

## TOPIC – MRI III SEMESTER MSC ZOOLOGÝ MIDHILA MOHAN Assistant Professor on contract

# MRI PROCEDURE

#### PROCEDURE OF MRI

The MRI scanning machine is a large donut –shaped magnet with a movable scanning table on which a person lies. The machine produces loud noises, like banging, during the procedure. The noises, while unpleasant at times, aren't dangerous or indicative of a problem, but are a signal that images are being taken.

The computer uses the MRI signals to create a image that is based o the strength of signal produced by different types of tissue.

Eg tissues that coati little or o hydrogen ( such as the bone) appear black. Those that coati a large amount of hydrogen ( such as the brain) produces a bright image.

Computer coverts signals from the MRI scan into extremely clear,

Each image is a slice of the body area scanned, and numerous images are created that clearly show all the features of that particular part of the body. The images produced by MRI can be compared to a sliced loaf of bread. just as you can lift each individual slice from the loaf and see both the slice ad the inside of the bread, so too the image slices produced by the MRI show the exact details of the inside of the body.

The computer is able to reconstruct all the images into a single image reassembling a X-ray. The reconstruction also can be made into threedimensional images, allowing complete and remarkable visualization of the body area scanned from all angles.

The patient is positioned on the moveable examination. Straps ad bolsters may be used to help him/her stay still and maintain the correct position during imaging. Small devices that contain coils In our bodies, the nuclei of hydrogen atoms (called protons) normally point randomly in different directions. However, when exposed to the magnetic field in a MRI chamber, the nuclei lie up in parallel formation, like rows of tiny magnets. Early two- thirds of the body's hydrogen atoms are found in water and fat molecules.

When the nuclei are subjected to a strong but harmless (and painless) pulse of radio waves from the MRI machine, they are knocked out of their parallel alignment. As they fail back into alignment they produce a detectable radio signal.

The signal is recorded by the machine and transferred to a computer, the computer uses these signals to calculate an image that is based on the strength of signal produced by different types of tissue. Eg tissue that contain little or no hydrogen ( such as bone) appear black. An entire MRI exam may take from 20 minutes to 1.5 hours, depending on the type of information required by the radiologist and physician, and the quality of the images needed to make a particular diagnosis. Normal activities can be immediately resumed after the images are obtained.

Because the machine has a tunnel like appearance , some people feel uncomfortable, or even claustrophobic (fearful of being closed in). Most people can overcome this feeling, But for these who need assistance , the doctor ca prescribe a tranquilizer for use before the procedure.

Special scanners with open magnets exist for these people who are too claustrophobic and / or too large to fit in the regular machines. Unfortunately, the image quality of these scanners is generally not as

#### APPLICATIOS OF MRI

MRI is used for a variety of diagnostic purposes. It is most often used to obtain information that hasn't been provided by other imaging techniques, including ultrasound, conventional X-ray or CT.

In general MRI is used to

Determine exactly what the problem is inside the body.

Show exactly where the problem is.

Rule out certain diseases.

Since MRI produces images in any plane so it is particularly valuable in studying the brain and spinal cord and pinpointing even the smallest abnormality there. Because the water and fat content of tumors is different from surrounding normal tissue, MRI can reveal the precise location ad size of tumors. MRI also provides :

- Images of the internal structure of the eye ad ear.
- Detailed images of the heart ad major blood vessels.
- Images of blood flow in the circulatory system.
- Detailed images of joints bad soft tissues, particularly of cartilage, ligaments and tendons within joints such as the knee.
- In clinical practice, MRI is used to distinguish pathologic tissue such as brain tumor from normal tissue.
- One advantage of a MRI scan is that it is harmless to the patient. It uses strong magnetic fields and non- ionizing radiation and may increase the risk of malignancy especially in a feotus.

While CT provides good spatial resolution (the ability to distinguish two stuctures arbitariarly small distance from each other as separate) MRI

#### ADVANTAGES:

- MRI is a non invasive imaging technique that does not involve exposure to ionizing radiation.
- MRI can help physicians evaluate both the structure of a organ and how it is working.
- MRI enables the discovery of abnormalities that might be obscured by bone with other imaging methods.
- f MRI enables the detection of abnormalities of the brain, as well as the assessment on the normal functional anatomy of the brain, which cannot be accomplished with other imaging techniques.

### DISADVANTAGES:

- If sedation is use there are risks of excessive sedation. The technologist or nurse monitors the vital sigs to minimize the risk.
- Although the strong magnetic field is not harmful in itself, implanted medical devices that contain metal may malfunction or cause problems during a MRI exam.
- There is a very slight risk of a allergic reaction if contrast material is injected. Such reactions usually are mild and easily controlled by medication. If one experiences allergic symptoms, a radiologist or other physician will be available for immediate assistance.
- Nephrogenic systemic fibrosis is currently a recognized, but rare, complication of MRI believed to be caused by the injection of high