

2.07 LUMBAR PUNCTURE

Introduction

Lumbar puncture (also called “spinal tap”) is a common procedure that involves obtaining cerebral spinal fluid via needle from the spinal canal. It is generally performed for diagnostic purposes, most often to assess for central nervous system infections, including meningitis. Other indications include the evaluation of idiopathic intracranial hypertension (IIH), altered mental status or neurologic deterioration, subarachnoid hemorrhage, and demyelinating diseases such as Guillain Barré. Lumbar puncture may also be performed for therapeutic purposes, including management of IIH or administration of intrathecal medications. A lumbar puncture often elicits great concern from both patients and the family/caregivers due to concerns of pain and a misunderstanding of risk to the spinal cord. Adequate discussion with patients and the family/caregivers and appropriate use of topical anesthesia, anxiolysis, or sedation can create the environment needed for a successful procedure. Pediatric hospitalists frequently encounter patients requiring lumbar puncture and should be adept at performing lumbar puncture in all appropriately selected pediatric patients.

Knowledge

Pediatric hospitalists should be able to:

- List the indications for lumbar puncture, such as confirmation of pleocytosis or pathogen, therapeutic removal of fluid, assessment of response to treatment, performance of neurometabolic studies, and others.
- Review the basic anatomy of the spine and spinal column.
- List the indications for obtaining an imaging study of the brain or spinal cord prior to performing a lumbar puncture.
- Describe the relative contraindications to lumbar puncture, such as pre-existing ventriculoperitoneal shunt, previous spinal surgeries, and others, and discuss the options for safely obtaining cerebrospinal fluid in these patients.
- List the absolute contraindications to lumbar puncture, such as increased intracranial pressure, unstable cardiorespiratory status, unstable coagulopathies, and others.
- Describe the risks and complications of lumbar puncture attending to infection, bleeding, nerve injury, pain, post-procedure headache, and others.
- Summarize factors that may increase risk for complications, including age, disease process, and anatomy.
- Review the steps in performing a lumbar puncture, attending to aspects such as infection control, patient identification, positioning options, monitoring, presence of the family/caregivers, and others.
- Discuss the roles of each member of the healthcare team during lumbar puncture, attending to responsibility for performing proper level of monitoring to maximize safety, timeout, documentation, specimen labeling and transport to the laboratory, and communication with patients and the family/caregivers.

Skills

Pediatric hospitalists should be able to:

- Perform a pre-procedural evaluation to determine risks and benefits of lumbar puncture.
- Obtain informed consent from the family/caregivers.
- Order and ensure proper performance of procedural sedation if indicated, including assurance of adequate staff presence for both the lumbar puncture and the sedation.
- Demonstrate proficiency in performance of lumbar puncture on infants, children, and adolescents.
- Identify the need for and efficiently offer education to healthcare providers on proper techniques for holding and calming patients before, during, and after lumbar puncture attempts.
- Adhere to infection control practices.
- Order appropriate monitoring and correctly interpret monitor data.
- Identify complications and respond with appropriate actions.
- Use the pressure manometer as appropriate.
- Identify the need for and efficiently access appropriate consultants and support services for assistance with pain management, sedation, and performance of a lumbar puncture, as indicated.

Attitudes

Pediatric hospitalists should be able to:

- Appreciate the importance of working collaboratively with hospital staff and subspecialists to ensure coordinated planning and performance of lumbar punctures.
- Realize the importance of effective communication with patients and the family/caregivers regarding the indications for, risks, benefits, and steps of the procedure.
- Role model and advocate for strict adherence to infection control practices.

Systems Organization and Improvement

In order to improve efficiency and quality within their organizations, pediatric hospitalists should:

- Lead, coordinate, or participate in the development and implementation of cost-effective, safe, evidence-based procedures and policies for performance of lumbar punctures for children.
- Work with hospital administration, hospital staff, and others to develop and implement standardized documentation tools for the procedure.
- Lead, coordinate, or participate in the development and implementation of a system for review of family/caregiver and healthcare provider satisfaction into procedural strategies.
- Lead, coordinate, or participate in the development and implementation of educational initiatives designed to teach the proper technique for lumbar puncture to trainees and other healthcare providers.

References

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2. Baxter AL, Fisher RG, Burke BL, Goldblatt SS, Isaacman DJ, Lawson ML. Local anesthetic and stylet styles: factors associated with resident lumbar puncture success. *Pediatrics*. 2006;117(3):876-881. <https://doi.org/10.1016/j.soard.2015.10.071>.
 3. Schulga P, Grattan R, Napier C, Babiker MOE. How to use... lumbar puncture in children. *Arch Dis Child Educ Pract Ed*. 2015;100(5):264-271. <https://doi.org/10.1136/archdischild-2014-307600>.