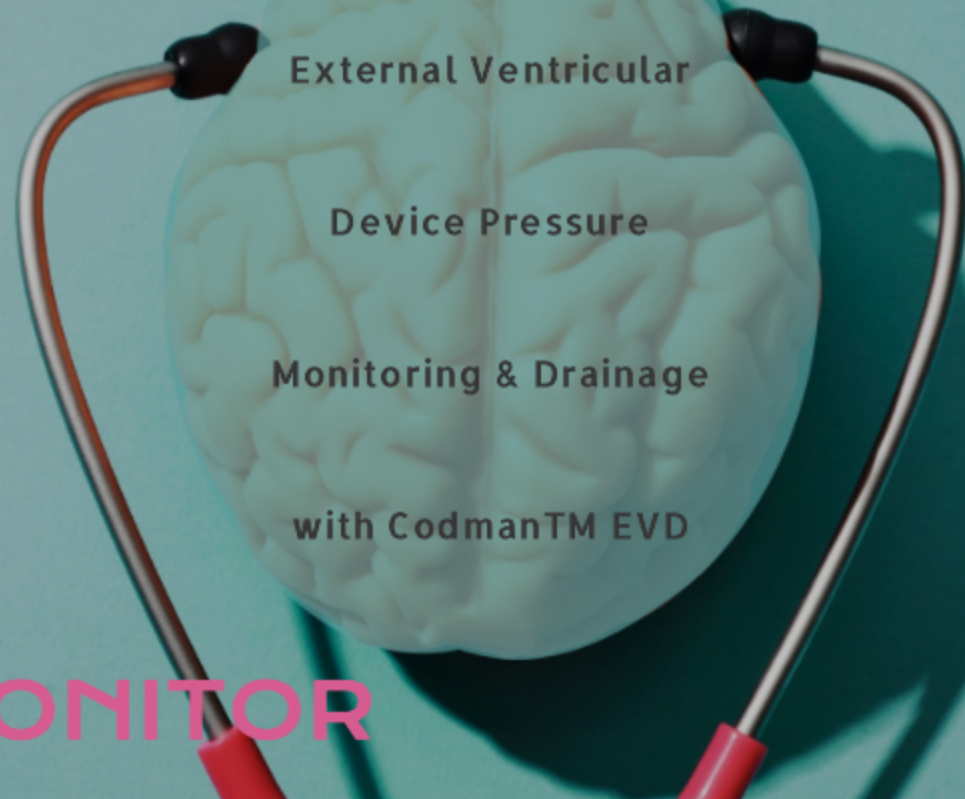




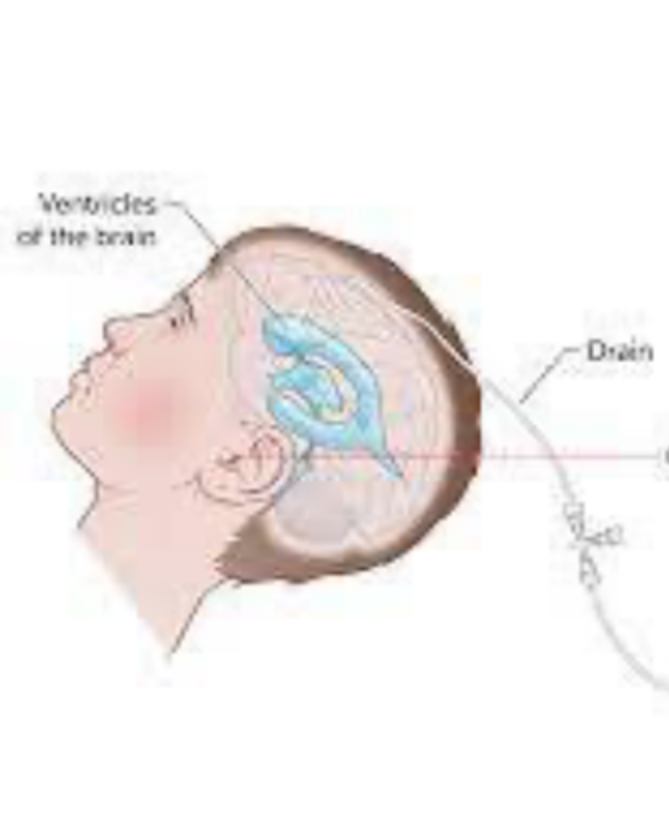
External Ventricular

Device Pressure

Monitoring & Drainage

with Codman™ EVD

EVD ICP MONITOR



EVD ICP PROTOCOL

1. Transducer Setup
2. EVD Setup
3. Connecting to Patient
4. Monitoring & Drainage
5. Obtaining CSF Sample
6. Changing Collection Bag



