MRI Helps Distinguish Cognitive Impairments

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

BY KERRI WACHTER
Senior Writer

PORTO, PORTUGAL — MRI used in combination with neurologic/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 Dementia.

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 Baylor College of Medicine in Houston. All of the volunteers were followed for at least 6 years and underwent serial evaluations every 3-6 months involving medical, neurologic, and psychometric assessments (Mini-Mental State plus Cognitive Capacity Screening Examination as Combined Mini-Mental Cognitive Capacity Screening Examinations and Hamilton Depression Scales).

Normal cognition was defined as a Combined Mini-Mental Cognitive Capacity Screening Examinations (CMC) score greater than 42 (52 participants). Based on positive findings on accepted clinical assessment (plus CMC scores less than 42), 30 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 (VaD), and Parkinson's disease dementia (PDD), respectively, said Dr. Meyer, director of the Cerebral Blood Flow Laboratory at the Michael E. Debakey Veterans Affairs Medical Center in Houston.

Later, 19 of the 30 participants with neurodegenerative MCI converted to AD, 17 of the 35 with vascular MCI progressed to VaD, and 5 of 8 with Parkinson's-Lewy body MCI converted to PDD. Those with AD met National Institute of Neurological and Communicative Diseases and Stroke/Alzheimer's Disease and Related Disorders Association criteria; those with VaD met National Institute of Neurological Disorders and Stroke-Association Internationale pour la Recherche et l'Enseignement en Neurosciences criteria; those with PDD met DSM-IV criteria.

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 the normal group. A family history of neurodegenerative disease was 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.

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On MRI, cortical atrophy was more frequently seen in MCI and dementia groups compared with the cognitively normal group—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. ■

Computer Assessment Promising For Mild Cognitive Impairment

BY PATRICE WENDLING
Chicago Bureau

QUEBEC CITY — Computerized assessment of mild cognitive impairment is an area of great promise and potential problems, Jason Brandt, Ph.D., said at a conference sponsored by the American Association for Geriatric Psychiatry.

A slew of new computerized tests are on the market; they're very professionally produced, glitzy, and fun to do, Dr. Brandt said. They're cost effective and provide rapid results. They can also be administered repeatedly, which makes them useful in monitoring cognitive progression and treatment effect.

But the tests need to meet established standards of reliability, validity, and lack of bias, said Dr. Brandt, professor and director of the division of medical psychology, Johns Hopkins Hospital, Baltimore. Tests also need to be adaptive to the needs of patients such as those with sensory or motor deficits.

In addition, it has to be established, and not assumed, that tests administered, scored, and interpreted by computer are comparable with traditional "pencil and paper" tests.

"Just because we call them by the same name or assert them to be measuring the same construct, doesn't mean that's true," he said. So far, none of the computerized tests have met these conditions to his satisfaction, he said in an interview.

Some of the tests currently available are:

► Computer Administered Neuropsychological Screen for Mild Cognitive Impairment or CANS-MCI (Screen, Inc., Seattle) takes about 30 minutes on a personal computer with a mouse or touch screen and measures visual spatial skills, mental control, language fluency, and both immediate and delayed memory.

A recent National Institute on Aging–funded study in 310 elderly patients concluded that the test shows promise as a reliable and valid screening tool in determining if more intensive testing is warranted (J. Neuropsychiatry Clin. Neurosci. 2005;17:98-105).

► Mindstreams (NeuroTrax Corp., New Brunswick, N.J.) is a cognitive battery that significantly discriminated between 30 patients with mild cognitive impairment and 39 healthy elders (J. Mol. Neurosci. 2004;24:33-44). Measures of memory, executive function, visual spatial skills, and verbal fluency discriminated best. Discrimination was at least comparable with that of traditional neuropsychological tests in these domains.

► CNS Vital Signs (CNS Vital Signs, Chapel Hill, N.C.), which is just beginning to be explored by clinicians at Johns Hopkins, includes seven tests that can be administered in about 40 minutes or more. CNS Vital Signs provides an elaborate printout with a variety of scores, but the question is whether patients will use it, he said.

If mild cognitive impairment is suspected, Dr. Brandt recommended that primary care physicians refer their patients to a board-certified clinical neuropsychologist who specializes in disorders of the elderly.

The choice of assessment techniques for any given patient should be left up to the neuropsychologist. ■

Paratonia in Patients: A Clinical Marker of Alzheimer's Disease?

SAN DIEGO — The presence of paratonia in patients with Alzheimer's disease may be a sign of cognitive decline, according to the results of a small study.

"Paratonia may be useful as a way of looking at the progression of Alzheimer's disease, because it can be seen, and it's not affected by medications, depression, or how well the person is functioning," Dr. Ipsit V. Vahia said in an interview during a poster session at the American Psychiatric Association's Institute on Psychiatric Services.

"We think it's an almost pure indicator of the rate of degeneration, which is the basic pathology in Alzheimer's disease. It may be useful clinically as a way of monitoring the progress of the disease process, not the disease manifestation," he said.

He and his associates studied 80 consecutive patients who were evaluated at the Brooklyn Alzheimer's Disease Assistance Center at the State University of New York Downstate Medical Center. Their mean age was 77 years, 79% were female, and 76% were black.

Each patient underwent a battery of tests, including the Hamilton Depression Rating Scale, the Blessed Dementia Scale, the Global Deterioration Scale, and the paratonia rating scale, said Dr. Vahia of the department of psychiatry at the medical center.

The investigators found that paratonia was significantly associated with the stage of illness as defined by the Global Deterioration Scale and number of frontal lobe symptoms, but not with other variables including age, race, level of education, gender, and general physical health. Paratonia was not correlated with the level of functioning in Alzheimer's disease, suggesting that the condition may serve as a marker of frontal lobe degeneration.

"We need to establish if it is a sensitive and specific clinical sign. It needs to be studied in other forms of dementia. How well it indicates brain degeneration will determine whether it is useful [as a marker] or not," Dr. Vahia said.

The study was partly supported by a National Institute on Aging grant.

—Doug Brunk