International Surgery Journal
Rajachandrasekar M et al. Int Surg J. 2025 Jan;12(1):47-54
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20243984

Original Research Article

Impact of single layer reconstruction following surgery for chronic calcific pancreatitis: a retrospective analytical study

Murugesan Rajachandrasekar, Joseph Rosemary Livinjose, Raju Prabhakaran, Chidambaranathan Sugumar*

Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai, Tamil Nadu, India

Received: 09 December 2024
Revised: 23 December 2024
Accepted: 24 December 2024

***Correspondence:**
Dr. Chidambaranathan Sugumar,
E-mail: dr.sugumar@yahoo.com

ABSTRACT

Background: Surgery is an effective treatment for chronic calcific pancreatitis (CCP), addressing intractable pain and complications. While many studies predict outcomes of various surgical procedures, few focus on the impact of reconstruction type. This retrospective study analyzed the outcomes of single-layer pancreaticojejunostomy (PJ) following surgery for CCP. Aim was to evaluate outcomes of single-layer PJ in CCP patients, focusing on complications, pain relief, exocrine insufficiency, and endocrine dysfunction, compared with historical controls.
Methods: The study included 250 CCP patients treated at a tertiary care center in Chennai, India, from January 2011 to December 2024. Surgical ductal clearance and single-layer Roux-en-Y PJ using non-absorbable/delayed absorbable sutures were performed. Data on intraoperative parameters, postoperative complications, and follow-up assessments at 1, 2, and 3 months were analyzed. Primary outcomes included reductions in pancreatic fistula, bleeding, and infections. Secondary outcomes included operative time and duct size.
Results: The median age was 38 years, with a male predominance (74%). Frey's procedure was the most common (59.2%), and the mean operative time was 170 minutes. Complications included pancreatic fistulas (6.4%) and infections (9.6%), with a low mortality rate (0.4%). Postoperatively, 91% of patients achieved pain relief, and 64.4% of diabetics had improved glycemic control. Single-layer PJ showed shorter operative times than two-layer PJ with similar pain relief and blood loss. Complications decreased significantly (from 45% to 8%), alongside reduced postoperative pain scores.
Conclusions: Single-layer PJ is a safe, effective reconstruction method for CCP, reducing surgical complexity and related complications.

Keywords: Single layer PJ, Drainage procedures, Fibrosis of the pancreas, CCP, Postoperative complications

INTRODUCTION

Chronic calcific pancreatitis (CCP) is a debilitating condition characterized by progressive inflammation and irreversible fibrosis of the pancreas, which is often associated with ductal obstruction and intraductal stone formation. Most patients with CCP are conservatively managed. Surgical intervention is typically reserved for specific indications, including intractable pain and, complications such as pseudocysts, biliary or duodenal obstruction, vascular involvement, or suspicion of malignant transformation.[1,2]

The surgical approach to managing CCP has evolved significantly over time, transitioning from simple ductal drainage techniques to more complex procedures, such as duodenum-preserving pancreatic head resection. Various technical modifications have been introduced to enhance

the outcomes and effectiveness of these surgical interventions.[1] The choice of surgical procedure for CCP depends on the location of the stones within the pancreatic duct, presence of inflammatory mass, dilation of main pancreatic duct (size), presence of pseudocyst, any vascular complications. These patients are proceeded for surgery after ruling out malignancy. Endoscopic drainage and stone removal are also an optional treatment when stones are predominantly located in the pancreatic head. However, multiple studies prefer early surgery preserve exocrine and endocrine function and if endoscopic management fails, surgical intervention is required. For intraductal stones primarily located in head, body and tail of the pancreas with significant dilation of the pancreatic duct, Frey's procedure or the Partington Rochelle modification of Puestow-Gillesby procedures (lateral PJ) were often performed.[3]

Although effective, pancreatic surgery is associated with high morbidity, with complication rates ranging from 6% to 30%, and a mortality rate of up to 2%.[4] The intraoperative factors that predict morbidity and mortality are duration of surgery and blood loss. The shift from double-layer to single-layer PJ represents a continuous effort to enhance surgical outcomes while reducing morbidity and mortality. The single-layer reconstruction is designed that it should lower surgical operative time, blood loss, amount of suture material, and additionally to lower the risk of postoperative complications such as pancreatic fistula, bleeding, and intra-abdominal infections, thereby promoting faster recovery and improving patients' quality of life.[1,5,6]

This study retrospectively evaluated the outcomes of single-layer PJ performed over 13 years as part of drainage procedures in patients with CCP at the Institute of surgical gastroenterology, Rajiv Gandhi government general hospital, Madras medical college, Chennai. By analysing perioperative factors, postoperative complications, and short-term outcomes, this study aimed to provide insights into the safety and efficacy of the single-layer reconstruction in the management of the CCP.

