**Journal of Advanced Medical and Dental Sciences Research**

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 100

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

# Original Research

## Study of cardiac profile in cirrhosis patients and its correlation with model for end stage liver disease (MELD) score

[1]Akamjot Kaur, [2]Parmvir Singh Dhillon

[1,2]MBBS, Punjab, India

***ABSTRACT:***

**Background**: This study aimed to investigate the cardiac profile in patients with cirrhosis and its association with the model for end stage liver disease score. **Material and methods**: The study was a prospective observational study conducted in a hospital setting, with a sample of 100 patients. This study was conducted over a duration of eighteen months. The study included all hospitalized patients with a diagnosis of liver cirrhosis, as well as newly diagnosed instances of cirrhosis at our hospital. The study covered patients with cirrhosis regardless of the cause, and all participants were 18 years of age or older. The study excluded patients who were suspected of having liver or cardiovascular cancer. The participants had comprehensive history gathering, clinical assessment, standard laboratory tests, and radiographic examinations. **Results**: The study found that the average age of the cases was 42.19±11.25 years. Among the 100 patients examined, 56% were males and 44% were girls. Out of the total number of patients, 35% experienced abdominal discomfort, 74% had abdominal distension, 9% exhibited altered sensorium, 19% presented with hematemesis, and 14% presented with malena. **Conclusion**: The MELD score and Child Pugh score are well-established methods used to evaluate the severity of patients with liver cirrhosis.

**Keywords**: cardiac profile, cirrhosis, MELD score, liver disease.

Received: 20 November, 2021 Accepted: 23 December, 2021

**Corresponding author:** Parmvir Singh Dhillon, MBBS, Punjab, India

**This article may be cited as:** Kaur A, Dhillon PS. Study of cardiac profile in cirrhosis patients and its correlation with model for end stage liver disease (MELD) score. J Adv Med Dent Scie Res 2022;10(1):233-236.

### INTRODUCTION

Allocation of organs for liver transplantation in the United States in the 1980s and early 1990s was prioritized based on the level of care required by the patient: hospitalized patients in the intensive care unit, hospitalized patients on the regular floor, and outpatient care. This approach had the potential of 'gaming' the system by keeping the patients in ICU in order to be transplanted. In 1996, a consensus conference mandating need for minimal criteria for listing the patients for liver transplantation (LT) introduced the Child–Pugh–Turcotte (CTP) score for liver allocation.[1]

MELD score was developed by a group of researchers at the Mayo Clinic initially as a model to predict survival following transjugular intrahepatic portosystemic (TIPS) for refractory variceal bleeding or refractory ascites.[2] The model was later shown to quite accurately predict 3 months mortality amongst patients with chronic end-stage liver disease awaiting LT.[3,4] As the score was objective and could predict mortality at 3 months with higher accuracy than the CTP score, allocation of livers for transplantation became MELD based, de-emphasizing the concept of waiting time.[5]

The actual prevalence of cirrhotic cardiomyopathy is unknown.[6] Most of these patients have normal or near normal cardiac function at rest but with abnormal cardiac responses during exertion, stress or liver transplantation.[6,7] The natural history of the disease has not been extensively studied yet. The condition has been described to be well tolerated with most patients being asymptomatic during the initial development of this complication.[6]

Hence, thisstudy was conducted to studycardiacprofileincirrhosispatients anditscorrelationwithmodel for endstage liverdisease score.

### MATERIAL AND METHODS

The study was a prospective observational study conducted in a hospital setting, with a sample of 100

patients. This study was conducted over a duration of eighteen months. The study included all hospitalized patients with a diagnosis of liver cirrhosis, as well as newly diagnosed instances of cirrhosis at our hospital. The study covered patients with cirrhosis regardless of the cause, and all participants were 18 years of age or older. The study excluded patients who were suspected of having liver or cardiovascular cancer. The participants had comprehensive history gathering, clinical assessment, standard laboratory tests, and radiographic examinations. The diagnosis of cirrhosis was established through the evaluation of clinical manifestations and an abdominal ultrasound examination. The severity of cirrhosis was assessed using the Child-Pugh criteria, which categorizes it into three groups: A, B, and C. Additionally, the MELD score was used to further classify cirrhosis into four MELD categories, each associated with an anticipated 3-month death rate.

## RESULTS

In this study, the mean age of the cases was 44.89±10.50 years, median age 45 years, minimum age 24 years and maximum age was 70 years. Out of 70 patients studied (42) 60% were males and (28) 40% were females. 23 patients (32.9%) presented with pain in abdomen, 61 patients (87.1%) have abdominal distension, 13 patients (18.6%) were having altered sensorium, 16 patients (22.9%) presented with hematemesis and 16 patients (22.9%) presented with malena.

