Magnetic Resonance Imaging

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What is an MRI?

MRI stands for Magnetic Resonance Imaging. An MRI is a medical technique that is used to view inside the human body non-invasively. It takes "slices" or cross sections of the body using powerful magnets and special computer software to view images of different portions of soft tissues in the body. An MRI allows a doctor to visualize the detailed internal structures and limited functions of the body.

What are the different parts of an MRI?

The main part of the MRI is the very powerful Electromagnet. This magnet is able to align the hydrogen atoms in the body into a specific order or pattern. The Radio Frequency coils (RF Coils) are able to change the hydrogen atoms and realign them. The Gradient coils pick up the released photons. These signals are sent through a receiver program in a computer. The computer then is able to translate the information and turn it into highly detailed high resolution image of inside the body. Then the computer can print out sheets of film with the detailed pictures on it so that they have portable versions of the pictures taken of the area being diagnosed.

How does an MRI work?

An MRI works by first aligning the individual hydrogen atoms in the body. A radiologist may also inject a contrasting agent into the patient's blood stream to make it easier to distinguish the very small blood vessel structures or the different neurological structures inside the patient's brain. Then the MRI produces radio frequency waves (RF Waves). These RF Waves realign the hydrogen atoms in the body which causes the hydrogen atoms to release photons. The gradient coils inside the MRI machine are able to pick up and detect the released photons. This generates a signal that is sent through a signal processor in the computer. The computer has special imaging software that is able to decipher these signals and turn them into a rendered image. The radiologist is then able to print off these images onto special film so that the doctor has a portable version of the images to work with and interpret.

What is an MRI used for?

An MRI is used to mainly diagnose injuries to soft tissues non-invasively. It is also used to diagnose possible signs of cancer to determine if surgery or biopsy is needed. It can be used to view blood vessels to monitor for abnormal constriction and dilation.

What are the benefits of an MRI?

The biggest benefit of getting an MRI over other medical imaging procedures is that an MRI doesn't use radioactive X-Rays to work. It provides excellent image resolution and contrast between different soft tissues in the body as well as excellent distinction between different anatomical structures in the body. The procedure takes a lot less time and is a lot less labor intensive in comparison to an X-Ray procedure of soft tissues. In general an MRI doesn't need contrasting media to be injected into the bloodstream for taking images of soft tissues and blood vessels. Also an MRI can provide better, clear images than a Computer Tomography scan.

References:
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