ORIGINAL PAPERS

Predictive Factors of Mortality in Acute Pancreatitis

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Abstract

Acute pancreatitis is acute inflammation of pancreatic acini. Most patients with acute pancreatitis develop mild or moderate forms, but there is a smaller category of patients that develop severe forms, with evolutionary potential serious and high mortality. Aim of the study is to assess the influence of age, gender and obesity on mortality in patients with acute pancreatitis. **Material and methods:** The study is a prospective and was conducted on a sample of 238 patients diagnosed with acute pancreatitis. Data were collected from the observation charts of patients entered into a basis for calculating and statistically analyzed. **Results and discussions:** Mortality is greatly increased in severe acute pancreatitis compared to the mild (45.63% vs. 2.22%). In both clinical forms are observed predominance of males (60.74% in mild form, 56.31% in severe form). Female patients with severe form died in old age than male patients. All female patients who died were aged over 55, and most male patients who died were aged between 55 and 65 years. In male patients aged below 35 years, respectively aged 55 and 75, it is noted that the number of deceased patients overtook that of survivors. More than a third of patients studied (36.97%) were obese. Most of them (71.59%) developed severe acute pancreatitis and of them, 47.62% died. The gender distribution of patient shows doubling of deaths among men compared to women. Mortality was higher among obese patients with acute pancreatitis in general and especially among those with severe acute pancreatitis. The latter dies in old age than normal weight patients and obese women die at older ages than men. **Conclusions:** In patients with severe acute pancreatitis there is a close correlation between age, sex, obesity and mortality. Mortality among patients with severe acute pancreatitis correlates with age and especially with advanced age. The age at which patients died was higher for women. Most obese patients developed severe acute pancreatitis and half of them died. Obese patients and especially female patients, deceases at older ages.

Keywords: acute pancreatitis, mortality, age, sex, obesity

Rezumat

Pancreatita acută reprezintă inflamația acută a celulelor acinare glandulare pancreatice. Majoritatea pacienților cu pancreatită acută dezvoltă forme uşoare sau moderate, dar există o categorie mai mică de pacienți ce dezvoltă forme severe, cu potențial evolutiv grav şi mortalitate ridicată. Obiectivul studiului îl reprezintă evaluarea influenței vârstei, sexului şi obezității asupra mortalității pacienților cu pancreatită acută. **Material şi metodă:** Studiul este unul prospectiv şi a fost efectuat pe un lot de 238 de pacienți diagnosticați cu pancreatită acută. Datele au fost colectate din foile de observație ale pacienților, introduse într-o bază de calcul şi analizate statistic. **Rezultate şi discuții:** Mortalitatea este mult crescută în cazul pancreatitei acute severe față de cea uşoară (45,63% vs. 2,22%). În ambele tipuri de forme clinice se observă predominanța sexului masculin (în forma uşoară 60,74%, în forma

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severă 56,31%). Pacienţii de sex feminin cu formă severă au decedat la vârste mai înaintate decât pacienţii de sex masculin. Toţi pacienţii de sex feminin care au decedat au avut vârste peste 55 de ani, iar cei mai mulţi pacienţi de sex masculin care au decedat au avut vârste cuprinse între 55 şi 65 de ani. În cazul pacienţilor de sex masculin cu vârste sub 35 de ani, respectiv cu vârste între 55 şi 75 de ani, se observă că numărul pacienţilor decedaţi l-a depăşit pe cel al supravieţuitorilor. Mai mult de o treime din pacienţii studiaţi (36,97%) au fost obezi. Majoritatea dintre aceştia (71,59%) a dezvoltat pancreatită acută severă, iar dintre ei, 47,62% au decedat. Repartiţia pe sexe a pacienţilor ne arată dublarea numărului deceselor în rândul bărbaţilor faţă de cel al femeilor. Mortalitatea a fost crescută în rândul pacienţilor obezi cu pancreatită acută în general şi mai ales în rândul celor cu pancreatită acută severă. Aceştia din urmă decedează la vârste mai înaintate decât pacienţii normoponderali, iar femeile obeze decedează la vârste mai înaintate decât ale bărbatilor. **Concluzii:** La pacienţii cu pancreatită acută severă se constată o strânsă corelaţie între vârstă, sex, obezitate şi mortalitate. Mortalitatea în rândul pacienţilor cu pancreatită acută severă se corelează cu vârsta şi în special cu vârsta înaintată. Vârsta la care au decedat pacienţii a fost mai mare în cazul femeilor. Majoritatea pacienţilor obezi a dezvoltat pancreatită acută severă şi jumătate dintre ei au decedat. Pacienţii obezi şi în special cei de sex feminin, decedează la vârste mai înaintate.

