

# *Laparoscopic longitudinal pancreaticojejunostomy using cystoscope and endoscopic basket for clearance of head and tail stones*

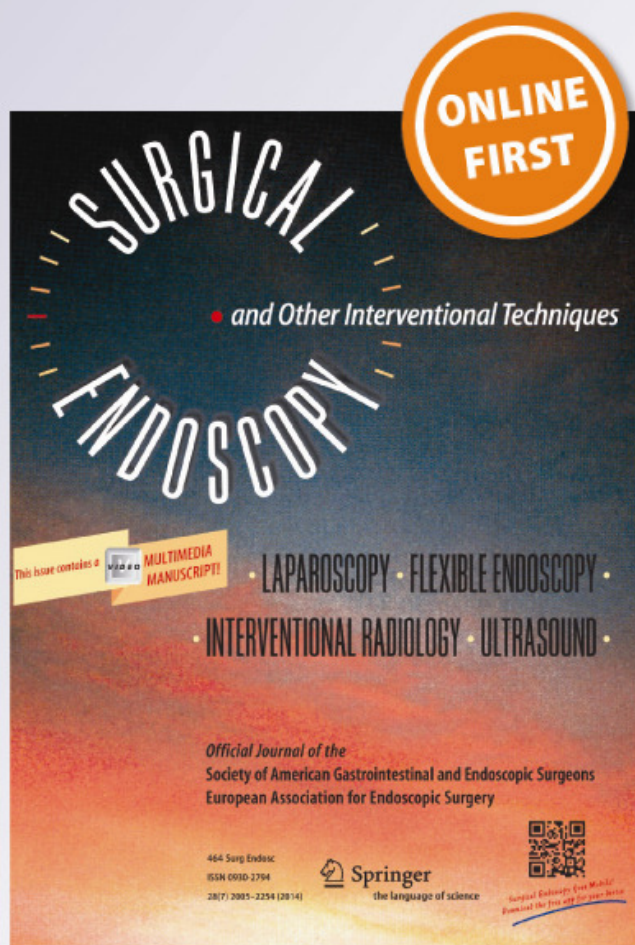
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VIDEO

# Laparoscopic longitudinal pancreaticojejunostomy using cystoscope and endoscopic basket for clearance of head and tail stones

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## Abstract

**Aim** Our aim was to study the results of laparoscopic pancreaticojejunostomy using cystoscope and endoscopic basket for clearance of stones in both the head and tail region. **Materials and methods** Twelve patients with chronic pancreatitis (CP) underwent laparoscopic longitudinal pancreaticojejunostomy (LPJ) in our unit. Patients' ages ranged between 19 and 45 years. The most common presenting symptoms were abdominal pain and weight loss. In all patients, diagnosis was confirmed by magnetic resonance cholangiopancreatography. Mean pancreatic duct diameter was 14.8 mm and we used a four-port technique. The pancreatic duct was identified by clearing the peripancreatic fat, palpating with a blunt instrument, and by aspirating pancreatic juice using a thin lumbar puncture needle. Clearance of the pancreatic duct in the head region was confirmed by direct vision using cystoscope introduced through the left lateral port, and the tail region through the right lateral port. After clearance of all stones, the leftover stones were removed using endoscopic basket through the

cystoscope. We routinely perform side-to-side pancreaticojejunostomy using 1-0 polypropylene suture reinforced with 1-0 Mersilk. All 12 patients who underwent laparoscopic LPJ had anteroposterior dimension of the pancreatic head of not more than 3 cm without any pancreatic head parenchymal calcification and with minimal stone load in the head, hence head coring was not contemplated.

**Results** Mean operating time was 262.5 min and mean postoperative stay was 5.8 days. There were no conversions, or intraoperative and major postoperative complications. Mean duration of follow-up was 16.5 months. Our first eight patients who were having more than 12 months' follow-up had pain relief and significant weight gain.

**Conclusion** Laparoscopic LPJ is a safe, effective, and feasible technique for CP in selected patients in the presence of adequately dilated pancreatic duct containing stones, and has favorable outcome in short-term follow-up.

