Depression and Anxiety in Living Kidney Donation: Evaluation of Donors and Recipients

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ABSTRACT

Background. Psychosocial status of donors before and after living kidney donor transplantation has been an important concern. Investigations of psychosocial issues in related recipients are not frequent.

Aim. The aims of this study were to evaluate and compare psychopathologic dimensions in donors and recipients before and after transplantation.

Methods. Thirty-five recipients and 45 donors completed a psychosocial evaluation before and after transplantation. We applied Pearson chi-square, McNemar, Fisher, Wilcoxon, and Mann-Whitney tests as well as linear and logistic regression statistical methods.

Results. Before transplantation 100% of the recipients presented total anxiety, compared with 64.4% of donors, with higher anxiety levels in all dimensions ($P < .001$). Also, 38.7% of recipients and 16.3% of donors had moderate/serious depression ($P = .029$). Men showed higher levels of cognitive anxiety before transplantation (odds ratio [OR] = 4.3; $P = .008$). After versus before transplantation central nervous system and cognitive anxiety had diminished in recipients ($P = .031$; $P = .035$, respectively); there were higher levels of cognitive anxiety than among the donors ($P = .007$). Depression showed no significant changes in recipients or donors; the differences were no longer significant. There were less severely depressed recipients but an increase among severely depressed donors. Male recipients and donors showed greater cognitive anxiety ($P = .02$; $P = .04$, respectively) at both times. Female recipients presented with more severe depression ($P = .036$).

Conclusions. Anxiety is an important symptom. Surgery had a positive impact to lower anxiety in recipients. Most protagonists displayed little or no depression; it was more prevalent among recipients. Donors and recipients maintained some psychopathologic symptoms after surgery. We defined vulnerable groups among these cohorts.

KIDNEY transplantation has significantly improved the prognosis of end-stage renal disease in terms of life expectancy and quality of life (QoL) when compared with maintenance dialysis.[1,2] The scarcity of organs from deceased donors had encouraged living kidney donation programs.[3] Cultural differences and public policies strongly influence this issue, namely a lack of legislation in some developing countries regarding donation from deceased donors. Living unrelated donation (LUD) in addition to living related donation (LRD) programs have brought more complexity in ethical trends for the evaluation of and psychosocial impact on donors.[4,5] Data from the United

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0041-1345/–see front matter
doi:10.1016/j.transproceed.2010.12.028

Network for Organ Sharing (UNOS) Report, United States of America[6] noted that in 2009 living kidney donation transplantation (LKDT) represented 88.1% of all transplantations. Spousal and other relatives represented 72.2% of donors.

Several reasons have justified living donation: the low risk to the donor, the favorable risk- benefit ratio, psychological benefits for the donor, altruism, and autonomy.[7–11] Beside the low morbidity and mortality rates donors display high levels of satisfaction.[12] Nevertheless, attention has been called to the possible inconsistency of these arguments and to the necessity of increasing the number of organs retrieved from deceased donors.[3]

Psychosocial evaluation of living kidney donation candidates is an important issue that has been the object of several studies, which have noted the presence of some anxiety and depressive symptoms, the possibility of adverse psychosocial outcomes, and associations with demographic, cultural, and psychological issues as well as medical outcomes.[13–17] Minimization of these harmful aspects depends on careful selection and follow-up.

Recipients of living kidney donation also need psychosocial assessment and follow-up. The presence of psychopathologic symptoms (anxiety and depression), adaptative demands, new stressors after transplantation, (posttransplantation regimens, potential medication side effects, guilt feelings toward donors, and fear of rejection) demands psychosocial support for this group.[14,18–21] After transplantation the recipient's QoL is greatly improved; better psychopathologic outcomes may be expected.[19]

In Portugal organ transplantation is entirely derived from the national health system. Portuguese law (1993, revised in 2007) established opting in as its foundation. The policy for organ donation recently changed—until June 2007 only related donors could be used; thereafter unrelated living donors are allowed.

Data from the Portuguese Authority for Transplantation (ASST) reported that in 2008 living donors represented 9.3% of total kidney transplantations (n = 527), whereas the following year, the number of living donors grew to 25%.

A Living Donor Kidney Program was implemented in our program in 2002. In 2008 living donors represented 20.4% of our total kidney transplantation.[22]

A protocol of psychosocial evaluation of donors and recipients conducted by a psychologist and a psychiatrist was integrated with the clinical and immunologic assessment. The protocol is always completed in a systematic way before transplantation.[23] Pairs are re-evaluated at 1 year after transplantation. Psychosocial support is also given when necessary. We assess psychosocial evaluations, emotional quality of the relationship, and psychological status. Problematic donors or recipients may require a more intense investment with further interviews alone or with other members of the family. All cases are regularly discussed with a medical team; consensual decisions determine acceptance of a candidate. When the assessment is completed, informed consent is given to an independent member of the hospital ethical committee. During the entire evaluation process, we guarantee confidentiality and autonomy. In this study we sought to assess psychosocial items (anxiety and depression) among living related kidney donors and recipients based upon data obtained by the protocol evaluation.

