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HOW I DO IT

Portal Vein Resection: A Modified Technique for Reconstruction After Pancreaticoduodenectomy

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Pancreaticoduodenectomy is the only curative treatment for pancreatic head tumors. The possibility to achieve a potentially curative surgical treatment is limited to patients in which a complete tumor resection can be performed with free surgical margins. In a small number of patients with localized pancreatic cancer, negative margins are only accomplished with portal vein resection. Pancreaticoduodenectomy is often avoided in these patients due to the mistaken concept that venous resection may be followed by higher mortality and carries poorer survival. Actually, these patients present the same survival rate as patients similarly staged in whom portal vein resection was not performed. Therefore, venous resection is worthwhile. The authors describe an alternative technique for venous reconstruction after resection of a long segment of portal or superior mesenteric vein. The use of a venous graft as proposed in this study is feasible, easy to perform, and may simplify the venous reconstruction even in extensive mesentericoportal venous resection.
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KEY WORDS: pancreas; cancer; technique; portal vein

INTRODUCTION

Surgery is the only curative treatment for pancreatic cancer. Despite recent technical advances in the diagnosis and in the surgical treatment, long-term results remain poor with 5-year survival below 20% [1].

Complete tumor resection with negative margins is a necessary condition to ensure a potentially curative treatment [2]. In a small number of patients with localized pancreatic cancer, negative margins are only obtained with portal vein resection. Pancreaticoduodenectomy is often avoided in these patients due to the concept that venous resection is followed by higher mortality and carries poorer survival. However, long-term outcome of patients after pancreaticoduodenectomy in patients similarly staged with or without venous resection is strictly the same [2–5].

The surgical technique for vein resection and reconstruction may vary. The authors describe an alternative technique for venous reconstruction after resection of a long segment of portal or superior mesenteric vein.

METHODS

Based on dual-phase helical CT scan and endoscopic ultrasonography patients with locally advanced tumors that involve portal or superior mesenteric veins are operated on with the intent to achieve negative margins. At laparotomy, after verification of absence of liver metastases, peritoneal seeding, celiac lymph nodes metastasis, and absence of involvement of major arterial vessels and

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evidence of blood flow in the portal vein, the patients are considered for surgical resection.

The procedure initiates with exploration of the posterior aspect of the pancreas head to assess possible involvement of superior mesenteric artery. All anatomic dissections are carried out before obtaining vascular control for venous resection.

Frozen section of biliary margin, pancreatic neck, and retroperitoneal margin are obtained. Regional lymph nodes around celiac trunk, hepatic artery, root of superior mesenteric artery, and aortic nodes are dissected. After complete dissection of pancreatic head and retroperitoneal tissue, the pancreas is left attached only to superior mesenteric vein. In most patients, resection of portal vein is carried out with primary end-to-end venous anastomosis.

However, in some patients, the segment of portal vein to be resected is long and requires the use of a venous graft. Splenic, common femoral, iliac, internal jugular and allograft venous conduit have already been used with good results. In few cases, the size of the stump of superior mesenteric vein is roughly smaller than the portal vein stump (Fig. 1). In this circumstance, the authors proceed with closure of superior mesenteric vein stump and perform an end-to-side anastomosis between a venous graft and the superior mesenteric vein. An end-to-end anastomosis between graft and the portal vein completes the venous reconstruction. This maneuver avoids size mismatch for both anastomosis (Fig. 2). The patency of the graft is assessed by postoperative Doppler ultrasonography.

