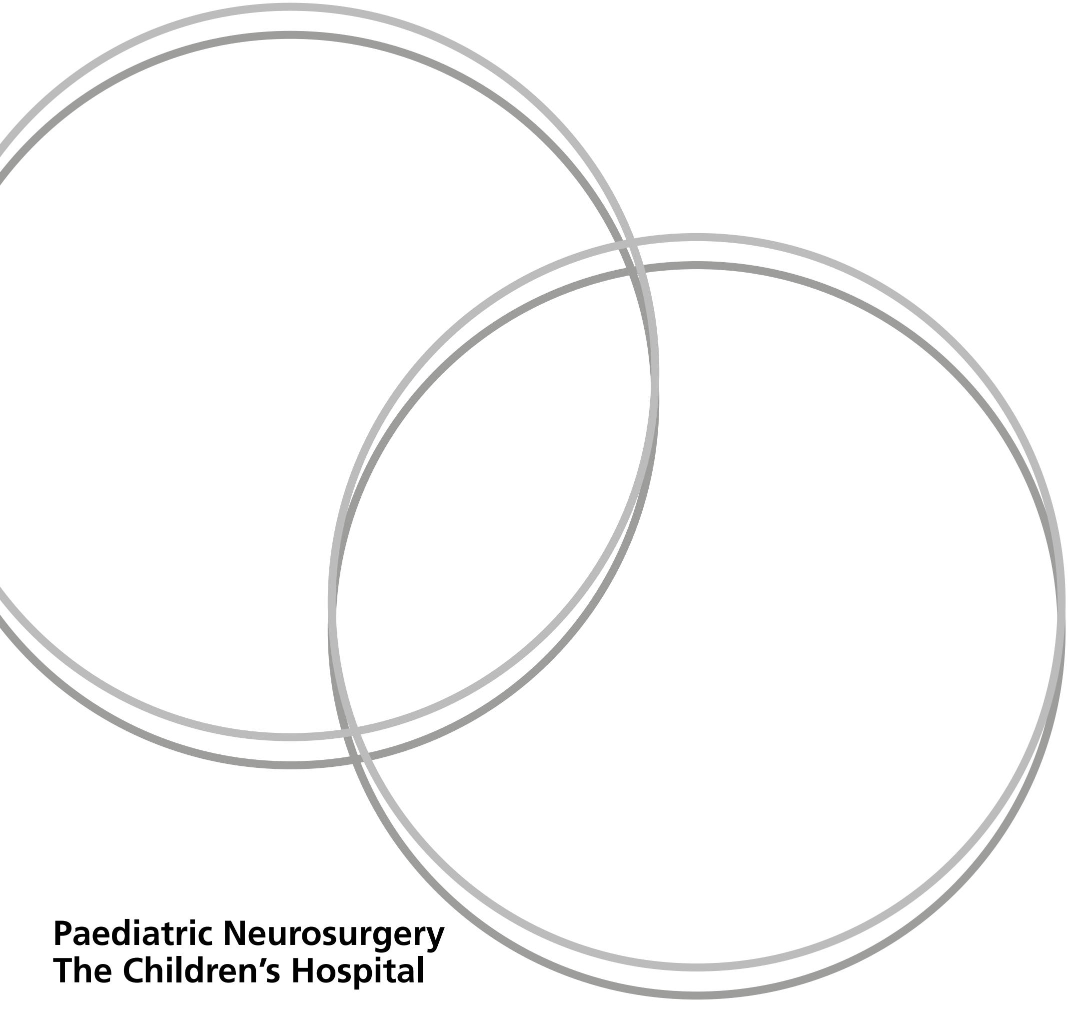
Oxford University Hospitals
NHS Foundation Trust

# External Ventricular Drain

## Information for parents and carers



Paediatric Neurosurgery
The Children's Hospital

# What is an external ventricular drain?

An external ventricular drain (EVD) is a soft, flexible tube (about 3mm in diameter) that is inserted into the ventricles in the brain. It is held in place with stitches and attached to an external container.

