

# LAPAROSCOPIC SURGERY FOR THE TREATMENT OF SEQUELAE OF PANCREATITIS - 18 CASES REPORT AND A REVIEW OF THE LITERATURE

CHIRURGIA LAPAROSKOPOWA W LECZENIU POWIKŁAŃ ZAPALENIA TRZUSTKI  
– STUDIUM 18 PRZYPADKÓW I PRZEGLĄD PIŚMIENICTWA

Anatolij Shchastny<sup>1</sup>, Aleksandr Siatcouski<sup>2</sup>, Siarhei Panko<sup>3</sup>

<sup>1</sup> Vitebsk State Medical University (Belarus)

Rector: Valerij Dejkalo PhD.

<sup>2</sup> Vitebsk Regional Clinical Hospital (Belarus)

Main doctor Anatolij Oladko

<sup>3</sup> Institute of Public Health, The Jan Kochanowski University of Humanities and Sciences in Kielce, (Poland)

Dean: prof. Stanisław Głuszek

## SUMMARY

**Introduction:** The treatment of chronic pancreatitis (pzt) constitutes a vital problem in general surgery. In the developed countries the morbidity of pzt amounts to 25–30 cases for 100 000 of population. The increase in the structure of chronic pancreatitis incidence in young and middle-aged patients makes this problem socially acute. Surgical treatment is indicated for 40% of all patients with chronic pancreatitis after ineffective conservative therapy. The main indications for surgical treatment are severe abdominal pain, pancreatitis complications and the possibility of malignancy.

**The aim** of the paper was to present own experience in the use of different minimally invasive surgery (MIS) techniques with endoscopic or laparoscopic approaches in the treatment of chronic pancreatitis and its complications.

**Material and methods:** In our clinic in the year 2007 there were 18 laparoscopic interventions performed for chronic pancreatitis and its complications, such as laparoscopic pancreaticojejunostomy, cystojejunostomy, gastrocystostomy and distal pancreatectomy.

**Results:** Laparoscopic pancreaticojejunostomy was successfully performed in 8 patients with hypertensive syndrome (with pancreatic duct of 0,8–1,0 cm in diameter), laparoscopic pseudocystojejunostomy was performed in 8 patients. Two patients underwent laparoscopic pseudocystogastrostomy with the formation of fistula 2.5 cm in diameter. In the next patient with a cyst located in the tail of the pancreas, the bleeding from the splenic artery required to convert the operation into open. In another patient laparoscopic longitudinal pancreatovirsungotomy and pancreatic resection were performed due to the impossibility of adequate cyst drainage in the hamulus region of the pancreas which required conversion of the operation into open. All patients who underwent minimally invasive procedures were discharged on the 6th day without any postoperative complications. Also according to the clinical data and USG no recurrence has been noted for 2 years.

**Conclusions:** 1. Clinical experience in the use of laparoscopic procedures in chronic pancreatitis treatment supports the conclusions of other authors concerning the advantages of laparoscopic techniques which are of better tolerance and which shorten hospital stay.

2. The application of minimally invasive surgery techniques may be effective on condition that there is a thorough selection of patients taking into account the anatomic features of the pancreas and its duct system in every individual case.

**Key words:** pancreatitis, laparoscopy, treatment, pancreaticojejunostomy.

## STRESZCZENIE

**Wstęp:** Leczenie przewlekłego zapalenia trzustki (pzt) stanowi istotny problem w chirurgii ogólnej. W rozwiniętych krajach pzt występuje w 25–30 przypadkach na 100 000 ludności. Wzrost zachorowalności w wieku młodym i średnim w strukturze przewlekłych zapaleń trzustki czyni ten problem bardzo aktualnym. Chirurgiczne metody stosuje się u 40% pacjentów z pzt po nieskutecznym leczeniu zachowawczym. Podstawowymi wskazaniami dla leczenia chirurgicznego są ból brzucha, powikłania po zapaleniu trzustki i zagrożenia chorobą nowotworową.

**Celem** pracy było przedstawienie własnych doświadczeń w wykorzystywaniu różnych mało inwazywnych technik endoskopowych lub laparoskopowych w leczeniu powikłań po zapaleniach trzustki.

