

LAPAROSCOPIC CENTRAL PANCREATECTOMY FOR SOLID PSEUDOPAPILLARY NEOPLASM: A CASE REPORT

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ABSTRACT

Background: Solid pseudopapillary neoplasm is a rare exocrine pancreatic tumor mostly found in young women, and a low malignant potential lesion. Laparoscopic central pancreatectomy for this tumor of the pancreatic body helps prevent from pancreatic endocrine and exocrine insufficiency. We present our initial successful experience of laparoscopic central pancreatectomy.

Case presentation: A 17-year-old female presented with complaints of discomfort and recurring painful episodes localized to the epigastric region. The patient underwent surgical resection for a cystadenoma located at the neck of the pancreas. The procedure involved proximal transection of the organ utilizing a linear stapler, while distal transection was performed with ultrasonic shears. Subsequently, the distal pancreatic remnant was utilized to create a pancreaticogastrostomy. The postoperative period was uneventful, with the patient showing stable recovery. At the eight-month follow-up, there were no signs of exocrine or endocrine insufficiency observed.

Conclusion: Solid pseudopapillary tumor is a rare primary neoplasm of the pancreas that typically affects young women. Laparoscopic central pancreatectomy for this tumor of the pancreatic body is a feasible method, and avoids the unnecessary removal of the normal pancreatic parenchyma.

Keywords: Solid pseudopapillary neoplasm, central pancreatectomy, laparoscopic, pancreaticogastrostomy.

I. INTRODUCTION

Solid pseudopapillary neoplasm (SPN) of the pancreas is a rare type of exocrine pancreatic tumor, representing approximately 1% of pancreatic neoplasms [1]. This disease predominantly affects young women, with a female-to-male ratio of roughly 10:1, and typically presents around the age of 20. Clinical presentations are usually subtle, characterized by nonspecific symptoms or even asymptomatic, frequently leading to initial misdiagnosis [2]. SPNs generally possess low malignant potential, minimal invasiveness, and low rates of metastasis or recurrence. Hence, surgical resection remains the primary and most effective treatment [3].

For SPNs located in the pancreatic body, distal pancreatectomy is commonly chosen. However, this approach has the disadvantage of removing healthy pancreatic parenchyma, potentially impairing endocrine and exocrine function. Tumor enucleation is an alternative approach but has limitations, including lower radicality and a high risk of pancreatic fistula due to ductal injury. Central pancreatectomy has been introduced as a viable surgical option to overcome these limitations, conserving healthy pancreatic tissue and preserving pancreatic functions. Nevertheless, this procedure, especially via laparoscopy, demands significant surgical expertise [3]. Here, we describe a case of

Received: 17/4/2025. Revised: 25/6/2025. Accepted: 03/7/2025.

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a young patient with SPN successfully managed through laparoscopic central pancreatectomy.

II. CASE PRESENTATION

A 17-year-old female presented with persistent pain in the epigastric and left upper quadrant regions in August 2024. Two months earlier, imaging had revealed a cystic lesion measuring approximately 45x47 mm within the pancreatic body, initially managed conservatively. However, symptoms intensified over time, prompting admission. The patient's prior history included intermittent mild abdominal discomfort and nausea spanning six months. On physical examination, vital signs were stable and laboratory investigations, including complete blood count and biochemical profiles, were normal.

A contrast-enhanced computed tomography (CT) scan (Figure 1) showed a pancreatic lesion measuring 44x47 mm with clear margins, heterogeneously enhancing less than normal pancreatic parenchyma, containing scattered non-enhancing hypodense areas. The tumor compressed the splenic vein posteriorly without invasion of surrounding structures, and the pancreatic duct was not dilated. The lesion was radiologically suspected to be a solid pseudopapillary neoplasm (SPN). This is a low-grade malignant tumor located in the body of the pancreas. Therefore, laparoscopic central pancreatectomy was indicated in this case.