SUBJECTS AND METHODS

From 2002 until 2008, 75 donors and recipients (pairs) underwent renal transplantation. All of them had pretransplantation psychosocial evaluation. Of these, 45 donors and 35 recipients completed a second assessment at least 1 year after the transplantation; they constituted the sample of the present study.

Because this work was intended to assess the psychological status of the participants, we analyzed the evaluative psychological tests performed before and after kidney donation.

Evaluative Instruments

A sociodemographic questionnaire included the following items: age, gender, school level, professional activity and current employment situation, marital status, and relatedness to the recipient. Information regarding donor and recipient postoperative courses and complications was collected from participant medical records.

Participants were evaluated with the Zung Self-Rating Anxiety Scale and the Zung Self-Rating Depression Scale. The Zung Self-Rating Anxiety Scale is a 20-item self-administered scale designed to measure anxiety.[24–26] The Zung Self-Rating Depression Scale is a 20-item self-administered scale designed to measure depression.[27] This scale is being used for the Portuguese population supported by a correlational study with Beck Depression Inventory.[28]

Statistical Analysis

Statistical analysis was performed using SPSS, version 17.0. Descriptive data are reported as frequency distributions. Fisher and chi-square tests were used to compare donor versus recipient groups. The McNemar test was used to compare times in each group. Finally, logistic regression models of dimensions of anxiety and depression were used to investigate associations with sociodemographic variables.

RESULTS

Demographic and Social Data

The study sample comprised 45 donors (56.2%) mainly females (n = 26; 57.8%), with a mean age of 41.2 years (range, 20–60 years). Thirty-five (43.8%) recipients were males (n = 22; 62.9%) with a mean age of 37.34 (range, 22–57 years). All donors were family members of the recipient: predominantly siblings (n = 24; 53.3%), followed by the mother or father (n = 20; 44.4%), or a daughter (n = 1; 2.2%). Most donors were married (n = 35; 77.8%), 6 were single (18.8%), and 4 were separated/divorced (12.5%). Twenty-six recipients were married (74.3%), 9 (25.7%) were single, divorced, or widowed. Forty-one donors were employed (91.1%) at the time of donation, 3 were retired (6.6%), and 1 was unemployed (2.2%). The professional status of recipients was as follows: employed (n = 17; 48.6%), retired (n = 11; 31.4%), unemployed (n = 4; 11.4%), or retired for medical reasons (n = 3; 8.6%). Most

Table 1. Anxiety and Depression Per Group Before and After Surgery

	Before Surgery					After Surgery				
	Recipients		Donors			Recipients		Donors		
	n	%	n	%	*P*	n	%	n	%	*P*
Cognitive anxiety										
No	10	28,6	31	68,9	<.001	20	57.1	37	82.2	.014
Yes	25	71.4	14	31.1		15	42.9	8	17.8	
Motor anxiety										
No	0	0,0	25	55,6	<.001	8	22.9	25	55.6	.003
Yes	35	100	20	44.4		27	77.1	20	44.4	
Vegetative anxiety										
No	2	5,7	22	48,9	<.001	4	11.4	15	33.3	.022
Yes	33	94.3	23	51.1		31	88.6	30	66.7	
CNS anxiety										
No	13	37,1	28	62,2	.026	22	62.9	27	60.0	.795
Yes	22	62.9	17	37.8		13	37.1	18	40.0	
Total anxiety										
No	0	0,0	16	35,6	<.001	4	11.4	15	33.3	.022
Yes	35	100	29	64.4		31	88.6	30	66.7	
Depression										
No/mild	21	61,8	36	83,7	.029	29	82.9	35	77.8	.573
Moderate/severe	13	38.2	7	16.3		6	17.1	10	22.2	

Note: $P < .05$, statistically significant. CNS, central nervous system.

donors (n = 31; 68.9%) had a school level of less than 9 years, only 14 donors (31.13%) had a school level equal to or higher than 9 years, and just 8 of these (17.8%) had obtained a graduate degree. Most recipients (n = 22; 62.2%) had a school level of less than 9 years, with 13 (37.1%) having a school level higher than 9 years. No significant differences were observed between the groups (recipients versus donors) for sociodemographic variables. The mean number of siblings in the families was 4.56 (range, 0–10).