Cuvinte cheie: pancreatită acută, mortalitate, vârstă, sex, obezitate

INTRODUCTION

Acute pancreatitis is acute inflammation of pancreatic glandular acinar cells followed by intraparenchymal enzymatic activation and pancreatic auto digestion. In most cases develop mild or moderate forms, with low morbidity and mortality. There is however a lower category of patients that develop severe forms of disease with increased morbidity and mortality[1].

The incidence of acute pancreatitis is variable and ranges, according to recent studies, between 13 and 45 cases per 100,000 inhabitants[2]. In the last time is observed an increase in the annual incidence of acute pancreatitis. Although the fatality rate per case decreased with time, overall mortality rate of people with acute pancreatitis remained unchanged[3,4].

Since the time of admission, once diagnosed with acute pancreatitis, it is important to estimate the severity of the disease, to distinguish mild or moderate forms of development of the severe forms, with serious evolutionary potential and high mortality. For this reason, as early identification of predisposing factors of mortality is beneficial in approaching the therapeutic management of patients with acute pancreatitis.

AIM OF STUDY

The primary objective of study is to assess the influence of age, gender and obesity on mortality in patients with acute pancreatitis.

MATERIAL AND METHODS

The study, prospective, was conducted in the Clinic of General Surgery of Clinical Emergency Hospital "Bagdasar-Arseni" Bucharest in 2006-2010 and was performed on a sample that included 238 patients diagnosed with acute pancreatitis. Positive diagnosis and severity assessment was made based on clinical, biological, imaging, intraoperative and pathological criteria. Classification of acute pancreatitis was established on the basis of Atlanta criteria[5]. Framing patients in the category of obesity was performed if the weight index was higher 30 kg/m^2 [6].

50
(21.01%)

■ Deceased
■ Survival

188
(78.99%)
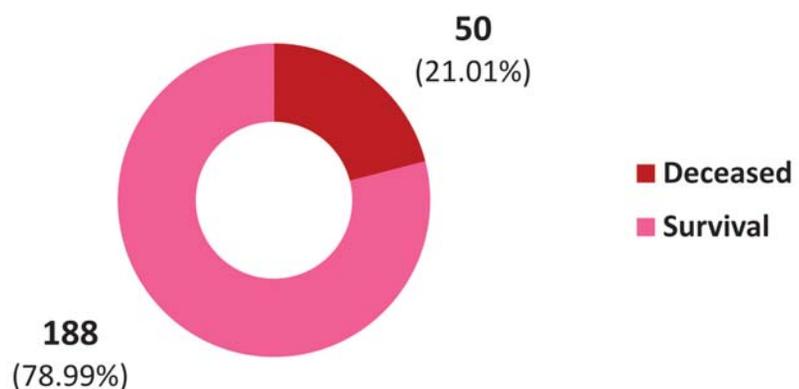
Figure 1. Distribution of patients according to survival.

Clinical and laboratory data were collected from the observation charts of patients and introduced into a basis for calculating MS Excel type. Statistical analysis was performed using SPSS 10 statistical calculation program for Windows and resulted in obtaining information via several methods: descriptive statistical tests (*t* test), uni- and multivariate analysis (general linear models), correlation tests (Pearson coefficient). Standard statistical significance level was set at 0.05. Values below this level are statistically significant, while values below 0.001 are highly statistically significant.

RESULTS AND DISCUSSIONS

Mortality for the entire study group was 21.01% (50 patients died out of 238 patients included in the study) (Figure 1), being close to the mortality reported in other European countries[7].

Depending on the outcome of patients with acute pancreatitis, we distinguish two types of clinical forms: mild and severe. In our study of 238 patients, 135 developed mild form (56.72%) and 103 had developed severe form (43.28%). The severity of evolution of acute pancreatitis influences mortality 8. On study group observed that mortality is much higher in severe acute pancreatitis (47 patients died of the 103 patients with severe form, representing 45.63%), compared to the mild (only 3 patients died of the 135 patients with mild form, representing 2.22%) (Figure 2).

In both clinical forms are observed predominance of males (82 patients in the mild form of the 135, representing 60.74%, and in severe form 58 patients out of 103, representing 56.31%) (Figure 3). Predominance of males is found and regarding deaths. Of the 3 patients who developed mild form and subsequently died, two

were male (66.66%) and of the 47 patients who developed severe form and subsequently died, 25 were male (53.19%) (Figure 4).