How Technology Communicates

THE CODMAN EVD DRAIN SYSTEM HAS A CONNECTER THAT PAIRS WITH A TELEMETRY PRESSURE CABLE. ONCE INSTERTED INTO THE PDM THE ICP AND CPP LEVELS CAN BE VIEWED. THESE LEVELS ARE NOT DIRECTLY SYNCED TO MEDITECH, YOU MUST USE AN EVD FLOW SHEET AND CHART THE VALUES INTO THE SYSTEM. THIS IS A GAP THAT DOES NOT NEED TO BE CORRECTED. THE ICP AND CPP ARE CONTINUOUSLY MONITORED; HOWEVER, THEY ARE NOT ACCURATE READS BECAUSE THE NURSE MUST TURN THE STOPCOCK OFF TO THE DRAIN IN ORDER TO GET AN ACCURATE READING. THIS IS WHY IT IS BEST THAT THE NURSE USE THE FLOW SHEET AND CHECK THESE VALUES HOURLY.

Transducer Setup

1. Insert pressure module and cable into bedside monitor.
2. Change monitor to "Neuro 6 wave".
3. Ensure ICP and CPP alarms are set appropriately according to physician's orders.
4. Wash hands.
5. Prime pressure monitoring transducer
 - 5.1. Remove tubing from distal end of transducer and discard.
 - 5.2. Attach 3-way stop-cock to patient-end of pressure tubing.
 - 5.3. Attach Sterile 10 mL pre-filled Normal Saline syringe for priming to distal luer-lock end of transducer.
 - 5.4. Flush entire system, turning the stopcocks as appropriate to ensure complete prime.
 - 5.5. Replace vented caps with non-vented caps.
 - 5.6. Turn stopcock at the transducer "off" to priming syringe.
 - 5.7. Remove priming syringe and replace with non-vented cap.
6. "Open" stopcock at patient-end of pressure tubing to patient (ports should have sterile non-vented caps in place).
7. Attach distal end (patient-end) of stop-cock to patient while maintaining aseptic technique.

NURSING ALERT:

Air in system may cause dampened intracranial pressure waveforms & prevent flow of cerebrospinal fluid into drainage system.
NEVER FLUSH SYSTEM!! FLUSHING SYSTEM MUST BE DONE BY PHYSICIAN.





Summary

THE CODMAN EVD SYSTEM USE IN MONITORING ICP HAS BEEN PROVEN NECESSARY BY CLINICAL STUDIES OF IT'S USE AND OF IT'S EFFICIENCY AT DETECTING AND PREVENTING POOR PATIENT OUTCOMES. THE PROTOCOL FOR THE EVD SYSTEM CAUTIOUSLY AND CHRONOLOGICALLY WALKS THE NURSE USER THROUGH THE PROCESS FROM START TO FINISH. INCLUDED IN THIS PROTOCOL IS OTHER USES OF THE EVD SYSTEM AND STEP BY STEP GUIDELINES ON HOW TO ACCESS IT FOR EACH USE. THE TECHNOLOGY HAS ADVANCED PATIENT CARE AND IMPROVED NURSING PERSONNELS ABILITY TO SAFELY CARE FOR EVD CANDIDATE PATIENTS.

HOW TO: GIVE FEEDBACK

Nurses can give feedback to the icu clinical nurse educator on any concerns about the protocol including its instructions and understandability. Any issues with the protocol above that can be taken to the chief of neurosurgery, the manager of neuroscience, and/or the CEO of the hospital.



References



Codman (2014). CODMAN® EDS 3TM CSF External Drainage System with Ventricular Catheter. Instructions for use.

Cooper, D.J., Rosenfeld, J.V., Murray, L. (2011). Decompressive Craniectomy in diffuse Traumatic Brain Injury. New England Journal of Medicine, 364(16), 1493-1502. DOI: 10.1056/NEJMoal102077

Cordonnier, C., Tyminski, M. (2019). Minimally Invasive Surgery with Thrombolysis in Intracerebral Hemorrhage Evacuation. American Heart Association Journals, 50(1), 1634-1635.
<https://doi.org/10.1161/STROKEAHA.119.025443>

London Health Sciences. (2013). Procedure for Setup and Use of CODMAN Intraventricular Drainage Unit in CCTC. Critical Care Trauma Centre Procedures. Retrieved from: http://www.lhsc.on.ca/Health_Professionals/CCTC/procedures/icpiv04.htm



Purpose

Allow for monitoring of ICP
Provide a system for drainage of cerebrospinal fluid (CSF) for management of elevated ICP in patients with brain injury, ischemic stroke, subarachnoid haemorrhage, intra- parenchymal haemorrhage, tumour, meningitis, or hydrocephalus.

