

## ORIGINAL ARTICLE

# One donor, two transplants: willingness to participate in altruistically unbalanced exchange donation

Leonieke W. Kranenburg,<sup>1</sup> Willij Zuidema,<sup>2</sup> Willem Weimar,<sup>2</sup> Jan Passchier,<sup>1</sup> Medard Hilhorst,<sup>3</sup> Marry de Klerk,<sup>2</sup> Jan N. M. IJzermans<sup>4</sup> and Jan J. V. Busschbach<sup>1</sup>

1 Department of Medical Psychology and Psychotherapy, Erasmus University Medical Center, Rotterdam, The Netherlands

2 Department of Internal Medicine –Transplantation, Erasmus University Medical Center, Rotterdam, The Netherlands

3 Department of Medical Ethics, Erasmus University Medical Center, Rotterdam, The Netherlands

4 Department of General Surgery, Erasmus University Medical Center, Rotterdam, The Netherlands

## Keywords

altruism, ethics, exchange donation, living kidney donation, psychology.

## Correspondence

Ms L. W. Kranenburg, Department of Medical Psychology and Psychotherapy, Erasmus University Medical Center, PO Box 1738, 3000 DR Rotterdam, The Netherlands. Tel.: +31 10 408 7810; fax: +31 10 408 9420; e-mail: l.kranenburg@erasmusmc.nl

Received: 31 March 2006

Revision requested: 26 April 2006

Accepted: 13 July 2006

doi:10.1111/j.1432-2277.2006.00378.x

## Summary

Kidney exchange donation programs offer a good solution to help patients with a willing, but incompatible living kidney donor. Literature shows that blood type O patients are less likely to be selected for transplantation within a living exchange donation program. 'Altruistically unbalanced donation' could help these blood type O patients: one donor-recipient pair is incompatible (e.g. A-donor > O-recipient) and the other pair is compatible, but not identical (e.g. O-donor > A-recipient). Exchanging these kidneys would result in two compatible living donor kidney transplants. We studied whether compatible pairs would be willing to participate in such procedure. We included 96 living kidney donors and recipients in our study. These donors and recipients could be divided into two groups: (i) donors and their direct recipients ( $n = 48$ ), and (ii) paired exchange donors and their intended recipients ( $n = 48$ ). All were asked whether they would be willing to participate in altruistically unbalanced exchange donation, as long as direct donation was also an option. We found no group differences. We found that one third of the donors and recipients are willing to participate in altruistically unbalanced kidney exchanges. Therefore this form of donation may be a feasible addition to already existing living kidney exchange programs.

## Introduction

The shortage of kidneys for transplantation is widely considered to be a problem for patients with end-stage renal disease. In the Netherlands, the waiting list for deceased donor kidney transplantation has increased to a median waiting time of 4.1 years and even 5 years for patients with blood type O [1]. Living kidney donation has prevented the waiting list from growing further, and has proven to be a good solution for many donors and recipients.

In the recent past, patients with a willing but incompatible donor would be put on the deceased donor kidney waiting list after all. Nowadays, kidney exchange programs offer an alternative to prevent patients from having

to endure this unfortunate situation and to increase the amount of kidneys for transplantation [2–6]. As the idea of kidney exchange donation was proposed in the literature, the vulnerability of blood type O recipients in kidney exchange programs has been the subject of intense debate [7–10]. Results from de Klerk *et al.* [4] show that couples with a positive crossmatch have better chances of finding a matching donor than couples with ABO incompatibility. This is especially true for those recipients with blood type O. O recipients have a 24% chance of finding a match within the Dutch kidney exchange program. In comparison, all B-donor > A-recipient combinations and all O-donor > B-recipient combinations entering the program could be matched successfully.

