

DISTAL PANCREATECTOMY WITH EN-BLOC CELIAC TRUNK RESECTION FOR LOCALLY ADVANCED PANCREATIC BODY CANCER (APPLEBY PROCEDURE): CASE REPORT

Pancreatectomia distal com ressecção em bloco do tronco celíaco para adenocarcinoma de corpo de pâncreas localmente avançado (operação de Appleby): relato de caso

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Financial source: none
Conflicts of interest: none

Received for publication: 22/06/2011
Accepted for publication: 27/11/2012

INTRODUCTION

Pancreatic cancer remains one of the most feared of the gastrointestinal tract malignancies. The only reasonable chance for long-term survival is curative surgical resection, although this treatment is appropriate for only a small minority of patients because the majority present with advanced disease. Less than 20% of patients with adenocarcinoma of the neck, body and tail of the pancreas have resectable lesions. The standard resection for tumors of the body and tail of the pancreas is a distal pancreatectomy with concomitant splenectomy^{10,11,12}.

Most patients lose the chance for surgical resection because of distant metastases, regional invasion into adjacent organs, or involvement of major vessels. Tumor involvement of common hepatic artery and/or celiac trunk is one of the main reasons which preclude radical resection¹⁰. Fortner introduced the concept of regional pancreatectomy with vascular resection, describing type I and II where venous or arterial segment were resected, respectively⁵.

However, distal pancreatectomy with en-bloc resection of the celiac trunk has broadened the operative spectrum in pancreatic surgery. This procedure was first reported by Appleby in 1953 to achieve complete nodal clearance around the celiac trunk for advanced gastric cancer². Subsequently, Mayumi et al. and Kimura et al. adopted this approach with or without the preservation of the stomach for locally advanced adenocarcinoma of

pancreatic body^{8,9}. Recent reports from expert centers showed clearly that vascular resection did not increase morbidity and mortality, and can offer these patients the possibility of radical surgery^{3,4,6}. Nonetheless, the presence of vascular invasion on preoperative staging is still considered by many as a contraindication for surgery and the concept of resection of the celiac trunk also implies the risk of relevant hepatic or gastric ischemia.¹¹

Revascularization strategies have recently been described to assure the preservation of the hepatic arterial flow and to avoid hepatobiliary complications, such as liver necrosis, liver abscesses, gallbladder necrosis or cholecystitis. In these situations the revascularization from the celiac trunk to the hepatic artery using prosthesis would be useful when compromised hepatic flow is detected during the operation^{4,14}.

The aim of this study is to present a case of pancreatic body cancer invading the celiac trunk treated by extended distal pancreatectomy with en-bloc resection of the celiac trunk and revascularization using prosthesis.

CASE REPORT

A 42-year-old otherwise healthy man had suffered epigastric and back pain for six weeks. Multiphase computed tomography (CT) scan showed a 4.5 x 3.5 cm lesion in the body of the pancreas with lymph nodal involvement along the left gastric artery and invasion of the celiac trunk. Magnetic resonance imaging (MRI) of the abdomen confirmed the diagnosis and revealed dilatation of the duct of Wirsung. Furthermore, CT angiography demonstrated involvement of the celiac trunk, hepatic and splenic artery (Figure 1). The patient was then referred for surgical treatment.

The surgical exploration revealed neither peritoneal carcinomatosis nor hepatic metastases and a frozen biopsy was performed and confirmed the diagnosis. The body and tail of the pancreas, the spleen, the celiac trunk, and the surrounding lymph



FIGURE 1 – CT angiography showing narrowing of the celiac trunk, splenic artery and common hepatic nodes and nerve plexus were removed en-bloc. A subtotal gastrectomy and cholecystectomy were also performed. The dissection of the portal vein revealed a potential tumor infiltration at the splenic vein confluence; thus, a concomitant portal vein resection and anastomosis was carried out. A 4 mm ring-reinforced polytetrafluoroethylene (PTFE) prosthesis was used from the celiac trunk to the common hepatic artery (Figure 2).

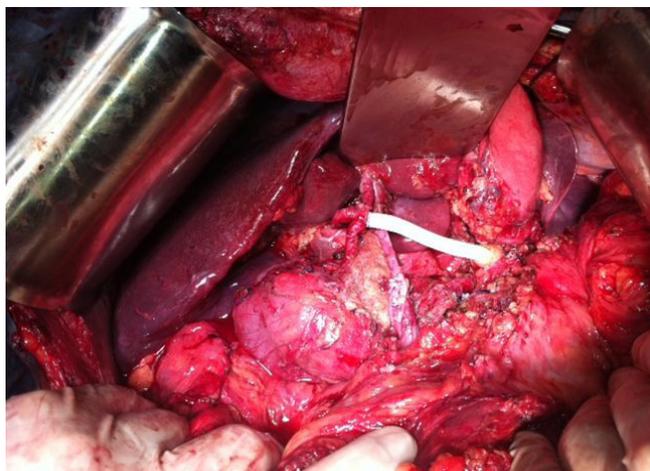


FIGURE 2 – Appleby procedure. Polytetrafluoroethylene (PTFE) prosthesis from the celiac trunk to the common hepatic artery.

Finally, the pancreatic duct was ligated separately and the pancreatic head stump was oversewn with nonabsorbable suture material. Two closed suction drains were placed in the abdominal cavity and the abdomen was closed. The patient received two units of blood transfusion intraoperatively.