NURSING ALERT

Aseptic Technique must be maintained
ICP & CPP should be recorded Q1H
Normal ICP is 0-15mmHg
For accurate ICP, stopcock must be "off" to EVD
and "open" to patient
EVD must hang upright at all times

EVD Setup

- Wash hands and don PPE.
- Open Codman™ EVD and hang from IV pole with rope. Attach to IV pole using blue screw.
- Tighten all connections on EVD.
- Turn stopcock between drip chamber and drainage bag “off” to drip chamber.
- Replace vented cap between drip chamber and collection bag with sterile needleless access adaptor.
- Remove system stopcock cap and attach sterile prefilled NS syringe.
- Turn system stopcock “off” to patient line and prime tubing towards drip chamber.
- Turn system stopcock “off” to drip chamber and prime patient line of tubing ensuring all air is purged from system, including stopcock closest to patient end.
- Apply sterile non-vented cap to distal end of patient line tubing.
- Turn system stopcock “off” to priming syringe and apply sterile non-vented cap to system stopcock.
- Turn system stopcock “off” to patient until system is connected and levelled as ordered by physician.



CONNECTING TO PATIENT

1. Attach laser level to Codman® EVD with laser pointing towards patient.
2. Level unit to floor by adjusting grey screw and visualizing bubble level above laser level.
3. Rotate laser pointer until laser emits from pointer towards foramen of Munro (external auditory meatus).
4. Adjust height of unit by loosening blue screw on Codman® System or adjust height of bed. This represents “zero” reference point. Rotate laser off once levelling complete.
5. Adjust set pressure in cm H₂O on Codman® system as per physician’s order.
6. Perform hand hygiene, don PPE.
7. Scrub ventriculostomy 3-way stopcock connection vigorously with alcohol and allow to dry for 1 minute.
8. Remove non-vented cap from 3-way stopcock of pressure monitoring system and remove dead-end from patient line of Codman® system and attach to ventriculostomy drain with aseptic technique.
9. Confirm physician’s orders for drainage and set pressure limit.



MONITORING & DRAINAGE

A. ICP MONITORING

1. Select "mean" ICP for monitoring and adjust monitor scale as appropriate for patient's intracranial pressure.

NOTE: Alarms should be individualized to patient need and should never be turned off.

2. Zero transducer at beginning of each shift, after any interruption in monitoring and PRN.

3. Record a waveform strip at beginning of each shift. Record ICP hourly and PRN.

B. CONTINUOUS DRAINAGE

1. Verify zero reference is at tragus of the ear

2. Level EVD drain at beginning of each shift and with change of patient position

3. Turn stopcock off to drip chamber

4. Observe and record color, clarity, and volume of CSF Q1H

5. Turn stopcock off to patient, turn stopcock below drip chamber off to sampling port

6. Once drip chamber is empty, open system stopcock to drip chamber and monitoring position

7. Change collection bag when 3/4 full



Obtaining a CSF Sample

1. Confirm physician's order for sample.
2. Wash hands.
3. Don appropriate personal protective equipment including mask.
4. Swab needleless adapter port between drip chamber and collection bag vigorously using alcohol swabs and allow to dry.
5. Confirm distal stopcock is "off" to EVD.
6. Attach syringe to needleless adapter port between drip chamber and collection bag and turn stopcock "off" to drainage bag.
7. Aspirate required volume of CSF into syringe.
8. Turn sampling stopcock "off" to drip chamber.
9. Disconnect syringe and transfer CSF to sterile specimen container(s) using caution to maintain sterility of sample.
10. Re-establish CSF drainage as ordered.
11. Label sample with patient's name, MRN#, date and time sample collected.
12. Send specimen to lab with appropriate requisitions.
13. Document procedure on Intensive Care Flowsheet.



Changing Collection Bag

1. Wash hands.
2. Don PPE including mask.
3. Apply clamps to top of collection bag to be discarded; ensure stopcock above collection bag is "off" to drip chamber.
4. Swab collection bag connection with alcohol and allow to dry for 1 minute.
5. Disconnect collection bag from EVD and reattach new collection bag while maintaining aseptic technique.
6. Secure collection bag to mounting posts on EVD.
7. Discard old collection bag filled with CSF into biohazard bin.



Evidence Based Practice

THE DECRA TRIAL (DECOMPRESSIVE CRANIECTOMY IN DIFFUSE TRAUMATIC BRAIN INJURY: THIS TRIAL COMPARED DECOMPRESSIVE DECOMPRESSIVE CRANIECTOMY WITH STANDARD CARE IN PATIENTS WITH TBI'S. THE STUDY HIGHLIGHTED THE SIGNIFICANCE OF ICP MONITORING AND MANAGEMENT, OFTEN INVOLVING EVD'S, IN IMPROVING SURVIVAL AND FUNCTIONAL OUTCOMES. (COOPER, 2011).

THE MISTIE TRIAL (MINIJMALLY INVASIVE SURGERY WITH THROMBOLYSIS IN INTRACEREBRAL HEMORRHAGE EVACUATION): THIS STUDY FOCUSED ON PATIENTS WITH ICH'S AND DEMONSTRATED THE IMPORTANCE OF ICP MONITORING, THROUGH EVD'S, IN GUIDING INTERVENTIONS TO MANAGE INCREASED ICP AND IMPROVE OUTCOMES. (CORDONNIER, 2019).

