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ORIGINAL ARTICLE

Frequency of Mortality in Cirrhotic Patients with Spontaneous Bacterial Peritonitis having Model for End Stage Liver Disease (MELD) Score >22

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Abstract

Objective: To determine the frequency of mortality in cirrhotic patients with spontaneous bacterial peritonitis having Model for end stage liver disease (MELD) score >22.
Methodology: This was a hospital based prospective clinical study conducted at the department of gastroenterology & hepatology, Isra University Hospital, Hyderabad. Patients diagnosed cases of CTP class B & C liver cirrhosis and having age more than 40 years to 60 years with MELD score >22 were included. Patients with who do not consent and those who had underlying hepatocellular carcinoma were excluded from this study. The descriptive frequencies and percentages were computed for gender, education level, economic status, and mortality. Age, duration of disease, and MELD score were calculated and presented as Mean±SD.
Results: Most of the patients belongs to middle age group (Mean±SD was 51.95±5.77 years). Mean ± SD MELD score was 27.67 ± 4.04 mg/dL. Males patients were 52.78% (n= 57). Among 108 admitted patients of SBP, 33 patients with MELD score >22 did not survive, thus mortality rate was 30.56% with significant association (p value < 0.003) while insignificant association was observed in respect to age, gender, economic status, and duration of illness with MELD score >22.
Conclusion: Due to the higher prevalence of chronic hepatitis C in our population, there is an abundance of cirrhosis patients. Spontaneous bacterial peritonitis is quite common in cirrhosis patients in our population. Non-invasive scoring system (MELD) is quite useful in assessing the prognosis of patients with liver cirrhosis and SBP.
Key words: Cirrhosis, Spontaneous bacterial peritonitis, MELD score, Ascites, Infection.

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Introduction

Patients with liver cirrhosis are prone to developing infection, which is associated with a poor overall outcome in such patients. Spontaneous bacterial peritonitis is among the most common infective complication patients experience with liver cirrhosis and it accounts for around 8% -32% in hospitalized patients.[1;2]

The overall survival of liver cirrhosis can be predicted based upon a predesigned scoring system, model for end stage liver disease (MELD).[3] This score can be calculated through testing baseline routine laboratory parameters including serum levels of creatinine & bilirubin and the International Normalized Ratio (INR) for prothrombin time. With the advancement in the technology, mobile based smart phone applications are also available through which MELD score can be calculated for free.

Mehmood T et al. 2019[4] with his colleagues, has conducted a study in which they observed that higher the MELD score is associated with higher chances of having SBP in patients with liver cirrhosis. On the other hands, a study conducted by Younis I and colleagues in 2015[5] signifies the prognostic importance of MELD score in patients with liver cirrhosis and associated SBP. Almost double mortality was observed in patients suffering from SBP as compared to those who only had liver cirrhosis without infection, 23.4% versus 12.0%, respectively.

Besides international data, study from Pakistan conducted in Rawalpindi by Khurram M et al. 2015[6] also observed associated of higher MELD score (>22) in patients with liver cirrhosis was significantly associated with higher rates of mortality but their study had limitations such as it was a retrospective study design that may cause bias based on the data is being provided that is why this study aims to fill the scientific gap in our region by determining the mortality rate in patients with liver cirrhosis associated SBP and having MELD score >22.

Material and Methods

A hospital based prospective clinical study was conducted on the cohorts of liver cirrhosis from department of gastroenterology & hepatology, Isra University Hospital, Hyderabad, Pakistan. The patients were selected through a convenient sampling technique and they were enrolled for the period of six months. All the patients diagnosed as liver cirrhosis and complicated with SBP with MELD score >22 were included in our study. Before commencement of the study, approval was taken from ethical committee of the hospital, and data were collected after taking consent from the patient/family member. Patients were followed in hospital, and at the end of 5th day, mortality was observed.

Statistical Package for Social Sciences (SPSS) Version 21 was used for data entering and final analysis. Categorical variables like gender, level of education, socioeconomic status, and mortality (Yes/No) were analysed as frequencies and percentages. While, continuous variables like age, duration of liver disease, and MELD score were analyzed and presented as mean with standard deviation. A p value of <0.05 was taken as statistically significant.

