

CORRELATION OF MEAN PLATELET VOLUME AND NEUTROPHIL LYMPHOCYTE RATIO WITH NIHSS AND MRS IN ACUTE ISCHAEMIC STROKE PATIENTS

DR. BILLA VIKAS, POST GRADUATE, DEPARTMENT OF GENERAL MEDICINE, VMMC, KARAIKAL, PONDICHERRY

DR.T. PRABHU, ASSISTANT PROFESSOR, DEPARTMENT OF NEUROLOGY, VMMC, KARAIKAL, PONDICHERRY

DR.V. SAKTHIVEL, PROFESSOR AND HOD, DEPARTMENT OF GENERAL MEDICINE, VMMC, KARAIKAL, PONDICHERRY

ABSTRACT: The present study is done to find out the correlation between MPV and NLR ratio with NIHSS and MRS in acute ischemic stroke. This case series study is done on 50 patients of age >18 years who presented to department of Medicine, VMMC, Karaikal. Pregnant women, lactating women, history of coagulation diseases, history of malignancies etc. were excluded from the study. In our study we have observed a significant relation between mean platelet volume (MPV), Neutrophil lymphocyte ratio (NLR) with National Institute of Health Stroke Scale (NIHSS) and Modified Rankin Scale (MRS) thus highlighting that NLR and MPV are the risk factors associated with stroke. They may assist in short term prognosis prediction and assessing the response to treatment.

INTRODUCTION-Acute ischemic stroke is a medical emergency which results due to lowered blood supply of brain, which ultimately results in damage to brain cells. This is the second most leading cause of morbidity worldwide and is most common type of stroke in India. It is highly prevalent in Thiruvananthapuram accounting for 83.6% followed by Mumbai accounting for 80.2%. Acute strokes are the major hazards of financial burden especially in a developing country like India. It is estimated that about 3-4% of total healthcare expenditure in Western countries is spent on stroke. The burden of stroke is also increasing in India. Previous research suggests that incidence of stroke in India ranges between 105-152 /100,000 people per year. Because of changes in lifestyle habits like sedentary lifestyle, un healthy eating habits the incidence of stroke is on trend. If not managed immediately stroke may lead to serious sequelae sometimes even death. Because of revolutionary changes in diagnostic modalities, there are many recent developments in management of stroke. Prompt management requires proper evaluation and strict time window of opportunity to derive benefit from these interventions. As the world is in the pandemic of non-epidemiological diseases the morbidity of stroke is increased to 12% in developing countries. Even though when treated promptly also about 4% of AIS were dying during hospital treatment and about 25% of patients are developing cardiac manifestations and about 75% of cases are developing autonomic dysfunction. Hematological tests are more rapid and affordable compared to testing predictors. It is observed in various previous studies that mean platelet volume and NLR are associated with increased risk of AIS. MPV and NLR have a role in inflammation in AIS, therefore they may assist a clinician in identifying the prognosis of AIS.

AIM AND OBJECTIVES-To assess the mean platelet volume and neutrophil lymphocyte ratio with NIHSS and MRS in patients of acute ischemic stroke.

MATERIALS AND METHODS-A case series of 50 patients who presented to the Department of General Medicine, Vinayaka Mission's Medical College, Karaikal for a duration of 6 months from July 2022 to December 2022. Adult patients of age >18 years who presented with acute ischemic

stroke are included in the study. Pregnant women, lactating women, those with any coagulation diseases, h/o of any malignancies, h/o of any renal and liver pathologies are excluded from the study. On admission ,5 ml of fasting peripheral venous blood was collected from the patients and was transferred to anti coagulation tubes and was tested for NLR and MPV by flow cytometry technique.

