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Original Article

Clinical characteristics and prognosis of severe alcoholic hepatitis in a cohort of 258 Chinese patients

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Abstract: Severe alcoholic hepatitis (SAH) has been scarcely studied. We aimed to examine the clinical characteristics and analyze the prognostic factors of SAH in China and retrospectively collected data on patients diagnosed as SAH in Beijing 302 Hospital from December 2003 to February 2014. Two hundred and fifty-eight patients were included. Median in-hospital time was 18 days. Of these patients, 254 (98.4%) were male. The in-hospital mortality of the whole cohort arrived at 25.19%. In the established model for predicting in-hospital death, three variables were finally selected out, including cholinesterase (P=0.012), creatinine (P=0.025) and the presence of acute upper gastrointestinal hemorrhage (P=0.008). Eventually, this model had a sensitivity of 71.7% and specificity 67.9% respectively. In conclusion, the established model can be used to effectively determine the prognosis of SAH and help to improve the management of these critically-ill patients.

Keywords: Severe alcoholic hepatitis, prognosis, risk factor

Introduction

Alcoholic liver disease (ALD) is a significant threat to public health and is an important contributor to the total burden of alcohol-related injuries [1, 2]. It is also reported that ALD can promote hepatocarcinogenesis [3, 4]. ALD encompasses a spectrum of disease, ranging from simple steatosis to decompensated cirrhosis, of which severe alcoholic hepatitis (SAH) represents the most life-threatening form [5-8].

SAH has a high mortality rate despite proposed several therapies [9, 10]. Recently, ALD has become the second most common cause of end-stage liver disease in China [11] and patients with SAH reach a certain amount on the liver transplant waiting list in several developed countries [12]. Therefore, it is important to study the prognostic factors with the aim of decreasing the transplant rate and increasing the survival rate [13].

In the present study, we investigated the clinical characteristics of 258 Chinese patients with SAH, analyzed the prognostic factors and established a prediction model for the in-hospital death.

Patients and methods

Patient selection

A total of 258 consecutive patients diagnosed as SAH from December 2003 to February 2014 were enrolled in this study. SAH in this study was defined as a Maddrey's discriminant function (MdF) ≥ 32 with a history of excess alcohol consumption [14]. **Figure 1** shows the enrollment of patients in our study.

Ethics approval

The study was performed in accordance with the ethical guidelines of the 1975 Declaration of Helsinki and was approved by the Ethics Committee of Beijing 302 Hospital. Written informed consent was obtained from the patients or their relatives.

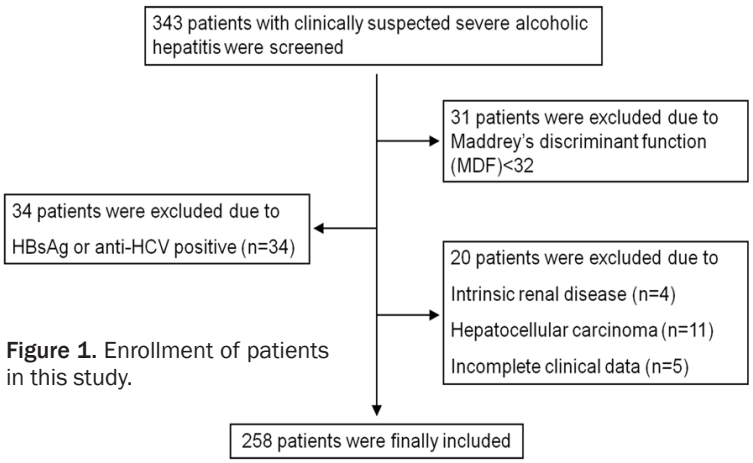

Figure 1. Enrollment of patients in this study.

