Dr R E Pope

Beneficence and Nonmaleficence
Neurosurgeon and Spine Surgeon

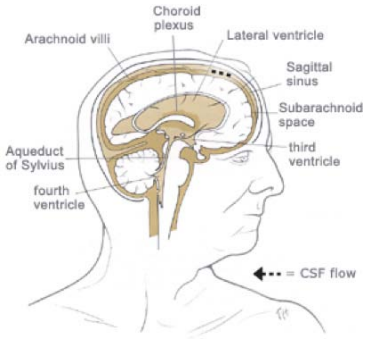
Shunt Procedures

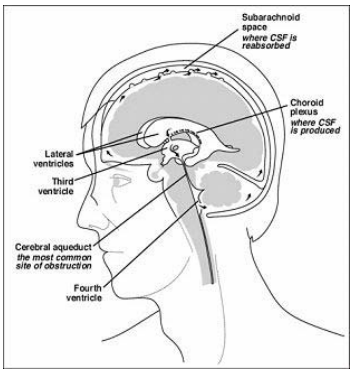
Introduction

Hydrocephalus is a condition that occurs when there is too much cerebrospinal fluid in the ventricles (cavities) of the brain.

Cerebrospinal fluid (CSF) is produced in the brain, and is needed by the body to protect the brain and spinal cord, and carry away waste from brain cells. It flows continuously through the ventricles of the brain and over the surface of the brain and spinal cord. Any excess CSF usually drains away from the brain and is absorbed by the body. For people with hydrocephalus, this doesn't happen, and the fluid instead builds up in the ventricles.

Too much cerebrospinal fluid puts a harmful amount of pressure on tissues in the brain - treatment is needed to release this pressure. Hydrocephalus can be congenital (present at birth), or develop later in childhood or adulthood. Normal pressure hydrocephalus (NPH) is a type of hydrocephalus, which usually develops in people over 60, because the drainage of the CSF gradually becomes blocked.





Symptoms

The symptoms of hydrocephalus can vary depending on your age, how the condition has developed, and other conditions you may have.

In children, because the skull is still forming and the skull bones are not yet fixed together as in adulthood, hydrocephalus can cause the child's head to enlarge. You may notice that your child's head has noticeably increased in size, or seems unusually large. Infants with hydrocephalus may experience symptoms such as vomiting, delayed growth and development, poor feeding, irritability, and less movement than normal. Many children with hydrocephalus also display symptoms that can be mistaken for naughtiness, such as verbal aggression and swearing, hyperactivity, not paying attention and generally unusual behaviour. They may also experience learning difficulties at school.

Dr Raoul Pope MBChB (Hons, Otago) FRACS Specialist Neurosurgeon and Spine Surgeon

The Poche Centre , Suite 8, Level 3, 40 Rocklands Rd, North Sydney NSW 2060
The Sydney Spine Institute, Suite 107/3 Railway Parade, Burwood, NSW 2134
p: 02 9911 7280 | f: 02 9954 9307 | e: info@spinesurgeon.com.au | w: www.spinesurgeon.com.au
Provider No. 2300 28DX | ABN: 55 002 611 382

In adults, the skull is fixed and cannot adjust to changes in pressure. Therefore the symptoms of a fluid increase can include:

- headache followed by vomiting,
- nausea,
- downward deviation of the eyes (the eyes look downwards),
- urinary incontinence,
- poor coordination, (clumsiness)
- difficulty walking,
- irritability, and other changes in personality.

In older people, normal pressure hydrocephalus can sometimes be mistaken for Parkinson's disease or Alzheimer's disease, because the symptoms are similar, and these conditions are very common among the elderly. It's important to get the correct diagnosis as hydrocephalus can be treated, and the symptoms can often be reversed.

Causes

There are many possible causes for hydrocephalus. The reason for congenital hydrocephalus isn't known, but it is believed that damage to the blood supply, or an infection, may affect the baby's development before birth. Many babies with hydrocephalus are also born prematurely.

Hydrocephalus is also often associated with conditions that affect the brain and/or spinal column, such as meningitis and spina bifida. Currently, 80-90% of people with spina bifida also have hydrocephalus. Other types of the condition can also be caused by cysts or tumours in the brain that block the flow of the cerebrospinal fluid. In some cases, problems with the shape and formation of blood vessels can also be a cause.