**Material i metody:** W 2007 roku w ośrodku wykonano 18 zabiegów laparoskopowych z powodu różnych powikłań zapalenia trzustki takich jak: laparoskopowa pankreatojejunostomia, cystojejunostomia, gastrocystostomia i dystalna pankreatektomia.

**Wyniki:** Laparoskopowa pankreatojejunostomia była skutecznie wykonana u 8 chorych z hipertensyjnym zespołem (z przewodem trzustkowym o średnicy 0,8–1,0 cm), laparoskopowa pseudocystojejunostomia u 8 chorych. Dwoch pacjentów zostało poddanych laparoskopowej pseudocystogastrostomii z wytwarzaniem przetok o średnicy 2,5 cm. U następnego chorego z torbielą zlokalizowaną w ogonie trzustki decyzja o otwartej operacji była spowodowana krwawieniem z tętnicy śledziony. U kolejnego chorego otwarty zabieg

był uwarunkowany niemożliwością dostatecznego drenażu torbelskiej w obrębie wyrostka trzustki po laparoskopowej przedłużonej pankreatowirsungotomii i resekcji trzustki. Wszyscy chorzy po zabiegach mało inwazyjnych zostali wypisani 6 dnia bez żadnych powikłań. Według danych klinicznych i USG nie odnotowano nawrotów choroby po upływie 2 lat.

**Wnioski:** 1. Kliniczne doświadczenia w stosowaniu zabiegów laparoskopowych w leczeniu przewlekłego zapalenia trzustki potwierdzają wyniki innych autorów o zaletach laparoskopowego leczenia, które jest lepiej tolerowane i skraca czas pobytu w szpitalu.

2. Mało inwazyjne zabiegi mogą być skuteczne pod warunkiem precyzyjnego kwalifikowania pacjentów w każdym przypadku z uwzględnieniem indywidualnych danych anatomii trzustki i jej przewodów.

**Słowa kluczowe:** zapalenie trzustki, laparoscopia, leczenie, pankreatojejunostomia.

## INTRODUCTION

At present the treatment of chronic pancreatitis is one of the most topical problems of abdominal surgery.

In the last decades chronic pancreatitis has become one of the most frequent gastrointestinal pathologies. In industrial countries the morbidity of chronic pancreatitis is about 25–30 cases for 100 000 of population. Moreover, the increase in young and middle-aged patients in the structure of chronic pancreatitis morbidity makes this problem socially acute.

Surgical treatment is indicated for 40% of all patients with chronic pancreatitis after ineffective conservative therapy. The main indications for surgical treatment are severe abdominal pain, pancreatitis complications and the possibility of malignancy.

In recent years the use of different minimally invasive surgery (MIS) techniques with endoscopic or laparoscopic approaches in the treatment of chronic pancreatitis and its complications has been widely discussed as one of the pathways to improve the results of treatment. However, the effectiveness of MIS techniques is sometimes difficult to interpret in the current literature. At present the clear indications for a definite surgical procedure are absent, as well as the algorithm for different MIS techniques application depending on the chronic pancreatitis course and its specific complications.

The tasks of both minimally invasive and traditional surgery are elimination of pancreatic damage reasons, reduction of the main symptoms of the disease, first of all severe pain, and eradication of the most important pancreatitis complications, i.e., pancreatic pseudocysts, virsungolithiasis.

The main aims of MIS procedures used in chronic pancreatitis are:

1. Drainage and decompression of the common biliary duct and/or pancreatic duct.
2. Removal of the stones from the common biliary duct including the fragments of the stones after lithotripsy.
3. Pancreatic cysts drainage to gastrointestinal tract [1].

The variants of minimally invasive treatment of chronic pancreatitis are:

- endoscopic decompression of the pancreatic duct, endoscopic internal drainage of pseudocysts;
- aspiration and drainage of fluid structures under US and CT control;
- laparoscopic operations.

The easiest method of pancreatic duct endoscopic decompression is endoscopic pancreatic papillotomy or virsungotomy, combined or not with endoscopic papillosphincterotomy [2]. In most cases these procedures are the first steps to a more difficult endoscopic intervention, such as dilatation of the stricture and stenting of the pancreatic main duct.

