# Evaluation of Prognostic Parameters for Assessment of Efficacy of Steroid Therapy at Day 7 in Patients with Severe Alcoholic Hepatitis

**B. Ramesh Kumar[1], K. Ravikanth[2], K. Panduranga Rao[3]**


## ABSTRACT

**Introduction:** Alcoholic Hepatitis (AH) is an acute inflammatory condition occurring in patients with alcoholic abuse. Currently steroids are the treatment modality in it so the present study was done to evaluate factors associated with poor response to steroid therapy in patients with severe alcoholic hepatitis and compare prognostic parameters in predicting efficacy of steroid therapy at day 7.

**Material and Methods:** This is a prospective comparative study conducted for a period of 2 years, Data was collected prospectively of 55 patients with diagnosis of severe alcoholic hepatitis who satisfied inclusion/exclusion criteria.

**Results**: Alcoholic hepatitis remains associated with high short term mortality in hospitalized patients. The 30 day mortality of severe AH in the current study was 40%. Alcoholic hepatitis was most common in males between 40-50 years old. With median age of 46.9 ± 7.7 (31 – 60) years. Edema/ascites were noted in 78.2%, liver decompensation in 76%, cirrhosis in 34.5% and portal hypertension was present in 67.2% patients. The clinical complications consisted of Asterixis and HE in 40%, HRS and renal failure in 18.2% and 40% patients developed infections. HRS, HE, LFTs, RFTs, $Na^+$ and all scores including MDF, MELD, CTP showed significant association with in hospital mortality at 30 days on univariate analysis.

**Conclusion:** The CTP, MELD, DF, GAHS, UKELD, and ABIC, as well as those of MDF, MELD obtained at day7 had excellent positive and negative predictive values on ROC curve analysis but at a higher cut-off value.


**Keywords:** Prognostic Parameters, Steroid Therapy, Alcoholic Hepatitis

## INTRODUCTION

The clinical phenotype of Alcoholic Hepatitis (AH) is very variable. There are mild forms, likely to improve with conservative management, while severe cases have a risk of death even if treated. Currently, corticosteroids, pentoxifylline and N-acetyl cysteine are the therapeutic options, although treatment of AH remains controversial. A survival benefit conferred by steroids is indeed disputed in standard meta-analysis, but supported in individual patient data analysis. Due to the potential adverse events associated with corticosteroids (mainly occurrence of sepsis), AH is currently managed on a risk benefit basis. Maddrey's discriminant function (MDF) of 32 is used to stratify a patient's severity of AH, with a score of ≥ 32 having a high short term mortality.[1-3] The aim of this study was to assess clinical profile of patients with severe AH and assess significant factors associated with poor response to steroid therapy.

## MATERIAL AND METHODS

A prospective comparative study was conducted from December 2013 to December 2015 at Liver Care Unit in Department of Gastroenterology, Osmania General Hospital. This study was approved by ethics committee of the hospital. Written informed consent was obtained from all the subjects included in the study.

**Inclusion Criteria:** Patients aged 18 years or older, clinical alcoholic hepatitis with serum albumin >5mg/dl, History of heavy alcohol abuse (>40 g/d for male and >20 g/d for female) present until 1 month of onset of symptoms, AST/ALT ratio >2 with an AST level >45 (1.5 times upper limit of normal) but <500 U/L or ALT <300 U/L and AST/ALT ratio >2, other causes of liver disease including chronic viral hepatitis (Hepatitis B or C), Biliary obstruction, Hepatocellular carcinoma, Discriminant function (DF) ≥ 32 (DF = 4.6 ×prothrombin time +(serum bilirubin).