Results

A total of 108 patients were selected based on the already made inclusion and exclusion criteria. The mean ± SD age of patients was 51.95± 5.77 years with range of 41-60 years. Mean ± SD MELD score was 27.67 ± 4.04 mg/dL. In this study, the lowest MELD score recorded was 23 while the highest was 36. Mean ± SD duration of current illness was 7.54 ±3.23 (Range: 3-15 days). Patients of age between 51-60 years were in majority i-e; 63.9% (n=69). Males patients were 52.78% (n= 57) while 47.22% (n=51) were females.

Figure 1 shows categorization of patients according to MELD score. Patients having MELD score between 22-25 were 37.04% (n=40). Those having MELD score between 26-30 were 29.63% (n=32), those having MELD score between 31-35 were 26.85% (n=29) while higher MELD score than 36 was recorded in 6.48% (n=7) patients. The current study found that among 108 admitted patients of SBP, 33 patients with MELD score >22 did not survive, thus mortality rate was 30.56%. (Figure 2).

When effect modification of the frequency of mortality among patients of SBP with MELD score >22 was evaluated with stratification of different variables, it was noted that only the MELD score was a significant effect modifier. With an increase in the MELD score there was significant increase in mortality. It was 17.5% in those who had MELD score of 22 to 25, and it increased up to 28.1% in those having MELD score of 26 to 30. It further increased to 37.9% with increasing MELD score till 35 and reached its peak of 85.7% in those who had MELD score >36 (p value < 0.003).

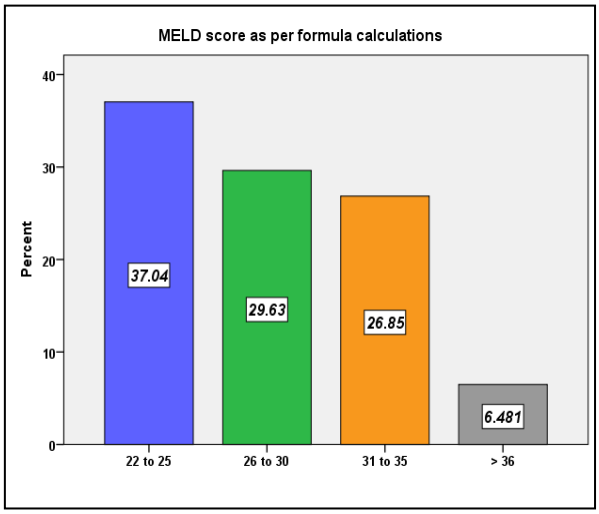

Figure 1. Categorical distribution of meld score in cirrhotic patients with spontaneous bacterial peritonitis (n = 108)

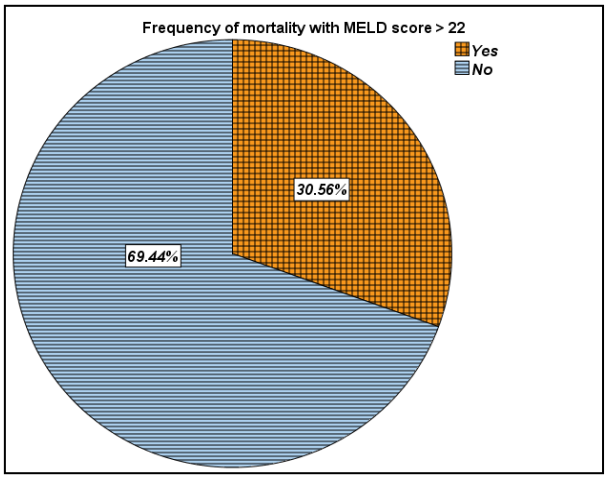

Figure 2. Frequency of Mortality among Patients of SBP Having With Meld Score >22 (N = 108)

Discussion

Patients with liver cirrhosis who complicated with spontaneous bacterial peritonitis experience higher rates of hospitalization and mortality. Increase in frequency of hospitalization possesses psychological and financial burden on patients and also their family members. Spontaneous bacterial peritonitis occurs when ascitic fluid gets infected with bacterial infection and its burden is quite higher ranging from

