

REVIEW ARTICLE

TREATMENT OF PATIENTS WITH CHRONIC PANCREATITIS COMPLICATED BY PANCREATORAGIA

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ABSTRACT

The aim: To present and share our experience in the treatment of pancreatoragia which could help to prevent pancreatoragia in patients with chronic pancreatitis in the pre- and postoperative period.

Materials and methods: Surgical treatment of complicated chronic pancreatitis (CP) was performed on 249 patients in the surgical clinic of the medical faculty №2 of National Pirogov Memorial Medical University of Vinnytsia during 2000 - 2021. Pancreatorrhagia occurred in 6 (2.4%) patients, group A – 3 (1.2%) – as disease manifestation, group B – 3 (1.2%) – as complication after surgery.

In group A the source of bleeding was the lower pancreato-duodenal artery: 2 (0.8%) had lower pancreaticoduodenal artery aneurysms with bleeding into the cyst, 1 (0.4%) – a year after previously performed pancreato-duodenal resection. In group B pancreatorrhagia developed in 3 (1.2%) patients after the Frey-Izbitsky local resection of the pancreas: 2 (0.8%) – from pancreato-jejuno anastomosis, 1 (0.4%) – from pancreatopleural fistula.

Conclusions: Pancreatoragia, as a manifestation of chronic pancreatitis, occurred in 6 (2.4%) patients. Bleeding occurred as a manifestation of the disease in 3 (1.2%) patients and in 3 (1.2%) patients – in the postoperative period. It is possible to use fibrin or cyanoacrylate glue to filling the defect of the pancreatic duct or to suture vessels in the parenchyma of the pancreas by PDS for the prevention of pancreatoragia in the postoperative period.

KEY WORDS: chronic pancreatitis, pancreatoragia, complications

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INTRODUCTION

Chronic pancreatitis (CP) is a polyetiological disease which has a number of pathogenetic pathways of the pancreatic glandular tissue fibrotization. Clinical manifestations of classical CP are belt-like abdominal persistent pain, exo- and endocrine insufficiency; pathomorphological signs are atrophy and fibrosis of the pancreas with dilation of the main pancreatic duct and calculosis. Pancreatoragia is a bleeding from the Vater's papilla, where the source of bleeding is in the pancreas or in adjacent structures [1,2]. Pancreatoragia is an extremely rare manifestation of the chronic pancreatitis. The pancreatoragia may occur in ruptured aneurysm or pseudoaneurysm of the pancreatoduodenal, gastroduodenal, hepatic arteries into pseudocyst cavity. Such cases are unusual, but according to some studies, the incidence of bleeding into the pseudocyst cavity ranges from 6 till 17%. The cause of pancreatoragia can be a tumor of the pancreas, for example: adenocarcinoma of the pancreas, serous cystadenoma, mucinous cystic pancreatic neoplasms, neuroendocrine tumors. Bleeding from the pancreas can be also as the result of iatrogenic trauma after medical manipulations, such as

biopsy of the pancreas during endoscopic ultrasound, stenting, etc. [3]. Often, pancreatoragia complicates the postoperative period after surgery on the pancreas. According to the recommendations of the International Study Group of Pancreatic Surgery (ISGPS) for bleeding after pancreatectomy, there are three degrees of bleeding: degree A, B, C. According to the time of onset divide early (up to 24 hours after surgery) and late (later 24 hours after surgery) bleeding. The source of bleeding can be intraductal, extraductal. According to the severity it can be mild or severe [4,5].

THE AIM

The aim of our study was to present and share our experience in the treatment of pancreatoragia which could help to prevent pancreatoragia in patients with chronic pancreatitis in the pre- and postoperative period.

MATERIALS AND METHODS

Surgical treatment of complicated chronic pancreatitis (CP) was performed on 249 patients in the surgical

department of the medical faculty №2 of National Pirogov Memorial Medical University, Vinnytsya., Vinnytsya, Ukraine during 2000 - 2021. There were 187 men (74.8%) and 62 women (25.2%), the average age were 51.25 ± 13.7 years.

According to the TIGAR-O classification 193 (77.6%) patients with CP had previously attack of acute pancreatitis, 176 (71.1%) patients were alcohol abused. Calcifying form of CP had 28 patients, obstructive form - 30, fibrosis - 55, inflammatory - 5, pancreatic cysts was detected in 119 patients. According to the Büchler classification "B" stage of chronic pancreatitis was observed in 38.2% (n = 96) patients, "C" stage - 61.8% (n = 153) patients. Pancreatogenic diabetes was observed in 101 (41, 06%) patients. All patients underwent transabdominal surgery. Pancreatic resection was performed in 58 patients (23%), internal and external drainage - 109 patients (43%), symptomatic procedures - 82 patients (32%).

