Closing the Clinical-Radiological Paradox Using the Visual Pathway in Multiple Sclerosis

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In multiple sclerosis (MS) there is a poor correlation between white matter lesions and clinical disability, the clinical-radiological paradox.\(^1\) The clinical phenotype is mainly dependent on the presence of lesions in specific regions (e.g., spinal cord or optic nerve), whereas the majority of lesions observed in the magnetic resonance imaging (MRI) affect noneloquent areas (e.g., subcortical white matter). One such example are lesions affecting the optic radiations (OR). This tract of the posterior visual pathway frequently is damaged in MS and represents up to 10% of the total lesion volume.\(^2\) However, almost all vision complaints in MS are ascribed to lesions in the anterior portion of the visual pathway, because of optic neuritis (ON). The binocular nature of the OR and the significant plasticity of the visual pathway, which compensates the damage, may prevent patients suffering new lesions in the OR from complaints about vision impairment.\(^3\)

In this issue, Alshowaeir et al.\(^4\) analyzed the hypothesis that latency delays in eyes without previous ON in patients with MS are due to OR lesions, and not to undetected previous ON or diffusion of the damage through the chiasma. To prove it, they analyzed cases without previous ON and cases with previous ON, but focusing in the non-ON eye. They used multifocal visual evoked potentials (mfVEP), which are more sensitive to detect subtle damage than pattern VEP, and diffusion tensor imaging (DTI) of the OR. They found a strong significant correlation between latencies and DTI measurements after controlling by sex, age, disability, brain lesion load, and presence of previous ON. Therefore, to our knowledge this study provides the first evidence that, with the adequate design, it is possible to capture the effects of damage in white matter regions that are not so much eloquent. In summary, this study contributes to close to certain degree the clinical-radiological paradox in MS, at least for the visual pathway.

References


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