ORIGINAL ARTICLE

Predictive factors at emergency department admission for a complicated course of acute pancreatitis

Fatih Acehan, İhsan Ateş, Nisbet Yılmaz

Department of Internal Medicine, Ankara Bilkent City Hospital, Ankara-*Türkiye*

ABSTRACT

BACKGROUND: Acute pancreatitis (AP) is a condition frequently encountered by emergency department (ED) physicians, presenting with a spectrum of severity ranging from a mild, uncomplicated form to a severe, potentially fatal one. This study aimed to identify ED admission parameters that could predict a complicated disease course in patients with AP.

METHODS: Patients consecutively diagnosed with AP between 2010 and 2018 were included in the study and categorized into complicated and uncomplicated AP groups based on disease progression. Various clinical and laboratory characteristics at ED admission were compared between the two groups, and independent risk factors for complicated AP were identified. Complicated AP was defined as the development of any of the following during hospitalization: death, severe disease, necrosis, late peripancreatic or vascular complications, and pancreatic/peripancreatic or major extrapancreatic infections.

RESULTS: Of the 511 patients included in the study, 74 (14.5%) were classified into the complicated AP group. At ED admission, recurrent AP, alcoholic etiology, pleural effusion, systemic inflammatory response syndrome, and calcium levels were identified as independent risk factors for complicated AP. The area under the curve for the combination of these five predictors for complicated AP was 0.857 (95% confidence interval: 0.810-0.904), significantly higher than that of existing scoring systems.

CONCLUSION: Using five simple parameters, the development of complicated AP was successfully predicted. These parameters should be considered in the development of new scoring systems to identify patients at risk for clinically severe outcomes in AP.

Keywords: Acute pancreatitis; alcoholic pancreatitis; complication; emergency department; recurrent pancreatitis; severe disease.

INTRODUCTION

Acute pancreatitis (AP) is an inflammatory disease characterized by abdominal pain and elevated pancreatic enzyme levels in the blood. AP is one of the most common gastrointestinal causes of hospitalization in the United States, accounting for approximately 300,000 emergency department visits annually.[1,2] Moreover, the global incidence of AP is increasing, driven by rising rates of obesity and gallstone disease.[3] As a result of this growing incidence, the associated medical and social burden continues to escalate, with annual healthcare costs exceeding $2 billion in the United States alone.[4]

The severity of AP ranges from mild to severe, the latter being defined by persistent organ failure, which is associated with a high risk of mortality.[5] Several factors significantly influence the course of AP, among which the development of pancreatic or peripancreatic necrosis is one of the most critical. This is often followed by infected necrosis, which carries high rates of organ failure and mortality.[6] Additional complications that may alter the disease course include late peripancreatic complications, such as pseudocysts and walled-off necrosis (WON), and vascular complications like splanchnic venous thrombosis (SVT).[7,8] Furthermore, major extrapancreatic infections, such as bloodstream infections and pneumonia, can

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Address for correspondence: Fatih Acehan

Department of Internal Medicine, Ankara Bilkent City Hospital, Ankara, Türkiye

E-mail: acehanf@gmail.com

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develop during patient follow-up, further complicating the clinical course and increasing mortality risk.[9,10]

In the majority of patients with AP, the disease remains mild and resolves within a week without progression. However, approximately 20% of patients may develop complicated AP, characterized by a life-threatening course that can involve various complications and organ failure.[11] While uncomplicated AP is typically managed with fluid replacement, pain control, and nutritional support, complicated AP may require intensive care unit (ICU) monitoring, antibiotic therapy, and interventional procedures, each carrying a risk of procedural complications that may result in significant morbidity and mortality.[12] Therefore, it is crucial to predict whether a patient with AP will follow a complicated course at the time of admission to the emergency department, as patient management strategies vary substantially based on clinical progression.

