Long Term Follow-up Results of Surgical Management of Chronic Pancreatitis

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Rezumat

Rezultatele urmăririi pe termen lung a managementului chirurgical al pancreatitei cronice

Context: Pancreatita cronică este o pierdere progresivă a funcției pancreatice exocrine și endocrine. Intervențiile chirurgicale sunt necesare în cazurile de durere insuportabilă, obstrucție biliară sau intestinală, complicații cauzate de pseudochisturi sau fistule pancreatice.

Obiectiv: Evaluarea rezultatelor managementului chirurgical al pancreatitei cronice, într-o monitorizare pe termen lung.

Metode: Am urmărit pacienții care au suferit o intervenție chirurgicală pentru pancreatită cronică, în perioada 2006 - 2017. Au fost înregistrate complicațiile procedurilor și demografia. Pentru evaluarea controlului durerii a fost utilizată scala analog vizuală. Pentru evaluarea calității vieții am aplicat un chestionar cu 12 puncte.

Rezultate: Șaizeci și cinci de pacienți au fost incluși în studiu. Perioada medie de urmărire a fost de 60,26 luni. Tipurile de intervenții chirurgicale au fost următoarele: pancreatojejunostomie laterală - 20 de pacienți, chisto-jejuno anastomoză pe ansă în Y - 22 de pacienți, chisto-gastrostomie transgatrică - 7 pacienți, procedura Frey și hepatojejunostomie - 1 pacient, pancreatojejunostomie laterală și chisto-gastrostomie - 1 pacient, pancreatojejunostomie laterală și hepatojejunostomie - 7 pacienți, chistojejuno anastomoză și hepatojejunostomie - 2 pacienți. Nu au fost înregistrate cazuri de decese perioperatorii. În 5 cazuri s-a constatat existența fistulei pancreatice, toate aceste cazuri urmând un management ne-operator. Din cei 65 de pacienți incluși în studiu, 39 au răspuns la chestionare. Scorurile medii obținute în urma aplicării

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chestionarelor care au testat starea fizică și psihică au fost $42,72 \pm 10,76$ și $49,84 \pm 11,75$.

Concluzie: Managementul chirurgical al pancreatitei cronice este sigur, cu rate scăzute de mortalitate și morbiditate. Aceste proceduri sunt eficiente în combaterea durerii și în asigurarea unei bune calități a vieții.

Cuvinte cheie: pancreatită cronică, durere cronică, ducte pancreatice, pancreatojejunostomie, calitatea vieții

Abstract

Background: Chronic pancreatitis is a progressive loss of exocrine and endocrine pancreatic function. Surgical procedures are required in cases of intractable pain, biliary obstruction or intestinal obstruction, complications from pseudocysts, or pancreatic fistulae.

Objective: To assess the outcomes after surgical management of chronic pancreatitis, in a long-term follow-up.

Methods: Patients that underwent surgical management of chronic pancreatitis, from 2006 to 2017, were reviewed. Demographics and complications of the procedures were recorded. Visual analogue pain scale was used for pain control evaluation. The 12-Item Short-Form Health Survey questionnaire was used for quality of life assessment.

Results: Sixty-five patients were included in the study. Mean follow-up was 60.26 months. Twenty patients underwent lateral pancreatojejunostomy, 22 to Roux-en-Y cystojejunostomy, 7 to transgastric cyst-gastrostomy, 1 to Frey procedure, 4 to hepaticojejunostomy, 1 to Frey procedure and hepaticojejunostomy, 1 to lateral pancreatojejunostomy and cyst-gastrostomy, 7 to lateral pancreatojejunostomy and hepaticojejunostomy and 2 to cystojejunostomy and hepaticojejunostomy. No cases of perioperative deaths were recorded. A Pancreatic fistula was found in 5 cases, and all of them followed non-operative management. Of the 65 patients included in the study, 39 answered the questionnaires. Mean scores on SF-12, physical and mental scales were respectively 42.72 ± 10.76 and 49.84 ± 11.75 .