Data collection

Clinical and laboratory data were collected on admission, one week after admission, and discharge from hospital. The following variables were collected: age, sex, history of alcohol consumption, cigarette smoking and accompanied diseases, hemoglobin (HGB), white blood cell count, neutrophil count, lymphocyte count, albumin, alanine aminotransferase (ALT), aspartate aminotransferase (AST), total bilirubin, gamma glutamyl transpeptidase (GGT), alkaline phosphatase (ALP), cholinesterase (CHE), urea nitrogen, creatinine (Cre), cholesterol, triglycerides, prothrombin levels and international normalized ratio (INR). The following prognostic scores were calculated at admission: Child-Pugh score [15], Model for End-stage Liver Disease (MELD) score [16] and Glasgow Alcoholic Hepatitis Score (GAHS) [17].

Statistical analysis

If continuous variables were normally distributed, data were presented as mean ± standard deviation (mean ± SD). When they were not normally distributed, median (interquartile range) was presented. Categorical data were expressed as number with percentage. The Mann-Whitney U test and Student's t test were respectively used to compare nonparametric and parametric continuous variables. The categorical variables were analyzed by χ^2 test or Fisher exact test. Multivariate logistic regression analysis was performed to identify independent predictors of in-hospital mortality. Receiver operating characteristic (ROC) curve analysis was used for assessing prognostic accuracy of the prediction model. Data were analyzed using SPSS version 16.0 for Windows (Chicago, IL). A probability (*P*) value of less than 0.05 was considered statistically significant.

Results

Patient characteristics

Three hundred and forty-three patients with clinically suspected severe alcoholic hepatitis were initially recruited. Eighty-five cases were excluded from the final analysis because of HBsAg or anti-HCV positivity (n=34), MdF < 32 (n=31), the presence of hepatocellular carcinoma (n= 11), intrinsic renal disease (n=4) and incomplete clinical data (n=5). A total of 258 patients were finally identified (**Figure 1**). Median in-hospital time was 18 (27) days. Two hundred fifty and four (98.4%) were male. The incidence of various complications is shown in **Table 1**. Two hundred fifty and two (97.9%) patients presented with ascites. This was followed by infection (67.8%), spontaneous bacterial peritonitis (SBP, 55.0%), hepatic encephalopathy (HE) (42.2%), hydrothorax (25.6%), hepatorenal syndrome (HRS, 23.6%) and acute upper gastrointestinal hemorrhage (AUGIH, 16.7%).

Predictors of in-hospital mortality in SAH

During the hospitalisation, there were 65 deaths, accounting for 25.2%. **Table 1** summarizes demographic, clinical and laboratory data at entry for the whole cohort. Factors associated with mortality during hospitalisation were total bilirubin, INR, albumin, cholinesterase, urea nitrogen, creatinine, neutrophil-to-lymphocyte ratio (NLR), Child-Pugh score, MELD score, GAHS, the presence of HE, infection, SBP, HRS and AUGIH. **Table 2** presents the final model established using multivariable logistic regression (Child-Pugh score, MELD score and GAHS were not included in the analysis).

The following parameters were eventually selected out to predict the in-hospital death: CHE (OR 0.999, 95% Confidence Interval (CI) 0.999-1.000; *P*=0.012), Cre (OR 1.046, 95% CI 1.014-1.080; *P*=0.004) and the presence of

Table 1. Demographic, clinical, and biochemical parameters in patients with severe alcoholic hepatitis on admission according to the outcome at discharge