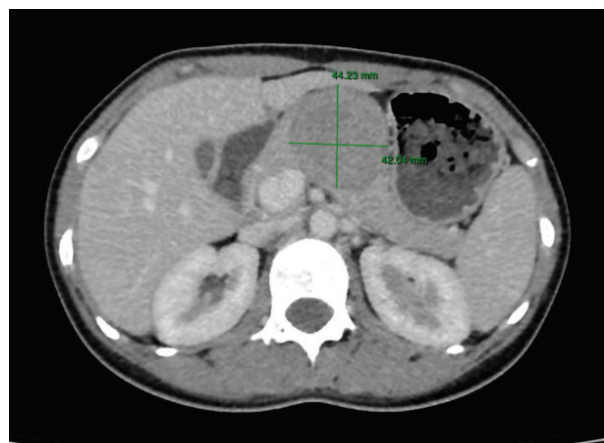


Figure 1: CT imaging showing a tumor in the pancreatic body

The patient underwent laparoscopic central pancreatectomy under general anesthesia, placed in a supine position with legs abducted. The surgeon's position is between the patient's legs, and an assistant stood to the right. Four trocars were used: a 10-mm supraumbilical trocar for the camera, a 5-mm trocar placed below the right costal margin for left-hand working port, a 12-mm trocar in the left hypochondrium serving as the main working port or for stapler insertion, and a 5-mm trocar in the epigastric region used for retracting. Laparoscopic exploration revealed no metastasis. The gastrocolic ligament was dissected, exposing the tumor in the pancreatic body (Figure 2). Dissection proceeded along the superior and inferior pancreatic margins. The body of the pancreas was retracted upwards,

creating a tunnel posterior to it. Blunt dissection was used to separate the pancreas from adjacent structures. The superior mesenteric vein at the pancreatic neck, portal vein, splenic vein, celiac trunk, and splenic artery were identified and carefully dissected from the pancreatic body. Proximal pancreatic transection was performed using a 60-mm laparoscopic stapler (Figure 3). The distal pancreatic stump required preparation for anastomosis with the stomach. Therefore, distal transection was utilized ultrasonic shears, and the main pancreatic duct was sharply divided with scissors. The distal pancreas was then anastomosed to the posterior gastric wall (Figure 4). Hemostasis was carefully ensured, and a drainage tube was placed near the anastomosis. Total operative time was 295 minutes.

