

Etiological differences in demographics, clinical course and consequences of acute pancreatitis: a retrospective study

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ABSTRACT

Aim: The study is intended to consider acute pancreatitis from the point of view of its etiological structure, as well as demographic description, features of the clinical course, distribution of morphological forms, severity and consequences of the disease in different etiological variants.

Materials and Methods: The work was based on a retrospective analysis of the medical records of 677 patients with acute pancreatitis who underwent inpatient treatment from 2017 to 2022 in an emergency hospital and a tertiary regional hospital in Vinnytsia, Ukraine.

Results: The etiological structure of the general sample was as follows: the alimentary factors – 37,5% of cases, biliary – 18,6%, alcohol – 14,0% and postoperative – 7,8%, respectively. The oldest patients were observed in the group with biliary AP (age [median, interquartile range] 61 [46-72] years), the youngest – in the group with alcoholic AP (age [median, interquartile range] 40 [35-47] years). Men significantly predominated in the groups with alimentary and alcoholic AP. A significant predominance of women was observed in the group with biliary AP (62,7% vs. 37,3%, $p=0,0003$). The highest mortality was in the alcoholic AP group (22,1%), also here was a significantly lower rate of inpatient bed days (6,0). Edematous AP was dominant in all etiological variants. While infected necrotic pancreatitis was significantly more often found in patients with alcoholic genesis (7,4%).

Conclusions: The etiologic variations of acute pancreatitis differ by demographic and clinical indicators and require more detailed study to understand its prognosis, management, and development of effective prevention and treatment strategies.

KEY WORDS: acute pancreatitis, etiology, clinical course

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INTRODUCTION

Acute pancreatitis remains the subject of special attention and careful study. The frequency of occurrence of this pathology in recent decades does not tend to decrease both in the world and in Ukraine, and in cases of severe forms it can lead to significant complications and high mortality, which can reach 41% [1]. It is the high prevalence of acute pancreatitis throughout the world and its various etiological forms, which vary in different geographical regions, that make it the subject of intensive scientific research.

For today numerous clinical studies have studied the effect of etiology on the course of AP. According to the latest data, in 70% of cases acute pancreatitis today is caused by gallstone disease and alcohol abuse in the ratio of gallstone etiology to alcohol 2:1 [2-5]. A 2019 meta-analysis showed that gallstones are the leading cause of AP worldwide, and occur twice as often as alcohol, 95% confidence interval (CI) (42%, 39-44). Alcohol showed a slightly higher estimated mean effect than idiopathic AP, and their 95% CIs were similar (21%, 17-25 and 18%, 15-22, respectively) [6]. On the other hand, in the structure of the

causes of AP, there is an increase in the share of idiopathic AP, which in some places reaches 25,6% [3].

In general, there is a potential relationship between the etiology, clinical course and consequences of acute pancreatitis, which was convincingly demonstrated in a systematic review and meta-analysis [7]. According to his data, the highest risk of moderately severe and severe course was found in hypertriglyceridemia-induced acute pancreatitis, followed by alcoholic, biliary and ERCP-induced. Patients with biliary AP had the lowest recurrence rate. The mortality rate was significantly higher in hypertriglyceridemia-induced acute pancreatitis compared with alcoholic and biliary pancreatitis (odds ratio (OR) = 1,72 and 1,50, 95% CI 1,04-2,84 and 0,96-2,35, respectively).

Thus, the development of acute pancreatitis can be based on various causative factors, from alcohol consumption to gallstone disease and other causes. Understanding the influence of various etiological factors on the course of AP and its consequences will allow effective management of this pathology, optimization of diagnosis and treatment, as well as development of prevention strategies.

