

## Lumbar Puncture in Neonatal Intensive Care Unit

### Procedure Responsibilities and Authorisation

<b>Department Responsible for Procedure</b>	Newborn Intensive Care Unit (NICU)
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<b>Target Audience</b>	NICU staff
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### Procedure Review History

Version	Updated by	Date Updated	Summary of Changes
1	Lee-Anne Gray	July 2002	Nursing procedure developed in 2002
2	Tricia Ho	Oct 2009	Updating an existing procedure
3	Joyce Mok	April 2013	3-yearly update
4	Joyce Mok	Sept 2016	3-yearly update
5	Richard Pagdanganan	Dec 2019	3-yearly update
6	Vicki Macdonell	November 2022	3-yearly update Name change, Added medical procedure and changed to combined medical/nursing guideline

## Lumbar Puncture in Neonatal Intensive Care Unit

### 1 Overview

#### 1.1 Purpose

To obtain cerebrospinal fluid (CSF) for diagnostic purposes, or to relieve pressure within the skull. It is performed by medical staff (Registrar/Nurse Practitioner/Clinical Nurse Specialist/Senior Medical Officer) using aseptic technique.

#### 1.2 Scope

Te Whatu Ora Waikato nursing and medical staff working in NICU.

#### 1.3 Patient / client group

Babies and infants in NICU.

#### 1.4 Contraindications

- Coma: absent or non-purposeful response to painful stimulus.
- Signs of raised intracranial pressure: e.g. drowsy, diplopia, abnormal pupillary responses, unilateral or bilateral motor posturing or papilloedema (NB papilloedema is an unreliable and late sign of raised Intracranial Pressure (ICP) in meningitis; a bulging fontanelle in the absence of other signs of raised ICP, is not a contraindication).
- Cardiovascular compromise/ shock
- Respiratory compromise
- Focal neurological signs or seizures
- Recent seizures (within 30 minutes or not regained normal conscious level afterwards).
- Coagulopathy/thrombocytopenia
- Local infection (in the area where an LP would be performed)
- The febrile child with purpura where meningococcal infection is suspected.

#### 1.5 Definitions

<b>CSF</b>	Cerebrospinal Fluid is clear, colourless liquid found in your brain and spinal cord.
<b>Lumbar Puncture (LP)</b>	The introduction of a hollow needle and stylet into the subarachnoid space of the lumbar part of the spinal cord. It may be performed as part of the initial work up of a sick baby, or later in the course of an illness once the patient has stabilised if there were initial contraindications. It is preferable to obtain a CSF specimen prior to antibiotic administration; however this should not be unduly delayed in a baby with signs of meningitis or sepsis.

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### 2 Clinical Management

#### 2.1 Competency required

- Registered Nurse who has completed Level 3 or Level 2 orientation
- Medical staff with experience or under supervision

#### 2.2 Equipment

- Trolley, cleaned and dried
- Sterile dressing pack
- 21 gauge spinal needle
- Three collection tubes (pre-labelled 1,2 & 3)
- Aqueous alcohol-free chlorhexidine solution (in medicine room)
- Extra gauze swabs
- Opsite/Tegaderm to secure dressing
- Opsite spray
- Sterile gloves
- Sterile gown pack
- Masks
- Blood sugar tube

#### 2.3 Procedure

##### 2.3.1 Preparations

- Identify the infant.
- Medical staff explains to parent(s) and obtains informed consent to ensure parent(s) are aware of the indication for the procedure and management of their baby.
- Provide screens for privacy.
- Ensure adequate lightning.
- Adjust height of incubator to prevent caregiver back strain.
- Staff assisting and performing LP must wear masks.
- Perform hand hygiene
- **Check blood sugar before or immediately following LP**, for comparison against blood sugar level in CSF (marked difference suggests infection).
- Consider use of sucrose ([Sucrose Oral Liquid for Analgesia in Neonates and Infants](#) Ref 2905), intranasal Midazolam ([Midazolam for neonates](#) Ref 2939) or a bolus of

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Fentanyl ([Fentanyl for neonates](#) Ref 2916) to provide adequate pain relief, check with medical staff.

- Perform hand hygiene.
- Open up dressing pack onto cleaned trolley and place all sterile equipment on sterile field.

