HYDROCEPHALUS

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Hydrocephalus

Hydrocephalus is excessive accumulation of Cerebrospinal Fluid (CSF) within brain cavities called Ventricles. CSF is produced in the ventricles and circulates through the brain into the spinal cord before it is reabsorbed form the brain into the blood stream. When this pathway is blocked due to any reason, back pressure develops in the ventricles and results in hydrocephalus. CSF has many important viz. nourishment, cushion like protection of the nervous tissue and to carry waste products away.

Causes

Congenital (present at birth)

Hydrocephalus is caused by a complex interaction of genetic and environment factors. Aqueductal stenosis (narrowing) is the most frequent cause. Blockages of fourth ventricle outlet (Dandy Walker Syndrome) or Chiari malformation (in association with Spina Bifida) are other common causes.

Acquired (development later in life)

Hydrocephalus can result from infection, bleeding (haemorrhage) head trauma, tumours and cysts. The most common cause in our country is meningitis (infection).

Diagnosis (detection)

Hydrocephalus can be detected by observing the child's behavior and a few physical signs, and it can be confirmed with simple tests.

In a small baby

Poor feeding high pitch cry, excessive sleepiness, enlarging head with soft areas on the top (fontanelles), inability to move eyes upwards and vomiting will prompt the diagnosis.

In an older child

Lethargy, increased head size and a few physical signs could indicate hydrocephalus and it can be confirmed by computerized Tomography (CT scan) of head or Magnetic Resonance Imaging (MRI). Such investigations could show the degree of ventricular enlargement, the exact site of blockage of the cerebrospinal fluid and the offending cause(s).

Treatment

There is no known way to prevent or definitively cure hydrocephalus. If obstruction is found on CT scan due to a tumor or cyst, it can be excised by a neurosurgeon to re-establish the CSF pathway. In other situation, the most effective treatment is insertion of a shunt (at a known pressure gradient). The shunt is a hollow silicone tube, placed into the ventricular system, diverting the CSF flow to the peritoneal cavity of the abdomen

(VP Shunt). These shunts are available in India. If abdominal cavity is unable to absorb the fluid due to some diseases like tuberculosis or cyst, the shunt can be placed via the jugular vein to reach the right atrium of heart (VA shunt). Shunts can also be placed in the pleural (chest) cavity.

In communicating hydrocephalus (mal-absorption of CSF but no blockage) a Lumboperitoneal (LP) shunt can be performed in order children where the tube goes form the spinal cavity to abdomen. The operation to insert a shunt is performed with extremely strict sterile precautions by either a paediatric surgeon or a neurosurgeon. This procedure takes about 1- 2 hours.

After operation

The child will be observed for a short time, in the recovery area and then transferred to the bed. He / she will be allowed fluids after 12 hours and normal food after 24 hours.
Usually after 5-7 days the child can go home. Sometime, a CT scan may be repeated to confirm the success of the treatment.

Endoscopic treatment

In selected cases as judged by the neurosurgeon, endoscopic procedures may be used to create alternative CSF pathway (s) within the brain (e.g. third ventriculostomy, aqueductal stenting) and a shunt may not be necessary. These techniques are developing and may find wider applications in the future.

Complications

Blockage of the shunt may occur occasionally due to twisting or break at the connections. These need an immediate rectification by a small surgery.

Blockage can occur even later with the waste products especially in case of hemorrhage or meningitis. Sometimes in a growing child the tube may slide out of the peritoneal cavity, due to an increase in the height of the child. All these can be surgically corrected. Infection of the shunt can occur, as with any implant in the body and should be watched for by observing for fever, redness and swelling over the shunt tube or a wound discharge. An infected shunt needs to be removed and antibiotics prescribed.

Symptoms of blocked shunt

The symptoms of shunt blockage are due to raised cerebro-spinal fluid pressure in the brain. The child who was all right may suddenly start vomiting and appear drowsy (sleepy). These symptoms may be accompanied by fever. Whenever a blocked shunt is suspected, you must seek urgent medical help.

Effects of hydrocephalus

In most cause the shunting procedure successfully controls hydrocephalus. Many children will have normal intelligence and development. They may be slow in learning or acquiring co-ordination. Blockages, infection and developmental delays require that the family be aware of these problem and actively participate in observation and care of the child.

How long is the shunt tube kept?

The shunt tube unless blocked or infected, by itself, can cause no problem and can be kept in place for years. Only if the surgeon is convinced that is safe to remove the shunt, it may be removed. In many cases the tube kept for a lifetime without causing any problem. It may need a revision in case the height of the child increases making the tube length relatively short.