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Prenatal Hydrocephalus

Prenatal hydrocephalus describes hydrocephalus that is diagnosed in utero (before birth).

Hydrocephalus can be detected in a fetus as early as the latter part of the first trimester of pregnancy. Around 20 to 24 weeks of gestation, abnormal dilation of the fetus's ventricles is more clearly detectable.

Prenatal ultrasound, performed by a radiologist or perinatologist skilled in obstetric ultrasound, is highly reliable and accurate. It will establish that there is an abnormal cerebrospinal fluid (CSF) collection but it may not show the precise site of flow obstruction. The more important question is what caused the hydrocephalus and to what degree are there other malformations within the central nervous system. In general, early (first trimester) develop-

ment of significant hydrocephalus can be a bad prognostic sign for infant mortality and developmental progress. In some cases, mild ventricular dilation identified by ultrasound has resolved itself by the third trimester.

Prenatal hydrocephalus is generally not treated until after birth, when a [shunt](#) may be inserted into the baby's brain to divert CSF fluid. While some neurosurgeons have attempted in utero placement of a shunt, existing studies indicate that there are few benefits of doing so and, in fact, the potential complications outweigh the benefits.

There are many unknowns surrounding a prenatal diagnosis of hydrocephalus. This can be very frightening, distressing and sad for expectant parents, and extremely frustrating for the

medical specialists who provide care. Although the outlook and success rate for infants diagnosed at or after birth is generally very high, there are limited studies available on the long-term prognosis of those with prenatal-onset hydrocephalus. Much seems to depend on the extent of associated brain and systemic abnormalities, structural changes in the brain and the extent of the hydrocephalus. It is very difficult to accurately predict future function based on morphology or imaging. The more significant factor in the future development of children with prenatal-onset hydrocephalus is the presence of continuing care and the absence of complications such as infection or hemorrhage.

Guardian Dues !!!



How to Help Us

The Guardians of Hydrocephalus Research Foundation (GHRF) was established in 1977 as a non-profit organization. Since then we have distributed over 10,000 information packets and received many phone calls every month answering important questions from concerned parents and worried individuals.

Our quest is to provide information to the public without cost so that a better understanding of hydro-

cephalus will be established. We provide counseling to families with children who have *hydrocephalus* to define specific problems that parents encounter and help resolve them as best as possible. We make many referrals to our doctors (more on page 3) who can assist individuals and their families through these tough times.

Since we are non-profit we do not, nor ever have, received

government funding. Our funding comes straight from the donations and annual dues of our members. We have an office staff and our upkeep is often expensive. Therefore the annual dues we ask of our members, \$30.00 per year/per family, is crucial to our continued existence and efficient performance. It is necessary in order for us to help you !

10 Steps to a Longer and Healthier Life



We all want to be as healthy as possible. But there is so much information that is out there that we sometimes lose focus on what is crucial to maintaining long healthy lives.

1. **Obtain a regular doctor.** As we get older regular checkups become essential, yet most of us only see a doctor when we are sick or unhealthy. Going to your doctor should be preventative catching problems before they escalate.

2. **Quit Smoking.** Smoking causes lung cancer, emphysema, and many other health problems. If you smoke stop now in order to prolong your life and the lives of others around you.

3. **Maintain a healthy heart.** Know your "numbers." Get your blood pressure and cholesterol checked regularly. Maintain a healthy weight and eat a healthy balanced diet. Try to also get at least 30 minutes of mod-



erate-to-vigorous exercise at least four days a week. They do not have to be consecutive and should be spaced out along the week.

4. **Get tested.** Get tested for HIV if you have ever been sexually active or ever injected drugs (even if just once). Also use condoms regularly and practice safe sex always.

5. **Seek psychological help when needed.** Depression and anxiety are common problems among people of all sexes, races, and ages. If you feel you need help talk to your doctor or seek out a mental health professional.

6. **Live free of dependence on Alcohol and Drugs.** Heavy drinking or drug use has deleterious side effects on your physical and mental well being. Steer clear of excessive use and if it is too late seek help.

