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Role of Neutrophil: Lymphocyte Ratio as a Predictive Marker in the Diagnosis of Acute Coronary Syndrome

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Abstract: ***Background: Acute Coronary Syndrome (ACS) is one of the prevalent conditions, responsible for fatal heart attack and heart failure & leading cause of mortality and morbidity worldwide. Aims and Objectives: To study NLR-Neutrophil Lymphocyte Ratio as a predictive marker in diagnosis of patients with ACS. Materials and Methods: A prospective study of 66 cases admitted in Princess Esra Hospital with diagnosis of ACS were studied, their CBC reports within 72hours of onset of symptoms were collected, NLR were analysed. After informed consent, 2ml of venous blood collected from antecubital vein under aseptic precautions in a K2 EDTA vacutainer. Samples were run on Sysmex XN550 automated 5part analyser and values of WBC differential count reconfirmed on Peripheral blood Smear. Results: Gender Distribution: Frequency Percentage Male 32 48.5 Female 34 51.5 Total 66 Discussion: In our study of 66 cases, there was slight female preponderance and majority of the females were of post-menopausal age group, 48.5%-males, 51.5%-females. Majority of patients had Neutrophilic leucocytosis with an elevated NLR. Most of patients fell in age group of 46-55years. P VALUE was calculated by applying Student T test and was found to be 0.00294. P value is statistically significant if P<0.05. C. Chen, et al, described NLR positively correlated with Myocardial damage. In a study by A. M. Shumailah, et al, NLR was found to be the strongest predictive marker for ACS, [p value=0.014]. CONCLUSION: NLR can be used as a predictive marker for the diagnosis of ACS. The study recommends using NLR as a simple, inexpensive, and widely available inflammatory marker which can be an auxiliary biomarker in the diagnosis of ACS.***

Keywords: Neutrophil Lymphocyte Ratio, Acute Coronary Syndrome

1. Introduction and Background

Cardiovascular diseases are the number one causes of mortality in humans worldwide, and acute coronary syndrome is one of the prevalent conditions that are responsible for fatal heart attack and heart failure. (1) Impaired vascular perfusion in MI and reperfusion cause the damage of the myocardium, depending on the duration of ischaemia and metabolic demand of the tissue. As a consequence, systematic and local inflammation can be triggered, which is important in the remodelling and the scar formation of the myocardium. (2, 3, 4)

Inflammation plays a key role in the development of atherosclerosis and in the pathogenesis of acute coronary syndrome (ACS). Leukocytes and leukocytes ratios were recognized as inflammatory markers in predicting the presence and severity of ACS.

Elevated white blood cells (WBC) play important role in vascular injury, development of an atherosclerotic plaque, its rupture and thrombosis. (5)

ACS is often accompanied with leukocytosis and it is thought to be associated with short term mortality and morbidity. (6 - 10).

The neutrophil count and NLR represent the balance between neutrophil and lymphocyte levels in the body and can be indicators of systemic inflammation. (11, 12)

2. Aims and Objectives

To study NLR - Neutrophil Lymphocyte Ratio as a predictive marker in diagnosis of patients with ACS.

3. Materials & Methods

A prospective study of 66 cases admitted from 1st April 2021 to 31st May 2021 at Princess Esra Hospital with diagnosis of Acute Coronary Syndrome in the Department of Cardiology were studied and their CBC reports within 72 hours of onset of symptoms were collected and Neutrophil to Lymphocyte ratios were analysed.

After routine informed consent from patient, 2ml of venous blood collected was collected from antecubital vein under aseptic precautions in a K2 EDTA vacutainer. Samples were run on Sysmex XN550 automated 5 part analyser and values of WBC differential count reconfirmed on Peripheral blood Smear.

Inclusion Criteria:

Patients diagnosed as Acute Coronary Syndrome - i.e., Patients with symptoms of Myocardial Infarction like:

- Central chest pain – Crushing sensation or Heaviness in the chest (radiating to left arm, neck, jaw)
- Diaphoresis - Excessive abnormal sweating in relation to environment and activity.
- Feeling of impending doom

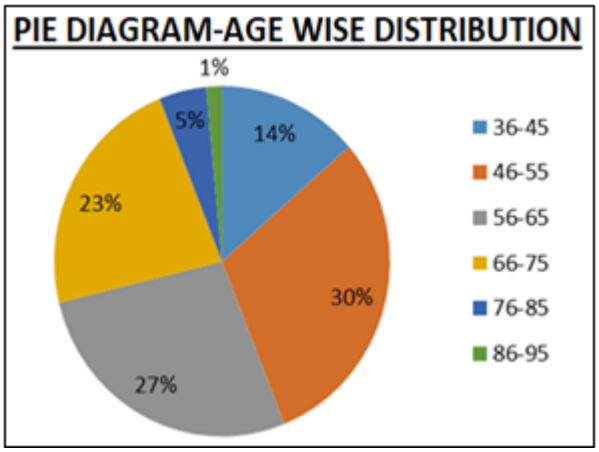
- Nausea/ Vomiting
- Along with ECG changes and Elevated biochemical markers like Troponin - I, Pro BNP were included in the study.

