ORIGINAL ARTICLE

Model for End Stage Liver Disease (MELD) Score & ALT-LDH Index as Poor Prognostic Indicators in Acute Liver Failure

PREM KUMAR MAHESHWARI[1], EHSAN RAHIM MEMON[2], SHABANA LAKHO[3], ZEESHAN UL HAQUE[4]
[1]*Assistant professor, Department of Gastroenterology Isra University Hospital*
[2]*Assistant professor, Department of Gastroenterology Isra University Hospital*
[3]*Assistant professor, Department of Gastroenterology Isra University Hospital*
[4]*Senior registrar, Bhitai Dental and Medical College Mirpurkhas*
Correspondence: Dr. Prem Kumar, Assistant Professor, Email: rajprem1980@yahoo.com

ABSTRACT

Aim: To determine the model for end stage liver disease (MELD) score and ALT-LDH index as poor prognostic markers among patients presented with acute liver failure
Study Design: Case series study.
Setting and duration: Department of gastroenterology Isra University Hospital from February 2015 to January 2016.
Methods: All the patients presenting with acute liver failure were enrollment in the study. These patients were assessed for the grade of hepatic encephalopathy. ALT LDH index of <3.0 and MELD score of ≥30 were considered as poor prognostic markers. Patients were followed up to fifteen days and then the grade of encephalopathy was re-assessed. The primary-end-point was death within 15 days of admission to Hospital. All the data was recorded in the proforma.
Results: Overall 151 cases were selected to study. Males were 59.6% and females were 40.4%, their mean-age was 22.58 years. 75.5% patients died during the study time. In 107 cases the MELD criteria cut off point was reached (MELD Score >30) and out of these 103 were died, therefore the accurately projected incidence of death for MELD score was 96.26%. ALT-LDH index cut-off-point was reached in 55 cases and out of these 43 were died, thus correctly projected incidence of death for KCH criteria remained 78.18%. Non survival rate was significantly higher among males and 20-30 years of age group, p-values were quite significant.
Conclusion: Both the ALT LDH index and MELD score criteria are the best poor prognostic markers in acute hepatic failure. MELD-score was more significant in mortality prediction.
Key words: Acute liver failure, Prognosis- ALT LDH index, MELD Score

INTRODUCTION

Acute hepatic dysfunction is a potentially distressing syndrome with a constantly elevated rate of mortality, which can possibly include profound metabolic disturbances, coagulopathy, hemodynamic instability, cerebral edema, a specific susceptibility to fungal and bacterial infections, and multi-organ dysfunction. The description of acute hepatic failure by Davidson and Trey [1] in 1959 was grounded on the manifestation of hepatic encephalopathy due to severe hepatic injury, occurring within 8 weeks of beginning of frequently common symptoms in subjects without pre-existing hepatic disorder[2] Acute hepatic dysfunction, differentiated by the unexpected commencement of hepatic encephalopathy, hyperbilirubinemia and coagulopathy without underlying hepatic disease, remains an unpredictable disorder with high rate of mortality and morbidity.[3] Acute liver failure (ALF) usually occurs in the nonexistence of any earlier known hepatic disorder with laboratory and clinical evidence of substantial hepatic impairment that results in impaired liver function. Acute fulminant hepatic failure (FHF) has as well been termed as Acute Liver or hepatic dysfunction, with the key definition of the commencement of Portosystemic encephalopathy in the course of 8 weeks of the subject becoming jaundiced. Some investigators suggest additional subdivision of FHF into sub-acute (29 days to <26 weeks), acute (8.0–28.0days), and hyperacute (0–7 days), however these categorizations have not widely been adopted.[2] Drug-induced liver dysfunction, which is usually categorized into non-acetaminophen- and acetaminophen-associated etiologies, takes place at greater rates among western nations than African and Asian nations, where hepatitis resulting from virus is a further prevalent factor of ALT. As per the statistics of US-FHF Group Registry 1998-2008, the commonest etiologies of FHF were acetaminophen (46%), after that indeterminate factors (14%), further drugs (12%), HBV (7.70%), and autoimmune factors (5.9%)[4] Less frequent factors included pregnancy, Budd-Chiari syndrome, Wilson disease, and ischemia. European nations have alike statistics reporting viral hepatitis (especially HAV and HBV) as leading factor of FHF globally. Drug-provoked hepatitis is very infrequent in underdeveloped nations, although drug therapy for tuberculosis insures special indication as the commonest factor of drug-provoked FHF within South Asia[5] FHF secondary to HBV is likewise growing in the United States and Europe because of immigration, as a few researchers attributed 5.0%–10% of fresh cases of FHF to HBV[6] However only 1.0% of cases with acute HBV progress to FHF, the rates approach to 20% among cases of hepatitis delta virus coinfection.[7] Older subjects and those who are infected with HCV also have greater proportions of FHF in acute HBV infection[8] Despite the etiology, FHF is a rare disease, with two thousand to 2.3 thousand cases yearly in the US[9] During 2009, diagnoses