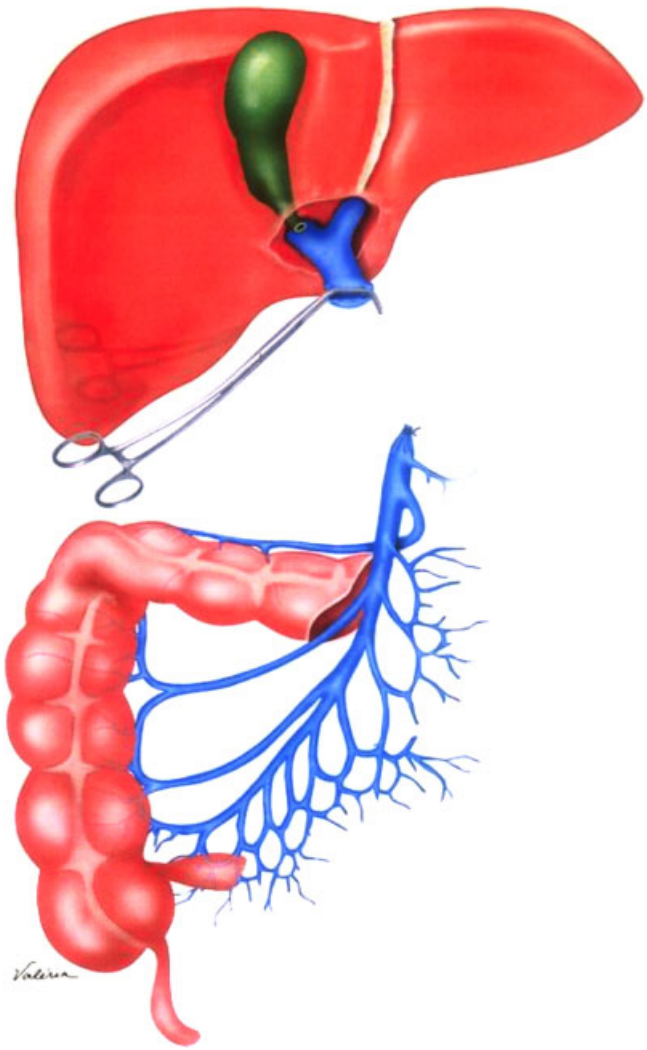

Fig. 1. Schematic diagram shows intraoperative view after extensive resection of portal vein. Note that the size of the stump of superior mesenteric vein is roughly smaller than the portal vein stump. [Color figure can be viewed in the online issue, available at www.interscience.wiley.com.]

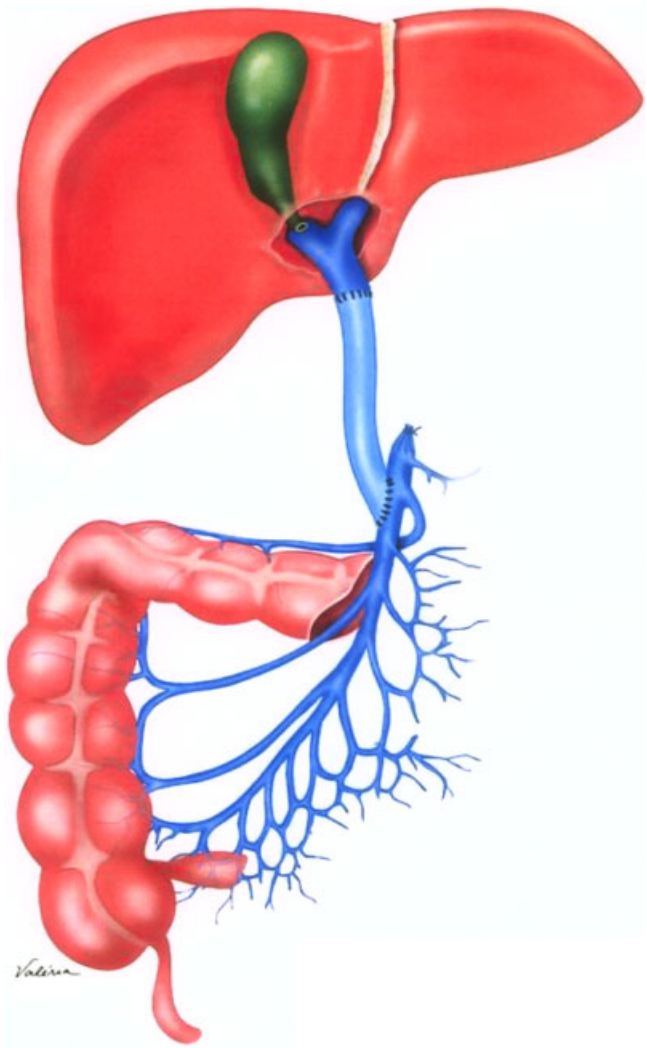

Fig. 2. Schematic view shows end-to-side anastomosis between a venous graft and the superior mesenteric vein. An end-to-end anastomosis between graft and the portal vein completes the venous reconstruction. [Color figure can be viewed in the online issue, available at www.interscience.wiley.com.]

DISCUSSION

Pancreaticoduodenectomy is the only curative treatment for pancreatic head tumors. In the last years, lower morbidity and mortality rates had been reported following this procedure in many centers [2,6,7]. The possibility to achieve a potentially curative surgical treatment is limited to patients in which a complete tumor resection can be performed with free surgical margins [8,9]. However, in a small number of patients, portal or mesenteric vein has to be removed in order to obtain free margins.

Patients who needed portal vein resection during pancreaticoduodenectomy presented the same survival rate as patients similarly staged in whom portal vein resection was not necessary [2–5]. Even with an increase in operative time, in transfusion requirements, intensive care unit stay, and increase in hospital stay, venous reconstruction is worthwhile [2,10]. This maneuver may be useful to achieve free margins and may provide the only possible way to remove the pancreatic tumor and therefore cure the patient.

CT scan can identify the ideal candidate for vein resection in up to 84% of the patients [11]. The presence of portal thrombosis and collateral circulation remain a contraindication to resection. Venous resection increases the resectability rate [12] but it is indicated only in cases where it can provide a complete tumor resection [13].

Recently, the authors reported an alternative surgical approach to portal vein resection that reduces the need for venous graft in most cases [14]. However, in patients, where a long portal vein segment needs to be removed, a venous graft is mandatory. In some patients, the mesenteric vein is resected below the colic veins leaving a very small vein stump making the reconstruction a difficult task.

Pancreaticoduodenectomy combined with portal vein resection can be safely performed. This surgical procedure can be recommended in order to obtain a margin-negative resection. The use of a venous graft as proposed in this study is feasible, easy to perform, and may simplify the venous reconstruction even in extensive mesentericoportal venous resection.

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