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Exploring the volumetry of subcortical structures as a potential surrogate of brain volumes in multiple sclerosis

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INTRODUCTION AND PURPOSE

Estimation of brain volumes, either as a whole (WB) or segmented by white (WM) and gray (GM) matter, seems to be useful in the monitoring of multiple sclerosis (MS), but is often time-consuming. Recently, simple measurements of the corpus callosum were proposed as possible surrogates of brain volume, especially that of the WM. We aimed to investigate which, if any, of six subcortical structures would also correlate with brain volumes.

METHODS

Patients with relapsing-remitting MS underwent 3.0 T brain magnetic resonance imaging (MRI). The Icometrix© software was used to estimate the WB, WM and GM volumes. The FreeSurfer© software allowed for the estimation of the volumes of six subcortical structures: thalamus, caudate nucleus, putamen, pallidum, hippocampus, and amygdala. The volume of each structure was considered to be the arithmetical mean between right and left sides. Pearson's correlation coefficient was calculated with the SPSS© software.

RESULTS

Twenty-one patients with relapsing-remitting MS were included. Age ranged from 18 to 46 years, disease duration ranged from 5 to 140 months, and EDSS ranged from 0 to 5. Table 1 shows the results of correlations between the six subcortical structures and the brain volumes.

DISCUSSION AND CONCLUSIONS

Some subcortical structures, especially the thalamus, may be potential targets for the development of simple measurement techniques that could act as surrogates of brain volumes, maybe creating easier-to-implement alternatives to the time-consuming techniques of brain volumetric analysis used nowadays.

REFERENCES

Benedict RH, Ramasamy D, Munschauer F, et al. **Memory impairment in multiple sclerosis: correlation with deep grey matter and mesial temporal atrophy.** *J Neurol Neurosurg Psychiatry* 2009;80(2):201-6.

Schoonheim MM, Popescu V, Rueda Lopes FC, et al. **Subcortical atrophy and cognition: sex effects in multiple sclerosis.** *Neurology* 2012;79(17):1754-61.

Table: Correlation between subcortical structures and traditional measurements of brain volume

Variable	Thalamus		Caudate Nucleus		Putamen		Pallidum		Hippocampus		Amygdala	
	R	P	R	P	R	P	R	P	R	P	R	P
Whole brain volume	0,804	<0,001	0,728	<0,001	0,708	<0,001	0,445	0,043	0,450	0,041	0,172	0,457
White Matter Volume	0,804	<0,001	0,563	0,008	0,431	0,051	0,182	0,429	0,466	0,033	0,025	0,915
Grey Matter Volume	0,502	0,020	0,607	0,004	0,699	<0,001	0,522	0,015	0,266	0,244	0,244	0,287

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