


MYELOGRAM

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Key points:

- * Anatomical review
- * Definition
- * Indication & contraindication
- * Who does the Myelogram
- * Where is Myelogram done
- * Purpose of Myelogram
- * Special concern
- * Patient preparation
- * CM (type, injection process, puncture position)
- * Before Myelogram
- * Imaging technique & what you experienced
- * Conventional radiograph positions
- * Post procedure care (After Myelogram)
- * Benefits and risk
- * Result
- * Limitations of Myelogram

Central Nervous System

For descriptive purpose the Central Nervous System is divided into two parts.

- A) Brain : which occupies the cranial cavity
- B) Spinal Cord: within the vertebral canal

BRAIN



BRAIN:-

The brain composed of

An outer portion of Grey matter (Cortex).

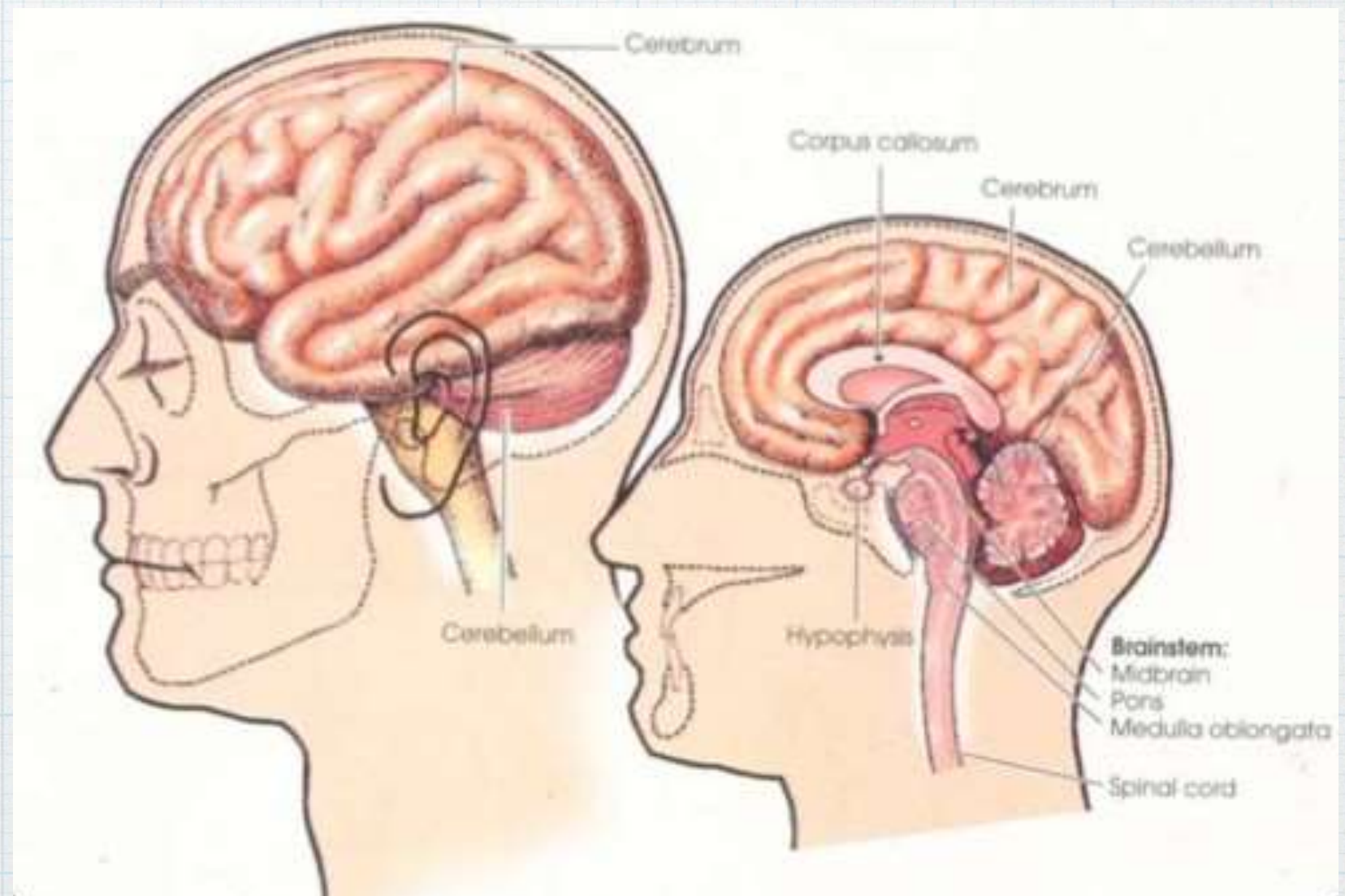
An inner portion of white matter

The brain consist of

- * Cerebrum
- * Cerebellum
- * Brain stem

The brain stem consist of

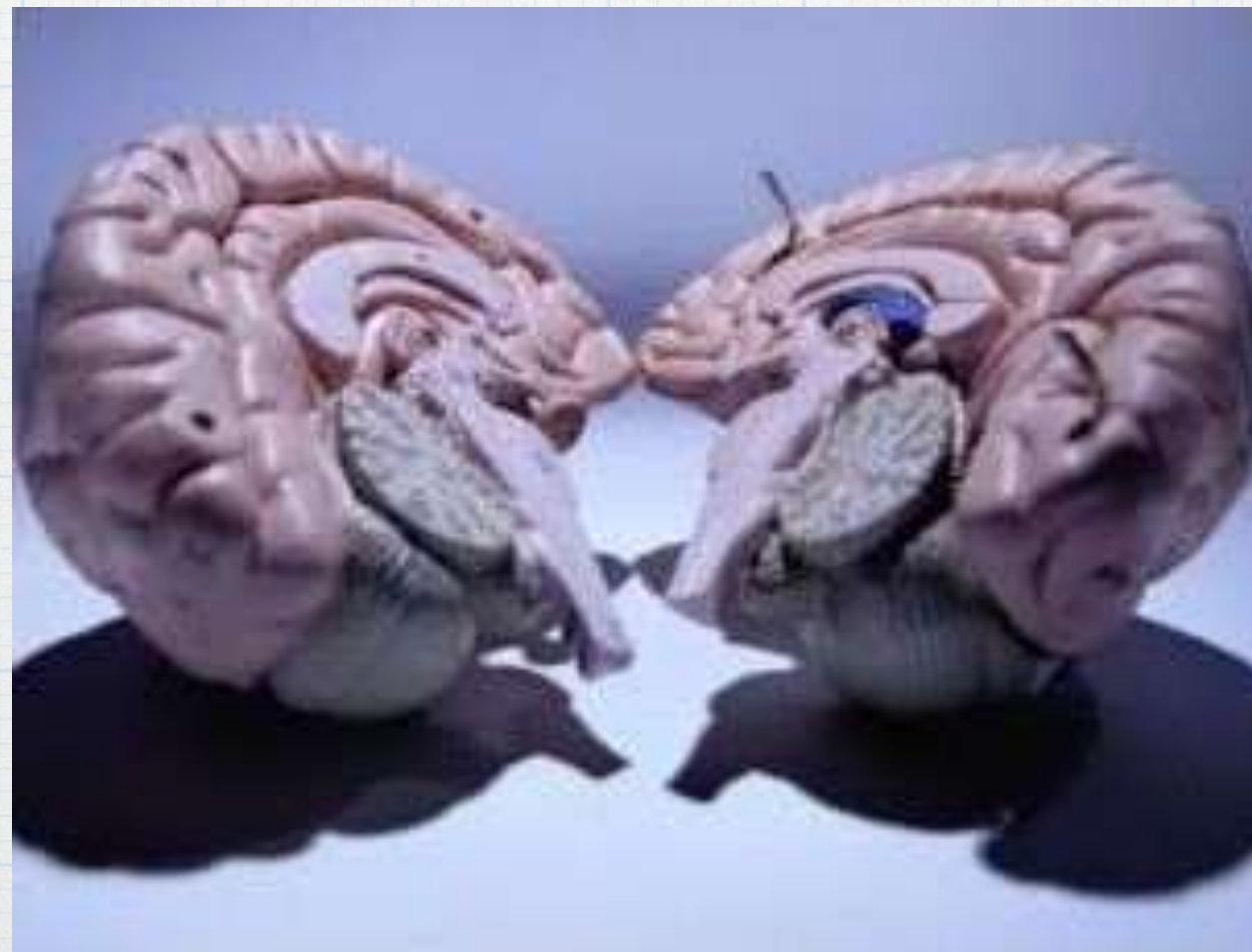
- * Mid brain
- * Pons
- * Medulla oblongata



- * The cerebrum is the largest part of the brain and is referred to as the **Forebrain**
- * The stem like portion that connects the cerebrum - to the pons & cerebellum is termed as the **Midbrain**
- * The cerebellum, pons & medulla oblongata makes up the **Hindbrain**

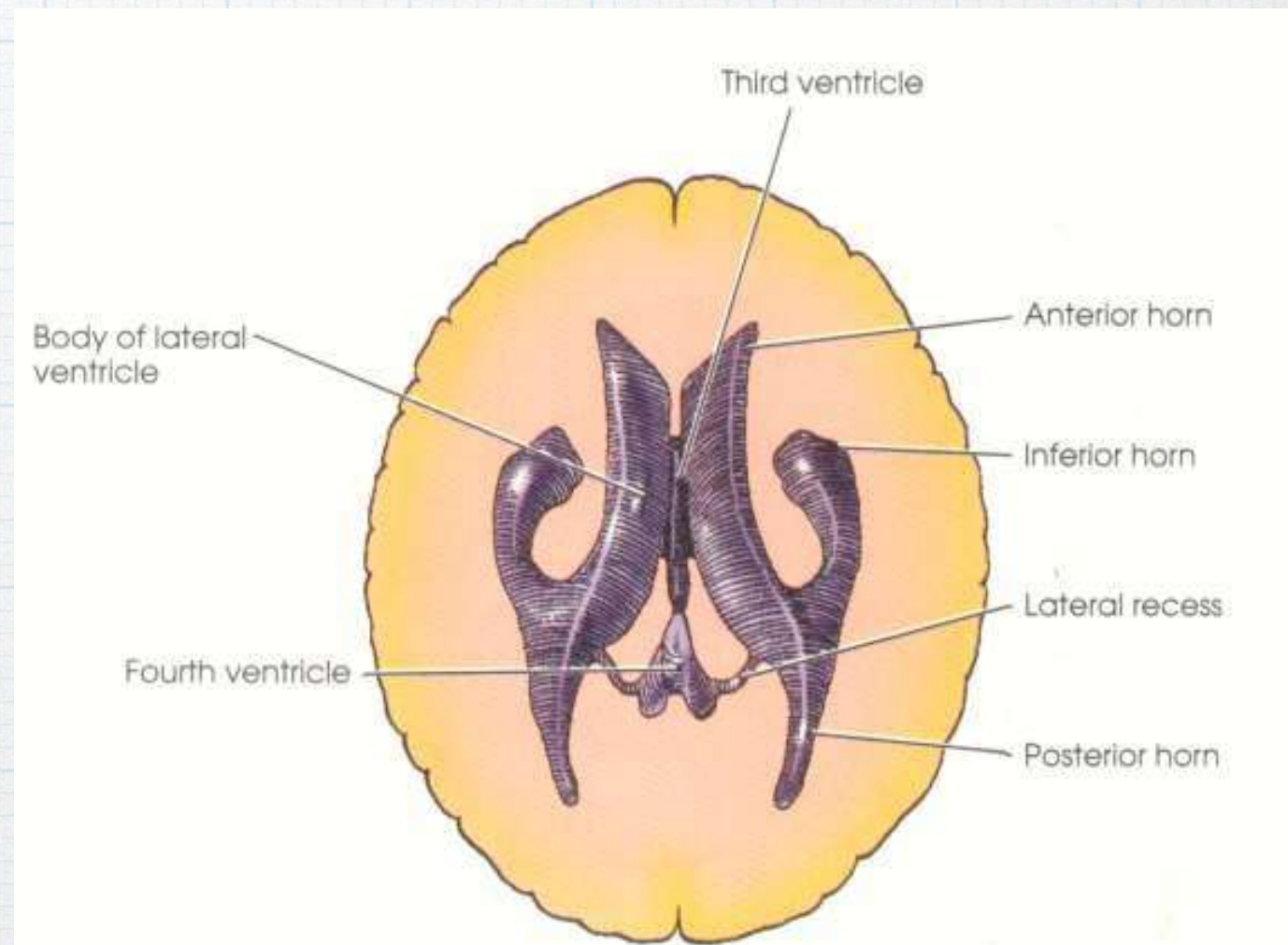
- * A deep cleft called The Longitudinal sulcus, separate the cerebrum into two R&L hemispheres

