INTRODUCTION

Liver cirrhosis is the end result of fibrogenesis that occur with chronic liver injury and tissue repair due to any etiology. Alcohol is one of the common aetiologies, alcohol related liver disease is the commonest cause of death, accounting for 2.5 million/yr. A cirrhotic liver may progressively deteriorate from compensated state to decompensated conditions. 5-year survival rate of 84% in compensated cirrhosis, 14% to 35% decompensated cirrhosis. Although a preferable treatment option for decompensated liver cirrhosis is liver transplantation, shortage of donor livers and high cost make this approach impracticable in most cases. Therefore, identifying a marker associated with disease severity helps in improving clinical management. Aspartate aminotransferase to platelet ratio index (APRI) was initially proposed as a predictive marker for liver fibrosis and cirrhosis in hepatitis C virus (HCV)-infected patients. Recent studies show that APRI predicted liver related mortality in alcoholic liver disease individuals.

APRI was calculated using the formula= AST (U/L)/(upper limit of the normal range) ×100/platelet count (10^9/L). The 40 U/L of AST was used as the upper limit of the normal range. It is a mathematical formula using only two parameters, based on routine blood tests and is compared to MELD score and albumin level. APRI reflect extent of liver injury and compensatory state of hepatic function which is simpler, cost effective and easier to calculate than MELD score.

Herein we conducted a retrospective data analysis to determine APRI, the association of APRI with the progression of chronic alcoholic liver disease and mortality and to compare the prognostic significance of the APRI score with MELD score and albumin level.
AIMS AND OBJECTIVES

1) To evaluate the AST to Platelet Ratio Index (APRI) for predicting the in-hospital mortality in chronic liver disease patients.
2) To compare APRI, MELD and albumin for predicting hospital mortality in chronic liver disease.

MATERIALS AND METHODS

The study was conducted at Bowring and Lady Curzon Hospital (Attached to Bangalore Medical College and Research institute). Chronic liver disease patients secondary to ethanol between 2016 January and 2016 December were retrospectively reviewed.

Inclusion criteria
1) All patients aged above 18 years with chronic liver disease.
2) Chronic liver disease as evidenced by abdominal ultrasound and liver profile derangement.

Exclusion criteria
1) Chronic liver disease due to hepatitis B, C, malignancy, metabolic causes, autoimmune hepatitis.

Method of collection of data
History, clinical Examination and Routine CBP, RFT, LFT, serum electrolytes, HIV, HBsAg, HCV, VDRL serology, prothrombin time, APTT, Ultrasound of abdomen, upper GI endoscopy and other relevant investigations were noted.

Chronic liver disease is evidenced by: abdominal ultrasound and liver profile derangement.

Complications like anaemia, hepatic encephalopathy, renal dysfunction and mortality noted.

APRI = AST (U/L)/(upper limit of the normal range) ×100/platelet count.

The 40 U/L of AST was used as the upper limit of the normal range.

MELD= (10 * ((0.957 * ln (Creatinine)) + (0.378 * ln (Bilirubin)) + (1.12 * ln (INR))) + 6.43

Method of Statistical analysis
All statistical analysis were performed using the Medcalc software. Continuous Data were expressed as the mean+/- standard deviation (SD) and median with minimum and maximum. Categorical data were expressed as the frequency. Receiving-operative characteristics curve analysis was performed to identify the discriminative ability of the APRI, MELD score and albumin levels in predicting in-hospital mortality. Areas under the ROC curves were calculated and compared. The best cut off value was selected as the sum of sensitivity and specificity was maximal. Then sensitivity, specificity, positive likelihood ratio, negative likelihood ratio were reported.

RESULTS AND ANALYSIS

The sample size in our study was 299 patients. The age distribution was between 18-64 years with mean age of patients being 46.47+/−10.9 years (Table 1). 267 were males and 32 were females (Table 2).

Among 299 patients, 53 were deaths and 246 were patients who showed improvement, with mortality percentage of 17.7 % (Figure 1).

**Table 1: Age distribution of patients studied**

| Age in years | No. of patients | %    |
|--------------|-----------------|------|
| 20-30        | 20              | 6.0  |
| 31-40        | 68              | 22.7 |
| 41-50        | 117             | 59.1 |
| 51-60        | 63              | 21.0 |
| 61-70        | 26              | 8.6  |
| >70          | 5               | 1.6  |
| Total        | 299             | 100.0|

Mean ± SD: 46.47 ± 10.9

**Table 2: Gender distribution of patients studied**

| Gender | No. of patients | %    |
|--------|-----------------|------|
| Female | 32              | 10.7 |
| Male   | 267             | 89.2 |
| Total  | 299             | 100.0|

*Death: 53, Improved: 246

![Figure 1: Outcome](image)
Comparison of in-Hospital mortality with APRI, MELD and albumin level

The in-Hospital mortality was 17.7%. The Area under curve (AUC) of the APRI score for predicting the in-hospital mortality was 0.631 (confidence interval: 95%: 0.574-0.686) (Table 3). The best cut-off value of -0.743, with sensitivity of 77.9%, a specificity of 46.2%, positive likelihood ratio (PLR) of 1.72 and negative likelihood ratio (NLR) 1.66 (Figure 2).

