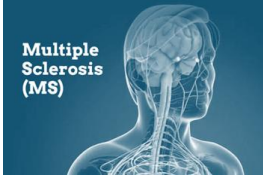
Cross-sectional and longitudinal observational study on the prevalence and progression of markers of inflammation and fatigue in a cohort of patients with Multiple Sclerosis



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Introduction and objectives

Fatigue is one of the most common and disabling symptoms in pwMS, and oxidative stress are involved in the pathogenesis of fatigue. However, no specific biomarkers of fatigue have been identified so far.
In this study, we calculated the prevalence of fatigue using specific questionnaires, as well as the prevalence of elevated blood levels of inflammatory and oxidative stress markers. Than, we investigated the potential correlation between specific blood markers and clinically measured fatigue.

Materials

Fatigue was assessed by:
- FSS (Fatigue Severity Scale),
- MFIS (Modified Fatigue Impact Scale)
- 6MWT (Six-Minutes Walking Test).

Inflammation (Inf) was assessed by:
- IL-6,
- IL-10
- TNFα

Oxidative stress (OxS) was assessed by:
- AOPP,
- FRAP,
- GSH.

Methods

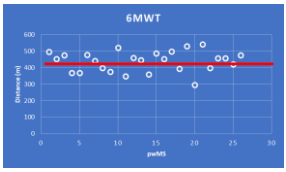
Cross-sectional study
We calculate the prevalence of increased scores of FSS and MFIS, reduced scores of 6MWT and increased levels of Inf and OxS

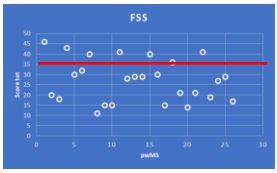
Longitudinal observation study
All parameters are evaluated at T0 (before initiating therapies) and T1 (6 months after starting therapy), and their correlations were analyzed using the paired t-test.
Then, we performed a correlation analysis using Spearman's rho. For each patient, we correlated delta (T1–T0) MFIS and delta 6MWT with the delta AOPP, delta FRAP, delta GSH, delta IL-6, delta IL-10, and delta TNF-α.

Results

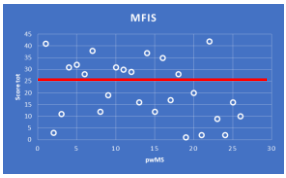
Cross-sectional study

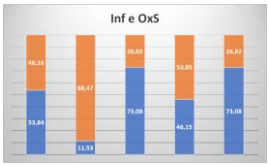
Variable	Value
Naïve pwMS enrolled n	26
Gender	
Male n (%)	7 (26.92)
Female n (%)	19 (73.08)
Median age (SD)	32.15 (11.33)
Period of enrollment	27 months





Normal score

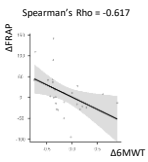


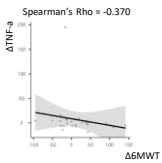


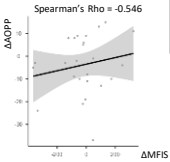
pwMS with normal values

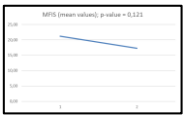
pwMS with pathological values

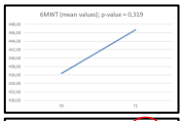
Longitudinal observation study

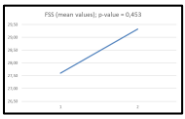


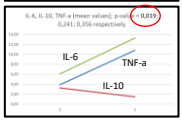


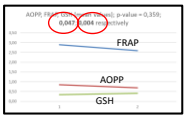












Conclusions

The study confirmed the prevalence of Inf and OxS markers and fatigue, as shown in previous studies.
The longitudinal analysis showed that the reduction of levels of OxS markers may correlate with the improvement of the results in questionnaires, but no single IL was identified as a reliable pro-/anti-inflammatory marker.
Finally, the weak correlations found suggest that fatigue cannot be explained only by Inf and OxS markers but involves more complex pathogenic mechanisms.