Evaluation of post-contrast susceptibility-weighted imaging enhancement patterns in patients with multiple sclerosis in 3 tesla magnetic resonance imaging: initial study.

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Purpose:

The present study aims to evaluate the enhancement patterns of active lesions in multiple sclerosis (MS) patients in the post-contrast susceptibility-weighted imaging (SWI) sequence, comparing the accuracy of this sequence in identifying such lesions in relation to the sequences currently used in clinical practice.

Approach/Methods:

This study is an observational retrospective analysis of brain MRI scans performed on 3 Tesla equipment of patients with a defined multiple sclerosis diagnosis. MR images were accessed through the digital archive of the institution and were acquired from June 2019 to February 2020.

Findings/Discussion:

The study population included twenty-nine patients diagnosed with multiple sclerosis, twenty-two female and seven male, whose ages ranged from 21 to 61 years. We found agreement in identifying active and non-active lesions between the post-contrast SWI and post-contrast T1 spin echo (SE) sequences in all patients included in the study. Two patients demonstrated enhancement lesions in both the T1 SE sequence and the post-contrast SWI sequence. The other twenty-seven patients showed no enhancement lesions in either sequence.

Figure 1: Male patient, 25 years old. Axial MRI sections weighted in FLAIR (A), axial T1 FSPGR post-contrast (B) and axial SWI post-contrast (C). They demonstrate an active focal lesion of MS (arrows) in the white matter of the semioval center on the right, with enhancement in the post-contrast T1 sequence and correspondence in the post-contrast SWI sequence.

Amaral LLF, Fragoso DC, Nunes RH, et al. Gadolinium-Enhanced Susceptibility-Weighted Imaging in Multiple Sclerosis: Optimizing the Recognition of Active Plaques for Different MR Imaging Sequences. *AJNR Am J Neuroradiol* 2019: 1-6.

Law LY, Riminton DS, Nguyen M, et al. The spectrum of immune-mediated and inflammatory lesions of the brainstem. *American Academy of Neurology* 2019;93: 390-405.

Summary/Conclusion:

Magnetic resonance imaging helps in early diagnosis, identifies lesions that indicate disease activity and those related to possible complications secondary to treatment.

The post-contrast susceptibility-weighted image (SWI) has been implemented as an additional sequence in the evaluation of patients with multiple sclerosis, allowing greater sensitivity in the identification of active lesions.

In the present study, unpublished by using 3T equipment, agreement was identified for T1 SE and post-contrast SWI sequences in the identification of active multiple sclerosis lesions, which were identified in two of the four patients with the diagnosis included in the study. In the other twenty-seven patients, no active lesions with enhancement were identified in either sequence, confirming the agreement between them. Confirming the accuracy of the post-contrast SWI sequence in demonstrating active inflammatory lesions of MS can bring numerous benefits to the diagnosis and follow-up of affected patients, ensuring greater accuracy in detecting typical active lesions, increasing the sensitivity and specificity of imaging findings.

Figure 2: Female patient, 39 years old. Axial MRI sections weighted in FLAIR (A), axial T1 FSPGR post-contrast (B) and axial SWI post-contrast (C). They demonstrate another active focal lesion of MS (arrows) subcortical in the white substance of the radiated crown on the right, with enhancement in the post-contrast T1 sequence and correspondence in the post-contrast SWI sequence.