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Original Article

Evaluation of changes in neutrophil-lymphocyte ratio and platelet-lymphocyte ratio in patients with vitiligo

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Abstract

Aim: Vitiligo is an acquired disease with loss of melanocytes, etiology of which is unclear. The aim of this study is to determine the role of systemic inflammation in vitiligo by measuring the Neutrophil-Lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR) markers included in routine hemogram test, in patients with vitiligo.

Material and Methods: The study was carried out by reviewing the data of patients who applied to İnönü University Faculty of Medicine Dermatology Polyclinic and diagnosed with vitiligo after Wood's lamp examination, between July 2012 and February 2018. The study was performed retrospectively by reviewing patient files and ethics committee approval was not obtained.

Results: A total of 170 individuals including 79 vitiligo patients and 91 healthy individuals were included in the study. When the vitiligo patients and healthy control group were compared in terms of routine hemogram parameters, statistically significant differences were found in terms of erythrocyte distribution width (RDW), but there were no statistically significant differences in terms of NLR, PLR, lymphocyte, neutrophil, platelets and White bloodcell (WBC) counts.

Conclusion: In our study, only RDW value was found to be higher in patients with vitiligo compared to healthy controls, and no difference was found in other parameters indicating systemic inflammation.

Keywords: Vitiligo; Platelet-Lymphocyteratio; Neutrophil-Lymphocyteratio; erythrocyte distribution width.

INTRODUCTION

Vitiligo is an acquired depigmentation disorder of the skin, developed due to loss of melanocytes. The prevalence is 1-4% worldwide and there is no difeerence between the sexes (1). In 50% of the patients, lesions begin before the age of 20 years and there is familial predisposition (2).

In vitiligo usually symmetrical and bilateral hypopigmented patches of chalk white are seen. It affects the psychosocial life of patients, reduces the quality of life and can cause stigmatism, especially due to the involvement of the face, lips, hands, feet and genitals. Etiology of the disease is unclear, but autoimmune, genetic, biochemical factors, and neural mechanisms are thought to involve in the pathogenesis (3).

Neutrophil-lymphocyte ratio (NLR), Platelet-lymphocyte ratio (PLR) , erythrocyte distribution width (RDW) and platelet number were investigated in various dermatological diseases as parameters indicating inflammation and have been associated with disease activity (4), prognosis (5), and disease spread. However, to our knowledge, although many expensive inflammatory markers which are not easily available were investigated, there is no study investigating NLR and PLR in vitiligo patients.

The aim of this study is to investigate the differences between vitiligo patients and healthy controls in terms of NLR and PLR which are easily available, cheap and fast inflammation markers included in a routine hameogram test.

MATERIAL and METHODS

The study was carried out by reviewing the data of the patients who admitted to Inönü University Faculty of Medicine Dermatology outpatient clinic were diagnosed with vitiligo after detailed clinical examination and Wood's

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lamp examination, between July 2012 and February 2018. The patients who were diagnosed with vitiligo and aged between 18 and70 years were included in the study. Patients who had autoimmune or inflammatory diseases such as DM, thyroid , rheumatological diseases, coronary diseases, those with active or chronic infection or those with malignancies, patients using non-steroidal or immune suppressive medications, pregnant women, and the obese ones were excluded from the study. The control group consisted of healthy individuals who admitted to our hospital for check-up purposes and do not have any systemic diseases. The study was conducted by reviewing patient files retrospectively and no ethical committee approval was obtained.

Statistical analysis

The data were evaluated by using IBM Statistical Package for the Social Sciences SPSS version 25.0. The normal distribution of the numerical variables was tested by Shapiro-Wilk(N<50) and Kolmogorv-Smirnov(n>=50) tests. Numerical variables were expressed as mean and standard deviation and median(min-max). Categorical variables were given as numbers and percentages. Since compliance with normal distribution was verified, Mann-Whitney U test was used. Chi-square test was used for categorical variables. A value of p<0,05 was considered significant for all tests.

RESULTS

A total of 170 subjects including 79 vitiligo patients and 91 healthy individuals were included in the study. The study group consisted of 28 female and 51 male patients and the control group consisted of 61 female and 30 male individuals. The mean age of the patient group was 30.03 (18-70) years and the mean age of the control group was 33.82 (20-63) years. There was no statistical difference between the groups in terms of age distribution (p: 0.075), but there was a statistical difference in terms of gender distribution (p: 0.001). The distribution of age and gender of the groups are shown in Table 1.

Table 1. The distribution of age and gender of the groups

	Gender		Age
	Female	Male	
Study Group	28	51	30.03 (18-70)
Control Group	61	30	33.82 (20-63)
p	0.001		0.075

The mean RDV value of the patient group was statistically significantly higher than the control group. There were no significant differences between the groups in terms of the mean NLR, PLR, lymphocyte, neutrophil, platelet, and WBC values. The mean values of RDV, NLR, PLR, lymphocyte, neutrophil, platelet, and WBC according to the groups are given in Table 2.

