

VALUE OF CONTRAST ENHANCED FLUID ATTENUATED INVERSION RECOVERY (FLAIR) MAGNETIC RESONANCE SEQUENCE IN DETECTION OF BRAIN LESIONS IN MULTIPLE SCLEROSIS PATIENTS

Yasser Mazloun Zakareya, Ashraf Mustafa Abdo,* Amr Magdy El Abd, Sally Osama Abd El-Rahman Ali Morsi

Department of Radiodiagnosis and Intervention, Department of Neuropsychiatry,* Faculty of Medicine, Alexandria University

Introduction

Multiple sclerosis (MS) is a chronic autoimmune, inflammatory neurological disease of the central nervous system (CNS). The diagnosis of MS requires objective evidence of CNS lesions disseminated in time and space. MS lesions may occur in any part of the central nervous system where myelin exists, but lesions around the ventricles and the corpus callosum are highly suggestive. MRI remains the most important paraclinical tool available to support the diagnosis and monitoring of MS. Contrast-enhanced MRI is regarded as the best indicator of disease activity and response to therapy, being used during the treatment course and follow-up of MS patients. CE-FLAIR is more sensitive than CE-T1WI for some enhancing MS plaques. FLAIR sequence is more sensitive to T1 shortening than T1WI at lower concentrations of Gadolinium. Additionally, the use of subtraction method to detect the change in disease burden in MS (using nonisotropic voxels) appears to be efficient and reliable.

Aim of the Work

The aim of this work was to assess the value of contrast enhanced fluid attenuated inversion recovery magnetic resonance sequence in detection of brain lesions in multiple sclerosis patients.

Subjects and Methods

The study was conducted on twenty patients with known or suspected multiple sclerosis according to McDonald criteria and clinical assessment.

All patients were subjected to:

- Full history taking
- Clinical and neurological examination.
- The following MRI protocols: *Pre contrast series including:*
 - *Axial and sagittal T1-weighted sequences
 - *Axial and sagittal FLAIR sequences
 - *Axial and coronal T2-weighted sequences
- Post contrast series including:*
 - *Axial, coronal and sagittal T1-weighted sequences
 - *Axial and sagittal FLAIR sequences
 - Subtraction technique for FLAIR sequence.
 - Statistical analysis of the data.

Results

Table 1: Number of patients, total number of Active enhancing lesions characteristics in different sequences

	Contrast Enhanced T1MRI	Subtracted Contrast Enhanced FLAIR
Number of patients with enhancing lesions: (n=20)		
	14 (70.0%)	18 (90.0%)
Total number of enhancing lesions: (n=38)		
	20 (50.0%)	38 (95.0%)

Table 2: Diagnostic performance of Subtracted Contrast Enhanced FLAIR in detecting active MS lesions

		TP	FP	FN	TN	Sensitivity	Specificity	PPV	NPV	Accuracy	P-value
Total sample (N=20)	Subtracted Contrast Enhanced FLAIR	16 80%	2 10%	0 0%	2 10%	100%	50%	88.8%	100%	90%	0.032*