Numerous scoring systems have been developed with the aim of facilitating early triage and prognostication, as well as improving patient outcomes. Among the most well-known scoring systems are the Ranson score, the Bedside Index of Severity in Acute Pancreatitis (BISAP), and the Acute Physiology and Chronic Health Evaluation II (APACHE II) score.[13-15] Although these scoring systems have been validated in large cohorts, their ability to accurately predict prognosis remains debated, and their calculation is often impractical.[2] Therefore, emergency clinicians who initially encounter patients with AP still lack a practical and effective tool for early triage. The purpose of this study was to determine the clinical, laboratory, and radiological parameters that could predict complicated AP at the initial stage of emergency department admission and, ultimately, to provide guidance for emergency clinicians.

MATERIALS AND METHODS

This study was approved by the Scientific Research Evaluation Commission of Ankara Numune Training and Research Hospital (decision number: E-18-1742, dated 31/01/2018). Due to the retrospective nature of the study, informed consent was waived.

Study Participants and Design

We conducted a retrospective analysis of consecutive patients aged 18 years and older who were diagnosed with AP between 2010 and 2018. Patients with a diagnosis code of K85 (acute pancreatitis) and/or an amylase level >300 U/L at admission were assessed for eligibility for inclusion in the study. Only patients diagnosed with AP in the emergency department were included in the study sample. Patients who were diagnosed with AP during hospitalization for another reason were excluded. As an exception, patients with post-endoscopic retrograde cholangiopancreatography (ERCP) etiology were included in the sample even if they were diagnosed with AP in a department other than the emergency department. However, for these patients, the evaluation was based on the parameters within the first 24 hours following the onset of AP, as well as clinical follow-up parameters after symptom onset (for example, the length of hospital stay was calculated from the onset of AP, not from the initial hospital admission). Patients who were diagnosed with AP but declined hospitalization and were discharged at their own request were excluded from the study. Additionally, patients with suspected AP who died before the diagnosis could be confirmed were also excluded. Finally, patients with incomplete data in their medical records were not included in the analysis.

The patients included in the study were divided into two groups based on whether they experienced a complicated clinical course during hospitalization: the complicated AP group and the uncomplicated AP group. By comparing the demographic, clinical, laboratory, and radiological characteristics at admission between the two groups, the factors associated with complicated AP were identified. Furthermore, independent predictors of complicated AP at the time of emergency department admission were determined.

Definitions

All AP-related definitions were based on the 2012 revised Atlanta classification.[5] Patients were diagnosed with AP if they met at least two of the following three criteria:

1) Acute onset of persistent epigastric pain, often radiating to the back;

2) Serum amylase and/or lipase levels elevated to three times or more above the upper limit of normal;

3) Radiological findings consistent with AP.

The etiology of AP was determined through a comprehensive evaluation of the discharge summary, medical history, imaging findings, and laboratory results. Gallstone pancreatitis was diagnosed when gallstones (including microlithiasis) were detected in the gallbladder or biliary tract on imaging. Alcoholic pancreatitis was defined by a history of long-term alcohol abuse (>5-10 years and >50 grams/day) or binge drinking, in the absence of other identifiable etiologies. Other etiologies were documented as noted in the electronic medical record by the physicians managing the patient.

According to the severity of AP, patients were categorized into three groups:

- Mild AP: No complications or organ failure;
- Moderately Severe AP: Complications and/or transient organ failure (lasting <48 hours);
- Severe AP: Persistent organ failure (lasting ≥48 hours).

Organ failure was defined as a modified Marshall score of two or more points for the involvement of one or more of the

following organ systems: cardiovascular, respiratory, or renal.[5] The absence of pancreatic and/or peripancreatic enhancement on contrast-enhanced computed tomography (CT) was considered indicative of pancreatic necrosis, while bacterial growth in culture from pancreatic or peripancreatic samples was accepted as evidence of infected necrosis or peripancreatic abscess.[5] Peripancreatic fluid collections occurring in the late phase, with subsequent formation of WON or pseudocysts, depending on the presence or absence of necrosis, were defined as late peripancreatic complications. Thrombosis in the portosplenomesenteric venous system (SVT) was defined as a peripancreatic vascular complication.[5]

Study Outcome

The primary outcome of the study was defined as the development of complicated AP. This was a composite outcome that included mortality, severe disease, pancreatic/peripancreatic necrosis, late peripancreatic complications (pseudocyst or WON), vascular complications (SVT), pancreatic/peripancreatic infections (infected necrosis and peripancreatic abscess), and major extrapancreatic infections (e.g., bacteremia and pneumonia).

