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## THE SURGEON AT WORK

# A technique for vascular reconstruction of pancreaticoduodenal allograft. A literature review and case report

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### Introduction

Refinements in immunosuppressive regimens have led to such a dramatic improvement in the success of vascularized whole pancreas and liver transplantations that 1year graft function in the 70 % - 90 % range has been reported [9, 16, 18]. This has led to a competitive state of procurement of both organs since they share the same blood supply. This report reviews the different strategies to allow safe procurement of both organs from the same donor and describes a new technique of vascular reconstruction of the pancreas allograft.

#### **Technique and Discussion**

The pancreas was removed from a multiorgan donor after identification and isolation of the blood supply to both organs and in situ perfusion via the distal aorta. The liver was additionally perfused by a cannula inserted into the superior mesenteric vein. Both organs were flushed with 3000 cc of University of Wisconsin (UW) solution [13]. The liver was removed with the whole common hepatic artery on an aortic patch. The kidneys were divided with their vascular supplies. The pancreas was left with the splenic artery at its origin from the celiac axis, the inferior pancreatic duodenal ar-

**Abstract** In most cases, whole pancreaticoduodenal allograft vessels can be reconstructed using a segment of donor common iliac artery bifurcation. An alternative way to bridge the splenic artery and the superior mesenteric artery (SMA) is to use a short segment of distal SMA as an interposition graft, as described herein. Key words Pancreas transplantation, arterial reconstruction · Arterial reconstruction, pancreas transplantation

teries arising from the superior mesenteric artery (SMA) stump, and the portal vein 1 cm long above the pancreas [13].

The pancreas and the kidney were offered to a 41year-old woman with a 37-year history of insulin-dependent diabetes mellitus. At the time of surgery, the pancreas package contained no extra donor arteries. There was a 3-cm gap between the splenic artery and the SMA. Fortunately, the SMA segment distal to its emergence from the process uncinatus was of the same diameter as the splenic artery and of adequate length to be used as an interposition graft between the end splenic artery and the side of the SMA. The first graft-splenic artery anastomosis was carried out in an end to end fashion with interrupted sutures. The latter end to side graft-SMA anastomosis was performed via a 4-mm punched-out arteriotomy of the SMA (Hancock Aortic Punch, Medtronic, Minneapolis, Minn., USA). A 5 Fr feeding tube was used to stent both anastomoses during the insertion of interrupted 7-0 polypropylene stitches. (Fig. 1). The distal SMA was closed with fine, monofilament sutures. The pancreas transplant was then revascularized by anastomosis of the proximal SMA to the right common iliac artery. The duodenum drained into the bladder [12]. The postoperative course was uneventful. The patient at 14 months follow-up remained insulin-independent and serum creatinine was 132 µmol/l.



**Fig.1** Schematic dorsal view of the pancreaticoduodenal graft with the splenomesenteric interposition graft removed from the distal SMA. The graft (*arrows*) was positioned low to provide mobility to the SMA cuff and facilitate its anastomosis to the recipient iliac vessel

Since multiorgan procurement is practiced more frequently to meet the increasing need for organs 1, multiple strategies for reconstruction of the pancreatic allograft blood supply, i.e., splenic artery and SMA have been designed. A tension and distortion free direct anastomosis between the end of the splenic artery and the side of the SMA has been reported in 7 % of cases [1, 6]. A long SMA was joined end-to-end to the splenic artery behind the pancreas in 5 % of patients [1, 6]. Elsewhere, an interposition graft with donor external iliac artery, distal splenic artery, or recipient hypogastric artery was performed in 2% of cases [1, 3, 6, 11, 14, 17]. In these instances, the SMA Carrel patch was attached to the recipient iliac vessels at the time of transplantation. In the remaining majority of cases, a segment of common iliac artery bifurcation graft was used to bridge the two vessels, with the hypogastric artery and the external iliac artery respectively anastomosed endto-end to the splenic artery and the proximal SMA [2, 4, 5, 7, 8, 10, 14, 15, 17]. At the time of transplantation, the proximal common iliac graft was connected to the recipient iliac artery.

With an ever-shrinking donor population in which older donors succumbing to cerebrovascular accidents are more likely to become available than younger trauma victims, one may expect to find an ever-increasing number of vessels such as the aorta and the origin of its collaterals, the iliac and femoral arteries, that are arteriosclerotic and, thus, unsuitable for grafting. Distal mesenteric vessels with minimal arteriosclerotic disease may then become an invaluable source of vascular grafts. Furthermore, they have the same diameter as the splenic artery [6]. Hence, it is important to procure as much mesentery bearing the mesenteric vessels as possible for arterial harvest. This simple technique can be added to the pancreas surgeon's armamentarium.

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