**Exclusion Criteria:** Abstinence of >2m prior to admission, or a previous index admission, Duration of clinically apparent jaundice >3 months, Co-existent chronic liver disease (NASH, Iron load, biliary or autoimmune),Evidence of chronic viral hepatitis (Hepatitis B or C), Biliary obstruction, Portal vein thrombosis (PVT), Hepatocellular carcinoma, Recent history of herbal medication/hepatotoxic drug exposure, Evidence of current malignancy (except non-melanotic skin cancer), Use of either prednisolone or PTX within 6 weeks prior to admission, AST >500 U/L or ALT >300 U/L (not compatible with AH), Patients dependent upon inotropic support (except Terlipressin). Data was collected prospectively of 55 patients with diagnosis of SAH who satisfied inclusion/exclusion criteria. Detailed clinical history was taken particularly with reference to history of alcohol intake, quantity, duration, pattern, and type of liquor, binge episodes. Patients were assessed at admission for severity of liver disease and presence of complications like ascites, jaundice, HE, variceal haemorrhage, SBP, and/or HRS and daily progress notes were recorded. MELD, CTP, DF scores were calculated on admission. In patients placed on CS, presence of contraindications to steroid treatment and the exact date of initiation of steroid therapy were all recorded. Lille score, change in bilirubin, increase in creatinine were documented at 7 days in patients who received steroids. Thus, these three scores were validated separately in a subgroup of patients with severe AH (admission DF ≥32) treated with corticosteroids, using clinical and biochemical parameters obtained on the day

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before treatment start and the evolution in bilirubin at day 7 of treatment with steroids. The data was collected for each patient until the end-point of either hospital discharge or in-hospital mortality.

Therapy for severe AH defined by MDF >32 consisted of either Corticosteroids(CS) or Pentoxiphylline (PTX), the choice between the two was based on clinical evaluation, presence of infection, development of complications, associated other co-morbidities and was in accordance with hospital protocol**.**

## STATISTICAL ANALYSIS

Baseline characteristics of study population was compared by using Chi-squared test for categorical data and Student t-test or Mann–Whitney U test for continuous data, as appropriate. Data are presented as mean with standard deviation, median (interquartile range) or number (%) and all reported *P* values are two-tailed.

## RESULTS

Total patients admitted with diagnosis of alcoholic hepatitis and evaluated for inclusion in the study (N=90). 35 patients were excluded. Reasons for exclusion were 1 patient had abstinence, 1 patient had duration of jaundice > 2 m, 16 patients had bilirubin <5 mg/dl, 4 patients had ionotropic support, 7 patients had ALT <45 or >500, AST/ALT <2, 1 patient had associated HCV infusion, 5 patients had Hbsg positive, Final number of patients included were 55.Out of 55 patients, 29 patients were treated with PTX, 26 patients were initially treated with CS. Most included patients were male except for one female patient. Demographic characteristics of the patients are shown in Table-1.

| Variables | Mean ± SD (range) |
|---|---|
| Age | 46.9±7.7 (31-60 years) |
| Male | 54 (98.2) |
| Duration of hospital stay | 15.76 ± 6.5 (5-40 years) |
| Alcohol (g/day) | 138.45 ± 34.5 (80-220) |

**Table-1:** Demographic details of cases included (n=55)

The mean TLC was 11,400/mm3 and mean PMN leukocytosis was 74.4%. The mean total bilirubin was 13.4 mg/dl, the mean AST, ALT and SAP were 192, 85 U/L and 209 U/L respectively. Mean albumin was 2.5g/dl and mean INR was 1.9 (mean PT-24.8) with a control time of 13 sec. Mean Urea and Creatinine levels at admission were 42 mg/dl and 1.4 mg/dl whereas mean Na+ was 130.7meq/L. The prognostic scores calculated with variables obtained at time of admission revealed mean MDF of 67.2+/_31.4 (range 35.9-142.5), mean CTP of 9.2+/_ 1.7(range7-13) and MELD of 26+/_5.6 (range 20.1- 40) (Tables-2,3).

In patients with severe alcoholic hepatitis who were treated with steroids (Table-4), presence of history of CLD, clinical signs of edema, asterixis, spenomegaly, presence of infection, MOD, sepsis and complications of HE but not HRS or SBP were associated with significant mortality and worsening of clinical disease with increased mortality at thirty days after starting steroid therapy. Increase in creatinine and bilirubin at day 7 were also associated with increased mortality and higher values (worsening) at day 7 than on day 1 after being started on steroid therapy and were associated with increased mortality and death at 30 days (p<0.005) and were comparable to lille

