



## In the Event of Chronic Pancreatitis with Dilated Main Pancreatic Duct, a Prospective Study on Longitudinal Pancreatico Gastrostomy as a Drainage Procedure For Relief of Pain

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### ABSTRACT

The chronic inflammatory disease known as chronic pancreatitis (CP) is incurable, has a complex etiology, a wide range of presenting variations and is difficult to cure. Although many of these alterations are also seen in older patients who do not exhibit any symptoms, autopsy investigations have shown that up to 5% of people have symptoms of chronic inflammation, including duct ectasia, acinar atrophy, and fibrosis. These results are difficult to interpret. This investigation was prospective in nature. From March-August 2021-2022, patients having longitudinal pancreaticogastrostomy as a final pain management operation for chronic pancreatitis were the subjects of this study at Burdwan Medical College and Hospital. This investigation involved a total of sixty patients. The day prior to surgery the average NRS score was  $9.8627 \pm 1.8931$ . The first postoperative day's mean NRS score was  $4.1667 \pm 2.0532$ . On day three after surgery the average NRS score was  $3.4270 \pm 1.6924$ . On discharge the average NRS score was  $7.667 \pm 1.1726$ . After two weeks the average NRS score was  $.7333 \pm 1.2885$ . After 1 month, the average NRS score was  $1.2000 \pm 1.7301$ . After 3 months the mean NRS score was  $1.2667 \pm 1.6802$ . The day before surgery the average WB faces pain score was  $7.9333 \pm 1.0048$ . The 1 postoperative day's mean WB faces pain score was  $4.1222 \pm 1.0180$ . On day 3 following surgery the average WB faces pain score was  $3.0000 \pm 1.6757$ . At discharge, the average WB faces pain score was  $.8333 \pm 1.1576$ . After 2 weeks the average WB faces pain score was  $7.776 \pm 1.1130$ . After 1 month, the average WB faces pain score was  $1.3011 \pm 1.8002$ . After 3 months the average WB faces pain score was  $1.222 \pm 1.574$ . The patients' average operating time was  $91.5000 \pm 5.5244$  mins. Patients' average hospital stay (post-operative days) was  $6.2667 \pm 1.321$  days. In the postoperative period, 48 patients (80% of the study population) did not develop any complication, whereas 12 patients (20% of the study population) developed complications in the early postoperative period (within 2 weeks of surgery). There were no late complications for any of the individuals. One patient out of the 6 who experienced problems following surgery (3.33% of the study population) had melaena (gastric hemorrhage) 2 patients (6.67% of the study population) had wound infection and 3 patients (10% of the study population) had a protracted ileus throughout the first postoperative days. Pancreatic fistula, intestinal fistula or any other kind of problem was not common. Longitudinal pancreatico-gastomy, with short surgical time, short length of hospital stay following surgery and low postoperative complications, is appropriate for providing adequate pain management in chronic pancreatitis. Longitudinal Pancreatico-Gastrostomy, Drainage Procedure, Chronic Pancreatitis and Pain Relief.

## INTRODUCTION

The chronic inflammatory disease known as chronic pancreatitis (CP) is incurable, has a complex etiology, a wide range of presenting variations and is difficult to cure<sup>[1]</sup>. According to postmortem investigations, up to 5% of individuals exhibit signs of chronic inflammation, including duct ectasia, acinar atrophy and fibrosis despite the fact that many of these alterations are also seen in older patients who do not exhibit any symptoms, making these results challenging to interpret<sup>[2]</sup>.

The treatment for chronic pancreatitis is irreversible. The exocrine and endocrine pancreatic insufficiency is followed by recurrent gland inflammation. People with chronic pancreatitis usually have the clinical triad of steatorrhea, diabetes, weight loss, and recurring or persistent stomach discomfort. In chronic pancreatitis the main causes of pain are elevated pancreatic parenchymal and ductal pressure together with perineural inflammation. Treatment options for exocrine and endocrine insufficiency and stomach pain include medicinal and endoscopic non-operative procedures. Reducing acute abdominal discomfort is the primary goal of surgical treatment for chronic pancreatitis. The majority of these patients typically have the worst prognosis and have previously experienced a lengthy period of ineffective conservative treatment<sup>[3]</sup>.

