Care of the Patient with a Lumbar Drain
Second Edition
AANN Reference Series for Clinical Practice
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## Contents

Preface .................................................................................................................. 4
Qualifications ........................................................................................................ 4
Statement of the Problem ....................................................................................... 5
  Etiology/Indications for Placement ....................................................................... 5
  Definitions ............................................................................................................ 5
Methods, Procedures, Interventions, and Education ............................................. 6
  Equipment ........................................................................................................... 6
  Assessment and Monitoring .................................................................................. 6
  System Maintenance and General Care Issues .................................................... 8
Removing the Lumbar Drainage Device ................................................................. 10
  Interventions and Troubleshooting ..................................................................... 10
  Patient and Family Education ............................................................................. 11
Expected Outcomes ................................................................................................ 12
  Documentation ................................................................................................... 12
  Controversial Issues ........................................................................................... 12
References ............................................................................................................... 14
Bibliography ........................................................................................................... 15
Preface

To meet its members’ needs for educational tools, the American Association of Neuroscience Nurses (AANN) has created a series of guides to patient care called the AANN Reference Series for Clinical Practice. Each guide has been developed based on current literature and built upon evidence-based practice.

The purpose of this document is to assist registered nurses, patient care units, and institutions in providing safe and effective care to patients with lumbar drainage devices (LDDs).

Several medical research and case-report studies have provided recommendations on managing patients with LDDs. With this foundation, AANN first developed guidelines in 1998 for nurses to further define practice related to nursing management of LDDs. This new edition, *Care of the Patient with a Lumbar Drain*, is based upon the current knowledge base.

The nursing care of patients with LDD is complex. Despite ongoing research, no evidence-based standards of best practices exist to guide practitioners in the management of LDDs. Recommendations in this guide are consistent with the literature cited to date and are deemed reasonable in the absence of definitive studies.

These guidelines are not intended to replace the judgment of the practitioner with respect to particular patients or special clinical situations and cannot be considered inclusive of all proper methods of care or exclusive of other treatments reasonably directed at obtaining the same results. Accordingly, adherence to these guidelines is voluntary with the ultimate determination regarding their application to be made by the practitioner in light of the individual circumstances presented by a particular patient.

Providing resources and recommendations for bedside practitioners should enable nurses to optimize patient outcomes. This reference is an essential resource for neuroscience nurses providing care to patients whose condition requires the placement and management of an LDD. This guide is not intended to replace formal learning, but rather, to augment the knowledge base of clinicians and provide a readily available reference tool.

Qualifications

The registered nurse is designated as qualified to provide care for the patient with an LDD following educational and clinical experience set by the institution’s policies and procedures.

The individual practice setting should have written policies and procedures specific to the type of LDD(s) used. These policies and procedures should delineate who may perform specific practices. Practitioner delineation should be based on state nurse practice acts, regional and institutional norms, and the feasibility of maintaining competency for infrequently performed procedures.

Evaluation of competency in the care of the patient with an LDD should be established by the administrative authority of the institution. Frequency of evaluation should be based on the volume and risk of the practice, but a minimum of annual evaluation is recommended.

To maintain a current knowledge base, ongoing participation in education on the management of patients undergoing subarachnoid drainage of cerebrospinal fluid (CSF) using an LDD is recommended at least once per year.
Statement of the Problem

