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Research article

Mean platelet volume and neutrophil to lymphocyte ratio in Behçet's Disease

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ABSTRACT

Behçet's Disease (BD) is a systemic inflammatory disease. Mean platelet volume (MPV) is a marker of platelet function and the neutrophil to lymphocyte ratio (NLR) is an indicator of inflammation. We investigated the levels of MPV and NLR in patients with BD and healthy individuals.We purposed to investigate the association of NLR and MPV with BD and disease activity.

Twenty-eight patients diagnosed with BD and 28 healthy subjects were enrolled in this study.Blood samples of patients and controls were measured for erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and full blood counts for white blood cells (WBC), MPV and NLR. The MPV levels in patients with BD were significantly higher than controls (p=0.002). The difference in NLR values between patient and control group was not significant (p=0.068). No significant difference was found in the NLR values between the patients with and without active lesions (p = 0.175). Also there was no significant difference in the MPV values between the patients with and without active lesions (p=0.35). There was no correlation between disease duration, disease severity and MPV and NLR values. The MPV levels may be used as an inexpensive and practical diagnostic marker in patients with BD.

Keywords: Behçet's Disease, mean platelet volume, neutrophil to lymphocyte ratio.

INTRODUCTION

Behçet's Disease (BD) is a multisystemic vasculitis characterized by oral ulcers, genital ulcers, uveitis and involvement of many systems. Vascular damage can affect all sizes of venous and arterial vessels. The etiology of BD has not been clarified yet.The disease has been accepted as an autoinflammatory disorder. Blood vessels display a nonspecific inflammatory process. Vasoconstriction, platelet aggregation may contribute to the vascular injury in BD.

Mean platelet volume (MPV) is an indicator of platelet activity and it has been shown to be associated with inflammation severity related with large or small sized platelets.MPV has beendefined as a risk factor for athero- thrombotic diseases.

Recently, neutrophil to lymphocyte ratio (NLR) has become popular as a marker to determine inflammation. NLR has been used to be a predictor for coronary artery disease, peripheral artery diseas and cancers.

Since BD is an inflammatory disorder, MPV and NLR values may be changed in patients with BD. The aim of our study is to analyze the association of NLR and MPV with BD and disease activity [1, 2].

MATRIALS AND METHODS

We enrolled 28 patients with BD who fulfilled the International Study Group (ISG) (10) criteria and a further 28 age- and sex-matched healthy subjects as the control group. Subjects with diabetes mellitus, hypertension, heart failure, previous history of coronary artery disease, liver failure, acute and chronic kidney failure, vitamin B12 and folate deficiency, antihypertensive drugs, lipid-lowering drugs, aspirin, oral contraceptive, hormone, vitamin usage and any other chronic inflammatory disease were excluded from the study.

All patients participating in the study provided written consent. The institutional ethics committee approved the study protocol.

BD patients were divided into two subgroups; those with active and those without active lesions. The presence of oral ulcer, genital ulcer, skin lesions, ocular lesions, arthritis, active major vessel disease or active major organ involvement was considered as active disease. The patients showing no lesions for at least 30 days were considered as being in the inactive stage. The disease severity score was calculated for patients in the active stage [3].

Blood samples of patients were measured for erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and full blood counts for white blood cells (WBC), MPV and NLR.

Data analysis was performed using SPSS for Windows (ver.17.0; SPSS Inc.,Chicago, IL, USA). The distribution of continuous variables were examinedfor normality based on the Kolmogorov- Smirnov tests. The data are shown as means ± standard deviation for continuous variables, medians (minimum–maximum) for ordinal variables, and frequencies with percent for categorical variables. The categorical variables were compared among groups using the chi-square test. Comparisons among the groups were performed using independent sample t- tests or Mann-Whitney U test for normally and abnormally distributed data, respectively. The relationship between disease duration, severity and other continuous variables were analyzed with Spearman analysis. A p-value of 0.05 was considered statistically significant [4, 5].

RESULTS

The study included 28 patients (18 females, 10 males) with BD and 28 healthy persons (21 females, 7 males). The average age in the patient group was 34.85 ± 9.65 years; in the control group it was 31.53 ± 5.10 years. The patients with BD and healthy persons were matched according to age and sex (p=0.115, p=0.383, respectively).

MPV values were found to be elevated significantly in patient group compared to the control group(p=0.002). Also, there was a significant difference between the patient and control group in terms of CRP and ESR (p=0.000, p=0.005, respectively); but the difference in NLR, WBC, neutrophil and lymphocyte values was not significant

In the patient group, no significant difference was found in the NLR values between the patients with and without active lesions (2.35 ± 0.81 vs. 2.81 ± 0.92, respectively; p = 0.175). Also there was no significant difference in the MPV values between the patients with and without active lesions (9.20 ± 1.24 vs. 9.71 ± 1.67, respectively; p=0.35).