32% to 34%.[7-9] This infection gets further complicated and worsen the condition of patients after it leads them to renal failure, shock, and hepatic encephalopathy and ultimately reduces overall survival of such patients 40% to 70% .[10] The current study enrolled the patients who had MELD score more than 22. A higher score leads to increased mortality.[11;12] Mean age of our patients was 51.95±5.77 years and in that majority of patients were of age in their 5th decade of life (63.9% were of age 51-60 years). Most of other studies at local and international level have described the similar age patterns among cirrhotic patients.[3;14] Ages of patients in these studies range from 5th decade to 7th decade of life with mean ages 41 to 50 years. One local study stated that mean age of patients was 44.99±14.29 years.[15] This could be due to the study's deliberate selection of younger patients. Overall it is seen that it takes nearly 2 decades to develop cirrhosis in chronic HCV patients which manifest the infection acquired in young age.

The Isra University hospital is situated at location where urban and rural populations are abundant and are in close approximation. The hospital's location along a major highway in the country makes it simple to reach a large rural population. That is why most patients coming to this hospital and enrolled in our study were from rural areas. This fact is reflected in demographic results of this study, which show that nearly two thirds (62%) of our patients were educated less than secondary level. The primary outcome of this study was to investigate the frequency of mortality among patients of SBP having with MELD score >22, further to evaluate the prognostic value of MELD score in cirrhotic patients presenting with SBP. The current study noted that death rate among patients having >22 MELD score was 30.6%. It is widely accepted that SBP is very fatal condition. Once SBP ensues there are other physiological disruptions in already compromised condition of cirrhotic patients that further increase the mortality rate.[16-19] In a previously conducted international study authors have observed that patients who had MELD score of more than 25 and underlying SBP were more likely to have poor prognosis[20] and mortality rate was 23.4% in SBP patients vs. 12.0% in non-SBP patients, p value 0.024. In another study it was noted that prevalence of SBP was 30.6%.[21] The study also documented that mortality rate among cirrhotic patients which develop SBP is approximately 20-40%. Thus our results are in concordance with results of previous studies signifying the severity of SBP in cirrhotic patients. In our study, we also discovered that deaths were more common in those with a higher MELD score, with approximately 85% of those with a MELD score >36 dying, compared to 17.5% of those with a MELD score between 22 and 25 dying. With increasing MELD scores, the mortality rate gradually increased. In a local study it was also shown that above 22 score with each degree rise in MELD score there was 8% rise in mortality.[22] Thus results of our study reiterate the importance of prognostic value of MELD score in cirrhotic patients who present with SBP.

The study has certain limitations as well. First of all we did not take those patients which had presented with asymptomatic patients of SBP. Secondly, the patients having MELD score of 15 or above were not included in the study. These points might have altered the rate of mortality. Further a comparison between the patients having MELD score between 15-22 and those having MELD score more than 22 would have yielded more insight into the prognostic value of the discussed score. Despite these limitations, the current study highlighted the conditions of cirrhotic patients coming from rural areas population.

Conclusion

Liver cirrhosis cases are now more prevalent due to the higher burden of chronic HCV patients. Furthermore, mortality is higher in these patients; thus, non-invasive strategies are critical to reducing the financial burden in these patients. MELD score of >22 in this study has proved to be a significant scoring technique to use for determining the mortality among SBP cirrhotic patients.

References

1. Santoiemma PP, Dakwar O, Angarone MP. A retrospective analysis of cases of Spontaneous Bacterial Peritonitis in cirrhosis patients. PLoS One 2020;15(9):e0239470.
2. Li YT, Huang JR, Peng ML. Current Status and Prospects of Spontaneous Peritonitis in Patients with Cirrhosis. Biomed Res Int 2020;2020:3743962.
3. Jepsen P, Watson H, Macdonald S, Vilstrup H, Jalan R. MELD remains the best predictor of mortality in outpatients with cirrhosis and severe ascites. Aliment Pharmacol Ther 2020 Aug;52(3):492-9.
4. Mehmood T, Zia MQ, Latif A, Ansar S. Mortality Related Factors in Patients with Variceal Bleeding with MELD Score >/= 18. J Coll Physicians Surg Pak 2019 Dec;29(12):1199-202.
5. Younis I, Sarwar S, Butt Z, Tanveer S, Qaadir A, Jadoon NA. Clinical characteristics, predictors, and survival among patients with hepatopulmonary syndrome. Ann Hepatol 2015 May;14(3):354-60.
6. Khurram M, Qayyum W, Umar M, ul AZ, Bushra HT. evaluation of model for end-stage liver disease score cut off values in patients with hepatic encephalopathy. J Ayub Med Coll Abbottabad 2015 Oct;27(4):886-9.
7. Jain P, S M S, Choudhury AK, Maiwall R, Kumar G, Bharadwaj A, et al. alcohol associated liver cirrhotics have higher mortality after index hospitalization: long-term data of 5138 patients. Clin Mol Hepatol. 2020 Dec 3.

