

Original Article

Follow-up of kidney donors at a single Center in South Africa

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Abstract:

Background

There is a worldwide shortage of organ donors. In our province, KwaZulu / Natal, this problem is more pronounced as the rate of cadaveric donation is very low. Thus both patients and nephrology staff are under pressure to seek living donors.

Methods and results

We studied 135 living kidney donors in ten years period: 85 females and 50 males; 78 (57.8%) were of Indian origin, 33 (24.4%) Black, 15 (11.1%) White and 9 (6.7%) of mixed race groups. The majority of donors (57%) were siblings, while 14.8% were parents, 6.7% children, 17.8% spouses and 3.7% were cousins. The mean age of donors was 34.2 years (range 21-56 years). Donors were hospitalised for a mean period of 6.1 days (range 3-15). Post-operative complications were left lobe atelectasis and chest infection in 11.1 %, other infections in 5.2%, pneumothorax in 2.2%, ileus in two cases, depression in one and prolonged pain at the site of surgery in 11.1%. Proteinuria was noted in three cases (0.26 gm/d and 0.66 gm/d in two donors at 2 years and 0.27 gm/d in the third case at 10 years).

Blood pressure levels were virtually unchanged from pre-nephrectomy data.

Conclusion

This study confirms that unilateral nephrectomy in normal individuals is associated with few major

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adverse effects and living donors in renal transplantation is a viable option.

Key words: follow-up; kidney donors; uni-nephrectomy

Introduction

The shortage of cadaveric donors with increasing patients on dialysis population is a world-wide problem. This has encouraged the use of living kidney donors especially in view of the reported negligible morbidity and mortality in addition to improved graft survival.

There is a marked shortage of cadaveric donors in South Africa (Table 1) and more so in our province of KwaZulu / Natal (Table 2). Therefore the transplantation team at our centre has to seek living donors.

Table 1. Renal transplantation in South Africa (1994)

Number of transplant Centers	8
Number of functioning transplants	1578
Number of transplants in 1994	299
cadaver	253
living donors	46
Transplant rate	8.7 pmp

Table 2. Renal transplantation in Zulu/Natal (1987-1996)

Related donors	107 (44.4%)
Living unrelated donors	27 (11.6%)
Cadaveric donors	106 (44%)
Total	240

Our renal transplant unit at Addington Hospital, Durban is the only facility serving the public sector in the province of Kwa Zulu / Natal. Both our Center and a private transplant unit serve a population of approximately 7 million.

Materials and methods

One hundred and thirty five adult living kidney donors in a ten year period from 1987-1996 were reviewed. The initial assessment of these potential donors included ABO and HLA typing, B & T lymphocyte matching with their recipients. Detailed assessment was done by a physician, psychologist and social worker.

Laboratory and radiological investigations included: Complete blood picture, chemistry, urine analysis, urine culture and creatinine clearance, measurement of 24 h. urine protein, Tc 99 m DTPA GFR, chest radiography, pyelogram and renal angiography. Left nephrectomy was preferred because of the longer length of the left renal vein. Multiple arterial supply to the left kidney was missed on angiography in 10% of donors and was not a contra-indication to harvesting the left kidney and up to three renal vessels were accepted for transplantation. In-dwelling urethral catheter was removed after 24 hours and the donors were then mobilised.

Twenty one donors required intra-operative blood transfusion, ranging from 1 to 6 units of packed red cells with a mean of 2 units. Post-operatively annual evaluation of donors was done including blood pressure level and renal function.

Results

The evaluation of donors was stringent with 37% of potential donors were accepted as kidney donors at our centre [1].

The majority (57.8%) of donors were of Indian origin and 85 (63%) were female (Table 3). The mean age was 34.2 years.

Table 3. Donor profile

Sex	85 female, 50 male	
Age	34.2 years (range 21-56 years)	
Race	indian	78 (57.8%)
	black	33 (24.4%)
	white	15 (11.1%)
	"mixed"	9 (6.7%)

Seventy seven (57%) were sibling donors. 20 (14.8%) of donors were parents, 9 (6.7%) donated to their parents (Table 4); 24 were spouses donors and 5 were cousins.