Data Collection

Data on patients' age, gender, and the presence of major comorbidities (including diabetes mellitus, chronic cardiovascular disease, chronic lung disease, chronic kidney disease, chronic liver disease, and active malignancy), as well as recurrent AP, history of chronic pancreatitis, etiologies, coexisting acute cholangitis and cholecystitis, pleural effusion (based on X-ray and/or CT imaging), and systemic inflammatory response syndrome (SIRS), were extracted from electronic medical records. SIRS was defined as the presence of two or more of the following criteria: respiratory rate >20/min; peripheral body temperature >38°C or 36°C; heart rate >90/min; white blood cell count >12,000/mm^3, 4,000/mm^3, or >10% immature peripheral white cells.[16] Laboratory findings at the time of admission were also collected. The total scores of the scoring systems at admission were either directly recorded from the patient files or calculated retrospectively. Follow-up data, including the morphological subtype of AP, AP-related complications, major infections, length of hospital stay, disease severity, ICU admission, and mortality rates, were also collected.

Statistical Analysis

Statistical analysis was performed using SPSS Statistics software, version 26.0 for Windows (IBM Corp., Armonk, NY, United States). Normally distributed data were presented as mean ± standard deviation, while non-normally distributed data were expressed as median (interquartile range). The Student's t-test and Mann-Whitney U test were used to compare continuous variables, while the Pearson chi-square test was employed to compare categorical variables. Parameters with a significance level of p<0.1 in the univariate analysis were included in a forward stepwise multivariate logistic regression analysis to identify independent predictors of complicated AP. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated for both univariate and multivariate analyses. The optimal cut-off values of the independent predictors were determined using receiver operating characteristic (ROC) curve analysis, based on Youden's method. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated at the corresponding cut-off points. The area under the curve (AUC) values for both the existing scoring systems and the combination of independent predictors were calculated with 95% CIs, and a pairwise comparison of ROC curves was performed. In all analyses, a p value of <0.05 was considered statistically significant.

RESULTS

Comparative Baseline Clinical Characteristics

Of the 511 patients included in the study, 222 (43.4%) were male and 289 (56.6%) were female. The mean age of the study population was 59.0±19.4 years. In the complicated AP group, major comorbidities, recurrent AP, and a history of chronic pancreatitis were observed more frequently. According to etiology, the distribution of patients was as follows: gallstone disease (including microlithiasis) in 327 patients (64%), alcoholic etiology in 30 (5.9%), hypertriglyceridemia in 18 (3.5%), post-ERCP in 42 (8.2%), idiopathic in 75 (14.7%), and other etiologies in 19 patients (3.7%). Alcoholic etiology was more common in the complicated AP group (16.2% vs. 4.1%). Pleural effusion and SIRS were also more prevalent in the complicated AP group. Additionally, in this group, median white blood cell count, blood glucose, and C-reactive protein levels were significantly higher, while median calcium and mean albumin levels were significantly lower. The comparative baseline characteristics are presented in Table 1.

Clinical Outcomes During Follow-Up

The median length of hospital stay was 6 (range: 4-10) days overall; specifically, 13 (5-26) days in the complicated group and 5 (4-8) days in the uncomplicated group (p<0.001). Pancreatic and/or peripancreatic necrosis occurred in 31 (6.1%) patients. Based on severity evaluation, 299 (58.5%) patients had mild AP, 191 (37.4%) had moderately severe AP, and 21 (4.1%) had severe AP. Pseudocysts, WON, and SVT developed in 13 (2.5%), 13 (2.5%), and seven (1.4%) patients, respectively. Peripancreatic infections developed in 13 (2.5%) patients, while pneumonia and bacteremia occurred in 13 (2.5%) and 10 (2.0%) patients, respectively. ICU admission was required in 39 (7.6%) patients—29 (39.2%) in the complicated group and 10 (2.3%) in the uncomplicated group (p<0.001). A total of 14 (2.7%) patients died (Table 2).

