UIJ UroToday International Journal®

www.urotodayinternationaljournal.com
Volume 3 - October 2010

En Bloc Bilateral Kidney, Aorta, and Vena Cava Transplantation From a Deceased Pediatric Donor to an Adult Recipient: A Case Report

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Submitted July 6, 2010 - Accepted for Publication August 23, 2010

ABSTRACT

Kidney transplantation is the treatment of choice for end-stage renal disease. There has been reluctance to transplant small pediatric deceased donor kidneys into adults because of possible vascular and urinary complications and insufficient nephron mass. The present case is a successful renal transplantation from a pediatric cadaver donor to an adult recipient. Both kidneys and a segment of inferior vena cava (IVC) and aorta were resected en bloc. One end of both the aorta and IVC was completely closed; the other ends were anastomosed to the internal iliac artery and the external iliac vein of the recipient, respectively. Renal DTPA scan of the transplanted kidney showed good perfusion and function. Recipient BUN, creatinine, urinary output, and blood pressure were acceptable. There have been no complications or signs of rejection 20 months later. The use of the en bloc technique may obviate the otherwise adverse effect of very small donor size on transplantation outcome.

INTRODUCTION

Kidney transplantation is the treatment of choice for end-stage renal disease (ESRD) [1-3]. Unfortunately, the disparity between the number of patients with ESRD on the kidney transplant waiting list and the availability of deceased donor organs continues to grow [4]. The prolonged waiting time for kidney transplantation and associated long periods on dialysis have been associated with significant morbidity and mortality [5].

Efforts have been made to maximize the donor pool. The criteria for donors have been expanded to include donations following cardiac death and donations to one recipient of dual marginal kidneys that would not be considered for single transplant [6]. However, the optimal use of small pediatric donors has been less clear [7].

A study of 2886 small pediatric donors from the Scientific Registry of Transplant Recipients (SRTR) showed that the rate of kidney recovery was significantly higher with increasing age, weight, and height [8]. There has been reluctance to transplant small pediatric deceased donor kidneys into adults for several reasons, including associations with increased vascular complications [9,10] and urinary complications [10]. There has been additional concern about transplanting an insufficient nephron mass using this donor population [11].

The present case shows the results of kidney transplantation from a deceased pediatric donor to an adult recipient.

CASE REPORT

The kidney recipient was a 35-year-old man who had ESRD because of chronic glomerulonephritis. He was on hemodialysis for 2 years before transplantation. His serum creatinine level

KEYWORDS: En bloc; Kidney transplant; End-stage renal disease

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CITATION: *UroToday Int J*. 2010 Oct;3(5). doi:10.3834/uij.1944-5784.2010.10.04

Abbreviations and Acronyms

ESRD = end-stage renal disease

IVC = inferior vena cava.

was 8-9 mg/dL.

The kidney donor was a 3-year-old boy who had brain death because of head trauma after falling from a building. His diagnosis was confirmed by members of a brain death committee.

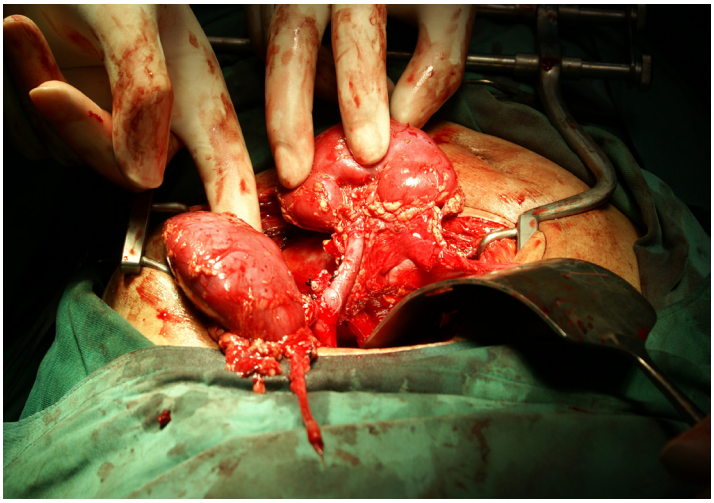
Preparation for transplantation included receiving parental permission from the donor, completing preoperative evaluations, and stabilizing the recipient patient's hemodynamics. The surgery was performed in Razi Hospital, Rasht, Iran in December, 2008.

