

Marla A. Taylor
BioRETS summer intern
LSU Health Sciences Center, New Orleans, LA

Dr. Deidre Devier, Ph. D
LSUHSC, Department of Neurology

Background: Multiple sclerosis (MS) is a degenerative neurological disease in which the immune system attacks the central nervous system. During the attack, the protective sheath or myelin that covers nerve fibers is damaged or destroyed causing inflammation to the brain, optic nerve and/or spinal cord. This damage can lead to motor, cognitive and neurological concerns. Thus, it causes communication problems between the brain and the other parts of the body.

Magnetic Resonance Imaging (MRI) is a crucial tool for analyzing disease presence and advancement. Patients with Multiple Sclerosis (MS) undergo periodic MRI imaging to monitor disease progression and treatment effectiveness. The scans specify lesion locations in the brain and spinal cord. The frequency of MRI scans varies depending on the individual's disease development and medication and treatment plan. Scans can be conducted in a series from every six months to two years.

In the brain, there are two lateral ventricles and a third and fourth ventricle. The ventricles of the brain circulate cerebrospinal fluid. The third ventricle of the brain is analyzed to determine the measure of brain atrophy. Atrophy is the gradual decline in effectiveness of cognitive and motor abilities.

Hypothesis: MS patients with larger third ventricles will have a decrease in cognitive function associated with

Methods: 24 MRI's from the MS study were selected and analyzed for third ventricle measurement. Several measurements were taken. The third ventricle length (3VL), the half length (3VL/2), the width (3VW), the horns (3VH) and the bicaudate (3-Bic) were all measured and recorded on an excel spreadsheet to compare to the clinical scans collected from various participants of the study in the metropolitan New Orleans area.

Conclusion: Measuring the third ventricle is an effective tool for evaluating brain atrophy in MS patients. Increase in third ventricle size is related to atrophy of the thalamus and corpus callosum part of the brain, which is related to sensory and communication functioning respectively. The Montreal Cognitive Assessment (MoCA) test is a measure of cognitive functioning. The measurement can be used in correlation with the MoCA test to trace disease progression and predict cognitive decline. It is a moderately straightforward measurement that can be collected through standard MRI scans making it a realistic marker for clinical and research use.