Imaging scientists develop a better tool for tracking MS

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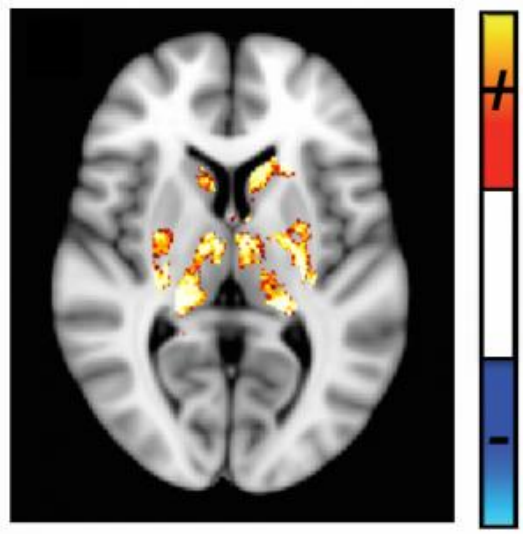

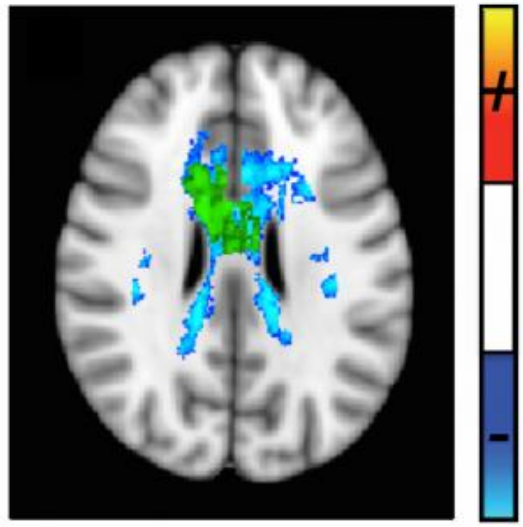

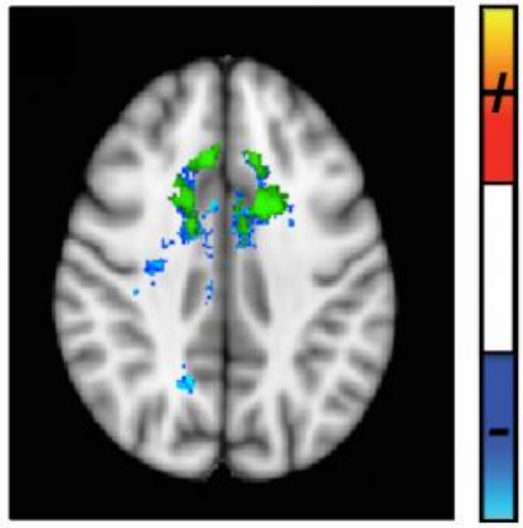

Dr. Ravi Menon, an imaging scientist at Western University's Robarts Research Institute, used what's called "Quantitative Susceptibility Magnetic Resonance Imaging," to show and measure damage in specific areas of the brain which the study showed to be common to all MS and CIS patients. Credit: Western University

Imaging scientists at Western University's Robarts Research Institute (London, Canada) have developed a better way to track the progression of Multiple Sclerosis (MS) from its earliest stages. Led by Ravi Menon, PhD, the researchers used what's called "Quantitative Susceptibility (QS) Magnetic Resonance Imaging (MRI)," to measure damage in specific areas of the brain which the study showed to be common to all patients. The findings are published in advance online, in *Radiology*.

"In MS research, there is something we call a clinical-radiological paradox. When you do conventional MRIs on these patients you see lesions in the brain very clearly, but the number or volume of their lesions do not correlate with the patients' disabilities. This paradox has been recognized since the MRI was introduced to clinical practice in the early 80s, and yet this is the only imaging tool we have for assessing MS," says Menon. "Our research provides a quantitative tool using a relatively conventional imaging sequence but with novel analysis. This tool shows that there is considerable damage occurring in common areas of all patients in both the white matter and in the deep brain structures –the gray matter. Those quantitative measures –what we call quantitative susceptibility, correlate with disease symptoms."

The process used a standard Siemens 3T MRI so it could be reproduced in any hospital, using the technique, called QS. The researchers mapped

this MRI parameter in 25 patients with relapsing-remitting MS or clinically isolated syndrome (CIS –half of those diagnosed with CIS will go on to be diagnosed with MS) measuring both demyelination and iron deposition. Fifteen age and sex-matched control subjects were also scanned. While brain and spine lesions visualized with normal MRI tend to appear and disappear over time, QS shows common areas of damage in all patients that correlated very well with the Extended Disability Status Score (EDSS) which is a standard tool used to measure MS progression, as well as with age and time since diagnosis.

"Significantly, in white matter, even where we see no lesions whatsoever, we're able to measure damage in the same area of all patients using QS mapping. So even at the very earliest stages of the disease when the disability score is very low, or when the person hasn't yet been diagnosed with MS, there's already significant damage," adds Menon. This could have important diagnostic and prognostic implications, as there are drugs available to slow or stop the progression of MS, if started early enough.

Provided by University of Western Ontario