

Normal Pressure Hydrocephalus (NPH)

Normal Pressure Hydrocephalus (NPH) is a rare type of dementia occurring in less than one percent of older patients. The clinical manifestations of normal pressure hydrocephalus include three basic symptoms: 1) abnormalities of gait, 2) abnormal function of bowel or bladder, and 3) dementia. Despite its misleading name, this disease is produced by obstruction of CSF flow in the brain. The disease is frequently mentioned because shunting may improve function; however, this disorder is uncommon.

Cerebral spinal fluid (CSF) is a clear liquid that is continually produced by specialized blood vessels i.e., choroid plexus, within chambers inside the brain, referred to as ventricles. The CSF flows through the ventricles and onto the surfaces of the brain where this clear liquid is reabsorbed back into cerebral veins via channels called "*arachnoidal granulations.*" Arachnoidal granulations are located on the top of the brain within the vessels of the dura mater, i.e., the fibrous sheet that separates the skull from brain tissue. Normal Pressure Hydrocephalus is probably caused by obstruction of these channels, i.e., the arachnoid granulation, that drain CSF. NPH received its name because early studies failed to show increased CSF pressure during spinal taps. More sophisticated monitoring subsequently demonstrated that these patients have obstruction of flow and periodic increased pressure, hence the name is not completely accurate. Specialized testing such as

intracranial pressure monitoring or cisternography can be performed to demonstrate these pressure spikes.

The treatment for Normal Pressure Hydrocephalus is the insertion of a shunt into the ventricle to relieve pressure. The shunt is a plastic tube that is inserted into the ventricle through brain tissue. The drain extends through a hole in the skull where it is connected to a reservoir beneath the scalp that feels like a button under the skin. A plastic drainage tube is tunneled under the skin of the neck and chest to the abdominal cavity where the fluid drains. The reservoir contains a one-way flow valve that prevents fluid from entering the brain from the abdomen. The insertion of a shunt through brain tissue poses specific risks to the patient, including hemorrhage and swelling.

The shunt will not reverse dementia. The shunt is helpful for persons under the age of 70 with predominantly bowel, bladder, and gait abnormalities. A shunt may slow or stop progression of symptoms in younger patients with NPH. Patients with NPH also develop behavioral symptoms that respond to medications and behavioral management programs. In persons over 70, the shunt should be inserted with great care.

NPH is a rare disease caused by old damage to channels that drain CSF. Many Alzheimer patients have enlarged ventricles as well as abnormal gait and bladder function. Since NPH and Alzheimer's disease may have identical clinical features, shunting is not usually performed unless clinicians have demonstrated elevated pressure or spikes, i.e., pressure waves.