Factors Predicting Complicated AP

Multivariable analysis revealed that recurrent AP (OR: 3.191; 95% CI: 1.464-6.954), alcoholic etiology (OR: 2.978; 95% CI: 1.033-8.585), presence of pleural effusion (OR: 4.292; 95%

Table 1. Comparative baseline clinical characteristics and laboratory parameters of patients with complicated and uncomplicated acute pancreatitis

Parameters	Overall n=511 (%)	Complicated AP n=74 (%)	Uncomplicated AP n=437 (%)	P value
Age, years	59.0±19.4	60.5±19.1	58.7±19.4	0.470
Male Gender	222 (43.4)	41 (55.4)	181 (41.4)	0.025
Major Comorbidity	232 (45.4)	42 (56.8)	190 (43.5)	0.034
Recurrent Acute Pancreatitis	68 (13.3%)	22 (29.7)	46 (10.5)	<0.001
History Of Chronic Pancreatitis	32 (6.3%)	10 (13.5)	22 (5.0)	0.005
Etiology				<0.001
Idiopathic	75 (14.7)	18 (24.3)	57 (13.0)	
Gallstone	327 (64.0)	35 (47.3)	292 (66.8)	
Alcohol	30 (5.9)	12 (16.2)	18 (4.1)	
Hypertriglyceridemia	18 (3.5)	5 (6.8)	13 (3.0)	
Post-ERCP	42 (8.2)	2 (2.7)	40 (9.2)	
Other	19 (3.7)	2 (2.7)	17 (3.9)	
Coexisting Acute Cholangitis	8 (1.6)	3 (4.1)	5 (1.1)	0.095
Coexisting Acute Cholecystitis	95 (18.6)	9 (12.2)	86 (19.7)	0.124
Pleural Effusion	48 (9.4)	25 (33.8)	23 (5.3)	<0.001
SIRS Score ≥2	103 (20.2)	47 (63.5)	56 (12.8)	<0.001
Scoring Systems				
Ranson Score at Admission	1 (1-2)	2 (1-2)	1 (1-2)	0.446
BISAP Score	2 (0-2)	2 (1-3)	1 (0-1)	<0.001
APACHE II Score	6 (3-8)	8 (5-11)	5 (2-8)	<0.001
Laboratory Findings*				
White Blood Cell Count (10^9/L)	11.5 (8.7-14.8)	13.9 (10.9-17.6)	11.1 (8.5-14.1)	<0.001
Hemoglobin (g/dL)	13.4±2.1	13.4±2.7	13.3±2.0	0.768
Amylase (U/L)	700 (378-1648)	753 (315-2047)	694 (381-1632)	0.755
Blood Glucose (mg/dL)	131 (111-163)	143 (120-183)	129 (110-159)	0.004
Blood Urea Nitrogen (mg/dL)	14 (11-20)	14 (10-22)	14 (11-19)	0.640
Creatinine (mg/dL)	0.88 (0.74-1.08)	0.93 (0.78-1.18)	0.87 (0.73-1.06)	0.105
Calcium (mg/dL)	9.3 (8.8-9.6)	9.1 (8.3-9.4)	9.3 (8.8-9.6)	0.002
Albumin (g/L)	3.6±0.5	3.4±0.6	3.6±0.5	0.010
C-Reactive Protein (mg/L)	48 (14-120)	147 (59-268)	38 (12-101)	<0.001

AP: Acute pancreatitis; SIRS: Systemic inflammatory response syndrome.

CI: 2.000-9.212), SIRS (OR: 8.607; 95% CI: 4.685-15.813), and calcium level (OR: 0.656; 95% CI: 0.447-0.962) were independent predictors of complicated AP (Table 3). The sensitivity, specificity, PPV, and NPV of these independent predictors are presented in Table 4.

