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Original Research Article

A HOSPITAL BASED OBSERVATIONAL STUDY TO FIND OUT THE CAUSES OF HOSPITAL MORTALITY IN PATIENTS ADMITTED WITH DECOMPENSATED CIRRHOSIS OF LIVER AT TERTIARY CARE CENTER

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Abstract

Background: The short-term prognosis of acutely ill patients with cirrhosis is influenced by the degree of hepatic insufficiency and by dysfunction of extrahepatic organ systems. Assessment of prognosis during hospitalization mortality can have important role in triaging for level of care. The aim of this study to find out the causes of hospital mortality in patients admitted with decompensated cirrhosis of liver. **Material & Methods:** A hospital based prospective study done on 100 cirrhotic patients admitted to the department of Medicine at Government Medical college, Sikar, Rajasthan, India during two-year period. Patients with decompensated cirrhosis liver who died during admission were selected as cases. Patients admitted with cirrhosis and its complications and who improved with treatment followed by discharge were selected as controls. Data collected included demographics; etiology of cirrhosis; indication for hospital admission; presence or absence of decompensation and portal hypertension; and the corresponding Child Pugh, MELD, and MELD-Na scores. The comparisons between cases and controls were carried out using the independent sample t test. **Results:** The Mean age of cases is 46.68 years and the mean age of controls is 45.34 years. The mean MELD and MELD-Na was significantly higher for the cases group compared to the control group i.e 24.53 & 18.26 for MELD and 29.12 & 23.46 for MELD-Na for the cases and controls respectively. On multivariate forward stepwise logistic regression, an elevated WBC count (p=0.02, OR 1.2) and creatinine (p=0.003, OR 1.2) were the only factors significantly associated with death. **Conclusion:** We concluded that the duration of the underlying disease, hematological parameters like leukocytosis and neutrophilia, biochemical parameters like creatinine, INR, SGPT were significantly associated with mortality. While scores like MELD and MELD sodium are associated with in hospital mortality, Child's score was not related to in-hospital mortality.

INTRODUCTION

The causes of mortality in decompensated cirrhosis patients are many fold. Both hepatic dysfunction and non hepatic causes have been implicated in causation of death in decompensated cirrhotic patients. Any patient with cirrhosis carries a risk of specific life-threatening complications such as variceal bleeding, sepsis, or hepatorenal syndrome. There is in addition a significant risk of nonspecific life-threatening complications due to the association of frequent comorbidities. Once patients have developed the first evidence of decompensation, complications tend to accumulate and life expectancy is reduced markedly.[1]

The course of cirrhosis varies extremely from patient to patient due to several factors, including hepatic synthetic function (or "hepatic reserve"), the cause of cirrhosis, the possibility of stopping or slowing the underlying damaging process to the liver, and the occurrence of liver malignancy. Even though the course of cirrhosis varies according to

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several factors, the need for prognostic models and scoring systems is obvious in order to manage individuals faced with different therapeutic options.[2]

The short-term prognosis of acutely ill patients with cirrhosis is influenced by the degree of hepatic insufficiency and by dysfunction of extrahepatic organ systems.

Child-Pugh score has been the reference for many years for assessing the prognosis of cirrhosis. However, Child-Pugh score has important limitations, making it difficult to categorize patients according to their own disease severity. The model for end-stage liver disease (MELD) score, which was originally designed for assessing the prognosis of cirrhotic patients undergoing trans jugular intrahepatic portosystemic shunt (TIPS), is a continuous score relying on three objective variables.[3]

However, both CTP score and MELD are associated with many limitations. Mainly they are not used in assessing prognosis during hospitalization. Assessment of prognosis during hospitalization mortality can have important role in triaging for level of care. The aim of this study to find out the causes of hospital mortality in patients admitted with decompensated cirrhosis of liver.

MATERIALS AND METHODS

A hospital based prospective study done on 100 cirrhotic patients admitted to the department of Medicine at Government Medical college, Sikar, Rajasthan, India during two-year period. Patients with decompensated cirrhosis liver who died during admission were selected as cases. Patients admitted with cirrhosis and its complications and who improved with treatment followed by discharge were selected as controls. Cases and controls were selected in a blinded manner.

The diagnosis of cirrhosis was made by clinical evaluation and with help of investigations. The clinical diagnosis of cirrhosis was made by a history of portal hypertension excluding other etiology, impaired liver function tests, impaired clotting parameters, ultrasonographic or computer tomographic criteria.

