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To Study the Clinical Significance of Neutrophil to Lymphocyte Ratio in Patients of Liver Cirrhosis

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Abstract

Background: The elevated neutrophil count implies active inflammation and the reduced lymphocyte count implies malnutrition and also inflammation. If it is raised it implies poor clinical outcomes. It is cheap, widely available and easily reproducible in all settings.This study is designed to know the clinical significance of NLR in patients of liver cirrhosis.

Methods: Our study was conducted in 200 patients with liver cirrhosis admitted in various wards of M.B.S. Hospital, Kota in year 2018-2020 after obtaining informed consent. Patients of both genders were included in the study after applying the inclusion and exclusion criteria. Relevant investigations were done and with the help them, neutrophil/lymphocyte ratio (NLR) and Modified C TP score, were calculated and correlation was analysed with chi-square test.

Results: The cut off value of NLR was 4.60.The normal range group of patients have a NLR of ≤ 4.60 and the elevated group of patients have a NLR ratio of > 4.60. The lowest NLR recorded was 1.15 and the highest NLR obtained was 23.88.We found out that alcoholism was not significantly related to the raised NLR (p = .767724) in our study. We found that majority of patients belonged to CLASS A i.e. 47.5% followed by CLASS C & B i.e. 28.5% and 24% respectively and there was a statistically significant correlation of NLR with modified CTP score(p=.00001).

Conclusion: We conclude that NLR and CTP score has a positive correlation and this correlation is statistically significant. Hence, NLR can be used as a prognostic indicator in patients with liver cirrhosis. After adjusting confounding variables for NLR, a standard cut off value should be determined for a population, its correlation with other scores like MELD-Na score should be studied and prospective cohort studies should be conducted in future to improve its accuracy and efficacy.

Keywords: NLR, Modified CTP score

Introduction

Cirrhosis is defined histopathologically as that development of fibrosis to the point that there is architectural distortion with formation of regenerative nodules. Although the diagnosis is histopathological, a

combination of clinical, laboratory and imaging features can help confirm a diagnosis of cirrhosis.[1]

Neutrophil-lymphocyte ratio is defined as the ratio between absolute count of neutrophils and the absolute count of the lymphocytes. It is one of the most simple and fast tools available to measure the systemic inflammation in our body. It is one of the most cost effective, less complicated procedure wise and easily reproducible, doesn't need skilled labour to perform. A high NLR ratio occurs when there is a neutrophilia and an associated lymphopaenia, conversely a low NLR ratio occurs when there is a lymphocytosis with an associated neutropenia. High NLR ratio indicates a subgroup of patients who will benefit from therapy with anti inflammatory agents.

The prognostic role of NLR has been implicated in a number of conditions. In general a high NLR ratio is associated with poor prognosis in lot of disease conditions among which, malignancies, stroke, acute coronary syndrome are to name a few. Inflammation has a major impact on the background pathology of number of non-inflammatory conditions, including lot of malignancies and atherosclerosis. There are a lot of inflammatory markers available, but neutrophil-lymphocyte ratio is more significant compared to others, especially in ischemic stroke[2] and cardiac abnormalities[3,4]& malignant diseases[5]

Neutrophil-lymphocyte ratio shows the balance that exists in-between the body's adaptive immunity and innate immunity and so indirectly between lymphocytes and neutrophils. Number of research have found out that conditions with elevated levels of cytokines that have proinflammatory properties have been associated with high levels of neutrophil-lymphocyte ratio. This may finally lead to damage of deoxy ribonucleic acid of the cells of the body. The normal value of Neutrophil-lymphocyte ratio varies according to race and ethnicity. Neutrophil to lymphocyte ratio is one of the latest inflammatory markers that has numerous clinical implications. The elevated neutrophil count implies active inflammation and the reduced lymphocyte count implies malnutrition and also inflammation. If it is raised it implies poor clinical outcomes. It is cheap, widely available and easily reproducible in all settings.

This study is designed to know the clinical significance of NLR in patients of liver cirrhosis.

Material and Methods

The study was conducted in 200 patients with liver cirrhosis admitted in various wards of M.B.S. Hospital, Kota in year 2018-2020 after obtaining informed consent.

Inclusion Criteria

- Patients of both genders diagnosed as liver cirrhosis.
- The diagnosis of liver cirrhosis was made on the basis of clinical, laboratory and imaging findings.

Exclusion Criteria

- Presence of secondary immunodeficiency states-HIV
- Hepatocellular cancer patients.
- Patients on corticosteroids or cytotoxic drugs.
- Patients with ongoing Infection.
- Pregnancy and lactation.
- Patients not capable of giving consent (psychiatric patients).
- Patients not willing to participate in the study (who refused to consent).

