ORIGINAL ARTICLE

Evaluation of 880 patients diagnosed with acute pancreatitis according to the Revised Atlanta Classification: A single-center experience

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SUMMARY

OBJECTIVE: *The Revised Atlanta Classification (RAC) is increasingly used in the evaluation of patients diagnosed with acute pancreatitis (AP). In our study, we aimed to evaluate the etiology, disease severity, and mortality rates of patients diagnosed with AP in our center in the previous 6 years.*

METHODS: *Patients diagnosed with AP between 2013 and 2018 were evaluated. AP etiology, demographic data, disease severity, and mortality rates according to the RAC were evaluated.*

RESULTS: *A total of 880 patients were included in the study. Five hundred and eighteen (59%) patients were female and 362 (41%) were male. Regarding the etiology, 474 (53.9%) patients had biliary AP (BAP), 71 (8.1%) had hyperlipidemic AP (HAP), and 44 (5%) had alcoholic AP (AAP). According to the RAC, 561 (63.7%) patients were considered to be in the mild AP group (MAP), 268 (30.5%) in the moderately severe AP (MSAP), and 51 (5.8%) in the severe AP (SAP). The mortality rate was 4.8% in the MSAP group and 49% in the SAP group. Mortality was 2.3 times in patients over 65 years old and 3.7 times higher in patients with ischemic heart disease.*

CONCLUSIONS: *In our country, BAP is still the main etiology of acute pancreatitis. Over the years, we have seen a decrease in BAP and idiopathic AP cases, while there was an increase in HAP cases due to factors such as lifestyle changes and fatty nutrition. We found that mortality was associated with disease severity, advanced age (> 65 y), hypertension, and ischemic heart disease regardless of the etiology.*

KEYWORD: *Pancreatitis/etiology. Pancreatitis, acute necrotizing. Severity of illness index.*

INTRODUCTION

Acute pancreatitis (AP) is an important gastrointestinal clinical event with an increased incidence due to increased life expectancy, obesity, alcohol use, hyperlipidemia, drug use, and diagnostic methods. Despite the increasing incidence of the disease, early diagnosis methods and the understanding of its pathophysiology have been associated with decreases in the duration of hospitalization, cost, and mortality rates in recent decades[1].

There are several scoring systems for assessing AP prognosis and disease severity (Ranson Criteria, Modified Glasgow Score, Acute Physiology, and Chronic Health Evaluation (APACHE) II-IV, etc.). Studies conducted using all these scoring systems have shown that morbidity and mortality rates are closely related to disease severity and organ failure that persists for more than 48 hours, regardless of the underlying etiology[1]. Due to the complexity and difficulty of the use

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of these scoring systems, the use of scoring systems such as the bedside disease severity index (BISAP) or Atlanta Classification has increased in acute pancreatitis. By demonstrating the effects of AP-related organ failure and the presence of local/systemic complications on mortality and morbidity, the Atlanta classification, developed in 1992 and revised in 2012 uses the classifications of mild AP (MAP), moderate AP (MSAP), and severe AP (SAP)[2].

Although regional differences are observed in our country, biliary AP (BAP) cases constitute the main etiology of AP[3]. We planned to conduct a retrospective study on the demographic data, comorbid diseases, etiology, and clinical course of the Revised Atlanta Classification (RAC) in patients diagnosed with AP in our tertiary health center in the western part of Turkey.

METHODS

Patient groups and study design

The study included patients who were admitted to the emergency department with abdominal pain between January 2013 and December 2018, aged 18 years and older, who were hospitalized with the diagnosis of AP. AP severity was classified according to the RAC[2]. Age, gender, comorbidities, history of pancreatitis, etiology, disease severity according to the RAC, duration of hospitalization, and mortality rates were recorded.

AP etiologies were determined according to the history, laboratory findings, imaging methods (abdominal ultrasonography, computerized tomography (CT), magnetic resonance imaging, magnetic resonance cholangiopancreatography, endoscopic ultrasonography, and endoscopic retrograde cholangiopancreatography) and, if necessary, pathology results.

