Original Research Article

Shaheed procedure: An Innovative Technique in the Management of Chronic Pancreatitis Calculous.

Abstract

Aim: To describe a new technique (Shaheed Procedure, single anastomosis-basedside-to-side lateral pancreatojejunostomy) instead of two anastomoses of Roux-en-Y pancreatic jejunostomy for chronic pancreatitis calculous. **Methods:** The Prospective longitudinal study was carried out in three tertiary-level hospitals in Bangladesh from 2010 to 2018. All the cases were diagnosed as chronic calculous pancreatitis with a dilated central pancreatic duct. The duct diameter is 6mm and above. The commonest investigation was ultra-sonography, and ERCP was carried out in all cases. The patients were subjected to surgery only when their pain was intractable and not responding to analgesics. A single anastomosis-based Pancreatic-Jejunostomy was made for all cases instead of the two-step anastomoses of Roux-en-Y pancreatic-jejunostomy. Postoperative assessment of their clinical and biochemical features was done every three months. **Description of technique:** The transverse colon with mesocolon is lifted upwards after incision. A longitudinal incision was made and exposed the whole length of the Pancreas. The anastomosis was made at the antero-inferior surface of the Pancreas, the most dependent part. The jejunal loop selected for anastomosis is 56 cm away from the DJ flexure, held by two Babcock forceps. No Rouxen Y anastomosis. **Results**: A total of 146 cases were evaluated in this study, including 76 male and 70 female patients. Age ranges from 15 years to 54 years. Complications like abdominal bleeding and anastomotic leakage did not happen in the postoperative period. Long-time follow-up was six years, and short-time follow-up was only one month. The total operating time is 90 to 120 minutes, with minimal blood loss. No recurrence and postoperative complications were observed in the follow-up time. The pain was relieved in 96% of cases postoperatively. Single anastomosis, shorter operating time, less morbidity with zero mortality rate. **Conclusion:** The new technique is a new option with better outcomes in pancreatic calculi management's drainage and decompression procedure.

Keywords: Chronic calculous pancreatitis, new technique, Single anastomosis, pancreatojejunostomy, Shaheed procedure.

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Introduction:

In chronic calculous pancreatitis, pain is the predominant symptom. Over time, it becomes intractable. It hampers patients' daily activities, causing them to become unresponsive to drug treatment. The aetiology of pain is multifactorial. Pain in pancreatitis is due to perineural inflammation;[1,2,3] ductal hypertension caused by stones or stricture is the primary cause of pain in chronic pancreatitis.[4-9] Among the different modality treatments, surgical treatment is the last option. Surgical options are resection, decompression and a combination of resection

and decompression. Many authors have introduced several procedures. Depending on the benefit of surgery, the surgeon chooses the best option. Extended drainage operations such as Beger[5] and Frey[6] were quickly adopted in Europe and have proven equally effective in morbidity, mortality, and pain relief. Proponents of drainage procedures such as lateral pancreatojejunostomy (LPJ) and modified Puestow or Partington procedure sufficiently decompress the affected ductal system. A resection procedure like pancreaticoduodenectomy that removes the affected head of the Pancreas with affected neural tissue is mandatory because the head is the pacemaker in chronic pancreatitis. Stone removal decreases pain; additionally, restitution of pancreatic duct flow improves the physiological function of the Pancreas.[10-12]

Roux-en-Y pancreatic-jejunostomy is well-accepted in pancreatic resection and drainage procedures. There are two anastomoses in this procedure: pancreatic jejunostomy and jejuno-jejunostomy.

Here, the author introduced the "Shaheed Procedure" as an alternate procedure. A long segment defunctioning jejunal loop (25 - 30 cm) is used for pancreatic-jejunostomy anastomosis. The straightforward procedure is only one anastomosis, side-to-side lateral pancreatojejunostomy. It maintains normal anatomical and physiological pathways.

Materials and method:

This is a prospective Longitudinal study in Bangabandhu Sheikh Mujib Medical University, and Prime Hospital in Savar City in Bangladesh. The study period is from January 2010 to December 2018. All the cases were diagnosed as chronic calculous pancreatitis with a dilated central pancreatic duct. The duct diameter is 6mm and above. The most common investigation was ultrasonography (Figure 2) in all cases. CT scan, ERCP (Figure 3) and MRCP are also used in some cases. Non-complicated cases like a pseudo-pancreatic cyst, CBD stricture and stone were included in this study. Malignant cases are not included. Viral screening like B and C viruses completed all the patient and surgical team safety cases. Cancer markers were done as a routine study. They had pancreatic calcification on the plain abdominal radiograph. Depending on the calculi position, they are graded (Table 1) into I, II, and III. Gr. I-stone in the head, Gr. II-stone at head and body, Gr. III-stone throughout the Pancreas (Figure 1).

