

LETTER TO THE EDITORS

Heart re-transplantation combined with kidney transplantation

doi:10.1111/tri.12598

Renal insufficiency is a frequent complication after heart transplantation and, when severe enough to require dialysis, is considered a contraindication to cardiac re-transplantation [1]. So far, very few anecdotal cases of combined simultaneous second cardiac and first renal replacements have been reported [5,7,8]. Here, we describe the results of three patients that demonstrate both the feasibility and efficacy of such a surgical approach.

Case 1: A 66-year-old female, with history of systemic hypertension, who underwent cardiac transplant for idiopathic dilated cardiomyopathy in 1992, revealed progressive renal function deterioration because of CNI-based therapy. She started dialysis treatment 8 years after transplantation. In the meanwhile, she developed cardiac allograft vasculopathy treated with repeated PCI between 2002 and 2011 with a relapse of the left main coronary artery re-stenosis 1 year later. Due to worsening heart failure (NYHA III class) and angina, a heart re-transplantation combined with kidney transplantation was scheduled, and finally performed simultaneously in 2012. The early postoperative course was complicated by refractory renal rejection which required three sessions of plasmapheresis. At 23-month follow-up, the woman was in good clinical condition, with normal cardiac function and mild renal insufficiency (serum creatinine slightly increased up to 1.59 mg/dl) without any sign of rejection.

Case 2: A 66-year-old male with a history of smoking, systemic hypertension, diabetes and hypercholesterolemia, symptomatic for dyspnea (NYHA class IV) had undergone a cardiac transplant for primary dilated cardiomyopathy in 2000. His renal function progressively worsened due to chronic CyA-based immunosuppression and cardiovascular risk factors. He suffered from repeated acute graft rejections which definitively impaired cardiac function (enlarged left ventricle with ejection fraction of 19% and moderate mitral regurgitation) and underwent ICD implantation in 2006. During 2010, the patient started dialysis treatment; he required intensive care with multiple hospitalizations, intravenous inotropic support and noninvasive pulmonary ventilation. In 2012, he underwent heart re-transplantation and kidney transplantation at the same time without any complication. At 21-month follow-up, the patient was in

good clinical conditions with normal cardiac and renal functions.

Case 3: A 48-year-old male with a history of systemic hypertension and hyperuricemia had undergone heart transplantation for primary dilated cardiomyopathy in 1999. He developed cyclosporine-related renal failure, and he started dialysis in 2013. He experienced three repeated PCI between 2008 and 2013 for late cardiac allograft vasculopathy and multiple hospitalizations due to worsening heart failure. Due to persistent refractory cardiac decompensation (NHYA IV class), he underwent heart re-transplantation and staged (12 h later) kidney transplantation in 2014. The postoperative course was complicated by initial renal failure requiring dialysis for a few days, followed by progressive and complete recovery. A subsequent urinary leak at the ureteral–bladder junction was treated with temporary percutaneous pyelostomy. At 6-month follow-up, the patient showed a complete recovery from the renal surgical complication, he was in good clinical condition with normal cardiac and renal function.

The incidence of chronic renal failure is estimated to be between 7% and 21% at 5 years after heart transplantation [1]. Pretransplant dialysis treatment in heart recipients has always represented a significant risk factor for short- and long-term mortality [2]. In a recent publication, the effect of stage 4 and 5 renal failure at the time of heart transplant has shown a significant increase in the risk of death (stage 4: HR 1.66, stage 5: HR 8.54, dialysis: HR 4.07) [3]. However, combined heart and kidney replacement to treat both organ failures seems to be associated with excellent outcome, similar long-term survival and lower rejection rate when compared with heart transplantation alone [4].

Cardiac re-transplantation may offer clinical results similar to primary heart transplantation; however, all comorbidities impacting the prognosis should be weighed individually [5]. Patient selection seems to be of utmost importance as multivariate analysis of data from the UNOS registry has shown that older age, increasing serum creatinine, and preoperative mechanical ventilation were associated with a higher risk of graft failure after re-transplantation [6]. Therefore, end-stage renal failure requiring dialysis has usually been considered a contraindication to heart re-transplantation, and only very few cases of

combined organ replacement following the original cardiac replacement have been reported so far, without details on dialysis treatment, if any, and patient outcome [5,7,8].

In our experience, the indication to combined heart re-transplantation and kidney transplantation is limited to such patients with advanced cardiac failure due to coronary vasculopathy associated with severe chronic renal failure (stage 4–5), also when treated with dialysis. The presence of other organ diseases (mainly liver or lung) and severe peripheral vascular pathology are considered a contraindication to a concomitant procedure. In contrast, metabolic disorders, arterial hypertension, and renal function impairment, common findings in transplanted patients, have to be evaluated case by case.

The preoperative work-up of comorbidities and postoperative management follows the usual rules of a single organ (heart or kidney) transplantation, the main difference being a mildly higher level of immunosuppression during the first month post-transplant. Finally, our recommendation is to perform the combined surgery with organs coming from the same donor and preferentially with no-staged modality (simultaneously), and to delay kidney transplantation (staged) only in case of initial hemodynamic instability following heart re-transplantation.

In conclusion, our preliminary experience of heart re-transplantation with renal transplantation performed in long-term cardiac transplant survivors treated by dialysis seems to support this therapeutic option which has been demonstrated to be feasible and safe in selected patients.

Sandro Sponga, Domenico Montanaro and Ugolino Livi
Cardiothoracic Department,
University Hospital of Udine, Udine, Italy
e-mail: sandro_sponga@yahoo.com

References

1. Ojo AO, Held PJ, Port FK, *et al.* Chronic renal failure after transplantation of a non renal organ. *N Engl J Med* 2003; **349**: 931.
2. Lund LH, Edwards LB, Kucheryavaya AY, *et al.*; International Society for Heart and Lung Transplantation. The Registry of the International Society for Heart and Lung Transplantation: thirtieth official adult heart transplant report–2013; focus theme: age. *J Heart Lung Transplant* 2013; **32**: 951.
3. Thomas HL, Banner NR, Murphy CL, *et al.*; Steering Group of the UK Cardiothoracic Transplant Audit. Incidence, determinants, and outcome of chronic kidney disease after adult heart transplantation in the United Kingdom. *Transplantation* 2012; **15**: 1151.
4. Karamlou T, Welke KF, McMullan DM, *et al.* Combined heart-kidney transplant improves post-transplant survival compared with isolated heart transplant in recipients with reduced glomerular filtration rate: analysis of 593 combined heart-kidney transplants from the United Network Organ Sharing Database. *J Thorac Cardiovasc Surg* 2014; **147**: 456.
5. John R, Chen JM, Weinberg A, *et al.* Long-term survival after cardiac retransplantation: a twenty-year single-center experience. *J Thorac Cardiovasc Surg* 1999; **117**: 543.
6. Kilic A, Weiss ES, Arnaoutakis GJ, *et al.* Identifying recipients at high risk for graft failure after heart retransplantation. *Ann Thorac Surg* 2012; **93**: 712.
7. Smith JA, Ribakove GH, Hunt SA, *et al.* Heart retransplantation: the 25-year experience at a single institution. *J Heart Lung Transplant* 1995; **14**: 832.
8. Goerler H, Simon A, Gohrbandt B, *et al.* Cardiac retransplantation: is it justified in times of critical donor organ shortage? Long-term single-center experience. *Eur J Cardiothorac Surg* 2008; **34**: 185.