Surg Today (2004) 34:878–881
DOI 10.1007/s00595-004-2839-9

SURGERY TODAY

Laparoscopic Spleen-Preserving Pancreatic Tail Resection for an Intrapancreatic Accessory Spleen Mimicking a Nonfunctioning Endocrine Tumor: Report of a Case

TAKASHI HAMADA, SHUJI ISAJI, SHUGO MIZUNO, MASAMI TABATA, KENTARO YAMAGIWA, HAJIME YOKOI, and SHINJI UEMOTO

First Department of Surgery, Mie University School of Medicine, 2-174 Edobashi, Tsu, Mie 514-8507, Japan

Abstract
Laparoscopic surgery is now performed for several pancreatic disorders, such as benign tumors of the pancreatic body or tail, which are a good indication for laparoscopic resection. However, the risk of pancreatic fistula after distal pancreatectomy, performed laparoscopically or by open surgery, is a topic of debate. We report the case of a 61-year-old man in whom a routine follow-up computed tomography (CT) scan showed a solid, well-defined mass, 1.5 cm in diameter, in the pancreatic tail. The mass was homogeneously enhanced from the early phase to the super-delayed phase on enhanced CT. We suspected a nonfunctioning endocrine tumor of the pancreas, and surgery was performed laparoscopically. After dissecting the pancreatic tail away from the splenic hilum and the splenic vessels, it was resected using only a linear stapler. The histological diagnosis was an intrapancreatic accessory spleen. The patient was discharged on postoperative day 14, but was readmitted 6 days later because of a pancreatic fistula, which was treated by CT-guided percutaneous drainage.

Key words Accessory spleen · Laparoscopic surgery · Spleen preservation · Pancreatic resection · Pancreatic fistula · Computed tomography-guided drainage

Introduction

Laparoscopic procedures have recently been advocated in the field of pancreatic surgery, and benign tumors of the pancreatic body or tail are a good indication for laparoscopic resection. Moreover, according to some reports, laparoscopic pancreatic surgery results in a better outcome than open surgery.[1–3] This is because remarkable improvements in surgical instruments and imaging devices have made laparoscopic surgery safer, more accurate, and less invasive.

We report the case of an intrapancreatic accessory spleen mimicking a nonfunctional endocrine tumor, which was successfully treated by spleen-preserving laparoscopic resection of the pancreatic tail with conservation of the splenic artery and vein. We describe our operative technique, and discuss the risk and management of a postoperative pancreatic fistula.

Case Report

A 61-year-old man who was being periodically evaluated for chronic hepatitis C underwent routine computed tomography (CT) examination, which showed a mass in the pancreatic tail as an incidental finding. He had no symptoms or any remarkable physical signs. Laboratory test results were normal, except for a slight elevation of carbohydrate antigen 19-9 to 50.5 U/ml (normal: <37 U/ml). Noncontrast CT showed an isodense mass, 1.5 cm in diameter, in the tail of the pancreas, and a dynamic study showed enhancement of the mass from the early phase to the super-delayed phase (Fig. 1). Splenic artery angiography showed a hypervascular tumor fed by a branch of the splenic artery, and the tumor staining persisted until the venous phase. The serum gastrointestinal hormone levels were normal. Thus, we made a preoperative diagnosis of a nonfunctional endocrine tumor, and decided to operate laparoscopically.

Operative Technique

The patient was placed in the semilateral position with the left side up and in a reverse Trendelenburg position.

Reprint requests to: T. Hamada
Received: February 28, 2003 / Accepted: November 4, 2003

