Original Research Paper　　　　**General Medicine**

THE STUDY OF NEUTROPHIL LYMPHOCYLE RATIO AS A PROGNOSTIC INDICATOR IN PATIENTS WITH COMMUNITY AQUIRED PNEUMONIA

Dr. Shivdas Medabalmewar	JR-II, Department of Medicine, Government Medical College and Hospital, Aurangabad, Maharashtra, India.
Dr. Vilas Paradke	JR-III, Department of Medicine, Government Medical College and Hospital, Aurangabad, Maharashtra, India.
Dr. Meenakshi Bhattacharya	Professor and Head, Department of Medicine, Government Medical College and Hospital, Aurangabad, Maharashtra, India.

ABSTRACT　**Introduction:** Community-acquired pneumonia (CAP) is a common, potentially fatal disease despite advances in both diagnosis and treatment. Neutrophilia is well recognized as an infection marker whereas the clinician is less familiar with absolute lymphocytopenia. Combining both parameters seems a logical step and the ratio of neutrophil and lymphocyte counts is increasingly used in several clinical circumstances. **Objectives:** To study N:L ratio as a prognostic indicator in patients with community-acquired pneumonia. **Methodology: Study Population:** Admitted Patients of community-acquired pneumonia in our hospital from Sept 2020 to November 2022 **Sample Size:** 100 Using Cochran's formula **Results:** We compared the survival of the patients in our study with respect to the N:L ratio and found that the N: L ratio of ≥ 7 was a better predictor of mortality with 14 deaths out of total al of 29 (48.28%) compared to 4 deaths out of 38 cases with N: L ratio of 3.5 to 7 (10.53%) and one death out of 33 cases in with N: L ratio of less than 3.5 (3.03%). **Conclusion:** In patients with CAP, the N:L ratios was associated with the severity of the disease and could be good prognostic markers for the prediction of morbidity and mortality in these patients. NL Ratio, as a biomarker, is easy to evaluate and calculate and gives an idea about the severity evaluation or prognostic prediction of CAP patients.

KEYWORDS : Neutrophil-to-lymphocyte ratio, Community-acquired pneumonia, Prognostic indicator.

INTRODUCTION:

Community-acquired pneumonia (CAP) is a common, potentially fatal disease despite advances in both diagnosis and treatment. Biomarkers, preferably in combination with clinical risk scores, are increasingly used to identify specific patients at risk, to judge the severity of illness and prognosis of CAP, and more recently to guide antibiotic therapy. Following endotoxemia the number of circulating neutrophils increases while lymphocyte counts decrease. Neutrophilia is well recognized as an infection marker whereas the clinician is less familiar with absolute lymphocytopenia (lymphocyte count below $1.0\times10e9/l$) as a possible marker in infectious disease management. Combining both parameters seems a logical step and the ratio of neutrophil and lymphocyte counts is increasingly used in several clinical circumstances. A neutrophil-to-lymphocyte ratio (NLR) > 7 is reportedly an independent marker of mortality in patients with bacteremia. However, no studies have shown an association between inflammation-based prognostic scores (including the Glasgow Prognostic Score, the NLR, the platelet-to-lymphocyte ratio, the Prognostic Nutritional Index, and the Prognostic Index) and mortality in patients with pneumonia. We conducted this study to evaluate neutrophil lymphocytes count ratio as a prognostic indicator in patients with community-acquired pneumonia.

Study Objectives:
Primary Objective:
To study neutrophil lymphocytes, count ratio as a prognostic indicator in patients with community-acquired pneumonia

Secondary Objective:
To evaluate the outcome of patients with lymphocytosis in community acquired pneumonia

MATERIAL AND METHODS:
Study Design: Cross-Sectional observational Study.

Study Setting : Medicine ward tertiary care centre

Study Population: Admitted Patients of community-acquired pneumonia in our hospital from September 2020 to November 2022 .

Sample Size: 100

Inclusion Criteria:
Random selection of diagnosed cases of Community Acquired Pneumonia.

Patients above 12 years of age were included in this study

Exclusion Criteria:
Pregnant women were excluded from this study.

Who did not give consent for study.

OBSERVATION AND RESULTS:
- In the observational cross-sectional study of 100 patients of community-acquired pneumonia done at tertiary care hospital, the detailed observations in our study are as follows:
- The most common cause of pneumonia was Streptococcus Pneumoniae in 48%, followed by Covid-19 in 30 cases (30%), Mycoplasma Pneumonia in 6%, Hemophilus Influenzae in 6%, and Staph. Aureus in 5% of the cases Influenza in 5% of the cases.

