

Lumbar Puncture (LP)

Introduction:

Lumbar puncture is a procedure in which a spinal needle is inserted into the lumbar subarachnoid space to obtain CSF for diagnostic or therapeutic purposes.

Indications:

- Cerebrospinal fluid (CSF) evaluation:
 - Meningitis
 - Subarachnoid hemorrhage
 - Neoplastic disease
- CSF drainage:
 - CSF leak
 - Pseudotumor cerebri
 - Communicating hydrocephalus
- Intracranial pressure measurement:
 - Communicating hydrocephalus
 - Pseudotumor cerebri
- Intrathecal drug administration:
 - Radiopaque contrast
 - Antibiotics
 - Antineoplastic chemotherapy

Contraindications:

- All patient should receive intracranial imaging (computed tomography [CT] or magnetic resonance [MRI]) to rule out an intracranial mass lesion prior to lumbar puncture
- Non communicating hydrocephalus
- Intracranial mass (tumor, abscess, hematoma)
- Coagulopathy
- Cellulitis at intended puncture site
- Complete spinal block above tap site
- Tethered cord syndrome
- Clinical signs of herniation

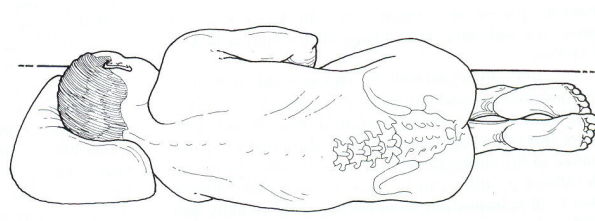
Equipment:

- Sterile prep solution
- Sterile gloves and towels

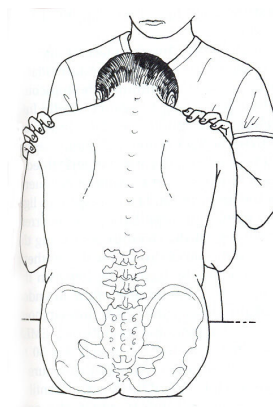
- Betadine
- Spinal needle with stylet
- CSF collection vials
- Manometer with stopcock
- 4 × 4 gauze pads
- Lidocaine (0.5%, 1.0% or 2.0%)

Position:

Lateral: Patient is placed in the lateral decubitus with knees and chin tucked into the chest. This position is favored for accurate measurement of intracranial pressure

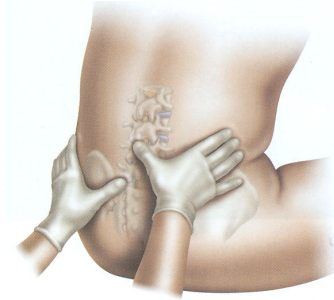


Sitting: Patient sits on the side of a bed, flexed forward over a pillow for support. Intracranial pressure cannot be measured in this position. This position is superior for obese patient.

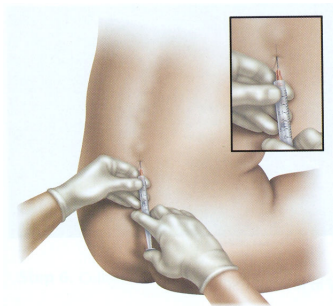


Technique:

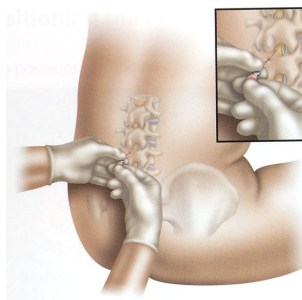
1. Place the patient in the lateral decubitus or seated upright position.
2. Flex the patient to increase the intervertebral spaces.
3. Identify the third to fourth lumbar intervertebral space. To find a safe intervertebral space, first locate the iliac crests. At the level of the crests, palpate the spinous processes and locate the intervertebral space at this level.



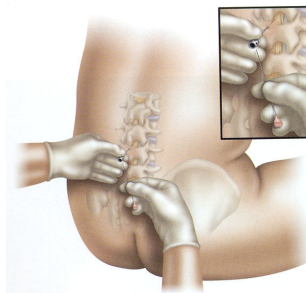
4. Anesthetize the skin and subcutaneous tissues with 25-gauge needle at the injection site.



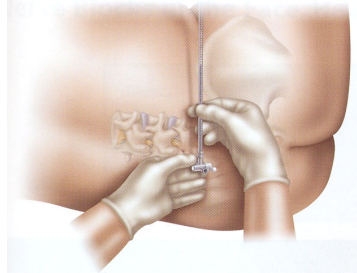
5. Insert the spinal needle into the interspace in the midline and directed slightly cephalad.



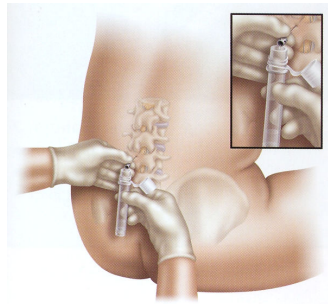
6. Advance the needle slowly removing the stylet frequently to look for CSF.



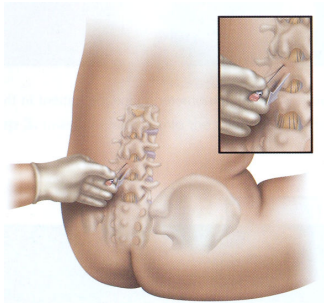
7. Once CSF is seen in the needle, read the opening pressure with the manometer.
Place the patient in the lateral decubitus position for this measurement.



8. Collect CSF for laboratory analysis (approximately 1 cc in each tube).



9. Replace the stylet and withdraw both needle and stylet.



10. Place an adhesive bandage over the puncture site.

Complications:

- Spinal, subdural, epidural, or subarachnoid hematoma
 - Tonsillar herniation
 - post-lumbar puncture headache
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- Nerve root injury
 - Aortic / arterial puncture
 - Soft tissue infection
 - Meningitis or spinal abscess formation
 - Arachnoiditis

Checklist for Lumbar puncture

1. Checks patient's name and hospital number
2. Gathers equipments
3. Greets and introduces oneself to patient
4. Explains procedure to patient
5. Washes hands
6. Corrects position of the patient
7. Wears gloves and gown
8. Preps and drapes site of LP
9. Numbs the site of LP
10. Selects correctly the site of LP
11. Estimates CSF pressure with manometer
12. Collects the CSF in four tubes
13. Replaces the stylet , and removes the needle
14. Places an adhesive bandage over the puncture site
15. Explains probably complication to the patient
16. Thanks and listens to patient's questions
17. Writes requisitions and sends the samples to the laboratory center