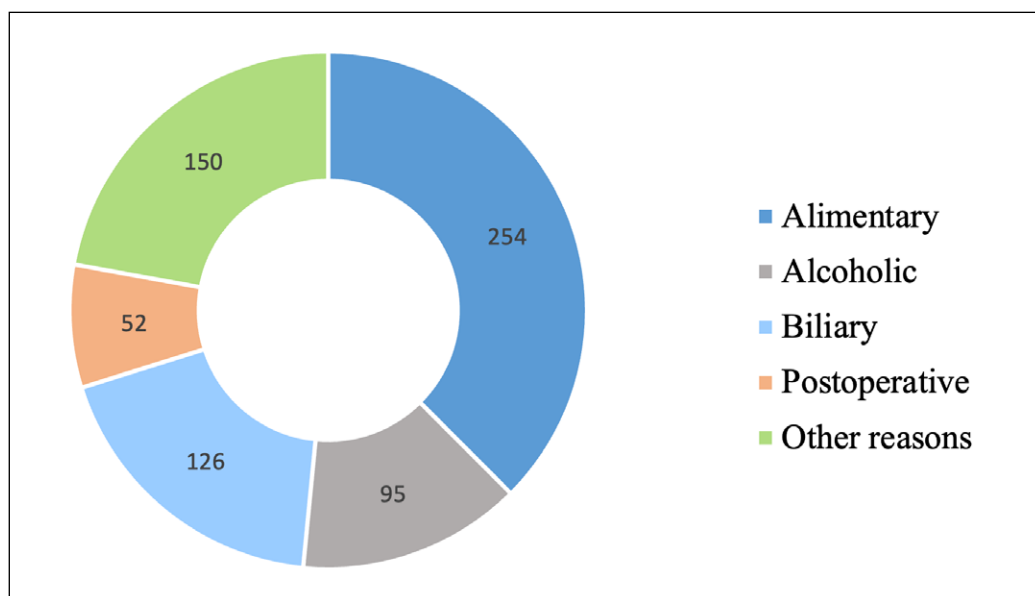


Fig. 1. Structural distribution of patients by etiology of acute pancreatitis.

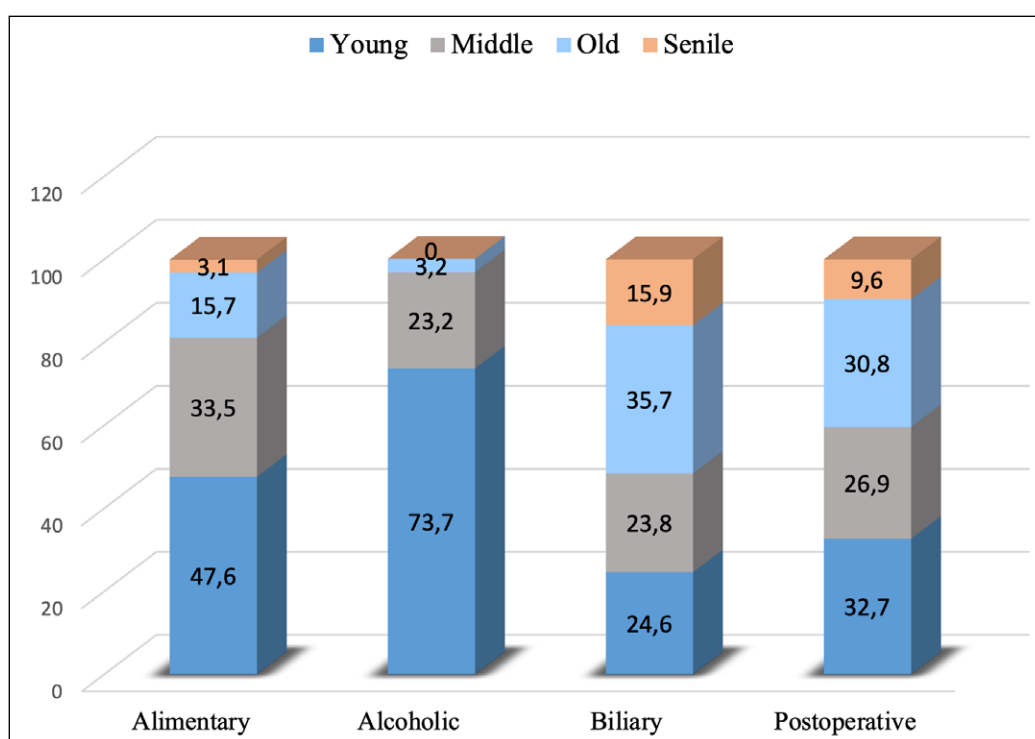


Fig. 2. Age distribution (in %) and median age depending on the etiological variant of acute pancreatitis.

AIM

The aim of our study is to determine the etiological factors of acute pancreatitis and to study their influence on the course of the disease.

MATERIALS AND METHODS

The analysis of clinical material was carried out on the basis of information from the medical records of inpatients who received treatment for acute pancreatitis from 2017 to 2022 in the Vinnytsia city clinical hospital of emergency medical care and the Vinnytsia regional clinical Pirogov memorial hospital. As part of the study,

the data of 677 patients with acute pancreatitis were analyzed. Among them, the vast majority were men – 60,7% (411), women were 39,3% (266). All patients undergoing inpatient treatment gave their consent to the processing of their personal data and information obtained during examination and treatment. The collection and analysis of clinical and laboratory material was performed in accordance with all ethical standards defined in the Declaration of Helsinki.