The main pancreatic duct's structure determines the kind of surgery that needs to be done (MPD). When treating small duct sickness, pancreatic resection is the proper course of action nevertheless, ductal drainage is beneficial when treating dilated and obstructed ducts. Although almost full (80-95%) pancreatectomy is the most successful in reducing pain, pancreatic resection carries an excessively high risk of postoperative morbidity, death and exocrine and endocrine insufficiency. When ductal drainage operations are used on patients with dilated MPD the best overall outcomes have been documented. An LPG has several unquestionable benefits over a pancreatico-jejunostomy. In a technical sense the operation is simpler to carry out and can be readily reversed if a subsequent reoperation is required. The stomach not only holds sutures well but also makes naso-gastric aspiration easier when it comes into contact with the anastomosis because of its thicker and more vascular wall and close proximity to the pancreas. Theoretically, it has the benefit of neutralizing trypsin by enveloping the pancreatic duct in acidic secretion. In addition to lowering the risk of anastomotic leak and stenosis, these variables help avoid pancreatitis from worsening during the first few days following surgery. Moreover, LPG permits any leftover pancreatic stones to come into contact with its solvents, which include oral citrate and stomach acid. Sixth, LPG patients have shorter average hospital stays and shorter surgical times.

## MATERIALS AND METHODS

**Study population:** Patients undergoing longitudinal pancreaticogastrostomy as a last pain management operation for chronic pancreatitis at Burdwan Medical College and Hospital from March-August 2021-2022.

**Study design:** A Prospective Study

**Sample size:** 60

**Inclusion criteria:**

- All patients with a clinical diagnosis of chronic pancreatitis, irrespective of gender, aged 20-60 years, Individuals didn't meet any exclusion criteria and who underwent pancreatico-gastomy at Burdwan Medical College and Hospital during the study's period
- Patients with duct calculi or with a major pancreatic duct diameter greater than 7 mm in whom pain cannot be managed medically
- Individuals who will provide the study with legitimate and informed consent

**Exclusion criteria:**

- Diametral pancreatic duct <7 mm
- Severe malformation of the heart
- People who have splenomegaly
- Myocardial infarction within the previous six months
- Cancer of the pancreas or malignancies of other organs concurrently

## RESULT

Thirty (60) patients underwent longitudinal pancreatico-gastrostomy during the study period. The results of the analysis of the data obtained in the master chart are displayed below. 14 patients (23.33% of the study population) were in the age group up to 30 years, 32 patients (53.33% of the study population) were in the age group from 31 to 40 years, 14 patients (23.33% of the study population) were in the age range of those over 40. The patient's average age was  $38.2000 \pm 5.2100$  years. 32 patients (53.33% of the study population) were female and 28 patients (46.67% of the study population) were male. In the age range of 31-40, there were more female patients. Alcohol was the etiological cause of chronic pancreatitis in 30% of the research subjects. Male patients were all those with a history of drinking. Twenty four of the patients who were male were found to be alcoholics.

Thirty-six patients in the pre-operative imaging studies had gallstones. (60% of the study population). 30 of these patients were female and the rest 6 were

male. Verifying the information gleaned via historical research and inquiries, 20 individuals had a history of alcoholism but no gallstones (33.33% of the study population). Gallstones were discovered in people who had no prior history of alcoholism 32. Patients (53.33% of the study population). Four individuals had a history of alcoholism and had gallstones (6.67% of the study population). For the remaining four individuals, the cause of their chronic pancreatitis was unknown (6.67% of the study population). Pre-operative imaging (USG, CECT, MRCP) showed that the primary pancreatic duct was dilated in each patient (MPD diameter > = 7mm).

10 (16.7%) patients had 7 mm duct diameter, 9(10.0%) patients had 7.5 mm duct diameter, 20(33.3%) patients had 8 mm duct diameter, 4(6.7%) patients had 8.5 mm duct diameter, 12(20.0%) patients had 9 mm duct diameter, 4(6.7%) patients had 9.5 mm duct diameter and 4(6.7%) patients had 10 mm duct diameter. The patient's average duct diameter was  $7.4500 \pm .4801$  mm. On imaging examinations (X-ray, USG, MRCP, CECT) duct calculi were observed in 54 individuals (90 per of the study group). The main goal of the surgical process was thought to be pain alleviation. The Wong Baker Faces pain rating scale and the Numerical Rating Scale (NRS) were used to measure pain. It was recorded once every two weeks, one month and three months after surgery prior to surgery, it was recorded once on the first (POD 1) third (POD 3) and the day of discharge.

