

Lateral Laparoscopic Approach to Pancreatic Tail Insulinomas

Jinu Kurian Thomas, Deepak Abraham, Philip Joseph, MJ Paul

ABSTRACT

Pancreatic endocrine tumors are relatively rare lesions and laparoscopic surgery is being increasingly used, especially for insulinomas because of their relatively small size and low incidence of malignancy. Laparoscopic approach to pancreatic tumors has been described in the supine position, transommentally via the lesser sac with anterior stomach retraction. We propose a simplified lateral laparoscopic approach to insulinomas localized preoperatively to the tail or distal body of pancreas. Four patients with pancreatic tail insulinomas underwent laparoscopic surgery between November 2006 and February 2008. Diagnosis was confirmed by fasting sugar, insulin and proinsulin assays. Lesions were localized by multiphase CT scan/MRI scan and endoscopic ultrasound. All these cases had definitely identifiable enhancing lesions in the distal body/tail in relation to the splenic hilum that appeared accessible by a lateral approach. Except for the first case which was done through the traditional supine approach, the other cases were done by the lateral approach. The patients were positioned right lateral with a kidney bridge. Four subcostal ports were placed and the left colon and spleen with pancreatic tail were mobilised in the same fashion as for splenectomy or adrenalectomy. Tumors were easily identifiable corresponding to the imaging studies. Laparoscopic enucleation was successfully completed in all four patients with lesions in the tail of pancreas, one by the traditional approach and other three by the proposed lateral approach. One patient had associated splenectomy because of the proximity of the lesion to the splenic vessels. Two patients had minor pancreatic leak managed conservatively. The left lateral transperitoneal laparoscopic approach to insulinomas located in the tail of pancreas is feasible and safe. The procedure can be done with ease by surgeons who are familiar with adrenalectomy and splenectomy.

Keywords: Pancreatic tail insulinoma, Lateral laparoscopic approach, Insulinoma, Laparoscopic.

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INTRODUCTION

Pancreatic endocrine tumors (PETs) comprise 1% of all pancreatic tumors¹ and have a relatively low incidence of less than 4 per million cases per year.¹⁻⁴ About 75% of clinically symptomatic PETs are insulinomas.⁵ These tumors present with classic adrenergic or neuroglycopenic

symptoms,⁶ thus leading to detection, while still small and benign^{5,7,8} though deep in retroperitoneum.⁸ The classic Whipple's triad in insulinoma comprises symptoms of hypoglycemia, fasting blood sugar less than 45 mg/dl, and symptoms relieved by administration of glucose.⁴

There are three stages in the management of neuroendocrine tumors, namely establishment of diagnosis, localization of the lesion and surgical removal of the tumor.⁹ Gold standard of establishing diagnosis is with a monitored 72 hours fast, with symptomatic hypoglycemia and high insulin and C-peptide levels clinching the diagnosis.⁶ Pre-operative localization is done by invasive or noninvasive methods. Invasive methods include endoscopic ultrasonography, selective angiography, portal venous sampling and provocative angiography; noninvasive methods include ultrasonography, octreotide scan, CT (Computed tomography) scan and MRI (magnetic resonance imaging) scan. Endoscopic ultrasound is one of the most accurate methods of localization¹⁰ with a sensitivity of 75 to 90%,¹¹ the sensitivity decreasing as one goes distally on the pancreas. A combination of endoscopic ultrasound and CT scan gives up to 100% sensitivity in localizing insulinomas¹² and has aided in the laparoscopic approach to resection.

Surgery is the mainstay of treatment of resectable PETs.^{3,7,13} Surgical management differs depending on the type of tumor, location and size. For lesions in the tail, enucleation or distal pancreatectomy is the surgical approach of choice.¹³ A laparotomy for removal of a pancreatic lesion involves making a large bilateral subcostal incision or extended midline incision resulting in significant postoperative morbidity. There was more pain, prolonged ileus, a higher incidence of wound infection and delay in getting back to routine activities. Laparoscopy revolutionized treatment of resectable PETs by significantly decreasing all the above-mentioned complications.⁶ Insulinomas, because of their small size (<2 cm), sporadic nature and low incidence of malignancy (<10%) are especially amenable to laparoscopic resection.⁵ Ten percent insulinomas are multiple, 10% are malignant and Ten percent are associated with MEN-I syndrome.^{4,14}