Patients eligible for inclusion met specific criteria. Specifically, a diagnosis of acute pancreatitis based on the 2012 Atlantic Classification with any two of the following three symptoms: characteristic abdominal

Table 1. Groups of patients

Groups of patients	Number of patients	Median age
Alimentary AP	n=254	46,0 (37,0; 58,0)
Alcoholic AP	n=95	40,0 (35,0; 47,0)
Biliary AP	n=126	61,0 (46,0; 72,0)
Postoperative AP	n=52	53,0 (42,5; 66,5)
p1-2=0,001; p1-3<0,0001; p1-4=0,08; p2-3<0,0001; p2-4<0,0001; p3-4=0,03		
Young age		
p1-2<0,0001; p1-3<0,0001; p1-4=0,04; p2-3<0,0001; p2-4<0,0001; p3-4=0,27		
Middle age		
p1-2=0,06; p1-3=0,05; p1-4=0,35; p2-3=0,91; p2-4=0,61; p3-4=0,66		
Old age		
p1-2=0,001; p1-3<0,0001; p1-4=0,01; p2-3<0,0001; p2-4<0,0001; p3-4=0,52		
Senile age		
p1-2=0,08; p1-3<0,0001; p1-4=0,04; p2-3<0,0001; p2-4=0,002; p3-4=0,27		

Notes: 1. Intergroup difference %, calculated according to the χ^2 criterion for independent samples; 2. The intergroup difference in age medians was calculated using the Kruskal-Wallis ANOVA test.

Table 2. Ratio of men to women in different groups (reliability calculated according to the χ^2 criterion for one-group analyses)

1. Alimentary AP	2,0 to 1,0	$\chi^2=58,2$; p<0,0001
2. Alcoholic AP	7,6 to 1,0	$\chi^2=112,2$; p<0,0001
3. Biliary AP	0,6 to 1,0	$\chi^2=16,3$; p=0,0003
4. Postoperative AP	0,8 to 1,0	$\chi^2=1,4$; p=0,50
Men:		
p1-2=0,0001; p1-3<0,0001; p1-4=0,002; p2-3<0,0001; p2-4<0,001; p3-4=0,39		
Women:		
p1-2=0,0001; p1-3<0,0001; p1-4=0,002; p2-3<0,0001; p2-4<0,001; p3-4=0,39		

pain, serum lipase/amylase threefold above normal, and corresponding changes in the pancreas visualized on CT or US.

All patients were classified according to Atlanta 2012 criteria into three groups depending on severity. Mild acute pancreatitis was not characterized by organ failure and was not accompanied by local or systemic complications. Moderate acute pancreatitis was determined by the presence of transient organ failure and/or local complications. The severe course of acute pancreatitis was characterized by persistent organ failure, that is, organ failure lasting more than 48 hours [8].

Determination of the etiological factor of acute pancreatitis was carried out on the basis of a detailed collection of medical anamnesis. In cases of alcohol consumption before the onset of the disease, it was considered that acute pancreatitis has an alcoholic etiology. The biliary etiology of acute pancreatitis, not having a specific biochemical marker, was determined by visualization of calculi in the gallbladder and/or ducts, including microlithiasis, as well as in the presence of a history of biliary colic attacks and dysfunction of the sphincter of Oddi. The consumption of fatty and fried

food before the onset of the disease was considered as an alimentary factor. Although in the modern classification of acute pancreatitis according to the recommendations of Atlanta 2012, there is no alimentary genesis, we consider that such an etiological factor is important and should be taken into account, based on a clear cause-and-effect relationship of the development of AP in patients after eating fatty, fried food. Postoperative pancreatitis was defined according to the definition proposed by ISGPS [9]. ERCP-induced pancreatitis was diagnosed on the basis of the method proposed by Cotton P. [10]. A rare cause of acute pancreatitis was the use of certain medications by patients. In the absence of visible causes in the medical history, the etiological factor was considered unknown.

Statistical analysis of the obtained material was carried out using SPSS software (version 20, from IBM). Quantitative values are presented in the form of the median and interquartile range (25 and 75 percentiles) in the case of non-normal distribution of the value of the indicators, which is determined by the W-test (Shapiro-Wilk test) and in the form of the mean value (M) \pm standard deviation of the mean (σ) in with normal

