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A Study of alcoholic liver disease with special reference to NLR ratio in a tertiary care centre

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Abstract

Background: Alcohol consumption produces a wide spectrum of hepatic diseases, including fatty liver, alcoholic hepatitis, and chronic hepatitis with liver fibrosis or cirrhosis. Neutrophil lymphocyte ratio (NLR) is an easily measurable laboratory marker that is used to evaluate systemic inflammation and is used as a marker to assess the severity of the disease.

Methods: The study involved subjects aged > 40 years of age who were admitted to a tertiary care center. This study was conducted on 100 patients who were consuming alcohol and were divided into two groups based on the duration and amount of alcohol consumed.

Results: The mean age was 50 ± 9.54 years. Raised NLR was seen in patients who consumed heavy amounts of alcohol and in patients who had consumed alcohol for a longer period of time, irrespective of their complications. A significantly raised NLR is seen in patients consuming moderate and heavy amounts of alcohol and in patients consuming alcohol for a longer period with complications.

Conclusion: NLR can be used as a useful marker of disease progression that correlates well with complications like hepatic encephalopathy (HE), ascites, and gastrointestinal bleeding (GI bleed).

Keywords: NLR, alcoholic liver disease, hepatic encephalopathy, ascites, hematemesis, melena.

INTRODUCTION

Excessive alcohol ingestion is a major cause of liver disease and is responsible for nearly 50% of all cirrhosis deaths[1]. Alcoholic liver disease consists of three major lesions: fatty liver, alcoholic hepatitis, and cirrhosis. Quantity and duration play a role in the main risk factors for developing alcoholic liver disease. 40-80g/day of ethanol produces a fatty liver, 160g/d for 10-20 years causes hepatitis or cirrhosis1.Women have an increased susceptibility to alcoholic liver disease at amounts >20 g/day[2]. Fatty liver is present in >90% of daily binge drinkers1. The mortality rate of alcoholic hepatitis with cirrhosis is nearly 60% at 4 years[3]. Alcoholic liver disease manifests with nausea, right upper quadrant pain, jaundice, and, in the end stage, leads to portal hypertension, ascites, variceal bleeding (hematemesis, melena), and hepatic encephalopathy.

NLR is an inflammatory marker and is used to predict the progression of disease[4]. The immune response to various physiological challenges is characterised by increased neutrophil and decreased lymphocyte counts, and NLR is often recognised as an inflammatory marker to assess the severity of the disease. It is cost effective, readily available and can be calculated easily. NLR is an easily measurable laboratory marker that is used to evaluate systemic

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inflammation and it has superiority compared to other WBC subtype counts (e.g., neutrophil, lymphocyte, and total leukocyte counts). NLR may represent both inflammatory and immune pathways that exist together in the patient. A study done by Zhang M et al[5] showed that NLR can be used as a prognostic marker in cirrhosis patients.

Methods

This study was conducted on 100 patients in a tertiary care center, involving both inpatients and outpatients. The study protocol was approved by the institutional ethics committee. Informed consent was taken from them. All patients aged more than 40 years who consumed alcohol according to the study criteria were included.

Patients were broadly divided into two groups: first group was based on the duration of alcohol consumed, and the second group was based on the amount of alcohol consumed. The first groups were short, moderate, and long, i.e., the duration of consumption up to 10 years, 11-20 years, and more than 20 years, respectively. The second group was light, moderate, and heavy, i.e., alcohol intake was less than 360 units, 360-719 units, and more than 719 units, respectively. Patients with HIV, hepatitis B and C, heamodynamically unstable patients, and systemic bacterial peritonitis were excluded from the study.

Complete blood cell count, stool occult blood, ultrasonogram abdomen, upper GI endoscopy were done. The NLR was calculated by taking the number of neutrophils and dividing it by the number of lymphocytes. The data was analyzed.

RESULTS

The mean age of the patients in this study with ALD was 50±9.54 years.

Mean NLR in association with duration of alcohol consumption

	Short up to 10 yr(N=26)	**Moderate 11 - 20yr (N=49)**	**Long >20yr (N=25)**	**P value**
Mean NLR±SD (n)	2.72±1.22 (n=3)	4.61±1.24 (n=6)	5.00±1.24 (n=10)	**0.041**

Table 1: mean NLR in association with duration of alcohol consumption.

In patients who were consuming alcohol for short duration the mean NLR was 2.72±1.22 (n=3), and patients consuming for moderate duration the mean NLR in this group was 4.61±1.24 (n=6)). Whereas in patients consuming alcohol for long duration the mean NLR was 5.00±1.24 (n=10).

With the p value of 0.041 there was significant correlation of mean NLR with respect to duration of alcohol consumed.

Mean NLR in patients consuming various amount of alcohol.

Mortality	Light (N=23)	Moderate (N=38)	Heavy (N= 39)	p value
Mean NLR±SD(n)	2.72±1.22 n=3)	4.01±1.29 (n=6)	5.36±1.24 (n=10)	**0.014**

Table 2: Mean NLR of mortality in patients consuming various amount of alcohol.

The mean NLR in the heavy group was 5.36±1.24 (n=10) which was higher compared to light 2.72±1.22 (n=3) and moderate amount 4.01±1.29 (n=6) consumers.

With the p value of 0.014 there was significant correlation of mean NLR with respect to amount of alcohol consumed.