- * The two cerebral hemispheres are connected through the white matter tract called Corpus Collosum



👉 ventricular system:-

- * The ventricular system of the brain consists of four fluid-filled cavities
- * These fluid-filled cavities are communicating with one another through connecting channels

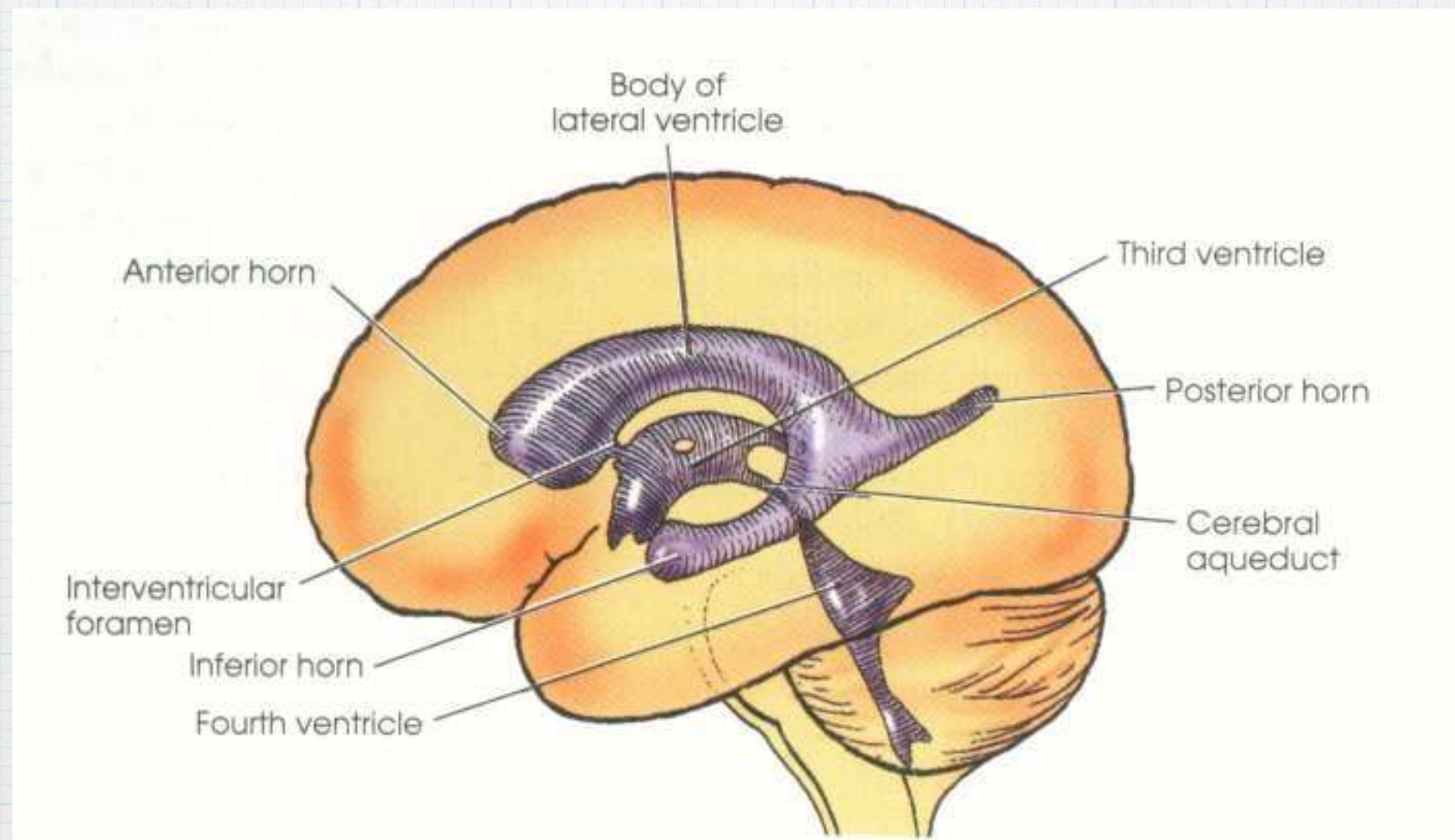


- * The two upper cavities are called lateral ventricles (R) & (L)

