

Laparoscopic Roux-en-Y pancreatic cyst-jejunostomy

An alternative in the minimally invasive management of pancreatic pseudocysts

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Abstract

Background: The surgical management of pancreatic pseudocysts can be established through a variety of techniques. Internal drainage has consistently proven to be the treatment of choice for both acute and chronic pancreatic pseudocysts. With the growing popularity of minimally invasive surgery and improvements in surgical technique, laparoscopic internal drainage procedures for pancreatic pseudocysts are being attempted. While most authors have focused on laparoscopic cyst-gastrostomies, few have written about laparoscopic cyst-jejunostomies.

Methods: In this article, we report our experience with eight laparoscopic Roux-en-Y cyst-jejunostomies. Of the eight patients, six had alcoholic pancreatitis, and two had gallstone pancreatitis. There were five men and three women with a mean age of 48 (range 35–71 years).

Results: The mean operative time was 150 min, with a range of 100–215 min. We report a mean EBL of 78 cc, a minor complication rate of 20%, and no major complications or mortalities.

Conclusions: These data compare favorably with both open and laparoscopic internal drainage procedures. Laparoscopic cyst-jejunostomy offers a feasible alternative in the minimally invasive management of pancreatic pseudocyst.

Key words: Pancreatic Roux-en-Y cyst-jejunostomy—Minimally invasive surgery

Internal drainage remains the treatment of choice in the management of acute and chronic pancreatic pseudocysts [8]. Although controversy continues to exist over the preferred method of internal drainage, the success of minimally invasive surgery has led investigators to study minimally invasive approaches to the operative treatment of pancreatic pseudocysts. To date, most authors

have focused their experience on the laparoscopic and endoscopic cyst-gastrostomies.

Pancreatic Roux-en-Y cyst-jejunostomy is an accepted alternative in the management of pancreatic pseudocysts, offering several advantages over cystgastrostomy, and should gain an important role in the era of laparoscopic surgery [8, 16]. Laparoscopic cyst-jejunostomy is a technically challenging procedure requiring complex laparoscopic skills, and it remains to be proven whether it can be performed safely. It is even less clear whether this technique will inherit the benefits of minimally invasive surgery, i.e., less pain, a faster recovery, and decreased hospital stay, with acceptable morbidity and mortality.

Few case reports have appeared in the literature demonstrating the technique and feasibility of laparoscopic cystjejunostomy in the management of pancreatic pseudocysts [2, 5, 9]. We report our experience, technique, and results with eight consecutive cases of pancreatic pseudocysts treated by laparoscopic Roux-en-Y cyst-jejunostomy.

Patients and methods

From November 1998 to April 2002, we performed 10 cases of laparoscopic pancreatic surgery at Westchester Medical Center and Montefiore Medical Center in New York. Two patients underwent distal pancreatectomy, and eight patients with acute and chronic pancreatic pseudocysts were treated with laparoscopic Roux-en-Y pancreatic cyst-jejunostomy by a single surgeon with fellows and residents. We are reporting our experience with laparoscopic Roux-en-Y cyst-jejunostomy. The charts were retrospectively reviewed and the data analyzed.

Preoperative workup

Patients were evaluated preoperatively by ultrasound and serial computerized tomography scans (Fig. 1). All patients were observed for a minimum of 6 weeks, as prior work has shown that it is rare for a pseudocyst to resolve after this time period [3, 4, 21, 23–25, 26]. In addition, this allows adequate time for the maturation of the pseudocyst wall in order to complete a safe anastomosis. Each patient also

