



Policies & Procedures
 Title: **Cerebrospinal Fluid (CSF) Drainage LUMBAR - Post Thoraco-aortic Aneurysm**

- Management of drainage system
- Spinal pressure monitoring
- Care of patient
- Assisting with removal

ID Number: **1093**

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Definitions

External Cerebral Spinal Fluid drainage system: This is a device that diverts cerebro-spinal fluid (CSF) from the spinal cord into a closed drainage system. It is necessary to allow cerebral-spinal fluid to drain in an external system if swelling in the spinal cord causes a rise in intracranial pressure and possible deterioration to the spinal cord

Thoraco-abdominal aortic aneurysm repair: can be considered a risk factor of the development of paraplegia associated with clamping of the thoracic aorta above the renal arteries. Lumbar subarachnoid drainage has been used to reduce the risk of spinal cord injury.

1. PURPOSE

- 1.1 To describe the set-up and maintenance of the External Cerebrospinal drainage via the lumbar system.
- 1.2 To maintain consistent standards for monitoring CSF drainage and the patients neurological status.
- 1.3 To minimize the risk of infection, damage, displacement and other complications associated with the care and use of External Cerebrospinal drainage system

2. POLICY

Physician Order Required	<ul style="list-style-type: none"> • For the position of the External CSF drain by ordering a pressure level (cmH2O) in relation to the zero reference • For any pressure level adjustments. In addition the hourly volume to be drained may be ordered • For the frequency of monitoring the patient’s neurological status and vital signs • For sampling CSF • For clamping of External CSF drain, either for transporting patient or trial of clamping prior to removal
Who will perform	<ul style="list-style-type: none"> • RNs identified by the manager in designated practice settings, will be certified in this RN Specialty Practice: Advanced RN Intervention, External CSF Drainage Lumbar – Post Thoraco-aortic Aneurysm: management of the drainage system, spinal pressure monitoring, care of patient & assisting with removal.
Special	<ul style="list-style-type: none"> • Insertion and removal are performed using strict aseptic technique. When

Considerations	<p>caring for the external drainage system, maintain a sterile, closed system to prevent infection</p> <ul style="list-style-type: none"> • Preference is to insert the spinal catheter in the operating room. • For inadvertent External CSF drainage tubing disconnections a padded forcep and sterile dead ender cap is required to be with the patient at all times
Physician /Anesthesia Responsibilities	<ul style="list-style-type: none"> • Will obtain consent for the procedure • Will apply the Initial dressing. Subsequent dressing changes can be performed by the nurse • Will flush an obstructed spinal catheter/drainage system as needed • Will access the drain tubing patient stopcock for administering medications • Will access the patient line stopcock for CSF sampling • Will remove the spinal catheter and drain
Certified Nurse Responsibilities	<ul style="list-style-type: none"> • Will flush the external CSF drainage system and stop cock prior to connection to the lumbar drain using strict aseptic technique • Will monitor the patient position, head of bed and bed height to maintain the ordered zero reference and pressure level • Must clamp drain when changing patient position or during transport (patient specific orders may be written) • Will monitor/document CSF drainage system q1h and patient temperature q4h. <ul style="list-style-type: none"> ○ Monitor CSF volume, color and clarity q1hr or as ordered ○ Record amount of CSF drainage • Will monitor/document the patient’s neurological status as ordered <ul style="list-style-type: none"> ○ Glasgow coma scale q1hr and prn ○ Spinal cord assessment q1hr (Spinal cord assessment record #100994) ○ Spinal cord pressure (labeled as ICP) q1hr and prn ○ Spinal cord perfusion pressure (labeled as CPP) q1hr and prn ○ Monitor spinal catheter insertion site q4hr • Will access the drip chamber stopcock only for CSF sampling • Will monitor vital signs q1hr, temperature q4hr • Must accompany the patient when transported off the ward

3. PROCEDURE

3.1 Connecting the Spinal / Lumbar catheter to the external CSF drainage system

3.1.1 Supplies

- External CSF drainage and monitoring system SKU #43300
- Laser level SKU #43301
- Sterile Sodium Chloride Injection, 10 ml
- Mask with shield
- Antiseptic Solution (Povidone-Iodine or Chlorhexidine)
- Alcohol Swabs
- Padded Forceps (SKU 537015)
- Designated IV pole

