THE MEDICAL BULLETIN OF
SISLI ETFAL HOSPITAL

DOI: 10.14744/SEMB.2018.37791
Med Bull Sisli Etfal Hosp 2018;52(4):274–278

Research Article

Evaluation of Laboratory Findings and Mortality in Elderly Patients with Acute Biliary Pancreatitis

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Abstract

Objectives: Gallstones are the most common cause of acute biliary pancreatitis. Laboratory and imaging findings as well as age are important predictors for mortality. Hospitalization rate is also higher in elderly patients. In this study, we investigated clinical parameters and total mortality in patients with acute pancreatitis aged >65 years.

Methods: In this study, 852 patients who entered the Gastroenterology Clinic for acute biliary pancreatitis between April 2006 and October 2013 were included. Data were retrospectively collected from the electronic record system. The patients with elevated aspartate aminotransferase levels (i.e. three times higher than normal value), cholelithiasis, cholecystectomy history, or choledocholithiasis were accepted as the patients with acute biliary pancreatitis. Patients were divided into two groups based on their age, i.e., >65 and <65 years.

Results: In the group with patients aged <65 years, serum alanine aminotransferase, albumin, hematocrit, and amylase, and in the group with patients aged >65 years, urea, leukocyte, and C-reactive protein levels were significantly different. Median hospital stay was similar in both the groups. The rate of detection of choledocholithiasis was significantly higher in elderly patients (p<0.001). Mortality rate was significantly higher in elderly patients for 28 day (0.21% and 2.95%, p<0.001) and 90 day (1.25% and 5.63%, p<0.001). In logistic regression multivariate analysis, age (OR 2.0, 95% CI 1.54–1.36; p=0.006), elevated urea levels (OR 1.12, 95% CI 1.05–1.19; p=0.001), elevated hematocrit levels (OR 1.42, 95% CI 1.13–1.77; p=0.002), and decreased albumin levels (OR 0.05, 95% CI 0.004–0.652; p=0.022) were found predictors for 90-day mortality.

Conclusion: Laboratory findings in elderly patients with acute pancreatitis may differ from those in younger patients. Although radiological findings are similar in both the groups, mortality is higher in the group with patients aged >65 years.

Keywords: Acute pancreatitis; mortality; elderly.

Please cite this article as "Vatansever S, Doğru R, Pakoz ZB, Genç H, Ünsal B. Evaluation of Laboratory Findings and Mortality in Elderly Patients with Acute Biliary Pancreatitis. Med Bull Sisli Etfal Hosp 2018;52(4):274–278".

Acute pancreatitis (AP) is one of the most common diseases of the gastrointestinal tract. The most common cause of AP is gallstone. In addition, alcohol, hypertriglyceridemia, drugs, genetic factors, hypercalcemia, autoimmunity, and pancreatitis due to ERCP (Endoscopic Retrograde Cholangio-Pancreatography) may develop.[1, 2] AP incurs serious physical, emotional, and financial burden.[1] In the US, it is responsible for roughly 330.000 emergency service and 240.000 hospital admissions each year, and its incidence is increasing worldwide.[3] The annual incidence ranges from 4.9 to 35 per 100.000 patients.[4] In the US, the annual cost incurred by AP is $2.5 billion.[3] Approximately 80% of the AP cases had a mild and 20% had a severe course.[2]

Sometimes diagnosis of moderate and very severe AP is

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Submitted Date: September 13, 2018 **Accepted Date:** September 25, 2018 **Available Online Date:** December 26, 2018

delayed. This may cause deaths due to inability to detect preventable causes, and development of secondary attacks. While mortality is very low in interstitial pancreatitis, it increases up to 10% in necrotizing pancreatitis and 30%–40% in infected necrosis.[5-7] The AP-related mortality shows bimodal distribution. Early death occurs due to severe and irreversible multiorgan dysfunction, and late-term deaths are caused by disease-induced sepsis and subsequent organ failure.[8] Various scoring systems are available to evaluate AP severity. While clinical and laboratory data are used together with Ranson, APACHE II, and Atlanta scores, the Balthazar scoring is used radiologically.[9-11]

Large-scale cohort studies show that the group with the highest rate of hospitalization due to AP is the elderly population.[12] Some studies have demonstrated increased AP-related mortality and co-morbidity in elderly patients.[13] In some studies, mortality in elderly patients was found to be similar to that in other age groups.[14, 15]

Physiology and morphology of organs change with age, which is a natural process. Therefore, the response of metabolism to external factors and diseases also change. The aim of this study was to evaluate the findings and total mortality in patients with acute biliary pancreatitis aged <65 and >65 years.

