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LETTER TO THE EDITOR

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# Reuse of a transplanted liver

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Sir: The shortage of organ donors and the increased demand for liver transplantation (OLT) has led to new strategies to increase the availability of livers for transplantation. The acceptance of old and marginal donors [8, 15], the use of one donor for two recipients (split liver) [1], reduced-size liver transplants, and living related segmental transplants [2] are techniques that have been developed to lower the mortality rate of patients on waiting lists. Another new approach is to reuse a transplanted liver. We report here a case of successful reuse of a liver graft, as well as two kidneys, after the death of the first recipient.

The first recipient was a 55-year-old female, blood group 0 ($Rh^+$), with end-stage alcoholic liver cirrhosis. Multiple samples for serology of hepatitis B virus (HBV) and hepatitis C virus (HCV) gave a negative result. The liver donor was a 65-year-old female, blood group 0 ($Rh^-$), who died as a result of severe head injury. She remained in the intensive care unit (ICU) for 24 h with perfect hemodynamic stability; there was no need for vasoactive drugs. The biochemical parameters were within the normal range (AST 37 IU/l, ALT 47 IU/l, bilirubin 14 μmol/l, creatinine 66 μmol/l, Na 139 mmol/l, and K 3.3 mmol/l). Serologies for HIV, HBV, and HCV were negative, as were the bacteriological blood cultures and the donor-recipient crossmatch test. Antibiotic prophylaxis was given with a unique dose of cefotaxime and clindamycine. Both kidneys were harvested and successfully transplanted by the urological team.

Orthotopic liver transplantation was performed using standard techniques with vena cava preservation (piggy-back technique) [14]. Arterial anastomosis was performed using the splenic artery of the recipient, due to inadequacy of the hepatic artery, as previously reported [4, 5]. The cold ischemia time was 314 min, and the duration of the anhepatic phase was 51 min. A biopsy of the liver showed a 2 % micro vesicular steatosis. During the operation, transfusion of 14 units of packed red cells, 21 units of fresh-frozen plasma, and 8 units of platelets were necessary. Quadruple immunosuppressive therapy with thymoglobulin, prednisone, cyclosporin, and azathioprine was started after reperfusion, as is usual in our unit [3, 6]. The patient's recovery was good, and the endotracheal tube was removed 12 h after OLT. The initial graft function was satisfactory, with a maximum peak ALT of 720 IU/l and an increase in bilirubin to 91 μmol/l. The postoperative biochemical evolution is shown in Fig. 1. After 2 days in the ICU, the patient was transferred to the general surgical ward for follow-up. On the 3rd postoperative day, the patient suffered a hypertensive crisis that was impossible to control with endovenous therapy, and within 3 h the patient lost consciousness. A CT scan showed a large intraventricular hemorrhage, and an electroencephalogram revealed a lack of brain activity. Five days after OLT, the patient was brain-dead. A biochemical study demonstrated a moderate cytolysis with AST 186 IU/l, ALT 540 IU/l, bilirubin seven times the normal level (136 μmol/l), and a normal prothrombin time (92 %).

Since the hemodynamic status of the recipient had been stable all the time and graft function was good, we decided to reuse the liver graft, as has been reported previously [9, 10, 13]. Informed consent about the possible risks was obtained from the new recipient and her family prior to OLT. From a technical point of view, harvesting was simplified because the dissection time was shorter than usual. The donor was perfused with 4 l of UW solution via the aorta and 1 l via the portal vein. Both kidneys were also harvested by the urological team.

The second recipient was a 58-year-old female, blood group 0 ($Rh^+$), with end-stage posthepatitis HCV cirrhosis. OLT was performed following the same techniques, with end-to-end anastomosis of the hepatic artery to the celiac trunk. There were no complications. Cold ischemia time was 660 min and the duration of the anhepatic phase was 55 minutes. Transfusion of 20 units of packed red cells, 20 units of fresh-frozen plasma, and 20 units of platelets were needed during surgery. The recovery of the second recipient was satisfactory, and initial graft function was good, with a maximum peak ALT of 866 IU/l, with a normal prothrombin time (80–103 %), and a maximum increase in bilirubin of 185 μmol/l. The postoperative evolution is again shown in Fig. 1.
The patient was transferred from the ICU to the general surgical ward on the 5th postoperative day and left the hospital 30 days after OLT with an otherwise uneventful postoperative evolution. Fourteen months later, the patient is in good condition with normal liver function.
The kidneys were transplanted into a 28-year-old male and a 45-year-old male after a cold ischemia time of 19 and 23 h, respectively. The first patient initiated urine output immediately with excellent graft function,

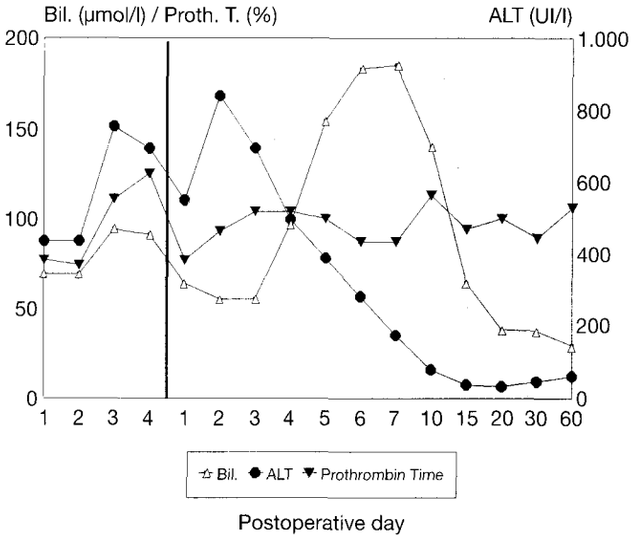


**Fig. 1** Changes in laboratory data before and after the second OLT

but the second one presented acute tubular necrosis with preserved diuresis.