However, the long-term outcomes of endoscopic procedures remain contradictory. So, some authors reported an enhancement of pathological changes in the pancreas and its ductal system because of long-term placing of endoprosthesis in the pancreatic duct, which results in infection, forming of pseudocysts and stricture of the pancreatic duct. The other authors reported the positive clinical effect after pancreatic duct stenting in 87% of patients with chronic pancreatitis over a period of 5 years [3–5].

Another endoscopic technique – transmural cystic drainage – is widely used in patients with cystic wall adherence to the stomach or duodenum.

Different strategies contribute to the treatment of pancreatic pseudocysts: endoscopic transpapillary or transmural drainage, percutaneous catheter drainage, or open surgery. The feasibility of endoscopic drainage is highly dependent on the anatomy and topography of the pseudocyst, but provides high success and low complication rates. Percutaneous drainage is used for infected pseudocysts. However, its usefulness in chronic pancreatitis-associated pseudocysts is questionable. Internal drainage and pseudocyst resection are frequently used as surgical approaches with a good overall outcome, but a somewhat higher morbidity and mortality compared with endoscopic intervention [6].

The endoscopic method of cystogastroanastomosis may be used as an alternative to a traditional open abdominal surgical approaches. With the availability of advanced imaging systems and cameras, better hemostatic equipment and excellent laparoscopic techniques, most pseudocysts can be found and managed by laparoscopy [7].

Cystogastroanastomosis is formed by electrosurgical dissection of the stomach and cyst conjoined walls. In spite of such an evident advantage as less traumatism, there are some difficulties typical of endoscopic cystogastrostomy, such as difficulty of forming wide enough anastomosis and impossibility to secure safe hemostasis.

There are some negative sides of endoscopic interventions such as limited possibility to exclude the presence of pancreatic neoplasm, high frequency of recurrent stent's occlusion (one of the most damaging complications), frequent inflammatory reactions to the foreign body from the side of the pancreatic and common bile ducts. The problems mentioned above require the introduction of new more effective and atraumatic methods of chronic pancreatitis and its complications treatment to clinical practice.

External drainage of a pseudocyst is, as a rule, a forced choice and is directed to the prevention and elimination of complications (i.e., progression of destructive pancreatitis, suppuration of the pseudocyst, perforation of the pseudocyst into the abdominal cavity or thorax, insufficient maturation of the pseudocyst wall, absence of the connection of the pseudocyst cavity with the pancreatic duct). Pseudocyst tapping under the sonographic control with further bacteriological, cytological and biochemical investigations of pseudocyst's content permits in most cases to determine whether there is a communication between the pseudocyst and the pancreatic ducts. If the biochemical activity of punctuates enzymes is high the pseudocyst is likely connected with the main pancreatic duct. In such a situation the possible consequence of the external drainage is the pancreatic external fistula, and thus external drainage should be avoided.

The other direction of minimally invasive surgery is the application of laparoscopic operations on pancreas in patients with chronic pancreatitis and its complications. The first experience of such minimally invasive interventions dated 1992, when laparoscopic pylorus-preserving pancreaticoduodenectomy was performed in Montreal University Surgical Clinic [8]. The place of laparoscopic pancreaticoduodenectomy in treatment of patients with chronic pancreatitis and acute pancreatitis with the predominant lesion of pancreatic head hasn't been defined yet.

One of the modifications of pancreaticoduodenectomy is pylorus-preserving pancreaticoduodenectomy; it is difficult to perform because of technical barriers during mobilization of pancreatic proximal part and reconstructive stage of operation. Five years after the first laparoscopic operation D. B. Jones et al. concluded that the rate of complications after pylorus-preserving pancreaticoduodenectomy with the resection of half of the stomach may be compared with the "open" operation [9].

Laparoscopic distal pancreaticoduodenectomy in the volume of 70% of the pancreas in combination with the splenectomy is used more often in the treatment of patients with chronic pancreatitis. In contrast to pylorus-preserving pancreaticoduodenectomy, distal laparoscopic pancreaticoduodenectomy has become quite widespread in the last years because of its easier tolerance for patients and decrease in the length of hospital stay to 5–6 days. The absence of big operation incision permits to resume normal daily activities in a short time.