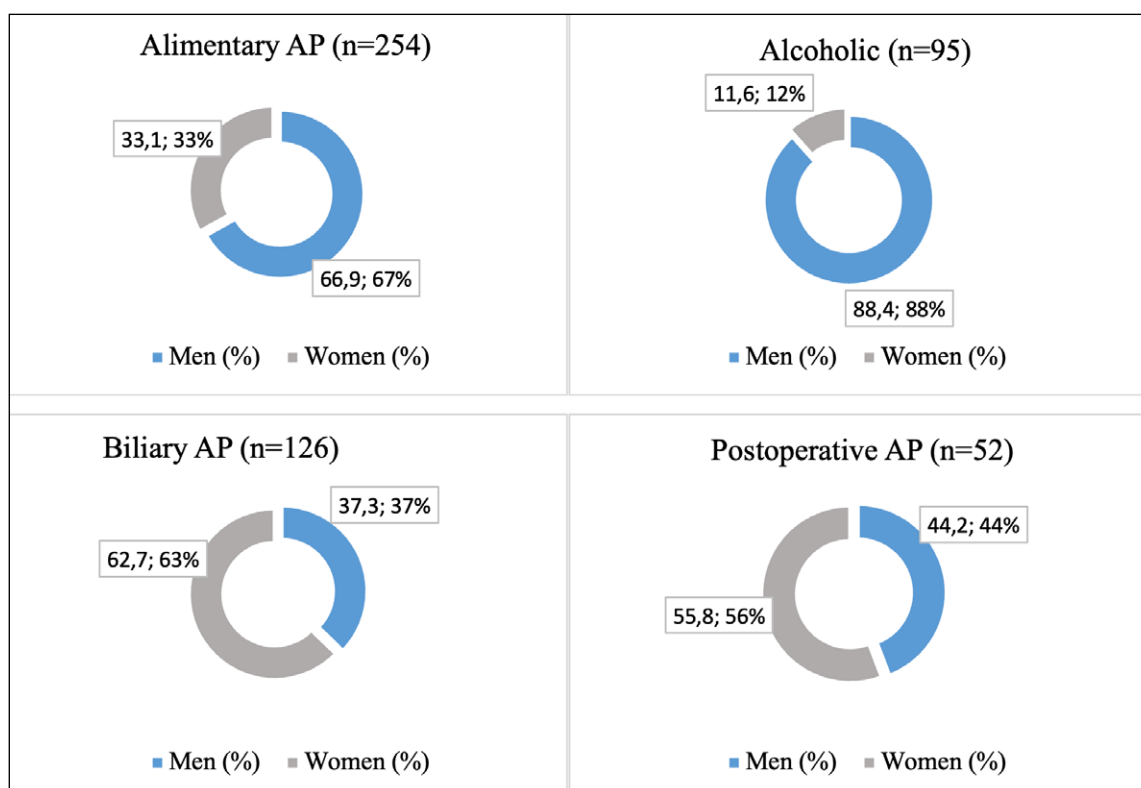


Fig. 3. Distribution (in %) by gender depending on the etiological variant of acute pancreatitis.
Note. Between-group distribution by gender, carried out according to the χ^2 test for independent samples.

distribution – p by W-test > 0,05. The reliability of the difference in the number of indicators was calculated for the median by Kruskal-Wallis ANOVA & Median test, for the average value – by one-way ANOVA & LSD-test. The level of significance was set at the 95% level, and the p value was considered statistically significant if it was less than 0,05.

RESULTS

Among all etiological factors of acute pancreatitis, alimentary was dominant – 254 (37,5%) cases, biliary factor was found in second place, which accounted for 126 (18,6%), alcoholic factor was the third most frequent – 95 (14,0%) and fourth place in the etiological structure of acute pancreatitis was taken by the postoperative factor – 52 (7,8%) cases. Another 150 (22,2%) patients had other causes of acute pancreatitis, which included post-traumatic, drug-induced acute pancreatitis, stress-induced acute pancreatitis, and in 134 (19,8%) patients, the cause of acute pancreatitis could not be determined (Fig. 1).

Analysis of the age characteristics of patients with acute pancreatitis depending on the cause of the disease showed (Fig. 2) that in the group with biliary AP (n=126) the oldest patients were observed, which was statistically significant compared to other groups

of patients (median age 61,0 vs. 46,0, 40,0 and 53,0 years, $p < 0,0001$, $p < 0,0001$ and $p = 0,03$, respectively). In addition, this group had the most elderly (37,5%) and senile (15,9%) patients, and the least young (24,6%) and middle-aged (23,8%) patients. Therefore, the proportion of young patients was significantly lower (24,6% versus 47,6% and 73,7%, $p < 0,0001$ and $p < 0,0001$, respectively), while the proportion of elderly patients (35,7% versus 15,7% and 3,2%, $p < 0,0001$ and $p < 0,0001$, respectively) and elderly (15,9% vs. 3,1% and 0, $p < 0,0001$ and $p < 0,0001$, respectively) age turned out to be more compared to groups of alimentary and alcoholic AP.

In the group with alcoholic AP, the youngest patients were observed (40,0 vs. 46,0, 61,0, and 53,0 years, $p = 0,001$, $p < 0,0001$, and $p < 0,0001$, respectively). Also, this group had the most young patients (73,7% vs. 47,6%, 24,6% and 32,7%, $p < 0,0001$; $p < 0,0001$ and $p < 0,0001$, respectively) and the least elderly patients (3,2% versus 15,7%, 35,7% and 30,8%, $p = 0,001$; $p < 0,0001$ and $p < 0,0001$, respectively) compared to other groups of patients. There were no elderly patients in the group with alcoholic AP (0 vs. 3,1%, 15,9% and 9,6%, respectively, $p = 0,08$; $p < 0,0001$ and $p = 0,002$, respectively).

