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Assessment Of Live Kidney Donor In Term Of Functional Outcome And Quality Of Life Using Psychometric Analysis

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Abstract

Background: Candidates for living kidney donation accept a variety of risks and advantages when they choose to proceed with nephrectomy. In order to give their consent in this matter, people must first acquire accurate information about the results they consider to be essential to their choice. We determined which outcomes were most significant to living kidney donors and explained their selection criteria.

Aims: The current study aims to investigate the functional alterations in residual kidneys and assess the post-donation quality of life of live kidney donors.

Methods: The Department of Urology was where this study was carried out. The study used a prospective observational design, with some data being gathered retroactively. The donors who underwent donor nephrectomy at IGIMS Patna two years ago were included in the study. Donors were contacted by telephone after a 2-year nephrectomy in this hospital-based study.

Results: In our study, the physical domain of quality of life declined, whereas the psychological, environmental, and social domains all saw improvements. Living kidney donors reported a significant increase in pre and postoperative kidney surface area; preoperative 40.46 cm2 vs. 52.85 cm2, $p<0.0001$. There has been a reported statistically insignificant improvement in overall QOL (3.23 to 3.58, $p<0.0148$). There has been a documented, statistically small rise in health satisfaction (3.1 to 3.53, $p<0.032$).

Conclusion: Our study underlines the necessity of routine follow-up with donors in order to evaluate the effects of donation on physical health, clinical outcomes, and overall QOL.

Introduction

In 1954, the first kidney transplant using live donors was carried out. The first renal transplant was performed between identical twins due to inadequate immunologic knowledge at the time. Transplants from deceased donors are now possible thanks to advances in immunology and the creation of anti-rejection treatment. Renal transplants for individuals with end-stage renal disease give the receiver a sufficient level of renal function and do away with the requirement for dialysis. Various regions of the world perform different numbers of living donor kidney transplants. To reduce risk, the donors should be chosen with extreme caution [1]. Future CKD (chronic renal disease) development should pose the least risk to donors.

Diabetes and hypertension are affecting an increasing number of people as the global population continues to rise as a result of lifestyle changes. Few patients with diabetes and/or hypertension will eventually develop end-stage renal disease (ESRD). The most effective treatment for ESRD at the moment is a kidney transplant. For the benefit of the recipient, live kidney donors are need to undergo surgery and run the long-term risk of developing additional issues. Donor care is crucial during the entire kidney transplant process. Donors of live kidneys need to be protected at all costs [7]. By choosing healthy donors, this can be accomplished. High-quality care should be provided to a donor both during the operation and after, as well as ongoing monitoring to reduce complications. Harm. Long-term, the development of CKD is the biggest worry for healthy donors (chronic kidney disease).

Anxiety, distress, and the presence of a scar may have an impact on kidney donors. Depending on whether the recipient's condition improves or deteriorates after the donation, their psychological health may be influenced in a variety of ways [8, 9].

The aim of the current study is to examine the functional changes that result in residual kidneys utilising noninvasive techniques and to assess the post-donation quality of life of live kidney donors.

Methods

The Department of Urology was where this study was carried out. The study used a prospective observational design, with some data being gathered retroactively. The donors who underwent donor nephrectomy at IGIMS Patna two years ago were included in the study. Donors were contacted by telephone after a 2-year nephrectomy in this hospital-based trial. The Institutional Review Board and Ethics Committee gave their approval for the study's methodology and design.

All patients were explained the nature of the study in their own language and informed consent in patient’s own language been obtained.

The patient was provided with a written consent form that needed to be approved by them. The department of Urology sought adult living kidney donors who were 18 years of age or older. Clinical history and physical exams were performed on the donors. The following details were noted: (a) Case serial number/OPD, (b) Donor's name and NUMBER, (c) Relationship with Recipient, and (d) Donor's Age at Time of Donation.