There was no correlation between disease duration, disease severity and MPV and NLR values. In the patient group a positive correlation was found between ESR and CRP, and a negative correlation was found between disease severity and onset of disease (r=0.530, p=0.004; r=-0.409, p=0.031, respectively) [6-7].

DISCUSION

T cells and polymorphonuclear leukocytes are shown within vasculitic reaction in BD. Activated leukocytes are thought to participate in vascular injury in BD.Increased serum levels of von Willebrand factor, plasminogen activator inhibitor-1 and thrombomodulin in patients with BD support the vascular disorder. Although acute phase proteins, cytokines, immunoglobulins, complement levels,

Table 1: Characteristics of patientswith BD

Characteristics	**BD** (n=28)	**Controls** (n=28)	***p***
Age, yr	34.85 ± 9.65	31.53 ± 5.10	0.115
Male, no(%)-female, no(%)	10 (%35.7)-18 (%64.3)	7 (%25)-21 (%75)	0.383
Onset age of disease, yr	26.96±8.03		
Disease duration, months	66 (12-312)		
Disease severity score	1 (1-6)		

Table 2: Laboratory Parameters in Patients and Control Groups

	BD	**Controls**	***p***
WBC (K/uL)	7.86±2.30	7.31±2.12	0.352
Neutrophil(K/uL)	4.87(2.61-9.50)	4.25(0.70-10.30)	0.098
Lymphocyte(K/uL)	2.117±0.581	2.135±0.718	0.921
NLR	2.71 (0.97-4.66)	2.03 (0.24-15.13)	0.068
MPV (fL)	9.15 (7.50-12.40)	8.15 (5.02-12.20)	0.002
ESR (mm/h)	16.50 (1.00-107.00)	8.00 (1.00-36.00)	0.005
CRP (mg/L)	5.25 (0.32-75.30)	0.20 (0.00-22.00)	0.000

lymphocytes,thrombogenic markers, cell surface markers can be used as an indicator of activity of BD, there is no specific method of assessing disease activity.

NLR was presented as a new biomarker to detect systemic inflammation. It has been demonstrated that NLR may be a marker for inflammation in many diseases such as atherosclerosis, diabetes mellitus, metabolic syndrome, myocardial infarction and psoriasis. In the study of Alan et al. NLR values were significantly higher in patients with BD, but there was no correlation between NLR values and disease severity. In the study of Öztürk et al. NLR values in the patient group were significantly higher than in the control group. In addition, NLR was higher in patients with active lesions than in those without active lesions. In the study of Rifaioglu et al. NLR was found higher in patients with active BD compared to healthy individuals and those without active lesions. In the study of Akkurt et al. NLR values were investigated in patients with BD and uveitis. NLR was

significantly higher in patients with BD compared to the control group. Also NLR values were significantly higher during the attack than the post- attack period. In the study of Özuğuz et al. NLR was determined higher in the patient group and NLR was significantly higher in the active period of the disease. In our study, NLR values in the patient group were higher than the control group, but the difference did not reach statistical significance. Also no significant correlation was found between disease activity, disease severity and NLR values. These results suggest that NLR may not be a reliable indicator of inflammation in BD MPV has been accepted as an indicator of proinflammmatory and prothrombotic states. Cardiovascular diseases, cerebrovascular diseases, chronic inflammatory disorders,even age, gender may alter MPV values. In the study of Ekiz et al., Özuğuz et al. and Acikgoz et al. MPV levels were significantly higher in patients with BD than the control group, but thedisease activity did not have a significant impact on the levels of MPV In the study of Alan et al. no significant difference was found between BD and the control group in terms of MPV. In the patient group, the levels of MPV in patients with severe disease were significantly higher than the patients with mild disease, but there was no correlation between the severity score of BD and MPV. In the study of Balta et al. MPV levels were higher in patients with BD than the control group. In the same study MPV levels correlated positively with arterial stiffness that is accepted as a marker of subclinical atherosclerosis. In our study MPV values were found to be significantly high in the patient group compared to the control group in line with findings in most of the previous studies. But we could not find positive correlation with disease severity and MPV levels, also there was no significant difference in MPV levels between BD with and without active stage. Our results support that MPV may be a marker of inflammation and thrombotic tendency seen in patients with BD.The lack of correlation between disease activity/tgseverity and MPV may cause from the lower disease severity score of our patients.

In our study the acute phase reactants, CRP and ESR values were significantly higher inpatient group compared to the control group. It has been thought that CRP is an inflammatory marker and may directly reveal endothelial dysfunction (24, 25). So, these results improve the reliability of our study.

In conclusion, we evaluated MPV and NLR, inexpensively and easily obtained from complete blood counts in our study. NLR was not found to be significantly high contrary to the studies in the literature. According to our results, NLR may not be a reliable marker of inflammation in BD. But MPV values were significantly higher in the patient group than in the control group. MPV may be a practical and cheap indicator of inflammation, even atherothrombosisin BD.

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