REVIEW

Pancreatoragia is a bleeding from the main duct of the pancreas, which occurred in 6 (2.4%) out of 249 patients. Moreover, in 3 (1.2%) patients bleeding occurred as a manifestation of the disease, and in other 3 (1.2%) patients - in the postoperative period.

Two patients had an aneurysm of the lower pancreaticoduodenal artery out of patients which had pancreatoragia as the main manifestation of the disease. There was a cyst of the pancreas, which had no connection with the main pancreatic duct (type VI by Nealon), where was detected active blood flow. Both patients had elective surgery to treat CP. Bleeding was stopped by suturing the pancreaticoduodenal artery. One patient was admitted to hospital with manifestations of profuse gastrointestinal bleeding (case I).

CASE I

Patient M., 45 years old, was admitted to surgical department on November 2018 with active gastrointestinal bleeding with signs of hemorrhagic shock. In anamnesis the pancreaticoduodenal resection was performed for chronic fibro-degenerative calculous pancreatitis in the 2014. Pancreaticojejunostomy was performed by a combined method: formed by a two-row duct-to-mucosa pancreaticojejunostomy with additional Blumgart type protective mattress sutures (Fig 1 A,B)

The patient was urgently performed fibrogastroduodenoscopy - the source of bleeding in the upper gastrointestinal tract was not detected. Laboratory tests: complete blood count: Hb-52 g/l, eryth-

rocytes - $1,85 * 10^{12}/l$, leukocytes - $8,2 * 10^9/l$, erythrocyte sedimentation rate (ESR) - 37 mm/h, blood glucose 8,3 mmol/l, total protein - 70 g/l, bilirubin total 0.5 mg/dL, direct - 0, urea - 5.4, creatine - 0.02, prothrombin index - 80%, prothrombin time - 14', fibrinogen - 3.2 g/l. Medications include fresh-frozen plasma, erythrocytes, tranexamic acid, etamsylate, omeprazole 120 mg, octreotide. The volume of intravenous therapy was up to 3 liters per day.

The conservative treatment helped to stop bleeding. The next day, fibrocolonoscopy was performed: no pathology of the colon was detected. However, after the procedure, the patient had a recurrence of bleeding in the hospital.

In the state of severe hemorrhagic shock the patient underwent urgent surgical treatment. During the operative exploration the entire small intestine was filled with blood above the entero-entero anastomosis. Fibrogastroduodenoscopy was performed intraoperatively, no sources of bleeding in the upper gastrointestinal tract (upper ligament of Treitz) were found. It was decided to continue the Fibrogastroduodenoscopy with manual assistance to the level of entero-entero anastomosis where was no source of bleeding also. When the endoscope approached the pancreaticojejunostomy, a large amount of fresh blood suddenly had appeared in the lumen of the afferent loop. Enterotomy was made below the functional choledochojejunostomy up to 4 cm and during the operative exploration from the area of pancreaticojejunostomy the pulsating bleeding appeared, blood stream was up to 0.3 cm, the vessel was sutured, the bleeding was stopped. A ligature impregnated with bile salts was found in the lumen of the anastomosis on the surface of the intestine, which was removed. The enterotomy incision was sutured with a double-row suture.

The postoperative period passed without complications. The patient was discharged on the 10th day after surgery.

CASE II

Patient N., 51 years old, was admitted to surgical department on January 23, 2017 with complaints on severe pain in the upper abdomen, nausea, repeated vomiting of undigested food, abdominal swelling, weight loss, severe general weakness.

According to his medical history he has been ill for two years, from the moment of acute destructive pancreatitis occurring caused by alcohol consumption.

At the time of admission diagnosis was chronic fibrous-degenerative calculous pancreatitis, with persistent pain syndrome, external and internal secretory insufficiency.

