

## **Magnetic Resonance Imaging (MRI) – Head and Brain**

### **What is Magnetic Resonance Imaging (MRI) of the Head and Brain?**

#### **Definition**

Magnetic Resonance Imaging (an MRI) of the head and brain creates detailed images of these areas in order to evaluate their condition and to assist with the diagnosis and treatment of problems. In some ways, an MRI is similar to an x-ray, but it is also different in several important ways. Magnetic resonance imaging is the best imaging method for the head and brain.

#### **How It Works**

During an MRI procedure of the head, a contrast material (dye) will be injected into the body via an IV (intravenous drip). The contrast material contains a magnetic substance. When the MRI equipment is put in motion, the contrast material reacts to the magnets to reveal the details of the structures within the head, similar to the way x-rays create images of bones. The difference is an MRI uses a powerful magnetic field and radiofrequency pulses to create detailed pictures, whereas an x-ray uses radiation. An MRI can also produce more detailed images of the head and brain than as x-ray or CT scan.

#### **Common Uses**

MRIs of the head and brain are commonly used to diagnosis and treat suspected or potential:

- Brain tumors
- Developmental problems with the structure of the brain
- Abnormal blood vessels or aneurysms (abnormal, blood-filled bulges in the blood vessels caused by the weakening of their walls, which can cause internal bleeding and sudden death if they burst) in the brain or head
- Eye problems
- Problems with the inner ear
- Strokes
- Certain forms of head/brain trauma
- Problems with the pituitary gland
- Multiple sclerosis
- Dementia
- Unexplained headaches

#### **Benefits and Risks**

##### ***Benefits***

- Magnetic resonance imaging (MRIs) can help identify causes of pain or developmental/cognitive impairment and help the patient make informed decisions about further treatment.
- Magnetic resonance imaging (MRIs) can produce much higher quality images of the head and brain than other methods, which can make a crucial difference in a doctor's

ability to quickly and accurately evaluate the cause of the patient's discomfort or impairment.

- Magnetic resonance imaging is a non-invasive procedure.
- The patient is not exposed to any x-ray radiation during an MRI procedure.
- The contrast material (dye) used in MRIs is less likely to cause allergic reactions than those used for x-rays and CT scans.

### ***Risks***

- There is an extremely small risk of developing an infection (less than 1 in 1,000) at the site where the patient's skin is punctured to establish the intravenous drip (IV), which would require treatment with antibiotics if it were to arise.
- Although rare, few patients may experience side effects from the contrast material. Patients are instructed to notify the technician immediately if any side effects are noted during the procedure.
- Medical devices inside the body may cause problems during any MRI exam because they will be affected by the magnets in the MRI equipment. Therefore, patients are carefully screened to insure it is safe to have an MRI scan.
- In extremely rare cases, patients with compromised kidney function who are injected with high doses of gadolinium contrast material (magnetic dye) during an MRI can develop nephrogenic systemic fibrosis.
- Other potential risks may vary from patient to patient; the patient should speak to his or her doctor before the procedure about any questions or concerns.

### **How Should I Prepare for My Appointment?**

Restrictions on what a patient may eat or drink before an MRI procedure vary, based on the type of procedure to be performed and the facility's guidelines. In certain cases, the patient may be asked to fast (to avoid consuming any food or liquids aside from water) for 8-12 hours before the procedure. The patient should check with the facility to see if he/she can eat, drink, and take medication as usual before the procedure. The patient should notify his or her doctor of any drugs or materials to which he/she is allergic and should notify doctor of pregnancy or of any other pertinent details of his or her medical history (prescriptions, recent illnesses or injuries, or serious health problems, etc.).

### **What Will Happen During the Procedure?**

- The patient will be asked to remove any items of clothing, jewelry, or other accessories that might interfere with the procedure.
- A patient gown will be provided unless the patient is wearing clothing that is free of metal (zippers, buttons, snaps, decorative glitter, etc.).
- Because the scan is loud, hearing protection will be provided.
- If contrast has been ordered, the technician will insert a needle into a vein to establish an IV (a harmless saline solution would most likely be dripping from the IV bag until it is time to insert the contrast dye via the IV, after any initial scans).
- The patient will be positioned on the moveable examination table. Then, the examination table will be slid into position inside the cylindrical tube.
- The patient will need to remain very still while the MRI machine takes images of the head and brain.

- The patient will be alone in the exam room (a parent or friend may be allowed to stay in the room), but the technician will be able to see and speak with the patient through a two-way intercom. The MRI machine will be noisy (it “buzzes” and “hums” while the magnets do the scan).
- After all the necessary images have been collected (sometimes several “runs” are necessary to enough images of the body part or area in question), the exam table will be moved back out of the cylindrical tube and the patient may get up.
- If an IV was inserted, it would be removed after the procedure is complete.

### **What Should I Expect After the Procedure?**

If the patient has been sedated as part of the MRI procedure, a short recovery period may be required; otherwise, the patient may generally go on with his or her normal routine and activities. There is conflicting research about whether or not breastfeeding mothers should continue nursing immediately after being injected with the contrast dye through an IV; the manufacturers of the contrast dye recommend mothers abstain from breastfeeding for 24 to 48 hours after the procedure (using a breast pump to store extra milk ahead of time and expressing and discarding their milk during that 24-48 hour time period).