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EDITORIAL

Cortico-juxtacortical and periventricular lesions and MS diagnostic criteria

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The art of diagnosing multiple sclerosis (MS) has changed considerably during recent decades, involving more radiology interpretation rather than purely clinical evaluations. The advent of MRI on the clinical scene during the 1980s changed the focus from repeated clinical assessments to an analysis of the number and distribution of white matter MRI lesions.

Since the first set of McDonald criteria published in 2001,[1] the MRI features most sensitive and specific to predict the occurrence of a second relapse (i.e., clinically definite MS) in patients with clinically isolated syndrome (CIS) have been analyzed and refined, although the main principle has remained the same: a diagnosis of MS requires objective evidence of dissemination of lesions in space (DIS) and in time (DIT), when alternative diagnoses have been considered and excluded. In the subsequent 2005 and 2010 revisions, the MRI criteria were further simplified and became more readily applicable in clinical practice.[2,3] The application of the 2010 criteria allows for a diagnosis of MS to be made in one third of patients with CIS using a single MRI scan and at a substantially earlier time point than using older criteria.[4]

In March 2016, the Magnetic Resonance Imaging in MS (MAGNIMS) group published an evidence-based and expert-opinion consensus on proposed modifications to MRI criteria for the diagnosis of MS.[5] These modifications included the presence of a lesion in the optic nerve, the combination of cortical lesions with juxtacortical lesions into a single category, no distinction between asymptomatic and symptomatic lesions, and the inclusion of 3 or more periventricular lesions for DIS. This latter modification was based on expert consensus to avoid a possible reduced specificity of the DIS criteria originating from the inclusion of a symptomatic lesion (for example, in the spinal cord or the optic nerve) and a single periventricular lesion. Periventricular lesions occur in other diseases, including small vessel cerebrovascular diseases.[6] A recent investigation showed that in young adult patients with a typical CIS, increasing the required number of periventricular lesions to 3 did not improve diagnostic accuracy, and, when combined with DIT, did not reduce specificity.[7]

In this issue of *Neurology*®, Arrambide et al.[8] have provided conclusive evidence for combining cortical and juxtacortical lesions in a single term (cortical–juxtacortical lesions) and for maintaining the criterion of at least 1 periventricular lesion. The authors have studied a large cohort of patients with CIS over more than 10 years at the Vall d'Hebron University Hospital in Barcelona. A total of 657 patients had sufficient data for the first step of their analysis, where the authors evaluated the individual topography of MRI lesions to assess DIS and DIT according to the 2010 McDonald criteria.[3] An important finding from this analysis was that the combination of cortical and juxtacortical lesions was superior to predict a second attack than using the traditional juxtacortical lesions only. This finding advocates for the addition of a double inversion recovery MRI for cortical lesion identification to our clinical, standard of care MRI protocols.

In the second step of their analysis, the performance of 2 DIS criteria using ≥1 and ≥3 periventricular lesions was tested in 326 patients with a follow-up of at least 10 years. The observation from this analysis was that ≥1 periventricular lesion was no less accurate than ≥3 periventricular lesions.[8] Although the specificity of 1 periventricular lesion was slightly lower than that obtained with 3 lesions, it became the same when DIS and DIT criteria were combined. When assessing age groups, ≥1 periventricular lesion was associated with a lower specificity of the DIS criteria (of about 8%) in patients over 40 years of age and in patients with optic neuritis as presenting CIS syndrome, although specificity improved after the addition of DIT criteria.[8] Therefore, in clinical practice, special attention and care should be paid to older patients and patients with optic neuritis. Since the erroneous determination of periventricular lesion location is often a contributor to MS misdiagnosis,[9] it is important to note the definition of periventricular lesions made by

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Arrambide et al.,[8] as those in contact with the lateral or third ventricle, and not the forth ventricle.

MS is a complex disease whose diagnosis can be facilitated and supported by the diagnostic criteria in patients with CIS and symptoms suggestive of demyelination. The inappropriate applications of the criteria to patients with atypical symptoms and the overreliance on the presence of DIS MRI criteria in patients with nonspecific neurologic symptoms are the major contributors to misdiagnosis.[9] A new revision of the criteria is going to be published later this year after a meeting held in Berlin in June 2017, and the study by Arrambide et al. will provide the evidence needed for some of the forthcoming recommendations.

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