Journal of Pakistan Association of Dermatologists. 2020; **30(4)**: 540-543.

Original Article

Mean platelet volume in patients with psoriasis vulgaris and its relationship with disease severity

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Abstract

Objective To determine Mean Platelet volume (MPV) in patients with psoriasis vulgaris (PV) and to compare its relationship with disease severity.

Patients and Methods This cross-sectional study was conducted in Dermatology department of Fauji Foundation Hospital, Rawalpindi.100 patients were recruited through the outpatient clinic. Diagnosis was made on relevant history, and clinical examination, Psoriasis Area Severity Index (PASI) and Body Mass Index (BMI) was recorded. Laboratory parameters included CBC (hemoglobin, White blood cell, platelet count, MPV) was measured using an auto-analyzer (SysmexX2000Germany). Alanine aminotransferase (ALT), Blood urea nitrogen (BUN), Creatine, Plasma sugar levels, Uric acid, Serum cholesterol, Hepatitis B and C screening and a baseline ECG was performed.

Results MPV was significantly higher in patients with psoriasis vulgaris ($p<0.05$), In addition there was a positive correlation between (PASI) and MPV. Mean MPV was 8.63 0.67fL (with minimum MPV was 7.8 fL while maximum was 9.9fL) ($p<0.05$).

Conclusion MPV is elevated among patients of psoriasis vulgaris and is significantly increased in patients with PASI $\geq$ 10.

Key words
Psoriasis, Mean Platelet volume, Psoriasis Area Severity Index, Atherosclerosis.

Introduction

Psoriasis is a prevalent, chronic inflammatory skin disease that affects approximately 2%–3% of the world's population.[1] Its most common clinical variant is termed as psoriasis vulgaris, which affects approximately 85 to 90% of all patients with the disease.[2]

Psoriasis is characterized by a series of linked cellular changes in the skin: hyperplasia of epidermal keratinocytes, vascular dilatation and infiltration of various types of leucocytes in affected skin.[2] It is believed to be multifactorial with numerous key components including genetic susceptibility, environmental triggers in combination with skin barrier disruption and immune dysfunction.[3]

Platelets are closely linked to the pathogenesis of inflammatory skin diseases, including psoriasis, atopic dermatitis, contact dermatitis, and urticaria. Platelet aggregation is greatly enhanced in psoriatic patients compared with healthy individuals and this elevated aggregation is markedly decreased after improvement of psoriasis.[4]

With both surface receptors (P-selectin,

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integrin's, CD40, Toll-like receptors and chemokine receptors) and stored mediators (adenosine diphosphate, adenosine triphosphate, serotonin, cytokines, and chemokines), they are able to respond to various stimuli to activate inflammatory responses.[5]

Among the wide array of methods measuring platelet activation, (MPV) is a simple parameter to estimate platelet activity and aggregation.[6] It is measured by automated hematology analyzer and is included in routine complete blood count (CBC) analysis.

Platelets with high MPV are larger, contain more dense granules, are metabolically and enzymatically more active than smaller ones. On the basis of this observation, elevated MPV is accepted as an indicator of platelet activation and indirectly as a marker of disease activity and also increased cardiovascular risk.[7]

The aim of this study was to evaluate the relation between MPV, psoriasis and disease severity. It's a common ailment in Pakistan and there is a dearth of data in literature regarding this aspect.

Patients and Methods

This cross-sectional study was carried out in Dermatology department of Fauji Foundation Hospital, Rawalpindi.100 patients were recruited through the outpatient department with all age groups and both genders. Approval from the Ethical committee was taken. Purpose of the study was explained and informed consent was taken. Patients with hypertension, ischemic heart disease, diabetes, obesity, hepatitis, chronic kidney disease, rheumatoid arthritis, autoimmune diseases and patients on drugs effecting platelets (acetyl salicylic, heparin) were excluded. Data was collected according to predesigned performa by the researcher. Psoriasis was diagnosed on history and clinical examination. PASI (Psoriasis Area Severity Index)[8] and BMI (Body Mass Index) was carried out. Laboratory parameters included CBC (hemoglobin, White blood cell, platelet count, MPV) was measured using an auto-analyzer (Sysmex XE 2000 Germany). Alanine aminotransferase (ALT), Blood urea nitrogen (BUN), Creatinine, plasma sugar levels, Uric acid, Serum cholesterol, ESR, Hepatitis B and C screening and a baseline ECG was performed. All tests were performed at laboratory of Fauji Foundation Hospital Rawalpindi, free of cost.