| | Alive | | Dead | | | |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | t value | P value |
| Alcohol g/d | 122.42 | 26.93 | 162.50 | 30.93 | 5.094 | .000 |
| Duration yr | 15.73 | 7.38 | 15.82 | 5.03 | .050 | .960 |
| Hb | 12.05 | 1.70 | 9.47 | 2.02 | 5.109 | .000 |
| TLC | 10757.58 | 2539.57 | 12386.36 | 2232.72 | 2.443 | .018 |
| PMN | 72.82 | 6.03 | 76.86 | 5.62 | 2.504 | .015 |
| Platelet | 156848.48 | 60807.13 | 128272.73 | 45869.57 | 1.875 | .066 |
| Bilirubin | 10.71 | 1.44 | 17.55 | 3.38 | 10.330 | .000 |
| ALT | 72.73 | 23.48 | 103.50 | 28.96 | 4.335 | .000 |
| AST | 159.79 | 47.93 | 242.00 | 66.63 | 5.325 | .000 |
| SAP | 165.33 | 68.02 | 276.41 | 61.94 | 6.145 | .000 |
| TP | 5.92 | 0.26 | 5.59 | 0.21 | 5.025 | .000 |
| Albumin | 2.69 | 0.33 | 2.24 | 0.31 | 5.048 | .000 |
| PT | 20.73 | 2.18 | 31.00 | 4.48 | 11.336 | .000 |
| INR | 1.56 | 0.18 | 2.36 | 0.34 | 11.476 | .000 |
| Urea | 34.82 | 5.89 | 52.91 | 10.70 | 8.071 | .000 |
| Creatinine | 1.18 | 0.10 | 1.84 | 0.73 | 5.065 | .000 |
| RBS | 89.91 | 22.46 | 91.95 | 35.70 | .261 | .795 |
| $Na^+$ | 133.21 | 5.86 | 127.05 | 4.82 | 4.098 | .000 |
| $K^+$ | 4.06 | 0.77 | 4.29 | 0.99 | .985 | .329 |
| MDF | 45.44 | 9.38 | 99.92 | 23.09 | 12.173 | .000 |
| CTP | 8.12 | 1.05 | 10.91 | 1.11 | 9.416 | .000 |
| MELD | 22.08 | 1.45 | 31.79 | 4.16 | 12.378 | .000 |
| NA_MELD | 24.73 | 3.28 | 34.36 | 3.27 | 10.67 | .000 |
| ABIC | 6.97 | 0.82 | 8.87 | 0.97 | 7.864 | .000 |
| GAHS | 8.03 | 0.73 | 10.36 | 0.85 | 10.90 | .000 |
| UKELD | 61.34 | 3.90 | 70.07 | 4.46 | 7.682 | .000 |

**Table-2:** Clinical features at Time of admission stratified according to survival

score in sensitivity and specificity.

On assessment of parameters to evaluate efficacy of steroid therapy at day 7, Lille score at cut off of 0.48, rise in creatinine of more than 0.15 and a rise in bilirubin of 3.5mg at day 7 compared to values calculated on day1, were all associated with good positive predictive value of 100 while NPV was best for rise in serum creatinine. A lille score of 0.48 had a sensitivity of 75% and specificity of 100% with an area under ROC of

| | Alive | | dead | | | |
|---|---|---|---|---|---|---|
| | **Mean** | **Std. Deviation** | **Mean** | **Std. Deviation** | **t value** | **p value** |
| Age | 42.8 | 6.6 | 52.3 | 7.7 | -2.94 | .008 |
| Alcoholic | 127.2 | 24.9 | 140.0 | 24.5 | -1.09 | .287 |
| Duration | 13.7 | 6.5 | 19.3 | 3.6 | -1.99 | .059 |
| Hb | 12.3 | 1.6 | 10.6 | 2.9 | 1.87 | .075 |
| TLC | 11344.4 | 1525.9 | 11800.0 | 737.6 | -.70 | .493 |
| PMN | 75.1 | 3.5 | 76.5 | 2.7 | -.88 | .389 |
| Platelet | 170222.2 | 68310.3 | 102833.3 | 34527.8 | 2.30 | .032 |
| Bil | 10.7 | 1.5 | 16.2 | 3.5 | -5.66 | .000 |
| ALT | 70.3 | 20.8 | 95.7 | 24.9 | -2.47 | .022 |
| AST | 155.5 | 45.7 | 213.7 | 63.6 | -2.45 | .023 |
| SAP | 156.1 | 67.8 | 230.0 | 63.3 | -2.35 | .028 |
| TP | 6.0 | .2 | 5.6 | .2 | 3.87 | .001 |
| ALBUMIN | 2.8 | .3 | 2.4 | .4 | 3.32 | .003 |
| PT | 20.4 | 2.2 | 27.3 | 3.2 | -5.93 | .000 |
| INR | 1.5 | .2 | 2.1 | .2 | -6.20 | .000 |
| UREA | 32.9 | 5.5 | 44.8 | 2.7 | -5.10 | .000 |
| CREAT | 1.2 | .1 | 1.4 | .1 | -3.85 | .001 |
| RBS | 83.4 | 16.4 | 110.5 | 63.1 | -1.72 | .099 |
| NA | 134.9 | 5.3 | 128.3 | 4.0 | 2.78 | .011 |
| K | 4.2 | .7 | 4.1 | .9 | .21 | .839 |
| MDF | 44.0 | 9.1 | 81.3 | 17.9 | -6.76 | .000 |
| CTP | 7.8 | .9 | 10.0 | .9 | -5.35 | .000 |
| MELD | 21.8 | 1.4 | 27.9 | 2.3 | -7.92 | .000 |
| CR_INC | .0 | .1 | .8 | .6 | -6.43 | .000 |
| BIL_DIFF | 1.9 | 1.4 | -4.3 | 2.2 | 7.96 | .000 |
| MDF7 | 33.2 | 7.8 | 102.5 | 32.6 | -8.65 | .000 |

