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Original Article

Evaluation of neutrophil-to-lymphocyte ratio, platelet-to-lymphocyte ratio and mean platelet volume in patients with lichen planus

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Abstract

Aim: In recent years, neutrophil / lymphocyte ratio (NLR), platelet / lymphocyte ratio (PLR) and mean platelet volume (MPV) has been shown to be important indicators of systemicinflammation. Studies have shown that NLR and PLR are higher and that MPV is lower in lichen planus patients compared to the control group. In this study, NLR, PLR and MPV values of lichen planus patients were calculated and investigated whether these parameters were related to nail and oral mucosal involvement.

Material and Methods: Eighty one patients with lichen planus without any systemic, infectious and autoimmune disease were included in this study while 81 patients who were admitted to the outpatient clinic for any non-inflammatory condition and whom had blood picture were included in the study as control group.

Results: There was no statistically significant difference between neutrophil count, lymphocyte count, leukocyte count, platelet count, NLR and PLR values in LP patients and control group ($p > 0.05$). MPV value of LP patients had a mean of 8.10 ± 1.40 , and controls had a mean of 7.21 ± 1.45, and the difference was statistically significant ($p < 0.001$). There wasn't statistically significant relationship between neutrophil count, lymphocyte count, leukocyte count, platelet count, NLR, PLR and MPV values and nail and oral mucosa involvement ($p > 0.05$).

Conclusion: It can be concluded that NLR and PLR were not suitable parameters to show inflammation in LP. The significant higher values of MPV in LP patients suggests that it may be used as a better marker of inflammation in LP patients than NLR and PLR. Nevertheless, the lack of significant association of MPV with nail involvement and oral mucosal involvement may restrict clinical use of it in LP.

Keywords: Lichen Planus; Mean Platelet Volüme; Neutrophil-To-Lymphocyte Ratio; Platelet-To- Lymphocyte Ratio.

INTRODUCTION

Lichen planus (LP) is a papulosquamous skin disease with different clinical types. Although the etiopathogenesis of LP is not fully known, it is thought to be a T-cell mediated autoimmune disease (1-4). In LP, levels of cytokines such as TNF alpha and IL-10 are increased in cutaneous lesions and serum (5). These cytokines, which play a role in LP pathogenesis, are thought to be associated with chronic inflammation (6,7).

In recent years, neutrophil / lymphocyte ratio (NLR), platelet / lymphocyte ratio (PLR), and mean platelet volume (MPV) have been shown to be important indicators of systemic inflammation (8-11).

Studies have shown that NLR and PLR are higher (5,12) and MPV is lower (13) in lichen planus patients compared to the control group. In this study, NLR, PLR and MPV values of lichen planus patients were calculated and investigated whether these parameters were related to nail and oral mucosal involvement.

MATERIAL and METHODS

Eighty one patients with lichen planus who were followed up at the Department of Dermatology of Dicle University between January 2010 and December 2017 and 81 control subjects who were admitted to outpatient clinic for any

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reason except inflammatory skin disease and who had no systemic inflammatory disease were included in this study. Gender, age, lymphocyte count, leukocyte count, neutrophil count, platelet count, NLR, MPV and PLR values were recorded for both patient and control group. Nail involvement and oral mucosal involvement were retrospectively reviewed from patients' records.

Complete blood counts were calculated by Cell-Dyn 3700 (optical scatter laser method, Abbott Diagnostics, Chicago, USA). NLR value is calculated by dividing the neutrophil count by the lymphocyte count, while PLR value is calculated by dividing the platelet count by the lymphocyte count.

Patients with other inflammatory skin diseases, cardiovascular disease, gastrointestinal disease, renal disease, malignancy, pregnancy, diabetes mellitus (DM), autoimmune, infectious and inflammatory diseases were not included in this study. Patients with white cell count <4x10³> 11x10³ were excluded.

For the study, ethics committee numbered 180 and dated 18.05.2018 was approved by the ethics committee of Dicle University Medical Faculty Hospital.

The normal distribution assumption of the data was tested by the Shapiro-Wilk test. Student's t test was used to compare mean values of two groups. Hypotheses are two-sided and a p value <0.05 is accepted as statistically significant. SPSS 21.0 for windows (SPSS Inc. Chicago, IL, USA) software is used for statistical analyses.

RESULTS

In our study, there was no statistically significant difference between patients with LP (40 males, 41 females; mean ± ss age 33.2 ± 10.7) and control group (37 males, 44 females; mean ± ss age 33.5 ± 10.2) in terms of gender and age. (p> 0.05). Eleven (13.6%) LP patients had nail involvement and 13 (16%) patients had oral mucosal involvement.

There was no statistically significant difference between neutrophil count, lymphocyte count, leukocyte count, platelet count, NLR and PLR values in LP patients and control group (p> 0.05) (Table 1).