**Table 1: Comparison of mean heart rate between Child-Pugh Class**

| Child- Pugh Class | N | Mean HEART RATE |
|---|---|---|
| C | 45 | 87.54 |
| B | 55 | 89.36 |

**Table 2: Comparison of mean QRS duration between Child-Pugh Class**

| Child- Pugh Class | N | Mean QRS-DURATION |
|---|---|---|
| C | 45 | 53.69 |
| B | 55 | 50.12 |

**Table 3: Comparison of mean QRS duration between MELD category**

| MELD Category | N | Mean QRS DURATION |
|---|---|---|
| <= 9 | 29 | 53.11 |
| 10–19 | 41 | 54.13 |
| 20–29 | 20 | 57.00 |
| 30–39 | 10 | 49.21 |
| Total | 100 | 53.36 |

**Table 4: Comparison of mean QTc duration between Child-Pugh Class**

| Child-Pugh Class | N | Mean QTc |
|---|---|---|
| C | 45 | 415.98 |
| B | 55 | 401.41 |

**Table 5: Comparison of mean LVEF between Child-Pugh Class**

| Child-Pugh Class | N | Mean-LVEF |
|---|---|---|
| C | 45 | 63.45 |
| B | 55 | 60.29 |

**Table 6 : Comparison of mean LVEF between MELD category**

| MELD Category | N | Mean LVEF |
|---|---|---|
| <= 9 | 29 | 60.52 |
| 10–19 | 41 | 59.83 |
| 20–29 | 20 | 61.73 |
| 30–39 | 10 | 59.50 |
| Total | 100 | 60.39 |

## DISCUSSION

Liver and renal dysfunction are often complicated in patients with acute heart failure.[8] Complicated interaction between heart, kidney, and liver has been an object of interest for a long time. In that sense, simple score capable of quantitating the severity of multiorgan failure is attractive. Biomarkers that reflect liver and kidney function are often used to predict adverse clinical outcomes in patients with AHF.[9,10] The model for end-stage liver disease (MELD) score evaluating liver and renal function was considered a reliable predictor for the risk of adverse events in

AHF patients.[11] Several studies also focused on the effects of modified MELD versions, such as the MELD excluding the international normalized ratio (MELD_XI) score[12], and the MELD including sodium (MELD_sodium) score[13], on the prognosis of acute heart failure.

Significant hepatic dysfunction is reported in several studies as being frequently found in patients with advanced HF, and may manifest as congestive hepatopathy and cardiac cirrhosis, or in other ways. Hepatic function markers (aspartate aminotransferase, alanine aminotransferase, bilirubin, alkaline phosphatase, etc.), although showing significant improvement after a few months of heart transplantation, were also related to unsatisfactory results, since the reversibility in this case will depend on the degree of hepatic parenchyma impairment.[14,15]

Hence, thisstudy was conducted to studycardiacprofileincirrhosispatients anditscorrelationwithmodel for endstage liverdisease score.

The study found that the average age of the cases was 42.19±11.25 years. Among the 100 patients examined, 56% were males and 44% were girls. Out of the total number of patients, 35% experienced abdominal discomfort, 74% had abdominal distension, 9% exhibited altered sensorium, 19% presented with hematemesis, and 14% presented with malena.

A retrospective cohort study conducted by Chen Y et al[16] involved 5373 patients with coronary heart disease after PCI was conducted from January 2008 to December 2016. Participants were classified to four groups according to the MELD score by quartiles. The primary endpoint was long-term mortality including all-case mortality (ACM) and cardiac mortality (CM). Secondary endpoints included bleeding events, readmission, major adverse cardiovascular events (MACE), major adverse cardiovascular, and cerebrovascular events (MACCE). The longest follow-up time was almost 10 years. There were significant differences in the incidences of ACM (p=0.038) and CM (p=0.027) among the four MELD groups, but there was no significant difference in MACEs (p=0.496), MACCEs (p=0.234), readmission (p=0.684), and bleeding events (p=0.232). After adjusting the age, gender, smoking, drinking status, and diabetes by a multivariable Cox regression analysis, MELD remains independently associated with ACM (HR:1.57, 95%CI 1.052–2.354, p=0.027) and CM (HR:1.434, 95% CI 1.003–2.050, p=0.048). This study indicated that the MELD score had a strong prediction for long-term mortality in CHD patients who underwent PCI.

In a study conducted by Liao S et al,[17]a total of 466 patients with AHF were prospectively evaluated. They compared the accuracy of the 4 MELD score formulas using the time-dependent receiver operating characteristic (ROC) curve and corresponding areas under the curve (AUC).During a median follow-up period of 34 months, 196 deaths occurred. In the fully adjusted Cox regression model, standardized hazard ratios with 95% confidence interval expressing the risk of all-cause mortality were 1.22 (1.06–1.40), 1.20 (1.04–1.39), 1.23 (1.06–1.42) and 1.21 (1.05–1.41) for MELD, MELD_XI, MELD_sodium and MELD_albumin scores, respectively. The MELD_albumin score showed the best prognostic accuracy (AUC = 0.658) for the prediction of long-term all-cause mortality, followed by the MELD_sodium score (AUC = 0.590), the MELD score (AUC = 0.580), and the MELD_XI score (AUC = 0.544); the MELD_albumin score performs significantly more accurate than MELD and MELD_XI score for predicting the risk of all-cause mortality. Considering reclassification, MELD_albumin score increased the net reclassification improvement over and beyond MELD (13.1%, P = 0.003), MELD_XI (14.8%, P = 0.002), and MELD_sodium (11.9%, P = 0.006) scores for all-cause mortality. It was concluded that the MELD_albumin score increases risk stratification of all-cause mortality over and beyond the MELD score and the other modified MELD scores in patients with acute heart failure.

