Impact of Discards for Living Donor Kidney Transplantation in a Transplant Program

Hilda M. Villafuerte-Ledesma[a,b], Erika De Sousa-Amorim[a,c], Lluis Peri[d,e], Mireia Musquera[d,e], Eduard Palou[f], Miquel Lozano[e,g], Joan Cid[e,g], Jaume Martorell[f], David Paredes[e,h], David Cucchiari[a,c,i], Pedro Ventura-Aguiar[a,c,i], Josep M. Campistol[a,c,e,i], Antonio Alcaraz[d,e], Federico Oppenheimer[a,c,e,i], Fritz Diekmann[a,c,e,i], and Ignacio Revuelta[a,c,e,i,*]

[a]Nephrology and Renal Transplant Department, Hospital Clinic, Universitat de Barcelona, Barcelona, Spain; [b]Nephrology Department, Hospital Clínico Lozano Blesa, Zaragoza, Spain; [c]Laboratori Experimental de Nefrologia i Trasplantament (LENIT), IDIBAPS, Barcelona, Spain; [d]Urology Department, Hospital Clinic, Universitat de Barcelona, Barcelona, Spain; [e]Barcelona University, Barcelona, Spain; [f]Immunology Department, Hospital Clinic, Barcelona, Spain; [g]Apheresis and Cellular Therapy Unit, Hospital Clinic, Barcelona, Spain; [h]Donation and Transplant Coordination Section, Hospital Clinic, Barcelona, Spain; and [i]Spanish Kidney Research Network, ISCIII-RETIC REDinREN RD016/0 009, Madrid, Spain

ABSTRACT

Objective. Living donor kidney transplantation (LDKT) is the best treatment for end-stage renal disease. In this setting, a significant percentage of transplants are not undertaken because of medical and nonmedical reasons of both donors and recipients. However, the impact of these discards in a transplant program has not been identified thoroughly so far. Our objective was to clarify key reasons for exclusion of LDKTs and the consequences for the discarded transplant candidates in the following 5 years.

Methods. Analysis of donors' and recipients' characteristics of 781 couples evaluated in our hospital from January 2005 to December 2013. The consequences of discards in transplant candidates were analyzed in the cohort 2012 to 2013 (n = 106) and followed up until October 2018.

Results. In our study group, 402 (51.5%) LDKT couples were successfully donated, and 379 (48.5%) were excluded. Donor and transplant recipient candidates discarded were older at the evaluation (55.07 ± 12.14 years vs 51.73 ± 10.93 years, $P < .001$; 48.81 ± 14.05 years vs 44.62 ± 13.91 years, $P < .001$, respectively). The most frequent reason for kidney discard was medical contraindication found in the potential donor (47.5%; low eGFR, diabetes mellitus, impaired glucose tolerance, high blood pressure, cardiovascular pathology casually found during evaluation, and proteinuria). Of the discarded candidates from 2012 to 2013, 36.8% received a deceased donor kidney transplant, 17% a LDKT with another donor, 7.5% stayed on the waiting list, 18.9% died, 3.8% were excluded from the waiting list, and 14.2% were lost to follow-up.

Conclusions. In most cases, transplantation was not undertaken because of donor pathology. Fifty-three percent of the discarded patients were eventually transplanted, with a 31.4% probability to receive an organ from another living donor.

LIVING donor kidney transplantation (LDKT) is the best renal replacement therapy for patients with end-stage chronic kidney disease (ESKD) [1]. Despite the growing need, LDKT rate has decreased considerably in many countries [2]. These declines in donation seem to be

*Address correspondence to I. Revuelta, Nephrology and Renal Transplant Department, Hospital Clinic, 170 Villarroel Street, 08036, Barcelona, Spain. Tel: (+34) 932275444; Fax: (+34) 932275498. E-mail: IREVUELT@clinic.cat

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related to many causes, such as the economic recession, drawing attention to the financial risks of kidney donation for individuals with little savings or income, an aging donor pool, reduction in family size, and changes in donor selection criteria [3]. Indeed, the major ethical dilemma in living donation has been the risk to the donor [4]. New and coming information about the risk of living kidney donors is welcome to refine this option as the optimal therapy to extend life expectancy and quality of life in patients with ESKD [5]. Despite these advantages, almost half of potential LDKTs are not undertaken [6]. A significant proportion of recipients or potential donors are excluded because of medical exclusion criteria or other nonmedical causes. The cost of this high proportion of discards is important, with economic and clinical implications for the health system. However, discards for a LDKT program are not well documented in many centers. The goal of this study was to identify the reasons for exclusion for a LDKT and the consequences for the discarded transplant candidates in the following 5 years.

