

Evaluation of neutrophil-to-lymphocyte, platelet-to-lymphocyte and eosinophil-to-lymphocyte ratios in childhood atopic dermatitis: Association with disease severity and treatment response

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ABSTRACT

Objective: Atopic dermatitis (AD) is a common chronic, inflammatory skin disease in childhood, characterized by pruritus and recurrent exacerbations. AD may impair daily functioning and negatively affect quality of life, psychosocial status, and personal development. In recent years, hematologic inflammatory indices such as neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), and eosinophil-to-lymphocyte ratio (ELR) have been investigated as potential biomarkers in chronic inflammatory diseases.

The aim of this study was to evaluate the relationship between disease severity assessed by the Eczema Area and Severity Index (EASI) and inflammatory biomarkers (NLR, PLR, and ELR), and to determine whether these markers can predict prognosis and treatment response in children with AD.

Materials and Methods: This prospective observational study included pediatric patients diagnosed with AD based on standard diagnostic criteria. Demographic characteristics, clinical findings, laboratory parameters, and quality of life scores (Infants' Dermatitis Life Quality Index, IDLQI) were recorded. EASI scores were calculated at diagnosis and after treatment. Receiver operating characteristic (ROC) analyses were performed to determine whether hematologic inflammatory parameters predicted $\geq 50\%$ improvement in EASI score.

Results: Seventy patients without additional chronic disease were included; 41 (58.6%) were boys. The mean age was 9.4 ± 14.4 months. ROC analysis demonstrated that the neutrophil-to-lymphocyte ratio (NLR) significantly differentiated patients who achieved $\geq 50\%$ reduction in EASI score from those who did not (AUC = 0.648, $p = 0.041$; 95% CI: 0.50–0.70). The optimal cutoff value for NLR was 0.3.

Conclusion: NLR is a rapid, inexpensive, and widely accessible biomarker that may help predict disease prognosis and treatment response in pediatric AD. Incorporating NLR into routine follow-up may assist clinicians in monitoring inflammation and optimizing treatment strategies.

Keywords: Atopic, biomarkers, blood cell count, dermatitis, pediatrics

Introduction

Atopic dermatitis (AD) is a common chronic inflammatory skin disease in children, characterized by itching and recurrent intermittent flare-ups. Its prevalence has reportedly increased approximately 2-3 times in industrialized countries with a high socioeconomic level in recent years (1,2).

In the development of AD, environmental factors such as lifestyle changes, increased environmental pollution, and exposure to smoking interact with genetic predisposition, immunological dysregulation, and epidermal barrier dysfunction. Although the exact steps in its pathophysiology are not fully understood, it is thought to develop as a result of triggering immune events in genetically predisposed individuals (3,4).

Additionally, the chronic course of the disease, the characteristic morphology and distribution of dermatitis, and a history of atopic diseases are key factors used in the diagnostic process. Clinical scoring systems, which include a detailed evaluation of the entire skin, are used to assess disease activity and the effectiveness of treatment (5,6). In patients with atopic dermatitis, eosinophilic and neutrophilic inflammation has been shown to be associated with immune and inflammatory mechanisms. Over the years, various inflammatory markers have been used to better assess inflammation and more accurately reflect disease activity. Recently, white blood cell counts and their subtypes in complete blood count have been identified as potential biomarkers of inflammation in various diseases (7-9).

In our study, we aimed to evaluate the relationship between disease severity and simple complete blood count parameters such as Neutrophil-to-Lymphocyte Ratio (NLR), Platelet-to-Lymphocyte Ratio (PLR), and Eosinophil-to-Lymphocyte Ratio (ELR). Additionally, we aimed to determine the impact of these inflammatory markers on predicting prognosis and treatment response.

Materials and Methods

Participant selection: A total of 70 patients aged 1–42 months who presented to the Pediatric Allergy and Immunology Outpatient Clinic of Ankara Bilkent City Hospital, were diagnosed with AD according to the diagnostic criteria, and voluntarily agreed to participate were included in the study. Patients with chronic comorbidities such as obesity, chronic liver disease, kidney disease, cardiovascular disease, diabetes, malignancy, or systemic inflammatory disorders were excluded. Additionally, those with abnormal blood test results (including anemia/polycythemia, leukopenia/leukocytosis, thrombocytopenia/thrombocytosis), patients receiving topical corticosteroid treatment, and those experiencing an active infection at the time of blood sampling were not included in the study. Before the study, informed consent forms were obtained from the parents of the patients. The study was carried out over a six-month period starting on 21 February 2024.

