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CENTRAL PANCREATECTOMY FOR NEURO ENDOCRINE TUMOR OF PANCREAS –THE HOLY CRITERIA REVISITED - A CASE REPORT

Oncology

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ABSTRACT

Pancreatic neuroendocrine tumors are rare low grade neoplasms with indolent course. Surgery is the only potentially curative treatment. Their location in neck of pancreas can pose surgical dilemma since enucleation may not always be feasible due to size of the lesion and proximity to main pancreatic duct, whereas pancreatico duodenectomy and distal pancreatectomy would result in exocrine and endocrine insufficiency due to functional parenchymal loss. In such patients central pancreatectomy remains a safe alternative. We report here a case of neuroendocrine tumor of neck of pancreas managed by central pancreatectomy. Though criteria restrict this rare procedure to lesions less than 5cm, we have safely performed the same for a larger lesion without any morbidity. Hence central pancreatectomy in selected patients provides a perfectly balanced option between enucleation and more radical pancreatico duodenectomy or distal pancreatectomy. We have reviewed literature and discussed the feasibilty and advantages of central pancreatectomy and techniques involved.

KEYWORDS

Pancreatic Neuroendocrine Tumors (pnet), Central Pancreatectomy.

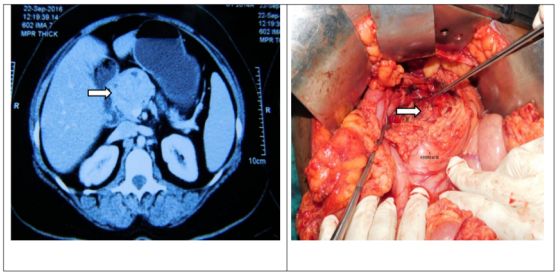
Introduction:

Surgery is the only potentially curative treatment for neuroendocrine tumors of pancreas. Enucleation, pancreatico duodenectomy and distal pancreatectomy are the conventional procedures described for these tumors. However, low malignant potential tumors in neck of pancreas can pose surgical dilemma since enucleation may not always be feasible, whereas pancreatico duodenectomy and distal pancreatectomy would result in exocrine and endocrine insufficiency due to functional parenchymal loss. Segmental pancreatectomy in the form of central pancreatic resection provides an excellent alternative for such lesions, minimizing the extent of parenchymal resection without compromising the oncological principles. We report here a case of neuroendocrine tumor of neck of pancreas managed by central pancreatectomy. We have reviewed literature and discussed the feasibility and advantages of central pancreatectomy and techniques involved.

Case history:

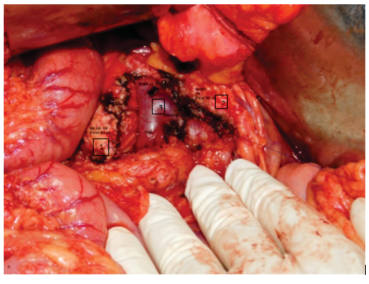
A forty year old female was evaluated for lower abdominal pain due to fibroid uterus. An incidental pancreatic mass lesion (block arrow) was detected in contrast enhanced CT (Fig 1). A 4.9x5.8cm heterodense lesion was noticed in the neck and proximal body of pancreas, abutting the superior mesenteric- portal vein confluence without occlusion. SMA and celiac axis were free. Main pancreatic duct was not dilated. There was no evidence of extra pancreatic disease. CA 19-9 and CEA were within normal limits. Patient had reported to our department with a percutaneous CT guided core needle biopsy of the lesion which revealed loosely cohesive nests and sheets of polygonal to oval cells with abundant eosinophilic cytoplasm and mild nuclear pleomorphism with intranuclear inclusions. Surrounding stroma showed hyalinisation. Tumor cells were positive for chromogranin (moderate to strong), synaptophysin (mild) and pancytokeratin but negative for Ki67 – features suggestive of pancreatic neuroendocrine tumor. Patient had no symptoms suggestive of any funtional pNET. UGI scopy was normal. In view of absence of necrosis, mild pleomorphism, absence of mitosis and low Ki- 67 index, a diagnosis of benign asymptomatic pancreatic neuroendocrine neoplasm was considered and planned for Whipples procedure.

Fig 1 **Fig 2**



Intraoperatively 6 x 6cm lesion (block arrow) was found involving the neck and proximal body of pancreas (Fig 2). Plane with SMV and portal vein was preserved. SMA and celiac axis were free. A 2x2cm common hepatic node was present. No extra pancreatic disease was noticed. Hepatic flexure of colon was taken down. Duodenum was kocherised and posterior plane with SMV – PV was dissected. Common hepatic node was dissected preserving the gastro duodenal A. An Intraoperative decision was taken for central pancreatectomy as the disease appeared limited to the neck and proximal body of pancreas (Fig 3).

