

## MULTIPLE POSTNECROTIC INFECTED PANCREATIC CYSTS. INDUCED PANCREATECTOMY

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### RESUME

**Background.** We present a case report of successful emergent surgical treatment of a patient with chronic pancreatitis complicated by perforated postnecrotic cysts and diffuse peritonitis.

**Case report.** The male aged 52 presented with a long-term persistent chronic pancreatitis (pain form) which developed following pancreatic necrosis. Perforation of postnecrotic cysts and duodenal fistula induced peritonitis. The indication for pancreatoduodenectomy was cystic transformation of the pancreas and complicated intraoperative situation that met the criterion of "Technical problems": the total lesion of the pancreas and parapancreatic tissues, formation of postnecrotic cysts, communication with the upper horizontal branch of the duodenum (fistula) and evacuation into the free abdominal cavity. The cysts communicated with the major pancreatic duct. Pancreatectomy under such conditions was reasonable. The first stage of surgery included distal resection of the pancreas, abdominal debridement, and compression hemostasis. After improving the patient's condition, the pancreatoduodenal complex was removed in programmed relaparotomy. We formed cholecystoenteroanastomosis because of the small diameter of the choledochus. Function of gastrointestinal tract restored shortly after operation due to enteral nutrition through a nasointestinal probe, pancreatic enzymes from the first day, and early activation of the patient.

**Conclusion.** Pancreatectomy in chronic pancreatitis is technically difficult. There is a high probability of damage to large vessels and significant blood loss. Correction of metabolic disorders in the postoperative period is possible due to the targeted use of modern medicines.

**Keywords:** chronic pancreatitis, postnecrotic cysts, duodenal fistula, peritonitis, pancreatectomy

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## МНОЖЕСТВЕННЫЕ ПОСТНЕКРОТИЧЕСКИЕ ИНФИЦИРОВАННЫЕ КИСТЫ ПОДЖЕЛУДОЧНОЙ ЖЕЛЕЗЫ. ВЫНУЖДЕННАЯ ПАНКРЕАТЭКТОМИЯ

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### РЕЗЮМЕ

**Цель исследования.** Представить клиническое наблюдение успешного неотложного этапного хирургического лечения пациента с хроническим панкреатитом, осложненным перфорацией постнекротических кист, дуоденальным свищем и распространенным перитонитом.

**Материал и методы.** В приведенном наблюдении обсуждается лечение пациента 52 лет, длительное время страдающего болевой формой хронического панкреатита после перенесенного инфицированного панкреонекроза. Перфорация постнекротической инфицированной кисты и дуоденальный свищ обусловили развитие перитонита. Показаниями к панкреатодуоденэктомии явились кистозная трансформация поджелудочной железы и сложная интраоперационная ситуация, которая соответствовала критерию «Technical problems»: тотальное поражение поджелудочной железы с формированием инфицированных постнекротических кист, сообщение с верхней горизонтальной ветвью 12-перстной кишки (свищ) и опорожнение в свободную брюшную полость. Кисты сообщались с главным панкреатическим протоком. Первым этапом сделаны дистальная резекция поджелудочной железы, санация живота, компрессионный гемостаз. После стабилизации состояния на программной релапаротомии удален панкреатодуоденальный комплекс. Сделана резекция желудка. Энтеральное питание через назоинтестинальный зонд с назначением панкреатических ферментов, компенсацией инкреторных показателей с первых суток и ранняя активизация способствовали быстрому восстановлению функции желудочно-кишечного тракта.

**Заключение.** Панкреатэктомия (вынужденный объем операции) при хроническом панкреатите, постнекротических кистах, дуоденальном свище технически сложна. Высока вероятность значительной кровопотери. Этапное хирургическое вмешательство позволило получить хороший результат. Коррекция метаболических нарушений в послеоперационном периоде достигалась за счет адресного применения современных лекарственных препаратов.