Mean NLR of complications with duration of alcohol consumed

Complications	Short up to 10 yrs. (N=26)	Moderate 11-20 yrs. (N=49)	Long>20 yrs. (N=25)	p value
NLR in Hematemesis (n)	2.67±1.34 (n=3)	5.13±1.24 N=11	4.95±1.29 (n=9)	**0.022**
NLR in Melena (n)	3.25±1.31 (n=5)	4.87±1.24 (n=28)	4.95±1.23 (n=19)	**0.024**
NLR in Ascites (n)	2.92±1.31 (n=7)	4.83±1.25 (n=35)	4.90±1.23 (n=24)	**< 0.001**
NLR in HE (n)	2.98±1.31 (n=10)	4.94±1.24 (n=30)	5.06±1.23 (n=18)	**< 0.001**

Table 3: Mean NLR of complications with duration of alcohol consumed

There was significant correlation of NLR with the complications of Alcohol liver disease like HE (p value <0.001) GI bleed (hematemesis (p value 0.022), melena (p value 0.024)) and ascites (p value = 0.001) with the duration of alcohol consumed.

Mean NLR of complications in relation with amount of alcohol consumed

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Complications	Light (N=23)	Moderate (N=38)	Heavy (N= 39)	p value
NLR IN HEMATEMESIS (N)	3.00±1.19 (n=2)	4.38±1.32 (n=5)	5.11±1.24 (n=16)	**0.083**
NLR in Melena (n)	3.00±1.19 (n=3)	4.23±1.24 (n=15)	5.13±1.24 (n=34)	**0.005**
NLR in Ascites (n)	2.87±1.28 (n=6)	4.37±1.23 N=23	5.12±1.25 (n=37)	**<0.001**
NLR in HE (n)	2.57±1.32 (n=7)	4.57±1.24 (n=15)	5.07±1.25 (n=36)	**<0.001**

Table 4: Mean NLR of complications in relation with amount of alcohol consumed

There was significant correlation of NLR with the complications of alcohol liver disease like HE ($p<0.01$), hematemesis ($p=0.083$), melena ($p<0.005$) and ascites ($p<.001$) with the amount of alcohol consumed.

DISCUSSION

Alcohol is the world's third largest risk factor for disease burden. It results in 3.5 million deaths worldwide each year[6]. The ethanol is metabolised to acetaldehyde by alcohol dehydrogenase, which is a highly reactive molecule with multiple effects. Intake of ethanol increases triglyceride accumulation and decreases fatty acid oxidation in the liver. Oxidative damage to hepatocytes occurs due to the formation of reactive oxygen species, leading to activation of stellate cells, fibrosis, or cirrhosis[7.]

NLR has been used as a predictor of inflammation and mortality[8]. NLR is a cost effective method for predicting the progression of ALD. NLR has been used as a prognostic marker in many inflammatory conditions like acute pancreatitis, acute appendicitis and GI malignancies[9].

In our study, NLR is significantly higher among patients who are consuming alcohol for a longer duration, with p value of 0.041, and among patients who are heavy alcohol consumers, with a p value of 0.014. In a study done by N nand et al[10] on alcohol liver disease and its correlation with the amount and duration of alcohol, it was shown that NLR, the rate of complications and overall mortality rate, correlate well with the duration of alcohol consumed, which is similar to our study.

A study by narwane[11] et al showed a positive correlation with the amount of alcohol consumed and disease progression. The mean NLR in patients with hematemesis who were consuming alcohol for a longer duration was significantly higher at 5.13±1.24(n=11) with a p value of 0.022.The mean NLR in patients with melena who had been consuming alcohol for a long time was significantly high at 4.95±1.23 (n=19) with a p value of 0.024.In a study

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done by Zheng peng[12] et al on neutrophil to lymphocyte ratio and albumin bilirubin ratio for predicting patient mortality with acute upper gastrointestinal bleed, they showed high NLR in patients with UGI bleed, which is similar to our study.

The mean NLR in patients with ascites who were consuming alcohol for a longer duration was significantly higher at 4.90 ±1.23 (n=24). With p value of <0.001. In a study done by yasin sahinturk[13] et al similar results were shown for high NLR in cirrohotic ascites. The mean NLR in patients with HE was significantly higher at 5.06±1.23 (n=18) in patients consuming alcohol for a longer duration, with a p value of<0.001.

There was a significant correlation of NLR with complications like HE (p value<0.001), GI bleed (hematemesis (p value 0.022), melena (p value 0.024)) and ascites (p value = 0.001) with the duration of alcohol consumed. In a study done by nand et al[10] showed that prognostic markers are higher NLR groups, which is similar to our study, which showed significantly high NLR in alcoholic liver disease patients with complications.

There was also a significant correlation of complications like HE (p value <0.001), melena (p value 0.005) and ascites (p value<0.001) with the amount of alcohol consumed. As compared to a study by vineeth V et al[14] on the utility of NLR as a predictor of complications in patients with liver cirrhosis, which showed a raised neutrophil to lymphocyte ratio is associated with complications and mortality in patients with cirrhosis, which is again similar to our study.

LIMITATIONS

Some limitations to our study should be considered. First, it is an institution-based study. Elevation of the neutrophil to lymphocyte ratio in also seen in other conditions. In future, we need further studies with large sample size to evaluate for association between NLR and mortality & morbidity in Alcohol Liver Disease in details.

CONCLUSION

NLR can be used as a predictor of disease progression among alcoholic liver disease especially in patients presenting with complications like hepatic encephalopathy and portal hypertension. Our study demonstrates that the amount and duration of alcohol consumption in relation to NLR has emerged as a useful bedside marker in assessing the severity of alcoholic liver disease. But the treating team has to consider the other probable causes of altered NLR.

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AUTHORS CONTRIBUTIONS:

'Author 1, 2" designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. 'Author 3,4 ' managed the literature search, analyses of the study and final approval. All authors read and approved the final manuscript."

CONSENT FORM: NA
ETHICAL APPROVAL: OBTAINED

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