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of acute hepatocellular necrosis represented 4.20% (243.0/5748.0) of overall adult hepatic transplantations carried out in the US.[10] However the high rates of mortality noted with FHF has progressed with improvements in the management of intensive care unit and hepatic transplantation, it yet reaches 60.0%–80.0%, far worse contrasted to most one-year survival rate (80.0%–90.0%) for hepatic transplant because of chronic hepatic disease.[11,12] Early identification and treatment, in addition to consideration of hepatic transplantation, are key causes of improving rates of survival. Accurate and early prognostic appraisal of subjects with FHF is challenging, however critically significant for the best clinical pathway, particularly proper utilization of hepatic transplantations. Over the previous 20 years, numerous prognostic prototypes have been suggested to assist in selection for FHF cases to be managed either by hepatic transplantation or medically. Though, it is very essential to assess the disease at the early stage and to prevent the further progression.[13] Therefore this study has been conducted to assess the MELD score and ALT-LDH index as poor prognostic markers among cases presented with ALF

MATERIALS AND METHOD

Case series study was conducted in Gastroenterology Unit, Isra University Hospital, Hyderabad for a period of one year (February-2015 to Jan 2016).

Data Collection: The patients presenting to emergency department with acute liver failure were considered for enrollment in the study. Patients taking sedatives anticoagulants drugs were excluded. Informed consent was obtained from patient's caretakers (because at the time of admission the patients were suffering from encephalopathy). Patients were assessed by a gastroenterologist having at least >3 years' experience. Acute hepatic dysfunction was defined as prolongation of Prothrombin time to >18 seconds and existence of grade III to IV portosystemic encephalopathy and absence of all of the following: ascites, splenomegaly on clinical examination, shrunken liver, enlarged spleen and dilated portal vein >1.3 cm on ultrasound scan, serum albumin <3.50 g/dl and significant hepatic fibrosis prior biopsy. Meanwhile, laboratory workup was done includimg total bilirubin, serum creatinine, prothrombin time (and INR), serum ALT and LDH values. MELD score of >30 and ALT LDH index <3.0 were considered as a poor prognostic markers. Patients were followed up to fifteen days and grade of encephalopathy was reassessed. The primary-end-point was death within 15 days of admission to Hospital. All the data was entered in the proforma and analyzed by SPSS version 16.0.

RESULTS

Of 151 cases males were 90(59.6%) and females were 61(40.4%), their mean age was 22.58±7.3 years. 114(75.5%) patients died during study period. Most common age group was 31-40 years 65.5% (Table 1).

The MELD criteria cut off point (MELD Score >30) was reached in 107 cases (out of 151). Out of these 107 cases 103 eventually died, therefore accurately projected incidence of death for MELD score was 96.3%, with a p-value of 0.01. ALT-LDH index cut off point was reached in 55 patients and out of these 43 patients eventually died, so accurately predicted incidence of death for KCH criteria was 78.18%, p-value 0.001 (Table 2)

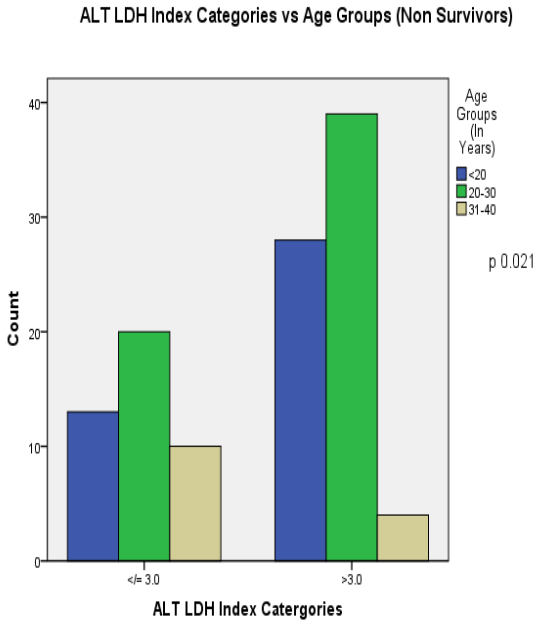
The patients who had poor prognosis (114 out of 151) were further stratified according to age and gender with respect to MELD score and ALT LDH Index respectively. Non survival rate was significantly associated with male gender and 20-30 years of age group, p-values were quite significant, results have been shown in figure 1 and 2.

