

# Hydrocephalus

## Types of Hydrocephalus

**Hydrocephalus** is the development of excessive volume or pressure of CSF in the ventricles (Figure 10). There are many causes. Hydrocephalus is broadly classified as either communicating or non-communicating.

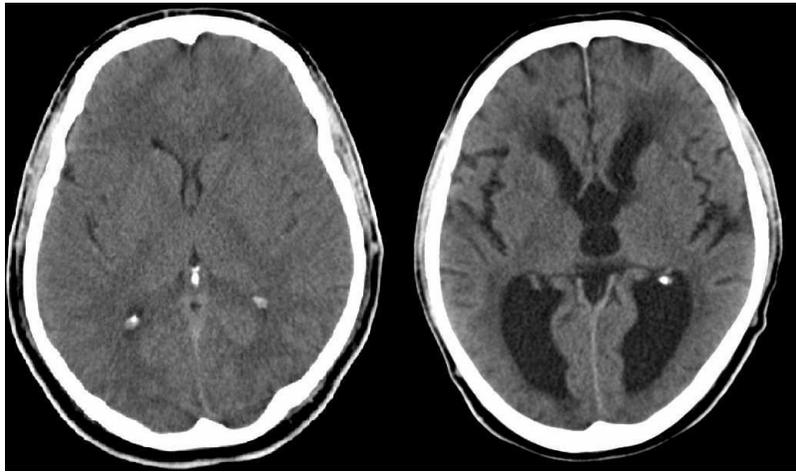


Figure 10: CT scans showing normal ventricles (left), and hydrocephalus (right).

## Communicating Hydrocephalus

In **communicating hydrocephalus**, all of the ventricles and subarachnoid (CSF) spaces surrounding the brain and spinal cord are in communication with each other in one continuous fluid compartment.

### a. Communicating Hydrocephalus with Elevated Pressure

Communicating hydrocephalus, which normally implies elevated intracranial pressure, occurs when there is a defect in absorption of CSF at the arachnoid granulations, coupled with continued production of CSF from the choroid plexus (CSF production never stops). Since the adult brain and spine are rigidly enclosed, increased CSF volume causes increased pressure throughout the CSF compartment. Typically the hydrocephalus is less rapid and severe than in non-communicating hydrocephalus. This type of hydrocephalus can occur following intracranial hemorrhage (especially subarachnoid and intraventricular hemorrhage), head trauma, and bacterial and neoplastic meningitis.

b. Normal Pressure Hydrocephalus (NPH)

**Normal pressure hydrocephalus (NPH)** is a disease of elderly people in which the ventricles increase in size in a communicating hydrocephalus pattern, but the CSF pressure remains normal. Symptoms include gait disturbance, urinary incontinence and dementia. The phenomenon is common but remains poorly understood. Lowering the intracranial pressure (through ventriculoperitoneal or lumboperitoneal shunting) improves the symptoms, although typically the ventricles still remain dilated.

## Non-Communicating Hydrocephalus

In **non-communicating hydrocephalus**, there is an obstruction to flow of CSF out of one of the ventricles, coupled with continued production of CSF from the choroid plexus above the obstruction (Figure 11). Pressure and volume increase within the obstructed ventricle is relatively rapid and severe, usually a neurosurgical emergency. Common causes of non-communicating hydrocephalus include:

- c. **Colloid Cyst:** a cyst that forms in the roof of the third ventricle, eventually obstructing the outflow of both lateral ventricles at the foramen of Munro.
- b. **Aqueductal Stenosis:** a congenital narrowing or web within the aqueduct of Sylvius, causing obstructive hydrocephalus of the third and lateral ventricles.
- d. **Chiari Malformation:** a congenital anomaly of the posterior fossa, with compression of the aqueduct of Sylvius



Figure 11: Colloid cyst of the third ventricle (white) with hydrocephalus.