Original Article

A Study Of Disease Activity In 50 New Onset Rheumatoid Arthritis Patients And Its Correlation With Das 28 Crp

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DOI: 10.47750/pnr.2023.14.S02.06

Abstract

Background :Neutrophil-to-lymphocyte ratio (NLR) have been reported to reflect the inflammatory response and disease activity in a variety of inflammatory conditions like Rheumatoid Arthritis.

Objectives This study aimed to evaluate the value of NLR as a marker to monitor disease activity in RA patients.

Methods A prospective cross sectional study was performed in 50 patients of Rheumatoid Arthritis. We evaluated NLR in these patients and correlated it with disease activity using DAS 28 CRP.

Results Increased NLR was observed in patients with RA. Majiority of the patients were females(90%).Most of the patients were in the age group of 30-44 years.Mean TJC and SJC were4.4871 ± 2.327 and 2.4689 ± 2.4345 respectively. The mean TLC was 9224.57 ± 3124.57 whereas mean neutrophil count was 52203.34 ± 2103.17 and mean lymphocyte count was 2128 ± 1120.17. It was observed that there was no statistically significant correlation of NLR with DAS 28 CRP.

Conclusion: There was no statistically significant correlation of NLR with DAS 28 CRP.

1. INTRODUCTION:

Rheumatoid arthritis (RA) is a systemic autoimmune inflammatory disorder evidenced by infiltration of the synovium with neutrophils, macrophages, T cells, B cells, and dendritic cells, in addition to accelerated destruction of cartilage and bone, resulting in substantial morbidity and a shortened life span.[1] In the past couple of years, the

Neutrophil Lymphocyte Ratio (NL RATIO) has emerged as a useful predictor of disease severity for diagnosis, evaluating disease severity, and predicting disease course. Neutrophils, lymphocytes, and platelets play a role in the control of inflammatory response, and systemic inflammation is associated with alterations in the number and structure of circulating blood cells, such as neutrophilia, lymphopenia, and thrombocytosis. NLR is determined by dividing the absolute number of neutrophils by the absolute number of lymphocytes, and PLR is calculated by dividing the absolute number of platelets by the absolute number of lymphocytes.[1] As an innovative inflammatory marker, NLR may be beneficial in assessing the magnitude of autoimmune and inflammation-related diseases. In RA, erythropoiesis is mediated by proinflammatory such as interleukin (IL)-1, IL-6, and tumour necrosis factor (TNF)-. Platelets are one of the most important immune cells. Neutrophils and lymphocytes, which include T cells and B cells, compensate for 40%75% of leukocytes in peripheral blood circulation, whereas lymphocytes account for 20%45%. Neutrophils and platelets contribute to the generation of inflammatory markers, which leads to their activation. NLR is a publicly available and cost-effective effective laboratory parameter used to evaluate systemic inflammation. Chronic hepatitis B and/or C infection, renal failure, diabetes mellitus, valvular heart disease, acute coronary syndromes, thyroid functional abnormalities, metabolic syndrome, essential hypertension, and multiple inflammatory diseases have had the impact on influencing the NLR.[1] Research on NLR and RA disease activity has often showed conflicting results. Inconsistencies and limitations in the individual studies were addressed by this meta-analysis. This meta-goals analysis's were to assess the relationship between NLR and RA as well as to establish a link between NLR levels and RA disease activity.