Atopic dermatitis diagnosis: The diagnosis was made in accordance with the diagnostic criteria established by Hanifin and Rajka in 1980, which were last revised in 2003, based on history and physical examination findings (10).

Atopic dermatitis severity: The Eczema Area and Severity Index (EASI) was used to assess disease severity.

EASI (Eczema Area and Severity Index): The area involved in four different body regions (upper extremities, head and neck, trunk, and lower extremities) is visually assessed and an area score is calculated; 1 (1%–9%), 2 (10%–29%), 3 (30%–49%), 4 (50%–69%), 5 (70%–89%), and 6 (90%–100%). The feet and buttocks are considered part of the lower extremities, while the groins and armpits are counted as part of the trunk.

Lesion severity: Each site is individually assessed for 4 clinical symptoms (erythema, edema/papulation, excoriation, and lichenification): Each symptom is assigned a severity score from 0 to 3, with 0 being absent; 1 being mild; 2 being moderate; and 3 being severe.

Area score: Each area is associated with an adult (>8 years) or pediatric multiplier that reflects the relative contribution of that area to the total body surface area. The area score is calculated for each area separately by multiplying the area density score by the area score and the area-specific multiplier.

Total Score: The final EASI score is the sum of 4 regional scores ranging from 0 to 72. A score of 0 indicates no eczema, 0.1 to 1.0 indicates almost clear, 1.1 to 7 indicates mild AD, 7.1 to 21 indicates moderate AD, 21.1 to 50 indicates severe AD, and greater than 51 indicates very severe AD (11).

Since this index has a subjectivity that is dependent on the person, the score was calculated and evaluated by the same person throughout the study. EASI was evaluated twice, at the initial application and one month after the appropriate treatment.

Data collection tools

Sociodemographic data form: Age, gender, medical history, family history, accompanying atopic diseases, initial symptoms, medications used, and the presence of familial allergic diseases were evaluated.

Clinical evaluation form: The characteristics, distribution, and severity of AD lesions were recorded. The presence of accompanying food allergies was also assessed.

Laboratory data and diagnostic tests: Neutrophil, Lymphocyte, White blood cell, Eosinophil and Platelet counts, Neutrophil to Lymphocyte count ratio (NLR), Platelet to Lymphocyte count ratio (PLR), Eosinophil to Lymphocyte count ratio (ELR) of the patients at the time of admission were recorded. Specific IgE levels (Siemens immulite 2000) of the patients at the time of admission were recorded and 0.35 kU/L was determined as the cut-off.

Quality of life assessment: For patients aged 0–3 years, the Infants Dermatitis Quality of Life Index (IDQOL) was completed by their parents. Permission to use both scales was obtained via email from the researchers who conducted the Turkish validity studies.

Infants dermatitis quality of life index (IDQOL): The IDQOL is designed as a parent-completed questionnaire to assess the impact of AD on the quality of life of children aged 0–3 years. It consists of 10 questions that evaluate various aspects, including the child's mood, itching, sleep patterns, ability to play, participation in family activities, discomfort during dressing or undressing, difficulties during mealtime, problems related to treatment, and challenges during bath time. Each question assesses the impact over the past week and is scored 0, 1, 2, or 3 based on severity. The total index score ranges from 0 to 30 and is categorized as follows: 0–1 points: not affected, 2–6 points: mildly affected, 7–12 points: moderately affected, 13–18 points: severely affected, and 19–30 points: very severely affected.