Data collected included demographics; etiology of cirrhosis; indication for hospital admission; presence or absence of decompensation and portal hypertension; and the corresponding Child Pugh, MELD, and MELD-Na scores. Other hematological and biochemical markers were studied.

Exclusion Criteria

Patients with portal hypertension not due to primary cirrhosis of liver were excluded. Patients with cirrhosis complicated by hepatocellular carcinoma were also not selected for this study

Statistical Analysis

Hematological, biochemical, scoring systems and clinical variables were reported as mean + SD, and group comparisons between cases and controls were carried out using the independent sample t test.

RESULTS

The Mean age of cases is 46.68 years, and the mean age of controls is 45.34 years (table 1). The mean duration of disease in cases was 20.12 months while the mean duration of disease in controls is 12.80 months. [Table 3]

The most common cause of liver dysfunction was found to be ethanol related. The number of hepatic and non-hepatic complications in both groups was similar and most patients had 2 or more comorbid conditions.

The most common cause of admission was hepatic encephalopathy in both groups. The other reasons for admission are renal insufficiency, refractory ascites, upper gastrointestinal bleeding.

While evaluating for Child status in both groups, 12 % of patients in both groups had Child's A cirrhosis. 48% of cases had Child' s B cirrhosis while 54% of controls had Child's B cirrhosis. 40.0% cases and 36% controls had Child's C cirrhosis.

The mean MELD and MELD-Na was significantly higher for the cases group compared to the control group i.e 24.53 & 18.26 for MELD and 29.12 & 23.46 for MELD-Na for the cases and controls respectively. [Table 2]

The most common causes of death are due to cirrhosis related complications associated with decompensation like hepatic encephalopathy, hepato renal syndrome and upper gastrointestinal bleeding. A small number of patients died due to non-cirrhosis related complications most commonly infections.

On multivariate forward stepwise logistic regression, an elevated WBC count (p=0.02, OR 1.2) and creatinine (p=0.003, OR 1.2) were the only factors significantly associated with death. [Table 3]

Table 1: Cause of death

Causes	Number (N=50)	%
Hepatic related		
HE	18	36%
HRS	15	30%
UGI bleed	9	18%
Others	1	2%
Non hepatic related		
Infection	6	12%
Others	1	2%

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Table 2: Demographic variables of patients

	Cases	Controls
Total number	**50**	**50**
Gender	Males -44: Females-6	Males-46; Females-4
Age (Years)	46.68	45.34
Complications related to hepatic decompensation (Mean)	2.21	1.89
Extra hepatic complications (Mean)	0.171	0.32
Etiology (Number)		
Alcohol	31	32
Viral	11	10
Others	8	8
CTP (Number)		
A	6	6
B	24	27
C	20	18
MELD (Mean)	24.53	18.26
MELD –Na (Mean)	29.12	23.46
TC (Mean)	11670.34	8175.22
% neutrophilia (Mean)	75.12	70.24
Platelet count (Mean)	1,10.210	123875
Sodium (Mean)	124.25	128.28
Albumin (Mean)	2.32	2.35
SGPT (Mean)	45.84	43.62

Table 3: This analysis revealed that increasing levels of MELD, MELD- Na, serum creatinine, INR, WBC, neutrophilia and duration of disease were significantly associated with increased risk of death

	Cases (Mean)	Controls (Mean)	P Value
Duration of disease	20.12	12.80	0.001
Child status	7.7	8.8	>0.05
MELD	24.48	18.42	0.001
MELD Na	29.20	23.56	0.001
Platelet	1,10.210	123875	>0.05
TC	11670.34	8175.22	<0.05*
% of neutrophils	75.12	70.24	<0.05*
Hemoglobin	8.98	8.66	>0.05
APTT	34.38	32.15	>0.05
INR	1.862	1.578	<0.05*
Creatinine	1.995	1.1082	0.001
SGPT	45.84	43.62	<0.05*
Albumin	2.32	2.35	>0.05
Sodium	124.25	128.28	>0.05

DISCUSSION

The Child-Pugh system is an important component of the prognostic evaluation of cirrhotic patients, although, this traditional scoring has several shortcomings. This issue intensified the search for a continuous disease severity score system that used more objective, readily verifiable parameters, which could be validated as a measure of liver disease severity, or predictor of mortality.