The study was approved by the local ethical committee of the XXX hospital (No: 2019/4-22).

Statistical analysis

Statistical analyses for the study were performed with the SPSS 22.0 (IBM Statistical Package for Social Sciences software version 22) package program. The numerical variables were described by medians and interquartile ranges (IQR). The Chi-square test was used to compare the categorical values between the groups. The Mann-Whitney U test was used to compare the continuous independent medians. The Wilcoxon signed-rank test was used to compare dependent medians. The mortality rate was evaluated by the Kaplan-Meier method, and predictive factors of mortality were evaluated by the Cox proportional hazard model. A p-value < 0.05 was accepted as statistically significant.

RESULTS

Demographic data and comorbid diseases

A total of 880 adult patients diagnosed with AP were included in the study. Five hundred and eighteen (59%) of the subjects were female and 362 (41%) were male. The mean age of females was 62.05 ± 17.99 and of males, it was 57.92 ± 16.50 (p > 0.5). Regarding comorbidities, upon examination, there was no additional comorbidity in 327 patients (37.2%), one in 296 (33.6%), two in 174 (19.8%), and three or more in 83 (9.4%) patients. The most common comorbidities were hypertension (HT) (41.9%), diabetes mellitus (DM) (26.8%), and ischemic heart disease (IHD) (12.4%).

Etiology

According to the etiology distribution, 474 (53.9%) patients were in the BAP group, 211 in the idiopathic AP (IAP) (24%), 71 (8.1%) in the hyperlipidemic AP (HAP), 44 in the (5%) in alcoholic AP (AAP), and 80 (9.1%) in the miscellaneous AP group. Although BAP was the most common etiology in both genders, it was found to be statistically more frequent in females (61% vs. 42%, p < 0.001). While BAP was the most frequent in all age groups of females, HAP and AAP were statistically more common in males (15% vs 5%, p < 0.001 and 10% vs 2%, p < 0.001). Figure 1 summarizes the changes in AP etiology rates of 2013 and 2018. Patient distributions by gender and age groups are summarized in Table 1.

FIGURE 1. CHANGES IN AP ETIOLOGY RATES BETWEEN 2013 AND 2018

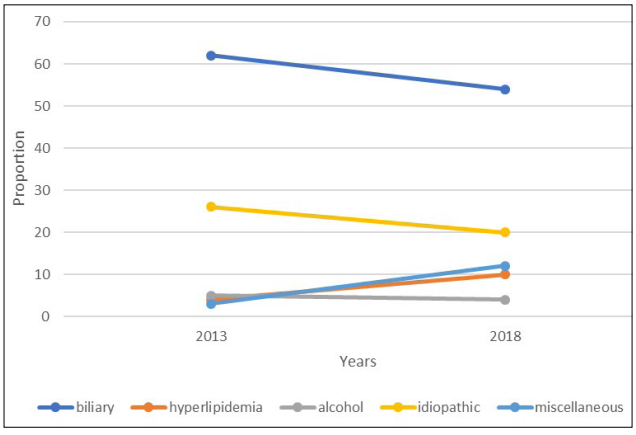


TABLE 1. DISTRIBUTION OF ACUTE PANCREATITIS PATIENTS ACCORDING TO GENDER AND AGE GROUPS

	Number of patients with acute pancreatitis (%)					
	biliary	hyperlipidemia	alcohol	idiopathic	miscellaneous	total
Male						
18-29	3 (18)	8 (47)	1 (5)	2 (12)	3 (18)	17
30-39	11 (25)	13 (30)	9 (20)	9 (20)	2 (5)	44
40-49	11 (23.5)	14 (30)	8 (17)	11 (23.5)	3 (6)	47
50-59	30 (37)	8 (10)	11 (17)	29 (35)	4 (5)	82
60-69	44 (56)	1 (1)	4 (5)	16 (21)	13 (17)	78
>70	57 (61)	2 (2)	3 (3)	21 (22)	11 (12)	94
all	156 (42)	56 (15)	36 (10)	88 (23)	36 (10)	362
Female						
18-29	23 (72)	0 (0)	1 (3)	6 (19)	2 (6)	32
30-39	23 (56)	8 (20)	1 (2)	9 (22)	0 (0)	41
40-49	22 (40)	6 (11)	0 (0)	20 (36)	7 (13)	55
50-59	51 (61)	8 (9)	3 (4)	15 (18)	7 (8)	84
60-69	75 (70)	2 (2)	1 (1)	25 (23)	4 (4)	107
>70	124 (62.5)	1 (0.5)	2 (1)	48 (24)	24 (12)	199
all	318 (61)	25 (5)	8(2)	123 (24)	44 (8)	518

