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Programme : (RAD)

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Subject : MRI

### Contraindication:

- \* Any electrically, magnetically or mechanically activated implant and (eg 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 body in the eye.
- \* metallic surgical clips or staples
- \* metal shrapnel or bullets

### Patient preparation

- \* A satisfactory written consent form must be taken from the patient before entering the scanner room.
- \* Ask the patient to remove all metal objects including keys, coins, wallet, cards with magnetic strips, jewellery, hearing aids and hairpins.
- \* eeg caps/plugs are headphones, possibly with mull' for extra comfort.
- \* Explain the procedure to the patient.
- \* Instruct the patient to keep still.
- \* Note the weight of the patient.

QNo: (5)

Ans: <sup>Knee</sup> Indication for MRI Scan:

- > Meniscal disorder: non displaced and displaced Tears, discoid menisci, meniscal cysts.
- > Marrow abnormalities: avascular necrosis, marrow edema syndromes, and stress fractures.
- > Congenital and developmental condition blunt disease, dysplasia, normal variants.
- > Synovial based disorders: Symptomatic plicae, synovitis, bursitis, and popliteal cysts.
- > Muscle and Tendon disorders: Strains and partial and complete tears, Tendinopathy.
- > Mechanical Knee Symptoms: catching, locking snapping crepitus
- > Vascular conditions:- entrapment aneurysm, stenosis, occlusion
- > Osteochondral Fractures.
- > Degenerative chondrosis
- > Acute trauma
- > Fractures

### What to Expect after an MRB/MRV Scan.

⇒ you will on the table until your technology confirms that the image are successful you can remove after word and return to your regular activities.

⇒ your IR will discuss the result with your primary care or referring physician who will consult with you about the next step in your treatment process.

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## What to Expect:

The bed will move you through the tunnel-shaped machine. As images are taken the machine makes a series of bumping and humming

noise.

~~to~~

⇒ you may be asked to hold your breath in order to remain still during the scan.

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⇒ you will be lying on a radiographic table through out the procedure.

⇒ If you experience discomfort you may ask for a pillow or blanket. The staff can also provide head phone then play music during the scan time ∴

⇒ eScan requires contrast dye, you should not eat 4-6 hours before the procedure. Inject through an IV into your veins.

⇒ coils are placed around area need imaging.

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## How to prepare for an MRA/MRV Scan.

⇒ If you have any allergies, are taking medications Blood thinners, ~~but~~ has ~~an~~ claustrophobia or are pregnant please notify the staff

⇒ Remove jewelry and other metal accessories.

⇒ you will be assisted by technician who is in a connected room during the procedure. Which can communicate with via microphone.

QNO:-(4) What is MRA and MRV (diagram/flowchart)

ANS:-XIV) MRA/MRV

Magnetic resonance arteriography and venography are minimally invasive imaging techniques that use a scanner which projects magnetic field radio waves in order to create images of the arteries and veins. These images assist in diagnosing vascular abnormalities with out of x-ray technology no radiation is required.

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Disc Disease - ~~non~~

- ⇒ many people with back pain have disc bulges or problems.
- ⇒ 64% of patient with no back pain have an abnormal MRI
- ⇒ Surgical treatment of degenerative changes based solely on MRI is not recommended.

Disc pathology nomenclature

- ⇒ Standardization nomenclature approved in 2001
- ⇒ Agreed upon definition of
  - Bulge.
  - protrusion.
  - Extrusion.

P-T-O

xii.

### Disc Spares :-

- Disc Height
- Disc water content.
- very common cause of patient symptom.
- Surgical target

### Common pathology Encountered

- > Degenerative
- > Tumor
- Infection
- > Trauma

### Back pain :-

- => 80% of Americans have back pain at some point = 240 million people
- => 95% of them do not need surgery
- => MRI is the test of choice for majority of spine indications

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### Spinal Cord :-

- => The the images  
adequate to exclude cord  
pathology.
- Most radiologists consider  
this priority #1
- => T2w Images critical
- => Identify etiology.
- Cord expanded?
- value added opportunity  
contrast

### Spinal Canal :-

- => very common cause of  
patient symptoms.
- => Surgical target
- => Cord compression is  
an emergency -

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### Alignment =>

- => Identify Spondylosthesis
- => Identify etiology
  - History of trauma?
  - Degenerative?
  - Congenital?

