Assessment of Mean Platelet Volume in Acute Ischemic Stroke and Its Correlation with Severity of Stroke in our Hospital

Dr. Meka Sai Lahari[1], Dr. Likhitha Padavala[2], Dr. Srinivas Guntupalli[3]
[1,2] *MD (General Medicine), Postgraduate Resident, Department of General Medicine, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh, India*
[3]*MD (General Medicine), Associate Professor, Department of General Medicine, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh, India.*

***Abstract*—Introduction:Acute ischemic stroke is a leading global cause of mortality and disability, with platelets playing a critical role in its pathophysiology. Mean Platelet Volume (MPV), a measure of platelet size and activity, is known to increase during ischemic events. This study aimed to analyse MPV in acute ischemic stroke patients and correlate it with the stroke prognosis and severity.**

Methods:

Conducted as a 12-month hospital-based observational study, the research included 96 patients over 40 years with first-episode acute ischemic stroke, confirmed by imaging. Patients with hemorrhagic stroke or prior anti-platelet medication were excluded. Key measurements included MPV and Modified Rankin Scale (MRS) scores.

Results:

Results from 96 patients showed a significant association between elevated MPV and increased stroke severity. Mean MPV increased from 8.92 ± 1.81 fL for MRS 2 to 12.10 ± 2.08 fL for MRS 4 (p=0.001). Notably, MPV showed no significant correlation with common comorbidities (diabetes, hypertension, dyslipidemia) or various pharmacological agents (aspirin, clopidogrel, statins, ACE inhibitors, anticoagulants). Furthermore, MPV significantly decreased from 11.12 ± 5.3 fL at admission to 6.5 ± 2.1 fL after one month of medication usage (p=0.001*).

Conclusion:

In conclusion, MPV serves as a significant and independent indicator of acute ischemic stroke severity and prognosis. Its responsiveness to therapeutic interventions and cost-effectiveness suggests its potential for integration into clinical practice for early risk stratification and management, though further research is warranted for comprehensive understanding and personalized care.

I. INTRODUCTION

Stroke remains one of the most common neurological disorders worldwide, with ischemic strokes comprising 87% of all cases. It results in significant morbidity and mortality, especially in the elderly. Platelets, due to their role in thrombus formation, are crucial in the pathophysiology of ischemic stroke. Mean Platelet Volume (MPV), a marker of platelet activation, may correlate with stroke severity and recovery.

Objectives:

- To evaluate MPV in acute ischemic stroke patients.
- To correlate MPV with stroke severity using the Modified Rankin Scale (mRS).
- To analyse associations between MPV, comorbidities, and medications.
- To assess MPV variation pre- and post-treatment.

II. METHODOLOGY

A hospital-based observational study was conducted on 100 AIS patients over one year. Inclusion criteria included patients >40 years, confirmed ischemic stroke (first episode), and consent. Exclusion criteria encompassed hemorrhagic or recurrent stroke and prior antiplatelet therapy. MPV was measured at admission and after one month of standard treatment. Data were analyzed using SPSS version 24.

Results:

1.Demographics and baseline characteristics

Variable	Observation
Age Group (most common)	51–60 years (33%)
Gender	Males 63%, Females 37%
Mean BMI	24.17 ± 2.41 kg/m²
Major Comorbidities	Dyslipidemia (58%), Hypertension (53%)
Lifestyle Habits	68% reported no alcohol or smoking
Most Used Drug	ACE Inhibitors (45%)

2.Stroke and MPV characteristics:

Stroke Characteristic	Observation
Laterality	Left-sided stroke (59%)
Infarct Territory	MCA (92%)
mRS Score (most common)	Score 3 (54%)
MPV Range (most common)	13–14 fL (30%)

3.Association of MPV with stroke severity:

Modified Rankin Scale	Mean MPV (fL) ± SD	p-value
Score 2	8.92 ± 1.81	
Score 3	10.41 ± 1.98	0.001
Score 4	12.10 ± 2.08	

Higher mRS scores are associated with significantly elevated MPV.

4. MPV before and after treatment:

Time Point	MPV (fL) ± SD	p-value
At Admission	11.12 ± 5.3	
After 1 Month	6.5 ± 2.1	0.001

A significant reduction of MPV after treatment indicates therapeutic effectiveness.

5.MPV correlation with Comorbidities and Drugs

Parameter	Correlation with MPV
Diabetes	0.2
Hypertension	0.73
Dyslipidemia	0.9
Aspirin	0
Clopidogrel	0.1
Statins	-0.5
ACE Inhibitors	0.1
Anticoagulants	0.1

III. DISCUSSION

The study demonstrates a strong positive correlation between elevated MPV and the severity of acute ischemic stroke. Patients with higher MPV presented with worse neurological outcomes, reinforcing findings from similar international studies. MPV levels also significantly reduced post-treatment, making it a useful prognostic biomarker. Interestingly, no strong correlation was found between MPV and individual risk factors such as diabetes, hypertension, or common medications — suggesting MPV acts as an independent prognostic factor in AIS.

IV. CONCLUSION

Mean Platelet Volume is a valuable, cost-effective marker in evaluating stroke severity and monitoring treatment response. Elevated MPV at admission correlates with more severe stroke and poorer short-term prognosis. A significant reduction in MPV post-treatment may reflect clinical improvement, warranting its use in routine stroke assessment protocols.

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