

Neutrophil/Lymphocyte And Platelet/Lymphocyte Ratios In Systemic Lupus Erythematosus

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ABSTRACT

Systemic lupus erythematosus (SLE) can affect all organs and tissues in the organism. SLE shows systemic involvement and its etiology is not fully known. This study aimed to examine the neutrophil-lymphocyte ratio (NLR) and platelet-lymphocyte ratio (PLR) values, which are thought to have a possible effect of systemic inflammation in SLE. The study consists of patients admitted between 01.01.2019 and 30.06.2020. The data used in the study were obtained retrospectively through the hospital information management system (HIMS). To the control group; Those with diabetes mellitus, rheumatic disease, those diagnosed with cancer, those with a chronic disease, those with active infection and those with any allergic disease were excluded. Of the 49 SLE patients who met the study criteria, 5 (10%) were male and 44 (90%) were female. The mean age of the patients was 36.33 ± 7.84 years. In the control group, 6 (12%) of 49 cases were male and 43 (88%) were female. The mean age was determined as 37.69 ± 6.67 . The NLR of the SLE patients was 2.09 ± 1.21 , while the PLR was 147.58 ± 36.99 , the NLR of the control group was 1.81 ± 0.99 , and the PLR was 103.61 ± 22.69 . When compared with the control group, NLR and PLR values of the patient group were determined ($p < 0.039$) and ($p < 0.043$), respectively, and it was found to be statistically significant. It was determined that there was an increase in NLR and PLR values in SLE patients. The test parameters we examined show that they are important in the diagnosis and follow-up of SLE.

Keywords: *Systemic lupus erythematosus, neutrophil lymphocyte ratio, platelet lymphocyte ratio*

INTRODUCTION

SLE can affect all organs and tissues in the body. Its etiology is not fully known. It is an autoimmune disease with systemic involvement. Clinical and laboratory findings vary. SLE is usually seen in women of young reproductive age. The disease is seen at an early age and is often diagnosed between the ages of 15-35. The prevalence of the disease varies between 4-250/100.000 (Sofulu et al., 2017). In those with genetic predisposition, some viral infections, hormonal changes, smoking and environmental factors can trigger autoimmune response. The disease has a chronic course, with periods of activation and remission (Tsokos, 2012). Epstein Barr virus (EBV) has been the most accused virus due to the data obtained among viral agents. The prevalence of EBV infection among viral infections seen in the world and its persistence throughout life after the infection has been suggested to be a risk factor for the development of SLE. It is thought that the basic pathology seen in tissues and organs in SLE develops due to damage caused by autoantibodies and immune complexes (Esen and İnanç, 2005). It has been stated that ultraviolet rays, foods and drugs are among the most important environmental factors affecting the pathogenesis of SLE (Huggins et al., 2005). SLE patients are lost in the early stages due to infections. Late deaths are usually due to atherosclerotic diseases. It has been reported that women with SLE under the age of 55 have a 5-8 times higher risk of coronary artery disease when compared to the general population (Er, 2013). SLE is an autoimmune disease that is most commonly seen in women and especially in those of childbearing age (Manzi, 2003). The disease usually begins between the ages of 20-40. The age of onset is seen at an early age in women and is lower than in men. It differs according to the races that change with the geographical location. The female-male ratio is 2:1 in children and those with advanced age onset. In reproductive periods, it can reach up to 12:1 (McCarty, 1995).

The increase in neutrophil counts is a parameter that shows the response to systemic inflammation. The decrease in

lymphocyte counts are the parameters showing that the cellular immunity is insufficient in general. The ratio of the parameters to each other shows the insufficiency of the cellular immune response against the infectious event despite the severity of the infection. It has been reported that the neutrophil-lymphocyte ratio (NLR) is an indicator of the immune response capacity in infected patients. NLR indicates a poor prognosis. This is due to the fact that the predominance of neutrophils can suppress cytotoxic T cells. It shows that NLR values increase when infection, especially sepsis, is present and the prognosis of the disease worsens (Faria, Fernandes and Silva, 2016).

Platelets are produced in the bone marrow and are the most important blood elements that play a role in coagulation. Besides coagulation, platelets secrete very important mediators for infectious agents. These mediators secreted by platelets play a role in the process of chemotaxis and phagocytosis. In addition to these effects, platelets also regulate inflammatory cell movements. In cases where the production of platelets in the bone marrow is absent or insufficient, it causes a delay in the migration of leukocytes to the inflammation area. These tasks it undertakes show that the functions of platelets are very important (Yeaman, 2014), (De Stoppelaar et al., 2014). There is no study investigating NLR and PLR in SLE patients. Therefore, this study is the first study conducted in SLE patients and aims to reveal NLR and PLR in SLE patients.

MATERIALS AND METHODS

Ethical Approval

For this study, permission was obtained from the Sakarya University Training and Research Hospital Ethics Committee with the letter dated 29/01/2021 and numbered E.6051, and the Helsinki Declaration criteria were taken into consideration.