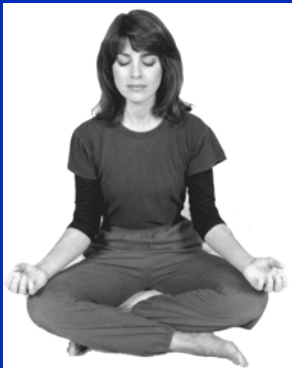
7. **Get checked out for**

cancer. Colonoscopies, Pap tests, and mammograms can save lives and catch problems early on. Talk to your doctor about the tests you should receive.

8. **Get all of your immunizations.** Vaccinations are not only for children. Ask your doctor if you and your family are fully protected against diseases like tetanus, hepatitis B, fly and pneumonia.

9. **Make your home safe and healthy.** Keep all emergency #s by your telephone. If you have young children make sure all the lower cabinets with cleaning supplies in them are safely guarded away from children.

10. **Have a healthy baby.** In many cases congenital diseases happen without the parents knowledge, however smoking or drinking while pregnant is preventable and to ensure a healthy newborn stay away from any toxins that



Seven Steps to Deep Relaxation

The relaxation response, a physical state of deep calm is a wonderful way to care for yourself, so practice this technique once or twice daily. Here is how to do it:

1. Pick a word or phrase that's comforting, meaningful or spiritual.

2. Sit quietly in a comfortable position.

3. Close your eyes and relax your muscles.

4. Breathe slowly and naturally and, as you do, Repeat your focus word or phrase as you exhale.

5. Don't worry about how

well your doing. When other thoughts come to mind, simply say "oh well" and gently return to the repetition.

6. Continue for 10-20 mins.

7. As you conclude continue sitting quietly for a minute allowing other thoughts to return.

At this Age	Your Child Needs These Shots
Birth	Hep B
2 months	Hep B, DTaP, Hib, Polio, PCV7
4 months	DTaP, Hib, Polio, PCV7
6 months	Hep B, DTaP, Hib, Polio, PCV7
12 months	MMR, Hib, Chicken Pox, PCV7
15 months	DTaP
6-23 months	Annual flu vaccine

The National Institute of Health recommends the following tips to help you stay in control of your health care.

- Write down the name of your medicines and why you are taking them.
- Write down the name of the condition that the medication is designed to treat or control.
- Write down the dosing schedule.
- Keep that list of medicines on the refrigerator door.
- Keep another list in your wallet, or in your purse.
- Let your doctor know about all the medicines you are taking, including over the counter medicines, herbal products and even vitamins.
- Ask your Doctor, Nurse or Pharmacist about the right way to take any medicine before you start to use it.

Benefits CheckUp®

Benefits CheckUp is a free Internet tool that is fast and private. At the website (www.benefitscheckup.org) you can learn about Government programs that may help you or an older family member pay for:

- Prescriptions
- Health care
- Property Taxes
- Utilities

A Good Heart Could Be the Key to a Good Mind

Blood feeds the brain. It feeds the whole body, of course, with the nutrients and oxygen that give cells energy. But the brain is especially demanding—a three-pound lump that consumes one fifth of the body’s energy supply.

It has long been clear that cardiovascular catastrophes can have a profound impact on the brain. When a patient’s heart stops beating, the brain is among the first organs to suffer irreparable damage. Strokes—which occur when a clot blocks the flow of blood to the brain, or when an artery in the brain bursts—often leave victims disabled or dead.

In recent years, though, a new wave of research has suggested the relationship between blood flow and the brain goes deeper. The mind’s ability to deal quickly with complex tasks declines naturally with age. But a stressed cardiovas-

cular system may accelerate the process, experts say.

And, while cardiovascular problems alone do not cause Alzheimer’s disease, they may be one of the key triggers that can allow Alzheimer’s to take hold.

Put another way: Taking care of the heart as you age may help protect the mind.

“We used to think there was cardiovascular disease and then there was cognition,” says Dr. Ranjan Duara, medical director of Mount Sinai’s Wien Center for Memory Disorders. “There’s more and more evidence that one feeds the other.”

Many of the risk factors that affect cardiovascular health—high blood pressure, high cholesterol, genetic factors, diabetes—also seem to affect brain health, says Carl W. Cotman, director of the

Institute for Brain Aging at U. of California. Conversely taking care of the cardiovascular system also seems to be good for the mind.

“Exercise, which has been well known for generations to reduce the risk of heart disease, now has recently been described to delay the onset of Alzheimer’s disease,” he says.

