Editor's Corner

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Looks can be deceiving

A B-cell–mediated encephalopathy with normal MRI?

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Editor Summary
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Advances in defining clinical criteria and immunologic biomarkers of autoimmune diseases such as MS or autoimmune encephalitides coupled with conventional MRI studies and diffusion tensor imaging (DTI) have revealed overlapping diseases characterized by autoantibodies against neuronal or glial surface proteins (NMDA receptor, aquaporin 4, or myelin oligodendrocyte glycoprotein)[1,2] and may disclose in the future unclassified autoimmune disorders with yet unknown mechanisms. For those readers who are impatient, the future is now. In this issue of *Neurology® Neuroimmunology & Neuroinflammation,* Dr. Takewaki et al.[3] describe 11 patients whose symptoms and clinical course mimicked MS, but without abnormalities on conventional MRI studies. None of the patients had oligoclonal bands in the CSF, and most had extensive white matter abnormalities identified by MRI DTI characterized by a decrease in fractional anisotropy values. Treatment with IV methylprednisolone and plasma exchange were often effective. These findings and the presence of frequent plasmablasts in the peripheral blood suggested that the underlying pathogenesis was likely mediated by B-cell mechanisms. The authors named this disorder "normal-appearing imaging-associated, neuroimmunologically justified, autoimmune encephalomyelitis." In the accompanying editorial comment, Dr. Finke[4] discusses the type of disease that these patients may have and indicates similar clinical-radiologic dissociations noted in other diseases. An example is anti-NMDA receptor encephalitis, where patients with severe symptoms often have normal conventional MRI studies, but DTI reveals extensive white matter abnormalities with decreased fractional anisotropy.[5] Further studies are needed to characterize this category of MRI-negative autoimmune encephalitis, which perhaps in the future may be defined by yet unknown immunologic biomarkers.

In another study, Dr Rissanen et al.[6] used PET to investigate the relationship of in vivo microglial activation to clinical and MRI parameters in MS. Microglia activation is associated with increased levels of the 18-kDa translocator protein, which the authors measured with the PET tracer [11C] (*R*)-PK11195. Patients with secondary progressive and relapsing-remitting MS (RRMS) and age-matched healthy participants were included in the study. The authors found differences in the amount and distribution of the PET tracer in patients with secondary progressive as compared to RRMS and healthy participants. Higher binding of the tracer in normal-appearing white matter also associated with higher clinical disability and reduced white matter structural integrity. Among patients with MS, older age associated with higher microglial activation in normal-appearing white matter. The study suggests that increased microglial activity in the normal-appearing white matter correlates closely with impaired white matter structural integrity, providing a potential pathologic correlate to DTI parameters.

In another article, Dr. Radke et al. describe the composition, organization, and presence of different B-cell subpopulations in patients with dermatomyositis (DM) and the relationship of

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these B-cell infiltrates to specific cytokines and chemokines involved in lymphoid neogenesis.[7] Twenty-three patients were enrolled, including cases with anti-Mi2 autoantibodies and excluding those with antisynthetase antibodies or necrotizing myopathy and signal recognition particle antibodies. Based on the inflammatory infiltrates and B-cell distribution, 3 groups of adults with DM (aDM) were identified: (1) classic aDM, with inflammatory infiltrates diffusely distributed and mainly located in the perimysium and partly in the adjacent endomysium, and rare $CD20^+$ B lymphocytes; (2) B-cell–rich aDM, with more inflammatory infiltrates and dense $CD20^+$ B-cell aggregates; and (3) follicle-like aDM, showing follicle-like structures, resembling tertiary lymphoid organs with germinal centers and dark and light zone organization. A significant upregulation of numerous genes implicated in different aspects of the interferon signature was found in the B-cell–rich and follicle-like aDM. The authors suggest that assessment of B-cell architecture, including ultrastructure and function, together with interferon signature genes can be useful tools to stratify patients with DM and develop therapies targeting these disease subsets individually (e.g., B-cell immunity or type 1 interferon signaling).

In another article, Dr. Cohen Aubart et al.[8] report a nationwide retrospective study of the clinical-pathologic presentations of muscular sarcoidosis. Forty-eight patients (28 women), median age at muscle symptom onset of 45 years (range 18–75 years), were enrolled. Forty patients had definite neurosarcoidosis confirmed by muscle biopsy, and 8 had probable neurosarcoidosis. Four clinical-pathologic patterns were identified, "myopathic," defined by the presence of motor deficits; "nodular," characterized by the presence of nodular lesions without motor deficit; "smoldering," defined by the presence of constant myalgias and absence of nodular lesions, motor deficits and amyotrophy; and "combined myopathic and neurogenic," characterized by the presence of a neurogenic pattern in electrophysiologic studies, in addition to muscle involvement. These 4 patterns differed according to symptom presentation (myalgia, nodules, and weakness), electrophysiologic and MRI findings, and response to treatment. After a median follow-up period of 6 years, patients with myopathic and neuromuscular patterns had the worse outcome.

In addition to these studies, the May issue of *Neurology: Neuroimmunology & Neuroinflammation* contains other interesting articles that I hope will catch your attention.

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Disclosure

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