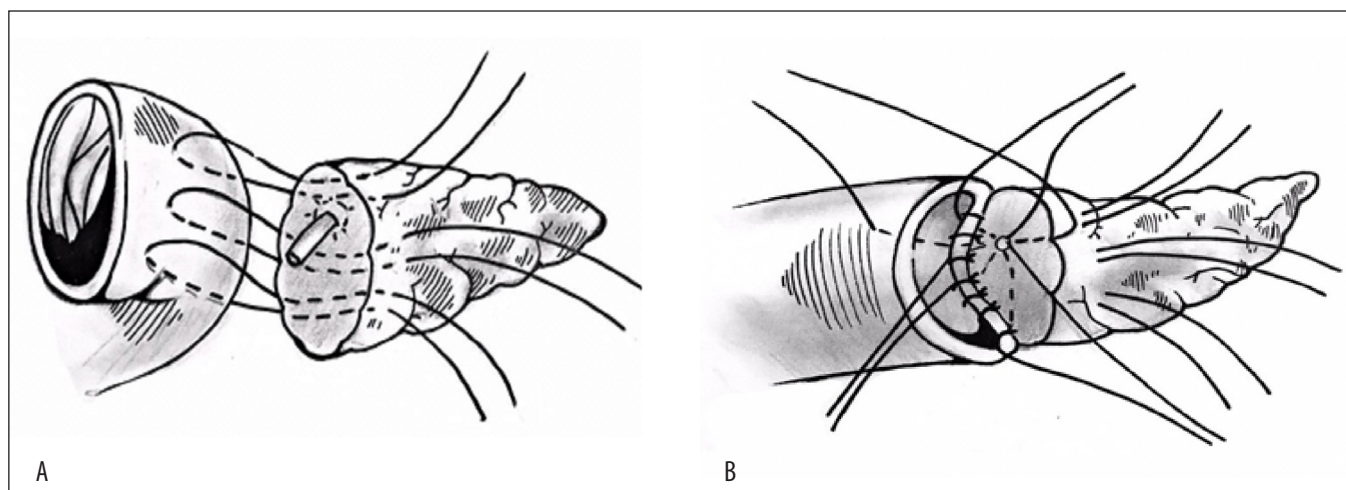


Fig. 1. A: Modified type of pancreato-jejuno anastomosis. B: Modified type of pancreato-jejuno anastomosis

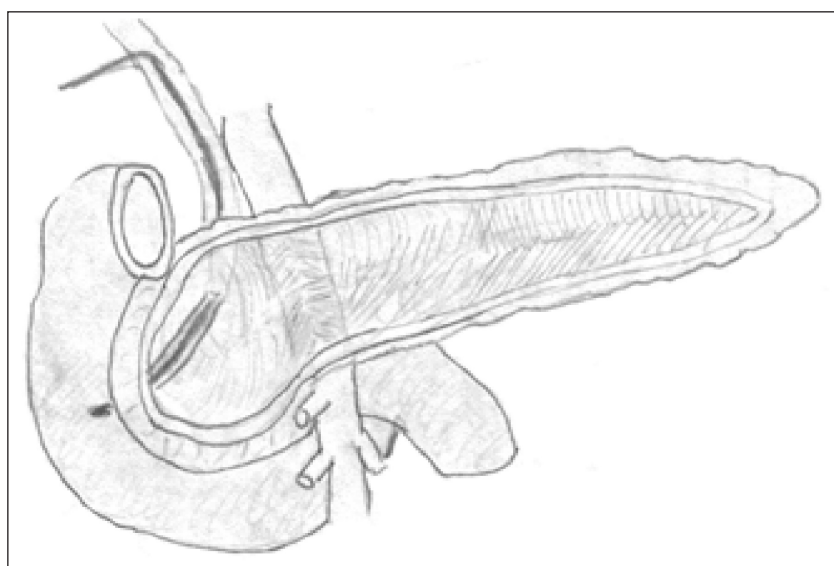


Fig. 2. Borders of Frey-Izbicki local resection of the pancreas

The patient underwent surgery - combined Frey-Izbickiy local pancreatic resection with longitudinal Roux-en-Y pancreaticojejunostomy with entero-enteroanastomosis. The technique of the surgery was in the following way: there was performed U-shaped excision of the pancreas tissue throughout all pancreas parenchyma and the boundaries of the excision were 5 mm on the upper and lower border of the body and tail of the pancreas. The boundary of the depth is the cut of a back wall of the pancreatic main duct. The next stage was excavation in the head of the pancreas. The cutout border was about 5 mm along the upper, lateral and lower borders of the pancreatic head. The depth cut of removal is the posterior wall of the Virsung duct, the duct of the uncinete process, which was excised, and the common bile duct. The Santorini duct was excised in one block with the upper part of the pancreatic parenchyma. Excision of the pancreatic tissue was performed with an electrocautery, there

was performed additional electrocoagulation of small pancreatic vessels and the arteries of the parenchyma were additionally sutured with separate ligatures. Therefore, in the area of a pancreatic gland's head there was a thin rim of thickness approximately 5 mm. This operation was supplemented by transpancreatic papillosphincterotomy to restore the physiological passage of pancreatic juice into the duodenum (patent of Ukraine №115291 from 10.10.2017). (Fig 2)