Statistical analysis

The SPSS 25 (IBM Corp., Armonk, NY, USA) program was used for the evaluation of the results. The normality of data distribution was assessed using the Shapiro-Wilk test. Descriptive statistics were presented as mean and standard deviation for normally distributed variables, and as median and interquartile range (IQR) for non-normally distributed variables. Categorical variables were expressed as number (n) and percentage (%). Continuous variables were compared between two independent groups using the Mann-Whitney U test for non-normally distributed data. For comparisons among three or more independent groups, the Kruskal-Wallis test was used. Categorical variables were compared using the chi-square test. Potential risk factors associated with AD severity and treatment resistance were examined using univariable logistic regression analysis.

ROC curve analysis was performed to test the overall discriminative ability of NLR, ELR, and PLR values for a significant decrease in EASI score. The optimal cut-off point was determined as the value at which the Youden index is highest. A p-value of <0.050 was considered statistically significant.

Results

A total of 70 infant patients diagnosed with AD were included in the study. The study population consisted of 41 (58.6%) males and 29 (41.4%) females. The median age of the patients was 6.0 months (IQR, 4.0–9.0). A family history of allergic disease was present in 29 patients (41.4%).

When evaluating the characteristics of AD-related skin lesions, it was found that 7 patients (10%) had lesions that had never regressed since their initial appearance, while 64 patients (91.4%) showed a tendency for lesion expansion compared to the initial stage. A change in lesion size was observed in 65 patients (92.9%). Itching was present in 57 patients (81.4%), and 40 patients (57.1%) experienced nighttime awakenings due to itching. All patients had dry skin. Additionally, 51 patients (72.9%) exhibited crusting, while 33 patients (47.1%) had oozing, peeling, or scaling.

The socio-demographic and clinical characteristics of the patients are summarized in Table I. Food sensitivity detected by skin prick test was present in 11 patients (15.7%), with egg sensitivity in 6 patients and milk sensitivity in 5 patients. When evaluating the EASI score results, which were used as the AD severity scale, the mean EASI score at diagnosis was 7.07 ± 5.61 , while after one month of treatment, it decreased to 4.09 ± 4.13 . A 50% significant reduction in EASI scores was observed in 32 patients after treatment. At the time of diagnosis, 41 patients had mild, 26 patients had moderate, and 3 patients had severe AD. After one month of treatment, 19 patients were almost clear, 40 patients had mild, 10 patients had moderate, and one patient had severe AD.

Table I: Sociodemographic characteristics of patients diagnosed with atopic dermatitis

Demographic characteristics	Values
Total number of patients	70
Gender*	
Male	41 (58.6)
Age (Month) [†]	6 (4-9)
Age at symptom onset (Monthly) [‡]	3.06 ± 2.39
Method of birth*	
Caesarean	46 (65.7)
Vaginal delivery	24 (34.3)
Birth weight (Gram) [‡]	3258.2 ± 539.72
Gestational age*	
Mature	65 (92.9)
Premature	5 (7.1)
Complementary feeding*	
5 th month	6 (8.5)
6 th month	31 (44.3)
After 6 Months	1 (1.4)
Prenatal maternal smoking*	7 (10)
Family history of allergic disease*	29 (41.4)

*: n(%), †: median (IQR), ‡: mean $\pm$ SD

Table II: Laboratory data and EASI score results of patients diagnosed with atopic dermatitis

Laboratory Data*	Values
Total number of patients	70
Diagnostic WBC ($10^6/L$)	10060 ± 2714
Diagnostic ALC ($10^6/L$)	6179 ± 1971
Diagnostic ANC ($10^6/L$)	2342 ± 1186
Diagnostic EOS ($10^6/L$)	543.4 ± 298.8
Diagnostic PLT ($10^6/L$)	419642 ± 97062
Diagnostic NLR	0.42 ± 0.32
Diagnostic ELR	0.09 ± 0.05
Diagnostic PLR	73.7 ± 25.7
Mean EASI score	7.07 ± 5.61
EASI score after treatment	4.09 ± 4.13

*: mean $\pm$ SD, **WBC**: white blood cell count, **ALC**: absolute lymphocyte count, **ANC**: absolute neutrophil count, **EOS**: eosinophil count, **PLT**: platelet count, **NLR**: neutrophil-to-lymphocyte ratio, **ELR**: eosinophil-to-lymphocyte ratio, **PLR**: platelet-to-lymphocyte ratio, **EASI**: eczema area and severity index

Laboratory data and EASI score results are summarized in Table II.

