Prognostic Value of Ratio of Neutrophil to Lymphocyte to Predict Prognostic Outcomes in Patients with Acute ST Segment Elevation Myocardial Infarction

Punit Gupta¹, O.P. Patidar², Deepak Gupta³

ABSTRACT

Introduction: Atherosclerosis is an 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 STEMI. Patients 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: Leucocyte; 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 leucocyte count and the different clinical manifestations of coronary heart disease.² Elevated leucocyte count is an important marker of inflammation which is used to assess the prognosis and related complications in patients with established coronary artery disease.²³ Four days 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 and offer incremental prognostic value to total leucocyte count.⁴⁻¹¹

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 October 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 0.2 mV in lead V₁, V₂, and V₃ 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 disease 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 antihypertensive 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) cholesterol, and low density lipoprotein (LDL) cholesterol. Total leucocyte count and differential leucocyte 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

¹PG Resident, ²Professor, ³Professor HOD, Department of Medicine, Jhalawar Medical College, Jhalawar, Rajasthan, India

Corresponding author: Dr. Punit Gupta C/O Mr Mukesh Jain, Near Gayatri Mandir, NH12, Jhalawar, India

How to cite this article: Punit Gupta, O.P. Patidar, Deepak Gupta. Prognostic value of ratio of neutrophil to lymphocyte to predict prognostic outcomes in patients with acute ST segment elevation myocardial infarction. International Journal of Contemporary Medical Research 2018;5(4):D30-D32.

DOI: 10.21276/ijcmr.2018.5.4.31
7.47
28(77.77%)
8(20%)
30
.0004
32(80%)
12.29
7(16.2%)
18
.0004
30
8(66.6%)
15
4(33.3%)
High NLR
54
11(37%)
50
36(83%)
11.02
P value
52
Low NLR
120
Low NLR

myocardial infarction patients shown by some previous
ST elevation myocardial infarction can contribute to risk stratification of patients with acute
associated with higher risk of morbidity and mortality. NLR
of morbidity and mortality which depend upon initial clinical
thrombolysed with streptokinase. STEMI has a higher rate
of atheroma formation. This study was done to evaluate
which is started with the endothelial injury and progress
Atherosclosis is an inflammatory disorder of arterial wall
than those discharged alive (7.46 vs 4.70, p value .0004),
8, 80% vs 20%, P value) in hospital than low NLR groups.
(30 vs 75% vs 25%, P value .002), and death (n=32 vs
(60%) cases have developed complications and out of these
patients in low NLR and High NLR groups
complications. 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 al18 conducted their study on STEMI patients and concluded that higher NLR is associated poor cardiovascular outcome. Felcino et al19 done their study to assess 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
carried that NLR is simple and cost effective method
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.

REFERENCES

1. A.H. Ates, U. Canpolat, H. Yorgun et al. Total white
cell count is associated with the presence, severity
and extent of coronary atherosclerosis detected by dual
source multislice CT coronary angiography. Cardiology
Journal 2011;18:371-377.
2. Rosenfeld ME. Inflammation and atherosclerosis: Direct
versus indirect mechanisms. Curr Opin Pharmacol
2013; 13:154-60.
3. R.S.A llichandi and S.M. Khilari, Association between
neutrophil to lymphocyte ratio with presence and
severity of coronary artery disease. IOSR journal of
dental and Medical science 2016;15:11-13.
4. Yayan J. Emerging families of biomarkers for coronary
artery disease: Inflammatory mediators. Vase Health
Risk Manag 2013; 9:435-56.
5. Cakici M, Cetin M, Dogan A, Oylumlu M, Aktürek E,
Polat M, et al. Neutrophil to lymphocyte ratio predicts
poor functional capacity in patients with heart failure.
Turk Kardiyl Dern Ars 2014; 42:612-20.
6. Yıldız A, Yüksel M, Oylumlu M, Polat N, Akil MA, Acet
H. The association between the neutrophil/lymphocyte
ratio and functional capacity in patients with idiopathic
dilated cardiomyopathy. Anadolu Kardiyl Derg 2015;
15:13-7.
7. Erkol A, Oduncu V, Turan B, Kiliçgedik A, Karabay
CY, Akgün T, et al. Neutrophil to lymphocyte ratio in
acute ST-segment elevation myocardial infarction. Am
J Med Sci. 2014; 348:37-42.
8. Arbel Y, Shacham Y, Ziv-Baran T, Lauffer Perl M, Finkelstein A, Halkin A, et al. Higher neutrophil/lymphocyte ratio is related to lower ejection fraction and higher long-term all-cause mortality in ST-elevation myocardial infarction patients. Can J Cardiol 2014; 30:1177-82.