It is worth noting that patients with alimentary and postoperative AP had an intermediate position with a slightly

Table 3. Mortality, duration of treatment, time factor and department of hospitalization depending on the etiological variant of acute pancreatitis

Clinical characteristics	Etiological variant of AP				Intergroup reliability (p) of the difference in results		
	Alimentary	Alcoholic	Biliary	Postoperative	1-2 1-3	1-4 2-3	2-4 3-4
Total (n=527)	1 group (n=254)	2 group (n=95)	3 group (n=126)	4 group (n=52)			
Lethal result, number (%) 44 (8,3 %)	16 (6,3 %)	21 (22,1 %)	7 (5,6 %)	0 (0)	<0,0001 0,77	0,06 0,0003	0,0003 0,08
Bed-day, days 8,0 (5,0; 12,0)	8,0 (5,0; 12,0)	6,0 (4,0; 9,0)	9,0 (6,0; 13,0)	10,0 (7,5; 14,5)	0,0009 1,00	0,43 <0,0001	0,0001 1,00
Time from the onset of the disease to hospitalization							
Up to 6 hours, number (%) 49 (9,3 %)	24 (9,4 %)	13 (13,7 %)	10 (7,9 %)	2 (3,8 %)	0,25 0,63	0,19 0,17	0,06 0,32
6-24 hours, number (%) 179 (34,0 %)	90 (35,4 %)	27 (28,4 %)	38 (30,2 %)	24 (46,2 %)	0,22 0,31	0,15 0,78	0,03 0,04
24-48 hours, number (%) 140 (26,6 %)	71 (28,0 %)	28 (29,5 %)	33 (26,2 %)	8 (15,4 %)	0,78 0,72	0,06 0,59	0,06 0,12
> 48 hours, number (%) 158 (30,0 %)	69 (27,2 %)	27 (28,4 %)	44 (34,9 %)	18 (34,6 %)	0,82 0,12	0,28 0,31	0,44 0,97
The department of patient's hospitalization							
Surgical, number (%) 456 (86,5 %)	224 (88,2 %)	66 (69,5 %)	114 (90,5 %)	52 (100,0 %)	<0,0001 0,50	0,009 0,0001	<0,0001 0,02
Intensive care unit, number (%) 66 (12,5 %)	27 (10,6 %)	27 (28,4 %)	12 (9,5 %)	0 (0)	<0,0001 0,74	0,01 0,0003	<0,0001 0,02
Another, number (%) 5 (0,9%)	3 (1,2 %)	2 (2,1 %)	0 (0)	0 (0)	0,52 0,22	0,43 0,10	0,29 -

Notes:

- Quantitative data are presented in the form of median and interquartile range (from the 25th to the 75th percentile) due to detection of non-normal distribution using the W-test (Shapiro-Wilk) and expressed as a percentage;
- The reliability of the difference between quantitative indicators is given using the Kruskal-Wallis ANOVA & Median test in percentages – according to the χ^2 criterion.

higher median age in the group with postoperative AP – 53,0 vs. 46,0 years, respectively ($p=0,08$). In addition, the family with postoperative AP had fewer young problems (32,7% vs. 47,6%, $p=0,04$) and used more elderly (30,8% vs. 15,7%, $p=0,01$) and older age (9,6% vs. 3,1%, $p=0,04$) compared to the alimentary AP (Fig. 2, Table 1).

Analysis by gender showed a significant predominance of men in the groups with alimentary and alcoholic AP (66,9% vs. 33,1% and 88,4% vs. 11,6%, $p<0,0001$ and $p<0,0001$, respectively) (Fig. 3, Table 2). Moreover, the largest proportion of men was found in the group with alcoholic AP and had statistical significance in comparison with other groups of patients (88,4% versus 66,9%, 37,3% and 44,2%, $p=0,0001$, $p<0,0001$ and $p<0,0001$, respectively). The ratio of men to women in the group with alcoholic AP was 7,6 to 1,0.

A significant predominance of women was observed in the group of patients with biliary AP (62,7% vs. 37,3%, $p=0,0003$), in comparison with the group of patients with

postoperative pancreatitis, where the gender distribution is almost equal (55,8% women versus 44,2% of men, $p=0,50$). The share of women in the group with biliary AP was the largest, which had statistical significance compared to alimentary and alcoholic (62,7% vs. 33,1% and 11,6%, $p<0,0001$ and $p<0,0001$, respectively).

In the course of treatment, 44 out of 527 (8,3%) patients died (Table 3). The highest percentage of mortality was in the group with alcoholic AP, which had statistical significance compared to all other groups of patients (22,1% versus 6,3%, 5,6% and 0, $p<0,0001$, $p=0,0003$ and $p=0,003$, respectively). In comparison with patients with postoperative pancreatitis, the mortality rate was higher in the group of patients with alimentary genesis, which tended to be significant (6,3% versus 0, $p=0,06$).

