

Comparison of mean platelet volume in patients with psoriasis and healthy individuals

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Abstract *Objective* To compare mean platelet volume in patients with psoriasis and healthy individuals.

Methodology This case control study was conducted in outpatients department and indoor of department of Dermatology, DHQ Hospital, Faisalabad. The duration of study was six months. Thirty consecutive patients of psoriasis, 20 to 60 years of age and thirty age and gender matched healthy individuals were selected. 2cc venous blood sample from each subject was sent to the pathology laboratory of DHQ Hospital. Mean platelet volume (MPV) was measured as a part of blood complete analysis in Medonic M series Haematology analyser.

Results MPV was found higher in the patients of psoriasis as compared to the healthy individuals. The mean value of MPV in the case group was 8.24 ± 1.22 fl, whereas in the control group, it was 7.29 ± 0.77 fl ($p < 0.05$).

Conclusion The study demonstrated that mean platelet volume is increased in patients with psoriasis as compared to healthy individuals. Such patients are at an increased risk of cardiovascular complications.

Key words

Psoriasis, platelet activation, mean platelet volume, cardiovascular complications.

Introduction

Psoriasis is a common, chronic, disfiguring, inflammatory and proliferative condition of the skin, in which both genetic and environmental influences have a critical role. The incidence of vascular, particularly arterial complications (coronary artery disease, cerebrovascular events) is higher in patients with psoriasis as compared to the normal population.¹ In psoriasis, T cell-mediated immune response mechanisms alone cannot fully account for the development and extent of macro- and microvascular complications. So other pathogenic mechanisms may be involved, such as increased platelet

activation.²

The role of platelets in hemostasis is very important. Normally, platelets circulate in a quiescent disc shaped state. As they activate, they undergo transformation from disc to sphere shape with the development of pseudopodia. Consequently, this leads to an increase in their size. Large platelets contain more dense granules, produce large amounts of thromboxane A₂ and therefore, exhibit hyper-responsiveness to ADP or collagen induced aggregation.³

It has been observed that platelet activation and aggregation are central processes in the pathophysiology of micro- and macrovascular (e.g. cerebrovascular, coronary and peripheral arterial) disease.⁴ Mean platelet volume (MPV) is an indicator of the average size and a marker

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of activation of platelets. Higher MPV is an independent risk factor for cardiovascular events.⁵

Altered platelet morphology and function have been reported in psoriasis patients. Canpolat *et al.* found MPV significantly higher in psoriasis (8.7±0.9 fl) as compared to healthy subjects (7.3±0.8 fl).⁶

MPV is a simple test done routinely as a part of blood complete analysis. By determining the mean platelet volume, we may be able to determine the risk of vascular complications in patients with psoriasis so as to offer preventive measures in time.

Methodology

This case-control study was conducted in outpatients department and indoor of department of dermatology, DHQ Hospital, Faisalabad. The duration of study was six months i.e August 2012 to February 2013. For the case group, 30 consecutive patients of psoriasis with PASI score of ≥10, 20 to 60 years of age and of both genders were included in the study. For the control group, 30 age- and gender-matched healthy individuals were included. Patients with diabetes mellitus, hypertension, dyslipidemias, obesity, recent surgery, illness and those on antiplatelet drugs were excluded.

Approval from Ethical Review Committee of Punjab Medical College was taken. Informed consent from the participants was obtained. 2cc venous blood sample was drawn from each participant and put in a CP bottle and sent to the main pathology laboratory of DHQ Hospital for blood complete analysis by Medonic-M seires hematology analyzer. Mean platelet volume is measured as a part of blood complete analysis.

Statistical analysis was done by using SPSS version 15. Descriptive statistics were calculated for quantitative variables like age and mean platelet volume and presented as mean±SD. Variable of gender was presented as frequency/percentages. Independent sample t-test was used to compare the MPV between the two groups. $P<0.05$ was considered significant.

Results

A total of 60 subjects, 30 patients with psoriasis and 30 healthy individuals participated in this study. Out of the 30 patients of psoriasis, the mean age was 40.23±10.40 years, the minimum age was 21 and maximum was 56 years. For the control group, the mean age of the healthy individuals was 35.20±9.73 years. The minimum age was 22 and maximum was 58 years (**Table 1**). Out of 30 patients in the case group, 16 (53.3%) were males and 14 (46.7%) were females. In the control group, out of 30 individuals, 17 (56.7%) were males and 13 (43.3%) were females.