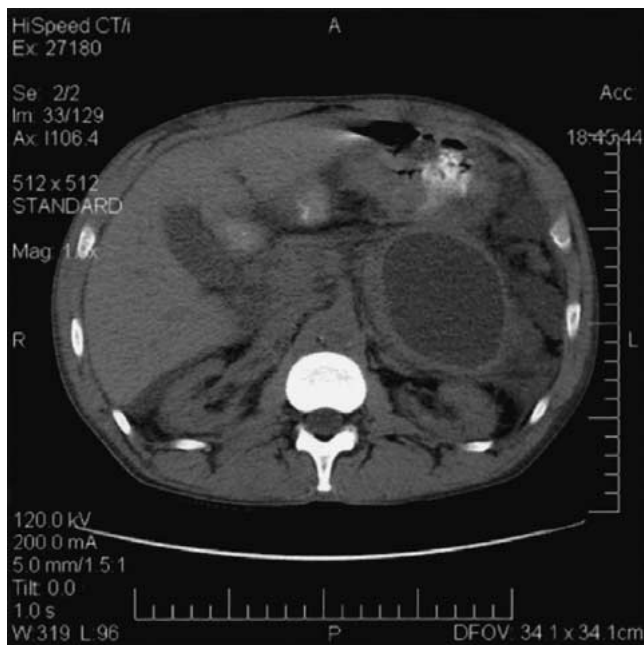


Fig. 1. Preoperative CT. Pancreatic pseudocyst measuring 7.2×6.3 cm.

underwent a preoperative ERCP to evaluate the anatomy for possible pancreatic ductal communication with the pseudocyst [8, 19, 22]. None were identified in this series of patients.

Surgical technique

The patient was placed in a supine position and, under general anesthesia; the patient was prepped and draped using standard technique. Initial access to the peritoneal cavity was obtained through a standard Hasson technique. A total of four or five ports were used, two 12-mm and three 5-mm ports positioned strategically in arc fashion in the lower abdomen, avoiding the midline in order to increase our operative field (Fig. 2). Intraoperative laparoscopic ultrasound was used in all cases to further localize the cyst and identify the most favorable area for positioning of the anastomosis. A Veress needle was then introduced percutaneously to aspirate the cyst and further confirm adequate localization. Using the Harmonic Scapel, the cyst was entered through the transverse mesocolon in all cases with the exception of one, where we approached the cyst through the gastrohepatic ligament. A window of approximately 3 cm was created, and a biopsy of the cyst wall was obtained for frozen section and pathologic evaluation. Necrosectomy was also performed when necessary [10].

Once pathologic confirmation was obtained for the absence of malignancy, we proceeded with creation of the roux limb by dividing the jejunum with a linear stapler approximately 35 cm from the ligament of Treitz. A jejunio-jejunostomy was then created 50 cm distally in a side-to-side functional end-to-end anastomosis with a 45-mm linear stapler, and the enterotomy closed in one layer with a continuous 2-0 Ethibond suture. The mesenteric defect was closed with interrupted 2-0 Ethibond sutures to prevent internal herniation. A 3-cm enterotomy was then created in the roux limb. In the first case, we performed the cyst-jejunostomy with a linear stapler. In the following seven cases, the cyst-jejunostomy was created in a hand-sewn fashion in one single layer with a continuous locked suture full thickness between the pseudocyst wall and the jejunum and then completed with a similar anterior continuous suture. We prefer a hand-sewn cyst-jejunostomy anastomosis because we believe we were able to eliminate some of the technical difficulties associated with the variability in pseudocyst wall thickness. Upon completion, the anastomosis was bathed with fibrin glue using a laparoscopic applicator, and a 10-mm Jackson-Pratt drain was placed in the vicinity of the anastomosis. Although there is no definitive evidence in this setting, fibrin glue was