RESULTS-

TABLE 1: COMPARISON OF AGE DISTRIBUTION

Age	Control Group		Study Group		P Value
	No of Cases	Percentage	No of Cases	Percentage	
< 40	5	20.0	4	16	0.867
41 – 50	11	44.0	7	28	
51 – 60	6	24.0	5	20	
61 – 70	2	8.0	7	28.9	
71 – 80	1	4.0	2	8	
Total	25	100.0	25	100.9	

GRAPH 1-GENDER DISTRIBUTION AMONG STUDY GROUP AND CONTROL GROUP

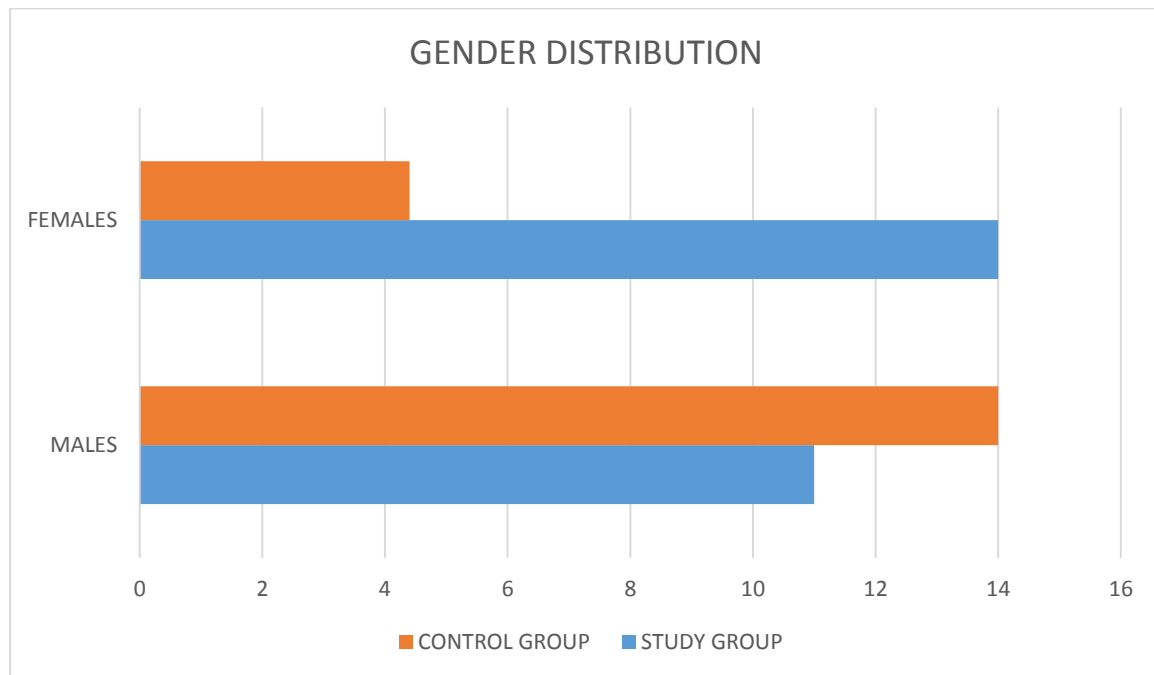
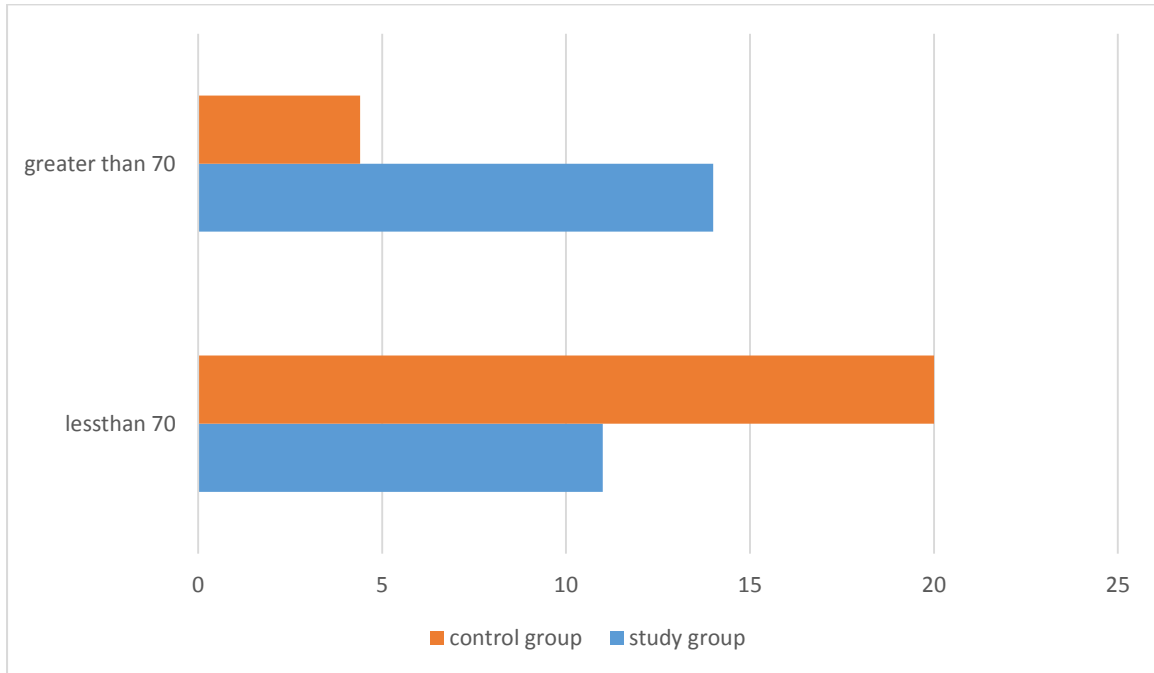


