A Comparative Study Between Longitudinal Pancreaticojejunostomy v/s Lateral Pancreaticogastrostomy as a Drainage Procedure for Pain Relief in Chronic Pancreatitis Done in a Tertiary Referral Centre of Eastern India

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Received: 12 August 2011 / Accepted: 10 September 2012 / Published online: 29 September 2012
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Abstract Chronic pancreatitis (CP) is a chronic inflammation of pancreas that leads to progressive fibrosis of pancreatic parenchyma. Commonest indication of surgery in chronic pancreatitis is intractable pain. Choice of procedure depends upon the main pancreatic duct (MPD) morphology. Decompression is useful in dilated and obstructed ducts. Traditional form of decompression is construction of a pancreatico-jejunal anastomosis (LPJ). Another method to achieve ductal decompression is by a pancreaticogastrostomy (LPG) and this study will try to evaluate its effectiveness against pancreaticojejunostomy. To compare the effectiveness of LPG and LPJ in relieving intractable abdominal pain in patients with CP and their respective post-operative complications. This prospective study was done over a period of 4 years from Jan 2007 to Dec 2010 at IPGME & R (SSKM), a tertiary hospital of eastern India. Patients with diagnosis of CP with or without duct calculi and MPD diameter ≥ 7 mm with intractable pain were included. 70 patients were randomly allocated for LPJ and LPG operation by lottery method. Study tools were questionnaires, blood and radiological investigations and standard instruments for open surgery. The patients were prospectively analyzed for duration of surgery and hospital

stay, operative/postoperative complications and assessment of postoperative pain relief. Pain relief was assessed as complete (no analgesic requirement), satisfactory (tolerable pain with normal daily activities) and unsatisfactory (hospitalization, narcotics or hampered daily activities). 1. Operative time was shorter in LPG than LPJ (Median 85 vs. 110 min). 2. Incidence of ileus was lesser in LPG group ($p=.054$). Other complications were comparable in both groups. 3. LPG was associated with shorter duration of hospital stay (Mean 6 vs. 8 days). 4. Pain relief was comparable in LPG and LPJ. LPG is a good alternative to LPJ for CP.

Keywords Chronic pancreatitis · Pain · Dilated main pancreatic duct · Longitudinal pancreaticojejunostomy · Lateral pancreaticogastrostomy

Introduction

Chronic pancreatitis is an irreversible procedure. There is recurrent inflammation of the gland followed by exocrine and endocrine pancreatic insufficiency. It is a clinical entity that includes recurrent or persistent abdominal pain. The patients of chronic pancreatitis usually present with clinical tetrad of abdominal pain, weight loss, diabetes and steatorrhea. The mechanisms of pain in chronic pancreatitis are mainly due to increased pancreatic parenchymal and ductal pressure and perineural inflammation. There are some forms of non-operative treatment for abdominal pain, and exocrine and endocrine insufficiency, but the primary goal of

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operative management is relief of pain and secondary consideration is to preserve exocrine and endocrine functions. Surgical treatment can be divided as resection procedures, ductal drainage procedures, combined resection and drainage, denervation procedure or ablative procedure. Chronic pancreatitis with inflammation at the head region is suitable for the resection procedure, and ductal dilatation due to obstruction of the duct is suitable for drainage procedure. Previously, it was thought that relief of pain after operation is short lasting, but now it is proven that many patients remain pain free for long time if the cause is treated simultaneously.

The most popular drainage operation is Puestow's longitudinal pancreaticojejunostomy (LPJ). But there is another option for drainage – longitudinal pancreaticogastrostomy (LPG) — though it was not practiced before as a routine procedure. In this study, we have tried to evaluate and compare their effectiveness in relief of pain and their complications. We have included all the patients of chronic pancreatitis with dilated main pancreatic duct (MPD) due to stone or stricture.

Aims and Objectives

To compare the effectiveness of LPJ and LPG as an operative procedure in relieving intractable abdominal pain in patients with chronic pancreatitis and the postoperative complications of the procedures in a tertiary centre in eastern India.