# Why does my child need an EVD?

Every child produces a fluid called cerebrospinal fluid (CSF). Within the brain there are four chambers, called ventricles, where this fluid is produced. CSF flows in the ventricles, around the brain and around the spinal cord. It protects, nourishes and discards waste products from these vital organs.

If a blockage develops in one of the ventricles (due to blood, infection or a tumour), this means the CSF cannot flow freely. When this happens, there is a build-up of CSF within the ventricles, causing them to swell and create pressure within the brain. This is called hydrocephalus.

Hydrocephalus needs to be treated, to prevent symptoms from becoming worse. An EVD (external ventricular drain) is a temporary method of treatment that helps the CSF to drain away and relieve the pressure.

The EVD drains the excess CSF away into the container, which allows the fluid to be measured and monitored. The EVD will also be set at a certain height, to help regulate the drainage.

An EVD allows fluid to be drained out of the brain and antibiotics to be given into the brain, if there is an infection. It also allows blood to be drained out of the brain after a procedure (e.g. removal of a brain tumour).

Your child will be in hospital until their CSF is free of blood or infection (depending on the reason why the EVD has been inserted). When the CSF is clear, the EVD can be removed.

## What does the operation involve?

The operation to insert the EVD will be carried out under a general anaesthetic. This means your child will be unconscious and not be able to feel anything.

A consultant anaesthetist (doctor who helps to put your child to sleep) will talk to you and your child (if appropriate) about the anaesthetic. This will be at your child's pre-operative visit, which could be on the day of their operation or a few weeks before, depending on how urgent their surgery is.

## What are the risks?

This is a simple and safe operation. However, as with all operations, it carries some risks. These include:

- infection of brain fluid
- bleeding on the brain
- wound infection
- damage to brain tissue
- swelling of the brain
- leakage of CSF from EVD site.

The surgeon will discuss the risks with you in more detail.

## Benefits

An EVD allows immediate drainage of brain fluid or blood in an emergency situation. It is a temporary measure, which allows the doctors to see whether a more permanent drain is required.

# Alternatives to an EVD

An EVD is a temporary measure, which is usually used in an emergency situation, following surgery, or if there is an infection of the brain fluid.

There are no alternatives to an EVD in the short term (the early stages after being admitted with a bleed/infection/or brain tumour). In certain cases (e.g. spinal surgery) a lumbar drain may be used to divert the CSF (your surgeon will discuss this with you prior to surgery).

Your child's neurosurgeon will regularly assess whether your child will need a more permanent option, such as a VP shunt. There is an information leaflet available, which you will be given if required.

# What is a lumbar drain?

A lumbar drain is similar to an EVD, but is inserted into the subarachnoid space (area around the spinal cord) in the lumbar area of the spine (the lower part of the spine).

The tubing will come out on your child's lower back and will be held in place with stitches.

As with the EVD, the tubing is attached to an external container, which is where the CSF collects and is measured. The lumbar drain will also be set at a certain height, to help regulate the drainage.

Lumbar drains are often used when wounds are not healing and are leaking CSF after neurosurgery. The lumbar drain provides a way of diverting the CSF away from the neurosurgery wound, giving it time to heal.

The monitoring and care of a lumbar drain is exactly the same as that of an EVD. The removal of the drain may be done on the ward, or your child may need to have this carried out in theatre. The surgeons will discuss this with you.

# Anaesthetic risks

In modern anaesthesia, serious problems are uncommon. Risk cannot be removed completely, but modern equipment, training and drugs have made general anaesthesia a much safer procedure in recent years.

Throughout the whole of life, a person is at least 100 times more likely to suffer serious injury or death in a road traffic accident than as a result of anaesthesia[1].

Most children recover quickly and are soon back to normal after their operation and anaesthetic. Some children may suffer side effects like sickness or a sore throat. These usually last only a short time and there are medicines available to treat them if necessary.