One symptom unites all study participants persistent, uncontrollably high stomach pain that was unresponsive to treatment and necessitated frequent hospital stays. 30(50.0%) The day before surgery, participants had an 8 on the numerical pain rating scale, 2(3.3%). The day before surgery the patient's numerical pain rating scale was 9 and 28(46.7%) The day before surgery, patients had a numerical pain rating scale of 10. 32(53.3%) On the day prior to surgery, individuals with WB faces had an 8 pain score and 28(46.7%) On the day prior to surgery, individuals had a WB face pain score of 10.

Accordingly, prior to surgery, 100% of the study sample experienced severe pain (NRS score in the range of 7-10 and WB Faces score in the range of 8-10). 2 patients (3.33%) had an NRS score of 5 on the first postoperative day 32 patients (53.33%) had an NRS score of 4 and 26 patients (43.33%) had an NRS score of 2. On the first postoperative day, 26 patients (43.3%) had WB Faces score of 2 and 34 patients (56.7%) had WB Faces score of 4. Hence, on the first postoperative day, 34 patients (56.7% of the study population) complained of moderate pain (NRS score in the range of 4-6 and WB Faces score in the range of 4-6) while 26 patients (43.3% of the study population) complained of mild pain. On the 3rd postoperative day, 2 patient

(3.33%) had NRS Score of 5-16 patients (26.67%) had NRS Score of 4-24 (40%) patients had NRS score of 2 and 18 patients (30%) had NRS score of 0. Using the WB Faces scale, on the third postoperative day, 18 patients (30%) had a score of 0, 24 patients (40%) had a score of 2 and 18 patients (30%) had a score of 4.

Thus, on the third day following surgery, eighteen patients (30% of the study population) of the study population had no pain ( both NRS and WB Faces score of 0) 24 patients (40% of the study population) complained of mild pain ( NRS score in the range of 1-3 and WB faces score of 2) and 18 patients (30% of the study population) had moderate pain (NRS score in the range of 4-6 and WB Faces score in the range of 4-6).

On the day of discharge, 36 patients (60%) had NRS score of 0, 4 patients (6.67%) had NRS score of 1, 14 patients (23.33%) had NRS score of 2, NRS score of 3 for 2 patients (3.33%) and NRS score of 4 for 4 patients (6.67%). On the day of discharge, 36 patients (60%) had a score of 0-20 patients (33.33%) had a score of 2 and 4 patients (6.67%) had a score of 4 according to the WB F aces pain scale. As so, 36 patients were discharged on the day of (60% of the study population) were completely pain-free (both NRS and WB Faces pain scores of 0) 20 patients (33.33% of the study population) had mild pain (NRS pain score in the range of 1-3 and WB Faces pain score of 2) and 4 patients (6.67% of the study population) still had moderate pain (both NRS and WB Faces pain scores in the range of 4-6). Two weeks following surgery, 44 patients (73.33%) had a score of 0-2 patients (3.33%) had a score of 1-10 patients (16.67%) had a score of 2, and 4 patients (6.67%) on the NRS pain rating scale had a score of 4.

Hence, 2 weeks after surgery, 44 patients (73.33% of the study population) had no pain at all (both NRS and WB Faces pain rating scores being 0) 12 patients (20% of the study population) had only mild pain (NRS pain score in the range of 1-3 and WB faces pain score of 2) and 4 patients (6.67% of the study population) still had moderate pain (both NRS and WB Faces pain rating scores being 0). One month after the surgery, 36 patients (60%) had a score of 0-2 patients (3.33%) had a score of 1-10 patients (16.67%) had a score of 2-2 patients (3.33%) had ascore of 3-8 patients (13.33%) had a score of 4 and 2 patients (3.33%) had a score of 6 according to the NRS scale.

Hence, 36 patients (60% of the study population) had no pain (both NRS and WB Faces pain scores being 0) 14 patients (23.33% of the study population) had mild pain (NRS pain score 10 patients (16.67% of the research group) exhibited moderate pain (both NRS and WB faces pain rating scores in the range of 4-6). in the range of 1-3 and WB Faces score of 2. Three months after the surgery, 32 patients (53.33%) had a score of 0-4 patients (6.67%) had a score of 1-14

patients (23.33%) had a score of 2-8 patients (13.33%) had a score of 4 and 2 patients (3.33%) had a score of 6. Three months after the surgery, 32 patients (53.33%) had a score of 0-18 patients (30%) had a score of 2-8 patients (13.33%) had a score of 4 and 2 patients (3.33%) had a score of 6.

