Technique

**Median pancreatectomy: a report of three cases**

Anand R, Sanjay Singh Negi, Randhir Sud, Adarsh Chaudhary

Departments of Surgical Gastroenterology and Gastroenterology, Sir Ganga Ram Hospital, New Delhi 110 060

Conventional pancreatic resections may be unnecessary for tumors of the pancreas that are benign or of low malignant potential and can place the patient at increased risk of developing postoperative exocrine and endocrine complications. Median pancreatectomy is an option that has been investigated in the management of such tumors located in the body of the pancreas. We present our experience with three women who underwent this procedure successfully for neuroendocrine tumors (2) and cystadenoma (1).

Surgery for pancreatic tumors usually entails either pancreatoduodenectomy or distal pancreatectomy, depending on the location of the lesion. Despite their technical complexity, these operations are now being performed with minimal mortality and acceptable morbidity rates. Procedures of such magnitude are justified for malignant lesions in order to achieve adequate oncological clearance. However, conventional pancreatic resections performed for benign or borderline malignant lesions incur unnecessary resection of normal pancreatic tissue, placing the patient at risk of both immediate and long-term complications.

Various newer pancreatic resections have been described for selected tumors to preserve functional, non-diseased pancreatic parenchyma. Median pancreatectomy is one such option. Evidence in literature on this procedure is limited, and only about 90 cases have been reported so far.¹

**Technique**

Between January 2003 and April 2005, three patients with tumors of the body of the pancreas underwent median pancreatectomy in our unit, which performs about 35 pancreatic resections annually. All patients were women (aged 32-55 years). One patient was asymptomatic and had a lesion detected incidentally on investigation for a gynecological problem. The other two had ill-defined upper abdominal pain. All patients underwent ultrasonography and CT scan of the abdomen (Fig). As the lesions were deemed resectable, preoperative biopsy was not attempted.

A bilateral subcostal incision was used, the lesser sac was entered and the anterior aspect of the pancreas was exposed. The posterior peritoneum along the superior and inferior aspect of the pancreas was incised. The splenic artery was dissected free, ligating branches to the pancreas. The posterior surface of the pancreas was lifted off the portomesenteric axis and splenic vein, ligating venous branches. After marking the proximal and distal lines of resection, stay sutures were placed to control the superior and inferior pancreatic vessels. The proximal pancreas was transected with a linear stapler and the distal pancreas was drained into a Roux loop of jejunum. An end-to-side invaginating pancreatojejunostomy was performed with 3'0 nonabsorbable polypropylene interrupted sutures in a single layer, as the pancreatic duct was not dilated in any patient. The head of pancreas and distal pancreatic remnant of between 5 cm and 7 cm was left behind in all patients. A drain was placed in the lesser sac.

**Results**

Mean operating time was 200 minutes (range 180-240). None of the patients required perioperative blood transfusion. Resection was successfully carried out in all the patients. All patients had uneventful postoperative course. Mean length of postoperative hospital stay was 6 days. The diameters of the resected lesions ranged from 4-7 cm.

Histologic examination revealed non-functional endocrine tumors in two patients while one patient...
had a serous cystadenoma. The resection margins were free of disease in all patients and none of the sections demonstrated features of malignancy. All patients are doing well at follow up of 6-14 months with no evidence of disease; none of them developed diabetes postoperatively.

**Discussion**

Median pancreatectomy, which involves limited resection of the mid-portion of the pancreas, thereby preserving both the spleen and the majority of pancreatic parenchyma, has been gaining increasing attention. Serio first described the technique, and recommended it for small benign lesions situated in the neck of pancreas or its contiguous portion.²

Animal studies have suggested that removal of as much as 70% of normal pancreas can be tolerated without causing endocrine insufficiency. However, in humans, hemipancreatectomy for organ donation has been reported to lead to either impaired glucose tolerance or frank diabetes in 25% of patients at 1 year.³ Postoperative exocrine and endocrine pancreatic insufficiency may depend on presence of duct obstruction, chronic pancreatitis or subclinical incipient diabetes, but in general the risk of diabetes is proportional to the extent of resection and the length of follow-up.³ Glucose tolerance tests performed before and after median pancreatectomy have shown no significant difference.²,⁴

Analysis of data of patients undergoing median pancreatectomy reveals maintained pancreatic exocrine function. Fat content of stools was slightly increased in one patient described by Rotman et al,⁵ and worsening of exocrine function occurred in two patients reported by Ikeda et al,⁶ both with underlying chronic pancreatitis, which may explain the pancreatic insufficiency.

For benign and low-grade malignant disease of the pancreas, splenectomy preservation may be beneficial. Besides, the addition of splenectomy to pancreatectomy has been shown to be associated with an increased incidence of complications, particularly of an infectious nature.⁷

The major reported complications after median pancreatectomy are pancreatic fistula, pseudocyst and abscess formation. Although pancreatic fistula has been reported in up to 30% of cases, the incidence is quite low considering that the pancreatic tissue is soft in almost all cases and a fistula can possibly arise from two sites, the pancreaticoenteric anastomosis and from the closed proximal pancreatic stump. None of the patients with pancreatic fistula following median pancreatectomy have died.¹ Reconstruction has been performed by Roux-en-Y pancreateojunostomy or pancreateogastrostomy.⁸,⁹

There was no local recurrence of the tumor in any of the series. One patient with islet cell carcinoma developed liver and bone metastases, another was found to have cystadenocarcinoma on histologic examination and subsequently underwent pancreateoduodenectomy.¹ It has been recommended that, when in doubt, all patients being considered for median pancreatectomy have a frozen section analysis of the lesion and resected margins.

From a technical perspective, median pancreatectomy requires meticulous dissection and anastomotic technique. These skills, coupled with the rare circumstances in which the need for such sections arise, support the recommendation that this is an operation to be performed by surgeons with experience in pancreatic surgery.¹⁰

**References**


**Correspondence to:** Dr. Chaudhary, C 476, Defence Colony, New Delhi 110 024. Fax: (11) 2540 0463. E-mail: adarsh@nda.vsnl.net.in

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