3.1.2 Perform baseline neurological assessment and vital signs. Record data on appropriate record.

3.1.3 Using strict aseptic technique- connect the transducer with one stopcock to the external CSF drainage system

3.1.4 Prime the system using the sterile normal saline

- 3.1.5 Connect spinal/lumbar catheter to the drainage system
- 3.1.6 Level the external CSF drainage system to the phlebostatic axis and the collection/drip chamber to the ordered pressure level position **(See Appendix A)**.
- 3.1.7 Documentation:
 - 3.1.7.1 Nurse's Progress Notes/Flow Sheet
 - date and time of connection to external CSF drainage system
 - color, consistency and amount of CSF drainage
 - baseline and post procedure neurological assessment and vital signs
 - ordered height of head of bed and level of drip chamber
 - condition of dressing
 - 3.1.7.2 Nursing Care Plan
 - date of insertion
 - ordered pressure level of drip chamber
 - ordered patient position and activity
 - specimens sent
 - frequency of neurological signs and vital signs
 - range of hourly CSF drainage ordered
 - frequency of dressing assessment
 - when and/or if to clamp tubing

3.2 Care of External CSF Drainage System

- 3.2.1 Supplies to be kept at bedside
 - Designated IV pole
 - Laser level (SPD# 43301)
 - Sterile male-female luer lock plugs (dead enders)
 - Padded forceps (SKU # 537015)
 - alcohol swabs
- 3.2.2 Level the external CSF drainage system q shift and with any position change.
 - 3.2.2.1 Ensure external CSF drainage system is mounted on designated IV pole.
 - 3.2.2.2 Zero the drainage system using the laser level to the phlebostatic axis
- 3.2.3 Ensure collection chamber is at the ordered pressure level line (cm H₂O). **(See Appendix A)**
- 3.2.4 Monitor as per certified nurse responsibilities.
- 3.2.5 Notify surgeon/intensivist of any change in neurological status.
- 3.2.6 Symptoms associated with changes in CSF drainage q1hr and prn
 - Signs/symptoms of over drainage include:
 - Headache - worse when head of bed raised
 - Decreased level of consciousness
 - Nausea, vomiting
 - Visual disturbances
 - Limb weakness
 - Hyponatremia
 - Seizures
 - Signs/symptoms of under drainage include:

- Decreased level of consciousness
- Headache – worse when head of bed lowered
- Change in motor response
- Pupillary changes
- Visual disturbances
- Irregular or decreased respiratory rate
- Nausea, vomiting

Note: *If external CSF catheter tubing inadvertently disconnects from the drainage system, clamp the catheter with a padded forcep and apply a sterile dead ender cap. Notify the Anesthetist/MRP or surgeon and obtain a new drainage system to be reconnected.*

Note: *Reassess patient and notify Intensivist/surgeon immediately if drainage begins to accumulate very rapidly (i.e.>10mls/hr for adults, or notify intensivist/surgeon if there is no drainage and no CSF pulsating in tubing as there could be possible catheter occlusion.*

3.2.7 Emptying the Drip chamber into the Collection Bag

- 3.2.7.1 Record amount of CSF in the drip chamber on appropriate record
- 3.2.7.2 Position the system stopcock with 'off' to the patient line
- 3.2.7.3 Position the drip chamber stopcock with 'off' to the sampling port. CSF will then flow into the collection bag.
- 3.2.7.4 Position the drip chamber stopcock with 'off' to the drip chamber (**See Appendix B**).

3.2.8 Clamping of the external CSF drain and Transporting Patient

- 3.2.8.1 Confirm physician order to clamp drain. (for either trial of clamping or transporting patient)
- 3.2.8.2 To clamp, position system stopcock with 'off' to the patient line (Appendix B)
- 3.2.8.3 Record CSF volume in drip chamber then drain into collection bag. Position drip chamber stopcock with 'off' to the drip chamber (see appendix B)
- 3.2.8.4 While clamped the drainage system can be left hanging on designated IV pole or added to another IV pole. The patient can also be transported with the External CSF drain positioned in this manner. For transport the drainage system could be laid in the bed.
Certified RN accompanies patient to destination. At destination if the patient condition deteriorates the RN can unclamp the External CSF drainage system. Ensure the External CSF drain is leveled to the ordered zero reference point and pressure level line.

