

# Lumbar Drains (LD)

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## OVERVIEW

### What?

- Closed, sterile system used to shunt cerebral spinal fluid (CSF) externally from the lumbar subarachnoid space

### Who?

- Hospitalized patients who need intraspinal/intrathecal pressure monitoring and/or drainage of CSF

### Why?

- Infected shunts
- CSF leak or potential for leaks
- Healing of surgical site
- Reduction of intracranial pressure (ICP) during craniotomy
- Improvement of spinal cord perfusion following thoracoabdominal aortic aneurysm repair
- Diagnostic workup for normal pressure hydrocephalus

### Where?

- A lumbar catheter is inserted via the patient's back into the lumbar subarachnoid space between L3/L4 or L4/L5.
- A drainage system is connected to the lumbar catheter with or without a flushless strain gauge transducer.

### How?

- Physician orders will indicate either a specified anatomical landmark (e.g., insertion site, shoulder, external auditory meatus) or hourly volume of CSF to be drained (typically 10 ccs per hour).
- Drain and patient positioning are **critical** to preventing over- or underdrainage in this pressure dependent system.

## NEUROLOGICAL EXAM PEARLS

- Monitor per physician orders:
  - Neurological status including level of consciousness (LOC), cranial nerve function, lower extremity motor and sensation, new or worsening headache during or after drainage
  - Bowel and bladder function
  - Clarity, color, and volume of drainage and spinal CSF pressure/waveforms (if ordered)
- Report any changes **immediately**.

## MANAGEMENT STRATEGIES/SET-UP/ NURSING IMPLICATIONS

- Before procedure
  - Assess neurological status.

- Verify completion of informed consent.
- Complete time-out procedure, including verification of correct patient, correct procedure, and correct site.
- Administer analgesia and anxiolysis as ordered, if indicated.
- Review medication history for recent anticoagulation or antiplatelet medications.
- Review pertinent labs (prothrombin time [PT], partial thromboplastin time [PTT], international normalized ratio [INR], platelet counts, PFA-100).
- During placement
  - Placement may be done at the bedside, in the operating room, or in interventional radiology.
  - Prime system using preservative-free sterile saline.
  - Assist with positioning of patient.
  - Assist with securing catheter to prevent unintentional dislodgement.
- After Procedure
  - Closely monitor the patient for neurological changes such as decreased LOC and/or lower extremity motor or sensory dysfunction.
  - Monitor CSF color, clarity, and volume and CSF pressure/waveform morphology every hour or per the practitioner's orders.
  - Assess the drainage system for patency by observing active dripping hourly.
  - Maintain sterile aseptic technique when managing the system.
- Other Tips
  - Always follow manufacturer recommendations when setting up and maintaining a lumbar drain.
  - Lumbar drainage is contraindicated when elevated ICP is suspected.
  - Never flush a lumbar subarachnoid catheter because the instillation of fluid in the subarachnoid space may result in patient harm. Likewise, never use a flushable transducer. Route tubes and catheters having different purposes in different, standardized directions (e.g., intravenous [IV] lines routed toward the head; enteric lines toward the feet).
  - Notify the provider if an extended period of clamp time (e.g., >5 min) is anticipated if the drain is intended to be managed by unclamped open titration method.

## TOOLS/SUPPLIES

- Lumbar catheter insertion kit (for provider)
- CSF drainage system
- Level (carpenter, line, laser)
- IV pole
- Preservative-free sterile saline
- Occlusive dressing
- CSF tubes for sampling
- Flushless external strain gauge transducer for monitoring intraspinal pressure, if indicated

## COMPLICATIONS

- Infection
- CSF leak
- Brain herniation
- Decreased LOC in association with herniation symptoms associated with excessive or fast drainage
- Severe headache
- Subdural hematoma
- Subarachnoid bleeding
- Tension pneumocephalus
- Paraspinal hematoma
- Sensory and/or motor dysfunction involving dermatome distribution of thoracic or lumbar spinal cord
- Irritation of spinal nerves
- Bladder or bowel dysfunction
- Spinal cord ischemia

## TROUBLESHOOTING

- If there is no drainage or less drainage than anticipated:
  - Check all stopcocks and clamps to ensure the drain is open.
  - Look for kinks or breaks in the catheter.
  - Lower the drip chamber burette slightly to check for dripping.
  - Reposition the patient.
  - Notify the provider.
- If there is overdrainage:
  - Clamp the drain and lay the patient flat unless doing so is contraindicated.
  - Assess the patient for neurological changes or headache.
  - Relevel the drain.
  - Notify the provider.

## SAFETY PRECAUTIONS FOR INTERPROFESSIONAL TEAM

- Instruct staff to always check with the bedside nurse before getting the patient out of bed (drain will need to be clamped).
- Do not allow unit staff to adjust the height of the bed or head of bed unless the bedside nurse has clamped the drain.
- Make sure that the bed control locks are enabled to prevent accidental movement of the head of bed or height of bed.
- Utilize a bed or chair alarm.
- Make sure the bed is in the position indicated by the provider's orders (such as 30° or flat).
- Clamp the drain prior to assisting the patient to the bathroom. The patient must be accompanied to the bathroom. Relevel and open the drain upon return to bed.
- If the patient is allowed to sit in a chair for meals and the drain is to be left open, maintain the reference level.
- Notify the provider if you note any of the following:
  - Patient has changed neurologically (e.g., sleeper, harder to wake up, confused).
  - System is disconnected.
  - Pockets of air appear in tubing, particularly with CSF drainage on the bed.
  - Dressing to drain insertion site is not intact.
  - Drainage from the dressing, system, or from the patient's incision, nose or ear occurs.
  - Change in color of the drainage from the patient (bloody, cloudy, etc) is observed.
  - The system chamber or bag is becoming full, if it is not within nursing scope to change the bag at the facility.

## PATIENT/FAMILY/CAREGIVER TEACHING SUPPORT

### EDUCATE, EDUCATE, EDUCATE!

- Instruct the patient to call first for assistance with positioning, ambulation, and any changes in head of bed.
- Lock bed controls, if necessary.
- Have the patient avoid activities that would increase ICP such as sneezing, coughing or straining.

### LINKS FOR MORE INFORMATION:

<https://www.integralife.com/evd-drains/category/neurocritical-care-evd-drains>

<https://www.medtronic.com/us-en/healthcare-professionals/products/neurological/critical-care/duet-external-drainage-monitoring-system.html>

<https://natus.com/products-services/natus-eds-3-external-drainage-system>