



Research Article

DEMOGRAPHIC AND CLINICAL PROFILE OF KIDNEY DONORS

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ABSTRACT

Over the years it has been observed that there is a predominance of female to male donations in living donor (LD) kidney transplantation. Factors like age, gender, familial predisposition influence donors renal function and hence the outcome of renal transplant recipient [2]. In a resource limited setting like India, it is important to understand the risk involved in renal donation. Our present study aims to outline the demographic profile and post operative followup in terms of proteinuria, hypertension and serum creatinine at 1, 3 and 6 months of nephrectomy.

We observed a significant increase in the amount of volunteer renal donations almost doubling every year. Majority (78%) of the donors were females while males contributed to 21.8 % of renal donations. We observed that mothers contributed to be the highest number of donors accounting for 181 donations (n=600) followed by wives which contributed to 102 of renal donors (n=600), 98 (16.3%) fathers donated to their children.

We observed a rise of 9.66 mmHg in MAP (mean arterial pressure) (p<0.05). In our study, we found hypertension in 55 post-nephrectomy (p<0.05) at 6 months followup. 50 % of donors who had family history of hypertension, became hypertensive.

None of the donors had microalbuminuria pre-nephrectomy, none of the donors developed proteinuria on followup at 1, 3 and 6 months. None of the donors had mortality at 6 months followup.

This study highlights the demographic characteristics and clinical profile of renal donors from a tertiary care center in a developing nation.

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INTRODUCTION

Disparity between supply and demand of donor organ in order to meet the needs of the growing number of cases of end stage renal disease (ESRD) patients who are awaiting renal transplantation motivates donation from living donors. [1] Factors like age, gender, familial predisposition influence donors renal function and hence the outcome of renal transplant recipient [2]. In a resource limited setting like India, it is important to understand the risk involved in renal donation. Our present study aims to outline the demographic profile and post operative followup in terms of proteinuria, hypertension and serum creatinine at 1, 3 and 6 months of nephrectomy.

MATERIALS AND METHODS

This was an observational study conducted at Mahatma Gandhi Medical college and Hospital and included all 550 Renal donations from 2013 to May 2018. Pre operatively, we noted medical history including donor age at nephrectomy,

relationship to patient, family history of hypertension, diabetes, renal disease, other illnesses, Body Mass Index and pre nephrectomy blood pressure were recorded.

We recorded Blood pressure readings from up to three separate time points during the donor evaluation. Family history of coronary heart disease, hypertension, diabetes mellitus, renal failure, stroke in the donor's first degree relatives was recorded.

Obesity was defined as a body mass index (BMI) ≥ 30 kg/m². Glucose intolerance was defined as a fasting blood glucose >100 mg/dL and HbA1c more than 6.4%. Hypertension was defined as a systolic blood pressure (SBP) ≥ 140 mmHg, or a diastolic blood pressure (DBP) ≥ 90 mmHg, the use of anti-hypertensive medications.

Evaluation of renal function included pre- and post-nephrectomy urinalysis for the detection of microalbuminuria by immunoturbidimetric assay, measurement of creatinine was done in our study by modified JaffeEs method and urea by urease method. GFR estimation was done by MDRD GFR equation.

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RESULTS

We observed in our study that the number of renal transplant rates increased every year substantially. Number of renal donations were 24 in 2013, 48 in 2014, 98 in 2015, 128 in 2016, 141 in 2017 and 101 donations till May 2018. Total number of renal donation till May 2018 being 550, out of which 97.4 % (535) were living donors and 2.6 % donations were deceased.

Females were the majority of donors accounting for 78.16% of donations while male donations were 21.8%.

Mean age of donors in our study was 44.0 +/- 11 years at the time of renal donation. Mean BMI of the donors was 21.4 +/-0.06.

Overall, 60% of living kidney donors were biologically related to their recipient.

Mothers contributed to be the highest number of donors 165 (n=550) followed by wives which contributed to 93 (n=550), 89 (16.3%) fathers donated to their children followed by 15.0 % donations by siblings.

Family history of hypertension was present in 14 % (n=550) and family history of diabetes in 10% (n=550), none had renal disease in the family.

Pre and postnephrectomy: (follow up 1, 3 and 6 months)

Hypertension: We observed that there was a rise of 9.66 mmHg in MAP (mean arterial pressure) ($p<0.05$). Hypertension was noted in 55 post-nephrectomy ($p<0.05$) at 6 months followup. 50 % of donors who had family history of hypertension, became hypertensive by end of 6 months follow up (n=77)

Diabetes mellitus: None of the donors developed Impaired glucose tolerance or frank diabetes mellitus post 6 months followup of donor nephrectomy

Renal functions

Proteinuria: None of our donors had microalbuminuria in pre operative work up. At the end of 1, 3 and 6 months followup none of the donors developed proteinuria in the form of microalbuminuria estimation.

Glomerular filtration rate (GFR): We observed that there was a reduction of 12 ml/min in GFR after nephrectomy ($p<0.05$) with no significant change in serum creatinine at the end of 6 months follow up post transplant.

