Research Article
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Interest of Child-Pugh and MELD scores in the prognostic evaluation of cirrhotic patients in Lomé (Togo)

Abstract

Background: the present study aimed to evaluate the effectiveness of Child-Pugh and MELD scores in predicting the prognosis of cirrhotic patients hospitalized in the hepato-gastroenterology department of Campus University Hospital.

Methods: This was a cross-sectional study with retrospective and prospective data collection over a 13-year period, based on the medical records of cirrhotic patients hospitalized in the HGE department of Campus University Hospital and including clinical and biological data enabling calculation of Child-Pugh and MELD scores.

Results: 443 patients were included, 69.1% of whom were male. The mean age of patients was 50±14 years. Cirrhosis was decompensated in 419 patients (94.5%). Edematous-ascitic decompensation was the main complication of cirrhosis in 85.6%. Mortality in our study was 32.7%. Median survival was 23 months. For a threshold value of 9, the Child-Pugh score predicted mortality with a sensitivity of 68.97%, a specificity of 55.03% and an area under the ROC curve of 0.66. The area under the ROC curve, for a threshold of 19 for the MELD score, was 0.63. At 03 months, there was no statistically significant difference between the two scores (p=0.506).

Conclusion: Child-Pugh and MELD scores performed similarly in predicting mortality in cirrhotic patients. Both scores remain useful tools in low-resource settings

Keywords: cirrhosis, prognosis, Child-Pugh, MELD, Togo

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Introduction

Cirrhosis is a diffuse inflammatory process of the liver, characterized by mutilating fibrosis responsible for disorganization of normal liver architecture, and represents the final outcome of chronic liver disease.[1,2] It is a major cause of morbidity and mortality, representing the 14th leading cause of death worldwide.[3] One-year mortality in cirrhotic patients ranges from 1% to 57% and is associated with factors such as etiology, severity of liver damage, and the presence of complications and comorbidities. The prognostic evaluation of cirrhotic patients is therefore essential for qualified management. Several prognostic scores, the most widely used of which are the Child-Pugh and MELD scores, have been proposed to evaluate short- and long-term prognosis in cirrhotic patients.[4] The Child-Pugh and MELD scores have shown good performance in the prognostic evaluation of cirrhotic patients, although the question of replacing the Child-Pugh score with the MELD score remains debated.[5-8] Data on prognostic scoring in cirrhotic patients in sub-Saharan Africa, and particularly in Togo, remain scarce. The aim of this study was to evaluate the effectiveness of the Child-Pugh and MELD scores in predicting the prognosis of cirrhotic patients in Togo.

Methods

This was a descriptive and analytical cross-sectional study, with retrospective (2010 to 2022) and prospective (2023) data collection, i.e. a duration of 13 years, carried out in the Hepato-gastroenterology department of the Lomé University Hospital Campus and covering the medical records of cirrhotic patients hospitalized during this period. The data were collected from patients' medical records. Included were the records of hospitalized cirrhotic patients, with clinical and biological data enabling the calculation of Child-Pugh and MELD scores. Patients who, apart from cirrhosis, had co-morbidities such as diabetes, hypertension, heart disease, HIV infection or malignant tumor pathology were not included. Child-Pugh and MELD scores were calculated at admission using the Medical Calculator application validated by the United Network of Organ Sharing (UNOS).[9] Statistical analysis was performed using Rstudio version 4.3.3 and Stata version 17 softwares. Survival curves were estimated using the Kaplan-Meier method, and comparisons of survival curves were made using the Log-rank test. Cox regression analyses were performed to evaluate factors associated with mortality (or death). In univariate regression, variables with a p-value < 0.20 were included in the multivariate analyses (significance level at 5%). A backward stepwise procedure was applied for variable selection, and hazard ratios (HR) were reported with their 95% confidence intervals. The etiologies were not considered in the logistic regression. Positive and negative predictive values, specificity and sensitivity were calculated with their confidence intervals, as well as a ROC curve. The ethics committee of the Faculty of Health Sciences of the University of Lomé gave its approval for the conduct of this study.

