Surgical treatment of chronic pancreatitis using Frey's procedure: a Brazilian 16-year single-centre experience

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Abstract

Background: Surgical treatment of chronic pancreatitis is indicated for intractable pain. Frey’s procedure is an accepted treatment for this disease. The aim of the present study was to describe a single-centre experience in the treatment of chronic pancreatitis using Frey’s procedure.

Methods: A retrospective analysis of 73 patients who underwent a Frey’s procedure between 1991 to 2007 and had at least 1 year of follow-up. Demographics, indication for surgery, peri-operative complications and late outcomes were analysed.

Results: The median age was 39.9 years. Seventy out of the 73 (95.8%) patients were male. The median pre-operative body mass index (BMI) was 19.1 kg/m². All patients had abdominal pain, 34 (46.6%) of them daily and 13 (17.8%) weekly, with moderate or severe intensity in 98.6% (n = 72). The aetiology was secondary to alcohol in 70 patients (95.9%), with a median consumption of 278 g per day. The surgical morbidity rate was 28.7%; there were no deaths. Median post-operative follow-up was 77.0 months; 64 patients (91.4%) had complete pain relief and post-operative BMI was 22.4 kg/m² (P < 0.001). All patients with pre-operative endocrine and exocrine insufficiencies showed no reversal of the situation. New onset insufficiencies appeared late.

Conclusions: Frey’s procedure was a safe and effective therapeutic option for the surgical treatment of patients with intractable pain caused by chronic pancreatitis.

Keywords
chronic pancreatitis, Frey’s procedure, pancreatojejunostomy, pancreatic surgery, exocrine insufficiency, endocrine insufficiency, secondary diabetes, abdominal pain, review

Introduction

Chronic pancreatitis (CP) is a progressive inflammatory disorder characterized by irreversible destruction of pancreatic parenchyma, associated with disabling chronic pain and permanent loss of exocrine and endocrine function. The management of patients with chronic pancreatitis remains a challenge because of the limited understanding of the pathophysiological process of the disease, the unpredictability of clinical evolution and the controversies between diagnostic criteria and therapeutic options.

Worldwide the main aetiological factor is alcohol abuse, and the most common symptom is relentless chronic abdominal pain. After optimization of symptoms with analgesics and enzyme supplementation, patients with persistent symptoms are candidates for invasive treatments. Previous studies have shown that surgical treatment of chronic pancreatitis reduces pain and subsequent complications, so that patients return to their prior work activities as well as improved quality of life. There is also evidence that early surgical duct decompression in patients with a...
dilated pancreatic duct and with relatively preserved glandular function can delay the onset of pancreatic exocrine and endocrine failure.\textsuperscript{11,12}

Historically, the procedures have been classified into two categories: (i) ductal decompression or (ii) partial (proximal or distal) or total pancreatectomy. In recent decades, procedures combining resection and decompression have evolved, such as the surgeries of Beger\textsuperscript{13,14} and Frey\textsuperscript{15} (Fig. 1). Both have subsequently proved to be safe and effective, providing long-term pain relief with low perioperative and long-term morbidity and mortality.\textsuperscript{6,7,16–35}

The aim of this retrospective study was to describe a 16-year experience using Frey’s procedure in a consecutive series of patients from a single institution.

**Methods**

Between January 1991 and December 2007, patients who underwent a Frey’s procedure for the treatment of chronic pancreatitis at the University Clinical Hospital were studied.

The diagnosis of chronic pancreatitis was based on the findings of clinical history, physical examination and radiological investigation. Radiological investigation consisted of a combination of ultrasonography (US), computed tomography (CT), magnetic resonance (MR) or endoscopic retrograde cholangiopancreatography (ERCP).

Exocrine pancreatic insufficiency was defined as the presence of more than 10 g of fat in faeces collected for 3 days after ingestion of 100 g of fat per day during this same period.\textsuperscript{36} Endocrine pancreatic insufficiency was determined according to the American Diabetes Association, which determines the diagnosis of diabetes for glucose levels $>126$ mg/dl and glucose intolerance for levels between 100 and 126 mg/dl.\textsuperscript{37}

Patients meeting the following criteria were considered eligible for surgery: presumed diagnosis of CP, clinical intractability of abdominal pain, an enlarged pancreatic head using radiological criteria, Wirsung’s duct $\geq 5$ mm and recommendation of alcohol abstinence for at least 3 months. Exclusion criteria were an atrophic pancreatic head and a high suspicion of malignancy. Portal hypertension was not a contraindication for the procedure.