DISCUSSION

Over the years it has been seen that renal transplant is the preferred treatment of choice for End stage Renal Disease. The increasing number of patients reaching ESRD has intensified the demand for the expansion of kidney donor pool. Various factors like age, gender and familial predisposition have been known to influence renal function in donors. This study was done to evaluate the demographic profile, clinical characteristics of renal donors

Gender: 78 % of renal donors in our study were females. Indicating that majority of the females were self volunteers for kidney donation. This is important since majority of them were mothers, wife or sisters representing the emotional self willingness to donate.

Age: at donation could adversely affect renal function secondary to the physiological changes in the kidney. Mean age of donors in our study was 44.0 ± 11 yrs. In a study by Ringel *et al*, they found that donors above 50 years of age were reported to have a higher mean serum Creatinine ($p>0.05$). A study done by Bock *et al* showed that donor age had significant effect on the prevalence of hypertension and proteinuria.

Donor Relation with Recipient

We found that females outweighed males in terms of volunteer kidney donation. Mothers contributed to majority of the donors with 30 % donations followed by wife contributing to 17 % of donations. 16.3 % fathers donated to their children and 10 husbands donated to their wife.

This has significant relevance since it shows the willingness of female donors specially mothers and wife for organ donation.

Proteinuria: Proteinuria may be an useful and early marker for renal dysfunction. In a meta-analysis by Bock HA *et al*, they observed that of 3100 donors and 1700 controls proteinuria was no different from that observed in controls at 20 years follow up. There have been few studies that have reported an increased prevalence of proteinuria with increasing donor age and the time elapsed since nephrectomy. [4] In our study, none of the donors had microalbuminuria pre-nephrectomy, none of the donors developed proteinuria on followup at 1, 3 and 6 months.

Short time follow up of 6 months in our study may be a limiting factor in this context.

Hypertension: 9.1 % of renal donors developed hypertension post nephrectomy after a mean period of 6 months. This can be explained by the fact that donor nephrectomy post operatively, is associated with an increase in filtration in the remnant kidney and one of the markers of hyperfiltration damage is evidence of systemic hypertension. It has also been observed that donors may have a slight rise in BP post-nephrectomy. On the other hand it is an established fact that the kidney has an enormous functional reserve and loss of upto 50% nephron mass does not have any ill effects. The studies on post nephrectomy increase in blood pressure have also not shown consistent results. In a study done at the Mayo clinic 24 mildly hypertensive donors had no adverse effects on BP at 1 year of donation follow up.

Glomerular filtration rate: We observed that there was a reduction of 12 ml/min in GFR after nephrectomy ($p<0.05$) with no significant change in serum creatinine at the end of 6 months follow up post transplant.

A study by Kasike *et al* [6] showed that there was a decline in GFR by 17 ml/min immediately post nephrectomy. When these patients were followed up they found that there was a stabilization of GFR with subsequent rise by 1.4 ml/min/decade. A study done by Lennerling *et al* concluded that kidney donation is unsafe with pre nephrectomy GFR of <80 ml/min.[6] The mean increase in creatinine as reported in most studies is 0.3 mg/dl, which is not significant. The risk of renal failure in donors is negligible and is reported as 0.2- 0.5%. [6]

Mortality: In our study none of the donors had mortality at 6 months followup of donation. Data on long term mortality were first presented by Ferhman *et al* in 1997 in which the

ratio of observed to expected mortality was 0.76 as compared to a background population.[7]

COCLUSION

This study highlights the demographic characteristics and clinical profile of renal donors from a tertiary care center in a developing nation . Such studies are needed to generate awareness on organ donation and increase the pool for organ transplant.

Table 1 Total number of renal donors with gender characteristics

Total no. of Renal Donors	N = 550	Percentage (%)
Live Donors	535	97.50%
Cadaver	15	2.50%
Female	429	78.16%
Male	119	21.83%

Table 2 Relationship of Renal Donor with recipients

Mother	165	30.00%
Wife	93	17.00%
Husband	9	1.66%
Father	89	16.30%
Sibling (sister/ brother)	83	15.00%
Mother in Law	41	7.50%
Father in law	4	0.80%
Son/ Daughter	3	0.50%
Others (swap/ Sister in law/ Brother in law / aunt / cousin)	63	10.80%

Table 3 Pre and Post transplant donor characteristics

Parameters	Pre transplant	Post Transplant 1 month	Post Transplant 3 month	Post Transplant 6 month
Systolic BP	118± 6	122 ± 1	124± 1	127± 1
Diastolic BP	77 ± 4	80 ± 2	82 ± 2	84 ± 2
GFR	100.7 ± 0.9	80± 1.1	84± 1.1	88± 1.2
Creatinine	0.87± 0.09	1.28 ± 0.06	1.18± 0.06	1.1± 0.04
Hypertension (n=550)	5	0	0	55
Overt Proteinuria	none	none	none	none

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