I. Etiology/Indications for Placement
   Placement of a lumbar drainage device (LDD) is an accepted medical therapy for the treatment of postoperative or traumatic dural fistulae, such as a cerebrospinal fluid (CSF) leak (Sade, Mohr, & Frenkiel, 2006; van Aken et al., 2004; Vourc’h, 1963), treatment of shunt infections (Pudenz, 1989; Thompson, 2000), and for the diagnostic evaluation of idiopathic normal pressure hydrocephalus (Marmarou, Bergsneider, Klinge, Relkin, & Black, 2005). LDDs also are used to reduce intracranial pressure (ICP) during a craniotomy (Grady, Horlocker, Brown, Maxson, & Schroeder, 1999; Samadani, Huang, Baranov, Zager, & Grady, 2003) and as adjuvant therapy in the management of traumatically brain-injured patients (Munch et al., 2001). Experimentally, LDDs have been used to treat patients with thoracoabdominal aortic aneurysms (thoraco-AAA) in order to improve spinal cord perfusion (Bethel, 1999; Coselli, LeMaire, Schmittling, & Koksoy, 2000; Crawford et al., 1991; Safi et al., 1994; Safi et al., 1996), to manage non-traumatic subarachnoid hemorrhage in order to prevent vasospasm (Klimo, Kestle, MacDonald, & Schmidt, 2004), and to manage increased ICP associated with cryptococcal meningitis (Macsween et al., 2005). Although the use of LDDs for these additional indications has been reported in the literature, they have been used in only a limited number of studies.

II. Definitions
   The LDD is a closed, sterile system that allows the continuous drainage of CSF from the subarachnoid space.
Methods, Procedures, Interventions, and Education

Review institutional policies and procedures and product information related to inserting and maintaining LDDs. General procedures for the insertion and care of LDDs follow.

I. Equipment
   A. Equipment needed for insertion
      Many of the disposable surgical supplies listed here are available in generic and custom kits supplied by LDD manufacturers. Check kit contents for the following:
      • antimicrobial scrub solution
      • antimicrobial swabs or swab sticks
      • sterile gloves, surgical caps, masks, and sterile surgical gown
      • sterile drape
      • local anesthetic (1% or 2% lidocaine without epinephrine)
      • 5-cc or 10-cc syringe with 18-gauge needle to draw up lidocaine
      • 23-gauge needle to administer lidocaine
      • Tuohy needle
      • lumbar drainage catheter
      • sterile scissors and needle holder
      • sterile suture with needle
      • sterile occlusive dressing
      • sterile CSF drainage system (i.e., collection tubing, bag, (±) chamber).
   B. Additional equipment
      Additional equipment depends upon the type of drainage management and hospital protocol, but could include the following:
      • system holder (i.e., device to secure system to pole to maintain ordered level)
      • transducer cable
      • external strain gauge transducer.

II. Assessment and Monitoring
   A. Placement of the LDD
      1. Patient preparation
         a. Consult hospital policies and procedures for obtaining informed consent.
         b. Explain and reinforce to the patient or the person giving consent the rationale for placement, procedure, and risks.
         c. Review the most recent laboratory results, which should include a coagulation profile.
         d. Perform and record a baseline comprehensive neurologic assessment.
         e. Provide medication or sedation as indicated to provide for the patient’s comfort and safety.
      2. Drain placement
         a. Depending on individual institutional policies, LDDs may be inserted in the operating room or at the patient’s bedside in the intensive care unit (ICU) or the nursing unit. For LDDs that are placed outside the operating room, all personnel at the bedside must wear caps, masks, gowns, and sterile gloves.
         b. Obtain the needed supplies for placement of the LDD. (See Equipment, p. 6, for more information.)
         c. Position the patient in the side-lying position and have the patient bring his or her knees to the chest, tucking the chin to chest (Figure 1). An alternative position is to have the patient sit up and lean over a bedside table. The objective is to round the patient’s back and widen the intervertebral space to aid in the proper placement of the catheter.
         d. Shave the lumbar area, if necessary, prep it, and drape it in a sterile manner.
         e. The neurosurgeon or designated, properly credentialed practitioner performs appropriate site preparation by following the institution’s policy, injects the area with local anesthetic, and inserts a spinal (e.g., Tuohy) needle into the subarachnoid space—usually at the L4–L5 intervertebral space. (Note. L2–L3 or L3–L4 also may be used, primarily for thoraco-AAA patients; Weaver et al., 2001). The lumbar drainage catheter is advanced through the needle...
Care of the Patient with a Lumbar Drain

to approximately the T12–L1 space. The needle is then withdrawn, and the catheter is attached to a sterile, closed CSF collection system. The catheter is secured to the skin with a suture at one or two sites (Clevenger, 1990; Figures 2, 3, 4).

