Plateletcrit levels in patients with psoriasis and its relationship with psoriasis disease severity

Sahira Gul, Muneeza Rizwan, Afnan Naeem*, Azka Zulfiqar*, Samra Shahid**, Hassan Ikram**

Department of dermatology, Fazaia Medical College, Air University, Islamabad, Pakistan.
* Department of Microbiology, Army Medical College, National University of Medical Sciences, Rawalpindi, Pakistan.
** Department of Pathology, Army Medical College, National University of Medical Sciences, Rawalpindi, Pakistan.

Abstract

Objective The main aim of study was to determine mean plateletcrit level in patients of psoriasis and to compare mean platelecrit level in patients of psoriasis with psoriasis area and severity index < 10 and ≥10.

Methods It was a single-center, cross-sectional study carried out at the Department of Dermatology, Pakistan Airforce Hospital, Fazaia Medical College, Islamabad. The study was conducted from 12 October 2020 to 11 April 2021 over a six-month period. Following informed consent, 100 known psoriasis patients were recruited to the study. Proper history was taken, and examination was done to determine disease severity. By computing the Psoriasis Area and Severity Index (PASI), the severity of the disease was evaluated. Plateletcrit level was also determined and was correlated with Psoriasis area and severity index to see if plateletcrit level is increased with score which shows the severity of the disease.

Results Mean age of the patients was 44 years. Majority of the patients were males. Mean BMI was 24.7 (kg/m2). Out of 100 patients, 77 (77%) were having psoriasis area and severity index score < 10 while 23 (23%) were having PASI score ≥ 10. Mean value of plateletcrit in patients of psoriasis was 0.284. Mean plateletcrit, in with PASI <10 and PASI ≥10 was 0.261and 0.360 subsequently. Statistics showed that there was a significant difference between the two groups (p<0.001).

Conclusion In conclusion, patients with PASI ≥10, who have psoriasis had higher mean plateletcrit values. In this study, a connection between platectrit and the severity of psoriasis is established. Given that this is a straightforward test that is part of a full blood analysis. However, thorough interventional trials and translational research are required to better examine the precise clinical significance of plateletcrit in psoriasis.

Key words
Plateletcrit levels; Psoriasis; Psoriasis disease severity; Psoriasis area and severity index.

Introduction

The prevalence of psoriasis, a chronic immunological inflammatory skin disease, is thought to be between two and three percent. Psoriasis consists of red, scaly, well demarcated, indurated plaques, present particularly over the extensor surfaces of the body and scalp.[1] Psoriatic individuals have higher levels of inflammatory markers such as high-sensitivity C-reactive protein (hs-CRP), interleukin (IL)-6, and tumor necrosis factor a (TNF-), indicating an inflammatory state that contributes to the

Address for correspondence
Dr. Afnan Naeem
Department of Microbiology,
Army Medical College, Abid Majeed Road,
Rawalpindi, Pakistan.
Email: faannaeem@gmail.com

development of cardiovascular disease. In severe cases, Psoriasis is appeared to be related to increased risks of cardiovascular disease even though it is primarily thought of as a cutaneous disease.[2]

Through several pathways, platelets are intimately connected to the pathophysiology of inflammatory skin problems such as psoriasis, atopic dermatitis, contact dermatitis, and urticaria. When compared to healthy people, platelet aggregation is significantly increased in psoriatic patients, and this heightened aggregation is significantly reduced after the improvement of psoriatic skin lesions.[3] The main effector cytokine in the pathogenesis of psoriatic pathology is (IL)-17.[4] (IL)-17A promotes platelet aggregation and activation in patients via Extracellular signal-regulated kinase 2 (ERK2) signaling pathway.[5]

The volume that platelets occupy in the blood as a percentage is known as plateletcrit (PCT), which is measured as PCT= platelet count x MPV/10,000.The normal range for PCT is 0.22-0.24%.[6] It is included in complete blood picture done routinely. It is inexpensive easily available marker for determining the severity of psoriasis.

A novel possible biomarker for determining the extent of psoriasis is PCT. Patients with psoriasis have much higher PCT than healthy people.[7]

The main rationale of this study is as very less published data is available from Pakistan regarding use of PCT as biomarker to predict severity of psoriasis. In our study we have used this inexpensive simple test for screening of psoriatic patients for severity and occlusive vascular disease. We primarily evaluated the link between the PCT level and PASI in the current study. PCT can also be utilized to screen for atherosclerosis in psoriatic patients

beforehand and measure can be taken to prevent such devastating disease in the future.

Methods

It was a cross-sectional study carried out at Department of Dermatology, Pakistan Airforce Hospital, Fazaia Medical College, Islamabad over a period of six months from 12-10-2020 to 11-04-2021. Using the WHO calculator and a confidence level of 95%, the sample size was determined. Population mean of 0.273 (0.108) and Absolute precision at 0.05. Sample size was 100 patients. Sampling technique used was nonprobability consecutive sampling technique.

Inclusion Criteria consisted of both male and female patients between 16-60 years of age who were known case of plaque Psoriasis. The study excluded patients with concomitant illnesses such inflammatory bowel disease, hypertension, diabetes, cardiovascular disease, obesity, cancer, hematological disorders, Rheumatoid arthritis, chronic liver disease, chronic kidney disease, and autoimmune disorders. Patients who were taking drugs (such as acetyl salicylates, anti-epileptics, or heparin) that affected platelet function were also excluded.

Study was conducted after taking permission from ethical committee of PAF hospital (Fazaia Medical College) Islamabad. Through the Dermatology OPD, patients meeting the aforementioned requirements were sought after. Before they were enrolled in the study, the purpose of the study was explained to them, and they signed an informed consent form. Data were collected according to pre designed Performa.

