

Role of Neutrophil–Lymphocyte Ratio in Predicting Severity and Outcome of Acute Pancreatitis

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Abstract

Background: Acute pancreatitis is an inflammatory condition with variable clinical presentation ranging from mild self-limiting disease to severe life-threatening illness associated with organ failure and mortality. Early prediction of disease severity is essential for prompt management. The Neutrophil–Lymphocyte Ratio (NLR) has emerged as a simple and cost-effective inflammatory marker. The aim is in order to assess the usefulness of Neutrophil–Lymphocyte Ratio in the prediction of severity and clinical outcome in acute pancreatitis. **Material and Methods:** The SSIMS & RC Department of General Surgery conducted a clinical study of prospective research for 6 months from March 2025 till September 2025. 18 patients were diagnosed with acute pancreatitis and included. On admission (Day 0), at 24 hours (Day 1) and at 48 hours (Day 2), neutrophil and lymphocyte counts were obtained and NLR was calculated. Severity was graded by parameters of Revised Atlanta Classification. Statistical analysis was carried out by Independent sample t test and p value of <0.05 was considered as statistically significant value. **Results:** There were 18 patients, 15 of whom (83.3%) suffered from mild pancreatitis and 3 (16.7%) from severe pancreatitis. The NLR levels of severe pancreatitis patients were significantly higher than those of mild pancreatitis patients at each of the time points. Mean NLR on Day 0 was 15.8 ± 2.5 in severe pancreatitis compared to 5.1 ± 1.2 in mild pancreatitis. In mild cases, NLRs gradually decreased while more severe cases showed increasing NLRs. There was significant correlation between NLR and organ failure, local complications, and mortality ($p < 0.05$). **Conclusion:** Neutrophil–Lymphocyte Ratio is simple, inexpensive and reliable biomarker for the prediction of the severity and outcome of acute pancreatitis. Early identification of high-risk patients using serial monitoring of NLR and management of NLR. Corresponding to the equality, the keywords are Acute pancreatitis, Neutrophil–Lymphocyte Ratio, NLR, Severity assessment, Inflammatory markers.

Keywords: Acute pancreatitis, Neutrophil-to-Lymphocyte Ratio, NLR, Disease severity, Revised Atlanta Classification.

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INTRODUCTION

Acute pancreatitis is one of the most frequently encountered gastrointestinal emergencies and is an inflammatory condition that may involve to a degree local or systemic involvement. The disease spectrum ranges from mild edematous pancreatitis to severe necrotizing pancreatitis associated with systemic inflammatory response syndrome, organ failure, and death.^[1,2]

Early identification of severe pancreatitis remains clinically important because aggressive monitoring and intensive treatment can reduce morbidity and mortality. Several scoring systems including Ranson's criteria, APACHE II, BISAP score, and C-reactive protein have been used to assess severity.^[3,4] However, these systems may be time-consuming, expensive, or require complex calculations.

The Neutrophil–Lymphocyte Ratio (NLR), derived from routine complete blood count parameters, reflects systemic inflammatory response and immune status. Increased neutrophil count and lymphocyte depletion are commonly observed during severe inflammatory conditions. Therefore, NLR has gained importance as a potential marker for predicting severity and outcomes in acute pancreatitis.^[2,3]

The present study was conducted to evaluate the usefulness of serial NLR estimation in predicting disease severity and

clinical outcomes in acute pancreatitis.

MATERIALS AND METHODS

Study Design: Prospective clinical study.

Study Setting: Department of General Surgery, SSIMS & RC

Study Duration: The study was conducted over a period of 6 months from March 2025 to September 2025.

Study Population: A total of 18 patients diagnosed with acute pancreatitis were included in the study.

