

External ventricular drain

What is an external ventricular drain (EVD)?

An external ventricular drain (EVD) is a temporary device that allows drainage or diversion of excess fluid called cerebrospinal fluid (CSF) from the brain and spine. It consists of a thin tube that is inserted during an operation under a general anaesthetic, that comes out of the head and drains fluid into a collection chamber outside the body. This device is attached to a mobile pole which allows your child to move about under supervision by nursing or medical staff.

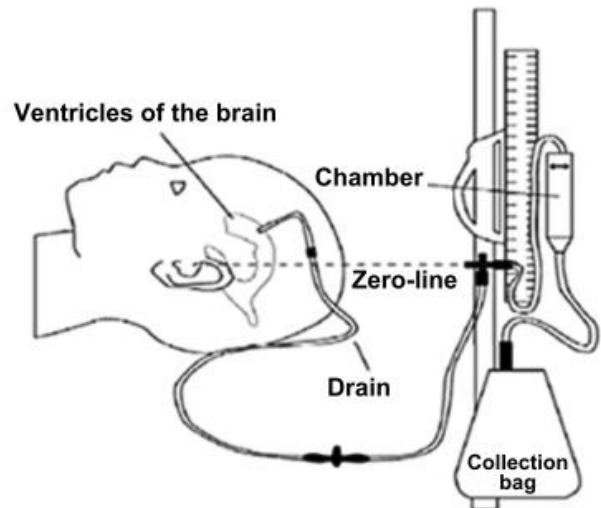


Figure 1: External ventricular drain setup

What is CSF?

Cerebrospinal fluid (CSF) is a clear, colourless fluid that is produced in the ventricles of the brain. It circulates through the brain and spinal cord before being reabsorbed on the surface of the brain into the blood stream. The role of CSF is to provide cushioning and nutrients to the brain and spinal cord as well as remove waste products.

Why does my child need an EVD?

An EVD can be needed for a variety of reasons. An EVD is inserted when there is raised intracranial pressure (ICP). Raised intracranial pressure occurs when there is an increased pressure in the skull caused by:

- A build-up of fluid in the brain (hydrocephalus)
- Swelling of the brain
- Bleeding

If there is an over production of CSF, an obstruction of the flow pathways (due to a tumour or other causes) or a problem with reabsorption pathways (due to infection or blood) then CSF may accumulate in the ventricles; causing them to swell and create pressure within the brain. This is called hydrocephalus. An EVD is a temporary method of treatment to help drain CSF and relieve the pressure in the brain.



How does an EVD work?

An EVD system uses gravity to drain CSF from the ventricles in the brain. This means the amount of CSF that drains depends on the height of the drip chamber in relation to the ventricles of the brain. Your child will have their EVD set at a height prescribed by the neurosurgeon to regulate drainage; and this may fluctuate throughout the admission depending on your child's clinical presentation. The EVD aims to relieve the pressure within the brain caused by a build-up of CSF. When the pressure in the ventricles exceeds the prescribed amount by the neurosurgical team, the CSF will flow through the EVD tubing and drain into the collection chamber. The amount that drains each hour may vary, but it is essential the drain is level to reduce the problems associated with over or under drainage. The CSF is measured and monitored each hour and may change colour.

What to expect while having an EVD?

Prior to the insertion of an EVD the Neurosurgical team will always discuss the procedure with you, answer any questions you may have and obtain consent.

Once the EVD is inserted, it needs to remain level. This means the EVD is positioned at the same height as the ventricles within the brain. The EVD will be levelled by using a laser pointer to your child's ear (when lying on their back) or between the eyebrows (when on their side). Clamping and re-leveling needs to occur every time your child changes position.

It is critical that your child does not sit up, move positions, or mobilise without informing nursing staff first. Only trained staff are allowed to reposition the drain.

Every hour the nursing staff will assess the EVD output, ensure the drain is levelled correctly and check that there are no leaks from the insertion site. The nursing staff may clamp the drain under the instruction of the neurosurgeon for certain activities (such as toileting, showering, mobilising) or when a specific volume is met (to prevent over drainage) or when the neurosurgical team is considering removing the drain. Your child's neurological condition will need to be checked regularly; this means your child will be woken regularly overnight. If your child is experiencing headaches, nausea/vomiting, double/blurred vision or seems more irritable or drowsy than usual, please let your nurse know immediately.

How long does the EVD stay in?

This varies for each child and depends on why the EVD was inserted in the first place. Your child will be required to remain in hospital until the drainage system is removed. Some children need assistance with ventricular drainage over a longer period of time, in this case the Neurosurgical team will discuss with you the potential need for a permanent system called a shunt.



How is the EVD removed?

Prior to removing the EVD, it is often clamped for a day or two. This helps us assess if there is a reliance on the EVD or if it is still required, prior to removing it. The EVD is often removed on the ward by a doctor from the Neurosurgical team. The stitches holding the EVD in place are removed and the EVD is gently pulled out. A stitch is then required to be inserted at the removal site to prevent a leak and a dressing is placed on the site. After your child's EVD is removed, you should monitor the wound site for any signs of leaking or infection and inform your bedside nurse or the Neurosurgical CNS (if you are an outpatient) if you have any concerns. Prior to discharge you will be provided with wound care education and follow up for any ongoing care requirements such as stitch removals or follow up scans.

Key points to remember.

- An EVD is a temporary device that drains excess fluid from the brain and spine.
- An EVD may be needed due to infection or raised ICP.
- Your child must not sit up or move positions without a nursing staff member present.
- The EVD will be frequently levelled by the bedside nurse.
- Only the neurosurgical team prescribes the EVD height.
- Parents are not to touch the EVD.
- Your bedside nurse will be able to assess your child if you have any concerns.



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