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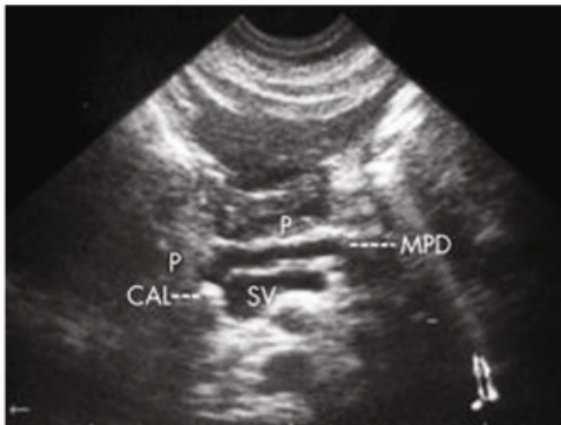
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Chronic pancreatitis (CP), a chronic inflammatory disease of the pancreas, is often associated with complications that may require surgical intervention [1–3]. The incidence of CP is approximately 5–10 cases per 100,000 population [4, 5] and has nearly quadrupled in the past 30 years. Ductal decompression and drainage are the basis for surgical treatment of a dilated and strictured main pancreatic duct, with or without additional calculi. We present our experience of undertaking laparoscopic longitudinal pancreaticojejunostomy (LPJ) in carefully selected patients.

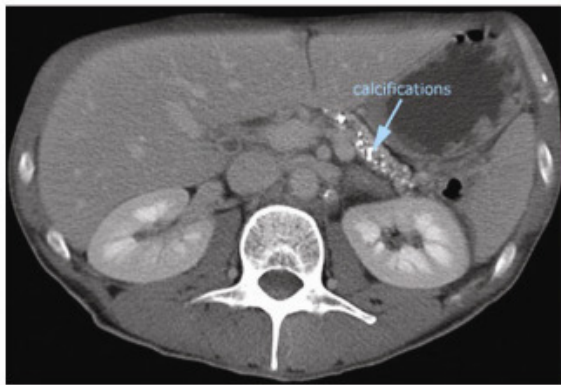
## Materials and methods

Twelve patients with CP underwent laparoscopic LPJ in our unit. Both male ( $n = 5$ ) and female ( $n = 7$ ) patients





**Fig. 1** Ultrasound showing dilated main pancreatic duct



**Fig. 2** CT scan showing calcification and dilated main pancreatic duct

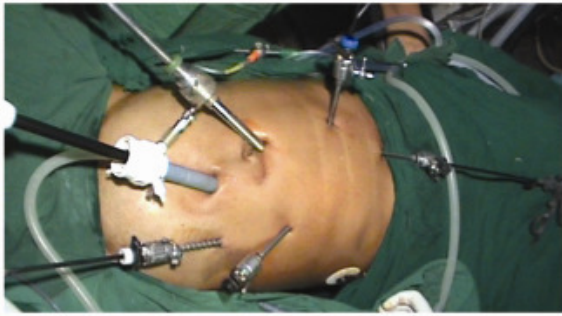
were selected and patients' ages ranged between 19 and 45 years. The most common presenting symptoms were abdominal pain and weight loss. Preoperatively, all patients were on opioid analgesics and pancreatic enzyme supplements. All patients underwent a routine hemogram profile, serum amylase and lipase to rule out any associated acute inflammation of the pancreas, ultrasound abdomen and pelvis (Fig. 1), as well as contrast enhanced computed tomography (CT) (Fig. 2) to record duct diameter and to rule out any mass. In all patients, diagnosis was confirmed by magnetic resonance cholangiopancreatography (MRCP) (Fig. 3). Mean pancreatic duct diameter was 14.8 mm. All patients had an AP diameter of the head of less than 3 cm, with no parenchymal calcification. After getting cardiologic and pulmonary clearance, patients were posted for surgery. The bowel was prepared in all patients on the day before surgery, and patients were kept on plain liquids until the night before surgery and nil orally from then on.



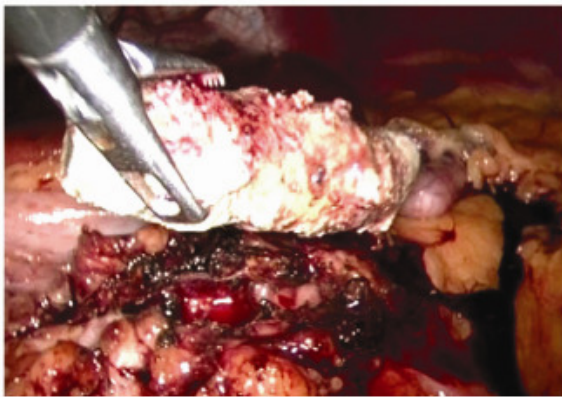
**Fig. 3** MRCP showing dilated duct and stones in main pancreatic duct