Materials and Methods

This is a prospective study done over a period of last 4 years from Jan 2007 to Dec 2010, and the study area was IPGME & R (SSKM), a tertiary hospital of eastern India.

Seventy patients were randomly allocated for LPJ and LPG operation. Study tools were questionnaires for grading of pain, investigations for selecting patients suitable for surgery (lipase, amylase, total bilirubin, albumin, 24-h fecal fat estimation, USG abdomen, CECT abdomen, ERCP, MRCP) and assessment of postoperative pain relief/complications. Parameters of this study were duration of surgery and hospital stay, assessment of postoperative pain relief and operative/postoperative complications. Regarding assessment of pain, we have divided all the patients into three categories: complete pain relief (no pain), satisfactory (mild pain) and unsatisfactory pain (moderate to severe pain). In this study, inclusion criteria were: all patients above 12 years of age and of either sex admitted with diagnosis of chronic pancreatitis with and without duct calculi with MPD diameter ≥ 7 mm in whom pain cannot be

controlled by medical means. The exclusion criteria were MPD diameter < 7 mm, gross cardiovascular abnormality, patients with splenomegaly and pancreatic malignancy.

The follow-up schedule of our study was 2 weeks → 3 months → 6 months → 1 year → 2 years → 3 years. They were assessed with regards to their symptomatic relief of pain, weight gain, glycemic control, liver function tests and local abdominal findings, if any. Patients presenting with recurrence of symptoms were additionally assessed by standard radiological test.

The data was analyzed by Fischer's exact two-tailed test using standard statistical software SPSS.

Results

A total of 70 patients were selected for our study on the basis of inclusion and exclusion criteria. Out of them, 35 patients each were randomly classified under groups A and group B who underwent LPJ and LPG, respectively, and a comparative study was made between the two groups. According to the study, the commonest age group is the 4th decade in both the groups. The least common affected are the extremes of age. The mean age of involvement in group A is 37.4 years and in group B 36.2 years. Males are affected 2.2 and 1.5 times more than females in groups A and B, respectively. The total duration of illness was 2–5 years. The mean duration was 3.5 years.

The commonest cause of chronic pancreatitis is alcoholism, which is seen in 51.4 % and 45.7 % in groups A and B, respectively. Other causes are shown in Table 1. There were no patients with hereditary or traumatic pancreatitis or pancreatitis due to ductal anomaly.

Regarding symptomatology, 100 % patients of both the groups had severe abdominal pain. Other symptoms were weight loss (62.8 % and 60 % in groups A and B, respectively), steatorrhea (25.7 % and 28.5 % in groups A and B, respectively) and diabetes (28.5 % in both the groups).

Hypoalbuminemia is seen in 37 % and 34.3 % in groups A and B, respectively. Hyperamylasemia is seen in 17.1 % and 14.3 % in groups A and B, respectively. Similarly raised alkaline phosphatase was seen in 22.9 % and 20 % in groups A and B, respectively. 24-h fecal fat estimation was done in

Table 1 Etiology

	Group A	Group B
Alcohol	18 (51.4 %)	16 (45.7 %)
Gallstone	8 (22.8 %)	7 (20.0 %)
Tropical	5 (14.2 %)	7 (20.0 %)
Idiopathic	4 (11.4 %)	5 (14.2 %)

all patients of both the groups but that was positive in 10 % of patients in both the groups.

A total of 80 patients attended the OPD with chronic pancreatitis diagnosed by ultrasonography. Ten patients had gross parenchymal disease without ductal dilatation, for which they were excluded from the study. Fifteen patients had cholelithiasis and out of them 11 had associated choledocholithiasis. ERCP was done for those 11 patients and stones removed in all prior to surgery.

Out of the remaining 70 patients, 42 patients had gross parenchymal disease and marginal ductal dilatation (>7 and ≤ 9 mm), for whom CECT whole abdomen was done to assess the severity of the disease and complications, if any. CECT confirmed chronic pancreatitis in all 42 patients. Among these, 29 patients (41 %) had atrophic pancreas, one patient had pseudocyst with ductal communication while fibrosis, and calcification of pancreatic parenchyma was found in 74 % of the patients.