MATERIALS AND METHODS

A total of 781 donor-recipient couples evaluated in our transplant center between January 2005 and December 2013 were included in the study (Fig 1). Data were collected and analyzed retrospectively by review of hospital and department electronic clinical databases (Systems, Applications and Products [SAP]; and Nefrolink). The couples were divided into those accepted and transplanted vs those discarded. Donors and recipients' characteristics of the accepted couples were compared with those of the discarded group. The data collected included age, sex, donor-recipient relationship, date of transplantation (if successful donation), and reasons for recipient or donor exclusion (if applicable). The following donor-recipient relationship categories were included: related (child, sibling, parent, second-degree relative) and unrelated (spouse, no relatives). The causes of discards were classified as donor pathology, a positive crossmatch criteria not susceptible to desensitization, negative of donor, deceased donor kidney transplantation (DDKT), recipient pathology, negative of recipient, noncompliance with the criteria for initiating the preconditioning protocol in ABO incompatibility (mostly due to high isoagglutinin titers), and others. We applied the international guidelines for the evaluation of living kidney donors [5].

The postdiscard recipients' statuses were analyzed in the cohort of transplants and discards between January 2012 and December 2013 (n = 106) and followed up until October 2018. Then they were classified as transplanted (with a deceased donor or other living donor), remained on waitlist, removed from the waitlist, lost to follow-up, or deceased. The study was approved by the local ethical committee.

Statistical Analysis

Values are expressed as mean ± standard deviation or percentage, as appropriate. Comparisons between groups (discards vs transplants) were assessed with Student's *t*-test for continuous variables and χ^2 test for nominal variables. Statistical analyses were performed using the statistical package for social sciences, version 22 (SPSS, Chicago, IL, United States). Statistical significance was defined as $P < .05$.

RESULTS

Of the 781 donor-recipient couples, 402 (51.5%) successfully undertook kidney transplantation and 379 (48.5%) did not. In the 8 years of the study, the number of potential donors evaluated for donation stagnated, especially after 2010, with a tendency to diminish. The number of transplanted and discarded couples by year is shown in Fig 1.

The demographic data of the 2 groups (discarded vs transplanted pairs) for LDKT are summarized in Table 1. The mean donor and recipient age was significantly higher in the group of discards (55.07 ± 12.14 years vs 51.73 ± 10.93 years, $P < .001$; 48.81 ± 14.05 vs 44.62 ± 13.91 years, respectively, $P < .001$). Regarding sex, there was a

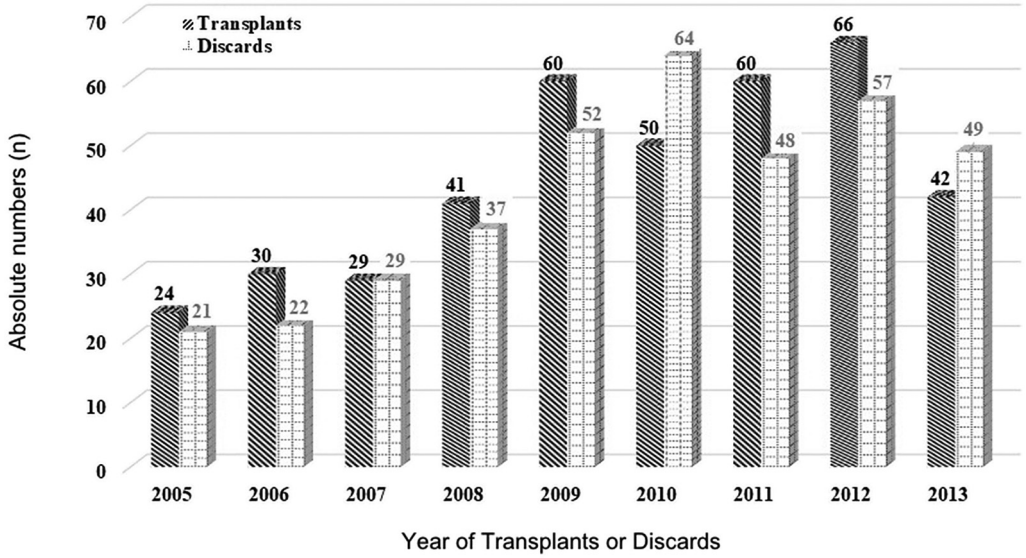

Fig 1. Living donor kidney transplants and discards evaluated in the period from 2005 to 2013.

