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Potential Candidacy for Liver Transplantation among Chronic Liver Disease Patients Presenting to Khyber Teaching Hospital, Peshawar

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ABSTRACT

OBJECTIVE: To determine the frequency of potential candidates for liver transplantation among decompensated chronic liver parenchymal disease patients.

METHODOLOGY: This cross-sectional descriptive study was conducted in the Department of Medicine at Khyber Teaching Hospital, Peshawar, from September 2021 to February 2022. The study included 200 patients with decompensated chronic liver parenchymal disease. Their eligibility for liver transplantation was determined by calculating the MELD-Na score for each of them. Eligibility for liver transplant was correlated with a higher MELD-Na score (>25). Data were collected and entered in SPSS 25.

RESULTS: 168 of the 200 patients comprised those with viral hepatitis B or C (84%); 73.21% of these were hepatitis C positive, and 26.8% were hepatitis B positive; this was followed by patients with hepatocellular carcinoma (8%). 62.5% (5% of the total sample size) were HBV positive, and 37.5% (3% of the entire sample size) were HCV positive; however, HCC secondary to viral hepatitis was taken as an independent indication for a liver transplant. 4% of the patients had autoimmune hepatitis, 2% had NAFLD, and 2% were attributed to other causes. Of the 200 patients, 5% had MELD-Na score ≤9; 19% had MELD-Na score 10-19; 36% had MELD-Na score 20-29; 39% had MELD-Na score 30-39; 1% had MELD-Na score ≥40.

CONCLUSION: Many patients with DCLPD are potential candidates for liver transplantation. Hence, measures are needed to establish a liver transplant centre in Khyber Pakhtunkhwa.

KEYWORDS: liver transplant; chronic liver disease; MELD-Na score.

INTRODUCTION

Decompensated chronic liver parenchymal disease constitutes a significant burden for admitted patients in general medical and hepatology wards[1]. These patients are usually frequent visitors to hospitals owing to the complications associated with the disease, like variceal bleeding, recurrent ascites, subacute bacterial peritonitis, hepatorenal syndrome, hepatopulmonary syndrome, hepatic encephalopathy, and hepatocellular carcinoma. This variety of complications leads to an undesirable impact on health-related quality of life (HRQOL). A mass of patients with cirrhotic liver disease have reduced quality of life as evaluated by Chronic Liver Disease Questionnaire (CLDQ) score. The HRQOL can be upgraded if factors leading to its deterioration are addressed on time[2]. However, these are repetitive problems that can be resolved if a patient undergoes a liver transplant. Some of the patients are potential liver transplant candidates. If they are scrutinized and referred to liver transplant centres, their morbidity and mortality might be remarkably improved[1]. The basis for an increase in the demand for liver transplantation can be attributed to a rise in viral hepatitis complicating to decompensated cirrhosis, particularly the hepatitis C virus[3].

Sindh Institute of Urology and Transplantation in Karachi pioneered the first liver transplantation in 2003; this was followed by liver transplantation on a 12-year-old boy at Shifa International Hospital in 2012. Since then, successful liver transplantation has widely started in the country, with Punjab and Sindh being the vanguard of liver transplant activity. However, the demand for liver transplantation is out of proportion to facilities providing liver transplantation. As previously mentioned, the attributing factor is the typical consequence of chronic liver disease secondary to the hepatitis C Virus and then the hepatitis B virus. In Pakistan, one in every 20 Pakistanis has already been afflicted with HCV, contributing to the significant morbidity from chronic liver disease here[4]. New cases of HCC are on the rise in Pakistan, and the major attributable risk factor might very well be HCV infection of the liver. HCC is one of the most common adult cancers in males[5]. The MELD scoring system has been used globally since 2002 to foresee the severity of liver compromise and ensure patients with the utmost needs are prioritized in the allocation process of liver transplantation. Later, MELD scoring was modified by adding sodium to predict mortality in cirrhotic patients.

Undoubtedly, Pakistan's healthcare system has grown into a well-planned, organized web of health facilities; however, despite all these improvements and upgradation in the health system, it is still facing certain limitations due to increasing demands from the ailing population and raising awareness among the masses which can be attributed to flux from social media in particular[6]. Several elements have been previously attributed to the poor outcome of transplantation awareness and implementation in Pakistan. These include burden of need, public awareness, identifying the right hospital, funding limitations, lack of experience, and sustainability[7]. Unfortunately, there is no liver transplant centre in the province of Khyber Pakhtunkhwa. This study aims to highlight the percentages of patients in Khyber Pakhtunkhwa who might benefit from a liver transplant. This study will be a foundation for establishing such a center/s in Khyber Pakhtunkhwa.

