

EPIDEMIOLOGICAL CHARACTERISTICS OF PANCREATIC LIPOMATOSIS, HYPERCHOLESTEROLEMIA, AND ALKALINE PHOSPHATASE AS RISK FACTORS FOR BILIARY PANCREATITIS

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Introduction.

Global studies have established that in more than 40% of cases, pathologies of the biliary tract play a significant role in the development of pancreatitis. In such situations, pancreatitis arises against the background of the following conditions: anomalies in the position and shape of the gallbladder, strictures and cysts of the distal pancreatic duct and common bile duct, stenosis of the sphincter of Oddi (in 52% of cases), chronic cholecystitis (in 42%), gallstone disease or consequences of cholecystectomy (in 6%) (Tsuman I.G. et al., 2001). Up to 25% of cases of pancreatitis in children are caused by gastrointestinal disorders (Moriville V.D. et al., 2010; Kornienko E.A. et al., 2010).

According to data presented by Rizaev K.S., Shukurov B.I., and Sattarov B.S. (2022), in 20% of patients with acute pancreatitis, pancreatic necrosis is diagnosed, which increases mortality to 20–30% due to infection of pancreatic necrosis, developing in 70% of cases.

Studies by Capp J. et al. (2019), Wadhwa V. et al. (2017), and Petrov M.S. et al. (2010) report that mortality in acute pancreatitis is around 1%. However, in complicated and severe cases (with pancreatic necrosis, multiple organ failure, or other complications), this rate can reach 40% or increase up to 40-fold.

These data clearly demonstrate that biliary pancreatitis is a serious medical, economic, and social problem. In patients with biliary tract disorders, multiple factors contribute to the development of biliary pancreatitis.

Objective.

To study the epidemiological characteristics of pancreatic lipomatosis, hypercholesterolemia, and elevated serum alkaline phosphatase levels as risk factors for biliary pancreatitis.

Materials and Methods.

This study investigated the epidemiological characteristics of the relationship between hypercholesterolemia (HCh), pancreatic lipomatosis (PL), and elevated serum alkaline phosphatase (ALP) levels with the development of biliary pancreatitis in 1500 geriatric patients diagnosed with biliary pancreatitis.

Hypercholesterolemia was identified in one out of every four (25.0%) of the studied population aged 60 to 90 years.

The prevalence of biliary pancreatitis among elderly individuals with confirmed hypercholesterolemia was 41.0%, while among those without hypercholesterolemia it was only

5.3%. Thus, the prevalence of biliary pancreatitis in the presence of hypercholesterolemia was more than eight times higher ($p = 0.012$).

The frequency of biliary pancreatitis across different age groups among individuals with and without hypercholesterolemia is presented below.

Table 1. Characteristics of the occurrence of biliary pancreatitis depending on the presence of hypercholesterolemia

Age group	Presence of HCh (n)	BP (abs.)	BP (%)	<i>p</i>	Absence of HCh (n)	BP (abs.)	BP (%)
60–74 years	647	259	40.0	0.012	441	27	6.1
75–89 years	212	91	42.9		172	6	3.5
≥90 years	23	12	52.2		5	1	20.0
Total (≥60)	882	362	41.0		618	34	5.5

Note: HCh – hypercholesterolemia; BP – biliary pancreatitis

OR = 8,11; CI [5,59 – 11,77]; $\chi^2 = 154,43$; $p < 0,05$

Pancreatic lipomatosis is reliably associated with an increased risk of developing biliary pancreatitis [OR = 7.89]. The confidence interval and Fisher's p -value also indicate the statistical significance of the obtained results [95% CI: 5.48–11.35; $p < 0.05$].

