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Characterizing iron deposition in multiple sclerosis lesions using susceptibility weighted imaging.

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PURPOSE: To investigate whether the variable forms of putative iron deposition seen with susceptibility weighted imaging (SWI) will lead to a set of multiple sclerosis (MS) lesion characteristics different than that seen in conventional MR imaging. MATERIALS AND METHODS: Twenty-seven clinically definite MS patients underwent brain scans using magnetic resonance imaging including: pre- and postcontrast T1-weighted imaging, T2-weighted imaging, FLAIR, and SWI at 1.5 T, 3 T, and 4 T. MS lesions were identified separately in each imaging sequence. Lesions identified in SWI were reevaluated for their iron content using the SWI filtered phase images. RESULTS: There were a variety of new lesion characteristics identified by SWI, and these were classified into six types. A total of 75 lesions were seen only with conventional imaging, 143 only with SWI, and 204 by both. From the iron quantification measurements, a moderate linear correlation between signal intensity and iron content (phase) was established. CONCLUSION: The amount of iron deposition in the brain may serve as a surrogate biomarker for different MS lesion characteristics. SWI showed many lesions missed by conventional methods and six different lesion characteristics. SWI was particularly effective at recognizing the presence of iron in MS lesions and in the basal ganglia and pulvinar thalamus. Copyright (c) 2009 Wiley-Liss, Inc.

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