Distal laparoscopic pancreatic resection with minimal complications may be successfully performed in chronic pancreatitis patients.

Laparoscopic operations are used in treatment of such chronic pancreatitis complication as pseudocysts because of insufficient results of the other treatment modality – percutaneous pseudocyst drainage (high rate of different complications and recurrence of pseudocysts). According to the data of A. Cuschieri et al. [10, 11] the adequate internal drainage of pseudocysts with the forming of pseudocystogastroanastomosis or pseudocystojejunostomosis can be reached by laparoscopic techniques.

The choice of a surgery method – traditional or minimally invasive – depends on the ductal anatomy.

According to the current literature, conversion to "open" operation is necessary in 14% of pancreatic laparoscopic operations. Laparoscopic operations are complicated by pancreatic fistula in 17% of cases. A second operation is necessary for about 6% of patients. The mean hospital stay is 7 days (range 3–70) [12].

Laparoscopic operations are not indicated in such chronic pancreatitis complications as biliary hypertension, duodenum compression, regional portal hypertension and impossibility to exclude malignancy.

## MATERIAL AND METHODS

In our clinic we have performed the following laparoscopic interventions for chronic pancreatitis and its complications: laparoscopic pancreaticojejunostomy, cystojejunostomy, gastrocystostomy and distal pancreatectomy.

The present study is based on the results obtained during clinical observation of 18 patients who underwent minimally invasive surgery in Vitebsk Regional Clinical Hospital (the number of hospitalized patients with chronic pancreatitis and its complications is 100–150 per year). In our clinic we use the following surgical procedures for the treatment of chronic pancreatitis: pancreatoduodenal resection, pancreatic resection of Beger, pancreatic resection of



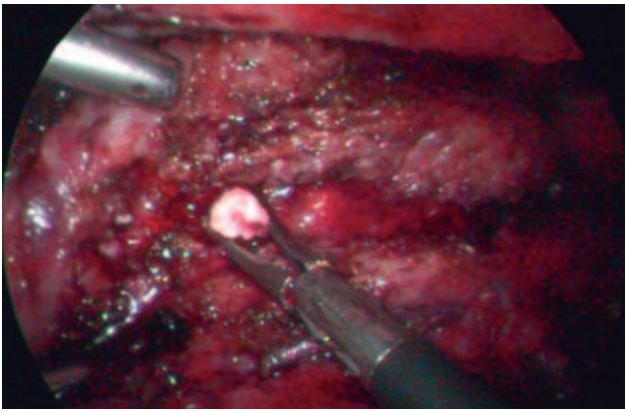


Fig. 1. Longitudinal pancreaticojejunostomy. Removal of a pancreatic duct's stone

