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Original Article

Can blood parameters be guiding in fibromyalgia syndrome?

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Abstract

Aim: The aim of this study was to evaluate MPV (Mean Platelet Volume), NLR (Neutrophil-to-lymphocyte ratio), and PDW (Platelet Distribution Width) values obtained from complete blood count in patients with fibromyalgia syndrome (FMS). In addition, we aimed to investigate the relationship of these parameters with clinical conditions such as disease activity and depression.

Materials and Methods: 91 patients who presented to Gaziantep University Physical Medicine and Rehabilitation department between November 2017 and March 2018 and were diagnosed with FMS according to the 2010 ACR (American Colleague of Rheumatology) criteria, and 33 healthy volunteers were enrolled in this study. Both groups filled out Fibromyalgia Impact Questionnaire (FIQ) and Hamilton Depression Rating Scale (HAM-D). Neutrophil, platelet, lymphocyte count, MPV, and PDW values were recorded from full blood count.

Results: Although NLR was higher in the patient group, there was no statistically significant difference ($p>0.05$). While MPV and CRP values were significantly high, PDW values were significantly low in the patient group ($p<0.05$). As the mean age values of both groups were different, a significant difference was found between the groups in terms of NLR values according to the results of regression model adjusted to age ($p<0.05$).

Conclusion: In our study, we found the NLR and MPV values to be high and the PDW values to be low, and found the NLR values to be associated with depression. The results of this study show that blood parameters can be used in FMS patients.

Keywords: Inflammation; depression; fibromyalgia.

INTRODUCTION

Fibromyalgia syndrome (FMS) is a musculoskeletal disorder with unknown etiology and characterized by chronic widespread pain (1). In addition to chronic pain, comorbidities might include fatigue, anxiety, depression, irritable bowel syndrome; sleep disorder and memory problems (2). The estimated prevalence of FMS is 2% (3).

Although the etiology and pathogenesis of FMS are still unclear, FMS is attributed to several factors such as central and peripheral nervous system, hormonal and immunological disorders, genetic predisposition and psychiatric factors (4,5). A few studies suggest that a low inflammatory process or excessive neurogenic inflammation might play a role in the etiology of FMS (6,7). There are no diagnostic biochemical markers or radiological tests in the diagnosis of fibromyalgia.

In recent years, it has been thought that hemogram parameters have a significant place in the assessment of certain diseases. The Neutrophil-to-lymphocyte ratio (NLR) is one of the few inflammation parameters suggested as a prognostic marker to determine systemic inflammatory response. NLR is an inexpensive and easily available parameter from full blood count. NLR is thought to be a parameter which can be used for diagnosis and prognosis in diabetes mellitus, coronary artery disease, malignancies, and rheumatic conditions such as rheumatoid arthritis and ankylosing spondylitis (8,9).

Mean Platelet Volume (MPV) is an easily obtained parameter from full blood count and indicates the size of platelet produced in bone marrow. Therefore, MPV can be used as an indicator of platelet activation and inflammation (10). Platelet Distribution Width (PDW) is a measure of variation in the size of platelet. PDW shows

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an elevation as the activation of platelet increases. In previous studies, NLR, MPV and PDW were associated with inflammatory diseases (11,12).

The purpose of this study is to examine MPV, PDW, and NLR values of patients with FMS, in whom inflammatory mechanisms also play a role, and to investigate the presence of correlation with clinical parameters such as the severity of disease and depression.

MATERIAL and METHODS

Ninety-one patients who presented to Gaziantep University Physical Medicine and Rehabilitation department between November 2017 and March 2018 and were diagnosed with FMS according to the 2010 ACR (American Colleague of Rheumatology) criteria and 33 healthy volunteers were enrolled in this study. Those who had a known inflammatory disease, acute or subacute infection, hypertension, diabetes, hypercholesterolemia, malignancies, predisposition to thrombosis or bleeding disorders and who were on anticoagulants were excluded from the study.

The socio-demographic data of all patients who participated in the study were asked and recorded. Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein (CRP) values were recorded from patient files. Neutrophil, platelet, lymphocyte count, MPV and PDW values were recorded from full blood count. NLR was calculated with a calculator and noted in the patients' files. Both groups of patients to determine the severity of disease and assess the level of depression, respectively filled out Fibromyalgia Impact Questionnaire (FIQ) and Hamilton Depression Rating Scale (HAM-D). Gaziantep University ethics committee's approval was obtained for the study. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Statistical Analysis

Normal distribution of numerical data was tested by the Shapiro–Wilk test. In the comparison of variants that complied with normal distribution, the Student T-test was used. Multiple linear regression model was used to correct the effect of age. Correlations between categorical variants and correlations between digital variants were tested with the Chi-Square test and the Pearson correlation coefficient, respectively. The SPSS 22.0 package software was used for the analyses. P<0.05 value was accepted as significant.

RESULTS

Ninety-one FMS patients and 33 healthy volunteers were enrolled in the study. Of the patients included in the study, 116 (93.5%) and 8 (6.5%) were female and male, respectively. The mean age was 44.78±11.42 in the patient group, and 40.21±8.4 in the control group (p<0.05). No significant difference was found in terms of gender, BMI (Body Mass Index) and level of exercise between the patient group and control group (p<0.05). The mean FIQ was calculated as 63.88±11.27 in the patient group, and 9.16±9.74 in the control group (p<0.05). HAM-D scores were 12.2±6.13 and 0.94±3.22 in the patient group and control group, respectively (p<0.05).