Inclusion Criteria: include all living kidney donors more than 18 year of age who had given consent

Exclusion Criteria: included donors lost to follow up and donors who had expired.
Before donating a kidney, all donors at IGIMS must undergo the following tests: CBC, KFT, ROUTINE URINE, 24-hour urine protein in patients with proteinuria, USG of the whole abdomen and KUB, and calculation of GFR for each kidney by DTPA scan. All donors who had had donor nephrectomy at IGIMS two years prior were invited to the urology department for the current trial. A complete haemogram, total leucocyte count, urine routine and microscopy, serum creatinine, and 24-hour urinary protein were all examined in kidney donors 2 years after donation to see if proteinuria was present. GFR measurement with DTPA scan and USG of the whole abdomen and KUB. DONOR were assessed regarding the appearance of the scar (wether bothered /not bothered), pain at the scar site (wether present / absent), sense of emptiness at the donation site(wether present / absent), the bulge at the scar site(wether present / absent) at the time of follow-up visit **2 years after kidney donation.**

The following questions ask about how much you have experienced certain things in the last two weeks.

		Not at all	A little	A moderate amount	Very much	An extreme amount
3	To what extent do you feel that physicalpain prevents you from doing what you need to do?	1	2	3	4	5
4	How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
5	How much do you enjoy life?	1	2	3	4	5
6	To what extent do you feel your life tobe meaningful?	1	2	3	4	5
		Not at all	A little	A moderate amount	Very much	Extremely
7	How well are you able to concentrate?	1	2	3	4	5
8	How safe do you feel in your daily life?	1	2	3	4	5
9	How healthy is	1	2	3	4	5

	your physical environment?					

The following questions ask about how completely you experience or were able to do certain things in the last two weeks.

		Not at all	A little	Moderately	Mostly	Completely
10	Do you have enough energy foreveryday life?	1	2	3	4	5
11	Are you able to accept your bodily appearance?	1	2	3	4	5
12	Have you enough money to meet yourneeds?	1	2	3	4	5
13	How available to you is the informationthat you need in your day-to-day life?	1	2	3	4	5
14	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5
				poor nor good		
15	How well are you able to get around?	1	2	3	4	5

Statistical analysis

If the continuous variables were regularly distributed, they were all displayed as mean standard deviation (SD). All other continuous non-normally distributed variables were shown as median (Inter quartile range). The percentages used to express all category variables. Fisher's exact test or the Chi-square test were used to compare categorical variables. The Independent Sample T-test or Mann-Whitney U test was used to compare continuous variables. SPSS version 16.0 was used to conduct the data analysis. Statistics were considered to be significant for any p-values less than 0.05. In the current study, paired t-tests were used to compare WHO quality of life in all 4 dimensions between pre- and post-donation. The haemoglobin (Hb), total leucocyte count, serum creatinine, renal length, renal surface area, and GFR were also compared between the pre-donation and post-donation periods using the paired t test.

Results

40 living kidney donors were enrolled from the Department of Urology, Indira Gandhi Institute of Medical Sciences from January 2019 – June 2021. The mean age (years) of patients was 45.32 (SD 13.18, 95% 41.11-49.54).

Age	
Mean	45.3
SE	2.1
Standard deviation	13.2
95% CI	40.09-50.03
Percentiles	o 25th 33 o 50th 45 o 75th 54

Table 2.

Parameters	Pre op	Post op	P value	Differences
Pre and post op renal length	9.62 ± 0.79	10.74 ± 1.01	< 0.0001	Highly significant
Sr. creatinine, mean, mg/dl	0.77 ± 0.12	0.79 ± 0.16	0.13	Not significant
Pre and post of GFR mL/min/1.73 m^2	48.80 ± 6.40	59.39 ± 13.30	< 0.0001	Highly significant
Haemoglobin gm/dl, mean	11.7± 1.2	11.7± 1.1	0.91	Not significant
TLC count, mean	7629.2 ± 2257.1	7869 ± 2501.2	0.66	Not significant
Pre and post op kidney surface area (cm^2)	40.46 ± 6.96	52.85 ± 8.69	< 0.0001	Highly significant
WHOQOL-bref domains				
Physical domain	15.43 ± 1.09	14.93 ± 1.44	0.082	Not significant
Psychological domain	15.16 ± 1.95	15.89 ± 1.16	0.038	Significant
Social relationship	15.11 ± 1.26	16.29 ± 0.98	< 0.0001	Significant
Environmental domain	14.16 ± 2.18	15.33 ± 1.78	0.010	Significant

