

Know Your Test: Magnetic Resonance Imaging (MRI)

BY: DR. MOMOCHA THANGJAM DMRD, DNB

Magnetic resonance imaging (MRI) is a radiological investigation that uses magnetic field and pulses of radio wave energy to make pictures of organs and structures inside the body. The MRI scanner is a tube surrounded by a giant circular magnet. The patient is placed on a movable bed that is inserted into the magnet. The magnet creates a strong magnetic field that aligns the protons of hydrogen atoms of the body, which are then exposed to a beam of radio waves. This spins the various protons of the body producing a faint signal that is detected by the receiver portion of the MRI scanner which is then processed by a computer to produce an image.

Damadian , an Armenian-American physician along with Minkoff and Goldsmith performed the first MRI body scan of a human being on July 3, 1977.

WHY IT IS DONE?

MRI is done for diseases affecting various organs of the body:

- Head - To look for brain tumours, bleeding, stroke and diseases of the eyes and ears.
- Chest - Assess the heart and for breast cancer.
- Abdomen and pelvis - To look for liver cancer, gallbladder stones and cancer, diseases of kidneys, uterus, ovaries and prostate.
- Bones and joints - For problems such as arthritis, bone tumours, ligaments or tendons tear, or infection.
- Spine - For conditions such as disc prolapse and cancer.
- Blood vessels - For vessel diseases and assess blood flow through them.

HOW TO PREPARE FOR THE TEST?

It is advisable to inform the technologist/ radiologist beforehand if one has fear of closed spaces (have claustrophobia). A medicine may be given to reduce the anxiety.

Before an MRI scan, the patient should also inform the radiology technologist/ radiologist if he/she has artificial heart valves, aneurysm clips, pacemaker, inner ear (cochlear) implants or has worked with sheet metal in the past as the magnetic field can affect them and be hazardous to the patient.

Because the MRI contains strong magnet, metal objects such as jewellery, watches, credit cards, and hearing aids are not allowed into the room as they can be damaged. Pens, pocketknives and clips should also be removed as they may fly across the room.

In case a contrast study is required, a blood test is to be done to check for creatinine level as it is possible for the contrast dye to cause organ damage in people with kidney disease. Contrast study is avoided if creatinine is above the normal level.

HOW IS THE TEST PERFORMED?

The patient will be asked to wear a hospital gown and lie on a narrow table, which slides into a large tunnel-shaped scanner. At certain times during the scan, the scanner will make loud tapping noises. This is the electric current in the scanner coils being turned on and off. Earplugs or headphones can

be used for blocking the noise. It is very important that the patient keeps as still as possible during the scan. The scan usually lasts between 15 and 90 minutes, depending on the size of the area being scanned.

During the test, a friend or family member may be allowed to stay in the room- especially for paediatric patients. The accompanying person also need to follow the same guidelines regarding clothing and removing metallic objects. The technologist monitors the patient through a window during the scan. Patient can communicate with the technologist through a two-way intercom.

Some examinations require a special dye (contrast) to be given through a vein before the test. The dye helps the radiologist see certain areas more clearly.

Small devices, called coils, may be placed around the head, arm, or leg, or other areas to be studied. These help improve the quality of the images.

The final images are interpreted by a radiologist.

RISKS

MRI is very safe and most people can have the procedure, including pregnant women and babies as it does not use ionising radiation.

Allergic reactions rarely occur with the MRI dye (Gadolinium). However, gadolinium can be harmful to people with kidney problems.

The strong magnetic fields created during an MRI can cause heart pacemakers and other implants not to work and also cause a piece of metal inside the body to move or shift.

No effects of MRI on the foetus have been demonstrated. However, as a precaution, current guidelines recommend that pregnant women undergo MRI only when essential. This is particularly the case during the first trimester of pregnancy.

(The writer is Consultant Radiologist, BABINA Diagnostics, Imphal)