Twenty two patients who had grossly dilated MPD (≥ 9 mm) were assessed with MRCP and the findings were irregular contour of the ductal system and multiple calculi within the duct. The remaining six patients had also gross dilatation of MPD but they had monetary constraints due to which MRCP was not done and operation was done on the basis of USG findings.

Digital X-ray was done in 70 patients to see calcification for academic interest.

The total duration of LPJ and LPG was 90–120 min and 70–90 min, respectively. The median duration was 110 and 85 min for LPJ and LPG, respectively.

Operative findings were as follows:

1. Pancreatic stones/calcification was seen in 71.4 % and 74.3 % in groups A and B, respectively.
2. Dilated pancreatic duct was found in 100 % patients of both the groups.
3. Atrophic pancreas was seen in 40 % and 43 % in groups A and B, respectively.
4. Cholelithiasis was seen in 22.8 % and 20 % in groups A and B, respectively.

There were no intraoperative complications — no intraoperative blood transfusion was needed.

The shortest duration of hospital stay was 7 and 5 days for LPJ and LPG, respectively. The longest duration was 15 days in both the groups due to pancreatic fistula, which was confirmed by drain fluid amylase estimation ($>1,000$ IU/L). The median duration of hospital stay was 8 and 6 days in LPJ and LPG, respectively.

Prolonged Ileus after LPJ was more than LPG (7 and 1, respectively) and the difference was found to be approaching a statistically significant value ($p=.054$).

Other postoperative complications are shown in Table 2.

Table 2 Postoperative complications

Complications	Group A	Group B
Pancreatic fistula	2(5.7 %)	1 (2.8 %)
Prolonged ileus	7(20.0 %)	1(2.8 %)
Wound infection	4(11.42 %)	2(5.7 %)
Gastric hemorrhage/melena	2(5.7 %)	1(2.8 %)
Intestinal fistula	2(5.7 %)	0

Patients were followed as per the given schedule: The first follow-up was 2 weeks postdischarge → then 3 months → 6 months → 1 year → 2 years → 3 years. Two patients were lost to follow-up after 1 year. The median duration of follow-up in our study was 14 months. The shortest duration of follow-up was 3 months while the longest was 3 years.

While assessing postoperative pain relief, the patients who were completely relieved of pain or had tolerable pain which did not interfere with daily activities were classified as complete pain relief. Those suffering from episodic moderate pain requiring simple analgesic were classified as satisfactory pain relief. Those still suffering from severe pain requiring hospitalization or use of narcotics were termed as unsatisfactory pain relief (Table 3).

In our series, the results based on questionnaires are shown in Table 4.

Four patients of group A and three patients of group B resumed alcohol intake and experienced postoperative pain and had to take analgesics for temporary pain relief. One patient of group B had gross pancreatic calcinosis and experienced moderate postoperative pain.

All the patients with unsatisfactory pain relief disagreed for reoperation and were managed by analgesics.

Twenty four patients of group A and 25 patients of group B returned to their daily normal activities with a median interval of 6.8 months and 6.5 months, respectively.

During the period of follow-up, the number of diabetics increased from 10 to 11 in group A and from 10 to 12 in group B.

Diarrhea and steatorrhea were controlled due to usage of enteric coated pancreatic enzyme supplement.

Discussion

Alcohol consumption is the commonest cause of chronic pancreatitis worldwide. [1]

Abstinence from alcohol is probably the single greatest contributory factor in positive results of surgery [2].