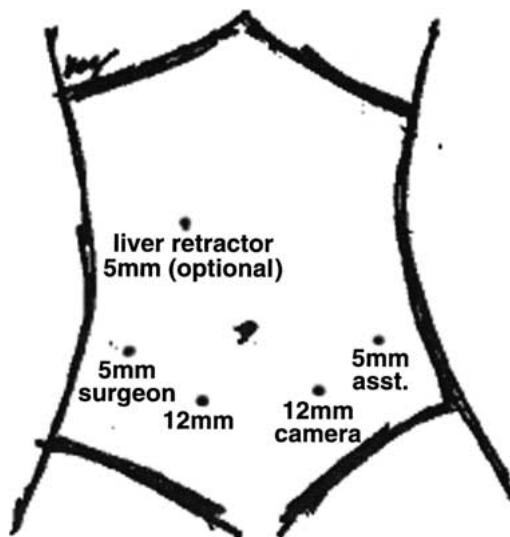


Fig. 2. Abdomen-port placement.

used for its potential ability to protect the anastomosis from leakage, promote wound healing, and control bleeding from cut edges [6, 12, 13].

Postoperatively, the patients were started on a clear liquid diet on postoperative day 1 and progressively advanced to a regular low-fat diet. The Jackson-Pratt drain was left in place until the patients were tolerating a regular diet, and the drain fluid was tested for the presence of amylase prior to its removal. Routine postoperative CT scanning is performed approximately 6–8 weeks postoperatively as part of our follow-up protocol. Once resolution of the pseudocyst has been documented, patients are then followed with annual abdominal CTs for approximately 3 years.

Results

We performed eight laparoscopic Roux-en-Y pancreatic cyst-jejunostomies in eight patients, five men and three women with a mean age of 48 (ranging from 35 to 71 years). The cause of pancreatitis was identified as alcoholic pancreatitis in six patients and gallstone pancreatitis in two patients. In six patients, the pseudocyst was identified after an episode of acute pancreatitis, and two patients had a history of chronic pancreatitis. Three patients had associated comorbidities including diabetes, cirrhosis of the liver, one case of chronic renal failure, and COPD. The mean cyst size was 10.5 cm with a range of 6 to 14 cm.

During the period of observation, one patient required percutaneous external drainage to treat a pancreatic abscess. This patient did go on to have a successful laparoscopic Roux-en-Y cyst-jejunostomy. All cases were performed laparoscopically without any conversions to conventional surgery, and no patients required reexploration. Our mean operative time was 150 min with a range from 100 to 215 min. Our operative time decreased with increasing experience. Our mean blood loss was 78 cc and seemed to be unrelated to the size, age of the cyst, or location of the internal drainage. No patients required transfusion. All patients were advanced to a regular low-fat diet by postoperative day 2 with the exception of our first patient, who de-

veloped an ileus requiring NGT decompression. Overall the mean hospital stay was 4 days with a range from 2 to 10 days. Our mean follow-up is 2 years (range 1–4 years).

In this series, there were no major complications related to the laparoscopic Roux-en-Y cyst-jejunostomy. One case of prolonged ileus and one case of fever in the postoperative period required no further intervention other than observation. Both of these patients had alcoholic pancreatitis as the cause of their pseudocyst formation. Postoperatively, there were no anastomotic leaks or cases of intraabdominal abscesses. In all cases once the patients were tolerating a regular diet, the drain fluid was tested for the presence and quantity of amylase, and all drains were removed prior to discharge from the hospital. One patient was readmitted to the hospital on postoperative day 25 with acute sigmoid diverticulitis that eventually required operative intervention. Our minor complication rate was 20%, and we had no major complications and no mortality in our series. To date, we have had no recurrences or complications of the Roux limb. All patients were studied with computerized tomography 6 to 10 weeks postoperatively to document resolution of the pseudocysts (Fig. 3).

Discussion

The choice of treatment of pancreatic pseudocysts remains controversial. The surgical options for internal drainage are cyst-gastrostomy, cyst-duodenostomy, and cyst-jejunostomy [15, 19]. Several factors influence the method of drainage including age, size, and location of the cyst. In recent years, the advent of minimally invasive techniques has caused investigators to examine their role in the management of pancreatic pseudocysts. Although few reports have appeared in the literature, most of the early experience has focused on laparoscopic cyst-gastrostomy through several described techniques. The reason for this preference has to do with technical simplicity and ease of accomplishing, internal drainage with minimal dissection and a single anastomosis [15, 17, 20]. In addition cystgastrostomy has demonstrated a shorter operative time, decreased intraoperative blood loss, and shorter hospital stay in the conventional surgical literature [16, 17, 20].