Variables	Alive (n=193)	Dead (n=65)	*P* value
Age (years)	45.62±9.54	48.03±10.26	0.085
Sex (male/female)	190/3	64/1	0.736
Alcohol consumption (g/day)	128 (80)	128 (80)	0.625
Total bilirubin (μmol/L)	288.9 (207.75)	352.7 (194)	0.033
INR	2 (0.58)	2.3 (1.15)	0.002
Albumin (g/L)	28.42±4.90	26.34±4.98	0.010
ALT (U/L)	35 (30.75)	32 (46.5)	0.849
AST (U/L)	73 (57)	69 (82)	0.980
AST/ALT	2.08 (1.33)	2.18 (1.68)	0.544
ALP (U/L)	131 (77)	126 (83)	0.306
GGT (U/L)	45 (97)	55 (127)	0.230
Cholinesterase (U/L)	1951 (1176.5)	1325 (853.25)	0.001
Total cholesterol (mmol/L)	1.38 (1.35)	1.02 (1.41)	0.245
Triglyceride (mmol/L)	0.95 (0.79)	0.91 (0.89)	0.873
Urea nitrogen (mmol/L)	6.1 (7.1)	8.8 (9.2)	0.001
Creatinine (μmol/L)	90 (50)	126 (146)	0.011
α-Fetoprotein (ng/ml)	7.48 (5.88)	8 (4.5)	0.629
White blood cell count (× 10^9)	7.90 (7.22)	9.83 (8.97)	0.123
Neutrophil count (× 10^9)	5.77 (7.24)	7.31 (7.89)	0.063
Lymphocyte count (× 10^9)	1.06 (0.71)	1.01 (0.61)	0.366
NLR	5.71 (6.82)	8.40 (11.51)	0.010
Hemoglobin (g/L)	93.88±24.92	92.66±27.77	0.741
Mean corpuscular volume	104.0 (11.40)	104.1 (16.20)	0.866
Platelet count (× 10^9)	66 (62.3)	66 (56.8)	0.703
Ascites	189 (97.9%)	63 (96.9%)	0.644
Hydrothorax	58 (30.1%)	28 (43.1%)	0.054
Hepatic encephalopathy	74 (38.3%)	35 (53.8%)	0.029
Spontaneous bacterial peritonitis	97 (50.3%)	45 (69.2%)	0.008
Infection (except peritonitis)	124 (64.2%)	51 (78.5%)	0.034
Hepatorenal syndrome	33 (17.1%)	28 (43.1%)	0.000
AUGIH	24 (12.4%)	19 (29.2%)	0.002
Clinical scores			
Child-Pugh score	11 (2)	12 (2)	0.005
MELD score	20.29 (9.32)	26.28 (14.68)	0.000
GAHS	9 (2)	10 (2)	0.000

Data presented as mean ± standard deviation for normal distribution data or median (interquartile range) for abnormal distribution data. INR, international normalised ratio; ALT, alanine aminotransferase; AST, aspartate aminotransferase; ALP, alkaline phosphatase; GGT, gamma-glutamyl transferase; NLR, neutrophil-to-lymphocyte ratio; AUGIH, acute upper gastrointestinal hemorrhage; MELD, Model for End-stage Liver Disease; GAHS, Glasgow Alcoholic Hepatitis Score.

AUGIH (OR 2.834, 95% CI 1.165-6.894; *P*= 0.022) (**Figure 2**). Eventually, the model had a sensitivity of 71.7% and specificity 67.9% respectively. Additionally, we further assessed the discrimination ability of different available clinical prognostic models (Child-Pugh score, MELD score and GAHS) in predicting in-hospital mortality in patients with SAH (**Figure 2**).

Discussion

Compared to western countries, there was a lower proportion of female ALD patients in China [9, 18]. In the present study, there were only 4 women in the SAH cohort. This was mainly caused by the cultural differences between the East and the West. In China, women consuming alcoholic beverages were not favored by the traditional culture, which led to a female paucity in the prevalence of SAH.

The spontaneous death rate of SAH was reported up to 30% at 1 month without effective treatment [5]. The in-hospital mortality of SAH in our study arrived at 25.19%. In clinical practice, it was often important to quickly determine the prognosis of SAH, which could help to optimize medical treatment to avoid life-threatening complications. In previous studies, AUGIH and infection were demonstrated to be associated with the poor outcome of SAH [19-21]. To our knowledge, no prediction model based on Chinese patients with SAH has been established till now. On the basis of our established model, CHE, Cre and the presence of AUGIH were finally identified to predict the death of SAH. The likelihood of death increased with the level of Cre increasing, the level of CHE decreasing and the presence of AUGIH.