2. MATERIALS AND METHODS:

2.1 Patients and study design

This prospective cross-sectional investigation was carried out in single location, the Dr. DY Patil Hospital and Research Hospital. In the course of 2020–2022, computerised records of RA patients who received care at the Medicine and Rheumatology OPDs and wards were gathered. The American College of Rheumatology (ACR)/European League Against Rheumatism (EULAR) criteria created in 2010 were used to diagnose RA. Individuals with a history of usage of steroids at a dose of more than 7.5 mg/day of prednisone or equivalent, active infection, cancer, or other autoimmune diseases, that could alter the NLR values were excluded from the study. After getting the lab findings, the NLR for each participant was manually computed by dividing the neutrophil count by the lymphocyte count. The Disease Activity Score of 28 joints (DAS28) system, which counts the number of sore joints and swollen joints, the ESR or CRP, and the patient's overall health using a visual analogue scale, was used to determine the disease activities of RA patients. As a result, the disease can be divided into four groups: those with severe activity (DAS28 5.1), moderate activity (3.2 DAS28 5.1), low activity (2.6 DAS28 3.2), and those in remission (2.6). According to the DAS28 system, we separated the patients into two groups. Patients in remission, or those with a DAS28 system score of less than 2.6, were placed in Group A, while those with a score of 2.6 or more were placed in Group B. (patients with active disease). Prior to starting the study, approval from the institutional ethics subcommittee was obtained. All patients provided their written, fully informed consent in English, Marathi, or both. In their own language, the study's objectives, methods, risks, and benefits were explained to the participants.

2.2 Statistical analysis:

Data was collected and entered into MS Excel (365) and R software. Qualitative variables are expressed as percentages and frequencies at 95% confidence interval. Quantitative variables were expressed in form of mean ,standard deviation. Correlation of anemia with DAS 28 CRP and HAQ DI was done with Pearson’s correlation coefficient and “ comparision of groups was done by Pearson’s correlation test,student’s t test and one way annova test.The values were considered significant if p value was <0.05.”

3. RESULTS:

Table 1: Distribution of patients according to sex

SEX	NUMBER OF PATIENTS	"PERCENTAGE"
MALE	6	12 %
FEMALE	46	92 %
TOTAL	50	100%

Out of 50 patients, 6 (12 %) of patients were males and the remaining 46 (92 %) were females.

Table 2: Distribution of patients according to Age

AGE (in years)	**NUMBER OF PATIENTS(n)**	**PERCENTAGE**
16-29	10	20 %
30-44	16	32 %
45-59	10	20 %
60-75	14	28 %
Total	50	100%

AGE (mean = 42.94 ; SD = 10.7421)

In the age groups of 16 to 29 years, there were 10 (20%) patients, 30 to 44 years, 16 (32%) patients, 45 to 59 years, 10 (20%) patients, and 60 to 75 years, there were 14 (28%) patients. The standard deviation was 10.74 years, with a mean age of 42.94 years.

Table 3: Distribution of patients according to Tender and Swollen Joint Count

Parameter	**Mean ± SD**	**Minimum (n)**	**Maximum (n)**
TENDER JOINT COUNT (TJC)	4.4871 ± 2.327	0	12
SWOLLEN JOINT COUNT (SJC)	2.4689 ± 2.4345	0	10
TOTAL PATIENTS=5			

Mean count of tender joint was observed to be4.4871 ± 2.327 while swollen joints were 2.4689 ± 2.4345.

PARAMETER	Mean ± SD	Minimum (n)	Maximum (n)
TOTAL LEUCOCYTE COUNT (TLC) (N=4000-10000/micro litre)	9224.57 ± 3124.57	2200	28400
NEUTROPHIL (N= 40-80%,2000-7000/micro litre)	52203.34 ± 2103.17	924	16209
LYMPHOCYTE (N= 20-40%,1000-3000/micro litre)	2128 ± 1120.17	328	6220

Table 4: Total and differential Leucocyte counts in RA:

It was observed that mean TLC was 9224.57 ± 3124.57 whereas mean neutrophil count was 52203.34 ± 2103.17 and mean lymphocyte count was 2128 ± 1120.17.

Table 5: Distribution of patients according to neutrophil / lymphocyte ratio

N/L RATIO	FREQUENCY (n)	PERCENTAGE (%)
<1	5	10 %
1 – 3.5	10	20 %
3.6 – 6	10	20 %
6.1 – 9	10	20%
9.1-18	11	22 %
>18	4	8 %
TOTAL PATIENTS	50	

It was seen that 5(10 %) patients had N/L ratio <1, 10 (20 %) had N/L ratio between 1-3.5, 3.6-6 , 7 and 6.1-9 each and , 11 (22%) had N/L ratio between 9.1-18 and 4(8% of the patients had N/L ratio >18.