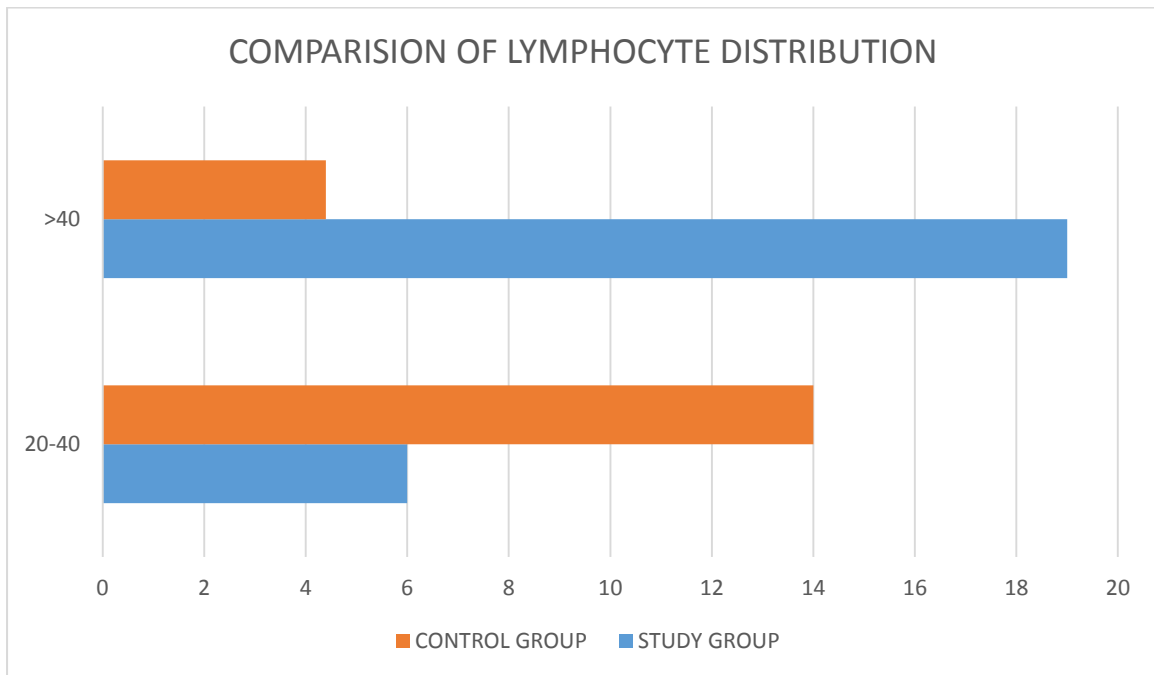
TABLE 2: COMPARISON OF MEAN PLATELET VOLUME DISTRIBUTION

MPV	Control Group		Study Group		P Value
	No of Cases	Percentage	No of Cases	Percentage	
≤ 9	7	28.0	12	48.0	0.000
> 9	18	72.0	13	56.0	
Total	25	100.0	25	100.0	

