

What you need to know about...

Magnetic Resonance Imaging

Magnetic resonance (MR) imaging is a sophisticated diagnostic technique that uses a strong magnetic field, radiowaves and a computer to generate detailed, cross-sectional images of human anatomy. Because it produces better soft-tissue images than x-rays can, MRI is most commonly used to image the brain, spine, thorax, vascular system and musculoskeletal system (including the knee and shoulder).

During an MRI exam, the patient is placed inside a scanner that produces a static magnetic field up to 8,000 times stronger than the earth's own magnetic field. Exposure to this force causes the hydrogen protons within the patient's body to align with the magnetic field. When a radiofrequency pulse is applied, the protons spin perpendicular to the magnetic field. As the protons relax back into alignment with magnetic field, a signal is sent to a radiofrequency coil that acts as an antenna. This signal then is processed by a computer. Different tissues produce different signals. For example, protons in water relax more slowly than those in fat. This differentiation can be detected, measured and converted into a cross-sectional image of the patient's anatomy.

Patient Preparation

MR is a safe procedure for most patients, although it generally is not recommended for pregnant women. If you are pregnant, let your physician know. Also, because the body is exposed to a strong magnetic field, patients who have a pacemaker, cochlear implants or aneurysm clips should check with a physician before undergoing an MRI examination. Patients who have other types of metal implants and patients who have been exposed to shrapnel or whose eyes have been exposed to metal shavings also might not be candidates for MR; it's important to let your physician know if these conditions apply to you. For similar reasons, women undergoing an MRI exam should not wear eyeshadow because it sometimes contains metallic substances.

If you are claustrophobic or experience pain when lying on your back for more than 30 minutes, let your doctor know. He or she may prescribe a relaxant

or pain medication. If you are sedated for the examination, a friend will have to drive you home afterward. In some facilities, you can arrange for your scan to be performed in an "open" magnet. Open MR units are less confining than traditional MRI machines. Instead of sliding the patient into a long metal tube, the magnet is suspended above the patient. Keep in mind, however that open magnets are a new technology and not all facilities have them.

Before your examination, an MR technologist will explain the procedure to you and answer any questions you might have. An MR technologist, also known as a radiologic technologist, is a skilled medical professional who has received specialized education in the areas of anatomy, patient positioning, patient care, imaging techniques and MR procedures.

During the Examination

Examination time depends upon the part of the body being examined, but typically ranges from 30 minutes to an hour. You will be asked to undress, remove all jewelry, and put on a hospital gown. Remember, the magnet will damage wristwatches and erase credit and bank cards, so don't take them into the exam room with you. You will be provided a secure place to store these items during your examination.

For most types of MR exams, the MR technologist will wrap a special coil around the body part that is being examined. This coil helps concentrate the radiofrequency pulses. The MR technologist will position you on a padded, moveable table that will slide into the opening of the scanner.

You may be given a contrast agent to highlight internal organs and structures. The contrast changes the relaxation rate of protons in the body, illuminating organs and tissues and making tumors, vessels and scar tissue appear brighter. It is very important to let the MR technologist know if you have kidney disease because in some cases you should not receive a contrast agent that contains gadolinium.

You won't feel anything during the scan, but you may hear intermittent humming, thumping, clicking and knocking sounds. These are the sounds



of the magnetic gradients turning on and off. Some MR centers provide patients with headphones or earplugs to help mask the noise.

The MR technologist will not be in the room during the scan, but will be able to observe you through a window from a room next door and will be able to hear you and talk to you through a two-way microphone system. The technologist will tell you when each scan sequence is beginning and how long it will last. You will be asked to remain as still as possible throughout the sequence.

When the exam is complete, your MR scans obtained will be given to a radiologist, a physician who specializes in the diagnostic interpretation of medical images.

Postexamination Information

After your images have been reviewed by a radiologist, your personal physician will receive a report of the findings. Your physician then will advise you of the results and discuss what further procedures, if any, are needed.

Magnetic resonance imaging is a noninvasive procedure, and there are no known side effects or after effects. If a contrast agent was administered, you may experience nausea, headache or dizziness following your examination. It's important to increase your water consumption in the days following the examination. If these symptoms persist, contact your physician. ♦

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La imagen por resonancia magnética (RM) es una técnica de diagnóstico sofisticada que utiliza un campo magnético fuerte, ondas de radio y una computadora para producir imágenes de sección transversal de distintas partes del cuerpo. La RM produce mejores exploraciones del tejido blando y se utiliza, en general, para producir imágenes del cerebro, la columna vertebral, los órganos en el pecho y el abdomen, el corazón y los vasos sanguíneos y estructuras próximos a los huesos, tales como los músculos y ligamentos.

