



Brain Volume in Early MS patients with and without IgG oligoclonal bands in CSF: a case-control study.

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Background

Oligoclonal bands of IgG (O.B.) are detected in near to 90% of Multiple Sclerosis (MS) patients and are proposed as early prognostic factor of the disease (Andersson, 1994, Imrell, 2009). Growing attention is actually oriented to the brain volume evaluation as possible MRI marker of activity and severity of the disease, also to estimate the response to MS treatments (De Stefano N, CNS Drugs 2014).

Objective

To evaluate a possible relationship between IgG O.B. and cerebral volume in a cohort of early MS patients.

Methods

Consecutive MS patients were recruited at the MS Centre of University of Cagliari. Inclusion criteria were: diagnosis of Relapsing remitting MS according to 2010 revision of diagnostic criteria; CSF analysis and MRI acquired simultaneously and within 12 months from clinical onset. An healthy control group underwent at the same MRI acquisition was also recruited. Acquisitions of brain MRI were obtained using a Magnetom Avanto Siemens Scanner at 1.5 T with the following sequences: 3D T1-MPRAGE: Echo time (TE): 2.37 ms, repetition time (TR): 1730 ms, inversion time (TI): 1050 ms, Field of View (FOV): 244 mm, voxel size: 1x1x1 mm. Brain parenchyma volumes were measured by SIENAX, a previously described method to obtain Normalized Brain Volume (NBV), Normalized Grey matter Volume (NGV) and Normalize White Matter Volume (NWV).

Results

In 20 patients CSF analysis did not showed IgG O.B synthesis (O.B. negative group). A control group of 25 patients with detection of IgG O.B. was also recruited (O.B. positive group). No significant difference between OB negative and OB positive group were detected in age (mean: 43.6 vs 40,4), gender (female: 10/20 vs 15/25) and EDSS (mean: 1,5 vs 2.2). Mean of NBV was 1517.10 ml (S.D. 75.14) in OB negative group and 1498.04 ml (S.D. 70.95) in OB positive group, respectively. Mean of NGV was 782.96 ml (S.D. 80.70) in OB negative and 806.25 ml (S.D.: 57.8) in OB positive group. Mean of NWV was 734.10 ml (S.D. 68.9) in OB negative and 691.68 ml (S.D. 38.02) in OB positive group. T test for independent groups showed a significant difference in NWV between OB positive and OB negative group (p value: 0.01). No difference was detected in NBV and NGV.

Conclusion

A previous study found that MS patients lacking O.B. have less global and regional brain atrophy (Ferreira D., 2014). Also our preliminary results suggested that OB positive patients show more atrophy of white matter since early phases of the disease and support the role of CSF analysis as prognostic factor at time of MS

Table 1. Clinical and demographic features of MS patients included in the study.

	O.B. negative group (20 patients)	O.B. positive group (25 patients)	P value
Age	43.65 (S.D.:11.9)	40.48 (S.D.:12.1)	ns
Gender	F/M: 15/5	F/M: 20/5	ns
EDSS	1.45 (S.D.: 1.23)	2.24 (S.D 1.80)	ns

Table 2. Mean (Standard Deviation, S.D.) Normalized Brain Volume, Normalized White Matter Volume and Normalized Grey Matter Volume in OB negative Group and O.B. positive Group.

	O.B. negative group (20 patients)	O.B. positive group (25 patients)	P value (T Test)
NBV	1517.10 (S.D.: 75.14)	1498.04 (S.D.: 70.57)	ns
NWV	734.10 (S.D.: 68.59)	691.68 (S.D: 38.02)	0.01
NGV	782.93 (S.D.: 80.70)	806.25 (S.D: 50.7)	ns

Table 3. Demographic characteristics of healthy controls and Mean (Standard Deviation, S.D.) Normalized Brain Volume, Normalized White Matter Volume and Normalized Grey Matter Volume.

	Healthy controls (n: 15)	P value (T Test) Healthy controls Vs O.B. positive group	P value (T Test) Healthy controls Vs O.B. negative group
Mean age (S.D)	46.2 (9.80)	ns	ns
Gender (F/M)	9/6	ns (chi square test)	Ns (chi square test)
Mean NBV (S.D.)	1503.27 (29.22)	ns	ns
Mean NWV (S.D.)	721.33 (18.33)	0.001	ns
Mean NGV (S.D.)	781.80 (20.80)	Ns	ns

Reference

De Stefano N, Airas L, Grigoriadis N, Mattle HP, O'Riordan J, Oreja-Guevara C, Sellebjerg F, Stankoff B, Walczak A, Wiendl H, Kieseier BC. Clinical relevance of brain volume measures in multiple sclerosis. CNS Drugs. 2014; 28:147-56.

Ferreira D et al, 2014 Multiple sclerosis patients lacking oligoclonal bands in the cerebrospinal fluid have less global and regional brain atrophy. J Neuroimmunol. 2014 Sep

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