3.2.9 CSF Sampling

- 3.2.9.1 Physician order required.
- 3.2.9.2 Supplies
 - Requisitions
 - Sterile specimen containers
 - Chlorhexidine 2% with 70% Alcohol swabs
 - 6ml Syringe
 - Face shield with mask
 - Sterile gloves
- 3.2.9.3 Ensure needleless adapter has been applied to drip chamber stopcock sampling port.

- 3.2.9.4 Position system stopcock with 'off' to the patient line. **(See Appendix B)**
- 3.2.9.5 Position the drip chamber stopcock with 'off' to the collection bag. **(See Appendix B).**
- 3.2.9.6 Perform hand hygiene
- 3.2.9.7 Vigorously scrub sampling port with chlorhexidine/alcohol pledget. Allow to air dry for 1 minute.
- 3.2.9.8 Don face shield/mask, don sterile gloves
- 3.2.9.9 Attach sterile syringe to needleless adaptor and aspirate 3-5 mL of CSF or available amount. Position the drip chamber stopcock with 'off' to drip chamber.
- 3.2.9.10 Confirm drainage system leveled and open system stopcock to patient
- 3.2.9.11 Maintaining sterile technique transfer the CSF from syringe into specimen tube(s). Label tube(s) (samples will be discarded by lab if incorrectly labeled or requisition(s) not signed)
- 3.2.9.12 **Only the physician** may sample CSF from the patient stopcock (closest to the insertion site) on the external CSF drainage tubing.

3.2.10 Replacing the Collection Bag

- 3.2.10.1 Obtain collection bag from SPD SKU#43310
- 3.2.10.2 Maintain sterile technique when replacing the collection bag. Face shield/mask and sterile gloves are worn.
- 3.2.10.3 Ensure the drip chamber stopcock is positioned with 'off' to the drip chamber. **(See Appendix B)** (This stops the flow of CSF to the collection bag and allows the bag to be changed.)
- 3.2.10.4 Using the clamp on the collection bag, occlude the tubing leading to the collection bag.
- 3.2.10.5 Twist the connector on the bag counter clockwise to disengage.
- 3.2.10.6 Connect the new bag to the tubing and hang collection bag on built in hooks.
- 3.2.10.7 Open clamp on the collection bag.
- 3.2.10.8 Dispose of the used collection bag in biomedical waste as per hospital policy.

3.2.11 Documentation

- 3.2.11.1 Nurse's Progress Notes/Flow Sheet
 - Neurological assessments on Clinical record
 - Vital signs and temperature on Clinical record
 - Patency of drainage system
 - Color, volume and clarity of CSF
 - Appearance of dressing, insertion site
 - Changing of collection bag
 - Any reason for notifying the Intensivist or surgeon
 - Response of patient to drain being clamped during transport
- 3.2.11.2 Nursing Care Plan
 - Ordered pressure level of drip chamber
 - Frequency of monitoring Neurological assessment, Vital signs Temperature
 - CSF sampling
 - Irrigation of the External CSF drain
- 3.2.11.3 Fluid Balance Record
 - Hourly CSF drainage volumes

3.3 Assisting with Removal of the Spinal/Lumbar Catheter - Physician

- 3.3.1 Prior to removal the surgeon may order a trial of drain clamping. During this process the RN increases monitoring of the patient observing for signs and symptoms of increased intracranial pressure.
- 3.3.2 If patient condition deteriorates during the trial notify the surgeon. A CT scan may be ordered or the surgeon may order the drain to be unclamped. The nurse should confirm orders for the leveling of the External CSF drainage system.
- 3.3.3 Obtain supplies for removal
 - sterile gloves
 - mask/face shield
 - 1 sterile dressing tray
 - absorbent/incontinent pad
 - normal saline
 - Chlorhexidine
 - occlusive dressing/bandaid
- 3.3.4 Position patient as requested
- 3.3.5 Monitor site for swelling, CSF leakage, signs and symptoms of infection and report to surgeon/anesthetist if any noted.
- 3.3.6 Monitor patient for changing neurological status
- 3.3.7 Documentation
 - 3.3.7.1 Nurses Progress Notes
 - patient response to trial of clamping drain
 - date and time of EVD removal
 - condition of insertion site
 - physician's name
 - type of dressing applied
 - how patient tolerated procedure
 - 3.3.7.2 Nursing Care Plan
 - trial(s) of spinal/lumbar catheter clamping
 - date of removal
 - if catheter tip sent for C&S
 - type of dressing applied
 - frequency of dressing/site assessment
 - date of suture removal (if applicable)

4. REFERENCES:

Alberta Health Services, Lumbar subarachnoid drain monitoring learning package, Calgary Zone Critical Care Unit manual Policy and Procedure 2012-05.