The AUC of the MELD score for predicting the in-hospital mortality was 0.766 (confidence interval 95%: 0.713-0.812), with a sensitivity of 84.2%, a specificity of 75.6%, PLR of 1.7 and NLR of 1.6 (Figure 3).

The AUC of the Albumin level for predicting the in-hospital mortality was 0.559 (confidence interval 95% 0.500-0.616), with a sensitivity of 89.8%, a specificity of 28.7%, PLR of 3.23 and NLR of 3.23 (Figure 4).

The AUC for predicting the in-hospital mortality was significantly different between the APRI, MELD score and albumin level (Figure 5). (APRI and MELD score –P= 0.0015; Albumin level and MELD P < 0.001) (Table 4).

ORDER: MELD score > APRI> Albumin level.

DISCUSSION

Cirrhosis of liver is associated with significant morbidity, mortality and health care costs. There are several biochemical markers that can reveal both liver function and the extent of liver injury. APRI uses platelet count and AST levels to reflect insufficient liver function and new stress/damage to the liver. Decreased platelet

| Table 3: Area under curve |
|--------------------------|
| Variable     | AUC     | Standard error | 95% CI       |
|--------------------------|
| ALBUMIN      | 0.559   | 0.0392         | 0.500 to 0.616 |
| APRI_FINAL   | 0.631   | 0.0403         | 0.574 to 0.686 |
| MELD_FINAL   | 0.766   | 0.0300         | 0.713 to 0.812 |

Figure 2: Area under curve for APRI

Figure 3: Area under curve for MELD score

Figure 4: Area under curve for Albumin

Figure 5: comparing AUC for albumin, MELD and APRI
Table 4: Pairwise comparison of ROC curves

|                        | ALBUMIN–APRI_FINAL | ALBUMIN–MELD_FINAL | APRI_FINAL–MELD_FINAL |
|------------------------|---------------------|--------------------|------------------------|
| Difference between areas | 0.0730              | 0.207              | 0.134                  |
| Standard Error*         | 0.0557              | 0.0461             | 0.0730                 |
| 95% Confidence Interval | -0.0361 to 0.182    | 0.117 to 0.297     | 0.0512 to 0.217        |
| z statistic             | 1.311               | 4.491              | 3.171                  |
| Significance level      | P=0.1899            | P<0.0001           | P=0.0015               |

Limitation of the study

1) Long term follow up was unavailable so this study couldn't evaluate the role of APRI for predicting long term Prognosis.
2) APRI score is not dynamically measured.
3) Retrospective study, needs prospective study for better understanding of correlation.

CONCLUSION

APRI is an independent predictor of mortality. Highly elevated APRI was associated with higher frequencies of clinical complications such as ascites and encephalopathy.

The prognostic performance of all 3 variables were comparable but MELD score has better prognostic significance than APRI score.

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count and increased AST levels are known as clinical manifestations of progression of liver cirrhosis. A reduction in platelet count can be caused by the accelerating destruction of an enlarged spleen which is termed as “hypersplenism” secondary to portal hypertension in cirrhosis. AST is more abundantly present in the mitochondria and cytoplasm relative to ALT. Fibrosis of liver may reduce the clearance of AST, leading to the retention of AST in blood. Therefore, high AST levels combined with low platelet count may be used to predict the severity and progression of liver injury in cirrhotic patients.

In our study, we tried to explore the prognostic performance of the APRI score for the assessment of the in-hospital mortality of chronic liver disease.

We found that the prognostic performance of the APRI score was comparable to that of MELD score and albumin level. In this study, MELD score had the largest AUC, followed by APRI and albumin level. Therefore, MELD score has better prognostic performance compared to APRI and albumin level.

Study done by Weillin Mao et al, On 193 chronic HBV-infected patients. Mortality that occurred within 90 days of hospital stay was compared, which concludes that APRI is an independent predictor for mortality in patients with cirrhosis and they found positive correlation between the MELD score and APRI. In a study conducted by Lieber CS1 et al, on 1308 patients, APRI has low sensitivity and specificity for the diagnosis of significant fibrosis in patients with alcoholic liver disease.
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