



Laparoscopic Lateral Pancreaticojejunostomy for Chronic Pancreatitis; a Single Operator Tertiary Center Experience from Western India

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Abstract

Introduction: Lateral Pancreaticojejunostomy (LPJ), has its recognized applications in the decompressive management of Chronic Pancreatitis (CP), and is recommended in patients with concomitant pain, obstructed, dilated pancreatic duct. Performing this procedure laparoscopically is technically challenging. We describe our technique and report our series of 33 patients who underwent this procedure.

Methods: Between March 2013 and June 2018, 33 patients (19 males, 14 females) hailing from 5 different states in India, with an established diagnosis of CP underwent laparoscopic LPJ by a single surgeon in a tertiary care center in Western India. The median age and pancreatic duct diameter on CT were 41.8 (22 to 54) years and 8.73 (7 to 10) mm, respectively.

Results: Thirty two patients were included in the final analysis in which the procedure was completed laparoscopically while one surgery necessitated conversion to open, owing to hemorrhage from the gastroduodenal artery. Median operating time was 131.2 (104 to 163) minutes and intraoperative blood loss of approximately 100 mL. There were no peri-operative deaths and no mortality at the six month follow up. No peri-operative blood transfusion was required, and the median postoperative hospital stay was 5.25 (5 to 8) days. Two patients required readmission at 8 months for pain. Twenty four patients reported to be nearly pain free on follow up while remaining 8 patients were managed with appropriate analgesia without further procedures.

Conclusion: Laparoscopic LPJ is feasible and can be performed safely in carefully selected patients in experienced hands. Our series shows good short-term outcomes and all the known benefits of laparoscopy which might entirely replace open pancreatic surgery in the future.

Introduction

Chronic obstructive calculus pancreatitis has a high prevalence in Southern and Western India, with the majority being tropical chronic pancreatitis. Chronic pancreatitis (CP) is a disease characterized by incapacitating pain and intractable symptoms related to endocrine and/or exocrine insufficiency of the pancreas. Hence, alleviation of the pain is the main aim for performing pancreatic surgery and remains the most effective line of treatment. Etiology of CP may be related to chronic alcohol intake in many cases but genetic mutations such as the SPINK1 gene mutation and environmental factors are likely causes in other patients where etiology is not known. In some series, approximately half of the patients with CP have required surgical intervention for pain relief. The preservation of pancreatic function and achieving symptomatic relief is prerequisites when considering the surgical approach. Lateral Pancreaticojejunostomy (LPJ), or modified Puestow procedure has its recognized applications in the decompressive management of CP, and is recommended in patients with concomitant pain, obstructed and dilated pancreatic duct, and inflammatory disease left of the gastroduodenal artery when there is absence of any inflammatory mass within the head of the gland. For patients with inflammatory or calcific changes in the head of pancreas, surgeries such as Beger procedure and its Frey and Berne modifications are effective with comparable symptomatic relief. The pancreas is located deep in the retroperitoneum and surrounded by major organs and vessels rendering any laparoscopic approach technically very challenging and can only be performed by highly experienced laparoscopic surgeons. To date, there are only few reported case series of laparoscopic LPJ. In this study, we describe our laparoscopic technique for LPJ and report on our series of 33 CP patients who underwent this procedure.

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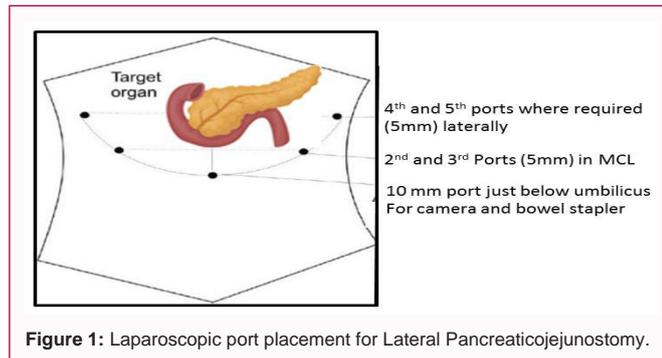


Figure 1: Laparoscopic port placement for Lateral Pancreaticojejunostomy.

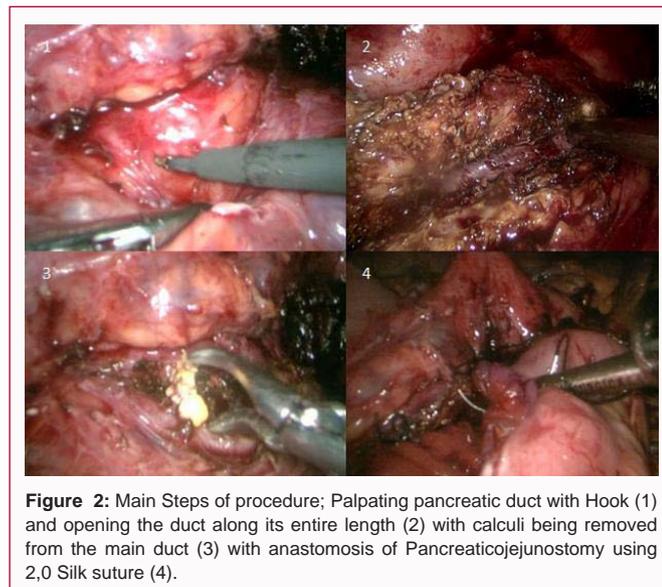


Figure 2: Main Steps of procedure; Palpating pancreatic duct with Hook (1) and opening the duct along its entire length (2) with calculi being removed from the main duct (3) with anastomosis of Pancreaticojejunostomy using 2,0 Silk suture (4).