METHODS

This retrospective observational study included 250 patients with CCP who underwent single layer PJ following pancreatic drainage procedure at the Institute of Surgical Gastroenterology, Rajiv Gandhi government general hospital, and Madras medical college Chennai, India. This study included cases managed between January 2011 and December 2024. The diagnostic workup plan comprises of measurement of serum amylase/ lipase, CA 19-9, ultrasonography (USG), computed tomography (CT) scan and magnetic resonance cholangiopancreatography (MRCP). These patients came to us with principal complaint of abdominal pain. Ducts less than 5mm in diameter in the neck were considered as non-dilated or small ducts. Main duct with diameter of greater than 7 mm are considered as dilated. Assessment of exocrine function was done by using the presence or absence of steatorrhea. Pain was assessed using visual analogue scale (VAS) and pain attack frequency along with analgesic requirement. Patients with visual pain score of greater than 8 were offered surgery. Following the procedure, drain tube amylase /lipase sent on postoperative day 3 and 5 and thereafter if needed. Pancreatic fistula/ leak is considered when drain tube amylase is 3 times raised than serum amylase and classified as A, B, C based on ISGPF classification.

Ethical considerations

Ethical approval for this retrospective study was obtained from our institutional review board. All patient data were anonymized to ensure confidentiality.

Inclusion criteria

The study included patients aged 12 to 70 years with a confirmed diagnosis of CCP based on clinical and radiological features. Patients were required to abstain from alcohol for at least six months before undergoing surgery.

Exclusion criteria

Patients were excluded if they had active pancreatic disease, as indicated by elevated amylase or lipase levels, or if they failed to maintain six months of alcohol abstinence. Additional exclusions included inadequate postoperative follow-up (<6 months), unsuitability for surgery due to comorbid conditions or contraindications, and confirmed evidence of malignancy.

Surgical procedure

Following a detailed preoperative assessment, surgical procedures are chosen based on pathomorphological conditions such as head coring for head mass, Internal drainage for selected pseudocyst cases, cholecystectomy /bilioenteric reconstruction for biliary pathologies, resection procedures for tail disease and left sided portal hypertension. These were done in addition to drainage procedure. Following which, the longitudinal opening of the main pancreatic duct from head to tail, ductal stone removal for clearance, and construction of a single-layer Roux-en-Y PJ using non-absorbable / delayed absorbable sutures in continuous fashion shown in picture below. The anastomosis was begun few centimetres proximal to tail in inferior side and the rest of the procedure is depicted in the diagram. The distance between two bites was maintained at 3 mm and the distance of the bite from the mucosal edge of the bowel wall is kept at 5mm. Inclusion of pancreatic duct mucosa is generally avoided because of inadvertent inclusion of minor pancreatic duct leading to occlusion. A jejunojejunostomy was performed in two layers, using 3-0 vicryl for the inner layer and 3-0 silk for the outer layer.

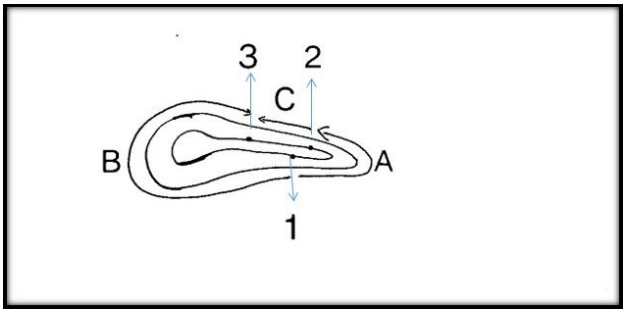

Figure 1: Reconstruction technique.
Starting point (1), first stop point (2), and end point (3), with options for anastomosis: A (1 to 2), B (1 to 3), or C (2 to 3).