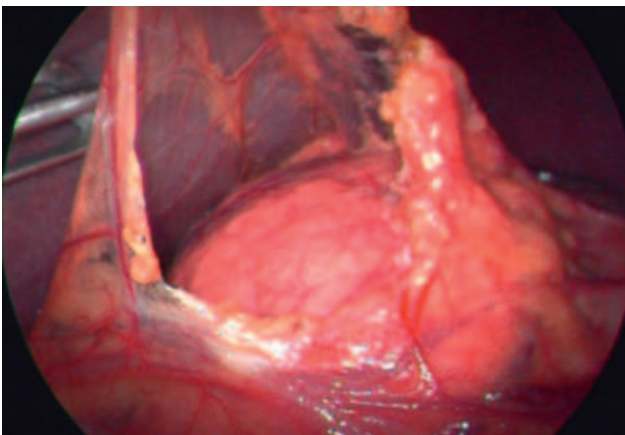


Fig. 2. Pancreatic pseudocyst

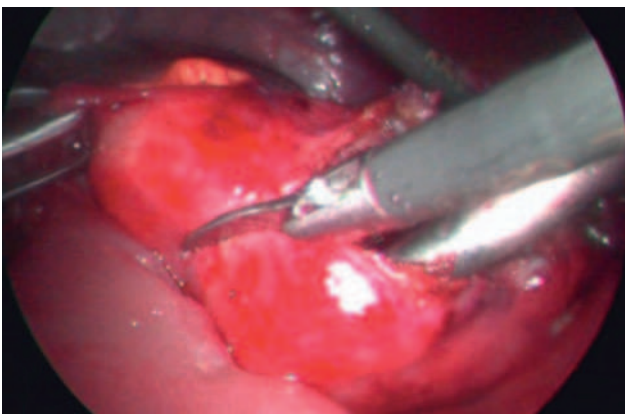


Fig. 3. Lancing of a parapancreatic cyst

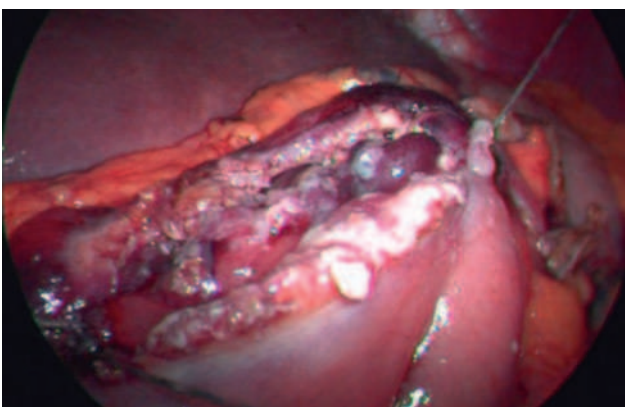


Fig. 4. One of the stages of cystojejunostomy forming

Frey, distal pancreatectomy, pancreaticojejunostomy, cyst drainage under ultrasonic control. Eighteen laparoscopic operations were performed in patients with chronic pancreatitis since 2007.

The diagnosis was based on the clinical picture and the data of instrumental methods (ultrasonography – USG, computerized tomography scanning – CT, magnetic resonance imaging – MRI, magnetic resonance cholangiopancreatography – MRCP), which allow to determine the condition of pancreatic parenchyma, pancreatic ductal system, presence of virsungolithiasis and calcifications in pancreatic parenchyma, the condition of pseudocyst (degree of cystic wall maturation, wall thickness, content characteristics). Cyst aspiration under ultrasound control with further chemistry, bacteriology and cytology was performed to determine whether there is a communication between the cyst and the pancreatic duct, and to investigate the cyst content.

## RESULTS

Longitudinal laparoscopic pancreaticojejunostomy was performed in 8 patients with hypertensive syndrome (pancreatic duct 0.8–1.0 cm, virsungolithiasis was obtained in 3 patients). The operation is performed under general anesthesia (endotracheal narcosis with muscle relaxant) in supine position with legs moved apart. First, a carbon dioxide pneumoperitoneum is established. A 10-mm trocar with optics is inserted on the middle line above the umbilicus. Then for working instruments two 10-mm trocars are inserted into the right and left abdominal regions, a 12-mm trocar is inserted into the left abdominal region at the level of the umbilicus and a 5-mm trocar is inserted under the xiphoid process on the left of the middle line. The operation always begins with dissection of the gastrocolic ligament which allows to define more exactly the location of pathological process and the operative technique. The pancreatic duct is opened longitudinally and stones are removed if present (Fig. 1). The Roux-en-Y-loop of the jejunum is constructed and then pancreatojejunal anastomosis is formed with a running intra-abdominal suture («Dexon» 4/0). Intestinal continuity is re-established using a stapling device or extra-corporally in the traditional way through the 3-cm incision in the left region, this incision is further used for abdominal cavity drainage. The mean operative time was 270 min.

Laparoscopic pseudocystojejunostomy was performed in 8 patients. The size of pseudocysts was 8–10 cm (Fig. 2). The first stage of the operation is the same as in laparoscopic pancreaticojejunostomy.

Then aspiration and lancing of the cyst with an ultrasound scalpel are performed (Fig. 3). The anastomosis (5–6 cm in length) of the Roux-en-Y-loop to the pseudocyst with a manual single-layer running intra-abdominal suture (Fig. 4) is formed. The content of the cyst is examined for histology and biochemistry. No complications were observed in the postoperative period and the patients were discharged on the 8th day.