The post-operative course was carried out in the intensive care unit. Daily monitoring of the hepatic function did not reveal functional insufficiencies. The output of the two abdominal drains was always lower

than 150 mL/d and enzymatic dosage in the drained liquid showed a value of 47 U/dL on the 5th post-operative day indicating that there is no pancreatic fistula. The length of stay in the intensive care unit was six days.

On the 14th day after surgery, patient presented abdominal pain and bile leak through right abdominal drain. A CT scan of the abdomen was performed and revealed thrombosis of the prosthesis but a sufficient arterial flow of the hepatic arteries via the pancreaticoduodenal arcades. Superior mesenteric artery and vein were patent and a collection in the right sub hepatic space was identified. We performed percutaneous drainage of abdominal collection and treatment with hyperbaric oxygen therapy.

The histopathologic findings showed an invasive ductal adenocarcinoma of the pancreas with a size of 4.5 cm and clear histologically surgical margins (R0). Lymph node metastases were not observed in 31 removed nodes.

The post-splenectomy vaccine prophylaxis against *Streptococcus pneumoniae*, *Haemophilus influenzae* type B, and *Neisseria meningitidis* was administered during the hospital stay. The patient was discharged from the hospital at postoperative day 23.

After 40 days of the post-operative period the patient developed diarrhea and malnutrition. He was readmitted and treated with pancreatic enzymes, loperamide, and nutritional support. The patient remained malnourished for too long and because of that did not receive adjuvant chemotherapy. The post-operative follow-up of a year and a half after surgery he showed slightly malnourished but no signs of recurrent disease.

DISCUSSION

In pancreatic carcinoma, the lack of specific signs or symptoms makes early diagnosis difficult, especially for carcinoma of the body/tail of the pancreas. In spite of the development of different techniques for early diagnosis and treatment modalities in recent years the long-term prognosis has not changed. The overall 5-year survival rate remains below 5% and the overall resection rate is low^{10,13}.

The preoperative diagnosis of vascular invasion is important for surgical planning. The use of CT angiography is important to establish the extent of vascular involvement. Furthermore, CT angiography allows anatomical study of small pancreatic vessels with a remarkable degree of accuracy¹⁴. In this study CT angiography was performed and confirmed the vascular involvement by the tumor.

Distal pancreatectomy combined with celiac trunk resection remains the only chance for survival in these patients. No survival advantages and elevated morbidity and mortality are the arguments for refusing

surgical resection in pancreatic cancer with vascular involvement. However, this procedure has resulted in an estimated 5-year survival rate of 42% for patients with locally advanced cancer of the body of the pancreas. The vascular resection should be planned and decided as soon as possible during the preoperative evaluation^{3,4,6,7}.

Patients, with or without vascular resection, have comparable survival rates, and even vessel wall invasion has not been demonstrated to affect survival. It must take into consideration that these cases had previously been considered unresectable. The median survival time of 20 months reported by some authors is excellent considering the advanced stages of the disease^{3,6,13}. In the study of Adham *et al.*, only one of six resected arteries was really involved¹.

Some centers have advocate pre-operative common hepatic artery embolization to decrease ischemia-related complications, such as gastric, gallbladder or hepatic necrosis. In the present case did not demonstrate any gastric ischemia without this procedure. Cholecystectomy was performed and was indicated due to the risk post-operative ischemic cholecystitis³. Embolization has some risk and may be unnecessary if the patient is unresectable, and this determination is often not made until the time of the operation^{4,7}.

An important point is the selection of the patient for aggressive resection of locally advanced pancreatic cancer and vascular involvement^{3,6}. The patient in this study was a 42 years old man and had no comorbidities.

During surgery, it is difficult to determine whether the tight adhesions with the vessel wall are only due to inflammation or secondary to tumour extension. In these situations it is performed a controlled segmental venous resection to avoid uncontrollable vascular injuries^{3,4,13}.

It was used prosthesis between the celiac trunk and common hepatic artery because it was thought the arterial flow via the pancreatoduodenal artery was compromised. However, the CT scan performed on the 14th day after surgery revealed thrombosis of the prosthesis but a sufficient arterial flow of the hepatic arteries via the pancreatoduodenal arcades. Arterial phase contrast-enhanced CT scan post-operatively is useful, which can provides information about the arterial blood supply to the hepatobiliary, pancreatic, and gastrointestinal systems.^{3,4,13,14}

From the arterial point of view, celiac trunk invasion can be the object of a resection. Celiac trunk resection without arterial reconstruction (Appleby procedure) is based on the presence of collateral circulation between the superior mesenteric artery and the hepatic artery by way of an intact pancreatoduodenal arcade. In the case of vascular reconstruction, this can be done either by direct anastomosis, by interposition of a venous graft, or with prosthesis^{8,9,12,14}.

Uncontrollable diarrhea is known to develop after pancreatectomy or pancreatoduodenectomy with circumferential resection of the nerve plexus around the superior mesenteric artery, and leads to poor appetite, malnutrition, and a generally poor quality of life. The extent of the clearance of autonomic nerve tissue is greater in distal pancreatectomy with celiac trunk resection, including resection of the celiac plexus and bilateral ganglions^{3,4,13}. This patient developed diarrhea and malnutrition and was treated with pancreatic enzymes, loperamide, and nutritional support.

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