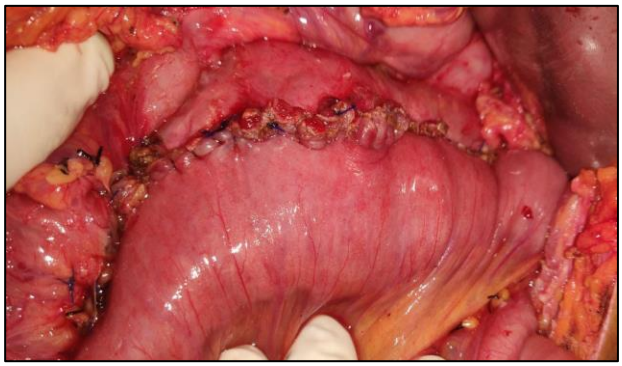

Figure 2: Single layer reconstruction technique image.

Data collection involved a thorough review of the patient records and operative reports. Intraoperative parameters including operative duration, suture type, duct size, and intraoperative findings were determined. Postoperative complications, such as postoperative pancreatic fistula, bleeding, intra-abdominal infections, and wound-related issues, were also documented. Patients were evaluated for postoperative complications with respect to Clavien Dindo classification and any identified issues were documented. Follow-up assessments were conducted at 1, 2, and 3 months after discharge.

Outcomes

Primary outcome: Reduction in postoperative complications, including postoperative pancreatic fistula, bleeding, and infection related to surgical procedures.

Secondary outcomes: Analysis of perioperative factors, including main pancreatic duct size, operative time, and postoperative recovery.

Statistical analysis

All data were entered into Microsoft excel and analysed using SPSS version 26. Normally distributed continuous variables are presented as means and standard deviations, while non-normally distributed continuous variables are expressed as medians with interquartile ranges. Categorical variables are presented as frequencies and percentages. Comparative analyses were conducted to evaluate the association between the perioperative factors and postoperative outcomes. Statistical significance was set at $p<0.05$.

RESULTS

The median age of the cohort was 38 years (IQR: 26-46 years), with male predominance (74%) than female (26%). The median main pancreatic duct size was 9 mm. Most patients (85%) had normal CA 19-9 levels, imaging findings revealed an atrophic pancreas with calcification in 20% and only chunky calcifications in 80% of cases (Table 1).

Table 1: Preoperative variables of patients undergoing single-layer PJ, (n=250).

Variables	N (%)
Age (in years), median, IQR	38 (26, 46)
Pancreatic duct size-MM, Median, IQR	9.00 (8.00, 11.00)
Sex	
Female	66 (26)
Male	184 (74)
CA 19-9	
Normal	213 (85)
Abnormal	37 (15)
Intraductal stones	
Present	250 (100)
Imaging	
Atrophic pancreas	50 (20)
Chunky calcifications	200 (80)
Alcoholic	
Yes	142 (57)
No	108 (43)
Smoker	
Yes	141 (56)
No	109 (44)
Steatorrhea	
Yes	32 (12.8)
No	218 (87.2)
Diabetes	
Yes	45 (18)
No	205 (82)
Attempted endotherapy	
Yes	5 (2)
No	245 (98)

In terms of lifestyle factors, 57% (142/250) of the patients reported alcohol use and 56% (141/250) were smokers. All patients (100%) reported pain before surgery, 91% (227/250) experienced pain relief after surgery, and 9% (23/250) reported no pain relief after the procedure. Steatorrhea was observed in 12.8% (32/250) of patients, while 87.2% (218/250) did not experience it. Additionally, 2% (5/250) of the patients had failed endoscopic treatment before surgery (Table 1).

Table 2: Distribution of clinical diagnoses and surgical procedures in study population, (n=250).

