

External Ventricular Drains (EVD) and Externalized Shunts



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What is Cerebral Spinal Fluid (CSF)?

There are 4 spaces in your child's brain that hold fluid. These spaces are called ventricles. Each of the 4 ventricles makes a clear fluid that circulates in and around your child's brain. This fluid is called cerebral spinal fluid (CSF). CSF feeds your child's brain with nutrients and cushions both it and the spinal cord. Usually, CSF is made in the ventricles and then reabsorbed into the blood stream. CSF is normally made and reabsorbed at the same rate.



To learn more about the brain's ventricles and CSF, explore About Kids Health on the BC Children's website.

What is an External Ventricular Drain (EVD)?

Some infections or injuries involving the brain can cause too much CSF to be made or not enough to be reabsorbed. Too much CSF can increase the pressure in your child's head

There is a temporary way to drain CSF and relieve pressure in your child's head. This is done by placing a flexible tube into the ventricle on the right or left side of your child's head. The tube is attached to a drainage system outside of your child's body that is carefully positioned to control the amount of CSF that is drained. Normally, CSF is a clear and colorless fluid. However, the color of the CSF may vary depending on what is going on with your child.

Why would my child need an EVD and for how long?

An EVD is always a short term treatment. Your child's doctor may recommend an EVD if:

- ▶ Your child has had a head injury that caused swelling of the brain tissue.
 - An EVD would drain CSF out of the brain and make more room in the skull.
 - The EVD catheter may be attached to a special monitor that records the amount of pressure within the skull. This information will help your child's health care team decide what type of treatment is best for your child.
 - The EVD will be kept in place until the swelling has come down and the amount of pressure in your child's head is within acceptable limits.
- ▶ Your child has a condition, such as bleeding in the ventricles or infection in the brain.
 - An EVD would drain the bloody or infected CSF out of the body and also decrease the pressure in the skull.
 - The EVD will be kept in place until the bleeding stops and the blood has cleared from the CSF pathway. Your child's doctor will also check that your child does not get a headache or other signs of pressure in his or her head when the EVD drainage system is shut off.
- ▶ Your child has a ventricular shunt that has become infected.
 - The ventricular shunt may be removed and replaced with an EVD until the infection has been treated.

- The nurse will take samples of CSF from the EVD drainage catheter. If the sample shows the infection has gone away, the EVD can be taken out and a new shunt can be put in. This is usually 7-10 days after your child starts intravenous (IV) antibiotics to treat the infection.
- ▶ Your child will have surgery to remove a brain tumor.
 - In some cases, placing an EVD before the surgery will decrease the pressure in the skull and may make it easier for the surgeon to remove the tumor.
 - The EVD may be left in for a short time after surgery to clear blood that may have leaked into the areas where CSF flows.
- ▶ Your child will have a procedure to unblock the fluid pathway between the ventricles. This is called a ventriculostomy.
 - Your child's doctor may recommend an EVD until it is clear that the ventriculostomy is working. Putting a clamp on the EVD and monitoring the pressure in your child's head will show whether the ventriculostomy has worked.
 - If the ventriculostomy has not worked, the EVD will be replaced with a permanent shunt.
- ▶ Your child's internal shunt needs to be externalized.
 - This may be done if your child:
 - has a peritoneal infection or cyst or
 - if your child is having difficulty absorbing the CSF through the peritoneal membrane.
 - An externalized shunt looks similar to an EVD and is cared for like an EVD. A shunt is externalized by surgically pulling out the drainage catheter than normally sits in the chest or abdomen and attaching it to a drainage container outside of the body.
 - The external shunt will remain externalized until the problem in your child's abdomen goes away.

Before the EVD is removed, the doctor may place a clamp on the EVD drainage system. The clamp will prevent the EVD from draining CSF. Your child's health care team will check to make sure your child is absorbing CSF. If there is no increased pressure in your child's head while the EVD is clamped, your child's health care team will know it is safe to remove the EVD.

What can I do to keep my child safe while the EVD is in place?

Your child will need to be watched very closely while the EVD is in place. This is what you can watch for:

The Bandage where the EVD is Placed:

The bandage should stay on at all times unless otherwise ordered by the doctor.

- ▶ **Do not let your child pick at the bandage as this can cause an infection.**
- ▶ **Do not let the bandage get wet.**
- ▶ **If the bandage becomes loose or falls off, let the nurse know so that it can be replaced.**
- ▶ **If CSF leaks from the site, your child's pillow will feel damp. Let the nurse know immediately.**

The Drainage Tubing and Collection Chamber:

- ▶ **Watch that the drainage tube or bag does not get pulled or caught in the bed rails.** The drainage tube could break or come out. If this happens, your child may have to have another surgery to put the EVD back.
- ▶ **Always ask your nurse for help any time you wish to move your child!**
- ▶ **Never adjust any stopcock levers on the tubing.** This can prevent the CSF from draining and seriously harm to your child.

Only a doctor or nurse should ever adjust the stopcock levers.

- ▶ **Watch for any leaks on the outside of the bag or tubing.** If you notice any CSF leaking, notify the nurse immediately.
- ▶ **Never adjust the height of the drainage bag or take the bag out of the blue levelling device.** This can cause too much or too little CSF to drain which can seriously harm your child. Only a nurse or doctor should ever move the drainage system.

Positioning in Bed:

Your child will be required to stay at a very specific level in bed while the EVD is draining. This ensures the level of the drainage system remains constant. The nurse will mark the bed to make it easy to see where your child should be.

- ▶ **If your child slips down in bed, let your nurse know immediately.**
- ▶ **Never raise or lower the head of your child's bed without a nurse present!**
- ▶ **Do not let your child sit up while the EVD is draining.** This may result in the fluid draining too quickly. Remind your child to remain lying down.
- ▶ **If your child must get up to go to the bathroom, ask for help.** The nurse must adjust the system to allow your child to do this safely.

General Behaviour:

Your nurse will assess your child's neurological status on a regular basis while the EVD is in place. Small changes in your child's behavior that may seem unimportant could be very important to your child's health care team.

- ▶ **Report any changes in your child's behaviour to your nurse and doctor.**
- ▶ **Report to your nurse immediately if:**
 - **your child complains of a headache**
 - **your child is sick to his or her stomach or throws up**
 - **your child becomes more and more tired.**

Can my child leave the unit while the EVD is in place?

Your child may have to leave the unit to go for tests or procedures while the EVD is in place. Your nurse will ensure that the EVD is clamped for transport and that your child is stable. The nurse will accompany your child to their tests and procedures to ensure they are safe.

Can my child go to the playroom while the EVD is in place?

Your child's doctor must make the decision to allow your child to go to the playroom. This decision is usually made after your child has had a clamp on the EVD for a long time without any increase pressure in his or her head. If your child's doctor allows your child to go to the playroom, it will be for one hour at a time. A nurse will assess your child before they leave the unit and upon their return to the unit to ensure they are okay.

Before your child goes to the playroom, your nurse will explain how to deal with a broken line, in case the small tube gets broken. The Child Life workers are also trained how to deal with a broken line in the event it should occur while in the playroom. **Always ensure you have reviewed emergency care prior to leaving the unit with your child!**

At Children's & Women's Health Centre of British Columbia we believe parents are partners on the health care team. We want you to be as informed as possible. This brochure will answer some of your questions. Please ask about things you do not understand and share your concerns. If you have any questions, please speak with your nurse or physician