

CORRESPONDENCE

Is there any association between microalbuminuria and multiple sclerosis?

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Previous studies have found association between cardiovascular risk factors and changes in clinical outcomes in multiple sclerosis (MS) patients. We investigated whether there is any relationship between microalbuminuria and clinical characteristics in MS patients. We found no significant differences in urine creatinine, Urinary albumin creatinine ratio (UACR) and microalbumin levels between MS patients and controls. Our findings suggest that MS patients do not have significant microalbuminuria.

MS is a demyelinating inflammatory autoimmune central nervous system disease with multifactorial pathogenesis involving both hereditary and environmental factors.¹ Systemic inflammation increases during clinical exacerbations of MS.² On the other hand, during remission, C-reactive protein has been found to be at normal ranges³, while serum levels of markers that related to oxidative stress were elevated.⁴ Both oxidative stress and inflammation have been proposed to play a significant role in the MS pathogenesis.⁵ Besides these, recent investigations have suggested vascular pathologies in MS. Varga *et al.* reported that there is a reduction in cerebral perfusion that influences widespread areas including white matter but with normal appearance.⁶ Zamboni *et al.* reported an association between MS and decreased CNS venous blood drainage, which was described as chronic cerebrospinal venous insufficiency.⁷

Microalbuminuria is the presence of albumin in the urine above the normal range of less than 30 mg per day, but under the detectable range with the conventional dipstick methodology. Microalbuminuria is an indicator of widespread vascular dysfunction and an independent risk parameter for cardiovascular disorders.⁸ Microalbuminuria in diabetic mellitus is the indicator of microvascular endothelial dysfunction and managements directed at decreasing albumin

excretion rates have reduced progression of renal failure and cardiovascular disease risk.⁹

MS is a degenerative inflammatory condition with a probable vascular component and there is several evidence for the role of cerebral endothelial cell dysfunction in the pathogenesis of the disease.¹⁰ Oxidative stress and chronic inflammatory response which are key elements in atherogenesis, also play a role in MS pathophysiology.¹¹ Activation of vascular endothelial cell may be an early change in the evolution of MS, and demyelination may have an ischemic basis.¹² In some diseases, microalbuminuria was considered as a sign of a generalized endothelial dysfunction, and haemodynamic factors and glomerular injury plays a role in its pathogenesis.^{13,14} The influences of degradation of the unity of the endothelial barrier is reflected as changed glomerular endothelial permeability in kidneys, inducing increased amounts of albumin leaking into the glomerular ultrafiltrate. The mechanism of tubular reabsorption for albumin from the ultrafiltrate is exceeded beyond its threshold capacity, causing an increased excretion of albumin in the urine.¹⁵⁻¹⁷ Accordingly, it may be expected that the development of microalbuminuria from endothelial dysfunction could be seen in MS.

Although MS and microalbuminuria may have similar possible pathogenetic mechanisms, the relationship between MS and microalbuminuria has not been investigated in adult with MS. Therefore, in this study, we searched for a possible association between MS and microalbuminuria.

Our patients were randomly chosen from the Neurology Clinic, Faculty of Medicine, affiliated to the Kirikkale University. The study was approved by the institutional ethical committee with consent by the patients. Thirty three adults with a diagnosis of relapsing remitting MS and 30 healthy controls were included in this study.

Table 1: The demographics and biochemical parameters of patients with MS and control

	Patients mean ± SD (n=33)	Controls mean ± SD (n=30)	P value
Age, year	34.15±9.2	33.93±10.49	0.93
Gender (Female, male)	24, 9	23, 7	0.72
MS duration, year	4.66±3.89		
EDSS	1.74±1.45		
Urine ceratinine	143.30±70.86	150.36±98.83	0.74
UACR	11.65±26.86	7.48±7.49	0.41
Microalbumin	1.24±2.25	1.05±1.25	0.69

MS: Multiple sclerosis, EDSS: Expanded Disability Symptom Scale, UACR: Urinary albumin creatinine ratio.

A power analysis was applied to identify the minimum sample size of patients. The assumed prevalences of microalbuminuria in MS patients and healthy controls were 59 and 26.¹⁸

The diagnosis of MS was based on the McDonald’s 2010 revised criteria.¹⁹ Age- and sex-matched family members and other healthy adults were recruited as controls.

Demographic characteristics including age, gender, duration of the disease and Expanded Disability Symptom Scale (EDSS) were recorded.

Exclusion criteria were neurodegenerative disease such as Parkinson’s disease, dementia, history of renal disease, congestive heart failure, diabetes mellitus, respiratory diseases, acute infectious diseases, severe hepatic failure and malignancy.

The urinary albumin and creatinine level measurements and the estimation of albumin excretion rates have been previously described. Monoclonal antibodies to human albumin was used to detect albumin levels by nephelometry. Published formula was used to determine creatinine levels through the Jaffe method and adjusted for sex and race. The ratio of urinary albumin creatinine was based on [urine albumin (mg)]/k [urine creatinine (g)], where k was a sex and race-dependent correction factor.²⁰ The presence of microalbuminuria was defined as the UACR ≥30 mg/g in women and ≥20 m/g in men and the upper limit being 299 mg/g for both sexes.²¹

We used SPSS version 16.0 to analyze the results. A p values <0.05 were considered statistically significant. Continuous variables were presented as mean and ±SD. Categorical

variables were expressed as proportions. We used the Student’s t test to test the differences in continuous variables and χ^2 test for categorical values. Pearson correlation was used to examine relations among the UACR, microalbumin, urinary creatinine with EDSS in all subjects.

The summary of characteristics of the study subjects is shown on Table 1. There was no difference related to the mean age and sex distribution between the MS patients and control. No significant differences were found in urine ceratinine, UACR and microalbumin values between MS patients and controls. Pearson analysis did not show any significant correlation between EDSS, disease duration and urine ceratinine, UACR, microalbumin (Table 2).

Our study has showed that urine ceratinine, UACR and microalbumin values were not different in the MS patients when compared to healthy controls. There was also no significant association found between EDSS, duration of disease and urine ceratinine, UACR, and microalbumin levels by using Pearson correlation analysis. These findings suggest that there is no relationship between microalbuminuria and MS. Our study suggests that endothelial function seems to be normal in MS.

Previous studies have shown that physical activity can improve vascular function.^{22,23} It is possible that the daily exercise in our patients could have affected the results. Therefore, it is important that future studies should take this into account. Renal function, as assessed by both urine ceratinine and microalbumin values, was not impaired in ambulatory patients with MS as compared with healthy controls. Future more

Table 2: The correlations between EDSS, disease duration and urine ceratinine, UACR, microalbumin

	EDSS		Disease duration	
	r _p	P	r _p	P
Urine ceratinine	0.05	0.75	-0.19	0.27
UACR	-0.15	0.40	-0.13	0.46
Microalbumin	-0.16	0.37	-0.18	0.30

EDSS: Expanded Disability Symptom Scale,

UACR: Urinary albumin creatinine ratio.

comprehensive investigations will be needed to clarify the relationship between MS, renal and endothelial functions.

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