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For patients

Pediatric MRI



Children's magnetic resonance imaging (MRI) uses a powerful magnetic field, radio waves and a computer to produce detailed pictures of the inside of your child's body. MRI may be used to help diagnose or monitor treatment for a variety of conditions within the brain, chest, abdomen, pelvis and extremities.

Tell your doctor about your child's health problems, medications, recent surgeries and 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 your child has any implanted medical or electronic devices. Inform your doctor and the technologist prior to the exam if your child has a known allergy to contrast material. Your child should wear loose, comfortable clothing and may be asked to wear a gown. You may be instructed to withhold food or drink beforehand, especially if anesthesia is to be used. In general, children who have recently been ill will not be given anesthesia. If this is the case, or if you suspect your child may be getting sick, talk to your physician about rescheduling the exam.

What is pediatric MRI?

Magnetic resonance imaging (MRI) is a noninvasive test doctors use to diagnose medical conditions.

MRI uses a powerful magnetic field, radiofrequency pulses, and a computer to produce detailed pictures of internal body structures. MRI does not use radiation (x-rays).

Detailed MR images allow doctors to examine the body and detect disease.

What are some common uses of the procedure?

MRI is used to help diagnose a wide range of conditions in children due to injury, illness or congenital abnormalities.

When imaging of a child's brain and spinal cord is needed, MRI is useful because of its ability to see through the skull and the bones of the skull and spine without radiation. MRI of the brain and spine is used to:

- detect a variety of brain conditions and abnormalities like cysts, tumors, bleeding, swelling, or problems with the blood vessels
- detect damage to the brain caused by an injury or a stroke
- diagnose infectious or autoimmune diseases like encephalopathy (http://www.radiologyinfo.org) or encephalitis (http://www.radiologyinfo.org)
- evaluate problems such as persistent headaches, dizziness, weakness, blurry vision or seizures
- help detect certain chronic diseases of the nervous system, such as multiple sclerosis (http://www.radiologyinfo.org)
- diagnose problems with the pituitary gland (http://www.radiologyinfo.org) and brainstem (http://www.radiologyinfo.org)
- assess the cause of developmental delay
- identify and evaluate degenerated or herniated spinal discs
- evaluate the bones of the spine for congenital or acquired abnormalities

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- determine the condition of nerve tissue within the spinal cord

In the heart, MRI is often used in a complementary role to echocardiography (heart ultrasound), computed tomography (http://www.radiologyinfo.org) and catheter angiography (https://www.radiologyinfo.org/en/info/angiocath) to provide information both before and after treatment. Cardiac MRI may be used to:

- evaluate the structure of the heart and surrounding blood vessels
- assess causes of arrhythmia (abnormal heart rhythm)
- evaluate infections
- assess blood flow to the heart muscle
- evaluate findings following cardiovascular surgery

In the abdominal and pelvic region, MRI is used to:

- diagnose causes of pain including evaluation for appendicitis
- evaluate for injury after trauma
- diagnose and monitor infectious or inflammatory disorders
- monitor response to cancer treatment

MRI is often the best choice for imaging the joints and bones, where it can help:

- diagnose sports-related injuries
- detect the presence of an otherwise hidden tumor or infection in a joint
- diagnose developmental joint abnormalities in children
- detect bone cancer
- inspect the marrow for leukemia and other diseases
- assess bone loss
- examine complex fractures

Who interprets the results and how do we get them?

A radiologist, a doctor trained to supervise and interpret radiology exams, will analyze the images. The radiologist will send a signed report to your primary care or referring physician, who will share the results with you.

Follow-up examinations may be necessary, and your doctor will explain the exact reason why another exam is needed. Sometimes a follow-up exam is done because a suspicious or questionable finding needs clarification with additional views or a special imaging technique. A follow-up examination may also be necessary so that any change in a known abnormality can be monitored over time. Follow-up examinations are sometimes the best way to see if treatment is working or if an abnormality is stable or changed over time.

What are the benefits vs. risks?

Benefits

- MRI is a noninvasive imaging technique that does not involve exposure to radiation.
- MR imaging of the soft-tissue structures of the body—such as the heart, liver and many other organs—is more likely in some instances to identify and accurately characterize diseases than other imaging methods. This detail makes MRI an invaluable tool in early diagnosis and evaluation of many focal lesions and tumors

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- MRI has proven valuable in diagnosing a broad range of conditions, including cancer, heart and vascular disease, and muscular and bone abnormalities
- MRI provides a noninvasive alternative to x-ray, angiography and CT for diagnosing problems of the heart and blood vessels
- MRI can detect abnormalities that might be obscured by bone with other imaging methods.
- The MRI gadolinium contrast material is less likely to cause an allergic reaction than the iodine-based contrast materials used for x-rays and CT scanning.

Risks

- The MRI examination poses almost no risk to the average patient when appropriate safety guidelines are followed.
- If sedation is used, there are risks of excessive sedation. However, a nurse or physician monitors your child's vital signs to minimize this risk.
- Although the strong magnetic field is not harmful in itself, implanted medical devices that contain metal may malfunction or cause problems during an MRI exam.
- Nephrogenic systemic fibrosis (http://www.radiologyinfo.org) is currently a recognized, but rare, complication believed to be caused by the injection of gadolinium-based contrast material in patients with very poor kidney function. Screening for adequate kidney function before considering a contrast injection minimizes the risk of this very rare complication.
- 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. If you experience allergic symptoms, a radiologist or other physician will be available for immediate assistance.
- After undergoing an MRI examination, small amounts of gadolinium contrast material may remain in the patient's body, including the brain. Gadolinium retention has not been shown to be harmful to patients with normal kidney function, and the benefit of an accurate diagnosis far outweighs any potential risk.

What are the limitations of Pediatric MRI?

High-quality images are assured only if your child is able to remain perfectly still and follow breath-holding instructions while the images are being recorded. If your child is anxious, confused or in severe pain, he/she may find it difficult to lie still during imaging.

A person who is very large may not fit into the opening of certain types of MRI machines.

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

A very irregular heartbeat may affect the quality of images obtained using techniques that time the imaging based on the electrical activity of the heart, such as electrocardiography (ECG).

An MRI exam typically costs more and may take more time than other imaging exams. Talk to your insurance provider if you have concerns about the cost of MRI.

MRI is generally not recommended for seriously injured patients. However, this decision is based on clinical judgment. This is because traction devices and life support equipment may distort the MR images. As a result, they must be kept away from the area to be imaged. Some trauma patients, however, may need MRI.

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