

ORIGINAL ARTICLES

CHANGES IN RENAL FUNCTION TEST FOLLOWING KIDNEY DONATION

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Abstract:

Objectives: The aim of this study was to find out any Changes in renal function test following kidney donation.

Materials and Methods: A Hospital based prospective study was conducted in the Department of Urology of Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh from April 2011 to September 2012. Investigations included specific gravity and urinary microalbumin, serum creatinine. According to inclusion and exclusion criteria a total of 37 donors were enrolled in this study. Subsequent follow up were taken at the end of three months, six months and nine months. Data were evaluated by Paired t-test, Significance was defined p value < 0.05.

Results: The age range varied from 25 to 39 years and 45.9% of patients belonged to 25-30 years and male to female ratio was 1:2.4. The mean baseline specific gravity was 1016.97 ± 8.03 , serum creatinine 1.03 ± 0.24 . The baseline urinary micro albumin was found nil and subsequent 1st, 2nd, and 3rd follow up were also nil. The mean difference of specific gravity, urinary micro albumin, and serum creatinine (mg/dl) were almost consistent between baseline and the subsequent follow-up, no statistical significant ($P > 0.05$) was found between baseline and the subsequent follow-up.

Conclusion: Renal function test of the remaining kidney in living donors does not significantly change after donor nephrectomy.

Key words: Kidney donation, Renal Function,

Introduction

Kidney transplantation is a standard treatment for patients with end-stage renal disease and which confers a survival benefit and is cost effective compared with haemodialysis. Living kidney donation is the main source in many countries, because the outcomes of cadaver transplantations are poor[1].

The inadequate supply of deceased donor kidneys is one of the factors to increase the number of living donor kidney transplants. The advantages of living donor renal

transplantation compared with deceased donor renal transplantation are better for graft survivals, less recipient morbidity, specific planning of the operation.

Renal function is thoroughly evaluated before live kidney donation. Potential kidney donors are also evaluated before donation. However, owing to increased demand for organs, some kidney transplant centers are becoming more willing to accept the living donors with regard to increase age, obesity, or low/normal glomerular filtration rate[2].

Living donor kidney transplantation provides superior allograft function for the recipients with a low risk of complications such as hypertension and chronic kidney disease for donors[3].

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Studies after live donor nephrectomy suggest that the long-term risk to the donor of developing end-stage renal disease is similar to the general population. The long-term safety of nephrectomy depends on careful screening to identify healthy donors with excellent renal function and a low likelihood of developing progressive disease in the remaining kidney[4].

Live donor kidney transplantation has excellent result for patient and graft survival with advances in immune-suppression and medical management. Follow-up studies of the live donors indicate that kidney donation is currently a safe procedure with low morbidity and mortality[5].

The major reasons leading to improved outcomes are more potent due to selective immunosuppression, better surgical techniques, more sensitive cross-matching and better prophylaxis and treatment of morbid infections. There is also an emerging consensus that preemptive transplantation, immediately prior to the need to dialysis, is advantageous in reducing morbidity and mortality[6].

The present study is designed to find out any Changes of renal function test following unilateral kidney donation.

Materials and methods

A Hospital based prospective study was conducted in the Department of Urology of Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh from April 2011 to September 2012, to find out Changes of renal function test following kidney donation in whom renal functions were within normal limit prior to donation. History, clinical examinations and investigations are necessary to identify the potential complications and outcomes. Investigations were included specific gravity from routine microscopic examination of urine and serum creatinine. Inclusion criterion for the present study was – all donors who were suitable for kidney donation and exclusion criterion was those who did not give consent to enter into this study. According to inclusion and exclusion criteria a total of 37 donors were enrolled in this study. Then purposive sampling was applied to collect sample from all kidney donors or participants by inclusion and exclusion criteria. By seeing the dependent variable of donors from investigations reports which were done in the various government hospitals or recognised private clinics. In analyzer machine, serum creatinine was estimated by enzymatic method using picric acid containing reagent. Total 37 donors were collected by this technique in our study period.

Subsequent follow up were taken at the end of three months, six months and nine months following nephrectomy

- 1) Specific gravity from routine microscopic examination of urine
- 2) Micro albumin from examination of urine
- 3) Serum creatinine

Result

A total of 37 Donors were included in this study. Majority number of Donors were found belonged to 25-30 years. The mean age was found 31.41 ± 3.99 years with range from 25 to 39 years. Male was found 29.7%(11) and female was 70.3%(26). Male female ratio was 1:2.4. (Table I).

Table I

Age and sex distribution of the respondents(n=37).

	Number of Donor	Percentage
Age (in years)		
25-30	17	45.9%
31-35	12	32.4%
36-40	8	21.6%
Mean \pm SD	31.41	± 3.99
Range (min-max)	(25	-39)
Sex		
Male	11	29.7%
Female	26	70.3%

Table II shows the specific gravity of the urine to assess the renal function. Before transplant the mean specific gravity of urine was found 1016.97 ± 8.03 , 1st follow up specific gravity was 1014.02 ± 6.57 , 2nd follow specific gravity was 1017.4 ± 6.9 and 3rd follow up specific gravity was 1015.64 ± 5.75 . The difference was not statistically significant ($P > 0.05$) between different follow up in paired t-test. The mean of serum creatinine (Table III) before transplant was found 1.03 ± 0.24 , 1st follow up serum creatinine was 0.96 ± 0.22 , 2nd follow up serum creatinine was 1.09 ± 0.22 and 3rd follow up serum creatinine was 1.0 ± 0.21 . The difference was not statistically significant ($P > 0.05$) between different follow up in paired t-test.

