



Lumbar Puncture

The indications of a lumbar puncture may fall into several different categories. These indications include

- to aid in the diagnosis of central nervous system (CNS) infections, such as meningitis or encephalitis, or to aid in the diagnosis of congenital infections, such as herpes simplex, rubella, and cytomegalovirus as well as other bacterial and fungal infections
- to monitor the efficacy of antimicrobial therapy in the presence of CNS infections
- to aid in the diagnosis of metabolic diseases
- to provide a route for the administration of medications
- to decrease volume of cerebral spinal fluid (CSF) inside the ventricles.

Contraindications for the procedure include increased intracranial pressure due to the risk of CNS herniation, presence of known bleeding abnormalities or low platelet counts, current infection near the site of the injection for the procedure, and lumbosacral abnormalities.

Precautions

- The infant should have ongoing cardiorespiratory monitoring, including oxygen saturations, during the procedure. Airway compromise can be an issue because of the positioning of the infant for the procedure. This can be reduced by avoiding fully flexed lateral position and direct flexion of the neck. Supplemental oxygen administration may assist in avoiding hypoxia. Lastly, flexing the hips only to a 90-degree angle may avoid abdominal compression and the potential for aspiration.
- Strict aseptic technique should be employed.
- Always use a needle with a stylet to avoid development of intraspinal epidermoid tumor. Do *not* use a butterfly needle for the procedure.
- Never aspirate the spinal fluid with a syringe. Allow the specimen collection to occur by gravity to avoid the increased risk for a subdural hemorrhage or herniation.

Procedure Considerations

Consider offering the infant preprocedural pain measures such as 24% sucrose solution, swaddling that doesn't

interfere with procedure site or sterile field, and use of a pacifier if appropriate to the infant's condition. EMLA cream also is a consideration for older infants or premature infants with mature skin.

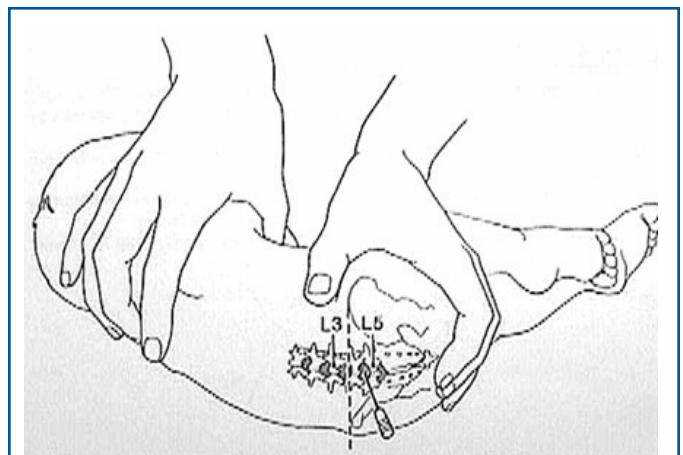
The lateral decubitis or sitting position is appropriate as long as there is good spine flexion. The assistant should avoid flexion of the neck to avoid the chance of airway compromise.

The CSF is generally collected in the tubes in the following order to be sent for testing:

- Tube 1. Gram stain, bacterial culture and sensitivity.
- Tube 2. Glucose and protein levels.
- Tube 3. Cell count and differential
- Tube 4 (optional). Rapid antigen testing for specific pathogen or polymerase chain reaction (PCR).

Complications

In neonates, a common complication is transient hypoxemia from positioning during the procedure as mentioned above. Other potential complications include contamination of CSF specimen with blood, infection (bacteremia, vertebral body osteomyelitis, spinal cord, or epidural abscess), intraspinal epidermoid tumor from lack of use of stylet, spinal cord or nerve damage if performed



Positioning and landmark used for lumbar puncture. The iliac crest (dotted line) marks the approximate level of L4. Reproduced with permission from Pediatrics, Vol. 128, Copyright ©2018 by the AAP.



above L4, bleeding or hematoma at site, CSF leakage into epidural space, and pain.

