



SHUNTS/IVH HYDROCEPHALUS

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HYDROCEPHALUS

1. Hydrocephalus is a condition where a large amount of water (spinal fluid) builds up in the head.
2. Spinal fluid bathes the brain (keeps it moist) and cushions it from blows to the head.
3. Spinal fluid is made in small areas in the brain called ventricles. The fluid flows out of the ventricles, goes over the brain, travels down the spinal column and ends up in the bloodstream. The brain makes spinal fluid daily.
4. Hydrocephalus occurs when spinal fluid cannot get out of the ventricles (where it is made) or if too much spinal fluid is made (rare).
5. Pressure on the brain from the fluid buildup can cause the brain to be damaged.

CAUSES OF HYDROCEPHALUS

Hydrocephalus may exist before birth or something can happen after birth (infection in the brain or bleeding in the brain).

1. **IVH (Intraventricular Hemorrhage):** Bleeding in the baby's head usually happens in the first week of life. It is very common in premature babies. The bleeding occurs in the area around the ventricles (sacks where spinal fluid is made). Sometimes this blood gets into the ventricles. This is called an IVH. There are 4 degrees or grades of IVH.

4 Grades of Bleeds:

Grade 1: Bleeding around the ventricles (where spinal fluid is made).

Grade 2: Bleeding into the ventricles.

Grade 3: Bleeding into the ventricles. The ventricles enlarge and push against the brain.

Grade 4: Bleeding into the ventricles and into the brain.

The higher the grade of bleed, the greater the baby's chance of having problems with his development. At discharge, it is impossible for us to know if your baby will have long term problems or what they may be. He may have no problems. He could have problems with hearing, vision, muscles and movement or learning.

2. **Subarachnoid bleed:** Bleeding in a space between the brain and skull. About 90% of these babies are normal.
3. **Meningitis:** Meningitis is an infection of the covering of the brain and spinal cord. Hydrocephalus can happen if scarring results. The spinal fluid is not able to flow around the brain.
4. **Aqueductal Stenosis:** A narrowed passage between two ventricles which blocks or slows the flow of spinal fluid out of the ventricles.
5. **Dandy-Walker Cyst:** A fluid-filled sack (cyst) by one of the ventricles in the brain. This blocks the flow of spinal fluid out of the ventricles and over the brain and down the spinal column.
6. **Arnold-Chiari Malformation:** A problem in the brain often seen in babies with myelomeningocele.
7. **Other causes of hydrocephalus** include tumors, head injury and other birth defects that involve the brain.

TESTS

1. Several tests are used to discover the hydrocephalus, show how it is doing, or see if a shunt is working.
2. **CT or CAT SCAN:** Stands for **Computerized Axial Tomography**.
 - Uses a beam of x-ray to take pictures of the brain. Your baby must be still for the test. Most times your baby is given medicine to make him sleepy for the test. Since he is small and the machine large, your baby actually looks like he is going inside the machine. He is watched very closely during the test.
 - Does not hurt your baby.
3. **CU:** Stands for **Cranial Ultrasound**.
 - Takes pictures of your baby's brain using sound waves.
 - A sensor is placed over soft spot on the head, sound waves measure the brain tissue and a picture is made. This is like the ultrasound done on moms when they are pregnant.
 - This does not hurt your baby. He can be awake or asleep for the test.
4. **MRI:** Stands for **Magnetic Resonance Imaging**.
 - A new way of looking and taking pictures of the brain, skull and body.
 - The test is like being placed in the CAT scanner. This machine uses a magnet instead of x-rays.
 - He is usually given medicine to make him quiet for the test.
 - It does not hurt your baby.
5. The doctor will decide if your baby needs any of these tests.

THE SHUNT

1. The purpose of the shunt is to bypass the blocked area and drain the spinal fluid to another place where it passes into the bloodstream.
2. The shunt is a small, very soft plastic tube about the size of the ink tube inside a pen.

HOW THE SHUNT WORKS

1. A small one-way valve in the tube controls the flow of spinal fluid out of the brain when pressure from the fluid builds up.
2. Some shunts have a bulb or flushing device that is used to test the shunt at home to see if it is working. You will be taught how and when to test the shunt before you go home. It does not hurt your baby or the shunt.

TYPES OF SHUNTS

1. There are two main types of shunts:
 - **Ventriculo-Peritoneal (VP) Shunt:** The shunt tube goes from the ventricle (Ventricular) in the brain to the belly (Peritoneal - medical word for into the abdomen or belly).
 - **Ventriculo-Atrial (VA) Shunt:** The shunt tube goes from the ventricle (Ventricular) in the brain to the heart (Atrial - a place in the heart).
2. The VP shunt is the most common type of shunt.

WHERE THE SHUNT GOES (VP SHUNT)

1. A small hole is made in the skull and the shunt tube is passed into the ventricle in the brain.
2. The other end of the tube is passed under the skin behind the ear into the belly (abdomen).
3. There are three cuts (incisions) on your baby:
 - A horseshoe cut on his scalp where the tube enters the head. There will be a small raised area about the size of a quarter behind the ear. This is the pump.
 - A cut at your baby's neck (sometimes) to help thread the tube down to the belly (abdomen).
 - A cut on your baby's belly where the end of the tube is in the belly.
4. The shunt tubing looks like a large vein that runs down your baby's body. Hair will cover the cut on his scalp.

CARE OF THE SHUNT

1. Handle your baby the same way you would any baby.
2. He can sleep in any position, including his tummy.

SHUNT PROBLEMS

1. **Blocked shunt:** The shunt can get plugged up and stop draining spinal fluid. This causes the fluid to build up pressure in the ventricle.

Signs the shunt is not working include:

- Raised or hard soft spot (with your baby sitting up quietly in your lap)
 - Vomiting
 - Fussing/crying
 - Poor feeding
 - Sleepiness
 - Seizures
2. **Infection:** The shunt can get infected. It is important to make sure that infections like ear infections, throat infections, boils or any skin infection be treated quickly. Signs that shunt is infected include:
 - Temperature over 101°F
 - Swelling and/or redness along the shunt tube
 3. **Growth:** The shunt may need to be replaced eventually because your baby has outgrown the shunt tubing.
 4. The shunt may need to be replaced due to an infection, if it is not working properly or your baby outgrows the shunt tubing. This is called a "shunt revision".

DOCTOR VISITS

1. Your baby needs to be followed by a neurosurgeon after discharge from the hospital.
2. Your baby's head will be measured with each visit.
3. The neurosurgeon will decide when any scans need to be repeated.

THE FUTURE

1. A few babies outgrow the need for the shunt; most need the shunt the rest of their life.
2. The outcome of hydrocephalus depends on the cause, part of the brain involved and severity of the problem.
3. While many hydrocephalic children have neurological problems, some are normal.
4. **It is important for your baby to be seen in the Newborn Follow-up Clinic by a doctor who specializes in infant development.**
5. **We refer you to a program that helps you work with your baby if there are any developmental problems.**
6. Use the first month home to get to know your baby and get things settled.

CALL THE DOCTOR IF...

1. Your baby has any signs the shunt is not working or may be infected.