Methods: All the patients who fulfilled the inclusion/exclusion criteria were selected from indoor patients from the M.B.S. Hospital. After meticulous

inspection of patient's medical records a through clinical examination was done and relevant routine and specific investigations were ordered.

Results

Table 1: Age Distribution

Age Of The Patients (Years)	Number Of Patients(N)	%Of Cases
≤20	2	1
21-40	71	35.5
41-60	92	46
>61	35	17.5

The above results shows the 1% of cases were ≤20 years of age. 35.5 % of cases were between 21-40 years of age. 46% of cases were between 41-60 years of age. 17.5 % of cases were >61 years of age.

Thus in our study majority of patients belonged to age group of 41-60 years i.e. 46 % of cases.

Table 2: Age Wise Distribution Of Patients According To Nlr Tertile

NLR Tertile	First	Second	Third
Age Range	20-85	17-75	30-73
Mean±SD	48±14.10	45.69±14.90	47.95±11.52

This table and bar diagram shows distribution of patients in each NLR tertile with mean age of 48±14.10, 45.69±14.90 and 47.95±11.52 in 1st,2nd and 3rdtertile respectively.

Table 3: Sex Distribution

Sex	Number Of Patients	Percentage
Male	146	73
Female	54	27

Among the study population, the predominant population was formed by males i.e. 73% and a comparatively lesser population was formed by the females i.e., 27%.

Table 4: NLR Levels

NLR Levels	No. Of Patients(N)
Normal NLR	116
Elevated NLR	84
Total	200

The cut off value of NLR is 4.60.The normal range group of patients have a NLR of ≤ 4.60 and the elevated group of patients have a NLR ratio of > 4.60.

Table 5: NLR Statistics

Nlr Tertile	1st Tertile	2nd Tertile	3rd Tertile	Total
Number Of Patients(N)	116	64	20	200
Percentage %	58	32	10	100

The highest number of patients fell in 1st NLR tertile i.e. having the normal NLR.

In 2nd tertile 32% of patients are there followed by 10% of patients (lowest) in 3rdtertile. The lowest NLR recorded was 1.15 and the highest NLR obtained was 23.88.

Table 6: Alcoholism & NLR

	Alcoholic	Non Alcoholic	Total
Normal NLR	75	41	116
Elevated NLR	56	28	84

The P value obtained was 0.767724, which is more than .05, and so statistically insignificant. Thus alcoholism is not significantly related to the raised NLR ratio in our study group of patients.

Table 7: Patients Distribution According To Ctp Score

Modified Child-Turcotte- Pugh Class	No Of Patients (N)	Percentage
A	95	47.5
B	48	24
C	57	28.5
Total	200	100

Modified CHILD PUGH SCORE was calculated with the help of relevant parameters and we found that majority of patients belonged to CLASS A i.e. 47.5% followed by CLASS C & B i.e. 28.5% and 24% respectively.

Table 8: Modified Ctp Score And NLR Corelation

NLR	1st Tertile	2nd Tertile	3rd Tertile
	≤ 4.60	4.61-10.00	>10.00
Child Pugh A (5-6)	81	13	1
Child Pugh B (7-9)	22	19	7
Child Pugh C (10-15)	13	32	12
Total	116	64	20

In the study population, to know the statistical correlation between NLR and Modified Child Pugh Score; we applied Chi-Squared test. The results shows the p value of .00001, which is less than .05 and hence is statistically significant.This indicates that as the Modified Child Pugh score increases, the NLR increases and it is statistically significant.

Discussion

Neutrophil-to-lymphocyte ratio (NLR) is a simple parameter to assess easily the inflammatory status of a subject. Different values of NLR, with different methods, in different populations (cancerous or not) are mentioned in the literature. And finally, no universal value is currently available.

In our study, the cut off value of NLR was taken as 4.60. The normal range group of patients had a NLR of ≤ 4.60 and the elevated group of patients had a NLR ratio of > 4.60. Patients were also categorized into three tertiles 1,st2,nd 3rd i.e. ≤ 4.60, 4.61-10.00 and >10.00 respectively.The lowest NLR recorded was 1.15 and the highest NLR obtained was 23.88.