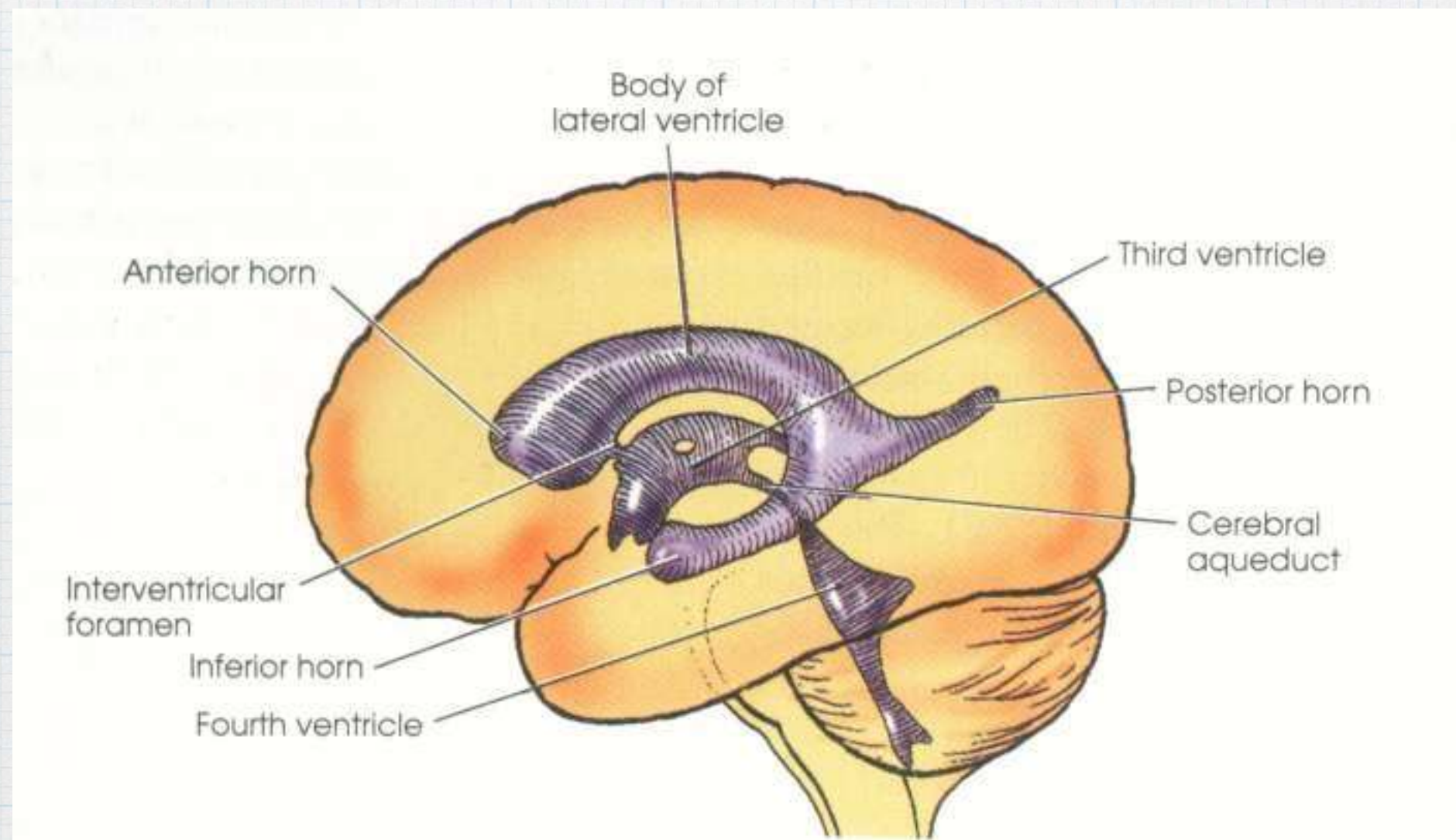
- * Each lateral ventricle consist of

- A. Body

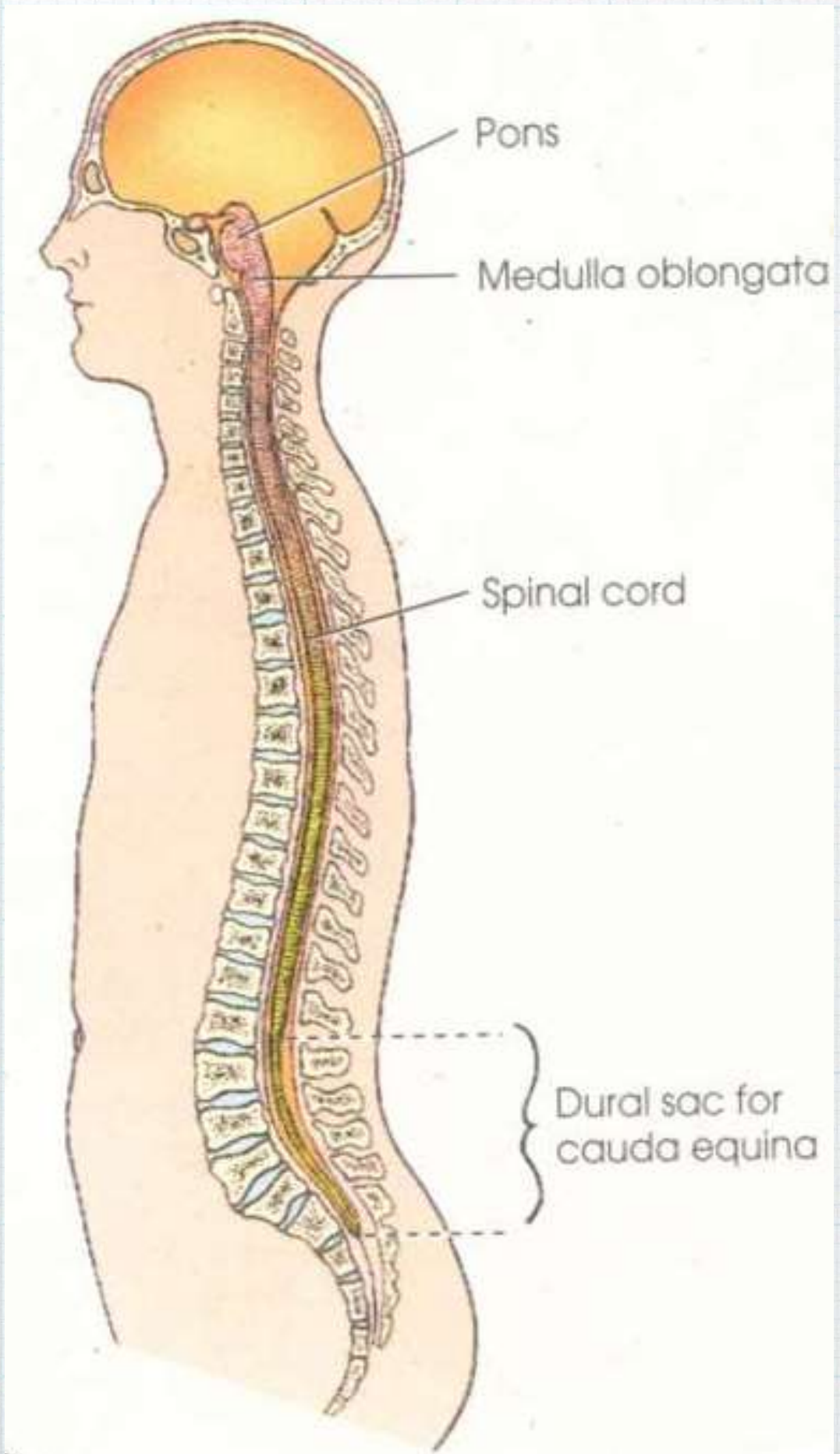
- B. Anterior, Posterior & Inferior Horns