Table 1. Inflammatory parameters of lichen planus patients and healthy controls

	Lichen planus (n: 81)	Healthy controls (n: 81)	P value
Leukocyte count (mean ± SD)x10³	7.79±1.82	7.78±1.63	0.951
Neutrophil count (mean ± SD)x10³	4.43 ±1.27	4.0±1.28	0.905
Lymphocyte count (mean ± SD)x10³	2.55±7.41	2.47±8.59	0.359
Platelet count (mean ± SD)x10³	280±59	267±63	0.118
NLR (mean ± SD)	1.85±0.70	1.98±0.95	0.479
PLR(mean ± SD)	118.87±40.84	120.04±52.75	0.569
MPV(mean ± SD)	8.10±1.40	7.21±1.45	<0.001

NLR: Neutrophil / lymphocyte ratio, PLR: Platelet / lymphocyte ratio, MPV: Mean platelet volume

MPV value of LP patients had a mean of 8.10 ± 1.40 , and controls had a mean of 7.21 ± 1.45, and the difference was statistically significant (p <0.001). (Table 1).

There wasn't statistically significant relationship between neutrophil count, lymphocyte count, leukocyte count, platelet count, NLR, PLR and MPV values and nail involvement and oral mucosa involvement (p> 0.05).

DISCUSSION

LP is seen all over the world and in all races but the incidence varies according to geographical regions. The estimated prevalence of LP in the world is reported to range from 0.22% to 5%. Although LP is an inflammatory process, etiology and pathogenesis are not yet fully understood (14,15). LP is thought to be a T-cell mediated inflammatory tissue reaction leading to a cytotoxic reaction to epithelial basal cells (16-19).

Neutrophils and lymphocytes are important blood cells involved in the inflammation process.Neutrophils initiate the first line of defense in systemic inflammation. Lymphocytes constitute the regulatory and protective component of inflammation (20). LP patients have intense lymphocytic inflammation in the skin, so it has been reported that lymphocyte clustering from the blood system may lead to lymphocyte reduction in patients with LP (12). Yamamoto et al. have shown that both lymphocyte and neutrophil functions are impaired in oral LP (21).

In our study, there was no difference between the LP patients and the control group in terms of neutrophil count and lymphocyte count. In addition, there was no statistically significant relationship between neutrophil count and lymphocyte count in LP patients and oral mucosa and nail involvement.

NLR is an easy to calculate and highly cost-effective inflammatory parameter that is obtained by dividing the neutrophil count by the number of lymphocytes. In recent years, NLR has become an easy and practical method of providing valuable information in the diagnosis of various diseases and in determining its prognosis (22). NLR has been shown to be increased in many diseases lead to inflammation, such as metabolic syndrome, hypercholesterolemia, diabetes mellitus, hepatic cirrhosis,psoriasis vulgaris,psoriatic arthritis, cardiovascular diseases and malignancies, which are common in the community (11,23-26).

In studies done by Atas et al. (12) and Ertem et al. (5) NLR values were found to be significantly higher in patients with LP compared to the control group. It has been shown that cytokines such as TNFα and IL-4, IL-6, which are associated with chronic inflammation and are known to increase in cutaneous lesions and serum in LP patients, cause NLR to rise (5,12). In the study conducted by Ozlu et al., There was no statistically significant difference between the LP patients and the healthy controls in terms of NLR values (13).

In our study, there was no difference in NLR values between

patients with LP and healthy controls. In addition, there was no statistically significant relationship between NLR values and nail involvement and oral mucosal involvement.

Platelets are discoidal cells with an average length of 1-2 μm and an average life span of 8-10 days.Apart from hemostasis, platelets also play an important role in angiogenesis, inflammation, allergic reactions, repair and regeneration of tissues and release chemokine and cytokines that produce a strong inflammatory response (27,28). PLR is an easily calculated and low cost parameter obtained by dividing the platelet count by the number of lymphocytes.In recent years, it has been reported that the PLR value can be used as an indicator of inflammation (29).

In the study performed by Ertem et al., PLR values were significantly higher in patients with LP compared to the control group (5). However, in the study conducted by Ozlu et al, there was no statistically significant difference between LP patients and healthy controls in terms of PLR values (13). In our study, there was no difference between LP patients and healthy controls in terms of PLR values. In addition, there was no relationship between PLR values,nail and oral mucosal involvement

MPV is the most common measure of the platelet size and since the large platelets are more active in metabolic and enzymatic terms, it is regarded as in vivo indicator of platelet's reactivity (30). Recently, it is reported that MPV reflects function and activation of platelets and acts as an indicator of inflammation in many inflammatory diseases (30,31).

In the study performed by Ozlu et al., MPV values were lower in healthy controls than in LP patients (13). In our study, MPV values were higher in LP patients than in healthy controls. However, there was no statistically significant relationship between nail involvement and oral mucosal involvement and MPV values.

CONCLUSION

In conclusion, there was no difference between NLR and PLR values between patients with LP and healthy controls. In addition, there was no relationship between NLR and PLR values and nail involvement and oral mucosal involvement. The significant higher values of MPV in LP patients suggests that it may be used as a better marker of inflammation in LP patients than PLR and NLR. Nevertheless, the lack of significant association of MPV with nail involvement and oral mucosal involvement may restrict clinical use of it in LP.

Competing interests: The authors declare that they have no competing interest.
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