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Comparision of the scoring systems to predict clinical outcomes in older adults with biliary pancreatitis: a cross-sectional study

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ABSTRACT

Aim: The issue of which scoring system is appropriate in older adults patients with acute biliary pancreatitis is an ongoing debate. We aimed to compare the efficiency of four existing scoring systems in predicting clinical outcomes in the elderly with acute biliary pancreatitis.

Material and Method: The study included patients aged 60 years and older with a diagnosis of acute biliary pancreatitis. Clinical findings, routine laboratory examinations, and imaging findings were retrospectively accessed through the hospital information system and reviewed. Then, the efficacy of Ranson, Bedside Index of Severity in Acute Pancreatitis (BISAP), Glasgow-Imrie, and Acute Physiology and Chronic Health Evaluation (APACHE) II scoring systems in predicting mortality, severity, organ failure, complications, intensive care unit (ICU) admission, and prolonged hospital stay (PHS) were compared.

Results: The Ranson score was compared with three other existing scoring systems in primary and secondary outcomes in 364 eligible patients. The area under the curve (AUC) values of the Ranson, BISAP, Glasgow, and APACHE II scores were 0.787 (95% CI: 0.649-0.925), 0.856 (95% CI: 0.784-0.929), 0.908 (95% CI: 0.854-0.961), and 0.836 (95% CI: 0.702-0.971) for mortality. Although the AUC of the Ranson score for mortality was lower than that of the other scores, no significant difference was found in pairwise comparisons with the other three scores ($p>0.05$ for all).

Conclusion: The Ranson scoring system was the weakest among the assessed scoring systems in predicting clinical outcomes in older adults with biliary pancreatitis.

Keywords: Acute pancreatitis, elderly, scoring methods, Apache II, roc curve

INTRODUCTION

Acute pancreatitis (AP) is an emergency of the gastrointestinal system that involves the acute inflammation of the pancreas (1-3). With the growing older adults population due to increasing life expectancy and advanced medical treatments, acute and chronic diseases of the cardiovascular, respiratory, and renal systems have become more common as well as hospitalizations due to AP (4-6). Gallstones are the most common cause of AP, and the frequency of acute biliary pancreatitis increases with age (7).

AP can manifest itself in a wide spectrum ranging from a clinically asymptomatic presentation to multiorgan failure and mortality; it is classified as mild, moderately severe, and severe according to the revised Atlanta classification (7,8). AP is a progressive disease and patients hospitalized with AP may develop organ failure and severe AP during follow-up (9,10). Mortality is directly related to the severity of AP and older adults patients are at high risk of mortality due to comorbidities. (11-13). Therefore, in order to predict prognosis and progression to severe AP, clinical findings, routine laboratory tests, and radiology results should be carefully evaluated together with multifactorial scoring systems in the follow-up and treatment of AP (14). Different scoring systems used for the prediction of prognosis in the setting of AP include Ranson's criteria, the Glasgow-Imrie scoring system, the Acute Physiology and Chronic Health Evaluation (APACHE) II score, and the Bedside Index of Severity in Acute Pancreatitis (BISAP) (15-18). However, there are few studies that investigate the validity of these scoring systems in older adults patients with AP (19,20).

Accordingly, in this study, we aimed to compare the efficacy of the Ranson, BISAP, Glasgow, and APACHE II scores in predicting mortality, severity, organ failure, and complications in older adults patients with biliary pancreatitis.

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MATERIAL AND METHOD

This study was conducted in the Ankara City Hospital in accordance with the Declaration of Helsinki and it received approval from Ankara City Hospital Ethics Committee No. 2 (Date: 14.07.2021, Decision No: E2-21-716). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Study Design

Patients aged 60 years and older who were diagnosed with biliary AP in Ankara City Hospital between January 2013 and April 2019 were included in the study. Patients under the age of 60 and those with non-biliary etiology, who refused to be hospitalized, who died within the first 24 hours, and who did not have sufficient data in their files were excluded from the study (**Figure 1**).

