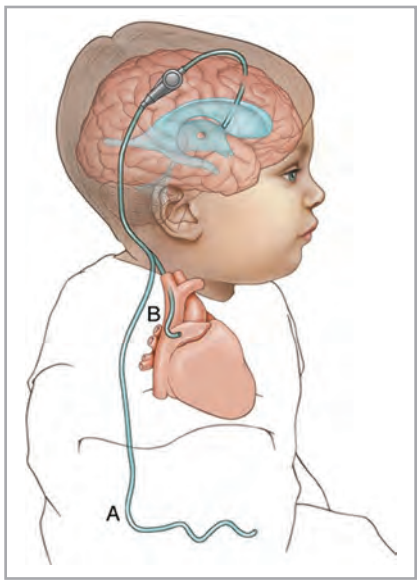
Hydrocephalus and Shunts

What is hydrocephalus?

Hydrocephalus is the abnormal accumulation of *cerebrospinal fluid* (CSF) within the ventricles of the brain. Hydrocephalus can be caused by a blockage of CSF flow (obstructive hydrocephalus) or failure to absorb CSF (communicating hydrocephalus). Hydrocephalus can be present at birth (congenital hydrocephalus) or develop later in life (acquired hydrocephalus). There are numerous causes of hydrocephalus, the most common being hydrocephalus associated with myelomeningocele and post-hemorrhagic hydrocephalus as a complication of preterm birth.

What are shunts?

One treatment of hydrocephalus is the placement of a *shunt,* which is a flexible tube, to carry the extra CSF from the ventricle of the brain to another area of the body. The most common distal site for a shunt is the peritoneal cavity in the abdomen. These shunts are ventriculoperitoneal shunts. A successful shunt relieves pressure on the brain, controlling the rate of head growth and maximizing developmental potential.



AAP

Ventricular shunting systems. **A,** Ventriculoperitoneal shunt. **B,** Ventriculoatrial shunt.

What are some common characteristics of children who have hydrocephalus or shunts or of hydrocephalus or shunts as children present with them?

- A shunt has 3 main components: the ventricular catheter that goes into the fluid cavities of the brain, a valve that regulates flow, and a distal catheter that goes to the drainage site, such as the peritoneum. These components are all internal, that is, located under the skin.
- Shunts may require replacement as a child grows. Once inserted, shunts are typically needed for life. However, complications occur and most patients undergo one or more shunt revisions over their life spans. For this reason, patients with shunts require regular follow-up with a neurosurgeon. Reasons for shunt revision include
  - Shunt malfunction from obstruction or breakage of the shunt components
  - Shunt infection
- Intellectual outcome is affected by the etiologic origin of the hydrocephalus, the associated conditions, and shunt-related complications. Some children with hydrocephalus may also have physical limitations such as neurogenic bladders, which do not contract properly, and latex allergies.
- Hydrocephalus may be an isolated problem, or it may be related to another condition such as myelomeningocele.

Who might be on the treatment team?

- The treatment team consists of the child's pediatrician/primary care provider in the medical home, pediatric neurosurgeon, and physical, speech, and occupational therapists.
- Patients with myelomeningocele require multidisciplinary care. In addition to needing the specialists just listed, these children often need care from physical medicine and rehabilitation specialists, pediatric urologists, pediatric orthopedic surgeons, and neuropsychologists.
- Children who are younger than 3 years (ie, 36 months) may receive therapy through *early intervention* services. Therapists working with early intervention may interact with teachers and caregivers after the child has shunt surgery.
- Older children may get services through *special education and related services.*

Hydrocephalus and Shunts (*continued*)

What adaptations may be needed?

Physical Environment and Other Considerations

- There are generally no limitations to activity by a child with a shunt in place, although some surgeons ask the child to refrain from contact sports, during which a physical blow to the pump or tubing at the head may occur.
- No particular medications or dietary changes are typically needed.

What should be considered an emergency?

- Call parents/guardians for any early signs of shunt malfunction or infection.
  - Headache
  - Nausea or vomiting (or both)
  - Irritability or lethargy
  - Fever
  - Redness or swelling along the shunt tract
  - Vision problems
  - Loss of coordination or balance
  - Dizziness
- Call emergency medical services (911) and arrange for the child to be transported to a neurosurgical center for
  - Seizures
  - Extreme lethargy
  - Loss of consciousness
  - Severe headache with vomiting

What types of training or policies are advised?

- Caring for children with shunts
- Recognizing signs and symptoms of shunt failure

What are some resources?

- Hydrocephalus Association: www.hydroassoc.org, 301/202-3811
- Spina Bifida Association: http://spinabifidaassociation.org, 1-800-621-3141

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