

Impact of brain atrophy on walking in multiple sclerosis patients with low disability: a dual task study



Giancarlo Coghe, Massimiliano Pau, Giuseppe Fenu, Lorena Lorefice, Micaela Porta, Federica Corona, Giuseppina Pilloni, Jessica Frau, Erica Zucca, Maria Giovanna Marrosu, Eleonora Cocco

Background

Ambulation is not a simply motor act but requires a cognitive involvement as demonstrated by the dual task paradigm. Moreover is well recognized that cognitive problems in MS are related to brain atrophy.

Aims

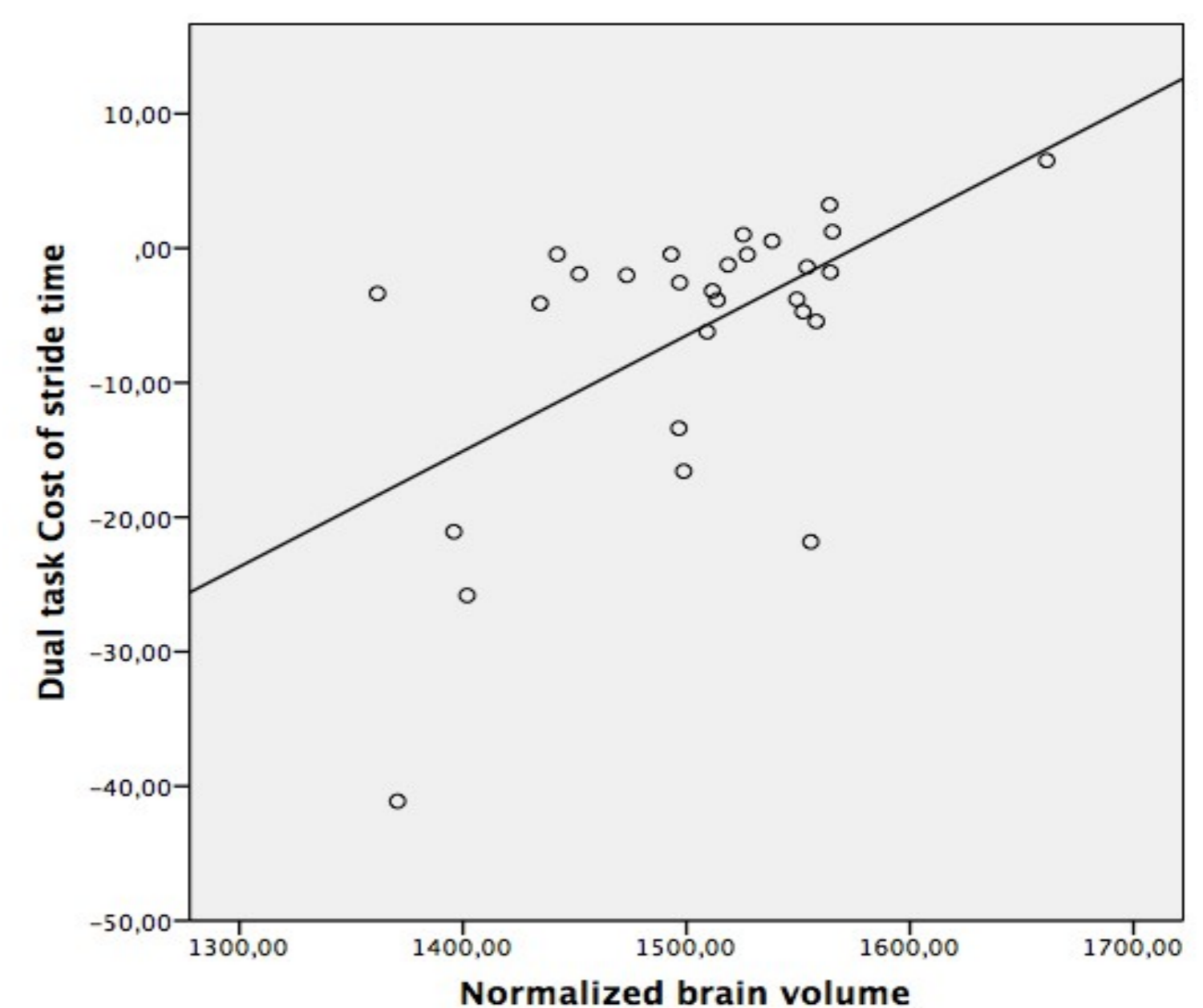
To evaluate the role of brain atrophy in cognitive motor interference assessed by the dual task cost (DTC) of walking in a group of MS patients with low disability.

Methods

The inclusion criteria were a diagnosis of MS, EDSS<3.0, been able to undergo to a brain MRI and a gait analysis.

Spatial temporal (ST) parameters were acquired by 3D gait analysis. Brain MRI was performed with a 1.5 Tesla scanner. Normalized Brain Volume (BV), Normalized Grey matter Volume (GM) and Normalized White Matter Volume (WM) were estimated with SIENAX. Relationship between DTC of gait and MRI data were assessed by means of the Pearson correlation.

- **Results**
- 30 patients
- 20F, 10M
- Mean age: 40.6 (SD ±9,6)
- Mean EDSS 1.5 (SD ±0,7)



Pearson correlation coefficient	DTC Stridetime		DTC Swingphase		DTC Double support		DTC Meanvelocity		DTC Cadence	
	Rho	p	Rho	p	Rho	p	Rho	p	Rho	p
Stroop test corrected	-0.587	0.001	0.462	0.013	0.362	0.058	0.420	0.026	0.580	0.001
NWV	0.445	0.02	0.287	0.137	0.345	0.072	0.333	0.083	-0.435	0.021
NGV	0.463	0.01	-0.488	0.008	0.416	0.028	0.256	0.188	-0.448	0.017
NBV	0.562	0.001	-0.499	0.007	0.476	0.010	0.372	0.051	-0.516	0.005

Discussion and conclusion.

Even in MS patients with low disability brain atrophy seems to have a strong impact on ambulation performance during a cognitive task, thus potentially worst performances in every day life activities that implicate cognitive motor interference.