Original Article

A CROSS-SECTIONAL OBSERVATIONAL STUDY OF THE RELATIONSHIP BETWEEN NEUTROPHILS AND LYMPHOCYTES IN CORONARY ARTERY DISEASE

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Abstract

Inflammatory indicators are traditional markers of inflammation in cardiovascular disorders, the leading cause of death worldwide (30%). The study will compare neutrophil and lymphocyte counts to coronary artery disease severity. October 2019 marked the beginning of patient registration 72 patients in total. Using the normal protocol, each individual was examined. Before the trial began, participants gave written consent. Interviews were done using a questionnaire containing questions regarding sociodemographic, addiction, the clinical profile, and other issues. The form also asked about past and present medical histories. When needed, sputum, blood, cerebrospinal fluid (CSF), pleural fluid, ascitic fluid, and pus cultures were used to diagnose infections. The entire database was developed in Excel. IBM SPSS Statistics 21.0 and Openepi 2.3.1 are used for all statistical studies. The percentage, mean, range, and standard deviation were used to describe the data. The Chi-square test and student t-test were employed to determine statistical significance for both qualitative and quantitative data. Therefore, a valuable measure for assessing the severity of coronary artery disease is the neutrophil-to-lymphocyte ratio.

Keywords: Coronary Artery Disease Severity, Neutrophil, Lymphocyte, Red Cell Distribution Width.

Introduction

In 40% of cardiovascular deaths, coronary heart disease is to blame. Coronary heart disease will probably continue to be a major cause of morbidity and mortality for many years to come. It takes years for the clinical symptoms of atherosclerosis, a chronic disease of the coronary arteries, to manifest. Fundamental to the development and spread of atherosclerotic plaques are intricate inflammatory and immunological mechanisms. 1 The fact that it is an inflammatory disorder has led to the suggestion of several inflammatory markers for the evaluation of cardiovascular risk. In patients with acute myocardial infarction, red cell distribution width (RDW) and neutrophil-to-lymphocyte ratio (NLR) are the two markers of inflammation that are used to determine the likelihood of morbidity and poor cardiovascular outcomes (AMI). 2 Since the values of these inflammatory markers are easily accessible during the examination of a normal blood count, NLR has the potential to be used as a reliable and affordable predictor of inflammation and cardiovascular issues. 3 Recent research has identified the neutrophil-to-lymphocyte ratio (NLR), also known as the neutrophil-to-lymphocyte ratio, as a potential novel biomarker with the ability to predict more severe clinical diseases, such as infectious disease and cardiovascular disease. To establish the prognostic significance of NLR in patients with an ST-elevation myocardial infarction,

there is inadequate information (STEMI). This investigation's goal was to assess NLR's possible prognostic significance in STEMI patients.

We will therefore examine the relationship between neutrophil and lymphocyte counts and the severity of coronary artery disease in this investigation.

AIM

To assess neutrophils to lymphocytes as an inflammatory ratio with coronary artery disease by comparing neutrophil and lymphocyte levels with disease severity.

SOURCE OF SAMPLE:

The study was performed at Krishna Hospital and Research Institute's Medical Outpatient Department.

INCLUSION CRITERIA

1. Age>18 years
2. Bothgender
3. Diagnosedwithcoronary arterydisease
4. Willingtoparticipate

EXCLUSION CRITERIA

1. Thepresenceofany activeorrecentinfections.
2. Patientswithotherhematopathology.
3. Patientswithsevereanaemia. (Hemoglobin<7g/dl)
4. PatientswithCerebrovascularAccident.
5. Patientswhohaverefusedconsentto thestudy.

STUDY DESIGN: The study was an observational one that took a cross-sectional approach.

STUDY PERIOD: Patients were recruited for the study between the months of October 2019 and October 2021.