Laparoscopic pancreatic surgery was first introduced in 1994 by Gagner and Pomp for chronic pancreatitis.¹⁵ Laparoscopic resection of islet cell tumors was attempted first in 1996 by Gagner et al.¹⁵ Successful outcome of laparoscopic surgery depends upon accurately localizing

the lesion, safe dissection and an excellent pancreatic/ endocrine laparoscopic surgeon.¹⁶

CASE REPORTS AND DEVELOPMENT OF THE TECHNIQUE

We operated upon four cases of pancreatic tail insulinoma in the period from October 2006 to March 2010. Pre-operatively, we used a combination of endoscopic ultrasound and multiphase CT scan of abdomen to localize the lesion and all lesions were localized to the distal pancreas. For the first patient, as mentioned above, we had approached the pancreas in the traditional supine manner with the help of our laparoscopic pancreatic surgeon. During laparoscopic left adrenalectomy and splenectomy, which are performed more frequently in the unit, we noticed good access to the distal pancreas from this approach and also that gravity aided in the spleen falling away from distal pancreas. Subsequently, for our other three patients with lesions in the distal pancreas, we approached in the same manner as for laparoscopic left adrenalectomy or splenectomy. All patients are given pneumococcal vaccination prior to surgery in case splenectomy is required.

Traditional Supine Approach

The patient is placed supine. Five ports are placed. The lesser sac is entered through the gastrocolic omentum below the gastroepiploic arcade. The stomach is lifted up and has to be kept retracted during the procedure. The retroperitoneum is opened along the inferior border of the pancreas and the rest of the procedure is carried out proximally or distally on the pancreas as guided by the preoperative imaging.

Lateral Laparoscopic Approach

The patient is placed in a right lateral 80° angle with a kidney bridge (Fig. 1). Four ports are placed, 10 mm camera port in mid-clavicular line between umbilicus and left subcostal margin, a 5 mm lefthand working port and a 10 mm right hand working port in the subcostal region, triangulating on the area of distal pancreas and another 5 mm port more laterally in subcostal line. A 30°, 10 mm laparoscope is used for the procedure. The left colon is mobilized and the splenic ligaments are divided. The mobilized spleen falls medially due to gravity and the posterior surface of the pancreas is seen (Fig. 2). Tumors are easily identifiable as pinkish, brown spherical nodules on the surface of the pancreas corresponding to the imaging studies (Fig. 3). The lesion was dissected using a combination of hook diathermy and ultrasonic shears. We did not use any sutures or fibrin glue for the enucleation defects. A closed suction drain was left routinely in the area of dissection.

Case 1

A 30-year-old gentleman with recurrent hypoglycemic symptoms for 1 year with unresponsiveness and staring spells during episodes. He also had progressive weight gain. He was investigated and found to have low glucose levels with high C-peptide and insulin levels. CT abdomen showed a 27 × 22 mm mass in distal third of pancreas (Fig. 4). He



Fig. 1: Operation room set-up



Fig. 2: CT scan showing distal pancreatic lesion and approach (1) yellow line—spleen mobilized first, falls medially, (2) red line—direct approach to distal pancreas

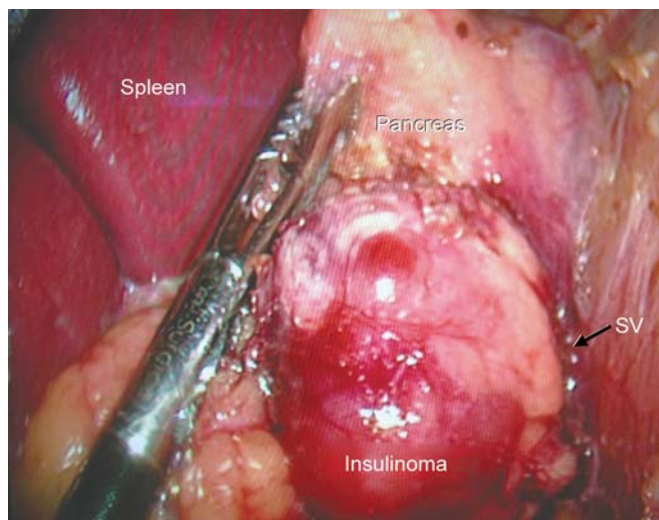


Fig. 3: Laparoscopic view after splenic mobilization, spleen falls off due to gravity. Relation of tumor to splenic vessels is well demonstrated. Enucleation done by harmonic scalpel