Table 4. Donor-recipient relationship

Sibling	female	77 (57%)
	male	45
Parent to child		32
		20 (14.8%)
Child to parent	female	14
	male	6
Spouses		9 (6.7%)
		24 (17.8%)
Cousins	wives	20
	husbands	4
		5 (3.7%)

The mean duration of hospitalisation of donors was 6.1 days with a range of 3-15 days. Uncomplicated donor nephrectomies resulted in a mean hospital stay of 5.1 ± 1.2 day compared to 6.9 ± 2.7 day ($p = 0.0002$; unpaired t-test). Twenty two donors (16.3%) suffered infective complications post-operatively, primarily chest infection in smokers (11.1%); 15 (11.1%) developed surgical complications: 3 donors had pneumothorax, requiring a chest drain; 2 developed post-operative ileus which resolved after 48 hours of intravenous fluids. Prolonged pain at the site of the nephrectomy scar persisted for several months (range 2-12) in 10 donors, requiring prolonged analgesia and psychological support.

One donor became acutely depressed in the immediate post-operative period. There was no post-operative mortality and no donors required intensive care. All donors returned to their full employment post-operatively.

Table 5. Post-operative complications

	N	%
Infection	22	16.3
- chest infection	15	11.1
- mild wound sepsis	3	2.2
- lower urinary tract infection	4	2.9
Surgical	15	11.1
- ileus	2	1.5
- pneumothorax	3	2.2
- prolonged pain	10	7.4
Acute depression	1	0.7

One hundred and two donors were attending follow-up clinic for 1-10 years while 20 have a follow-up period of less than one year and 13 have been lost as the majority of these were from other provinces or countries. The mean rise in serum creatinine was 33.4% in the follow-up period and was within the normal laboratory reference range.

The mean systolic blood pressure was 118.7 mmHg pre-operatively and 119.1 mmHg at follow-up ($p=0.76$) while the mean diastolic blood pressure was

74.6 mmHg pre-operatively and 71.8 mmHg at follow-up ($p = 0.01$; students paired t-test); this blood pressure may be a reflection of donors age (mean age of 34.2 years).

Proteinuria ranging from 0.19 to 0.66 grams was found in 3 donors: donor AH was noted to have proteinuria of 0.26 grams and creatinine clearance of 76 ml/min at 2 years and 0.19 grams and 145 ml/min at 5 years; donor MH developed proteinuria of 0.66 grams at 2 years during pregnancy which resolved completely following delivery; donor SN was noted to have a pre-nephrectomy urine protein excretion of 0.06 grams, which increased to 0.2 grams at 7 years and 0.27 grams at 10 years and was associated with a creatinine clearance of 134-167 ml/min compared to a post nephrectomy baseline of 87 ml/min. These donors require careful long-term follow-up and assessment.

One donor sustained an inferior myocardial infarct 5 years after donation with full recovery. Two donors died of cancer after 6 years and 10 years of follow-up.

Discussion

Currently in renal transplantation living-related donation is most successful. Cadaveric kidneys are inadequate to meet the increasing demands, thus it became mandatory to search for other sources as living unrelated donors or non-heart beating donors. Short-term studies have shown that glomerular filtration rate and renal blood flow increase by 40 to 60% within a few weeks of nephrectomy (2-4). These changes are not accompanied by proteinuria or hypertension [5]. Renal hyperfiltration and hypertrophy are not associated with adverse effects over 10 to 20 years of follow-up (6-9). Albuminuria was reported in 7.8% and microalbuminuria in 36.6% of donors in Brazil 1 to 14 years after nephrectomy [10]. The prevalence of hypertension at 19.2% was similar to that of the general population.

Najarian et al [11], showed in their study 21-29 years after kidney donation, that the frequency of hypertension in the donors was 32%, similar to that in the general population, and the incidence of proteinuria was 23%, comparable to 22% in their siblings. They also estimated a peri-operative donor mortality of 0.03% in the USA. Moreover, higher prevalence of hypertension or renal failure was not found 45 years after uni-nephrectomy in subjects who lost a kidney due to trauma in the second World War [12].

Eighty five percent of kidney donors were alive after 20 years of follow-up in Sweden [13], whereas the expected survival rate was 66%. The causes of death were chiefly due to cardiovascular disease and cancer; there was no death due to renal disease. Hypertension was present in 35% of donors in this study; 20% had serum creatinine exceeding 120

umol/l and the average GFR was 48 ml/min/ 1.73 M2 (these subjects were all aged 75 years or older).

Our study supports current literature data that unilateral nephrectomy in normal individuals is associated with few major adverse effects and living kidney donation is a viable option. Longitudinal follow-up of kidney donors for 30-40 years is required to be absolutely certain of the long term safety of kidney donation as suggested by Provost and Brenner [14].

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Acknowledgements

We wish to thank Mrs E Shepherd for secretarial assistance.