Surgical Procedure

A transperitoneal midline incision was used to retrieve the donor organs. Both kidneys and a sufficiently long segment of the inferior vena cava (IVC) and aorta were resected en bloc (Figure 1).

The transplant was performed from the right side of recipient's pelvis by using an extraperitoneal route and a rectus-preserving Gibson incision. One end of both the aorta and IVC was completely closed by suturing; the other ends were anastomosed to the internal iliac artery and the external iliac vein of the recipient, respectively (Figure 2). Arterial and venous anastomosis were carried out with 6/0 and 5/0 nylon sutures, respectively. The ureter was anastomosed to the bladder with 5/0 vicryl sutures using an extravesical approach. A double pigtail ureteral stent was devised. A closed suction drain was inserted.

Figure 2. Intraoperative View of the Recipient's Kidneys After Transplantation.
doi: 10.3834/uij.1944-5784.2010.10.04f2

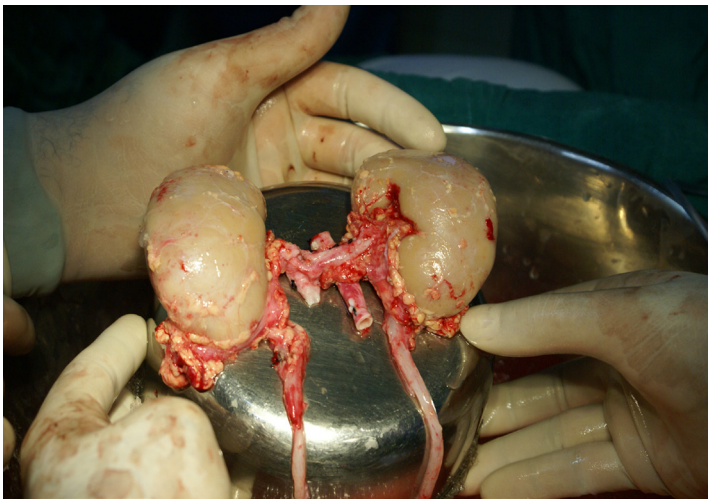


Postsurgical Care and Results

Immunosuppressants (eg, cyclosporine, prednisone, and mycophenolate mofetil) were used as antirejection medications. The patient had good urinary output after the operation.

The drain and urethral catheter were removed after 7 days. The sutures were resected after 13 days. A renal DTPA scan of the transplanted kidney was done 10 days after the operation. The scan showed good perfusion and function (Figure 3).

Figure 1. En Bloc Kidney Resection With a Segment of Aorta and Vena Cava.
doi: 10.3834/uij.1944-5784.2010.10.04f1