Comparisons of laboratory parameters according to disease severity and treatment response are presented in Table III. Based on EASI scores, 41 patients were classified as having mild disease and 29 as having moderate-to-severe disease. No statistically significant differences were found between these two groups in NLR, PLR, ELR, white blood cell count, absolute lymphocyte count, absolute neutrophil count, eosinophil count, or platelet count. Regarding treatment response, 38 patients showed no significant improvement in EASI scores, whereas 32 showed significant improvement. Although the median NLR was higher in the group without significant improvement than in the group with significant improvement, this difference was not statistically significant [0.401 (IQR: 0.267–0.515) versus 0.299 (IQR: 0.223–0.422), respectively; $p=0.109$]. No statistically significant differences were found between the treatment response groups in the other laboratory parameters.

In the logistic regression model applied to identify potential risk factors associated with moderate-to-severe EASI scores at diagnosis, the following variables were analyzed using a univariate logistic regression model: gender, maternal smoking, maternal history of thyroid disease, family history of allergic diseases, mode of delivery, and time of birth. However, none of these factors were found to be statistically significant risk factors. Detailed results of the univariate logistic regression analysis for these risk factors are presented in Table IV.

The ability of the NLR value to distinguish between groups with and without a 50% reduction in EASI score was evaluated, yielding an AUC of 0.648 (95% CI: 0.51–0.78, $p=0.041$). The optimal cutoff value for differentiating these groups was determined to be 0.32, yielding a sensitivity of 65.6%, a specificity of 61.1% (Figure 1). In contrast, ROC analysis for ELR and PLR values did not identify a statistically significant cutoff point for distinguishing between groups with and without a 50% reduction in EASI score ($p = 0.190$ and $p=0.620$, respectively).

Table III: Comparison of laboratory parameters according to disease severity and treatment response in patients with atopic dermatitis

Parameter	Mild EASI*	Moderate-Severe EASI*	p	No significant improvement EASI score*	Significant improvement EASI score*	p
Total number of patients	41	29	-	38	32	-
NLR	0.309 (0.224–0.424)	0.420 (0.280–0.508)	0.067	0.401 (0.267–0.515)	0.299 (0.223–0.422)	0.109
PLR	65.78 (56.20–85.17)	71.32 (54.52–88.58)	0.882	63.29 (52.01–77.75)	74.34 (55.37–101.16)	0.199
ELR	0.075 (0.053–0.098)	0.087 (0.067–0.107)	0.331	0.080 (0.062–0.108)	0.073 (0.054–0.099)	0.629
WBC	10010 (7900–11270)	10000 (8430–12170)	0.368	10075 (8400–12080)	9725 (7930–11325)	0.458
ALC	6290 (4880–7190)	5620 (4900–7600)	0.725	6130 (4930–7600)	5865 (4665–7410)	0.592
ANC	2050 (1540–2280)	2570 (1460–3640)	0.099	2170 (1580–3420)	2070 (1345–2515)	0.173
EOS	520 (250–690)	470 (400–720)	0.849	525 (420–720)	470 (335–710)	0.440
PLT	401000 (342000–483000)	394000 (339000–473000)	0.957	394000 (339000–460000)	445000 (345500–502500)	0.447

*: median (IQR) (Mann-Whitney U test), **EASI**: eczema area and severity index, **WBC**: white blood cell count, **ALC**: absolute lymphocyte count, **ANC**: absolute neutrophil count, **EOS**: eosinophil count, **PLT**: platelet count, **NLR**: neutrophil-to-lymphocyte ratio, **ELR**: eosinophil-to-lymphocyte ratio, **PLR**: platelet-to-lymphocyte ratio

Table IV: Univariable logistic regression analysis of factors associated with treatment response and decrease in EASI score

Variable	OR	95% Confidence Interval	p
Gender	1.06	0.40–2.76	0.900
Maternal smoking	0.17	0.02–1.51	0.110
Family history of allergic disease	1.51	0.58–3.94	0.390
Mode of delivery	0.99	0.36–2.67	0.980
Maternal thyroid disease	1.57	0.38–6.43	0.520
Time of birth	3.64	0.38–34.4	0.250