Conclusion: Surgical management of chronic pancreatitis is safe, with low mortality and morbidity rates. These procedures are effective in assuaging pain and in providing good quality of life.

Key words: chronic pancreatitis, chronic pain, pancreatic ducts, pancreatojejunostomy, quality of life

Introduction

Chronic pancreatitis is a progressive loss of exocrine and endocrine pancreatic function (1), leading to nerve and perineural inflammation, pancreatic ductal obstruction and ergo to high-intraductal pressure and increased pressure in the pancreatic tissue, and occasionally stenosis of intrapancreatic biliary duct (2,3). Complications related to chronic pancreatitis include diabetes mellitus, pseudocysts and obstructions of the biliary duct. The most

common symptoms, which usually deteriorate quality of life of patients, are abdominal pain, digestion issues, steatorrhea, nausea, jaundice and fatigue (4).

Pain is the leading symptom of chronic pancreatitis (4). It is the most significant factor for decreased quality of life of patients (4). Therefore, the seemly pain management is the main issue in order to improve the quality of life in chronic pancreatitis patients (2). Job loss, early retirement, financial issues, sleeping issues and fatigue are also associated with

chronic pancreatitis and contribute to decreased quality of life (4).

Surgical procedures are required in cases of intractable pain, biliary obstruction or intestinal obstruction, complications from pseudocysts or pancreatic fistulae.

This study aimed to evaluate the outcomes of patients after surgical management of chronic pancreatitis in a long-term follow-up.

Methods

Records of all patients that underwent surgical management of chronic pancreatitis at the Hospital das Clínicas of Sao Paulo University from 2006 to 2017 were reviewed. Diagnosis of chronic pancreatitis was based on typical clinical manifestations and findings on computed tomography.

Patients underwent lateral pancreatojejunostomy or Frey procedure for intractable pain; hepaticojejunostomy for biliary obstruction; and cystojejunostomy or transgastric cyst-gastrostomy for pseudocysts complications.

Radiographic images were analyzed. Ductal dilatation, calcification, pseudocysts, biliary stenosis and vascular thrombosis were reported. Parenchymal thickness was calculated by subtracting the diameter of the main pancreatic duct from the horizontal thickness of the pancreas (5).

Demographics and procedural complications were recorded.

Regarding the evaluation of outcomes, visual analogue pain scale was used for pain control evaluation. The 12-Item Short-Form General Health Survey (SF-12) questionnaire was used for quality of life assessment (7). Dosage of serum glycated hemoglobin, peptide-C and measure of fat fecal content by Sudanstain test were used to assess endocrine and exocrine pancreatic function.

This study was approved by the local institutional ethical committee.

Results

Patient Demographics

Sixty-five patients (52 men, 13 women) were

included in the study. The causes of chronic pancreatitis were due to alcohol abuse in 57 cases, hypercalcemia in two cases, hereditary in two cases and idiopathic in four cases. Mean follow-up was 60.26 months and 60 patients were still alive at the moment of that data were collected (5 patients died of conditions non-related to chronic pancreatitis). Thirty-nine patients were available for interview and answered the questionnaires. Baseline characteristics are reported in *Table 1*.

Radiographic Preoperative Evaluation

Computed tomography evidenced fifteen cases of preoperative asymptomatic splenic vein thrombosis. Forty-five patients had pseudocysts. Dilatation of the main pancreatic duct was noted in 45 cases. Biliary obstruction was noted in 14. Thirty-eight cases showed parenchymal calcification. Preoperative findings on computed tomography are reported in *Table 2*.

