

Early detection with speckle tracking echocardiography of biventricular systolic dysfunction, and its relationship with fatigue, in patients with multiple sclerosis

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Funding Acknowledgements: Type of funding sources: None.

Background: Fatigue is a frequent and debilitating symptom of multiple sclerosis (MS), affecting 90% of patients. Symptoms seems multifactorial, but little is known about the contribution of cardiovascular morpho-functional alterations linked to comorbidities, to lifestyle, to MS itself or to drugs (i.e. mitoxantrone).

Aim: to investigate the presence of cardiac alterations in MS patients, and to evaluate their impact on fatigue.

Methods: 24 patients with relapsing-remitting MS (RR-MS) underwent an electrocardiogram (ECG), a transthoracic echocardiographic (TTE), a six minutes walking test (6MWT) with Borg scale (BS), and two fatigue self-assessment scales, the Fatigue Severity Scale (FSS) and the Modified Fatigue Impact Scale (MFIS). The patients were divided into 2 groups: group 1, without traditional cardiovascular risk factors (CVRF: smoke, hypertension, diabetes, hypercholesterolemia; n = 12, 11 females), and group 2, with at least one CVRF (n = 12, 5 females). None of the patients had ever been on mitoxantrone therapy. No new control group was studied due to the SARS-CoV-2 pandemic restrictions, so the comparison was performed with general healthy population in internationally validated previous studies.

Results: No arrhythmias were found. In both MS groups all the TTE left ventricular (LV) systolic function parameters were depressed compared to the healthy population, but only the mean global longitudinal strain (GLS), the mean longitudinal strain rate (LSR) of LV and estimated pulmonary artery systolic pressure (PAPs) were statistically significant depressed compared to the healthy general population ($p < 0.005$): see table. This reduction was observed in both MS groups, while there were non significant differences among the two groups. TTE LV function depression significantly correlated to variation of parameters of fatigue, especially considering LV GLS in relation to BS values.

Conclusions: Subclinical biventricular systolic dysfunction is present in MS patients, and it seems to be linked to the disease itself without being influenced by CVRF. This dysfunction, detected by speckle tracking echocardiographic techniques, seems to contribute to the symptom of fatigue in patients with MS. It is important to include TTE in the workup and follow-up of MS patients, in order to promptly treat cardiac dysfunction and relieve fatigue.

Echocardiography and LV strain

	MS total	MS no CVRF	MS + CVRF	Healthy population
LV GLS	17.7 ± 2.2*	18.0 ± 2.1*	17.4 ± 2.4*	22.6 ± 1.7
LV LSR	1.0 ± 0.1*	1.0 ± 0.1*	1.0 ± 0.2*	1.2 ± 0.1
PAPs	25.0 ± 2.6*	24.8 ± 2.9*	25.2 ± 2.5*	14.0 ± 6.0

* $p < 0.05$ vs healthy population