
RSNA Press Release

Automated MRI Technique Assists in Earlier Alzheimer's Diagnosis

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OAK BROOK, Ill. — An automated system for measuring brain tissue with magnetic resonance imaging (MRI) can help physicians more accurately diagnose Alzheimer's disease at an earlier stage according to a new study published in the July issue of the journal *Radiology*.

In Alzheimer's disease, nerve cell death and tissue loss cause all areas of the brain, especially the hippocampus region, to shrink. MRI with high spatial resolution allows radiologists to visualize subtle anatomic changes in the brain that signal atrophy, or shrinkage. But the standard practice for measuring brain tissue volume with MRI, called segmentation, is a complicated, lengthy process.

"Visually evaluating the atrophy of the hippocampus is not only difficult and prone to subjectivity, it is time-consuming," explained the study's lead author, Olivier Colliot, Ph.D., from the Cognitive Neuroscience and Brain Imaging Laboratory in Paris, France. "As a result, it hasn't become part of clinical routine."

In the study, the researchers used an automated segmentation process with computer software developed in their laboratory by Marie Chupin, Ph.D., to measure the volume of the hippocampus in 25 patients with Alzheimer's disease, 24 patients with mild cognitive impairment and 25 healthy older adults. The MRI volume measurements were then compared with those reported in studies of similar patient groups using the visual, or manual, segmentation method.

The researchers found a significant reduction in hippocampal volume in both the Alzheimer's and cognitively impaired patients when compared to the healthy adults. Alzheimer's patients and those with mild cognitive impairment had an average volume loss in the hippocampus of 32 percent and 19 percent, respectively. Studies using manual

At A Glance

- Researchers have developed a new automated system to help in earlier and more accurate diagnosis of Alzheimer's disease.
- In Alzheimer's disease, nerve cell death and tissue loss cause all areas of the brain, especially the hippocampus region, to shrink.
- MRI with automated segmentation quickly and accurately measures tissue loss in the hippocampus.

segmentation methods have reported similar results.

"The performance of automated segmentation is not only similar to that of the manual method, it is much faster," Dr. Colliot said. "It can be performed within a few minutes versus an hour."

According to the Alzheimer's Association, more than five million Americans currently have Alzheimer's disease. One of the goals of modern neuroimaging is to help in the early and accurate diagnosis of Alzheimer's disease, which can be challenging. When the disease is diagnosed early, drug treatment can help improve or stabilize patient symptoms.

"Combined with other clinical and neuropsychological evaluations, automated segmentation of the hippocampus on MR images can contribute to a more accurate diagnosis of Alzheimer's disease," Dr. Colliot said.

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"Discrimination of Alzheimer's Disease, Mild Cognitive Impairment and Normal Aging Using Automated Segmentation of the Hippocampus." Collaborating with Dr. Colliot and Dr. Chupin on this paper were Gaël Chételat, Ph.D., Béatrice Desgranges, Ph.D., Benoît Magnin, Habib Benali, Ph.D., Bruno Dubois, M.D., Ph.D., Francis Eustache, Ph.D., and Stéphane Lehericy, M.D., Ph.D. Journal attribution requested.

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