



ORIGINAL RESEARCH PAPER

Medicine

MEAN PLATELET VOLUME LEVELS IN PATIENTS WITH ISCHEMIC STROKE:

KEY WORDS: Mean plateletet Volume, Stroke, Ischemic.

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ABSTRACT

Strokes are the most important cause of prolonged disability. About 15% to 25% of stroke survivors become disabled permanently, while 20% remain in institutional care for three months after their stroke. Various studies demonstrate an association between mean platelet volume and ischemic stroke prognosis. This study attempts to identify the significance of Mean platelet volume as a risk factor as well as prognostic factor for ischemic stroke patients.

INTRODUCTION:

Strokes are the most important cause of prolonged disability. About 15% to 25% of stroke survivors become disabled permanently, while 20% remain in institutional care for three months after their stroke. Various studies demonstrate an association between mean platelet volume and ischemic stroke prognosis. Stroke is the most common cause of death after cardiac disease and cancer. It plays an important cause of morbidity and mortality in the elderly and late middle age persons. Because of the rise in the number of ageing population, the burden of stroke is likely to increase automatically in the near future. Early identification of risk factors associated with stroke and implementing prevention programs will definitely help to control the burden of this major epidemic. The measurement of MPV1 may add useful prognostic patients marker at the time of admission in patients presenting with ischemic cerebrovascular disease. Martin JF et al¹ conducted a case control study with 482 stroke patients and concluded that mean platelet volume was significantly elevated in stroke patients than in matched control group. We also found a strong positive correlation with mean platelet volume and ischemic stroke. T. O'Malley et al studied mean platelet volume and platelet count in stroke patients. His study conclusion was that elevated MPV and decrease in platelet counts are found both in acute and non-acute phases of ischemic stroke. This study attempts to identify the significance of Mean platelet volume as a risk factor as well as prognostic factor for ischemic stroke patients.

AIMS AND OBJECTIVES:

To study the mean platelet volume levels in patients with ischemic stroke.

MATERIALS AND METHODS:

Thirty patients were selected for the study randomly. The study was done in St. John's Medical College.

INCLUSION CRITERIA:

All the patients were between 40-70 years.

EXCLUSION CRITERIA:

Known Hematological Pathologies.

Standard treatment was given to all patients with ischemic stroke. After 8 weeks of onset of stroke, all the patients were again followed up. Functional outcomes were determined by use of Modified Rankin scale (MRS) for the patients who had elevated MPV. All patients were stratified using MRS Scale [0-2, 3- 4 and 5-6] into three groups. MPV level was correlated with MRS score at the time of admission and again at 8 weeks. Patients with MRS score of 5 and 6 were declared as very poor outcome & MRS of 3 and 4 as poor outcome. Patients with MRS 0, and 1 were considered as good outcome.

RESULTS:

Table 1: Mean Age of the Patients

Mean Age	Standard Deviation
46.76 years	11.65 years

Table 2: Sex Distribution:

Male	Female
17	13

Table 3: Mean Platelet Volume

Normal (MPV)	Elevated (MPV)
12	8

Table 4: Modified Rankin scale

	Normal (MPV)	Elevated (MPV)
Grade 0 and 1	9	Nil
Grade 2 and 3	03	2
Grade 4 and 5	Nil	6

Table 5: Test for Significance (Compared to 30 control, 2 tailed)

Total	X-Value	P-Value (<0.05)
Grade 4 and 5 (6)	0.627	0.002

The study shows significant relation between elevated mean platelet volume and Modified Rankin scale (Functional score)

DISCUSSION:

Stroke is the most common cause of death after cardiac disease and cancer. It plays an important cause of morbidity and mortality in the elderly and late middle age persons. Because of the rise in the number of ageing population, the burden of stroke is likely to increase automatically in the near future. Early identification of risk factors associated with stroke and implementing prevention programs will definitely help to control the burden of this major epidemic. The measurement of MPV1 may add useful prognostic patients marker at the time of admission in patients presenting with ischemic cerebrovascular disease.

Shah PA et al⁴ studied 22 ischemic stroke patients in study group and matched 27 subjects in control group. He found that MPV is an independent predictor of ischemic stroke¹ and transient ischemic attack. His conclusion was MPV may be a useful prognostic information for clinicians in managing ischemic stroke patients. One author studied that mean platelet volume >9 fl was associated with a significant increase of risk for morbidity and mortality (OR = 1.37; p =0.026). By univariate analysis, an elevated mean platelet volume was seen associated with higher risk of cardiac failure (OR = 1.46; p = 0.01) and a significant increase in the incidence of recurrent ischemic stroke events (OR = 1.35; p = 0.07)³. In addition, he found that elevated mean platelet volume was also associated with a higher prevalence of ischemic vascular events, arterial hypertension and diabetes mellitus. Smyth et al study showed that increased platelet size is associated with increased platelet activity. Bath PM et al⁵ studied platelet volume in citrated blood in two groups of patients at risk of having atherosclerotic renal artery stenosis, namely (i) 30 patients with severe hypertension and (ii) 44 patients with peripheral vascular disease. Platelet volume was increased in patients with hypertension who had atherosclerotic renal artery stenosis diagnosed by angiography.⁵ Platelet volume correlated with severity of renal artery stenosis (rs= 0.391, 2p = 0.033, n = 30). Similarly, platelet volume correlated with severity of

renal artery stenosis in patients with peripheral vascular disease ($r_s = 0.319$, $2p = 0.035$, $n = 44$). Serum immunoreactive platelet-derived growth factor (predominantly released from platelets) and plasma immunoreactive interleukin-6 (a cytokine which has been postulated to regulate platelet volume) concentrations were not different between hypertensive patients with and without renal artery stenosis. Since large platelets are hyperactive, increased platelet volume may contribute to the development of atherosclerotic renal artery stenosis. This study also supports our study that large platelets are hyperactive, and increased platelet volume as measured by MPV directly relates to prothrombotic state. One Article stated that volume of platelet is determined by thrombopoietin in bone marrow. Thrombopoietin is a cytokine and growth factor for volume of platelet size which explains elevated mean platelet volume in inflammatory and vascular events. MPV1 is considered as an independent predictor of large infarct volume in ischemic stroke patients, coronary artery disease and severity of coronary artery disease. In our study, there is a linear relation with MPV and severity of ischemic stroke. As the MPV increases the severity (MRS)^{2,3,6,7} of stroke increases.

CONCLUSION:

The study shows significant relation between elevated mean platelet volume and Modified Rankin scale (Functional score)

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