Hence, 32 patients (53.33% of the study population) had no pain 3 months after the surgery (both NRS and WB faces pain scores being 0) 18 patients (30% of the study population) had mild pain (NRS score in the range of 1-3 and WB faces score of 2) and 10 patients (16.67% of the study population) had moderate pain persistent even after 3 months (both NRS and WB faces pain scores in the range of 4-6). The day prior to surgery the average NRS score was  $9.8627 \pm 0.8931$ . The first postoperative day's mean NRS score was  $4.1667 \pm 0.0532$ . On day three after surgery, the average NRS score was  $3.4270 \pm 1.6924$ . On discharge the average NRS score was  $7.667 \pm 1.1726$ . The mean NRS score after 2 weeks was  $7.333 \pm 1.2885$ . The mean NRS score after 1 month was  $1.2000 \pm 1.7301$ . The mean NRS score after 3 months was  $1.2667 \pm 1.6802$ .

The mean WB faces pain score on the day before surgery was  $7.9333 \pm 1.0048$ . The mean WB faces pain score on postoperative day1 was  $4.1222 \pm 1.0180$ . The mean WB faces pain score on postoperative day3 was  $3.0000 \pm 1.6757$ . The mean WB faces pain score on discharge was  $8.333 \pm 1.1576$ . The mean WB faces pain score after 2 weeks was  $7.776 \pm 1.1130$ . The mean WB faces pain score after 1 month was  $1.3011 \pm 1.8002$ . The mean WB faces pain score after 3 months was  $1.222 \pm 1.574$ . The mean operative time of patients was  $91.5000 \pm 5.5244$  mins. The mean hospital stay (post op days) of patients was  $6.2667 \pm 1.321$  days.

12 patients (20% of the study population) experienced difficulties in the early postoperative period (within 2 weeks of surgery) while 48 patients (80% of the study population) did not experience any complications during the postoperative period. There were no late complications for any of the individuals. Out of the 12 patients who developed postoperative complications, 2 patients (3.33% of the study population) had melaena (gastric hemorrhage), 4 patients (6.67% of the study population) had wound infection and 6 patients (10% of the study population) had prolonged ileus in the early postoperative period. Pancreatic fistula, intestinal fistula or any other kind of problem was not common.

## DISCUSSION

When pancreatitis is persistent the exocrine and endocrine parenchyma is replaced by fibrotic and inflammatory tissue, an irreversible process that leads to progressive structural changes<sup>[4]</sup>. Abdominal pain, exocrine and endocrine insufficiency and other

conditions can be treated non-operatively with a variety of medical and endoscopic techniques. Surgical procedures are generally recommended for patients with uncontrollable stomach pain that is not alleviated by medicine and necessitates frequent hospital stays. Patients with ductal dilatation due to duct blockage in chronic pancreatitis may want to think about receiving ductal drainage or decompression therapy. One common decompression technique is the construction of a longitudinal pancreatico-jejunal anastomosis (LPJ). The longitudinal pancreatico-gastrostomy (LPG) is an alternative technique.

Studies show that LPG is superior to traditional jejunal anastomosis in a few ways<sup>[5]</sup>. Because of its thicker walls, increased vascularity and near proximity to the pancreas the stomach promotes better anastomosis. In LPG, there is no longer a prolonged jejunal blind tube. LPJ takes longer to heal and has a higher risk of leaking since it necessitates the development of two anastomoses. As a result the patient stays in the hospital longer following surgery. After surgery, if the stone is still in the primary pancreatic duct, it dissolves when gastric juice and an oral citrate solution come into direct touch. From a physiological perspective, the stomach mucosa's absence of enterokinase inhibits the activation of proteases<sup>[6]</sup>.

The purpose of this study was to evaluate the effectiveness of longitudinal pancreatico-gastomy in treating pain in patients with chronic pancreatitis, as well as to track the duration of hospital stay subsequent to the treatment and analyze postoperative complications. Thirty patients in all who satisfied the inclusion criteria and were properly briefed about the surgical method consented to participate in the study. One year and six months were spent doing the study. Based on imaging investigations, all patients with clinically diagnosed chronic pancreatitis had dilated pancreatic ducts (diameter  $> 7$  mm) with or without duct calculi. The patients were between the ages of 20 and 60. They were all repeatedly in need of hospitalization because of severe, ongoing stomach pain that would not go away. Patients with pancreatic or any other cancer, as well as those with cardiovascular problems, were not included in our sample.