Two patients underwent laparoscopic pseudocystogastrostomy. In both cases one of the walls of parapancreatic pseudocyst was the stomach wall. After opening of the anterior gastric wall the anastomosis 2.5 cm in diameter was formed and strengthened with separate sutures. Gastrostomy aperture was closed with intra-abdominal suture. Postoperative complications were absent and the patients were discharged on the 6th day.

One more patient had a cyst located in the tail of the pancreas, and laparoscopic pancreatic resection was performed. But in the stage of pancreas dissection the bleeding from the splenic artery required to convert the operation into open.

In another patient laparoscopic longitudinal pancreatovirsungotomy and pancreatic resection (Frey) were performed. However, impossibility of adequate cyst drainage in the hamulus region required to convert the operation into open.

The postoperative period proceeded without any complications. The period of observation is from 6 months to one year with satisfactory results. According to the control sonography data no recurrence has been noted so far.

## CONCLUSIONS

1. Our clinical experience in laparoscopic interventions in chronic pancreatitis patients supports the conclusions of other authors that the advantages of laparoscopic techniques are a better tolerance, a shorter hospital stay and an earlier postoperative recovery.
2. Despite some advantages of MIS for management of chronic pancreatitis, further studies are necessary to work out the optimal algorithm of minimally invasive techniques both in non-complicated and complicated chronic pancreatitis.

3. Thus, minimally invasive technique application may be effective on condition that there is thorough selection of the patients taking into account the anatomic features of the pancreas and its duct system in every individual case.

## BIBLIOGRAPHY

- [1] Laugier R, Return C. Endoscopic Treatment in Chronic Pancreatitis. In: *Pancreatic Disease Towards the Year 2000*. Ed. C Johnson, C Imre. Springer-Verlag London 2000; 181–187.
- [2] Siegel J, Veerappan A. Endoscopic management of pancreatic disorders: potential risks of pancreatic prostheses. *Endoscopy* 1991; 23: 77–80.
- [3] Cremer M, Deviere J, Delhaye M. Non-surgical management of severe chronic pancreatitis [Review], *Scand. J. Gastroenterol* 1990; 175: 77–84.
- [4] Cremer M et al. Stenting in severe chronic pancreatitis: results of medium-term follow-up in 76 patients. *Endoscopy* 1991; 23: 171–176.
- [5] Mathieson JR, Cooperberg PL, Murray DJ. Pancreatic duct obstruction treated with percutaneous antegrade insertion of a metal stent: report of two cases. *Radiology* 1992; 185(2): 465–467.
- [6] Aljarabah M, Ammori BJ. Laparoscopic and endoscopic approaches for drainage of pancreatic pseudocysts: a systematic review of published series. *Surg Endosc* 2007; 21(11): 1936–1944.
- [7] Qin-Song Sheng et al. Laparoscopic cystogastrostomy for the treatment of pancreatic pseudocysts: A case report. *World J Gastroenterol* 2008; 14(30): 4841–4843.
- [8] Gagner M, Pomp A. Laparoscopic pylorus-preserving pancreaticoduodenectomy. *Surg Endosc* 1994; 8: 408–410.
- [9] Jones DB, Wu JS, Soper NJ. Laparoscopic pancreaticoduodenectomy in the porcine model. *Surg Endosc* 1997; 11: 326–330.
- [10] Cuschieri A. Laparoscopic surgery of the pancreas. *J R Coll Surg Edinb* 1994; 39: 178–184.
- [11] Cuschieri A, Jakimowicz JJ. Laparoscopic pancreatic resection. *Semin Laparosc Surg* 1998; 5: 168–179.
- [12] Jean-Yves Mabrut et al. Laparoscopic pancreatic resection: Results of a multicenter European study of 127 patients. *Surgery* 2005; 137: 597–605.

## Address for Correspondence:

Prof. Siarhei Panko  
The Faculty of Health Sciences UJK in Kielce  
Poland, 25–317 Kielce, al. IX Wieków Kielce 19  
e-mail: pan@brsu.brest.by  
Phone: +48 41 349 69 64

