

CASE REPORT

Total Pancreatectomy: Doing It with a Mini-Invasive Approach

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ABSTRACT

Objective Pancreatic laparoscopic surgery represents one of the most discussed and demanding fields in surgery. Total pancreatectomy is considered to a viable option for treating both benign and malignant pathologies of the pancreas and, thanks to the introduction of laparoscopic techniques for pancreatic resections into clinical practice, it can be performed nowadays with a less invasive approach. **Case report** We report the case of a combined total pancreatectomy, consisting of a totally laparoscopic body-tail mobilization followed by the opening of a right subcostal mini-laparotomy in order to perform a pancreaticoduodenectomy and a reconstructive phase. **Discussion** This technique represents the result of experience acquired in the last decade in the field of advanced laparoscopic pancreatic surgery. It consists of a widely accepted laparoscopic splenopancreatectomy and of a traditional pancreaticoduodenectomy which nowadays is considered safer and less time-consuming than the experimental laparoscopic one.

INTRODUCTION

The first total pancreatectomy was reported in 1943 by Rockey who performed the procedure for a carcinoma [1]. At the beginning, it was not recommended and was even abandoned by most surgeons because of high peri- and post-operative morbidity and mortality. The incidence of postoperative diabetes control problems ranged from 15 to 75% and, according to several studies was the cause of death in the long-term in nearly half of all patients [2]. In recent decades, however, total pancreatectomy has become a satisfactory treatment option [3, 4] in selected cases since notable improvements in both surgery and postoperative management have been achieved. Improvements in surgical techniques have allowed an "organ preserving" total pancreatectomy, preserving such organs as the pylorus and the spleen. Moreover the introduction of laparoscopic techniques for pancreatic resections into clinical practice permits a less invasive total pancreatectomy. We herein report a case of a total pancreatectomy in which the

laparoscopic technique was combined with the open approach to allow a mini-invasive approach.

CASE REPORT

A 75-year-old man was admitted to our institute for abdominal pain, weight loss and greasy stools. His past medical history was characterized by a previous episode of acute pancreatitis and he was affected by arterial hypertension, type II diabetes, ischemic heart disease and chronic obstructive pulmonary disease. The patient had previously undergone a right-superior lobectomy for a benign tumor, and surgery for lithiasis of the right kidney. Laboratory tests showed a slight increase of serum amylase level (112 U/L; reference



Figure 1. CT scan showing a notable dilatation (>7 mm) of the main pancreatic duct which involved the whole gland.

Received February 24th, 2009 - Accepted April 1st, 2009

Key words Laparoscopy; Pancreas; Surgery

Abbreviations ASA: American Society Anesthesiologists

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Document URL <http://www.joplink.net/prev/200905/21.html>

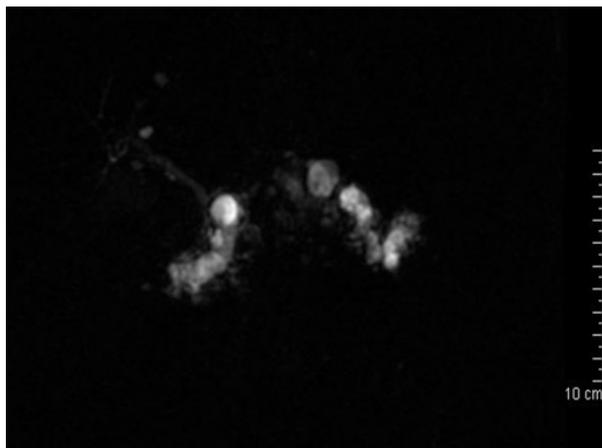


Figure 2. Colangio-Wirsung magnetic resonance showing diffuse dilatation of the Wirsung and branch ducts, and the presence of a nodal mural in the body of the main pancreatic duct.

range: 30-100 U/L) whereas tumor markers, such as CA 19-9 and CEA, were normal. Ultrasonography (US) showed a diffuse dilatation of the Wirsung duct. A spiral multislice-computed tomography (CT) scan of the abdomen revealed a diffuse dilatation of the main pancreatic duct and the branch ducts at the level of the pancreatic body-tail (Figure 1); a type III intraductal papillary mucinous tumor (IPMT) was suspected. A colangio-Wirsung magnetic resonance with secretin confirmed the diffuse dilatation of the Wirsung (more than 7 mm) and branch ducts, and revealed the presence of nodal mural in the body of the main pancreatic duct (Figure 2). These latter features were considered as factors predictive of malignancy. Moreover, the diffuse dilatation of the main pancreatic duct is highly suspicious for disease involving the whole pancreatic gland. On the basis of these findings, the diabetic, non-obese patient with an American Society Anesthesiologists (ASA) score III, underwent a total pancreatectomy.