Diagnosis

If your GP thinks that you or your child may have hydrocephalus, you will probably need to have a CT scan or an MRI scan.

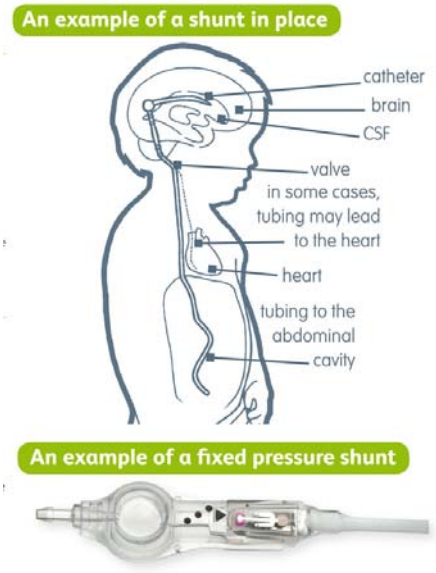
A CT (computerized tomography) scan provides a three dimensional picture of your brain, and shows up any enlarged ventricles, which may suggest that hydrocephalus has occurred.

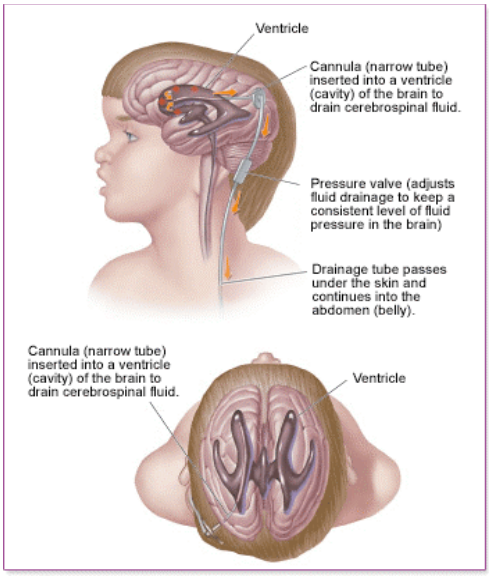
An MRI (magnetic resonance imaging) scan is another way of producing a clear image of your brain. This type of scan requires that you lie still inside a large tube-like scanning machine. Most people find having the scan quite comfortable, but if you don't like enclosed spaces, you should let the staff know, so that they can give you plenty of extra support.

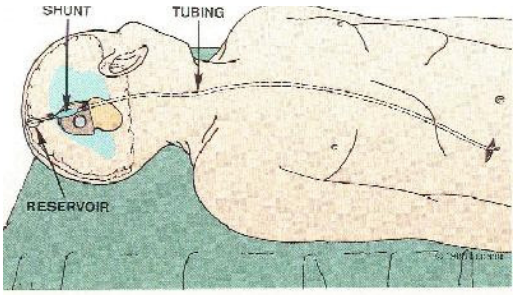
Treatment

The main aim of any treatment for hydrocephalus is to release the pressure on the brain caused by the build up of cerebrospinal fluid. If the cause of the hydrocephalus is a tumour on the brain, then surgery to remove the tumour may be carried out. For all other causes, a shunt operation may be required.

A shunt is a thin tube that is implanted permanently in the brain, allowing the excess fluid to drain away to another part of the body, where it can be absorbed. Many people find that this operation greatly reduces the symptoms of hydrocephalus, but sometimes it doesn't make a big difference. This procedure may not be suitable for everyone - your specialist will be able to advise you whether it would be appropriate for you.