- * Each lateral ventricle is connected to the 3rd ventricle by the channel called intra-ventricular foramen
- * The 3rd ventricle is connected to the 4th ventricle by a channel called cerebral aqueduct
- * 4th ventricle opens with the central canal of the medulla oblongata



THE SPINAL CORD



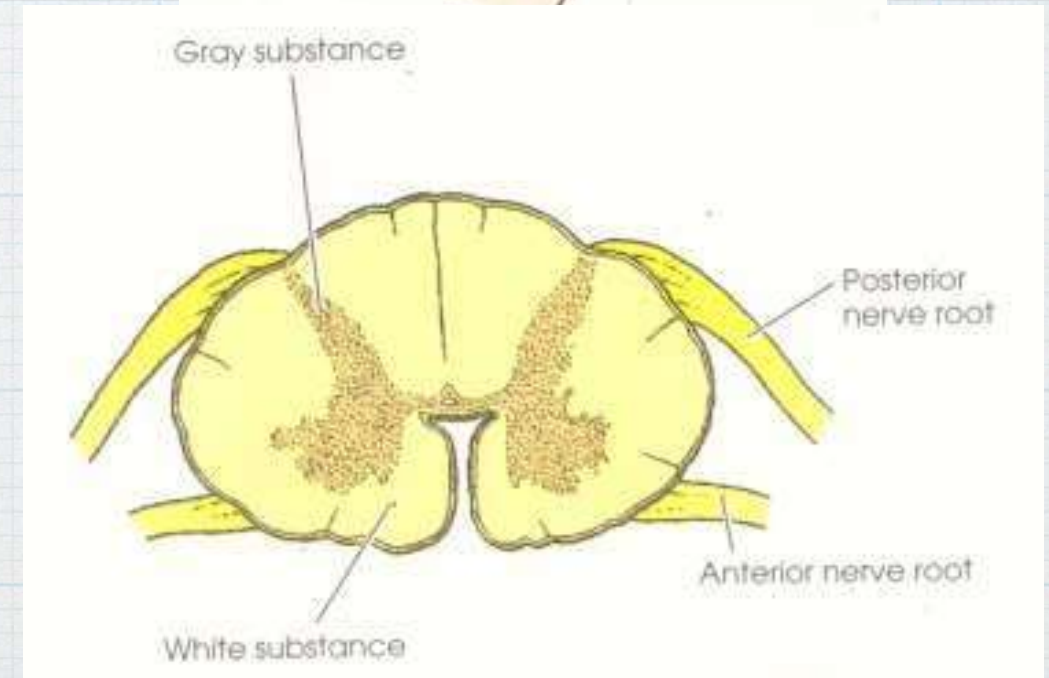
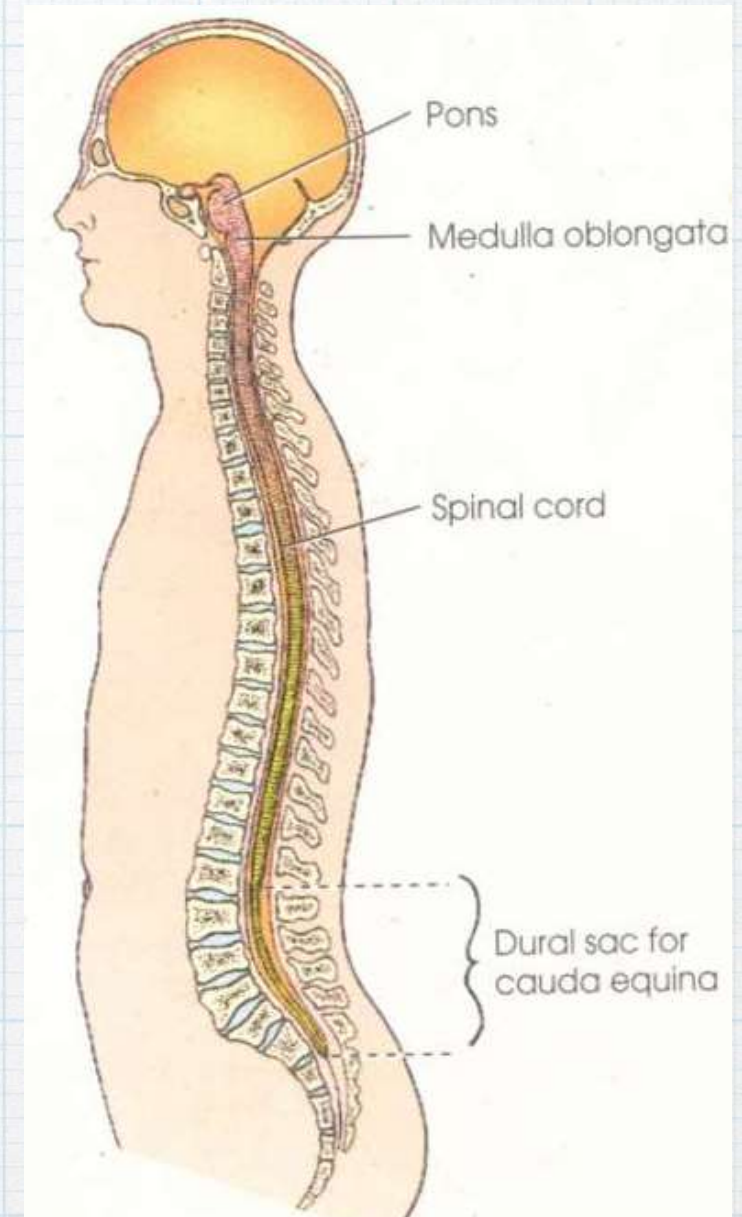
SPINAL CORD:-