Table 2. A model for prediction of the in-hospital death in severe alcoholic hepatitis using entry variables

Variables	B	*P* value	Odds ratio	95% confidence interval	
				Lower	Upper
Acute upper gastrointestinal hemorrhage	1.1439	0. 008	3.139	1.346	7.323
Creatinine	0.0039	0.025	1.004	1.000	1.007
Cholinesterase	-0.0006	0.012	0.999	0.999	1.000
Constant	-0.9373	0.055	0.392		

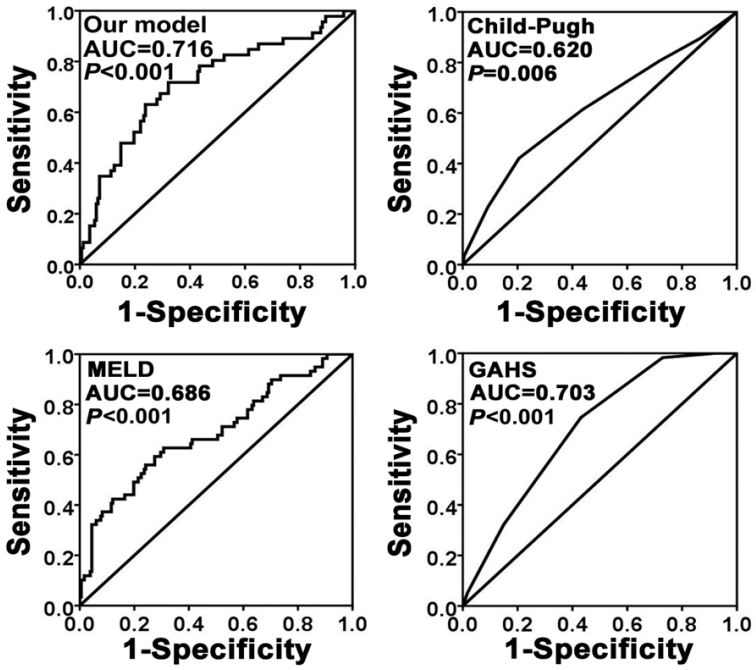

Figure 2. Receiver operating characteristic (ROC) curve analysis for in-hospital mortality in 258 Chinese patients with severe alcoholic hepatitis based on our established model, Child-Pugh score, MELD score and GAHS.

Moreover, we tested the ability of current available prognostic scoring systems for predicting short-mortality outcomes of SAH, including Child-Pugh score, MELD score and GAHS. Our model had the best discrimination (sensitivity and specificity of 71.7% and 67.9% respectively) to discriminate survivors from non-survivors (AUC=0.716), followed by the GAHS (AUC=0.703). The reasons for this result might be the progression of alcoholic liver disease in Chinese patients was different from that in Caucasian patients [18, 22].

In conclusion, there is a paucity of female patients in Chinese SAH cohort. The established prediction model can be used to effectively determine the prognosis of SAH and help to improve the management of these critically-ill patients.

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Disclosure of conflict of interest

None.

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References

[1] Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y and Patra J. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. Lancet 2009; 373: 2223-2233.

[2] Parikh ND and Schlansky B. Comparative effectiveness of medical therapies for severe alcoholic hepatitis: guidance at last? Gastroenterology 2015; 149: 857-859.

[3] Ambade A, Satishchandran A and Szabo G. Alcoholic hepatitis accelerates early hepatobiliary cancer by increasing stemness and miR-122-mediated HIF-1alpha activation. Sci Rep 2016; 6: 21340.