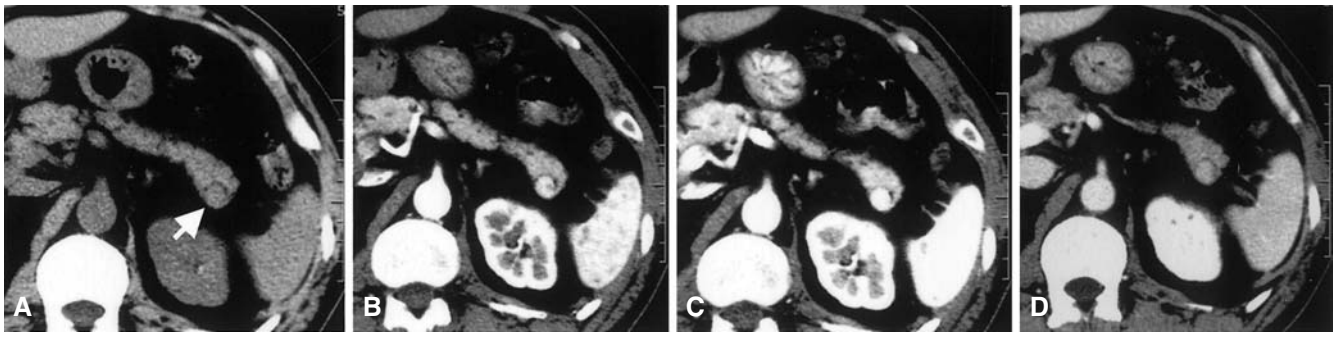

Fig. 1A–D. Dynamic computed tomography images. **A** Noncontrast; **B** early phase; **C** delayed phase; **D** super-delayed phase. **A** Noncontrast image shows an isodense mass, about 1.5 cm in diameter, in the dorsal aspect of the pancreatic tail (*arrow*). **B–D** The mass was enhanced from the early phase to super-delayed phase in the dynamic study

The first 12-mm trocar for the laparoscope was inserted 3 cm above the umbilicus by Hassen's method. After creating a pneumoperitoneum, we inserted three other 12-mm trocars: in the xiphoid area, subcostally in the mid-axillary line, and subcostally in the mid-clavicular line, respectively. First, we dissected the splenorenal ligament and subjacent fascia lateral to the spleen, then the splenocolic ligament was divided using an ultrasonically activated scalpel (AutoSonix; US Surgical, New Haven, CT, USA). The splenic flexure of the colon was mobilized downward, and the body and tail of the pancreas came into view. The gastrocolic ligament was opened up to the level of the mesenteric vessels.

Following these steps of the procedure, a laparoscopic ultrasound (Echo Camera; Aloka, Tokyo, Japan) of the anterior surface of the pancreas was done to confirm the position of the tumor, which showed a hypoechoic lesion, 1.5 cm in diameter, in the pancreatic tail. The inferior border of the pancreas was dissected, and the body and tail of the pancreas were completely detached from the retroperitoneum. The splenic vein was identified in the posterior wall of the pancreas, and it was bluntly dissected carefully away from the posterior pancreatic wall. A tunnel was created between the splenic vein and the pancreas, and the splenic artery was identified through the tunnel by careful blunt dissection. Small branches of the splenic vessels were either clipped with titanium clips or coagulated. The abundant parenchyma of the pancreatic tail was divided with a linear stapler (Endo-GIA, 4.7 mm, Tyco, Harrisburg, PA, USA) (Fig. 2). The specimen was extracted through the left lateral port, completing the spleen-preserving resection of pancreatic tail. The operation took 6 h 35 min, with minimal blood loss.

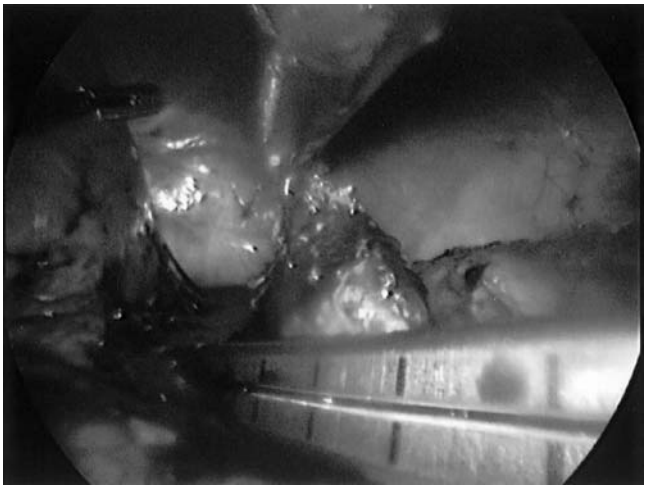

Fig. 2. Intraoperative findings. The pancreatic tail was transected with a sufficient tumor-free margin by using the Endo-GIA Stapler

Pathological Findings

Gross pathological examination revealed a sharply delineated and encapsulated tumor measuring 1.5 × 1.2 cm, which was completely surrounded by pancreatic tissue (Fig. 3A). Histological examination of the tumor showed structures similar to a sinus lienalis, with splenic cords and trabecular reticulum (Fig. 3B). The final diagnosis was an intrapancreatic accessory spleen.