B. Application
A sterile, occlusive dressing is applied to the site, securing the tubing beneath the dressing and ensuring that there are no kinks in the drainage system beneath the dressing. Document on the dressing the date and time of placement. Help the patient get into a more comfortable position. Elevate the head of the bed to the level ordered.

C. Attachment
Place the drain at the level ordered by the physician or as directed by institutional policies and procedures. There are three types of drain management protocols: draining at a specific level, draining to a specific volume, and draining at a specific pressure. Physician’s orders will specify how the drain is to be managed (Figure 5).

1. Draining at a specific level: This method is utilized primarily to aid in the repair of a CSF fistula. The physician sets the vertical level at which to maintain the drainage collection device. This level varies based on the physician’s preference or hospital policies and procedures, but may be at shoulder level or the level of the catheter insertion site. (See Table 1.)

2. Draining to a specific volume: This method also is utilized primarily to aid in the repair of a CSF fistula. When draining to a specific volume the physician determines the amount of CSF to be drained in a particular time period. An average amount would be 5–10 cc per hour. The drain’s vertical level is manipulated in order to achieve the specified volume. Hospital policies and procedures should determine upper and lower limits of manipulation. The drain should not be raised above lateral ventricles, however, because CSF backflow may occur. (See Table 1.)
3. **Draining at a specific pressure:** This method is used to determine whether shunt placement will benefit the patient in the treatment of normal pressure hydrocephalus, for the treatment of shunt infections, and in the adjuvant treatment of increased ICP. Lumbar drainage also has been used to increase distal aortic perfusion in patients requiring repair of thoraco-AAA as a means of decreasing neurologic complications such as paraplegia. The physician orders the specific pressure required for drainage. The system will then drain only when the pressure exceeds that of the set pressure, thereby acting as an external shunt. The zeroing point for the transducer is generally at the tragus, while in thoraco-AAA patients it is generally at the spine. For thoraco-AAA patients the ordered pressure to drain is generally 10–15 mm Hg (Safi et al., 1994; Safi et al., 1996). For patients with increased ICP and for whom the LDD is being used as an adjunct to the ventriculostomy, the pressure level to begin drainage is generally ordered at the same level as the ventriculostomy (Baldwin & Rekate, 1991; Levy et al., 1995; Willemse & Egeler-Peerdeman, 1998; see Table 1).

D. **Record**

Document the name of the practitioner who placed the LDD, as well as the date and time of the lumbar drain insertion. Assess and document color and clarity and volume of initial CSF drainage. Record the condition of insertion site, initial dressing, and patency of drainage system. Ensure all stopcocks or clamps are in the open position if drainage is ordered.

### III. System Maintenance and General Care Issues

**A. General practice**

Maintain strict aseptic techniques at all times when dealing with the drain (Thompson, 2000).

**B. Patient assessment**

1. Perform a comprehensive neurological assessment every 4 hours, unless otherwise specified by a physician, and compare to baseline; perform the assessment more frequently if indicated. Notify the physician if the patient experiences changes in level of consciousness or a headache or if he or she develops new neurologic deficits.

2. Assess the color, clarity, and amount of CSF drainage hourly and as needed. Assess the vertical level of the drain if the physician’s orders or the hospital’s policies and procedures require that the drain level be manipulated in order to achieve a specified amount of CSF drainage.

3. Assess insertion site every 4 hours or per unit protocol for signs and symptoms of infection or for sign of CSF leakage around the insertion site.

4. Assess the patient every 4 hours or per unit protocol for signs and symptoms of meningeal irritation.

**C. Patient care**

1. Confused or noncompliant patients may require sedation, or restraints as per hospital policy, to prevent disruption of, or complication from, lumbar drainage of CSF.