Pre-operatively patients with poor nutritional status were identified and assessed by nutritionists. Patients with a pre-operative serum albumin $<3.5$ g/dl were defined as hypoalbuminemic and when $<3.0$ g/dl they received nutritional support with enteral and/or parenteral nutrition support for 5 to 7 days before surgery. Pain control was achieved with staggered administration of analgesics, sparing opioids and its derivatives for patients with more severe pain. Thromboprophylaxis with low-molecular-weight heparin and antibiotic prophylaxis with 2 g of cefazolin were performed at induction of anaesthesia.

All procedures were elective and performed by the same surgical team (3 surgeons) during the study period. Surgical technique followed recommendations described by Frey and Smith\textsuperscript{15} (Fig. 2). After extensive mobilization of the pancreatic head with Kocher’s maneuver and exposure of the pancreas body and tail, Wirsung’s duct was identified and opened throughout its length. At the head of the gland, the pancreatic tissue was excised primarily with a knife, preserving a thickness of about 5 mm at the edges, and excavated down to the level of the pancreatic duct in depth; Santorini’s duct and uncinate process tissue were excised. After the first year, cholecystectomy was performed and the bile duct was explored with Bakes dilators and/or transcystic cholangiography was performed to evaluate patency. The anastomosis between the pancreas and a transmesocolic Roux-en-Y loop was performed with a single layer of absorbable serosubmucosal sutures (polyglactin). A drain was placed adjacent to the pancreatic anastomosis. Patients with bile ducts $>1.5$ cm or with insufficient decompression underwent a biliary bypass. Early in the series, in this situation, a choledochoduodenostomy was performed thus preserving the Roux-en-Y loop exclusively for pan-
creatic anastomosis. However, as experience with the technique increased, the technique of choice became a choledochojejunostomy to the same Roux-en-Y limb as the pancreatic anastomosis.

All excised tissue was weighed and sent for histopathology.

Post-operative mortality included overall in-hospital deaths. Minor and major complications were recorded. A pancreatic fistula was defined according to the parameters of the International Study Group on Pancreatic Fistula (ISGPF).

Post-operatively all patients were asked to classify their pain as mild, moderate and severe or no pain. Patients were also asked to repeat endocrine and exocrine function tests. Only patients with at least 12 months of post-operative follow-up were included.

This research was submitted and approved to the University Research Ethics Committee and was carried out with the patients’ consent.

Data are expressed as median and ranges for continuous variables or as percentage for categorical data. For comparison of numerical measurements between two groups we used the Mann–Whitney U-test and between three groups the Kruskal–Wallis test. Results were considered to be significant when \( P < 0.05 \). The data were analysed using the SPSS® v.11.5 statistical program (SPSS Inc., Chicago, IL, USA).

**Results**

Between January 1991 and December 2007, 73 patients were identified who underwent a Frey’s procedure for the treatment of chronic pancreatitis at the University Clinical hospital. Seventy (95.9%) out of 73 patients were male. The median age was 39.9 (range, 24–69) years; 48 (65.7%) patients were Caucasian and 10 (13.7%) were Black. The aetiology of CP was alcohol abuse in 70 patients (95.9%) and idiopathic in 3 patients. The alcoholic patients had a median alcohol consumption onset of 19.3 (range, 7–74) years-old, and maintained the addiction during 23.4 (range, 9–60) years of the disease. A typical Brazilian liquor named cachaça was the most consumed drink (72/73 patients). Smoking was present in 69 patients (94.5%), with initiation at 15.4 (range, 7–31) years-old, and use during 23.4 (range, 9–60) years of 23 (range, 10–60) cigarettes per day. Only two patients reported the use of narcotics; both were cocaine dependent.