Inclusion Criteria

- Age >18 years
- Diagnosed cases of acute pancreatitis

Exclusion Criteria

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- Chronic pancreatitis
- Pancreatic malignancy
- Immunocompromised patients
- Patients with haematological disorders or active infections affecting leukocyte count

Parameters Studied

Neutrophil count

Lymphocyte count

Neutrophil–Lymphocyte Ratio (NLR)

Timing of NLR Assessment

Day 0 (Admission)

Day 1 (24 hours)

Day 2 (48 hours)

Severity Assessment

Severity was classified according to the Revised Atlanta Classification.^[1]

Statistical Analysis: Data were analysed using independent sample t-test. Continuous variables were expressed as mean $\pm$ standard deviation. A p-value <0.05 was considered statistically significant.

RESULTS

Demographic Profile: Among 18 patients included in the study, 15 patients (83.3%) had mild pancreatitis and 3 patients (16.7%) had severe pancreatitis. The mean age in mild pancreatitis was 38.6 ± 10.4 years, while severe pancreatitis patients had a mean age of 49.3 ± 8.2 years. Male predominance was observed in both groups.

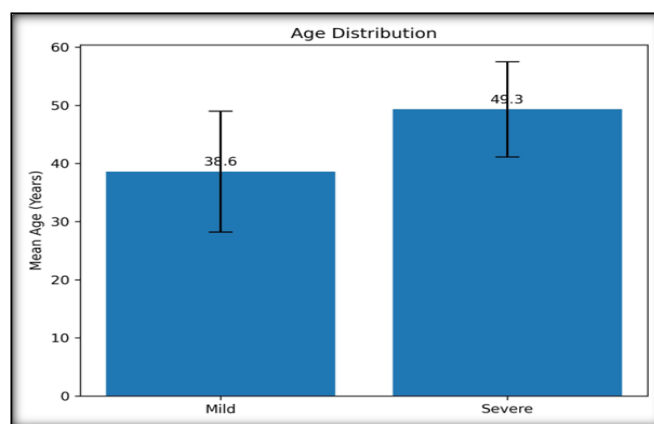
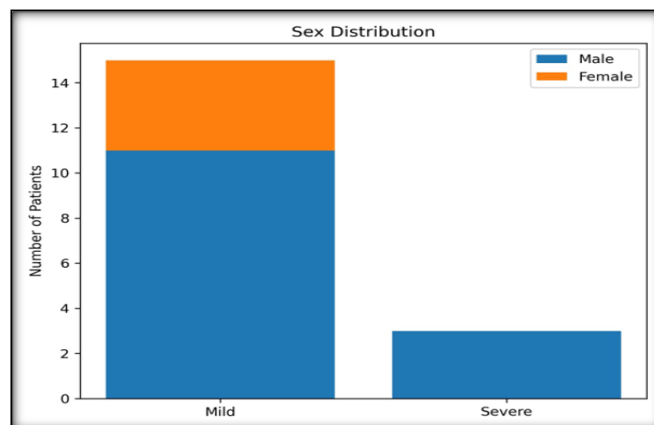
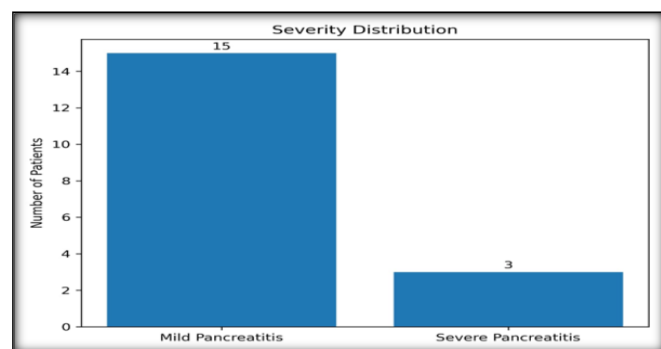


Table 1: Comparison of Haematological Parameters

Variable	Mild Pancreatitis (n=15)	Severe Pancreatitis (n=3)
Mean Neutrophil Count Day 0 (cells/ μ L)	$10,800 \pm 1,200$	$16,500 \pm 1,800$
Mean Lymphocyte Count Day 0 (μ L)	$2,100 \pm 350$	$1,000 \pm 180$
Mean NLR Day 0	5.1 ± 1.2	15.8 ± 2.5
Mean NLR Day 1	4.3 ± 1.0	17.6 ± 2.9
Mean NLR Day 2	3.4 ± 0.9	19.1 ± 3.1



Severe pancreatitis patients showed persistently elevated neutrophil counts and progressively increasing NLR values

over 48 hours. In contrast, mild pancreatitis patients demonstrated gradual decline in NLR values during recovery.