**Ключевые слова:** хронический панкреатит, постнекротические кисты, дуоденальный свищ, перитонит, панкреатэктомия

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## INTRODUCTION

Removal of the pancreas (P) has been a subject of discussion and opposing opinions ever since it became clear that the operation was feasible. Reports of pancreatectomy in the 1940s–1950s were met with restrained interest, since, among other issues, the key problem of the postoperative period was incretory and exocrine insufficiency. The first documented pancreatectomies (PE) were performed by Rockey E. in 1942 for pancreatic carcinoma and by Priestley J. in 1944 in a female patient with insulinoma and hyperinsulinism, whom he observed for 5.5 years [1, 2]. In his opinion, compensation of metabolic disorders after PE was possible. Subsequently, this position was confirmed by Chen L., et al. and Bellin M.D., et al. [3, 4]. The latter performed autotransplantation of the islets of Langerhans.

As for the indications for extirpation of the P, Janot M.S. et al. systematized them according to the principle of the “four T’s”: Tumor, Technical problems, Troubles in the perioperative period, Therapy-refractory pain in chronic pancreatitis [5].

According to Patyutko Yu.I., et al., PE performed for justified indications, despite its complexity, significant blood loss, and severe metabolic disorders, allows an acceptable quality of life to be ensured [6]. Postoperative mortality was 6.9 %. According to Danilova E.V., it reaches 20 %, and complications of PE is 86.7 % [7].

More often, PE is performed for pancreatic tumors, less often for chronic pancreatitis (CP). Coco D. et al. defined the indications for surgery in CP and believe that extirpation of the P, despite its drawbacks, is inevitable in the therapy-resistant pain form of the disease [8].

We have not found any reports of emergent PE for calculous CP, postnecrotic cysts, duodenal fistula (DF), and diffuse peritonitis.

The study was performed in accordance with the ethical norms of the Declaration of Helsinki and Order No. 200n of the Ministry of Health of the Russian Federation dated April 1, 2016 “On approval of the rules of clinical practice”. The patient gave voluntary informed consent to the publication of the clinical case in the open press.

## CLINICAL CASE

A 52-year-old man was admitted on November 7, 2022, one day after intensification of abdominal pain and the appearance of repeated vomiting. Several years earlier, calculous cystic CP with pain syndrome resistant to medicines had been diagnosed.

The condition was severe. The patient was accessible to productive contact. Height 175 cm, weight 50 kg, body mass index 16.3. The skin was pale. Pulse 100 bpm, blood pressure 110/70 mm Hg. The tongue was dry. The abdomen was enlarged. The anterior abdominal wall was painful on palpation. There were signs of peritoneal irritation. Peristalsis was poorly audible.

Laboratory blood tests: leukocytes  $11.1 \times 10^9$ , erythrocytes  $4.9 \times 10^{12}$ , hemoglobin 132 g/L, glucose 15.2 mmol/L, amylase 2333.0 IU/L.

Multispiral computed tomography (MSCT) diagnosed free fluid (10–15 units) in all parts of the abdominal cavity with spread into the posterior mediastinum up to the aortic arch. The P was visualized indistinctly. The structure was heterogeneous. Contrast accumulated unevenly. In the head, body, and tail there were fluid formations  $22 \times 26$  mm and  $20 \times 30$  mm with small calcium inclusions. The retroduodenal cavity was up to 5 cm in diameter. The duct of Wirsung was 5–6 mm, with concretions in the lumen (Fig. 1).

After preoperative preparation for 2 hours 40 minutes, a complete median laparotomy was performed. More than 7 L of turbid brown fluid with loose fibrin, without odor, was evacuated. A defect in the wall of the cyst located immediately below the pylorus at the hepatoduodenal ligament was found (Fig. 2).

The duodenum was mobilized according to Kocher. Behind the head there was a cavity with brown fluid. It was aspirated. The gastrocolic ligament was dissected. The left flexure of the colon was mobilized. Five false cysts of the body and tail of the P were opened. The cavity in the mediastinum was drained. Distal subtotal resection of the P and splenectomy were performed.

The duct of Wirsung, up to 5 mm with small concretions, was drained. The right gastric artery and the gastropiploic vessels were ligated. The cyst along the upper edge of the P emptied into the abdominal cavity and communicated with the duodenum through the posterior thinned wall of the upper horizontal branch, which was sutured with a stapler and transected below the fistula. The stomach was sutured at the level of the pylorus. Pronounced bleeding and hypotension were noted. It was decided to complete the operation. Hemostasis by electrocoagulation and suturing was insufficiently effective. Hemostatic tamponade of the upper abdominal cavity was performed.



