

Hydrocephalus

What is Hydrocephalus?

The term hydrocephalus is derived from two words: "hydro" meaning water, and "cephalus" referring to the head.

Hydrocephalus is a condition in which excess cerebrospinal fluid (CSF) builds up within the ventricles (fluid-containing cavities) of the brain and may increase pressure within the head. Although hydrocephalus is often described as "water on the brain," the "water" is actually CSF, a clear fluid surrounding the brain and spinal cord. CSF has three crucial functions: 1) it acts as a "shock absorber" for the brain and spinal cord; 2) it acts as a vehicle for delivering nutrients to the brain and removing waste; and 3) it flows between the cranium and spine to regulate changes in pressure within the brain. Hydrocephalus can occur at any age, but is most common in infants and adults age 60 and older. According to the National Institute of Neurological Disorders and Stroke,

hydrocephalus is believed to affect approximately one in every 500 children. The majority of these cases are often diagnosed before birth, at the time of delivery, or in early childhood.

Common Causes of Hydrocephalus

Although rare, hydrocephalus can be inherited genetically or may be associated with developmental disorders, including spina bifida (congenital defect of the spine) and encephalocele (hernia of the brain). Other causes can include bleeding within the brain, brain tumors, head injuries, complications of premature birth such as hemorrhage, or diseases such as meningitis or other infections. In some cases, normal flow of CSF within the brain is blocked, resulting in fluid build-up.

Symptoms of hydrocephalus vary greatly from person to person. According to the Hydrocephalus Association, some of the most common symptoms are listed below as a reference.

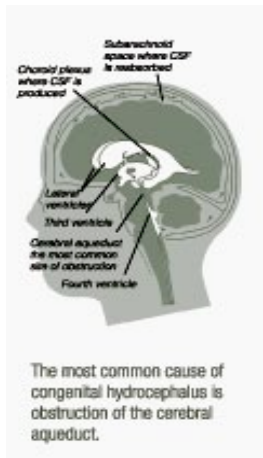
Symptoms of Hydrocephalus in infants Abnormal enlargement of the head; soft spot (fontanel) is tense and bulging; scalp can appear thin; bones separated in baby's head; prominent scalp veins; vomiting; drowsiness; irritability; downward deviation of baby's eyes; seizures; or poor appetite.

Symptoms of Hydrocephalus in toddlers/children

Abnormal enlargement of baby's head; headache; nausea; vomiting; fever; blurred or double vision; unstable balance; irritability; sleepiness; delayed progress in walking or talking; poor coordination; change in personality; inability to concentrate; loss of sensory motor functions; seizures; or poor appetite. Older children may experience difficulty in remaining awake or waking up.

Symptoms of Hydrocephalus in young and middle-aged adults

Headache; difficulty in remaining awake or waking up; loss of coordination or balance; bladder control problems; impaired vision and cognitive skills that may affect job performance and personal skills.



Symptoms of Hydrocephalus in older adults

Loss of coordination or balance; shuffling gait, memory loss; headache; or bladder control problems. Hydrocephalus is often categorized for age groups as either congenital or normal pressure hydrocephalus. Congenital hydrocephalus refers to conditions that are caused by conditions existing at birth. Primary symptoms include headache, nausea, vomiting and drowsiness. Normal pressure hydrocephalus (NPH) is the accumulation of cerebrospinal fluid that causes the ventricles in the brain to become enlarged, with little or no increase in pressure. Adult-onset NPH mainly occurs in adults age 60 and older. Patients with NPH often get misdiagnosed with Alzheimer's disease or dementia, as some of the symptoms mimic these two conditions.

Diagnosing Hydrocephalus

Before your doctor can recommend a course of treatment, he or she will:

- Review your medical history, and perform a physical examination
- Perform a complete neurological examination including diagnostic testing if needed
- Ask specific questions to determine if symptoms are caused by hydrocephalus

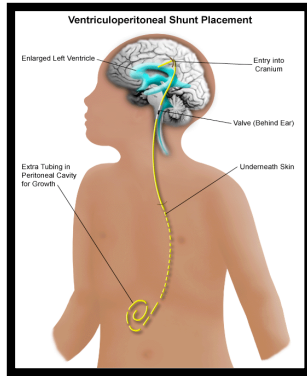
The neurological examination will also help to determine the severity of your condition. Further tests such as an ultrasound (if the patient is an infant), computed tomography (CT or CAT scan), or magnetic resonance imaging (MRI) may be ordered. The tests may reveal useful information about the severity of the condition and its likely cause.

When Surgery is Necessary

Hydrocephalus can be treated in a variety of ways. The problem area may be treated directly (by removing the cause of CSF obstruction), or indirectly (by diverting the fluid to somewhere else; typically to another body cavity). Indirect treatment is performed by implanting a device known as a shunt to divert the excess CSF away from the brain. The body cavity in which the CSF is diverted is usually the peritoneal cavity (the area surrounding the abdominal organs).

In some cases, two procedures are performed, one to divert the CSF, and another at a later stage to remove the cause of obstruction (e.g., a brain tumor). Once inserted, the shunt system usually remains in place for the duration of a patient's life (although additional operations to revise the shunt system are sometimes needed). The shunt system continuously performs its function of diverting the CSF away from the brain, thereby keeping the intracranial pressure within normal limits.

An alternative operation called endoscopic third ventriculostomy utilizes a tiny camera to look inside the ventricles, allowing the surgeon to create a new pathway through which CSF can flow.



Recovery

Your neurological function will be evaluated post surgery. If any neurological problems persist, rehabilitation may be required to further your improvement. However, recovery may be limited by the extent of the damage already caused by the hydrocephalus and by your brain's ability to heal.

Because hydrocephalus is an ongoing condition, long-term follow-up by a doctor is required. Follow-up diagnostic tests including CT scans, MRIs and x-rays, are helpful in determining if the shunt is working properly. Do not hesitate to contact your physician if you experience any of the following postoperative symptoms:

- Redness, tenderness, pain or swelling of the skin along the length of the tube or incision
- Irritability or drowsiness
- Nausea, vomiting, headache or double vision
- Fever
- Abdominal pain
- Return of preoperative neurological symptoms

Prognosis

The prognosis for hydrocephalus depends on the cause, the extent of symptoms, and the timeliness of diagnosis and treatment. Some patients show a dramatic improvement with treatment while others do not. In some instances of NPH, dementia can be reversed by shunt placement. Other symptoms such as headaches may disappear almost immediately if the symptoms are related to elevated pressure.

In general, the earlier hydrocephalus is diagnosed, the better the chance for successful treatment. The longer the symptoms have been present, the less likely it is that treatment will be successful. Unfortunately, there is no way to accurately predict how successful surgery will be for each individual. Some patients will improve dramatically while others will reach a plateau or decline after a few months.

Shunt malfunction or failure may occur. The valve can become clogged or the pressure in the shunt may not match the needs of the patient, requiring additional surgery. In the event of an infection, antibiotic therapy may be needed. A shunt malfunction may be indicated by headaches, vision problems, irritability, fatigue, personality change, loss of coordination, difficulty in waking up or staying awake, a return of walking difficulties, mild dementia or incontinence. Fortunately, most complications can be dealt with successfully.