

## Brief Clinical Report

# Alternative Technique of Laparoscopic Hepaticojejunostomy for Advanced Pancreatic Head Cancer

Marcel Autran C. Machado, MD, Julio R. M. Rocha, MD, Paulo Herman, MD, FICS,  
André L. Montagnini, MD, and Marcel C. C. Machado, MD, FACS

---

**Summary:** Only 20% of patients with pancreatic cancer can undergo curative resection. Therefore, palliative treatment of pancreatic cancer assumes the utmost clinical importance. The aim of the palliative treatment of pancreatic head carcinoma is to relieve the jaundice and/or duodenal obstruction. Endoscopic or transparietal decompression of the obstructed bile duct can be accomplished in most cases, but the durability of these techniques is not as great as that of a surgically created bypass. On the other hand, hepaticojejunostomy carries higher morbidity and mortality rates than the former nonsurgical methods. In order to promote long lasting palliation with low morbidity and mortality rates, minimally invasive techniques of biliary and gastric bypass have been described. However, laparoscopic Roux-en-Y hepaticojejunostomy seems to be a complex surgical procedure. With an aim to simplify the construction of a laparoscopic hepaticojejunostomy, the authors suggest an alternative technique. **Key Words:** Hepaticojejunostomy—Laparoscopy.

---

It is known that up to 85% of the patients with pancreatic cancer at the time of diagnosis present a disease that is so extensive as to preclude curative surgical resection (1). Therefore, palliative treatment of pancreatic cancer assumes the utmost clinical importance.

Jaundice is present in about 80% of patients with pancreatic head cancer, and the natural progression of the disease leads to cholangitis, hepatocellular failure, and coagulopathy. Although endoscopic or transparietal decompression of the obstructed bile duct can be accomplished in most cases, the durability of the decompression is not as great as that of a surgically created bypass. On the other hand, hepaticojejunostomy carries higher morbidity and mortality rates than the former nonsurgical methods (1).

In order to promote long-lasting palliation with low morbidity and mortality rates, minimally invasive techniques of biliary and gastric bypass have been described (2–9). However, choledocho-duodenal anastomosis is inappropriate to treat a pancreatic head cancer, and laparoscopic Roux-en-Y hepaticojejunostomy seems to be a complex surgical procedure. With the aim to simplify the confection of a laparoscopic hepaticojejunostomy, we suggest an alternative technique.

## CASE REPORT

A 58-year-old woman with a 6-month history of back pain and with a 4-week history of jaundice was referred for treatment. A physical examination showed jaundice and right upper-quadrant tenderness. A laboratory evaluation revealed raised total bilirubins (25 mg/dL), alkaline phosphatase (687 IU/L), and  $\gamma$ -glutamyltranspeptidase (590 IU/L) levels. An abdominal ultrasound disclosed gallbladder stones, a dilated extrahepatic biliary duct (1.2 cm), and a 5-cm mass in the head of the pancreas. A

---

Received September 24, 1999; revision received February 15, 2000; accepted February 18, 2000.

From the Department of Abdominal Surgery, Cancer Hospital, São Paulo, Brazil.

Address correspondence and reprint requests to Marcel Autran C. Machado, MD, Al. Casa Branca 438 # 101, 01408-001, São Paulo, SP, Brazil. Address electronic mail to: mmautran@dedalus.net

computed tomography scan showed a 4.5-cm tumor in the head of the pancreas with signs of mesenteric artery invasion. An exploratory laparoscopy was performed in order to stage the pancreatic cancer and, if advanced disease were present, to understand how to treat the patient.

### Technique

Under general anesthesia, the patient was placed in the Lloyd-Davis position with a reverse-Trendelenburg tilt. The surgeon (MACM) stood between the patient's thighs. Pneumoperitoneum was induced after a 12-mm subumbilical incision by open technique, as previously described (10), and a 30° laparoscope was introduced. Four additional working ports were inserted (Fig. 1). At laparoscopy, a 5-mm hepatic metastasis found in segment V of the liver was enucleated, and a frozen-section biopsy disclosed a metastatic adenocarcinoma. It was decided to perform laparoscopic palliative surgery.