The exact likelihood of complications depends on your child's medical condition and on the nature of the surgery and anaesthesia your child needs. The anaesthetist can talk to you about this in detail before the operation.

# Consent

We will ask you for your written consent (agreement) for the operation to go ahead. If there is anything you are unsure about, or if you have any questions, please ask the doctor before signing the consent form.

# Fasting instructions

Please make sure that you follow the fasting (starving) instructions given to you by your child's nurse or doctor.

If this surgery is an emergency, the nurses on the ward will give you fasting instructions.

Fasting is very important before an operation. If your child has anything in their stomach whilst they are under anaesthetic, it might come back up while they are unconscious and get into their lungs.

# Pregnancy statement

All girls aged 12 years and over will need to have a pregnancy test before their operation or procedure. This is in line with our hospital policy.

We need to make sure it is safe to proceed with the operation or procedure, because many treatments including anaesthetic, radiology (X-rays), surgery and some medicines carry a risk to an unborn child.

The pregnancy test is a simple urine test and the results will be available immediately. If the result is positive, we will discuss this and work out a plan to support your child.

# What happens before the operation?

Your child will most likely be an inpatient on the ward before their surgery, after being admitted as an emergency.

Your child will then be seen before their surgery by the neurosurgical team. The doctors will also take your child's medical history and samples of blood. This is to make sure the right type of blood is available during the surgery, if it is needed. The blood test will also be sent to check their electrolyte levels (biochemistry) and for any signs of infection.

# In the anaesthetic room

A nurse and one parent or carer can come with your child to the anaesthetic room. Your child can also take a toy or comforter.

It may be possible to give the anaesthetic with your child sitting on your lap. Your child may either have anaesthetic gas to breathe, or an injection through a cannula (a thin plastic tube that is placed under the skin, usually on the back of the hand). Local anaesthetic cream (EMLA or Ametop, sometimes known as ‘magic cream’), can be put on their hand or arm before injections so they do not hurt as much. It works well for 9 out of 10 children.

If the anaesthetic is given by gas, it will take a little while for your child to be anaesthetised. They may become restless as the gases take effect. If an injection is used, your child will normally become unconscious very quickly indeed. Some parents may find this upsetting.

Once your child is asleep you will be asked to leave quickly so that the medical staff can concentrate on looking after them. The nurse will take you back to the ward to wait for your child.

Your child will then be taken into the operating theatre to have the operation. The anaesthetist will be with them at all times.

# What happens during the operation?

Before the operation starts, some of your child's hair may have to be shaved. The surgeons will try to shave the smallest area possible and the hair will grow back in time, after the operation.

The surgeon will then make an incision (cut) approximately 3cm long on their scalp. They will make a small hole in the skull (about the size of a 20p piece), through which they can place one end of the EVD. This will be positioned within the ventricle (fluid spaces) in the brain.

The rest of the tubing will be tunnelled below the skin and brought out onto the scalp on the left or right hand side, near the ear. It will be held place in a coil shape with non-dissolvable stitches. The other end of the tube will be attached to the external container.

The operation will take about 1 hour, but your child will be away from the ward for up to 2 hours. This is to allow the anaesthetic to take effect before the operation and then give them time to come round afterwards.

# After the operation

After the operation your child will be taken to the recovery room while they come round from the anaesthetic. You will then be collected to go with the nurse to the recovery room where you will be able to see them.

A recovery nurse will look after your child until they are ready to come back to the ward. The nurse will regularly checks your child's pulse, blood pressure, temperature and wound. They will also make sure your child has adequate pain relief. The nurse will then bring you and your child back to the ward.

The nurse will need to look in your child's eyes with a small torch, to check that they are reacting as they should. They will also ask them a couple of questions (if they are old enough/able to answer) to check their level of consciousness.