8. Tu B, Zhang YN, Bi JF, Xu Z, Zhao P, Shi L, et al. Multivariate predictive model for asymptomatic spontaneous bacterial peritonitis in patients with liver cirrhosis. World J Gastroenterol 2020 Aug 7;26(29):4316-26.
9. Sanglodkar U, Jain M, Venkataraman J. Predictors of immediate and short-term mortality in spontaneous bacterial peritonitis. Indian J Gastroenterol 2020 Aug;39(4):331-7.
10. Fedosina EA, Byeverov AO, Bogomolov PO, Staroverova NP. [Some practical issues in the management of patients with decompensated liver cirrhosis]. Ter Arkh. 2019 Aug 15;91(8):148-54.
11. Watanabe S, Kurihara C, Manerikar A, Thakkar S, Saine M, Bharat A. MELD Score Predicts Outcomes in Patients Undergoing Venovenous Extracorporeal Membrane Oxygenation. ASAIO J 2020 Dec 10.
12. Jepsen P, Watson H, Macdonald S, Vilstrup H, Jalan R. MELD remains the best predictor of mortality in outpatients with cirrhosis and severe ascites. Aliment Pharmacol Ther 2020 Aug;52(3):492-9.
13. Ullah A, Rehman IU, Ahmad J, Gohar M, Ahmad S, Ahmad B. Hepatitis-C Virus and Cirrhosis: An Overview from Khyber Pakhtunkhwa Province of Pakistan. Viral Immunol 2020 Jun;33(5):396-403.
14. Stroffolini T, Sagnelli E, Sagnelli C, Morisco F, Babudieri S, Furlan C, et al. The association between education level and chronic liver disease of any etiology. Eur J Intern Med 2020 May;75:55-9.
15. Nazir N, Jan MR, Ali A, Asif M, Idrees M, Nisar M, et al. Prevalence of hepatitis-C virus genotypes and potential transmission risks in Malakand Khyber Pakhtunkhwa, Pakistan. Virol J 2017 Aug 22;14(1):160.
16. Mittal H, Wyawahare M, Sistla S. Microbiological profile of pathogens in spontaneous bacterial peritonitis secondary to liver cirrhosis: a retrospective study. Trop Doct 2020 Apr;50(2):138-41.
17. Li H, Wieser A, Zhang J, Liss I, Markwardt D, Hornung R, et al. Patients with cirrhosis and SBP: Increase in multidrug-resistant organisms and complications. Eur J Clin Invest 2020 Feb;50(2):e13198.
18. Smith A, Baumgartner K, Bositis C. Cirrhosis: Diagnosis and Management. Am Fam Physician. 2019 Dec 15;100(12):759-70.
19. Termsinsuk P, Auesomwang C. Factors that predict recurrent spontaneous bacterial peritonitis in cirrhotic patients. Int J Clin Pract 2020 Mar;74(3):e13457.
20. Lameirao GC, Violante SR, Carrola P, Presa J. Bacterial Infections in Patients with Liver Cirrhosis in an Internal Medicine Department. GE Port J Gastroenterol 2019 Aug;26(5):324-32.
21. Duah A, Nkrumah KN. Spontaneous bacterial peritonitis among adult patients with ascites attending Korle-Bu Teaching Hospital. Ghana Med J. 2019 Mar;53(1):37-43.
22. Khan R, Abid S, Jafri W, Awan S, Hamid S, Shah H, et al. Model for end-stage liver disease (MELD) score as a useful prognostic marker in cirrhotic patients with infection. J Coll Physicians Surg Pak. 2009 Nov;19(11):694-8.