**Table-3:** Baseline parameters and patient demographics/clinical features at time of admissionin patients treated with steroids stratified according to survival/death:

| | **total** | **Alive** | **dead** | **Pts with (alive/dead)** | **P-value** |
|---|---|---|---|---|---|
| Jaundice | 24 | 18 | 06 | 7 ( 3/4) | 0.02 |
| Fever | 24 | 18 | 06 | 10 (8/2) | 0.64 |
| Anorexia | 24 | 18 | 06 | 14 (8/6) | 0.02 |
| Ascites | 24 | 18 | 06 | 13 (7/6) | 0.01 |
| Edema | 24 | 18 | 6 | 14(8/6) | 0.02 |
| Anorexia | 24 | 18 | 06 | 17(13/4) | 0.8 |
| Asterixis | 24 | 18 | 06 | 5 (1/4) | 0.00 |
| GI bleed | 24 | 18 | 06 | 1 (0/1) | 0.7 |
| Splenomegaly | 24 | 18 | 06 | 8 (4/4) | 0.05 |
| HE | 24 | 18 | 06 | 5 (1/4) | 0.003 |
| HRS | 24 | 18 | 06 | 1 (0/1) | 0.7 |
| SBP | 24 | 18 | 06 | 1 (0/1) | 0.7 |
| MOF | 24 | 18 | 06 | 4 (0/4) | 0.00 |
| Infection | 24 | 18 | 06 | 5 (1/4) | 0.001 |
| Sepsis | 24 | 18 | 06 | 6 (0/6) | 0.00 |

**Table-4:Clinical** features and other complications associated with mortality in those treated with steroids

| **Test Result Variable(s)** | **AUROC** | **Asymptotic Sig.[b]** | **Best cut off** | **sensitivity** | **specificity** | **PPV** | **NPV** |
|---|---|---|---|---|---|---|---|
| CR_INC | 1.000 | .002 | 0.15 | 100 | 100 | 100 | 100 |
| BIL_DIFF | .916 | .003 | 3.5 | 100 | 93.8 | 100 | 94.4 |
| LILLE | .852 | .033 | 0.48 | 75 | 100 | 100 | 85.7 |

**Table-5:** Sensitivity and specificity and best cut-off values for parameters used for assessment of efficacy of steroid therapy at day7 and ROC curve

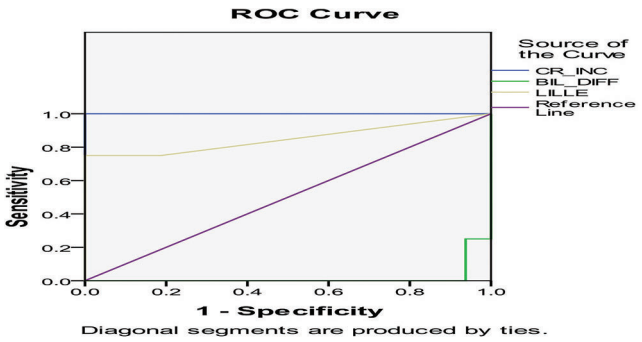


**Figure-1:** ROC curve

0.852, while creatinine rise was the best indicator of increased mortality risk with continued steroid therapy with a sensitivity and specificity of 100% and area under ROC of 1.00 (Figure-1).