Methods

Between April 2006 and October 2013, 852 patients were enrolled in this study. Data were collected from the electronic registry of the patients, and retrospectively evaluated. The patients were divided into two groups: those aged <65 and those >65 years. The diagnosis of AP was based on the presence of two of the criteria including typical pancreatic pain, ≥3-fold increased amylase or lipase levels, or AP findings in imaging. Patients with aspartate aminotransferase levels increased up to more than upper limit of normal, those with cholelithiasis, bile duct stone, or biliary pancreatitis, patients with a history of cholecystectomy were accepted as patients with biliary pancreatitis. Patients with a history of alcohol use, high triglyceride and calcium levels, those using a new drug before the attack, and those presented with AP for the second time were excluded from the study.

In addition, patients who were referred from another center due to severe pancreatitis and complicated pancreatitis and those who received treatment at the center where they were referred from for more than two days were excluded from this study. All the patients were screened with abdominal ultrasound (USG), endosonography (EUS), or magnetic resonance cholangiopancreatography (MRCP) for choledocholithiasis. ERCP was performed to those who had choledochal stone. In accordance with the AP treatment guidelines, all patients were firstly given fluid therapy. In patients with recurrent febrile episodes, despite antibiotherapy, wide spectrum antibiotics and/or antifungals were added to their treatment. All patients were hospitalized, followed up, and treated. Those with signs of clinical and laboratory recovery were discharged.

The Balthazar scoring used in radiological imaging was divided into two groups: mild and severe. Balthazar score of A–C and computed tomography (CT) severity index of 1–5 were taken as an indication of mild pancreatitis. Balthazar score D–E and CT severity index of 6–10 were taken as an indication of severe pancreatitis. Our study was conducted in accordance with the principles of the Declaration of Helsinki, and the ethics committee approval was obtained.

Statistical Analysis

Statistical analysis of the study was performed with the SPSS 17 package software. Data were expressed as mean and standard deviation. The chi-square test was used for categorical variables. The normality and homogeneity of the groups were evaluated. The Mann–Whitney U test was used for data not consistent with normal distribution. Data with normal distribution were evaluated using Student t test. After the logistic regression univariate analysis was performed to evaluate mortality, the p values below 0.1 and independent of each other were taken into the multivariate analysis to create a model. A p value of <0.05 was considered significant.

Results

In the study, mean ages were 38 and 75 years in groups with patients aged <65 and >65 years, respectively. Demographic and laboratory data of the patients are given in Table 1. Alanine aminotransferase, albumin, hematocrit, and amylase levels were found to be significantly higher in younger people, whereas urea, leukocyte, and C-reactive protein levels were significantly higher in the elderly. The mean hospital stay was similar in both groups. The rate of detection of choledochal stones was found to be significantly higher in the elderly (Table 1). Balthazar scores were similar in both the groups (Table 2).

Mortality rates were evaluated on the 28th day and 90th day. Mortality rates on the 28th day and 90th day in patients aged >65 years were significantly higher than those in the younger age group (Table 3).

In addition, in the multivariate logistic regression analysis, increase in age, urea, and hematocrit, and decrease in albumin levels were found to be predictive of mortality on day 90 (Table 4). Although in the univariate logistic regres-

Table 1. Laboratory and imaging findings of the patients <65 and >65 years

	<65 years (n=479)	>65 years (n=373)	p
Age	38 (18-64)	75 (65-95)	<0.001
Gender (F/M)	315/164	221/152	0.051
AST	104 (10-1599)	108.5 (3-3633)	0.354
ALT	177 (12-682)	127.5 (9-543)	0.029
ALP	120 (62-601)	141 (52-1346)	0.338
GGT	263.5 (15-2084)	216 (11-1416)	0.483
Total bilirubin	2.4 (0.2-34)	2.9 (0.3-23)	0.183
Albumin	3.8±0.5	3.6±0.5	<0.001
Amylase	1300 (350-8776)	1099 (350-5400)	0.005
Glucose	111 (47-700)	112 (42-729)	0.236
LDH	222 (99-3325)	206 (91-1333)	0.391
Urea	12 (4-59)	18.5 (4-98)	<0.001
Creatinine	0.7 (0.5-7.3)	0.7 (0.52-3.86)	0.629
CRP	7.2 (0.1-55)	12 (0.1-57)	0.002
WBC	11.5±5.1	13.8±6.7	<0.001
Calcium	9±0.7	8.8±0.7	<0.001
Hematocrit	37.8±4.3	36±5	<0.001
Duration of hospitalization (day)	6 (1-32)	6 (1-52)	0.48
Choledochal stone	41/479	73/373	<0.001
Size of choledochal stone (mm)	8 (3-20)	10 (3-45)	0.091
Number of choledochal stone	2 (1-5)	1 (1-5)	0.696
Ratio of multiple choledochal stones	21/41	33/73	0.59
History of cholelithiasis + cholecystectomy	415 (86.6)	313 (83.9)	0.76
Presence of cholelithiasis + cholecystectomy at admission	80/335	49/264	0.239

AST: Aspartate aminotransferase; ALT: Alanine aminotransferase; ALP: Alkaline phosphatase; GGT: Gamma- glutamyl transferase; LDH: Lactate dehydrogenase; CRP; C-reactive protein.