Surgical Technique

1) Laparoscopic Approach

The patient was placed in a supine position with his legs apart. A slight anti-Trendelenburg tilt was obtained and the patient was rotated about 30-45° to the right. The surgeon stood between the legs of the patient; the first and the second assistants stood on either side of the patient. The scrub nurse stood on the right of the operating surgeon. The monitors were placed both over the right and left shoulders of the patient. The first trocar was inserted, with an open technique, into the right side of the umbilicus to induce pneumoperitoneum. At the beginning of the operation, the intra-abdominal pressure was maintained at about 12 mmHg. The other 3 trocars were placed as follows: one in the left paraxiphoid (10 mm), one in the right subcostal area (10 mm) and one in the left subcostal area (10 mm) (Figure 3). The 30° angled scope was inserted through the umbilical trocar. The operating surgeon used the instruments placed in the right and left subcostal areas. The first assistant used a 30°

angled scope inserted into the umbilical trocar and the second assistant used the instrument in the left paraxiphoid trocar.

The gastrocolic ligament was opened widely. The second assistant grasped the stomach at the great curvature and raised it. The operating surgeon used an ultrasound dissector to open a window in the gastrocolic ligament, below the gastroepiploic vessels. The window was then enlarged to expose the whole pancreas; the splenocolic ligament was divided and the splenic flexure of the colon was mobilized downward. The anterior surface of the pancreas was exposed by dividing the adhesions between the posterior surface of the stomach and the pancreas. Intraoperative ultrasonography (US) was performed showing a very dilated Wirsung duct (1.2 cm), containing a septum and vegetation. The lesser omentum was opened to facilitate identification of the celiac trunk and its branches. The second assistant placed a liver retractor to raise the stomach and to create a substantial working space. A complete dissection of the superior border of the pancreas was performed in front of the common hepatic artery to allow identification of the anterior surface of the portal vein. The splenic artery was visualized and clipped at its origin. Then the inferior border of the pancreas was dissected; the dissection began at the inferior margin of the body (left of the

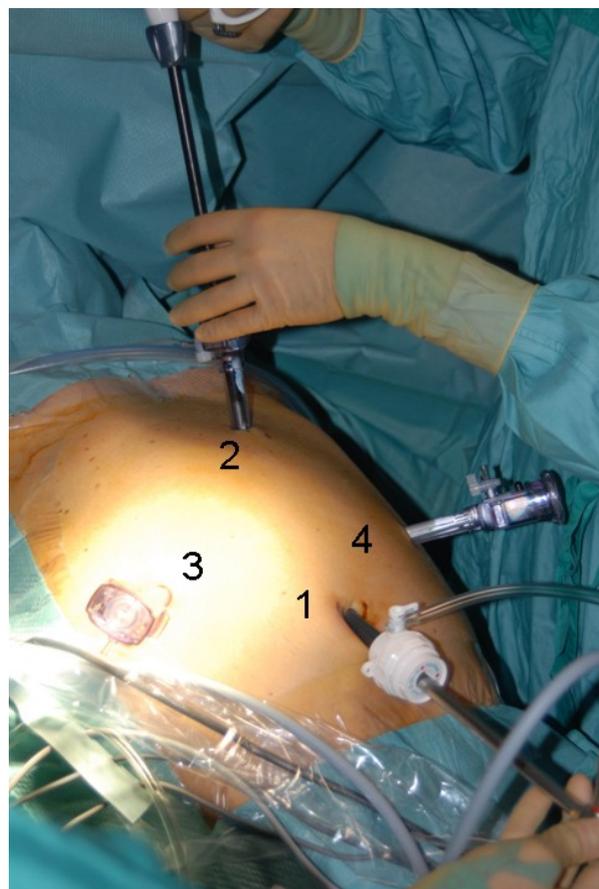


Figure 3. Positioning of the trocars for the laparoscopic approach: 1) at the right side of the umbilicus; 2) at the left paraxiphoid (10 mm); 3) at the right subcostal area (10 mm); 4) at the left subcostal area (10 mm).