The relationship between blood flow and cognitive health is still poorly understood, and is likely to result from interacting with each other. One possible model explains that high blood pressure and high cholesterol damage the lining of the small blood vessels in the brain, reducing blood flow and depriving nearby brain cells of nutrients. “This trouble in blood flow to parts of the brain (may be) doing damage and shifting people down the cognitive decline curve,” Langa says.

It’s unclear just how important cardiovascular processes are both in normal mental decline and in the onset of dementia—the debilitating cognitive decline such as that seen in Alzheimer’s patients.

Many studies have showed correlations between cardiovascular risk factors and Alzheimer’s, but none has clearly shown that cardiovascular problems actually cause the disease.

“We are probably ready to have some trials in which you identify some people at high risk for cardiovascular disease,” Yaffe says. “It would be interesting to see—if you (control) their cardiovascular disease, would you prevent dementia?”

Hydrocephalus Research: What is being done?



Within the Federal government, the leading supporter of research on hydrocephalus is the National Institute of Neurological Disorders and Stroke (NINDS). The NINDS, a part of the National Institutes of Health (NIH), is responsible for supporting and conducting research on the brain and the central nervous system. NINDS conducts research in its laboratories at NIH and also supports studies through grants to major medical institutions across the country.

One NINDS-supported study examined cognitive development, academic achievement, and behavioral adjustment in children with hydrocephalus. With further research, investigators hope to shed new light on the influence of hydrocephalus on development as well as the more general issue of the effect of early brain injury.

The NINDS also conducts and supports a wide range of fundamental studies that explore the complex mechanisms of normal brain development. The knowledge gained from these studies provides the foundation for understanding how this process can go awry and, thus, offers hope for new means to treat and prevent developmental brain disorders such as hydrocephalus.

Shunt Statistics

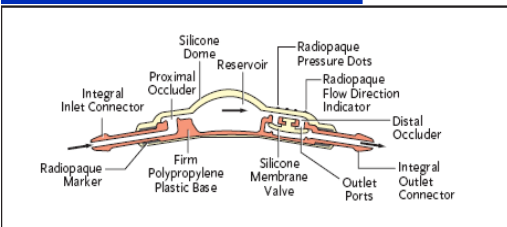


Fig 14. Cutaway of a Fixed Pressure Valve

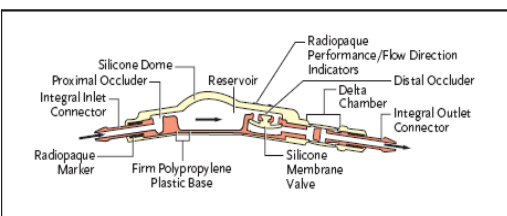
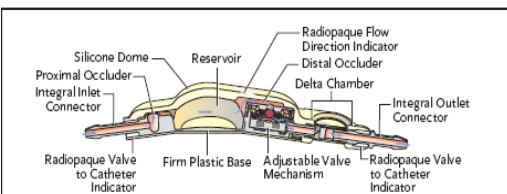


Fig 15. Cutaway of a Delta Valve



- There are 25,000 shunt operations performed each year in the United States. Of those, some 18,000 are initial shunt placements.
- Some 85% of people with shunts have had at least two shunt operations.
- Studies show that the risk of shunt failure in an infant's first year is 30%.
- Shunts are revised about two times in the first ten years of use per patient.
- 95% of shunt infections occur within 3 to 5 days of surgery.
- The reported frequency of shunt infection varies from 1.5 to 39% with an average of 10 to 15%.
- The overall complication rate of CSF shunts remains quite high: 25 to 60%.
- More than 50% of staphylococcal infections occur within 2 weeks of the operation, and 70% of infections occur within 2 months.
- Recent rates of infection range from 2% to 11% with infants less than 1 year of age having a higher incidence of infection.
- An average of 3 to revisions are usually required during childhood if treated for hydrocephalus from infancy.
- Ocular gaze and movement disorders are found in approximately 25 to 33% of children with hydrocephalus.
- These visits produce nearly 36,000 shunt-related procedures, 33,000 of which involve the placement of a shunt.
- CSF shunting procedures account for almost \$100 million dollars of national health care expenditures in the United States.
- Nearly half of these dollars are spent on shunt revisions.
- Shunt malfunctions occur in about two to 40% of cases.