METHODOLOGY

This cross-sectional descriptive study was conducted in the Department of Internal Medicine, Khyber Teaching Hospital, Peshawar, between September 2021 and February 2022. It was a needs analysis study. A non-probability consecutive sampling technique was used. The study sample included two hundred admitted patients with decompensated chronic liver parenchymal disease due to different etiologies. These etiologies included viral hepatitis B and C, hepatocellular carcinoma secondary to hepatitis B and/ or C, autoimmune hepatitis, NAFLD, primary biliary cholangitis, Wilson disease, and cryptogenic hepatitis. All of them were recruited in the study with informed consent. The purpose of the study was explained to them as well. Patients with decompensated cirrhosis with active uncontrolled infection or sepsis, active alcohol or substance use, Acquired Immuno-Deficiency Syndrome (AIDS), extra-hepatic malignancy, hepatocellular carcinoma with portal vein thrombosis, and extra-hepatic metastases, severe cardiopulmonary disease, and compensated cirrhosis with no complications were excluded from the study. Details of the patients, including biodata, comprehensive medical history, physical examination, and laboratory tests, were registered. Further details like age, gender, source of cirrhosis, reason for admission, and previous positive history of complications of decompensated cirrhosis were taken, and a complete panel of blood tests was recorded for the patients. Patients' eligibility for liver transplantation was determined by calculating the MELD-Na score for each one. Patients were stratified into five groups based on MELD-Na scores calculated during the last 48 hours: 1. MELD-Na score $\leq$9; 2. MELD-Na score 10-19; 3. MELD-Na score 20-29; 4. MELD-Na score 30-39; 5. MELD-Na score $\geq$40. Eligibility for liver transplant was correlated with a higher MELD-Na score (>25). Data were collected and entered in SPSS 25. The etiology of DCLPD was stratified across different age and gender groups. The MELD-Na score was also stratified across the various etiologies of DCLPD.

RESULTS

The characteristics of patients regarding age, gender, etiology of DCLPD, and MELD-Na scores are elaborated on in **Table I**. The majority (168) of the 200 patients comprised those with viral hepatitis B or C (84%); 73.21% (123) of these were hepatitis C positive, and 26.8% (45) were hepatitis B positive. Hence, HCV comprised 62%, and HBV comprised 22% of the total sample size, followed by patients with hepatocellular carcinoma (8%). 62.5% (5% of the full sample size) of these were HBV positive, and 37.5% (3% of the entire sample size) were HCV positive; however, HCC secondary to viral hepatitis was taken as an independent indication for liver transplant and not included in the previous stratum of viral hepatitis induced DCLPD. 4% (8) of the patients had autoimmune hepatitis, 2% (4) had NAFLD, and 2% (4) were attributed to other causes. These include Wilson disease, Primary Biliary Cholangitis (PBC), and cryptogenic hepatitis. Of the 200 patients, 5% had MELD-Na score $\leq$9; 19% had MELD-Na score 10-19; 36% had MELD-Na score 20-29; 39% had MELD-Na score 30-39; 1% had MELD-Na score $\geq$40.

