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ORIGINAL ARTICLE

Correlation of Endoscopic Findings with Meld Score in Patients with Cirrhosis

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ABSTRACT

Background: Liver cirrhosis is reduced liver function caused by the growth of scar tissue known as fibrosis. The injury to hepatic tissues leads to the creation of scar tissue, which, over time, can replace normally functioning tissues.

Objectives: The study evaluated the correlation of endoscopic findings with MELD and NIEC scores in patients with liver cirrhosis in Lahore.

Methods: MELD scores were assessed based on the results of the biochemical laboratory tests using the equation. 9.57 x log(creatinine) + 3.7 x log(bilirubin) + 11.2 x log(INR) +6.43, while the endoscopy in assessing variceal characteristics was demonstrated according to the NIEC scoring system.

Results: The etiological factors underlying the cirrhosis were hepatitis B (35.03%), hepatitis C (23.78%), Wilson disease (19.94%), autoimmune disorders (10.48%) and 3.58% with idiopathic etiology. The major clinical manifestations were jaundice (73.91%), followed by ascites (69.30%), gastrointestinal bleeding (34.27%), etc. The patients were classified as per the MELD scoring index into Group A (<18) and Group B (>18). The patients of Group A were significantly high 67.01% (262/391), ($p<0.05$) than Group B 32.99% (129/391) out of which 39 patients died. Endoscopic findings were also studied according to scoring at the NIEC index and the patients were classified into different risk assessment classes.

Conclusion: Being a potentially life-threatening illness, cirrhosis necessitated prompt evaluation and action to minimize the death rate. In individuals with liver cirrhosis, NIEC and MELD scores appeared to be reliable predictors of esophageal varices.

Keywords: Ascites; Endoscopy; Gastrointestinal bleeding; Icterus; Risk assessment.

INTRODUCTION

Liver cirrhosis (LC) is the reduced liver function caused by the creation of scar tissue known as fibrosis as a result of liver disease-related damage. Tissue damage leads to tissue repair and the creation of scar tissue, which, over time, can replace normal functional tissue, resulting in cirrhosis' reduced liver function. Often, the condition progresses gradually over months or years. Early symptoms may include fatigue, inappetence, weakness, nausea, unexplained weight loss, vomiting and discomfort in the upper right quadrant of the abdomen. As the disease progresses, symptoms may include itching, ascites, lower leg edema, easy bruising, jaundice, and the formation of spider-like blood capillaries on the skin. The fluid accumulated in the abdomen may spontaneously become infected. Hepatic encephalopathy and bleeding from dilated veins in the liver, esophagus, stomach and intestines are more significant consequences [1-3].

Cirrhosis is accompanied by numerous hemodynamic alterations, which can be evaluated using invasive (transjugular pressure measurement) and non-invasive (liver duplex) methods. It is possible to assess portal venous pressure gradients via the transjugular method, and a result greater than 5 mm Hg is indicative of portal hypertension. Duplex imaging can detect the existence or absence of portal vein thrombosis and evaluate the vein's diameter, flow rate, and flow direction [4-6].

While having gastrointestinal endoscopy, such individuals entail individualized pre-assessment comprising rank of hemostasis impairment, infection risk, sedation influencing the hepatic encephalopathy and additional aspects. Pre-procedural phase should also include an evaluation of the liver's general function, using a standardized Model for End-Stage Liver Disease (MELD) scores [7]. Endoscopy of upper GIT is the gold standard for diagnosing varices. It is the preeminent method for diagnosing esophageal, gastric and occasionally duodenal varices [8].

Therefore, current research study aimed assessing correlation of endoscopic findings with MELD and NIEC scores in liver cirrhosis patients in Lahore, Pakistan.

MATERIALS AND METHODS

Study Location and Period: This cross-sectional study was conducted at Combined Military Hospital, Lahore, Pakistan, from February 2022 to Februarys 2023.

Sample Size: The study comprised 391 patients of all age and sex groups, diagnosed with chronic liver cirrhosis, who was hospitalized CMH Lahore.

Inclusion and Exclusion Criteria: All patients having upper gastrointestinal bleeding at specified time were integrated in study cohort if portal hypertension was reason of bleeding. Portal hypertension was diagnosed based on prior record of liver cirrhosis evidenced by hospital and labs). An endoscopy of the upper gastrointestinal tract revealed substantiation of portal hypertension (fundal or esophageal varices).