A hundred and ten patients (12.5%) had recurrent AP events. In the subgroup analysis, recurrent AP was found in 39 patients (8.2%) of the BAP group, 22 (31%) of the HAP, 15 (34.1%) of the AAP, and 22 (10.4%) of the IAP.

Disease severity

According to the RAC, 561 (63.7%) patients were in the MAP group, 268 (30.5%) were in the MSAP group, and 51 (5.8%) in the SAP group. The median duration of hospitalization of all patients was 6 days (IQR=4) (5 days (IQR=3) in the MAP group, 9 (IQR=6) in the MSAP group, and 13 days (IQR=13) in the SAP group). According to the RAC groups, the median duration of hospitalization is summarized in Figure 2. Demographic data, etiology distributions of patients with AP according to the RAC severity are summarized in Table 2.

Mortality rates

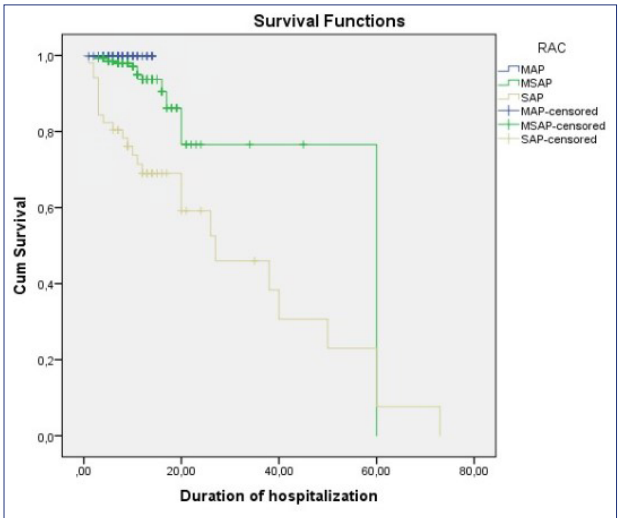
Mortality was seen in 39 (4.4%) of the 880 patients included in the study. Of these, 13 were in the MSAP group and 25 in the SAP group. The mortality rate was 4.8% in the MSAP group, and 49% in the SAP group ($p < 0.001$). There was no statistically significant difference between the etiology groups in terms of mortality rates ($p = 0.492$).

There were statistically significant differences between advanced age (> 65 y) ($p = 0.001$), HT ($p = 0.002$), IHD ($p = 0.001$) and mortality. According to the Cox regression analysis, mortality was 2.3 times higher (HR:2.3, 95% CI; 1.03-5.38, $p = 0.041$) in patients over 65 years old and 3.7 times higher (HR:3.7, 95% CI; 1.79-7.92, $p < 0.001$) in IHD patients.

DISCUSSION

Although the incidence and etiology of AP vary between countries and regions, BAP and AAP are often the two main etiologic factors (60-80%). In the literature, the incidence of AP varies between 4.6 and 100 per 100,000[4]. In Southern European countries, BAP comes first, while in Eastern European countries, AAP stands out. In Northern and Western Europe, BAP and AAP have similar rates[4]. In South

FIGURE 2. MEDIAN DURATION OF HOSPITALIZATION ACCORDING TO THE RAC GROUPS



RAC; Revised Atlanta Classification; MAP; mild AP, MSAP; moderate AP, SAP; severe AP