Postoperative Course

On Postoperative day (POD) 1, a sudden high fever of 39.0°C and frequent watery diarrhea developed in our patient. An 8-day course of oral vancomycin was started immediately, for pseudomembranous colitis, which relieved his symptoms. The drain near the pancreatic stump was removed on POD 5 and he was discharged on POD 14.

The patient was readmitted with left flank pain and a fever of 38.0°C 6 days later. A CT scan showed fluid collection, 6 cm in diameter, around the stump of the

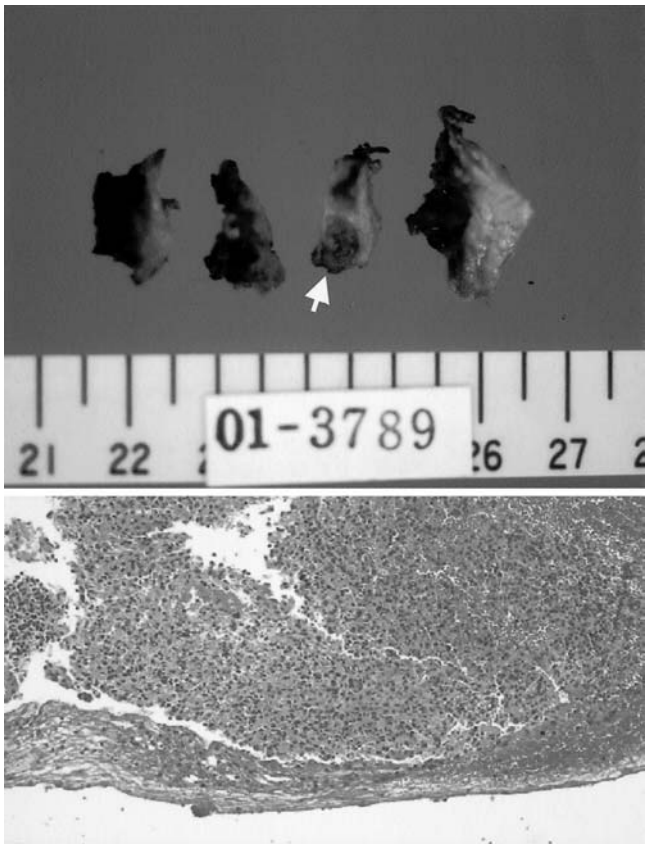

Fig. 3A,B. Histopathological appearance. **A** Gross pathological examination revealed a sharply delineated and encapsulated tumor (*arrow*) measuring 1.5 × 1.2 cm, surrounded by pancreatic tissue. **B** The structure of the tumor was similar to a sinus lienalis, with splenic cords and trabecular reticulum (H&E, ×40)

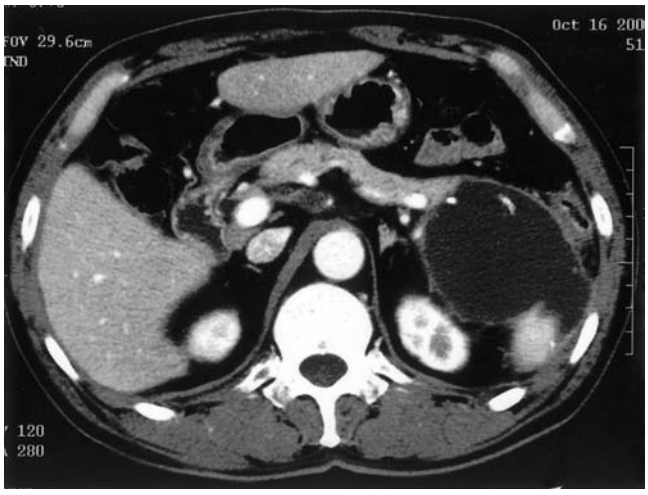

Fig. 4. Computed tomography images on readmission. A fluid collection, about 6 cm in diameter, was seen around the region of the pancreatic resection

