A Rarely Used Surgical Technique of Adult En Bloc Renal Transplant

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Abstract

Objectives: We report the first en bloc adult deceased-donor renal transplant at our center. We had an extended criteria, female, deceased donor, who was a known hypertensive, hypothyroid, with a history of Hodgkin lymphoma that had been treated successfully 30 years prior without recurrence. Her cause of death was intracranial hemorrhage. In view of the raised creatinine level at the time of donation, the transplant team decided to accept the kidneys for dual transplant. We decided to use a technique that is used to recover pediatric en bloc kidneys in our adult deceased donor.

Materials and Methods: The kidneys were recovered en bloc with the aorta and inferior vena cava. Meticulous back table work was required in ligating all the nonrenal tributaries of the donor aorta and inferior vena cava. We anastomosed the aorta to the common iliac artery in an oblique end-to-side fashion. The donor inferior vena cava was anastomosed to the external iliac vein in an end-to-side fashion. The distal ends of ureters were made into a common lumen with a side-to-side anastomosis, and this common ureter was implanted into the bladder.

Results: There was no requirement for postoperative dialysis. The creatinine is at nadir of 88 μmol/L at 1 year of follow up.

Conclusions: This is a method that can be attempted for implanting dual kidneys on one side. Kidneys with multiple vessels can be transplanted like a single kidney with a shorter cold ischemia/overall operative time and less fatigue for the surgeon.

Key words: Dual kidney transplant, En bloc kidney transplant, Extended criteria donor

Introduction

We report the first en bloc adult deceased-donor renal transplant, performed in June 2012, at St. John’s Medical College in Bangalore, India. We had a 65-year-old female, extended criteria deceased donor, a known hypertensive, hypothyroid, with a history of Hodgkin lymphoma that had been treated successfully 30 years prior with no recurrence. Her cause of death was intracranial hemorrhage with diffuse axonal injury. The recipient was a 48-year-old man, who was hepatitis C virus positive, and hypertensive; he was on maintenance hemodialysis for prior 6 months.

In view of the raised creatinine level (194 μmol/L) at the time of donation, we decided to accept the kidneys for dual kidney transplant. Insertion biopsy of only the right kidney was done. As this insertion biopsy report of the donor, the right kidney showed an acceptable histology for transplanting it as a single renal allograft. We could argue that these extended criteria donor kidneys could have been used in 2 different recipients. However, with the previous history of lymphoma and raised creatinine, there were no suitable recipients for this pair of extended criteria donor kidneys in our state, and we do not have a national deceased organ sharing system in place.

Materials and Methods

The kidneys were recovered en bloc with the aorta and inferior vena cava. Meticulous back table work
was required in ligating all the nonrenal tributaries of donor aorta. We anastomosed the aorta to the common iliac artery in an oblique end-to-side fashion (Figure 1). The donor inferior vena cava was anastomosed to external iliac vein end-to-side. Vascular anastomoses were done using 6-0 Prolene. The distal ends of ureters were made into a common lumen with a side-to-side anastomosis, and this common ureter was implanted into the bladder using a Lich-Gregoir extravesical technique with 5-0 polyglyconate suture material. A single double J stent was placed in each ureter.

Figure 1. Schematic Diagram of the Adult En Bloc Renal Transplant

Abbreviations: CIA, common iliac artery; EIV, external iliac vein; IVC, inferior vena cava

The final positioning of kidneys was not subject to space constraints; there was enough space for the en bloc kidneys. Both kidneys were placed retroperitoneally in the right iliac fossa, with the left kidney being more superior and deeper. On reperfusion, the kidney’s began making urine immediately. The abdomen was closed after placing a drain. Preoperative induction was with basiliximab and triple immunosuppression using prednisolone, mycophenolate mofetil, and cyclosporine.

The back table repair and refashioning of the aorta and inferior vena cava were time-consuming, as there were many unnamed aortic branches that needed ligation. Cold ischemia time was 5 hours. The total time taken for surgery, from recovery to anastomoses, was approximately 10 hours. Transplant Doppler both postoperatively and at 1 year showed good global vascularity and acceptable resistive indices in both kidneys. Donor creatinine at the time of recovery was 194 μmol/L. Preoperative creatinine of the recipient was 1096 μmol/L, which decreased to 186 μmol/L postoperatively on day 1, and 97 μmol/L at the time of discharge on postoperative day 9. There was no requirement for postoperative dialysis. The creatinine is at nadir of 88 μmol/L at 1 year of follow-up, and Doppler ultrasound showed good global vascularity in the kidney. The insertion renal biopsy showed 3/20 sclerosed glomeruli with minimal arterial sclerosis and scarring. Biopsy of the liver and spleen from the deceased donor did not reveal any evidence of lymphoma.

Discussion

To overcome the disparity between supply and demand of organs, various strategies such as the increased use of organs from extended criteria donors have been proposed. Dual kidney transplant is another approach to expand the existing deceased donor pool. The number of functioning nephrons is the most important determinant of kidney function; the number of functioning nephrons supplied by dual marginal kidneys is higher. Dual kidney transplant recipients achieved better creatinine clearance at 1, 3, 6, and 12 months, the difference being statistically significant at 6 months, compared with single extended criteria donor kidneys as shown by Miguel and associates. Dual kidney transplant provides good results regarding survival and renal function, despite being more complex surgically, and the organs have characteristics that probably make them unsuitable for single transplant. The decision to perform a dual kidney transplant makes using extended criteria donor kidneys based on a combination of pretransplant histologic criteria and the donor’s clinical characteristics. Bunnapradist and associates, found that that graft survival was comparable in dual kidney transplant and single kidney transplant with donors over 55 years of age. These otherwise discarded kidneys should be cautiously considered as a source of marginal donors. In our deceased donor, liver and pancreas transplant teams discarded the possibility of
using those organs because of the history of lymphoma.

Although en bloc dual renal transplant is a complex surgical procedure, it can reduce the operation time and cold ischemia time when compared with separate kidneys being transplanted as part of a dual transplant. It also leaves the opposite side intact for future transplant. Lastly, from a surgical viewpoint, it is easier to do 3 anastomoses in the recipient compared with 6, if 2 kidneys with 1 vessel each were being put on 1 side. This technique is possible if there are only no other abdominal organs being recovered, as we require a wider clearance of the aorta and the inferior vena cava so the kidneys can be retrieved en bloc. For extended criteria donors, organ recovery teams routinely recover en bloc adult kidneys when it is only the kidneys that are recovered, and subject them for a biopsy to determine whether it should be transplanted alone or as a dual kidney transplant?

We believe that adult en bloc renal transplant is a method that can be attempted for implanting dual kidneys on one side. Kidneys with multiple vessels can be transplanted like a single kidney. We also can argue that the level of fatigue for the surgeon is less with this technique.

References