

LONG TERM FOLLOW-UP OF KIDNEY DONORS



Urology

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ABSTRACT

Renal transplantation is the standard of care for patients with end-stage renal disease. There is concern regarding long-term health status of living kidney donors. A retrospective study of kidney donors who have donated kidneys three or more than three years are included in the study for the past 10 years. All donors are evaluated with 24hr creatinine clearance, urinary protein excretion, ultrasound abdomen, DTPA renogram, QOL and Psychosocial impact was assessed by SF-36 and HADS questionnaires. A total of 60 patients are included in the study, mean age of donors at donation was 37.8 years. All donors were normotensive at the time of donation and 6 were detected to have developed hypertension at follow up. None has renal failure, eight donors developed proteinuria, and mean increase in renal length was 1.09cm. The quality of life in donors was almost similar in all age groups. We conclude that living kidney donation is a safe procedure with minimal complication rate in the long-term follow-up.

Introduction:

Renal transplantation is the standard of care for patients with end-stage renal disease. It offers survival and cost effective benefit compared to deceased renal transplantation. Due to poor outcome on long term dialysis¹ and limited number of availability of deceased kidneys, live related kidney remains the main mode of renal transplantation. Graft survival rates are better with preemptive transplant than those having pretransplant dialysis.^{4,5,6,7}

Live kidney donation offers better patient and graft survival. However, ethical issues impose most rigid selection process to avoid harm to donors, to maximize benefits to both recipient and donor. Because of this the short-term complications are minimal for donor. There is concern regarding long-term health status of living kidney donors.^{2,3,17}

Long-term health status of people who donated kidneys for renal transplantation in our centre was assessed for effects on renal function, development of proteinuria, obesity, blood pressure and psychosocial impact after kidney donation.

Materials and methods:

A retrospective study of kidney donors who have donated their kidneys three or more than three years are included in the study. Sixty people were included in the study.

All donors are evaluated with detailed clinical history. On physical examination weight, height, BMI were calculated, vitals and blood pressure were recorded. Laboratory examination included serum electrolytes, random blood sugar, blood urea, serum creatinine, complete hemogram, lipid profile, serum uric acid and complete urine examination were performed. Twenty four hour creatinine clearance and urinary protein excretion were estimated. ultrasound abdomen was performed to estimate the size of left over kidney, DTPA renogram was done to estimate its GFR.

The above parameters were compared with predonor nephrectomy values. Psychosocial evaluation and quality of life after donation were evaluated by SF-36 health survey questionnaire and hospital anxiety and depression scale.

Results:

Mean age of donors at donation was 37.8 years and the age at follow up was 46.4 years. Duration of the follow up is in the range of 4-10 years

Table 1: Age distribution of the donors

Age range (years)	Living renal donors	
	At donation	At follow up
20-29	10	4
30-39	20	8
40-49	28	18
50-59	2	26
60-69	0	4

Out of 60 donors, 41(70%) were females and 18(30%) were males. Parents donated in 24(40%) (16 mothers and 8 fathers). Donation between siblings in 12(20%) and 8 were offspring's (13%). sixteen donors (26%) were spouses (6 husbands and 10 wives) who have donated their kidneys.

Table 2: weight gain and BMI

Donor characteristics	Living renal donors	
	At donation	At follow up
Mean weight in Kg	51.2	56.6
Mean BMI(kg/m ²)	23.4	25.3

Mean weight of the donors at donation was 51.2kg and 56.6 kg at follow up. Two donors became obese with a BMI of 31 and 30.4 respectively.

Table 3: cardiovascular status

Blood pressure	Living renal donors	
	At donation	At follow up
Normotensive	60	48
Hypertensive	0	12

All donors were normotensive at the time of donation and 12 were detected to have developed hypertension at follow up and was statistically significant (p<0.011)

Table 4: renal function

Renal function	Living renal donors	
	At donation	At follow up
Mean S.creatinine(mg/dl)	60	48
Mean S.uric acid (mg/dl)	0	12
Proteinuria (mg/24hr)		
• 150	0	10
• 300	0	6

Mean renal size (cm)	9.42	10.51
DTPA Mean GFR(ml/min)	107.2	76.8

The average serum creatinine pre donation was 0.95 mg/dl and was 1.02mg/dl at follow up (P=0.094). None of the donors had renal failure.

sixteen donors developed proteinuria, out of which 6 developed overt proteinuria (>300mg/dl) and all of them were females. There was strong correlation between proteinuria and hypertension as all 10 donors who developed hypertension had proteinuria.

There was a significant reduction in mean GFR of about 30.4ml/min after nephrectomy (p<0.0001) however there was no significant change in serum creatinine. There was a mean increase in renal length of 1.09cm which is statistically significant (P<0.0001).

Table 5: quality of life SF-36 scores

Donors	PF	RP	BP	GH	VT	SF	RE	MH
Age	94	96	94	80	68	92	93	88
<40 yrs	90	87	76	74	70	93	90	90
>40yrs								
Time since donation	91	90	77	73	67	94	93	81
<7 yrs	90	88	76	72	69	92	89	80
>7 yrs								
Sex	94	92	76	75	76	92	89	80
Males	91	88	72	71	72	78	77	76
Females								

PF: physical functioning, RP: Role physical, BP: Bodily pain, GH: General health,

VT: Vitality, SF: Social functioning, RE: Role emotional, MH: Mental health

The quality of life in donors was almost similar in all age groups. When analyzed by donor-recipient relationship parents who donated to their children had the best scores. In female donors, the scores of mental health, social functioning and role were lesser than the male donors.

