STANDARD OPERATING PROCEDURE

Lumbar Puncture Procedure

Special Region (1)

Union of Myanmar

Version: 1.0

Effective Date: March 2026

Review Date: March 2028

Approved by: Internal Medicine

1. Purpose

To provide a standardized protocol for performing lumbar puncture (LP) safely for diagnostic or therapeutic purposes in SR-1 hospitals. The SOP aims to ensure patient safety, reduce complications, and standardize CSF collection and handling.

2. Scope

This SOP applies to physicians, fellows, and medical officers.

3. Definition

Lumbar puncture is a sterile procedure in which a needle is inserted into the subarachnoid space of the lumbar spine to obtain cerebrospinal fluid (CSF) for diagnostic or therapeutic purposes. The needle is usually inserted between L3-L4 or L4-L5 intervertebral spaces below the termination of the spinal cord.

4. Indications

Diagnostic indications include suspected meningitis including tuberculosis, encephalitis, subarachnoid hemorrhage with negative CT, demyelinating diseases, CNS malignancy, and neurosyphilis.

Therapeutic indications include cryptococcal meningitis, spinal anesthesia, intrathecal chemotherapy, and idiopathic intracranial hypertension.

5. Contraindications

Absolute contraindications include signs of raised intracranial pressure due to mass lesion, infection at puncture site, uncorrected coagulopathy including platelet count <50,000, INR >1.5.

6. Pre-Procedure Assessment

Assess for focal neurological deficit, papilledema, seizures, or altered mental status. CT brain should be performed prior to LP in patients with focal deficits, immunocompromised state, papilledema, new seizures, or altered consciousness. Laboratory evaluation should include platelet count, PT/INR, and blood glucose.

7. Required Equipment

Sterile lumbar puncture kit, spinal needle (20-22G), sterile gloves, antiseptic solution, sterile drapes, manometer (if available), CSF collection tubes (4), lidocaine 1%, syringes, and adhesive dressing.

8. Patient Positioning

Preferred position is lateral decubitus with knees flexed and chin tucked to allow measurement of opening pressure. Sitting position may be used when anatomy is difficult or patient is obese.

9. Procedure Steps

Identify L4 using Tuffier's line connecting iliac crests. Insert needle at L3-L4 or L4-L5. Prepare skin with antiseptic and sterile drapes. Infiltrate local anesthetic. Insert spinal needle midline with slight cephalad direction until CSF appears. Measure opening pressure using manometer if available and collect CSF into 3-4 tubes for laboratory testing.

10. CSF Tests

CSF Routine Examination

Macroscopic examination: appearance, protein, globulin, chloride, sugar.

Microscopic examination: cells, lymphocytes, polymorphs, RBCs, Gram's stain, ZN stain.

Optional CSF Examination

CSF cytology, CSF cryptococcal antigen, CSF NAAT for TB (CSF GeneXpert), CSF VDRL, CSF Adenosine deaminase (ADA), CSF culture and PCR for viral or TB infection.

Note: CSF ADA cutoff = **≥10 U/L:** Strongly suggests TBM, especially with lymphocytic pleocytosis, high protein, and low glucose in CSF.

11. Post-Procedure Care

Observe patient for headache, neurological deterioration, or back pain. Encourage hydration and monitor for 30-60 minutes.

12. Complications

Post-lumbar puncture headache, bleeding, infection, nerve root irritation, and cerebral herniation in patients with raised intracranial pressure.

13. Management of Post-LP Headache

Initial management includes bed rest, hydration, and analgesics such as paracetamol or NSAIDs. Severe cases may require epidural blood patch.

14. Documentation

Document indication, site of puncture, opening pressure, CSF appearance, patient tolerance, and any complications.

15. Infection Prevention

Strict aseptic technique is required including sterile gloves, antiseptic skin preparation, and sterile drapes.

16. Patient Consent

Written informed consent should be obtained before the procedure with explanation of risks, benefits, and purpose.

17. References

1. Tunkel AR et al. *Clin Infect Dis*. 2017.
2. Hasbun R et al. *N Engl J Med*. 2001.
3. World Health Organization. Meningitis Guidelines. 2023.
4. Harrison's Principles of Internal Medicine. 21st ed. 2022.

Consent Form for Lumbar Puncture

Special Region 1
Health Department

Patient Information

Name: _____	Age/Sex: _____
Hospital: _____	Ward: _____
Registration number:	Date/time of procedure:

Procedure Explanation

A lumbar puncture (spinal tap) is a medical procedure in which a needle is inserted into the lower back (lumbar region) to access the cerebrospinal fluid (CSF). It may be performed for:

- **Diagnosis:** To detect infections, bleeding, cancers, or other neurological conditions.
- **Therapeutic intervention:** To relieve pressure, administer medications, or remove excess fluid.

Benefits

- Helps in accurate diagnosis of neurological and infectious diseases.
- Allows therapeutic relief and administration of drugs directly into CSF.

Risks and Possible Complications

- Headache, dizziness, or nausea.
- Pain or discomfort at puncture site.
- Bleeding or infection.
- Rarely, nerve injury or brain herniation in patients with raised intracranial pressure.

Alternatives

- Imaging studies (CT/MRI).
- Blood tests and other laboratory investigations.
  (However, these may not provide the same diagnostic accuracy as lumbar puncture.)

Patient Rights

- You have the right to ask questions and receive clear answers.
- You may refuse or withdraw consent at any time before the procedure.
- Refusal will not affect your right to receive other appropriate medical care.

Consent Statement

I, _____ (patient/guardian), have been explained in detail about the lumbar puncture procedure, its purpose, benefits, risks, and alternatives. I understand the information provided and voluntarily consent to undergo the procedure.

Signatures

Patient/Guardian Name & Signature: _____ Date: _____

Doctor/Health Worker Name & Signature: _____ Date: _____

Witness Name & Signature: _____ Date: _____