Table 2. Epidemiological characteristics of the prevalence of pancreatic lipomatosis among elderly individuals and its association with biliary pancreatitis

Age group	Lipomatosis (n)	BP (abs.)	BP (%)	<i>p</i>	Without lipomatosis (n)	BP (abs.)	BP (%)
60–74 years	695	257	37.0	0.066	393	27	7.0
75–89 years	255	91	35.7		129	6	4.7
≥90 years	24	12	50.0		4	1	25.0
Total (≥60)	974	360	37.0		526	34	6.4

Note: BP – biliary pancreatitis

1. Among individuals aged **60–74 years**, the prevalence of biliary pancreatitis was **40.0%** in the presence of hypercholesterolemia (HCh) and **6.1%** in its absence, indicating a **6.6-fold higher prevalence** ($p = 0.001$).
2. In the age group **75–89 years**, the rates were **42.9%** versus **3.5%**, i.e., more than **14 times higher** in the presence of HCh ($p = 0.001$).
3. In individuals older than **90 years**, biliary pancreatitis was also diagnosed significantly more often in the presence of HCh (**52.2%**) compared with its absence (**20.0%**).

Thus, the prevalence of biliary pancreatitis in the geriatric population with hypercholesterolemia ranged from **41.0% to 52.2%**, significantly exceeding the rates observed in the control groups [OR = 8.11; 95% CI: 9.59–11.77; $\chi^2 = 154.43$; $p < 0.05$].

The epidemiological characteristics of the prevalence of **pancreatic lipomatosis** in the geriatric population and its association with the development of biliary pancreatitis were also assessed. Specific trends and features were confirmed and quantitatively presented in the form of an analytical review of the obtained data.

Table 3 presents the epidemiological data on the prevalence of elevated alkaline phosphatase (ALP) levels in elderly individuals and its relationship with biliary pancreatitis. According to the table, the prevalence of biliary pancreatitis among individuals with elevated ALP (ALP+) was **33.3%**, while in those with normal ALP levels (ALP–) it was **24.1%**, i.e., the difference was **9.2%** ($p = 0.726$), which is not statistically significant.

In the **60–74 years** age group, biliary pancreatitis was observed in **34.4%** (ALP+) and **23.3%** (ALP–), which was statistically significant ($p < 0.05$). In the **≥90 years** age group, the rates were **30.3%** versus **60.0%** respectively ($p < 0.05$), which, despite the reverse trend, also reached statistical significance.

Table 3. Epidemiological characteristics of the prevalence of alkaline phosphatasemia in elderly individuals and its association with biliary pancreatitis.

Age group	ALP+ (n)	BP (abs.)	BP (%)	<i>p</i>	ALP– (n)	BP (abs.)	BP (%)
60–74 years	287	99	34.4	0.888	801	187	23.3
75–89 years	144	45	31.3		240	52	21.7
≥90 years	13	4	30.8		15	9	60.0
Total (≥60)	444	148	33.3		1056	248	23.5

Note: ALP+ – elevated alkaline phosphatase; ALP– – normal alkaline phosphatase; BP – biliary pancreatitis

RR = 1,73; CI [1,35 – 2,22]; $\chi^2 = 19,36$; $p < 0,05$

An elevated level of alkaline phosphatase is reliably associated with an increased risk of developing biliary pancreatitis up to 73% [OR = 1.73]. The confidence interval and Fisher's *p*-value also confirm the statistical significance of this result [95% CI: 1.35–2.22; $p < 0.05$].

Conclusions

1. **Hypercholesterolemia** is one of the leading risk factors for the development of biliary pancreatitis: it was established that in individuals with elevated cholesterol levels, the probability of developing biliary pancreatitis is **8 times higher** compared to those with normal cholesterol [OR = 8.11]. The confidence interval and Fisher's *p*-value also confirm the statistical significance of this result [95% CI: 5.59–11.77; $p < 0.05$].
2. **Pancreatic lipomatosis (PL)** occurs in **37.0%** of the geriatric population of the Fergana region. Among individuals without signs of PL, biliary pancreatitis is diagnosed in only **6.4%** of cases. Thus, the presence of lipomatosis increases the risk of developing biliary pancreatitis by more than **six-fold** [RR = 7.89; 95% CI: 5.48–11.35; $\chi^2 = 155.9$; $p < 0.05$].
3. **Elevated alkaline phosphatase (ALP+)** is a reliable risk factor for biliary pancreatitis in elderly individuals — the disease is diagnosed in **one out of every three patients** with this biochemical marker [RR = 1.73; 95% CI: 1.35–2.22; $\chi^2 = 19.36$; $p < 0.05$].

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