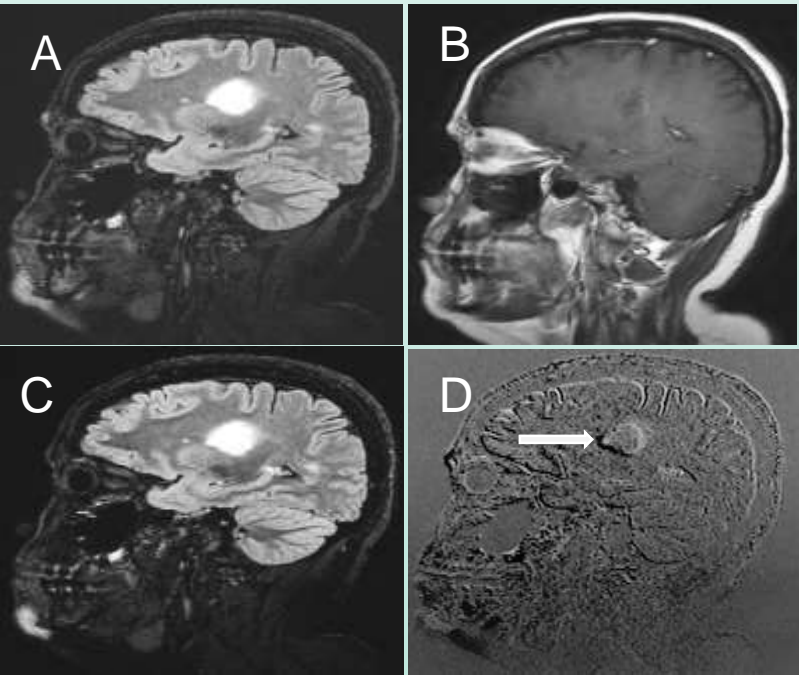


Figure (1):
(A) Sagittal pre contrast FLAIR shows left periventricular and deep white matter hyperintense plaque (white arrow).
(B) The same lesion in sagittal post contrast T1 shows inhomogeneous enhancement.
(C, D) Sagittal post contrast FLAIR shows enhance-ment of lesions confirmed by subtraction image reflecting presence of activity.

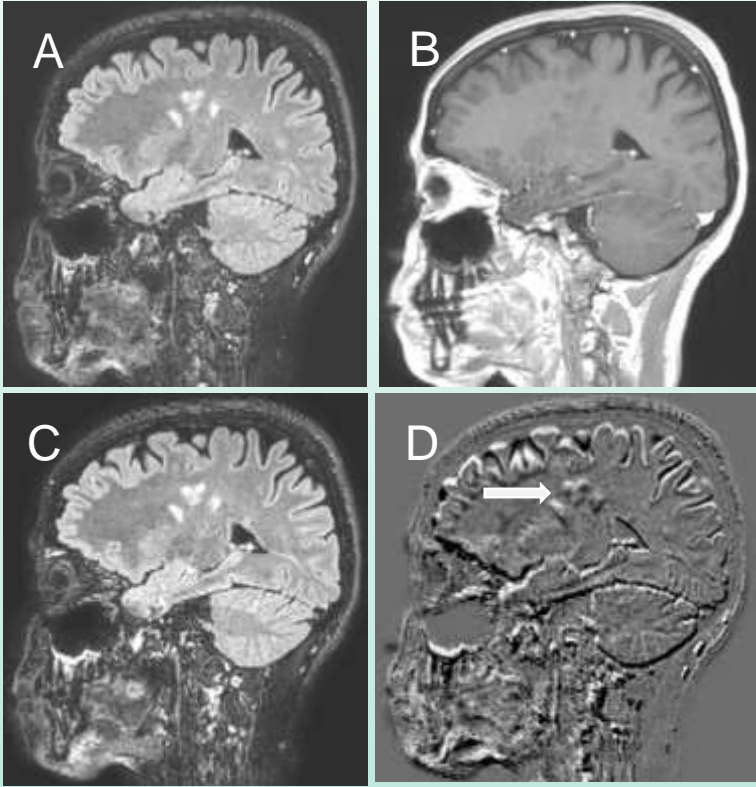


Figure (2):
(A) Sagittal pre contrast FLAIR shows right periventricular hyperintense plaques (white arrow).
(B) The same lesion in sagittal post contrast T1 shows no definite enhancement.
(C,D) Sagittal post contrast FLAIR shows enhancement of lesions confirmed by subtraction image reflecting presence of activity.

Conclusion

CE-FLAIR is more sensitive and specific for diagnosing MS than the routine CE-T1WI. CE-FLAIR images are reliable sequences for depicting enhancing brain MS lesions in comparison with CE-T1MRI. Accordingly, we concluded that CE-FLAIR brain MRI can be considered as part of the evaluation of MS patients, especially if, despite clinically suspected active disease, no enhanced lesion is found in the routine CE-T1WI.