Overall QOL	3.23 ± 0.43	3.58 ± 0.79	0.015	Significant
Satisfaction with health	3.1 ± 0.39	3.53 ± 0.85	0.032	Significant

Significant increase in pre and post operative renal length is reported in living kidney donor; preoperative 9.62 vs 10.74, p< 0.0001. Marginal, but not statistically significant increase in Sr. creatine from preoperative of 0.77 mg/dL to post operative 0.79 mg/dL is reported in our study. Significant increase in GFR is reported in living kidney donor; preoperative 48.80 vs 59.39, p< 0.0001. Our study did not report the drop in hemoglobin from base line 11.7 gm/dL to post operative 11.7 gm/dL. Marginal, but not statistically significant increase in TLC count from preoperative of 7629.2 to post operative 7869 is reported in our study. Significant increase in pre and post operative kidney surface area is reported in living kidney donor; preoperative 40.46 cm2 vs. 52.85 cm2, p< 0.0001.
Statistically insignificant decrease in WHOQOL -BREF physical domains is reported in both transformed score (4-20) (15.43 to 14.93, p< 0.082). Significant increase in WHOQOL -BREF Psychological domains is reported in both transformed score (4-20) (15.16 to 15.89, p<0.038). Significant increase in WHOQOL -BREF social domains is reported in both transformed score (4-20) (15.11 to 16.29, p< 0.0001). Significant increase in WHOQOL -BREF environmental domains is reported in both transformed score (4-20) (14.16 to 15.33, p< 0.010). Statistically insignificant increase in overall QOL is reported (3.23 to 3.58, p<0.0148). Statistically insignificant increase in satisfaction with health is reported (3.1 to 3.53, p<0.032).

Discussion

Numerous studies have shown that living organ donors do not experience any appreciable clinical or physical side effects after organ donation [1]. But, especially in underdeveloped nations like India, the impact of organ donation on quality of life is frequently overlooked. We did not discuss the literature from India on measuring the QOL of live-related donors using a standardised questionnaire, with the exception of one study [2]. We did the study to evaluate the functional outcome and quality of life using the WHOQOL-BREF questionnaire on four categories in order to better understand organ donation and its effects on functional outcome and QOL (Physical, Psychological, Environmental and Social domain)

Age: The mean age (years) of patients was 45.32 (SD 13.18, 95% 41.11-49.54). Published literature reported similar mean age of the living donor. 43.2±11.95 (22–65) [2], 42.8 ± 10.6 years (range21–68 years) [3], 41.26 +/- 8.12 years (25-54.16 years) and39 years (range, 25-57) [4]. Higher average age 46.24 ± 9.62 (range 28–65) years of kidney donor is reported by Mehta KS et al.2017[5]

Sex Females constituted to be the highest amongst living donors in published literature. Studies have reported female donors from 56% Sahay[4], 61% M Bieniasz[6], 73% Vemuru Reddy SK[2], and 84%Mehta KS[5]. However, a lower percentage of female donors is reported in one study. Total number of female donors in our study is 30(75%) and total number of male donor is 10(25%). The male to female ratio is 1: 3. The possible reason for the higher percentage of

the female population might be due to social and cultural factors prevailing in developing countries like India

Relationship

Female dominance in organ donation might be explained by the fact that not only in our study but in other published literature, wife and mother constitute the highest share in organ donation. In our study, the higher number of donations done by wife 17 (42.5%) followed by mother 14 (35%), sister 3 (7.5%) and father 6 (15%)

A study from India, reported a similar finding that mothers donated the kidneys in 42% cases by Vemuru[2] and in 64% cases by Mehta KS [4] . Similar dominance was reported in a study from Tunisia by Abdellaoui[3], where 27% of donors were mothers, 9% fathers, 15% spouses, and 33% siblings (17% brothers and 16% sisters).