Exclusion Criteria:

- Patients admitted with symptoms of chest pain, breathlessness, etc. - Differential Diagnosis of MI:
- Oesophageal Rupture
- Pericarditis
- Aortic Aneurysm
- Endocarditis
- Pericardial effusion/ Cardiac Tamponade
- Severe Anxiety
- Pulmonary Embolism.

4. Results

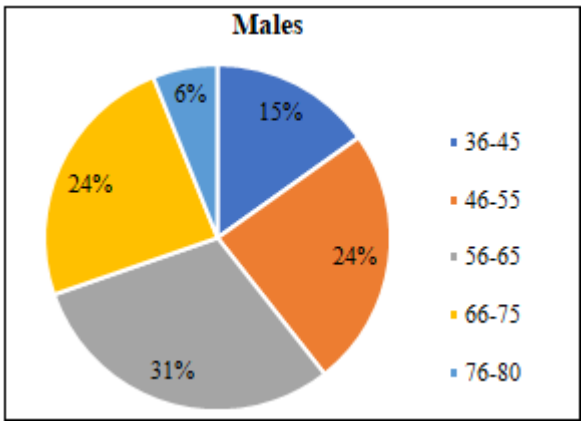
Age Wise Distribution of Cases of Acute Coronary Syndrome in Our Study:



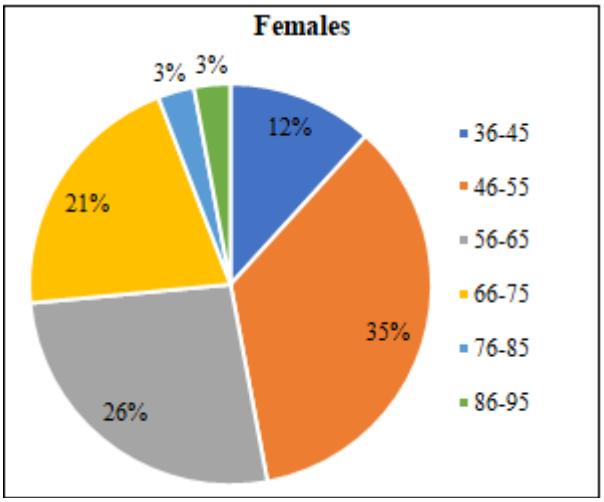
Age Distribution		
Age	Frequency	Percentage
36 - 45	9	13.6
46 - 55	20	30.3
56 - 65	18	27.3
66 - 75	15	22.7
76 - 85	3	4.5
86 - 95	1	1.5
Total	66	

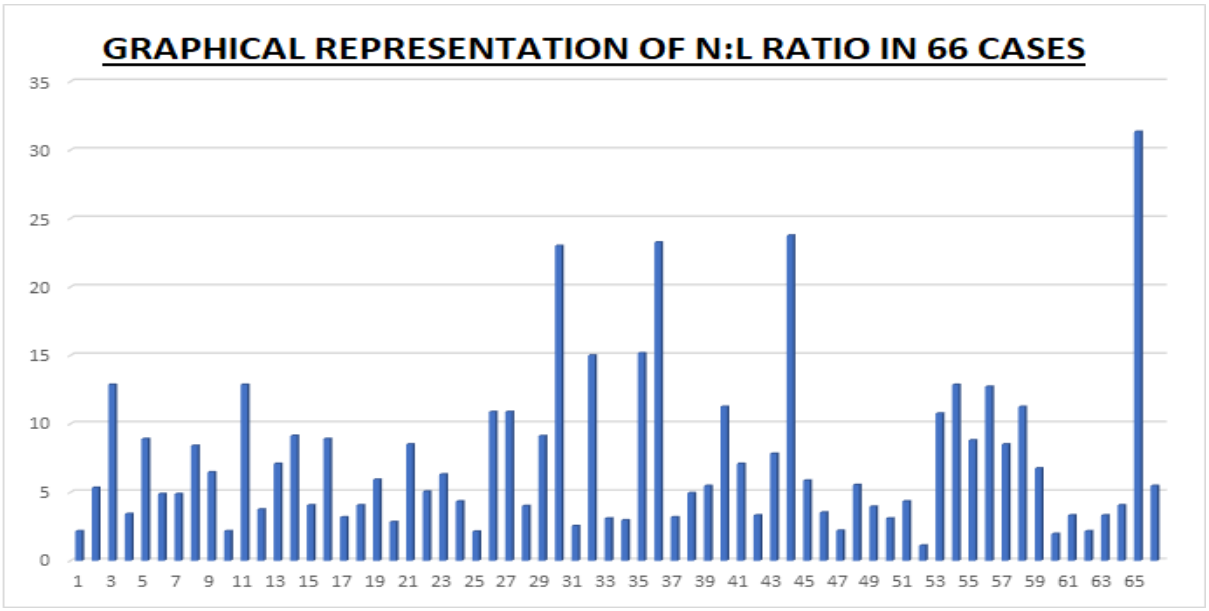
Gender Distribution	Frequency	Percentage
Male	32	48.5
Female	34	51.5
Total	66	