### Technique

On the operating table under general anaesthesia, the patient was placed in the modified lithotomy position with 15° head up tilt, the surgeon was standing between the patient's legs, and the camera assistant was to his left and the second assistant was to the patient's left side, with the monitor placed over the head of the patient and facing the surgeon. After Veress pneumoperitoneum, the first telescopic port (11 mm) was placed just supraumbilically a little to the left of the patient, the second port (6 mm) was placed subxiphoid for retracting the stomach, then the third port (6 mm) was placed midway between the telescopic and subxiphoid port a little to the right of midline, which acts as the left-hand working port, and finally the fourth port (6 mm) was placed in the midclavicular line in the left hypochondrium to the left of the telescopic port, which acts as the right-hand working port (Fig. 4). After entry to the peritoneal cavity a general survey was done and the stomach was lifted up with an endobag entered through the subxiphoid port. The gastroduodenal omentum was divided widely by a Harmonic Scalpel and the attachments from the posterior part of stomach to the pancreas were lysed. The whole pancreas was then freed from all peripancreatic adhesions, and the peripancreatic fat was taken care of with a Harmonic Scalpel. The pancreatic duct was localized and palpated with a blunt grasper and confirmed using a spinal needle and aspirating pancreatic juice. The duct was then opened using a Harmonic Scalpel from head to tail. Stones were removed using laparoscopic instruments such as a blunt grasper and stone grasper (Fig. 5), and out of the abdominal cavity by placing in endobag through the telescopic port under guidance of a 5 mm

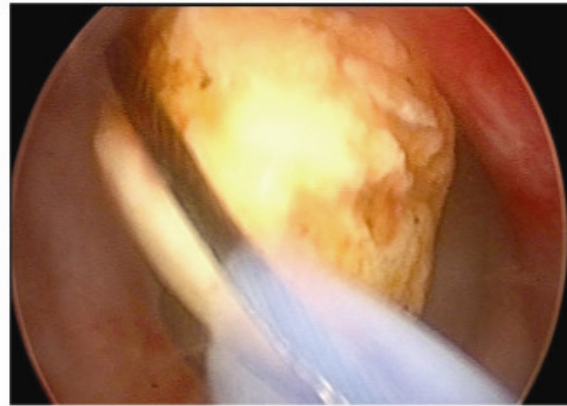


**Fig. 4** Port positions



**Fig. 5** Pancreatic duct stones are removed using a blunt grasper

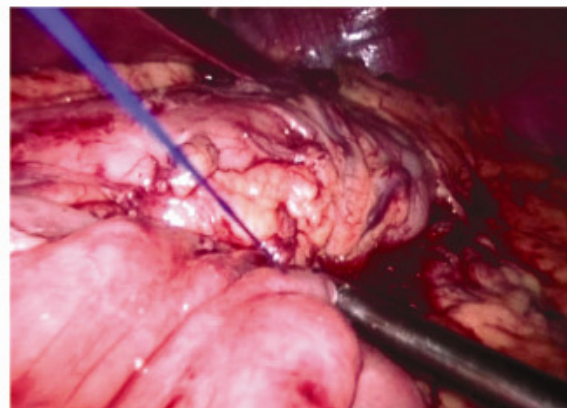
telescope introduced through the left midclavicular port. Finally, cystoscope was introduced to both the head and tail end to see if there were any missed stones. If any were found they were removed using endoscopic retrograde cholangiopancreatography (ERCP) basket (Fig. 6). All patients had an AP diameter of the head of less than 3 cm, with no parenchymal calcification in the head region; hence coring of head was not required. The duodenojejunal flexure was identified after elevating the transverse colon laparoscopically, and from the ligament of treitz 20 cm distally the jejunum was held with a closed bowel grasper. The telescopic port was then extended transversely about 5 cm and held, the jejunal loop was exteriorized and the abdomen desufflated. The jejunal loop was divided 20 cm from the ligament of treitz with a linear cutter stapler (Johnson & Johnson), the jejunojejunostomy (end to side) was performed extracorporeally (Fig. 7) to cutdown on the cost of the endostapler, keeping adequate distal limb of jejunum for pancreaticojejunostomy, the anastomosed enteroenterostomy was pushed to the peritoneal cavity, and