It was found that MPV was higher in the subjects with psoriasis as compared to the healthy individuals. The mean value of MPV in psoriasis patients of case group was 8.24±1.22 fl. The mean MPV in healthy individuals of the control group was 7.29±0.77 fl. Comparison of means was done by using independent sample t-test. A significant difference in means ($P=0.001$) was observed (**Table 2**).

Table 1 Distribution of age in case (n=30) and control (n=30) groups.

	Cases N=30	Controls N=30
Age (years)		
Mean	40.23±10.40	35.20±9.73
Minimum	21	22
Maximum	56	58

Table 2 Mean platelet volume in case (n=30) and control (n=30) groups.

Variable	Cases (n=30)	Controls (n=30)	t-Value	P value
Mean platelet volume	8.24±1.22	7.29±0.77	3.6	0.001

Since $P < 0.05$ was documented, hence the null hypothesis was rejected and the study proved that MPV is increased in patients with psoriasis as compared to healthy individuals.

Discussion

Psoriasis is a common,⁸ chronic, disfiguring disease with higher incidence of cardiovascular complications as compared to the normal population.¹ Although various studies have suggested chronic T-cell stimulation in psoriasis,⁹ leading to the release of potent pro inflammatory cytokine $TNF\alpha$ ¹⁰ as well as other chemokines and adhesion molecules,^{11,12} yet these cannot fully account for the development of cardiovascular complications. So other mechanisms like increased platelet activation seem to be involved in this process.¹³ Platelets play a significant role in hemostasis and platelet activation and aggregation are central processes in the pathophysiology of micro and macro vascular disease. MPV is an indicator of the average size and a marker of activation of platelets and an increased level of MPV is an independent risk factor for cardiovascular diseases.⁴

We conducted our study in a postgraduate teaching hospital in which the mean value of MPV in psoriasis patients was found to be higher (8.24±1.22 fl), than the control group it (7.29±0.77 fl). This was in comparison to the study conducted by Canpolat *et al.*⁶ which showed the MPV in patients with psoriasis to be 8.7±0.9 fl which was significantly higher than that of control subjects 7.3±0.8 fl. There was also statistical difference between those with (9.5±0.8) and without (8.0±0.7) psoriatic

arthritis ($p < 0.001$). Also, the MPV levels were positively correlated with PASI score ($p = 0.000$, $r = +0.735$) and disease duration ($p = 0.01$, $r = 0.518$).⁶

In a study done by Mehta *et al.* the risk of major adverse cardiac events between patients with psoriasis and the general population was compared and the attributable risk of severe psoriasis was estimated. Their study showed that severe psoriasis was a risk factor for major adverse cardiac events (hazard ratio 1.53; 95% confidence interval, 1.26-1.85) after adjusting for age, gender, diabetes, hypertension, tobacco use, and hyperlipidemia. After fully adjusted analysis, severe psoriasis conferred an additional 6.2% absolute risk of 10-year major adverse cardiac events.¹

In another study done by Tamagawa-Mineoka *et al.* in Japan, the association between platelet activation and psoriasis activity was investigated and a close association was found between platelet activation and psoriasis activity.²

Keeping in view all the above studies, it may be inferred that platelet activation is a central process in the development of micro- and macrovascular complications. Patients with psoriasis are at an increased risk of these complications as compared to healthy populations due to this very phenomenon. MPV is an indicator of platelet activation and therefore has been found to be higher in the patients with psoriasis as compared with healthy population.

Conclusion

Our study concludes that mean platelet volume is significantly increased in patients with psoriasis as compared to the healthy population. It is therefore evident that patients with psoriasis are prone to develop abnormal morphology and/or increased platelet activation which ultimately leads to the development of long term macro and micro vascular complications of this disease.

MPV is a simple cost-effective tool through which psoriasis patients at risk of cardiovascular disease can easily be identified and can benefit from preventive treatment. Therefore it may be used and explored extensively, especially in countries like Pakistan. Our study may be helpful in future studies on this subject. This may ultimately help in reducing the impact of long term complications of psoriasis.

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