### Bones :-

=> is there a focal or diffuse bone marrow abnormality.

=> T1W and STIR / Fat sat image critical

=> Identify etiology.

- History of cancer or trauma?
- value added opportunity contrast.

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Additional Sequences

- ⇒ Axial Gradient Echo: Stereolax for cervical spine
- ⇒ T2w
- ⇒ Coronal STIR or T2w coronal cervical junction ligaments.
- ⇒ Axial T1 fat saturation for dissection.
- ⇒ CSF flow imaging: cervicocervical junction obstruction.

Radiologist Approach to Spine MRI

- ⇒ Alignment
- ⇒ Bones
- ⇒ Spinal cord
- ⇒ Neural foramen, facet joint
- ⇒ Disc Spaces
- ⇒ Extraspinal tissues.

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Alignmen

- ⇒ Ident
- ⇒ Ident

Bones

or

⇒

⇒

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Q No.: (iii) 13 (iii)

ANS ⇒ MRI Spine

Outline ⇒ Diagnostic Approach

→ Terminology and concepts.

⇒ common spine pathology

Before Imaging ⇒

⇒ Adequate clinical history taking

⇒ ~~opp~~ Opportunity to add value to image

⇒ Indication for IV contrast

= known or suspected malignancy

= prior surgery

= possible or known infection.

Standard Spine Sequences ⇒

⇒ T<sub>1</sub> weighted: Axial and Sagittal

⇒ T<sub>1</sub> weighted: Sagittal +/- axial

⇒ STIR or T<sub>2</sub>W fat sat: Sagittal.

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- » Liver iron content determination
- » potential liver donor evaluation
- » Evaluation of vascular patency
- » Evaluation of cirrhotic liver

### Contra indication:-

» Any electrically, magnetically or mechanically activated implanted.

- » Intracranial aneurysm clips
- » pregnancy
- » Ferromagnetic surgical clips or staples
- » Metallic foreign body in the eye
- » Metal Shrapnel or bullet

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Qno (ii)

Ans Indication for liver

MRI

→ Evaluation of diffuse

liver disease such as haemochromatosis

nodular regenerative hyperplasia, fatty infiltration

→ Detection of focal hepatic lesion

metastasis, focal nodular hyperplasia,

→ lesion of characterization

→ Clarification of findings from other imaging

→ Evolution of tumours

→ response to treatment



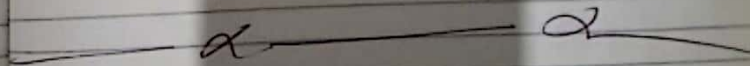
(v)

- > Give cushions under the legs for extra comfort
- > Centre the laser beam localiser over the glabella.

=> T<sub>2</sub> tse axial

=> T<sub>1</sub> SE coronal

=> T<sub>2</sub> tse sagittal



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and with magnetic strips  
jewellery, hearing aid and hairpins.

- > Contrast inject the risk and benefits must be explained to the patients before the scan.
- > Gadolinium should only be given to the patients if GFR is  $> 30$ .
- > Head phone possible
- > Explain the procedure to the patient :-

### positioning for MRI Brain

- > Head first supine
- > position the head coil in and the head coil and immobilise the cushions.

### Contra Indications :->

- > Any electricity, magnetically activated implant.
- > Intracranial aneurysm clips
- > pregnancy aneurysm clips
- > Ferromagnetic surgical clips or staples
- > Metallic foreign body in eye
- > Metal shrapnel or bullet.

### patient preparation for MRI

#### Principle ::

- > A satisfactory written consent form must be taken from the patient before entering the scan room.
- > Ask the patient to remove all metal object including keys, coins, wallet

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QNO:- (i) (1)

ANS :-> Indications of MRI Brain

- => Transient ischaemic attack (TIA)
- cerebrovascular attack (CVA)
- => Infection, inflammation, meningitis
- encephalitis, HIV, AIDS, TB
- => Cognitive decline, neurode-
- generative disorder.
- => Demyelinating disease
- multiple sclerosis
- => loss of consciousness
- => Brain tumor, metastases
- abscess
- => cerebellar lesion, brainstem
- lesion.
- => congenital abnormality.
- => vascular pathology
- => Headaches
- => Haemorrhage
- => Trauma and stroke.