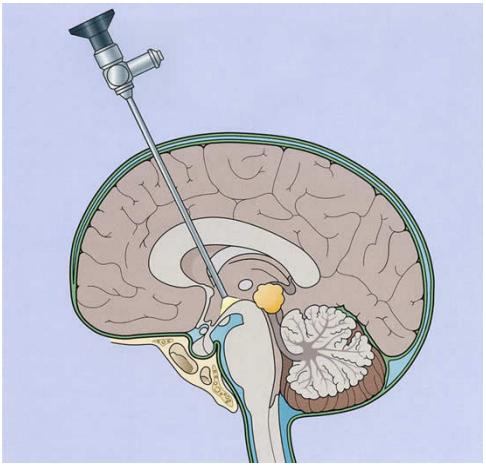


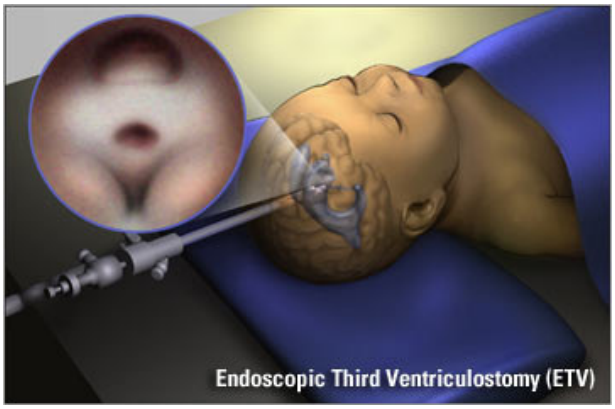


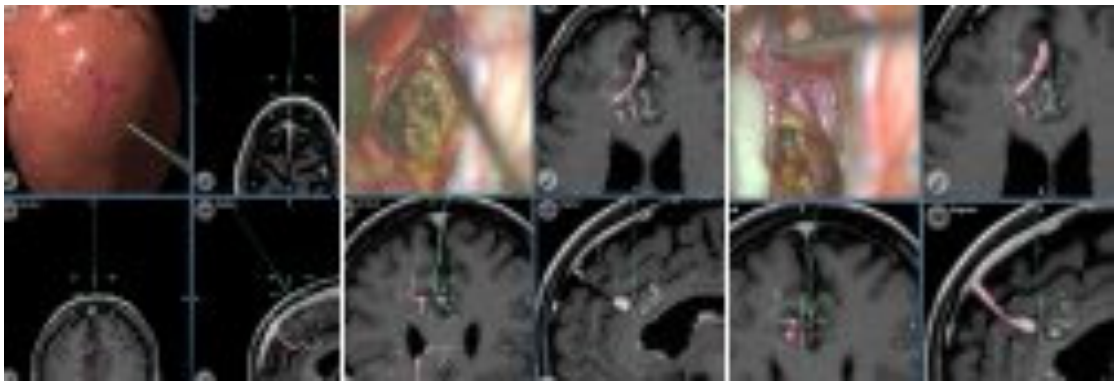


Shunt tubing in place

For a small number of people with hydrocephalus (depending on the type), a procedure called endoscopic third ventriculostomy (ETV) may be performed instead of shunt surgery. During this procedure the surgeon creates a small hole in one of the ventricles in the brain. This allows the excess fluid to drain away from the brain, and then be absorbed by the body.







As hydrocephalus affects both mental and physical development, a team of specialists is often required to assist with treatment for this condition. But with the right treatment and a lot of support, many people with hydrocephalus lead normal lives, with few limitations.

Complications

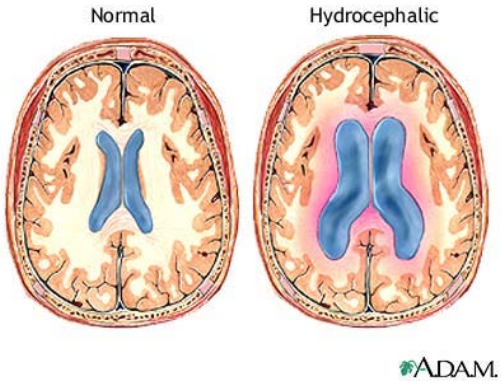
If left untreated, hydrocephalus will gradually get worse, in some cases causing brain damage, and affecting vital functions controlled by the brain such as breathing and heartbeat.

