

The value of serum mean platelet volume in ischaemic stroke patient

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Abstract

Objective: To investigate the value of serum Mean Platelet Volume in acute ischaemic stroke patients.

Method: The retrospective case-control study was conducted at Ankara Numune Training and Research Hospital in Turkey and comprised record of patients of acute ischaemic stroke admitted to the Emergency Department between June 2010 and January 2012. The two groups were statistically compared using SPSS 18.0.

Result: Overall, there were 482 stroke patients (Group 1) and 315 subjects as controls (Group 2). The median value in Group 1 was 9.0 (2.1) (fL), while in Group 2 it was 8.80 (2.4) (fL). The difference was statistically significant ($Z=-2.80$; $p<0.05$).

Conclusion: Mean Platelet Volume increased in the stroke patients.

Keywords: Stroke, Mean Platelet Volume (MPV), Thrombocyte, Emergency, Disability. (JPMA 63: 1468; 2013)

Introduction

Stroke is one of the major healthcare problems; the third leading cause of death in developed countries and the leading cause of long-term disability.¹ Stroke results in more than 5 million deaths each year and at least 1 of 6 patients who survive will suffer another stroke within 5 years.²

Mean Platelet Volume (MPV) is a parameter calculated and provided by automatic blood cell count equipment during routine blood analysis. Although MPV is not generally taken into consideration by clinicians, it could be a marker of platelet activation in terms of platelet reactivity, aggregation and production of thrombogenic factors.³

The objective of this study was to evaluate MPV in acute stroke patients.

Patients and Methods

The retrospective case-control study was conducted at Ankara Numune Training and Research Hospital, Turkey, and comprised data of patients of acute ischaemic stroke admitted to the Emergency Department (ED) between June 2010 and January 2012. The records were collected from the hospital automation system. Group 1 consisted of patients who had been diagnosed as International Classification of Disease (ICD) Code I-63. Patients with subarachnoid haemorrhage and haemorrhagic stroke were excluded. Demographic, clinical and laboratory data (age, gender, haematocrit, thrombocyte counts and MPV values) of patients related to the time of hospital admission. Cranial computerised tomography (CT) scan data was also obtained.

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Group 2 comprised the controls.

Both groups were statistically compared using SPSS 18.0. Demographic and clinical features were expressed as mean±standard deviation, median, interquartile range (IQR), and percentage. Normal distributions were tested with Kolmogorov-Smirnov test. Mann-Whitney U tests were used for continuous group comparisons, including median MPV levels. $P<0.05$ was considered statistically significant.

Results

Of the 797 subjects in the study, there were 482 (60.5%) in Group 1 and 315 (39.5%) in Group 2.

Socio-demographic characteristics were compared between the cases and the controls (Table) and there was no statistically significant difference with respect to age and gender ($p>0.05$).

The median platelet count in Group 1 was 219000 (78) (/?L) and 238000 (96)(/μL) in Group 2. The difference was statistically significant ($Z=-2.80$; $p<0.05$).

The median MPV values in Group 1 and in Group 2 were 9.0 (2.1) (fL), and 8.80 (2.4) (fL) respectively. The difference was statistically significant ($Z= -2.29$; $p<0.05$).

Table-1: Demographic and laboratory features.

	Stroke (n)	Control	P degeri
Sex M/F	244/238	158/157	$p>0.05^*$
Age	69.58±13.2	66.10±8.6	$p>0.05^*$
MPV	9.0 (2.4)	8.80 (2.1)	$p>0.05^*$
Plt	219.000 (78)	238.000 (96)	$p>0.05^*$

*Mann-Witney U. MPV: Mean Platelet Volume.

Discussion

MPV values in association with both thrombosis and inflammation have become a point of interest in the last few decades, and recent studies have reported MPV values significantly higher in patients with stroke.^{4,5} Vizoli et al reported that platelet volumes are determined in bone marrow by thrombopoetin, cytokines and growth factor that may explain changes in MPV value in vascular and inflammatory events.^{6,7} Increased MPV is considered an indicator of platelet function and an independent predictor of coronary artery disease (CAD), severity of CAD, larger infarct volume in stroke patients and severity of strokes.^{8,9} Slavka et al¹⁰ showed that subjects with higher MPV (>11.01 fL) had 1.5 times higher vascular mortality risk than patients with low MPV (<8.7 fL) value. In the same study, significant positive relationship between high MPV and the risk of ischaemic heart disease was identified. Arevalo-Lorido et al¹¹ reported that higher MPV levels in stroke patients are associated not only with overall morbidity and mortality, but also their cardiovascular mortality. The result of our study is compatible with these studies. However, Cho et al¹² did not find statistically significant difference between patients and controls in terms of MPV values. This finding may indicate differences in environment, dietary habits and endocrinological co-morbidities that should play a role in MPV values, but most of the studies determined that MPV levels were higher in stroke patients.¹³⁻¹⁵

Butterworth et al.⁵ reported that there was lower platelet count in the stroke group, whereas some studies showed that patients with acute ischaemic stroke had higher platelet counts than the control groups.^{16,17} This conflicting result in literature should be the consequence of the timing of obtaining blood samples and their assessment. Our results are compatible with Butterworth et al.⁵ that may indicate temporary platelet consumption at the time of stroke.

Cho et al showed that MPV levels were higher in female patients than male.¹² We found no significant difference in MPV values according to gender. Geographical location and habitual conditions may lead to this finding.

The major limitation of this study was its retrospective nature, which deprived the study of a chance to cover social and clinical characteristics of patients.

Conclusion

Increased MPV is related with ischaemic strokes. Serum MPV levels can be used for determining patients' risk for stroke or other thromboembolic diseases.

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