Research Paper

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Study of Prognostic Value of Neutrophil-Lymphocyte Ratio in Early Outcome of Myocardial Infarction

Medical Science

KEYWORDS : Neutrophil lymphocyte ratio, Myocardial infarction,prognosis

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ABSTRACT

OBJECTIVE: To study the value of neutrophil lymphocyte ratio in patients of acute myocardial infarction in immediate post-infarct period and correlation between the value and the development of complications and mortality during hospital stay in patients of AMI.S MATERIALS & METHODS: Patients of acute myocardial infarction admitted in ICCU of a general hospital were included in the present study. Acute Myocardial Infarction was diagnosed in patients with or without ischemic chest pain by presence of ST- segment elevation of > 1mm with or without T wave inversion and Q wave in more than two consecutive limb or chest leads in standard 12 lead ECG. Haemoglobin level, Total WBC count and differential count of patients were obtained by Abacus-3 haematology analyser (Hungary). RESULTS: We found strong association of Neutrophil Lymphocyte ratio with complications (p=0.004). Mean admission N:L ratio in patients with Complicated MI (4.0+/- 1) was found to be significantly higher than the mean level in patients with uncomplicated MI (3.5+/- 0.9). Rate of complications among patients in range of 0 to 2 N:L ratio was found to be 25% , in range of 2.1 to 4 it was 31.8% while with N:L ratio above 4 almost 44.7 % of patients had complications. We also found strong association of Neutrophil Lymphocyte ratio with death, mean admission N:L ratio in patients who died (4.2+/- 0.6) was found to be significantly higher than the mean level in patients who survived (3.6+/- 1). (p=0.006). Mortality among patients in range of 0 to 2 N:L ratio was nil, while in range of 2.1 to 4 it was 2.2% and in range above 4 was 21.1 %

INTRODUCTION

Coronary artery disease (CAD) continues to be a major cause of morbidity and mortality in both men and women not only in developed countries but also in developing countries. The extent of myocardial damage after an acute myocardial infarction determines the prognosis for morbidity and mortality in early post-infarct period, as also the overall quality of life.

It has been reported by Ala et al1 that leucocytosis and increase in neutrophils to lymphocytes ratio after an AMI has been associated with increased risk of in hospital heart failure and death. They also concluded in their study that both these markers are acting independently as risk predictors for early mortality. Measurement of release of these inflammatory process markers is quite a routine in day to day practice in every hospital, is cheap and does not require any sophisticated equipment. If these parameters are done in early infarct period may serve as prognostic indicators.

Considering all these aspects, we consider it worthwhile to study the prognostic value of three easily measured markers.

AIMS AND OBJECTIVES:

1) To study the value of neutrophil lymphocyte ratio in patients of acute myocardial infarction in immediate post-infarct period (as early as possible after the patient was admitted).
2) To find out the correlation between the neutrophil lymphocyte ratio and the development of complications and mortality during hospital stay in patients of AMI.

MATERIALS AND METHODS

Patients of acute myocardial infarction admitted in ICCU of a general hospital were included in the present study.

	Neutrophil Lymphocyte ratio		
	0-2	2.1-4	>4
Complicated MI (n=46)	01 (2.2%)	28 (60.8%)	17 (37%)
Uncomplicated MI (n=84)	3 (3.6%)	60 (71.4%)	21 (25%)
Death (n=10)	0	02 (20%)	08 (80%)

Acute Myocardial Infarction was diagnosed in patients with or without ischemic chest pain by presence of ST- segment elevation of > 1mm with or without T wave inversion and Q wave in more than two consecutive limb or chest leads in standard 12 lead ECG.

Detailed clinical examination of each patient was done and after initiating oxygen inhalation and pain relieving therapy, following investigations were sent;

- Haemoglobin level
- Total WBC count
- Differential count
- CPK-MB
- CRP level

Haemoglobin level, Total WBC count and differential count of patients were obtained by Abacus-3 haematology analyser (Hungary).

