THE ADDED VALUE OF SUSCEPTIBILITY WEIGHTED IMAGING IN EVALUATION OF PATIENTS WITH MULTIPLE SCLEROSIS

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INTRODUCTION

MRI is an important diagnostic tool used in MS diagnosis that can help fulfill the criteria of dissemination in space and time guided by the Mc Donalds criteria. Despite high sensitivity and specificity to Mc Donalds criteria, there are still issues of delayed diagnosis and misdiagnosis. As a result the Magnetic Resonance Imaging in MS (MAGNIMS) group and the Consortium of MS Centers (CMSC) have called for more studies into more MRI specific diagnostic biomarkers for MS such as the central vein sign and the paramagnetic rim sign. SWI sequence has the ability to visualize these new biomarkers which can potentially allow for an earlier and more accurate diagnosis of MS as well as provide additional information regarding the age and the presence of chronic.

AIM OF THE WORK

The aim of this study was to evaluate the added value of SWI in evaluation of patients with Multiple Sclerosis.

PATIENTS AND METHODS

Thirty clinically definite MS patients according to McDonalds criteria underwent clinical brain MRI scans including: T1W, T2W, FLAIR, DWI, SWI and 3D FLAIR. Fourteen patients underwent contrast enhanced MRI studies.18 Patients were scanned on a 1.5T and 12 patients were scanned on 3T MRI at Radiodiagnosis Department, Faculty of Medicine, Alexandria University.

RESULTS

SWI was able to identify additional features of MS plaques not identified on conventional sequences:

a) 515/890 (58%) of lesions were associated with central veins
b) 71/890 (8%) of lesions showed the paramagnetic rim sign
c) 63/890 (7%) showed the core sign (core lesions)
d)134/8 d) (15%) showed intralesional iron

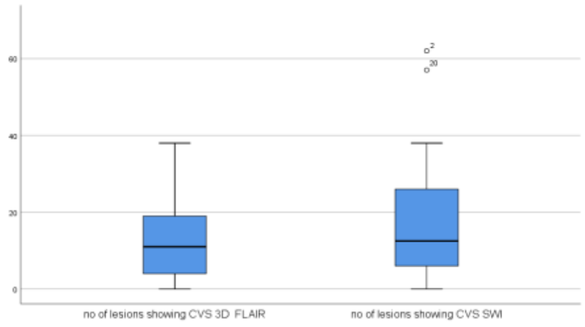

Figure 1: Box plot demonstrating the comparative frequency (median and interquartile range) of number of perivenular lesions in MS patients using SWI and 3D

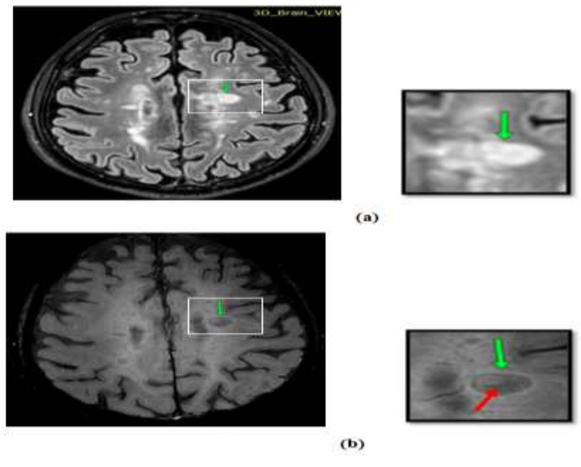

Figure 2: Axial (a) 3D FLAIR shows multiple bilateral periventricular demyelinating hyperintense foci (b) SWI shows the central vein sign (red arrow) and paramagnetic rim sign (green arrow) clearly demonstrated simultaneously in one of the periventricular lesions

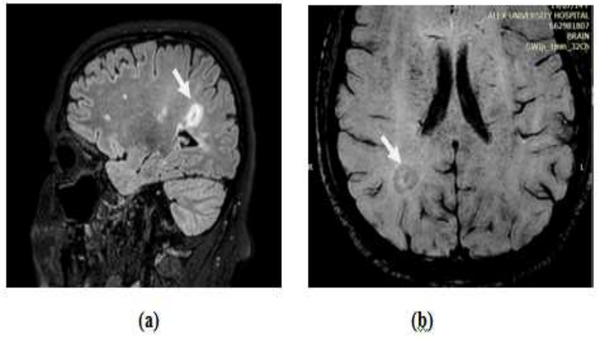

Figure 3: Sagittal 3D FLAIR (a) and axial SWI (b) show a deep white matter lesion (white arrow) showing a central vein on both sequences, yet the paramagnetic rim could only be visualized clearly on SWI.

CONCLUSION

1. SWI is a valuable MRI sequence in evaluation of MS patients.
2. SWI is a valuable tool in diagnosing MS and differentiating it from other MS mimics by visualization of central vein sign.
3. SWI is the best sequence to visualize intralesional iron which can take one of two forms; paramagnetic rim lesion and core lesion.
4. The presence of paramagnetic rims and intralesional iron generally correlates with disability and degree of brain atrophy.