Child-Pugh score has been the reference for assessing the prognosis of cirrhosis for about three decades. The longevity of the Child-Pugh score can be explained by its empirical simplicity, its intuitiveness, and, overall, its good accuracy across a broad spectrum of causes and specific situations. Recently, MELD score emerged as a "modern" alternative to Child-Pugh score. There is no clear evidence that MELD is superior to Child-Pugh score in terms of accuracy. Studies comparing these scores have shown that the accuracy of Child-Pugh score for predicting 3-month to 3-year survival is not always inferior to that of MELD score.[3] In addition, for many physicians, Child-Pugh score remains more convenient to use at the bedside and more explicit than MELD score.

MELD score has several strengths compared with Child-Pugh. The variables incorporated into the MELD score are simple and more objective. The weight of each variable has been determined by statistical analysis. MELD is a continuous score, which makes it more convenient for scoring individuals within large populations. In addition to organ allocation, MELD score has been validated across a large spectrum of causes of liver diseases.[4] All these reasons make the MELD score likely to be the core tool for assessing the prognosis of cirrhosis in the future. By using MELD score, it can be reasonably assumed that physicians will get landmarks as simple as those they had with Child-Pugh score.

The Child- Pugh score uses two very subjective variables in its calculation - portosystemic encephalopathy and ascites.

MELD uses objective variables in their computation. MELD uses prothrombin time INR, serum bilirubin, and serum creatinine levels. In addition to these variables, MELD sodium uses sodium levels for computation.[5]

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Bacterial infections are a frequent and severe complication of cirrhosis. Cirrhotic patients have an acquired immune deficiency because of dyshomeostasis and malnutrition. All host defense systems are compromised.[6]

In our study, the result of the multivariate logistic analysis showed that an elevated WBC count was associated with in-hospital mortality. On univariate analysis in my study, mean duration of disease was the clinical demographic which was found to significantly correlate with in hospital mortality.

In our study, Child score was not found to correlate with in hospital mortality, but both MELD and MELD Na were found to correlate significantly with in hospital mortality.

In general, the prognosis of cirrhotic patients admitted to the intensive care unit (ICU) due to multiorgan failure is very poor. Mortality rates in patients with failure of two or three organ systems are estimated to be around 75% and 95%, respectively.[7] Mortality is much higher than that of noncirrhotic patients with multiorgan failure. The poor outcome of cirrhotic patients with multiorgan failure results from a rapid alteration of liver function, a limited capacity for liver regeneration, and the absence of efficient artificial liver support systems. Predicting the outcome in this context may help optimize resource utilization and triage. However, it must be kept in mind that not all patients admitted to the ICU have a fatal outcome. In particular, some patients may be efficiently managed with aggressive management.[8]

A previous studies by Wehler et al,[7] to assess and compare the prognostic accuracy of the Child-Pugh classification, the Acute Physiology and Chronic Health Evaluation (APACHE) II system and the Sequential Organ Failure Assessment (SOFA) for predicting hospital mortality showed that the discriminatory power of the SOFA to predict short-term mortality in critically ill patients with cirrhosis is superior to the APACHE II and Child-Pugh systems. Also Prognostic scoring systems cannot replace the clinical evaluation of the patient.

The present study also confirms that Child score is not predictive of short term mortality. Features of multiple organ involvement like raised renal parameters, coagulopathy and leukocytosis are associated with early or in hospital mortality.

In a similar study conducted by Ira I Yu et al comparing in hospital prognosis among cirrhotic patients: Child-Pugh versus APACHE III versus MELD scoring systems concluded that the APACHE III scoring system is superior to Child-Pugh and MELD scoring systems for prognosticating in-hospital mortality among decompensated cirrhotic patients. In the present study, as ABG could not be performed for all patients, APACHE could not be assessed. However components of the APACHE score like creatinine and leukocytosis showed relation to in hospital mortality.

The limitations of this present study were the lack of follow up of the control group once the patients have been discharged.

CONCLUSION

We concluded that the duration of the underlying disease, hematological parameters like leukocytosis and neutrophilia, biochemical parameters like creatinine, INR, SGPT were significantly associated with mortality. While scores like MELD and MELD sodium are associated with in hospital mortality, Child's score was not related to in-hospital mortality.

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