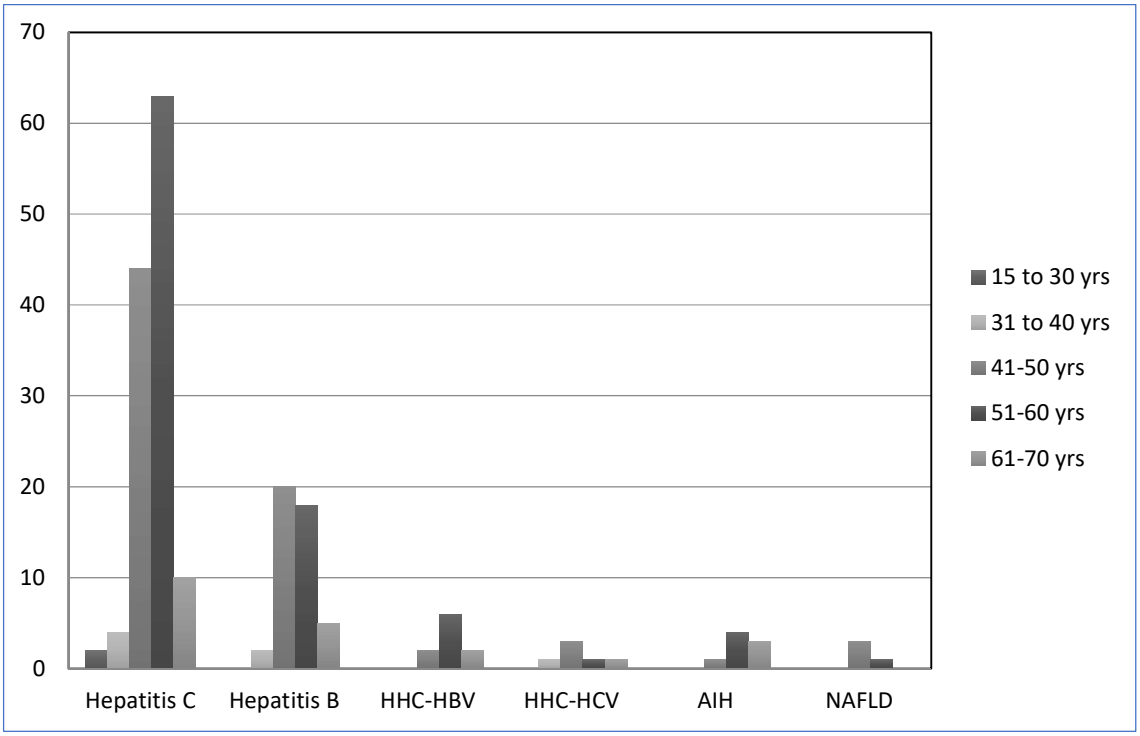
Table I: Characteristics of Patients

	No. of patients (%) (n=200)
Age (yrs)	
15-30	2 (1%)
31-40	8 (4%)
41-50	73 (36%)
51-60	95 (48%)
61-70	22 (11%)
Gender	
Female	109 (54%)
Male	91 (46%)
Etiology of chronic liver disease	
[δ]Hepatitis C	123 (62%)
[δ]Hepatitis B	45 (22%)
[δ]HCC- Hepatitis B	10 (5%)
HCC- Hepatitis C	6 (3%)
[δ]AIH	8 (4%)
[δ]NAFLD	4 (2%)
[δ]Others	4 (2%)
[ɪ]**MELD-Na score**	
≤9	10 (5%)
10-19	38 (19%)
20-29	72 (36%)
30-39	78 (39%)
≥40	2 (1%)

[δ]NAFLD=Non-alcoholic fatty liver disease, AIH=Autoimmune Hepatitis, HCC=Hepatocellular carcinoma, Others=Wilson's disease, Primary biliary cholangitis and cryptogenic
[ɪ]MELD-Na Score=Model for End-stage Liver Disease Sodium Score

The distribution of DCLPD etiologies across different age groups is further elaborated in **Figure I**.

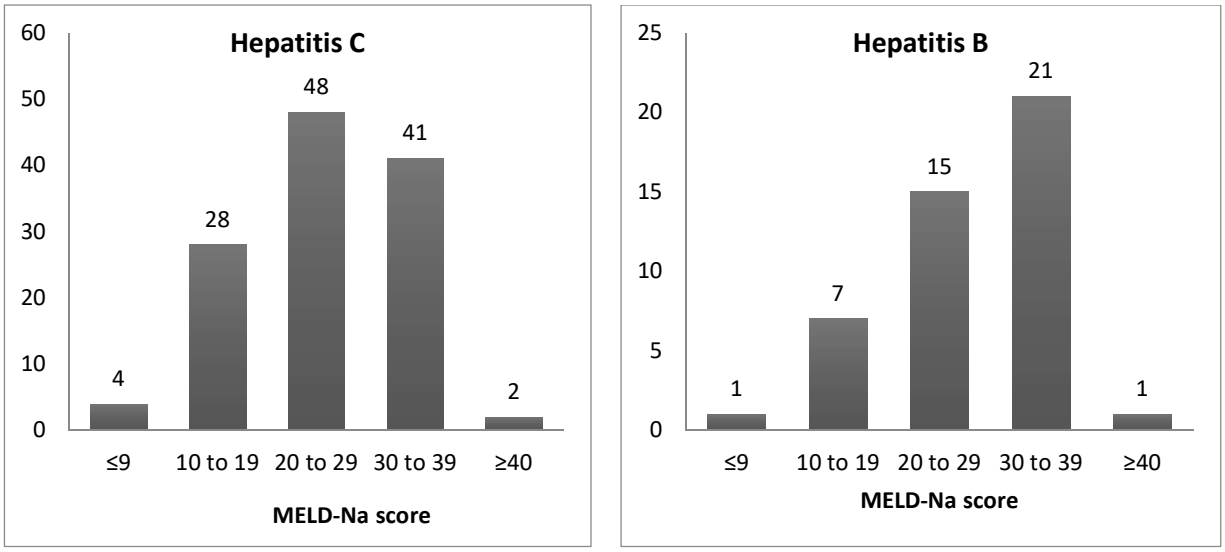
Figure I: Distribution of DCLPD etiologies across different age groups