Results

During the study period, 1090 cirrhotics were hospitalized and 443 were included in the study. Three hundred and six patients (69.1%) were male, corresponding to a sex ratio of 2.2. The mean age of patients was 50±14 years. The reason for hospitalization was abdominal distension in 65.7% of cases. The etiologies of cirrhosis were dominated by chronic B viral infection (46.7%). Patients with ascites had a 3.5 times greater risk of death (CI 95%: 1.75-7.00; p<0.001). Table 1 shows the parameters associated with mortality in cirrhotic patients. Ascitic decompensation and esophageal varices

were the most common complications in 85.6% and 36.3% of cases respectively. According to the Child-Pugh score, cirrhosis was decompensated in 419 patients (94.5%). Prognostic evaluation of patients on admission revealed a mean MELD score of 21±11, with 52.8% of patients in stage C of the Child-Pugh classification. Of the 443 patients included, 145 (32.7%) died during follow-up. Median patient survival was 23 months, with a 2-year survival of 45%, as shown in Table 2 shows survival probabilities according to different scores. Survival at 6 months and 12 months for a patient classified as Child-Pugh C was 48.9% and 42.2% respectively. For a Child-Pugh score ≥ 9, the sensitivity for predicting death was 68.9% for an area under the ROC curve of 0.66; CI 95%: 0.59 - 0.72. For a threshold value of 19, the MELD score had an area under the ROC curve of 0.63 to predict death; CI 95%: 0.57 - 0.70 (Table 3). There was no statistically significant difference between the performance of the Child-Pugh and MELD scores in predicting survival at 3 months (p=0.506), 6 months (p=0.308) and 12 months (p=0.129) (Table 4).

Table 1 Parameters associated with mortality in cirrhotic patients

	Death n (%)		**Univariable**			**Multivariable**		
	No (n = 298)	Yes (n=145)	HR	CI 95%	p	aHR	CI 95%	p
Gender								
Male	212 (69.3)	94 (30.7)	1	-				
Female	86 (62.8)	51 (37.2)	1.03	0.71-1.50	0.873			
Child-Pugh score								
A-B	164 (78.5)	45 (21.5)	1	-				
C	134 (57.3)	100 (42.7)	1.24	0.78-1.95	0.366			
MELD score								
≤ 21	205 (76.2)	64 (23.8)	1	-				
> 21	93 (53.4)	81 (46.6)	1	0.63-1.57	0.989			
Esophageal varices								
No	179 (63.5)	103 (36.5)	1	-		1	-	
Yes	119 (73.9)	42 (26.1)	0.68	0.43-1.08	0.104	0.74	0.50-1.09	0.125
Infections			1.18	0.74-1.90	0.482			
No	262 (69.3)	116 (30.7)						
Yes	36 (55.4)	29 (44.6)						
Ascites								
No	52 (81.3)	12 (18.8)	1	-		1	-	
Yes	246 (64.9)	133 (35.1)	3.54	1.69-7.41	<0.001	3.5	1.75-7.00	<0.001
Hepatic encephalopathy								
No	256 (80.8)	61 (19.2)	1	-		1	-	
Yes	42 (33.3)	84 (66.7)	4.64	2.94-7.34	<0.001	5.2	3.44-7.86	<0.001
Kidney failure								
No	248 (76.3)	77 (23.7)	1	-		1	-	
Yes	50 (42.4)	68 (57.6)	1.48	0.85-2.56	0.165	1.95	1.31-2.91	0.001
Digestive haemorrhage			1,83	0,89-3,76	0.101			
No	241 (66,8)	120 (33,2)						
Yes	57 (69,5)	25 (30,5)						

CI, Confidence interval HR, hazard ratio aHR, ajusted hazard ratio

Table 2 Survival of cirrhotic patients according to different scores

	Survival rate (%)			
	3 months	**6 months**	**12 months**	**24 months**
Child-Pugh A and B	80.9	72	69.7	51.8
Child-Pugh C	54.9	48.9	42.2	28.1
MELD ≤ 21	79	70	64.1	46.2
MELD > 21	49.4	46.2	42.7	28.3

Table 3 Performance score Indices

	Cut-off	**Se (%)**	**Sp (%)**	**Ppv (%)**	**Npv (%)**	**AUROC [CI 95%]**
Child-Pugh score	9	68.97	55.03	42.74	78.47	0.66 [0.59 - 0.72]
MELD score	19	62.76	59.06	42.72	76.52	0.63 [0.57 - 0.70]

Ss, Sensitivity; Sp, Specificity; Ppv, Positive predicitive value; Npv, Negative predictive value; AUROC, Area Under Receiver Operating Curve; CI, Confidence Interval

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Table 4 Comparison of scores of Child-Pugh and MELD

