Defining criteria for new or enlarged T2 lesions in a cohort of early multiple sclerosis patients and their impact on measuring effect size of disease modifying therapies (P1359)

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Introduction and Purpose

- New or enlarged T2 lesions (lesion activity) are the most important surrogate marker of clinical disease activity in MS.
- The purpose was to evaluate different criteria for lesion activity with respect to their impact on measuring effect size of disease modifying therapies.

Methods

- A cohort of 33 patients with early MS underwent 3 MRI examinations (treatment-naïve at baseline (BL), after onset of treatment (re-BL) and at follow-up (FU)) (see Figure 1).
- T2 lesion activity was manually measured by two experienced raters at : a) pre-treatment and b) treatment phase.
- Three different size thresholds were applied: visible on at least two consecutive slices, minimum volume of 0.01 ml, and minimum volume of 0.02 ml.
- Enlarged T2 lesions were sub-categorized into partially enlarged T2 lesions (B in Figure 2) or spherically enlarged T2 lesions (C in Figure 2).
- In addition to T2 lesion activity, gadolinium enhancing (Gd+) lesions were also evaluated.

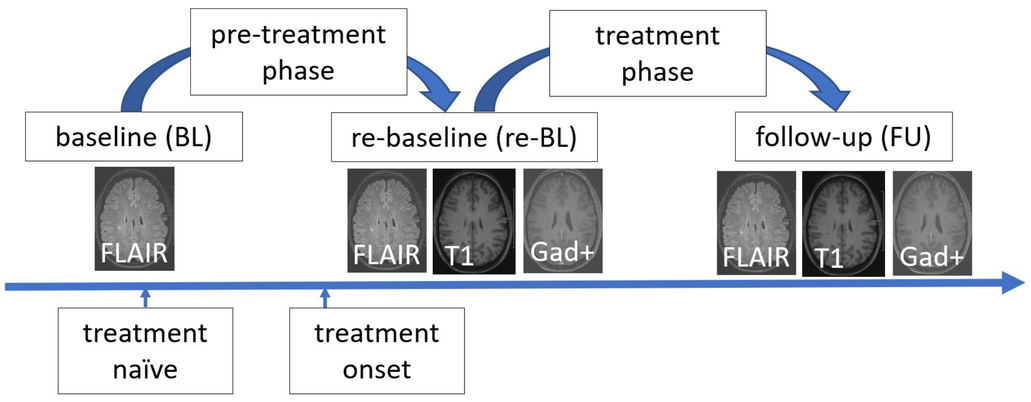

Figure 1 MRI schema

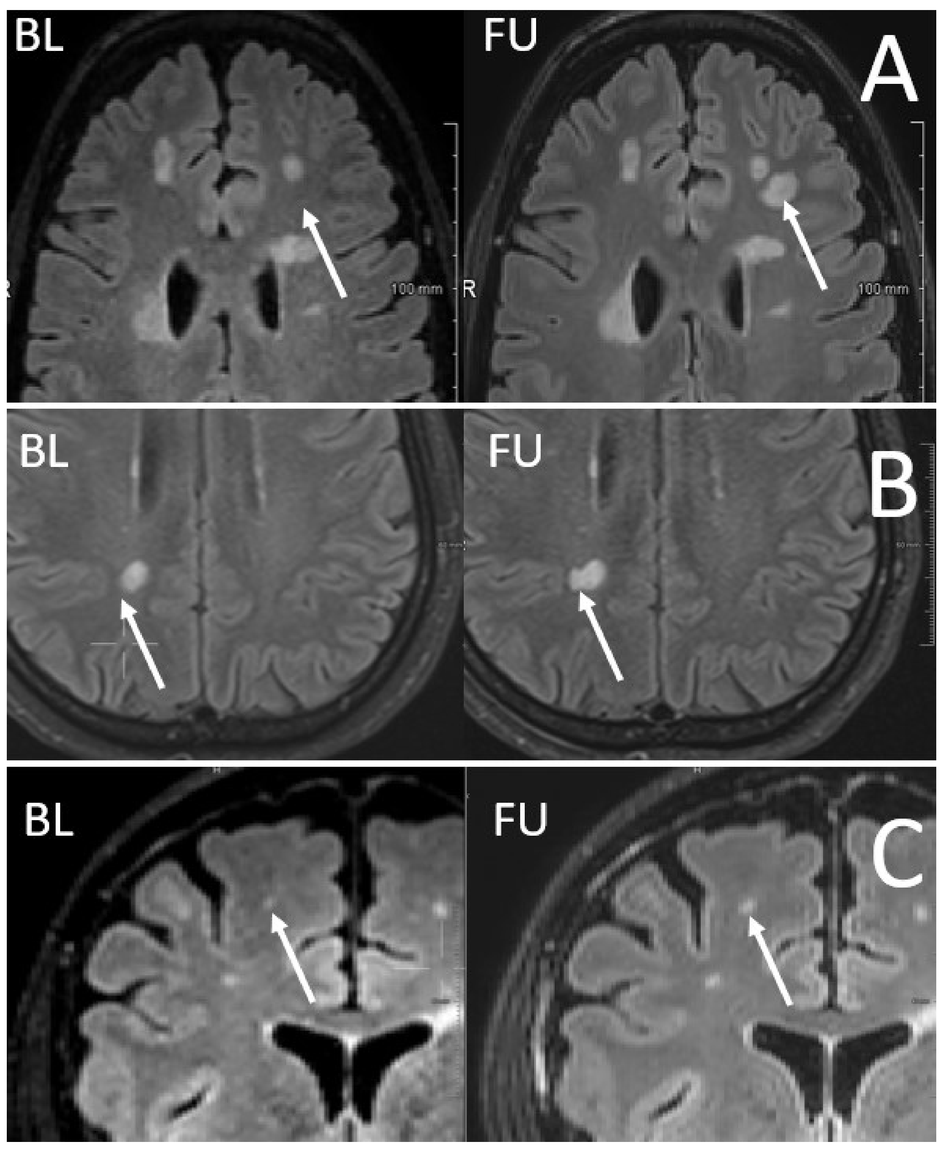

Figure 2 Sub-categorization: **A** new lesion, **B** partially enlarged T2 lesions, **C** spherically enlarged T2 lesions

Results

- A total of 117 new or enlarged T2 lesions and six Gd+ lesions were found in the pre-treatment phase.
- From 117 T2 lesions 111 (95%) were new, 5 (4%) were partially enlarged and one lesion was a spherically enlarged T2 lesion (<1%).