The ideal operation for chronic pancreatitis should relieve pain and preserve endocrine and exocrine functions. [1, 3]

Table 3 Comparison of LPJ/LPG in pre- and postoperative state

Variable	Group A		Group B	
	Preop	Postop	Preop	Postop
Diabetes	10	11	10	12
Pain	35(SP)	20(CPR)	35	19(CPR)
		30(SPR)		31(SPR)
		4(UPR)		4 (UPR)
Alcohol use	16	4	16	3
Body weight	56 kg	58 kg	55 kg	58 kg
Normal activity	None	24 pts within 6.8 m	None	25 pts within 6.5 m

Pain relief occurs in 65–90 % patients with chronic pancreatitis treated with ductal drainage [4–6].

Procedures that involve either drainage or resection only fail to meet all the aims of ideal operation for chronic pancreatitis.

Ductal drainage procedures in dilated and obstructed ducts provide the best results [7, 8].

In one controlled series LPG was compared to celiac plexus block and was found to be superior to it in achieving pain relief after 6 months of operation in patients with chronic pancreatitis [9].

Recently uncontrolled studies show LPG is better as drainage procedure in chronic alcoholic pancreatitis though the technique of operation is not always identical [2, 10].

Results of pancreaticogastrostomy are excellent, as shown in studies conducted in southern India [11]. Data comparing LPJ and LPG is not available for chronic pancreatitis. The available studies comparing the two procedures frequently include patients of carcinoma pancreas [12].

It is documented that drainage procedures in cases with duct diameter ≥ 7 mm with a stoma diameter of 6 mm provide effective pain relief [13].

Technically LPG operation is easier than LPJ operation. LPJ involves creation of two anastomosis, and hence takes more time, has a higher probability of leakage and results in longer duration of hospital stay postoperatively. LPG operation has some extra advantages like

1. The stomach lies in proximity to pancreas, is thick walled and more vascular and hence ensures better anastomosis, resulting in decrease chances of postoperative leak.
2. In this operation, nasogastric tube lies in close proximity to pancreatic duct postoperatively. It helps in bathing

the duct with gastric juice and neutralizing the trypsin effect and minimizes the chances of leak and postoperative pancreatitis.

3. If stone remains in MPD after operation, it gets dissolved with the direct contact of gastric juice and orally administered citrate solution.
4. Assessment of permeability of pancreatic duct becomes technically easier by upper gastrointestinal endoscopy following LPG [14].

LPG and LPJ were associated with a low postoperative morbidity and nil mortality in our study though some studies reported 0 %–4 % mortality in LPG [15].

After LPJ operation in our study, the incidence of pancreatic fistula was 5.7 %. It also corroborates with one study, which showed the incidence of fistula after LPJ to be 5 % [16]. After LPG, the incidence of fistula is 2.8 % in our study, which is more than that reported in other series (where no incidence of fistula was reported).

Hemorrhage from anastomotic site was seen in many other studies [1, 15]. In our study, the incidence of hemorrhage was 5.7 % after LPJ and 2.8 % after LPG, and they were managed conservatively.

To circumvent the deficiencies in language and verbal recognition skills, we adopted a simpler verbal method of pain assessment. Complete pain relief was achieved in 57.1 % patients after LPJ against 56 % after LPG. After LPJ and LPG, 85.7 % and 88 % of patients reported satisfactory pain relief, respectively. Pain relief was unsatisfactory in 11.4 % in each group.

The median duration of return to normal activities (emphasis was stressed on pain relief as the primary determining factor) was shorter after LPG (6.5 months) than LPJ (6.8 months).

Table 4 Pain relief in LPJ v/s LPG

	Group A	Group B
Complete	20 (57.1 %)	19 (56 %)
Satisfactory	30 (85.7 %)	31 (88 %)
Unsatisfactory	4 (12 %)	4 (12 %)

Conclusion

- LPG is a simpler and safer procedure than LPJ for ductal decompression in chronic pancreatitis with dilated MPD.
- Duration of operation and hospital stay for LPG is shorter than LPJ.

- It is associated with lower morbidity and mortality.
- Pain relief achieved after LPG is comparable to LPJ.
- Return to normal activities occurs earlier in LPG than LPJ.

Though promising, a larger sample randomized comparative trial is required to establish LPG as an acceptable procedure for ductal drainage in chronic pancreatitis.

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