ORIGINAL ARTICLE

Rheumatology Quarterly

DOI: 10.4274/qrheumatol.galenos.2023.96168
Rheumatology Quarterly 2023;1(4):162-5

ASSOCIATION OF THE PLATALET-TO-ALBUMIN RATIO WITH DISEASE ACTIVITY SCORES IN PSORIATIC ARTHRITIS PATIENTS

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Abstract

Aim: Psoriatic arthritis (PsA) is a chronic inflammatory disease that can cause musculoskeletal involvement in the form of sacroiliitis, spondylitis, enthesitis, dactylitis, and arthritis and can cause disability in patients. PsA does not have a single blood test that can show disease activity; therefore, complex and difficult-to-apply composite indexes are often used in activity tracking. The serum platelet-to-albumin ratio (PAR), calculated as the ratio of one positive and one negative phase response parameter, is a newly defined index and has been shown to be related to activation and disease survival in inflammatory diseases and malignancies. In this study, we investigated the relationship of this index with disease activity and disease processes in patients with PsA.

Material and Methods: The study was conducted on 66 patients diagnosed with PsA according to the CASPAR criteria. Physician global assessment, patient global assessment, Disease Activity in Psoriatic Arthritis (DAPSA), Psoriasis Area Severity Index (PASI), Psoriasis Nail Severity Index (NAPSI), and Leeds Enthesitis Index (LEI) were evaluated. The erythrocyte sedimentation rate, which is a routine test, was measured by the Westergren method (mm/hour), and C-reactive protein (CRP) was measured as nephelometric (mg/dL).

Results: A positive correlation was detected between PAR and DAPSA and CRP levels in patients with PsA ($p<0.05$). In addition, a correlation was detected between the onset of nail disorder and joint pain, but no relationship was detected between the duration of rash. On the other hand, there was no significant relationship between PAR and other measures of disease activity, including patient global assessment, physician global assessment, PASI, NAPSI, LEI, and sedimentation ($p>0.05$).

Conclusion: In this study, we found a significant positive correlation between serum PAR and DAPSA, which is the disease activity score for PsA, and CRP, which is an acute phase marker. These results suggest that PAR may be a biomarker for monitoring PsA activity.

Keywords: Psoriatic arthritis, serum platelet-to-albumin ratio, disease activity index

INTRODUCTION

Psoriatic arthritis (PsA) is a chronic inflammatory disease associated with psoriasis that can cause disability by involving the musculoskeletal system. PsA can cause very different heterogeneous clinical presentations, such as sacroiliitis, spondylitis, peripheral arthritis, dactylitis, and enthesitis, as well as cause many comorbid diseases, especially cardiovascular disease (1). There is no single blood test that can show disease activity in PsA. In addition, because of the heterogeneous nature

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Received: 25.12.2023 **Accepted:** 27.12.2023

of the disease, different composite indices should be used according to the affected regions. Therefore, intensive studies are required to predict the activity and future course of the disease.

In inflammatory pathologies, platelets increase, indicating an acute phase response. In addition, the relationship between platelet number and function and thromboembolic events is well known. It is known that the risk of cardiovascular events increases with PsA (2).

Albumin is a negative acute phase reactant, and its value can vary in many inflammatory and non-inflammatory conditions throughout the course of the disease. Low albumin levels have been shown to be closely associated with mortality in some diseases and intensive care processes (3).

In addition to the relationship between albumin and platelet levels, each with different disease activations and clinical courses, serum platelet-to-albumin ratio (PAR) has been shown to be associated with survival in many diseases. It has been demonstrated that the pre-operative PAR value, especially in cancer patients, may be a potential prognostic biomarker in cancer patients undergoing primary resection (4-8).

There are limited studies on the PAR index in rheumatic inflammatory diseases. In a retrospective study, a significant correlation was found between PAR and disease activation markers (5). In another study, 198 axial SpA and 48 healthy volunteers were retrospectively examined. PAR, C-reactive protein (CRP), and sedimentation were higher in the axial SpA group than in the control group (6).

Because of the close relationship of PAR with inflammation and the surveillance of other diseases, it can be thought that this index may be associated with disease activity and disease process in patients with PsA. When we searched the common literature, we could not find any study evaluating the PAR value in PsA. This parameter appears to be an inexpensive and easily applicable index that can be obtained from routine blood tests. In this study, we attempted to show the relationship between the platelet albumin ratio in PsA and disease activity scores and disease process.