Characteristic	N (%)
Diagnosis	
CCP /head mass	105 (42)
CCP without head mass	59(23.6)
CCP/pseudocyst	30 (12)
CCP/cholelithiasis	10 (4)
CCP/choledocholithiasis	5 (2)
CCP/tail cyst	6 (2.4)
CCP/biliary stricture	5 (2)
CCP/GB sludge	3 (1.2)
CCP/pancreaticopleural fistula	2 (0.8)
CCP/distal CBD stricture/splenic artery pseudoaneurysm/sinistral PHT	2 (0.8)
CCP/left-sided portal hypertension	2 (0.8)
CCP/sinistral ht/hypersplenism/CKD	2 (0.8)
CCP/type 1 choledochal cyst	2 (0.8)
CCP/MPD stricture	1 (0.4)
CCP/GOO	1 (0.4)
CCP/hemosuccus pancreaticus	1 (0.4)
CCP/pancreatic ascites	1 (0.4)
CCP/pancreatic pseudocyst/pancreatic abscess	1 (0.4)
CCP/tail mass	1 (0.4)
Chronic fibrosing pancreatitis	1 (0.4)
CCP with others	10 (4)
Procedure	
Frey's	148 (59.2)
Frey's with others	54 (21.6)
LPJ	34 (13.6)
LPJ with others	13 (5.2)
Izbiki	1 (0.4)

The most common diagnosis was CCP with and without head mass, accounting for 42% (105/250) of cases and 23.6% (59/250) of cases respectively. Other diagnoses included CCP with an associated pseudocyst (12%, 30/250), CCP with cholelithiasis (4%, 10/250), CCP with biliary stricture (2%, 5/250), and CCP with choledocholithiasis (2%, 5/250). The less common diagnoses included CCP with gallbladder sludge (1.2%, 3/250), and MPD stricture (0.4%, 1/250). Other rare associations included pancreatitis complicated by gastrointestinal obstruction (GOO), hemosuccus pancreaticus, pancreatic ascites, pancreatic pleural fistula, and various vascular anomalies, such as splenic artery pseudoaneurysm and left-sided portal hypertension, each accounting for less than 1% of cases. A small proportion of patients had additional complications such as tail cysts (2.4%, 6/250) and tail masses (0.4%, 1/250). Chronic fibrosing pancreatitis was observed in 0.4% (1/250) of the patients, and 4% (10/250) had CCP with other less common coexisting conditions.

Regarding the procedures performed, the majority of patients underwent Frey's procedure (59.2%, 148/250), either as a standalone procedure or in combination with other interventions (21.6%, 54/250). A small proportion of patients underwent LPJ alone (13.6%, 34/250), with a few cases involving LPJ combined with other procedures (5.2%, 13/250). The Izbiki procedure was the least common procedure, performed in only one patient (0.4%) (Table 2). Procedures done in combination are cholecystectomy, distal pancreatectomy with or without splenectomy, bilioenteric anastomosis, internal/ external drainage of pseudocyst, coeliac neurolysis, etc.

Table 3: Details of intraoperative, post operative and complications following the procedures performed, (n=250).

Characteristic	N (%)
Intraoperative variables	
Blood loss/ML, Mean±SD	177±15
Duration (in min), mean	170 (120-220)
Postoperative variables	
Pancreatic fistula	
A	16 (6.4)
B, C	1 (0.4)
Nil	233 (93.2)
Postoperative haemorrhage	
Nil	246 (98)
Present	4 (2)
Pulmonary infection	
Nil	248 (99)
Present	2 (1)
Intrabdominal infection	
Nil	249 (99.6)
Present	1 (0.4)
Wound infection	
Nil	227 (90.8)
Present	23 (9.2)
Mortality	
Nil	249 (99.6)
Yes	1 (0.4)
Last Dt removal	7.00 (6.00, 9.00)
Post-surgery diabetes control (n=45)	29 (64.4)
Post-surgery steatorrhea control (n=32)	20 (62.5)
Post op pain relief	
Yes	227 (91)
No	23 (9)
Postoperative hospital stays (days)	
Median	8 (6-17)
Rx of complications following single-layer PJ	n=250
Bleeding-conservative management	3 (1.2)
Relaparatomy/bleeding control/external drainage of anastomosis	1 (0.4)
Relaparatomy/lavage of pelvic/supracolic abscess	1 (0.4)

A mean blood loss of 177±15 mL and average operative duration of 170 min were noted. The most common

postoperative complication was pancreatic fistula (6.4%, 16/250), predominantly grade A, with one case (0.4%) of grade B or C. Most patients (93.2%, 233/250) did not experience pancreatic fistulas. Postoperative haemorrhage occurred in 2% (4/250) of the patients, and 98% (246/250) did not experience bleeding. Pulmonary infections were rare, occurring in 1% (2/250) of patients, whereas abdominal infections i.e. intraabdominal infection were reported in 0.4% (1/250), wound infections reported in 9.2% (23/250). The overall mortality rate was extremely low, with only one patient (0.4%) passing away and the mortality is due to resection procedure but not due to the reconstruction technique. The duration of the postoperative hospital stay was 8 (6-17) days. Diabetes was present in 18% (45/250) of the patients, with 64.4% (29/45) achieving good post-surgery diabetes control. The last drain removal occurred at a median of seven days (IQR, 6-9) (Table 3).