Korea, AAP ranks first, while BAP stands out in other Asian countries and the Arabian Peninsula[5-9]. In Latin American countries, BAP cases are reported to account for almost three-quarters of all cases[10]. In our country, in the review of AP cases between 1980 and 2016 by Calık et al.[3], it was reported that 70% of cases were BAP, 16% were idiopathic pancreatitis, 7% were AAP, and 4% were HAP. In our study, we observed that most patients were in the BAP group, while a decrease in the BAP rate and an increase in the HAP and miscellaneous group rates were observed. When we compared the etiology rates of AP patients in 2013 and 2018, a decrease in the BAP and IAP rates and an increase in the HAP and miscellaneous groups were observed. In accordance with the literature, we found that HAP and AAP are more common in middle-aged males, and BAP again came to the fore in females over the age of 50[4,11-13]. This trend can be attributed to improvements in diagnostic imaging and laboratory investigations, lifestyle changes, and increased hyperlipidemia due to fatty nutrition. Despite advances in diagnostic imaging and laboratory investigations, it is useful to say that IAP cases constitute almost ¼ of the cases, similar to the literature in our study[12,14].

TABLE 2. DEMOGRAPHIC DATA AND ETIOLOGY DISTRIBUTION OF PATIENTS WITH ACUTE PANCREATITIS ACCORDING TO THE RAC SEVERITY

Characteristic	MAP	MSAP	SAP
Gender (n, %)			
female	347 (61.9%)	139 (51.9%)	32 (62.7%)
Age (n, %)			
>65 y	206 (36.7%)	132 (49.2%)	43 (84.3%)
Comorbidities (n, %)			
Hypertension	199 (35.4%)	134 (50%)	36 (70.5%)
Diabetes mellitus	123 (21.9%)	92 (34.3%)	21 (41.1%)
Hyperlipidemia	25 (4.4%)	16 (5.9%)	3 (5.8%)
Ischemic heart disease	53 (9.4%)	47 (17.5%)	9 (17.6%)
Cerebrovascular disease	17 (3%)	11 (4.1%)	3 (5.8%)
Chronic renal failure	2 (0.3%)	19 (7%)	12 (23.5%)
COPD/Asthma	27 (4.8%)	15 (5.5%)	3 (5.8%)
Others	44 (7.8%)	17 (6.3%)	3 (5.8%)
Etiology (n, %)			
Biliary	302 (53.8%)	145 (54.1%)	27 (52.9%)
Hyperlipidemia	33 (5.8%)	34 (12.6%)	4 (7.8%)
Alcohol	25 (4.4%)	18 (6.7%)	1 (1.9%)
Idiopathic	152 (27%)	47 (17.5%)	12 (23.5%)
Miscellaneous	49 (8.7%)	24 (8.9%)	7 (13.7%)
Recurrent pancreatitis (n, %)	65 (11.5%)	37 (13.8%)	8 (15.6%)

Mild AP (MAP); moderately severe AP (MSAP); severe AP (SAP); chronic obstructive pulmonary disease (COPD)

In addition, recurrent pancreatitis developed in 12.5% of the patients included in our study, and it was more common in HAP and AAP cases. In the literature, the recurrent AP rate is reported to be 10-30%, and most of these are BAP and AAP cases[5,15]. In our study, we found that recurrent AP cases consisted of AAP (34%) and HAP (31%) cases, unlike the literature. We think that the lower rate of recurrent AP in patients with BAP (8%) may be due to early cholecystectomy without waiting for a second event. Considering that recurrent AP events may cause various complications and morbidities such as chronic pancreatitis, we can say that treatment such as early lipid apheresis in HAP cases, psychiatric support in AAP cases, and early cholecystectomy in BAP cases will be effective in reducing cost and mortality rates.