Materials and Methods

Between March 2013 and June 2018, 33 patients (19 males, 14 females) hailing from 5 different states in India, with an established diagnosis of CP underwent laparoscopic LPJ by a single surgeon in a tertiary care center in Western India who offered the laparoscopic approach to all patients referred to him fulfilling the inclusion criteria and requiring this surgery. All patients have had the diagnosis confirmed by computed tomography scan (n=33) and endoscopic retrograde cholangiopancreatography (ERCP) (n=4). Three patients had been pre-operatively stented by ERCP. Unrelenting abdominal pain for >12 months, was the main indication for surgery, and all patients were dependent on opioid analgesia preoperatively. In some patients intermittent vomiting or severe unrelenting back ache, were more significant symptoms than abdominal pain. The etiology of CP was alcohol related in 8 patients (24%) and idiopathic in 25 patients. Alcohol abstinence was a prerequisite criterion before embarking on surgery. All patients admitted complete alcohol abstinence for at least 6 months before surgery and this was confirmed in correspondence from their family members. The median (range) age and pancreatic duct diameter on CT were 41.8 (22 to 54) years and 8.73 (7 to 10) mm, respectively.

The preoperative details, investigations, and disease characteristics for the study group are shown in Table 1. About 12 patients had calcifications along the entire length of the duct with remaining having limited calcific disease other than head and uncinata process of pancreas. A 1 patient had evidence of splenic vein thrombosis with

collaterals while two had small pseudocysts on preoperative CT scans. We elected to perform decompressive drainage of the pancreatic duct with a side-to-side LPJ (n=33) as the pancreatic duct was markedly dilated in the absence of either an inflammatory mass within the head of the gland or biliary dilatation. In 32 of these patients successful completion of the procedure was possible laparoscopically. However in one patient, due to bleed from the Gastroduodenal artery necessitated conversion to open.

Operative Technique

The operation was performed under general anesthesia with prophylactic intravenous antibiotics, graduated compression stockings. The patient was catheterized and placed in a flat Lloyd-Davies position. Surgery was accomplished with the patient tilted in a 30 to 40 degrees reverse Trendelenberg position using three 5 mm port and two 10 mm ports in 20 patients while only 4 ports were required in 11 patients. In two patients, we were able to complete the procedure using only three ports (1 mm × 10 mm, 2 mm × 5 mm). The lesser sac was opened through the gastrocolic omentum, the gastric antrum was mobilized, and the stomach was retracted with stitch to anterior abdominal wall from posterior wall of stomach. Identification of the pancreatic duct was accomplished by palpating depression on the anterior surface of the pancreas or palpating the ductal calculi with help of the laparoscopic hook, since intra operative laparoscopic ultrasound facility is not available at our center. The duct was opened over the body/neck of the pancreas and this was extended along the entire length of the pancreas to the tail and well into the head of the gland (Figure 1). The pancreatic duct was explored and multiple calculi varying insize were removed. A Roux loop was fashioned and brought into the lesser sac retrocolic, where a side-to side LPJ was fashioned using a hand sown single-layer full-thickness continuous 2-0 sutures, with mersilk being used in 11 patients and Ethibond in 21 of them (Figure 2). The colonic and small bowel mesenteric defects were closed with Vicryl 3-0 suture. The Jejunojejunostomy was stapled close in 2 patients and hand sown in 30 of them from an economic standpoint. About 18 Fr to 20 Fr vacuum drainage was left in vicinity of the LPJ. The gastrocolic omentum was restored with interrupted Vicryl 3-0 sutures followed by closure in the usual standard fashion.

Postoperative Management

Intravenous Cefuroxime was used as prophylactic antibiotic, and was continued for 24 hrs postoperatively. Oral fluids were introduced 2nd to 3rd day after surgery and liquid diet was allowed as tolerated. Patients were advanced to solid diet on 4th day in 30 patients and 5th day in 2 patients. The drains' effluent was routinely sampled on day-2 or day-3 postoperatively for measurement of amylase concentration and the drains were removed if there was no evidence of pancreatic fistula. None of the patients had biochemical evidence of pancreatic fistula and at an average 2.8 days the drains were removed (range 2 to 5 days). The dosage of analgesia was administered on demand and gradually reduced during follow-up as tolerated. Patients received routine postoperative ultrasound of abdomen approximately 6 weeks postoperatively, even if asymptomatic, to ensure absence of intra-abdominal collections. Fourteen of the 32 patients were diabetics pre-operatively. In 8 of those 14 diabetic patients, insulin requirements came down by more than 30% at 6 months post surgery.