Table IV shows estimation of renal function by microalbumin of urine. The baseline microalbumin of urine was found nil and subsequent 1st, 2nd, and 3rd follow up did not show significant change.

Table II
Distribution of respondents according to specific gravity (n=37)

Specific Gravity	Mean \pm SD	(Min	-max)	P
Before transplant	1016.97 \pm 8.03	(1003	-1029)	value
1 st follow up at the end of 3 months	1014.02 \pm 6.57	(1003.17	-1025.15)	0.088 ^{ns}
2 nd follow up at the end of 6 months	1017.4 \pm 6.9	(1006.36	-1027.9)	0.805 ^{ns}
3 rd follow up at the end of 9 months	1015.64 \pm 5.75	(1006.02	-1025.58)	0.415 ^{ns}

Table III
Distribution of respondents according to serum creatinine (n=37)

Serum creatinine (mg/dl)	Mean \pm SD	(Min	-max)	P value
Before transplant	1.03 \pm 0.24	(0.6	-1.4)	
1 st follow up at the end of 3 months	0.96 \pm 0.22	(0.6	-1.4)	0.195 ^{ns}
2 nd follow up at the end of 6 months	1.09 \pm 0.22	(0.7	-1.4)	0.266 ^{ns}
3 rd follow up at the end of 9 months	1.0 \pm 0.21	(0.6	-1.4)	0.569 ^{ns}

Table IV
Distribution of respondents according to microalbumin of urine (n=37)

Microalbumin of urine	Findings	Number of patients	Percentage
Baseline	Nil	37	100%
1 st follow up at the end of 3 months	Nil	37	100%
2 nd follow up at the end of 6 months	Nil	37	100%
3 rd follow up at the end of 9 months	Nil	37	100%

Discussion

In this current study it was observed that majority number of donor belonged to 25-30 years and the mean age was 31.41 \pm 3.99 years with range from 25 to 39 years. Similarly, Azar et al. showed the mean age at the time of donation was 28.97 \pm 4.75 years with range from 18 to 47 years, which is comparable with the current study. In another study a higher mean age observed by Chien et al. where the investigators found mean age was 45 years with range from 23 to 68 years at the time of kidney donation. Freedland et al.[7] and Reese et al. found the mean age were 39.0 \pm 9.0 years and 39 \pm 10 years respectively at the time of donation. The higher age range may be due to increased life expectancy in their study donor. Younger donors exhibit a capacity for hyperfiltration that remains for several years, whereas renal function declines in the elderly.

In this current series it was observed that male and female donors were found 29.7% and 70.3% respectively, where male to female ratio was 1:2.4,

which indicates that female donor is predominant. Similarly, Gossman et al.[8] found 29.0% male and 71.0% female. Similar observations regarding the female predominant donor were also made by Freedland et al. and Reese et al. On the other hand, Azar et al. showed male predominant, where the authors found 67.5% male and 32.5% female.

Hamza et al. [9] found that renal function parameters such as serum creatinine, showed a relevant increase between 12 and 18 hours after donor nephrectomy. The time to increase differed slightly between individual parameters. At day 4, there was no significant difference between the initial and final values, except urine α 1 microglobulin, which indicates an impaired tubular function. In this study it was observed that the mean baseline serum creatinine was 1.03 \pm 0.24 mg/dl varied from 0.6 -1.4 mg/dl, 1st follow up it was 0.96 \pm 0.22 mg/dl varied from 0.6 -1.4 mg/dl, 2nd follow up it 1.09 \pm 0.22 mg/dl varied from 0.7 -1.4 mg/dl and 3rd follow up it was 1.0 \pm 0.21 mg/dl varied from 0.6 -1.4 mg/dl. The mean

difference was not statistically significant ($P>0.05$) between different follow up, that indicates serum creatinine level were almost consistent during baseline and the subsequent follow-up, which are similar with Mjoen et al. and Nozaki et al. [10]. In another study Chien et al. [11] showed mean serum creatinine before kidney donation 0.90 with range from 0.58 to 1.40 mg/dl; Day 2 after kidney donation it was 1.31 with range from 0.80 to 1.90 mg/dl and the mean change was +0.4 with varied from +0.1 to +0.7 mg/dl. In another study, Siebels et al. [12] obtained the mean (\pm SD) Creatinine during pre-operative was 0.88 ± 0.12 mg/dl and post-operative was 1.45 ± 0.52 mg/dl. Lind et al [13] reported that serum creatinine in laparoscopic donors was significantly greater than that in open-operation donors at 1 day, 3 months, and 1 year posttransplantation. However, most reports compared donor renal function with both kidneys before nephrectomy with that of the single nondonated kidney after nephrectomy. Such analysis can not demonstrate the actual functional change in the preserved kidney after Laparoscopic donor nephrectomy.

In this current study before transplant the albumin of urine was found nil and subsequent 1st, 2nd, and 3rd follow up were also nil. El-Agroudy et al. [14] and Ibrahim et al. [15] found similar findings in their study but El-Agroudy et al. found 3.4% albumin of urine in long time follow-up.

Conclusion:

This study demonstrates that renal function of the remaining kidney in living donors do not significantly change after donor nephrectomy.

Conflict of interest: None declared.

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