### 2.3.2 Positioning of infant

- Prepare infant and position infant on side (or sitting upright, not NICU usual practice). Hold infant securely in a curved position which ensures a flexed position.
- A flexed position ensures the spine is curved, thus widens the vertebrae and facilitates the insertion of the needle
- Avoid extreme flexion during positioning to prevent iatrogenic vertebral body compression.



Image 1: Positioning of Infant for Lumbar Puncture

#### Note:

Many infants requiring lumbar punctures are very ill and to position them with an exaggerated curving of their back may obstruct their airway. Care must be taken and a reduction in the degree of the flexion to ensure a patent airway at all times.

- Lie the infant on his/her side and have his/her back positioned close to the edge of the mattress to provide easier access during the procedure.
- Hold the infant firmly throughout the procedure and ensure infant remains as still as possible to minimise discomfort and trauma, and prevent accident needle displacement.

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### 2.3.3 Observations during LP

- Watch closely for signs of reactions to the procedure such as apnoea, obstructed airway, increased pulse rate, desaturations, pallor and neurologic status.
- Ensure an aseptic technique is used throughout.

### 2.3.4 Procedure of LP and Collection of CSF

- Medical staff will perform procedure under sterile conditions
- Medical staff will collect CSF for laboratory analysis. (CSF is normally under slight pressure so should drip out without any need for suction).
- Ensure specimens are collected (approximately 5-10 drops in each container) in correct sequence.
- Ensure specimen is securely capped and label correctly.
- Send to laboratory promptly for cell count, glucose and protein, should also have biofire PCR requested
- Document procedure in clinical notes

### 2.3.5 Observation after LP

- Apply small dry gauze dressing to puncture site and secure dressing with Opsite/Tegaderm.
- Reposition infant comfortably.
- Check puncture site for redness, swelling or oozing during cares time, e.g. 3-4 hourly for the first 24 hours. Ensure dressing removed after 24 hours.
- Observe and record vital signs 1-2 hourly, as required according to baby's condition.
- Observe baby for signs of pain/discomfort/irritability – may indicate headache. Report to medical staff.
- Remove equipment and rubbish and dispose into appropriate container.
- Perform hand hygiene.
- Record details of procedure and infant's response in the clinical notes.

## 3 Audit

### 3.1 Indicators

- Informed consent from parents/caregiver is obtained prior to the procedures (and documented)
- A blood sugar level is measured prior and post a lumbar puncture
- There is documentation to evidence physiological investigations are undertaken according 2.3.3 & 2.3.5

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### 4 Evidence base

#### 4.1 References

- Adigun, O. & Aldahir, M. (2018). Anatmoy, head, neck and cerebrospinal fluid. Retrieved on November 20, 2019 from <https://www.ncbi.nlm.nih.gov/books/NBK459286/>
- Royal Children’s Hospital (2019). Lumbar Puncture. Retrieved on November 20, 2019 from [https://www.rch.org.au/clinicalguide/guideline\\_index/Lumbar\\_puncture/](https://www.rch.org.au/clinicalguide/guideline_index/Lumbar_puncture/)
- Wolters Kluwer Health (2018). Lumbar puncture, assisting, paediatric. Retrieved on November 20, 2019 from <https://procedures.lww.com/lnp/view.do?pld=729359>
- Safer care Victoria, Lumbar Puncture for Neonates 2021, <https://www.neonatal.ehandbook@safercarevic.gov.au>
- Lippincott procedures
  - Lumber puncture, paediatric (Advanced practice) <https://procedures.lww.com/lnp/view.do?pld=3872834&hits=puncture,lumbar&a=false&ad=false&q=lumbar%20puncture>
  - Lumbar puncture, paediatric assisting, paediatric <https://procedures.lww.com/lnp/view.do?pld=729359&hits=puncture,lumbar&a=false&ad=false&q=lumbar%20puncture>

#### 4.2 Associated Te Whatu Ora Waikato Documents

- [Fentanyl for neonates](#) Ref 2916
- [Midazolam for neonates](#) Ref 2939
- [Neonatal Pain and Sedation - Assessment and Nursing Management](#) guideline Ref 1684
- [Sucrose Oral Liquid for Analgesia in Neonates and Infants](#) Ref 2905

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