MATERIAL AND METHODS

This research was conducted by selecting patients who applied to İnönü University Turgut Özal Medical Center Rheumatology Clinic. Patients were selected from among the first 66 patients diagnosed with PsA according to the CASPAR criteria between the specified dates.

Ethics committee approval was obtained from İnönü University Clinical Research Ethics Committee (no: 2019/212, date: 08.01.2020). All patients provided consent for the use of their clinical and demographic data.

The patient's demographic, clinical, laboratory, and medication data were obtained from the patient file and the hospital's electronic information system. The erythrocyte sedimentation rate (ESR) was measured by the Westergren method (mm/h), and serum CRP was measured as nephelometric (mg/dL). The PAR value, calculated from routine tests performed in hospitals, was calculated by dividing the platelet count (10^9/L) by the serum albumin level (g/L).

Previously recorded Disease Activity in Psoriatic Arthritis (DAPSA), Psoriatic Arthritis Response Criteria (PsARC), Psoriasis Area Severity Index (PASI), Psoriasis Nail Severity Index (NAPSI), and Psoriasis Enthesitis Assessment Scale (LEI) were evaluated.

Statistical Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences software package version 25 (released 2017, IBM SPSS Statistics for Windows, Version 25.0., Armonk, IBM Corp., NY, USA). Demographic variables were analyzed using descriptive analysis. Conformity to normal distribution was determined by Shapiro-Wilk and Kolmogorov-Smirnov tests. Continuous parameters were compared using the Mann-Whitney U test. Categorical variables were analyzed using the chi-square test. A p value <0.05 is accepted as statistically significant.

RESULTS

A total of 66 people, 12 (18.2%) women and 54 (81.8%) men, were included in our study. Fourty-six (69.7%) of the patients were housewives, the rest were workers, farmers, students, tradesmen, and retired. Fourty-nine (74.2%) of the patients had psoriasis, and 17 (25.8%) did not. There was additional disease in 54 (81.8%) patients. The comorbidities were mostly diabetes, hypertension, and hyperlipidemia. Thirteen patients were smokers. Rash was detected in 49 (74.2%) patients. Nail disorder was detected in 32 (48.5%) patients. Enthesitis was observed in 41 (62.5) patients, whereas dactylitis was detected in 31 (47%) patients. Uveitis was detected in 3 (4.5%) patients (Table 1).

There was no significant relationship between PAR value and smoking, body mass index, presence of psoriasis, diabetes, hypertension, presence of hyperlipidemia, presence of nail disorders, presence of enthesitis, presence of dactylitis, presence of uveitis, non-steroidal anti-inflammatory drugs use, disease-modifying antirheumatic drugs use, steroid use, and biological agent use in PsA patients ($p>0.05$).

A positive correlation was detected between PAR, DAPSA, and CRP levels in patients with PsA ($p<0.05$). In addition, a correlation

was detected between the onset of nail disorder and joint pain, but no relationship was detected between the duration of rash. On the other hand, there was no significant relationship between PAR and other measures of disease activity, including patient global assessment, physician global assessment, PASI, NAPSI, LEI, NAPSI, and sedimentation (p>0.05) (Table 2).

DISCUSSION

In this study, a significant positive correlation was found between PAR value and DAPSA, CRP, nail disorder time, and time to start joint pain. However, no correlation was found between PAR and other disease parameters such as ESR.

To date, no single test or biomarker has been identified that is specific enough to diagnose PsA, provide a definitive differential diagnosis from other rheumatic diseases, or indicate disease activity. Acute phase reactants can be seen in 30-40% of patients with PsA. Additionally, leukocytosis, thrombocytosis, and chronic disease anemia may be observed because of this disease activity and inflammation (7). Studies have shown that chronic disease anemia, low albumin, increase in ESR, and CRP fibrinogen levels are associated with disease activity (8). In addition, thrombocytosis can be seen in patients because of the increase in tumor necrosis factor-alpha and Il-6 by triggering inflammation. Some parameters such as rheumatoid factor, antinuclear antibody, and anti-citrullinated peptide antibodies, which may be relatively more specifically positive in other diseases, may be positive in lower rates in patients with PsA.