The duration of inpatient treatment in the total sample was 8,0 (5,0; 12,0) days. Despite the high mortality in the group with alcoholic AP, these patients had significantly

Table 4. Distribution of morphological forms and accompanying pathology depending on the etiological variant of acute pancreatitis

Morphological form of AP	Etiological variant of AP				Intergroup reliability (p) of the difference in results		
	Alimentary	Alcoholic	Biliary	Postoperative	1-2 1-3	1-4 2-3	2-4 3-4
Total (n=527)	1 group (n=254)	2 group (n=95)	3 group (n=126)	4 group (n=52)			
Morphological forms of AP							
Edema form, number (%) 396 (75,1 %)	191 (75,2 %)	65 (68,4 %)	98 (77,8 %)	42 (80,8 %)	0,20 0,58	0,39 0,12	0,11 0,66
Aseptic necrotic pancreatitis, number (%) 102 (19,4 %)	48 (18,9 %)	22 (23,2 %)	22 (17,5 %)	10 (19,2 %)	0,38 0,73	0,96 0,29	0,58 0,78
Infected necrotic pancreatitis, number (%) 28 (5,3 %)	15 (5,9 %)	7 (7,4 %)	6 (4,8 %)	0 (0)	0,62 0,65	0,07 0,41	0,04 0,11
Accompanying pathology							
Diagnosed accompanying pathology, number (%) 451 (85,6 %)	218 (85,8 %)	75 (78,9 %)	122 (96,8 %)	36 (69,2 %) ^w	0,12 0,001	0,004 <0,0001	0,19 <0,0001
Pathology of the stomach and duodenum, number (%) 210 (39,8 %)	114 (44,9 %)	33 (34,7 %)	54 (42,9 %)	9 (17,3 %)	0,09 0,71	0,0002 0,22	0,03 0,001
Cardiovascular pathology, number (%) 77 (14,6 %)	36 (14,2 %)	20 (21,1 %)	5 (4,0 %)	16 (30,8 %)	0,12 0,003	0,004 0,0001	0,19 <0,0001
Diabetes, number (%) 41 (7,8 %)	20 (7,9 %)	8 (8,4 %)	13 (10,3 %)	0 (0)	0,87 0,43	0,04 0,63	0,03 0,02
Gallstone disease, number (%) 119 (22,6 %)	12 (4,7 %)	1 (1,1 %)	93 (73,8 %)	13 (25,0 %)	0,11 <0,0001	<0,0001 <0,0001	<0,0001 <0,0001
Adiposity, number (%) 43 (8,2 %)	18 (7,1 %)	2 (2,1 %)	20 (15,9 %)	3 (5,8 %)	0,07 0,007	0,73 0,0007	0,24 0,07
Another pathology, number (%) 178 (33,8 %)	74 (29,1 %)	35 (36,8 %)	45 (35,7 %)	24 (46,2 %)	0,17 0,19	0,02 0,86	0,27 0,19
Number of accompanying diseases, 1,0 (0; 1,0)	1,0 (0; 1,0)	1,0 (0; 1,0)	2,0 (1,0; 2,0)	1,0 (0; 1,0)	1,00 <0,0001	1,00 <0,0001	1,00 <0,0001

less bed days compared to all other groups of patients (6,0 vs. 8,0, 9,0, and 10,0 days, respectively, $p=0,0009$, $p<0,0001$ and $p=0,0001$, respectively) (Table 3).

Analysis of the time from the onset of the disease to hospitalization of patients in the hospital in the general sample showed that in most cases this interval lasted from 6 hours and was the highest during the first day (from 6 to 24 hours – 34,0%). Intergroup analysis showed a significant prevalence of patients with postoperative pancreatitis who were hospitalized within 6-24 hours compared to alcoholic and biliary genesis (46,2% compared to 28,4% and 30,2%, respectively, $p=0,03$ and $p=0,04$, respectively).

86,5% (456) of patients with AP of the general sample were hospitalized for inpatient treatment in the surgical department. All patients with postoperative pancreatitis (100%) were hospitalized in the same department, as well as the majority of patients with alimentary (88,2%) and biliary genesis (90,5%). The smallest number of patients with AP who were hospitalized for treatment in the surgical department was the group with alcoholic genesis. This difference was statistically significant compared to other patient groups (69,5% vs. 88,2%, 90,5%, and 100%, respectively, $p<0,0001$, $p=0,0001$, and $p<0,0001$, respectively).

Instead, 12,5% (66) of patients were hospitalized immediately to the intensive care unit. Among them, there

Table 5. Distribution of complications depending on the etiological variant of acute pancreatitis