Comparison of the Combination of Predictors with Existing Scores

The AUC for the combination of recurrent AP, alcoholic etiology, pleural effusion, SIRS, and calcium in predicting complicated AP was 0.857 (95% CI: 0.810-0.904). In a pairwise comparison of ROC curves, this combined predictor model performed significantly better than the Ranson score at admission (AUC: 0.527; 95% CI: 0.453-0.600), the BISAP score (AUC: 0.748; 95% CI: 0.684-0.811), and the APACHE II score (AUC: 0.691; 95% CI: 0.626-0.757). Figure 1 illustrates the ROC curves and the pairwise comparisons for predicting complicated AP.

DISCUSSION

For effective initial triage and prognostication in AP, it is crucial for the emergency physician, who is responsible for the initial management, to accurately identify patients who are likely to experience a complicated disease course based on their presenting characteristics. Accordingly, this study aimed to evaluate the predictive value of emergency department admission parameters for complicated AP. The results demonstrated that recurrent AP, alcoholic etiology, pleural effusion, SIRS, and calcium level were independent risk factors for a complicated course. Moreover, the combination of these

Table 2. Clinical outcomes during follow-up

Parameters	Overall n=511 (%)	Complicated AP n=74 (%)	Uncomplicated AP n=437 (%)	P value
Length of Hospital Stay, days	6 (4-10)	13 (5-26)	5 (4-8)	<0.001
Necrotizing Subtype	31 (6.1)	31 (41.9)	-	-
Severity of AP				<0.001
Mild	299 (58.5)	10 (13.5)	289 (66.1)	
Moderate	191 (37.4)	43 (58.1)	148 (33.9)	
Severe	21 (4.1)	21 (28.4)	-	
Peripancreatic Complications				-
Pseudocyst	13 (2.5)	13 (17.6)	-	
Walled-Off Necrosis	13 (2.5)	13 (17.6)	-	
Splanchnic Venous Thrombosis	7 (1.4)	7 (9.5)	-	
Major Infections				-
Infected Pancreatic Necrosis	8 (1.6)	8 (10.8)	-	
Peripancreatic Abscess	5 (1.0)	5 (6.7)	-	
Pneumonia	13 (2.5)	13 (17.6)	-	
Bacteremia	10 (2.0)	10 (13.6)	-	
Intensive Care Unit Admission	39 (7.6)	29 (39.2)	10 (2.3)	<0.001
In-Hospital Mortality	14 (2.7)	14 (18.9)	-	-

AP: Acute pancreatitis; SIRS: Systemic inflammatory response syndrome.

Table 3. Univariable and multivariable analyses for the prediction of complicated acute pancreatitis

	Univariable Analysis		Multivariable Analysis	
	OR (95% CI)	P value	OR (95% CI)	P value
Male Gender	1.757 (1.070-2.887)	0.026		
Major Comorbidity	1.706 (1.038-2.805)	0.035		
Recurrent Acute Pancreatitis	3.596 (2.004-6.453)	<0.001	3.191 (1.464-6.954)	0.004
History of Chronic Pancreatitis	2.947 (1.334-6.511)	0.008		
Alcoholic Pancreatitis	4.505 (2.070-9.805)	<0.001	2.978 (1.033-8.585)	0.043
Pleural Effusion	9.184 (4.847-17.400)	<0.001	4.292 (2.000-9.212)	<0.001
SIRS Score ≥2	11.843 (6.832-20.531)	<0.001	8.607 (4.685-15.813)	<0.001
White Blood Cell Count (10^9/L)	1.122 (1.068-1.178)	<0.001		
Blood Glucose (mg/dL)	1.005 (1.002-1.009)	0.003		
Calcium (mg/dL)	0.521 (0.380-0.714)	<0.001	0.656 (0.447-0.962)	0.031
Albumin (g/L)	0.462 (0.280-0.765)	0.003		
C-Reactive Protein (mg/L)	1.009 (1.006-1.012)	<0.001		

OR: Odds ratio; CI: Confidence interval; SIRS: Systemic inflammatory response syndrome.

predictors outperformed existing scoring systems in predicting complicated AP.

