



and Other Interventional Techniques

Laparoscopic distal pancreatectomy

Three cases of insulinoma

D. Mahon, E. Allen, M. Rhodes

Department of Surgery, Norfolk & Norwich University Hospital NHS Trust, Norwich NR1 3SR, United Kingdom

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Abstract

Background: Surgery for benign pancreatic disease has traditionally required a major laparotomy however the minimal-access approach is now being applied to a wide variety of procedures, and surgery of the pancreas need not be excluded.

Methods: Laparoscopic distal pancreatectomy was performed on three patients presenting with insulinomas found on preoperative investigation to lie within the tail of the pancreas.

Results: All three patients had an excellent clinical outcome and returned to a state of normoglycemia. All of them made a rapid recovery with no major complications.

Conclusion: Laparoscopic distal pancreatectomy is a viable technique for removing insulinoma of the tail of the pancreas.

Key words: Laparoscopic surgery — pancreas — distal pancreatectomy — insulinoma

Insulinomas are rare tumors of the islet cells of the pancreas. Overwhelmingly, they are solitary, small, and benign [2]. They may occur anywhere within the pancreas gland and occasionally are ectopic. Although it is possible to treat patients with oral diazoxide, definitive treatment is by excision of the tumor. Traditionally, this has required a major laparotomy not at all in keeping with the small size of the tumor itself.

We report a series of three patients with pancreatic insulinoma treated with laparoscopic distal pancreatectomy, which produced an excellent clinical outcome.

Materials and Methods

Three cases of pancreatic insulinoma were referred to us between July 1996 and March 2000. Patient details are given in Table 1.

In all cases, the diagnosis was made biochemically. Preoperative localization, performed by the radiologists and endocrinologists using computed tomography (CT) imaging and pancreatic angiogram (Fig. 1), suggested that all three lesions lay in the tail of the pancreas. With this diagnosis, the patients were then referred to the surgeon.

Under general anesthesia, patients were positioned supine. Reverse Trendelenberg tilt was applied to the table, and a sandbag was placed behind the left loin. A five-port laparoscopic technique was used. Port placement is shown in Fig. 2. A Hasson technique was used to place the initial port.

The stomach and colon were retracted using atraumatic grasping forceps (Endoclinch II; Autosuture, Tyco, New Haven, CT, USA). The pancreas was then approached through the lesser sac by dividing two or three vessels to the greater curve of the stomach with a Harmonic Scalpel (Ultracision LCS-5; Ethicon, Cincinnati, OH, USA). Once the pancreas was visualized, laparoscopic ultrasound (Aloka Echo-Camera SSD-500; KeyMed, Southend-on-Sea, England, UK) was applied directly to the anterior surface of the pancreas to confirm the position of the insulinoma within it. The inferior border of the pancreas was mobilized using the Harmonic Scalpel to allow the passage of a 35-mm endoscopic linear stapler/cutter (Endopath ETS; Ethicon) across it. This instrument was used, with staple reloads as required, to transect the pancreas and perform the distal pancreatectomy itself (Fig. 3), including both closure of the pancreatic duct and hemostasis. After the 12-mm port was enlarged to 15-mm, the specimen was removed from the abdominal cavity via an endoscopic bag retrieval system (Endocatch II; Auto Suture).

Once abdominal cavity was washed with saline and checked for hemostasis, a single suction drain was inserted via one of the 5-mm ports and positioned in the region of the pancreatic resection. The rectus sheath at the sites of the 10-mm and 15-mm ports was closed with 0 Ethibond suture, and the skin was closed using subcuticular 4/0 Vicryl sutures and steristrips.

Postoperatively, the drains were removed when the volume in 24 h was < 50 ml and free of amylase.

In patient 3, preoperative imaging showed that the insulinoma lay within four branches of the splenic vessels. After discussion with the radiologists, it was decided that even if we carried out the procedure through a midline laparotomy rather than laparoscopically, we would have to resect the spleen along with the distal pancreas. The patient therefore gave informed consent for a splenectomy. Perioperative laparoscopic ultrasound confirmed that the position of the insulinoma was incompatible with preservation of the spleen. Indeed, bleeding from the splenic vessels was encountered during the distal pancrea-

Table 1. Demographic data and presentation of patients undergoing laparoscopic distal pancreatectomy for insulinoma

	Sex	Age (Yr)	Weight (kg)	Presentation
1	Female	65	56	Blackouts
2	Female	74	69	Multiple falls
3	Male	40	70	Hypoglycemic fits

Table 2. Operative and postoperative data of patients undergoing laparoscopic distal pancreatectomy for insulinoma

	Operative time (minutes)	Blood loss (ml)	Days until drain removed	Days until patient eating	Length of-stay (nights postop)
1	148	300	2	1	5
2	85	100	1	1	6
3	80	1800	1	1	3

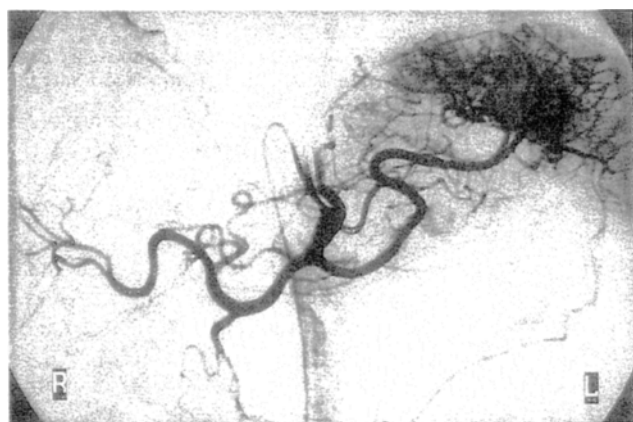


Fig. 1. The insulinoma is located by preoperative pancreatic angiogram.

