Measuring iron deposits within focal lesions in patients presenting clinically isolated syndrome

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Purpose

To evaluate the role of the iron (Fe) deposit within focal lesions visualized on T2-weighted magnetic resonance images in patients presenting clinically isolated syndrome (CIS).

Material and Methods

Thirty patients with CIS underwent two 3.0T brain MRI (0-3 and 12 months after first symptoms), including proton density-, T2-weighted, and magnetic susceptibility sequences. Baseline iron content of lesions was measured on filtered-phase SW images as the increase with regard to white matter values in healthy controls for the whole lesion (iFe1B), and the increase and extension in the region with high iron content (iFe2B, and NPB). Correlations of iron measurements with lesion load, new lesions, brain parenchymal fraction (BPF), percentage of brain volume change, EDSS, and disease duration were studied by means of Spearman rank correlation test. Moreover, in all patients we analyzed using Student t-test the presence of differences in iron deposits between groups defined by the fulfillment of MRI criteria for dissemination in time and space (according to multiple sclerosis diagnostic criteria), and conversion to clinically definite MS (new relapse).

Results

Moderate-strong significant correlations were found between NPB and baseline lesion load (LLD), new lesion (NLT2) and BPF at month 12. iFe1B and iFe2B presented moderated significant correlations with LLD of active lesions, iFe1B with the number of NLT2, and iFe2B with the baseline T2 lesion volume and BPF at month 12. Significant differences for the 3 iron variables were found between groups of dissemination in time and space-time, and only in space for NPB, and in new relapses for iFe2B.

Conclusions

We found relation between the iron deposits within baseline lesions and baseline lesion load, the presence of NLT2, and BPF at month 12. The iron deposit allows discriminating those patients with CIS and those with a higher probability to present multiple sclerosis.