Complication of acute pancreatitis	Etiological variant of AP				Intergroup reliability (p) of the difference in results		
	Alimentary	Alcoholic	Biliary	Postoperative	1-2	1-4	2-4
Total (n=527)	1 group (n=254)	2 group (n=95)	3 group (n=126)	4 group (n=52)	1-3	2-3	3-4
Diagnosed complications, number (%) 184 (34,9 %)	86 (33,9 %)	37 (38,9 %)	53 (42,1 %)	8 (15,4 %)	0,38 0,12	0,009 0,64	0,003 0,0006
Fluid accumulations, number (%) 41 (7,8 %)	22 (8,7 %)	5 (5,3 %)	13 (10,3 %)	1 (1,9 %)	0,29 0,60	0,09 0,17	0,33 0,06
Phlegmon of the retroperitoneal space, number (%) 16 (3,0 %)	10 (3,9 %)	4 (4,2 %)	2 (1,6 %)	0 (0)	0,91 0,22	0,15 0,23	0,13 0,36
Parapancreatic abscess, number (%) 9 (1,7 %)	8 (3,1 %)	1 (1,1 %)	0 (0)	0 (0)	0,27 0,04	0,19 0,25	0,46 -
Diabetes mellitus, type II, (%) 11 (2,1 %)	8 (3,1 %)	1 (1,1 %)	2 (1,6 %)	0 (0)	0,27 0,37	0,19 0,73	0,46 0,36
Peritonitis, number (%) 24 (4,6 %)	11 (4,3 %)	9 (9,5 %)	3 (2,4 %)	1 (1,9 %)	0,07 0,34	0,41 0,02	0,08 0,85
Pseudocyst, number (%) 23 (4,4 %)	14 (5,5 %)	4 (4,2 %)	5 (4,0 %)	0 (0)	0,62 0,52	0,08 0,93	0,13 0,15
Pleurisy, number (%) 62 (11,8 %)	34 (13,4 %)	13 (13,7 %)	13 (10,3 %)	2 (3,8 %)	0,94 0,39	0,05 0,44	0,06 0,16
POPF, number (%) 2 (0,4 %)	1 (0,4 %)	0 (0)	0 (0)	1 (1,9 %)	0,54 0,48	0,21 -	0,18 0,12
Other, number (%) 116 (22,0 %)	46 (18,1 %)	29 (30,5 %)	34 (27,0 %)	7 (13,5 %)	0,01 0,04	0,42 0,56	0,02 0,05
Total number of complications 0 (0; 1)	0 (0; 1)	0 (0; 1)	0 (0; 1)	0 (0; 0)	1,00 1,00	0,13 1,00	0,07 0,06

were the most patients with alcoholic genesis of AP, which significantly outweighed the number of patients alimentary, biliary, and postoperative AP (28,4% versus 10,6%, 9,5% and 0 respectively, $p < 0,0001$, $p = 0,0003$, $p < 0,0001$, respectively) (Table 3).

The main morphological form of AP was edematous in all etiological variants of AP: alimentary – 75,2%, alcoholic – 68,4%, biliary – 77,8%, postoperative – 80,8%, respectively ($p > 0,10$). Aseptic necrotic pancreatitis occurred in 19,4% of patients in the general group and did not differ significantly in different etiological forms of AP: 18,9%, 23,2%, 17,5% and 19,2%, respectively ($p > 0,20$). While infected necrotic pancreatitis, as the most severe form of pancreatitis, was significantly more often detected in patients with alcoholic genesis, in particular compared to postoperative, in which this form was not detected in any case (7,4% vs. 0, $p = 0,04$) (Table 4).

In 85,6% of patients with AP, a concomitant pathology was diagnosed, and it was found significantly more often in patients with biliary etiology of AP compared to other etiological forms (96,8% compared to 85,8%, 78,9% and 69,2% respectively; $p = 0,001$, $p < 0,0001$ and

$p < 0,0001$ respectively). In addition, in patients with alimentary AP, concomitant pathology was detected significantly more often than in patients with postoperative AP (85,8% compared to 69,2%; $p = 0,004$). Thus, concomitant pathology was most often detected in patients with biliary genesis of AP, and least often - in patients with postoperative AP (Table 4).

The total number of complications in patients with AP was 34,9%. The most common among them were fluid accumulation (7,8%) and pleurisy (11,8%). It should be noted that in the group with postoperative pancreatitis the number of complications was significantly lower than in other etiological forms of AP (15,4% compared to 33,9%, 38,9% and 42,1%, respectively; $p = 0,009$, $p = 0,003$ and $p = 0,0006$). Also, in this same group, there was a trend towards a significant decrease in the number of cases of fluid accumulation compared to biliary AP (1,9% compared to 10,3%; $p = 0,06$) (Table 5).

Pancreatic fluid collections and pseudocysts were found significantly more often in patients with moderate and severe disease compared to those with mild disease (18,2% and 18,6% vs. 0,3%, respectively;

$p < 0,0001$ in both cases, and 12,0% and 6,2% vs. 0,3%; $p < 0,0001$ in both cases). On the other hand, phlegmon of the retroperitoneal space, parapancreatic abscesses, and type II diabetes were detected in the group with a severe course significantly more often than in those with a mild or moderately severe course (19,4% vs. 0% and 0,5%, respectively; $p < 0,0001$ in both cases; 10,1% vs. 0% and 0,5%; $p < 0,0001$ in both cases; and 8,5% vs. 0,3% and 1,6%; $p < 0,0001$ and $p = 0,003$, respectively). Logically, the total number of complications was significantly higher in patients with severe disease and significantly lower in those with mild disease (2,0, 1,0, and 0, respectively; $p < 0,0001$ in all cases).

