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Adiponectin as a possible biomarker in Multiple Sclerosis

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Background

Adiponectin plays important roles in the regulation of energy homeostasis and insulin sensitivity, enough to be considered a marker for obesity and related diseases as type II diabetes. Moreover, an immunomodulatory action in several systemic inflammatory disorders has been demonstrated. Few studies analyzed the adiponectin role in a neuroinflammatory disorders as Multiple Sclerosis (MS) with controversial results. In this study, we analyzed serum adiponectin levels in MS patients and investigated the potential relationships with disease features.

Materials

99 unrelated MS patients, at moment of diagnosis according to Mc Donald Criteria, were recruited and compared to 87 age- and sex-matched controls. We collected sera of patients at moment of diagnosis, before starting any treatment at baseline. During 3,6 years of follow-up were collected relapses and total annualized relapse rate (ARR) were calculate as total number of clinical relapses during disease duration of each patient. To assess disability were used the EDSS score in combination with disease duration to calculate progression Index and MSSS (Multiple Sclerosis Severity Score). Adiponectin levels were measured by ELISA.

Results

Baseline characteristics of patients and controls are reported in **Table 1**. They did not differed for clinical and biochemical features. Serum adiponectin levels analyzed by ELISA assay were higher in MS patients compared to matched controls (12,18 vs 10,02 µg/ml) (p<0,001) (**Fig.1**).

Parameters	Controls=87 mean (ds)	Patients=99 mean (ds)	p value
Age (ys)	40.71 (14.12)	38.34 (13.00)	0.23
Sex Female/Male	41 (47,1%)	51 (59,6%)	0.10
BMI (Kg/m2)	23.87 (3.48)	24.27 (4.36)	0.50
Total Cholesterol (mg/dL)	192.17 (38.38)	184.51 (35.56)	0.18
Triglicerydes (mg/dL)	103.39 (60.62)	92.35 (51.80)	0.21
Glucose (mg/dL)	87.76 (16.08)	86.95 (22.20)	0.18

Table 1 Clinical and biochemical features of MS patients and controls: the patients didn't differ for any demographic and metabolic features; adiponectin was higher in MS patients compared to healthy controls.

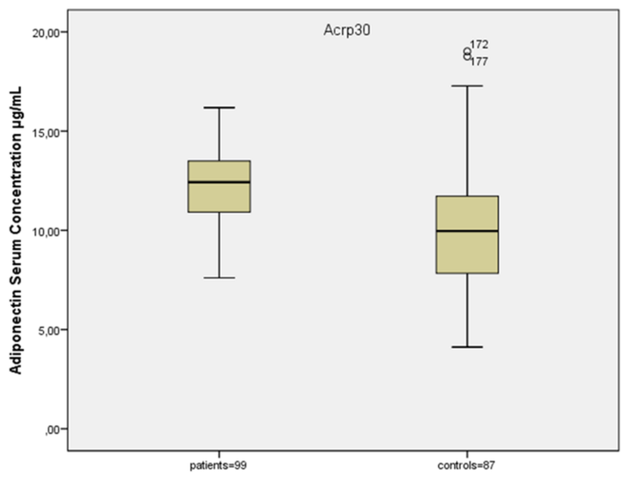

Figure 1. Total Acrp30 serum concentrations are statistically higher in MS patients compared to controls. ELISA test showed that adiponectin levels are strongly increased in MS patients (mean value 10.2 µg/ml) compared to healthy controls (mean value 12.18 µg/ml) (*p*-value <0.05).

Clinical characteristics of patients are resumed in **Table 2.** No difference in adiponectin was found between active/no active patients and between forms of disease. Then we divided patients and controls based on their levels of adiponectin at baseline, to investigate prognostic value of adiponectin

Parameters	Mean	ds
Age (ys) at diagnosis	3808	13.01
BMI at baseline	23.91	4.36
ARR total	0.37	1.78
Clinical follow up (ys)	3.64	2.20
MSSS	3.09	2.76
EDSS at baseline	2.13	1.55
Progression Index	0.52	3.55
Disease duration	5.09	3.59

Table 2: Clinical and demographic characteristics of patients (=99)

On the basis of the mean value of adiponectin (12,18 mg/mL),we divided patients with high levels of adiponectin (above the mean value) and low levels of adiponectin (under the mean value). The patients with high levels of adiponectin are female, had significantly higher BMI, higher progression index, higher MSSS and higher total ARR (**Table3**). Then the results was confirmed in a multivariate model (**Table 4)**

Parameters	Adiponectin		p-value
	low	high	
Age	38.82(13,01	37.88 (13.12)	0.72
BMI	23.01 (3.01)	25.48 (5.09)	0.004
Total cholesterol	187.29 (38.17)	181.91 (33,17)	0.48
Triglycerides	81.58 (44.49)	90.44 (48.46)	0.37
Glucose	80.28 (9.67)	81.27 (12.01)	0.67
Basal EDSS	1.75 (1.35)	2,35 (1.68)	0.69
Total ARR	0.36 (0.37)	1.45 (2.35)	0.002
Progression Index	0.33 (0.37)	1.39 (4.77)	0.004
MSSS	2.44 (2.33)	3.84 (3.06)	0.001
Oligoclonal bands	10.33 (6.38)	12.75 (6.16)	0.38
Sex (Male) **(Female)**	61,2% 38,8%	36% 64%	0.001

Table 3: Univariate analysis of MS patients divided according to high or low levels of adiponectin at baseline

Parameters	p value	OR	Lower 95% I.C	Higher 95% I.C
BMI	0,008	1,279	1,065	1,536
ARR Tot	0,257	2,679	0,488	14,719
MSSS	0,014	1,294	1,053	1,589
Disease duration	0,442	0,929	0,769	1,122
Sex (female)	0,002	5,598	1,84	17,035

Table 4: Regression logistic analysis confirms that patients with higher adiponectin value have higher risk of disability progression, independently from BMI and Sex

Discussion and conclusions

Our data demonstrate that in Multiple Sclerosis, as in other autoimmune diseases, adiponectin levels are increased. Importantly, it is a potential biomarker to predict worse prognosis and disease progression. Adiponectin could play a role in the regulation of pro-inflammatory pathways at the basis of MS. Further studies are required to better understand the biological role of adiponectin and its possible usefulness as a biomarker of MS.

Bibliography

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