## DISCUSSION

In this cohort, most of patients were male (98.6%). Worldwide, men are more likely than women to drink excessively. Proportion of patients who meet criteria for alcohol dependence is greater in men than in women and men consistently have higher rates of alcohol-related deaths and hospitalizations than women. In our study mean age was 46.9 ± 7.7 (31 – 60) years and is consistent with many other studies which also showed SAH to be most common in males between 40-50 years old. The clinical profile and complications during admission in this study included all 55 patients with clinical jaundice; anorexia was significant in 74.5% while fever was documented in 34.5% only. Edema and ascites were noted in 78.2 %( 43 out of 55). Out of total 55patients 42 (76%) patients had one or more features of liver decompensation at the time of admission. 19(34.5%) patients had evidence of Cirrhosis at time of admission and portal hypertension was present in 37 (67.2%) patients. All patients in the study had severe alcoholic hepatitis (MDF >32). Asterixis and HE were documented in 40% (22 out of 55) patients at admission, while HRS/ renal dysfunction was documented in 10 patients (18.2%) and 22 patients developed infections (40%). 11 had urinary tract infection, 2 had pneumonitis, 2 had diarrhoea and 4 oesophageal candida infection. SBP was documented in a total of 5 patients (9%). GI bleed was noted in 18 (32.7%) patients and overall, the 30d mortality in our cohort was 40%, which is consistent with previous studies reporting short-term mortality ranging to 14.4–27%.[1-3] In a study by Tijera et al[4], main clinical risk factor associated with mortality in patients with SAH, were concomitant cirrhosis demonstrated by USG and the development of HE. Whereas, in our study only HRS was significantly associated with mortality on univariate analysis, also HE, ascites, sepsis and age did not show high significance compared to HRS(HR-0.135 ($p<0.05$)). Zhao JM, et al[5] evaluated factors related to mortality in patients with severe hepatitis for several causes, they found that mortality was higher in patients with cirrhosis compared with non-cirrhotic patients (40% vs. 4.3%, $P = 0.002$) and results of multivariate conditional logistic regression analysis indicated that HE, serum creatinine levels are risk factors for death. This is corroborated by very high significance of CTP (HR-607.5($p<0.01$)) in this study, which had most significance among all the scores evaluated at time of admission. Bilirubin, ALT, AST, SAP, PT/INR, Urea and creatinine all showed significance ($p<0.05$). Finally, recently, Orntoft N W[6], et al found that most deaths within the first 84 days after admission in patients with alcoholic hepatitis resulted from liver failure(40%), infections(20%), or HRS(11%). Most patients without cirrhosis died of causes related to alcohol abuse, whereas most patients with cirrhosis (n = 675) died of liver failure, infections, or VB. In our study 22 patients developed infections (40%); 11 had UTI, 2 had pneumonitis, 2 had diarrhoea and 4 had oesophageal candidiasis. SBP was documented in a total of 5 pts( 9%). GI bleed was noted in 18(32.7%) patients. 15(27%) patients had features of SIRS at time of admission, out of these, associated infection was detected in 9 pts but 6 pts did not have any evidence of infection, suggesting SIRS of non-infectious etiology likely sec to SAH itself. Only HRS was significantly associated with mortality on univariate and multivariate analysis, also HE, ascites, sepsis and age did not show high significance compared to HRS. However, other authors have reported bacterial infections as a main cause of death.[7,8]

Immune system dysfunction is reported in patients with SAH. Neutrophils are an essential component of the innate immune response and key playersinthe pathogenesis of alcoholic hepatitis. Jaeschke H, et al,[9] found decreased neutrophil phagocytic capacity correlating with disease severity. Mookerjee RP, et al[10], also demonstrated neutrophil dysfunction in patients with alcoholic hepatitis Regard to infections found in our patients, is noteworthy that the most frequent was UTI followed by Candida, an explanation for this finding could be the potential side-effects of corticosteroids compounded by malnourished status.