Data was entered and analyzed by software SPSS version 15. Descriptive statistics was calculated for quantitative variables like age, MPV and BMI and presented as mean±SD. Frequencies and percentages were calculated for gender, obesity, and disease severity. Independent sample t-test was used to compare the MPV between PASI $\geq$ 10 and PASI < 10. P value of < 0.05 was considered significant.

Effect modifiers like age, gender, obesity was controlled by stratification. Post stratification independent sample t test was applied to see their effect on outcome. p value equal or less than 0.05 was taken as significant.

Results

Our study comprised of 100 patients meeting the inclusion criteria. Of these 100 study cases, 66 (66%) were female while 34 (34 %) were male.

The mean age of cases was 39.98±9.66 years (with minimum and maximum age of 26 and 60 years). Mean age of the male patients was noted to be 41.77±10.82 years while that of female patients was 36.50±5.50 years (p=0.009). Our study results have indicated that majority of our study cases i.e. 60 (60%) were aged up to 40 years.

82 (82%) had BMI of 23.62±2.18 kg/m^2 and it was more than 25 kg/m^2 in 18 (18%).

PASI of less than 10 was seen in 78 (78%) while 22 (22%) had PASI equal to or more than 10. It was stratified with regards to MPV ($p<0.05$).

Mean MPV was 8.63±0.67 fL (with minimum MPV was 7.8 fL while maximum was 9.9 fL) ($p<0.05$)

MPV was stratified with regarding to gender, age and BMI but no statistically significant correlation was seen.

Discussion

In the present study mean age of cases was 39.98±9.66 years (with minimum age of 26 and maximum 60 years). Mean age of the male patients was 41.77±10.82 years while female patients was 36.50±5.50 years ($p=0.009$). In the present study 60 (60%) of our patients were aged up to 40 years. A study conducted by Kilic *et al*.[9] has also reported 37.66±14.63 years mean of the patients with psoriasis vulgaris which is in compliance with our study results. Kim *et al.* [10] from Korea has reported 39.82±15.16 years mean age of the patients with psoriasis vulgaris which is close to our study results. However, this finding differs from the result of Tollefson *et al.*[11] who studied 100 Turkish children and observed that the ages ranged between 4 and 18 years, with a mean of 20±4.4 years. This difference may be attributed to the fact that psoriasis is a common ailment, less common in children, and more common in adults, with prevalence rates showing a worldwide geographic variation[12]

Our study reported 66(66%) female while 34 (34%) were male. A study conducted by Kilic *et al.*[9] has reported 54 % male gender predominance which is different to our study results. A study conducted by Kim *et al.*[10] from Korea has reported (64.77%) male gender predominance in patients with psoriasis vulgaris. This difference can be attributed to high turn over of female patients to our hospital due to entitlement of only wives, unmarried daughters and sons of age of less than 18 of ex-service men.

In our study 78 (78%) patients had PASI less than 10 while 22 (22%) had PASI equal or more than 10. MPV was 8.63±0.67 fL (with minimum MPV was 7.8 fL while maximum was 9.9 fL). Zaheer *et al.*[13] in Pakistan reported MPV in psoriasis to be higher (8.24±1.22 fL) than the control group (7.29±0.77 fL).

Kilic *et al*.[9] has also reported MPV 8.79±0.86 fL among patients with psoriasis vulgaris. Kim *et al.*[10] from Korea reported MPV 9.92±0.73 fL which is in compliance with our study results. In our study mean MPV was significantly elevated in patients with PASI equal or more than 10 (8.29±0.23 fL and 9.83±0.07 fL, $p=0.000$, respectively). Similar observations have been made by Kim *et al*.[10] Study conducted by Canpolat *et al.*[14] reported MPV 8.7±0.9 fL among patients with psoriasis which is close to our study results. Enas *et al.*[15] also reported increased MPV levels in psoriasis and significant correlation with disease severity.

However, Saleh *et al.*[16] revealed a nonsignificant increase in the MPV than their matched controls and no association between PASI and MPV. This conflicting result may be because of small sample size of 25 patients with psoriasis and 25 healthy controls.

Limitations

In our study, patients were not compared with matched healthy controls. Patients with psoriatic arthritis were not included. All patients (newly diagnosed, partially treated) were included.

Conclusion

MPV is elevated among patients having psoriasis vulgaris and is significantly increased in patients with PASI ≥ 10.

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