Care of the Patient Undergoing Intracranial Pressure Monitoring/External Ventricular Drainage or Lumbar Drainage AANN Clinical Practice Guideline Series Copyright 2011 revised December 2011.

The Ottawa Hospital- discussion with the critical care educator. Postoperative thoracic aneurysm Lumbar drain management order set 2012-05.

Appendix A

Codman System

Priming the system is done **only by the neurosurgeon or resident prior to connecting to the patient. ICU nurses are certified to prime the system.

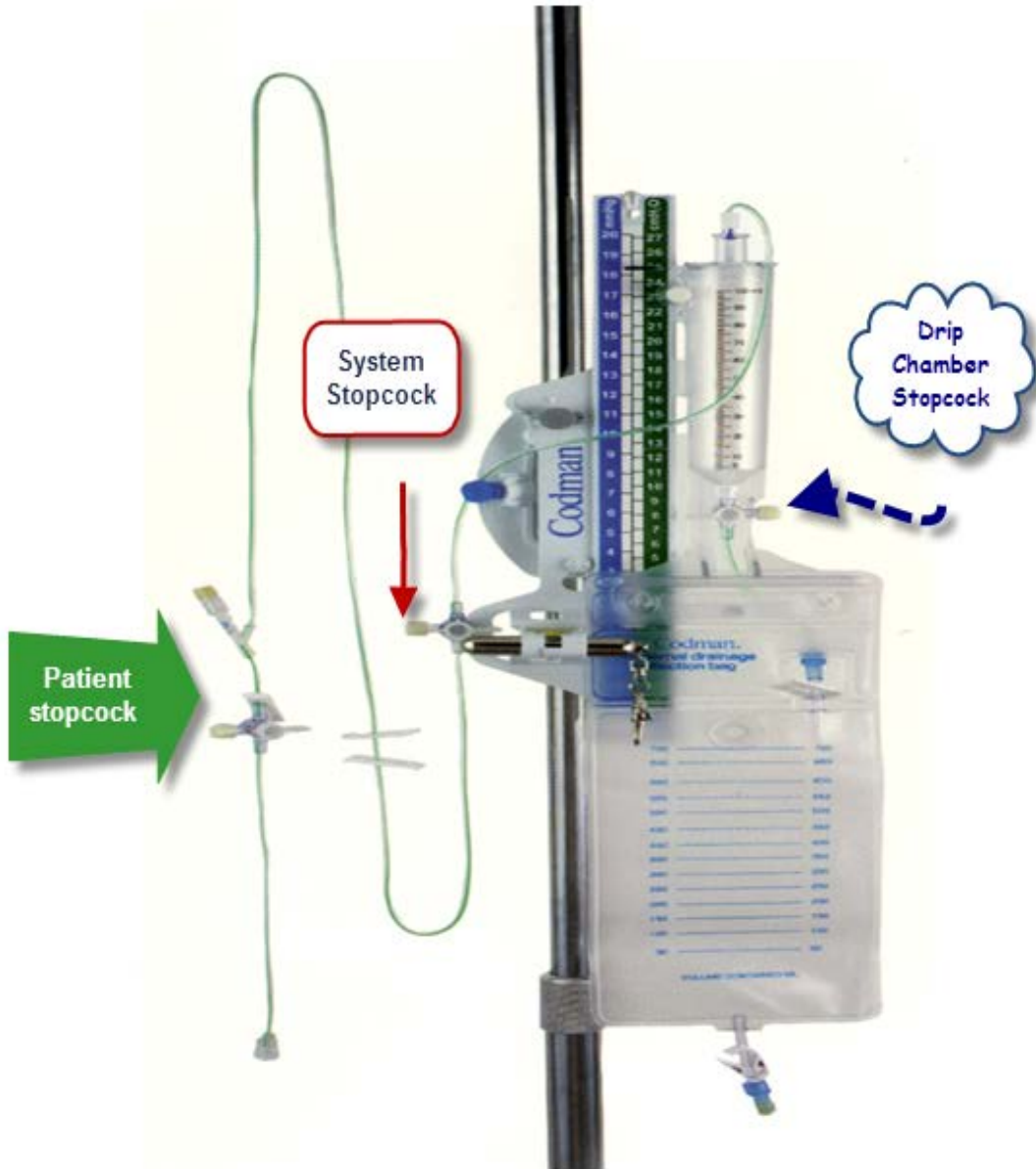




Figure 1

1) Secure the Codman system to the IV pole by fitting the clamp over the pole and tightening the blue screw. (See Figure 1)



Figure 2

2) Attach leveling device. Point the laser towards the patient. (See Figure 2)

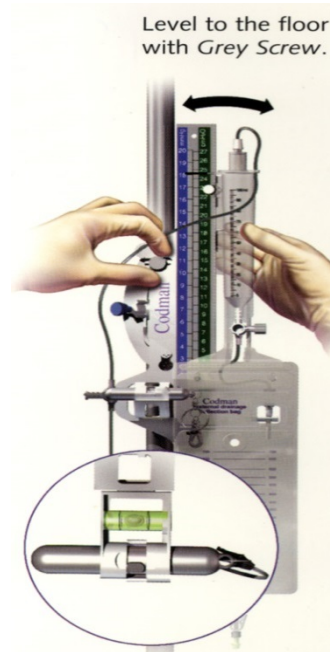


Figure 3

3) Level the unit to the floor by adjusting the grey screw. (See Figure 3)

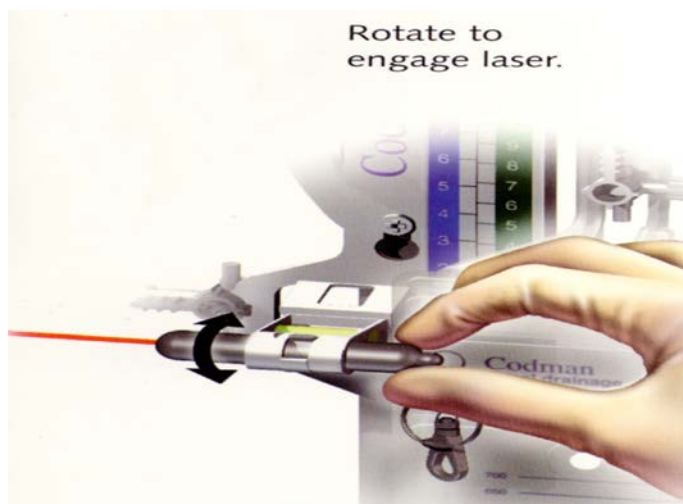


Figure 4

4) Rotate the laser pointer until the laser emits from the pointer. (See Figure 4)