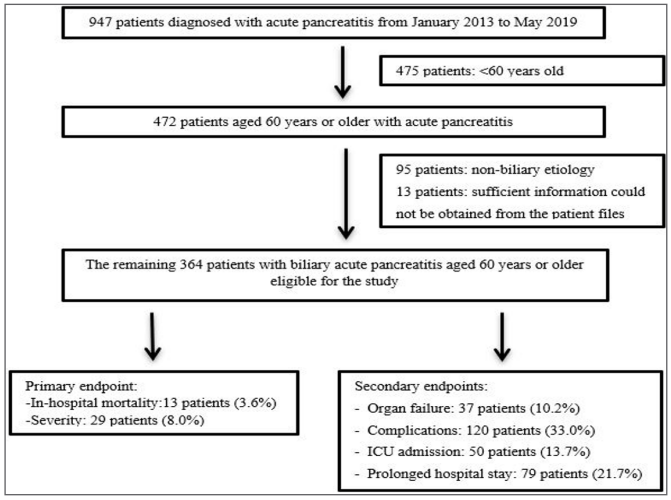

Figure 1. Flow chart showing the number of patients included and excluded and the primary and secondary endpoints observed.

The prognostic role of the Ranson score was evaluated in 364 eligible patients and the Ranson score was compared with 3 other existing scoring systems in terms of primary and secondary outcomes. Ranson and Glasgow scores in the first 48 hours of hospitalization and BISAP and APACHE II scores in the first 24 hours of hospitalization were calculated with laboratory and clinical parameters. Pairwise comparisons of Ranson with other scores were analyzed with area under the curve (AUC) values calculated with receiver operating characteristic (ROC) curve analysis.

Data Collection and Definitions

Many laboratory parameters were recorded in the first 48 hours of admission. Morphological subtype and local complications of AP were evaluated by radiological imaging. Age, gender, hospitalization day, presence of systemic complications, presence of intensive care unit (ICU) admission, disease severity, presence of organ failure, and mortality rate of the patients were clinically evaluated.

Patients with 2 of the following 3 criteria were diagnosed with AP: 1) sudden onset of abdominal pain radiating to the back, 2) serum amylase and/or lipase levels more than 3 times the upper limit of normal, and 3) pancreatic inflammation typical of AP detected on imaging.

Patients with stones, sludge, or microlithiasis in the gallbladder, biliary tract, or pancreatic duct identified with imaging methods and without any other obvious etiology were considered as having biliary AP. Patients with pancreatic or peripancreatic necrosis detected by advanced imaging methods (CT/MRI) were evaluated as having necrotizing AP. According to the revised Atlanta classification, the detection of acute peripancreatic fluid collection, pseudocyst, acute necrotic collection, walled-off necrosis, or splanchnic venous thrombosis with advanced imaging was considered as a local complication and exacerbation of an underlying comorbid condition was considered a systemic complication. Complications were defined as local and/or systemic. Severity was divided into three groups according to the revised Atlanta classification: 1) mild, without complications and organ failure; 2) moderately severe, with complications and/or organ failure lasting less than 48 hours; and 3) severe, with organ failure lasting longer than 48 hours. Organ failure was defined as patients scoring 2 or higher on the modified Marshall scoring scale. Cases were divided into two groups as severe and non-severe to compare severity dichotomously. Prolonged hospital stay was a stay of 10 days or more.

Study Outcomes

The primary endpoint of the study was to compare the Ranson score with other scores for mortality and severity. The secondary endpoint was a further comparison of the Ranson score with other scores in terms of organ failure, complications, intensive care hospitalization, and prolonged hospital stay.

Statistical Analysis

SPSS 26 (IBM) and MedCalc 20.0.8 (MedCalc) were used for statistical analysis. ROC curve analysis was performed to calculate the AUC values for the primary and secondary endpoints of the study. Pairwise comparison of ROC curve analyses was carried out to compare the AUC values of the scoring systems. In order to assess the predictive capabilities of the scoring systems, appropriate cut-off values for each system were determined using ROC curves with the Youden index method. Based on these cut-off values, the sensitivity, specificity, positive likelihood ratio (PLR) and negative likelihood ratio (NLR) were found and risk analysis was carried out. In all analyses, a 2-sided value of $p < 0.05$ was considered statistically significant

RESULTS

Baseline Patient Characteristics

The mean age of the 364 patients included in the study was 74.4±8.9 years. Of the patients, 208 (57.1%) were female and 156 (42.9%) were male. Median length of stay was 6 days (min-max: 2-105). Necrotizing AP developed in 13 (3.6%) patients. While 66.8% of the patients had a mild course, 8% cases were severe. While no complications developed in 244 patients, local complications developed in 109 patients and systemic complications in 32 patients. While 85.2% of patients did not develop any serious clinical events, 13 (3.6%) patients died, 37 (10.1%) patients developed organ failure, and 50 (13.7%) patients required ICU admission. The baseline characteristics of the patients are summarized in **Table 1**.