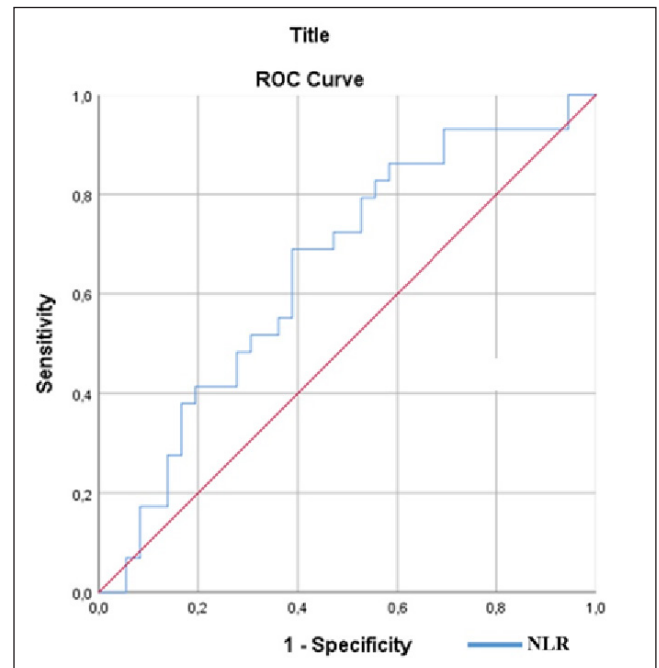
Table V: Infants Dermatitis Quality of Life Index (IDQOL) scores stratified by EASI severity categories

EASI Severity Category	Values*	IDQOL Score†	p‡
Mild (EASI 0.1–7.0)	41 (58.6)	4.17±2.87	<0.001
Moderate (EASI 7.1–21.0)	26 (37.1)	9.65±4.54	
Severe (EASI >21.0)	3 (4.3)	15.70±5.61	
Total	70 (100)	7.07±5.61	-

*:n(%), †:mean±SD, ‡: Kruskal–Wallis test

In the logistic regression model applied to identify potential risk factors associated with treatment response, the variables gender, maternal smoking, maternal history of thyroid disease, family history of allergic disease, mode of delivery, and birth timing were analyzed using a univariate logistic regression model. No significant risk factors were identified.

Since all patients were under the age of four, the Infants Dermatitis Quality of Life Index (IDQOL) was administered at diagnosis, completed by the parents to assess the impact of atopic dermatitis (AD) on quality of life. It was found that 37.1% (n=26) of the patients were moderately affected, 12.9% (n=9) were severely affected, and 18.6% (n=13) were very severely affected. Only one patient (1.4%) had no impact on their quality of life. When evaluating the effect of AD severity on quality of life at diagnosis, patients whose quality of life was moderately or more affected were compared to those who were

**Figure 1:** ROC curve of NLR values for groups with and without a 50% reduction in EASI score

not or minimally affected. It was found that the EASI scores at diagnosis were significantly higher in the more affected group, with mean IDQOL scores of 4.17±2.87 for mild, 9.65±4.54 for moderate, and 15.70±5.61 for severe AD groups, respectively (p<0.001). The detailed distribution of IDQOL scores stratified by EASI severity categories is presented in Table V.

Discussion

This study aimed to investigate the role of an easily accessible, inexpensive, and objectively assessable marker in evaluating disease severity and treatment response. In our

study, no significant differences in NLR, ELR, or PLR were observed between the mild and moderate-to-severe atopic dermatitis groups. Comparisons according to treatment response also revealed no significant differences in these markers. However, ROC analysis showed that pretreatment NLR had limited discriminatory ability to identify an inadequate treatment response, defined as failure to achieve a 50% reduction in EASI score (AUC=0.648; $p=0.041$). The NLR cutoff of 0.32 yielded a sensitivity of 65.6% and a specificity of 61.1%, whereas no statistically significant cutoff was identified for ELR or PLR.