pancreatic resection (Fig. 4). We performed CT-guided percutaneous drainage immediately and the amylase activity of the discharged fluid was 92 000 IU/ml. His condition improved after the drainage and the volume of fluid drained gradually decreased. Fistulography done after 14 days of drainage showed a remarkably diminished cavity size, with no communication between the cavity and the pancreatic duct. A CT scan done 34 days after drainage showed almost complete disappearance of the fluid collection. The drainage tube was removed after 37 days of drainage and the patient was discharged 44 days after his second admission. He is currently well 16 months after surgery.

Discussion

Accessory spleens are a common congenital anomaly, with a reported incidence of about 10% in the general population.[4] They are usually asymptomatic and rarely detected in clinical practice. Recent advances in imaging modalities have increased the frequency of detection of pancreatic masses, and an intrapancreatic accessory spleen can be an important differential diagnosis in such patients.

Intrapancreatic accessory spleens are usually located in the pancreatic tail and are about 1 cm in diameter in 65% of cases.[4] Symptomatic accessory spleens are very rare, but some patients complain of abdominal pain, discomfort, back pain, and nausea.[5–7] Although resection of asymptomatic accessory spleens is unnecessary, they are usually resected if they mimic enlarged lymph nodes, intramural masses in the gastrointestinal tract, or tumors of the pancreas.[5–9]

According to most reports, intrapancreatic accessory spleens are removed by performing distal pancreatectomy with splenectomy because the operation is short and easy. However, this offers no advantage to the patient. An overwhelming incidence of sepsis has been reported after splenectomy, and transient thrombocytosis can also occur, which may cause venous thrombosis, pulmonary embolism, cerebral infarction, and angina pectoris.

Open pancreatic surgery, like adrenalectomy, requires a relatively large incision for a small lesion, and therefore the potential benefits of the minimally invasive laparoscopic approach are substantial. Transecting the pancreas through a laparoscope used to be a major problem, but more than a decade age, some surgeons became able to achieve this with the aid of a stapling device after distal pancreatectomy. Since then, mechanical staplers have provided a quick and easy method of performing pancreatic transection. By using mechanical staples and vascular staplers, Soper et al.[10] were able to establish the safety and efficacy of laparo-

scopic distal pancreatectomy in an animal model, with no evidence of pancreatic leaks or fistulas. In 1996, Cuschieri et al.[1] described a technique of performing laparoscopic distal 70%–80% pancreatectomy with en bloc splenectomy, which they used in seven patients with chronic pancreatitis. Warshaw's technique[11] of spleen-preserving distal pancreatectomy, in which the splenic artery and vein are resected together, was also employed for laparoscopic distal pancreatic resection,[12–14] but this technique was associated with splenic infarction, prolonging hospital stay.

More recently, Fernández-Cruz et al.[15] reported successful laparoscopic distal pancreatectomy with preservation of the splenic vessels, without any serious complications, in five patients with chronic pancreatitis. They emphasized that the magnified view afforded by the laparoscopy enabled separation of the splenic artery and vein from the pancreatic parenchyma and identification of the small arteries and veins, which were then easily controlled with laparoscopic instruments, such as the ultrasonically activated scalpel. They concluded that this technique is superior to conventional open distal pancreatectomy in terms of cosmetic results, hospital stay, and postoperative recovery.

