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CASE REPORT

Fourteen-year survival of a renal graft reused 2 years after initial transplantation: a case report

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Summary

We report on the successful regrafting of a transplanted kidney. The donor kidney was first transplanted into a 32-year-old patient with renal atrophy. More than 2 years later, he suffered from severe grand mal seizure with brain edema and the patient met the criteria for brain death. The well-functioning graft was recovered and subsequently transplanted into a 66-year-old woman with chronic glomerular nephritis. Neither the first nor the second recipient experienced any acute rejection. To date, more than 14 years later, she is in good health with excellent graft function. This case report implies that excellent long-term graft function is viable in a graft reused 2 years after the initial transplantation.

Introduction

More than 20 years have passed since Al-Hasani *et al.* [1] first reported about reutilization of a transplanted kidney. Others have subsequently reported about reuse of heart [2] and liver [3–5]. Although the disparity between solid-organ supply and demand persists [6] surgeons have refrained from reusing organs especially if the time between the first transplantation and reuse of the organ is longer than a few days. In this article, we describe a case of reuse of a transplanted kidney 25 months after the initial transplantation with an excellent long-term graft function in the second recipient.

Case report

A 32-year-old man with end-stage renal disease caused by renal atrophy underwent renal transplantation in July 1993. He had been on renal replacement therapy for 11 years. The heartbeating donor was a 36-year-old woman who suffered from spontaneous subarachnoid hemorrhage. Donor and recipient had blood group O Rhesus positive. Typing of human leukocyte antigens (HLAs) did not indicate any mismatches and cross match was negative. The cold ischemia time was 33 h. The left kidney was transplanted in the right iliac fossa and after reperfusion passed urine immediately. The immunosuppressive regimen consisted of prednisolone, cyclosporine, and azathioprine. At discharge from the hospital 3 weeks after transplantation, serum creatinine was still elevated (1.5 mg/dl) but dropped to normal level within the next 6 months (see Fig. 1).

In the following two years, the clinical course was uneventful and monthly measurements of serum creatinine, creatinine clearance, and blood urea nitrogen were slightly elevated but within normal range. There were no signs of rejection in protocol biopsies. Twenty-five months later, he was admitted to another hospital because of a grand mal seizure. He had been well until 4 h before admission, when he complained about dizziness and impaired vision and later was seen to have seizure-like movements. At the hospital, he had another grand mal seizure followed by respiratory failure and subsequently symptomatic bradycardia. Cardiopulmonary resuscitation was successful but the patient remained hypotensive and unconscious. Computed tomography

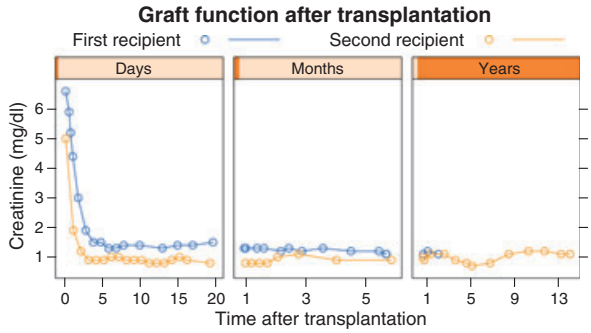

Figure 1 Serum creatinine after transplantation in the first and second recipient.

showed global brain and restricted diffusion, consistent with diffuse hypoxic-ischemic injury. He had normal renal function and there were no signs of systemic or local infection.

Subsequently, the patient met the criteria for brain death and the patient's family expressed a wish to donate his organs. Further examinations confirmed his suitability for donation of the heart and transplanted kidney. The heart was recovered according to standard procedures but for *in situ* perfusion of the transplanted kidney the aorta and right iliac artery were cannulated and perfused antegrade.

By standard allocation procedures, the kidney was allocated to a 66-year-old woman with end-stage renal disease caused by chronic glomerular nephritis. She also suffered from high blood pressure, intermittent tachyarrhythmia absoluta, and suspected coronary heart disease and had been on hemodialysis for almost 2 years. She also had blood group 0 Rhesus positive and there were two HLA mismatches with the original donor. Cross match with the original donor was not possible because tissue for cross match was no longer available 2 years after the initial transplantation. Cross match with the first recipient was negative.