HCC=Hepatocellular carcinoma, AIH=Autoimmune Hepatitis, NAFLD=Non-alcoholic fatty liver disease

Since 84% of the study sample comprised patients with either hepatitis C or B, F**igure II** separately describes the stratification of hepatitis C and B patients across the five categories of MELD-Na Score.

Figure II: Distribution of patients with chronic liver disease secondary to hepatitis C and hepatitis B into different classes of Model for End-stage Liver Disease (MELD-Na) classification



DISCUSSION

This study established that a good percentage of patients presenting to tertiary care hospitals with DCLPD in Khyber Pakhtunkhwa are probable contenders for liver transplantation. Most patients had developed decompensated cirrhosis secondary to viral hepatitis C, the second being viral hepatitis B.

The MELD score has been used globally since 2002 to extrapolate the severity of liver compromise to ensure patients with the greatest need receive priority in the allocation process of liver transplantation. The old allocation approach strongly emphasized waiting times and included subjective sickness assessments, such as the severity of ascites and encephalopathy. In the past, a patient with cirrhosis who was referred too late to receive an organ could die while waiting for one, while a patient with a longer waiting list who had a less severe case of the disease received a transplant. The MELD score is calculated from a formula involving an algorithm of serum bilirubin, international normalized ratio (INR), and creatinine. It predicts mortality risk at three months in patients with liver cirrhosis. Its success is attributed to the fact that it is not only objective but also reproducible and readily available in all settings[8,9]. It is considered a better prognostic indicator than the Child-Turcotte-Pugh score in patients with compromised liver[10]. Now, the MELD-Na score is the new score in place of the MELD score, which includes serum sodium as an independent predictor of mortality in cirrhotic patients[11]. The MELD-Na score is better than the MELD score because it predicts the 3-monthly and 1-yearly morbidity and mortality among cirrhotic patients better[12-14]. A higher MELD-Na score indicates a worse outlook for these patients and, hence, eligibility for liver transplantation. Patients with higher MELD-Na scores are kept higher up on the waiting list for cadaveric liver transplantation; however, those with low MELD-Na scores can be eligible for live donor liver transplantation[15]. The MELD-Na score is calculated from 6-40. A higher score predicts a worse outcome.

The current study recruited DCLPD patients with different etiologies, and their MELD-Na scores were calculated. The most common etiology was chronic hepatitis C; this contrasts with a study conducted in France, where the most common etiology was HCC[16]. Surprisingly,

most patients had MELD-Na scores higher than 25; this indicates a bad prognosis if not managed on time. A timely referral for liver transplantation will improve their clinical outcomes and have better implications for mortality. However, this study has come with its limitations. The sample size was limited to 200, and samples were collected from only one tertiary care hospital. The results differed from our study's presentation, provided the sample size was more significant and a multi-centre study was done.

CONCLUSION

It can thus be concluded that a good proportion of patients presenting to tertiary care hospitals with DCLPD are potential candidates for liver transplantation. Therefore, this option should be discussed with these families, and measures needed to establish a liver transplant centre in Khyber Pakhtunkhwa should also be worked over.

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Consent to Participate: Written and verbal consent was taken from the patients included in this study.
Data Sharing Statement: The corresponding author can provide the data proving the findings of this study on request. Privacy or ethical restrictions bound us from sharing the data publically.

AUTHOR CONTRIBUTIONS

Badshah A: Main adea, data collection, analysis
Atif D: Literature review, analysis, reference writing

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