Fig 3



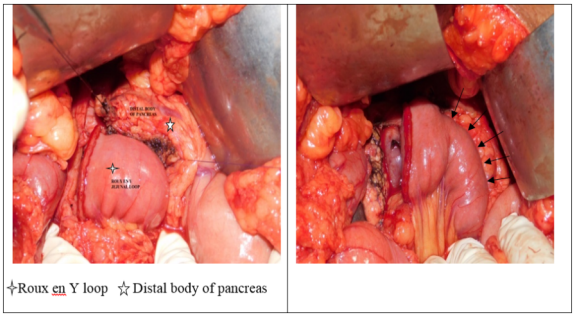
1- Head of pancreas; 2- body of pancreas; 3- SMPV confluence

Proximal cut end of pancreatic head was oversewn and cut end of distal body of pancreas was anastamosed with roux en Y loop of jejunum by

following technique involving invagination of pancreas without duct to mucosal anastamosis. The distal remnant pancreas was more than 5 cm.

The distal pancreatic remnant was mobilized for 2 cm carefully dividing the tributaries to splenic vein (Fig 4). Pancreatic duct was not identifiable due to compression by the tumor. Jejunal limb was brought in a retrocolic fashion to the left of the middle colic vessels. Outer row of 'U' sutures (3-0 polyglactin) were placed about 1 cm distal to the cut edge of the pancreas and went through the whole pancreas parenchyma from front to back. Horizontal mattress seromuscular sutures were taken near the mesenteric edge of jejunum as the posterior outer layer, and the same suture reverted back to front through the whole pancreas again to complete the U suturing, about 5 mm away from the initial entry point of the suture into the pancreas. Each of the U-sutures was placed at a distance of 5–8 mm to the next one. These sutures with needles on them were not tied at this time, but instead kept separately and held with clamps until all of the inner layer of sutures were placed and tied. After creating an enterotomy of around 4 cm in the jejunum, using a series of simple interrupted sutures with 3-0 polyglactin, transected pancreatic parenchymal end (partial thickness bites) was anastamosed with jejunum (full thickness bites). After completing the inner layer, the outer anterior seromuscular sutures on the jejunum were completed using previously held U-sutures and tied one-by-one on the anterior surface of the pancreas. Thus, the resected end of pancreatic remnant was completely covered by jejunum (thin arrows) (Fig 5).

Fig 4 **Fig 5**



Post operative period was uneventful. Patient was started on enteral feeds on 4th post operative day. Drain was removed on 6th postoperative day. Patient was discharged on 10th postoperative day. Post op HPE: low grade neuroendocrine carcinoma; Nodes were negative and all margins were free of tumor.

Discussion:

With widespread use of cross-sectional imaging more number of low-grade pancreatic lesions, such as pancreatic neuroendocrine tumors (pNETs), intraductal papillary mucinous neoplasms and mucinous cystadenomas are being diagnosed incidentally [1-3].

In the absence of malignant behaviour such as direct invasion of adjacent organs or metastases to regional lymph nodes or distant sites, size is typically used to classify malignant potential of pNETs. Though this patient had asymptomatic non functioning pNET with no evidence of distant disease, size of the lesion measuring > 2cm signifies metastatic potential warning against observation.

Though standard resections like pancreatico duodenectomy and distal pancreatectomy are now performed with low mortality rates in experienced hands, they seem excessive for benign and low grade malignant tumors of pancreas since they are associated with significant postoperative and long term morbidity, especially high prevalence of pancreatic insufficiency [4].

Enucleation of such lesions can be performed only if the lesion is small enough and situated away from the main pancreatic duct [5,6]. For larger lesions in the neck with close proximity to pancreatic duct, central pancreatectomy is a feasible parenchymal sparing alternative.

Guillemin and Bessot first described the concept of dividing the pancreatic neck with pancreaticojejunal anastamosis in 1957 for treatment of chronic calcifying pancreatitis [7]. In 1959, Letton and Wilson described this modality for the treatment of traumatic rupture of the pancreatic neck [8]. Later, this concept became an attractive alternative technique for a benign or low grade malignant tumor located in the middle portion of the pancreas.