Patients having partial or mislaid laboratory findings, patients who did not provide informed consent, individuals with no evidence of portal hypertension, and endoscopy of the upper gastrointestinal tract revealed no evidence of portal hypertension, were excluded from research.

Study Design: Data was collected utilizing an approved questionnaire, which included questions about the patient's age, gender, existence or lack of esophageal varices and other endoscopy findings, and symptoms at the time of admission. MELD scores were assessed based on the results of the biochemical laboratory tests including serum albumin, AST, bilirubin, ALT, creatinine, and hematological values of white blood cells, platelets and hemoglobin was determined.

To assess the severity of portal hypertensive gastropathy (PHG), hepatic vein pressure gradient (HVPG) was monitored along with clinical analysis and endoscopic features of LC patients. The demographic characteristics, etiology of LC, endoscopic findings, HVPG and laboratory findings were measured (Figure 1). On the day of hospitalization, laboratory results, including the MELD score, were evaluated. MELD equation was utilized for determining the severity score: 9.57 x log(creatinine mg/dL) + 3.78 x log(bilirubin mg/dL) + 11.2 x log(INR) + 6.43(constant for etiology). To study the influence of MELD score allocation on survival forecast, patients were divided into three partially overlapping groups based on their baseline MELD scores [9].

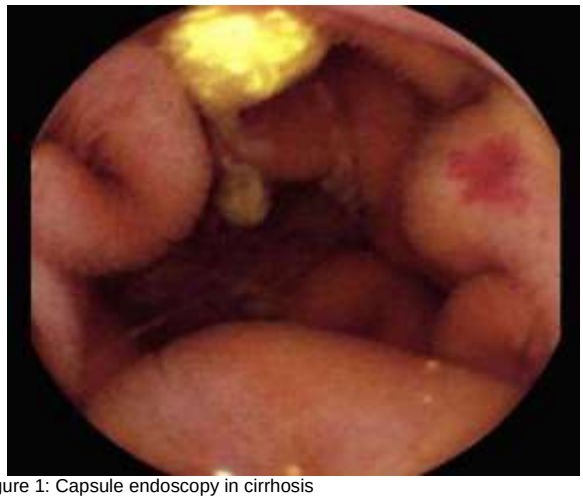

Figure 1: Capsule endoscopy in cirrhosis

(Source: Dabos et al [10])

The endoscopy findings of the patients with cirrhosis were also scored by the Northern Italian Endoscopic Club (NIEC). The endoscopy in assessing variceal characteristics was demonstrated according to NIEC scoring. The patients were classified in five risk assessment classes based on the NIEC scoring system, in which scores were added. By risk class, definite cumulative frequency of patients with different NIEC indices who experienced bleeding during eventual research was stratified. The points are added to the scoring system pertaining to the size of varices (small: 8.70, medium: 13.0, large: 17.40) and red wale markings (mild: 6.40, moderate: 9.60, severe 12.80) [11].

Ethical Approval: A pre-informed consent was gained from patients participating and research was commenced post acquiring ethical approval from the Institutional Review Board and all the ethical norms and patients' confidentiality was strictly implemented.

Statistical Analysis: Chi-squared tests were implied for binomial variables and analysis of variance (ANOVA) including Tukey HSD for continuous variables was used to do univariate analysis, using SPSS software version 24. We generated odds ratios and 95% (confidence intervals) for selected variables found as significant in analysis. A p-value below 0.05 were judged statistically significant.