Then a pancreaticojejunostomy was performed on the Roux-en-Y intestinal loop (40 cm) with the Brown entero-entero anastomosis. In the postoperative period, the patient had a small amount (up to 10-15 ml) of fresh blood discharge from drainages in the lesser sac. Furthermore, after the restoration of the natural intestinal passage, a melena stool was noticed. The level of HB was - 110 g / l, er - $3,1 \cdot 10^{12}$ / l. The patient underwent standard postoperative medication plus additionally heamostatic therapy was prescribed.

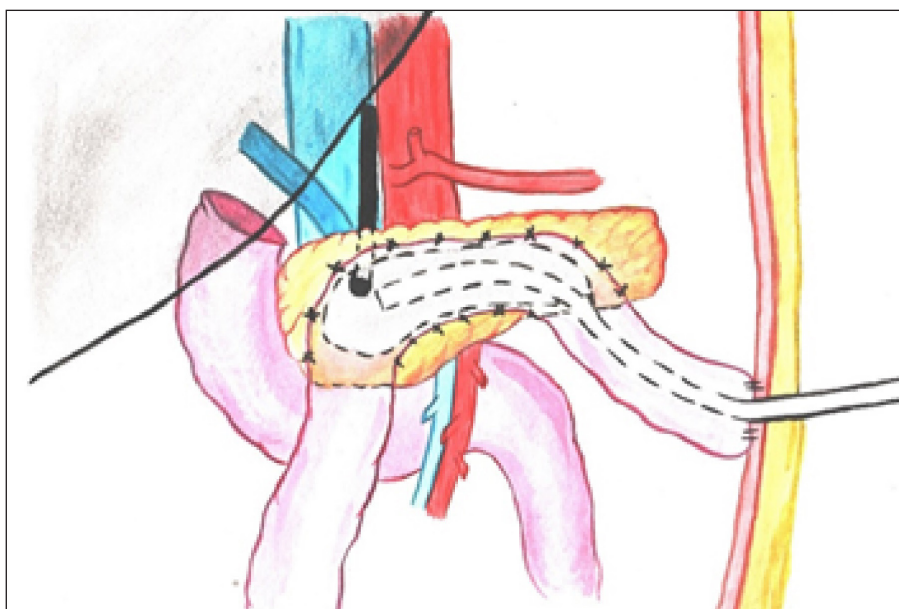


Fig. 3. Protective jejunostomy on the same loop of intestine with pancreato-jejunoanastomosis after Frey-Izbicki local resection of the pancreas in patient with pancreato-pleural fistula.

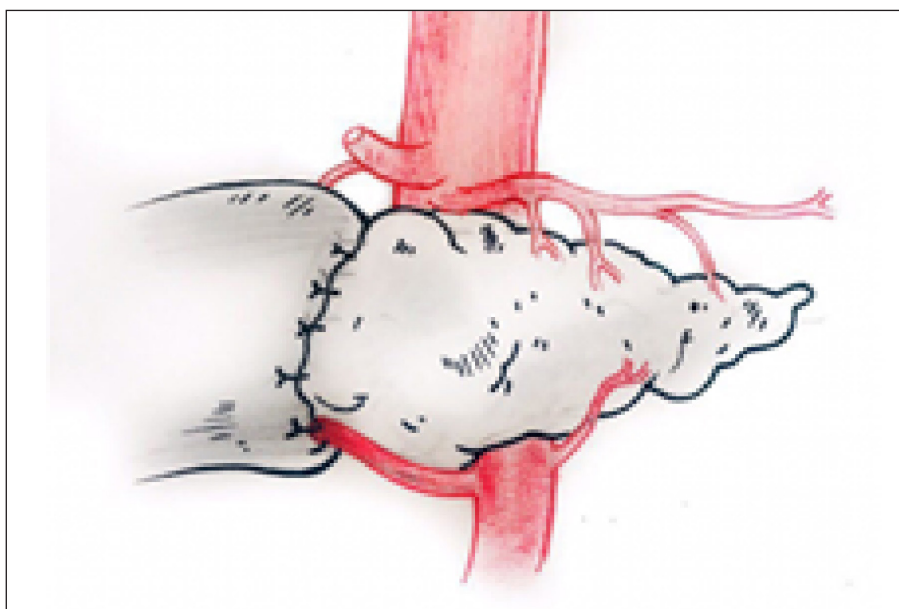


Fig. 4. The branch of inferior posterior pancreato-duodenal artery involved in pancreato-jejuno anastomosis.