This study is distinct from many others in that the primary outcome was defined as the occurrence of any serious event associated with AP hospitalization. The objective was to identify not only the parameters that predict severe disease and mortality, which occur relatively infrequently during hospitalization, but also those that predict major clinical events that can significantly impact outcomes. These include prolonged hospitalization, intensive care unit admission, serious procedure-related complications, increased healthcare costs,

Table 4. Predictive performance of independent risk factors for complicated acute pancreatitis

Parameters	Sensitivity	Specificity	PPV	NPV
Recurrent Acute Pancreatitis	29.7%	89.5%	32.4%	88.3%
Alcoholic Pancreatitis	16.2%	95.9%	40.0%	87.1%
Pleural Effusion	33.8%	94.7%	52.1%	89.4%
SIRS Score ≥2	63.5%	87.2%	45.6%	93.4%
Calcium ≤8.5 mg/dL	31.1%	86.3%	27.7%	88.1%

PPV: Positive predictive value; NPV: Negative predictive value; SIRS: Systemic inflammatory response syndrome.

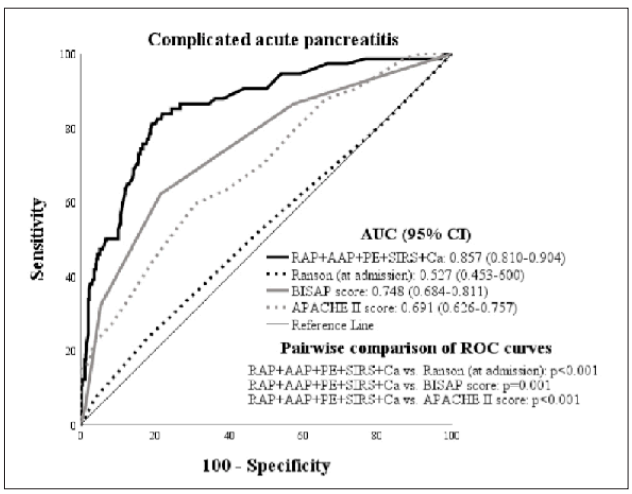

Figure 1. Performance comparison of the combination of recurrent acute pancreatitis (RAP), alcoholic acute pancreatitis (AAP), pleural effusion (PE), systemic inflammatory response syndrome (SIRS), and calcium (Ca) with existing scoring systems in predicting complicated acute pancreatitis.
AUC: Area under the curve; CI: Confidence interval; RAP: Recurrent acute pancreatitis; AAP: Alcoholic acute pancreatitis; PE: Pleural effusion; SIRS: Systemic inflammatory response syndrome; Ca: Calcium; ROC: Receiver operating characteristic.

and delayed mortality due to late complications. We hypothesized that initial triage and prognostication by emergency clinicians, accounting for the serious clinical events that may arise during the course of AP, could enhance overall patient prognosis.

Although numerous studies have examined the long-term progression of recurrent AP to chronic pancreatitis or pancreatic endocrine and exocrine insufficiency, the impact of a history of recurrent attacks on the early course of AP has been explored in relatively few studies, with conflicting results. While several studies have associated recurrent AP with less severe disease, lower mortality and pneumonia rates, and shorter hospital stays,[17-20] Avanesov et al.[21] reported no difference between recurrent and non-recurrent AP cases across outcome parameters. Conversely, one of the two retrospective studies reported that patients with recurrent AP had more severe findings on CT imaging, while the other indicated that these patients required longer hospitalization.[22,23] In our study, we found that recurrent AP was an independent risk factor for complicated AP. A plausible explanation for the discrepancies between our findings and previous research may lie in differences in study design and defined outcomes. As previously noted, the primary outcome in our study was the development of any serious clinical event associated with hospitalization for AP. Our findings may be attributable to the fact that patients with recurrent hospitalizations for AP may have a higher likelihood of developing complications and serious infections, potentially due to colonization with hospital flora. However, to definitively determine the impact of recurrent attacks on the early course of AP, more comprehensive prospective studies are needed.