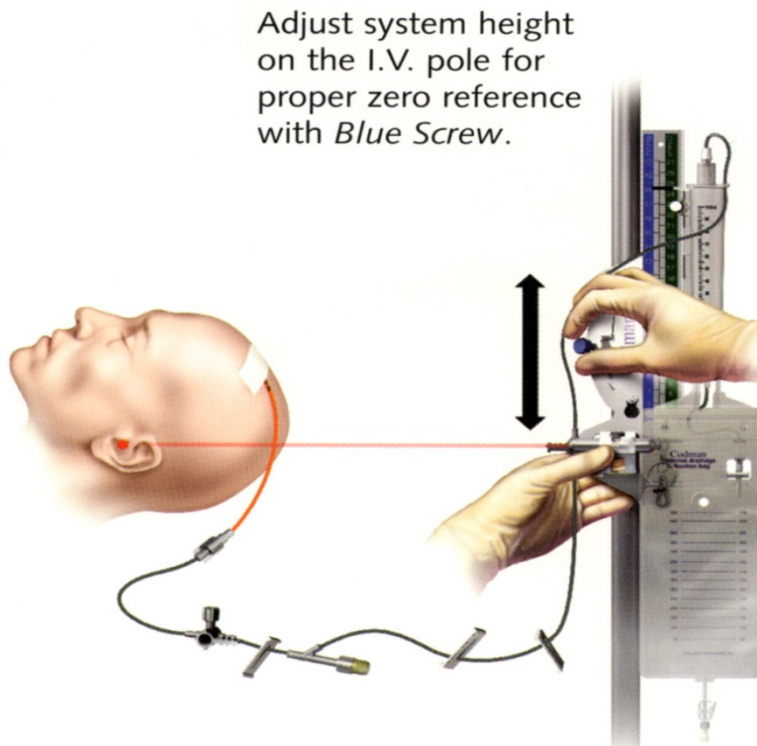


Figure 5

- 5) a. Loosen the blue screw and adjust the height of the unit centering the laser pointer to the patient's external auditory meatus (ventricular drainage) or to the lumbar