Material & Method

The outpatient medicine division of a tertiary care hospital. In October 2019, patient sign-ups got under way. As soon as they entered the department of medicine, they registered. When patients registered for the trial, those who met the exclusion criteria were not included. Seventy-two patients were present in all. The usual protocol was used to evaluate each patient. Before the trial started, participants' signed informed consent was obtained. The study was open to patients who had appointments at the Medicine department and met the eligibility criteria. A questionnaire with usual questions regarding sociodemographic traits, addiction, the clinical profile, and other

issues was used during the interviews, which were conducted in accordance with a predetermined timetable. The questionnaire also asked questions on the respondent's current health and medical history as well as past medical history. Sputum, blood, cerebrospinal fluid (CSF), pleural, ascitic, and pus cultures were all used to determine the source of an illness as necessary.

Stastical Analysis

Excel was used to create the complete database. All statistical analysis was conducted using IBM SPSS Statistics 21.0 and Openepi 2.3.1. The data were described using descriptive statistics such as percentage, mean, range, and standard deviation. To examine the statistical significance of the qualitative and quantitative data, respectively, the student t-test and the Chi-square test were both used.

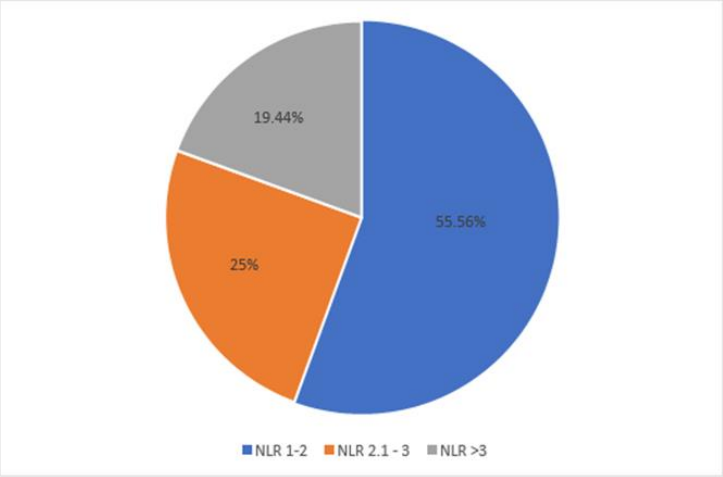
Result

For this analysis, we included 72 participants who had coronary artery disease. Of the total number of subjects (72), 55.56 percent had only mild disease (NLR 1-2), 25 percent had intermediate disease (NLR 2.2–3.3), and 19.44 percent had severe disease (NLR > 3).

Table 1: Distribution of the study population depending on severity of coronary artery disease based on neutrophilto lymphocyte ratio.

NLR	Severity	Subjects with CAD (n=72)	Percent
1-2	Mild	40	55.56
2.1-3	Moderate	18	25
>3	Severe	14	19.44
Total		72	100

Graph 1: Distribution of study population depending on severity of coronary artery disease based on neutrophils lymphocyte ratio(NLR)

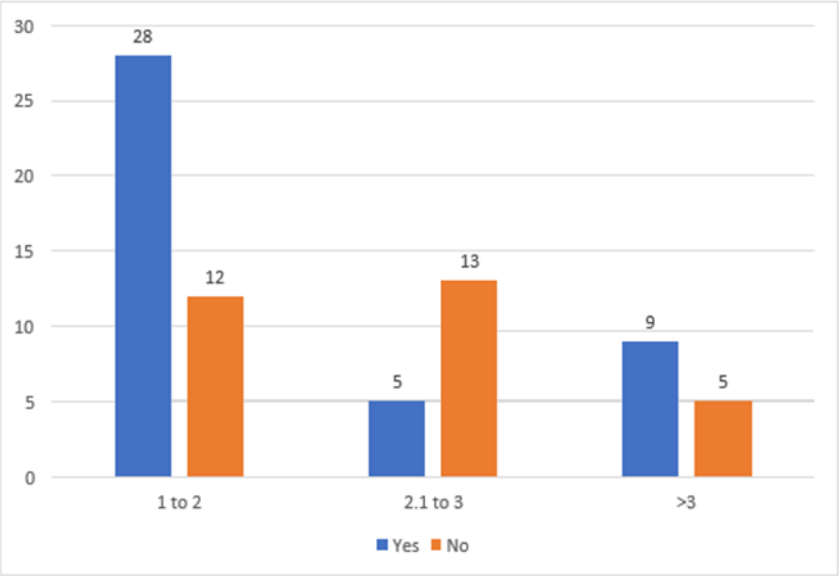


The current study comprised 72 participants with coronary artery disease. 42 (58.33%) of the 72 participants were smokers. Among smokers, 28 participants had an NLR between 1-2, 5 subjects had an NLR between 2.1-3, and 9 subjects had an NLR >3, indicating that the data is significant (R = 0.09).