Many previous studies have associated alcoholic pancreatitis with an increased risk of mortality, pancreatic necrosis, and other complications.[24-26] Consistent with this body of research, our study demonstrated that alcoholic etiology was a significant predictor of the development of complicated AP. However, due to the demographic characteristics of the region in which our study was conducted, the proportion of patients with alcoholic etiology (5.9%) was significantly lower than that reported in the literature,[24,25] suggesting that these findings should be interpreted with caution.

In the current study, SIRS and the presence of pleural effusion, both of which are components of the BISAP score,[14] were identified as independent risk factors for complicated AP. SIRS and pleural effusion are widely recognized as important prognostic indicators in AP, and clinical guidelines recommend their use for prognostication and severity assessment of AP.[27,28] In addition to these two predictors, we found that calcium level at admission was an independent risk factor for complicated AP, in line with the findings of several previous studies.[29-32] Moreover, a recent study has also identified SIRS and calcium levels as independent predictors of severe AP.[33]

Numerous studies have evaluated the ability of existing scoring systems to predict prognosis in AP. Although these systems have been validated in clinical practice, the prognostic value of the individual variables comprising these scores in AP has not yet been thoroughly investigated.[34] Furthermore, the complexity and impracticality of calculating ex-

isting scoring systems limit their implementation in routine clinical practice. Due to its 48-hour calculation requirement, the Ranson score, the most widely used scoring system, is not suitable for use by emergency clinicians. In our study, the performance of the Ranson score at admission, the BISAP score, and the APACHE II score was compared with that of a combination of five parameters identified as independent predictors of complicated AP. The total Ranson score was not evaluated, as it cannot be applied at the time of emergency department admission due to its 48-hour calculation requirement. Remarkably, the AUC value for the combination of five basic parameters that can be assessed at the bedside for predicting complicated AP was 0.857, significantly higher than that of the Ranson score at admission, the BISAP score, and the APACHE II score. These parameters, which can be readily evaluated using the patient's clinical history, physical examination, basic imaging, and initial laboratory findings within the first hours of emergency department admission, appear to offer valuable guidance for emergency clinicians in early triage and prognostication. In practice, an emergency department (ED) clinician and nurse encountering a patient with severe abdominal pain radiating to the back, typical of AP, can promptly identify the presence of SIRS and pleural effusion through vital signs assessment and through physical examination. Moreover, information on heavy alcohol consumption and recurrent episodes of pancreatitis can be readily obtained through the patient's clinical history. Consequently, even without immediate access to laboratory results (such as calcium), clinicians can still perform initial triage and prognostication.

One might question why the combination of these five simple parameters demonstrated superior predictive performance compared to established scoring systems. Several factors contribute to this. First, although existing scores have generally been validated for predicting disease severity or mortality,[11,35] they have not been extensively validated for other important clinical outcomes. For example, while the BISAP score, which can be calculated at the bedside upon presentation in the emergency department, has been thoroughly validated for mortality prediction, it has not been validated for predicting outcomes such as length of hospital stay, need for ICU admission, or requirement for interventional procedures.[14] Second, the Ranson score cannot be fully calculated at the time of admission, and the APACHE II score has been reported to have a poor predictive value within the first 24 hours.[11] In contrast, our study specifically analyzed the selected parameters for their ability to predict a composite outcome encompassing multiple clinical events, thereby providing a tailored combination of predictors for this particular endpoint. It is important to note, however, that the five parameters identified were evaluated using our own dataset, and therefore external validation is necessary to assess the potential for overfitting.

This study has several limitations, the foremost being its retrospective design. As data were collected retrospectively, information regarding the time from symptom onset to hospital admission was unavailable for many patients. Consequently, patients with prolonged symptom duration were not excluded from the study. Another limitation is that the study was conducted at a single center, which may limit the generalizability of the findings to broader populations. Additionally, the inclusion of patients with post-ERCP etiology who were already hospitalized for other reasons may be considered a limitation, particularly as this study aimed to guide emergency clinicians using parameters evaluated at the time of admission. However, it is important to note that post-ERCP AP is not uncommon, and patients with this etiology were intentionally included. To standardize the data and minimize the impact of this limitation, we evaluated the parameters of these patients within the first 24 hours following the onset of post-ERCP pancreatitis. Furthermore, the overall findings were likely not significantly affected, as the number of patients with post-ERCP etiology was relatively small compared to other etiologies.