After the dissection of gallbladder hilum, the cystic artery was clipped. Under upper-traction of the gallbladder, the common bile duct was dissected on its anterior wall. The proximal jejunum was identified, and antemesocolic mobilization was performed. Two stay sutures were applied in order to fix the proximal jejunum to the common hepatic duct. The common hepatic duct was then longitudinally opened with scissors. The proximal jejunum was sutured to the right wedge of the common bile duct opening using a continuous suture, without

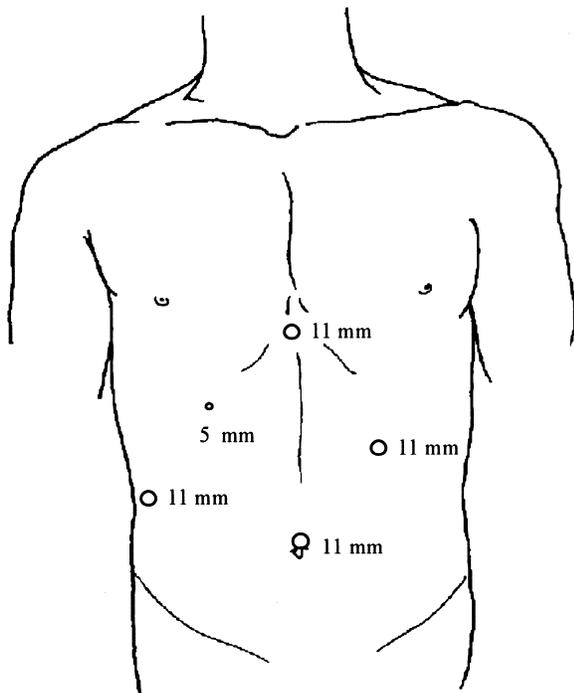


FIG. 1. Sites of the five ports for hepaticojejunostomy.

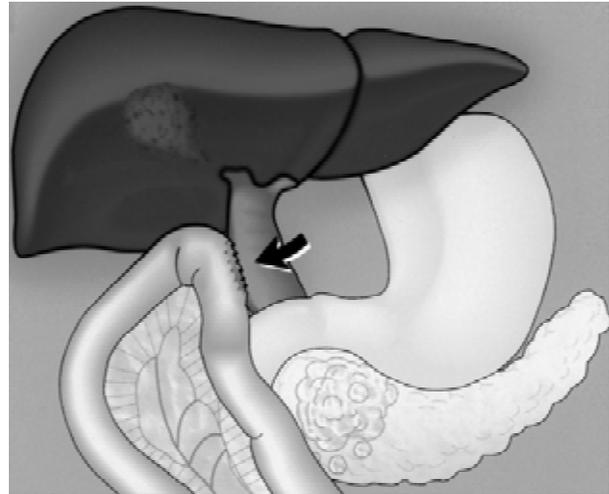


FIG. 2. The proximal jejunum was identified and a latero-lateral hepaticojejunostomy was performed (arrow).

opening the jejunum wall. The jejunum was then opened with scissors. After opening the jejunum, its wall was included in a continuous suture. A latero-lateral hepaticojejunostomy with delayed jejunal opening and intracorporeal knotting technique was completed with interrupted stitches (Fig. 2). The jejunum was divided with a linear endoscopic stapler through a small opening in the jejunum mesentery (Fig. 3). Two stay sutures were applied in order to fix the loop of the jejunum. Two small openings at least 40 cm from the hepaticojejunostomy were made in order to apply the heads of the stapling device. A latero-lateral jejuno-jejunostomy was performed, firing the stapler (Fig. 4). The openings were closed with intracorporeal interrupted stitches. The gallbladder was removed at the end of the procedure because