Sample Preparation

The data of the patients included in the study consisted of those who applied between 01.01.2019 and 30.06.2020 and were diagnosed with SLE. Patient data were obtained from HIMS. Of 49 SLE patients, 5 were male and 44 were female. The control group consisted of 49 healthy individuals, 6 men and 43 women. To the control group; Those with diabetes mellitus, rheumatic disease, cancer diagnosis, chronic disease, active infection, and any allergic disease were excluded. In our study, the relationship and differences between the patient group and the control group were investigated.

Hematological Analysis

Neutrophil, platelet and lymphocyte parameters of the patient and control groups were analyzed on the CELL-DYN 3700 (ABBOTT, USA).

Statistical analysis

SPSS 20.0 (SPSS, Chicago, USA) was used for the statistical analysis of the data in this study. Student's t test was used for comparisons between the patient group and the control group. The data of the patient and control groups were accepted as mean \pm standard deviation, and $p<0.05$ values were considered significant in all of the results.

RESULTS

Of the 49 SLE patients included in the study, 5 (10%) were male and 44 (90%) were female. The mean age of the patients was 36.33 ± 7.84 years. In the control group, 6 (12%) of 49 cases were male and 43 (88%) were female. The mean age is 37.69 ± 6.67 . NLR of SLE patients was 2.09 ± 1.21 and PLR was 147.58 ± 36.99 . NLR of the control group was 1.81 ± 0.99 , PLR was 103.61 ± 22.69 . When compared with the control group, NLR and PLR values of the patient group were determined ($p<0.039$) and ($p<0.043$), respectively, and it was found to be statistically significant. (Table 1).

Table 1. Data of the patient and control groups

	Patient (n=49) (Mean \pm SD)	Control (n=49) (Mean \pm SD)	p
Age	36.33 ± 7.84	37.69 ± 6.67	>0.854
Hb (gr/dl)	12.99 ± 1.09	13.09 ± 1.33	>0.849
Htc (%)	38.09 ± 2.67	39.21 ± 2.39	>0.796
Erythrocyte (M/uL)	4.77 ± 1.09	5.84 ± 1.62	>0.910
NLR	2.09 ± 1.21	1.81 ± 0.99	<0.039
TLR	147.58 ± 36.99	103.61 ± 22.69	<0.043

Hb: Hemoglobin, Htc: Hematocrit, NLR: Neutrophil Lymphocyte Ratio, TLR: Platelet Lymphocyte Ratio

DISCUSSION

Clinical and laboratory findings in SLE patients are very diverse and variable. It is one of the autoimmune connective tissue diseases that affect organs and systems, the etiology of the disease is unknown, accompanied by immunological disorders (Sofulu et al., 2017). Neutrophils, lymphocytes and platelets show changes in blood levels in cases of inflammation. These blood cells are widely used in clinics and can be measured from peripheral blood and are parameters that are easy to access. Today, it is used in many infectious diseases as well as in tumoral formations (Özjin, 2020). A correlation was found between the increase in NLR values and the increase in mortality (Bhat, 2013). Studies have shown an increase in NLR values in infectious diseases, as well as in patients with Bell's palsy and cardiovascular system diseases (Bucak et al., 2014). In studies conducted on diabetics, significant increases in NLR values were reported between the patient group and the control group (Shiny et al., 2014). NLR and PLR values were found to be high in patients with colorectal carcinoma, which is among the

malignant diseases and has an important place among the causes of mortality. It has also been reported that these high values may be a biomarker in patients with colorectal carcinoma (Oflazoğlu et al., 2017). NLR values were found to be high in patients with another malignant disease, pancreatic cancer, and it was found that patients with increased NLR values had a poor prognosis and reduced survival (Demirci and Erdem, 2017). NLR and PLR values were found to be high in 77 rheumatoid arthritis patients (Kılıç et al., 2016). In a study conducted in patients with nasal polyps, NLR and platelet values were shown to be high (Atan et al., 2015). It has been reported that the NLR values of those who have COVID-19 infection and who are hospitalized are higher (Harbalioğlu, Genc and Yıldırım, 2020). Elevated PLR may reflect increased platelet activation, which has been implicated in the pathogenesis of diabetic complications. Activated platelets can release proinflammatory mediators and growth factors that may contribute to nerve damage and impaired regeneration in diabetic neuroathy (Özjin, Yazar and Mundan, 2022). NLR and PLR values of 131 ulcerative colitis patients followed in clinics were found to be high (Kamış, Çetin, Ugar, and Beyazit, 2020). Studies conducted in diabetics with microvascular complications have shown that NLR and PLR values are high (Şiranlı, 2019). In a study, it was reported that NLR and PLR values were high in Sjögren's patients (Özjin, 2021). Platelets are blood cells synthesized in the bone marrow and involved in coagulation. Thrombocytosis is seen in some types of cancer. The same situation is observed in coronary artery diseases, infectious diseases and peripheral vascular diseases (Bhat et al., 2013), (Wang et al., 2013).

CONCLUSION

In this study conducted in SLE patients; It was revealed that the NLR and PLR values of the patients were increased and it was statistically significant compared to the healthy control group.

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