RESULTS

This cross-sectional study was conducted at CMH, Lahore, from February 2022 to February 2023 and comprised 391 patients diagnosed with liver cirrhosis, who met the inclusion criteria. The demographic features of the study patients were recorded and the mean age of the participating patients was 58.72+12.42 years and 70.58% of them were males (276/391), while 29.41% were females (115/391). Out of 391 patients, 251 (64.19%) were educated and well aware of their clinical conditions, 60.61% of them belonged to the urban areas and 39.38% were from rural area people (Table 1). The etiological factors underlying the cirrhosis were significantly different ($p<0.05$) and most of the patients had suffered from liver cirrhosis were diagnosed with hepatitis B (35.03%), hepatitis C (23.78%), Wilson disease (19.94%), autoimmune disorders (10.48%) and 3.58% were with idiopathic etiology (Table 2). The clinical manifestations of all the patients were noted and analyzed. It was revealed from the results that the major clinical manifestation in liver cirrhosis was jaundice (73.91%), followed by ascites (69.30%), gastrointestinal bleeding (34.27%), secondary infections (28.9%), esophageal bleeding (24.29%), peritonitis (12.53%) and pruritis (11.50%) (Figure 2). The laboratory tests including hematological analysis and serum biochemistry were also conducted for the cirrhosis patients and were comparatively studied with the reference ranges of the parameters. It was found that the mean hemoglobin concentration of 391 cirrhosis patients recorded was 11.76+3.27 g/L, while mean ALT (191+41 mU/ml), AST (218+138 mU/ml), creatinine (1.7+0.31 mg/dl), albumin (2.1+1.8 g/dl) and International normalized ratio was 1.28+0.91 (Table 3).

Table 1: Demographic characteristics of patients with liver cirrhosis

S. No	Characteristic	No. of subjects (n)	Frequency (%)
1	Age (Mean+SD)	58.72+12.42	---
2	Sex Male Female	 276 115	 70.58 29.41
3	Education Literate Illiterate	 251 140	 64.19 35.80
4	Location Urban Rural	 237 154	 60.61 39.38

Table 2: Etiological classification of the patients suffering from liver cirrhosis

S. No	Etiological factors	Number of patients (n)	Frequency (%)	p-value
1	Hepatitis B	137	35.03	0.00001* (significant at p<0.05)
2	Hepatitis C	93	23.78	
3	Alcohol	28	7.16	
4	Autoimmune disease	41	10.48	
5	Wilson Disease	78	19.94	
6	Others	14	3.58	

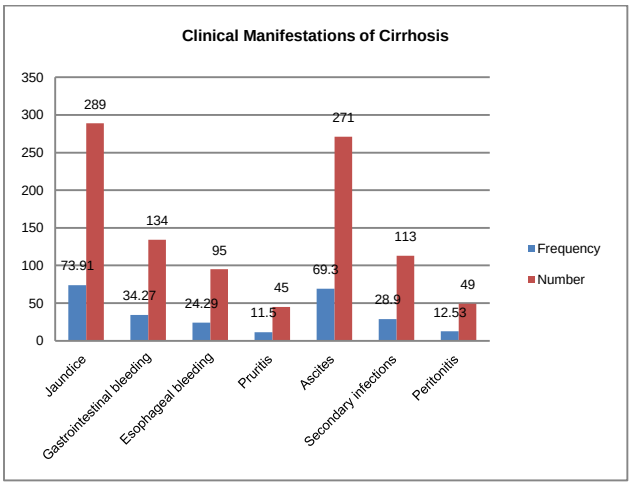

Figure 2: Clinical manifestations of the cirrhosis patients presented at the hospitals

Table 3: Laboratory findings of the cirrhosis patients in comparison to the standard values

S. No	Parameter	Reference Ranges	Patients values (Mean+SD)
1	Hemoglobin (g/L)	12-18*	11.76+3.27
2	ALT (mU/ml)	5-35*	191+41
3	AST (mU/ml)	7-40*	218+138
4	Creatinine (mg/dl)	0.6-1.2*	1.7+0.31
5	Albumin (g/dl)	3.5-5.5*	2.1+1.8
6	International normalized ratio	0.9-1.1*	1.28+0.91

*indicated that these reference ranges were taken from TMCE-07-2017 Clinical and Laboratory values

The endoscopic findings of the cirrhosis patients were studied according to the MELD scoring index in which the patients were classified into two study groups, viz Group A (MELD score <18) and Group B (>18). The patients enrolled in Group A was significantly high 67.01% (262/391), ($p<0.05$) and in Group B was 32.99% (129/391). Thirty-nine of the total patients had died of the disease within 06 months period and their mortality rates were also studied according to the groups of MELD scoring. Seventeen

patients of Group A and 22 patients of Group B died of the malady with a significantly higher (p<0.05) frequency of 4.34 and 17.05%, respectively (Table 4). Endoscopic findings of the cirrhosis patients were also studied according to the scoring at NIEC index and the patients were classified into five risk assessment classes viz Class A (NIEC score <18), Class B (19-24), Class C (25-31), Class D (32-38) and Class E with NIEC score more than 39 (Table 5). The findings among the patients of these classes were significantly different from each other (p<0.05) and the highest number of individuals 29.92% (117/391) had an NIEC score of 19-24, followed by 22.25% with NIEC score <18, while, 19.43%, 15.85% and 12.53% patients of Class C, D, E had NIECE score of 25-31, 32-38 and >38, respectively.

