ANI scoring system – In differentiating alcoholic and non-alcoholic liver disease

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ABSTRACT

Background: Alcoholic liver disease/non-alcoholic liver disease Index – ANI scoring system was constructed for clinically diagnosing the etiology of liver diseases, avoiding the risks of liver biopsy. **Aims and Objectives:** This study aims to test the reliability of ANI scoring system as a non-invasive method to distinguish alcoholic liver disease (ALD) from non-alcoholic fatty liver disease (NAFLD). **Materials and Methods:** This retrospective study was conducted on 177 (114 men and 58 women) treated as inpatients in Trichy SRM Medical College Hospital and Research Centre, Trichy, in the period of December 1, 2015–August 1, 2016. About 40 patients with etiology of viral, autoimmune, and biliary lithiasis were excluded. A total of 137 patients (98 men and 39 women) were classified into two groups, ALD (70) and NAFLD (67) based on diagnosis. Parameters of ANI – AST, ALT, MCV, BMI, and sex were recorded. ANI was calculated by online calculator. **Results:** ANI was significantly higher in patients with ALD than NAFLD (P < 0.01). The cutoff value of ANI is −0.11. **Conclusion:** On the basis of the results, ANI scoring system may be used in clinically distinguishing ALD from NAFLD, avoiding the risks of liver biopsy.

Key words: Alcoholic liver disease; Non-alcoholic fatty liver disease; ANI Score

INTRODUCTION

Based on the etiology, fatty liver disease is classified into two broad categories, alcoholic liver disease (ALD) and non-alcoholic fatty liver disease (NAFLD).[1] Both ALD and NAFLD impart serious health problems to people worldwide with prevalence raising to 32% among common Indian adult population[2] and 70% among diabetic population.[3] However, in practice, clinicians find it crucial to distinguish between alcoholic and non-alcoholic cause of hepatic steatosis, as the diagnosis of these two different entities directs to different selection of management.[4,5]

Although the gold standard to establish the diagnosis between ALD and NAFLD is liver biopsy, the procedure by itself is an invasive procedure and carries certain risks.[6]

Dunn et al., in the year 2006, formulated a new diagnostic model ALD/NAFLD index – ANI to differentiate alcoholic and non-ALD.[7]

This study aims to test the reliability of this ANI scoring system in distinguishing alcoholic and non-alcoholic liver disease.

Aims and Objectives
To test the reliability of this ANI scoring system in distinguishing Alcoholic and Nonalcoholic liver disease.

MATERIALS AND METHODS

This is a retrospective study of patients of alcoholic and non-alcoholic liver disease. A total of 177 patients

(114 men and 58 women) treated as inpatients in Trichy SRM Medical College Hospital and Research Centre, were selected. About 40 patients with etiology of viral, autoimmune, and biliary lithiasis were excluded. A total of 137 patients were finalized (98 men and 39 women) and were classified into two groups, ALD (70) and NAFLD (67) based on diagnosis.

The study participants were residents of in and around Trichy, Tamil Nadu, South India. The study was conducted after the pre-approval of Institutional Ethics Committee.

The study reviewed electronic medical records of the selected patients and obtained data on AST, ALT, BMI, AGE, SEX, and MCV. Other information taken from the electronic medical records were sociodemographic factors such as gender, age, ethnicity, and other past medical, surgical, and treatment history were noted for the exclusion criteria.

Exclusion criteria
Liver disorders with viral, autoimmune, or biliary lithiasis were excluded from the study.

Statistical analysis
Data were expressed as mean± standard deviation. All outcomes were assessed using Chi-squared test and independent t-test, $P < 0.05$ was considered statistically significant. Statistical analysis were done using SPSS version 23 statistical software. Evaluation of the validity of ANI scoring system was done using area under the receiver-operating characteristic (AUROC) curve, with its 95% confidence interval. AUROC was performed assessing the sensitivity, specificity, positive predictive value, negative predictive value, and cutoff value using Med Calc v.10.20.0 (MedCalc Software, Mariakerke, Belgium). The optimal cutoff for the detection of ALD was determined according to the highest sensitivity and specificity. For all tests, significance was achieved at P value less than 0.05.

The age distribution among ALD and NAFLD patients had no statistical differences ($P < 0.05$). The sex distribution was different, in the ALD group,all patients being men. ($P < 0.01$) (Table 1).

In this study, BMI values were significantly lower in ALD patients in comparison with NAFLD patients ($P < 0.01$).

The average values of biochemical parameters, MCV, and AST/ALT ratio were significantly higher in patients with ALD compared with the patients with NAFLD ($P < 0.01$). ANI was significantly higher in patients with ALD than NAFLD ($P < 0.01$).

ANI values in patients with ALD and NAFLD
Significance of the difference was estimated using the rank-sum test (*$P < 0.01$) (Figure 1).