**FIG. 1.** CT scan. Free fluid in the abdominal cavity is spreading to the posterior mediastinum (1). Cysts in the head, body, and tail of the pancreas (cursors)

Postoperative diagnosis: chronic calculous pancreatitis; multiple postnecrotic cysts; duodenal dystrophy; pancreatocystoduodenal fistula; diffuse serous-fibrinous peritonitis with an admixture of pancreatic juice.

Bacteriological examination of the peritoneal fluid revealed *Klebsiella oxytoca*  $10^7$ , *Aeromonas caviae*  $10^7$ . Macroscopic specimen: spleen, body and tail of the P with cysts in the infiltrated parapancreatic tissue (Fig. 3).

Histological examination: sclerosis of the P tissue with atrophy of pancreatic acini, cystic transformation and atrophy of the epithelium of the excretory ducts. Focal lymphoid infiltration in the interstitium. The cyst wall was represented by connective tissue, with no epithelial lining. Fibrinous-leukocytic peritonitis. Splenic tissue with focal fibrosis of the capsule.

Thirty six hours after stabilization of homeostasis parameters, a planned relaparotomy was performed. In the abdominal cavity there was up to 500 mL of turbid serous-hemorrhagic exudate and massive deposits of loose fibrin. The tampons were removed. Bleeding was moderate. Inflammatory infiltration of the hepatoduodenal ligament. The gastroduodenal artery was ligated and transected. The choledochus was 4 mm in diameter and was ligated in the supraduodenal segment. The walls were thickened and covered with fibrin. The jejunum was transected 10 cm distal to the ligament of Treitz. The pancreatoduodenal complex was removed (Fig. 4). Since the bile duct was transected distal to the ductus cysticus, a cystic-intestinal anastomosis was formed. The performed operation was more correctly named "type PDR".

Due to pronounced inflammatory infiltration of the choledochus wall and surrounding tissues,

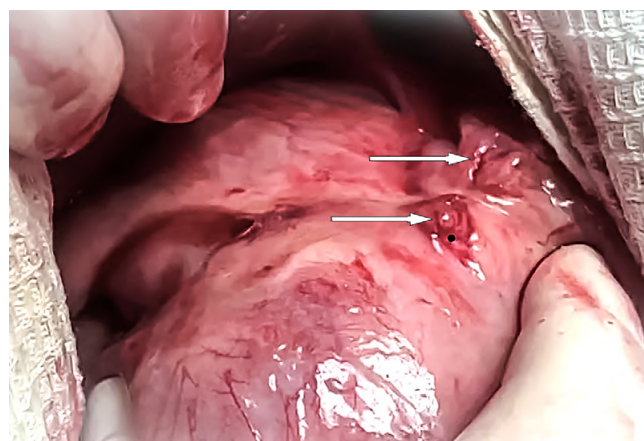


**FIG. 2.**  
Intraoperative photo. Defects of cyst wall with fluid inflow (cursors)

a supradiaphragmatic cholecystoenteroanastomosis was applied with a non-absorbable monofilament thread PDS 4.0. Distal resection of the stomach (antral part) was performed. A retrocolic gastroenteroanastomosis was applied on a long loop with an interintestinal anastomosis with PDS 3.0 thread.

Morphological conclusion: macroscopic specimen – pancreatoduodenal complex. The duodenum was 15 cm long, in its descending part – a segment of the doubled wall over 4 cm. Part of the stomach 4–8 cm, in the paragastric tissue – small single foci of steatonecrosis, deposits of fibrin on the serous membrane. The head of the P was  $3 \times 3.5 \times 4$  cm, the body  $2 \times 3 \times 4.5$  cm. In the region of the head of the P there was fibrosis. The major duodenal papilla was passable