Pancreatic fistula after distal pancreatectomy has been a topic of debate, even in the era of laparoscopic pancreatectomy. Patterson et al.[3] reported the largest single-institution series of patients who underwent laparoscopic pancreatic resection. This series consisted of 19 patients, 3 (16%) of whom had postoperative pancreatic fistulas. They also collected data from the literature on morbidity after open and laparoscopic pancreatic resections, and found that the rate of pancreatic fistula ranged from 20% to 33% after laparoscopic pancreatectomy and from 5% to 23% after open pancreatectomy.[3] Because laparoscopic pancreatic resection has a lower incidence of chronic pancreatitis than open pancreatic resection, the fistula rate after the laparoscopic approach is expected to be higher. According to the data reported by Patterson et al., the fistula rate associated with the laparoscopic approach is comparable with those of recent series of open distal pancreatectomy.[3]

Vezakis et al.[12] reported the cases of two patients who underwent laparoscopic distal pancreatectomy with spleen preservation followed by pancreatic fistula, requiring CT-guided drainage. The hospital stay of these patients was 55 and 60 days, respectively. In both patients, the pancreas was divided by using the Endo-GIA alone, and the stump was not oversewn. Therefore, it is now their practice to oversew the pancreatic stump. In our patient, the pancreas was divided with the stapler alone, and the pancreatic fistula that developed was successfully treated by CT-guided drainage.

In conclusion, spleen-preserving laparoscopic distal pancreatectomy with conservation of the splenic artery and vein is a technically feasible operation for benign lesions of the pancreatic body or tail. However, a better operative technique for closure of the pancreatic stump needs to be established to minimize the risk of postoperative pancreatic fistula.

References

1. Cuschieri A, Jakimowicz JJ, Spreeuwel J. Laparoscopic distal 70% pancreatectomy and splenectomy for chronic pancreatitis. Ann Surg 1996;223:280–5.
2. Gagner M, Pomp A, Herrera MF. Early experience with laparoscopic resections of islet cell tumors. Surgery 1996;120: 1051–4.
3. Patterson EJ, Gagner M, Salky B, Inabnet BW, Brower S, Edye M, et al. Laparoscopic pancreatic resection: single-institution experience of 19 patients. J Am Coll Surg 2001;193:281–7.
4. Halpert B, Gyorkey F. Lesions observed in accessory spleens of 311 patients. J Clin Pathol 1959;32:165–8.
5. Hayward I, Mindelzum RE, Jeffrey RB. Intrapancreatic accessory spleen mimicking pancreatic mass on CT. J Comput Assist Tomogr 1992;16:984–5.
6. Harris GN, Kase DJ, Bradnock H, Mckinley MJ. Accessory spleen causing a mass in the tail of the pancreas: MR imaging findings. Am J Roentgenol 1994;163:120–1.
7. Sica GT, Reed MF. Intrapancreatic accessory spleen. Radiology 2000;217:134–7.
8. Churei H, Inoue H, Nakajyo M. Intrapancreatic accessory spleen: case report. Abdom Imaging 1998;23:191–3.
9. Läuffer JM, Baer HU, Maurer CA, Wagner M, Zimmermann A, Büchler MW. Intrapancreatic accessory spleen. Int J Pancreatol 1999;25:65–8.
10. Soper NJ, Brunt LM, Dunnegan DL, Meininger TA. Laparoscopic distal pancreatectomy in the porcine model. Surg Endosc 1994;8:57–60.
11. Warshaw AL. Conservation of the spleen with distal pancreatectomy. Arch Surg 1988;123:550–3.
12. Vezakis A, Davides D, Larvin M, McMahon MJ. Laparoscopic surgery combined with preservation of the spleen for distal pancreatic tumors. Surg Endosc 1999;13:26–9.
13. Watanabe Y, Sato M, Kikkawa H, Takahiro S, Motohira Y, Yuji Y, et al. Spleen-preserving laparoscopic distal pancreatectomy for cystic adenoma. Hepato-Gastroenterology 2002;49:148–52.
14. Sussman LA, Christie R, Whittle DE. Laparoscopic excision of distal pancreas including insulinoma. Aust N Z J Surg 1996;66: 414–6.
15. Fernández-Cruz L, Saenz A, Astudillo, Pantoja JP, Uzcategui E, Navarro S. Laparoscopic pancreatic surgery in patients with chronic pancreatitis. Surg Endosc 2002;16:996–1003.