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Subject	MRI procedure
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Q1: What you know about MRI  
Brain, important sequences,  
and procedure?

Ans: MRI Brain:-

MRI can detect a variety of condition of the brain such as cysts, tumors, bleeding, swelling, developmental and structural abnormalities, infection, inflammatory condition, or problems with the blood vessels. It can determine if a shunt is working and detect damage to the brain caused by injury of a stroke.

Important Sequences:-

The simplest way to think about the multitude of sequences available on modern scanners is to divide them according to the dominant influence on the appearance of tissues. This leads to a division of all sequences into proton density (PD) weighted,  $T_1$  weighted,  $T_2$  weighted, diffusion weighted, flow sensitive and miscellaneous.

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A number of optional add  
ons can also be considered  
i.e. as fats or fluid  
attenuation or contrast  
enhancement. This leads to  
a broad categorization  
as follows.

T1 → Gadolinium enhanced

→ Fluid attenuated.

→ Fats suppressed

T2 → Fat suppressed

→ Fluid attenuated

→ Susceptibility sensitive

Proton density:

→ Fat suppressed.

→ Diffusion weighted

→ Flow sensitive.

→ MR Angiography

→ MR venography

→ CSF Flow study

Miscellaneous

→ MR cholangio pancreatography  
(MRCP)

→ A typical special T2  
weighted

→ MR spectroscopy.

→ MR perfusion.

## MRI Brain procedure

During important To stay still To obtain the clearest images. childrens who have difficulty staying still may need sedation. Administered either orally or through an iv line. Sedation can also be helpful for adults who's are claustrophobic

You will lie down on table that slides into the MRI machine. The table slides through a large magnet shaped like a tube. You may have a plastic coil placed around your head. After the table slides into the machine, a technician will take a several picture of brain, each of which will take a few minutes. There will be a microphone in the machine that allows you to communicate with staff there. There are two risks associated with an MRI at self. There is very slight

PTO

# Flow chart of MRV:

Eligible EVST patients  
for MRV (TOF and CE) (n=39)



Patients successfully  
complete MRV (n=32)

Patients  
with DSA  
and TOF  
MRV = (n=22)

Patients with  
DSA TOF  
and CE MRV n=32

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Chance that you have an allergic reaction to a contrast solution. Tell the medical staff if you have decreased kidney function it may not be safe to use contrast solution if this is the case.

Any 3) a MRI spine:

MRI of the spine uses radio waves, a magnetic field and a computer. It creates clear detailed picture of the spine and surrounding tissues. MRI does not use radiation and may require an injection of gadolinium contrast material.

- MR imaging is used to assess:
- Spine anatomy and alignment
  - Birth defects in the vertebrae of spinal cord.
  - Trauma injury to the bone, disc, ligament or spinal cord.

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MRI Spine Sequences  
Commonly used sequences  
in MRI of the spine  
include T<sub>1</sub> intermediate  
TE (proton density) or FLAIR  
T<sub>2</sub> weighted sequences  
T<sub>2</sub> and various FAT  
suppression. These  
Techniques can be employed  
as 2D or 3D image  
acquisitions. Vascular  
Techniques can be used  
for angiography.

Q No 3 B Flow chart of  
MRV and MRA

Ans: Flow chart of MRA

(1) Acquisition of 3D TOF  
MRA



(2) Acquisition of fat image  
with 3d LAWA-Flex



(3) Normalize signal intensity



(4) Subtract FAT image  
normalized 3D from TOF MRA

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Best Indication and Contraindication for MRI liver, liver anatomy (diagram)?

Ans Indications:-

These are gadolinium based contrast agents which have been widely used in liver MRI for several years. Gadolinium is a paramagnetic metal ion, which shortens T<sub>2</sub> relaxation time and produces positive enhancement on T<sub>2</sub> weighted scans. Gadolinium agents initially enhance the vessels then rapidly disperse throughout the extracellular space and are eliminated by renal excretion. The best liver-to-lesion contrast will be possible within the first 90 seconds after the injection. It is therefore important to acquire the dynamic sequences during this time. Liver specific agents have been developed recently to increase and prolong the contrast between normal and abnormal tissues and improve lesion detection.