Fig. 5. Possible source of bleeding from pancreato-jejuno anastomosis after Frey-Izbicki local resection of the pancreas.

On the 7th day of the postoperative period patient had recurrences of bleeding.

The patient underwent urgent relaparotomy: during the operative exploration of the abdominal cavity - the lumen of the pancreaticojejunostomy, the Roux-en-Y intestinal loop, the entero-entero anastomosis, the afferent intestinal loop of the small intestine, including the duodenum and part of the stomach were tightly swabbed with a single clot. The volume of blood clot was up to 200 ml in the lesser sac. The clots were removed from the lesser sac. The pancreatic jejunal anastomosis was separated on his upper part, clots were removed from the intestinal lumen. The intestinal lumen was processed by antiseptics, but a detailed inspection did not reveal the source of the bleeding. Additional coagulation of the pancreas resection area was performed. A jejunostomy was formed on the previously formed Roux-en-Y intestinal loop to control hemostasis, and a pancreaticojejunostomy anastomosis was formed on the same Roux-en-Y intestinal loop. (Fig 3) Sanation and drainage of the abdominal cavity was done.

The postoperative period passed with supuration of the laparotomy wound, severe hypochromic anemia. The patient was discharged on the 20th days after surgery.

CASE III

Patient K., 41 years old, was admitted to surgical department on February 17, 2020. According to his medical history he had an attack of acute pancreatitis 1 year before, then was treated three times because of diffuse pleural fibrosis and underwent surgical procedure - decortication of the left lung 4 months ago.

During the examination: Ps - 92 beats / min. Blood pressure was = 90/60 mm Hg. Sa O₂ = 93%. Weakened vesicular breathing with moist rales is heard in the lower parts of the right lung. The abdomen was painful in the upper part of abdomen, bloated. During rectal exam were not found any changes. Hb-83 g/l, erythrocytes - $2.77 \cdot 10^{12}/l$, leukocytes - $6.4 \cdot 10^9/l$, ESR -40 mm/h, blood glucose 3.9 mmol/l, total protein - 47 g/l, albumin 24 g/l, total bilirubin 0.94 mg/dL, direct - 0, indirect - 0.94 mg/dL, urea - 4.8, creatine - 0.062 mmol/l, prothrombin index - 89%, fibrinogen - 4.2 g / l. The patient had CT scan where detected pancreato-pleural and pancreato-mediastinal fistula.

The patient was prescribed medication therapy: hemostatic, antibiotic therapy, fresh-frozen plasma, erythrocytes, proton pump inhibitors, nonsteroid anti-inflammatory drugs.

The patient underwent surgical treatment. During the operative exploration of the pancreas: head 6 cm, body - 2 cm, tail 2 cm, all structures were fibrous changed. In

the caudal part of the pancreas fistula was detected: up to 1 cm in diameter, which begins on the posterior surface of the pancreatic body and run to the left adrenal gland. Spleen-preserving corporo-caudal resection of the pancreas was made. The fistula was cut out. During inspection of a stump of a pancreas - the pancreatic duct was being expanded to 1 cm. The pancreatic duct is dissected throughout to the head of the pancreas. Local resection of the pancreas by Frey-Izbitsky with subsequent revision of the duct was made.

In the area of the pancreatic head on the posterior surface was found another fistula, which run from the main pancreatic duct into the retroperitoneal space and spread to the mediastinum along the v.porta and v.cava. Due to the absence of possibility of resection of the fistula or its excision decided to make external drainage of the fistula through a suspended jejunostomy on the excluded loop on Roux-en-Y loop (fig 5). On the same intestinal loop, a Duval pancreatojejunostomy was formed with a double-row suture with an entero-entero anastomosis.