All patients presented with abdominal pain; 34 (46.6%) patients daily, 13 (17.8%) weekly and 26 (35.6%) monthly. Most patients had severe (\( n = 30 \)) or moderate (\( n = 42 \)) pain for a period of 16.5 (range, 3–96) months. Analgesics were used continuously by 64 patients (87.7%), and 32.9% (\( n = 24 \)) of patients were dependent on opioids. Forty-three (58.9%) patients had been hospitalized because of a pain crises or episodes of exacerbation of pancreatitis, with a median of 1.9 (range, 1–15) hospitalizations per patient. Patients presented a mean body mass index (BMI) of 19.0 (range, 14.4–24.8) kg/m² and pre-operative weight loss of 10.1 (range, 0–30) kg. Cholestasis and jaundice affected 41.1% (\( n = 30 \)) of patients; 9 patients had a previous diagnosis of cholecystolithiasis. Forty-three patients (60.3%) had comorbidities; anemia (\( n = 17 \); 23.3%), hypertension (\( n = 14 \); 19.2%) and diabetes (\( n = 11 \); 15.5%) were the most frequent. Alcohol abstinence in the pre-operative period was followed by 57 patients (78.1%), for a median of 7.0 (range, 1–72) months, resulting in improvement of symptoms in 61.4% of patients (\( n = 35 \)), who presented mostly with little (\( n = 21 \)) or moderate (\( n = 11 \)) in pain intensity. Among the patients who were abstinent from alcohol pre-operatively, despite reporting improvements in intensity and frequency of pain, 69 patients (98.6%) still rated their pain as moderate or severe, and 45 patients (64.4%) presented with daily or weekly episodes. Although there were clinical improvements with the discontinuation of alcohol abuse, it did not improve symptoms enough to reverse the indication of surgery in these patients.

Pre-operatively 17 patients (23.3%) were hypoalbuminemic (<3.5 g/dl).

The median operative time was 319 (range, 240–480) minutes and blood loss was 780 (range, 300–2500) ml; 43.8% (\( n = 32 \)) of patients required a median transfusion of 1.9 (range, 1–5) units of blood during hospitalization. The median size of the head of the pancreas was 6.0 (range, 4–10) cm, and a pancreatic duct diameter of 8 (range, 5–15) mm; cysts were found in 36 patients (49.3%). Excised tissue presented with a median weight of 14.8 (range, 7–78) g.

The main intra-operative complications are shown in Table 1. Additional procedures performed are shown in Table 2. Three of 13 patients who underwent a biliary bypass had complications (two pneumonias and one pancreatic fistula). Patients who suffered intra-operative complications were more likely to suffer a post-operative infectious complication than those that did not (7/20 patients with intra-operative complication vs. 5/53 patients with no intra-operative complication; \( P = 0.03 \)). In those who underwent biliary bypass there was no significant increase in post-

<table>
<thead>
<tr>
<th>Complication</th>
<th>No. of patients (%)</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transection of intrapancreatic common bile duct</td>
<td>9 (12.3)</td>
<td>Pancreatecholedochostomy (( n = 3 )) and proximal biliary bypass (( n = 6 ))</td>
</tr>
<tr>
<td>Splenic injury</td>
<td>4 (5.4)</td>
<td>Splenectomy</td>
</tr>
<tr>
<td>Duodenal injury</td>
<td>4 (5.4)</td>
<td>Suture</td>
</tr>
<tr>
<td>Portal vein injury</td>
<td>2 (2.7)</td>
<td>Suture</td>
</tr>
<tr>
<td>Colon injury</td>
<td>1 (1.4)</td>
<td>Suture</td>
</tr>
</tbody>
</table>
operative complications (4/13 patients with biliary bypass vs. 16/60 patients without biliary bypass; $P = 0.51$) or post-operative infections (3/13 patients with biliary bypass vs. 10/60 patients with no biliary bypass; $P = 0.83$).

The overall morbidity rate was 28.7% ($n = 21$) (Table 3). There were five patients with pancreatic fistulae, all of them grade B by ISGPF classification; they were treated conservatively with total parenteral nutrition, antibiotics and octreotide, with benign evolution. Two reoperations as a result of bleeding were performed, the first one was in post-operative day 2 because of bleeding in the spleen and retroperitoneum, and the other one was in post-operative day 12 because of bleeding from the pancreatic excised face (no fistula). In these two patients the pancreatojejunostomy was taken down, the haemorrhage controlled and anastomosis was redone. Postoperative ileus was the most frequent minor complication ($n = 5$; 6.8%). There were no deaths. The median hospital stay was 10.6 (range, 6–42) days. Using univariate analysis (Table 4) only intra-operative intercurrences were associated with increased post-operative complications and infections. Other factors analysed had no relation with the post-operative morbidity.