What is a CAT scan?

A computerized axial tomography scan is more commonly known by its abbreviated name, CAT scan or CT scan. It is an x-ray procedure which generates cross-sectional views and, if needed, three-dimensional images of the internal organs and structures of the body. A CAT scan is used to define normal and abnormal structures in the body and/or assist in procedures by helping to accurately guide the placement of instruments or treatments.

CAT scans are performed to analyze the internal structures of various parts of the body. This includes the head, where traumatic

injuries, (such as blood clots or skull fractures), tumors, and infections can be identified.

Occasionally, contrast material (an x-ray dye) is placed into the spinal fluid to further enhance the scan and the various structural relationships of the spine, the spinal cord, and its nerves. The technique is painless and can provide extremely accurate images of body structures in addition to guiding the radiologist in performing certain procedures, such as biopsies of suspected cancers, removal of internal body fluids for various tests, and the draining of abscesses which are deep in the body. Many of these procedures are minimally invasive

and have markedly decreased the need to perform surgery to accomplish the same goal.

The amount of radiation a person receives during a CAT scan is minimal. In men and non-pregnant women, it has not been shown to produce any adverse effects. If a woman is pregnant, there may be a potential risk to the fetus, especially in the first trimester of the pregnancy. If a woman is pregnant, she should inform her doctor of her condition and discuss other potential methods of testing, such as an [ultrasound](#), which are not harmful to the fetus.

What is a MRI?

The image and resolution produced by MRI is quite detailed and can detect tiny changes of structures within the body. An MRI scan can be used as an extremely accurate method of disease detection throughout the body. In the head, trauma to the brain can be seen as bleeding or swelling. Other abnormalities often found include brain aneurysms, [stroke](#), tumors of the brain, as well as tumors or inflammation of the spine. Often, surgery can be deferred or more accurately directed after knowing the results of an MRI scan.

An MRI scan is a painless radiology technique which has the advantage of avoiding x-ray radiation exposure. There are no known side effects of an MRI scan. The benefits of an MRI scan relate to its precise accuracy in

detecting structural abnormalities of the body. During the MRI scan, patients lie in a closed area inside the magnetic tube. Some patients can experience a claustrophobic sensation during the procedure.

After the MRI scanning is completed, the computer generates visual images of the area of the body that was scanned and these images are transferred to film (hard copy). This film is given to a radiologist, a physician who is specially trained to interpret images of the body reproduced on film. The interpretation is transmitted in the form of a report to the practitioner who requested the MRI scan. The practitioner can then discuss the results with the patient and/or family.

What is a Lumbar Puncture?

A lumbar puncture (an LP) is the insertion of a needle into the fluid within the spinal canal. It is termed a "lumbar puncture" because the needle goes into the lumbar portion (the "small") of the back. An LP is most commonly performed to diagnose a disease, namely to obtain a sample of the fluid in the spinal canal (the cerebrospinal fluid) for examination. Spinal fluid obtained from the lumbar puncture can be used to diagnose many important diseases such as bleeding around the brain; increased pressure from hydrocephalus; inflammation of the brain, spinal cord, or adjacent tissues (encephalitis, meningitis); tumors of brain or spinal cord, etc.

Spinal fluid is sometimes removed by LP for the purpose of decreasing spinal fluid pressure in patients with uncommon conditions (such as, for examples, normal-pressure [hydrocephalus](#) and benign intracranial hypertension).

The patient is typically lying down sideways for the procedure. LPs in infants are often done upright.

When spinal fluid is removed during an LP, the risks include headache, brain herniation, bleeding, and infection. Each of these complications are uncommon with the exception of headache, which can appear from hours to up to a day after LP. Headaches occur less frequently when the patient remains lying flat 1-3 hours after the procedure.



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From everyone at the Guardians of Hydrocephalus Research Foundation we would like to show our appreciation to those who continue to help maintain this organization. With your help we can continue distributing information and connecting people with hydrocephalus with doctors that can help them. If you would like to be a part of our organization or have a question for us feel free to contact us over the phone or check out our web site. Through our web site our members can send emails to us or talk to one another through a bulletin board message service. Again we thank you !

