

Technique of arterial anastomosis in liver transplantation, surgical management in routine situations and anatomical variations

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Abstract. With a careful donor hepatectomy in order to preserve and, if necessary, to reconstruct accessory liver arteries and a microsurgical technique for the arterial anastomosis the rate of arterial complications after liver transplantation can be kept at a low level.

Key words: Liver transplantation – Arterial anastomosis

Arterial thrombosis is a major factor in morbidity in liver transplantation as it may contribute to graft failure or complications of the biliary tract. It is important to preserve and to reconstruct, if necessary, accessory hepatic arteries of the graft to ensure adequate arterial perfusion after transplantation.

Materials and methods

Between September 1988 and January 1991 144 liver transplantations were performed in 131 adult patients. The indications for transplantation are shown in Table 1.

During donor hepatectomy the coeliac axis was taken including an aortic patch. Accessory arteries were preserved. For eventual vascular reconstruction the iliac vessels (artery + vein) were also routinely taken. The arterial anastomoses were performed with a 7.0 prolene running suture using microsurgical techniques. The patency of the arterial anastomoses was examined routinely every 3 months by Doppler ultrasound, angio-CT scan and, if indicated, by angiography. The follow-up period included a period of 8–35 months (median, 18 months).

Donor organs had regular anatomy in 75% of cases with variations occurring in 25%. These variations included accessory left hepatic artery from left gastric artery (11.1%), accessory right hepatic artery from superior mesenteric artery (7.6%), combination of both (3.5%) and others (2.8%). All accessory right hepatic arteries were reconstructed by end-to-end anastomosis to the donor splenic artery or gastroduodenal artery.

At transplantation anastomosis was performed in general with 7-0 prolene running sutures using an end-to-side technique between the coeliac axis of the graft and the common hepatic artery at the

Table 1. Indications for liver transplantations

	<i>n</i>	%
Posthepatic cirrhosis	69	47.9
Alcoholic cirrhosis	15	10.4
Acute liver failure	12	8.3
PSC	9	6.3
PBC	8	5.6
HCC in cirrhosis	4	2.8
Budd–Chiari	4	2.8
Others	10	6.9
Retransplantations	13	9.0

offspring of the gastroduodenal artery (74.3%), or splenic artery (13.2%). In 5.6% the bifurcation of the hepatic artery was chosen as the site of the anastomosis. An end-to-end technique between the common hepatic artery and the coeliac axis was performed in 2.1%. In 2.8% the interposition of a graft (a segment of the donor iliac artery) was necessary for reconstruction.

Results

Table 2. Results

	<i>n</i>
Transplantations	144 ^a
Retransplantations	13
Retransplantation for arterial thrombosis	1
Died ^b	13
Arterial stenosis ^c	1
Splenic artery steal syndrome ^d	5
Follow up	18 months (median)

^a In 131 patients

^b Upon autopsy no arterial thrombosis or haemodynamically significant stenosis was found to be responsible for death in any case.

^c In one patient a 70% stenosis of the common hepatic artery could be identified at the site of the anastomosis three months after transplantation. Since the liver function was excellent no further therapy was considered.

^d During follow up a moderate increase in the aminotransferase levels and slight liver function impairment was observed in five patients. This was shown to be caused by a splenic artery steal syndrome with splenomegaly. Therefore an embolization of the splenic artery and/or splenectomy was performed. Thereafter the aminotransferase levels as well as the liver function tests normalized in all patients.