Hospital anxiety and depression scale (HADS):

Table 6: Anxiety scale:

HADS score	Age		Sex		Time since Donation	
	<40yrs (n=30)	>40yrs (n=30)	Male (n=18)	Female (n=42)	<7yrs (n=30)	>7yrs (n=30)
0-7 (normal)	28	24	16	36	26	26
8-10 (border line)	2	6	2	6	4	4
11-21 (abnormal)	0	0	0	0	0	0

eight donors found to have borderline abnormality on anxiety scale, 6 of them were female and they were more anxious about their kidney function in the long term.

Table 7: Depression scale:

HADS score	Age		Sex		Time since Donation	
	<40yrs (n=30)	>40yrs (n=30)	Male (n=18)	Female (n=42)	<7yrs (n=30)	>7yrs (n=30)
0-7 (normal)	28	22	16	34	28	22
8-10 (border line)	2	6	2	6	2	6
11-21 (abnormal)	0	2	0	2	0	2

Overall 9 donors have lost their recipients, two of them was in severe depression and the seven were having borderline mood disorder. One

donors kidney got rejected in the post operative period and he was also in the borderline mood disorder.

Discussion

Kidney donation is a relatively safe procedure with little morbidity and no mortality. Developing countries have and will continue to rely on living kidney donation.^{2,10-15} there is limited data from India on general health and psychological impact among kidney donors in the long term.

We contacted 150 donors who underwent surgery at our institute out of which only 60 donors who donated three or more than three years participated in this study.

In our study renal function in the follow up period was normal, even though there was insignificant high serum creatinine and significantly low GFR. Overall 20% became hypertensive and were under treatment.

our study majority were females. Six donors conceived after donation and none had pregnancy related complications. Nephrectomy is safe in both sexes and in females nephrectomy is not detrimental to the outcome of pregnancy.¹⁶

Age at donation could affect renal function due to the age related physiological changes in the kidney. Donors above 50 years of age were reported to have a higher mean serum creatinine in a study by Ringden et al¹⁷. Effect on hypertension and proteinuria are conflicting with few studies showing significantly increased prevalence in donors >55 years while other study by Bock et al showing no such effect.¹⁸

Mean donor age in our study was 37.8 years as compared to other studies, which may explain the lower incidence of hypertenSion.^{2,10-13}

Most of the studies showed a statistically non significant trend of increased blood pressure after donation. In a meta analysis by Boudville et al there was 5mm Hg increase in blood pressure with 5 to 10 years of donation over that anticipated with normal aging.¹⁹ In contrast, in a study performed by Eberhard et al 29 % of 29 donors developed hypertension at 11.13 ± 8 years of follow up.²⁰ In our study 12 (20%) donors developed hypertension and six of them had family history of hypertension and they were aged more than 40 years at the time of donation.

Proteinuria is a marker of renal disease and its Progression. A meta-analysis by Garg et al showed incidence of proteinuria is 12% after donation.²¹ But higher grade of proteinuria (>300mg/24hr) was infrequent and only seen in 5% in a study by Rizvi et al.²² In our study, proteinuria was seen in 16(27%) donors and 6(10%) of them had proteinuria >300mg/ 24 hours. ten donors who had developed hypertension post donation had proteinuria.

It is well established that reduced renal mass is a risk factor for hyperfiltration and resultant loss of renal function in the remnant kidney. A meta-analysis by Kasike et al showed a decline of GFR by 17 ml/min post donation.⁸ A study by Manisha et al showed mean GFR pre and post nephrectomy was 102.74 ml/min and 74.ml/min.²³ In our study decline of GFR was 30.4ml/min at 4 to 10 years of follow up. The mean increase in creatinine as reported in many studies was not significant. In our study mean serum creatinine post donation was 1.02 mg/dl with statistically insignificant increase (0.07mg/dl) which was comparable to other studies.²¹

Although studies are equivocal regarding renal function, majority show an overwhelming positive psychosocial response to kidney donation. In a Norwegian study of 1800 kidney donors, the donors were shown to have a better QOL and less than 1% regretted donation.⁸ Few other studies suggested that donors were at risk of developing Psychiatric disorders, and 1-5% of donors would not donate again; up to 5% suffer from long-term mental problems and

with health. Consequently, some authors suggested monitoring donors for their psychosocial variables.^{12,24} In our study donors QOL and Psychosocial impact was assessed by SF-36 and HADS questionnaires. Most of them (80%) reported better quality of life and it persisted for years and they said that they would make the same decision again, and would strongly encourage others to donate which was consistent with other published reports.^{25,26}

Over all 10(16.6%) donors were dissatisfied as nine of them had lost their recipients and one with graft failure. In female donors quality of life was impaired in the areas of "role emotional", "social functioning" and "mental health" in our study. Reimer et al reported similar findings in 12.5% of the donors. There have been some reports of depression and disrupted family relationships after donation, and even a suicide after recipient's death.¹² One donor in our study was severely depressed due to death of her recipient.

Conclusion

We conclude that living kidney donation is a safe procedure with minimal complication rate in the long-term follow-up. With the exception of mild proteinuria of unknown clinical significance, unilateral nephrectomy for donation is not associated with adverse effects on kidney function. Over all most of the donors showed better quality of life and psychosocial well being.

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Conflicts of interest

There are no conflicts of interest.

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