If you are given a sedative, be sure that a friend or family member brings you and drives you back home after the MRI. If you take a sedative, do not drink anything for six hours before the MRI unless your doctor authorizes it. You can take medications with small sips of water, unless your doctor instructs otherwise.

Wear comfortable clothing when you go to have the exam performed. You will be given a hospital gown to wear during the procedure. You can wear pants that have no metal element, such as snaps or zippers. You will be given a gown. Do not wear jewelry or watches. The magnet can affect the magnetic strips of credit cards.

What to expect during the heart MRI:

- Electrodes (small adhesive patches) will be stuck to your chest. The electrodes are connected to an electrocardiography monitor (for the electrocardiogram). Men may be shaved partly on the chest for the electrodes to adhere. This way the heart's electric activity during the test is checked and recorded.
- In most cases, an intravenous line is inserted in the hand or arm to administer the contrast (dye) during the procedure, helping to obtain better images during the exam. The dye is not iodine-based, like the one that is used in X-ray tests. However, do not forget to tell the technician if you are allergic to any medications.
- For the heart MRI, you will have to lie down on a long and moving platform that is introduced into the MRI machine. It is a long tube-shaped machine. It is open at both ends and has lighting and ventilation. An intercom system allows you to talk to the technician during the exam. During the exam, you will be asked to stay as still as possible. The technician may ask you to hold your breath for short periods to avoid producing blurry images due to respiratory movements.
- During the exam, you may hear noises like bangs. You may be given earphones or earplugs in order to attenuate the noises before the scanning procedure.

The MRI exam tends to take approximately 30 to 75 minutes, depending on the number of images needed.

You will be able to return home after the procedure. If you received a sedative, you will be given instructions about when you can resume your usual activities. A friend or family member must drive you back home. If you did not receive a sedative, you can resume your usual activities immediately.

Once the results of the MRI are available, your doctor will explain them to you.