A possible solution to help blood type O recipients in a living donor exchange program is 'altruistically unbalanced exchange donation' [3,7,11–12]. In this case, one donor-recipient pair is incompatible (e.g. A-donor > O-recipient) and the other pair is compatible, but not identical (e.g. O-donor > A-recipient). Exchanging these kidneys results in two ABO compatible living donor kidney transplants. Thus, altruistically unbalanced exchanges could be beneficial to optimize the number of transplants [3,11]. However, without the support of the potential altruistically unbalanced exchange donors (and their recipients), this type of exchange donation is likely to remain a 'paper solution'. At the time this solution was first discussed in the literature, it was named 'altruistically unbalanced' because of 'differences in the degree of altruism required by the two donor-recipient pairs' [7]. Ross and Woodle [7] noted in their article that there was a need for empirical data about donor attitudes on altruistically unbalanced exchange donations. Until then, they indicated that they would not be supportive of altruistically unbalanced exchanges, because they feared that under the current circumstances of kidney shortages the request for an altruistically unbalanced exchange donation risks donor coercion: i.e. the donor might consent to donate only in order to benefit his paired recipient so he might feel coerced to participate although he had no interest in doing so. On the other hand, it could be argued that an O-donor might be willing to participate in an altruistically unbalanced exchange, because in doing so he has an opportunity to help two recipients instead of one; the O-donor has already decided to donate his kidney anyway. It is very likely that he knows of, or has experiences with the unfortunate situation of kidney patients on dialysis. Knowing this, he might feel that it would be worthwhile to help another person in the same situation at the same time.

As far as we know, there are no empirical data on attitudes of living kidney donors and their intended recipients towards altruistically unbalanced kidney exchanges. In our study, we included 96 living kidney donors and recipients. All were asked whether they would be willing to participate in altruistically unbalanced exchange donation, as long as direct donation was also an option.

## Materials and methods

### Participants

We included 96 living kidney donors and recipients. These donors and recipients could be divided into two groups: (i) donors and their direct recipients, and (ii) paired exchange donors and their intended recipients. We included 48 living kidney donors (24 direct donors, M/F: 4/20 median age: 52; 24 paired exchange donors, M/F:

10/14, median age: 54) and 48 living kidney recipients (24 direct living kidney recipients, M/F: 14/10, median age: 45; 24 paired exchange recipients, M/F: 11/13, median age: 49). Recipients in the direct recipient group had a median waiting time on the deceased donor waiting list of 1 year and recipients in the exchange recipient group had a median waiting time of 2 years. All participants were included before donation/transplantation. They had undergone all the pretransplant medical treatment necessary before undergoing the donation/transplantation procedure. The average time between the interview and the planned transplantation date was 6 weeks. Participants were seen in the context of a broader study on psychosocial support for participants in living kidney donation programs. In this article, we will focus on the attitudes of living kidney donors and their intended recipients towards altruistically unbalanced kidney exchanges.

### Materials

We used a structured interview for all participants. Participants were interviewed at the hospital or at home. We left it up to the preferences of the participants whether they would be interviewed in the hospital or at home; almost all participants considered it more convenient to be interviewed at home. Donors and recipients were interviewed separately. All donors and recipients participating in the living kidney exchange program were asked whether they would be prepared to participate in the living kidney exchange program, given that a direct donation would have been possible for them. All donors and recipients participating in the regular, direct donation program were asked whether they would be prepared to participate in the living kidney exchange program in their current situation (thus, although a direct donation is possible). To both groups, it was explained that the purpose of the proposed type of donation was to help another couple for whom a direct donation was not feasible because of blood type incompatibility. For both the 'exchange donation group' and the 'regular donation group', the interviewer took as much time as needed to explain what the proposed form of donation comprised. If constructive, the information was further concretized by drawing the exchange procedure on a paper. After full comprehension was established, all participants were asked to choose one of the five response categories: (i) no; (ii) no, probably not; (iii) yes, probably; (iv) yes; (v) I do not know. All participants were asked to explain their answers. Once the participant had provided an explanation, the interviewer wrote down a summary of this explanation and then read out the summary to the participant in order to verify the summary for accuracy and completeness.

There were two interviewers involved in the administration of interviews. There was no statistically significant difference in data obtained by the one or the other interviewer ( $P = 0.45$ ).