A scoring system was made to grade the pain. Its intensity (I), frequency (F) and consequences (C) were assessed at every visit to determine a "pain score".

Table 1: Grading of Pancreatic Calcification

Pain Grade No.	Calcification grade (No.)			Duration (yrs)
	Grade I	Grade II	Grade III	
No Pain				
Mild				
Moderate	3	5	4	7-9
Sever	5	16	29	4-8

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Table 2: Scoring System

Scores	0	1	2	3	4
(F) **Frequency**					
of pain episodes/year	3	4-6	7-9	10-12	12
duration in hours/ episode	<12	12-24	24-48	48-78	72
(C) **Consequences**					
work loss in months/ year	0	1	2-4	5-8	8
No. of hospitalizations/ year	0	4	5-8	9-12	12

Intensity (I) was given a score of 0 to 8 on the following scale:

- No pain I_0
- Insignificant pain (only on direct questioning) I_2
- Mild pain I_4
- Moderate pain (analgesics regularly required but no drug dependency) I_6.
- Severe pain (Drug dependency present and sleep disturbed regularly) I_8

Frequency (F) and consequences (C) were also assigned maximum scores of 8 each, but the latter comprised four scores of two different subcategories (Table 2). Thus, the eight F scores comprised four pain episodes/year and 4 of duration/year, as shown below. Similarly, C was assessed by two different parameters, each comprising a maximum score of 4.

The maximum possible score of I, F, and C together was thus 24. Depending on the sum of the three sets of scores (I, F and C) for an individual patient, they were categorized as having mild (scores 1-8), moderate (scores 9-14) or severe (scores 15-24) pain. Every patient had a thorough physical examination, including weight and height measurement, to calculate the body mass index (weight in kg/height in meters.[2,14] Investigations included routine blood chemistry, ultrasonography, a plain film of the abdomen, and endoscopic retrograde cholangiopancreatography (ERCP). The patients were subjected to surgery only when their pain was intractable, i.e., not responding to mild analgesics and when it interfered with their daily activities. Postoperative assessment of their clinical and biochemical features was done every three months.

Description of the technique:

Under general anaesthesia by rooftop, the incision abdomen is opened. The transverse colon with its mesocolon is pulled upwards. The Pancreas is palpated at the base of peritoneal attachments, covering the Pancreas. A longitudinal incision at this peritoneum exposes the whole length of the Pancreas. The Pancreas's normal anatomy is prism-shaped, with three

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borders and three surfaces. Anastomosis is made at the anteroinferior surface of the Pancreas, the most dependent part. This surface is easily identified. By finger palpation, the central pancreatic duct with its stone is fixed. Using a knife, a longitudinal incision is given at the central pancreatic duct, where a stone will quickly come out, along with stone-thick pancreatic debris being expelled. A metallic dilator is introduced towards the tail first. Over the dilator, scissors are used to extend the incision, then a metallic dilator is introduced towards the head, and the incision is extended towards the head. This incision will reach close to the duodenal wall, about 1 cm from it. The incision will reach near the hilum of the spleen if the duct is dilated. All stone fragments are removed by thorough dissection, and any inflammatory mass, even of small size, is dissected and removed. Any stricture band with calcification is removed. The whole length of the duct becomes a single unobliterated channel. The duct length goes to the right side of the gastroduodenal artery. Any stone in the wiring and Santorini duct were also removed, and both ducts decompressed. The minimum Frey procedure is used for the inflammatory mass at the head.

The jejunal loop selected for the anastomosis is 5-6 cm away from the DJ flexure, held by two Babcock forceps. At its anti-mesenteric border, the jejunum is opened by scissors. The length is the same as the length of the MPD. Using 3-0 silk, anastomosis starts from the tail. Two pieces of silk are used, one for the lower leaf and one for the upper leaf. The stitch is continuous with regular intervals of tight knots. Anastomosis is watertight. There is no other anastomosis. Any leakage is checked. Keeping one drain at the anastomotic site, the abdomen is closed in layers. A nasogastric tube is introduced for gastric decompression.

Results:

The entire case is 146. The male is 76, and the female is 70. Age ranges from 15 years to 54 years. No abdominal catastrophes like bleeding and anastomotic leakage happened in the postoperative period. Long-time follow-up is 6 yrs. Short-time follow-up is only one month. The mean ± SD follow-up time was 22.84±17.84 months. Most patients came from the low socio-income group. All are non-alcoholic. All patients are leaving with physical and mental peace. None developed pancreatitis.

The ERCP and ultrasonography are summarized in Table No. 3

Few have diabetes, but none have diarrhoea. After the operation, all patients kept nothing per oral for four days. A drain was kept for seven days to observe any leakage.