Surgery

Of the 65 patients, 20 were underwent lateral pancreatojejunostomy, 22 to Roux-en-Y cystojejunostomy, 7 to transgastric cyst-gastrostomy, 1 to Frey procedure, 4 to hepaticojejunostomy, 1 to Frey procedure and hepaticojejunostomy, 1 to lateral pancreatojejunostomy and cyst-gastrostomy, 7 to lateral pancreato-

Table 1. Preoperative clinical and demographic characteristics of studied population. SD=Standard Deviation

Age (years, mean $\pm$ SD)	44 $\pm$ 12.4
Sex (M/F)	52/13
Ethnicity (no. of patients)	White: 50 Mulatto: 8 Black: 3 Unknown: 4
Etiology (no. of patients)	Alcoholic: 57 Hypercalcemia: 2 Hereditary: 2 Idiopathic: 4
Abdominal pain (no. of patients)	51
Common bile duct stenosis (no. of patients)	14
Diabetes mellitus (no. of patients)	23

Table 2. Preoperative findings on computed tomography

Parenchymal thickness (mm, mean $\pm$ SD)	11.49 $\pm$ 6.2
Main pancreatic duct dilatation	No dilatation (no. of cases): 45 Mean dilatation: 6.66 mm $\pm$ SD 3.96 mm
Pseudocysts (no. of patients)	45
Pseudocyst size	Mean maximum diameter (mm): 94.36 $\pm$ 68.25 Volume (cm ³): 824.8 $\pm$ 1205.9
Location of pseudocysts on pancreas (no. of cases)	Head /Uncinated process: 30 Body: 15 Tail: 18
Splenic vein thrombosis (no. of cases)	15
Calcification (no. of cases)	38

SD = Standard deviation

jejunostomy and hepaticojejunostomy and 2 to cystojejunostomy and hepaticojejunostomy.

Complications

No cases of perioperative deaths were recorded. A pancreatic fistula was found in 5 cases, all of them followed non-operative management.

Postoperative Functional Pancreatic Insufficiency

Clinical manifestations of exocrine insufficiency, such as digestion issues, steatorrhea and diarrhea were noted in seven cases after surgery. Serum laboratory tests related with pancreatic functional insufficiency and nutritional status are reported on *Table 3*. Sudan stain for fecal fat was assessed, and 40% had no fecal fat content, 27% had medium fecal fat content and 33% had low fecal content.

Quality of life assessment

The follow-up scores on SF-12 were investigated.

Table 3. Serum laboratory tests related to pancreatic functional insufficiency and nutritional status

Glycated hemoglobin (%)	6.3(5-13)
C-peptide (ng/mL)	0.8(0.8-3.7)
Fasting glucose (mg/dL)	112(47-566)
Serum lymphocytes (mil/mm ³)	1800(660-5600)
Serum albumin (g/dL)	3.5 (2.2-5.2)

Data expressed as median and range

Thirty-nine patients were available for interview and answered the questionnaires. Mean scores on physical and mental scales are respectively 42.72 $\pm$ 10.76 and 49.84 $\pm$ 11.75.

Pain relief

Of the 39 patients that underwent surgical management of chronic pancreatitis and who answered the questionnaires, three had no history of preoperative pain, 10 had full post-operative pain relief, 25 had partial relief and 1 reported worse pain level than in the pre-operative period. Visual Analogue Scale after surgery was applied and histogram is shown in *Fig. 1*. Of all the interviewed patients, one third felt no pain at all.

Discussion

Appropriate chronic pancreatitis management is crucial to assuage chronic incapacity and the substantial burden on society related to this disorder (8).

Surgery is indicated in cases of intractable pain or complications, such as common bile duct obstruction, pancreatic ascites, pseudocysts, duodenal or colonic obstruction and pancreatic fistulae (8).