2. Maintain head of bed at the level ordered.

3. Keep the patient’s head, neck, and back in a neutral position. The patient may be turned as necessary. Avoid hyperflexion, rotation, or extension of the hips or neck because this may impede drain outflow.

4. The drain may be clamped briefly (<5 minutes) during care activities that require movement of the patient or a change in the level of the head of the bed (Clevenger, 1990). The risks and benefits of travel or procedures that necessitate clamping the drain longer than 5 minutes (e.g., an MRI scan) should be evaluated with the attending practitioner prior to clamping the drain (Thompson, 2000).

5. Ensure that all healthcare professionals working with the patient are aware that a lumbar drainage system is in place and that the necessary precautions and restrictions are observed.
D. System maintenance

1. The dressing at the insertion site should be clean, dry, and occlusive.
   a. Frequency of dressing change varies at different institutions. If the dressing is wet, it should be changed.
   b. If the dressing is damp with CSF, the physician should be notified because it may signal a leak within the system.
   c. Centers for Disease Control and Prevention (CDC) guidelines state that bacitracin near central line sites increases rate of infection (O’Grady et al., 2002); therefore, no bactericidal agent should be applied to the LDD insertion site.
   d. Ensure that the dressing covers the catheter tubing and that no kinks are present. A transparent dressing is preferable because it allows better visualization of the insertion site (Thompson, 2000).

2. Drainage system
   a. Maintain the integrity and sterility of the closed system by keeping all connections tight.
   b. Do not secure drainage tubing to the bed because it may dislodge the catheter if the patient thrashes or tries to sit up.
   c. Do not allow tubing to rest under the patient when he or she is side-lying because it may impede CSF flow.

3. CSF specimen collection
   a. Obtain CSF specimens from a side-port or stopcock for laboratory analysis. (See Controversial Issues, p. 12.)
      b. Obtain the sample using aseptic technique: sterile gloves and mask. The length of preparation time and the cleansing solution used at the port or stopcock are directed by institutional infection control procedures. A minimum drying time of 3 minutes is recommended for iodine solutions.

4. Changing the drainage bag
   a. Change the drainage bag when it becomes full or per hospital policy using aseptic technique: sterile gloves and mask. (See Controversial Issues, p. 12.)
   b. Turn the stopcock closest to the bag off to the patient to prevent flow of CSF.
   c. Disconnect the bag from the system; clean the disconnection site according to institutional infection control procedures before reconnecting the new system.
   d. Cap the full bag to prevent leakage and send for laboratory analysis, or discard it according to institutional policies.
   e. Connect the new drainage bag, maintaining aseptic technique. Ensure the connections are tight and that the stopcocks and clamps are in the correct position.

5. Catheter care
   a. Do not forcefully bend or kink the catheter.
   b. Follow the natural curve of the catheter and secure it to the patient beneath the occlusive dressing.

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Table 1. Types of Drain Management