In recent years, studies have been conducted on the prognostic importance of the NLR in chronic inflammatory diseases such as inflammatory cardiovascular diseases, hypertension, diabetes, malignancies, familial Mediterranean fever, and liver cirrhosis. NLR is considered a cost-effective and easily calculated marker for assessing inflammation (14). Building on this, studies have suggested that in AD, the most common inflammatory skin disease, not only local but also systemic inflammation may be present. Research has been conducted on the potential use of inflammatory markers in assessing this condition. However, the relationship between AD and peripheral blood leukocyte profiles has yielded conflicting results in the literature. AD is characterized by T-helper-2-driven inflammation in the acute phase and both T-helper-1 and T-helper-2-type inflammation in the chronic phase. Neutrophilic inflammation accompanies eosinophilic inflammation in AD. Studies indicate a correlation between allergic inflammation and blood eosinophil count, and while neutrophils alone may not fully reflect inflammation, NLR is increasingly considered a potential marker of inflammation (15). In their study including 66 AD patients and an equal number of control subjects, Doğru and colleagues did not find a significant difference in NLR values between the patient and control groups. However, when they classified the patients based on disease severity using the SCORAD index into mild, moderate, and severe groups, they observed that NLR was higher in patients with severe AD compared to those with mild and moderate AD. Both NLR and ELR were found to correlate with disease severity (16).

Hagino and colleagues conducted a study to evaluate treatment response in AD patients, including 65 patients over the age of 12 diagnosed with moderate-to-severe AD. They assessed the relationship between NLR, PLR, and ELR values and EASI and pruritus scores (PP-NRS) at baseline and at weeks 4, 12, and 24 of treatment. The authors found a positive correlation between baseline ratios and both EASI and pruritus scores. They observed that NLR and ELR decreased in parallel with EASI and pruritus scores at week 4, and this reduction was maintained until week 24. However, PLR showed a temporary decrease at week 4 but returned to baseline levels by week 12. The authors found that the percentage reduction in ELR was significantly associated with the percentage reduction in EASI and pruritus scores at weeks 4, 12, and 24, suggesting that ELR may serve as an indicator of clinical improvement and itch relief in AD treatment (15).

In another study including 252 AD patients and 75 healthy controls, the mean NLR and PLR values were found to be

higher in the patient group compared to the control group. Additionally, a positive correlation was observed between NLR and PLR values and disease duration. The study emphasized that, due to their easier accessibility compared to other expensive inflammatory markers, NLR and PLR could be more preferable as biomarkers (17).

In another study conducted by Jiang et al. (9) in China (80 patients / 45 controls), it was reported that NLR was higher in AD patients compared to the control group. Additionally, when grouped according to the severity of the SCORAD index, a positive correlation was observed between disease severity and NLR. In our study, unlike other studies, we examined the relationship between inflammatory markers (ELR / PLR / NLR) and treatment response, represented by a decrease in the EASI score before and after treatment. Pre-treatment high NLR was found to be associated with inadequate treatment response. However, no significant cutoff point was found in evaluating the ability of ELR and PLR values to distinguish between groups with and without a 50% reduction in the EASI score. In our study, the AUC value of 0.648 for NLR indicates a modest discriminative performance in predicting treatment response. We acknowledge that this predictive capacity is moderate and suggests that NLR should not be viewed as a standalone gold-standard diagnostic tool. However, the potential clinical applicability of NLR remains noteworthy. Its primary strength lies in being a cost-effective, non-invasive, and universally accessible biomarker derived from a routine complete blood count. In clinical practice, particularly in resource-limited settings, such a 'modest' marker can still provide valuable ancillary information. Rather than providing a definitive prognosis, NLR can serve as a supplementary screening tool to help clinicians identify patients who may require closer monitoring or a more aggressive treatment approach from the outset.

There are also similar studies evaluating inflammatory chronic airway diseases such as asthma and allergic rhinitis. In a study conducted by Yıldız and colleagues, which included a total of 600 adult participants with a diagnosis of allergic rhinitis (AR) and/or asthma and a control group, the NLR and ELR values were found to be significantly higher in the patient group compared to the control group. The authors emphasized that these markers could serve as potential indicators for prognostic processes and early diagnosis (18). Radhapyari and colleagues, in their study evaluating a total of 90 pediatric patients aged 5 to 18 years diagnosed with asthma, found a significant relationship between NLR and asthma severity. They emphasized the potential of NLR as an inflammatory marker (19).