Statistical analysis of data obtained was done with help of SPSS (Statistical Package for Social sciences) version 13.0.

OBSERVATION

Table: 1 showing Age and sex distribution of patients.

Age group(years)	Male	Female	Total (%)
21-30	01	00	01 (0.7)
31-40	12	03	15 (11.53)
41-50	27	05	32 (24.61)
51-60	29	13	42 (32.30)
61-70	22	04	26 (20)
71-80	06	04	10 (7.6)
>80	04	00	04 (3.07)
Total	101	29	130(100)

One hundred and thirty patients of acute myocardial infarction admitted in a general tertiary care hospital were included in present study.

More number of male patients were admitted with AMI with M: F ratio of 3.5:1. Our youngest patient was 30 years old, 4 male patients were above 80 years of age, while maximum number of patients were in the 5th decade of life.

In present study, we included all the patients admitted with AMI irrespective of site of infarct and complications.

Thus we studied 86 patients of Anterior wall MI,
39 patients of Inferior wall MI
03 patients of global MI,
and 02 patients of RV+ Inferior wall MI.

At the time of admission, 12.3% of our patients had early complications of MI in the form of LVF (12 patients), arrhythmia (1 patient) and cardiogenic shock (3 patients), while 35.4% of our patients developed complication of MI during the course of the disease in hospital in the form of:

- LVF: 36.9%
- cardiogenic shock: 13%
- Arrhythmia: 26.2%,
- unstable angina: 17.4%,
- Ventricular septal rupture: 2.1%
- Acute cerebral stroke: 2.1%.

In all the patients, immediately after primary treatment and before thrombolytic therapy, blood samples were collected to measure CPK-MB, CRP and Neutrophil Lymphocyte ratio along with other routine investigations.

Raw data of the parameters measured in present study were not normally distributed. So, we applied Mann Whitney U test to analyse the values of NL Ratio for relationship with death and complications separately. In present study, we found strong association of Neutrophil Lymphocyte ratio with complications (p=0.004). Mean admission N:L ratio in patients with Complicated MI (4.0+/- 1) was found to be significantly higher than the mean level in patients with uncomplicated MI (3.5+/- 0.9). Rate of complications among patients in range of 0 to 2 N:L ratio was found to be 25% , in range of 2.1 to 4 it was 31.8% while with N:L ratio above 4 almost 44.7 % of patients had complications. We also found strong association of Neutrophil Lymphocyte ratio with death, mean admission N:L ratio in patients who died (4.2+/- 0.6) was found to be significantly higher than the mean level in patients who survived (3.6+/- 1). (p=0.006). Mortality among patients in range of 0 to 2 N:L ratio was nil, while in range of 2.1 to 4 it was 2.2% and in range above4 was 21.1 %.

Out of 130 patients in present study, 10 patients (8 male and 2 female) died, thus mortality was 7.7%. Two of these patients died of acute LVF one due to cardiogenic shock, rest of the patients had sudden cardiac arrest. Neutrophil lymphocyte ratio were comparatively higher than cut off values in all death cases.

CONCLUSION

A study of 130 patients admitted with AMI was done and findings are summarized as follow:

- Age group of 51-60 years contributed the maximum number of patients (42).
- Male to female ratio of patients was 3.5:1.
- Anterior wall was the commonest site of AMI.
- 35.4% of patients had complications.
- LVF was the commonest in-hospital complication whereas ventricular septal rupture and acute cerebral stroke were rarest.
- 7.7% (10 out of 130) of patients died. Majority of them died of arrhythmias and cardiogenic shock.
- Mean admission neutrophil lymphocyte ratio was 3.9. It was significantly higher in patients who died (4.2) than who survived (3.6). It was also significantly higher in patients with complicated MI (4.0) than in patients with uncomplicated MI (3.5).

From our study we draw a conclusion that N:L ratio at the time of hospital do have a direct correlation with development of complication and/or mortality in early post- infarct period. We also found that these markers are important not only for diagnosis but also have prognostic values and help in risk stratification and decision making regarding further early therapeutic intervention.

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