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose of Drain</th>
<th>Drain Level</th>
<th>Amount of CSF Drained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain at specific level</td>
<td>Repair of CSF fistula</td>
<td>Stationary at position ordered by physician</td>
<td>Varies</td>
</tr>
<tr>
<td>Drain to specific volume</td>
<td>Repair of CSF fistula</td>
<td>Varies. Drain is manipulated up and down to achieve ordered amount of drainage</td>
<td>Generally 8–10 cc/hr Specified by physician</td>
</tr>
<tr>
<td>Drain at specific pressure</td>
<td>Treatment of shunt infections/malfunction</td>
<td>Stationary. Zeroing point generally at ear or level of ventricles, unless thoraco-AAA, then at spine. Pressure specified by physician</td>
<td>Varies. Will only drain if ordered pressure exceeded</td>
</tr>
<tr>
<td></td>
<td>Treatment of normal pressure hydrocephalus</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adjunctive treatment of increased intracranial pressure</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Improvement of spinal cord perfusion in patients undergoing repair of thoraco-AAA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: CSF = cerebrospinal fluid; thoraco-AAA = thoracoabdominal aortic aneurysms.
IV. Removing the Lumbar Drainage Device
A. The LDD is removed by the practitioner when the patient’s condition has improved, the treatment course no longer requires drainage of CSF, the risks of prolonged monitoring outweigh the benefits (e.g., infection), or the device is nonfunctional. (See Controversial Issues, p. 12.)
B. The device should be removed by following manufacturer’s instructions, using sterile technique.
   1. The procedure may be done at the bedside. Personnel should wear masks and sterile gloves.
   2. Position the patient in the side-lying or sitting position.
   3. Remove the dressing and examine the site for evidence of CSF leakage or infection. Close the system by turning off the stopcocks or clamping.
   4. Clean the area with an antiseptic solution, usually iodine.
   5. The practitioner first cuts any sutures securing the catheter to the patient. The catheter is then slowly pulled out from the subarachnoid space through the skin insertion site, ensuring the catheter is removed intact.
   6. The catheter tip may be sent for culture according to unit protocol or physician or practitioner order.
C. The physician may suture the site and request antibiotic ointment. A sterile dressing is applied according to unit protocol or practitioner order.

V. Interventions and Troubleshooting
A. Break in the sterile system
   1. Consider the system no longer sterile if leakage or disconnection occurs.
   2. Turn off the stopcock closest to the patient or clamp the end of the lumbar catheter to close off CSF drainage and notify the physician.
   3. Replace the system, using aseptic technique (per practitioner or institution protocol).
   4. A leak in the lumbar catheter may be repaired and reattached by the physician or may require removal of the device.
B. Occlusion of tubing (e.g., blood)
   1. If the blockage is located proximal to the patient, notify the physician. Do not irrigate.
   2. If the blockage is not located close to the port nearest the patient, flush the system with a sterile solution through the first port to the occlusion or as per unit policy.
      a. Preservative-free normal saline solution is recommended as the flush solution.
   b. Prior to flushing, turn stopcock off to patient to prevent CSF backflow. Always flush the system from the direction of the patient toward the drainage bag.
   c. Use aseptic technique: sterile gloves, mask, and 3-minute preparation of the port used for irrigation.
   d. Do not attempt to withdraw the blockage with a syringe or milk tubing to remove the blockage.
C. No CSF in collection chamber
   1. Assess drainage system from the catheter insertion site to the collection bag for kinked tubing or turned stopcock and correct.
   2. Assess for drainage at insertion site and notify physician if present.
   3. Assess for tubing disconnection and follow above procedure.
   4. Notify the physician after the above assessment is completed if there is no CSF drainage.
D. Excessive CSF drainage
   1. Check the vertical level of the system—it may be too low in relation to leveling landmark on the patient. If draining to a specific volume, raise the collection system level and reassess the drainage rate.
   2. Monitor the patient’s neurologic exam and report any changes, particularly onset of headache.
   3. If excessive drainage persists during the next hour despite intervention, notify the physician.
E. Complications
   1. Infection
      In one study the reported incidence of bacterial meningitis from lumbar drainage catheters was 7% (Schade et al., 2005). Risk factors for development of infection included leakage at the site, drain obstruction, and length of therapy.
      a. Bacterial colonization
         (1) Defined as a positive CSF culture in the LDD
         (2) Occurs with increasing frequency 5 days after initiation of therapy; if the system is opened or if irrigations are performed
      b. Clinical symptoms of infection
         (1) Fever, redness, swelling, or drainage at insertion site should be reported to the physician.
         (2) Signs and symptoms of meningeal irritation (i.e., stiff neck, headache, nausea, vomiting, photophobia, decreased level of consciousness) must be reported to the physician.
         (3) The patient may be treated with antibiotics, have cultures taken, or undergo removal of the system.
2. Pain
   a. Nerve root irritation
      (1) Nerve root irritation may occur in relation to the position of the lumbar drain.
      (2) Signs and symptoms include presence of radicular leg pain, numbness or tingling, and changes in deep tendon reflexes.
      (3) Treatment includes changing the patient's position, slightly withdrawing the catheter, providing analgesic medication, or removing the catheter (Thompson, 2000).
3. Immediately life-threatening or serious complications
   a. Tension pneumocephalus
      (1) Tension pneumocephalus occurs in patients with a dural fistula resulting from a siphoning effect. A negative pressure gradient is created by the combination of head elevation and excess CSF drainage. As the fluid drains out, air enters the intracranial space at the site of the fistula.
      (2) Signs and symptoms include sudden decrease in level of consciousness or development of neurologic deficit (Graf, Gross, & Beck, 1981; Park, Strezlo, & Friedman, 1983).
      (3) Treatment includes shutting off the drainage tube, placing the patient in a supine or a slight Trendelenburg position, administering high-flow oxygen, and performing ongoing assessment. The physician should be notified immediately (Graf et al., 1981; Park et al., 1983).
   b. Herniation
      (1) Herniation may occur in the presence of increased ICP or result from CSF draining too rapidly, causing a downward shifting of intracranial contents (Bloch & Regli, 2003).
      (2) Signs and symptoms include decrease in level of consciousness, irritability, confusion, weakness, paresis, posturing, abnormal breathing pattern, and changes in pupillary reactivity and size.
      (3) Treatment includes blocking the drain, immediately notifying the physician, performing ongoing assessment, and implementing nursing measures to treat herniation. (See Guide to the Care of the Patient with Intracranial Pressure Monitoring, also from the AANN Reference Series for Clinical Practice.)
   c. Subdural hematoma
      (1) Subdural hematoma may result from overdrainage or from CSF draining too rapidly.
      (2) Signs and symptoms include decrease in level of consciousness, irritability, confusion, weakness, paresis, and changes in pupillary reactivity.
      (3) Treatment includes blocking the drain, performing ongoing assessment, and immediately notifying the physician (Thompson, 2000).
   d. Intradural hematoma
      (1) Intradural hematoma has been reported as a complication at the insertion site of a lumbar drain in thoraco-AAA repair (incidence rate 3.2%; Weaver et al., 2001). It may occur following drain removal.
      (2) Signs and symptoms include progressive lower extremity paresis, loss of reflexes, and decreased muscle tone.
      (3) Treatment includes immediately notifying the physician and performing ongoing assessment and potential surgical evacuation.