All patients (100%) underwent continuous suturing for PJ. Regarding postoperative complications, 1.2% (3/250) of the patients required conservative management for bleeding, while 0.4% (1/250) required relaparotomy for bleeding control and external drainage of the PJ. Another 0.4% (1/250) of patients required relaparotomy for pelvic or supracolic abscess lavage (Table 3).

Comparing two-layer and single-layer pancreaticojejunostomies, the single-layer technique had a shorter operating time (170 min) ranging between 120min to 220min than the two-layer procedure (240 min) (Range-180-420 min). The blood loss in single-layer group was (177±15 mL). Morbidity was lower in the single-layer group, with 16 grade A pancreatic fistula (6.4%), One grade B pancreatic fistula (0.4%), four postoperative haemorrhages (2%), one intraabdominal infection (0.4%) and 23 patients had wound infections (9.2%). The two-layer group had 6 grade A fistula, 2 grade B fistula and 1 grade C fistula or abdominal infections (4%). Mortality occurred in one patient (1/250) in the single-layer group and one patient (1/52) in the double layer group. The postoperative stay was 8 days for the single-layer group, versus 10.4 days for the two-layer group (median). Pain relief was significant (91% for single-layer and 95% for two-layer based on literature) (Table 4).

Table 4: Comparison between single-layer and two-layer PJ from various studies.

Variables	Double layered PJ Izbicki et al, (n=31)[17]	Double-layered PJ, Šileikis et al (n=52)[7]	Double layered anastomosis Tan et al (n=44)[16]	Single PJ (present series), (n=250)
Operating time (min)	245	240 (180-420) (range)	230 (151-309) (range)	170 (120-220) (range)
Morbidity	19%	45%	12%	8%
Mortality	3.2%	1%	Nil	1%
Postoperative hospital stays (days in median)	NA	10.4 (8-42)	8.3±3.1	8 (6-17)

Post op complications according to Clavien-Dindo classification with comparison with a study.

The number of cases who experienced steatorrhea decreased significantly from 32 before the intervention to 20 (Figure 3).

Table 5: Degree of complications between PJ.

Degree of the complications (Clavien-Dindo)	Double layer PJ[7]	Single layer PJ
I	7 (13.5%)	23 (9.2%)
II	12 (23.1%)	19 (7.6%)
IIIa	0	1 (0.4%)
IIIb	6 (11.5%)	2 (0.8%)
Iva	0	0
IVb	0	0
V	1 (2.0%)	1 (0.4%)

Table 6: Comparison between single layer in our study versus other studies.

Parameters	Present series	Šileikis et al[7]
Operating time (minimum) (Range)	170 (120-220)	210 (140-510)
Fistula class A (%)	6.4% (16/250)	23.1% (12/52)
Fistula class B (%)	0.4% (1/250)	5.8% (3/52)
Fistula class C (%)	Nil	1.9% (1/52)
Morbidity (%)	8%	51.9%
Mortality (%)	0.4% (1/250)	3.8% (2/52)
Period of stay (days in the median)	8 (6-17)	10.3 (7-42)

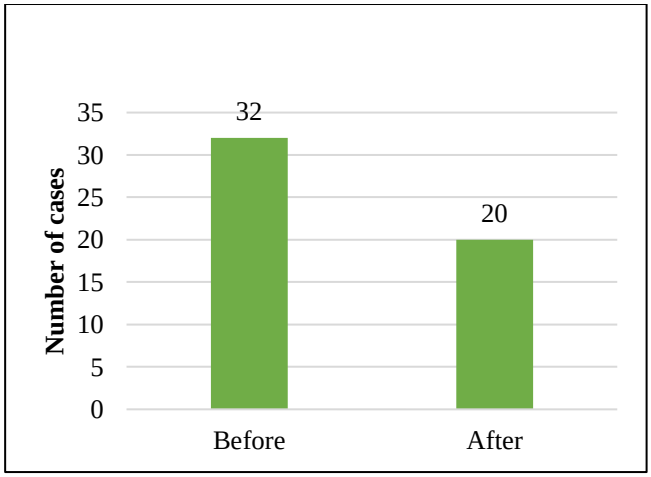

Figure 3: Comparison of the number of cases before and after intervention.

