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**Informative Title:** Multiple Reasons for Living Donor Denial: A Single Center Experience

**Running Title:** Living Kidney Donor Denial

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## **Introduction**

Living donor kidney transplantation (LDKT) is the preferred treatment for end stage kidney disease because it leads to better survival than either dialysis or deceased donor transplantation. Despite high numbers of potential donors, the rate of LDKT continues to stagnate. To address this, transplant centers have considered liberalizing eligibility criteria for living donors. To understand the impact that changing any criterion might have on increasing the acceptance rate of living donors, we analyzed the primary reasons for denial at our center.

## **Materials and Methods**

In this single-center retrospective study at UCLA Medical Center, medical records of all potential living donors presenting to the living donor selection committee from 2009 to 2014 were reviewed, with reasons for donor denial coded. Previous screening confirmed no history of diabetes mellitus, hypertension before the age of 50, hypertension  $\geq 50$  years old, taking more than one anti-hypertensive drug, having a body mass index (BMI)  $\geq 35$ , or malignancy other than skin cancer. Prior to selection committee presentation, they had also undergone HLA testing, were histocompatible with their recipient, completed transplant evaluation, and were committed to donation. Denials after committee review were categorized as medical, surgical, or social by two coders. Both absolute and relative contra-indications were included. Multiple reasons could be coded per case. Coder disagreement was resolved through discussion.

## **Results**

Of 1370 individuals, after committee review, 55% (760) were accepted as potential donors, 16%(225) required further workup, and 28% (385) were denied, 84% for multiple reasons (Table). The median number of reasons for denial per potential donor was two (IQR, 2-3), but some were denied for as many as nine reasons. The most common reasons were medical: young age (<25 years old), family history of diabetes in a first degree relative, another medical issue, and pre-diabetes or diabetes. The top social reason was a prior history of psychiatric illness other than depression, and the top surgical reason was evidence of a renal lesion. Thirty-eight percent (148) had denials in multiple categories.

UCLA-specific absolute contraindications to donation include pre-diabetes/diabetes, fatty liver, hematuria, hypertension in patients <50 years old or in those  $\geq 50$  years old on more than one

anti-hypertensive, and obesity (BMI  $\geq 30$ ). Of the 385 denied donors, 132 (34%) had at least one absolute contra-indication, with only 30 (8%) having more than one (Figure).

History of diabetes in a first-degree relative is not an absolute contraindication, yet it was the second leading reason for denial (N=82). All individuals denied for a family history of diabetes had additional reasons for denial, most often young age (N=50, 61%). Notably, 42 (51%) potential donors with a family history of diabetes also had an absolute contraindication to donation.

Since some centers allow obese individuals to donate, we looked at the other reasons obese potential donors were denied. Of the 41 donors denied for obesity, only six (15%) had no other reasons for denial. Eighteen (44%) were also denied for either pre-diabetes/diabetes, hypertension, or fatty liver, which would have also disqualified them.

## **Discussion**

Of these cases, the selection committee denied almost one-third of potential living donors, most due to reasons spanning multiple categories. Previous studies have described similar primary reasons potential kidney donors were denied (1-5); Specifically, others found that 17-40% of potential donors were denied for non-immunological reasons, with hypertension, prediabetes/diabetes, and obesity among the leading medical reasons for non-donation. While previous studies propose that allowing medically complex donors to donate could increase the rate of LDKT substantially, we find that the increase would be modest due to the presence of multiple absolute and/or relative contraindications.

This study is only a single-center study, with data on potential recipients and their outcomes not available. There is selection bias in that we did not include donors who were screened out before the evaluation committee, including histo-incompatible donors. Even with these limitations, the findings reflect the experience of one of the top five US centers for LDKT. It is also, to our knowledge, the first to document multiple reasons for denial per potential donor.

In conclusion, nearly a third of potential living donors were denied, most for multiple reasons. Modifiable opportunities to increase living donors might include medically monitored life style alterations or relaxing acceptance criteria for older donors. However, effective interventions to increase the rate of acceptance of potential donors must be multi-faceted since addressing single causes for living donor candidate rejection is unlikely to clear many potential donors for donation.

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**Table.** Reasons for denying potential living donors, categorized by medical (grey), surgical (white), and social (blue).