Pain

Pain is the most prevalent and dominant symptom of chronic pancreatitis and is a complaint of nearly 90% patients (9). Pain clinical

Figure 1. Pain analogue scale after surgery was applied. Of all the interviewed patients, one third felt no pain at all

management is the first choice of treatment and surgery is only indicated in cases of intractable pain. Several studies have shown that surgical therapies have a high index of pain-free patients, with preservation of the pancreatic function (10-13). Chronic pancreatitis associated with intractable pain and pancreatic ductal dilation can be managed with ductal decompression surgery, and in cases of pancreatic inflammatory mass, it can be treated with pancreatic resection (14). Endoscopic treatment is an alternative to surgery, although surgical drainage of the pancreatic duct is more effective than endoscopic treatment in patients with obstructed pancreatic duct (12). In the present study, when the indication of surgery was due to intractable pain, patients underwent ductal drainage surgery. Out of the 36 patients that underwent this kind of surgery for pain management and that answered the questionnaires, 35 had a full or partial pain relief.

Vein Thrombosis

Local inflammation secondary to chronic pancreatitis can increase the risk for vascular thrombosis (15). Our study had 15 cases of splenic thrombosis, but no case of mesenteric vein or portal vein thrombosis. None of the cases received any specific treatment. Spontaneous

recanalization may reach 30%, predominantly for splenic vein thrombosis (16).

Bile duct obstruction

Jaundice in chronic pancreatitis can occur due to periductal fibrotic stricture, leading to intrapancreatic bile duct obstruction, or in cases of pseudocysts, to bile duct compression (17,18). Treatment options include surgery or endoscopic drainage. Usually, endoscopic stenting is indicated only as a temporary treatment and operative options are the first choice of definitive procedures (19). In the present study, 14 patients had biliary obstructions and all of them were managed by hepaticojejunostomy.

Pseudocysts

Usually, indications for surgery are due to pseudocysts larger than 6 cm or complications such as pseudocyst compression of nearby organs, infection and hemorrhage (20). Treatment options are laparoscopic cystogastrostomy, cystoduodenostomy, cystojejunostomy or endoscopic cystogastrostomy (20). Most of our cases with pseudocysts were treated by incorporation into pancreatojejunostomy. When indication for surgery was due only to the presence of pseudocysts, a

Roux-en-Y cystojejunostomy or a trans-gastric cyst-gastrostomy procedure was performed.

Quality of Life

This study applied the SF-12 questionnaire, which is an abridged version of the SF-36 questionnaire, to assess quality of life. Pezzilli et al. (21) confirmed the reliability and easier applicability of the SF-12 compared with the EORTC QLQ-C30. The SF-12 tool generated two general components – physical and mental health. In this work, physical and mental scales mean scores are 42.72 ± 10.76 and 49.84 ± 11.75 , respectively. As limitation of the present study, there is no preoperative quality of life data to compare with the postoperative results of SF-12. In a chronic pancreatitis-affected population, Pezzilli et al. (21) reported physical and mental scales of 42.9 ± 10.2 and 42.7 ± 12.2 , respectively, and pancreatic type of surgery was not able to substantially modify the physical and mental domains explored by SF-12.

Postoperative Functional Pancreatic Insufficiency

Strate et al. (22) reported that postoperative exocrine insufficiency can be found in up to 80% of patients. Chronic pancreatitis treated by pancreatic resection procedures may favor development of pancreatic insufficiency (23). In this study, 40% of patients evidenced no fecal fat content and 89.2% of patients had no complaints related to postoperative pancreatic insufficiency symptoms. Concerning the endocrine pancreatic function, diabetes prevalence is similar in surgically and non-surgically treated patients (24,25).

Conclusion

Surgical management of chronic pancreatitis is effective in assuaging pain, controlling complications and providing a good quality of life. Also, the outcomes of these procedures proved

to be safe, with low mortality and morbidity rates.

Conflict of Interest

Authors have no conflict of interest.

Author's Contributions

Francisco Tustumi, Data collection. Thiago Nogueira Costa, Data collection. Sonia Penteado, Data analysis. Telesforo Bacchella, study design. Ivan Cecconello, study design.

Ethical Policies

The Institutional Ethics Committee approved this study protocol.

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