Complications Following Living Donor Kidney Transplantation

There were no deaths in the donor population. No one suffered a major postoperative complication. One death occurred in recipients as a result of a septic shock and 4 major complications (rejection and vascular thrombosis, 1 corresponding to graft failure) were reported after transplantation.

Depression and Anxiety Versus Group

To analyze the proportions of depression and anxiety according to group, we used the Fisher test for data from before versus after transplantation. Before transplantation, 100% of the recipients showed total anxiety compared with 64.4% of donors. Recipients presented higher anxiety levels in all dimensions ($P < .001$) compared with donors; 38.7% of them showed moderate to serious depression compared with 16.3% of donors ($P = .029$). After transplantation, differences in depression and central nervous system anxiety between the groups were no longer significant ($P > .05$ in both). A small number of severely depressed recipients and a little increase in severely depressed donors was observed (Table 1).

Depression and Anxiety Versus Evaluation Moments in Each Group

To analyze alterations in the proportion of depression and anxiety for each group, we used the McNemar test. Analyzing changes in depression and anxiety from the initial to the final evaluation, donors did not show any changes. For recipients, SNC and cognitive anxiety had diminished ($P = .031$ and $P = .035$, respectively). All other dimensions and depression scores did not show significant changes ($P > .05$; Table 2).

Logistic Regression

Logistic regression was used to analyze associations between anxiety and depression with sociodemographic independent variables before and after surgery.

Presurgery

High cognitive and SNC anxiety were associated with recipients (odds ratio [OR] = 6.3) and males (OR = 4.3) (Table 3). The recipient group and school level (≤9 years) were important factors in the vegetative anxiety level ($P = .001$ and $P = .039$, respectively). Depression did not vary with sociodemographic characteristics (Table 3).

Postsurgery

Being a recipient versus a donor was associated with cognitive and total anxiety levels (OR = 5.2 and OR = 5.1, respectively). High motor anxiety was associated with recipients ($P = .011$) and lower school level ($P = .034$; Table 4). Vegetative and SNC anxiety did not vary with sociodemographic characteristics. A high depression level was associated with not married subjects (OR = 4.6; $P = .033$) (Table 4).

Table 2. Anxiety and Depression vs Evaluation Moments in Each Group

	Recipients				Donors			
	No		Yes		No		Yes	
Pre\Post	n	%	n	%	n	%	n	%
Cognitive anxiety								
No	6	30.0	4	26.7	29	78.4	2	25.0
Yes	14	70.0	11	73.3	8	21.6	6	75.0
Motor anxiety								
No	0	0.0	0	0.0	18	72.0	7	35.0
Yes	8	100	27	100	7	28.0	13	65.0
Vegetative anxiety								
No	0	0.0	2	6.5	10	66.7	12	40.0
Yes	4	100	29	93.5	5	33.3	18	60.0
CNS anxiety								
No	10	45.5	3	23.1	20	74.1	8	44.4
Yes	12	54.5	10	76.9	7	25.9	10	55.6
Total anxiety								
No	0	0.0	0	0.0	9	60.0	7	23.3
Yes	4	100	31	100	6	40.0	23	76.7
	No/Mild		Moderate/Severe		No/Mild		Moderate/Severe	
Depression	n	%	n	%	n	%	n	%
No/mild	19	67.9	2	33.3	29	87.9	7	70.0
Moderate/severe	9	32.1	4	66.7	4	12.1	3	30.0

CNS, central nervous system.

DISCUSSION

Most of our donors were siblings, which corresponds to literature data;[29] this is an interesting finding considering the legal background. Portugal has had restricted access for related donor candidates.

Psychosocial impact of donation has been reported in the literature, namely, increased rates of mental distress and intrafamilial conflicts,[19] positive long-term psychological donor well-being,[10] low psychosocial morbidity,[12] and psychosocial risk for donors.[20] All of these factors strongly

Table 3. Multiple Logistic Regression Adjusted for Social Demographic Independent Variables Presurgery

	Presurgery											
	Cognitive Anxiety		Motor Anxiety		Vegetative Anxiety		SNC Anxiety		Total Anxiety		Depression	
	OR	*P*	OR	*P*	OR	*P*	OR	*P*	OR	*P*	OR	*P*
Group												
Recipients	6.3	.005			36.8	.001	5.0	.009			3.1	.093
Donors	1	—			1	—	1	—			1	—
Gender												
Male	4.3	.008			3.3	.067	0.30	.026			0.84	.771
Female	1	—			1	—	1	—			1	—
School level												
≤9 y	2.3	.141			4.1	.039	2.0	.222			1.2	.748
>9 y	1	—			1	—	1	—			1	—
Age group												
≤40 y	1.1	.924			0.73	.669	1.5	.498			2.4	.142
>40 y	1	—			1	—	1	—			1	—
Marital status												
Other	2.1	.272			3.2	.195	1.5	.537			1.3	.673
Married	1	—			1	—	1	—			1	—
Professional situation												
No active	0.83	.794			0.47	.430	0.62	.456			1.3	.693
Active	1	—			1	—	1	—			1	—