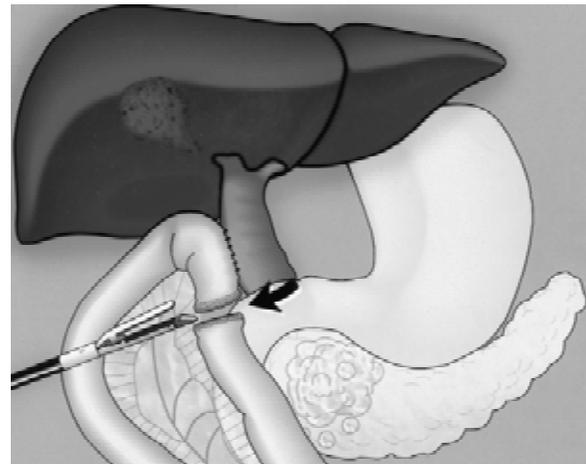
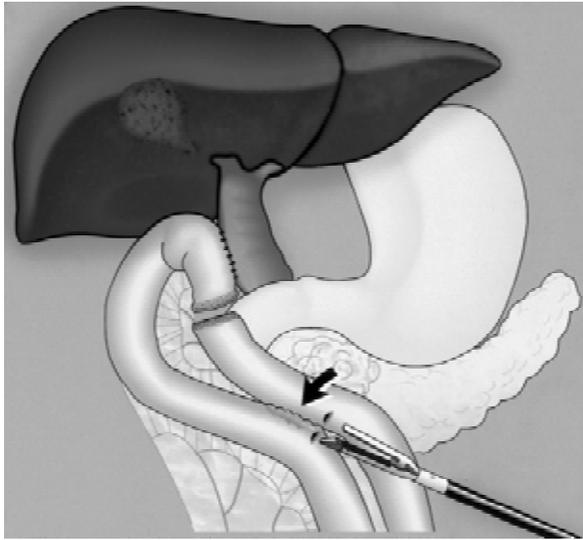


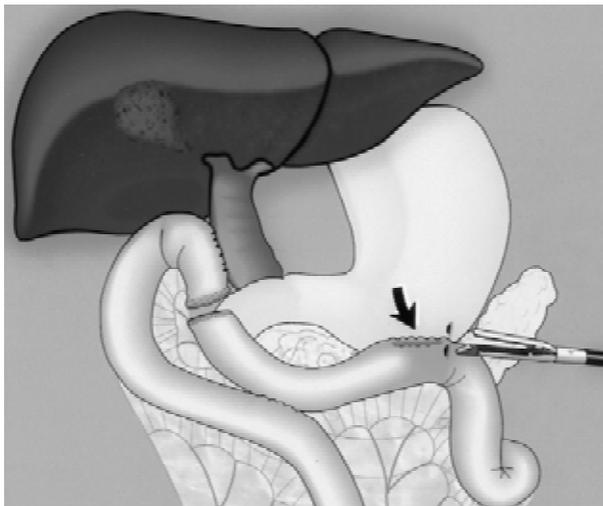
FIG. 3. The jejunum was divided with a linear endoscopic stapler (arrow).



**FIG. 4.** A latero-lateral jejunostomy (arrow) was performed using the stapler via openings at the contramesenteric border of the jejunum, at least 40 cm from the hepaticojejunostomy.

its upper traction was helpful to expose the hepatic hilum structures. An optional gastrojejunostomy can be added if the patient presents gastric outlet obstruction. Two stay sutures were applied in order to fix the loop of the jejunum to the stomach. Two small openings were made in order to apply the heads of the stapling device. A latero-lateral gastro-jejunostomy was then performed, firing the stapler twice (Fig. 5). The openings were closed with intracorporeal interrupted stitches.

The patient had an uneventful recovery, and she was able to tolerate clear liquids on the second postoperative day; she was discharged on the sixth postoperative day.



**FIG. 5.** A gastrojejunostomy (arrow) was performed using a standard technique (2,9).

Total bilirubins decreased to normal levels within 2 weeks. Alkaline phosphatase and  $\gamma$ -glutamyltranspeptidase levels decreased slowly and remained slightly elevated during the late follow-up examinations. The patient died 20 months after this procedure of respiratory insufficiency due to the progression of the disease; she had no recurrence of jaundice nor gastric outlet obstruction.

## DISCUSSION

Surgical resection is the only potentially curative therapy for pancreatic cancer. Unfortunately, only 10% to 20% of the patients with pancreatic cancer can undergo resection for cure (1). Therefore, the majority of patients with this disease will require palliative treatment.

Malignant obstructive jaundice requires different methods for its treatment—either a palliative surgical bypass or a nonoperative endoscopic or transperietal stent. The success rate for both methods is similarly high (11). Although surgical biliary bypass for unresectable periampullary tumors is superior because of the high rates of occlusion after endoscopic stent placement due to incrustation, sludge deposition, or tumor ingrowth, the latter has become popular because of its minimally invasive approach. Otherwise, more than 20% of patients may need a second operation if gastroduodenal obstruction develops (12). In order to avoid a laparotomy in patients with an unresectable carcinoma of the head of the pancreas, the feasibility of a minimally invasive double-bypass operation was assessed in experimental and clinical studies (2–9). Laparoscopic biliary bypass appears to offer advantages; however, this approach remains technically difficult, leading some authors to prefer a cholecystojejunostomy to a hepaticojejunostomy (3,4,7).