Table 1. Baseline characteristics of patients.

Variable	N (%)
All patients	364 (100)
Age, years, mean±SD	74.4±8.9
Female	208 (57.1)
Comorbidities	
Hypertension	275 (75.5)
Diabetes mellitus	107 (29.4)
Coronary artery disease	157 (43.1)
Dysrhythmia	70 (19.2)
Chronic lung disease	93 (25.5)
Cerebrovascular disease	51 (14.0)
Chronic kidney disease	25 (6.9)
Chronic liver disease	6 (1.6)
Malignant diseases	16 (4.4)
Length of hospital stay, days, median (min-max)	6 (2-105)
Prolonged hospital stay, ≥10 days	79 (21.7)
Necrotizing pancreatitis	13 (3.6)
Severity	
Mild	243 (66.8)
Moderately severe	92 (25.3)
Severe	29 (8.0)
Complications	
None	244 (67.7)
Local complication	106 (29,1)
Systemic complications	32 (8.8)
Peripancreatic vascular complications	
Splanchnic venous thrombosis	3 (0.8)
Pseudoaneurysm	0 (0.0)
Serious clinical event	
None	310 (85.2)
Mortality	13 (3.6)
Organ failure	
None	327 (89.8)
Transient, <48 hours	8 (2.2)
Persistent, >48 hours	29 (8.0)
ICU admission	50 (13.7)
Mean score (min-max)	
Ranson score	3.2 (0-8)
BISAP score	1.7 (1-5)
Glasgow score	2.6 (1-7)
APACHE II score	7.3 (3-21)

APFC, acute peripancreatic fluid collection; ANC, acute necrotic collection; WON, walled-off necrosis; ICU, intensive care unit.

Comparison of Ranson Score with Other Scores

The AUC values of the Ranson, BISAP, Glasgow, and APACHE II scores were 0.787 (95% CI: 0.649-0.925), 0.856 (95% CI: 0.784-0.929), 0.908 (95% CI: 0.854-0.961), and 0.836 (95% CI: 0.702-0.971) for mortality and 0.775 (95% CI: 0.674-0.876), 0.918 (95% CI: 0.879-0.958), 0.885 (95% CI: 0.827-0.943), and 0.879 (95% CI: 0.804-0.954) for severity, respectively. Although the AUC of the Ranson score for mortality was lower than those of the other scores, no significant difference was found in pairwise comparisons with the other 3 scores ($p > 0.05$ for all) (**Figure 2**).