Table 2. Comparison between the Balthazar score and CT severity index score

	<65 years	>65 years	p
Balthazar score			0.239
Mild pancreatitis (A, B, C)	411 (85.8)	336 (90)	
Severe pancreatitis (D, E)	68 (14.2)	37 (10)	
CT severity index			0.873
Mild pancreatitis (0–3)	450 (94)	352 (94.6)	
Severe pancreatitis (4–10)	29 (6)	21 (5.6)	

CT: Computed tomography.

Table 3. Total mortality rates on days 28 and 90 in patients <65 and >65 years (chi-square test)

	<65 years	>65 years	p
28 day	0.21	2.95	0.001
90 day	1.25	5.63	0.001

sion analysis, CT severity index was found to be significant in predicting 90-day AP mortality (OR 4.88, 95% CI 1. 51–15.77; p=0.008), in the multivariate logistic regression analysis, it was not detected to be an independent predictor in predicting AP mortality at 90 days (p=0.279).

Table 4. Multivariate logistic regression analysis for the prediction of 90-day mortality

	B	Wald	p	OR	Lower limit	Upper limit
Age	0.180	7.705	0.006	1.198	1.054	1.360
Hematocrit	0.348	9.344	0.002	1.416	1.133	1.771
CRP	0.076	3.137	0.077	1.079	0.992	1.173
AST	<0.001	0.032	0.857	1.000	0.997	1.004
Albumin	-3.009	5.219	0.022	0.049	0.004	0.652
Urea	0.111	110.271	0.001	1.117	1.047	1.192
CT severity index	1.340	1.170	0.279	30.819	0.337	43.318

CRP: C-reactive protein; AST: Aspartate aminotransferase; CT: Computed tomography.

Discussion

With the increase in the average life expectancy, the number of elderly people is also increasing in societies.[16] Therefore, the course of the disease has been investigated increasingly in the elderly. Previous studies indicate that severe AP is an important cause of morbidity and mortality in elderly patients. Xin et al.[17] found mortality rate of 17% in

elderly patients with severe AP.

Among 212 patients with acute biliary pancreatitis, Roulin et al.[15] found similar 90-day mortality rates in the groups with patients <70 and >70 years. Similarly, in the study of Kim et al.,[18] the progression of AP was investigated in patients who were aged <65 and >65 years, and no significant difference was found between the two groups in terms of mortality and complications. Patel et al.[19] found higher mortality rates in the elderly group. Yadav et al.[13] examined 18 publications related to AP, and they found that mortality increased with age. In our study, mortality rates on the 28th and 90th day in patients >65 years of age were found to be significantly higher than those aged <65 years. In the multivariate logistic regression analysis, age was found to be an independent predictor of mortality.

Numerous studies show that the Balthazar scoring is successful in predicting the prognosis of AP.[20, 21] Mortality rates were found to be 8%–17% higher in severe pancreatitis based on CT severity index relative to previous studies.[22, 23] In our study, no difference was found in the patients with acute biliary pancreatitis aged <65 and >65 years according to the Balthazar scoring and CT severity index. In multivariate logistic regression analysis, tomography findings were not found to be an independent variable in predicting mortality. This may be because the factor that increases mortality in the geriatric group is other accompanying diseases. In addition, the low number of patients with mortality may have caused the CT severity index not to be detected significantly. Previous studies show that the inflammatory response in the elderly population is less than that of young people.[24] In our study, leukocyte and CRP elevation, decrease in albumin levels was significantly different in geriatric patients.

In our study, the rate of choledochal stones was found to be significantly higher in patients aged >65 years. Biliary diseases are more common in the elderly. Similar to previous studies, biliary stones responsible for etiology were more frequently found in the common bile duct. This situation is because the stones are smaller and have higher clearance in the common bile duct in the younger age group.[13, 25, 26]

The most important limitation of our study was that APACHE-2 and Ranson scores could not be used together. In addition, detailed evaluation of comorbidities might play a more effective role in predicting mortality. Another limitation was that our study was a single-center and retrospective study. Today, the maintenance and treatment of geriatric patients has become more important as the population of the geriatric population increases. Our study has the largest number of patients in the literature comparing geriatric patients with acute biliary pancreatitis. In our study, the AP-related mortality rates were found to be higher in patients >65 years. Detailed and prospective studies may be more enlightening.

Disclosures

Ethics Committee Approval: The study was approved by the Local Ethics Committee.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Authorship contributions: Concept – S.V., R.D.; Design – S.V., H.G., R.D.; Supervision – B.U.; Materials – S.V., R.D., H.G.; Data collection &/or processing – Z.B.P.; Analysis and/or interpretation – S.V.; Literature search – Z.B.P., H.G.; Writing – Z.B.P.; Critical review – B.U.

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