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NEWS

RSNA Press Release

MRI May Contribute to Early Detection of Alzheimer's

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At A Glance

- MRI volume measurement across multiple brain regions may improve detection of Alzheimer's disease.
- Follow-up exams showed that 25 of the 149 initially cognitively normal participants, or 17 percent, had memory decline.
- The Alzheimer's Association estimates that 5.4 million Americans are living with the disease today.

OAK BROOK, Ill. (April 11, 2011) — New research suggests that magnetic resonance imaging (MRI) could help detect Alzheimer's disease (AD) at an early stage, before irreversible damage has occurred, according to a new study published online and in the June print edition of *Radiology*.

With no known treatment to alter its course, AD exacts an enormous toll on society. The Alzheimer's Association estimates that 5.4 million Americans are living with the disease today, and the cumulative costs for care could top $20 trillion over the next four decades. As a result, there is growing interest in tests that could identify individuals at risk for AD at an early stage, when memory preservation may still be possible. Brain volume measurement with MRI is one promising area of research.

"One of the things that made our study novel was that we looked at patients who were cognitively normal at baseline, rather than people with mild cognitive impairment," said lead author Gloria C. Chiang, M.D., radiology resident at University of California San Francisco.

Gloria C. Chiang, M.D.

For the study, researchers looked at whether automated brain volume measurements on MRI could accurately predict future memory decline in elderly people with normal cognitive ability. They assessed 149 participants with an initial baseline MRI scan and a neuropsychological assessment.

Follow-up exams two years later showed that 25 of the 149 initially cognitively normal participants, or 17 percent, had memory decline.

While previous research has focused on the medial temporal lobe of the brain, which is

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strongly associated with memory, researchers looked at volume changes across a number of regions in the temporal and parietal lobes. The parietal lobe is primarily associated with the processing of sensory information and is involved in a number of cognitive and language processes.

The predictive accuracy of the classification model increased as the number of brain regions included in the model increased. Models that took into account several areas of both the temporal and parietal lobes had an 81 percent accuracy rate in discriminating between cognitively normal people with and without memory decline.

The findings illuminated how the interaction between these brain regions may play a key role in memory loss.

"Previous models have included regions of the brain as isolated variables," Dr. Chiang said. "Our study showed that volume loss in multiple regions that may be interconnected had a greater impact on memory decline. We found that automated temporal and parietal volumes identified those at risk for future memory decline with high accuracy."

The study represents another step in the process of incorporating imaging into the diagnosis and management of Alzheimer's disease, according to Dr. Chiang.

"We can see so much with MRI, but right now there's no way to definitively diagnose AD with imaging," she said. "The goal in the future is to have a screening device to monitor cognitive decline and diagnose AD."

# # #

"Identifying Cognitively Healthy Elderly Individuals with Subsequent Memory Decline by Using Automated MR Temporoparietal Volumes." Collaborating with Dr. Chiang were Philip S. Insel, M.S., Duygu Tosun, Ph.D., Norbert Schuff, Ph.D., Diana Truran-Sacrey, B.A., Sky Raptentsetsang, B.S., Clifford R. Jack Jr., M.D., Michael W. Weiner, M.D.

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