

**Ageing-related Alterations in the Third and  
Lateral Ventricles of the Brain in Man:  
Morphometric Magnetic Resonance Imaging  
Study**

*Thesis*

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## Summary

The present work was designed to study the normal and variant anatomy of the supratentorial ventricular system of brain. This study is directed to look for changes in the dimensions of the supratentorial ventricular system as per age and sex by magnetic resonance imaging study and correlation of these dimensions with systolic stroke volume, systolic peak velocity and systolic mean velocity of CSF flow across the aqueduct of Sylvius using magnetic resonance cerebrospinal fluid flowmetry (MRCSF flowmetry).

MRI scans of 75 patients with age ranging from 15 to 70 years were used in the current study. Their scans were normal and randomly selected. The patients were divided into three equal groups (n = 25 patient each): Group **I** (young adult group): from fifteen year to thirty years (15-30 years), Group **II** (middle age adult group): from thirty one years to fifty years (31-50 years), Group **III** (late adult group): from fifty one years to seventy years (51-70 years). Conventional MRI of the brain was performed for measurement of the transverse diameters of body and horns of the lateral ventricles and the maximum width of the third ventricle. Then MRCSF flowmetry was used for analysis of CSF flow for each patient to estimate the systolic stroke volume, systolic peak velocity at the level of aqueduct of Sylvius. CSF flow was quantitatively studied and the parameters were tabulated and statistically analysed with respect to age and sex of individuals.

In group **I**: twelve patients showed normal criteria, seven patients exhibited mild type criteria, five patients illustrated moderate type criteria and only one patient was considered as severe type criteria. In group **II**: nine patients exhibited normal criteria, thirteen patients illustrated mild type criteria, no patients illustrated moderate type criteria and, on the other hand, three patients showed severe type criteria. In group **III**: no patients illustrated normal criteria, six patients exhibited mild type

criteria, eight patients showed moderate type criteria in addition to one patient was considered as moderate type criteria and eight patients showed severe type criteria with two patients were considered as severe type criteria.

In the present study, the differences in systolic stroke volume and systolic peak velocity were more significant than the differences in systolic mean velocity. Higher values from the measurements of maximum width of third ventricle recorded here in females in all groups except for middle age adult group where higher values were recorded in males. Frontal horn, occipital horn, temporal horn and body transverse diameters at both sides showed statistically significant differences in male and female patients.

It could be concluded that, ventricular enlargement is a characteristic physical change that is present frequently in a number of cerebral disorders encountered in neurologic and psychiatric practice. So, it is important for knowing the normal upper and lower limits of the brain ventricular system in the different age groups, and in both sexes.

More studies are recommended to assess the rest of dimensions of the ventricles and to make a 3D reconstruction of the different ventricular shapes with age.