underwent enucleation of pancreatic neoplasm laparoscopically through the traditional supine approach. Postoperatively, he had a pancreatic fistula which healed spontaneously on conservative management.

Case 2

A 22-year-old lady presented with multiple episodes of loss of consciousness for a year, about 10 to 12 episodes every month, each requiring hospitalization. There was no history of seizures. CT abdomen showed an 11 × 12 mm hyper enhancing focus in tip of tail of pancreas on arterial phase (Fig. 5). We used the lateral laparoscopic approach for this patient, for the first time in our institute. As mentioned above, we used four ports and mobilized the spleen medially. The tail of the pancreas was mobilized fully and the lesion was identified. It was subsequently enucleated from the tail of the pancreas. During dissection, an inferior polar vessel to the spleen was inadvertently clipped and divided. It

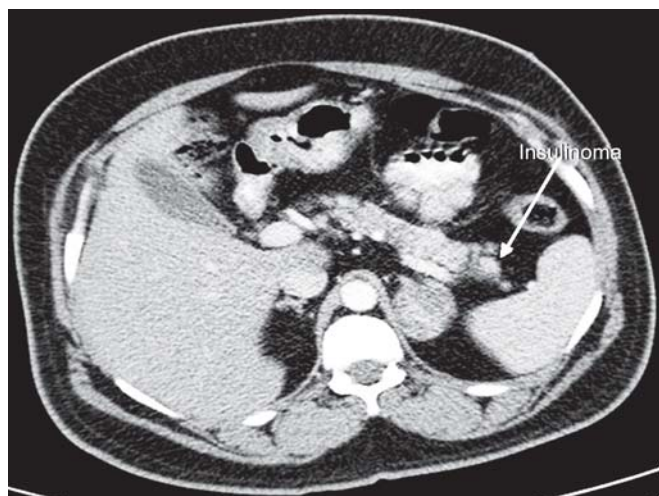


Fig. 4: CT scan of patient in case 1

resulted in an infarct of a fairly large portion of the spleen and splenectomy was performed. The patient had no postoperative complications.

Case 3

A 27-year-old lady presented with multiple episodes of loss of consciousness and diplopia, with a weight gain of 20 kg over a year. CT abdomen showed a tumor localized to tail of pancreas (Fig. 6). The lateral laparoscopic approach was done and the 18 × 15 mm tumor was enucleated. She had a minor pancreatic fistula which resolved in a week.

Case 4

A 46-year-old lady, presented with a 4-year history of recurrent episodes of collapse and altered behavior, associated with sweating, palpitations and increased somnolence. She occasionally had loss of bowel and bladder control during the episodes. The symptoms were exaggerated on exertion and alleviated on eating.



Fig. 5: CT scan of patient in case 2

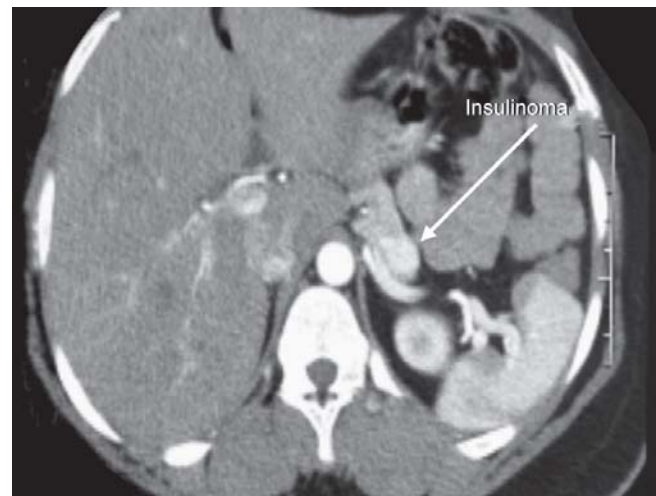


Fig. 6: CT scan of patient in case 3

CT abdomen showed a 21 × 15 mm enhancing lesion in tail of pancreas (Fig. 7). Laparoscopic distal pancreatectomy (spleen preserving distal pancreatectomy or SPDP) was done as the tumor was lobulated. She had no postoperative complications.