The current shortage of organ donors is the most important limiting factor for the extension of solid organ transplantation, and it is the main cause of death in patients on the waiting list [8, 12, 15]. Neurological complications after liver transplantation are common in adults, and stroke or cerebral edema may result in brain death of the patient [7]. In this situation, organ function and hemodynamic status may remain normal, and the recipient may, him/herself, become a suitable donor. The reuse of a graft has been previously reported under exceptional circumstances in heart [11] and liver transplantation [9, 10, 13]. Until now, all reused grafts were obtained from young donors (under 40 years). Most previous reports recommend not only excellent biochemistry before reuse but also early reutilization (within the first 48 h). Other conditions required are total ABO compatibility, negative crossmatch, absence of infection, and negative serology for HBV and HCV for both the donor and the first recipient [9, 10, 13]. The indication for the second transplantation was, in the majority of cases, urgent, or the condition of the recipient was very poor (retransplantation or advanced tumor) [9, 10]. Yet, interestingly, graft function in the second recipient was very good in all reported cases [9–11, 13]. In our patient, the peak ALT of the second recipient was similar to that of the first one.

Ours is the first case in which the interval between the first and second OLTs was 5 days [13] and in which the first donor was old enough (65 years) to be considered a marginal donor [8]. Transplantation of the kidneys and the second OLT were performed as elective surgery, and recovery was uneventful in all of the recipients.

This report confirms the notion that a brain-dead liver transplant recipient can be considered a suitable multiorgan donor without increasing the risk for the subsequent recipients.

## References


1. Bismuth H, Morino M, Castaing D, Gillon MC, Descorps-Declere A, Saliba F, Samuel D (1989) Emergency orthotopic liver transplantation in two patients using one donor liver. Br J Surg 76: 722–724
2. Broelsch CE, Edmond JC, Whitington PF, Thiestlethwaite JR, Baker AL, Lichtor JL (1990) Application of reduced-size liver transplants as split grafts, auxiliary orthotopic grafts, and living related segmental transplants. Ann Surg 212: 368–377
3. Fabregat J, Fradera R, Jaurrieta E, Figueras J, Rafecas A, Rufi G, Casanovas T, Casais L, Gil-Vernet S (1992) Clinical results of quadruple drug immunosuppresive therapy in liver transplantation. Transplant Proc. 24: 148–149
4. Figueras J, Jaurrieta E, Segura R, Rafecas A, Fabregat J, Sabate A, Fradera R, Torras J, (1992) A simplified technique for hepatic revascularization of the liver graft with inadequate recipient hepatic artery. Transpl Int 5: 120–121
5. Figueras J, Torras J, Aranda H, Torras J, Ramos E, Borobia FG, Sabate A, Jaurrieta E (1995) Revascularization of liver grafts with recipient splenic artery in liver transplantation. Transplant Proc 27: 2313–2314
6. Kalayoglu M, Stratta RJ, Hoffmann RM, Sollinger HW, Belzer FO (1988) Quadruple immunosuppresive therapy for liver transplantation. Transplant Proc 20: 524–529
7. Menegaux F, Keefe EB, Andrews BT, Egawa H, Monge H, Concepcion W, So SK, Esquivel CO (1994) Neurological complications of liver transplantation in adult versus pediatric patients. Transplantaton 58: 447–450
8. Mor E, Klintmaln G, Gonwa TA, Solomon H, Holman MJ, Gibbs JF, Watemberg I, Goldstein RM, Husberg BS (992) The use of marginal donors for liver transplantation. Transplantation 53: 383–386
9. Moreno-Gonzalez E, Garcia I, Gonzalez-Pinto I, Gomez R, Loinaz C (1991) Successful reuse of a liver graft. Br J Surg 78: 813–814
10. Moreno-Gonzalez E, Gomez R, Gonzalez-Pinto I, Loinaz C, Garcia I, Maffetone V, Corral M, Marcello M, Gonzalez A, Jimenez C, Castellon C (1996) Reuse of liver grafts after early death of the first recipient. World J Surg 20: 309–313
11. Pasik MP, Gallino A, Carrel T, Maggiorini M, Laske A, Segesser LV, Turina M (1993) Reuse of a transplanted heart. N Engl J Med 328: 319–320

12. Soifer BE, Gelg AW (1989) The multiple organ donor: identification and management. Ann Intern Med 110: 814–823
13. Tantawi B, Cherqui D, Duvoux C, Dhumeaux D, Fagniez PL (1996) Reuse of a liver graft five days after initial transplantation. Transplantation 62: 868–869
14. Tzakis A, Todo S, Starzl TE (1989) Orthotopic liver transplantation with preservation of the inferior vena cava. Ann Surg 210: 649–652
15. Wall WJ, Mimeault R, Grant DR, Bloch M (1990) The use of older donors livers for hepatic transplantation.Transplantation 49: 377–381

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