The median pain score showed a drastic decline from 9 before surgery to 1 at one month postoperatively, and this improvement was sustained at six months

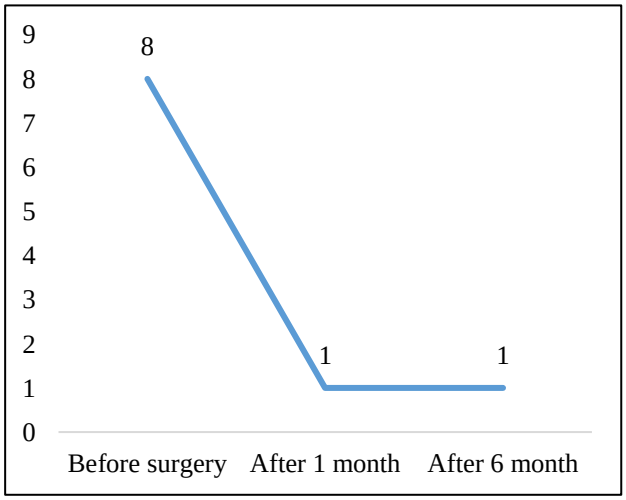

Figure 4: Median pain score over time.

DISCUSSION

This retrospective study highlights the effectiveness of single-layer PJ as a viable alternative to the traditional two-layer technique for the surgical management of CCP. The single-layer technique has several advantages including shorter operative times, decrease in consumable use, reduced cost and minimizing collateral damage to adjacent organs such as stomach, mesocolon. Based on this study, this technique showed comparable postoperative outcomes, such as low rates of pancreatic fistula, haemorrhage, and infections. These findings support the growing shift toward simplifying surgical approaches without compromising patient safety or recovery. The pain relief rate (91%) achieved with the single-layer technique was comparable to the 95% reported for two-layer PJ, it offered superior procedural efficiency with fewer perioperative demands. Notably, single-layer technique has shown lesser morbidity or duration of hospitalization. In our institute, we have published a paper on this reconstruction technique with a small volume of cases, but we have come up with a large volume of cases (250) and the outcomes of this technique.

Imran et al observed that the mean age of the respondents was 36.74 years, with 64% male and 35% female. Upper abdominal pain was universally present (100%), while steatorrhea and jaundice were observed in 8.6% and 5.7% of patients, respectively. The duration of symptoms varied, with 32.43% reporting 18-24 months, 27.02%-12-18 months, 24.32% within 6-12 months, and 16.21% less than 6 months. The mean duration of symptoms was 13.56 months.[3] In our study, median age at presentation was 38 years with male predominance (74%). most common symptom was abdominal pain and duration of the symptoms was between 6 months and 3 years.

Šileikis et al found that the single-layer continuous suturing method (Group I) significantly reduced the surgery duration (210 min vs. 240 min, p=0.004) and pancreaticojejunal anastomosis construction time (19±6 min vs. 51±18 min, p<0.001) compared to the two-layer interrupted suturing method (Group II).[7] Postoperative morbidity (51.9% vs. 45.1%, p=0.177) and mortality (3.8% vs. 2%, p=0.636) rates did not differ significantly between the groups. The findings suggest that single-layer continuous pancreatojejunostomy is a safe, efficient, and less complex option for the surgical management of chronic pancreatitis.[7] In our study, the average duration of surgery was 170 minutes with morbidity of 8% and mortality of 0.4%.

Imran et al noted that postoperative morbidity was observed in 27% of patients, with no reported mortality. Specific complications included respiratory infections (5.4%), prolonged ileus (7.1%), wound infections (5.4%), intra-abdominal abscesses (2.7%), and anastomotic leakage (5.4%). Oral feeding was resumed on the 5th postoperative day in 78% of patients, with a median resumption time of 4 days.[3] Additionally, this study underscores the metabolic benefits of surgical intervention in CCP, as evidenced by improved glycemic control in over 64% of diabetic patients postoperatively. Specific complications in our study seen such as grade A pancreatic fistula (6.4%), grade B pancreatic fistula (0.4%), postoperative hemorrhage (2%), pulmonary infection (1%), intraabdominal infection (0.4%), wound infections (9.2%) and mortality (0.4%). However, persistent comorbidities such as diabetes and steatorrhea highlight the need for integrated perioperative management to enhance long-term outcomes.