The Lille score is a combination of six variables including a dynamic one, i.e. the evolution in bilirubin following 1 week of corticosteroid treatment. Within our cohort, use of the Lille model proved an accurate predictor of both 30d (AUROC 0.81). Our findings are cohernt with those of a recent prospective assessment, in which, however, diagnosis of AH relied completely on clinical criteria.[20] In this study, Lille score showed sensitivity of 75% and specificity of 100% at a cut off value of 0.48 for increased short term mortality and poor response to therapy with CS. As of today, the Lille model represents one of the best currently validated dynamic criterion for the assessment of mortality in AH, and the only one linked to specific stopping rules for corticosteroid management: in poor responders (Lille >0.45) discontinuation of corticosteroids is recommended, particularly when Lille >0.56. Paradoxically in a few cases, Lille score showed a value of zero (<0.45) even when the bilirubin at day 7 had increased mildly compared to bilirubin at day7 in patients started on CS. A very important variable in the Lille score is the level of serum bilirubin at 7 days after start treatment with corticosteroids. The decrease in the bilirubin level is a crucial determinant of response to treatment. In a study by Bargalló-García A, et al[19] MELD score, urea and bilirubin values one week after admission were independently associated with both in-hospital survival (OR = 1.14, 1.012 and 1.1, respectively), and survival at 6 months (OR = 1, 15; 1.014 and 1.016, respectively). In patients treated with Corticosteroids, bilirubin, TP/Albumin, PT/INR, Urea, creatinine showed significantly higher values in those who died compared to those who survived.

Amongst the prognostic scores, all the scores also showed

higher values in those who died compared to those who survived ($p<0.05$) including Lille score, change in bilirubin at 7days and increase in creatinine. Age, Bilirubin, total protein/albumin, PT/INR, Urea, Creatinine were associated with increased mortality risk ($p<0.005$) in those treated with steroids. Presence of decompensated cirrhosis, elderly in age, renal injury, and malnourished status were also found to be significant in patients who responded poorly to steroids.HRS did not yield significant P-value likely secondary to the fact that very few patients were eligible for initiation of steroids.

For efficacy of steroid therapy at day 7, Lille score at cut off of 0.48, rise in creatinine of more than 0.15 and a rise in bilirubin of 3.5mg at day 7 compared to values calculated on day1, were all associated with good positive predictive value of 100 while NPV was best for rise in serum creatinine. AUROC analysis of parameters that were evaluated on 7$^{th}$ day for response to treatment with steroids showed highest sensitivity and specificity for increase in creatinine with a cut-off value of 0.15mg increase on 7$^{th}$ day with an AUROC of 1.00. Lille score with a cut-off of 0.48 had specificity of 100% and PPV of 100 for poor response to steroids after 7 days.Currently, importance is laid on response criteria to corticosteroids, or non-improvement at 7-days if liver transplantation is considered, as the PPV of most scores in earlier studies was insufficient to establish a poor prognosis at admission.

## CONCLUSION

Alcoholic hepatitis remains associated with high short term mortality in hospitalized patients. The 30 day mortality of severe AH in the current study was 40%. Alcoholic hepatitis was most common in males between 40-50 years old. Edema/ ascites were noted in 78.2%, liver decompensation in 76%, cirrhosis in 34.5% and portal hypertension was present in 67.2% patients. The clinical complications consisted of Asterixis and HE in 40%, HRS and renal failure in 18.2% and 40% patients developed infections. Forassessment of efficacy of steroid therapy at day 7, Lille score at cut off of 0.48, rise in creatinine of more than 0.15 and a rise in bilirubin of 3.5mg at day 7 compared to values calculated on day1, were all associated with good positive predictive value of 100 while NPV was best for rise in serum creatinine.

