



STUDY OF PROGNOSTIC VALUE OF RATIO OF NEUTROPHIL TO LYMPHOCYTE TO PREDICT PROGNOSTIC OUTCOMES IN PATIENTS WITH ACUTE ST ELEVATION MYOCARDIAL INFARCTION.

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ABSTRACT

Introduction: Atherosclerosis is a inflammatory disease of arterial wall which have multifactorial causes.

So study was done to investigate the role of neutrophil lymphocyte ratio in prediction of in hospital adverse events in ST elevated myocardial infarction (STEMI) patients thrombolysed with streptokinase (SK).

Material and methods: The study consisted observational retrospective longitudinal study. In this 70 patients [47 (67.1%) men, 23(32.8%) women, mean age 53.6 ± 11.16 years], diagnosed case of acute ST elevation MI. Patints were devided in two group according to NLR (High NLR and Low NLR) detected by CBC.

Result: A Total of 42 cases developed complications; in high NLR groups had higher rate of complications like Arrhythmia 6(60%), cardiogenic shock 12(80%), heart failure 10(77%), Post MI Angina 2 (50%) in hospital than those in low NLR group.

Conclusion: Our findings reveal that N/L ratio, a simple marker which can be derived from a routine complete blood count test was significantly and independently related to prognosis of Acute myocardial infarction.

KEYWORDS : Leukocyte; Neutrophil; NLR (Neutrophil to Lymphocyte ratio), STEMI (ST elevation MI)

INTRODUCTION:

Cardiovascular diseases are responsible for 30% of all deaths worldwide and are the number one cause of deaths globally(1). Cardiovascular diseases caused an estimated 17.3 million deaths in a year. Around 40% of these cardiovascular deaths are due to coronary heart disease. It is projected that coronary heart diseases will remain a leading cause of morbidity and mortality for many years to come. Atherosclerosis, the main underlying pathologic process for coronary heart diseases, is a chronic disease state of the coronary arteries that slowly develops over decades before becoming clinically significant. Its pathophysiology is complex, including inflammatory and immunological events which are considered to be of central importance in the initiation and progression of atherosclerotic plaques (2). Gradual chronic progression of coronary atherosclerosis may result in luminal narrowing causing symptoms of angina. However a more acute scenario exists where an abrupt change in plaque status causes rapid decrease in luminal patency. ST-elevation myocardial infarction (STEMI) is due to red thrombus formation often leads to acute vessel occlusion, while for non-ST elevation myocardial infarction (NSTEMI) a non-occluding (mural) platelet rich thrombus is the cause. Many studies have done to find out the associations between the various circulating markers of inflammation, such as C-reactive protein, fibrinogen, adhesion molecules, cytokines, elevated leukocyte count and the different clinical manifestations of coronary heart disease(3). Elevated leukocyte count is an important marker of inflammation which is used to assess the prognosis and related complications in patients with established coronary artery disease(4-9). Now a days the elevated neutrophil to lymphocyte (N/L) ratio have been used to assess the prognosis of acute STEMI. An elevated N/L ratio has been shown to independently indicate an increase association with myocardial infarction.

OBJECTIVES OF THE STUDY

To study the prognostic significance of Neutrophil to Lymphocyte ratio in patients with acute STEMI to predict prognostic outcomes.

METHODOLOGY

Study design: observational retrospective longitudinal study.

Source of study population:

Patients admitted and treated SNMC and HSK Hospital Bagalkot.

Study duration- July 2020 to July 2021 at SNMC and HSK Hospital Bagalkot

Sample size

Sample size estimation was done using open epi software version 2.3.1. At 95% confidence level,

Sample size estimated is 62 which is rounded off to 70.

Formula used $n = [DEFF * Np(1-p)] / [(d^2 / Z^2_{1-\alpha/2}) * (N-1) + p * (1-p)]$

Inclusion Criteria:

STEMI patients who were thrombolysed

Exclusion Criteria:

are those which affect the NLR ratio like Inflammatory conditions such as collagen-vascular disorders

- Acute or chronic infectious diseases
- Auto-immune diseases
- Neoplastic diseases
- Chronic hepatic diseases
- Renal failureThyroid disorders
- History of cardiac valvular disease.

Data collection-

Record based study on patients admitted with STEMI who were thrombolysed under department of general medicine. Data collected from medical record department, SNMC and HSK hospital.