## CONCLUSION

The MELD score and Child Pugh score are well-established methods used to evaluate the severity of patients with liver cirrhosis.

## REFERENCES


1. Lucey M.R., Brown K.A., Everson G.T. Minimal criteria for placement of adults on the liver transplant waiting list: a report of a national conference organized by the American Society of Transplant Physicians and the American Association for the Study of Liver Diseases. Liver Transpl Surg. 1997;3:628–637.
2. Malinchoc M., Kamath P.S., Gordon F.D., Peine C.J., Rank J., ter Borg P.C. A model to predict poor survival in patients undergoing transjugular intrahepatic portosystemic shunts. Hepatology. 2000;31:864–871.
3. Brandsaeter B., Friman S., Broome U. Outcome following liver transplantation for primary sclerosing cholangitis in the Nordic countries. Scand J Gastroenterol. 2003;38:1176–1183.
4. Said A., Williams J., Holden J. Model for end stage liver disease score predicts mortality across a broad spectrum of liver disease. J Hepatol. 2004;40:897–903.
5. Wiesner R., Edwards E., Freeman R. Model for end-stage liver disease (MELD) and allocation of donor livers. Gastroenterology. 2003;124:91–96.
6. Zardi EM, Abbate A, Zardi DM, Dobrina A, Margiotta D, Van Tassell BW, Afeltra A. et al. Cirrhotic cardiomyopathy. J Am Coll Cardiol. 2010;56(7):539–549.
7. Ripoll C, Catalina MV, Yotti R, Olmedilla L, Perez-Pena J, Lo Iacono O, Rincon D. et al. Cardiac dysfunction during liver transplantation: incidence and preoperative predictors. Transplantation. 2008;85(12):1766–1772.
8. Biegus J, Zymlinski R, Sokolski M, Siwolowski P, Gajewski P, Nawrocka-Millward S, et al. Impaired hepato-renal function defined by the MELD XI score

as prognosticator in acute heart failure. Eur J Heart Fail. 2016;18:1518–1521.
9. Weidmann ZM, Breidthardt T, Twerenbold R, Zusli C, Nowak A, von Eckardstein A, et al. Prediction of mortality using quantification of renal function in acute heart failure. Int J Cardiol. 2015;201:650–657.
10. Shinagawa H, Inomata T, Koitabashi T, Nakano H, Takeuchi I, Naruke T, et al. Prognostic significance of increased serum bilirubin levels coincident with cardiac decompensation in chronic heart failure. Circ J. 2008;72:364–369.
11. Kim MS, Kato TS, Farr M, Wu C, Givens RC, Collado E, et al. Hepatic dysfunction in ambulatory patients with heart failure: application of the MELD scoring system for outcome prediction. J Am Coll Cardiol. 2013;61:2253–2261.
12. Biegus J, Demissei B, Postmus D, Cotter G, Davison BA, Felker GM, et al. Hepatorenal dysfunction identifies high-risk patients with acute heart failure: insights from the RELAX-AHF trial. ESC Heart Fail. 2019;6:1188–1198.
13. Grodin JL, Gallup D, Anstrom KJ, Felker GM, Chen HH. Tang WHW Implications of Alternative Hepatorenal Prognostic Scoring Systems in Acute Heart Failure (from DOSE-AHF and ROSE-AHF) Am J Cardiol. 2017;119:2003–2009. The prognosis and outcome of alcoholic liver disease. Morgan MY. Alcohol Suppl. 1994;2:335–343.
14. Liver cirrhosis: epidemiology and etiology. Fehér J, Lengyel G. http://www.researchgate.net/publication/289960324_Liver_cirrhosis_Epidemiology_and_etiology Orv Hetil. 2006;147:1589–1593.
15. Acute-on-chronic and decompensated chronic liver failure. Olson JC. http://www.ncbi.nlm.nih.gov/pubmed. Crit Care Clin. 2016;32:301–309.
16. Chen Y, Han M, Zheng YY, Zhu F, Aisan A, Maheshati T, Ma YT, Xie X. Model for End-Stage Liver Disease Score Predicts the Mortality of Patients with Coronary Heart Disease Who Underwent Percutaneous Coronary Intervention. Cardiol Res Pract. 2021 Apr 17;2021:6401092.
17. Liao S, Lu X, Cheang I, Zhu X, Yin T, Yao W, Zhang H, Li X. Prognostic value of the modified model for end-stage liver disease (MELD) score including albumin in acute heart failure. BMC Cardiovasc Disord. 2021 Mar 9;21(1):128.