Table 1. Baseline Characteristics of the Studied Population

Demographic Data	Discards (n = 379)	Transplants (n = 402)	*P* Value
Donor			
Age, y	55.07 ± 12.14	51.73 ± 10.93	< .001
Sex, M vs F, %	31.4 vs 68.2	34.1 vs 65.8	NS
High blood pressure, %	40.2	30	NS
Diabetes mellitus, %	9	0	< .001
Dyslipidemia, %	32.8	20	NS
Recipient			
Age, y	48.81 ± 14.05	44.62 ± 13.91	< .001
Sex, M vs F, %	59.9 vs 39.8	61.7 vs 38.3	NS
Etiology, %			
Unknown	15.1	14.3	NS
Diabetic nephropathy	16.9	10.5	.02
Hypertensive nephropathy	9.9	7.5	NS
ADPKD	11	13.5	.03
Others	47.1	54.1	NS
Clinical situation, %			
Hemodialysis	56.9	38.5	
Predialysis	31.7	47.1	NS
Peritoneal dialysis	8.2	11.1	NS
Dysfunctional renal allograft	3.3	2.4	NS
High blood pressure, %	88.2	80.5	NS
Diabetes, %	24.9	15.8	.04
Dyslipidemia, %	50.9	39.8	NS
Relationship			
Related, %	52.8	60.7	.03
Unrelated, %	47.2	39.3	

Values are expressed as mean ± standard deviation or percentage, as appropriate.

Abbreviations: ADPKD, autosomal dominant polycystic kidney disease; F, female; M, male; NS, not significant.

slightly increased prevalence of female donors (68.3% vs 65.9%) and male recipients (59.9% vs 61.7%) in the discard group, even though the difference was not statistically significant. An increased prevalence of diabetic nephropathy was noted in the discard group (16.9% vs 10.5%), as well as an increased percentage of autosomal dominant polycystic kidney disease in the transplant group (13.5% vs 11.0%, $P = .03$). A genetic relationship between donor and recipient was more frequent in the transplant than in the discard group (60.7% vs 52.8%, $P = .03$).

Most donors were excluded for medical and immunologic reasons. One hundred and seventy-five (47.6%) were excluded for donor abnormalities found in the donor evaluation (Table 2). The medical causes for donor rejection were low eGFR in 22.3% (n = 39), known diabetes mellitus or abnormal glucose tolerance test in 19.4% (n = 34), high blood pressure or cardiovascular pathology found during evaluation in 17.7% (n = 31), tumoral pathology in 8.6% (n = 15), and unknown reason in 14.3% (n = 25). Twenty-three donors were rejected for surgical reasons: vascular calcification and severe atheromatosis in 5.1% (n = 9), renal artery fibromuscular dysplasia in 4% (n = 7), and renal structural abnormalities in 4% (n = 7).

Table 2. Causes of Discard of Living Donor Kidney Transplantation

Causes of Discard	n	%
Donor pathology	175	47.6
eGFR < 80 mL/min/1.73 m^2	39	22.3
Known diabetes mellitus or abnormal GTT	34	19.4
Hypertension or cardiovascular pathology	31	17.7
Hematuria and/or proteinuria	5	2.9
Hepatopathy	3	1.7
Tumoral pathology	15	8.6
Vascular calcification and atheromatosis	9	5.1
Fibromuscular dysplasia of the renal arteries	7	4.0
Renal structural abnormalities	7	4.0
Unknown	25	14.3
Histocompatibility reasons	72	19.3
ABO incompatible	54	14.5
Crossmatch positive	18	4.8
Psychosocial reasons	47	12.6
Negative of donor	11	2.9
Negative of recipient	36	97
Others	77	20.5
DDKT during the study	30	7.9
Recipient pathology during the study	27	7.2
Others	20	5.4

Abbreviations: DDKT, deceased donor kidney transplantation; eGFR, estimated glomerular filtration rate; GGT, glucose tolerance test.

The immunologic causes were ABO incompatibility in 14.5% (n = 54) and positive crossmatch in 4.8% (n = 18) of cases. A total of 11 donors and 36 recipients were discarded for psychosocial reasons (negative for LDKT). A total of 42 discards (7.2%) were caused by recipient issues, including death or other morbidity that contraindicated transplantation. Thirty DDKT were performed during the study. Of all the discarded couples, 60.2% could be easily ruled out as potential candidates for LDKT applying our basic protocol evaluation, minimizing health expenses (Table 2).