Some children remain sleepy for a little while after their operation, while other children wake up quickly. If your child is still sleeping, it is important for the nurse to wake them up, to check that they can be easily woken.

The nurse will also need to assess how much movement and sensation your child has in their limbs. Once your child begins to recover, the frequency of these checks can be reduced. We will also regularly inspect your child's wound, to check for leaking or bleeding.

The anaesthetic and operation itself may cause headaches, but these will get better as your child recovers. These can be caused by changes in pressure in the head from high to low. We can give your child pain relief to help with these.

The hospital experience is strange and unsettling for some children so do not be concerned if your child is more clingy, easily upset or has disturbed sleep. Just be patient and understanding.

# Recovery from the anaesthetic

When your child is awake from the anaesthetic they can start drinking and, if they are not sick, they can begin to eat a light diet. Often, children are given fluids through their cannula until they are able to tolerate their normal diet again.

Occasionally, the anaesthetic may leave your child feeling sick for the first 24 hours and they may vomit. The best treatment for this is rest and small, frequent amounts of fluid, toast or biscuits. We can also give medication to help with this, but it should settle with time.

# Pain assessment and pain relief

Your child's nurse will use a pain assessment tool to help assess their pain score after their operation. This is a chart which helps us to gauge how much pain your child may be feeling.

You and your child will be introduced to this assessment tool on the ward before their operation. You can continue to use this assessment at home to help manage your child's pain if you wish.

Your child will be given oral pain relief (either tablets or liquids), such as paracetamol, to help keep them comfortable.

# Monitoring the EVD

The EVD that has been attached to your child will be set at a certain height. This will have been calculated so that we can collect a set amount of CSF each hour. Your nurse will need to make sure the drain is level with your child's ear every time they move; this will help to keep the drain at the right height setting.

When your child wants to change position, their nurse can clamp off the drain and then re-position it. It is extremely important that you do not move your child without the EVD being clamped. This could lead to either too much or too little CSF being drained, which could harm your child.

If your child moves, or you think they have moved, call a nurse immediately to come and re-position the drain.

Your child will have a cannula (narrow tube) in a vein in their hand or foot. This is used to replace the CSF that has drained with equal amounts of fluid.

Your child's nurse will check the drain each hour, measuring the amount of CSF in the drainage chamber and checking its colour. They will also re-check the position of the EVD in relation to your child's ear.

# Removing the drain

The length of time that the EVD has to stay in place will depend on the reason why your child needs to have it. The surgeons will discuss this with you.

When the time comes to remove the drain, your child's nurse will talk through this process with you (and your child, if appropriate).

The drain can usually be removed on the ward. It will involve cutting any stitches holding it in place, removing the drain, and then applying a pressure bandage. This bandage will need to stay on for at least 30-40 minutes, to prevent CSF leaking from the wound.

The wound site will then be checked for any leaks of CSF. If there is a CSF leak, your child may need a stitch in the wound to help it to stop.

# Discharge advice – leaving hospital

Wound care and hygiene

The wound on your child's scalp may be covered by a thin dressing, but is usually left without one. The wound will need to be kept clean and dry for a minimum of 72 hours. Your child's doctor will tell you if your child's hair can be washed after this time.

Your nurse can help you wash your child's hair for the first time, to reassure you that you won't hurt them. A mild/baby shampoo can be used, but avoid soaking or rubbing the wound, as this causes the stitches to dissolve too quickly, which may result in the wound opening or not healing well..

Fresh, clean water should be used to wash and rinse their hair, as this reduces the risk of infection. It is also important to avoid using conditioner, moisturisers or body lotion around the wound area, as they can also cause the stitches to dissolve too quickly and be a risk for infection.

If your child has had the wound closed with stitches, they will gradually dissolve in 7-14 days but this can take up to 6 weeks.

Your child should be discouraged from scratching the wound, as this could cause an infection. If the wound site becomes red, inflamed or painful, call the ward on the number given at the back of this leaflet.