The PAR, which has been used in recent years, has been reported as a survival indicator in some malignancies. When looking at rheumatic diseases, a limited number of studies have been conducted on ankylosing spondylitis and rheumatoid arthritis (RA). There is no study yet on PsA. In a retrospective study 136 patients with RA and 87 control groups were evaluated (5). While PAR was found to be higher in RA patients than in the control group, albumin was found to be lower. In addition, there was a positive correlation between the PAR value and DAS28, CRP, and sedimentation. In another study, 198 axial SpA and 48 healthy volunteers were retrospectively examined. PAR, CRP, and sedimentation were higher in the axial SpA group than in the control group. Albumin and hemoglobin were found to be lower (6).

In our study, we found that there was no correlation between PAR and physician and patient global assessment, PASI, NAPSI, and LEI scores, whereas there was a correlation with DAPSA scores. This finding may indicate that PAR may be an activity indicator for peripheral joint involvement of PsA but not a biomarker for extra-articular involvement. The correlation between PAR and DAS28 score, which is an indicator of peripheral joint involvement, in RA studies also supports this thesis (5).

Table 1. Demographic, clinical and laboratory information of the patient

	Mean ± SD
Age	48.39±11.36
BMI	30.50±6.51
ESR mm/hour	16.33±13.40
CRP mg/dL	1.01±1.97
Plt/alb ratio	74.19±22.48
Skin rash time (year)	13.79±13.23
Nail disorder time (year)	5.76±8.82
Enthesitis time (year)	3.24±4.83
Dactilitis time (year)	5.03±7.20
Uveit time (year)	2.66±1.15
Patient global assessment	3.09±3.02
Doctor global assessment	2.69±2.21
Dapsa score	13.64±13.50
PASI score	1.55±5.33
LEI score	2.12±2.05
NAPSI total score	14.06±30.66

SD: Standard deviation, BMI: Body mass index, ESR: Erythrocyte sedimentation rate, CRP: C-reactive protein, Plt/alb: Platalet/albumin, DAPSA: Disease Activity in Psoriatic Arthritis, PASI: Psoriasis Area Severity Index, LEI: Psoriasis Enthesitis Index, NAPSI: Nail Psoriasis Severity Index

Table 2. Correlation of platelet-to-albumin ratio with clinical variables

	PAR	
	r	p
Patient global assessment	0.110	0.380
Doctoral global assessment	0.112	0.371
PASI score	-0.027	0.832
LEI score	0.200	0.108
NAPSI score	0.040	0.752
DAPSA score	0.254	0.044
ESR	0.224	0.07
CRP	0.327	0.007
Nail disorder time	0.501	0.003
Time to start rash	0.061	0.676
Time to start joint pains	0.319	0.009

PAR: Platelet/albumin ratio, PASI: Psoriasis Severity Index, LEI: Psoriasis Enthesitis Index, NAPSI: Nail Psoriasis Severity Index, DAPSA: Disease Activity in Psoriatic Arthritis, CRP: C-reactive protein, ESR: Erythrocyte sedimentation rate

CRP is an acute-phase protein released from hepatocytes. Studies have previously shown that there is a correlation between CRP levels, sedimentation levels, and disease activity in patients with PsA (8). In our study, although there was no correlation between PAR and ESR, a positive correlation was detected with CRP. This may be related to the late onset and late regression of the ESR response. In addition, the CRP response occurs quickly. However, the PAR value may indicate PsA activity in its early stages.

In addition, when the skin, joint, and nail involvement time of the disease and PAR ratio were examined, a correlation was found with the onset of nail disorder and joint pain, but not with the time of rash. This situation may be related to the fact that the patients participating in our study work in jobs that require more labor.

Study Limitations

The limitation of our study was the small number of patients. There were not enough patients to analyze the PsA subgroups. The limitations of the study were that most of the patients were follow-up patients and were taking antirheumatic drugs, and there were very few new patients.

CONCLUSION

In this study, we found a significant positive correlation between PAR and DAPSA, which is the disease activity score for PsA, and CRP, which is an acute phase marker. These results suggest that PAR may be a biomarker for monitoring PsA activity. Clinical studies involving more patients are needed for the use of this parameter in clinical practice.

Ethics

Ethics Committee Approval: Ethics committee approval was obtained from İnönü University Clinical Research Ethics Committee (no: 2019/212, date: 08.01.2020).

Informed Consent: All patients provided consent for the use of their clinical and demographic data.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: S.Y., Y.Y., Concept: S.Y., Y.Y., Design: S.Y., Y.Y., Data Collection or Processing: S.Y., Y.Y., Analysis or Interpretation: S.Y., Y.Y., Literature Search: S.Y., Y.Y., Writing: S.Y., Y.Y.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study received no financial support.

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