Children with hydrocephalus sometimes need a shunt. Sometimes children with a shunt need to have it repaired or replaced. We hope this pamphlet will answer your questions and let you know what to expect.

What is a shunt?
A shunt is a tube that drains fluid from one area to another space in the body, where the fluid is then reabsorbed.

There are 4 different kinds of shunts:

1. **Ventriculo-Peritoneal (V-P) shunt:** Drains cerebrospinal fluid (CSF) from the ventricles into the peritoneum (the space in the abdomen around the stomach and intestines).

   - **The proximal catheter:** the part of the tube that is placed directly into the ventricle (fluid space) of the brain.
   - **A one-way valve** is attached to the end of the proximal catheter. It controls the flow of CSF, keeping a normal amount of fluid in the ventricle. This valve only allows fluid to leave the ventricle, preventing back-flow.
   - **The distal catheter** is the end part of the shunt. The shunt is passed under the skin in the neck and chest, and the end is placed in the peritoneum. Extra length is left to allow for growth.

2. **Lumbo-Peritoneal (L-P) Shunt:**
   This shunt is placed into the CSF fluid space below the spinal cord, and drains into the abdomen.

3. **Ventriculo-Atrial (V-A) shunt:**
   Drains from the ventricle, into the right atrium of the heart.

4. **Ventriculo-Pleural (V-Pleural) shunt:**
   Drains from the ventricle into the lining of the lung.

Before the surgery....
Your child may need some of the following tests:

- **CT scan:** this donut-shaped x-ray scanner shows us the amount of fluid inside the ventricles of the brain.
- **Ultrasound of the head** (infants only): sound waves are used to look at the amount of fluid in the ventricles.
- **MRI (Magnetic Resonance Imaging):** radio waves and a magnetic field (created by a large magnet), give a detailed picture of the brain.
- **Shunt survey:** a series of x-rays of the shunt tubing, which shows if the tubing is in the right position, is disconnected or broken.
- **Shunt-o-gram:** this test uses a nuclear tracer to show movement of CSF through the shunt. The radiologist will inject a small amount of tracer into the valve with a sterile needle. Pictures are then taken as the fluid moves through the shunt.
- **A blood test:** All children having surgery must have a blood test before the surgery.

You and your child will have an appointment to meet with the Anesthesiologist. This is the doctor who will put your child to sleep for the surgery.

How long is the operation?
Shunt surgery usually takes about 2 hours, but may take longer. After the surgery:

- Your child will go to the Post-Anesthetic Care Unit (PACU) to wake up.
- PACU nurses will let you know when you can see your child.

What can I expect after surgery?

- **Hospital stay:**
   Your child will stay in hospital for 1-3 days after surgery (sometimes longer). Your doctor will tell you when your child is ready to go home.

- **Vital signs:**
   Your nurse will check your child’s “vital signs”, pupil reaction, and wake your child up often.

- **Incisions and dressings:**
   Your child will have sutures (stitches), surgical clips (staples) or stitches below the skin that will dissolve on their own. The incision, will be covered by a dry dressing.
   - If your child has a V-P shunt, you will notice small incisions on the head, abdomen, and sometimes on the neck.
   - If your child has an L-P shunt, incisions are on the back and abdomen.

- **Eating and drinking:**
   When your child is awake after surgery, he or she can start to drink and eat normally. The first drink will be small sips of water, or ice chips. The nurse will help your child gradually go back to a regular diet.

- **Intravenous line (IV):**
   We will take this out when your child is drinking well, and when IV medications are finished.

- **Activity:**
   Your doctor will decide how much activity is allowed. Usually, your child may gradually return to normal, quiet activities within a few days.

- **Tests:**
   A brain CT scan and shunt survey are usually done the day after surgery.

- **Follow up appointment:**
   We will book a follow-up appointment to remove your child’s stitches or surgical clips 6-10 days after surgery.
Taking care of your child at home

- **Comfort.** If your child has pain, you can give acetaminophen (Tylenol® or Tempra®) every 4 hours for 1-3 days as needed. Follow instructions carefully.
- **Keep the bandage(s) clean and dry.** Avoid wetting the incision(s) until 2 days after staples or stitches are removed.
- **Antibiotic ointment.** After the stitches, staples or steri-strips are removed, apply antibiotic ointment 3 times daily for 1-2 days.
- **Quiet activities** are best. Ask your doctor when your child may return to usual activities.
- **Go to the emergency department** if your child’s incision:
  - Is draining clear, bloody fluid or pus
  - Is swollen or not healing well
  - Is opening up

What about long-term follow-up?

- **Regular appointments and tests:** Your doctor will arrange appointments to check the shunt. Your child may have CTs, MRIs, and shunt surveys to check how the shunt is working.
- **No contact sports.** Keep your child as active as possible, through gym classes and other physical activities. Avoiding contact sports will help to prevent head injuries and damage to the shunt.
- **Avoid constipation!** Hard stools (poop!) may interfere with drainage of the shunt. Give your child lots of fluids, fruits, vegetables and fibre. If your child becomes constipated, talk with your family doctor.
- **Routine dental work (like cleaning & fillings):**
  - **If your child has a V-A shunt** (drains into the heart), he will need antibiotics before any dental work to prevent a heart infection. Please ask your doctor for these instructions.
  - **If your child has a V-P shunt,** an L-P shunt or a V-Pleural shunt, antibiotics are not needed.

How do I know if there is a problem with my child’s shunt?

Shunts don’t work well when there is a blockage of CSF flow or a break in the tube. There may be a problem with your child’s shunt if your child:

- Has a bulging fontanelle, (bulging soft spot on top of your baby’s head)
- Is vomiting
- Is more fuzzy or irritable than usual
- Seems confused
- Isn’t able to look up (‘sun-setting’ eyes)
- Is very drowsy
- Complains of headaches
- Has a change in appetite or behavior
- Is not doing as well in school
- Has a seizure
- Gets a fever within 6 months after surgery
- Has swelling or redness along the shunt tract
- Complains of neck pain

**If you think your child’s shunt is not working:**

- Go to the Emergency Department
- Do not push on the shunt valve unless your doctor tells you it’s OK.

Want more info?

**Check out these websites:**
Spina Bifida and Hydrocephalus Association of Ontario www.sbhao.on.ca
Spina Bifida and Hydrocephalus Canada www.sbhac.ca

Illustration courtesy of Medtronic of Canada

Children’s Hospital of Eastern Ontario
Centre hospitalier pour enfants de l’est de l’Ontario
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