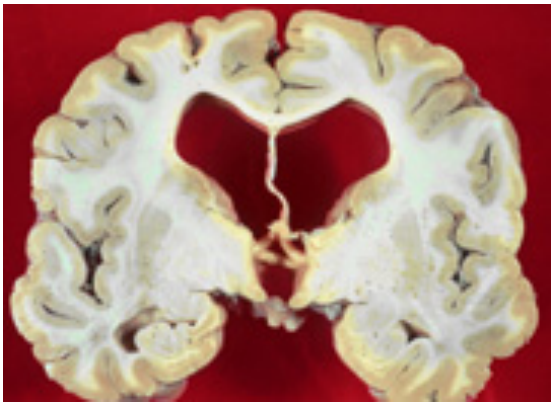
One in three children with hydrocephalus, whether treated or not, develop epilepsy, which can also be treated.

Normal Pressure Hydrocephalus: What It Is and How It Is Treated

What is normal pressure hydrocephalus?

Normal pressure hydrocephalus (say: hi-dro-sef-uh-lus; or NPH for short) is a rare, but sometimes treatable, cause of dementia. It mainly affects people older than 60. It does not run in families. Sometimes it happens after a brain infection, such as meningitis. Other times, it happens after a brain injury. Often, it happens for no reason at all.





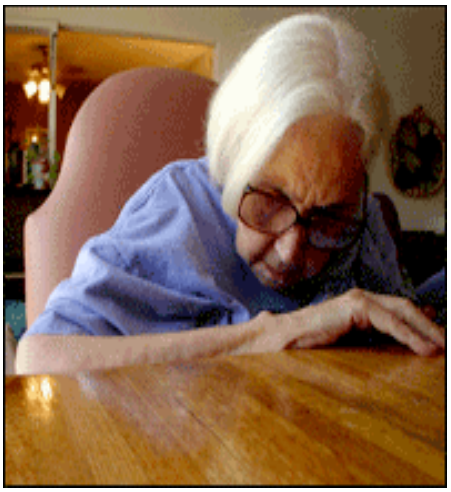
What happens if I have NPH?

With NPH, the fluid inside your brain doesn't drain as it should. Fluid usually is formed and stored inside special spaces in your brain. These spaces are called ventricles. Usually, there is a balance between the amount of fluid made and the amount of fluid taken away. When the fluid doesn't drain right, the ventricles get bigger and can press on nearby brain tissue. This pushing can change the shape of the brain a little bit. This change in shape can make you think slower, have trouble walking, and perhaps lose control of your bladder.

What are some signs to look for?

- You may have trouble walking.
- You may fall down and need help to get up.
- You may pause before you start walking.
- Your feet may feel stuck to the floor.
- You may shuffle, or walk with your feet spread wide apart.
- You may pause for a while before you start to speak.
- You may take a long time to answer questions.
- It may take a while to think about, or understand, what people say to you.
- You may lose control of your bladder.


"Hello, incontinence helpline - can you hold?"



What do I do if I think I have NPH?

If you or members of your family notice these signs, you should see your doctor. Your doctor will want to talk to you, and also may want to speak with the friends or family members you bring along. Your doctor will watch you walk. Your doctor will note how long it takes you to answer questions. Your doctor will want to know if you are sometimes unable to hold your urine and how often this happens.

Once your doctor has all this information, he or she may want to take a picture of your brain. Sometimes a lumbar puncture (also known as a spinal tap) may help your doctor figure out if you have NPH.

During a spinal tap, your doctor will remove some fluid from your back. After the spinal tap, your doctor will check to see how smoothly you walk or if you answer questions faster. Your doctor also will want to know if you still have a hard time making it to the bathroom in time to urinate.

How is NPH treated?

If you have NPH, your symptoms may get better if a surgeon places a shunt. A shunt is a tube that is put in, starting inside one of your brain ventricles and is then tunneled under your scalp and beneath the skin along your neck and chest. The tail end of the tube is put inside the space around your stomach. Extra fluid inside your brain can then drain from the brain into your abdomen. Fluid runs only one way because there is a valve in the tube. Depending on how severe the symptoms, surgery still have a relatively low efficacy for this condition.

Will I get better?

With the fluid draining out of your brain, fluid will not build up and the ventricles may not grow so large. Then the nerve fibers may not be pushed out of shape and messages may reach down to your feet and bladder like they used to. The decrease in brain fluid may help you walk better, think more clearly, and urinate only when you want to. The decrease in brain fluid may help you understand what people say. You also may think of answers more quickly. The success of shunt surgery may be in the vicinity of 50%.