Medical Xpress

New imaging research shows increased iron in the brain in earliest stages of MS

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While it's been known for over a century that iron deposits in the brain play a role in the pathology of Multiple Sclerosis (MS), new imaging research from Western University (London, Canada) helps to answer the question of whether these accumulations are a cause or consequence of the disease. The study led by Ravi Menon, PhD, of the Robarts Research Institute found iron deposits in deep gray matter, suggesting the accumulation occurs very early in the disease course. The researchers also found evidence casting further doubt on the controversial liberation therapy for MS. The research is in early publication online in *Multiple Sclerosis and Related Disorders*.

Menon and PhD candidate Matthew Quinn used 3-Tesla Magnetic Resonance Imaging (MRI) to scan 22 patients with clinically isolated syndrome (CIS). These are patients who've had a single clinical attack, at least half of whom will go on to be diagnosed with MS. The others may have a different disease. Sixteen age and sex matched controls were also studied.

"We wanted to know if the iron deposits happen early in the process, or whether it's something that accumulates with time as the disease progresses," says Menon, who holds a Canada Research Chair in Functional Magnetic Imaging. "We also studied the veins that drain from the brain and looked for a correlation between the diameter of of these veins and iron accumulation. One of the reasons to do this, of course was the hypothesis proposed by Paolo Zamboni that if you had narrow jugular veins, this would give rise to additional iron and in turn cause

MS."

The scientists found iron deposits in the CIS group were well above the amounts found in the control group. The MRIs also revealed for the first time, subtle damage to the brain's white matter even at this early stage. The researchers also found no correlation between the iron deposits and diameter of the veins.

"So while the iron in the brain correlates with the disability of the subjects, the iron in the brain does not correlate with the actual diameter of the jugular veins. So the Zamboni hypothesis is incorrect as far as the iron being related to some kind of obstruction." Menon found narrowed veins in the control group as well as the CIS group, and both groups had narrower veins on one side compared to the other.

Menon hopes this imaging research will lead to the earlier diagnosis of MS. He plans to follow the patients every four months for the next two years, to see retrospectively, what characterizes those patients that go on to be diagnosed with MS compared to those who do not.

"We're looking at a couple of different approaches to diagnostics using this imaging research. In suspected MS cases –the very first time they appear in clinic, if they have an abnormally high amount of iron in the frontal cortex of the brain –that's probably a pretty good sign they have MS or some other white matter disease." This research was funded primarily by the Canadian Institutes of Health Research.

MS is the most common neurological disease affecting young adults, with symptoms that include loss of balance, impaired speech, double vision, extreme fatigue and paralysis.

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