Case Report

Laparoscopic Pancreatic Resection of an Insulinoma in a Child

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Insulinoma is a rare neuroendocrine tumour infrequently reported in children. Operative excision is the treatment of choice, but requires a disproportionately large incision to remove a small and benign tumour located deep in the retroperitoneum. Laparoscopic resection of benign tumours of the pancreas has been increasingly reported in adults and seems to be ideal for pancreatic insulinomas. We present the case of pancreatic insulinoma in a 13-year-old boy treated by laparoscopic distal pancreatectomy. (Asian J Surg 2003;26(1):43-5)

Introduction

Pancreatic insulinoma is overwhelmingly small, solitary, benign and evenly distributed in the pancreas deep in the retroperitoneum. Surgical resection requires an incision that is large in proportion to the size of the tumour. New technology has facilitated the application of various open surgical procedures to their equivalents in a minimally invasive fashion. Laparoscopic pancreatic resection has been increasingly reported for benign conditions of the pancreas, including insulinoma in adults. We report the application of this minimally invasive technique to surgical treatment of an insulinoma located in the pancreatic tail of a 13-year-old boy.

Case report

A 13-year-old Chinese boy presented with episodic fainting attacks associated with dizziness, sweating and decreased consciousness. Hypoglycaemia with a serum glucose of 2.0 mmol/L (normal: 3.8–5.9 mmol/L) was confirmed in the presence of an inappropriately elevated insulin level of 20 mIU/L (normal: up to 23 mIU/L). Preoperative localization with computed tomography and magnetic resonance imaging revealed a 3-cm tumour at the tail of the pancreas (Figure 1). Endoscopic ultrasonography confirmed a hypoechoic lesion at the corresponding position. Laparoscopic resection was planned after administering the pneumococcal vaccine prophylactically.

The patient was put in a supine position and a nasogastric tube and an indwelling urinary catheter were inserted. A 30°-angled, 10-mm laparoscope was inserted into the subumbilical port for laparoscopy. Four additional 11-mm ports were inserted into the left lower quadrant and the epigastrium. By lifting the greater curvature of the stomach using a pair of Babcock forceps through the epigastric trocar, a window was created by ligating and dividing the branches of the gastroepiploic arcade with clips and scissors or by an ultrasonic dissector (Ultracision, Johnson & Johnson, Cincinnati, OH). Through this window, the neck, body and tail of the pancreas were exposed, and laparoscopic ultrasonography was performed using a 10 mm in diameter, 8 MHz ultrasound probe (Sharplan, Honeyclave Medical, NJ) directly in contact with the anterior surface of the pancreas. The tumour was identified as a hypoechoic lesion at the pancreatic tail close to the pancreatic duct and the splenic hilum. Distal pancreatectomy was decided based on the anatomical position of the tumour.

The inferior border of the pancreas was dissected and retracted upwards. Dissection continued at the superior border of the pancreas to identify and dissect the splenic artery from the pancreas. Splenic preservation was attempted by dissecting and preserving the splenic vessels. However, because of the proximity of the tumour to the splenic hilum, it was not...
Figure 1. Magnetic resonance imaging showed a 3-cm, T2 hyperintense tumour (arrow) located at the tail of the pancreas near the splenic hilum.

It was possible to separate the splenic vein from the firmly adherent tail of the pancreas, and the decision to perform distal pancreatectomy with splenectomy was made. After confirming the extent of the resection by laparoscopic ultrasonography, the splenic artery was doubly clipped and ligated proximal to the proposed line of transection. It was then divided, and the ligation at the proximal stump was reinforced with a pre-formed suture loop. The pancreas was transected proximal to the tumour together with the splenic vein by an endoscopic linear stapler (45 mm in length and 18 mm in diameter, Ethicon, Johnson & Johnson, Cincinnati, Ohio) (Figure 2). The pancreas was then retracted laterally and dissection was completed with division of the splenorenal ligament. The specimen was placed inside a sterile plastic bag and was retrieved after morcellating the spleen through the subumbilical port. A closed suction drain was left in the lesser sac close to the transected pancreas for postoperative drainage.

The operating time was 330 minutes, with an estimated blood loss of 400 mL. The tumour at the pancreatic tail measured 2.3 cm in size and was confirmed to be a neuroendocrine tumour. The postoperative recovery was uneventful. The patient resumed a normal diet on day 5 and became ambulatory on day 7 after surgery. The drain was removed on day 8 and the patient was discharged home on day 11, with a normal glucose level (Figure 3). The postoperative requirement for analgesia was minimal.

Discussion

Pancreatic insulinoma is an uncommon condition with an estimated incidence of four per 5,000,000 people per year. In similarity to other pancreatic tumours, this condition is infrequently reported in children. New technology has facilitated the application of various open surgical procedures to their equivalents in a minimally invasive fashion. Experience with laparoscopy and laparoscopic ultrasonography has paved an important step in allowing successful laparoscopic resection. Laparoscopic pancreatic resection was initially described in both animal and human studies in the early 1990s. Increasing numbers of successful laparoscopic pancreatic resections have been reported for benign conditions, including benign pancreatic tumour and chronic pancreatitis. Laparoscopic enucleation and distal pancreatectomy have been shown to be safe and are associated with improved postoperative recovery. Although the role of laparoscopic surgery in children has been accepted into the modern paediatric surgical armamentarium, the potential of applying...
Laparoscopic surgery in children for treatment of different conditions is being explored and investigated in appropriate settings. In the present report, we documented the safety and feasibility of applying this technique to pancreatic resection for benign insulinoma located in the pancreatic tail in children.

Ideally, all insulinomas should be localized before exploration but the sensitivity of preoperative imaging is remarkably low. A combination of digital palpation and intraoperative ultrasonography by an experienced surgeon remains the most sensitive method to locate an insulinoma during surgical exploration, and has been associated with high surgical success. In contrast to open surgery, tactile examination of the pancreas is limited during laparoscopy. Thus, laparoscopic resection of a pancreatic insulinoma may depend on accurate preoperative localization. Laparoscopic ultrasonography has been shown to be valuable for intraoperative localization despite accurate preoperative localization. It confirms the position of the tumour and optimizes resection via the minimally invasive technique.

During surgical treatment for tumours located in the body and tail of the pancreas, splenic preservation is worthwhile, if it can be achieved safely. It can be achieved by tumour enucleation or splenic preservation distal pancreatectomy based on the anatomical position of the tumour in the pancreas. Splenic preservation was achieved in 16 of 38 (42%) patients who underwent distal pancreatectomy for chronic pancreatitis. In one of the largest series of patients undergoing distal pancreatectomy for mainly benign pancreatic pathologies, splenic preservation was achieved in only 16% of patients. There appears to be no difference in short-term outcome when distal pancreatectomy is performed with or without splenectomy.

Spleen-preserving laparoscopic distal pancreatectomy has been reported upon meticulous dissection of the splenic vessels or by preserving blood supply from the short gastric vessels. In the present case, we believed that preservation of the spleen was technically infeasible because of the proximity of the tumour to the splenic hilum. The relatively long hospital stay of our patient can be attributed partly to the delay in removal of the abdominal drain because of concern about leakage, our early experience and caution, and to the lack of pressure to send patients home, with our present health care system.

References