VI. Patient and Family Education
A. Explain the need to
   1. maintain head of bed position to promote accuracy and safety of treatment, because it reduces the risk of overdrainage (Thompson, 2000).
   2. request nursing assistance prior to any patient movement to prevent dislodgement, disconnection, or overdrainage (Thompson, 2000).
   3. avoid sneezing, coughing, or straining because it may increase CSF drainage. The physician should specify whether the patient is to avoid coughing or other Valsalva maneuvers (Clevenger, 1990).
B. Explain that there will be some discomfort at the drain insertion site or a mild headache after placement. Should discomfort occur, the patient should notify his or her nurse so that pain medications may be ordered and given as needed.
C. Explain that frequent neurologic assessments and assessment of the drain and insertion site will be performed to ensure proper drain functioning and patient safety (Thompson, 2000).

VII. Expected Outcomes
A. The patient will remain free of complications related to the LDD.
B. Patient and personnel safety will be maintained.
C. The patient and/or significant other will convey that they understand the rationale for drain placement and the therapeutic benefits and risks of CSF drainage via a lumbar drain.

VIII. Documentation
A. Record on a flow sheet hourly or per institutional policies the amount, color, and clarity of drainage and level of drain.
B. Record neurological assessment every 4 hours (Thompson, 2000) or per institutional policies or with any change in neurological status.
C. Record drain insertion site assessment every shift; note any signs or symptoms of infection or leakage at site.
D. Include the following in progress notes and plan of care:
   1. problems or complications and troubleshooting required
   2. acute interventions for complications.
E. Document patient and family education and responses (e.g., ability to return explanation, conveying their understanding of the procedure; additional questions; behavior consistent with focus of education).