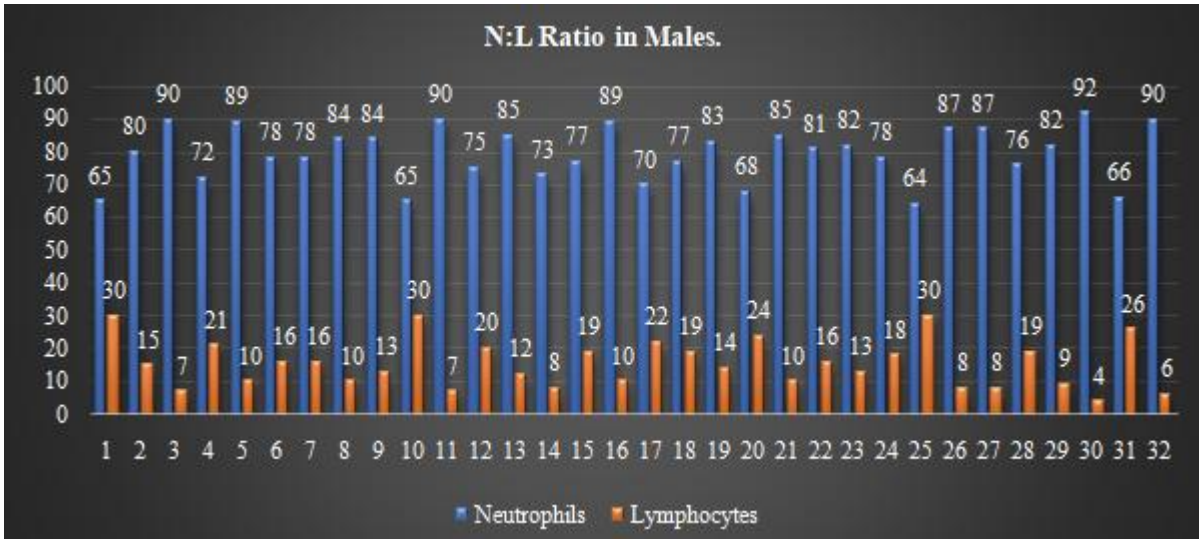
The following pie diagrams show age wise distribution in males.

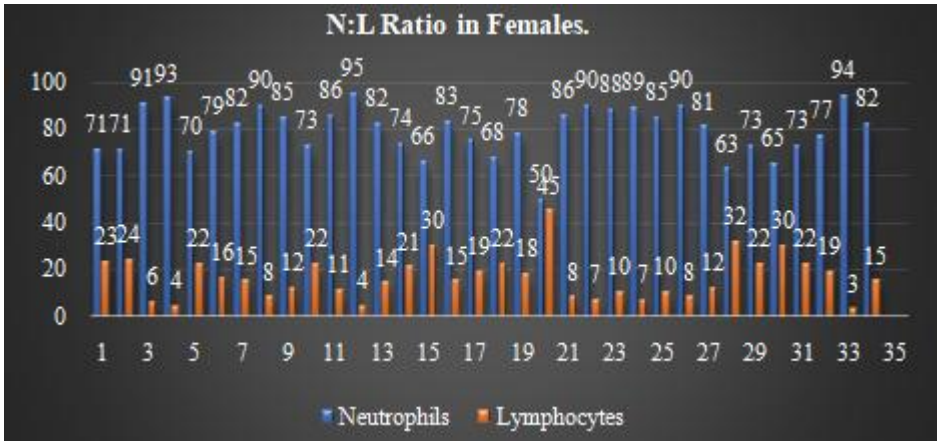


The following pie diagram shows age wise distribution in females:









5. Discussion

- Myocardial Infarction is the leading cause of mortality and morbidity worldwide. In our study of 66 cases, there was slight female preponderance and majority of the females were of post menopausal age group. In our study 32 out of 66 patients i. e., 48.5% were males and 34 out of 66 patients i. e., 51.5% were females.
- In the present study majority of the patients had Neutrophilic leucocytosis with an elevated N: L ratio. Majority of patients in our study fell in the age group of 46 - 55 years. P VALUE was calculated by applying Student T test on SPSS software and it was found to be 0.00294. P value is statistically significant if $P<0.05$. C. Chen et al described NLR positively correlated with Myocardial damage (13). In a study by A. M. Shumailah, et al NLR was found to be the strongest predictive marker for ACS, [p value=0.014] (14).

6. Conclusion

- NLR can be used as a predictive marker for the diagnosis of ACS.
- The study recommends using NLR as a simple, inexpensive, and widely available inflammatory marker which can be an auxiliary biomarker in the diagnosis of ACS.

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