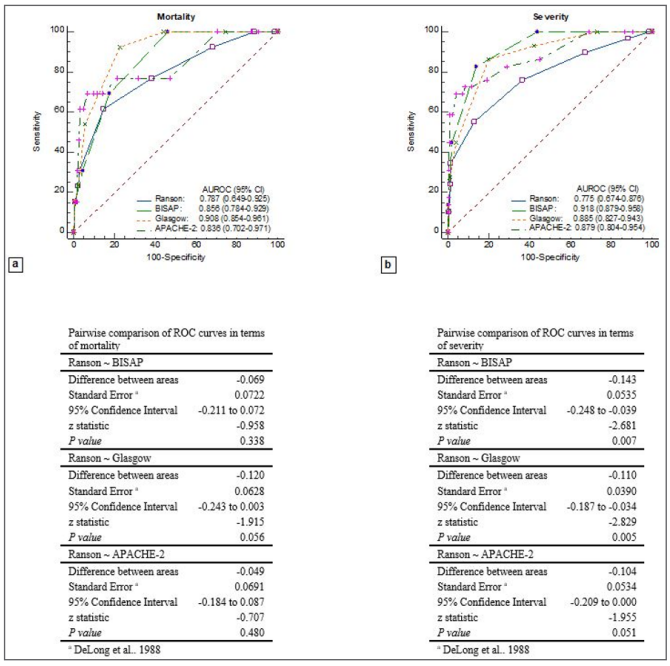

Figure 2. Comparison of the predictive value of Ranson score with other scores in terms of primary endpoints with ROC curve analysis. In terms of mortality, there was no significant difference between the AUROC values of Ranson and other scoring systems (a). For severity, the BISAP and Glasgow scores were significantly superior to the Ranson score (p=0.007 and p=0.005, respectively), while the APACHE II score was not significantly different from the Ranson score (p=0.051), but its AUROC value was higher (b). ROC, receiver operating characteristic; AUROC, area under the ROC curve; CI, confidence interval.

While the AUC values of the BISAP and Glasgow scores for severity were significantly higher than that of the Ranson score (p=0.007 and p=0.005, respectively), there was no significant difference between the Ranson and APACHE II scores (p=0.051) (**Figure 2**). When compared in terms of organ failure, complications, ICU admission, and prolonged hospital stay, which were determined as secondary endpoints, the AUC of the Ranson score was significantly lower than the AUC of the other 3 scores ($p < 0.05$ for all, except for the comparison with APACHE II for complications at p=0.228) (**Figure 3**).

When comparing the AUC values of the scores other than Ranson in terms of primary and secondary endpoints, no significant difference was found ($p > 0.05$ for all, except for the comparison of BISAP and APACHE II for complications at p=0.006). Pairwise comparisons of the AUC values of the scores are shown in **Table 2** and **Table 3**.

Predictive Values of the Scoring Systems

When the Ranson score was >4, sensitivity, specificity, PLR, and NLR were 61.5%, 85.5%, 4.23, and 0.45, respectively, for mortality and 55.2%, 87.2%, 4.29, and 0.51, respectively, for severity. The highest sensitivities for mortality and severity were obtained for the Glasgow score (93.2% and 86.2%, respectively), while the highest specificities were obtained for APACHE II (93.2% and 96.1%, respectively). The highest PLR values to accurately confirm mortality and severity were obtained for APACHE II (10.12 and 17.77, respectively), while the lowest NLR values to accurately exclude mortality and severity were obtained for the Glasgow score (0.09 and 0.17, respectively). Patients with Ranson scores of >4 had a 9.4-fold (OR: 9.4, 95% CI: 2.9-29.9) and 8.3-fold (OR: 8.3, 95% CI: 3.8-18.6) risk of mortality and severity, respectively, compared to those without. The highest risks for mortality and severity were 41.3-fold and 55-fold among those with Glasgow scores of >3 and APACHE II scores of >12, respectively (OR: 41.3, 95% CI: 5.3-322.6 and OR: 55.0, 95% CI: 21.0-144.1, respectively). The predictive values of the scores in terms of secondary endpoints are illustrated in **Table 4**.

Table 2. Predictive capabilities of scoring systems and comparison of predictive capability of Ranson score with other scores for 6 clinical outcomes