### Statistics

To compare donors and recipients, the exchange donation group and the direct donation group, land of birth (native or nonnative) and male-female differences we used the Mann-Whitney  $U$ -test, exact testing;  $\alpha$  was set at 0.05. We discerned four types of donor-recipient relationship [(i) partners ( $n = 48$ ); (ii) parent-child relationship ( $n = 24$ ); (iii) siblings ( $n = 11$ ); (iv) other ( $n = 13$ )]. We used the Kruskal-Wallis test to investigate whether donor-recipient relationship influenced willingness to participate in altruistically unbalanced exchange donation. We also used this test to investigate whether the sex of donors and recipients within a couple influenced willingness to participate in altruistically unbalanced exchange donation, there were four subgroups: (i) male donating to male ( $n = 4$ ); (ii) male to female ( $n = 24$ ); (iii) female to male ( $n = 46$ ); and (iv) female to female ( $n = 22$ ). To investigate the strength of the relationship between time on the waiting list and willingness we used Spearman's correlation. We used the method of Cohen's kappa for correspondence to take into account the pairedness within the structure of the dataset: each individual is part of a donor-recipient dyad (for instance, spouses), and therefore a dependency between responses could be expected.

### Results

Thirty-one percent of all 96 participants in our study were probably or definitely willing to participate in a living donor kidney exchange program, even if direct donation was also a feasible option. Fifty-one percent of the participants were probably or definitely not willing to participate in an exchange program if direct donation was also possible. A relatively large proportion (18%) of participants were not sure what they would do in such a situation. Table 1 provides a more detailed overview of these findings (Table 1).

The explanation that was most often given for a reported willingness to participate in the exchange program, given that direct donation was also possible, was the wish to help another couple. A typical comment in this respect was 'by doing that you also help someone else. It would not be fair to withhold someone else a kidney'. The second most often named reason in favor of participating was the possible gain in quality of the kidney, in that the kidney received via the exchange procedure would provide a better match. This argument was also reversed in that some participants feared a worse match if they participated in an exchange program. The most often named reasons not to participate in an exchange program however were emotional reasons, for instance one recipient commented 'I know he does it for me, and for himself, and not for someone else. Emotionally it makes a difference whether the kidney is donated directly or indirectly'; or from a donor, '[if direct donation were possible] then there was no need for an exchange. I'll do this for her, not for someone else'. Other reasons not to participate in the program were practical objections, for instance if the donor had to travel to another hospital. Participants who were undecided stated that they had never thought about this option. In most cases, they added that they found the question puzzling thereby recognizing the advantages and disadvantages of the proposal. They felt that they would need more time to consider their view.

We found no statistically significant difference in willingness between participants in the regular living kidney donation program and participants in the exchange donation program ( $P = 0.58$ ). We also found no statistically significant difference between donors and recipients ( $P = 0.71$ ). More specifically, we found no statistically significant differences between the direct donors and the exchange donors, and also no difference between the direct recipients and the exchange recipients (respectively  $P = 0.83$ ;  $P = 0.35$ ). Furthermore, we found no statistically significant differences between men and women ( $P = 0.90$ ), and the sex of donors and recipients within a couple was not of influence on willingness to participate in altruistically unbalanced exchange donation ( $P = 0.79$ ). Donor-recipient relationship was not related to willingness to participate in altruistically unbalanced exchange donation ( $P = 0.35$ ). There seems to be a trend

**Table 1.** Willingness to participate in altruistically unbalanced exchange donation, given that a direct donation would also be feasible.

	Yes	Yes, probably	?	No, probably not	No	Total
Donors exchange ( $n = 24$ ) (%)	5 (21)	2 (8)	5 (21)	7 (29)	5 (21)	24 (100)
Donors direct ( $n = 24$ ) (%)	4 (17)	2 (8)	6 (25)	7 (29)	5 (21)	24 (100)
Recipients exchange ( $n = 24$ ) (%)	4 (17)	4 (17)	3 (12)	9 (37)	4 (17)	24 (100)
Recipients direct ( $n = 24$ ) (%)	4 (17)	5 (21)	3 (12)	4 (17)	8 (33)	24 (100)
Total ( $n = 96$ ) (%)	17 (18)	13 (13)	17 (18)	27 (28)	22 (23)	96 (100)

that nonnatives (compared with natives) are less willing to participate in this type of donation ( $P = 0.052$ ), but it should be noted that there were only six nonnative participants in our sample. Time on the waiting list seemed not to relate to willingness to participate in the exchange program solely to help another couple ( $P = 0.38$ ). We found a statistically significant correspondence between donors and recipients belonging to the same couple (Cohen's  $\kappa = 0.55$ ;  $P < 0.001$ ).