**FIG. 3.**  
Specimen

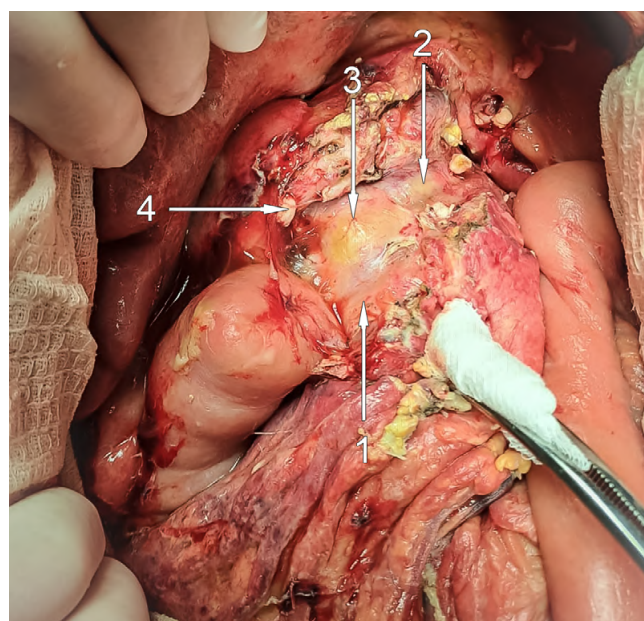


**FIG. 4.**  
Intraoperative photo after removal of the pancreatoduodenal complex. 1 – superior mesenteric vein, 2 – splenic vein, 3 – portal vein, 4 – stump of the choledochus

with a probe. The choledochus diameter was 0.4 cm. Microscopic description: in the P, interstitial pronounced sclerosis with uneven lymphoid infiltration, foci of abscessation in the parapancreatic tissue, and vacuolization were noted. The parenchyma was preserved in places in the form of islands. In the duodenum – edema of the walls, full-blooded vessels. Signs of fibrinous-leukocytic peritonitis. In the stomach, sclerosis of the submucosal layer, chronic moderately pronounced minimal active inflammation in the mucous membrane with foci of pyloric metaplasia, signs of fibrinous-leukocytic peritonitis with foci of steatonecrosis in the paragastric fatty tissue were noted.

Twenty four hours later, a debridement relaparotomy was performed. In the abdominal cavity up to 100 mL of serous exudate with loose fibrin. From the first day, enteral nutrition through a nasointestinal tube and parenteral support were prescribed. Insulin therapy. Glycemia 9.0–13.0 mmol/L.

The patient was discharged on the 17<sup>th</sup> day after the final operation. He was examined after 8 months. Diabetes mellitus E13.9. Insulin therapy was continued: glargine 300 (Toujeo) in the evening, 8 units. Before meals, insulin lispro (2 units before breakfast, lunch, dinner). Blood glucose 7.6 mmol/L. Pancreatin at a dose of 100 IU 4 times a day. Stool 1 time a day, formed. He was examined after another 6 months. Quality of life was satisfactory. The diet and replacement therapy were determined by an endocrinologist.

## DISCUSSION

Regarding PE, starting from 1942, an ambiguous position remains. First of all, because the problem of replacing the lost functions of the removed P has not been definitively resolved. The operation is performed rarely, especially in CP. Indications for PE were formulated by Jakot et al. (the principle of the four T's) and supplemented in relation to CP by Coco D., et al. They consider them, first, in therapy-resistant pain pancreatitis. Our patient had a long history of CP. This was not the basis for PE, and total cystic transformation of the P with suppuration, complicated by diffuse peritonitis, the progression of which was due to the perforated cystic wall of the duodenum (duodenal dystrophy), served as the basis for PE.

In connection with this condition, increased bleeding, the operation was divided into 2 stages. At the first stage, subtotal distal resection of the P with splenectomy and transection of the duodenum was performed. This allowed the surgical trauma to be reduced, bleeding to be managed, and the mediastinal and subdiaphragmatic leaks of infected fluid to be drained. At the second stage, after stabilization of homeostasis parameters, the pancreatoduodenal complex was removed.

In the management of the patient in the postoperative period, the key role is played by personalized insulin therapy, administration of enzyme preparations,

and balanced nutrition. All this can ensure an acceptable quality of life for the patient [9, 10].

## CONCLUSION

Interventions on the P in CP are complex due to pronounced normal symptomatology of the upper abdominal cavity, pronounced inflammation, and cicatricial deformation of the surrounding tissues, which creates significant difficulties in mobilizing the P and duodenum, which is accompanied by pronounced bleeding. There is a high probability of damage to large vessels and significant blood loss. In an urgent situation, these risks are even higher. In our case, there was no alternative to PE. Compensation of incretory and exocrine insufficiency with the targeted use of modern medicines allowed metabolic disorders to be corrected and a satisfactory condition of life to be ensured in the postoperative period.

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### Conflicts of interest

The authors declare no conflicts of interest.

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