CONCLUSION

Considering that acute pancreatitis is one of the most common gastrointestinal diseases leading to hospitalization among emergency department admissions, it is evident that both clinicians and nurses involved in the initial medical care of these patients require practical tools that can provide insight into disease progression and help guide management to improve patients outcomes. In this study, five parameters including recurrent AP, alcoholic etiology, pleural effusion, SIRS, and calcium level were identified as risk factors that can assist clinicians and nurses in assessing prognosis when encountering AP patients for the first time. The combination of these risk factors outperformed existing scoring systems in predicting the development of complicated AP. Of the five parameters associated with complicated AP identified in the study, three (recurrent AP, alcoholic etiology, and SIRS) can be assessed solely through clinical history and physical examination, while basic laboratory tests and imaging (e.g., X-ray) are sufficient for evaluating the remaining two. By utilizing these five parameters, ED physicians and nurses can make more informed initial management decisions, including triaging patients to either a general ward or an intensive care unit and determining the need for advanced imaging. In the future, it would be reasonable to develop new scoring systems incorporating these five parameters, considering not only severe disease and mortality, but also other clinically significant events that may contribute to a complicated disease course.

Ethics Committee Approval: This study was approved by the Scientific Research Evaluation Commission of Ankara Numune Training and Research Hospital (Date: 31.01.2018, Decision No: E-18-1742).

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ORİJİNAL ÇALIŞMA - *ÖZ*

Komplikasyonlu seyir gösteren akut pankreatit için acil servis başvurusundaki prediktif faktörler

AMAÇ: Akut pankreatit (AP), acil servis hekimlerinin sıkça karşılaştığı, hafif bir formdan, şiddetli ve potansiyel olarak ölümcül bir forma kadar geniş bir şiddet spektrumuna sahip bir hastalıktır. Bu çalışmada, AP'li hastalarda komplikasyonlu bir hastalık seyirini öngörebilecek acil servis başvuru parametrelerini belirlemeyi amaçladık.

GEREÇ VE YÖNTEM: 2010 ve 2018 yılları arasında ardışık olarak AP tanısı konan hastalar çalışmaya dahil edildi ve hastalar komplikasyonlu ve komplikasyonsuz AP olmak üzere iki gruba ayrıldı. Acil servise başvuru sırasındaki birçok klinik ve laboratuvar özelliği iki grup arasında karşılaştırıldı ve komplikasyonlu AP için bağımsız risk faktörleri belirlendi. Komplikasyonlu AP, şu durumların herhangi birinin varlığı olarak tanımlandı; hastanede yatış sırasında ölüm, şiddetli hastalık, nekroz, geç peripankreatik veya vasküler komplikasyonlar ve pankreatik/peripankreatik ya da büyük ekstrapankreatik enfeksiyonların varlığı.

BULGULAR: Çalışmaya alınan 511 hastanın 74'ü (%14.5) komplikasyonlu AP grubuna dahil edildi. AS'ye başvuru sırasında tekrarlayan AP, alkolik etiyoloji, plevral efüzyon, sistemik enflamatuvar yanıt sendromu ve kalsiyum seviyeleri komplikasyonlu AP için bağımsız risk faktörleri olarak belirlendi. Bu beş prediktörün kombinasyonunun komplikasyonlu AP'yi öngörmedeki eğri altındaki alan değeri 0.857 (güven aralığı: %95, 0.810-0.904) idi ve mevcut skorlamalardan anlamlı derecede yüksekti.

SONUÇ: Beş basit parametre kullanılarak komplikasyonlu AP gelişimi başarıyla öngörüldü. Bu parametreler, AP'de klinik olarak ciddi olayın gelişimini öngörmek amacıyla yeni skor sistemleri geliştirilirken dikkate alınmalıdır.

Anahtar sözcükler: Akut pankreatit; alkolik pankreatit; komplikasyon; acil servis; tekrarlayan pankreatit; şiddetli hastalık

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