catheter exit site (lumbar drainage). This represents the "zero" reference point
- b. Rotate the laser pointer until laser is extinguished

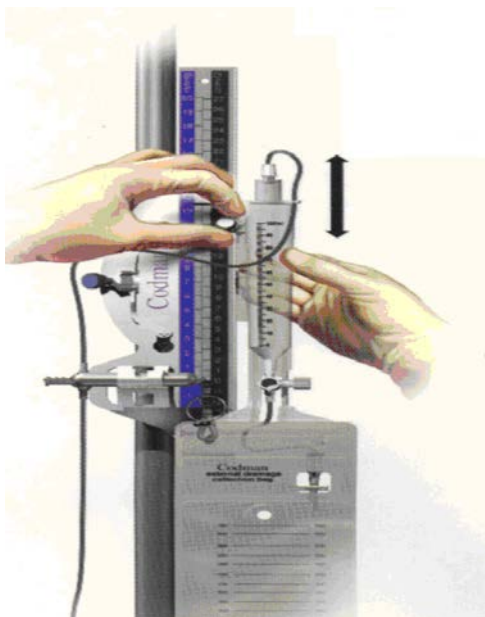
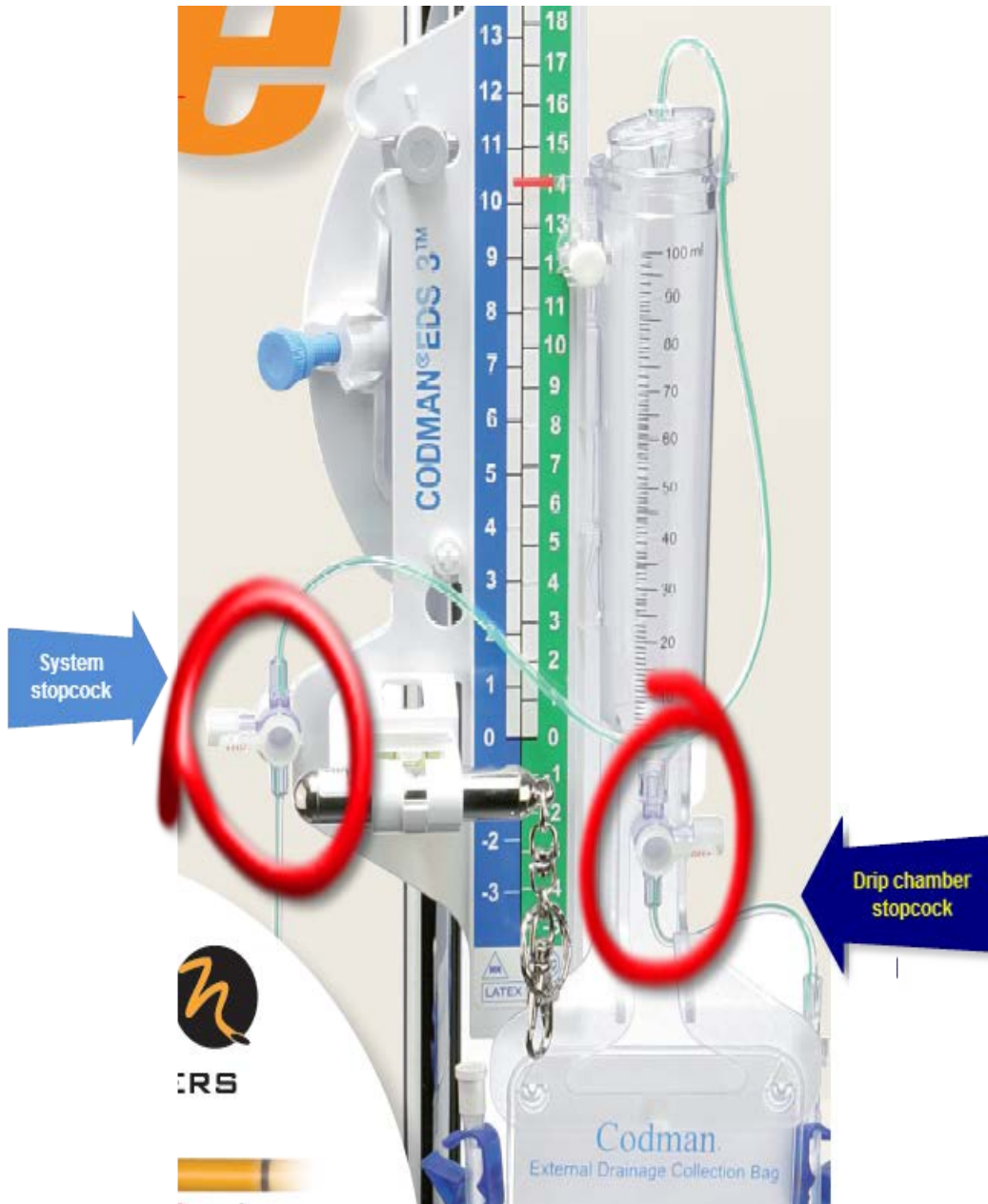