The postoperative period passed with complications. On the 7th day after surgery patient had fresh blood discharge from a fistula, which had drained through an enterostomy. Furthermore, there was a secretion of fresh blood in the drainage from the abdominal cavity. The patient had hemorrhagic shock. Hemostatic therapy was performed the bleeding was stopped by medication. According to computed tomography, there was a retroperitoneal hematoma in the area of the portal vein. The patient's condition stabilized. The patient was discharged on the 21st day. However, on the 40th day of the postoperative period, at home the patient had a recurrence of profuse bleeding which caused the patient death.

DISCUSSION

Following literature analysis there are no statistical data that can show the actual incidence of late pancreatoragia. Among the possible reasons it can be the erosion of pseudoaneurysms of the pancreaticoduodenal vessels [5].

Following the case I, that was happening to this patient, we can suggest that the bleeding arose from the lower pancreaticoduodenal artery, which was cut out through the mattress suture because of heavy physical activity which this patient had and it could cause severe pancreatoragia. The case belongs to a series of casuistry. Based on our sample data, late pancreatoragia was recorded in one patient out of 249, which set 0.4% [6,7].

According to the case II the literature review about early pancreatoragia showed that this complication

occurs in 2-3% of cases. The common cause II of bleeding is ligature eruption or vascular erosion in the area of pancreaticojejunostomy [9].

Among patients presenting with pancreatoragia in our sample, postoperative bleeding from pancreaticojejunostomy occurred in 2 (0.8%) patients. Bleeding occurred in patients which had been undergoing Frey-Izbitsky combined surgery in the early postoperative period, which is probably occurred due to the larger volume of pancreatic resection.

In this case II, massive bleeding occurred in the early postoperative period, on the seventh day, probably from the artery after eruption by ligature. The source of bleeding could be multiple branches of the anterior pancreatoduodenal artery, its prepancreatic arcade or branches of the splenic artery and pancreatic arteries of the pancreatic body and tail. (Fig 5)

The bleeding occurred in two stages. The first stage, when there was leakage of blood through the drainage, in a volume up to 20 ml. The second stage was after eruption of the ligature, when began massive bleeding which caused hemorrhagic shock. It didn't notice intraoperative, during the primary operation, when hemostasis was achieved by electrocoagulation and additional suturing of the vessel. Obviously, the cause of ligature eruption may be the case of excessive pulling of the node, with eruption of the parenchyma by a thread or tying a ligature at the site of excessive tissue coagulation, which eventually is weakened and rejected after some period of a time. The third probable cause is the erosion of the stitched vessel by pancreatic juice.

To prevent this type of bleeding in postoperative period, the hemostasis must be performed extremely by suturing blood vessels in the parenchyma of the pancreas with S-shaped sutures. PDS 3/0 or 4/0 were used for hemostasis.

The data analysis of pancreaticopleural fistula showed that pancreaticopleural fistula occurs in 0.4% of patients

with chronic pancreatitis. The level of complications that accompany the course of pancreaticopleural fistula is indicated at 10%, but the details of complications in the literature were not specified. [10]

The clinical case was published in 2007 where chronic pancreatitis was complicated by pancreaticopleural fistula and hemotorax, which required surgical treatment. However, the authors did not prove that the bleeding arose from the lumen of the pancreatic-pleural fistula. [11]

According to the cause III of pancreatoragia, there was vascular erosion in the lumen of the pancreaticopleural fistula. Erosion probably was occurred before surgery, which was impossible to recognise during the operation. The cause of erosion is difficult to analyze, because after surgery, the ingress of pancreatic juice into the lumen of the fistula was interrupted, i.e. the main factor in the occurrence of bleeding was removed. However, this clinical case indicates that any defect in the lumen of the Virsung duct, even when the outflow of pancreatic juice into the intestine must be closed, either by stitching or by filling with fibrin or cyanoacrylate glue.

Postoperative mortality among patients with pancreatoragia was 16.7% (1 patient), who died 40 days after surgery.

CONCLUSIONS

1. Pancreatoragia, as a manifestation of chronic pancreatitis, occurred in 6 (2.4%) patients. Bleeding occurred as a manifestation of the disease in 3 (1.2%) patients and in 3 (1.2%) patients - in the postoperative period.
2. It is possible to use fibrin or cyanoacrylate glue to filling the defect of the pancreatic duct or to suture vessels in the parenchyma of the pancreas by PDS for the prevention of pancreatoragia in the postoperative period.

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The Authors declare no conflict of interest.

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