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Original Research Paper

General Medicine

A STUDY OF CHILD PUGH SCORE VS MELD SCORE FOR ASSESSMENT OF PROGNOSIS IN LIVER CIRRHOSIS

Dr Shivani A Patel Professor, Department of Medicine, B.J. Medical College, Civil Hospital, Ahmedabad.

Dr Kavit Shastri Junior Resident Doctor, Department of Medicine, B.J. Medical College, Civil Hospital, Ahmedabad.

Dr Sahil Patel Junior Resident Doctor, Department of Medicine, B.J. Medical College, Civil Hospital, Ahmedabad.

Dr Krunal Patel Junior Resident Doctor, Department of Medicine, B.J. Medical College, Civil Hospital, Ahmedabad.

ABSTRACT

Aim: To compare the discriminative ability of Child Pugh Score and MELD Score, as a as a marker of prognosis in terms of disease outcome. **Methods:** Type of study: Prospective observational study. Patients diagnosed with cirrhosis of liver were included in the study. Blood investigations were done for all patients and Child Turcotte Pugh Scores and Model for end stage liver disease scores were calculated. Data analysis was carried out using Statistical package for social sciences. **Results:** 50 patients were enrolled in the study. 68% patients belonged to Child Pugh class C suggestive of advanced liver disease while only 8% belonged to Child Pugh class A. The mean length of hospital stay was maximum in CPS Class B-8.2 days, followed by CPS Class C-7.3 days and CPS Class A -6.3 days. The mean length of hospital stay was maximum in MELD score of 20-30 where it was 9.1 days. Mortality Rate in our study was 42%. This higher mortality rate was attributed to more patients presenting in advanced stage of cirrhosis.

KEYWORDS :

INTRODUCTION

Cirrhosis as defined histologically, is a diffuse hepatic process involving fibrosis and nodule formation, secondary to chronic liver injury, leading to alteration of the normal lobular architecture of the liver. Liver cirrhosis has a high morbidity and mortality and ranks as the 14th most common cause of death all over the world. Common Causes of cirrhosis include Alcoholic liver disease, Hepatitis C virus (HCV), Hepatitis B virus (HBV) and Non-Alcoholic Steatohepatitis (NASH). The natural history of cirrhosis is classically characterised by an asymptomatic phase termed compensated cirrhosis, followed by the development of complications and symptoms from portal hypertension and/or liver dysfunction, termed decompensated cirrhosis. The transition to decompensated stage has been estimated to occur at a rate of 5%-7% per year. A number of scores have been developed to determine the prognosis in cirrhotic patients. These include Child Turcotte Pugh (CTP) Classification, Model for End Stage Liver disease (MELD) and Pediatric End Stage Liver Disease (PELD). The objective of this study is to compare CTP and MELD scores in assessing the prognosis of cirrhosis patients in terms of complications and mortality.

MATERIALS AND METHODS

Type of Study: Prospective observational study

50 patients of decompensated liver cirrhosis were enrolled in the study. All patients were admitted during July 2020 to September 2021 at the Civil hospital Ahmedabad. Details of medical history vitals and clinical examination of each patient were recorded. Radiologic study in the form of abdominal-pelvic ultrasound was done. Results of laboratory investigations like complete blood count, liver function test, blood urea, serum creatinine, ascitic fluid analysis, serum sodium, serum potassium and prothrombin time were collected, MELD and CTP scores were calculated based on clinical and laboratory data using standard formulas.

OBSERVATIONS

Table 1:- Etiology of cirrhosis

ETIOLOGY	NUMBER OF PATIENTS	PERCENTAGE
Alcoholic Cirrhosis	35	70%
Cryptogenic Cirrhosis	3	6%
Chronic Hepatitis B	4	8%
Chronic Hepatitis C	2	4%
(NASH)	3	6%
Autoimmune cirrhosis	1	2%
Grand Total	50	100%

The most common etiology of chronic liver disease in our study was alcoholic cirrhosis (70%).

The second most common etiology remained chronic hepatitis B (8%) followed by cryptogenic (7%) despite thorough investigations.