As the number of deaths among patients with mild acute pancreatitis was insignificant, it was passed directly to analyze patients with severe acute pancreatitis and which had died. The distribution by gender and age decades of patients with severe acute pancreatitis who survived respectively deceased, can be seen in Figure 5.

Female patients had died in old age than male patients. All female patients who died were over 55 years. In contrast, male patients who died were aged in the range <35 years - 75 years.

Mortality among patients aged over 55 years who developed severe acute pancreatitis was very high (22 patients out of a total of 28, representing 78.58%). Of the 22 female patients who died, most were aged between 65 and 75 years (12 patients; 54.55%), followed by the group of patients older than 75 years (7 patients, 31.82%), respectively aged between 55 and 65 years (3 patients; 13.63%). International literature mentions that mortality in women with advanced age is increased, mainly due to the biliary etiology[9].

All female patients younger than 55 years survived, although at the group level aged between 35 and 45 years have seen the highest number of female patients who developed severe acute pancreatitis (14 patients of the total 42, representing 33.33%). Among the 42 female patients who developed severe acute pancreatitis, is distinguished another group of 14 patients aged between 65 and 75 years, but this group mortality was very high (12 deaths among the 14 patients, representing 85.71%). This thing due mainly to the presence of comorbidities, as confirmed in literature[8,10].

Out of the 25 male patients with severe acute pancreatitis and which had died, most were aged between
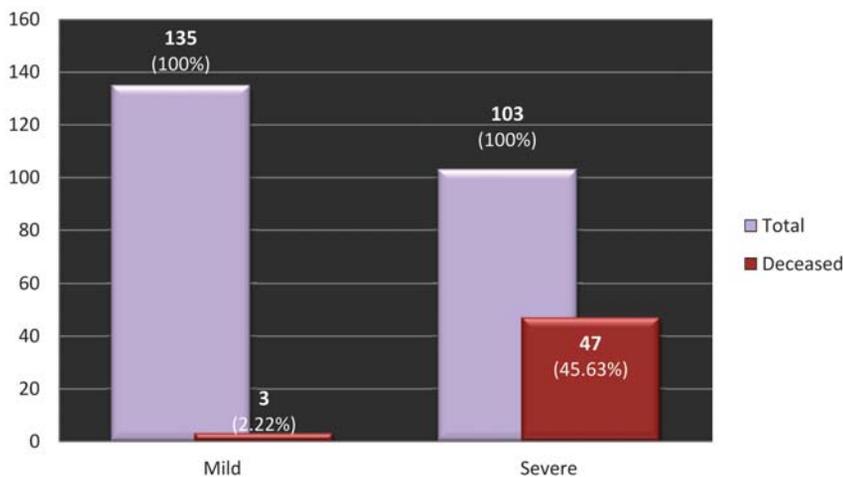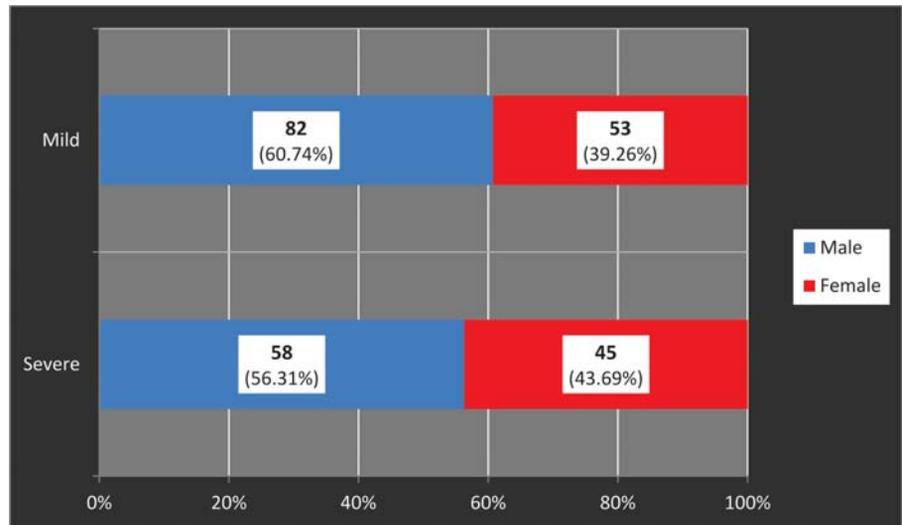

Figure 2. Distribution of patients according to severity and survival.

