



HALP score for chronic spontaneous urticaria: Does it differ from healthy subjects?

Hüseyin ERDAL ^{1,*}, Fatma Esra GÜNAYDIN ²

¹Department of Genetics, Faculty of Medicine, Aksaray University, Aksaray, Türkiye

²Department of Immunology and Allergy Diseases, Ordu University Education and Training Hospital, Ordu, Türkiye

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Abstract

The immune inflammatory response has an important role in urticaria. In this study, we aimed to understand whether HALP score and systemic inflammatory response index (SII) role in predicting urticaria. In the present study, evaluated medical records of 69 patients with chronic spontaneous urticaria (CSU) and 71 healthy controls. HALP score was calculated according to this formula $HALP\ score = (hemoglobin\ (g/L) \times albumin\ (g/L) \times lymphocytes\ (/L)) / platelets\ (/L)$. Neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte (PLR), systemic inflammatory index (SII) index (neutrophil x platelet/lymphocyte count) were calculated. We demonstrated that NLR, PLR, SII levels were not statistically significant in patients with CSU compared to the healthy subjects ($p > 0.05$). However, HALP score levels were statistically significant between the groups ($p < 0.05$). HALP score is a newly designed index that are known as easily calculable and comprehensive indicator of treatment response precursors in patients with CSU.

Keywords: inflammation, biomarkers, hemoglobin, albumin, lymphocytes, blood platelets

1. Introduction

Urticaria is a skin condition can be presented as acute or chronic episodes and is driven by various underlying causes, making it a complex disorder to understand and manage (1). It can develop on any part of the body and may come and go within a few hours or persist for several days before fading away (1, 2). There are two types of urticaria including spontaneous and chronic (3).

Chronic Spontaneous Urticaria (CSU), also known as chronic idiopathic urticaria, is a skin condition characterized by the recurrent appearance of itchy, raised, and often red or pale swellings on the skin (4). These swellings are known as wheals or hives. The estimated global prevalence of chronic spontaneous urticaria ranged from approximately 0.5% to 1%. This means that around 5 to 10 people out of every 1,000 individuals might be affected by CSU (5). However, these numbers can differ in various regions and populations. Prevalence tends to be higher in adults compared to children and is slightly more common in females (6).

Oxidative stress (OS) is a physiological imbalance between the production of reactive oxygen species (ROS) and the body's ability to detoxify them or repair the resulting damage (7). OS has been implicated in various disease conditions, including CSU (8-17).

Like many other diseases, inflammation plays a central role in the development and manifestation of CSU (18). There is a multifaceted and complex relationship between inflammation

and urticaria. While the inflammatory response is a key component of urticaria, the exact triggers and mechanisms can vary among individuals (19). Blisters that appear in urticaria are a result of localized inflammation in the skin's upper layers. For clinical practice, inflammatory indices such as lymphocyte-monocyte ratio (LMR), neutrophil-lymphocyte ratio (NLR), thrombocyte-lymphocyte ratio (PLR), pan-immune-inflammation value (PIV) and systemic inflammatory response index (SIRI) are correlated with systemic inflammation and can be useful for predicting prognosis and checking treatment response (20-24). A novel index combining hemoglobin and albumin levels and lymphocyte and platelet counts (HALP) has been found significantly associated with outcomes in various types of cancer (25). There is limited data about urticaria and HALP score. The aim of the study was to evaluate the effectiveness of the NLR, PLR, SII, SIRI and PIV together in patients with CSU. This is the first report to evaluate HALP score and SII index together in patients with CSU.

2. Materials and Methods

This retrospective case-control study was conducted in the Department of Immunology and Allergic Diseases, Ordu University Education and Research Hospital, Ordu, Turkey from January 2023 to July 2023. The medical records of 69 adult patients who were diagnosed with CSU were analyzed. The control group consisted of age- and gender-matched healthy 71 individuals. The study was approved by the

*Correspondence: herdalyfa@gmail.com

institutional ethics committee of Ordu University (No: 2023/181). The study was conducted in accordance with the Helsinki Declaration rules.

The hemogram parameters, albumin and serum C-reactive protein (CRP) levels of individuals were obtained. Neutrophil lymphocyte ratio (NLR), platelet lymphocyte ratio (PLR), systemic inflammatory index (neutrophil \times platelet / lymphocyte count) and HALP score (hemoglobin (g/L) \times albumin (g/L) \times lymphocytes (/L))/platelets (/L) were used in complete blood parameters. Patients with diabetes mellitus, severe systemic disease, active infection, nutritional

Table 1. Demographic information of the study groups

Parameters		CSU (n=69) mean \pm SD	Control (n=71) mean \pm SD	p
Gender	Male	22 (31.9%)	31 (43.7%)	0.207*
	Female	47 (68.1%)	40 (56.3%)	
Age (year)		40.9 \pm 13.9	39.0 \pm 11.7	0.371 [‡]

*Chi-Square test [‡]Student t –test

Neutrophil, Lymphocyte, hemoglobin, platelet, albumin were not statistically between the study and control groups ($p > 0.05$, Table 2). Monocyte, MPV, were statistically significant between the groups ($p < 0.05$, Table 2).