The plot of the receiver-operating characteristic (ROC) curve for ALD is presented in Figure. 2. For this ROC analysis, the AUROC showed significant discriminatory power with a 95% confidence interval ($P < 0.001$).
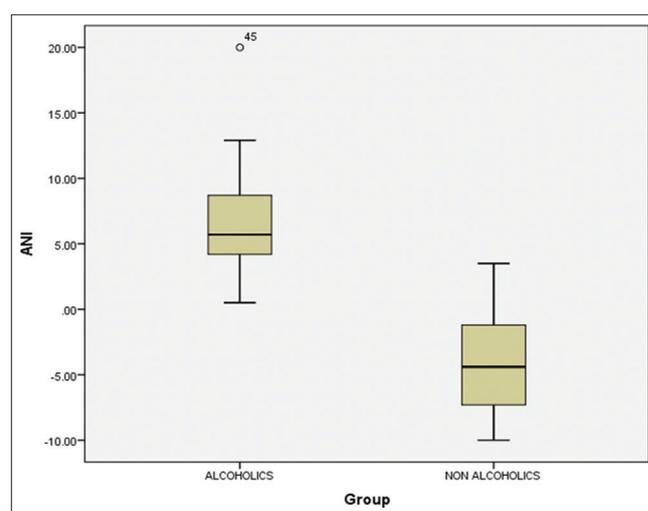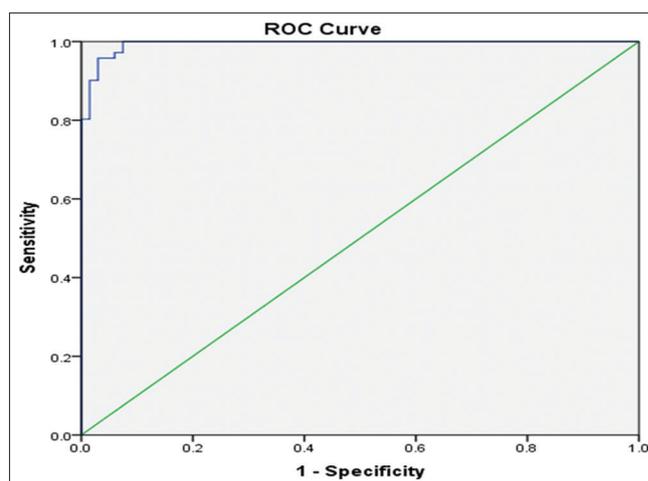

Figure 1: ANI values in patients with ALD and NAFLD

	ANI	AUROC	95% cofidence interval		P-value
ALD	−0.11	0.994	0.986	1.000	<0.0001

AUROC curve analysis for ANI score values in diagnosing ALD. ALD: Alcoholic liver disease, ANI: ALD/NAFLD index, AUROC: Area under receiver operating characteristic

Figure 2: Receiver-operating characteristic (ROC) curve for ALD

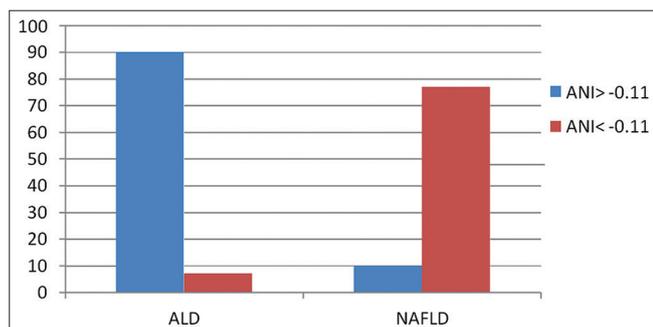| Table 1: Sex distribution in patients with alcoholic liver disease and non-alcoholic fatty liver disease		
Sex	**ALD (70)**	**NAFLD (67)**
Male	100% (70/70)	47.79% (28/67)
Female	0% (0/70)	58.20% (39/67)
ALD: Alcoholic liver disease, NAFLD: Non-alcoholic fatty liver disease		

Figure 3: Distribution of ANI scores (ALD/NAFLD)

According to the ROC curve, the cut off value of ANI is - 0.11. ANI greater than -0.11 indicates ALD and ANI less than -0.11 is indicative of NAFLD, with high specificity (91.04%) and sensitivity(97%).

This figure shows ANI was significantly higher in patients with ALD than NAFLD (P<0.01).

DISCUSSION

Alcoholic liver disease (ALD) and Nonalcoholic fatty liver disease (NAFLD),though two different clinical entities, they share similar pathological spectra from simple hepatic steatosis, steatohepatitis ,liver cirrhosis and liver failure. it should also be noted that both ALD and NAFLD patients have complications of cardiovascular diseases and malignancy.[8,9]

Though many markers such as Mast (mitochondrial aspartate transaminase), CDT (carbohydrate deficient transferrin) and Protein Kinase C ε (PKC-ε), can also be used for the diagnosis of ALD or NAFLD, they lack sensitivity and specificity.[10,11,12] But many studies have proposed, the ANI diagnostic model put forth by Dunn et al, have high accuracy in differentiating ALD and NAFLD. The advantage with this model is that,it has also taken into account, parameters of obesity,BMI.[6,8,9] In this study, ALD were more common in men as alcohol abuse is more prevalent among men than in women.[13] The mean BMI of patients with NAFLD was also higher than that of ALD group which is due to obesity, the major cause of NAFLD.[14]

The present study reveals that alcohol has a specific effect on aminotransferases. Though there is increase of ALT in other liver disorders, in Alcoholic liver disease, there is raise in AST. This is due to the fact that pyridoxal phosphate being the coenzyme for the transaminases, is mostly utilized by the ALT enzyme. Inn alcoholics, due to pyridoxine deficiency, ALT becomes much lower than AST, leading to higher AST/ALT ratio.[15,16] In this study, the average MCV was greater in ALD than NAFLD, which

may due to direct toxic effects of alcohol on hematopoietic cells and also due to decreased absorption of B12/ Folic acid.[17,18]

Our results showed that ANI was significantly higher in patients with ALD than NAFLD (P<0.01).which emphasize the reliability of ANI scoring system in diagnosing the types of steatohepatitis.

Eventhough, ANI scoring system, cannot replace, histopathology, it is definitely, a reliable non-invasive method for predicting ANI in a clinical set up.

Limitations of the study
Additional prospective multi-centric studies, with large sample size, along with correlation histo - pathological analysis would help in establishing the reliability of ANI scoring system.

CONCLUSION

on the basis of the results, ANI scoring system may be used in clinically distinguish ALD from NAFLD, avoiding the risks of liver biopsy. Although ANI confirms alcoholic etiology, it does not exclude other associated factors in the development of fatty liver.

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