The follow-up was 77.0 (range, 12–204) months. Late biliary complications occurred in six patients (8.2%). One patient developed choledochothiasis which was treated surgically, and five patients (6.8%) developed stenosis of the distal biliary tract of which, three were treated endoscopically and two surgically (choledochojejunostomy).

At the time of the last follow-up visit, 91.4% ($n = 64$) of patients described complete pain relief, 7.1% ($n = 5$) described occasional episodic pain but did not take analgesics routinely. Only one patient had pain recurrence 2 years after surgery; he had been abusing alcohol and drugs. The median weight regain of the operated patients was 9.4 (range, 1.2–22) kg, and there was statistical difference between the BMI of patients before and in the last clinical evaluation after the procedure (19.0; range, 14.4–24.8 kg/m$^2$ vs. 22.4; range 14.5–30.5 kg/m$^2$, $P < 0.001$).

All patients with pre-operative endocrine ($n = 11$; 15.5%) and exocrine ($n = 19$; 27.2%) insufficiencies showed no reversal of these conditions. As for patients classified as normal endocrine function ($n = 29$; 40.8%) before the procedure, 19 patients remained the same; those who developed diabetes ($n = 10$), presented the disease later (Fig. 3). Overall, by the end of the study, 36.7% (22/60) of the patients had developed new onset diabetes during a median follow-up time of 59.7 (range, 3–180) months after surgery. In patients with glucose levels ≥100 mg/dl but without specific treatment (classified as intolerants or hyperglycemics) diagnosis of diabetes seemed to be more precocious, but the sample appeared to be small because there was no statistically significant difference in diabetes onset between groups ($P > 0.05$). Four of eleven patients with pre-operative diabetes maintained glycaemic control with the same treatment before surgery whereas seven patients required an escalation in their treatment.

The effect of exocrine insufficiency is shown in Fig. 4. Of the patients who presented pre-operatively with exocrine insufficiency at surgery ($n = 19$), 10 required an escalation in the dosage of supplemental enzymes, seven of them within the first year.
The proportion of patients with normal pancreatic function decreased from 65.7% at the time of surgery to 48.6%, 35.7% and 24.3% at 1-, 3- and 5-years post-operatively, respectively. The breakdown is shown in Fig. 5.

Statistical analysis shows that there was no difference in the post-operative endocrine and exocrine functions results related to duct diameter, resected gland weight and alcohol abuse recurrence (\(P > 0.05\)). Patients with pancreatic ducts larger than 10 mm presented more diabetes pre-operatively (\(P = 0.04\)).

Twenty-three patients (32.9%) returned to alcohol abusive intake after surgery; 14 patients of this group (60.9%) returned to addiction early in the first post-operative year. The median intake of this group was 159.6 (range, 8–480) g of alcohol per day.

### Discussion

Surgical intervention for chronic pancreatitis is commonly accepted as the most effective therapeutic option for pain control and management of complications.\(^{39}\) However, choosing the optimal intervention is still a challenge.\(^{40}\)

Although lateral Roux-en-Y pancreatojejunostomy (Partington–Rochelle’s technique)\(^{41}\) has become the procedure of

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**Table 4** Statistical analysis of the relationship between patient characteristics and the occurrence of complications and infections in the early post-operative period, expressed as \(P\)-value (significant \(P > 0.05\))

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Post-operative complications ((n = 21))</th>
<th>Post-operative infection ((n = 10))</th>
<th>Pancreatic fistula ((n = 5))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n)</td>
<td>(n)</td>
<td>(P)-value</td>
<td>(n)</td>
</tr>
<tr>
<td>Jaundice</td>
<td>30</td>
<td>7</td>
<td>0.29</td>
<td>4</td>
</tr>
<tr>
<td>Comorbidity</td>
<td>43</td>
<td>14</td>
<td>0.72</td>
<td>7</td>
</tr>
<tr>
<td>Hypoalbuminemia</td>
<td>17</td>
<td>7</td>
<td>0.18</td>
<td>5</td>
</tr>
<tr>
<td>Biliary stent</td>
<td>4</td>
<td>1</td>
<td>1.0</td>
<td>4</td>
</tr>
<tr>
<td>Wirsung duct &gt;10 mm</td>
<td>7</td>
<td>2</td>
<td>1.0</td>
<td>1</td>
</tr>
<tr>
<td>Portal hypertension</td>
<td>8</td>
<td>2</td>
<td>1.0</td>
<td>2</td>
</tr>
<tr>
<td>Biliary bypass</td>
<td>13</td>
<td>5</td>
<td>0.51</td>
<td>2</td>
</tr>
<tr>
<td>Intra-operative complications</td>
<td>22</td>
<td>8</td>
<td>0.44</td>
<td>7</td>
</tr>
<tr>
<td>Splenectomy</td>
<td>8</td>
<td>1</td>
<td>0.42</td>
<td>1</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>37</td>
<td>13</td>
<td>0.34</td>
<td>6</td>
</tr>
<tr>
<td>Head size of the pancreas*</td>
<td>–</td>
<td>–</td>
<td>0.28</td>
<td>–</td>
</tr>
<tr>
<td>Excised tissue (amount)*</td>
<td>–</td>
<td>–</td>
<td>0.47</td>
<td>–</td>
</tr>
</tbody>
</table>