Table 2: Distribution of study population based on history of smoking and its association with NLR

NLR	Positive history of smoking	No history of smoking	Total	'p' value
1-2	28 (38.88%)	12 (16.66%)	40	0.009
2.1-3	5 (6.94%)	13 (18.05%)	18	
>3	9 (12.5%)	5 (6.94%)	14	
Total	42 (58.33%)	30 (41.66%)	n = 72	

Graph 2: Association between NLR and history of smoking in a study population having coronary artery disease

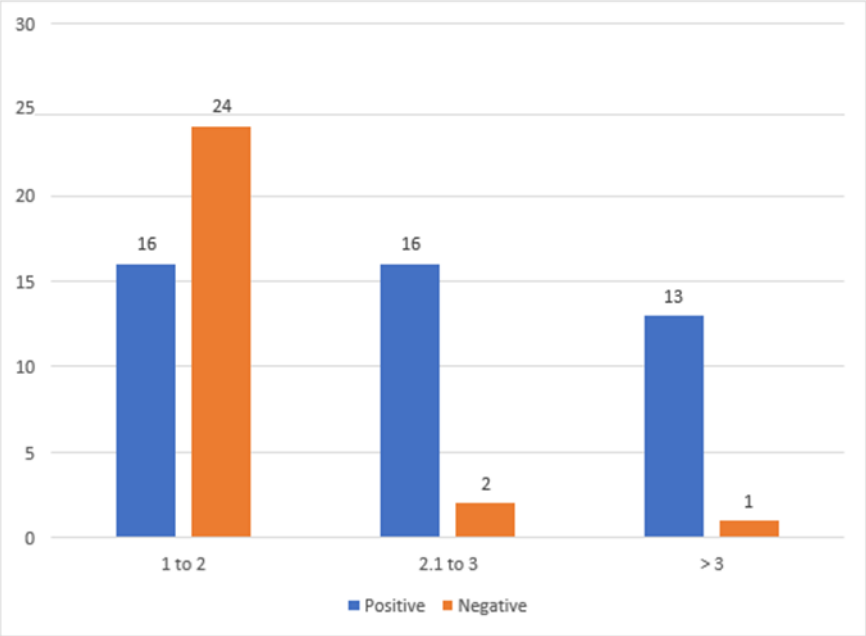


The current study comprised 72 participants with coronary artery disease. Of the 72 participants, 45 (62.5%) had positive hs-CRP and 27 (37.5%) had negative hs-CRP. Out of the total positive hs-CRP individuals, 16 had an NLR between 1-2, 16 had an NLR between 2.1-3, and 13 had an NLR > 3, which was statistically significant (P. Out of the total positive hs-CRP individuals, 16 had an NLR between 1-2, 16 had an NLR between 2.1-3, and 13 had an NLR > 3, which was statistically significant (p = 0.0001%).

Table 3: Distribution of study population based on hs-CRP and its association with NLR in coronary artery disease.

NLR	Positive hs-CRP	Negative hs-CRP	Total	'p' value
1-2	16 (22.22%)	24 (33.33%)	40	<0.0001
2.1-3	16 (22.22%)	2 (2.77%)	18	
>3	13 (18.05%)	1 (1.38%)	14	
Total	45 (62.50%)	27 (37.50%)	n = 72	

Graph 3: Association between NLR and hs-CRP in a study population having coronary artery disease.