Table 2. Comparison of the blood parameters of the study and control groups

Parameters	CSU (n=69) median (min-max)	Control (n=71) median (min-max)	p*
WBC ($10^3/\mu\text{L}$)	7.5 (4.3-11.8)	7.2 (4.4-10.3)	0.627
Neutrophil ($10^3/\mu\text{L}$)	4.0 (1.5-8.3)	3.7 (2.4-6.9)	0.081
Lymphocyte ($10^3/\mu\text{L}$)	2.4 (1.2- 4.3)	2.3 (1.2-3.6)	0.161
Monocyte ($10^3/\mu\text{L}$)	0.51 (0.23-6.7)	0.47 (0.26-0.75)	0.036
Hemoglobin (g/dL)	13.6 (9.9-12.9)	13.1 (10.4-16.6)	0.133
Platelet ($10^3/\mu\text{L}$)	262 (152-402)	258 (162-438)	0.799
Albumin (g/L)	46.1 (34.1-50.4)	46.5 (37.9-51.4)	0.289
MPV (fL)	10.4 (8.4-12.4)	9.1 (5.9-12.1)	<0.001
CRP (mg/L)	1.5 (0.2-24)	1.30 (0.13-6.5)	0.184
NLR	1.8 (0.6-4.1)	1.7 (1.0-3.5)	0.372
PLR	108.8 (61.4-270.8)	124.4 (60.5-204.8)	0.064
SII	458.6 (146.8-1213.3)	441.6 (230.1 -1036.2)	0.463
HALP score	5.6 (0.7-11.2)	5.8 (3.6-9.8)	0.02

*Mann- Whitney U test WBC: White Blood Cell; NLR: Neutrophil Lymphocyte Ratio, CRP: C-reactive protein, MPV: Mean Platelet Volume, PLR: Platelet Lymphocyte ratio, SII: Systemic inflammatory index (neutrophil \times platelet / lymphocyte count), HALP score ((hemoglobin (g/L) \times albumin (g/L) \times lymphocytes (L))/platelets (L))

3.1. Statistical analysis

Data analysis of the groups was performed using the statistical software IBM SPSS 22. The normality of the quantitative variables was confirmed by using the Kolmogorov-Smirnov test. Comparative analysis of study groups was carried out with Student's t test and Mann-Whitney U (variables without normal distribution) test. Categorical variables were presented as numbers and percentages and compared with the chi-square test. The statistical significance level of the p-value was accepted as < 0.05 .

deficiency, malignancy, malnourished, hematologic disease and on immunosuppressive, and other treatments of urticaria except for anti-histamines were excluded from the present study.

3. Results

The present study consisted of a total of 69 CSU subjects with an average age of 40.9 ± 13.9 and 71 healthy controls with an average age of 39.0 ± 11.7 . There was no statistically significant difference between the groups in terms of age and gender (Table 1).

In addition, inflammatory indices were calculated for the study groups. A statistically significant difference was found between SII, HALP Score NLR and PLR indices between the groups ($p < 0.05$) Table 2).

4. Discussion

Chronic Spontaneous Urticaria (CSU), also known as chronic idiopathic urticaria, is a dermatological disorder characterized by the recurrent appearance of raised, itchy hives (wheals) on the skin (26). The condition is considered "chronic" when these hives persist for a duration of six weeks or more without an identifiable external trigger. The itching and discomfort associated with CSU can significantly impact the quality of life of individuals affected by the condition.

In the present study, we demonstrated that NLR, PLR, SII, and HALP score indices together in patients with SCU. This study was to examine whether systemic inflammatory indices and HALP score play a crucial role in predicting prognosis of patients with CSU. In this retrospective case-control study, we demonstrated that NLR, PLR, SII levels were not statistically significant in patients with CSU compared to the healthy subjects ($p>0.05$). However, HALP score levels were statistically significant between the groups.

Moreover, we also evaluated hemogram parameters and neutrophil, lymphocyte, hemoglobin and platelet values were not statistically significant between the groups ($p<0.05$). However, platelet levels were high but not statistically significant in the patient group than healthy subjects.

In the literature, studies examining the effect of systemic inflammatory index on various diseases. In the study by Varghese et al. (27) they, indicated that hs-CRP and IL-18 levels were significantly increased in patients with chronic urticaria. They concluded that inflammation increases disease severity.

In another study, Tarkowski et al. (28) in their study on chronic urticaria patients they found that SII, SIRI, PLR, and NLR were not statistically significant difference between the study groups before and after treatment. They hypothesized that their single-center study concluded that SII, SIRI, NLR, and PLR could not be confirmed as predictors of response to OMA in the SCU. Another study conducted by Cosansu et al. (29) they showed that SII and SIRI levels were found statistically significant difference between the groups before and after the omalizumab treatment. They concluded that evaluation of SII and SIRI in CSU may suggest that it may provide additional information about inflammation.

In Zeynep's study of colorectal cancer patients, the Halp Score has been shown to be a simple and accessible index that can predict the prognosis of the disease (30). The results of the study revealed that it is a simple, cost-effective and useful marker that can predict overall survival in mCRC patients. In the study of Tian et al. (31) in ischemic stroke patients, They showed that an increased HALP score was associated with a reduced risk of recurrent stroke and death, suggesting that the HALP score could be a strong indicator for patients with acute ischemic stroke. In line with the previous studies, we found the halp score statistically significant between the study and healthy subjects. We hypothesized that Halp-score and could be a strong indicator of the patients with CSU. In addition, It may be helpful to use other indices to understand the inflammatory state of the CSU patients.

In conclusion, we indicated that HALP score is a newly designed index that are known as easily calculable and comprehensive indicator of treatment response precursors in patients with CSU. Inflammatory status could be related with disease activity. For this purpose prospective studies with

larger patient populations are needed to obtain stronger results.

Conflict of interest

The authors declared no conflict of interest.

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None to declare.

Authors' contributions

Concept: H.E., Design: H.E., F.E.G., Data Collection or Processing: F.E.G., Analysis or Interpretation: H.E., F.E.G., Literature Search: H.E., F.E.G., Writing: H.E., F.E.G.

Ethical Statement

Approval was obtained from Ordu University Ethics Committee, the study started. The ethics committee decision date is 07/07/2023 and the number of ethical committee decisions is 2023/181.

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