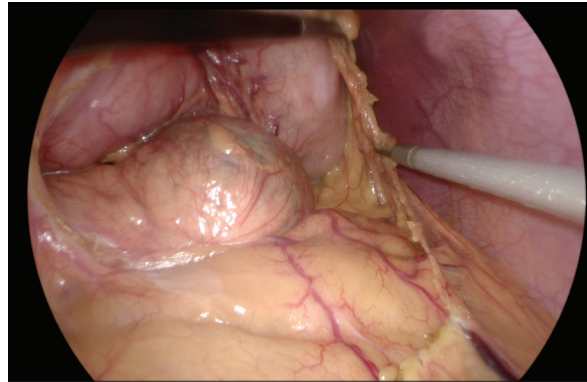


Figure 2: Pancreatic body tumor

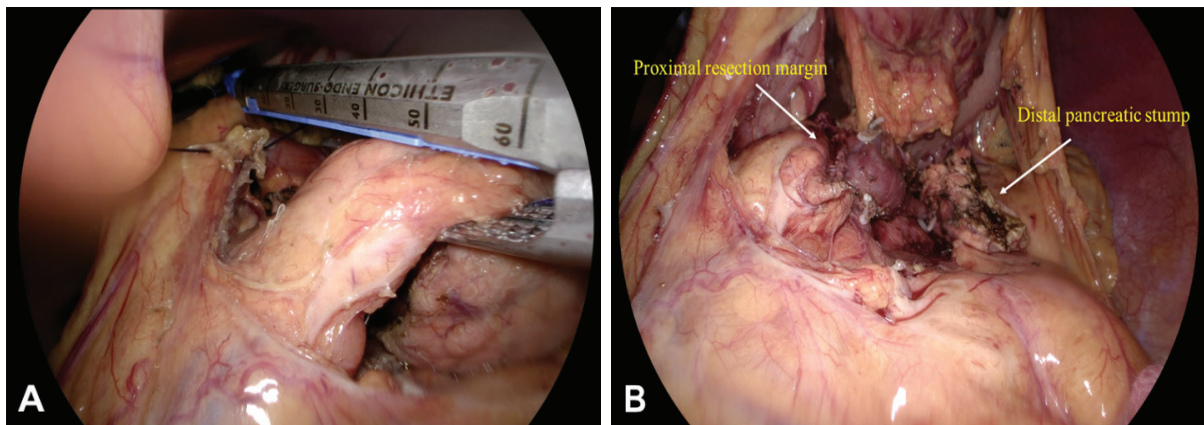


Figure 3: A. Proximal pancreatic transection using stapler;
B. Proximal and distal pancreatic resection margins

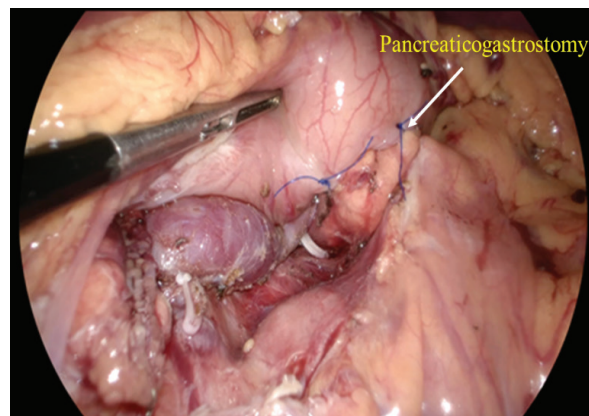


Figure 4: Pancreaticogastrostomy

Postoperatively, the patient had early mobilization and received antibiotics, analgesics, proton-pump inhibitors, and octreotide therapy. Oral intake resumed on day two, the drain was removed on day three, and biochemical tests (amylase 85 U/L and lipase 59 U/L) remained normal. The patient

experienced no postoperative complications and was discharged uneventfully on postoperative day eight. Histopathological and immunohistochemical examination confirmed solid pseudopapillary neoplasm (ICD-O: 8452/3), positive for Vimentin, Cyclin D1, Synaptophysin, and CD56. Follow-

up at eight months showed normal endocrine and exocrine pancreatic function without recurrence. No symptoms suggestive of abdominal pain, bloating, steatorrhea, weight loss, or diabetes were reported by the patient.

III. DISCUSSION

Solid pseudopapillary neoplasms (SPNs) are uncommon exocrine pancreatic tumors [1]. Initially described in 1927 by Gruber-Frantz, these tumors were extensively documented in 1959 as “Frantz tumors”. In 1996, the World Health Organization officially adopted the term “solid pseudopapillary neoplasm” (SPN) of the pancreas [2]. SPNs primarily affect young women of Asian and African descent, with a mean age of 26.2 years [2]. Several hypotheses regarding SPN origin have been proposed, including multipotent stem cells, pancreatic exocrine cells, and cells related to genital ridge development [2]. SPNs account for less than 3% of exocrine pancreatic cancers [4]. Clinical diagnosis is challenging due to non-specific symptoms. Maimaijiang et al. reported that among 18 SPN cases, 50% were asymptomatic, 38.89% presented with abdominal pain, and 22.22% had palpable abdominal masses [1]. Our patient, a 17-year-old female, presented with epigastric and left hypochondriac pain.

Histologically, SPNs display heterogeneous composition. Immunohistochemistry typically shows positivity for alpha-1-antitrypsin, alpha-1-antichymotrypsin, NSE, Vimentin, Progesterone receptors, CD10, CD56, Claudins 5 and 7, Galectin 3, Cyclin D1, and beta-catenin. Pathologists commonly use beta-catenin, CD10, chromogranin, and Vimentin for SPN diagnosis; beta-catenin positivity alone can also be sufficient [1, 4]. Our patient’s tumor was immunohistochemically positive for Vimentin, consistent with prior literature. SPNs typically remain localized but may metastasize to the peritoneum, mesentery, liver, greater omentum, ovaries, duodenum, stomach, and lungs [4]. Thus, postoperative surveillance is crucial.