* The spinal cord is a slender, elongated structure consist of

- A. An inner, grey cellular substance
- B. An outer, white fibrous substance

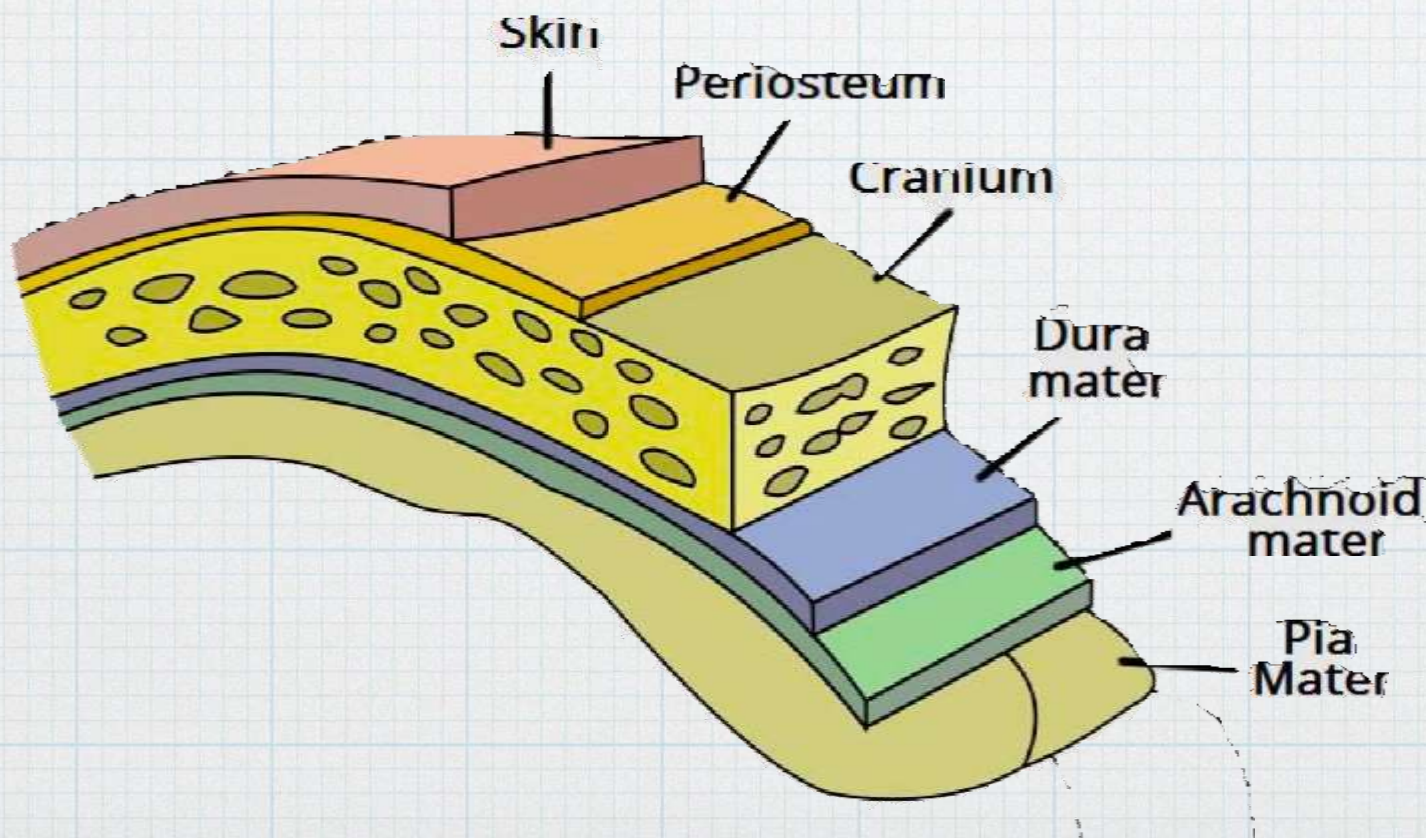
-Spinal cord extends from the brain, where it is connected to the medulla oblongata at the level of the foramen magnum to 1st & 2nd lumbar vertebra.

-The spinal cord is connected to 31 pair of spinal nerves



☞ Meninges:-

- * The brain & spinal cord are enclosed in 3 continuous, protective membrane called Meninges
- * The inner sheath is called Piamatter
- * The middle sheath is called Arachnoid matter
- * The outer sheath is called Duramatter
- * The space between piamatter & arachnoid matter is called subarachnoid space



? what is Myelogram

- * The term “**myelos**” it is a Greek word, which means marrow (spinal cord)
- * A myelogram is a radiographic study where contrast medium is injected in to spinal sub arachnoid space with the help of fluoroscope to evaluate the structural details of spinal cord, conus medullaris, nerve roots, spinal canal & abnormalities of the spinal cord
- * Usually completed within **30 to 60 minutes**



Indications:-

- ✓ Spinal cord tumours
- ✓ Cysts
- ✓ Infections
- ✓ Suspected spinal mass lesions caused by disease / trauma
- ✓ Disc lesion
- ✓ Arachnoiditis
- ✓ Spinal nerve root injury
- ✓ Fracture
- ✓ UB& bowel disturbance
- ✓ Back pain radiating to limbs
- ✓ Compression of spinal cord by a herniated disc