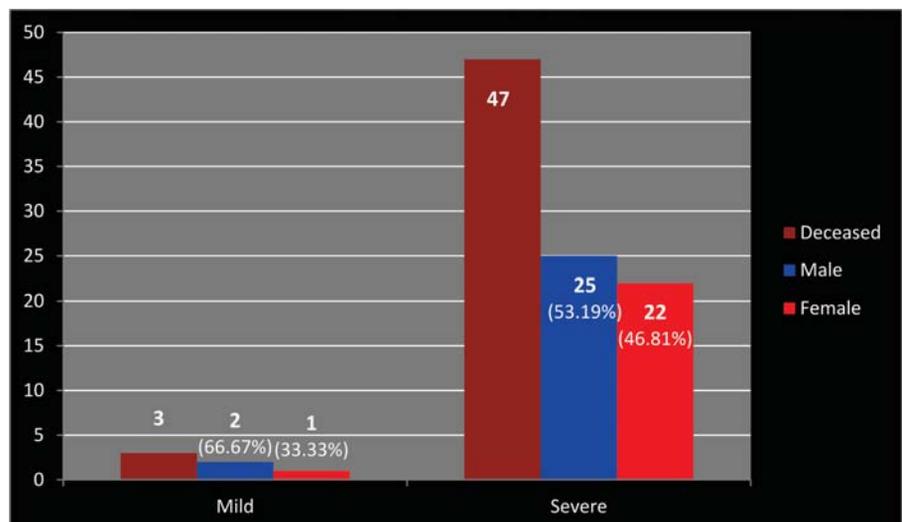**Figure 3.** Distribution of patients according to severity and gender.

55 and 65 years, respectively 10 deaths (40.00%). In the other two groups, ages 45 and 55 years, respectively 65 and 75 years, had died one every 5 patients (20.00%). In younger patients, aged under than 35 years, and between 35 and 45 years, mortality was lower by 8.00%, respectively 12% (2 deaths, respectively 3 deaths). It should be noted that the sole patient older than 75 years survived.

Most patients who developed severe pancreatitis were aged between 35 and 45 years, respectively between 55 and 65 years (there were two groups of equal size every 16 patients). It should be noted that mortality differed greatly depending on the age category. Among patients aged between 35 and 45 years, died only 3 patients (18.75%), unlike the category aged between 55 and 65 years, where 10 patients died, mortality being much higher (62.50%).

Referring to patients with younger age, respectively between 35 and 45 years, we have observed that mor-

tality was lower among males (18.75%) and there has been for females. This is probably due to the younger age of the entire body with greater potential for recovery after episodes of acute pancreatitis and the absence / reduced presence of comorbidities.

In male patients younger than 35 years, respectively between the ages 55 and 75 years, it is noted that the number of deceased patients overtook that of survivors. In the category under 35 years, of the 3 patients, two died and only one survived (66.66% vs. 33.33%). At the age category 55-75 years, of the 25 patients, 15 died and 10 survived (60.0% vs. 40.0%). The explanation for this is probably the attack severity of acute pancreatitis due to excessive consumption of alcohol at a young age and the existence of gallstones, most often neglected and complicated at older ages[11]. There is neglected in both cases, possible fulminant development disease, described in the literature[12].
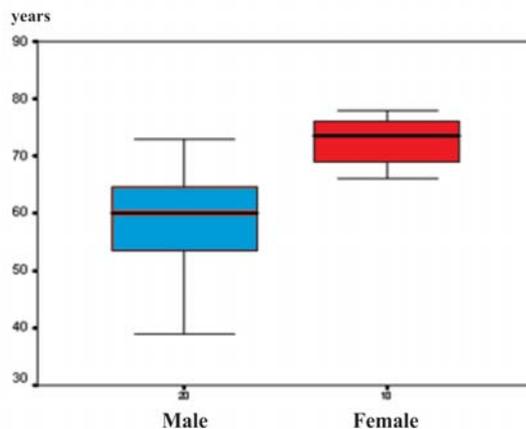