Figure 6

- Tighten all connections and make sure there are no kinks
- Position the drip chamber stopcock with 'off' to the drip chamber
- Place a needleless adapter on the port below the drip chamber

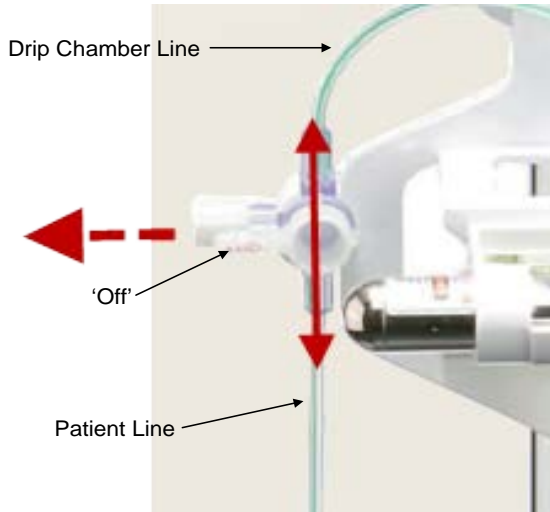
Appendix B

CSF External Drainage System



Patient stopcock (on tubing closest to patient) is **accessed or adjusted only by the surgeon** with specific order, i.e. for sampling, medication administration or drain removal.

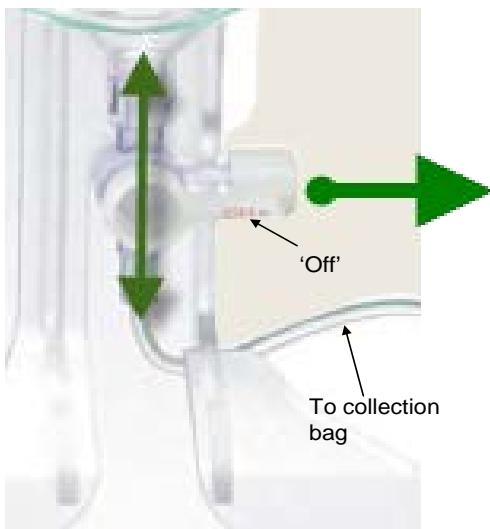
System Stopcock



System stopcock

- controls the flow of CSF to the drip chamber
- “OFF” stops the flow of CSF in the direction it is pointed
- this stopcock position** allows CSF to drain from the patient into the drip chamber

Drip Chamber Stopcock



Drip chamber stopcock

- controls whether the CSF flows into the collection bag or accumulates in the drip chamber
- when not draining the 'off' should be pointed to the drip chamber
- also used for sampling CSF (apply needleless adaptor in place of dead-ender)
- this stopcock position** allows CSF to drain into the collection bag