Results

About 32 of the 33 cases were completed successfully

Table 1: Fourteen Diabetic patients with changes in requirements of their Anti-DM medications post Laparoscopic Lateral Pancreaticojejunostomy.

No	Age	Sex	Preop insulin (units) req.	At 6 months post surgery (units)	% age reduction in insulin requirements
1	42	F	24	24	0
2	55	M	38	29	25
3	49	F	48	36	33
4	48	M	22	14	37
5	22	M	44	28	37
6	45	M	30	24	20
7	45	F	28	28	0
8	51	M	32	20	40
9	44	M	24	Low dose OHA only	100
10	44	F	24	diet controlled	100
11	29	F	20	24	-20
12	46	M	16	8	50
13	54	M	28	14	50
14	46	M	On OHA	Dose unchanged	0

laparoscopically with a median (range) operating time of 131.2 (104 to 163) minutes and intraoperative blood loss of ~100 mL. The operative outcomes are shown in Table 2, and there were no operative deaths. No intraoperative or postoperative blood transfusion was required, and the median postoperative hospital stay was 5.25 (5 to 8) days. Two patients required readmission after a follow-up of 8 months, who were detected to have few parenchymal calcifications.

At a follow-up of 14.2 (6 to 36) months, 26 of the patients were pain free while 6 reported intermittent discomfort of 1-2 on the VAS scale but did not require any analgesics for it. None of the patients reported any subjective weight loss at their 6 month visit. However this was not objectively measured as a parameter on a weighing scale.

Discussion

LPJ is currently the most commonly performed decompressive surgery for the management of CP. Till date, laparoscopic LPJ has been reported to have been attempted in ___ patients across __ series excluding the current series. Adequate decompression and complete removal of pancreatic stones are associated with significant reduction in episodes and intensity of recurrent abdominal pain. Some patients undergo endoscopic drainage of the pancreatic duct with varying degrees of relief of symptoms. The patients suitable for LPJ usually have multiple stones throughout the length of the gland that makes them unsuitable for endoscopic intervention. About 3 of our patients have had at least 1 endoscopic pancreatic stent insertion through the course of their disease progression; this procedure was unsuccessful at providing adequate and sustained relief.

The Mean Pancreatic Duct Diameter (MPDD) reflects the diameter of the pancreatic duct along its entire length and is an important factor in determining whether LPJ is technically feasible or not. Identifying and isolating the duct is one of the most difficult steps in this operation and the laparoscopic approach to LPJ becomes more feasible and safer with increasing MPDD. Palanivelu et al. operated on patients with MPDD of 10 mm and reported no conversions to open surgery, whereas Tantia et al. reported 3 conversions in patients with MPDD <9 mm. In a short series of 5 cases of the first UK experience from the NHS, Khaled et al. reported the MPDD in 5 patients who had laparoscopic LPJ was >8 mm in 4 but 6 mm in 1 patient, and

the utilization of laparoscopic ultrasound facilitated identification of the pancreatic duct for them, The MPDD in our 32 patients who had laparoscopic LPJ was average 8.75 mm. Preoperatively on imaging the duct had been demonstrated to be larger than 7 mm and only those patients were selected for this laparoscopic procedure due to unavailability of intra operative laparoscopic ultrasound.

Although we completed all our cases successfully laparoscopically except one, the conversion rate from laparoscopic to open LPJ is reported to be around 10% to 12%, mainly due to uncontrolled bleeding and inability to isolate the pancreatic duct. The mean postoperative hospital stay in our series was 5.25 days in keeping with the findings of a 2014 review by Khaled et al. of all the 36 reported cases of laparoscopic LPJ and this is almost half of the mean hospital stay of 8 to 10 days after conventional open LPJ. We have reported no mortality and this compares favorably with the <5% mortality rate of conventional open LPJ. Our 3% morbidity rate (due to postoperative bleeding in 1 of the 33 patients who had the procedure) is lower than the reviewed collective morbidity rate of laparoscopic LPJ (14.6%).

The postoperative complications reported in our series included superficial wound infection at one of the port sites in 2 of the 32 patients. There have been no reported events of internal herniation or pancreatic leak in our series till date. We have adopted a suturing technique that takes reasonable but more conservative bites into the hardened pancreatic tissue and one that extends far out right up to the tail of the gland. Pain control was adequate in all patients. Various studies have reported more than 85% pain-free rate with conventional LPJ at 3 years postoperatively. The potential need for remedial operation (redrainage or resectional surgery) after open LPJ due to recurrence of intractable abdominal pain may be expected in up to 30% of patients at some point of time in their lives.

Conclusion

Laparoscopic pancreatic surgery for the treatment of CP is expanding with the advancement of surgical technology and expertise. Laparoscopic LPJ is feasible and can be performed safely in carefully selected patients in experienced hands. Our series shows good short-term outcomes and all the known benefits of laparoscopy which might entirely replace open pancreatic surgery in the future.

We believe further experience and follow-up data will only strengthen this claim.

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