**Fig. 6** Leftover stones are basketed out using ERCP basket



**Fig. 7** Enteroenterostomy done extracorporeally



**Fig. 8** Laparoscopic pancreaticojejunostomy completed



**Table 1** Results of all patients who underwent laparoscopic LPI

No.	Pancreatic duct diameter (mm)	Operating time (min)	Postoperative stay (days)	Follow-up (months)
1	16	310	10	25
2	14	300	7	23
3	15	300	5	25
4	14	280	5	24
5	15	260	5	23
6	16	280	6	21
7	14.5	270	5	18
8	14.5	240	6	17
9	15	210	6	10
10	14	250	5	6
11	16	230	5	4
12	14	220	5	3
Mean	14.8	262.5	5.8	16.5

the telescopic port was then reinstituted. The pancreaticojejunostomy was performed intracorporeally (Fig. 8) using a Harmonic Scalpel in the distal limb of jejunum proximal to enteroenterostomy. The jejunotomy loop was kept beside the opened up pancreatic duct and intracorporeal anastomosis was carried out using 1-0 polypropylene and 1-0 Mersilk, maintaining a distance of 50 cm between the pancreaticojejunostomy and jejunojunction. A closed tube drain was placed beside the pancreaticojejunostomy, and all ports and the extended telescopic ports were closed.

## Results

Mean operating time was 262.5 min. There were no conversions, or intraoperative and major postoperative complications. Mean postoperative stay in hospital was 5.8 days, and mean duration of follow-up was 16.5 months (Table 1). Our first eight patients had more than 12 months' follow-up. All patients had significant weight gain (around 3–4 kg in 3 months;  $3.4 \pm 0.45$ ;  $p < 0.005$ ) and excellent pain relief. Pain was measured using a standard visual analogue scale (VAS), starting at baseline preoperatively and every 3 months postoperatively, by the VAS folder given during discharge, and at their follow-up visit asking them to submit at 3-monthly intervals. Pain relief was measured from baseline until each patient's last follow-up. Only two patients had pain recurrence after 6 months. These patients were admitted and managed conservatively, and responded well during their follow-up. All patients had their weight checked preoperatively then every 3 months postoperatively until their last follow-up. Mean weight of each patient measured postoperatively was compared against their baseline preoperative measurement.

## Discussion

The majority of cases were caused by alcohol abuse, although CP is about 30 times less common than alcoholic cirrhosis. In alcoholic patients, the disease typically manifests in middle age. Cigarette smoking plays an important role and constitutes a major risk factor for CP, statistically independent of alcohol intake [6–8]. There are now well-defined inherited germline mutations that can cause CP in families [9]. Rarely is CP related to the biliary tract or gallstone disease. Other etiologies for CP include anatomical variants such as pancreas divisum or annular pancreas, metabolic (hypertriglyceridemia or hypercalcemia), and sphincter of Oddi dysfunction or trauma. Finally, some cases of CP are idiopathic. In our study, out of five males, four were alcoholic and other was idiopathic. Out of seven females, none were alcoholic, one had a family history of CP, and others were idiopathic. The diagnosis of CP is generally made by detecting calcifications in the pancreas, i.e. stones in the pancreatic duct, on a CT. Pancreatic calcifications are pathognomonic of the disease and their presence indicates that the disease is advanced. The diagnosis of CP can also be made by ERCP; the changes in the pancreatic duct system associated with CP and the criteria for a diagnosis by ERCP have been delineated [10]. In our patients, the pancreatic duct system was delineated by non-invasive MRCP, which is now the investigation of choice. The most common indication for surgery in patients with CP is pain. Even our patients were admitted to our department with a chief complaint of pain, which was the main indication for surgery in our patients. In general, daily pain associated with CP is managed initially by oral non-enteric coated pancreatic enzymes and non-narcotic analgesics, although the impact of these measures is modest [11]. The mechanism of pain in patients with CP remains poorly understood [12]. It is thought that significantly elevated pressure in the main pancreatic duct of patients with CP causes a compartment syndrome, which may be the source of the pain characteristic [13–17]. The fibrosis that envelops the chronically inflamed pancreas plays a central role in the evolution of this pressure by limiting the ability of the gland to expand during periods of exocrine secretion and to absorb the pressure created by the increased ductal volume. Ductal decompression and drainage are the basis for surgical treatment of a dilated and strictured main pancreatic duct, with or without additional calculi. Hence removal of stones and releasing the intraductal pressure and creating a drainage procedure by pancreaticojejunostomy forms the basis of any surgical procedure, whether it be open or laparoscopic technique. Here we used cystoscope with endoscopic basket to remove leftover stones, thus ensuring clearance of all stones and thereby relieving intraductal pressure, and thus giving all

patients immediate pain relief with advantages of minimally invasive surgery.

## Conclusion

Cystoscope and ERCP basket can be used to remove residual stones during surgery under direct vision, ensuring clearance of all stones from both the head and tail in carefully selected patients, in the presence of adequately dilated pancreatic duct. This has a favourable outcome in short-term follow-up.

**Disclosures** Dr. Manash Ranjan Sahoo and Dr. Anil Kumar have no conflicts of interest or financial ties to disclose.

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