* Numerical variables.
Bold indicates significant \(P\)-values.

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**Figure 3** Endocrine function evolution of patients during follow-up
choice for ductal decompression since the second half of last century, it is clear that this is not a technique that solves all problems for patients with CP, especially those when there is no pancreatic duct dilatation or the disease is predominantly located in the head of the gland. In addition, several series had described that although remission of pain occurs in up to 80% of patients at 3 years, approximately 30% of patients subsequently develop recurrent pain after this period of time. This late pain recurrence was often attributed to persistence or relapse of the disease in the pancreatic head. Later it became clear that the main cause of Partington–Rochelle’s procedure failure is the absence of adequate decompression of the proximal main pancreatic duct, uncinate process and secondary head ducts within the head of the pancreas.

The surgery most often used in the treatment of chronic pancreatitis since 1950 was pancreatoduodenectomy, which has proved to be effective in controlling pain and complications of chronic pancreatitis. More recent studies have reported pain remission of between 71% and 89% of patients at 4 to 6 years, with mortality reduced to less than 5% in referral centres, but maintaining surgical morbidity rates of around 40%. Even with the modification of Longmire and Traverso, which contributed significantly to the reduction in morbidity and mortality of pancreatoduodenectomy, glandular function deterioration remained a problem which developed in 50% of the patients.

In this context, the mixture of the two techniques has been proposed by Beger and Frey, combining a less aggressive form decompression with ductal pancreatic resection with preservation of duodenum. Both techniques showed similar results in randomized controlled trials, but Frey’s technique facilitated post-operative morbidity. In a randomized and prospective study comparing the two techniques in 40 patients, Buchler et al. showed similar post-operative morbidity (15–20%) and hospital stay (13–14 days). Most CP patients candidates for surgical treatment are in a poor general condition, with diabetes and are malnourished, and therefore are at higher risk of post-operative complications. Thus, a less aggressive technique that leads to lower post-operative morbidity benefits this population.

The present series shows the experience of a single centre in the care of patients suffering from CP who underwent a specific surgical technique, the Frey’s procedure. The overall morbidity and mortality in this study is in agreement with recent studies that show overall morbidity ranging from 7.5% to 39% and mortality of 0 to 2.4%.

Haemorrhage, pancreatic fistula and abdominal collection are frequent complications. Pancreatic fistulae rates ranged from 0 to 12% in different studies. The most common clinical complica-
tion is pulmonary. Smoking is often associated with alcoholism, which is the most frequent cause of CP. In this series, 96% (n = 69) of patients were heavy smokers for a long period, which may explain the presence of pulmonary complications.

Malnutrition is often present in patients with CP, but there are many tools to assess patients’ nutritional status, such as serum albumin level and BMI. Serum albumin is a good and simple predictor of surgical risk, and has a close correlation with the degree of malnutrition. Hypoalbuminemia was associated with poor tissue healing, decreased collagen synthesis in the surgical wounds or the anastomosis and impairment of immune responses. Low albumin levels can be a good predictor of some types of morbidity and an independent predictor of poor surgical outcomes, especially sepsis and major infections. Gibbs et al. reported that a decrease in serum albumin from concentrations greater than 4.6 g/dl to less than 2.1 g/dl was associated with an exponential increase in mortality rates from less than 1% to 29% and in morbidity rates from 10% to 65% after non-cardiac surgery. In the present study, severe hypoalbuminemia (<2.5 g/dl) was an risk factor for post-operative infections. In this series, pre-operative nutritional recovery has been fundamental and mandatory for these patients to decrease surgical morbidity, especially infections.