The Ranson scoring system is the first scoring system for AP that can be assessed 48 hours after the patient's admission. The low specificity of the Ranson scoring in predicting mortality may cause difficulties in differentiating patients in need of close follow-up and intensive care unit[16,17]. It has been shown in studies that the APACHE II-IV scoring system, which was introduced later, has a higher efficacy in predicting severe AP and mortality[16,18,19]. However, the computed severity index (CTSI) developed by Balthazar et al.[20], which is a scoring system based solely on imaging has also been reported as an effective scoring system for predicting SAP and mortality in some studies, and with moderate efficacy in other studies[18-20]. Studies have shown that both BISAP and RAC scoring systems are effective to predict disease severity and mortality[8,16,19,21]. In the literature, the incidence of SAP according to RAC is reported to be 10-20%, and mortality rates are reported to be 20-60%[2,4,12,22]. In our study, the SAP rate was lower than the literature (5.8%), while the mortality rate in this group was similar to the literature (49%). Also, the median duration of hospitalization and mortality rates correlated with RAC severity in accordance with the literature[12,23,24]. According to these data, it is possible to say that RAC is an effective classification method in determining patients who require close follow-up. Also, advanced age (> 65 y), HT, DM, chronic renal failure, and IHD were closely related to the severity of AP; advanced age (> 65 y), HT, and IHD were also especially closely related to mortality[1,25].

Our study has several limitations. The first is the retrospective nature of the study. The second is that it does not reflect country-wide data since it contains data from a single center. In addition, the study did not

include comparative data with other scoring systems.

In conclusion, BAP is still the main etiology in acute pancreatitis in our country. Although our study included regional data, it was observed that there was an increase in HAP cases due to factors such as lifestyle change and fatty nutrition while BAP and IAP cases have been decreasing over the years. We can say that the RAC is effective in determining the severity of the disease and cases that should be closely monitored.

Conflict of interest

No.

Authors' contributions

Concept: OBB. Design: OBB, HCB. Supervision: HCB. Materials: OBB. Data collection and/or processing: OBB. Analysis and/or interpretation: OBB. Literature search: OBB. Writing: OBB, HCB. Critical reviews: OBB, HCB.

RESUMO

OBJETIVO: *A Classificação de Atlanta revisada (RAC) é cada vez mais usada na avaliação de pacientes diagnosticados com pancreatite aguda (PA). Em nosso estudo, objetivamos avaliar a etiologia, a gravidade da doença e as taxas de mortalidade de pacientes diagnosticados com PA em nosso centro nos últimos seis anos.*

MÉTODOS: *Foram avaliados pacientes diagnosticados com PA entre 2013 e 2018. Avaliaram-se a etiologia da PA, os dados demográficos, a gravidade da doença e as taxas de mortalidade de acordo com a RAC.*

RESULTADOS: *Um total de 880 pacientes foi incluído no estudo. Quinhentos e dezoito (59%) pacientes eram do sexo feminino e 362 (41%) do sexo masculino. Na etiologia, 474 (53,9%) pacientes apresentaram PA biliar (PAB), 71 (8,1%) PA hiperlipidêmica (PAH) e 44 (5%) PA alcoólica (PAA). De acordo com a RAC, 561 (63,7%) pacientes estavam em PA leve (MAP), 268 (30,5%) estavam em PA moderadamente grave (MSAP) e 51 (5,8%) estavam em grupos de PA grave (SAP). A taxa de mortalidade foi de 4,8% no grupo MSAP e de 49% no grupo SAP. A mortalidade foi vista como 2,3 vezes em pacientes acima de 65 anos e 3,7 vezes em pacientes com cardiopatia isquêmica.*

CONCLUSÕES: *Em nosso país, o PAB ainda é a principal etiologia da pancreatite aguda. Ao longo dos anos, observamos uma diminuição nos casos de PAB e PA idiopática, enquanto houve um aumento nos casos de PAH devido a fatores como mudança de estilo de vida e nutrição gordurosa. Descobrimos que a mortalidade estava associada à gravidade da doença, idade avançada (>65 anos), hipertensão e cardiopatia isquêmica, independentemente da etiologia.*

PALAVRAS-CHAVE: *Pancreatite/etiologia. Pancreatite necrosante aguda. Índice de gravidade de doença.*

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