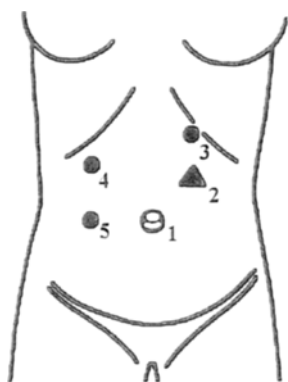


Fig. 2. Port positions for laparoscopic distal pancreatectomy. Ports 1 and 2 = 10/12 mm; ports 3, 4, and 5 = 5-mm.

tectomy. Therefore, laparoscopic splenectomy was carried out in this patient.

Results

The clinical course of our patients is summarized in Table 2. Due to a transient episode of urinary retention, one patient (patient 3) required overnight catheteriza-



Fig. 3. Distal pancreatectomy with laparoscopic linear cutting/stapling device.

Fig. 4. Abdominal scars after laparoscopic distal pancreatectomy for insulinoma.

tion on the day of the procedure. There were no long-term complications; in particular, there were no pancreatic leaks. All patients returned to a state of normoglycemia. Histology confirmed complete excision of benign insulinomas in all three cases. The final cosmetic result is shown in Fig. 4.

Discussion

Although laparoscopy and laparoscopic cholecystectomy evolved rapidly [4, 9], laparoscopic pancreatic surgery has been much slower to gain acceptance. The surgical treatment of insulinoma has traditionally required laparotomy via a midline or bilateral subcostal incision. The procedure involved techniques for the enucleation of the tumor, or, in lesions of the body or tail, distal pancreatectomy. Distal pancreatectomy can be carried out en bloc with the spleen; however, in recent practice, attempts were made to achieve splenic conservation [6, 7].

As in open surgery, localization of the tumor is important. CT scan and pancreatic angiogram may be used for its in preoperative localization [8, 10], sometimes with the addition of hepatic venous sampling. Intraoperative ultrasound is even more sensitive and can be of great benefit for final localization of the tumor at the time of surgery [3].

This series from a single institution shows that laparoscopic distal pancreatectomy is a safe and effective treatment for insulinoma of the tail of the pancreas and confirms the findings of previous single case reports [11] and reports of small series of insulinomas [1]/islet cell tumors [5] of the pancreas dealt with laparoscopically. In patients where the spleen can be preserved at open distal pancreatectomy, it can also be preserved during laparoscopic surgery.

References

- Berends FJ, Cuesta MA, Kazemier G, Van Eijck CHJ, De Herder WW, Van Muiswinkel JM, Bruining HA, Bonjer HJ (2000). Laparoscopic detection and resection of insulinomas. *Surgery* 128: 386–391
- Bieligk S, Jaffe BM (1995) Islet cell tumours of the pancreas. *Surg Clin North Am* 75: 1025–1040
- Boukhman MP, Karam JM, Shaver J, Siperstein AE, DeLorimier AA, Clark OH (1999) Localisation of insulinomas. *Arch Surg* 134: 818–822
- Cuschieri A (1994) Laparoscopic surgery of the pancreas. *J R Coll Surg Edinb* 39: 178–184
- Gagner M, Pomp A, Herrera MF (1996) Early experience with laparoscopic resections of islet cell tumors. *Surgery* 120: 1051–1054
- Govil S, Imrie CW (2000) Value of splenic preservation during distal pancreatectomy for chronic pancreatitis. *Br J Surg* 86: 895–898
- Kimura W, Inoue T, Futakawa N, Shinkai H, Han I, Muto T (1996) Spleen-preserving distal pancreatectomy with conservation of the splenic artery and vein. *Surgery* 120: 885–900
- Kuzin NM, Egorov AV, Kondrashin SA, Lotov AN, Kuznetsov NS, Majorova JB (1998) Preoperative and intraoperative topographic diagnosis of insulinomas. *World J Surg* 22: 693–598
- Park A, Schwartz R, Tandan V, Anvari M (1999) Laparoscopic Pancreatic Surgery. *Am J Surg* 177: 158–163
- Pasieka JL, McLeod MK, Thompson NW, Burney RE (1992) Surgical approach to insulinomas: Assessing the need for preoperative localisation. *Arch Surg* 127: 442–447
- Sussman LA, Christie R, Whittle DE (1996) Laparoscopic excision of distal pancreas including insulinoma. *Aust N Z J Surg* 66: 414–416