The long-term results related to pain control are in agreement with other studies, with 91.4% of patients pain free for a follow-up of 77.0 months (Table 5). Because it is a subjective symptom, evaluation of pain control as a criterion of surgical success in the post-operative follow-up has to be looked at with caution, as it may suffer interference from a number of psychological and social factors. The coexistence of mental disorders in patients with alcoholism and those dependent on narcotics can interfere with treatment outcome. Therefore, the service routine requires the cessation of alcohol, tobacco and narcotics abuse, and offers psychosocial support for these patients to undergo the surgical procedure, so they can get better results not only concerning pain, but also for the overall recovery of the patient. Furthermore, some studies have shown that the return to alcoholism may be a cause of pain recurrence in some patients. Thus, over the years dealing with patients with chronic pancreatitis, the authors have observed that surgery is only part of a complex and multidisciplinary treatment that should start preparing the patient for surgery, and continue during the whole post-operative period. Unfortunately, despite the monitoring of patients in the post-operative period, one-third of patients returned to drinking alcohol, most of them within the first year.

As for pancreatic function, it was observed during the monitoring of patients the failure of surgery to cease continuous degradation of glandular function. In all, 49% of patients developed new onset exocrine insufficiency, which is higher than values reported in the studies of Keck et al. with 34%, and Pessaux et al. with 33%. No patient presented reversal of the situation, and among those who developed the deficiency, its appearance was not delayed, which corroborated the failure of ductal decompression in reversing the pathological status and interrupting the progression of tissue injury. Maybe because of intervening in organs greatly affected by the disease, a delay in the degradation or preservation of glandular function was not seen in the current series, as previously suggested by Nealon. Results showed continuous and gradual evolution of pancreatic functional impairment after surgery.

Other series showed an appearance of diabetes de novo in 10% to 34% with this technique; after Whipple’s procedure, the rate can range from 20% to 50%. In the current series, at the time of surgery 11 patients (15.5%) were already diabetic, which is a frequency similar to other published series, ranging from 12% to 26%, except for Chaudhary et al. that showed almost half of diabetic patients in surgery. The development of diabetes de novo ranged from 10% to 34% in published studies, which are values lower than the one observed in this series, of 36.7%. What could have raised this rate is the extreme aggression to pancreatic parenchyma caused by the median alcohol intake of 278 g per day per patient for a long period in this

| Table 5 Comprarsion data of pain-free patients and follow-up in previously reported relevant patients cohorts undergoing Frey’s procedure |
|---------------------------------|-----------------|-----------------|-----------------|
|                                | Pain-free at the end of follow-up (%) | Mean follow-up (months) | No. of patients |
| Frey and Amikura (1994)         | 86.7            | 37              | 50              |
| Izbicki et al. (1995)           | 94              | 17              | 22              |
| Amikura et al. (1997)           | 90              | 25              | 11              |
| Izbicki et al. (1998)           | 90              | 24              | 31              |
| Ho and Frey (2001)             | 88              | 38.4            | 75              |
| Kelemen and Horvath (2002)      | 57.1            | 20.6            | 13              |
| Falconi et al. (2006)           | 88.8            | 60              | 40              |
| Pessaux et al. (2006)           | 88              | 15              | 34              |
| Egawa et al. (2009)             | 100             | 46              | 71              |
| Keck et al. (2010)              | 62              | 43              | 50              |
| Present series                  | 91.4            | 77.0            | 73              |
series, which is significantly above the mean levels reported by Falconi et al.\(^4\) (100 g per day).

It is important to note that despite the complications and the inability to stop the deterioration of glandular function, the main goal of surgery is to control abdominal pain, which was largely achieved. This can be noticed in the increase of BMI at follow-up compared with preoperatively, which is an indirect sign of improved quality of life.

**Conclusions**

The results of the study confirmed that local resection of the head with longitudinal pancreaticojunostomy as proposed by Frey has high effectiveness in the treatment of pain in long-term follow-up, combined with little interference in the disease course (endocrine and exocrine function). Frey’s procedure should be considered as the primary operation in patients with disabling pain as a result of CP because it is safer, easier and presents less morbidity and mortality than alternative techniques.

**Conflicts of interest**

None declared.

**References**

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