## REFERENCES


1. Sheth M, Riggs M, Patel T. Utility of the Mayo End-Stage Liver Disease (MELD) score in assessing prognosis of patients with alcoholic hepatitis. BMC Gastroenterol. 2002;23:45-50.
2. Dunn W, Jamil LH, Brown LS, Wiesner RH, Kim WR, Menon KV, et al. MELD accurately predicts mortality in patients with alcoholic hepatitis. Hepatology. 2005;41: 353-358.
3. Srikureja W, Kyulo NL, Runyon BA, Hu KQ. MELD score is a better prognostic model than Child-Turcotte-Pugh score or Discriminant Function score in patients with alcoholic hepatitis. J Hepatol. 2005;42:700-706.
4. FátimaHiguera-de la Tijeraa, Alfredo Israel Servín-Caama˜nob, Eduardo Pérez-Torresa, Francisco Salas-Gordilloa, Juan Miguel Abdo-Francisa, José Luis Pérez-Hernándeza, David Kershenobichc, Main clinical factors influencing early mortality in a cohort of patients with severe alcoholic hepatitis, and evaluation through ROC curves of different prognostic scoring systems.
5. Zhao JM, Zhang L, Du QW, et al. Analyse related factors of impact and prognosis of 73 cases of severe hepatitis. Zhonghua Shi Yan He Lin Chuang Bing Du XueZaZhi. 2013;27:366-9.
6. Orntoft NW, Sandahl TD, Jepsen P, Vilstrup H. Short-term and Long-term causes of death in patients with alcoholic hepatitis in Denmark. Clin Gastroenterol Hepatol. 2014:34:45-50.
7. Navasa M, Fernandez J, Rodes J. Bacterial infections in liver cirrhosis. Ital J GastroenterolHepatol. 1999;31:616-25.
8. Linderoth G, Jepsen P, Schonheyder HC, Johnsen SP, Sorensen HT. Short-term prognosis of community-acquired bacteremia in patients with liver cirrhosis or alcoholism: a population-based cohort study. Alcohol ClinExp Res. 2006.
9. Jaeschke H. Neutrophil-mediated tissue injury in alcoholic hepatitis. Alcohol. 2002;27:23–7.
10. Mookerjee RP, Stadlbauer V, Lidder S, et al. Neutrophil dysfunction in alcoholic hepatitis superimposed on cirrhosis is reversible and predicts the outcome. Hepatology. 2007; 46:831-40.
11. Tripodi A, Caldwell SH, Hoffman M, Trotter JF, Sanyal AJ. Review article: the prothrombin time test as a measure of bleeding risk and prognosis in liver disease. Aliment Pharmacol Ther. 2007;26:141–8.
12. Lolekha PH, Sritong N. Comparison of techniques for minimizing interference of bilirubin on serum creatinine determined by the kinetic Jaffe reaction. J Clin Lab Anal. 1994;8:391–9.
13. Srikureja W, Kyulo NL, Runyon BA, Hu KQ. MELD score is a better prognostic model than Child-Turcotte-Pugh score or Discriminant Function score in patients with alcoholic hepatitis. J Hepatol. 2005;42:700-706.
14. Vaa BE, Asrani SK, Dunn W, Kamath PS, Shah VH. Influence of serum sodium on MELD-based survival prediction in alcoholic hepatitis. Mayo Clin Proc. 2011;86:37–42.
15. Hsu CY, Lin HC, Huang YH, Su CW, Lee FY, Huo TI, Lee PC, Lee JY, Lee SD. Comparison of the model for end-stage liver disease (MELD), MELD-Na and MELD-Na for outcome prediction in patients with acute decompensated hepatitis. Dig Liver Dis. 2010;42:137–142.
16. Forrest EH, Evans CD, Stewart S, Phillips M, Oo YH, McAvoy NC. etal. Analysis of factors related to mortality in alcoholic hepatitis and thederivation and validation of the Glasgow alcoholic hepatitis score. Gut. 2005;54:1174-9.
17. Forrest EH, Morris AJ, Stewart S, Phillips M, Oo YH, Fisher NC, et al. The Glasgow alcoholic hepatitis score identifies patients who may benefit from corticosteroids. Gut. 2007;56:1743-1746.
18. Dominguez M, Rincon D, Abraldes JG, Miquel R, Colmenero J, BellotP, et al. A New scoring system for prognostic stratification of patients with alcoholic hepatitis. Am J Gastroenterol. 2008;103:2747-56.
19. Bargalló-García A, Serra-Matamala I, Marín-Fernández I, et al. Prognostic factors associated with mortality in patients with severe alcoholic hepatitis. Rev EspEnferm Dig (Madrid). 2013;105:520-3.
20. Lafferty H, Stanley AJ, Forrest EH. The management of alcoholic hepatitis:a prospective comparison of scoring systems. Aliment Pharmacol Ther. 2013;38:603–10.
21. Palaniyappan N, Subramanian V, Ramappa V, Ryder SD, Kaye P, Aithal GP. The Utility of Scoring Systems in Predicting Early and Late Mortality in Alcoholic Hepatitis: Whose Score Is It Anyway? International J Hepatol. 2012; 2012:624675.


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