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CASE REPORT

The use of a composite graft of iliac artery and inferior mesenteric vein in liver transplantation

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Summary

Innovation may be required for satisfactory arterial reconstruction in liver transplantation, particularly when the vessels obtained from the donor are inadequate. We have used a composite graft of donor iliac artery and recipient inferior mesenteric vein (IMV) between the infrarenal aorta and donor hepatic artery. Postoperative liver function was satisfactory, with normal daily duplex ultrasound scans for the first 2 weeks. At 4 years follow up, graft function is normal, a duplex ultrasound scan shows normal arterial flow and no dilatation of the composite graft, and a magnetic resonance angiogram reveals no evidence of dilatation or thrombosis of the composite graft. This is one of the few reported cases in which a composite graft has been used to arterialize the allograft in liver transplantation. A composite graft of iliac artery and IMV provided a satisfactory outcome in this patient and may be a valuable addition to the arterial grafts available to the liver transplant surgeon.

Introduction

The liver transplant surgeon will be confronted by situations where vessels obtained from the donor are inadequate for the arterial reconstruction required. These situations will demand the use of conduits derived from the recipient and may require some degree of innovation. We describe a case in which the recipient inferior mesenteric vein (IMV) was used to achieve a satisfactory arterial reconstruction.

Case report

Orthotopic whole liver transplantation was performed on a 10-year-old male with cirrhosis secondary to a bile transport disorder. The cadaveric donor was an 18-year-old male who died of subarachnoid haemorrhage. At the back table dissection of the donor liver, it was noted that the hepatic artery proper had been transected immediately proximal to the bifurcation into left and right hepatic arteries in the organ retrieval operation. In addition, only the common iliac artery had been retrieved from the donor. After reperfusion of the liver on the portal vein, an arterial anastomosis between the donor hepatic artery proper stump and recipient confluence of common hepatic artery and gastroduodenal artery was attempted. However, the recipient artery was thin walled and dissection between the intima and media occurred. The recipient artery was therefore dissected back to the proximal common hepatic artery. Intimal dissection was noted also at this level, and the intima was tacked back with 8-0 polypropylene (Prolene, Johnson and Johnson, North Ryde, NSW, Australia) sutures. The donor coeliac axis was then used as an interposition graft from the recipient common hepatic artery to the donor hepatic artery proper. However, dissection occurred also within the coeliac graft and there was inadequate flow within the graft. It was therefore decided that an infrarenal aortic interposition graft would be required. In view of the inadequate length of donor iliac artery, the recipient left long saphenous vein was explored but was found to have a small diameter.

It was therefore decided to use an interposition graft derived from the recipient IMV. A 6 cm length of IMV was harvested from the confluence of the last two tributaries to the point of insertion into the splenic vein. The diameter of the vein graft was comparable with that of

the distal end of the donor common iliac artery graft and the donor hepatic artery proper stump. The common iliac artery graft was anastomosed end-to-side to the infrarenal aorta using continuous 5-0 polypropylene (Fig. 1). The IMV graft was anastomosed end-to-end to the common iliac artery graft using 7-0 polypropylene continuous to the posterior wall and interrupted to the anterior wall. The composite graft was brought up to the porta hepatis in a retrocolic, retrogastric and antepancreatic fashion. The IMV graft was anastomosed end-to-end to the donor hepatic artery proper using 8-0 polypropylene continuous to the posterior wall and interrupted to the anterior wall. On release of the clamp, there was a good pulse in the left and right hepatic arteries and duplex ultrasonography revealed satisfactory arterial traces.

Daily duplex ultrasonography for the first 2 postoperative weeks revealed satisfactory arterial traces in the interposition graft, left and right hepatic arteries and intrahepatic arterial branches. At 4 years follow up, the patient has normal liver function and has had no problems related to the hepatic artery. A duplex ultrasound performed at 39 months revealed normal arterial flow and no evidence of dilatation of the composite graft.