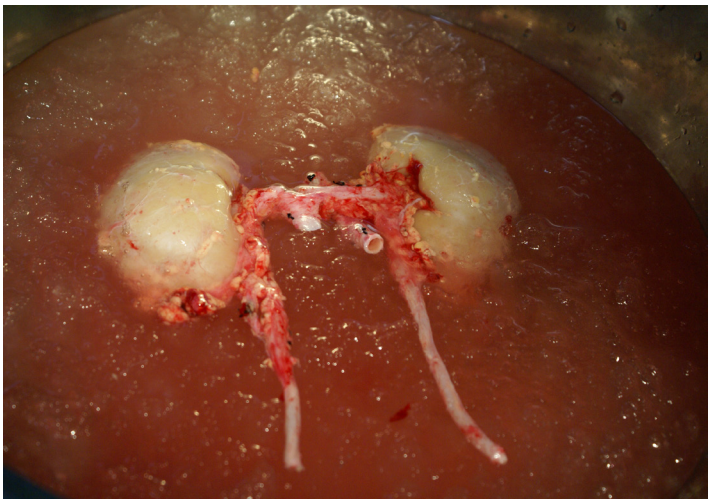


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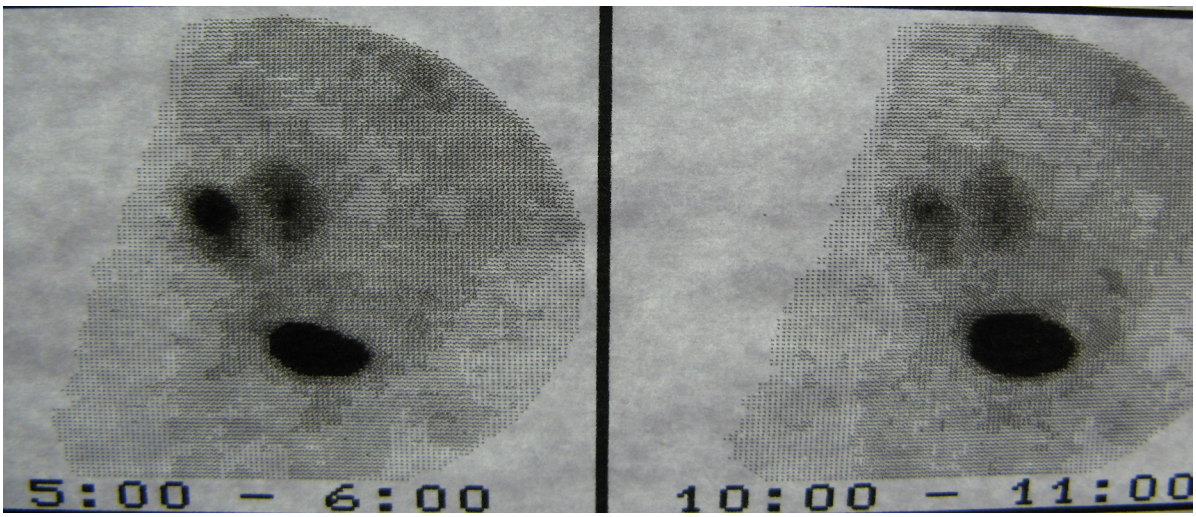
Figure 3. Renal DTPA Scan 10 Days After Transplantation.
doi: 10.3834/uij.1944-5784.2010.10.04f3



The patient was discharged after 22 days with good general condition. At the time of discharge, his blood urea nitrogen (BUN) was 33 mg/dL and creatinine was 1.5 mg/dL.

The ureteral stent was removed 40 days after the operation. The 1-month, 6-month, and 9-month follow-up examinations showed that the patient's creatinine level was 1.4, 1.3, and 1.1 mg/dL, respectively. His general condition was good and there were no transplant-related complications. His urinary output was good and his blood pressure was well controlled. He is seen for follow-up every 2-3 months; his status is unchanged 20 months after his surgery.

DISCUSSION

Donation of organs after cardiac death is advocated as a means to increase the total organ pool available for transplantation [2]. The use of kidneys from small deceased pediatric donors is rare, and such kidneys are not usually found in a donor pool [8].

Kidney transplants from live donors, particularly those related to the patient, are another option. At present, children should not be considered as donors for live renal transplantation, unless in exceptional life-saving circumstances with appropriate external assessment and monitoring [12]. Age is not a reliable predictor of a person's maturity and competency to make such decisions, which are greater than understanding the mortality and morbidity risks and sequelae of donor nephrectomy [13]. Guidelines for living donor kidney transplantation developed by a joint committee of the British Transplantation Society and the Renal Association state that donation from children under 18 years old should take place only in very unusual and specific circumstances. Nonautonomous minors should never be allowed to donate, but donations from autonomous minors are also highly problematic [13].

Surgical complications represent the most common problems after renal transplantation and may be associated with significant morbidity [14]. In the present recipient, surgical complications were not seen. One reason may be that graft survival of en bloc kidney transplants is significantly better than survival of single kidney transplants [8]. The incidence and the type of acute rejection episodes have a significant negative impact on graft survival [2].

It seems that the use of the en bloc technique may obviate the otherwise adverse effect of very small donor size on transplantation outcome. The discrepancy between the size of the transplant donor and recipient vessels appears to be minimized. Longer follow-up and studies with more cases are needed in order to see true survival advantages with this type of transplantation.

We have reported a successful renal transplantation from a 3-year-old pediatric cadaver donor to an adult recipient without any complication or rejection 20 months later. Although it was not the first reported case, these studies can build evidence for similar patients in need of kidney donation and provide support for increasing the total organ pool available for transplantation.

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doi:10.3834/uij.1944-5784.2010.10.04
ISSN 1944-5792 (print), ISSN 1944-5784 (online)