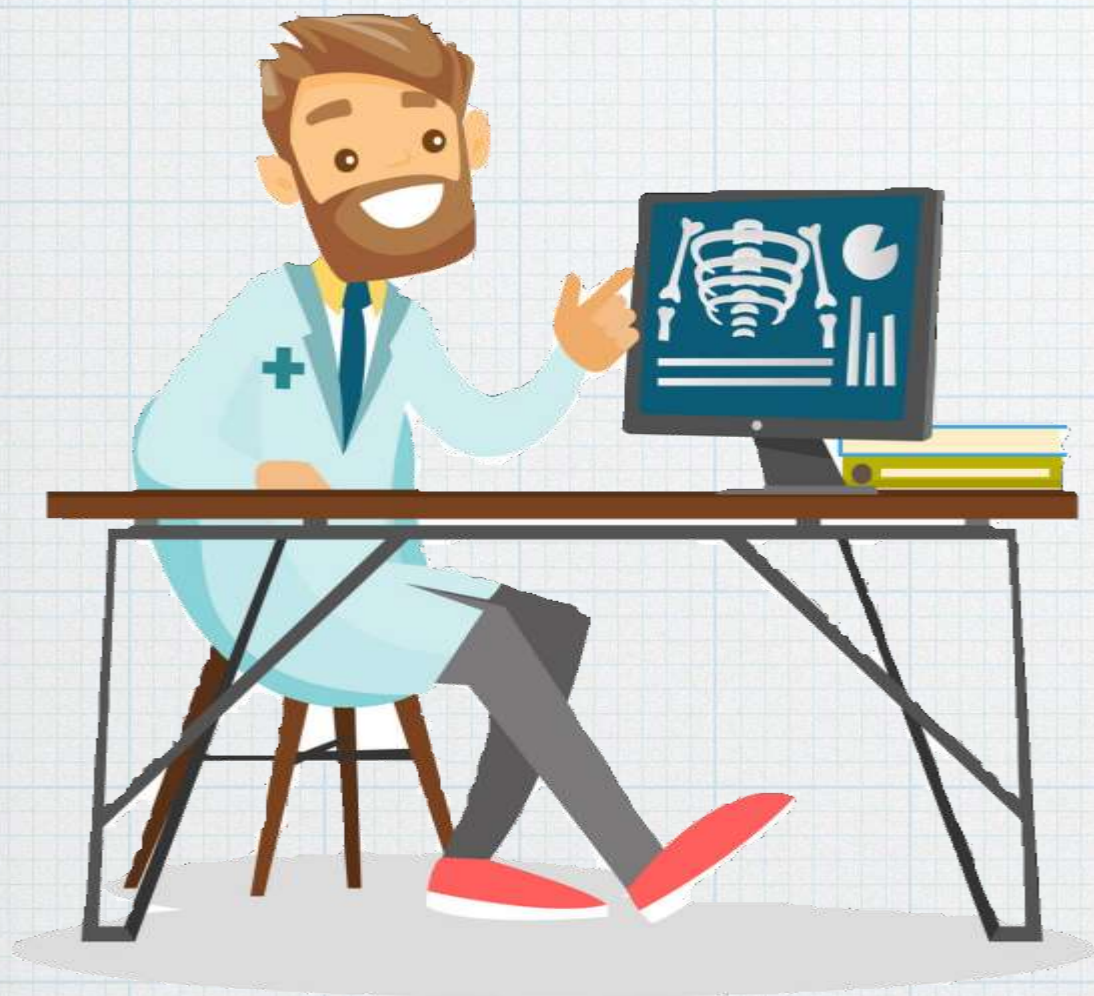
Contraindications:-

- ☒ Blood in CSF
- ☒ Increased intra cranial pressure
- ☒ Decreased platelet count / (pt)'s on anticoagulant
- ☒ Recent lumbar puncture (upto 7 days)
- ☒ Iodine sensitivity

? Who does the myelogram:-

The myelogram will be carried out by a **RADIOLOGIST**.

The radiologist is assisted by the radiographer, who is the technician who operates the x-ray machine while the procedure is carried out and the CT scan afterwards



?Where is myelogram done:-

A myelogram is usually carried out in a hospital radiology department equipped with fluoroscope and a CT scanner.

Fluoroscopy equipment is the device where the x-ray images can be watched on a TV screen as the procedure is being carried out.



Special concern:-

- * Pregnant women should not undergo this test because exposure to ionising radiation may harm the foetus
- * Myelogram is not appropriate for individuals who have increased intracranial pressure, infection at the site of the needle insertion (or) multiple sclerosis.
- * Different types of contrast dyes either oil based (or) water soluble may be used for this procedure. Oil based dyes must be withdrawn after myelogram before the needle is removed; this is not necessary with water soluble dyes which are absorbed by the body and excreted through kidneys.



- * People with allergies to iodine (or) may experience allergic reaction to iodinated or oil based contrast dyes
- * Certain dyes can increase the risk of seizures (water soluble contrast agent, such as Metrizamide)
- * People who experience “Claustrophobia” may find it difficult to undergo a CT scan, which takes place in a narrow tunnel like structure. In addition the CT scan may not be possible for severely overweight individuals (over 300lbs)

Patient preparation:-



- * Remove any metal objects or clothing that might interfere with the x-ray images
- * Injectable sedative- muscle relaxant 1hr before the examination, to reduce anxiety and relax the patient
- * Solid foods are avoided for several hrs before the exam (4hrs fasting prior to exam)
- * Plenty of oral fluids on the previous day of myelogram
- * Informed consent from the patient
- * Preparation of the site of LP Xylocaine
- * sensitivity testing.

Contrast Medium:-

* Types:-

- ▶ Oil-based
- ▶ Water soluble
- ▶ Air - contrast

* Currently:-

- ▶ Non ionic, water soluble iodine based media are used

*

- ▶ **Dosage:-** Generally 6-17ml recommended by manufacturer and varies with the medium concentration.

☞ Water soluble contrast media:-

Eg:- Iohexol - Omnipaque ; Iopamidol - Iopamiro



Injection of Contrast Medium:-

* **Where ?** In to sub arachnoid space

lumbar puncture
(L3 - L4)

Cervical puncture
(C1 - C2)

* The radiologist looks at the spine under fluoroscopy to find the best location to position the needle