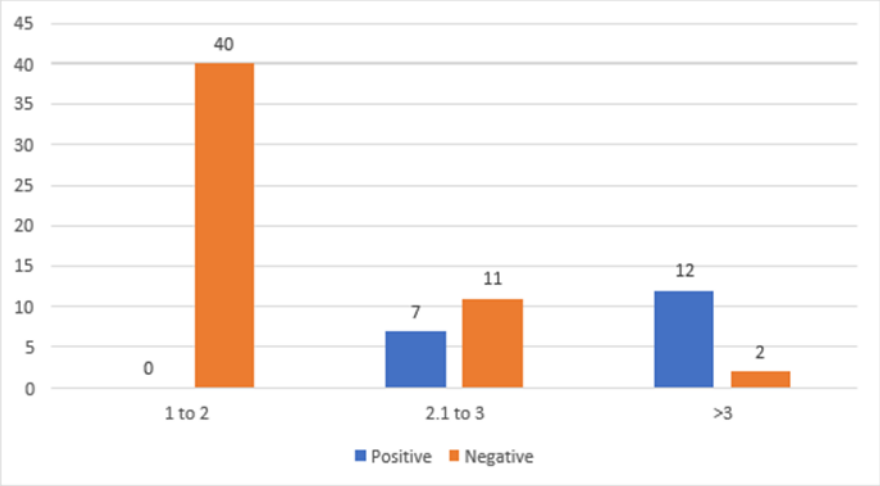


The current study comprised 72 participants with coronary artery disease. Positive ESR values were found in 19 (26.39%) of the 72 patients, while negative ESR levels were found in 53 (73.61%). Among 19 participants with elevated ESR, 7 had a NLR between 2.1-3 and 12 had a NLR between ratios >3, which was statistically significant (p = <0.05).

Table 4: Distribution of study population based on ESR levels and its association with NLR in study population of coronary artery disease.

NLR	Positive ESR	Negative ESR	Total	'p' value
1-2	0	40 (55.55%)	40	<0.0001
2.1-3	7 (9.72%)	11 (15.27%)	18	
>3	12 (16.66%)	2 (2.77%)	14	
Total	19 (26.39%)	53 (73.61%)	72	

Graph 4: Association between NLR and ESR in a study population having coronary artery disease.



Discussion

According to the neutrophil-to-lymphocyte ratio, the majority of patients (55.56%) had mild coronary artery disease (NLR 1-2), 25% had intermediate coronary artery disease (NLR 2.1–3), and only 19.44% had severe coronary artery disease (NLR >3). The majority of patients, 62.5%, exhibited a positive hs-CRP. A study conducted by Kamal Sharma and colleagues revealed that the majority of cases—57%—had abnormal levels of hs-CRP. The average was 1.8. There was no statistical significance between NLR and CRP (p = 0.284). In the current study, 26.39% of the cases had a positive ESR. According to a study conducted by Kamal Sharma et al., the average ESR was 22.5 ±9.1. NLR and ESR have high statistical significance (p 0.0001) in our study. Whereas, no statistical significance was found between NLR and ESR (p = 0.803) in Kamal Sharma et al study. [4]NLR and Hs CRP were found to have a highly significant statistical relationship (p = 0.0001). NLR was related to Hs CRP, as shown by a study conducted by Verdoia M et al., which also showed comparable results (p 0.001).[5]In our investigation, there was statistical significance between NLR and smoking history (p = 0.009). In contrast, Hasan Kaya et al. found no link between smoking and NLR. ('p' = 0.390)[6] .

Conclusion

In this study, there was a direct correlation between the severity of coronary artery disease and the neutrophil-to-lymphocyte ratio (NLR). A high neutrophil to lymphocyte ratio has been associated with coronary artery occlusion and triple vessel coronary artery disease (NLR). In comparison to nonsmokers, smokers had a statistically increased neutrophil-to-lymphocyte ratio (NLR). Positive correlations were found between ESR, CRP, and neutrophil-to-lymphocyte ratio (NLR). A measure of the severity of coronary artery disease is the neutrophil-to-lymphocyte ratio. Coronary artery disease severity can be determined by the neutrophil-to-lymphocyte ratio.

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