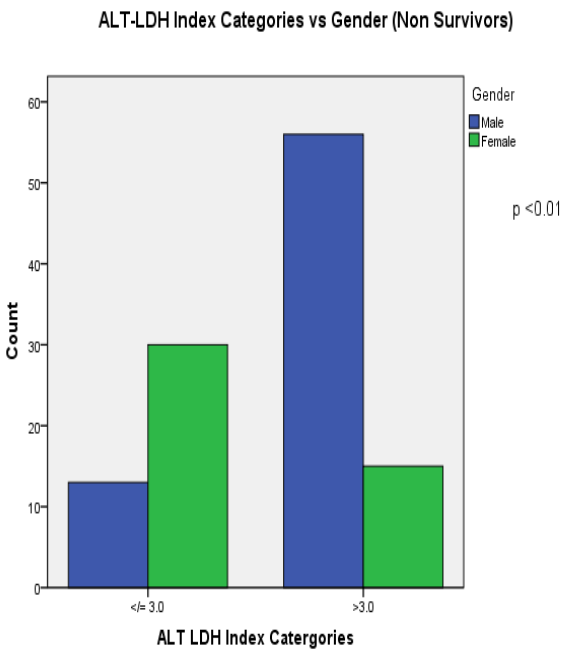
Table 1: Patients distribution according to age, gender and survival rate n=151

Variables		Frequency	Percent
Age groups	31-40 years	114	65.5
	20-30 years	51	29.3
	< 20 years	1	0.6
	Total	151	100
Gender	Male	90	59.6
	Female	61	40.4
	Total	151	100
Survival	Yes	37	75.5
	NO	114	24.5
	Total	174	100

Table 2: Survival rate according to MELD Score and ALT-LDH index n=151

Variables		Survival		Total	P value
		Yes	No		
MELD Score	< 30	33	11	44	0.001
	>30	04	103	107	
	Total	37	114	151	
ALT-LDH index	<3.0	25	71	96	0.001
	>3.0	12	43	55	
	Total	37	114	151	





DISCUSSION

Acute hepatic dysfunction (ALF or FHF) is a relatively infrequent condition, however it is rather distinctive because it has managed to get a high mortality rate despite the improvements in the hepatic transplantation, hepatic assist devices, intensive care, and the medicine field.[14] Appraisal of prognosis of this serious condition is always very important because a substantial majority of cases would require intensive care, moreover within these a specific proportion would need liver transplantation in order to survive. Due to these selection processes it became necessary that suitable scoring methods be established which can forecast the likelihood of death or survival, thus simplifying complicated setting of hepatic transplantation. The major prognosis forecasters are the MELD score and ALT LDH index[15].

In current study out of 151 cases 75.5% were died. In 2006 Sarwar S et al, from Lahore, studied FHF and documented mortality among 55.60% of cases.**[16]** Haroon H et, al., explored the natural history of FHF at Karachi and documented that 65.0% of cases died in the course of the study duration.**[17]** Shaikh S et al at Hyderabad demonstrated mortality rate 77.63%[18]. Parkash O et al, reported mortality rate 63%[19]. The survival was poor in current study, which is in accordance with Shaikh et al may be due to the availability of better facilities of intensive care at Lahore and Karachi respectively. ALF was reported in all age groups as in this study majority of patients were relatively young. Similar result was reported by Shakil et al in USA.**[21]**

In this study males were most common 59.60%, which is inconsistent to Shakil et al the majority of the patients were females. This female predominance is also reported by another study: United Network of Organ Sharing (UNOS) registry[21]**.** Though in a local study of Zubair UB et al[22] reported that 67.3% were male and 32.7% were female. Nafeh HM et al[23] also found male in majority 85% and females were 15%.

In this study patient's mean age was 21.54 ± 7.3 years and Shakil et al reported a mean age of 39 years. This huge variance in age could possibly be because of diverse etiologies of FHF as current study mainly comprised of the cases of acute hepatitis caused by virus, while in the study of Shakil et al the key factor was acetaminophen poisoning. Formerly, MELD-score have been approved as valuable criteria for mortality prediction in hepatic cirrhosis for three months.[21] It has previously been practiced as a predictor of hepatic dysfunction and death in acetaminophen provoked hepatic dysfunction in European literature. Schmidt et, al, reported that MELD score not a valuable predictor of death in acetaminophen provoked FHF as compared to isolated value of KCH or INR criteria; in contrast they established that it is a valuable marker of FHF in acetaminophen provoked hepatic injury.[25] Yantorno et al also reported comparable results regarding that MELD criteria for mortality pridcition.**[26]** Dhiman et al[28] from India as 20 out of 22 patients who survived were having average MELD score of <30, whereas the average MELD score in non-survivors was >30 in 20 out of 30 patients. In this study ALT-LDH index cut off point was reached in 55 patients and out of these 43 patients eventually died. Kotoh et al[29] done study in Japan regarding the ALT LDH index and this was the premier and only study done on this novel index. In that study a total of 16 patients had ALT LDH index of <3.0 and 8 of them (50%) eventually died.

CONCLUSION

It was concluded that both the ALT LDH index and MELD score criteria are valuable predictors of poor outcomes in acute hepatic failure. MELD score of >30 is the significant predictor of the mortality. Further studies are suggested on these pridictors.

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