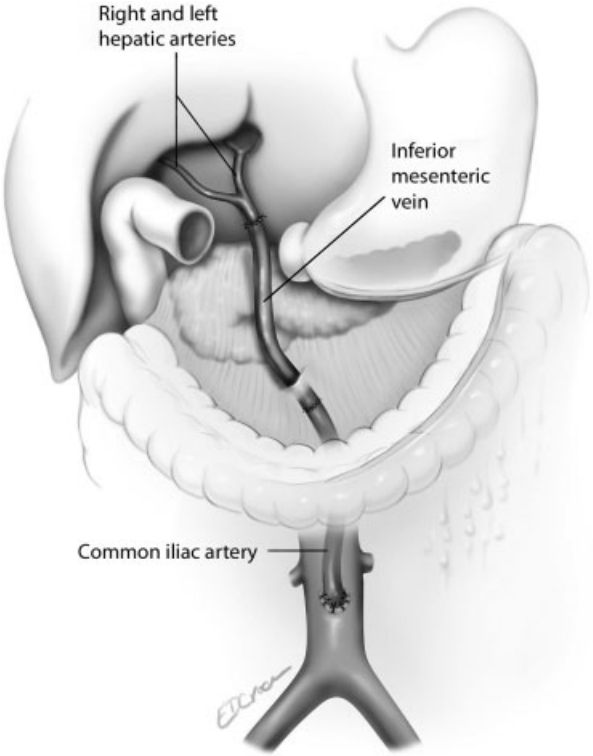

Figure 1 Diagram illustrating a composite graft of donor iliac artery and recipient inferior mesenteric vein used as a conduit between the infrarenal aorta and stump of the donor hepatic artery proper. The graft was placed in a retrocolic, retrogastric, antepancreatic position.

A magnetic resonance angiogram performed at 47 months revealed no evidence of dilatation or thrombosis of the composite graft.

Discussion

There have been few reports detailing the use of composite vascular grafts in liver transplantation. Double iliac artery grafts have been placed between the aorta (site not specified) and hepatic inflow (site not specified) in two cases, the supracoeliac aorta and coeliac axis 'occasionally', the infrarenal aorta and hepatic inflow (site not specified) in three cases and between the recipient external iliac artery and donor superior mesenteric artery in a patient with hepatic artery thrombosis (HAT) and a replaced right hepatic artery in one case [1–4]. The outcome was good, with no HAT in two of the reports, but the outcome of composite grafts was not separated from the overall good outcome of vascular grafts in the other reports. The use of composite grafts of iliac artery and abdominal aorta (one case) and abdominal and thoracic aorta (one case) resulted in HAT [4]. The successful use of a composite graft of donor iliac artery and recipient saphenous vein between the infrarenal aorta and donor coeliac axis has also been reported [5].

The use of venous grafts as arterial conduits in liver transplantation has been mainly confined to saphenous vein grafts. There is an extensive experience in the use of saphenous vein grafts, mainly in the setting of living donor liver transplantation or revascularization after arterial complications of liver transplantation [1,3,5–12]. These reports document an acceptable rate of HAT and do not describe ectasia or rupture of the venous segment. However, reuse of old saphenous vein grafts and use of cryopreserved saphenous vein grafts in arterialization of liver grafts has resulted in HAT [3,9].

The IMV has previously been used as a graft for portal vein reconstruction in living-related liver transplantation [6,13], for bypass between an aortic graft and superior mesenteric artery in chronic intestinal ischaemia [14] and as a patch to repair defects in the hepatic veins during extended liver resections [15]. The Chicago group has reported on the use of the donor IMV as an arterial interposition graft in living donor liver transplantation in children [6,7]. Their experience was unfavourable, with dilatation and thrombosis of the vein in two of three cases. It should be noted, however, that the inflow to the graft in these cases was from the hepatic artery, rather than the aorta. The same report documents a 50% rate of HAT when inflow was from the hepatic artery, compared with only 8% when the inflow was from the aorta.

We describe the successful use of a composite graft of donor iliac artery and recipient IMV in the setting of

inadvertent damage to the donor hepatic artery at the retrieval operation, compounded by retrieval of insufficient donor iliac vessels and intimal dissection in the recipient hepatic artery. There was no apparent viable alternative. Excising and grafting the IMV was straightforward and the graft has functioned well over an extended period, with no evidence of ectasia. In this limited experience, a composite graft of iliac artery and IMV provided a satisfactory outcome, and may be a valuable addition to the arterial grafts available to the liver transplant surgeon.

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