* The skin cleaned, & apply the local anaesthetic

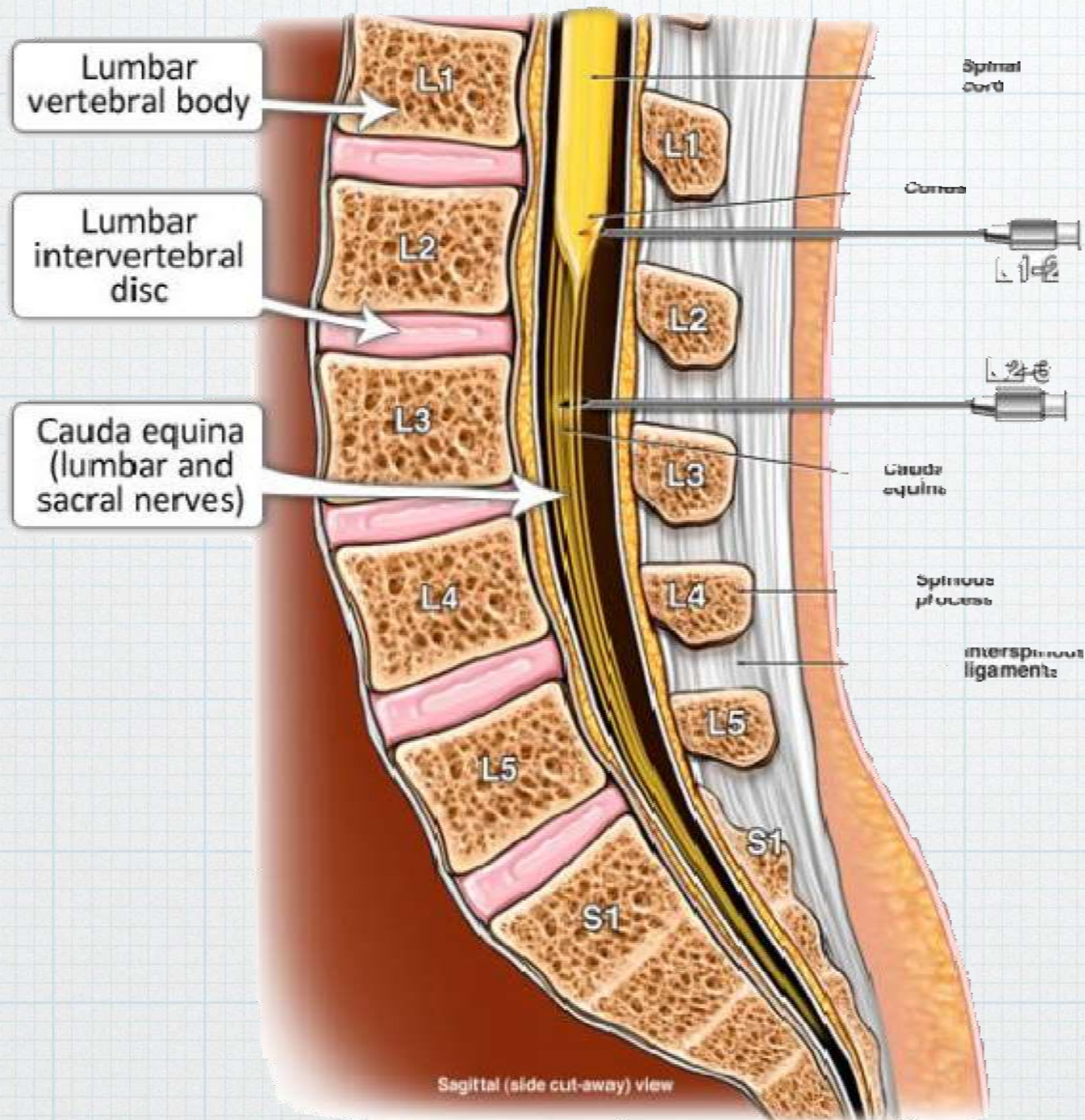
* The needle is inserted and the contrast medium is injected through in to the subarachnoid space

Before the myelogram:-

- * If iodinated dye is to be used, you may be given a combined antihistamine steroid preparation, to reduce the risk of allergic reaction.
- * Tell your doctor, if you are taking any medications
- * Tell your doctor, if you are, could be pregnant
- * Should disclose taking any medications for seizures
- * Do not smoke the day before the test
- * Do not eat or drink for at least 4hrs, before the test
- * Give an anticholinergic drug (atropin) in addition to sedative to reduce swallowing during the procedure
- * To remove clothes & metallic objects (including watch, hair clips, other jewellery) and put on a hospital gown.

*

Lumbar puncture:-



* Puncture position

- ☑ Body position for lumbar puncture
 - A. Prone position
 - B. Left lateral position with spine flexed to widen to the inter spinous space

*

* Body position for cervical puncture

1. Erect position
2. Prone position with the head flexed to open the interspinous space.

What you experienced :-

- * Needle insertion site is cleaned with an antiseptic solution & local anaesthetic agent is injected to numb area - feel brief stinging during the injection
 - * A long needle is carefully inserted in to the spinal canal (L puncture), fluoroscopy is used to guide in to the subarachnoid space,
 - * Contrast dye is injected through the needle into the spinal canal. Feel a transient flushing sensation, warmth, a headache, a salty taste or nausea after the material is injected
 - * The flow of contrast agent is followed using fluoroscopy, and active x- ray films are obtained for any abnormalities
- Once the procedure was completed, the needle should be removed
- * The puncture site cleaned with any antiseptic solution & dressing is applied
 - * The procedure usually take about 1hr

CONVENTIONAL RADIOGRAPHIC POSITIONS



LUMBAR MYELOGRAM

LUMBAR MYELOGRAM



Preliminary images:-

- * AP&lat: projections study are taken
- * Preliminary radiographs is helpful to assess the anatomy of spine
- * There is a potential danger of operating at the wrong level if this is not made explicitly clear in the report
- * A clear description of any anomaly is required, together with a statement of how the vertebrae have been numbered in the report.

Radiographic views:-

- * AP & Oblique views are obtained.
(about 25 degrees of obliquity is typical, but this should be tailored in the individual case to profile the exit sleeves of the nerve roots of the cauda equine)
- * A lateral view with horizontal beam is useful, but further laterals in the erect or semi erect position on flexion & extension add a dynamic dimension to study



AP



OBLIQUE



LATERAL

After the myelogram :-

- * If oil based contrast agent was used, must lie flat in bed upto 12hrs and your head raised at least 30degrees after the procedure.
- * If a water based dye was used, you must rest for about 6-8hrs
- * Your BP & other vital signs checked periodically & you will be monitored for signs of complications
- * You may return home, if there are no complications (or) adverse reactions, you may resume your normal diet and activities the day after the test
- * You are encouraged to drink clear fluids to avoid dehydration and helps to flush the contrast dye out of your system (if lumbar puncture was done, extra fluids helps to replace the CSF)
- * Delayed allergic reactions to the contrast dye may appear to 2-6hrs after procedure. If this occurs, your doctor will prescribe antihistamines (or) steroids to ease your discomfort.

☞ Risk & Complications:-

- * Radiation exposure is minimal, but if the test including CTscan, you will receive higher dose of radiation
- * Headache (or) soreness in the back may occur for a short time after the procedure. Rarely serious complications, such as meningitis / seizure may be developed
- * Some people may experience an allergic reaction to the iodine based contrast dye, which can cause symptoms such as nausea, sneezing, vomiting etc
- * If a lumbar puncture is performed, it carries the associated risks
- * You may experience temporary leg numbness or lower back pain



Limitations of Myelogram :-

- * Its only sees inside the spinal canal & the very proximal nerve roots. Abnormalities outside these areas may be better imaged with MRI
- * It may be difficult to inject contrast material in patients with structural defects of the spine or some forms of spinal injury
- * Myelogram is avoided during pregnancy.



**EXCELLENCE IS
A CONTINUOUS PROCESS
& NOT AN ACCIDENT**