Blood biochemical tests, including glucose, amylase, and lipase, are typically unremarkable. Tumor markers are usually negative and unrelated to endocrine syndromes [1]. Our patient’s biochemical tests were normal. Preoperative diagnosis primarily relies on CT or magnetic resonance imaging (MRI). CT findings typically include large, encapsulated, heterogeneously enhancing lesions due to hemorrhage and necrosis. SPNs should be differentiated from pseudocysts, pancreatic adenocarcinomas, mucinous cystic neoplasms, intraductal papillary mucinous neoplasms, serous cystadenomas, cystic adenocarcinomas, pancreatoblastomas, and hemangiomas [4]. CT helps evaluate tumor relationships and potential metastasis [5].

Central pancreatectomy was first described by Guillemin and Bessot in 1957 [6]. This technique, preserving pancreatic tissue, is ideal for benign or low-grade malignant lesions in the pancreatic body, superior to distal pancreatectomy. Central pancreatectomy via open surgery has a complication rate of 43.2% and a mortality of 0.24%. Laparoscopic or robotic approaches have complication rates of 37.3% and zero mortality [3]. The advantage of laparoscopy is that it allows exploration of the entire peritoneal cavity [7]. Although laparoscopic surgery has been developed, this method is usually applied for tumor enucleation, distal pancreatectomy, and pancreaticoduodenectomy [8]. Laparoscopic central pancreatectomy is performed less often [8]. The main reason is technically challenging due to complex pancreatic anastomoses and the high risk of pancreatic fistula from both cut ends [3, 9]. Long-term studies at Massachusetts General Hospital and Verona University demonstrated significantly higher endocrine/exocrine dysfunction after distal compared to central pancreatectomy (4% vs 38%, $P = 0.0001$ and 5% vs 15.6%, $P = 0.039$, respectively) [10]. Tumor enucleation has the potential to preserve pancreatic parenchyma. However, this method is difficult to ensure negative resection margins, and has a high risk of pancreatic fistula (about 38%).

Pancreaticojejunostomy is the most common method, and typically performed using a Roux-en-Y anastomosis. The rate of pancreatic fistula after central pancreatectomy with pancreaticojejunostomy is 10.6% [11]. Mason analyzed 733 cases of pancreaticogastrostomy following pancreaticoduodenectomy and found a low fistula rate (4%) [12]. The advantages of pancreaticogastrostomy include reduced anastomotic tension, good gastric perfusion, gastric acid preventing pancreatic enzyme activation, and the thickness of the gastric wall allowing for strong sutures. Although pancreaticojejunostomy is generally considered a faster procedure, it is associated with the disadvantage of pancreatic enzyme activation by intestinal fluid, thereby increasing the risk of complex fistulas. Pancreaticogastrostomy does not require an additional jejunojejunostomy like pancreaticojejunostomy [13]. However, this technique may affect gastric motility and lead to delayed gastric emptying [14, 15]. In our study, we performed a pancreaticogastrostomy. In our case, the operative time was 295 minutes, which falls within the upper range reported by Hajibandeh et al. for minimally invasive central pancreatectomy (160-411 minutes) [16]. The findings support the safety and potential benefits of this approach, including a significantly lower risk of pancreatic fistula without increasing the incidence of severe complications or mortality [16]. After 8 months of follow-up, the patient recovered well with no postoperative complications.

IV. CONCLUSION

Laparoscopic central pancreatectomy for SPNs in the pancreatic body is safe and feasible. Despite technical complexity and the requirement of experienced surgeons, this method effectively preserves pancreatic endocrine and exocrine functions.

Conflict of interest

The authors have no conflicts of interest to declare.

Ethical approval

All details, medical records and figures were used with the written consent for publication from the patient. This case report was approved by the Research Ethics Committee of Hue Central Hospital

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