

Advanced MRI brain scan may help predict stroke-related dementia

September 12 2019



A blood clot forming in the carotid artery. Credit: American Heart Association

An advanced Magnetic Resonance Imaging (MRI) brain scan analysis in patients with stroke-related, small vessel disease helped predict problems with thinking, memory and even dementia, according to new research

published in *Stroke*, a journal of the American Stroke Association, a division of the American Heart Association.

When a [stroke](#) or other disease damages tiny blood vessels in the brain, the condition is known as small vessel disease. This condition is the most common cause of thinking problems (planning, organizing information and processing speed) and can even lead to dementia. Although early treatment could help patients at risk, no effective test is available to identify them.

This study evaluated the accuracy of a new MRI analysis technique using diffusion tensor imaging (DTI), in predicting thinking problems and dementia related to small vessel disease. A single scan measured the brain in fine detail to reveal damaged areas. By comparing these images to a healthy person's, researchers were able to classify the brain into areas of healthy versus damaged tissue.

Results showed that participants with the most [brain damage](#) were much more likely to develop thinking problems. The analysis also helped predict three-fourths of the dementia cases that occurred during the study.

"We have developed a useful tool for monitoring patients at risk of developing dementia and could target those who need early treatment," said senior author Rebecca A. Charlton, Ph.D., department of psychology at Goldsmiths, University of London, in the United Kingdom.

The study included 99 patients with small vessel disease caused by ischemic stroke, a type of stroke that blocks the blood vessels deep within the brain. Slightly more than one-third were female, average age 68, and most were Caucasian. All participants were enrolled in the St George's Cognition and Neuroimaging in Stroke (SCANS) study from

2007 to 2015 in London.

Participants received the MRI scans annually for three years and thinking tests annually for five years. Eighteen participants developed dementia during the study, with an average time to onset of approximately three years and four months.

This advanced MRI analysis offers a highly accurate and sensitive marker of small vessel disease severity in a single measure that can be used to detect who will and will not go on to develop [dementia](#) in a five-year period, noted Charlton.

The healthy [brain](#) scans used for comparison were from one individual and may not represent the true range of all healthy brains. In addition, the study's relatively small number of participants all had small [vessel](#) disease resulting from one type of stroke, so the results may not apply to people with different forms of the [disease](#).

More information: Owen A. Williams et al, Predicting Dementia in Cerebral Small Vessel Disease Using an Automatic Diffusion Tensor Image Segmentation Technique, *Stroke* (2019). [DOI: 10.1161/STROKEAHA.119.025843](#)

Provided by American Heart Association

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