Figure 4. Distribution of patients according to severity, survival and gender.
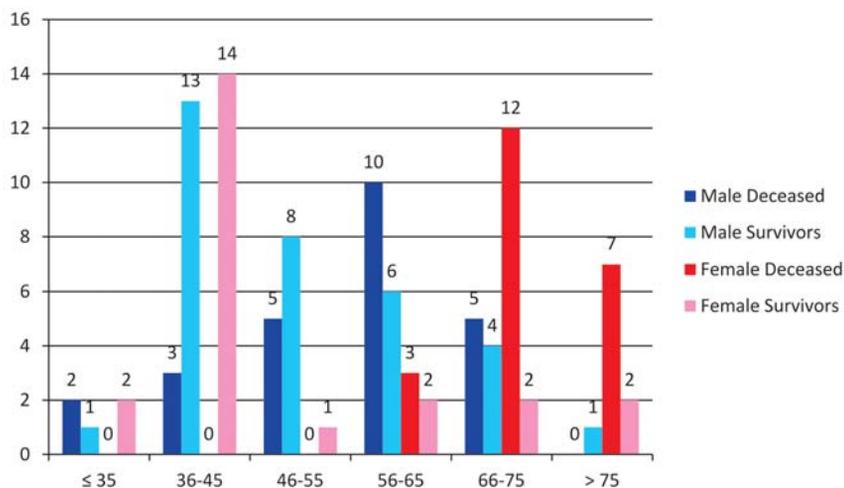
Figure 5. Distribution of patients with severe acute pancreatitis, survivors versus deaths, according to age decades and gender.
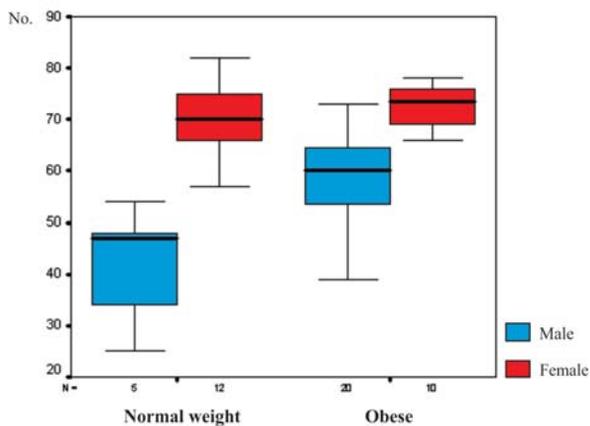
Figure 6. Distribution of patients with severe acute pancreatitis who died, according to obesity and gender.

Figure 7. Distribution of obese patients with severe acute pancreatitis who died, according to gender and age.

Analyzing the results mentioned above it appears that there is a correlation between mortality and age, as confirmed by numerous studies[13,8,10], in particular in the case of advanced age[14,15].

Studies conducted in the recent decades have shown that obesity is on the upward trend among patients[16]. Also, increasing the severity of the disease was observed in obese patients, being suggested several mechanisms[3]. Analysis of obesity in our study shows that 88 of the total 238 patients were obese (36.97%). The majority of obese patients (63 patients) developed severe acute pancreatitis (71.59%). Of these, 30 patients died (47.62%). The gender distribution of patient shows doubling of male deaths compared to that of female (20 vs. 10, respectively 66.67 vs. 33.33%). Numerous authors confirm increased mortality among obese patients with acute pancreatitis generally[17,18,19,3,20,16] and especially among those with severe acute pancreatitis[21].

Referring only to patients with severe acute pancreatitis, we notice that obese patients die at older ages than normal weight patients, the difference being more visible in male patients (Figure 6). From the same figure is found that obese female patients die at older ages than male patients.

Obese patients who died were aged between 40 and 75 years, with a median at 61 years, older ages compared to normal weight patients' who were aged between 25 and 55 years and a median at 47 years old, surrounded by a high frequency of ages to this level.

Obese female patients who died had a median stood at 74 years, as opposed to normal weight female patients who died and who had a lower median value, respectively 70 years.

From Figure 7 it is noted that the upper limit of ages of death is slightly higher in female patients (78 years) than male patients age (73 years), as the median

(74 years for females to 60 years for males), but age distribution is on the a larger area in the case male patients (range: 39-73 years) compared to female patients (much narrower range: 66-78 years). Also note that all obese female patients with severe acute pancreatitis who died were older (>65 years).

CONCLUSION

Acute pancreatitis is acute inflammation of the pancreas. In the evolution of this disease can distinguish two forms of evolution: mild forms, with lower morbidity and mortality or severe forms, with increased morbidity and mortality. In patients with severe acute pancreatitis there is a close correlation between age, sex, obesity and mortality. Mortality among patients with severe acute pancreatitis correlates with age and especially with advanced age. The age at which patients died was higher for female patients. Majority of obese patients developed severe acute pancreatitis and half of them died. Obese patients and especially obese female patients, decease at older ages.

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