GRAPH 2: COMPARISON OF NEUTROPHILS DISTRIBUTION



GRAPH 3-COMPARISON OF LYMPHOCYTES DISTRIBUTION



GRAPH 4: COMPARISON OF NEUTROPHILS / LYMPHOCYTES RATIO DISTRIBUTION

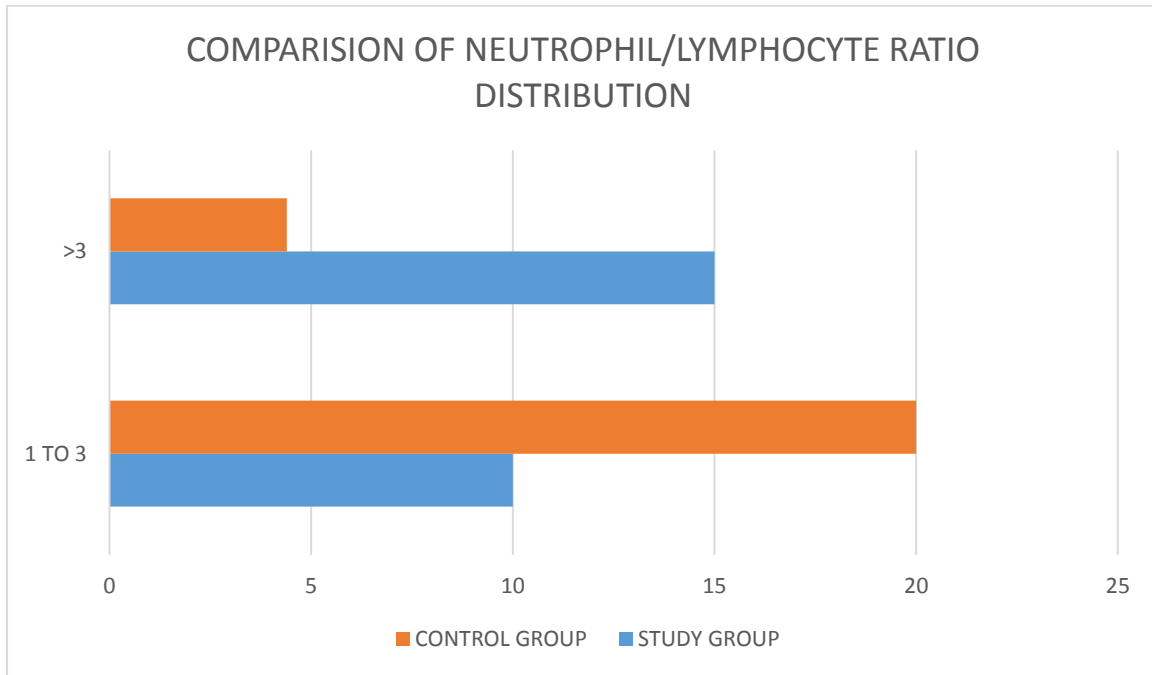


TABLE 7: COMPARISON OF MODIFIED RANKING SCORE DISTRIBUTION

MRS	Control Group		Study Group		P Value
	No of Cases	Percentage	No of Cases	Percentage	
1	2	4.0	0	0.0	0.000
2	20	40.0	2	4.0	
3	3	6.0	12	24.0	
4	0	0.0	9	36.0	
5	0	0.0	2	4.0	
Total	25	100.0	25	100.0	

Correlations			
		MPV_Control_Group	NIHSS_Control_Group
MPV_Control_Group	Pearson Correlation	1	.174
	Sig. (2-tailed)		.406
	N	25	25
NIHSS_Control_Group	Pearson Correlation	.174	1
	Sig. (2-tailed)	.406	
	N	25	25

