

Kidney Transplantation from Living Donors with Bilateral Double Renal Arteries

Sopot Wudhikarn, MD

Surithorn Soontornpan, MD

Bannakij Lojanapiwat, MD

Dusit Lumlertkul, MD

Division of Urology and Renal Transplantation,

Department of Surgery and Medicine,

Faculty of Medicine, Chiangmai University, Chiangmai, Thailand.

Abstract: From May 1988 to February 1995, 53 kidney transplantations were performed at Chiangmai University Hospital. Three cases out of 53 kidney donors had double renal arteries and were transplanted successfully with excellent renal function in all cases. There was no increased incidence of acute tubular necrosis in recipient of kidney from living donor with double renal arteries. Since transplants from living related donor have superior long-term outcome than transplants from cadaveric donor, related person with bilateral double renal arteries should not be excluded from consideration as donor.

Renal transplants from related donors have been shown to have superior long-term outcome than do transplants from the unrelated or cadaver donors.^{1,2} Thus, many transplant centers continue to use living related persons as kidney donors whenever possible in order to solve the problem of organ shortage. However, a critical consideration arises in selecting a living related donor with bilateral double renal arteries.^{3,4} The use of kidney with multiple renal arteries from living donors has been in general discouraged because of the increased risks both to donors and recipients as well as technical difficulty.⁵ Donors risk is increased when cross clamping of the aorta becomes necessary during the harvesting process. Prolonged ischemic time and possible infarct of a portion of the transplant kidney may lead to serious hypertension subsequently.

MATERIALS AND METHODS

A total of 53 renal transplants were performed at Chiangmai University Hospital between May 1988 to February 1995. Three patients received kidneys from living related donors with bilateral double renal arteries. Their medical records were reviewed. The status of the arterial branches was known by preoperative arteriography in two cases, but in the other case we recognized the presence of double renal artery of the selected graft during the donor operation.

The choice of donor kidney in bilateral double renal arteries was based on the criteria outlined by Simmons et al.³

Of the 53 renal transplants, there was a single renal artery in 50 cases. The arterial anastomosis was

Table 2 Results After Transplantation of Related Donor (sibling) Kidney with Multiple Arteries

Patient	Age	Serum creatinine at three months	Current serum creatine	Current blood pressure
1	34	1.5 mg/dl	1.8 mg/dl	160/90
2	42	1.2 mg/dl	1.1 mg/dl	120/70
3	28	1.3 mg/dl	1.2 mg/dl	110/60

made either to the end of the recipients' internal iliac artery (5 cases) or to the side of the recipients' common or external iliac artery (45 cases).

In three cases the donor kidney had multiple vessels. They were all from living sibling donors. The first case, the vessels were taken together on an aortic patch which was anastomosed to the side of the recipient's external iliac artery. The second case, the polar artery was anastomosed to the branch of internal iliac artery and in the third case the smaller renal artery was first anastomosed end-to-side of the main renal artery.

RESULTS

Three cases of transplants with single renal artery developed post-transplant acute tubular necrosis. All three kidney grafts with double renal arteries were well vascularized when transplanted without evidence of renal infarction or post-transplant acute tubular necrosis. At one year post-transplantation, all patients remained well with good functioning kidneys (Table 1).

DISCUSSION

Many transplant groups now have been utilizing living related donors with double renal arteries that technically feasible for anastomoses.⁴⁻⁶ Small polar vessels may be sacrificed with impunity. In our experience with these 3 cases, the double renal arteries presented no technical reason for not utilizing them as donor grafts. All 3 living related grafts with double renal arteries are doing better than cadaver kidney transplants.

It has been generally agreed that the chance and degree of developing acute tubular necrosis following transplantation may be more common in the graft with double renal arteries possible because of increased donor kidney manipulation, prolonged ischemia of a portion of graft. We encountered none in our 3 cases, but for the 50 transplants with single renal artery we had 3 cases of transient acute tubular necrosis (6%). One of our case with double renal arteries transplant had hypertension and required slightly more antihypertensive medication than did patients receiving a single artery graft from matched donor. However, the degree of hypertension was not difficult to control.

References

1. Hume DM. Progress in clinical renal transplantation. Advances Surg 1966; 2:419.
2. Ross JA, Samuel E, Melar DR. Variation in the renal vascular pedicle. Br J Urol 33; 1961:478.
3. Starzl TE. Experience in renal transplantation. Philadelphia, WB Saunders, 1964.
4. Simmons RL, Tallent MB, Kjellstrand CM, and Najarian JS. Kidney transplantation from living donors with bilateral double renal arteries. Surgery 69; 1971: 201.
5. Aguiló J, Rodríguez O, Gaete J, Galleguillos I. Vascular anastomosis techniques in renal transplants. Int Angiol 1991; 10:39.
6. Shokier AA, el-Diasty TA, Nabeel A, Shaaban AA, el-Kenawy M, Wafa EW, Ghonim MA. Digital subtraction angiography in potential live-kidney donors : a study of 1000 cases. Abdom Imaging 1994; 19:461.