As alcoholism was very prevalent in our study population, we applied chi squared test to find out whether any significant correlation exist between alcoholism and NLR, p value obtained was .767724, which was more than .05 and so statistically insignificant. Thus alcoholism was not significantly related to raised NLR in our study. Modified CHILD PUGH SCORE was calculated with the help of relevant parameters and we found that majority of patients belonged to CLASS A i.e.47.5% followed by CLASS C &B i.e. 28.5% and 24% respectively. In a study of 91 patients Pal et al[6] found 51% of patients belonged to Child-Pugh Class B followed by class C in 35 % and only 14% in class A; results were similar to our study.

In the study population, to know the statistical correlation between NLR and Modified Child Pugh Score; we applied Chi-Squared test. The results shows the p value of 0.00001, which is less than 0.05 and hence is statistically significant. Based on the results of their study, Probowati et al[7] found a positive significant correlation between the ratio of neutrophils to

lymphocytes and CTP score with r = 0.749 and p= <0.0001. Thus increasing of neutrophils to lymphocytes ratio positively correlated with the severity of liver cirrhosis.

To determine any significant correlation between NLR and Child-Turcotte- Pugh (CTP) score among decompensated liver cirrhosis patients,at Medan, Indonesia; similar study was conducted by Sungkar T et al.[8] The results of this study was statistically significant. This indicates that as the Modified Child Pugh score increases, the NLR increases in patients with liver cirrhosis and it is statistically significant. In Other studies also, similar results were found. NLR is a recognized predictor of survival in patients with hepatocarcinoma[9] or hepatitis B virus (HBV) infection, as well as in patients awaiting transplantation[10]. Moreover, it has been shown that in uncomplicated cirrhosis, higher NLR could predict mortality independently of the model for end-stage liver disease (MELD) and Child-Pugh scores[11]

Conclusion

Based on our study, we can conclude that NLR and CTP score has a positive correlation and this correlation is statistically significant. Hence, NLR can be used as a prognostic indicator in patients with liver cirrhosis.

References

1. Bacon B R .Cirrhosis and its complications;Harrison's principles of internal medicine 2019;20:2405.
2. Xue J, Huang W, Chen X, et al. Neutrophil-to-lymphocyte ratio is a prognostic marker in acute ischemic stroke. J Stroke Cerebrovasc Dis 2017;26:650–7.
3. Tamhane UU, Aneja S, Montgomery D, et al. Association between admission neutrophil to lymphocyte ratio and outcomes in patients with acute coronary syndrome. Am J Cardiol 2008;102:653–7.
4. Muhmmed Suliman MA, Bahnacy Juma AA, Ali Almadhani AA, Pathare AV, Alkindi SS, Uwe Werner F. Predictive value of neutrophil to lymphocyte ratio in outcomes of patients with acute coronary syndrome. Arch Med Res. 2010(41):618-622.
5. Guthrie GJ, Charles KA, Roxburgh CS, Horgan PG, McMillan DC, Clarke SJ. The systemic inflammation-based neutrophil-lymphocyte ratio: experience in patients with cancer. *Crit Rev Oncol Hematol* 2013;88:218-230.
6. Pal J, Dasgupta S, AgarwalV, Kejariwal D, Roy S, Majumder AK. Clinical profile of chronic liver diseases in a tertiary care center in Kolkata. Japi. 2003; 51: 1173-4.
7. Probowati W, Bayupurnama P, Ratnasari N. Correlation between neutrophil to lymphocyte ratio with child turcotte pugh in liver cirrhosis patients. ActaInterna: The Journal of Internal Medicine. 2016;6(1):28-35.
8. Taufik Sungkar, Muhammad Fakhrur Rozi, Leonardo Basa Dairi, Lukman Hakim Zain. Neutrophil-to-Lymphocyte Ratio (NLR) and its Correlation with Severity of Decompensated Liver Cirrhosis based on Child-Turcotte Pugh (CTP) Score. Journal of Clinical and Diagnostic Research. 2019 ;13(2):29-31.
9. Gao F, Li X, Geng M, Ye X, Liu H, Liu Y, Wan G, Wang X. Pretreatment neutrophil-lymphocyte ratio: an independent predictor of survival in patients

with hepatocellular carcinoma. *Medicine (Baltimore)* 2015; 94(11):639.

10. Leithead JA, Rajoriya N, Gunson BK, Ferguson JW. Neutrophil to lymphocyte ratio predicts mortality in patients listed for liver transplantation. Liver Int 2015;35:502-509.
11. Biyik M, Ucar R, Solak Y, Gungor G, Polat I, Gaipov A, et al. Blood neutrophil to lymphocyte ratio independently predicts survival in patients with liver cirrhosis. Eur J Gastroenterol Hepatol2013;25:435-441.