Retrospective and collective reviews in the era prior to laparoscopic surgery showed higher complication rates with cyst-gastrostomies relative to cyst-jejunostomies, specifically higher rates of upper gastrointestinal hemorrhage [7, 8, 16, 19]. In addition, higher rates of recurrence have also been observed with the cyst-gastrostomy [9]. Johnson et al. also noted that the complication rate with cyst-gastrostomies increased with increasing size of the pseudocyst [11]. Furthermore, anatomic considerations, particularly size and location, may render a pseudocyst less approachable by cyst-gastrostomy [8, 16]. Pseudocysts are not always confined to the lesser sac and occasionally are not adherent to the posterior wall of the stomach. In such circumstances a



Fig. 3. Postoperative CT of abdomen. Resolution of pseudocyst.

cyst-jejunostomy is the preferred procedure. Although issues as pseudocyst size, location, and lack of adherence to the posterior gastric wall can be contraindications to performing a cyst-gastrostomy, they are favorable to the performance of a cyst-jejunostomy. Therefore, if laparoscopic cyst-jejunostomy can be performed safely, it ought to become a formidable alternative to the cyst-gastrostomy in the management of pancreatic pseudocysts. Cyst-jejunostomy offers several advantages. It allows for individualized positioning of the anastomosis for a more dependent and effective drainage [8]. While providing diversion from the alimentary tract, it prevents the introduction of food particles and potential cyst infection. The advantages demonstrated by cyst-gastrostomy over cyst-jejunostomy in the conventional literature, namely, decreased blood loss and shorter hospital stay, could potentially be neutralized by the application of minimally invasive techniques [8, 16]. On the other hand, laparoscopic Roux-en-Y cystjejunostomy requires advanced laparoscopic skills, two intra corporeal anastomoses, and perhaps a longer operative time (at least initially).

To date only a few isolated case reports of laparoscopic cyst-jejunostomy have appeared in the literature [2, 5, 9]. These reports have essentially centered on creating a proximal loop cyst-jejunostomy. However, a loop cyst-jejunostomy does not allow for effective diversion from the alimentary tract. The contents of the biliary tree can flow freely into the pseudocyst cavity. In addition, in the event of an anastomotic leak, the loop cyst-jejunostomy would yield a greater morbidity as it is in continuity with the alimentary track [8]. In open surgery, cyst-jejunostomy is the procedure of choice in the management of pancreatic pseudocyst. Given the current technical advances in minimally invasive techniques, our experience shows that laparoscopic Roux-en-Y cyst-jejunostomy is feasible. However, fur-

ther studies would be needed to determine the benefits of the laparoscopic approach in this setting.

In our series of eight patients, laparoscopic Roux-en-Y cyst-jejunostomy was successfully completed with no major complications or mortality and an acceptable minor complication rate. There were no conversions to laparotomy and no reoperations. Our data compare favorably with the literature on open cyst-jejunostomies, which reports a recurrence rate of 5–10%, postoperative bleeding complications of approximately 2%, overall morbidity of 5–20%, and mortality of 2–14% [1, 8, 11, 16, 19]. Our technique is a reconstruction of the conventional operation through a laparoscopic approach without any major alterations. It must be noted, however, that we attempted this technique only after having had extensive experience with laparoscopic intracorporeal anastomosis by both stapled and hand-sewn techniques. As a final note, we also wish to emphasize the importance of the liberal use of intraoperative ultrasound. This additional tool allows for the confirmation of the presence and location of the pseudocyst. It is particularly important in cases where the expected bulge of the pseudocyst is not appreciated. The ideal location for placement of the cyst-jejunal anastomosis can be better identified [14, 18].

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