Table 4. Multiple Logistic Regression Adjusted for Social Demographic Independent Variables Postsurgery

	Postsurgery											
	Cognitive Anxiety		Motor Anxiety		Vegetative Anxiety		SNC Anxiety		Total Anxiety		Depression	
	OR	*P*	OR	*P*	OR	*P*	OR	*P*	OR	*P*	OR	*P*
Group												
Recipients	5.2	.011	5.3	.011	3.6	.087	0.96	.946	5.1	.027	0.46	.321
Donors	1	—	1	—	1	—	1	—	1	—	1	—
Gender												
Male	0.99	.990	1.4	.496	1.6	.440	0.48	.148	0.64	.436	0.44	.195
Female	1	—	1	—	1	—	1	—	1	—	1	—
School level												
≤9 y	0.60	.373	3.4	.034	0.63	.452	1.7	.330	1.4	.582	0.86	.818
>9 y	1	—	1	—	1	—	1	—	1	—	1	—
Age group												
≤40 y	1.4	.581	1.3	.634	2.5	.230	0.68	.494	1.3	.665	2.0	.336
>40 y	1	—	1	—	1	—	1	—	1	—	1	—
Marital status												
Other	2.6	.141	3.3	.104	1.0	.987	3.0	.086	1.0	.981	4.6	.033
Married	1	—	1	—	1	—	1	—	1	—	1	—
Professional situation												
No active	0.42	.223	0.84	.806	0.93	.920	1.2	.777	0.70	.646	2.4	.291
Active	1	—	1	—	1	—	1	—	1	—	1	—

support the importance of psychological advice and support for donors. Mild depression and family problems have been the most extensively documented negative psychosocial issues after living donation. The majority of these were related to graft failure or recipient death after transplantation.[29]

Most studies have been directed to donor issues. This emphasis is important given the necessity to know the impact of donation on physical and psychological aspects of healthy subjects. The safety and well being of living donors have been important concerns to continue these programs. Few studies have compared donor and recipient psychosocial problems.[14,18]

In our study, before transplantation all recipients presented total anxiety, which showed higher levels in all dimensions than that of donors. Recipients displayed moderate to serious depression, which was more important than in donors. If we considered mild depression, we have obtained more impressive figures. Only a minority of donors and recipients showed no depressive symptoms.

According to our results men, either recipients or donors, displayed higher levels of anxiety before transplantation. Also male recipients and donors showed greater cognitive anxiety at both times. So we may conclude that men are more vulnerable to anxiety.

After transplantation SNC and cognitive anxiety in recipients diminished but there were higher levels of cognitive anxiety than in donors. Depression showed no significant change in recipients or donors; the differences between the groups were no longer significant. We observed less severely depressed recipients and an increase in severely depressed donors. Female recipients showed higher levels of severe depression.

The participants who showed severe depressive symptoms or anxiety, predonation or postdonation, underwent psychosocial support and psychiatric treatment as required.

In conclusion, anxiety is an important symptom. Surgery had a positive impact to lower anxiety in recipients. Most protagonists had light or no depression; it was more prevalent in recipients. Donors and recipients maintained some psychopathologic symptoms after surgery, which demands psychosocial support and careful assessment.

Some vulnerable groups for depression and anxiety are defined by age, gender, marital status, moment of evaluation (pretransplantation or posttransplantation), and being a donor or a recipient. The relatedness and the burden of care may explain the importance of some of these psychopathologic findings. No candidates for donation and transplantation were refused because of psychopathologic findings.

This study confirmed that living donor kidney transplantation does not adversely affect the lives of donors and significantly improves psychosocial status in recipients. Positive aspects have been met, but also some potential problems are raised by living donation. Psychological and psychiatric support of living donors and recipients may often be needed. Psychological assessment and structured protocols and programs are important. Careful donor selection with appropriate psychological assessment and psychiatric consultation before transplantation allows donation without major psychological consequences. Psychosocial assessment and support of recipients is also necessary to promote better outcomes for both donors and recipients. Psychopathologic evaluation should constitute a regular procedure in candidates for kidney donation. Significant problems may occur among donors after a failed transplantation; special

attention must be paid to these donors. Follow-up psychosocial evaluations of donors are important.

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