## Discussion

### The use of the term 'altruistically unbalanced exchange donation'

The term 'altruistically unbalanced exchange donation' refers to the situation wherein one ABO incompatible donor-recipient pair exchanges kidneys with another pair that is ABO compatible, but not identical. The term 'altruistically unbalanced' was used when this situation was described in the literature earlier [7]. To maintain continuity, we have chosen to use the same terminology for this paper. However, 'altruistically unbalanced' is quite a complicated term in that it is not clear what exactly is meant by altruism. Altruism can be defined in many ways. According to one definition, something is altruistic only when it costs you; if it is no bother for you, it's not really altruism [13]. Within this definition of altruism, it is possible to speak of degrees of altruism (more/less; low/high). As Ross and Woodle [7] define altruistically unbalanced exchange donation as a donation where 'more', or a higher degree of altruism is asked from one donor-recipient couple, it is likely that they conceive of the concept of 'altruism' as defined above. Looking at altruism in this way, the question is: are the costs attached to donating to a stranger (under the condition that your loved one will also receive a kidney) higher than donating directly to your loved one (so no stranger receives a kidney)? If we adhere to the definition of altruism as discussed above, the answer probably is yes. Our results show that at least half of our participants feel that donating indirectly in order to help more patients (taking into account that direct donation is also a possible option), indeed requires a 'higher degree of altruism'.

### Discussion of the results found

Willingness to participate in altruistically unbalanced exchange donation was not related to group (either exchange donation or direct donation), being a donor or a recipient, sex, donor-recipient relationship, or time spent on the waiting list. The questions then rises what is a determinant for willingness to participate in altruistically unbalanced exchange donation? From our results, it

seems that a factor like empathy, or 'altruism' in it's common sense meaning might be predictive for willingness. In this respect it might be helpful to refer to studies on altruistic (or anonymous, Samaritan, nondirected) donation. Especially a study by Landolt *et al.* seems of relevance here [14]. They found that persons who were likely to act as altruistic donors tended to score high on the 'Agreeableness' scale of the NEO-PI-R, a widely used and validated psychometric instrument for measuring stable personality characteristics [15]. Persons scoring high on 'Agreeableness' are moved by others' needs and show an active concern for others' welfare. Further research could investigate whether there indeed is a relationship between the personality characteristic 'Agreeableness' and the willingness to participate in altruistically unbalanced exchange donation.

Furthermore, our results showed that the quality of the exchanged kidney was an important factor in decision making about altruistically unbalanced donation. For instance, there were participants who choose against altruistically unbalanced donation, but were willing to switch if the exchanged kidney provided a better match. One person said for example, 'My first reaction is "no", but I would if it proved to be a better match, or if a child was involved'. Apparently the idea of better and worse matches are still common amongst donors and recipients, although nowadays it is known that the number of human leukocyte antigen (HLA) mismatches no longer accounts for a significant difference in successful living kidney transplantation [16].

### Practical implications

The main ethical objection to altruistically unbalanced exchange donation was raised by Ross and Woodle [7]: they were cautious to support altruistically unbalanced donation (mainly) because of the potential of donor coercion given the current organ shortages. However, we wish to emphasize the word *potential*, as in clinical practice coercion can be anticipated, for example by a protocol that describes how to prevent feelings of coercion and by giving the donor an independent confidant.

Next to the issue of potential coercion, altruistically unbalanced exchange donation has several other implications for potential participants, to cite Spital [12] 'giving up the comfort of knowing the donor intimately, jeopardize family visits after surgery and risk compromising the outcome by adding complexity and unknowns to the process'. As we explained in the results section of this article, all of these issues were recognized in the explanations of the 50% unwilling to participate in altruistically unbalanced exchange donation. The other half was either in doubt, or expressing a certain willingness to help two

recipients rather than one at the same time. However, it should be noted that attitudes may be subject to social desirability bias and may not be a good predictor for actual behavior. This is a limitation inherent to this type of research and only testing the idea in clinical practice will provide more insight into whether the attitudes found were accurate predictors of behavior.

