What Else Can We Use in The Discrimination of Activated MS Plaques in Addition to Diffusion MRI?

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We read the article by Unal et al. [1] regarding the usefulness of diffusion-weighted magnetic resonance imaging (MRI) in the discrimination of active multiple sclerosis (MS) lesions with great interest. We want to highlight a few essential notes based on the issues pointed by the authors.

Even before the discovery of gadolinium deposition in the brain, normal-appearing white matter (NAWM) changes and thus early detection of a lesion in MS with nonconventional MRI techniques such as diffusion and perfusion imaging have been investigated. Contrast-enhanced perfusion imaging was proceeded by new techniques such as arterial spin labeling that enables the delineation of tissue perfusion without contrast agent administration in the brain [2]. MS, an inflammatory process, causes changes in perfusion in NAWM, suggesting axonal damage in NAWM [3]. Furthermore, this type of alteration can be observed with or without diffusion restriction [4]. Therefore, we believe that it is crucial to combine diffusion and perfusion imaging rather than to use a single technique for evaluating NAWM in patients with MS.

Another point we want to add is the black hole formation of the previous MS lesions. Chronic MS lesions are observed as hypointense or isointense in T1 images, and sometimes, these lesions are termed as "black holes" due to their hypointense appearance on T1-weighted images [5, 6]. These lesions can be easily detected in conventional MRI; however, according to our own experience, regions of interest based evaluation of these factors may show unpredicted signal intensity values in both perfusion and diffusion imaging.

Finally, we conclude that advanced brain imaging will shed light on the pathophysiology of MS in the near future.

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