A total of 106 recipients were discarded during the year period 2012 to 2013 for LDKT, and they were followed at least during 5 years. Of these recipients, 36.8% received a DDKT, 17% were transplanted with another living donor, 7.5% still remain active on the waiting list, 3.8% were excluded from the waiting list, 18.9% died, and 14.2% were lost during the follow-up (Fig 2).

DISCUSSION

In this monocentric retrospective study, we observed a discard rate of 48.5% in couples studied for LDKT. The rejected donor and recipient candidates were significantly older than the accepted ones, and female sex was strongly associated with donation, without significant difference between accepted and discarded couples. This sex difference is widely known in the donation process [7] and the cause is thought to be multifactorial [8]. In many countries and cultures, women seem to perceive organ donation as their maternal or spousal duty to help and save their suffering child or partner [9]. In contrast, in other countries

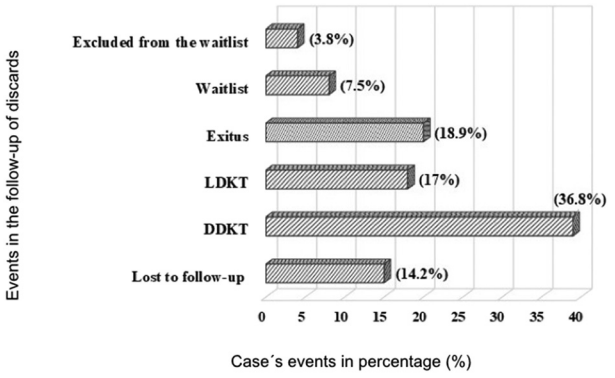

Fig 2. Follow-up of the transplant candidates discarded for LDKT. DDKT, deceased donor kidney transplantation; LDKT, living donor kidney transplantation.

such as Canada, investigators did not find any evidence of sex effect because of psychosocial pressure [10]. On the other hand, Gill et al [11] from the United States demonstrated that LDKT in women has remained stable but declined during a 5-year follow-up period because of financial barriers, such as lack of health insurance with the prospect of a male donor of interrupting his professional activity or losing his job.

Our results showed that many potential donors and recipients were precluded to the process of donation, as almost half of the evaluated couples were discarded for medical and nonmedical reasons. The most frequent discard cause was donor pathology (47.5%; low eGFR, diabetes mellitus status or impaired glucose tolerance, high blood pressure or cardiovascular pathology found during evaluation, and proteinuria or hematuria). Similarly high rates of discard of potential living kidney donors have been reported by other authors. Lapasia et al [6] reported a donor rejection rate of 47% of their 484 prospective donors, with 150 excluded for medical reasons, such as obesity (body mass index > 30 kg/m^2), high blood pressure, nephrolithiasis, and abnormal oral glucose tolerance test. Kezić et al. [12] from Serbia excluded 42.4% of their 241 donors for medical reasons. Perlis et al. [13] reported also a discard rate of 50.2% in their initial health screen that included medical donor conditions such as history of cancer, high blood pressure, diabetes mellitus, heart disease, hepatitis, nephrolithiasis, and renal disease. On the other hand, discard rates reported from Japan transplant groups were lower (27.9%) than our findings and the previous reports [14]. It has to be highlighted that in Japan, 90% of all kidney transplants are from living donors [15].

In our experience, a substantial percentage of discarded recipients remained on the waiting list or died (18.9%) during a 5-year minimum time of follow-up. The consequences of a long dialysis time with the well-known burden of cardiovascular events and other complications has to be taken into account, along with the high economic impact that the treatment of ESKD implies. In a previous study from our group, we demonstrated that LDKT was more cost effective than hemodialysis and was associated with an increase in quality-adjusted life years [16]. For these reasons, the fact that 48% of evaluated couples were discarded requires new solutions, as only 53% of discards finally received a transplant. There are no studies with long-term follow-up of discards for LDKT, and our findings add a valuable piece of information in this uncharted territory. Being a retrospective monocentric study, these results should be interpreted with caution and need to be confirmed by others in different settings.

In conclusion, based on these results, in high-risk patients considered for LDKT and then discarded, there are limited medical options to avoid dialysis and the best option seems to be LDKT from another donor. Future research is needed to better define the clinical and economic consequences in discarded potential recipients of LDKT.

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