9. Pan W, Zhao D, Zhang C, Li W, Yu J, Wang S, et al. Application of neutrophil/lymphocyte ratio in predicting coronary blood flow and mortality in patients with ST-elevation myocardial infarction undergoing percutaneous coronary intervention. J Cardiol 2015; 66:9-14.

10. Hong LF, Li XL, Luo SH, Guo YL, Liu J, Zhu CG, et al. Relation of leukocytes and its subsets counts with the severity of stable coronary artery disease in patients with diabetic mellitus. PLoS One. 2014; 9:e90663.

11. Balta S, Demirkol S, Aparci M, Celik T, Ozturk C. The neutrophil lymphocyte ratio in coronary heart disease. Int J Cardiol 2014;176:267.l

12. Mann DL, Zipes DP, Libby P, Bonow RO. Braunwald E.Braunwald’s heart disease: A textbook of cardiovascular medicine. Tenth Edition. Philadelphia: Elsevier Saunders; 2015:p1249, 1250, 1253, 1319.

13. Cho KH, Jeong MH, Ahmed K, Hachinohe D, Choi HS, Chang SY, et al. Value of early risk stratification using hemoglobin level and neutrophil-to-lymphocyte ratio in patients with ST-elevation myocardial infarction undergoing primary percutaneous coronary intervention. Am J Cardiol 2011; 107: 849-5.

14. Kaya MG, Akpek M, Lam YY, Yarlioglues M, Celik T, Gunebakmaz O, et al. Prognostic value of neutrophil/lymphocyte ratio in patients with ST-elevated myocardial infarction undergoing primary coronary intervention: A prospective, multicenter study. Int J Cardiol 2013; 168:1154-9.

15. Ergelen M, Uyarel H, Altay S, Kul S, Ayhan E, Isik T, et al. Predictive value of elevated neutrophil to lymphocyte ratio in patients undergoing primary angioplasty for ST-segment elevation myocardial infarction. Clin Appl Thromb Hemost 2014; 20:427-32.

16. Akpek M, Kaya MG, Lam YY, Sahin O, Elcik D, Celik T, et al. Relation of neutrophil/lymphocyte ratio to coronary flow to in-hospital major adverse cardiac events in patients with ST-elevated myocardial infarction undergoing primary coronary intervention. Am J Cardiol 2012; 110:621-7.

17. Azab B, Zaher M, Weisburs KF, Torbey E, Lacossiere K,Gaddam S, et al. Usefulness of neutrophil to lymphocyte ratio in predicting short- and long-term mortality after non-ST-elevation myocardial infarction. Am J Cardiol. 2010;106:470-6. Cardiol 2013; 61: e78-e140.

18. Chia S, Nagurney JT, Brown DF, et al. Association of leukocyte and neutrophil counts with infarct size, left ventricular function and outcomes after percutaneous coronary intervention for ST-elevation myocardial infarction. Am J Cardiol. 2009;103:333–337.

19. Feliciano Chanana Paquissi et al. The role of inflammation in cardiovascular diseases: the predictive value of neutrophil–lymphocyte ratio as a marker in peripheral arterial disease. Ther clin Risk 2016; 12: