



“बेटी बचाओ, बेटी पढ़ाओ”

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Faculty of Physiotherapy & Diagnostics

Faculty Name- **JV'n Dr. Rency Koshy (Assistant Professor)**

Program- **BPT V**

Course Name - **Neurology**

Session No. & Name – **Lumbar puncture**

Academic Day starts with –

- Greeting with saying ‘**Namaste**’ by joining Hands together following by 2-3 Minutes Happy session, Celebrating birthday of any student of respective class and **National Anthem**.

Lecture Starts with-

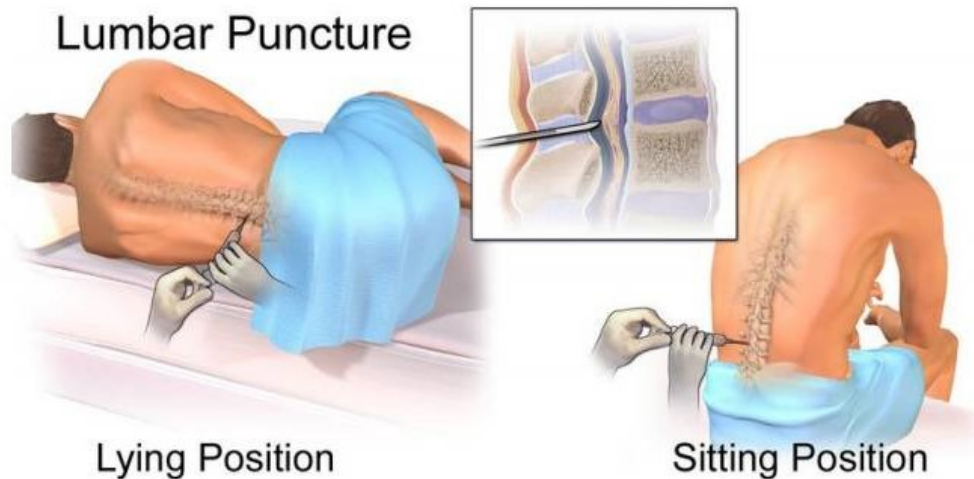
Review of previous Session- Na

Topic to be discussed today- Today We will discuss about Lumbar puncture

Introduction & Brief Discussion about the Topic

Lumbar puncture is defined as a procedure in which cerebrospinal fluid is collected and sampled from the spinal cord. Heinrich Quincke created it in the latter half of the 1800s. When diagnosing subarachnoid hemorrhage, meningitis, and other neurological illnesses, this is the gold standard diagnostic method. Additionally, it is utilized in the administration of drugs or diagnostic agents as well as the monitoring of intracranial pressure.

About 55 mm, or two thirds of the spinal needle's length, separates the epidural space from the skin. The region from which the cerebrospinal fluid (CSF) sample is taken is the subarachnoid space. A "pop" is felt when the needle advances; this usually happens as the needle passes through the ligamentum flavum.



Indications

1. There are two possible indications for lumbar punctures: diagnostic and therapeutic.
2. The diagnosis of certain disorders, including infectious (meningitis, encephalitis), inflammatory (multiple sclerosis, Guillain-Barre syndrome), oncologic, and metabolic processes, may be aided by lumbar punctures.
3. It might help with subarachnoid hemorrhage diagnosis.
4. For the intrathecal delivery of some drugs, including analgesics, chemotherapeutic medicines, and antibiotics, a lumbar puncture may also be necessary.

Contraindications

1. Using unfiltered heparin within the previous 24 hours, coagulopathies (such as hemophilia and von Willebrand disease)
2. Skin infections near or at the site of the lumbar puncture needle placement
3. Central nervous system (CNS) lesions or spinal masses causing increased intracranial pressure
4. Vertebral traumas are among the contraindications to performing a lumbar puncture

5. The following are indicators of potentially elevated intracranial pressure: altered mental status; focal neurological deficits; new-onset seizures; papilledema; immunocompromised state; malignancy; history of focal CNS disease (stroke, focal infection, tumor); concern for mass CNS lesion; and age greater than 60.

Instrumentation

1. The contents of lumbar puncture kits should contain the following:
2. A spinal needle with a stylet (20 gauge or 22 gauge), four CSF collection vials, sterile drape, manometer with three-way valve, local anesthetic, syringes with needles (usually 18 gauge to draw up anesthetic and 25 gauge to inject into the skin), disinfecting solution (0.5% chlorhexidine/70% alcohol), sterile gloves, mask with face shield, and surgical cap.
3. Using a Whitacre spinal needle—a pencil-point spinal needle—rather than a Quincke spinal needle—is advised due to its lower risk of complications. Because the Whitacre spinal needle is pencil-point and considered an atraumatic needle, the skin must be punctured before the needle is inserted.

Patient Preparation

1. Start by determining whether the process can't be performed in any circumstances.
2. Before doing a lumbar puncture, review the head CT indications (LP). Before doing a lumbar puncture, review the head CT indications (LP).
3. It may be necessary to place the patient in a sitting or lateral recumbent position.
4. The lateral recumbent position is recommended because it lowers the risk of headaches during lumbar puncture and enables an accurate assessment of opening pressure.
5. The fetal posture, which requires the patient to flex their spine, should be taught to them. Giving the patient instructions to stretch their back "like a cat" can be beneficial.
6. This makes it easier to insert the needle because it widens the area between the spinous processes.
7. When sitting, the lumbar spine is supposed to be perpendicular to the table; when lying down, it should be parallel to the table to assist with keep the needle close to the midline during insertion.

8. The optimal location for the spinal needle to be inserted is either between L3 and L4 or in the interspinous region between L4 and L5.
9. By using these landmarks, you can prevent unintentional harm to the conus medullaris, which ends at L1.
10. To find the best place to implant the needle, one palpates landmarks around the patient's back.
11. A line should be drawn between the superior aspects of the iliac crests.
12. This line is referred to as the intercrystal line or Tuffier line. This line typically intersects the spine along the L4 spinous process; however, this should only serve as a general reference as there are anatomical variations from person to person.
13. The intercrystal line may intersect at a higher level than L4 if the patient is female or obese.
14. Palpate the landmarks before cleaning the skin are and before administration of local anesthesia.
15. Once the interspinous space is palpated, use a skin marking pen to mark the area of needle insertion.
16. It is thought that the lumbar puncture is an aseptic procedure. Put on sterile gloves and a gown, and use a disinfectant to clean the area.
17. Starting at the location where the needle was inserted and working your way outward, apply the cleaning solution in a widening, concentric circular motion to the skin.
18. Let the spot that was cleaned dry. Cover the space with sterile curtains.
19. Sort and label CSF collection vials based on the order in which they should be prepared.
20. Use a local anesthetic on the needle insertion site after the area has been cleaned and covered. Before administering a local anesthetic, it is crucial to mark the area where the needle will be inserted because failing to do so could cause landmarks to disappear.

Techniques

1. Prior to inserting the spinal needle, re-identify the anatomical landmarks.
2. The stylet should be in position when the spinal needle is introduced, and the bevel should be in the sagittal plane.

3. The patient is in the lateral decubitus posture, the level should be toward the ceiling. When placing the needle along the superior aspect of the L5 spinous process, one should do it in the L4-L5 interspace. It is recommended to insert the needle at a roughly 15-degree angle.
4. Visualizing the needle being aimed at the patient's umbilicus could be beneficial. Smoothly inserting the needle in a single direction is recommended.
5. There can be a "popping" sound when the material passes through the ligamentum flavum due to slight resistance. To check for any CSF fluid draining, advance the needle after crossing the ligamentum flavum in increments of 2 mm each time the stylet is removed.
6. The ligamentum flavum will be reached after inserting a typical Whitacre spinal needle about two thirds of the way.
7. Take out the needle and reposition it to the subcutaneous tissue avoid breaking the skin if a bone is found or no CSF fluid is retrieved.
8. Redirecting the needle while it is put past the subcutaneous tissue increases the likelihood of a lumbar puncture that is not pleasant.
9. If there is a significant amount of blood in the needle, it could clog. Replace the spinal needle at a different location if this happens. An alternative site may be employed if the first needle insertion location is not able to provide CSF.
10. If the standard medial approach fails, a another method called the paramedian approach can be utilized to access the subarachnoid area.
11. The usual L4 marker is located 1 cm lateral and inferior to the needle insertion position.
12. The needle will be inserted with an angle of 15 degrees medially and cephalad, and it will be progressed until CSF is obtained.
13. As soon as the needle enters the subarachnoid area, CSF fluid begins to flow.
14. Assure that your client is in the lateral decubitus posture before applying any opening pressure
15. With a flexible connector, join the spinal needle and the manometer.
16. Permit the manometer's CSF fluid level to increase. Note the point at which the CSF fluid ceases to rise. There can be pulsatile fluctuations in the patient's breathing.

17. The typical opening pressure is in the range of 6 to 25 cm of water.
18. Disconnect the tube once the opening pressure has been measured and recorded.
19. Permit the CSF to passively flow into the collection vials from the needle hub.
20. Avoid aspirating the CSF liquid. For the majority of standard diagnostic investigations, gather roughly 1 milliliter each collection vial.
21. Replace the stylet in the spinal needle and take out the needle once the CSF fluid samples have been collected. Sterile gauze should be gently applied to the region where the needle was placed. Put a tiny bandage over the affected region.
22. All sharps should be disposed away in the proper containers.
23. Replace the stylet in the spinal needle and take out the needle once the CSF fluid samples have been collected. Sterile gauze should be gently applied to the region where the needle was placed. Put a tiny bandage over the affected region.
24. All sharps should be disposed away in the proper containers.
 - University Library Reference-
 - Suggestions to secure good marks to answer in exam-
 - Explain answer with key point answers
 - Questions to check understanding level of students-
 - i. What is lumbar puncture used for?
 - ii. Write the indication and contraindications of lumbar puncture?
 - iii. Write about the patient preparation of lumbar puncture?
 - iv. Write about the technique used for lumbar puncture?
 - Small Discussion About Next Topic-CT scan
 - Academic Day ends with-

National song' Vande Mataram'