A thorough physical examination, pertinent medical history, Psoriasis Area severity Index, and Body Mass Index were performed. About 5ml blood was drawn and sent for laboratory

examination. Hemoglobin, White blood cells, platelet count, and PCT were measured as CBC laboratory parameters. An auto-analyzer (Sysmex XE 2000 Germany) was used to measure them. All tests were carried out in the PAF Hospital's laboratory in Islamabad.

PCT was correlated with PASI and to see if PCT level is increased with PASI score which shows the severity of the disease.

The SPSS version 23 was used to enter and evaluate the data. Quantitative factors like age and PCT were given descriptive statistics that were calculated and displayed as Mean SD. Independent sample t-test for comparison of mean PCT between two groups was applied. Binary logistic regression for prediction of PCT was used as independent variable of psoriasis. P value of ≤0.05 was considered significant.

Results

Participants in our study ranged in age from 16 to 60 years old. As shown in **Table 1**, the patients' average age was 44.0 11.7 years.

Out of total 100 patients 78 patients (78%) were

Table 1 Distribution of patients by age.

Age (Year)	Number	Percentage
16-30	18	18.0
31-60	82	82.0
Mean±SD	44.0±11.7	

Table 2 Distribution of patients by PASI score.

PASI	Number	Percentage
< 10	77	77.0
≥ 10	23	23.0
Total	100	100.0

Table 3 Comparison of mean PCT, age and BMI in patients of psoriasis with PASI <10 and PASI ≥10.

Variables	PASI < 10 (Mean±SD)	PASI ≥ 10 (Mean±SD)	P value
Plateletcrit	0.261±0.044	0.360±0.062	<0.001
Age	44.04±11.77	39.57±13.13	0.123
BMI	24.76±3.98	26.13±3.62	0.140

males while remaining 22 patients (22%) were females. Mean BMI of study participants was 24.7 ± 3.9 (kgm^2). Out of 100 patients, 77 (77%) were having PASI score <10 while 23 (23%) were having PASI score ≥10. Mean value of plateletcrit (PCT) in patients of psoriasis was 0.284 ± 0.064. Comparison of mean PCT, in patients of psoriasis with PASI <10 and PASI ≥10 was 0.261 ± 0.044 and 0.360 ± 0.062, respectively. The difference between two groups was statistically significant ($p<0.005$).Hence stabling relationship between PCT level and severity of disease.

Discussion

Psoriasis vulgaris is a immune-mediated chronic inflammatory skin disorder having prevalence of 2 to 4% of the world population. A increasing body of evidence supports the understanding of psoriasis as a systemic illness with concomitant extracutaneous comorbidities, despite the condition's historical association with the formation of many inflammatory skin plaques in an extensor distribution.[8]

In the skin, platelets control immunological and inflammatory responses. Previous investigations highlighted the role of platelet activation in the pathophysiology of several inflammatory disorders.[9] The increased inflammation and thrombosis have been linked to the raised platelet counts. Additionally, the activated platelet may enhance the impact of leukocytes in the skin, leading to a worsening or presentation of the disease. PCT, a recently discovered bio marker that displays platelet activity, indicates platelets function.[10]

Studies have shown that PCT and inflammation are interlinked. A unique and sensitive biomarker for certain inflammatory diseases was described as PCT, which indicates platelet activity. As immune cells in the skin, platelets play a significant role in the initiation and

regulation of inflammation and immunological response.[11]

According to certain studies, thrombocyte may be associated to the mechanisms that control inflammatory skin conditions. The mean platelet volume and platelet count are used to determine PCT. PCT is a cheap and simple to analyze parameter. We concentrated on the risk factors, such as increased platelets and thrombocyte hyperactivity, which may be a direct result of the inflammation caused by psoriasis.[12]

The PCT test measures the quantity of blood platelets in circulation. The development of skin inflammation and subsequent increase in disease severity may be facilitated by activated platelets.

On the other hand, it was mentioned that the systemic inflammation in psoriasis may have caused the platelets to become activated.[7]

Psoriasis although is multifactorial disease but the main underlying mechanism in psoriasis is inflammation which leads to metabolic and catabolic complications.[13] PCT is correlated with CRP and other inflammatory markers. The correlation between hsCRP, IL-6, platelet activity and disease severity were mentioned.[3] Patients with psoriasis may exhibit inflammation, depicted by PCT. We demonstrated that a high PCT could indicate a patient's likelihood of having psoriasis.[14]

In our study as shown by various studies males were effected more by psoriasis and BMI also effected the degree of severity.[15]

In current study mean PCT in patients of psoriasis with PASI <10 and ≥10 was 0.261±0.044 and 0.360±0.062, respectively. Our findings are comparable with a study conducted by Pektas *et al*.[8]

A systemic review showed similar results to our study that PCT and other platelet related factors are elevated in patients of psoriasis.[16] Very less published data is available from Pakistan and south east Asia which correlates platecrit to psoriasis severity.

Conclusion

Mean platecrit levels are hailed as new biomarker to determine the presence and severity of psoriasis. Mean platecrit levels are increased in patients of psoriasis with PASI ≥ 10. In the present research, there was a positive relation between PASI and PCT. To gauge the severity of psoriasis, a PCT assay should be employed because it is easy, affordable, and readily available. However, extensive prospective trials and further research is needed to examine the specific therapeutic importance of platecrit in psoriasis.

Recommendations

In Pakistan and around the world, multicenter studies, rigorous prospective trials, and research is needed to further examine the precise clinical importance of platecrit in psoriasis.

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