Imran et al noted that the median postoperative hospital stay was 12 days, with 75% of cases staying within 10-15 days.[3] Manapure et al revealed that lateral PJ is an excellent surgical option for patients with chronic pancreatitis and pancreatic duct calculi, offering effective

pain relief with acceptable rates of morbidity and mortality while preserving pancreatic function.[8] The technique effectively prevents further exacerbations and preserves both pancreatic endocrine and exocrine functions.[9]

Sudo et al stated that the major indication for surgery was acute pancreatitis exacerbation (80%), with no postoperative mortality. Postoperative morbidity occurred in 33% of the patients, with severe complications requiring non-surgical intervention in 6%. After surgery, 91% of the patients were pain-free and 95% experienced no further acute exacerbations. Four patients (7%) required surgery for pancreatitis-related complications. Among those who completed follow-up, 57% had diabetes mellitus, including 19% with new-onset diabetes, and 56% developed pancreatic exocrine insufficiency.[10] Exocrine insufficiency (20/32) and diabetes control (29/45) improved in patients following the reconstruction in our study.

Javed et al reported that nine patients had diabetes, and six had steatorrhea. The surgery lasted an average of 180 min, and blood loss was 110 ml. There were no deaths, and the average hospital stay was five days. At least 91% reported satisfactory pain relief at 3-month follow-up.[11] Islam et al observed that, out of 32 chronic pancreatitis patients, 27 achieved complete pain remission, and disease progression slowed after lateral pancreato-jejunostomy. Two patients died during follow-up: one from small intestine gangrene and short bowel syndrome and the other from diabetes and malabsorption. Pain-free survival was 84%, recurrence 6%, and mortality 6%.[2] On short term follow up of patients, post operative pain relief was noted in 91% of patients with 8% morbidity and 0.4% mortality.

Surgical drainage through longitudinal PJ has a complication rate of 6-30%, a mortality rate of 0-2%, and achieves long-term pain relief in 65-85% of cases.[3] Laparoscopic lateral PJ for CCP is a challenging procedure but is safe and feasible when performed by experienced surgeons.[12] Kalady et al reported peri-and postoperative morbidity and mortality rates of 25% and 0%, respectively, with a mean postoperative hospital stay of 12.1 days.[13]

Cahen et al stated that an operative PJ performed at the time of initial presentation proved superior to lithotripsy and stenting, offering better pain relief and fewer reinterventions, without incurring higher costs.[14] Additionally, Bhatwal et al stated that lateral PJ is a safe procedure for patients unresponsive to medical therapy, offering good pain relief, low postoperative morbidity, and preventing exacerbations while preserving pancreatic exocrine and endocrine functions.[15]

This study's limitations include its retrospective design, single-center setting, and focus on short-term outcomes, limiting generalizability and long-term insights. Historical comparisons may introduce bias, and confounding factors like comorbidities and duct size were not fully controlled. Variability in surgical expertise and a predominantly male cohort (74%) may limit applicability, while exclusion criteria could have skewed results by underreporting complications.