Our study, from India and other countries, reported that mothers and spouses reported being highest amongst the donors

Serum creatinine

Marginal, but not statistically significant increase in Sr. creatine from preoperative of 0.75 mg/dL to post-operative 0.80 mg/dL is reported in our study [10]. In a study from India by Sahay [4] reported similar result in which there was statistically insignificant rise in serum creatinine post donation (0.97 +/- 0.09 mg/dl vs 1.22 +/- 0.82 mg/dl)

In another study by Mehta [5] serum creatinine 0.80 (±0.17) mg% before donor nephrectomy ,1.05 (±0.20) mg% post-donation with a significant mean rise of 0.25 mg% (P <0.0001)

In another study by Abdoloni[3]mean creatinine blood rate (CBR) increased immediately after nephrectomy from 64 µmol/L to 105 µmol/L and decreased progressively during follow-up to reach 84.7 µmol/L at the 5th visit at 2 year.

Mean creatinine concentrations were found to be increased after 24 months of donation in published literature (0.83 versus 1.15 mg/dL at 24 months after donation (P <0.05) by M Bieniasz [6]

Pre and post operative kidney surface area

In our study, a significant increase in pre and post-operative kidney surface area is reported in living kidney donors; preoperative 40.47 cm2 vs. 52.86 cm2, p< 0.0001. Significant increase in remnant kidney size from 35.12 ± 6.80 [Mean ± standard deviation (SD)] cm2 to 42.32 ± 8.59 cm2 (P <0.0001) was reported in a published study from India by Mehta[5]

GFR

In our study, a significant increase in GFR is reported in living kidney donors; preoperative 48.81 vs 59.40, p< 0.0001. In a study done by Mehta [5] similar increase in GFR has been noted from pre-donation GFR value of 48.83 ± 7.79 mL/min to post-donation GFR 60.48 ± 14.32 mL/min (P <0.0001). In another Indian study, By Sahay [4] Mean GFR pre and post nephrectomy were 102.74 +/- 6.91 ml/min and 74.54 +/- 14.64 ml/min with a mean reduction of 28.2 +/- 13.57 ml/min. QOL (WHOQOL- BREF) We reported a decrease in QOL in the overall WHOQOL -BREF physical domain; transformed score (4-20) (15.425 to 14.925, p<

0.08) and transformed score 0-100 (71.825 to 68.550, p <0.0615). Other domains like the social domain (15.10 to 16.28, p< 0.001), environmental domain (14.15 to 15.32, p< 0.009), and psychological domain (15.150 to 15.900, p<0.0378) we reported a significant increase in the WHOQOL -BREF transformed score 4-20 and transformed score 0-100 [11]. In our study most of donors had reduced physical activity in post-donation period due to lack of knowledge. this has led to decrese in QOL score in physical domain in post-donation period.

In our study, we found information about scar-related pain, bulges, emptiness, pleasure, and bothersome scar appearance for the first time in the literature. 77.5 percent (31) of the patients were content with their scars; nevertheless, 5 (12.5%) of the patients reported a bulge at the scar site. Thirteen patients, or 32%, reported feeling empty at the scar location. Six patients (15%) reported experiencing sporadic soreness at the scar site. To corroborate these results, additional research with a bigger sample size is required. In our study Hemoglobin showed statistically insinficant difference in pre donation (11.8∓1.327) and post donation (11.8∓1.261). In our study, the total leucocyte count increased in the pre-donation (7630) and post-donation (7870) periods but not statistically significantly. The total leucocyte count and pre- and post-donation haemoglobin levels were measured in our study for the first time ever. To corroborate these results, additional research with a bigger sample size is required.

Conclusion

In our study, the physical domain of quality of life declined, whereas the psychological, environmental, and social domains all saw improvements. The donors' overall quality of life was significantly influenced by the death of their receiver. Our study confirms the necessity of routine follow-up with donors to evaluate the effects of donation on physical health, clinical outcomes, and overall quality of life, particularly with donors whose receiver has passed away.

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