Table 2. The mean values of RDV, NLR, PLR, lymphocyte, neutrophil, platelet, and WBC according to the groups

	Vitiligo (n: 79)	Control (n=90)	p
	Median (±SD)	Median (±SD)	
RDW	13.40 (0.10)	12.95 (0.08)	0.001
NLR	1.56 (0.06)	1. 73 (0.05)	0.154
PLR	108.65 (3.71)	114.30 (3.20)	0.402
Lymphocyte	2.87 (0.13)	2.46 (0.06)	0.007
Neutrophil	4.09 (0.16)	4.03 (0.09)	0.710
Platelet	289.45 (8.28)	270.24 (5.83)	0.117
WBC	8.06 (0.24)	7.29 (0.13)	0.08

DISCUSSION

The etiology of vitiligo disease has not been fully explained, but genetic, autoimmune, biochemical, and neural factors are thought to play a role in the pathogenesis (1). Immune dysregulation, catecholamine mediated cytotoxicity, and oxidative stress are thought to cause melanocyte destruction (2). The release of catecholamine caused by stress leads to vasoconstriction and the formation of oxygen radicals and this leads to melanocyte destruction. The presence of IG G and IG M type antibodies against melanocytes and the increase of T cells, langerhans cells and macrophages around the lesion in the immunohistochemical tests suggest that autoimmune mechanisms play a role in etiopathogenesis. The benefit of immunosuppressive treatments in patients supports this theory (3).

The NLR ratio which is obtained by dividing the number of neutrophils by the lymphocyte count and the PLR ratio which is obtained by dividing the number of platelets by lymphocytes are cheap, easily available, and safe parameters that can be used as markers of inflammation in several diseases. The NLR and PLR values have been found almost always high in rheumatic diseases, inflammatory diseases, malignancies, and coronary diseases (6). The primary function of the platelets is providing hemostasis. In addition, the interaction between the platelets and endothelial cells, leukocytes, and progenitor cells lead to the migration of inflammatory cells into lesion sites, release of inflammatory cytokines and contribute formation of an inflammatory environment (7). Red cell distribution (RDW) is a parameter that describes the difference in the size of red blood cells. RDW has been considered to be an inflammatory parameter in any diseases. In addition, the increase in RDV has been associated with poor prognosis, especially in cardiovascular diseases (8).

In our study, we found a significant difference between the RDW values of the study group and the control group. There were no significant differences between the NLR, PLR, lymphocyte, neutrophil, platelet and WBC values of the patients and the control group.

These inflammatory parameters have been studied in

many dermatological and systemic diseases. In a study conducted on patients with psoriasis, NLR, PLR and mean platelet volume were found to be higher in patients in comparison to the healthy controls. However, no correlation between these inflammatory parameters and severity of disease, joint involvement, and nail involvement with these parameters was determined. Therefore, they concluded that these parameters were not adequate for evaluation of psoriasis (7).

In another study conducted on patients with acute urticaria, chronic urticaria and healthy controls, it was found that NLR was significantly higher in patients with acute urticaria in comparison to the control group. It was also found that the mean NLR value was higher in the chronic urticaria group in comparison to the control group. The mean RDW values were higher in the acute and chronic urticaria groups in comparison to the control groups, whereas no significznt difference was found between the acute urticaria and chronic urticaria groups. There was no difference in platelet count, lymphocyte count and PLR ratio between the acute and chronic urticaria groups and the control group (9). In a study on patients with alopecia areata, there was no significant difference between patients with alopecia areata and healthy control group in terms of NLR values and it was concluded that NLR was not a useful marker for patients with alopecia areata (10).

There is no consensus in the literature about these inflammatory parameters. Although these parameters are elevated in many inflammatory diseases, several inflammatory diseases in which these parameters are not elevated have been reported. In our study, only the mean RDW value was found to be higher in patients with vitiligo in comparison to the control group, whereas no significant differences were found between the groups in terms of other parameters showing systemic inflammation. These limited data suggest that there is no systemic inflammation in vitiligo. There is a need for studies including larger number of patients in order to conclude whether inflammation is limited only to the skin or any systemic inflammation is present in patients with vitiligo. In case of presence of a systemic inflammation, co-morbidities that may accompany the disease will also gain importance.

CONCLUSION

In our study we conducted on limited number of patients, we found that only the mean value of RDW was higher in the study group in comparison to the healthy controls. There is a need for studies including larger number of patients in order to conclude whether inflammation is limited only to the skin or any systemic inflammation is present in patients with vitiligo.

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