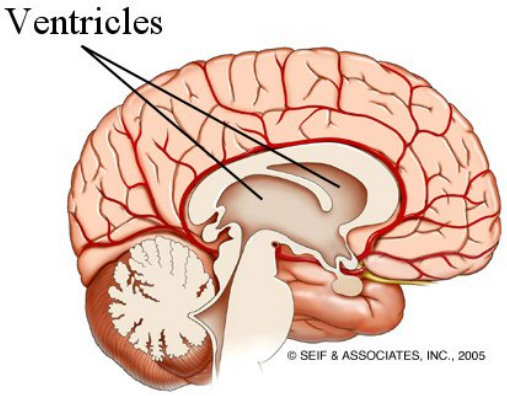
Hydrocephalus

Hydrocephalus is also known as "water on the brain". A watery fluid, known as cerebral-spinal fluid or CSF, is made inside four spaces (*ventricles*) in the brain. The CSF normally flows through narrow pathways from one ventricle to the next, then over the outside of the brain and down the spinal cord. The CSF is absorbed into the bloodstream and re-circulates.



If the flow of CSF is blocked, fluid may accumulate in the ventricles. This causes the ventricles to swell. Increased pressure in the ventricles may cause pressure on the brain and result in brain damage. In small babies when the growth lines have not grown together, the head will grow larger. Later in life, when the bones of the skull have grown together, the skull cannot get larger if pressure is increased and brain tissue may be rapidly injured.

COMMON CAUSES

- Present at birth (*congenital*). This does not mean that the condition is inherited. Often the exact cause cannot be determined.
- Babies born *prematurely* (early) are at risk. Swings in blood pressure may create blood clots in babies born prematurely. This can eventually block the flow of the spinal fluid, and this can lead to hydrocephalus.
- Most babies born with *spina bifida* (birth defect of the spine) have hydrocephalus. In addition to the lesion in the spinal cord, certain parts of the brain that develop before birth may be abnormal. This prevents proper drainage of the CSF and puts more pressure on the brain.
- In adults, bleeding in the brain (*hemorrhage*), as a result of stroke or trauma.
- Sometimes an infection of the membranes covering the brain (meningitis) develops. The inflammation and debris from this infection can block the drainage pathways. Meningitis may occur at any age. It is more common in children.
- A particular group of disorders involving the formation of fluid-filled cysts in the CSF system (for example Dandy Walker cysts). In these cases, hydrocephalus is often due to pressure on the surrounding tissues by the enlarging cyst.
- Tumors of the brain cause compression and swelling of surrounding tissues. This can result in poor drainage of CSF. In the treatment of brain tumors, it is often necessary to include measures to control hydrocephalus, which may be temporary.
- In very rare circumstances, hydrocephalus is due to *hereditary* (passed by parents) factors.

TREATMENT

Some forms of hydrocephalus require no specific treatment. Other forms of this condition are temporary and do not require long-term treatment. Most forms do require treatment. Treatment is usually surgical. This involves inserting a *shunting* device.

A *shunt* is a device that diverts the CSF from the obstructed pathways and returns it to the bloodstream. It consists of:

- A system of tubes.
- A valve to control the rate of drainage and prevent back-flow.

It is inserted surgically so that the upper end is in a ventricle of the brain. The lower end leads either into the:

- Heart (*ventriculo-atrial shunt*).
- Abdomen (*ventriculo-peritoneal shunt*).
- Outer lining of the lungs (*ventriculo-pleural shunt*).

The shunting device is completely inside the body.

Shunting does not cure the hydrocephalus. Shunting controls the pressure by draining excess CSF. Shunting prevents the condition from becoming worse. Symptoms caused by raised pressure usually improve. Damage to the brain tissue remains. An alternative treatment may be opening of the third ventricle of the brain. This treatment, if successful, avoids the need for a shunt. However, not all types of hydrocephalus can be treated by this method. This method is not available everywhere. Drugs have been used for many years. Drugs may have unpleasant side effects and are not often successful.

COMPLICATIONS

- In most cases, a shunt is intended to stay in place for life. The shunt may need to be replaced if it becomes too short as the patient grows. An operation to lengthen it might be necessary.
- Infection may occur. Infection is more likely to occur one to three months after surgery.
- There can be mechanical failure.
- The shunt may become blocked.

SYMPTOMS WHEN A COMPLICATION OCCURS

- These vary greatly between individuals. Previous shunt problems are usually a reliable guide.
- Possible signs of sudden (*acute*) shunt blockage may include:
  - Vomiting.
  - Headache.
  - Dizziness.
  - Sensitivity to light (*photophobia*).
  - Other visual disturbances.
  - Drowsiness.
  - Fits.
- Possible signs of longstanding (*chronic*) shunt blockage may include:
  - Fatigue.
  - General malaise.
  - Visual-perceptual problems.
  - Behavioral changes.
  - Decline in academic performance.
  - Being just "not right"from your caregivers point of view.
- Get medical advice if a shunt blockage is suspected, within four hours after acute symptoms started.
- In shunt infections, symptoms vary with the route of drainage.
  - In ventriculo-peritoneal shunts, the symptoms often resemble those of a blockage. This is because the shunt becomes infected, and the lower catheter is then very often sealed off by tissue. There may be accompanying fever and abdominal pain or discomfort.
  - In ventriculo-atrial shunt infections, fever is present in most cases though often intermittently. Anemia is frequently present, and sometimes skins rashes along with joint pains occur. In contrast to ventriculo-peritoneal shunts, such infections may not appear for months or years after the operation when they were contracted.
  - Various tests can be carried out for shunt infections and medical advice should always be sought if an infection is suspected.

TREATMENT OF SHUNT PROBLEMS

- Shunt blockages that are causing illness usually require an operation. The operation will replace or adjust the offending part of the shunt. Shunt infections are usually treated by removal of the shunt and a course of antibiotics before inserting a new shunt. New use of antibiotic therapy means that treatment is usually successful.
- Convulsions (s*eizures)* may occur with hydrocephalus but these are not usually associated with underlying causes such as meningitis, abnormal development of the brain, neonatal hemorrhage etc. Treatment of seizures is usually the same as other people with seizure disorders

SOME OF THE PROBLEMS ASSOCIATED WITH HYDROCEPHALUS INCLUDE:

- Learning difficulties such as problems with concentration, reasoning and short-term memory.
- Problems with co-ordination, motivation and organizational skills.
- Physical problems such as visual difficulties, or early puberty in children, may also occur.

Effects of hydrocephalus vary from one individual to another. Some people will have very few, if any,

problems.

Document Released: 12/08/2003 Document Re-Released: 03/14/2011
ExitCare® Patient Information ©2011 ExitCare, LLC.