Table 6: Correlation of DAS 28 score with NLR:

Test used: Correlation test using Pearson's correlation coefficient (if P value < 0.05; significant. i.e. There is correlation between two variables.)

CORRELATION	DAS 28 CRP	CI (95%)	P value
N/L RATIO	0.0799	(-0.2059, 0.3532)	0.5852

It was observed that there was no statistically significant correlation of NLR with DAS 28 CRP.

4. DISCUSSION:

In the present study,out of 50 patients, 6 (12 %) of patients were males and the remaining 46 (92 %) were females.These results were in concordance with other similar studies. A study conducted by Ghosh et al revealed that 79.16% patients were females & 20.84% were males.[2] In the age groups of 16 to 29 years, there were 10 (20%) patients, 30 to 44 years, 16 (32%) patients, 45 to 59 years, 10 (20%) patients, and 60 to 75 years, there were 14 (28%) patients. The standard deviation was 10.74 years, with a mean age of 42.94 years.

According to TACERA longitudinal studies, mean age was 53.1 ± 15.2 years.[3] In a study by Singh et al., it was discovered that 32.20% of the patients were between the ages of 31 and 40, 20.34% were between the ages of 40 and 50, and 13.56% were beyond the age of 60.[4] In the present study mean count of tender joint was observed to be 4.4871 ± 2.327 while swollen joints were 2.4689 ± 2.4345. According to a study by Riazzoli et al , mean SJC and TJC in patients of RA at baseline were 9.52±5.2 and 10.98±7.3 respectively.[5] It was observed in the current study that mean TLC was 9224.57 ± 3124.57 whereas mean neutrophil count was 52203.34 ± 2103.17 and mean lymphocyte count was 2128 ± 1120.17.

It was seen that 5(10 %) patients had N/L ratio <1, 10 (20 %) had N/L ratio between 1- 3.5 , 3.6 - 6 , 7 and 6.1-9 each and , 11 (22%) had N/L ratio between 9.1-18 and 4(8% of the patients had N/L ratio >18.
According to Mercan et al, NLR was higher in patients with RA as compared to the control group (2.53 ± 1.4 vs. 2.16 ± 1.0).[6] According to a study by Fawzy et al , NLR was significantly increased in the RA patients (3.28 ± 0.59) compared to the control (1.7 ± 0.23) .[7]A meta-analysis by Lee revealed that NLR was significantly higher in the RA group than in the control group. NLR had a positive correlation with RA activity measured by using DAS28. This meta-analysis showed that NLR was a new potential inflammatory markers that can be used to evaluate inflammatory status and disease activity in patients with RA. This increase in NLR can be explained by the fact that inflammatory cytokines cause increased neutrophil and platelet production in active RA as part of the inflammatory process.[1]According to a study conducted by Li et al, NLR had a good value for judging RA disease activity, indicating that NLR was the same as CRP and ESR and can be used as important indicators in assessing RA disease activity. However, compared with CRP and ESR, NLR reflects the degree of inflammation more objectively, and remain relatively stable. [8]It was observed in our study that that there was no statistically significant correlation of NLR with DAS 28 CRP.Our results were in concordance with a study by Chandrashekhar et al which states that patients with NLR <2 had 10 times better chances of remission and lesser chances of relapse in patients of RA and that it was not correlated with disease activity.[9]Fawzy et al revealed that here was a significant correlation between NLR and DAS-28. NLR was significantly elevated in highly active RA patients compared to patients with moderate and low disease activity .[7] According to Mercan et al, NLR correlated well with DAS28.[6] According to Li et al, NLR correlated well with disease activity in RA. [8]

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