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LETTER TO THE EDITORS

The old transplant recipient that becomes a liver donor

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Dear Sirs,

The success of transplantation has made it inevitable that there will be more transplant recipients that become potential cadaveric donors. The re-use of allografts and utilization of other organs from former transplant recipients will add to the limited donor pool. In addition, many transplant recipients will want the opportunity to donate in return. The following is a short report on two liver donors who were former transplant recipients.

The first case was a 63-year-old male donor after brainstem death (DBD) with a BMI of 28.7. The donor had received a heart transplant 14 years previously for a viral cardiomyopathy. Cause of death was intracranial hemorrhage from warfarin. Liver function tests were all normal, and he had stage 3 chronic kidney disease. Medications were azathioprine, cyclosporine, aspirin, lansoprazole, warfarin, and pravastatin. Due to age and function, the only organ accepted for transplant was the liver. At retrieval, the liver was macroscopically healthy with a normal-sized spleen, weighed 1.62 kg, and was mildly fatty. A trucut biopsy was taken for frozen section histology, and no significant abnormality was seen. The selected recipient was a 62-year-old man with alcohol-related chronic liver disease and hepatocellular carcinoma (HCC), MELD 12, weight 76 kg and BMI 26. Transplantation was piggybacked with temporary portocaval shunt (TPCS); total blood loss was 2.2 l and the cold ischemic time, 12 h. Liver function normalized rapidly from a peak serum AST 2120 (10–50) IU/l, day 5 INR was 1.08, and day 5 serum bilirubin (total) was 31 (3–20) μmol/l. The post-transplant course was uneventful, and the recipient was discharged on day 6. Immunosuppression regime was CNI based. At 7 months, graft function remains good.

The second case was a 47-year-old female donor after cardiac death (DCD), with a BMI of 21 who had been admitted with a subarachnoid hemorrhage. The donor, an insulin-dependent diabetic, had received a combined kidney and pancreas transplant 8 years previously. All liver function tests were normal. Medications were tacrolimus, mycophenolate mofetil, omeprazole, thyroxine, and phenytoin. The liver and lungs were accepted for transplant. The donor had no gag, no cough and was on no inotropic support; withdrawal was by extubation in the anesthestic room. The first warm ischemic time (from systolic <50 mmHg to aortic cannulation) was 16 min. The liver weighed 1.2 kg, was well perfused, and nonsteatotic. As there were no concerns from the donor history, liver function or with the appearance of the liver a liver biopsy was not performed. The recipient was a 56-year-old woman with HCV G3a cirrhosis complicated by a solitary hepatocellular carcinoma. Her MELD was 11, weight 76 kg with a BMI of 27.6. Transplantation was piggybacked with a TPCS, blood loss was 3.5 l and cold ischemic time, 7 h 15 min. Immunosuppression was tacrolimus based. Peak serum AST in the first week after transplant was 372 (10–50) IU/l, day 5 serum total bilirubin was 12 (3–20) μmol/l and day 5 INR was 1.1 (0.9–1.2 ratio). The patient was discharged at day 10 and at last follow-up, liver function was good, apart from a mildly raised gamma glutamyl transferase 171 (1–55) IU/l.

Reports on the use of organs that have had long-term exposure to immunosuppression are limited. Most papers describe the successful immediate or early reuse of liver allografts after brain death in the acute liver failure recipient [1,2]. Two cases of elective reuse of auxiliary grafts at 1 month post-transplant, after native liver regeneration has also been described [3]. The data on late liver allograft reutilization or use of a liver after long-term immunosuppression in a transplant recipient of other organs were more limited [4–7] (See Table 1), and there are no reports of DCD in either situation. As a consequence, it has been advocated by some that such livers should be regarded as an extended criteria organ and allocated accordingly [4].

United Network of Organ Sharing (UNOS) registry data 1987 – 1996 has identified 52 prior organ recipients that became donors, from whom 15 livers were transplanted. The data did not show any difference in the incidence of early or late cellular rejection when comparing kidney recipients whose donor had been a previous organ recipient to those who had not [8]. This UNOS data also showed that graft survival was equivalent for kidney and liver, but there was a decrease in graft survival of the heart when comparing recipients of organs from donors who had been previously transplanted to those who have not [8].

Table 1. Summary of the cases reported in the literature on the utilization of a liver allograft from a transplant recipient after long-term immunosuppression exposure. Abbreviations used donor 1 (D1), recipient 1 (R1), immunosuppression (IS), cause of death (COD), recipient 2 (R2), donor after brain stem death (DBD), back table biopsy (Bx) of R1 liver, length of follow-up (FU), not stated (NS), not done (ND).

Reference	D1 age (years)	R1 age (years)	IS	R1 COD	R1 survival	Graft type	Bx	R2 diagnosis & age (years)	R2 FU	Graft outcome
Rentsch [4]	16	38	Cyclosporin	Cerebral thrombosis	5 years	DBD	40% microsteatosis	Polycystic Liver Disease 51y	1.5 year	Good function
Tayar [5]	NS	59	Cyclosporin	Intracerebral bleed	13 years	DBD	Mild periportal fibrosis	Cryptogenic Cirrhosis + HCC 61 year	3 weeks	Good function
Ortiz [6]	NS	44	NS	NS	1776 days	DBD	NS	NS	3 days	Failed
	NS	22	NS	NS	1013 days	DBD	NS	NS	176 days	Good function
Desai [7]	25	16	Tac, MMF	Neurotrauma	52 months	DBD	ND	Autoimmune cirrhosis 34 year	14 months	Good function, R2 died of sepsis

Long-term injury from the side effects of immunosuppression on the liver are rare but need to be considered when assessing the 'transplantability' of such organs. CNI-induced chronic vasculopathies have been reported, and nodular regenerative hyperplasia is recognized to be associated with the use of azathioprine, which highlights the importance and for some groups [4], the mandatory need of frozen section liver biopsy. It has been suggested that long-term immunosuppression may make the donor liver more vulnerable to ischemia reperfusion and steatosis [4]. However, immunosuppression has been shown to reduce damage from ischemia reperfusion [9,10] and may also give an immunological advantage to the donor organ [8,10].

In conclusion, both the liver allograft and donor liver from the old transplant recipient of other organs can be successfully re-used or used with good outcome providing careful donor assessment has been undertaken.

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Conflicts of interest

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