Table 4: The prognosis of the cirrhosis patients according to the MELD scoring index

S. No	Groups	Variable	Scoring Index	No. of patients (n)	Frequency (%)	Mortality n(%)	p-value
1	A	MELD	<18	262	67.01	17(4.34)	0.00001* (significant at p<0.05)
2	B	MELD	>18	129	32.99	22 (17.05)	

Table 5: Endoscopic findings of cirrhosis patients according to the scoring at NIEC index

S. No	Risk Assessment Class	NIEC scoring criteria	No. of patients (n)	Percentage (%)	p-value
1	Class A	<18	87	22.25	0.00001* (significant at p<0.05)
2	Class B	19-24	117	29.92	
3	Class C	25-31	76	19.43	
4	Class D	32-38	62	15.85	
5	Class E	>39	49	12.53	

DISCUSSION

The etiological factors underlying the cirrhosis were hepatitis B, hepatitis C, Wilson disease, autoimmune disorders, etc, while, the clinical manifestations of patients were jaundice, ascites, gastrointestinal bleeding, secondary infections, esophageal bleeding, peritonitis and pruritis. The mean hematological and serum biochemical values of the patients were also significantly altered due to cirrhosis. Based on the MELD score, 67.01% of patients were <18 scored and 32.99% were scored >18, out of which 39 patients had died of the disease within 06 months period. The NIEC index revealed the highest number of individuals 29.92% with a NIEC score of 19-24, followed by 22.25% with a NIEC score <18, while, 19.43%, 15.85% and 12.53% of patients of Class C, D, E had NIECE score of 25-31, 32-38 and >38, respectively.

Our results were consistent with the study, in which the 6-week death rate was 14.7% for patients with MELD values of less than 21.5 and 71.7% for those with higher MELD scores. The reported mortality rate was 38.3%, which is greater than the mortality rate for patients with acute variceal bleeding [11]. Another study also reported that rebleeding resulting from hypovolemic shock was an independent risk linked with 6-week death. This observation was comparable to previous findings that the severity of the bleeding predicted 6-week mortality in all cirrhotic patients with acute EVH [12-13]. Our study was strongly supported by the reports that 72.8% of cirrhotic patients who underwent upper gastrointestinal endoscopy had esophageal varices and the prominent symptoms included icterus, gastric erosion, PHG, fundal varices, gastric erythema and gastric ulcer. The average Child-Pugh and MELD/PELD scores were 8.53 and 14.85, respectively [8, 14].

Our findings were also corroborated by the researchers revealing a strong correlation between MELD, ALBI, PALBI, AAR, and FIB-4 scores and the presence of EV. Specifically, the MELD score in the group of patients with EV was considerably higher than in the group of patients without EV [15]. Hsieh et al. revealed that ALBI score was substantially connected with HVPG and other hemodynamic parameters, with a greater correlation coefficient compared to those of other fibrosis indicators, indicating that had a potentially crucial role [16]. It was demonstrated that Child-Pugh-Turcotte and MELD scores were strong predictors of in-hospital survival probability for these patients and served as accurate predictors of risk assessment in upper gastrointestinal hemorrhage caused by liver cirrhosis [17-18]. Another study indicated FIB-4 and AAR as modest diagnostic accuracy in predicting EV [19-20].

CONCLUSION

The major etiological factors underlying cirrhosis were determined to be hepatitis B, hepatitis C, Wilson disease, and autoimmune disorders, and their prominent clinical manifestations were jaundice, ascites, gastrointestinal bleeding, secondary infections, esophageal bleeding, peritonitis, and pruritis. Being a potentially life-threatening illness, the upper gastrointestinal hemorrhage necessitated prompt evaluation and action to minimize the death rate. In individuals with liver cirrhosis, NIEC and MELD scores appear to be reliable predictors of esophageal varices. These ratings correlate strongly with in-hospital mortality following variceal hemorrhage. Although the MELD score has been utilized for years, it was the only score among those evaluated that had a significant association with all of the variables studied in our study.

Conflict of Interest: None.

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