Preparación del Paciente

Debido al campo magnético fuerte, los pacientes que tienen un marcapasos, implantes en el oído o clips para aneurisma deben consultar a un médico antes de realizarse un examen de RM. Los pacientes con otros tipos de implantes metálicos y pacientes que hayan estado expuestos a fragmentos, o cuyos ojos hayan estado expuestos a virutas de metal también podrán no ser candidatos para la RM; es importante que le avise a su médico si dichas condiciones corresponden a su caso. Asimismo, no se debe usar sombra en los ojos durante un examen de RM, pues suele contener sustancias metálicas.

Aunque la RM es un procedimiento seguro para la mayoría de los pacientes, debe informarle a su médico si está embarazada. Si tiene claustrofobia o siente dolor al acostarse boca arriba durante más de 30 minutos, avísele a su médico. Él o ella podrán recetarle un relajante o un medicamento para el dolor.

Antes de su examen, un tecnólogo en RM le explicará el procedimiento y responderá a sus preguntas. El tecnólogo en RM, también conocido como tecnólogo en radiología, es un profesional médico especializado

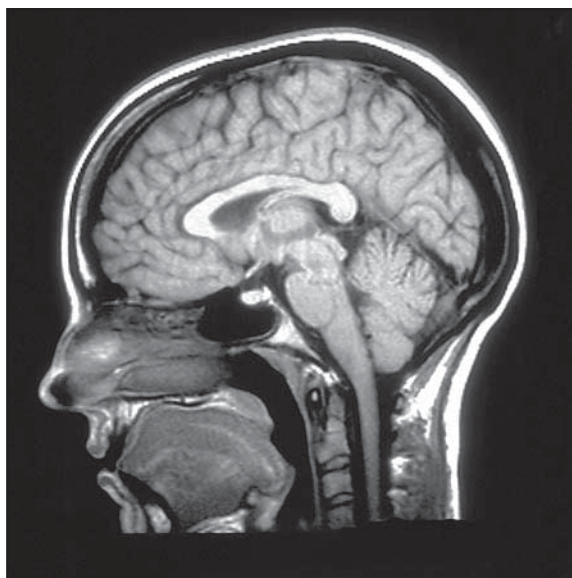
con estudios en las áreas de anatomía, posicionamiento de pacientes, atención de pacientes, técnicas de producción de imágenes y procedimientos de RM.

Durante el Examen

La duración del examen depende de la parte del cuerpo que se esté examinando, pero generalmente dura entre 30 minutos y una hora. Se le pedirá que se desvista, se ponga una bata de hospital y se saque las alhajas, hebillas de cabello, gafas, auriculares y dentaduras. Debe tener en cuenta que el imán dañará los relojes de pulso y borrar tarjetas de crédito y tarjetas de banco. El establecimiento de producción de imágenes le proveerá un lugar seguro para guardar estos artículos durante el examen.

Para la mayoría de los tipos de exámenes de RM, el tecnólogo envuelve la parte del cuerpo que se examina con una banda ancha. Dependiendo del área que se examina, se le podrá dar un agente de contraste para que los órganos internos y estructuras sean más visibles. El tecnólogo lo(la) ubicará sobre una camilla movable y acolchada que se desliza hacia adentro de la abertura del scanner.

No sentirá nada durante la exploración, pero podrá escuchar zumbidos, clics y golpes que vienen del equipo. Los centros de RM proveen auriculares o audífonos para tapar el ruido. Asimismo, la sala de examen podrá tener poca luz y estar fría.



Una imagen de RM de la cabeza.

El tecnólogo no estará en la sala durante el procedimiento, pero podrá verlo(a) y comunicarse con usted a través de un comunicador. El tecnólogo le dirá cuándo comienza cada secuencia de exploración y cuánto durará. Se le pedirá que permanezca lo más quieto(a) posible durante la secuencia.

Cuando finalice el examen, se le entregará sus imágenes de RM a un radiólogo, médico especializado en la interpretación diagnóstica de imágenes clínicas.

Información de Pos-examen

Una vez analizadas sus radiografías, su médico personal recibirá un informe de los resultados. Su médico luego conversará con usted sobre los resultados y discutirá qué procedimientos futuros, si los hubiera, serían necesarios.

Las imágenes por resonancia magnética constituyen un procedimiento no-invasivo y no se conocen efectos colaterales ni posteriores. ♦

Esta página educacional del paciente provee información general en cuanto a la ciencia radiológica. ASRT sugiere que usted consulte con su doctor para obtener información específica concerniente a su examen de imagen y condiciones medicas. Los profesionales del cuidado de la salud pueden reproducir estas páginas para ser usadas sin recibir lucro económico. La reproducción de estos documentos para ser usadas para otros objetivos necesita la autorización del ASRT.