Viral cirrhosis accounted for 12% patients with both chronic hepatitis B and C accounting 8% and 4% respectively. Non-Alcoholic steatohepatitis and autoimmune cirrhosis accounted for remainder of the patients. (8%)

Table 2:- Duration of hospital stay and CPS Score

Child Pugh class	Number of patients	Mean duration of hospital stay
A	8	6.3
B	24	8.2
C	68	7.3

- The mean length of hospital stay was maximum in CPS Class B - 8.2 days
- This was followed by Class C where the mean duration was 7.3 days.

Reduced duration in Class C despite increased severity of disease, can be attributed to increased mortality of patients in this class.

Table 3:- Duration of hospital stay and MELD Score

MELD Score	No. of patients	Mean length of hospital stay(No. of days)
10-19.9	37	6.2
20-30	49	9.1
30-40	14	8.1

- Mean duration of hospital stay in score of 10-19.9 was 6.2 days
- Mean duration of hospital stay in score of 20-30 was 9.1 days
- Mean duration of hospital stay in score of 30-40 was 8.1 days, attributable to increased mortality in this class

Table 4:- CTP class and survival in patients with cirrhosis

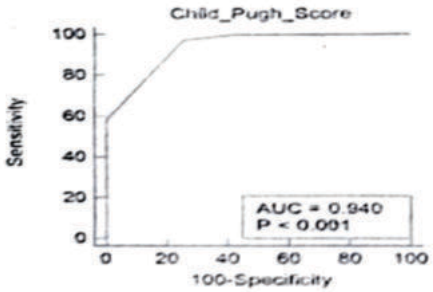
CHILD PUGH CLASS	SURVIVED	EXPIRED	TOTAL
A	8(13.74%)	0	8
B	8(31.03%)	6(14.28%)	24
C	32(55.17%)	36(85.71%)	68
TOTAL	58	42	100

- Chi square value=11.982 p value= 0.0025 significant at p <0.05
- Survival was excellent in Class A without any short-term mortality.
- Meanwhile, Class C SBP had 85.71% mortality despite optimal treatment.
- Child Pugh Class C with score of 10 or more is an independent risk factor determining adverse outcome in patients with spontaneous bacterial peritonitis.

Table 5:- MELD Score and outcome in patients with cirrhosis

MELD SCORE	SURVIVED	EXPIRED	TOTAL
10-19.9	34(90.85%)	3(3.14%)	37
20-30	20(40.92%)	29(59.07%)	49
30-40	4(28.44%)	10(71.41%)	14
TOTAL	58	42	100

- Chi square value=25.181 p value= 0.0000034 significant at p<0.05
- Scores in the range of 20-30 and 30-40 were associated with higher mortality (92.80% overall) compared to scores between 10-20 (7.14%)



Area under the ROC curve (AUC)

Table 6:- ROC and AUC(Area under Curve) of CPS score

Area under the ROC curve(AUC)	0.940
Standard Error a	0.0179
95% Confidence interval b	0.874 to 0.978
Z statistic	24.643
Significance Level P(Area =0.5)	<0.0001

Criterion values and coordinates of the ROC curve

Criterion	Sensitivity	95% CI	Specificity	95% CI	+LR	-LR
≥8	100.00	90.7-100.0	0.00	0.0-5.8	1.00	
>12	100.00	90.7-100.0	56.45	43.3-69.0	2.30	0.00
>13	97.37	86.2-99.9	74.19	61.5-84.5	3.77	0.035
>14	57.89	40.8-73.7	100.00	94.2-100.0		0.42
15	0.00	0.0-9.3	100.00	94.2-100.0		1.00

From the present graph, it can be concluded that AUC is 0.94 (statistically significant at AUC value >0.50) with p value <0.001. Using a cut off of >7, gives a 100% sensitivity at the cost of specificity, whereas, a cut off of 13 or more has a sensitivity of 97.37% with a specificity of 74.19%