Outcome by scoring systems	AUROC (95% CI)	AUROC difference (95% CI)	z statistic	p value
Mortality				
Ranson (reference)	0.787 (0.649 to 0.925)	-	-	-
BISAP	0.856 (0.784 to 0.929)	-	-	-
Ranson vs. BISAP	-	-0.069 (-0.211 to 0.072)	-0.958	0.338
Glasgow	0.908 (0.854 to 0.961)			
Ranson vs. Glasgow	-	-0.120 (-0.243 to 0.003)	-1.915	0.056
APACHE II	0.836 (0.702 to 0.971)			
Ranson vs. APACHE II	-	-0.049 (-0.184 to 0.087)	-0.707	0.480
Severity				
Ranson (reference)	0.775 (0.674 to 0.876)	-	-	-
BISAP	0.918 (0.879 to 0.958)	-	-	-
Ranson vs. BISAP	-	-0.143 (-0.248 to -0.039)	-2.681	0.007
Glasgow	0.885 (0.827 to 0.943)			
Ranson vs. Glasgow	-	-0.110 (-0.187 to -0.034)	-2.829	0.005
APACHE II	0.879 (0.804 to 0.954)			
Ranson vs. APACHE II	-	-0.104 (-0.209 to 0.000)	-1.955	0.051
Organ failure				
Ranson (reference)	0.735 (0.635 to 0.834)	-	-	-
BISAP	0.904 (0.855 to 0.952)	-	-	-
Ranson vs. BISAP	-	-0.169 (-0.270 to -0.067)	-3.260	0.001
Glasgow	0.872 (0.821 to 0.923)			
Ranson vs. Glasgow	-	-0.137 (-0.212 to -0.063)	-3.614	<0.001
APACHE II	0.870 (0.799 to 0.940)			
Ranson vs. APACHE II	-	-0.135 (-0.235 to -0.035)	-2.651	0.008
Complications				
Ranson (reference)	0.563 (0.502 to 0.625)	-	-	-
BISAP	0.674 (0.616 to 0.732)	-	-	-
Ranson vs. BISAP	-	-0.111 (-0.180 to -0.041)	-3.124	0.002
Glasgow	0.624 (0.561 to 0.688)			
Ranson vs. Glasgow	-	-0.061 (-0.117 to -0.005)	-2.138	0.033
APACHE II	0.602 (0.538 to 0.666)			
Ranson vs. APACHE II	-	-0.039 (-0.102 to 0.024)	-1.206	0.228
ICU admission				
Ranson (reference)	0.739 (0.661 to 0.817)	-	-	-
BISAP	0.854 (0.797 to 0.911)	-	-	-
Ranson vs. BISAP	-	-0.115 (-0.206 to -0.024)	-2.474	0.013
Glasgow	0.824 (0.759 to 0.889)			
Ranson vs. Glasgow	-	-0.085 (-0.160 to -0.010)	-2.219	0.026
APACHE II	0.825 (0.759 to 0.892)			
Ranson vs. APACHE II	-	-0.086 (-0.169 to -0.003)	-2.038	0.042
Prolonged hospital stay (≥10 days)				
Ranson (reference)	0.513 (0.438 to 0.588)	-	-	-
BISAP	0.657 (0.589 to 0.725)	-	-	-
Ranson vs. BISAP	-	-0.144 (-0.226 to -0.062)	-3.446	0.001
Glasgow	0.595 (0.523 to 0.666)			
Ranson vs. Glasgow	-	-0.082 (-0.146 to -0.017)	-2.478	0.013
APACHE II	0.628 (0.556 to 0.700)			
Ranson vs. APACHE II	-	-0.115 (-0.190 to -0.040)	-3.003	0.003

AUROC, area under the receiver operating characteristic curve; CI, confidence interval; ICU, intensive care unit.

Table 3. Pairwise comparison of ROC curves* in terms of clinical outcomes of the 3 scoring systems other than Ranson

Outcome by scoring systems	BISAP	Glasgow	APACHE II
Mortality			
BISAP	-	0.253	0.665
Glasgow	0.253	-	0.278
APACHE II	0.665	0.278	-
Severity			
BISAP	-	0.339	0.139
Glasgow	0.339	-	0.894
APACHE II	0.139	0.894	-
Organ failure			
BISAP	-	0.334	0.153
Glasgow	0.334	-	0.960
APACHE II	0.153	0.960	-
Complication			
BISAP	-	0.134	0.006
Glasgow	0.134	-	0.483
APACHE II	0.006	0.483	-
ICU admission			
BISAP	-	0.394	0.336
Glasgow	0.394	-	0.972
APACHE II	0.336	0.972	-
Prolonged hospital stay			
BISAP	-	0.051	0.287
Glasgow	0.051	-	0.319
APACHE II	0.287	0.319	-

*The values in the table are the p values showing the significance of pairwise comparisons of the ROC curves of the scoring systems. ICU, intensive care unit.

