

Lumbar Puncture Guideline

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This is the most current version and should be used until a revised document is in place		

Key Amendments

Date	Amendment	Approved by
19 th Nov 2020	Document extended for 1 year	Paediatric QIM/Dr J West
26 th March 2021	Approved with no amendments	Paediatric QIM
9 th March 2024	Document reviewed and amended: <ul style="list-style-type: none"> • Changes as per NICE NG143 • Consent change • Chloraprep • Removal of proforma and mentions • Removal of phone number/bleep • Inclusion of transfer to lab (porters) 	Paediatric Governance Meeting

Performing a diagnostic lumbar puncture is a very common and important skill in both paediatric and neonatal practice. The first lumbar puncture was performed by Heinrich Irenäus Quinke, a German specialist in Internal Medicine in 1891, on a 1 year 9 month of child with suspected tubercular meningitis ¹. Our practical technique has changed little since the first description.

Indications:

CSF analysis can aid diagnosis of a variety of infective, inflammatory, metabolic and genetic nervous system disorders. It can also be used to measure and for therapeutic treatment of raised intracranial pressure.

NICE guidelines recommend that all children with suspected meningitis should undergo a lumbar puncture, in the absence of contraindications³. In addition, it should be considered in infants younger than 1 month with a fever or younger than 3 months with a fever who appear unwell or have a WCC <5 or >15 ⁴. Ideally this should be performed prior to administration of parenteral antibiotics.

Contraindications:

Contraindication must be considered prior to performing lumbar puncture taking into account the entire clinical picture.

If performing a lumbar puncture is contraindicated, do not allow this to delay the administration of parenteral antibiotics.^{2,3}

Preparation:

- Lumbar puncture needle (safe non-luer lock needle, gauge 22-24, 25G x 25mm for the pre-term neonates)
- Sterile towel, gauze and galipot (sterile wound pack if available)
- 0.5% Chlorhexidine solution or ChloraPrep 2% applicator
- Sterile gloves x2
- Apron
- Hibiscrub/Soap
- 2x Assistants
- Containers/Bottles:
 - 3x Universal containers (labelled 1,2,3) + 4th container for viral PCRs or other studies
 - 1x fluoride bottle (yellow)
 - Specific bottles/containers as needed
- Manometer (if measuring intracranial pressure)
- Obtain bedside blood sugar reading prior to procedure in suspected infection
- Consider the need for oral sedation, sucrose(in neonates), local anaesthetic (topical or subcutaneous) and analgesia especially in older children

Consent:

Verbal consent from patient/parents/guardian is needed to perform a lumbar puncture.

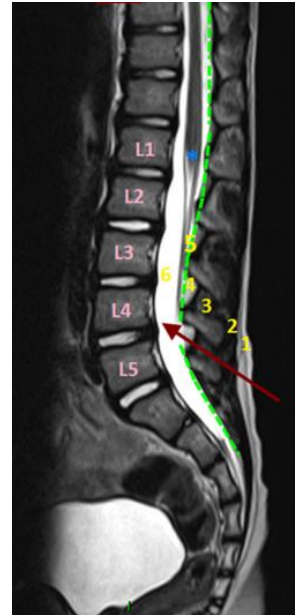
Points to discuss –

- What is a lumbar puncture
- Indication
- How it is performed
- When results will be available
- Complications – failure of procedure, pain, infection, bleeding, headache

If oral sedation is needed, you will need to obtain written consent.

Technical Background:

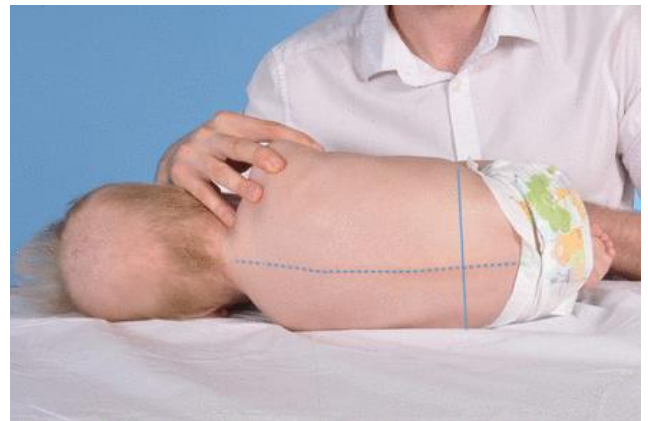
- The lumbar region is the safest location to obtain a CSF sample.
- The spinal cord terminates around L1-2, whereas the subarachnoid space extends to the lower border of S2. In neonates the spinal cord may reach L3.
- Therefore a lumbar puncture should be attempted between L3-5².
- Distance from skin to subarachnoid space increases with weight and is estimated using the formula²:
- $\text{Depth (mm)} = 0.4 \times \text{weight} + 20$.



Patient Position:

Left Lateral Position:

- For children, the left lateral position, with hips fully flexed is recommended. This reverses the natural lumbar lordosis, opening the spaces between spinous processes and their adjacent laminae².
- Ensure hips are fully flexed.
- Locate Tuffier's line (joins the most superior aspects of both iliac crest, crossing the midline over L4 spinous process). A space inferior to this is safe for performing an LP.²



Sitting Position:

- A recent study suggests a sitting position with legs flexed at the hip should be considered for neonatal LP, as this maximises the interspinous space and causes less hypoxaemia.



Procedure:

1. Wash hands
2. Apply 2x pairs of sterile gloves and apron
3. Place sterile towels to maintain your sterile field
4. Clean the area using 0.5% Chlorhexidine or Chloraprep 2.5% applicator
5. Remove top pair of gloves
6. Insert the LP needle – below vertebrae towards umbilicus
7. Remove the stylet
8. A minimum of 6 drops is needed in each universal container - liaise with lab for more specialist tests
9. Re-insert stylet and remove needle
10. Apply dressing for 24 hours

Post Procedure:

- Document procedure in the patients clinical notes
- For suspected meningitis –
 - Microbiology – Sent bottle 1 + 3 for MC+S (consider sending a 4th bottle if virology is required)
 - Biochemistry – Send bottle 2 + yellow bottle for protein and glucose
- Contact the biochemistry lab and inform them of incoming sample
- Contact on-call micro technician (out of hours via switchboard) and document their name
- Contact porters to deliver samples to the lab
- Inform parents that the procedure is complete and when you expect to receive the results

References:

1. Pearce, J, M. Walter Essex Wynter, Quincke, and lumbar puncture. Journal of Neurology, Neurosurgery and Psychiatry. 1994 Feb, 57(2):179
2. P Schulga, R Grattan, C Napier, M Babiker. Now To Use... Lumbar Puncture in Children. ABC Education and Practice. BMJ Journals. June 2015. Volume 100, Issue 5.
3. Meningitis (bacteria) and Meningococcal Septicaemia in under 16s: Recognition, Diagnosis and Management. NICE Guidelines CG102.
4. Fever in under 5s: Assessment and Initial Management. NICE Guidelines NG143.
5. C Hart, A Thompson, P Moriarty. Is the lateral decubitus position best for successful paediatric lumbar puncture? Arch Dis Child 2016;101:774-777