IX. Controversial Issues
AANN acknowledges that controversial issues surround the management of LDDs. Current research is limited and has not yet defined the most effective and safest practice in this area. Institutional decisions regarding these issues must be based on, but not limited to, the following:
- state nurse practice acts
- institutional policies and procedures
- institutional category of practice privileges
- regional and institutional norms
- infection control policies and practices
- institutional quality improvement findings
- ability to maintain and document competency.

A. Management of the patient with an LDD in the ICU or intermediate care unit versus neuroscience floor
   Although this decision is made at the physician and hospital’s discretion, the location where patient safety is maintained (and frequent patient monitoring is performed) at the lowest charge to the patient is optimal.

B. Removal of lumbar drainage catheter by anyone other than a physician (nurse practitioner, physician’s assistant, certified registered nurse anesthetist, registered nurse)
   If the catheter is removed by a nonphysician, stop the procedure if any resistance or radicular pain occurs and notify the physician.

C. The number of days the LDD is kept in place depends on the rationale for drain insertion.
   1. Typically, the LDD is used for 3–7 days if it was inserted for CSF fistula or idiopathic normal pressure hydrocephalus; longer if it was for infection.
   2. The lumbar drainage catheter may be tunneled subcutaneously (Hahn, Murali, & Couldwell, 2002) if longer placement is required.

D. Irrigation of drainage system
   1. The flush solution is usually a sterile, preservative-free normal saline or antibiotic.
   2. The volume and frequency of flush should be conducted as ordered by physician; typical volume is 1–5 cc.
   3. The nurse’s authorization to irrigate the system may be dependent upon state nurse practice acts.

E. Instillation of medications by registered nurse or advanced practice nurse
   1. The nurse’s authorization to instill medications is dependent upon state nurse practice acts.
   2. Institutional policies and procedures should specify if an equivalent amount of CSF is to be withdrawn prior to instillation of medication.
   3. The volume and frequency of the flush should be conducted as ordered by the physician.
   4. The flush solution is usually preservative-free saline or the patient’s CSF.
   5. The frequency of antibiotic instillation varies from every 24 hours, if patient is clinically infected, or only at discontinuation of the system.

F. Sampling of CSF by registered nurse
   1. The nurse’s authorization to take CSF samples is dependent upon the individual institution’s policies and procedures.
   2. The volume of CSF samples varies from 1 cc to 5 cc.
   3. The sampling site ranges from an access port closest to the patient (e.g., resealable port or stopcock) or the drainage bag.
   4. Frequency varies from every 24 hours, if the patient is clinically infected, or only at discontinuation of the system.
   5. If the sample is for culture and sensitivity, the sample should be obtained from the port closest to the patient to decrease the risk of contaminants or CSF getting trapped in the drainage system.
G. Change of drainage system by registered nurse
1. Some manufacturers recommend changing the bag every 24 hours, but breaking the system increases the risk of infection.
2. Changing bags should be kept to a minimum (e.g., only if drainage system is full, nonfunctional, or contaminated) to decrease breaks in system.
3. If using a drainage system in which the bag can be drained rather than changed, follow the manufacturer’s recommendation and hospital policy regarding bag emptying.

H. Frequency and type of dressing change
1. Frequency of dressing changes ranges from every 24 hours to only when or if the dressing becomes dislodged or soiled.
2. There is no clear consensus at this time as to which dressing to use at the LDD site. Dressing types include gauze pads with tape and clear, occlusive dressing.

I. Use of infusion pumps
In some institutions an infusion pump is used to control the flow of CSF (Houle et al., 2000; Vender, Houle, Flannery, Fryburg, & Lee, 2000). However, this practice is considered “off label” use and is not recommended by the manufacturer.
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