SUMMARY (TABLE 1)

Table 1: Summary of the four cases

No.	Age, sex	Site, size	Pre-op Loc	Surgery	Approach	Complications	Hosp days
1	30, M	Tail, 3.1 cm	CT + EUS	Lap enucleation	Lesser sac	Fever, minor fistula	14 days
2	22, F	Tail, 1.2 cm	CT + EUS	Lap enucleation + splenectomy	Lateral	None	7 days
3	27, F	Tail, 1.8 cm	CT + EUS	Lap enucleation	Lateral	Minor fistula	10 days
4	46, F	Tail, 2.1 cm	CT + EUS	Lap SPDP	Lateral	None	6 days

DISCUSSION

Laparoscopic excision of insulinoma is now accepted as the procedure of choice, as they are usually single, small and benign. The traditional approach to pancreatic neoplasms through the supine, lesser sac approach entailed considerable dissection and the stomach had to be retracted cephalad for access to the pancreas.

In the website, www.websurg.com, Professor Dallemagne shows a video on how to do this lateral approach to tail of the pancreas for an insulinoma in the distal pancreas.¹⁷ All cases described in this paper were done in the period, November 2006 to February 2008, before Dr Dallemagne’s videos were published (2010).

Cheah Kow et al had described in 2009, a lateral to medial approach to distal pancreatic lesions, wherein the hilum of the spleen is directly approached.¹⁸ This technique however, has the disadvantages as described for the traditional supine approach.

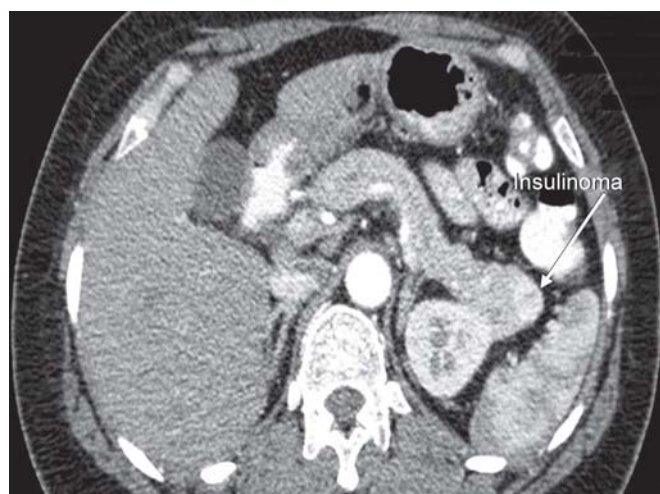


Fig. 7: CT scan of patient in case 4

Advantages of our proposed lateral approach to distal pancreatic lesions are as follows:

1. Ease of dissection in relatively fat-free planes.
2. There is no need to enter the lesser sac or keep the stomach retracted during the procedure.
3. Gravity aids in spleen falling away and minimal retraction is required.

4. Visualization of splenic vessels is better during the procedure.
5. Laparoscopic ultrasound is not mandatory for lesions of pancreatic tail with this approach. Though some authors have mandated the use of laparoscopic ultrasound to ensure completeness of resection and to assess proximity to the duct, these do not appear critical in the tail region on account of the thin parenchyma and attenuated duct. We did not find any difficulty without the use of this adjunct.

CONCLUSION

The left lateral transperitoneal laparoscopic approach to the pancreatic tail is a feasible technique for enucleation or excision of insulinomas. This approach is easy for surgeons familiar with transperitoneal left adrenalectomy or splenectomy. The limitation of this procedure is that it is suitable only for lesions located in the tail and distal body of the pancreas which are rarer than more proximal locations in the pancreas.

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