At transplantation, the ureter of the graft was found to be short for a standard uretero-cystostomy. Thus the pelvis of the graft was directly anastomosed with the ureter of the recipient, i.e. a pyelo-ureterostomy. Cold ischemic time was 12 h. Immunosuppression was initiated with 500 mg methylprednisolone and maintained with tacrolimus and prednisolone tapered to a maintenance dose of 7.5 mg/day. After transplantation, diuresis began immediately and serum creatinine fell to normal level within the next 3 days. She left the hospital on the 24th postoperative day with normal renal function. In biopsies from the graft, chimerism, i.e. migration of recipient cells to the grafted kidney, could not be detected by fluorescence *in situ* hybridization [7].

Over the next 10 years, renal function remained stable with serum creatinine around 1 mg/dl. Protocol biopsies were negative for signs of rejection. Because of progressive coronary heart disease, she had percutaneous transluminal coronary angioplasty almost 5 years after the transplantation and 2.5 years later she had aortic valve replacement for aortic valve stenosis. In the 11th and 12th postoperative year, the serum creatinine level slightly rose to 1.1 but never exceeded 1.3 mg/dl. Until today, 14 years after transplantation, she is alive, in good clinical condition.

Conclusion

Reutilization of grafted organs after brain death of the first recipient has been shown feasible [1–5,8,9] but there have been no reports about the long-term outcome in grafts recovered weeks, months, or even years after the

Table 1. Characteristics of donor and recipients.

	First donor	First recipient/Second donor	Second recipient
Gender	Female	Male	Female
Age	36	29	66
Kidney disease	–	Renal atrophy	Glomerulonephritis
Cause of death	Subarachnoid hemorrhage	Brain edema resulting from status epilepticus	–
Blood group	O positive	O positive	O positive
Human leukocyte antigens (HLA)	A 2 A 32 (19) B 7 (w6) B 60 (40, w6) Cw 10 (3) Cw 7 DR 15 (2) DR 13 (6, 52) DQ 6 (1)	A 2 A 31 (19) B 7 (w6) B 60 (40, w6) Cw 3 Cw 7 DR 2 DR 13 (6, 52) DQ 1	A 2 A 3 B 7 (w6) B 60 (40, w6) Cw 9 (3) Cw 7 DR 15 (2) DR 6 DQ 2

initial transplantation. We report a case of re-engraftment 2 years after the initial transplantation and long-term survival of more than 14 years with excellent graft function.

There has been some speculation about the additive effect of repeated ischemia/reperfusion injury and immunologic host response [8,9]. As there have been no reports about detrimental effects of reutilization (although there may be publication bias) early re-transplantation does not seem to cause undue harm to the graft.

Late reuse of transplanted organs has been reported much less [1,10] and until now the fate of such organs was unknown. The unusual combination of a donor, a first, and a second host offers interesting perspectives as cells of the first recipient migrate into the grafted organ and may interact with the second recipient. Al-Hasani *et al.* [1] suggested that interaction of the graft in the first host may not be detrimental but, on the contrary, may be beneficial for graft survival in the second host. In animal models, retransplantation of long surviving renal allografts into a fresh recipient has led to prolonged survival of the retransplanted kidney [11]. In this type of situation grafts may contain leukocytes with an immunoregulatory function that allow prolonged survival in the second host. We performed fluorescence *in situ* hybridization to assess the existence of male cells in the female graft but were unable to show any chimerism in the graft before the second transplantation.

In conclusion, long-term survival of an allograft reused 2 years after the initial transplantation is possible. In the face of ongoing organ shortage [6] we avidly encourage transplant surgeons to consider all grafts with good function in the first recipient for reuse in a second host.

Authorship

TL: in charge of medical care for both patients and collected data, AO and ADG: analysed data, ADG: wrote the paper.

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