

## Evaluation of the Treatment Processes of Patients with MS and Comparing Liver Function Test Parameters with Healthy Individuals

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### Abstract

Multiple Sclerosis (MS) is a worldwide neurodegenerative disease with an unknown etiology and treatment. Onset time and progression of the disease may be different for every patient. As a result, sex, age, diagnosis time, medication and liver function parameters of a MS patient can be different from a healthy person and also from another patient with MS.

Keywords—*Characteristic features, liver function parameters, multiple sclerosis, statistics.*

### Purpose

To examine characteristic features, diagnosis time, medication, some liver function tests parameters of MS patients and to compare with healthy people.

### Method

Study was conducted with a total of 100 people who conducted to a state hospital in Turkey (Study group:50 MS patient, control group:50 healthy people). General characteristic features of the participants were evaluated. Status of medication usage and type of medication of the study group were examined. Liver function parameters and some analyses of MS patients were compared with healthy subjects and between MS patients according to diagnosis time. Mann Whitney U and Kruskal Wallis tests were applied for evaluations.

### Results

**Table 1. Demographic characters of the individuals**

Variable	Control (n=50)		MS (n=50)		p	
	Mean	±SD	Mean	±SD	n	%
Age (years)	38.9	±10.9	38.4	±9.7		
Average (n:100)	38.7 ± 10.3				0.0825	
<b>Sex</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Female	29	58	38	76	67	67
Male	21	42	12	24	33	33

SD: standard deviation MS: Multiple sclerosis

The ages of the two groups in the study were not statistically different from each other (p=0.0825).

58% of the MS patients and 67% of the participants were female.

**Table 2. Determination of the medication usage and the type of drug used by MS patients (n:50)**

Variable	n	%
<b>Medication usage</b>		
Yes	39	78
No	11	22
<b>Type of medication</b>		
Rebif 22 mg	3	7.7
Rebif 44 mg	6	15.4
Gilenya/Fingya	9	23.1
Tysabri	7	17.9
Betaferon	4	10.3
Copaxone	5	12.8
Other	5	2.8

78% (n:39) of the MS patients were having a regular medication while 23.1% (n:9) of them were using Gilenya/Fingya for reducing of lightening the MS attacks.

**Table 3. Biochemical values of the participants (n:100)**

Variable	Group	Mean ±SD	Median	p
<b>ALT (I/U)</b>	C	22.4 ± 13.2	20.0	<b>0.008*</b>
	MS	16.2 ± 10.0	13.0	
	T	19.3 ± 12.1	16.0	
<b>AST (I/U)</b>	C	21.9 ± 5.9	20.5	0.091
	MS	19.8 ± 6.9	19.0	
	T	20.8 ± 6.5	20.0	
<b>CRP (mg/l)</b>	C	0.8 ± 1.5	0.4	<b>0.005*</b>
	MS	0.2 ± 0.2	0.1	
	T	0.5 ± 1.1	0.2	
<b>ALP (U/l)</b>	C	68.9 ± 23.0	70.0	0.295
	MS	75.0 ± 27.5	71.0	
	T	71.9 ± 25.4	70.0	

C: control group, T: total, MS: Multiple Sclerosis \*: statistical difference Mann Whitney U Test was used to compare the groups.

Average values of ALT, AST, CRP and ALP analyses of survey participants are shown in Table 3. ALT, AST and CRP values of MS patients were lower than healthy controls while average ALP values of MS patients were higher than the

controls. Only ALT and CRP values differed significantly (respectively,  $p=0.008$ ,  $p=0.005$ ).

**Table 4. Comparison of biochemical values according to the diagnosis time of MS patients (n:50)**

Variable	Diagnosis time (years)	Mean $\pm$ SD	Median	p
ALT (I/U)	<1	14.8 $\pm$ 9.4	12.5	0.533
	1-5	20.1 $\pm$ 12.5	17.0	
	>5	15.3 $\pm$ 9.3	13.0	
AST (I/U)	<1	15.0 $\pm$ 4.3	16.0	0.028*
	1-5	21.4 $\pm$ 4.7	20.0	
	>5	20.5 $\pm$ 7.6	19.5	
CRP (mg/l)	<1	0.1 $\pm$ 0.1	0.2	0.118
	1-5	0.2 $\pm$ 0.1	0.2	
	>5	0.2 $\pm$ 0.2	0.1	
ALP (U/l)	<1	66.6 $\pm$ 11.3	70.0	0.810
	1-5	72.1 $\pm$ 16.0	72.5	
	>5	78.0 $\pm$ 32.6	73.5	

\*: statistical difference. Kruskal Wallis Test was used to compare the groups.

Liver function tests and some biochemical parameters of MS patients were variable according to the diagnosis time. The highest value of ALT and AST tests were in patients whose diagnosis time was 1-5 years while the highest value of CRP and ALP tests belonged to patients with diagnosis time of more than 5 years. Only AST value differed significantly between MS patients ( $p=0.028$ ).

**Conclusion**

With an unknown etiology and treatment, MS is an important disease. Health professionals are seeking new methods to find treatment of disease and provide a better life for the patients with MS. While onset time and progression of the disease may be different for every patient, it is important to review biochemical tests regularly.

In this study, demographic characters and liver function tests of the participants, diagnosis time, medication types and liver function parameters according to diagnosis time of the MS patients were evaluated.

Age and sex of the participants were not statistically different. Liver function tests (ALT, AST) and CRP values were lower while ALP values were higher in MS patients. CRP and AST values of MS patients were significantly lower than healthy controls.

AST values were statistically different according to diagnosis times of patients. The difference was important between <1 years and 1-5 years ( $p=0.038$ ), and <1 years and >5 years of diagnosis time ( $p=0.049$ ).

In conclusion, blood samples of the MS patients should be monitored regularly to be aware of the different metabolic processes. Healthy people should also be monitored to be able to interfere in and prevent possible diseases or delay diseases like MS.

**Biography:**

Gülşen Delikanlı Akbay has completed his PhD at the age of 34 years from Hacettepe University and postdoctoral studies from Karadeniz Technical University Faculty of Health Sciences at Turkey. She is a member of Turkish Dietetic Association and working on nutrition sciences and dietetics. She has personal interest on neurology and has papers on nutrition in MS patients. She also has research and review papers on nutrition sciences and community health. Her thesis of master was on infants and mothers about breastfeeding, baby nutrition and mothers' knowledge of child nutrition. Her thesis of doctorate was conducted with healthy people and MS patients. She evaluated and compared general features, dietary habits, biochemistry results and physical performance of participants. She has published papers in reputed journals and attended international nutrition congresses as a speaker and listener.

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