MRI Helps Distinguish Cognitive Impairments

Use of technology has potential to lead to subtype-specific prophylaxis or therapy.

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PORTO, PORTUGAL — MRI used in combination with neuropsychometric evaluations enables physicians to distinguish among three subtypes of mild cognitive impairment, thus potentially permitting early and effective subtype-specific prophylaxis or therapy before conversion of a given subtype to its corresponding dementia, according to data presented at the at the Fourth International Congress on Vascular Neurology in Porto.

The study involved 166 volunteers recruited from ongoing longitudinal studies of aging, stroke, cerebrovascular disease, and dementia, said Dr. John S. Meyer, a professor of neurology at Yale College of Medicine in New Haven. All of the volunteers were followed for at least 6 years and underwent serial evaluations every 3-6 months involving medical, neuropsychometric assessments (Mini-Mental State plus Cognitive Capacity Screening Examination as Combined Mini-Mental Cognitive Capacity Screening Examinations and Hamilton Depression Scales), and neuropsychologic cognition was defined as a Combined Mini-Mental Cognitive Capacity Screening Examinations (CMMCSE) score greater than 42 (52 participants). Based on positive findings on accepted clinical assessment (plus CMMCSE scores less than 42), 40 participants were determined to have neurodegenerative MCI, 35 had vascular MCI, and 8 had Parkinson's-Lewy body MCI.

Neurodegenerative MCI, vascular MCI, and Parkinson's disease MCI were considered to be prodromal for AD, vascular dementia, and Parkinson's disease dementia (PDD), respectively. Both patients with MRI MRI disease MCI were considered to be prodromal for AD, vascular dementia, and Parkinson's disease dementia.

MRI scans were performed annually. A visual rating scale was used to perform MRI analysis. Volumetric measurements were made of the temporal horn and entorhinal cortex by enlarging regions of interest. Subjects with MCI and dementia tended to be older than cognitively normal subjects. Those with vascular MCI had more depressive symptoms than normal subjects. Histories of hypertension, heart disease, diabetes, transient ischemic attacks, and stroke were more common in subjects with vascular MCI than in normal subjects. A history of transient ischemic attacks and stroke were more common among subjects with neurodegenerative MCI and AD than in normal subjects. A history of transient ischemic attacks and stroke were more common among subjects with Parkinson's MCI than among normal subjects.

On MRI, cortical atrophy was more frequently seen in MCI and dementia groups compared with cognitively normal groups — except for the parietal and occipital cortices in the Parkinson's MCI group and the occipital cortex in the PDD group. Subjects with AD displayed significantly more temporal cortical atrophy than those with neurodegenerative MCI.

Based on volumetric measurements, subjects in MCI and dementia groups had more significant frontal horn and third ventricle enlargement, compared with those in the normal group. Subjects with neurodegenerative MCI, AD, and PDD showed significantly more temporal horn enlargement. Subjects with vascular MCI had less significant frontal horn enlargement than VaD subjects. Those with neurodegenerative MCI displayed more significant temporal horn enlargement than did those with vascular MCI. Among subjects with MCI and dementia subtypes — except those with vascular MCI — hippocampal and entorhinal cortex atrophy was greater than in normal subjects.

Vascular groups showed more white matter infarcts, leukoaraiosis, and lacunar infarcts than the normal, neurodegenerative, or Parkinson's groups.

In particular, vascular MCI subjects showed more white matter lacunar infarcts and leukoaraiosis than those with neurodegenerative or Parkinson's MCI. Subjects with neurodegenerative MCI showed more medial/temporal lobe atrophy than other types of MCI. Parkinson's MCI subjects had significantly greater enlargement of the third ventricle than neurodegenerative and vascular MCI subjects.

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