Table 7:- Roc And Auc (area Under Curve) Of Meld Score

Area under the ROC curve(AUC)	0.940
Standard Errora	0.0179
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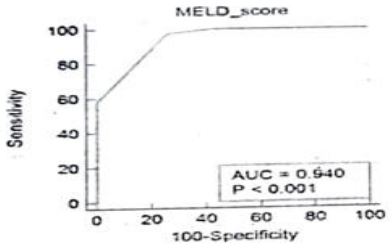
Significance level P(Area=0.5)	<0.0001

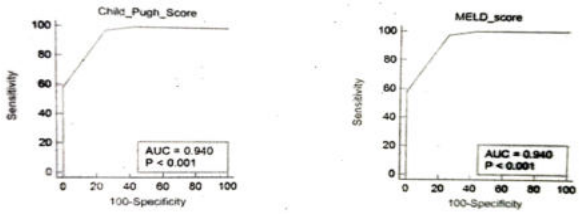


Criterion values and coordinates of the ROC Curve

Criterion	Sensitivity	95% CI	Specificity	95% CI	+LR	-LR
≥14.43	100.00	90.7-100.0	0.00	0.0-5.8	1.00	
>18.43	100.00	90.7-100.0	56.45	43.3-69.0	2.30	0.00
>19.43	97.37	86.2-99.9	74.19	61.5-84.5	3.77	0.035
>20.43	57.89	40.8-73.7	100.00	94.2-100.0		0.42
>21.43	0.00	0.0-9.3	100.00	94.2-100.0		1.00

From the present graph, it can be concluded that AUC = 0.94, which is statistically significant (at value >0.5) with a p value <0.001, Hence, MELD Score serves as a useful method to assess prognosis in cirrhosis.

Table 8:- Comparison of AUC of CPS and MELD Score



AUC of Child Pugh Score and MELD Score is found to be 0.940. Hence, in present study, both are found to be equally effective as a prognostic marker for decompensated cirrhosis of liver.

DISCUSSION

In our study, majority decompensated cirrhotic patients presented with ascites in all 3 classes of CTP.

In Vardhaman et al. it was hematemesis in Class A, HE in Class B and HRS in Class C. Similarly, commonest presentation across all ranges of MELD score was ascites. Vardhaman et al found that complications varied with MELD score. Most common complication was Ascites in all 3 ranges of MELD score, HE in score range of 10-19.9 and 20-30 and HRS in score range of 30-40 in study by Vardhaman et al.

Survival was excellent in Class A without any short-term mortality, while Class C CTP had 85.71% mortality despite optimal treatment. This was comparable to Juhi kawale et al in which also CTP class C was associated with mortality 54.54%. CTP C with score of 10 or more is an independent risk factor determining adverse outcome in patients with spontaneous bacterial peritonitis. MELD scores in the range of 20-30 and 30-40 were associated with higher mortality (92.80% overall) compared to scores between 10-20 (7.14%). This was similar to Bledar kraja et al patients with higher MELD were associated with high susceptibility to SBP and increased mortality. 18.8%

patients had MELD Scores ≤15, 43.8% had MELD between 16-24 and MELD of ≥ 25 was seen in 37.5% indicating advanced disease. AUC of Child Pugh Score and MELD Score is found To be 0.940. Hence, in present study, both are found to be equally effective as a prognostic marker for decompensated cirrhosis of liver. In a study by Liu kai and Wang Xi Kai, the area under the curve (AUC) was 0.795 for CPS and 0.772 for MELD, which Was not significantly different. Hence. both scores were found to be equally effective
as a prognostic marker.

CONCLUSION

Decompensation is characterised by the development of complications from portal hypertension and/or liver dysfunction, which includes: variceal haemorrhage, ascites, encephalopathy. Once decompensation starts, patient has a rapid downhill course with high mortality rates within 1 year. High level of bilirubin and increased creatinine level are associated with poor prognosis. Hence, various scoring systems are used to assess prognosis of patients with hepatitis or cirrhosis.CTP and MELD are important tools to stratify patients of cirrhosis prognostically. While comparing the two scores for prognosis of cirrhosis - in the present study - both were found to be equally useful. The present study consists of limited number of subjects. Long term follow up is needed to assess prognosis based on these calculated scores.