Contraindication:-

magnetically or mechanically activated ⇒ Any electrically activated



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Implant (e.g. Cardiac pacemaker, insulin pump biostimulator, neurostimulator, cochlear implant, and hearing aids)

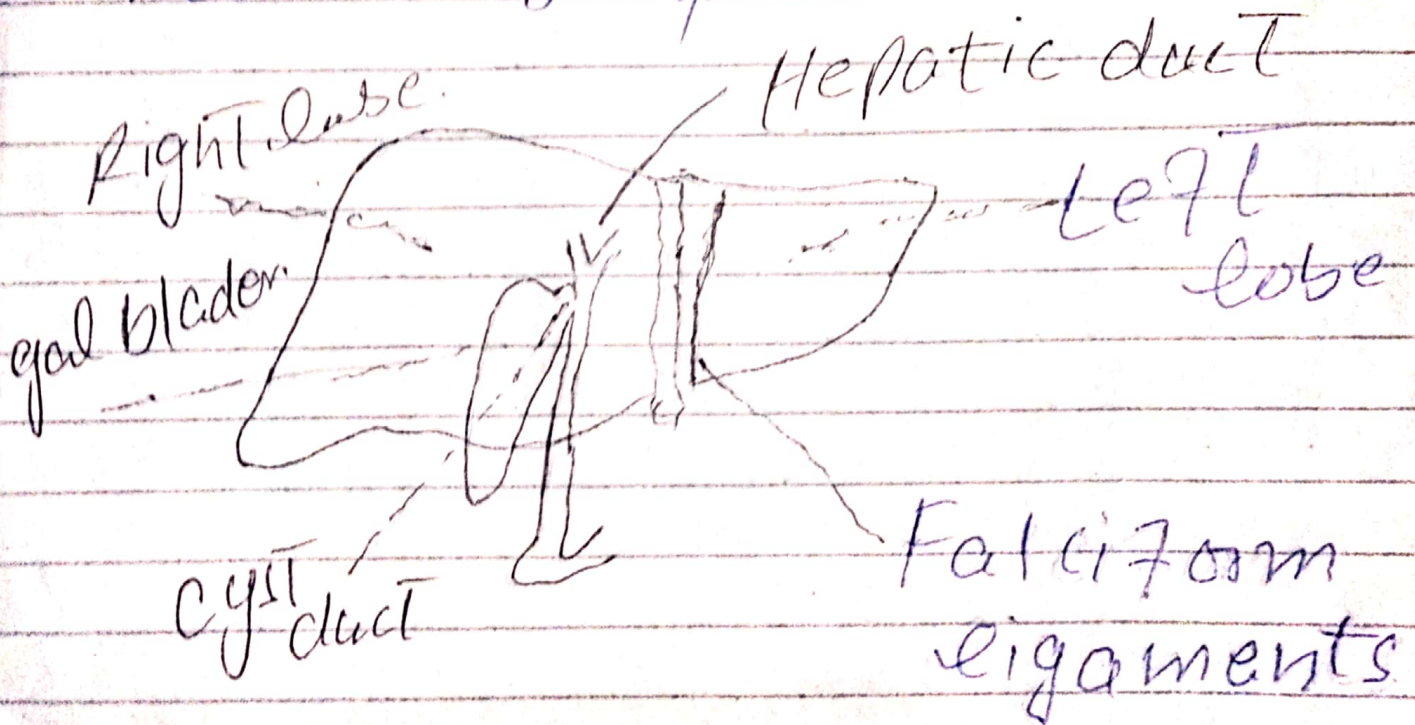
→ Intracranial aneurysm clips (unless made of titanium)

→ Pregnancy (risk vs benefit ratio to be assessed.)

→ Ferromagnetic surgical clips or staples.

→ Metallic foreign body in the eye.

→ Metal shrapnel or bullet.



## Liver Diagram and Anatomy

Q Nos: How you will prepare a patient for MRI knee and procedure?

Ans: MRI Knee :-

MRI of the knee provides detailed images of structures within the knee joint including bones, cartilage, tendons, ligaments, muscles and blood vessels from many angles.

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

MRI uses a powerful magnetic field, radio waves 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. The image can be reviewed on a computer monitor. They may also be sent electronically, printed or copied to a CD, or uploaded to a digital cloud server.

## Producers :-

swelling or bleeding in the tissues in and around the joint. Knee pain, weakness

② Damaged Cartilage, meniscus  
ligaments or tendons.

③ Sports-related knee injuries  
such as sprains and torn  
ligaments, cartilage, or tendons.