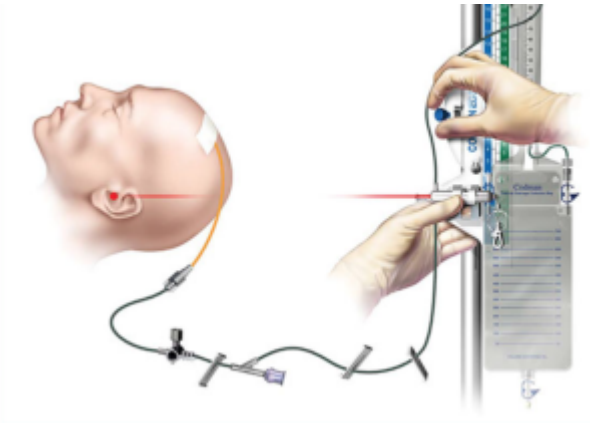
External ventricular drainage management



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- Effectiveness of External Ventricular Drainage versus Lumbar Drainage in Aneurysmal Subarachnoid Hemorrhage: A Propensity-Matched Multicenter Study
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- Prepontine Cistern Filling Independently Predicts Poor Neurologic Outcomes in Ruptured PICA Aneurysms
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External ventricular drainage postoperative management is thought to influence long-term patient outcomes, rates of healthcare-associated ventriculitis, the incidence of delayed cerebral ischemia, the need for a ventriculoperitoneal shunt, and intensive care unit (ICU), and hospital length of stay.

Evidence on the optimal management of external ventricular drainage remains limited. Additional multicenter prospective studies are critically needed to guide approaches to the management of EVD [1)].

Nursing

Nursing should ensure proper zeroing, placement, sterility, and integrity of the external ventricular drainage system. Intracranial pressure waveform analysis and close monitoring of cerebrospinal fluid drainage are extremely important and can affect the clinical outcomes of patients. In some institutions, nursing may also be responsible for CSF sampling and catheter irrigation.

Maintenance, troubleshooting, and monitoring for External ventricular drainage complications have essentially become a nursing responsibility. Accurate and accountable nursing care may have the ability to portend better outcomes in patients requiring CSF drainage [2)].

A study aims to assess the knowledge, attitudes, and practices of nurses from different departments regarding bedside EVD insertion in patients with acute hydrocephalus. EVD and intracranial pressure (ICP) monitoring competency checklists were developed, and a quasi-experimental, single-group, pre/post-test study was conducted at a university hospital in Jeddah, Saudi Arabia, in January 2018 during an educational program. The neurosurgery team determined program efficacy using pre/post-questionnaires. All attendees who agreed to fill in the pre- and post-survey and whose data were complete were included in the study. Results Of the 140 nurses who participated in the study, the data of 101 were analyzed. Knowledge level improved significantly between the pre- and post-test; for example, when asked about administering antibiotics before EVD insertion, the pre-test correct response rate of 65% increased to 94% in the post-test ($p<0.001$), and 98% considered the session informative. However, the attitude toward bedside EVD insertion did not change after the teaching sessions. This study emphasizes the importance of ongoing nursing education, hands-on training, and strict adherence to an EVD insertion checklist to achieve successful bedside management of patients with acute hydrocephalus [3)].

Mandatory Checks (Treatment Orders)

At the beginning of each shift it is the responsibility of the nurse RN caring for a patient with an EVD to complete the following mandatory safety checks:

The patient has a valid EVD order set on EMR that includes; height (value), height (units), reference point (e.g. Tragus), drainage (e.g. continuous), and notify RMO if drainage is greater than (mL/hr).

Reportable limits are noted and adhered which are patient-specific.

EVD drainage point is set at the prescribed level (as per Neurosurgeon documentation in post-operative orders).

EVD transducer is leveled to the patient's external auditory meatus (Tragus).

EVD column is oscillating and patent.

The Head dressing is dry and intact.

Report any signs of changes in the patient's neurological condition to the Medical team.

Documentation

It is imperative that the management of the drain is documented hourly.

Hourly documentation must include:

Drain status (e.g. clamped/unclamped).

Drain leveled (e.g. tragus/ mid-sagittal line).

Drain height (cmH2O).

Hourly output (mL).

Cerebrospinal fluid appearance (e.g. rosé, clear, cloudy)

Is the drain oscillating?

Patient position (e.g. supine, lateral, sitting up in a chair).

Patient state (e.g. alert, crying, settled, c/o headache).

Dressing status (e.g. dry and intact, old ooze).

Dressing intervention.

Opening pressure

Immediately obtained after the ventricular drainage placement, the mean opening pressure has significant prognostic implications and it influences the strategy and desired height of the cerebrospinal fluid collection system.

Height

External ventricular drainage height management.

Cerebrospinal fluid collection

External ventricular drainage cerebrospinal fluid collection.

Monitoring

Other important aspects of nursing management include monitoring for signs and symptoms of intracranial hypertension and inspecting the entire EVD system and insertion site for CSF leak, which is known to predispose to infection [4)]

Noting the quantity, color, and clarity of CSF is also important. Clinically relevant scenarios can be detected by noting each of these factors such as an increase in the hourly output may signal intracranial hypertension, bright red bloody CSF may indicate aneurysm re-rupture, and cloudiness of CSF may indicate the presence of an infection, respectively [5) 6)]

The available evidence supports adopting early clamp trials and intermittent cerebrospinal fluid (CSF) drainage. However, a recent survey demonstrated that most neurological ICUs employ the opposite approach of continuously open EVDs and gradual weaning. In this article, we review the literature and arguments for and against the different EVD approaches. We conclude that an early clamp trial and intermittent CSF drainage can be safe and result in fewer EVD complications and a shorter length of stay. Given the discrepancy between the available evidence and current practice, more studies on the optimal management of EVDs are warranted with the greatest need for multicenter prospective studies [7)].

Complications

External ventricular drainage complications

1)
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7)

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