Staging periampullary malignancy by laparoscopy is routinely performed in some centers (13). In these cases, the ability to complete a definitive, laparoscopic, palliative biliary- and gastric-bypass at the same time will avoid further surgical, endoscopic, or transperietal approaches (13). Laparoscopic biliary and gastric bypass are possible in most patients and offer a less-invasive alternative than open surgery, with a shorter hospital stay and a more rapid return to normal activity (13,14).

This technique provides biliary bypass without the extensive mobilization of the jejunum that can be more difficult in laparoscopic surgery. With this technique, hepaticojejunostomy can be accomplished without division of the jejunal vessels, which is a procedure that is difficult to perform with the videolaparoscopic approach. Although some authors (6) have reported success with

laparoscopic hepaticojejunostomy with a fully prepared Roux-en-Y loop, in many circumstances, such as tumor invasion of the portal vein leading to portal hypertension, the division of the mesenteric vessels may result in massive bleeding.

The proposed alternative technique is feasible, combining the benefits of minimally invasive surgery with the functional results of a conventional Roux-en-Y hepaticojejunostomy, and it may be an option for the relief of malignant jaundice due to periampullary malignancies.

### REFERENCES

- Bell RH. Neoplasm of the exocrine pancreas. In: Greenfield LJ, Mulholland MW, Oldham KT, Zelenock GB, eds. *Surgery: scientific principles and practice*. Philadelphia: JB Lippincott Company, 1993:816–33.
- Machado MA, Rocha JR, Bove CR, Machado MC. Laparoscopic treatment of duodenal obstruction in a patient with pancreatic cancer. *Rev Hosp Clin Fac Med Sao Paulo* 1997;52:35–7.
- Patel AG, McFadden DW, Hines OJ, Reber HA, Ashley SW. Palliation for pancreatic cancer: feasibility of laparoscopic cholecystojejunostomy and gastrojejunostomy in a porcine model. *Surg Endosc* 1996;10:639–43.
- Raj PK, Mahoney P, Linderman C. Laparoscopic cholecystojejunostomy: a technical application in unresectable biliary obstruction. *J Laparoendosc Adv Surg Tech A* 1997;7:47–52.
- Rhodes M, Nathanson L, Fielding G. Laparoscopic biliary and gastric bypass: a useful adjunct in the treatment of carcinoma of the pancreas. *Gut* 1995;36:778–80.
- Schob OM, Schmid RA, Morimoto AK, Largiader F, Zucker KA. Laparoscopic Roux-en-Y choledochojejunostomy. *Am J Surg* 1997;173:312–9.
- Shimi S, Banting S, Cuschieri A. Laparoscopy in the management of pancreatic cancer: endoscopic cholecystojejunostomy for advanced disease. *Br J Surg* 1992;79:317–9.
- Soulez G, Therasse E, Oliva VL, et al. Left hepaticogastrostomy for biliary obstruction: long-term results. *Radiology* 1997;204:780–6.
- Wilson RG, Varma JS. Laparoscopic gastroenterostomy for malignant duodenal obstruction. *Br J Surg* 1992;79:1348.
- Machado MA, Rocha JR, Machado MC. An alternative technique for open laparoscopy. *Rev Hosp Clin Fac Med Sao Paulo* 1998;53:174–5.
- Truong S, Conze J, Willis S, Kasperk R, Schumpelick V. Palliative therapy of inoperable malignant occlusive jaundice: stent implantation or biliodigestive anastomosis. *Langenbecks Arch Chir Suppl Kongressbd* 1996;113:762–6.
- Singh SM, Reber HA. Surgical palliation for pancreatic cancer. *Surg Clin North Am* 1989;69:599–611.
- Targarona EM, Pera M, Martinez J, Balague C, Trias M. Laparoscopic treatment of pancreatic disorders: diagnosis and staging, palliation of cancer and treatment of pancreatic pseudocysts. *Int Surg* 1996;81:1–5.
- Edye M. Current laparoscopic approaches to pancreatico-biliary disease. *Eur J Gastroenterol Hepatol* 1997;9:744–9.