# Ventricle

The brain ventricles are structures that have been related to cognition since antiquity. They are essential components in the development and maintenance of brain functions. The aging process runs with the enlargement of ventricles and is related to a less selective blood-cerebrospinal fluid barrier and then a more toxic cerebrospinal fluid environment. The study of brain ventricles as a biological marker of aging is promising because they are structures easily identified in neuroimaging studies, present good inter-rater reliability, and measures of them can identify brain atrophy earlier than cortical structures. The ventricular system also plays a role in the development of dementia, since dysfunction in the clearance of beta-amyloid protein is a key mechanism in sporadic Alzheimer's disease. The morphometric and volumetric studies of the brain ventricles can help to distinguish between healthy elderly and persons with mild cognitive impairment (MCI) and dementia. Brain ventricle data may contribute to the appropriate allocation of individuals in groups at higher risk for MCI-dementia progression in clinical trials and to measuring therapeutic responses in these studies, as well as providing differential diagnoses, such as normal pressure hydrocephalus. Here, we reviewed the pathophysiology of healthy aging and cognitive decline, focusing on the role of the choroid plexus and brain ventricles in this process [1)]

## Anatomy

Their true function started to be realized more than a thousand years later.

Their anatomy and function are extremely important in the neurosurgical panorama [2)].

The intracranial ventricles are anatomical interconnected cavities where the cerebrospinal fluid flows through.

The ventricular system is composed by the four well known cavities:

The two lateral ventricles

The third ventricle

The fourth ventricle.

Each lateral ventricle communicates with the third ventricle through the foramen of Monro and the third ventricle communicates with the fourth through the aqueduct of Sylvius.

Cerebrospinal fluid (CSF) pathway studies have revealed that the CSF secreted from the choroid plexus of the ventricles after egressing from the fourth ventricle reaches the basal suprasellar cistern and ultimately the sylvian cisterns.

It is continuous with the central canal of spinal cord. The ventricle lining consists of an epithelium-like membrane called ependyma.

The ventricles are interconnected, allowing the flow of cerebrospinal fluid.

Narrowing of the aqueduct of Sylvius can blocks the cerebrospinal fluid motion in the ventricular system.

# Pathology

see Intraventricular tumor.

see Ventriculitis.

1)
de Mélo Silva Júnior ML, Diniz PRB, de Souza Vilanova MV, Basto GPT, Valença MM. Brain ventricles, CSF and cognition: a narrative review. Psychogeriatrics. 2022 Jul;22(4):544-552. doi: 10.1111/psyg.12839. Epub 2022 Apr 30. PMID: 35488797.
2)
Mortazavi MM, Adeeb N, Griessenauer CJ, Sheikh H, Shahidi S, Tubbs RI, Tubbs RS. The ventricular system of the brain: a comprehensive review of its history, anatomy, histology, embryology, and surgical considerations. Childs Nerv Syst. 2014 Jan;30(1):19-35. doi: 10.1007/s00381-013-2321-3. Epub 2013 Nov 16. Review. PubMed PMID: 24240520.