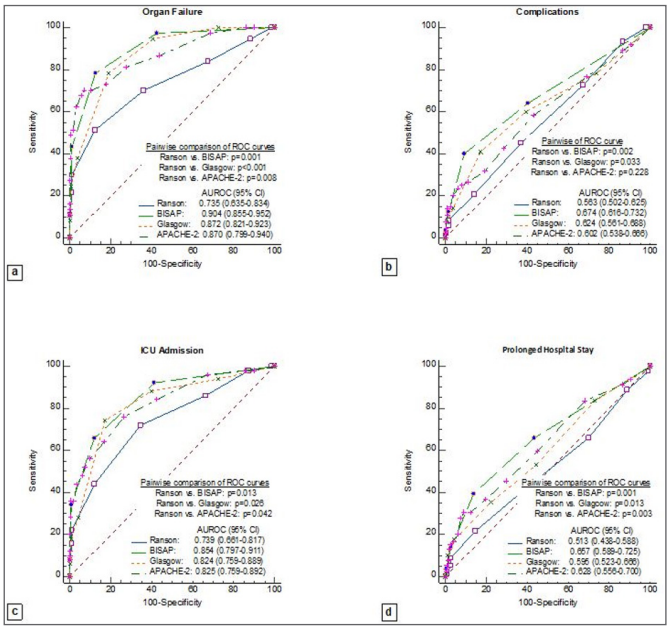

Figure 3. AUROC values of the 4 scoring systems for secondary endpoints and pairwise comparison of these values: (3a) for organ failure, (3b) for complications, (3c) for ICU admission, and (3d) for prolonged hospital stay (≥10 days). The predictive ability of the Ranson score for all 4 clinical outcomes (except when compared to APACHE II for complications) was significantly lower than those of the other scores. AUROC, area under the receiver operating characteristic curve; CI, confidence interval; ICU, intensive care unit.

Table 4. The predictive values of the scores in terms of secondary endpoints

Outcome by scoring systems	Cut-off points	No. (%) of patients over the cut-off	OR (95% CI)	Sensitivity (%)	Specificity (%)	PLR	NLR
Primary endpoints							
Mortality							
Ranson	>4	59 (16.2)	9.4 (2.9-29.9)	61.5	85.5	4.23	0.45
BISAP	>2	70 (19.2)	10.6 (3.2-35.9)	69.2	82.6	3.98	0.37
Glasgow	>3	91 (25.0)	41.3 (5.3-322.6)	92.3	77.5	4.10	0.09
APACHE II	>12	33 (9.0)	30.6 (8.8-106.8)	69.2	93.2	10.12	0.33
Severity							
Ranson	>4	59 (16.2)	8.3 (3.8-18.6)	55.2	87.2	4.29	0.51
BISAP	>2	70 (19.2)	30.1 (10.9-83.0)	82.8	86.3	6.02	0.19
Glasgow	>3	91 (25.0)	25.4 (8.5-75.7)	86.2	80.3	4.37	0.17
APACHE II	>12	33 (9.0)	55.0 (21.0-144.1)	69.0	96.1	17.77	0.32
Secondary endpoints							
Organ failure							
Ranson	>4	59 (16.2)	7.5 (3.6-15.6)	51.4	87.8	4.19	0.55
BISAP	>2	70 (19.2)	25.2 (10.8-59.0)	78.4	87.5	6.25	0.24
Glasgow	>3	91 (25.0)	15.5 (6.7-35.5)	78.4	81.0	4.13	0.26
APACHE II	>10	49 (13.4)	31.2 (13.7-71.1)	70.3	93.0	9.99	0.31
Complications							
Ranson	>3	144 (39.5)	1.4 (0.9-2.2)	45.0	63.1	1.22	0.87
BISAP	>2	70 (19.2)	6.7 (3.8-11.9)	40.0	91.0	4.43	0.65
Glasgow	>3	91 (25.0)	3.3 (2.0-5.4)	40.8	82.8	2.37	0.71
APACHE II	>10	49 (13.4)	3.9 (2.1-7.3)	25.0	92.2	3.21	0.81
ICU admission							
Ranson	>3	144 (39.5)	4.9 (2.5-9.4)	72.0	65.6	2.09	0.42
BISAP	>2	70 (19.2)	14.5 (7.3-28.6)	66.0	88.2	5.60	0.38
Glasgow	>3	91 (25.0)	13.7 (6.8-27.5)	74.0	82.8	4.30	0.31
APACHE II	>7	120 (32.9)	8.9 (4.4-17.9)	76.0	73.9	2.91	0.32
Prolonged hospital stay							
Ranson	>4	59 (16.2)	1.5 (0.8-2.9)	21.5	85.3	1.46	0.92
BISAP	>2	70 (19.2)	4.0 (2.3-7.1)	39.2	86.3	2.86	0.70
Glasgow	>4	26 (7.1)	4.9 (2.1-11.0)	17.7	95.8	4.20	0.85
APACHE II	>10	49 (13.4)	4.5 (2.4-8.5)	30.4	91.2	3.46	0.76

OR, odds ratio; CI, confidence interval; PLR, positive likelihood ratio; NLR, negative likelihood ratio; ICU, intensive care unit.