Survival	Prognostic score	AUROC [CI 95%]	p
At 03 months	Child-Pugh	0.66 [0.59 - 0.72]	0.506
	MELD	0.63 [0.57 - 0.70]	
At 06 months	Child-Pugh	0.64 [0.59 - 0.70]	0.308
	MELD	0.62 [0.56 - 0.68]	
At 12 months	Child-Pugh	0.66 [0.60 - 0.72]	0.129
	MELD	0.62 [0.56 - 0.68]	

AUROC, Area Under Receiver Operating Curve; CI, Confidence Interval

Discussion

This study has some limitations, the first being the incompleteness of patient medical records (some data were collected retrospectively). Biological data, including prothrombin time, International Normalized Ratio, albumin, creatinine, hemoglobin level, and in some cases, follow-up information, were difficult to obtain. Furthermore, these various tests were not performed in the same laboratory; the reference ranges for these biological tests differ from one laboratory to another. In addition, the study was limited to patients in the gastroenterology department of the Campus Teaching Hospital of Lomé, which restricts its representativeness at the national level. The exclusion of certain patients with comorbidities (patients who, apart from cirrhosis, had co-morbidities such as diabetes, hypertension, heart disease, HIV infection or malignant tumor pathology) could constitute a limitation. However, to our knowledge, this was the first study of its kind conducted in Togo. It therefore constitutes an important basis for improving the prognostic management of cirrhotic patients in Togo.

The diagnosis of cirrhosis was made at the complication stage, reflecting the high proportion of patients classified as Child-Pugh stage C. This observation has been made in other developing countries,[6,10] and could be explained by a lack of information among patients, contributing to delayed consultation, financial difficulties and lack of access to a gastroenterologist in certain environments. The mortality of cirrhosis in our study was high compared with the literature[6,11] and could be explained by the various potentially fatal complications such as hepatic encephalopathy, digestive haemorrhage or renal failure presented by patients. The 12-month survival of patients, according to Child-Pugh score, was admittedly lower than the data reported by Attia et al.[6] and Kai et al.,[12] but consistent with data in the literature concerning 12-month survival of cirrhotic patients classified as Child-Pugh C.[7,13] According to literature data, 3-month survival for a MELD score ≤ 20 is over 90% and over 60% for a MELD score > 20.[6,7] Our results are significantly lower than these data and could be explained by the inadequacy of the technical platform and the financial difficulties of patients not allowing optimal care of certain complications of cirrhosis in our context. Although the areas under the ROC curve of the Child-Pugh and MELD scores are below 0.7, the value above which a score is qualified as good,[14] and below the data in the literature,[5,6] these two scores remain effective for the prognostic evaluation of cirrhotic patients. The Child-Pugh score, known as the oldest and easiest to calculate among the prognostic scores for cirrhosis, nevertheless has certain limitations. Assessment of the clinical parameters of the Child-Pugh score can be subjective, and therefore varies from one examiner to another. The MELD score is based solely on objective parameters relating to liver function and the complications of cirrhosis, and is currently the score used for liver transplant allocation. However, large-scale systematic reviews have shown that, despite its limitations, the Child-Pugh score is still a robust predictor of short- and long-term prognosis in cirrhotic patients.[7,15] Although some studies have found the MELD score to be statistically superior to the Child-Pugh score,[16,17] there was no statistically significant difference between the predictive performances of these two scores in our study, as in several studies.[18,19]

Conclusion

Mortality from cirrhosis is high in developing countries like Togo. Prognostic evaluation of cirrhotic patients using Child-Pugh and MELD scores enables identification of patients at high risk of death. Prevention of chronic liver disease, diagnosis at the compensated cirrhosis stage, and adequate care of the various complications of cirrhosis would improve the prognosis and survival of cirrhotic patients. Future prospective multicentric studies could explore the integration of MELD-Na or other biochemical markers to improve prognostic accuracy in resource-limited settings.

Conflict of interest

The authors declare no conflict of interest to this work.

Authors' contribution

Conception and design of the study: Lawson-Ananissoh LM and Gbolou MH.

Acquisition of data: Mbala Ndougou T, Kogoe LRM and Redah DV.

Analysis and interpretation of data: Mbala Ndougou T, Gbolou MH and Kanake YY.

Drafting the manuscript: Kogoe LRM and El Hadji-Yakoubou R.

Approval of the version of the manuscript to be published: Bagny A, Lawson-Ananissoh LM

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