# Prognostic Value of Ratio of Neutrophil to Lymphocyte to Predict Prognostic Outcomes in Patients with Acute ST Segment 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 and mortality in ST elevated myocardial infarction (STEMI) patients thrombolysed with streptokinase (SK).

**Material and methods**: A prospective comparative observational study is done in between April 2016 and october 2016, The study consisted of 200 patients [150 (75%) men, 50(25%) women, mean age 53 ± 10.6 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 120 cases developed complications;40 (20%) died in hospital.patients in high NLR groups had higher rate of complications (75% vs 25% p value .002) and death (80% vs 20%), p value.0004), 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; Lymphocyte; STEMI, SK; Neutrophil; Lymphocyte

## INTRODUCTION

Atherosclerosis is a inflammatory disease of arterial wall which have multifactorial causes. Once the inflammation developed in arterial wall, the cascade of atheroma formation started. Any cause which leads to injury of the vascular wall,started an inflammatory response that involves complex interactions between endothelial and smooth muscle cells, leucocytes and plate-lets.[1] 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.[2] 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 desease.[3-8] Now a days the elevated neutrophil to lymphocyte (N/L) ratio have been used to assessthe prognosis of acute STEMI. An elevated N/L ratio has been shown to independently indicate an increase association with myocardial infarction and offer incremental prognostic value to total leukocyte count.[9-11]

## MATERIAL AND METHODS

Our prospective study done at Medicine Department, JMC, Jhalawar, evaluated 200 patients who have ST segment elevation myocardial infarction in ECG between April 2016 to oct 2016. All study patients referred ECG due to the angina or angina like chest pain.Those patients who have new ST segment elevation from the J point in two or more contiguous lead with an elevation of at least 0.2mV in lead $V_1$, $V_2$ and $V_3$ or at least 0.1 mV result on continuous measurement are presented on Mean ± SD (min to max) and result on chi square 2 test was used to determine the relationship between leucocyte count and NLR to acute STEMI.

**Exclusion criteria** were the presence of acute coronary syndromes with developed complications, pts on statin therapy, infectious desease and severe renal or liver disease. After detailed physical examination, the demographic characteristics and the cardiovascular risk factors were recorded by the physicians.The patients with a history of hypertension and taking antihy pertensive drugs were accepted in study. All patients have given informed consent and the study protocol was approved by our institutional investigational review board.

### Laboratory test

At the time of hospital admission ECG was done and venous blood sample was taken for analysis of the following parameters using standard techniques: glucose, triglycerides, total cholesterol, high density lipoprotein (HDL) choles-terol, and low density lipoprotein (LDL) cholesterol. Total leukocyte count and differential leukocyte counts were measured with an automated hematology analyzer.The cut off point value to differentiate High NLR to Low NLR is 4.50.

## RESULTS

Total 200 cases of acute ST segment elevated MI with STK

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| Characters | Low NLR(100) | High NLR(100) |
|---|---|---|
| Age(yrs) | 52 | 54 |
| Sex (male) | 65 | 85 |
| Hypertension | 70 | 15 |
| Diabetes Mellitus | 30 | 50 |
| TLC | 11.17 | 12.29 |
| ANC | 7.47 | 11.02 |
| ST Resolution | 75 | 50 |
| Type of MI<br>Anterior wall<br>Inferior wall<br>Lateral wall | <br>50<br>30<br>20 | <br>65<br>25<br>10 |

**Table-1:** Baseline characters in patients of Low NLR and High NLR

| Complications | Low NLR | High NLR | P value |
|---|---|---|---|
| Cardiogenic shock | 7(16.2%) | 36(83%) | .0002 |
| Heart failure | 8(22.2%) | 28(77.77%) | |
| Arrhythmia | 11(37%) | 18(62.06%) | |
| POST MI Angina | 4(33.3%) | 8(66.6%) | |
| Total | 30 | 90 | 120 |

**Table-2:** In hospital complication in Low NLR and High NLR patients

| Variables | Low NLR | High NLR | P value | P value |
|---|---|---|---|---|
| Death | 8(20%) | 32(80%) | .0004 | .0004 |
| Survive | 22(.18.3%) | 58(81.7%) | | |

**Table-3:** Total number of death and survival in complicated patients in low NLR and High NLR groups

thrombolysed were selected for this study and out of this 200 cases, [150(75%) men, 50 (25%) women] with an average age of 53 years. The studied patients were divided in two group according to NLR, Table 1 show baseline character of two NLR groups. Out of 200 patients with STEMI, 120 (60%) cases have developed complications and out of these 120 complicated patients, 40 (20%) died in hospital. Patients with high NLR groups had higher rate of complications (n=90 vs 30, 75% vs 25%, P value .002), and death (n=32 vs 8, 80% vs 20%, P value) in hospital than low NLR groups. Table 2 shows the rate of in hospital complications in the two groups. Median NLR in patients died in hospital was higher than those discharged alive (7.46 vs 4.70,p value.0004),

## DISCUSSION

Atherosclosis 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.[12] Early risk detection of STEMI patients improves outcomes. Our study suggest that high NLR is associated with higher risk of morbidity and mortality. NLR can contribute to risk stratification of patients with acute ST elevation myocardial infarction.[13] This study supports the role of NLR in predicting complications and death in myocardial infarction patients shown by some previous studies.[14-16] 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.[17] 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[18] conducted their study on STEMI patients and concluded that higher NLR is associated poor cardiovascular outcome. Felcino et al[19] 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

The present study was designed to determine predictive role of NLR on admission for morbidity and mortality in patients of STEMI thrombolysed with streptokinase. We finally concluded that NLR is simple and cost effective method to determine in hospital outcome in patients with STEMI**.** High NLR also predicted short-term mortality elevation myocardial infarction.

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