Figure 4. Right subcostal incision used in the open approach.

superior mesenteric vein) moving towards the tail, searching for the splenic vein. With this maneuver, the body and tail of the pancreas were completely detached from the retroperitoneum. The splenic vein was identified and then transected with clips. The spleen was mobilized by division of the lienorenal ligament and the short gastric vessels. At the end of the laparoscopic step, the body-tail of the pancreas and the spleen were completely mobilized and the portal-mesenteric trunk was identified in both the superior and inferior margins of the pancreas.

2) Open Approach

A right subcostal incision of less than 10 cm (Figure 4) was carried out and all the maneuvers for a pylorus-preserving pancreaticoduodenectomy were made [5]. A pylorus-preserving total pancreatectomy was performed (Figure 5). The reconstruction phase consisted of a biliojejunal anastomosis and a duodenojejunal anastomosis.

Operating time was 485 minutes; 2 units of plasma and 2 units of blood for a total of 1,200 mL were necessary during surgery.

Histological examination of the specimen showed a diffuse mixed type-IPMN (type III) with high-grade dysplasia (carcinoma in situ) localized at the body-tail of the pancreas. No lymph node metastases were found (n=36).

The postoperative course was uneventful; the patient began oral feeding on day 4 and was discharged on the 14th postoperative day. At present, the patient is alive and well, and is disease-free at 14 months after surgery.

DISCUSSION

Laparoscopic pancreatic surgery represents one of the most discussed and demanding fields in surgery. It was first introduced in 1994 by Gagner and Pump [6] and Cuschieri [7] for patients with chronic pancreatitis. Nowadays, even if laparoscopic pancreatectomies are rarely performed [8], a laparoscopic distal pancreatectomy, with or without spleen preservation, appears to be feasible and safe for non-malignant pancreatic lesions [9, 10, 11, 12, 13, 14, 15,16, 17, 18, 19].

Kooby *et al.* [12] reported the results of a multicenter study regarding 159 cases of laparoscopic distal pancreatectomy compared with 508 cases of open distal pancreatectomy; the authors concluded that, in selected patients, a laparoscopic distal pancreatectomy is associated with less morbidity and a shorter hospital stay than open distal pancreatectomy. In contrast, a laparoscopic pancreaticoduodenectomy remains controversial because the reconstruction phase is very difficult. Some authors [20, 21, 22] carried out the reconstruction phase through a small midline incision. Palanivelu *et al.* [23] described 42 laparoscopic pancreaticoduodenectomies performed only in selected cases (non-obese patients with an ampullary tumor less than 3 cm in diameter and an ASA score of I-II). However, it is acknowledged that laparoscopic pancreaticoduodenectomy operative outcomes are not favorable even when performed on selected patients by highly skilled endoscopic surgeons. A laparoscopic total pancreatectomy is rarely described in the literature [24, 25]. In their review of 297 cases of laparoscopic pancreatic resections, Pierce *et al.* [10] reported only one case (0.3%) of a total pancreatectomy. To our knowledge, only one other case of laparoscopic total pancreatectomy has been reported [25] in which the reconstructive phase was carried out through a small midline incision. Our case is the third case of laparoscopically-assisted total pancreatectomy. In particular our surgical technique (consisting of a laparoscopic approach of the pancreatic body-tail) was feasible and safe, and involved an open approach of the head of the pancreas through a small right subcostal incision which is nowadays considered safer and less time-consuming than laparoscopic approaches. The results were good as regarded operating time, blood loss and postoperative course.

In conclusion, we believe that this combined technique can be considered a viable option to a total pancreatectomy in selected patients. It is a feasible and safe procedure but it requires considerable expertise in both open and laparoscopic pancreatic surgery.



Figure 5. Specimen of mini-invasive total pancreatectomy.

Conflict of interest The author has no potential conflicts of interest

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