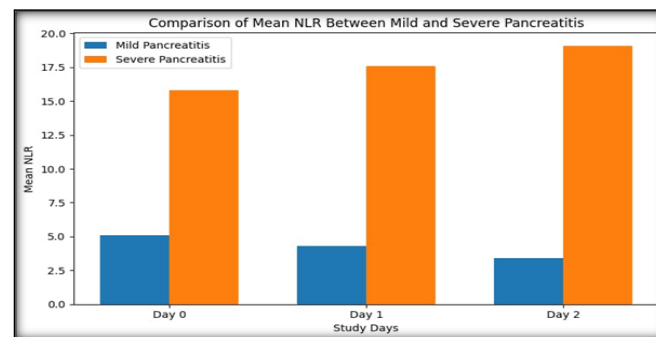
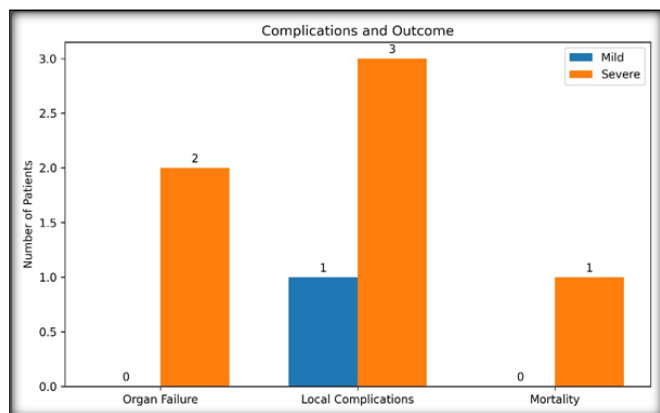


Table 2: Clinical Outcomes

Outcome	Mild Pancreatitis	Severe Pancreatitis
Organ Failure	Nil	2 patients
Local Complications	Minimal	Present in all cases
Mortality	Nil	1 patient



Elevated NLR values correlated significantly with severe pancreatitis, organ failure, local complications, and mortality ($p < 0.05$).

DISCUSSION

Acute pancreatitis causes systemic inflammatory response including activation of neutrophils and suppression of lymphocytes. This inflammatory balance can be measured by the ratio of neutrophils and lymphocytes (NLR).^[2]

The mean NLR at admission until day 7 was significantly higher in severe pancreatitis group than in mild pancreatitis group in the present study. Furthermore, progressive change in the number of severe cases and the gradual decrease in mild cases were shown with serial NLR assessment, supporting the role in the monitoring of disease progression. In the present study, severe cases of pancreatitis were significantly correlated to organ failure, local complications and mortality, which are known complications associated with severe pancreatitis and are also reported in previous studies as factors that are early indicators of pancreatitis severity as measured by NLR. In the present study, the cases of severe pancreatitis were associated with organ failure, local complications and mortality, which all showed significant correlation with elevated NLR and are known complications associated with severe pancreatitis and reported in previous studies as early indicators of pancreatitis

severity as measured by NLR.

NLR has several benefits: it is simple, quickly available, cost-effective and accessible, particularly in resource-poor areas. NLR does not require any extra sample taking to be calculated from routine blood investigations, unlike the more complex scoring systems. NLR is an easy scoring system to adopt in a routine blood investigation, and this does not cost extra, as opposed to the more complicated scoring systems.

The study, however, was limited in its scope with small numbers of participants and by being conducted at a single centre. Further multicenter trials are needed to confirm the results and set standardized NLR level cut-offs for predicting severity.

CONCLUSION

Neutrophilic–Lymphocyte Ratio (NLR) is a simple, low cost and reliable inflammatory marker, which is highly correlated with disease severity and outcome in acute pancreatitis. Serial NLR estimation can help identify high-risk patients early and support timely intensive management.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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