[4] Abe H, Aida Y, Seki N, Sugita T, Tomita Y, Nagano T, Itagaki M, Sutoh S, Nagatsuma K, Itoh K, Matsuura T and Aizawa Y. Aldehyde dehydrogenase 2 polymorphism for development to hepatocellular carcinoma in East Asian alcoholic liver cirrhosis. J Gastroenterol Hepatol 2015; 30: 1376-1383.
[5] European Association for the Study of Liver. EASL clinical practical guidelines: management of alcoholic liver disease. J Hepatol 2012; 57: 399-420.
[6] Moreau R. Stimulating hepatocyte renewal: a new paradigm for the treatment of severe alcoholic hepatitis unresponsive to corticosteroids? Gut 2015; 64: 1839-1840.
[7] Lucey MR, Mathurin P and Morgan TR. Alcoholic hepatitis. N Engl J Med 2009; 360: 2758-2769.
[8] Horie Y, Yamagishi Y, Ebinuma H and Hibi T. Therapeutic strategies for severe alcoholic hepatitis. Clin Res Hepatol Gastroenterol 2011; 35: 738-744.
[9] Townsend SA, Rowe IA and Elsharkawy AM. Is pentoxifylline still an option in severe alcoholic hepatitis? Hepatology 2015; 62: 1643-1644.
[10] DiNubile MJ. Prednisolone or pentoxifylline for alcoholic hepatitis. N Engl J Med 2015; 373: 281-282.
[11] Wang H, Ma L, Yin Q, Zhang X and Zhang C. Prevalence of alcoholic liver disease and its association with socioeconomic status in north-eastern China. Alcohol Clin Exp Res 2014; 38: 1035-1041.
[12] Lucey MR and Rice JP. Liver transplantation for severe alcoholic hepatitis crosses the Atlantic. Am J Transplant 2016; 16: 739-740.
[13] Naldi M, Baldassarre M, Domenicali M, Giannone FA, Bossi M, Montomoli J, Sandahl TD, Glavind E, Vilstrup H, Caraceni P and Bertucci C. Mass spectrometry characterization of circulating human serum albumin microheterogeneity in patients with alcoholic hepatitis. J Pharm Biomed Anal 2016; 122: 141-147.
[14] Maddrey WC, Boitnott JK, Bedine MS, Weber FL Jr, Mezey E and White RI Jr. Corticosteroid therapy of alcoholic hepatitis. Gastroenterology 1978; 75: 193-199.
[15] Pugh RN, Murray-Lyon IM, Dawson JL, Pietroni MC and Williams R. Transection of the oesophagus for bleeding oesophageal varices. Br J Surg 1973; 60: 646-649.
[16] Kamath PS, Wiesner RH, Malinchoc M, Kremers W, Therneau TM, Kosberg CL, D'Amico G, Dickson ER and Kim WR. A model to predict survival in patients with end-stage liver disease. Hepatology 2001; 33: 464-470.
[17] Forrest EH, Evans CD, Stewart S, Phillips M, Oo YH, McAvoy NC, Fisher NC, Singhal S, Brind A, Haydon G, O'Grady J, Day CP, Hayes PC, Murray LS and Morris AJ. Analysis of factors predictive of mortality in alcoholic hepatitis and derivation and validation of the Glasgow alcoholic hepatitis score. Gut 2005; 54: 1174-1179.
[18] Zheng SH, Li YM, Chen SH, Huang HX and Yuan GJ. Alcoholic liver disease. Are there any differences between China and Western countries in clinical features? Saudi Med J 2014; 35: 753-756.
[19] Rudler M, Mouri S, Charlotte F, Lebray P, Capocci R, Benosman H, Poynard T and Thabut D. Prognosis of treated severe alcoholic hepatitis in patients with gastrointestinal bleeding. J Hepatol 2015; 62: 816-821.
[20] Lahmer T, Messer M, Schwerdtfeger C, Rasch S, Lee M, Saugel B, Schmid RM and Huber W. Invasive mycosis in medical intensive care unit patients with severe alcoholic hepatitis. Mycopathologia 2014; 177: 193-197.
[21] Gustot T, Maillart E, Bocci M, Surin R, Trepo E, Degre D, Lucidi V, Taccone FS, Delforge ML, Vincent JL, Donckier V, Jacobs F and Moreno C. Invasive aspergillosis in patients with severe alcoholic hepatitis. J Hepatol 2014; 60: 267-274.
[22] Bansal RK, Kumar M, Sachdeva PR and Kumar A. Prospective study of profile of hepatic osteodystrophy in patients with non-choleastatic liver cirrhosis and impact of bisphosphonate supplementation. United European Gastroenterol J 2016; 4: 77-83.