Helping More Patients Receive a Living Donor Kidney Transplant

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Abstract

The best treatment option for many patients with kidney failure is a kidney transplant from a living donor. Countries that successfully increase their rate of living kidney donation will decrease their reliance on dialysis, the most expensive and high-risk form of kidney replacement therapy. Outlined here are some barriers that prevent some patients from pursuing living kidney donation and current knowledge on some potential solutions to these barriers. Also described are strategies to promote living kidney donation in a defensible system of practice. Safely increasing the rate of living kidney donation will require better programs and policies to improve the experiences of living donors and their recipients, to safeguard the practice for years to come.

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Introduction

Mary is a 67-year-old woman with diabetes and hypertension, who has been followed in an outpatient nephrology clinic for the past 2 years. She is compliant with recommended treatment, has good physical and cognitive function, but is obese (224 pounds; body mass index 37.5 kg/m^2). She is widowed, has three children, has a modest pension, and comes alone to appointments. Unfortunately, her kidney function continues to decline. Her most recent laboratory results show a serum creatinine of 260 μmol/L (2.9 mg/dl), an eGFR of 16 ml/min per 1.73 m^2, and a random urine albumin-to-creatinine ratio of 60 mg/mmol (530 mg/g). Her estimated chance of needing kidney replacement therapy is 31% in 2 years and 68% in 5 years (www.kidneyfailurerisk.com) (1). Although you aim to preserve her native kidney function for the longest time possible, you wish to advance a plan of kidney replacement therapy. Treatment options to discuss with Mary include (1) taking a conservative, palliative-care approach to therapy (not aligned with Mary's current goals of care) (2), planning for dialysis delivered in-center or at home, and (3) seeking a kidney transplant from a deceased or living donor.

Receipt of a kidney from a living donor could be Mary's best treatment option. Compared with dialysis, a kidney transplant would give her the best chance of a longer life—her estimated 3-year survival in the United States with a living donor transplant would be 96% compared with only 66% on dialysis (assuming her health characteristics remain stable until the start of treatment; www.ichoosekidney.emory.edu) (2). She is more likely to feel better, allowing her to be more active and have an easier time traveling to visit grandchildren. Finally, receiving a kidney from a living donor would save Mary from waiting many additional years for a deceased donor kidney (and her estimated 3-year chance of survival in the United States with a living donor transplant would be 96% compared with 94% with a deceased donor transplant) (2). Ideally, Mary could receive her living donor transplant preemptively, avoiding any exposure to dialysis (3). In the Canadian publicly funded healthcare system, receipt of a kidney transplant would save an estimated CAN$200,000 in averted dialysis costs over 5 years (4,5).

Unfortunately, in many countries, including the United States and Canada, many people like Mary will not receive a kidney transplant. In many countries, the waiting list for deceased donor kidneys continues to grow with the rising number of patients with advanced kidney disease, and rates of living donor kidney transplants have stagnated over the last decade (as seen in the United States, Canada, Brazil, Australia, and New Zealand) (6). Increasing the rate of living kidney donation would help meet the demand for transplantable kidneys (7,8).

Using Mary's case as an illustrative example, some barriers to living donor kidney transplantation are discussed. Current knowledge on some potential solutions that address these barriers are then considered, followed by the context in how we promote living kidney donation in a defensible system of practice.

Barriers to Living Kidney Donor Transplantation

There are many barriers to receiving a living donor kidney transplant (Figure 1). These begin with Mary (at the level of a patient with advanced kidney disease) and extend to her support network of family and friends (who may also become living donors), her healthcare providers, and the healthcare system.