CONCLUSION

In conclusion, single-layer reconstruction is a safe, efficient, and effective alternative to double layer reconstruction for CCP, offering significant improvements in patient outcomes, while minimizing surgical complexity. Future prospective multicenter studies are necessary to confirm these findings and directly compare single-layer and two-layer techniques across larger and more diverse patient populations. Additionally, further research focused on refining surgical methods to reduce blood loss and address residual metabolic complications will be pivotal in enhancing the overall efficacy of this approach. By advancing surgical techniques and incorporating a holistic management strategy, single-layer reconstruction can be established as the standard of care in the treatment of CCP.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Prabhakaran R, Villalan R, Chandrabose A, Rajendran S, Naganath BOL. Single layer pancreaticojejunostomy (PJ) in surgery for chronic calcific pancreatitis-A single centre observational study. Int J Curr Res. 2017;9:50697-701.
2. Islam SR, Rahman S, Talukdar S, Sarkar SA, Poran S, Rahman M. Lateral Pancreato-Jejunostomy in Chronic Pancreatitis: An appraisal of 32 cases. Arch Surg Clin Res. 2020;4:001-5.
3. Imran MA, Islam MN, Hossain MD, Pradhan P, Begum A, Ahamed MU. Clinical Outcome after Pancreatico Jejunostomy in Patients with Pancreatic Calculi. Sch J App Med Sci. 2022;10(5):836-45.
4. Cahen DL, Gouma DJ, Nio Y, Rauws EAJ, Boermeester MA, Busch OR, et al. Endoscopic versus surgical drainage of the pancreatic duct in chronic pancreatitis. N Engl J Med. 2007;356(5):676-84.
5. Liu CZ, Zhu JK, Xu Q, Liu FY, Wang YD, Zhu M. Application of pancreaticojejunostomy with one-layer suture in pancreaticoduodenectomy: A retrospective cohort study. Int J Surg. 2018;56:68-72.
6. Jiang L, Ning D, Cheng Q, Chen X-P. Endoscopic versus surgical drainage treatment of calcific chronic pancreatitis. Int J Surg. 2018;54(pt4):242-7.
7. Šileikis A, Jurevičius S, Butvila M, Strupas K. Comparison of single-layer continues or two-layer

interrupted pancreatojejunal suture in Frey procedure for treatment of chronic pancreatitis: a prospective randomized study. Pol Przegl Chir. 2019;91(6):11-4.
8. Manapure SB, Munde AS, Kasale RJ, Lokare P. A clinical study on lateral pancreaticojejunostomy in a case of chronic pancreatitis. Int Surg J. 2021;8(5):1617-20.
9. O'Neil SJ, Aranha GV. Lateral pancreaticojejunostomy for chronic pancreatitis. World J Surg. 2003;27(11):1196-202.
10. Sudo T, Murakami Y, Uemura K, Hashimoto Y, Kondo N, Nakagawa N, et al. Short- and long-term results of lateral pancreaticojejunostomy for chronic pancreatitis: a retrospective Japanese single-center study. J Hepatobiliary Pancreat Sci. 2013;21(6):426-32.
11. Javed A, Bd SK, Ps A, Saravanan M, Agarwal A. Laparoscopic lateral pancreatico-jejunostomy: An experience from a tertiary care center. Trop Gastroenterol. 2020;41:66-72.
12. Shenoy G, Ramesh BS. Laparoscopic Lateral Pancreaticojejunostomy for Chronic Calcific Pancreatitis with Impacted Pancreatic Duct Stent for More Than a Decade: Double Trouble. Asian J Case Rep Surg. 2023;17(1):13-9.
13. Kalady MF, Broome AH, Meyers WC, Pappas TN. Immediate and long-term outcomes after lateral pancreaticojejunostomy for chronic pancreatitis. Am Surg. 2001;67(5):478-83.
14. Cahen DL, Gouma DJ, Laramée P, Nio Y, Rauws EAJ, Boermeester MA, et al. Long-term outcomes of endoscopic vs surgical drainage of the pancreatic duct in patients with chronic pancreatitis. Gastroenterology. 2011;141(5):1690-5.
15. Bhatwal AS, Patil AJ, Shirole NU, Bhatwal PA, Bhatwal SR. Lateral pancreatico-jejunostomy: a case series. Int Surg J. 2022;9(5):1062-7.
16. Tan CL, Zhang H, Yang M, Li SJ, Liu XB, Li KZ. Role of original and modified Frey's procedures in chronic pancreatitis. World J Gastroenterol. 2016;22(47):10415-23.
17. Izbicki JR, Bloechle C, Broering DC, Knoefel WT, Kuechler T, Broelsch CE. Extended drainage versus resection in surgery for chronic pancreatitis: A prospective randomized trial comparing the longitudinal pancreaticojejunostomy combined with local pancreatic head excision with the pylorus-preserving pancreatoduodenectomy. Ann Surg. 1998;228(6):771-9.

Cite this article as: Rajachandrasekar M, Livinjose JR, Prabhakaran R, Sugumar C. Impact of single layer reconstruction following surgery for chronic calcific pancreatitis: a retrospective analytical study. Int Surg J 2025;12:47-54.