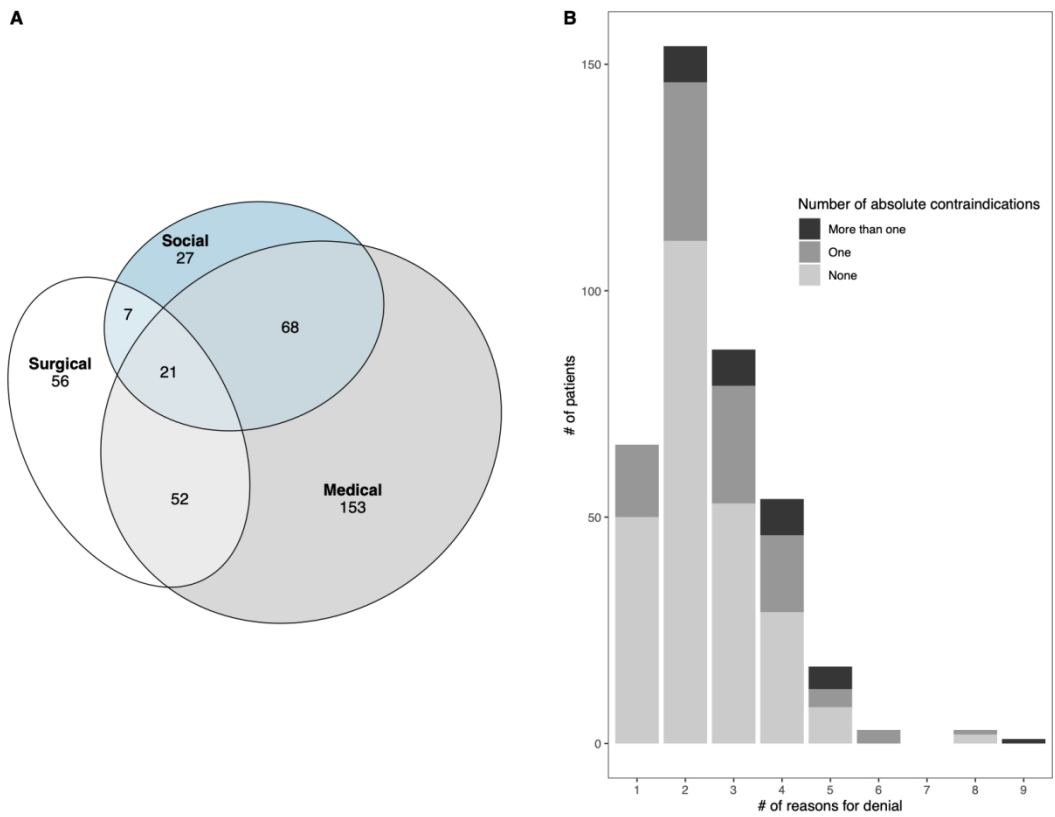
Reason for Denial*	N	Rank in Category
Young age (<25 years old)	89	1
History of diabetes in 1 <sup>st</sup> degree relative	82	2
Other medical issues	68	3
Pre-diabetes or diabetes (HbA1c≥6)	55	4
Hypertension	52	5
Renal lesion (cyst or solid mass)	52	1
Non-renal imaging finding	44	2
Abnormal labs (other than diabetes)	42	6
Obesity (BMI>30)	41	7
Vascular calcifications	40	3
Nephrolithiasis	37	8
Complex vascular anatomy	32	4
Prior psych history (other than depression)	24	1
Genitourinary abnormality	23	5
Fatty liver	22	9
Tobacco use	21	2
Hematuria	19	10
Psychosocial issues	19	3
No insurance	15	4
International donor	14	5
Question of coercion/financial gain	14	5
Pre-hypertension	13	11
Older age (>70 years old)	13	11
Cardiac issues	12	13
Heavy alcohol use	12	7
Unclear relationship to recipient	12	7
Other complex anatomy	12	6



Recreational drug use	11	9
History of depression	11	9
History of recurrent urinary tract infections	8	14
Unemployed/poor employment	8	11
Parent of children <18 years old	7	12
Use of prescription narcotics	7	12
Question of support post operatively	7	12
In school	6	15
History of incarceration	6	15
Renal scan unavailable	4	7
Unstable living environment	2	17

\*Two coders coded the reasons for denial. Of the 41 reasons that were used for more than one donor, percent agreement between the two coders ranged from 82% to 100%, with agreement > 90% for 39 of 41 reasons. The kappa coefficient was 0.4, indicating moderate agreement for 26 of 41 reasons. Those reasons with less than moderate agreement had an average frequency of 15 and low prevalence.

**Figure Legend.** Reasons for denying potential living donors. A. Categories of reasons potential donors were denied. B. Number of reasons for denial per potential donor.



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