In a study evaluating the relationship between AR severity and NLR and PLR, including 200 AR patients and 160 healthy controls (aged 3-18 years), NLR and PLR values were found to be higher in the AR group compared to the control group. When AR patients were categorized as intermittent and persistent, NLR and PLR were found to be higher in the persistent group. A positive correlation was observed between higher NLR and PLR values and AR severity. The authors suggested that these markers could be used at the initial diagnosis stage to determine disease severity in pediatric patients (20). In another

study comparing 140 AR patients with a control group, the mean NLR and PLR values were found to be significantly higher in the patient group than in the control group. Additionally, when the cases were classified as mild, moderate, and severe, NLR and PLR were higher in severe cases. These markers were identified as indicators of disease severity (21).

In recent years, as a requirement of a holistic approach to patients, the concept of “quality of life” has emerged alongside the assessment of physical well-being, incorporating psychological and social evaluations. In our study, quality of life assessment using IDQOL showed that, except for one patient, all patients experienced an impact on their quality of life, ranging from mild to very severe. Furthermore, when evaluating the effect of disease severity on quality of life, patients whose quality of life was moderately or severely affected had higher baseline EASI scores compared to those who were not or only slightly affected. Similarly, in a study assessing the quality of life in children with AD, Siafaka et al. (22) found that disease duration and severity negatively impacted quality of life.

AD can negatively impact quality of life due to severe itching, sleep disturbances triggered by itching—especially during infancy—frequent night awakenings, dietary restrictions recommended upon identifying allergens, difficulties in adhering to dietary regimens, and changes in eating habits. Additionally, in adolescence, when physical appearance is particularly important, altered body image due to skin lesions can further affect quality of life. Therefore, treatment should be planned in a multidisciplinary manner, and psychosocial support mechanisms should be activated for both the patient and their family when necessary. Due to ethical considerations, routine blood tests are not performed on healthy infants, making it impossible to include a control group in our study. This can be considered a limitation of our research. Additionally, there is no established cut-off value for NLR, as there is for other inflammatory parameters. However, in our study, we were able to determine a cut-off value for NLR that could predict a 50% reduction in pre-treatment EASI scores. This suggests that NLR may serve as a simple biomarker for predicting treatment response. A similar evaluation was conducted for ELR and PLR, but no significant differences were found. This may be related to both the limited sample size and the insufficient number of patients classified as having severe atopic dermatitis.

Limitations

There are several limitations to our study that should be considered. First, the evaluation of treatment response was conducted at a one-month follow-up. Given that atopic dermatitis is a chronic condition characterized by periodic fluctuations and flare-ups, this relatively short observation period limits our ability to assess the long-term sustainability of the clinical improvement and the predictive stability of the investigated hematologic markers. Additionally, our study was conducted in a single center and lacked a healthy control group due to ethical constraints regarding blood sampling in the infant population. Further multi-center, longitudinal studies with extended follow-up durations are warranted to validate the long-term prognostic value of NLR, PLR, and ELR in pediatric AD management.

Conclusion

NLR is a subcomponent of the complete blood count, is an inexpensive, reliable, and easily measurable parameter, even in primary healthcare settings. It may serve as an economical and useful biomarker for assessing disease severity and activity in conditions associated with systemic inflammation. Given that AD is prevalent in the pediatric population, utilizing NLR in clinical practice could provide healthcare providers with significant practicality in evaluating disease prognosis and treatment response. Further large-scale, controlled pediatric studies are needed to guide future applications in this field.

Ethics committee approval

This study was conducted in accordance with the Helsinki Declaration Principles. The study was approved by Ankara Bilkent City Hospital (14.02.2024, reference number: E2-23-5190).

Contribution of the authors

Study conception and design: PY, ZŞE, AS, MT, EDM, Data collection: PY, AS, Analysis and interpretation of results: PY, ZŞE, AS, MT, EDM, Draft manuscript preparation: PY, ZŞE, AS, All authors reviewed the results and approved the final version of the manuscript

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Conflict of interest

The authors declare that there is no conflict of interest.

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