Though central pancreatectomy is considered inadequate in terms of lymph node harvest, reserving this procedure to benign and low grade malignant lesions does not compromise oncological principles. Moreover, radical retroperitoneal lymphadenectomy does not improve cancer specific survival even in pancreatic adeno carcinoma [9,10].

Iacono and colleagues (1998) summarized the prerequisites that allow segmental pancreatectomy to be considered as a reasonable approach: small lesions (<5 cm in diameter) (1) that are benign or low-grade malignant tumors (2) located in the neck or its contiguous portion (3), and a distal pancreas stump of at least 5 cm in length (4). Our patient had a low grade malignant neuroendocrine tumor in the neck resectable with adequate distal pancreatic stump of >5cm [11].

Even though the size of this lesion didn't fall within the cutoff proposed by Iacono et al, as the disease was resectable with negative margin, we proceeded with central pancreatectomy sparing an adequate distal pancreatic stump rather than its size per se.

The technique of pancreatic division varies widely among surgeons, and there is no evidence that identifies a single method as superior. In the literature, the technique of pancreatic head transection ranges from a cut-and-sew to a staple technique with or without staple-line reinforcement. A recent comparative study has shown that division of the pancreatic parenchyma with vascular cartridges resulted in a significantly lower fistula rate compared with standard cartridges [12]. However, division with ultrasonic dissection is equally effective and hemostatic. The end of head can be safely oversewn with or without omental reinforcement.

The management for the distal pancreas is more demanding and can be performed by pancreatogastrostomy or Roux-en-Y pancreatojejunostomy. Pancreatogastrostomy is easier and faster, but it may delay oral feeding and it prolongs the length of stay [4]. Deactivation of pancreatic enzymes in acidic gastric environment may contribute to exocrine insufficiency. Pancreatojejunostomy is a more complex reconstruction, but has better long-term outcomes in terms of endocrine and exocrine function. As central pancreatectomy is indicated in patients with an expected long survival, pancreatojejunostomy is considered ideal for the distal pancreas after central pancreatectomy [13]. We used an invagination technique of pancreaticojejunostomy using two layered sutures without duct to mucosal anastamosis as described above. We have been using this technique for anastamosis after pancreatico duodenectomy and found it to be safe with no leak encountered. Berger et al in their randomized study have found that two layered invagination pancreaticojejunostomy technique is safer with two folds lower anastamotic leak rate against a duct to mucosa technique (7% grade B/C versus 17%; p=0.03) [14].

Michael Wayne et al in their small series of ten patients have claimed that deferring enteric anastamosis of distal pancreas (by over sewing the cut end after duct ligation) decreased the leak rate while retaining exocrine and endocrine function in short term follow up [15]. However isolation of distal pancreas would certainly hamper the utility of this parenchymal exocrine function which would become evident in long term since these patients have reasonably good life expectancy and hence the short term result of this small series study should be valued with caution.

Incidence of new onset diabetes mellitus after Whipple procedure for periampullary tumors has been 10-15%, and up to 40% in patients with chronic pancreatitis [16-18]. For an extended distal pancreatectomy in the setting of chronic pancreatitis, the rate of new onset diabetes was reported as high as 90% since distal resection results in greater loss of islet cells (60- 90%) [16-19].

Studies show excellent long-term functional results after CP, with only a 2% rate of new-onset diabetes and a 6% rate of clinically significant exocrine insufficiency after a median follow-up of 3 years, far better than what is observed after standard resection [4].

Moreover, studies show that quality of life,[20] nutritional status,[21] and weight[22] remain conserved after CP and that overall more than 95% of patients are satisfied with the operation.[20]

Since pNETs are slow growing tumors with longer life expectancy than one would expect despite the presence of locally advanced or metastatic disease (survival duration of unresectable, non metastatic, non functioning pNETs is approximately 5 years), treatment related mortality should be avoided. Central pancreatectomy is a technically demanding procedure and should be performed in expert hands to ensure avoidance of added morbidity or mortality.

Conclusion:

Pancreatic neuroendocrine tumors are relatively rare, low – intermediate grade neoplasms with indolent course. For pNET and other benign, low malignant potential tumors of neck of pancreas not suitable for enucleation by virtue of size and proximity to main pancreatic duct, central pancreatectomy remains a viable option as a parenchymal preserving surgery with no added morbidity in experienced hands. The criteria for central pancreatectomy may be safely increased to 6 cm if other criteria can be fulfilled. Hence central pancreatectomy in selected patients provides a perfectly balanced option between enucleation and more radical pancreatico duodenectomy or distal pancreatectomy.

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