Finally, it may be of relevance to refer to altruistic living kidney donation once more [14,17–20]. Although altruistic donation of course differs fundamentally from altruistically unbalanced *exchange* donation, there may be similarities with respect to the fulfillment of ‘altruistic wishes’, a desire to help another in meaningful way without receiving anything in return [17]. This motivation is recognized as ‘valid’, and nowadays altruistic donors are welcomed as a valuable ‘source’ of donor kidneys; yielding positive results both for the altruistic donors and the recipients [17–19]. Given our results and the positive experiences with altruistic kidney donation, perhaps the time has come to consider the altruistically unbalanced exchange donation more seriously as an addition to already existing living kidney exchange programs.

## Acknowledgments

We wish to thank the Dutch Kidney Foundation for supporting this study. We also wish to thank the physicians, surgeons and transplant coordinators from the Dutch transplant centers: AMC, LUMC, UMCN St Radboud, UMCU, AZG and AZM for their continuing co-operation and support during this study. We would like to thank Dr Hugo Duivenvoorden for his help with the statistical analyses.

## Funding

We would like to thank the Dutch Kidney Foundation for supporting this study.

## References

1. Dutch Transplantation Foundation, 2006 (<http://www.transplantatiestichting.nl>). Leiden: Nederlandse Transplante Stichting, 2006.
2. Kranenburg LW, Visak T, Weimar W, *et al.* Starting a crossover kidney transplantation program in the Netherlands: ethical and psychological considerations. *Transplantation* 2004; **78**: 194.
3. Stegall M, Dean P, Gloor J. ABO-incompatible kidney transplantation. *Transplantation* 2004; **78**: 635.
4. de Klerk M, Keizer K, Claas F, Witvliet M, Haase-Kromwijk B, Weimar W. The Dutch national living donor kidney exchange program. *Am J Transplant* 2005; **5**: 2302.
5. Delmonico F, Morrissey P, Lipkowitz G, *et al.* Donor kidney exchanges. *Am J Transplant* 2004; **4**: 1628.
6. Ross LF, Zenios S. Practical and ethical challenges to paired exchange programs. *Am J Transplant* 2004; **4**: 1553.
7. Ross LF, Woodle ES. Ethical issues in increasing living kidney donations by expanding kidney paired exchange programs. *Transplantation* 2000; **69**: 1539.
8. Zenios S, Woodle ES, Ross LF. Primum non nocere; avoiding harm to vulnerable wait list candidates in an indirect kidney exchange. *Transplantation* 2001; **72**: 648.
9. Thiel G, Vogelbach P, Gurke L, *et al.* Crossover renal transplantation: hurdles to be cleared! *Transplant Proc* 2001; **33**: 811.
10. Spital A. Donor exchange for renal transplantation. *N Engl J Med* 2004; **351**: 936.
11. Veatch RM. Organ exchanges: fairness to the O-Blood Group. *Am J Transplant* 2006; **6**: 1.
12. Spital A. Veatch's proposal may not work. *Am J Transplant* 2006; **6**: 855.
13. Seglow J. *The Ethics of Altruism*. London: Frans Cass, 2004.
14. Landolt MA, Henderson AJZ, Gourlay W, *et al.* They talk the talk: surveying attitudes and judging behavior about living anonymous kidney donation. *Transplantation* 2003; **76**: 1437.
15. Costa PT, McCrae RR. *NEO PI-R: Professional Manual*. Lutz FL: Psychological assessment resources, 1992.
16. Terasaki PI, Cecka JM, Gjertson DW, Takemoto S. High survival rates of kidney transplants from spousal and living unrelated donors. *N Engl J Med* 1995; **333**: 333.
17. Jacobs C, Roman D, Garvey C, Kahn J, Matas A. Twenty-two nondirected kidney donors: an update on a single center's experience. *Am J Transplant* 2004; **4**: 1110.
18. Morrissey PE, Dube C, Gohn R, Yango A, Gautam A, Monaco AP. Good Samaritan kidney donation. *Transplantation* 2005; **80**: 1369.
19. Crowley-Matoka M, Switzer G. Nondirected living donation: a survey of current trends and practices. *Transplantation* 2005; **79**: 515.
20. Hilhorst MT, Kranenburg LW, Zuidema W, *et al.* Altruistic living kidney donation challenges psychosocial research and policy: a response to previous articles. *Transplantation* 2005; **79**: 1470.