Correlations			
		MPV_Study_Group	NIHSS_Study_Group
MPV_Study_Group	Pearson Correlation	1	.183
	Sig. (2-tailed)		.381
	N	25	25
NIHSS_Study_Group	Pearson Correlation	.183	1
	Sig. (2-tailed)	.381	
	N	25	25

DISCUSSION-In our study when we compare the age distribution between study group and control group, in study group 4 cases are less than 40 years' age group ,7 cases are between 41-50 years,5 cases are between 51-60 years,7 cases are between 61-70 years,2 cases are between71-80 years. In control group 5 cases are less than 40 years' age group ,11 cases are between 41-50 years,6 cases are between 51-60 years,2 cases are between 61-70 years,1 case are between71-80 years. p-value of age distribution between study group and control group is 0.867 which is statistically insignificant. On comparison of gender distribution between study group with14 male cases and 11 female cases and control group with11 male cases and 14 female cases p-value is 0.452 which is statistically insignificant (<0.05). On comparison of mean platelet volume between study group ($\leq 9 = 12$ cases, $> 9 = 13$ cases) and control group ($\leq 9 = 7$ cases, $> 9 = 18$ cases), p-value is 0.000 which is statistically very significant. On comparison of neutrophil distribution between study group and control group p – value is 0.000 which is statistically significant. On comparison of lymphocyte distribution between study group and control group, p-value is 0.000 which is statistically significant. On comparison of neutrophil/lymphocyte ratio between study group and control group, p-value is0.000 which is statistically significant. On comparison of Modified Ranking Score distribution between study group (MRS-1 in 0 cases, MRS 2=2 cases, MRS 3=12 cases, MRS 4=9cases, MRS5=2 cases) and control group (MRS1=2 Cases, MRS 2=20 cases, MRS 3=3 cases, MRS 4=0 cases, MRS5=0cases), p-value is 0.000 which is statistically significant. Correlation is significant at 0.001 level(2-tailed) in both NIHSS study group and MRS study group and also in NIHSS control group and MRS control group. NIHSS score is helpful for assessing the severity of stroke and degree of neurological impairment and has good predictive effect on any bleeding transformation, therefore it is very helpful in risk assessment. The basic mechanisms involved in development of stroke are oxidative stress and inflammation. In case of inflammation activated platelets, neutrophils and lymphocytes play an important role resulting in thrombosis, plaque rupture and ultimately interrupting with blood supply to brain. The activated neutrophils and lymphocytes aggregate in early stages of AIS, as a result not only the area of infarct is enlarged but also blockage of peripheral intra cranial capillaries also occurs. Therefore, we have observed that patients with higher NIHSS score has poor prognosis if thrombolysis is delayed. This is in correlation with a retrospective study done by Weimin Xue et al; who observed that AIS is more serious in patients with higher NLR and MPV and higher NIHSS score. In a study by Xu et al; they also observed that raised MPV may result in increased oxidative stress and inflammation in stroke patients resulting in poor prognosis, but by multivariate regression analysis they observed that MPV and NLR are independent predictors of stroke as the area under curve for MPV and NLR was greater than 0.7 and both have good predictive value. This is in correlation with our study findings. On comparison of association between MPV and CADASIL gene

in MPV control group and NIHSS control group patients with acute ischemic stroke correlation is significant. Significant correlation (2-tailed N) is observed on assessment of severity of AIS by MPV and CADASIL gene in correlation with NIHSS and MRS. Correlation is significant at 0.001 level (2-tailed) in both NIHSS study group and MRS study group and also in NIHSS control group and MRS control group. This is in correlation with study done by Weimin Xue et al; where they observed positive correlation between NLR and MPV through Pearson correlation test.

CONCLUSION-NLR and MPV can be associated risk factors for acute ischemic stroke. They may assist physician to identify the severity of stroke, response to treatment and short term prognosis. This research didn't give any information of different treatment patterns on outcome of patients. Further studies are needed to be done in future to evaluate the impact of different treatment modalities on MPV and NLR and its prognostic outcome in AIS.

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