Comparison of MRI Lesion Evolution in Different Central Nervous System Demyelinating Disorders

Elia Sechi, MD, Karl N. Krecke, MD, Steven A. Messina, MD, et al.

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Correspondence
Dr. Flanagan
flanagan.eoin@mayo.edu

Study Question
What is the temporal evolution of T2 demyelinating lesions seen on MRI after a single clinical attack in patients with myelin oligodendrocyte glycoprotein immunoglobulin G (IgG)–associated disorder (MOGAD), aquaporin 4 (AQP4) IgG–positive neuromyelitis optica spectrum disorder (AQP4-IgG-NMOSD), and multiple sclerosis (MS)?

What Is Known and What This Paper Adds
While most MRI-based studies of patients with demyelinating diseases have focused on lesion location and morphology acutely, understanding the temporal evolution of lesions after an initial attack may increase our understanding of disease pathophysiology, course, and prognosis. This investigation’s results show that these demyelinating diseases differ in the temporal evolution of MRI lesions, with resolution of T2 lesions occurring more often in patients with MOGAD than in patients with AQP4-IgG-NMOSD or MS.

Methods
This retrospective longitudinal analysis uses data from patients with MOGAD (n = 38), AQP4-IgG-NMOSD (n = 51), or MS (n = 67) who had had an attack of brain or spinal cord demyelination, an MRI within 6 weeks of the attack, and an MRI done more than 6 months later without interval relapses. They received care at the Mayo Clinic (Rochester, Minnesota) between 2000 and 2019. Two neuroradiologists blinded to diagnosis and serology status independently reviewed the MRI scans to assess lesion changes on T2 sequences by manually measuring the index lesion.

Results and Study Limitations
Complete resolution of the index (symptomatic) T2 lesion and resolution of all T2 lesions occurred more often in the MOGAD group than in the AQP4-IgG-NMOSD group or the MS group. The median T2 lesion area reductions in axial brain MRI scans over follow-up were greater in the MOGAD group than in the AQP4-IgG-NMOSD group or the MS group. The median T2 lesion area reductions in sagittal spine MRI scans over follow-up in the MOGAD group were similar to those in the AQP4-IgG-NMOSD group and greater than those in the MS group. The present study’s limitations include its retrospective nature and lack of standardized MRI assessment of CNS lesions performed at regular temporal intervals on the same MRI scanner.

Study Funding and Competing Interests
This study was funded by the NIH. Some authors report receiving personal fees, committee appointments, and research support from foundations and health care companies; holding patents related to neurologic autoimmunity; receiving publishing royalties; serving as a site investigator on an industry-sponsored clinical trial; and serving on the editorial board of Multiple Sclerosis and Related Disorders. Go to Neurology.org/N for full disclosures.
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