DISCUSSION

The ROC curve analysis showed that the Ranson scoring system was inferior to the other considered scoring systems in predicting mortality in older adults AP patients. The BISAP and Glasgow scores were similar and superior to the Ranson score in predicting disease severity. The BISAP, Glasgow, and APACHE II scores were superior to the Ranson score in predicting organ failure, complications, ICU admission, and prolonged hospital stay.

With the increasing world population and increased life expectancy, AP has become more common in the older adults population (21). The few relevant studies available in the literature have shown that older adults patients with AP usually present with a more severe clinical picture with higher rates of permanent organ failure, pancreatic necrosis, and mortality (22-26). In a recent single-center study (27) and a study on the predictors of severity of AP in the older adults population (28), progression to severe disease was significantly more common in older adults patients. We also found similar results regarding progression to severe AP.

The Ranson score is the first scoring system used to evaluate biliary and non-biliary AP and it requires a timeframe of 48 hours for a complete score (15). Generally, a Ranson score of 3 or higher is required to diagnose severe AP. One study compared the Ranson, BISAP, APACHE II, and CTSI scores and found that the Ranson score's AUC values for predicting disease severity, pancreatic necrosis, and mortality were superior to those of the BISAP and APACHE II systems and that all patients who died had a Ranson score of ≥3 (29). Another study similarly compared Ranson, BISAP, Glasgow, and APACHE II scores and demonstrated that the Ranson score's AUC values for predicting disease severity and mortality were lower compared to BISAP and Glasgow scores in older adults patients. However, in younger patients, the Ranson score was superior to the other scoring systems in predicting disease severity and was superior to BISAP and APACHE II in predicting mortality (30). In the first of these studies, conducted by Ranson and Pasternack, biliary pancreatitis accounted for 36% of all cases of AP, whereas in the second study, biliary pancreatitis accounted for 75% of all cases among older adults patients and 51.5% of cases among younger patients with AP. Ranson and his colleagues reported the rate of biliary pancreatitis to be 14% in 1974 and 17% in 1977 (15,31). These findings suggest that the Ranson scoring system is less effective in older adults patients with biliary pancreatitis. We also found that the Ranson scoring system was less clinically useful in older adults patients with biliary pancreatitis.

The Glasgow scoring system employs parameters similar to those of the Ranson score as well as objective clinical evaluations and similarly requires 48 hours of follow-up (16). The APACHE II score was developed mainly for the assessment of ICU patients and has been used for the assessment of AP since 1989 (17,18). The BISAP is a more recent scoring system aimed at early detection of patients at risk for in-hospital mortality (11,18), and recent prospective clinical studies have shown it to be reliable in the evaluation of patients with AP (11). A recent study by Li et al. (30) revealed that the BISAP score is valid for predicting disease severity, pancreatic necrosis, and mortality in older adults patients, whereas the APACHE II score is more suitable for younger patients. In our study, we compared the BISAP, Glasgow, and APACHE II scores and found that BISAP and APACHE II were significantly different only in the prediction of complications, and the 3 scoring systems were not significantly superior to one another in terms of the remaining parameters. In reference to these results, besides etiology, we think that the relatively poor efficacy of the Ranson score in older adults patients may be attributed to the high prevalence of comorbidities in this population. The follow-up periods required by the scoring systems are a disadvantage in estimating severity and mortality in older adults patients with comorbidities, and parameters that are not related to AP interfere with the assessment of this disease.

The main limitation of our study is its retrospective design, which limits our access to the findings.

CONCLUSION

In conclusion, compared to the other scoring systems, the Ranson scoring system was less useful in predicting disease severity, organ failure, disease-related complications, admission to the ICU, and mortality in older adults patients with biliary pancreatitis. Further prospective studies with larger samples are needed to apply our results in clinical practice..

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Ankara City Hospital Ethics Committee No. 2 (Date: 14.07.2021, Decision No: E2-21-716).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper and that they have approved the final version.

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