RESULTS:

Total 70 cases of acute ST elevation MI with STK (streptokinase) thrombolysed were selected for this study. 47(67.1%) men, 23(32.9%) females, with an average of 53.6 years. The studied patients were divided in two group according to NLR, Out of 70 patients with STEMI, 42 (60%) cases have developed complications. like Arrhythmia 6(60%), cardiogenic shock 12(80%), heart failure 10(77%), Post MI Angina 2 (50%) in hospital than those in low NLR group.

Table 1 Relation between cases and Age

Age	No of cases	Percent
< 60	47	67.1
≥ 60	23	32.9
Total	70	100.0

Majority of cases were <60 years 47 (67.1%) cases. and More or equal to 60 were 23 (32.9%) cases.

Table 2 Relation between cases and sex

Gender	No of cases	Percent
Male	47	67.1
Female	23	32.9
Total	70	100.0

Majority of cases were Men 47 (67.1%) and females were 23 (32.9%).

Table 3 Cases distribution according to Types of MI

	Low NLR(<3)	High NLR(>3)	P value
Ant wall MI	30	11	0.001
Inf wall MI	14	5	0.04
Lat wall MI	8	2	0.09

Anterior wall MI were 30 (73.1%) low NLR cases and 11(26.9%) high NLR cases which showed statistically significance with P value 0.001. Inferior wall MI were 14(73.7%) low NLR and high NLR 5(26.3%) which was statistically significant P value (0.004). Lateral wall MI were 8(80%) low NLR and High NLR 2(20%) cases were not statistically significant P value 0.09

Table 4 Post MI complications

Complications	Low NLR	High NLR	P value
Cardiogenic shock	3 (20%)	12(80%)	0.02
Heart Failure	3(23%)	10(77%)	0.04
Arrhythmia	4(40%)	6(60%)	0.04
Post MI Angina	2(50%)	2(50%)	0.03

Cardiogenic shock cases were 3 (20%) low NLR and high NLR 12 (80%) were statistically significant with P value 0.02. Heart failure cases were 3 (23%) low NLR and high NLR 10 (77%) were statistically significant P value 0.04. Arrhythmia cases were 4(40%) low NLR and High NLR 6 (60%) were statistically significant P value 0.04. Post MI angina cases were 2(50%) low NLR and High NLR 2(50%) were statistically significant P value 0.03.

DISCUSSION:

Acute myocardial infarction is associated with leukocytosis which was a well known fact. The differential analysis of white blood cells like the newer parameter Neutrophil lymphocyte ratio (NLR) gives additional benefit of assessing ACS severity by clinical outcomes and gives complexity and severity of plaque burden on admission by a simple and easily available blood test. This elevated NLR was a quantum of neutrophils to lymphocytes irrespective of total count.

Atherosclerosis is an inflammatory disorder of arterial wall which is started with the endothelial injury and progress to atheroma formation. This study was done to evaluate the prognostic value of NLR in patients with STEMI thrombolysed with streptokinase. STEMI has a higher rate of morbidity and mortality which depend upon initial clinical presentation. Early risk detection of STEMI patients improves outcomes. Our study suggest that high NLR is associated with higher risk of morbidity. NLR can contribute to risk stratification of patients with acute ST elevation myocardial infarction(10). This study supports the role of NLR in predicting complications and death in myocardial infarction patients shown by some previous studies(11-13). The limitations of our study are Firstly, NLR was not compared for its predictive role with other inflammatory markers. Second, NLR at admission was used only, NLR 24 hours after admission was not used in addition. Considering short half life of neutrophils, repeated measurements of NLR may provide better prognostic information(14). In this study all admitted patients who diagnosed as a cases of acute STEMI thrombolysed with STK are posted to detect NLR by sending CBC at the time of admission. NLR is easily calculated from the cell counts obtained by a readily available, rapid and economical test on blood sample. High NLR has been shown to be associated

with higher rate of complications. Chia et al(15) conducted their study on STEMI patients and concluded that higher NLR is associated poor cardiovascular outcome. Felcino et al(16) done their study to asses the role of NLR in prediction of perivascular disease and concluded that higher NLR is associated with poor peripheral vascular disease outcome. Further studies are needed to predict the role of NLR in improving cardiovascular outcome in patients with acute coronary syndrome and ST elevation myocardial infarction.

CONCLUSION:

This study which was intended to find out the role of NLR in assessing risk stratification of STEMI. Our findings support the role of inflammation in the pathogenesis of post MI complications. Thus, NLR assessments which are routinely performed upon admission and universally available, may be considered in future practice for prediction of post MI complications. But we are in need to extent this study, by conducting it in multiple centers and involving larger population, for better risk stratification. We finally concluded that NLR is simple and cost effective method to determine in hospital outcome in patients with STEMI.

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