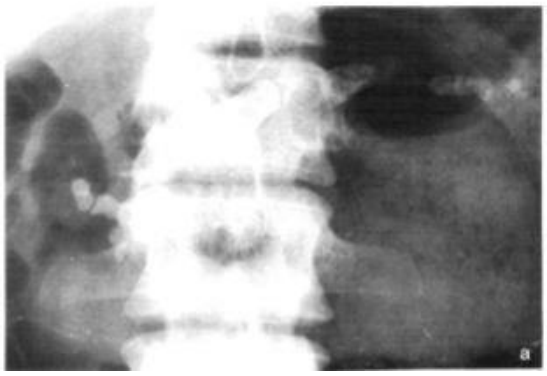

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Figure 1: A plain x-ray of the abdomen shows gr. III calcification.

The total operating time is 90 minutes to 120 minutes. Blood loss is 20 ml to 40 ml. The length of the hospital stay is from 7 days to 10 days. The total follow-up period is six years.

Transverse ultrasonography shows markedly with gr. III calcification. Dilated central pancreatic duct (arrows show outer border) with echogenic shadow at the head and body of the Pancreas.

Table 3: ERCP and ultrasonography of the study group.

Abnormality	Ultrasound (146)		ERCP		MRCP (146)	
	No.	%	No.	%	No.	%
Ductal Dilatation	146	100	78	100	146	100
Detection of calculi	146	100	78	100	146	100
MPD dilatation on US: block by ERCP	146	19.35	78	64.28	146	
US & ERCP both show blockage of MPD	46	12.90		57.14		

Figure 2: Ultrasonography and Figure 3: ERCP shows a dilated central pancreatic duct.

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Discussion:

Roux-en-Y pancreatic-jejunostomy is the accepted method in surgical operation of the Pancreas, stomach, liver, and biliary tree diseases. It includes two anastomoses. Long-time surgery, a long jejunal loop that may cause blind loop syndrome, adhesion, twisting, and obstruction.

In my new technique, I choose only the small loop of the jejunum about 5-6 cm away from the DJ flexure. It lies in very close proximity to the tail of the Pancreas. This 5-6 cm long jejunum is optimum for making anastomosis. It causes no tension after anastomosis. In Roux-en-Y anastomosis, usually, a hole is made in the gastro-colic omentum. So, chances of herniation prevailed. But here, there is no chance of herniation. Anastomosis is made at the anteroinferior surface of the Pancreas, most dependent on all body postures—no droplets of food stick at the anastomotic site. The digested food materials are microparticle liquid, coming out in small quantities with isoperistaltic waves; there is abundant space at the jejunal loop at the anastomotic site, so no leakage happens. The results of the Partington procedure are summarized in the Table. No.4.[3,11-20]

Pain is relieved by 66 to 91% in a mean follow-up of 3.5 to 9.1 years. Morbidity and mortality rates are 20% and 2% respectively.[11,12] In the Partington procedure, pain recurrence is more in 30% of cases because the wiring duct with stone remains undrained.[22]

It is important to note that the Partington procedure only applies to inflammatory mass in the Pancreas at its body left to the gastroduodenal artery, not to inflammatory mass at the head.[24]

In this new innovative procedure, we have taken advantage of removing the inflammatory mass and stone at the head, body, and tail. The success rate is very high. That's why pain recurrence is significantly less in my series (Table 5).

Advantages of the new technique:

A. Single anastomosis
B. Shorter operating time
C. Bleeding is very minimal.
D. Morbidity and mortality are zero.
E. No internal herniation.
F. No attack of pancreatitis
G. Pain recurrence is 3-4%
H. Exocrine and endocrine functions are preserved.
I. Splenectomy and removal of the tail of the Pancreas are not done.
J. There is no need to mobilize the pancreatic posterior surface.

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This procedure is better than any previous procedure, compared to the result of the Partington procedure in Table 4.

Table 4: Results of parting ton procedure for chronic pancreatitis

Reference	**year**	**No. of Pts**	**operative Mortality %**	**Mean Follow up**	**Pain relief%**
Shahid et al.	2010-2018	146	0	6 yrs	96%

Conclusion:

It is a new option in the drainage and decompression procedure of pancreatic calculi management without Roux. It gives the best result in pain management. There was no significant complication development in the study period. It is an extensive study and a short time follow-up.

Further, long-time follow-up and multicenter studies can be appreciated for future direction. Hepatobiliary and pancreatic surgeons worldwide can accept this as an alternate procedure.

Table 5: Result of our series

References	year	No. of Pts	Operative mortality %	Mean follow-up years	Pain relief%
Nealon et al.	2001	124	0	6.5	86
Delcore et al.	1994	28	-	3.5	86
Greenlee et al	1990	50	4.2	7.9	82
Bradley	1987	48	0	5.8	66
Sato et al	1986	43	0	9.1	91
Holmberg et al	1985	51	0	8.2	72
Warsaw	1985	36	3.0	3.6	83
Sarles et al	1982	69	4.2	5	85

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