DISCUSSION

This study showed significant variations of AP in gender distribution, age, time, laboratory and clinical, as well as different distribution of etiological groups according to the severity of the course and the results of treatment in different etiological variants of this pathology, which requires their careful study. Based on the latest understanding of the features of pathogenetic mechanisms and clinical features in each individual etiological variant of AP, it can help identify risk groups and determine the appropriate approach to each patient.

In recent years, more and more studies have appeared in which the authors tried to divide all causes of AP into two groups (biliary and non-biliary genesis) depending on their interaction with the biliary system. However, in our opinion, despite the convenience and simplicity of performing statistical processing in the case of two etiological groups, such a division is inherently limited.

The absence of an alimentary etiological variant of pancreatitis in modern classifications is, in our opinion, a misunderstanding of the importance of this factor in the development of acute pancreatitis. After all, in the dominant part of the patients analysed by us – 37,5% (254), a clear connection was noted with the intake of fatty, fried food on the eve of the disease in the absence of other causative factors, including any biliary factor.

In contrast to the current study, which was conducted in Ukraine, and according to the results of which the biliary factor of AP was in the second place and amounted to 18,6% (126), Alkareemy, E.A.R. et al., 2020, published the results of their study, in which the biliary factor was dominant in patients from Egypt and accounted for more than half of all cases – 56% [11]. Similar data, where the biliary factor of AP was dominant in the vast majority of patients, were published in a number of other studies. In particular, a 2020 study by Matta B, et al., whose final analysis included 1612 patients with AP, demonstrated the predominance of the biliary factor

of AP in India – in 45% of patients, in Latin America – in 78% of patients, respectively [12]. This can be explained by the geographical variations of this disease, in which different regions and countries may have differences in the causative factors of the development of acute pancreatitis, such as nutrition, alcohol consumption, infections, genetic aspects, etc.

Regarding the age structure, patients with biliary AP were characterized by the highest age (median 61,0 years), while patients with alcoholic AP were the youngest (median 40,0 years). Elderly patients with alcoholic genesis of AP were not identified at all. The highest age at biliary genesis is predictable, because the frequency of gallstone formation increases with age, which is confirmed by many studies. In particular, a Chinese study found that the presence of gallstones are independent risk factors for the development of AP in people older than 55 years [13].

Men significantly predominated in the groups with food and alcohol genesis, especially in the last one (the ratio of men to women was 7,6 to 1,0). However, this trend suddenly changed in favor of a significant preponderance of women in the case of biliary AP, which corresponds to the results of other studies [14, 15], while in the postoperative variant the ratio of men to women was almost equal.

Of the 44 reported deaths among the 527 patients examined (8,3%), the highest mortality rate was recorded in the alcoholic AP group (22,1%), while there were no deaths in the postoperative AP group (0).

The mean length of hospital stay for all patients with AP was 8,0 (5,0; 12,0) days, with the shortest duration of treatment recorded in the group with the alcoholic variant of AP (median 6,0 days). 86,5% of patients with AP were hospitalized in the surgical department, 100% of them with postoperative AP and the vast majority with alimentary (88,2%) and biliary (90,5%). The largest number of cases of treatment in the intensive care and intensive care unit amounted to 28,4% and was registered in patients with an alcoholic etiology of AP.

The edematous form prevailed in all etiological variants of AP. However, infected necrotic pancreatitis, as the most severe form of pathology, was diagnosed significantly more often in patients with the alcoholic variant of AP (7,4%). This echoes data from a meta-analysis, which also revealed a more frequent development of necrotic AP in patients with alcoholic compared to biliary AP (OR = 1,58, 95% DI 1,08-2,30) [7]. In our opinion, this may be related to deeper metabolic intracellular changes under the influence of alcohol than in other forms [16].

In addition to pancreatitis, another pathology was also detected in 85,6% of the examined. This was much more common in patients with biliary AP and

significantly less often in patients with postoperative AP. In our opinion, the biliary variant of AP should be considered as a polymorbid disease, since more than two concomitant diseases were observed in almost half of the cases.

Complications of AP were detected in 34,9% of patients. The most common among them were fluid accumulation (7,8%) and pleurisy (11,8%). The group with postoperative AP had the lowest number of complications. In our opinion, the latter is related to the fact that patients who underwent surgical interventions received postoperative treatment, including infusion therapy, nonsteroidal anti-inflammatory drugs, what reduce the risk of complications in patients with postoperative acute pancreatitis.

CONCLUSIONS

This study showed significant variations in gender distribution, age characteristics, pre-hospital duration of the pathological process, morphological forms, clinical course, complications and consequences of acute pancreatitis depending on its etiology. Among the most common causes of AP were consumption of fatty foods, alcohol and the presence of gallstones. Acute alcoholic pancreatitis occurred more often in men, while acute biliary pancreatitis occurred more often in women. Differences by sex in the manifestation of the disease, time of onset, course, diagnosis, severity and consequences should be taken into account when developing treatment tactics, taking into account the etiological variant of the pathology.

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CONFLICT OF INTEREST

The Author declare no conflict of interest

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