Ventriculostomy

Overview

Ventriculostomy is a medical procedure that involves the insertion of a catheter into one of the brain's ventricles to drain cerebrospinal fluid (CSF) or to monitor intracranial pressure. This procedure is commonly performed in cases of hydrocephalus, traumatic brain injury, or intracranial hemorrhage to alleviate pressure on the brain and prevent further damage.

What are the Ventricles?

The brain has hollow fluid-filled cavities called ventricles (Fig. 7). Inside the ventricles is a ribbon-like structure called the choroid plexus that makes clear colorless cerebrospinal fluid (CSF). CSF flows within and around the brain and spinal cord to help cushion it from injury. This circulating fluid is constantly being absorbed and replenished.

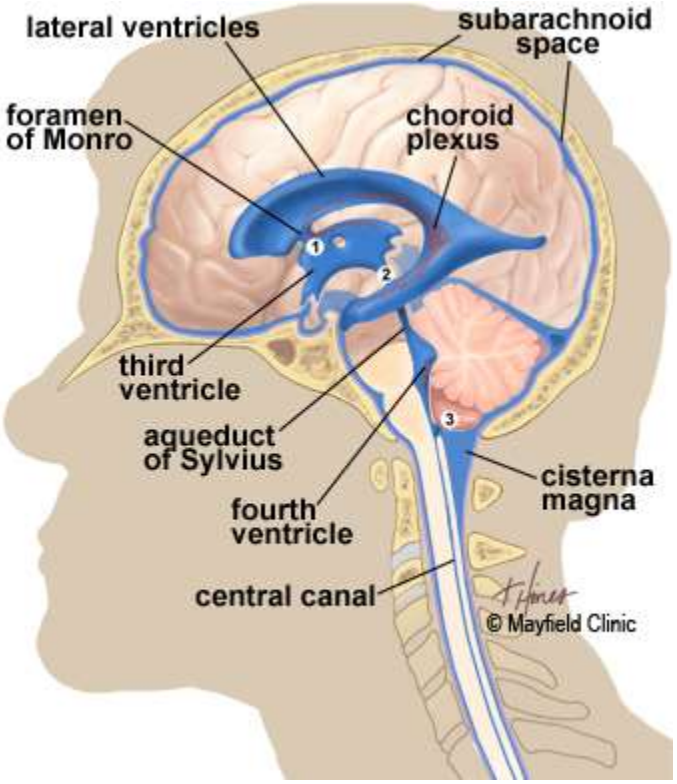

Figure 7. CSF is produced inside the ventricles deep within the brain. CSF fluid circulates inside the brain and spinal cord and then outside to the subarachnoid space. Common sites of obstruction: 1) foramen of Monro, 2) aqueduct of Sylvius, and 3) obex.

There are two ventricles deep within the cerebral hemispheres called the lateral ventricles. They both connect with the third ventricle through a separate opening called the foramen of Monro. The third ventricle connects with the fourth ventricle through a long narrow tube called the aqueduct of Sylvius. From the fourth ventricle, CSF flows into the subarachnoid space where it bathes and cushions the brain. CSF is recycled (or absorbed) by special structures in the superior sagittal sinus called arachnoid villi.

A balance is maintained between the amount of CSF that is absorbed and the amount that is produced. A disruption or blockage in the system can cause a build up of CSF, which can cause enlargement of the ventricles (hydrocephalus) or cause a collection of fluid in the spinal cord (syringomyelia). Retrieved from https://mayfieldclinic.com/pe-anatbrain.htm

Why is this procedure done?

Your brain is protected by your skull and spinal fluid. The spinal fluid, also called cerebrospinal fluid or CSF, surrounds your brain and your spine. The CSF in your brain is mostly in the fluid filled areas, called ventricles.

A ventriculostomy is a tube that goes into the ventricle. It can drain extra CSF to lower the pressure in the brain. This tube can also measure the pressure on the brain. The doctor sometimes measures your brain pressure when you have a head injury or too much CSF. The brain pressure is also called your intracranial pressure or ICP.

Too much CSF or bleeding in your brain can cause increased pressure on your brain and spinal cord. Swelling from a brain injury or a tumor can also cause increased pressure. The pressure can harm the brain and blood vessels in the brain.

What will the results be?

There is less fluid around the brain and lower pressure inside the skull. The tube measures and lowers the pressure inside the skull by draining extra fluid.

What happens before the procedure?

Most often this is done in the intensive care unit or in surgery. You may not be aware of it. If you are awake:

- The doctor will ask you about your health history. Talk to the doctor about:
    - All the drugs you are taking. Be sure to include all prescription and over-the-counter (OTC) drugs, and herbal supplements. Tell the doctor about any drug allergy. Bring a list of drugs you take with you.
    - Any bleeding problems. Be sure to tell your doctor if you are taking any drugs that may cause bleeding. Some of these are warfarin, rivaroxaban, apixaban, ticagrelor, clopidogrel, ketorolac, ibuprofen, naproxen, or aspirin. Certain vitamins and herbs, such as garlic and fish oil, may also add to the risk for bleeding. You may need to stop these drugs as well. Talk to your doctor about them.
    - When you need to stop eating or drinking before the procedure.

- The doctor will do an exam and may order:
    - Lab tests
    - CT scan or MRI
    - X-ray

What happens during the procedure?

Once you are in the operating room or before the procedure, the staff will put an IV in your arm to give you fluids and drugs. You will be given a drug to make you sleepy. It will also help you stay pain free during the surgery. You will likely have a tube in your mouth to help with breathing.

- The doctor will shave the hair where the ventriculostomy will go, clean the area, inject a drug to make the skin numb, and make a small cut. The doctor uses a special drill to make a hole in the skull. The doctor puts the catheter into the ventricle in the brain.
- The catheter is connected to a drainage system. It may be connected to a system to measure the pressure in the brain.
- The doctor will make sure the drainage system is level with your head.
- Your doctor will close your cuts and cover them with clean bandages.
- The procedure takes about 90 minutes.

What happens after the procedure?

- You will go to the Recovery Room or to the Intensive Care Unit and the staff will watch you closely.
- You may feel discomfort and numbness after the procedure. You will get drugs to help with the pain and prevent infection.
- The staff may talk to you and ask questions to check you when you wake up.
- Each time you move, the drainage system will need to be checked.
- Once the pressure is normal, the staff may clamp the catheter shut and watch to make sure the pressure stays normal.
- If so, the tube will be removed before you leave the hospital. If not, the doctors may talk about putting in a different kind of catheter that drains the fluid somewhere else in your body.

What problems could happen?

- Infection in the spinal fluid or on the skin opening
- Ventriculostomy may drain too much fluid or not work well
- Bleeding
- Seizures
- Damage to the brain tissue
- The doctor cannot find the ventricle with the catheter
- Blood clots or something else clogs or blocks the catheter