- From 111 new T2 lesions 28 (25%) were < 0.02 ml.
- The mean number of new or enlarged T2 lesions decreased between pre- and treatment phases from 3.55 to 0.64 T2 lesions per patient for the smallest lesion size threshold (2 slices), from 3.06 to 0.61 T2 lesions per patient for lesions > 0.01 ml, and from 2.7 to 0.61 T2 lesions per patient for lesions > 0.02 ml. The corresponding Cohen's effect sizes were 0.57, 0.62, and 0.63, respectively (see Table 2).

Table 1 New or enlarged T2 lesions found in pre- and treatment phases

		pre-treatment	post-treatment
	size threshold	sum over all patients	
# new lesions	≥ 2 slices	111	21
	≥ 0.01 ml	95	20
	≥ 0.02 ml	83	20
# enlarged lesions with own nucleus	≥ 2 slices	5	0
	≥ 0.01 ml	5	0
	≥ 0.02 ml	5	0
# spherical enlarged lesions		1	0
# gad lesions		6	4

Table 2 Cohen's effect sizes for different lesion size thresholds

	pre-treatment lesion activity	post-treatment lesion activity		
size threshold	mean (std), median [IQR] per patient		p	Cohens's effect size d
≥ 2 slices	3.55 (7.15), 1.0 [0.0,3.0]	0.64 (1.18) ,0.0 [0.0,1.0]	0.014	0.57
≥ 0.01 ml	3.06 (5.47), 1.0 [0.0,3.0]	0.61 (1.18), 0.0 [0.0,1.0]	0.009	0.62
≥ 0.02 ml	2.70 (4.58), 1.0 [0.0,3.0]	0.61 (1.18), 0.0 [0.0,1.0]	0.011	0.63

Conclusion

- In a cohort of patients with early MS, both enlarged T2 lesions and Gd+ lesions were rare.
- Most small lesions were due to a few patients who also had larger new T2 lesions. Therefore, statistical power was not improved by the inclusion of very small lesions.

Disclosures

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