Thirty-three percent of patients reported drinking in the past, even in the absence of gallstones. In contrast, 53.33% of patients had a history of gallstone disease alone and 6.67% of patients had both of these conditions. The remaining 6.67% of patients did not have a recognized cause for their chronic pancreatitis. As a result, unlike earlier studies that identified persistent alcohol usage as the primary etiological component the majority of individuals in our research had gallstone disease as their etiology. Given that all

female patients had no prior history of alcohol use and that 53.33% of the study's female participants were female overall, this may be related to the patient's gender. While majority of the patients had hypoalbuminaemia, elevated alkaline phosphatase and hyperamylasemia were less prevalent.

In all cases, preoperative imaging studies showed a dilated primary pancreatic duct. Gross parenchymal disease and a slightly dilated main pancreatic duct ( $>7\text{mm}$  and  $\leq 9\text{mm}$ ) were seen in 86.66% of the patients. The primary pancreatic duct was substantially dilated in 13.34% of the remaining patients ( $>9\text{mm}$ ). Ninety percent of these individuals had both pancreatic ductal dilatation and duct calculi. CECT revealed that the majority of these individuals with severe parenchymal illness had an atrophic pancreas. No patient had a pseudocyst or any other pancreatic cystic neoplasm.

#### **Overall the imaging results and the operational findings agreed:**

- In all cases, a dilated pancreatic duct was discovered
- Ninety percent of patients had pancreatic stones or calcifications
- Sixty percent of patients had cholelithiasis
- The majority of individuals had atrophic pancreas
- Neither an intraoperative blood transfusion nor an intraoperative complication were required
- Pain relief and preservation of endocrine and exocrine functioning are the goals of the optimal surgical procedure for chronic pancreatitis<sup>[7,8]</sup>
- Numerous investigations using ductal drainage to treat chronic pancreatitis have shown that pain alleviation happens in 65-90% of cases<sup>[9-11]</sup>.

In dilated and clogged ducts, ductal drainage techniques yield the best results. After 6 months of surgery<sup>[12,13]</sup> was discovered to be more successful in relieving patient's chronic pancreatitis pain<sup>[14]</sup>. Recent uncontrolled trials suggest that LPG is a better drainage treatment for chronic alcoholic pancreatitis, albeit the specific approach employed differs<sup>[15]</sup>. Pancreatico-gastrostomy has demonstrated positive outcomes in studies carried out in southern India. Data comparing LPJ with LPG in cases of persistent pancreatitis are not available. Studies comparing the two methods often include patients with pancreatic cancer<sup>[16]</sup>.

It has been shown that drainage techniques with a stoma diameter of 6 mm and a duct diameter  $\geq 7\text{mm}$  effectively relieve pain. We could classify the patients into three groups based on how much pain they were experiencing: total pain relief (no pain), satisfactory pain (mild pain) and unsatisfactory pain

(moderate to severe pain). At the conclusion of three months, 53.33% of patients reported complete pain relief, 30% reported satisfactory results and only 16.67% reported unsatisfactory results, based on data from the NRS and WB Faces scales. Theoretically, LPG requires less skill to perform surgery than LPJ. LPJ causes the establishment of two anastomoses, which takes longer and increases the risk of leakage, extending the length of the patient's hospital stay after surgery.

It was clear that there was a five-day minimum and an eleven-day maximum for the postoperative hospital stay. Consequently, the mean duration of hospitalization was 6.46 days, accompanied by a 1.56 standard deviation. We discovered that there was no postoperative mortality in our investigation, despite certain studies reporting 0-4% rate. Twenty percent of patients experienced some kind of complication in the early postoperative phase, while eighty percent of patients experienced no complications at all. Out of the 20% of the study participants, one patient experienced anastomotic site hemorrhage, which showed up as stomach hemorrhage (melaena). Early in the postoperative period, 3 patients experienced prolonged ileus and 2 patients experienced an incidence of operative wound infection. Intestinal and pancreatic fistulas did not occur frequently. No late complications were observed.

#### **CONCLUSION**

Our conclusions are supported by data from a prospective research that was conducted over the course of a year and a half at Burdwan Medical College. A simple and secure approach of ductal decompression for treating dilated duct chronic pancreatitis is longitudinal pancreatico-gastrostomy (LPG). Most patients receive sufficient, comprehensive, or pleasing pain relief following surgery. There was no postoperative mortality and the length of hospital stay and operation time for LPG were less than those reported for pancreatico-jejunal anastomosis. There were very few postoperative complications-much fewer than those associated with pancreatico-jejunostomy. Thus, it is possible to draw the conclusion that longitudinal pancreatico-gastomy, with short surgical time, short length of hospital stay following surgery and low postoperative complications, is appropriate for providing adequate pain management in chronic pancreatitis.

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