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### Cerebrospinal fluid (CSF)

CSF circulates around the brain and spinal cord.

CSF is a clear, watery fluid. CSF is *continuously* made in the spaces of the brain called ventricles.

- CSF flows out of the ventricles and circulates around the brain and spinal cord.
- The blood vessels of the brain reabsorb CSF into the bloodstream.

#### Functions of CSF:

- Acts as a cushion to protect the brain and spinal cord from injury.
- Delivers nutrients to the brain.
- Removes waste products from brain tissues.

### Hydrocephalus

Caused by increased CSF in the brain.

If CSF cannot flow normally, fluid builds up inside the ventricles. This causes the ventricles to enlarge and increases the pressure inside the brain. This is called *hydrocephalus*.

#### Problems:

If left untreated, the enlarged ventricles start placing pressure on the delicate brain tissue. This will soon damage the brain tissue and cause *serious* health problems, including death.

#### Types of hydrocephalus:

1. **Obstructive hydrocephalus:** Something is blocking the usual flow of the CSF.
2. **Absorptive hydrocephalus:** Inability of the brain to re-absorb the CSF that it is making.

### Endoscopic Third Ventriculostomy (ETV)

**Endoscopic:** Thin tube also called “scope”. We use the scope perform the ETV.

**Third Ventricle:** Space in the brain that stores CSF. This is where we make a small opening.

**ETV:** Opening made in the floor of the third ventricle. This allows CSF to flow out of the blocked 3<sup>rd</sup> ventricle and into the area below the base of the brain. CSF then flows up and over the brain where it reabsorbs into the bloodstream.

**Goal of Surgery**  
 Keep the CSF volume in the ventricles balanced.  
 The amount of CSF *flowing out* of the ventricles is equal to the amount of CSF *made* in the ventricles.

### ETV Surgery

1. The most common site of CSF blockage is the narrow pathway between the third and fourth ventricles of the brain.
2. An opening is made through the thin membrane in the bottom (or floor) of the third ventricle.
3. With an ETV procedure, the change in ventricular size is slow and takes time to see on imaging.

### Endoscopic Third Ventriculostomy (ETV)

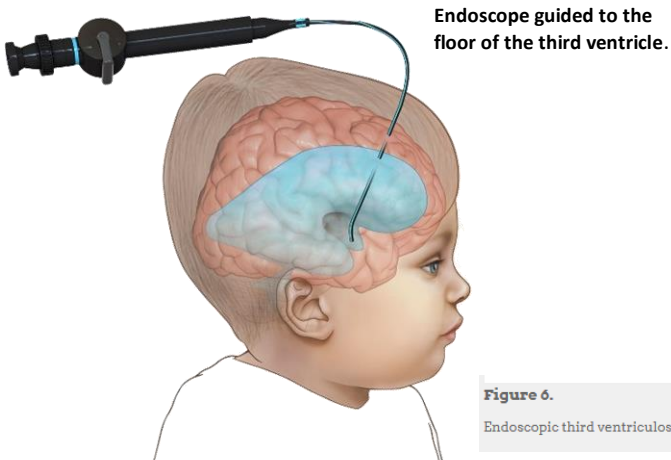


Figure 6.  
 Endoscopic third ventriculostomy.

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## Post-Operative Care after an ETV

### 1. Immediately after surgery:

We closely monitor your child.

### 2. Incision and Dressing

- There will be a small incision on your child's head.
- The stitches that the surgeon uses will dissolve over time. We do not need to remove them.

### 3. Pain medicine

- Your child may have some discomfort for the first few days after surgery.
- The Neurosurgery team will order pain medicine as needed

### 4. Activity

- Your child can return to normal activity when the team tells you it is ok. This is usually at your 1 month follow-up appointment.
- *Do not* exercise, play sports, or rough play until your team approves.

### 5. Shower or Bath

- You may shower or wash over incision sites 48 hours after surgery.
- You may wash your child's hair with soap and water 48 hours after surgery.
- Do not let incisions get under water until your doctor approves.

### 6. Follow-up Appointments

- We will schedule all follow-up appointments before you go home.

## Notes:

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## Complications

Problems and complications with an ETV can occur.

### Most common complication is a failure of the ETV

- We use the endoscope to make an opening on the floor of the third ventricle.
- This presents a risk of scar tissue forming over this opening and then sealing it off.
- If the ETV fails, your child may need another ETV, or a different type of shunt for hydrocephalus.

### **Warning signs of hydrocephalus can appear quickly.**

Call your provider or nurse if you see the following

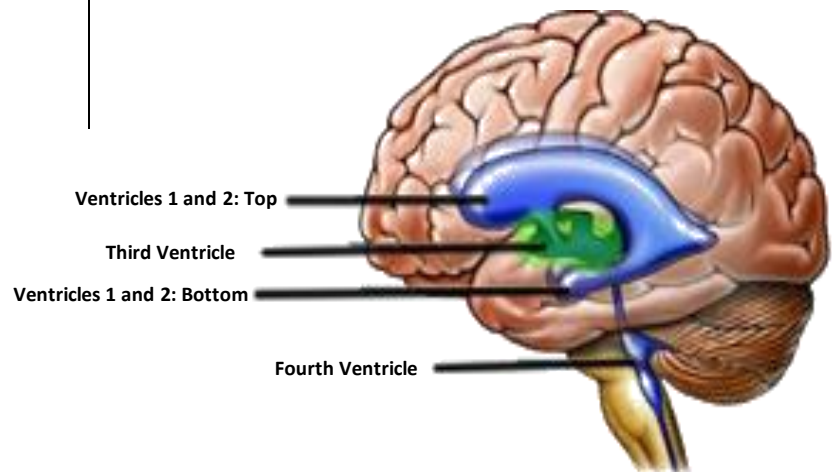
#### Infants:

- Full, tense fontanel or head enlargement.
- Bulging scalp veins.
- Unusual vomiting, fussiness or sleepiness.
- Decreased interest in eating.
- Downward looking of the eyes.

#### Older children:

- Headaches, vomiting, fussiness, tiredness.
- Loss of previous abilities.
- Constant downward looking of the eyes.

These instructions are only general guidelines. Your surgeon may give you special instructions. If you have any questions or concerns, please ask a member of the Neurosurgery team.



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