There was a positive correlation between NLR and HAM-D scores (p<0.05, r=0.242). CRP values and FIQ scores also had a positive correlation (p<0.05, r=0.255). No correlation was found between the other blood parameters and FIQ and HAM-D scores (p>0.05) (Table 3).

Table 1. Comparison of sociodemographic and clinical features of groups

		Patients (n=91)	Control (n=33)	p
Age		44.78 ± 11.42	40.21 ± 8.4	0.018*
BMI**		28.10 ± 5.28	26.91 ± 4.93	0.052
	Female	87	29	
Sex	Male	4	4	0.144
HAM-D***		12.2 ± 6.13	0.94 ± 3.22	0.001*
FIQ****		63.88 ± 11.27	9.16 ± 9.74	0.001*

*: Statistically significant difference
**:Body Mass İndex
***: Hamilton Depression Rating Scale
****: Fibromyalgia Impact Questionnaire

Table 2. Comparison of blood parameters of groups

	Patients (n=91)	Control (n=33)	p
WBC	7.44 ± 2.64 10/L	7.06 ± 1.55 10/L	0.434
PLT	283454 ± 87365	273923 ± 73388	0.545
MPV	9.8 ± 1.36	9.07 ± 1.09	0.008*
PDW	16.39 ± 0.61	14.2 ± 2.56	0.001*
NLR	1.96 ± 0.93	1.66 ± 0.6	0.087
ESR	14.93 ± 8.11	11.67 ± 8.13	0.050
CRP	4.75 ± 3.34	2.91 ± 2.85	0.006*

*: Statistically significant difference

As the mean age values of both groups were different, a significant difference was found between the groups in terms of NLR values according to the results of regression model adjusted to age ($p<0.05$).

DISCUSSION

In this study, we assessed whether NLR, MPV and PDW values differed in FMS patients compared to the control group or not, and the correlation with conditions such as the severity of disease and depression. We found NLR and MPV values to be higher and PDW values to be lower in the patient group than the control group.

FMS is a chronic pain syndrome with unknown etiology and characterized by widespread pain, fatigue and sleep disorder. Many factors are thought to play a role in its etiology. Some studies suggest that inflammatory mechanisms have a role in its pathogenesis. It is thought that neurotransmitter and cytokine levels vary, which might be a potential cause of core symptoms in FMS patients (13,14,15).

NLR appears to be a marker indicating systemic inflammation that can be derived from routine full blood count. It has been shown in several studies that this marker could be used as an inflammation marker and a prognostic factor in inflammatory diseases such as Ankylosing Spondylitis, Rheumatoid Arthritis, Familial Mediterranean Fever as well as coronary artery disease, Diabetes Mellitus and many cancers (9,16,17). Uslu et al. found the NLR values to be higher in patients with Rheumatoid Arthritis than the control group, established a positive correlation with DAS-28 (Disease Activity Score 28) scores and argued that it was a parameter that could be used in monitoring disease activity (8). Akturk et al. compared the NLR values of FMS patients to those in the control group and found NLR to be higher in FMS patients than the control group; however, clinical features such as disease activity and depression level were excluded from the assessment (18). Similarly, we also found NLR of the patient group higher than the control group in our study.

In their study comparing 80 newly diagnosed major depression patients to 91 healthy volunteers, Demircan et al. found NLR to be significantly higher in the patient group. They showed that NLR significantly decreased compared to the baseline after a three-month therapy with Selective Serotonin Reuptake Inhibitor (19). We also detected a positive correlation between HAM-D and NLR scores in FMS patients in our study. Based on our current knowledge, this study is the first trial showing a correlation between NLR and depression in FMS patients. In addition, this suggests that inflammatory mechanisms might play a role in the etiology of depression, which is frequent in FMS.

MPV values, as indicators of platelet size, have been associated with thrombotic processes as well as many inflammatory diseases (20). Higher MPV values are associated with the activation of platelets and increased level of Thromboxane A2. Increased levels of Thromboxane A2 causes a predisposition to thrombosis and atherosclerosis (21). Some studies have shown that cardiovascular disease is higher in FMS patients due to reasons such as a low level of physical activity and low fitness to physical activity compared to healthy controls (22,23). Haliloğlu et al. found the MPV levels to be significantly higher in FMS patients than those in the control group and advocated that MPV could be an indicator of increased cardiovascular risk in FMS (24). However, they did not assess the correlation with conditions such as the severity of disease and depression. In our study, we detected that the MPV values were similarly higher in FMS patients than the control group; however, we did not found any significant relationship between the severity of disease and the MPV values. In addition, we find the PDW values to be significantly higher than those in the control group do. High MPV values and low PDW values in FMS patients could be associated with not only cardiovascular risk but also low-grade inflammation.

CONCLUSION

The lack of a marker or radiological imaging to be used for diagnosis in FMS patients creates various difficulties in diagnosis. In our study, we found the NLR and MPV values to be high and the PDW values to be low and found the NLR values to be associated with depression. These markers are inexpensive and rapid parameters that can be easily derived from full blood count and used routinely. Therefore, it is considered that they can be used in diagnosing FMS patients and in case of comorbidities. Prospective studies are needed to clearly understand the role of blood parameters in the etiology of FMS.

Limitations

The limitations of our study include relatively low number of patients and the fact that the medication conditions of patients who were enrolled in our study were not assessed. Therefore, assessments should be performed with broader patient groups and for newly diagnosed patients before and after medication.

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