Bibliography

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Lumbar Puncture: Information for Parents

A lumbar puncture, also known as a “spinal tap,” is a procedure your baby needs in which cerebral spinal fluid (CSF) will be collected. CSF is the colorless liquid that is contained in your infant’s back (spine) and around their brain and acts as a “cushion” to the brain and spinal cord. In a lumbar puncture, this fluid is carefully collected with a needle inserted into your baby’s back (much like an epidural for moms in labor) and will be sent for testing.

Common reasons that a lumbar puncture may be indicated for your child

- to help determine if your baby has an infection in the spinal fluid (meningitis)
- to remove excessive spinal fluid buildup when certain conditions are present.

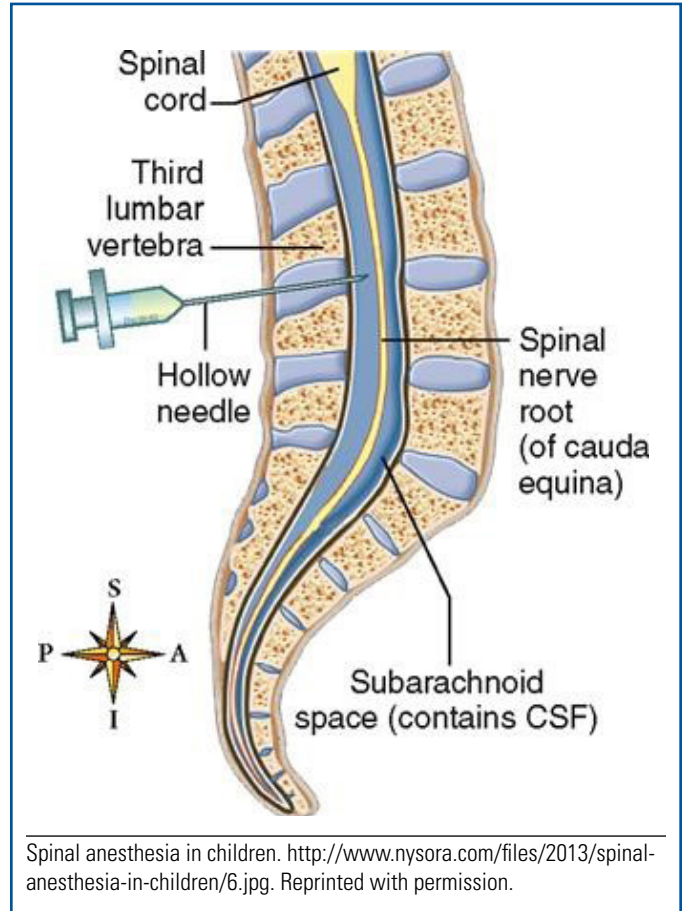
Procedure

In most instances, after your provider has discussed the need for the procedure and has explained the risks and benefits, you will need to complete a consent form. Before doing a lumbar puncture, a numbing cream may be applied to the area of the spine where the lumbar puncture will take place. Sometimes, the provider may use a local anesthetic to numb the site on your baby’s back. Other comfort measures can be done for your baby during the procedure, such as offering a sucrose pacifier. A hollow needle is then inserted between the bones (called the vertebrae) of your baby’s back. A sample of the CSF is collected through the needle and sent for testing. A small dressing will be used to cover the site where the needle was inserted.

Risks and Benefits

The information obtained from the fluid testing can give life-saving and diagnostic information to your healthcare team. There are a few risks, which include

- infection where the needle was inserted in to the back
- bleeding into the spinal canal or leakage of fluid from the spinal canal
- injury to the spinal cord itself (very rare).



If your baby requires a lumbar puncture, don’t be afraid to ask questions. Try to remind yourself that the procedure is necessary to make an accurate diagnosis and provide the best possible treatment for your baby. In some cases, a lumbar puncture is the only way to gain information on the nature of your baby’s illness.