Please make sure you have enough children's paracetamol at home, ready for when your child comes home from hospital. We will give you a short supply of these, at a higher dose, to take home, but you may need to continue with more of your own supply when these run out.

# Follow-up care

Your child may have headaches after the surgery. You can give them children's paracetamol, but not more than once every 4-6 hours.

You can also give them children's ibuprofen every 6-8 hours, but only give a maximum of 4 doses in a 24 hour period. Please make sure you follow the correct dosage instructions for your child's age

Your child's doctor will tell you when they need a follow-up appointment. The letter confirming this will come by post within 2 weeks. Please contact the hospital switchboard and ask to speak to your consultant's secretary if this does not arrive after this time.

# Getting back to normal

When your child returns to school depends on how they feel when they return home. Your child may feel tired for several weeks after the operation, but this is normal. Gradually increase the amount your child does until they are back to their usual level of activity.

Your child may be able to return to sporting activities such as PE, bike riding, swimming, etc. after 6 weeks, depending on their recovery.

Your child can go away on holiday (including flying) when they feel well enough and have had their follow-up appointment. Please tell your insurance company that your child has been in hospital and has had an EVD.

# Signs to look out for

Please watch out for the following symptoms when you return home with your child:

- drowsiness
- limb weakness
- confusion
- increased headaches
- bulging fontanelle (soft part of the skull) in a baby
- if your child starts to have seizures (fits) or the frequency of their normal seizures increases
- if the wound site becomes painful, red, inflamed or begins to produce pus
- any leaking of other fluid from the wound.

If your child has any of these symptoms, you should contact the ward urgently (contact numbers are at the end of the leaflet).

# How to help with your child's recovery

A healthy balanced diet is important in your child's recovery, as it gives them energy to recover and helps with wound healing.

Regular pain relief is important, as it helps reduce any discomfort. This will help your child to keep moving, which can speed up their recovery.

Please make sure you have enough children's paracetamol at home, ready for when your child comes home from hospital. You can give them children's paracetamol, but not more than once every 4-6 hours, with no more than 4 doses in a 24 hour period.

You can also give them children's ibuprofen every 6-8 hours, but only give a maximum of 4 doses in a 24 hour period.

Please make sure you follow the correct dosage instructions for your child's age.

# How to contact us

If you have any further questions, worries or queries about your child once you get home, please contact us. We are available 24 hours a day, 7 days a week.

### Robin's Ward

Tel: **01865 231 254/5**

### Melanie's Ward

Tel: **01865 234 054/5**

### Neurosurgical Nurse Specialist

Tel: **01865 226 535**

To contact your child's consultant's secretary, please phone the John Radcliffe Hospital Switchboard:

Tel: **0300 304 7777**

**If your child requires urgent treatment, please call 999 or go to your nearest Emergency Department.**

### How to give feedback about your experience?

We would like to hear about your experience with our Childrens' Services. There are different ways to feedback to us:

Online: **www.ouh.nhs.uk/childrens-feedback**

Email: **childrens.patientexperience@ouh.nhs.uk**

Or ask for a paper survey to fill in.

# References

[1] From the Royal College of Anaesthetists (2014) Fourth Edition Your child's general anaesthetic. Information for parents and guardians of children.

www.rcoa.ac.uk/patientinfo

*We hope that this information is useful to you and would welcome any comments about the care or information you have received.*

*Please bring this leaflet with you on the day of your child's operation.*

If you need an interpreter or would like this information leaflet in another format, such as Easy Read, large print, Braille, audio, electronically or another language, please speak to the department where you are being seen. You will find their contact details on your appointment letter.

Authors: Sarah Callow, Staff Nurse, Robin's Ward
Shailendra Magdum, Consultant Paediatric Neurosurgeon
December 2020
Review: December 2023
Oxford University Hospitals NHS Foundation Trust
www.ouh.nhs.uk/information

OMI 57655P