Table No.1: Etiology of Pneumonia

| Etiology of pneumonia	Frequency	Percent
Streptococcus Pneumoniae	48	48%
Covid 19	30	30.0%
Mycoplasma Pneumonia	6	6.0%
Hemophilus influenza	6	6.0%
Staph. Aureus	5	5.0%
H1N1	5	5.0%
Total	100	100.0%
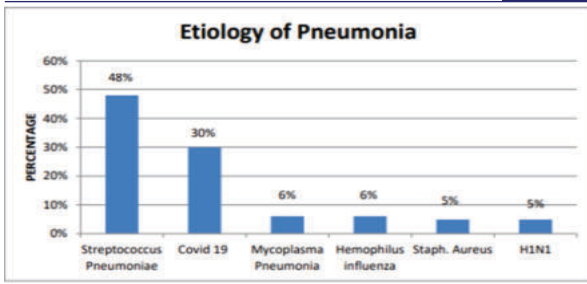
Graph No.1: Etiology of Pneumonia

We compared the survival of the patients in our study with respect to the N:L ratio and found that the N: L ratio of ≥ 7 was a better predictor of mortality with 14 deaths out of total al of 29 (48.28%) compared to 4 deaths out of 38 cases with N: L ratio of 3.5 to 7 (10.53%) and one death out of 33 cases in with N: L ratio of less than 3.5 (3.03%).

Table no.2 : N: L Ratio and Survival in the study participants

| N:L ratio and Survival	Survived	Died	Total
< 3.5	32(96.96%)	1(3%)	33
3.5 to 7	34(89.47%)	4(10.53%)	38
>7	15(51.7%)	14(48.2%)	29
Total	81	19	100

P = 0.028, Significant
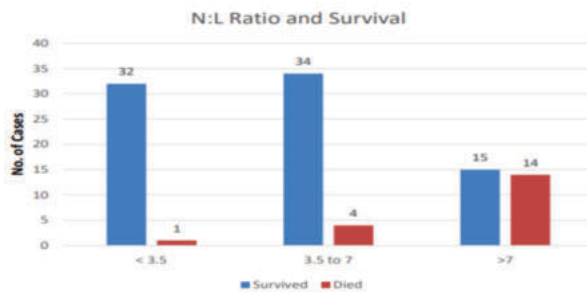
Graph No.2: N:L Ratio And Survival In The Study Participants
We observed deaths in 19 cases (19%), while majority of the patients, 81 cases survived (81%).

Table No.3 : Survival in the study participants

Survival	Frequency	Percent
Death	19	19.0%
Discharge	81	81.0%
Total	100	100.0%
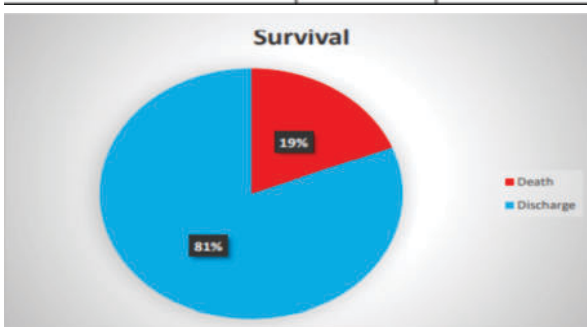
Graph No.3 : Survival in the study participants

DISCUSSION:

- NL Ratio has been reported to be an indicator that correlates with the severity of a series of diseases and has been applied to predict the prognosis of various clinical circumstances
- we compared NL Ratio with other biomarkers on diagnostic performance and prognostic prediction in patients with community-acquired pneumonia in our hospital.
- We observed deaths in 19 cases (19%), while most of the patients, 81 cases survived (81%). N Zheng et al [2020] (42) observed the overall mortality rate of the enrolled population was 25.3%
- We compared the survival of the patients in our study with respect to the N:L ratio and found that the N: L ratio of ≥ 4 was a better predictor of mortality with 16 deaths out of total 69 (23.19%) compared to 3 deaths out of 31 cases with N: L ratio of less than 4 (9.68%).
- N Zheng et al [2020] (42) and Kaspříková N et al (57) observed that the N: L ratio of ≥ 4 significantly predicted mortality in the study participants.

CONCLUSION:

- Apart from other parameters like comorbidities, high CT severity score, advanced age, N:L ratios is associated with the severity of the disease.
- In patients with CAP, the N:L ratios was associated with the severity of the disease and could be good prognostic markers for the prediction of morbidity and mortality in these patients.
- It is very important to predict a patient's prognosis and plan for further management in tertiary care centers for patients with pneumonia or other severe diseases.
- Because of limited ICU beds availability and limited resources, it becomes very necessary to predict early intensive care requirements in patients admitted to tertiary care centers
- N:L ratio has proven to be beneficial in becoming the predictor of patients' disease severity and outcome in our study.

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