

# Living Donor Kidney Donation in the United States: *Quo Vadis?*

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After the first successful living donor kidney transplant between identical twins at Harvard in 1954, Joseph Murray, who received the Nobel prize, said of the recipient's famed nephrologist 'John Merrill and I had an understandable difference of opinion as to whether or not native kidneys (from healthy living donors) should be removed' (1). In the subsequent 6 decades, the controversies over removing kidneys from healthy donors remain.

Within a few years of this storied event, living donor transplantation from first-degree relatives became commonplace. In the early 1980s, living donation from donors who were 'emotionally related,' but not biologically related became more frequent. In 1986, in the pages of the *New England Journal of Medicine*, Levey et al. offered a cogent and prescient discussion of the opportunities for increasing biologically unrelated donation (2). In the ensuing years, the closeness of the emotional bond between donor and recipient has evolved into something quite elastic. The identification, evaluation and protection of so-called 'altruistic,' 'good Samaritan' or 'nondirected' donors (NDDs, our preferred term) and other donors with a limited relationship to the recipient has become the subject of intense scrutiny.

But how best to translate the remarkable gift of the NDD? A single kidney donated from an NDD can potentially be parlayed into several, potentially dozens, of chain transplants downstream (3). Contrary to the simulation study by Gentry et al. (4) referenced by Woodle and colleagues, actual

chains tend to be much longer than the predicted 1.9 transplants. In fact, of the approximately 25 chains completed to date, none have ever been less than two transplants long. Recently, a chain of a dozen transplants was completed from a single nondirected donor. The potential magnitude of multiple iterations to generate many more transplants is so potentially attractive as to outweigh, for many, the hypothetical concerns about the unintended consequences of such a policy.

Not so for Woodle and colleagues: In this issue, they linger in some detail over the potential unintended consequences for candidates waiting on the 'O' blood group list who do not have potential living donors (5). They observe that preferentially allocating 'O' blood NDD kidneys to exchanges and chains on utility grounds as a matter of policy, deprives 'O' blood deceased donor waitlist candidates of an opportunity to receive a living donor kidney. While it is true that an NDD organ allocated to initiate a chain is an organ not allocated to the next candidate on the deceased donor waitlist, these concerns can easily be resolved by arranging to have the last donor of the chain an 'O' or 'A2' and have this person close the chain by donating to the next 'O' candidate on the deceased donor waitlist. Additionally, 'O' blood group candidates on the deceased donor waitlist may yield collective benefits by preferentially allocating 'O' NDDs to trigger exchanges. As chains started by an 'O' NDD may liberate additional, otherwise unrealized living 'O' donors that would otherwise never have been utilized because of sensitization. This net gain of living 'O' donors in effect reduces the competition for organs on the 'O' blood group deceased donor waitlist.

The routine implementation of chains and exchanges with organs from nondirected donors confers additional systemic benefits. Alternatives such as positive-crossmatch transplantation requires a considerable financial investment, professional time and expertise, and comparable long-term outcomes may be threatened by a spectrum of ongoing antibody-mediated injury (6). Chains and exchanges also require investment in staffing and infrastructure but the inevitable 'angst' of facilitating complex chains is preferable to the clinical 'angst' of caring for the unintended complications arising from immunologically incompatible transplantation. Favorable media coverage has benefited transplant programs and institutions and served to emphasize the variegated humanity of living donor chain participants thus promoting the solidarity and trust that is

the foundation of broad societal support for organ transplantation.

National living donor exchange programs have been developed in South Korea and in the Netherlands where a concerted effort to promote living donation has yielded a 30% decrease in the deceased donor waiting list, providing affirmation of what can be achieved when centers cooperate on a national level. Efforts to develop a national system of kidney exchanges in the United States have recently floundered and efforts outside the transplant community have been mobilized to fill the vacuum. For example, the National Kidney Registry (NKR-authors GD and JV disclose board membership) has achieved 93-chain transplantations in less than 2 years, demonstrating unprecedented harmony between multiple transplant centers across the country.

But we will need to pay credence to the legitimate concerns of Dr. Woodle and colleagues. The prospect of large increases in the number of transplants yielded through pairs and chains should be tempered by an awareness of tacit coercive pressures on donors, breaches of confidentiality, unintended new disparities in access and vigilance in spotting unintended consequences. If we are to make meaningful inroads into the deceased donor waiting list, a concerted national effort will be required. There are wide geographic and programmatic variations in living donation in the United States, both in respect to related donation and the various forms of unrelated donation (7). Only a

few programs are systematically engaged in donation from NDDs, paired exchanges and chains. Living donation could well benefit from the application of the 'best practices' principles that have been developed by the National Organ Donor Collaborative for deceased donation. The 30% increase in donation that followed is a first target that would seem to be eminently achievable in living donation: we have no time to lose.

## References

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