

Tips for Nurses and Teachers of Children with Hydrocephalus and Shunts

Hydrocephalus is an abnormal accumulation of cerebrospinal fluid that builds up within the ventricles. The ventricles are the fluid containing cavities of the brain. Cerebrospinal fluid (CSF) is produced in the ventricles and circulates through the ventricular system where it is absorbed into the bloodstream. Our bodies produce cerebrospinal fluid every day. Hydrocephalus occurs when there is an imbalance between the production of the CSF and the rate of absorption. Pressure inside the head will build up when the CSF is not properly absorbed.

Hydrocephalus can present at birth (congenital) or occur during a person's life secondary to a variety of reasons. The most common treatment for hydrocephalus is surgical implantation of a **shunt**. A shunt is placed to divert the CSF from the ventricles in the brain to the abdominal cavity, pleural space, or atrium of the heart. These are the most commonly used diversion sites. This diversion allows the pressure within the skull to be normalized. A catheter is placed in the ventricle and then connected to a valve. The valve is joined to an antibiotic impregnated tube that is tunneled to the area chosen as the distal site for drainage.

There are a variety of shunt models, but they all have similar parts. Certain shunt systems have adjustable valves which allow the neurosurgeon to select a chosen pressure based on the needs of the patient. The shunt has a reservoir which is able to be felt on the outside of the patient's skull. The shunt type is named by the part of the body where they are implanted. The catheter in the brain is the ventricular catheter. The distal part of the tube in the abdomen is the peritoneum. Thus, the shunt is named a ventriculoperitoneal shunt. If the distal portion of the tubing is placed in the pleural space, the shunt is termed a ventriculopleural shunt. There are no external parts of the shunt.

1. A shunt is a mechanical device and can malfunction. If the shunt is not working properly, the student will begin to experience symptoms of increased pressure in the head.
 - Headaches
 - Nausea and vomiting
 - Drowsiness or irritability
 - Personality change
 - Loss of coordination
 - Decrease in mental function
 - Blurred vision
 - Seizures
 - Increased size in head growth for young children
 - Sunsetting of eyes—downward deviation of eyes in infants

Full fontanel in infants

 - Prominent scalp veins in infants

2. Shunts are very durable. They rarely malfunction secondary to a bump or fall. Children with shunts should be allowed to participate in physical education and sports. They can participate in recess.
3. **Children with shunts should avoid playing with magnets.** They must not be permitted to use magnet building toys or be exposed to magnets in science class. Subjecting the programmable valve to strong magnets can change the setting of the valve.
4. Constipation should be avoided in children with shunts. Pressure to the distal portion of the shunt secondary to constipation can hinder proper drainage.
5. Please be aware that some children with hydrocephalus have difficulty with hand/eye coordination and fine motor skills. Handwriting can be difficult.
6. Some children may experience a degree of a learning disability. Having an IEP evaluation is encouraged. **This is not true of all children with hydrocephalus.**
 - Students who have learning disabilities may be in denial of their special needs and not willing to ask for help. Please be patient and respectful of their needs.
 - Some children experience behavioral issues which may be a direct relation to their struggles with learning. This is often misunderstood and the child labeled as a “bad behavior” problem.
 - Some children may struggle with organizational skills. They may require additional structure.
 - Early identification is the key to identifying learning problems. Recommending a comprehensive evaluation to the families is important to getting the proper resources for the child.
7. It is very important for both teachers and nurses to communicate with parents frequently regarding school progress and any new changes that they witness with the student.
8. Children with hydrocephalus and shunts should have yearly eye examinations.
9. Shunts that are programmable must be reprogrammed by the neurosurgeon after any MRI. The magnet in the MRI machine is capable of changing the valve setting.
10. Microwaves, wireless telephones, high tension wires, electric motors, or transformers do not affect the valve.
11. Airport security machines do not change the valve setting.
12. Certain amusement rides and roller coasters are not advised.
13. Information cards with the make, model, serial number and present valve setting are encouraged to be carried with the older students and parent. These should be provided by the neurosurgeon.
14. The companies that produce the different implantable shunts stand behind their data that the magnets contained within I pads and computer devices are not of concern for use in the classroom. They recommend that the student do not take the device and hold it over the shunt valve. General use of these devices is safe within the classroom.

Additional information on hydrocephalus and shunts can be found on our website at:

www.njpediatricneurosurgery.com