Barriers Experienced by Patients with Advanced Kidney Disease

Mary may lack knowledge about her treatment options (9–11). Each time Mary visits her nephrology

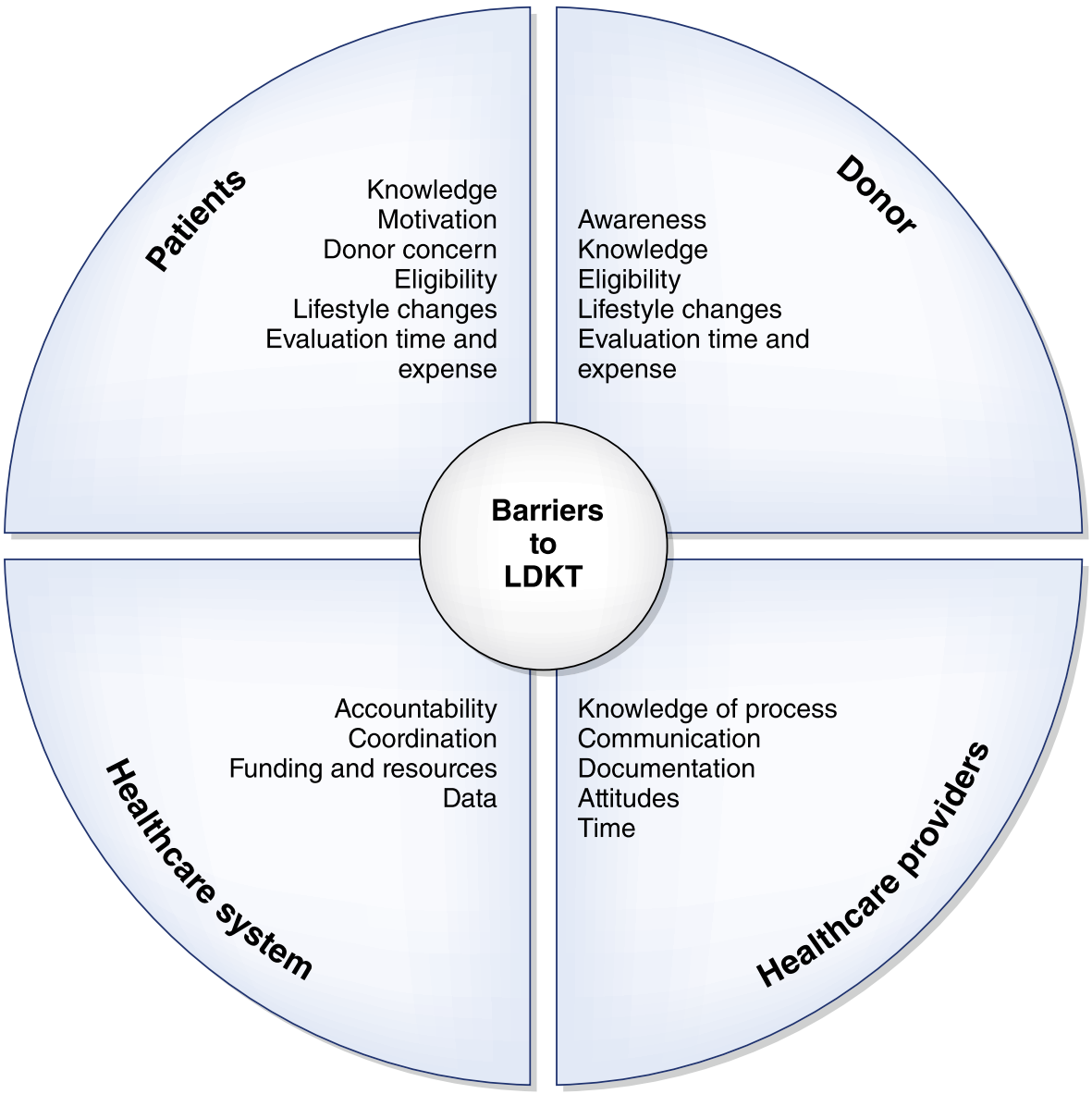

Figure 1. | **There are several barriers to living donor kidney transplantation.** Some barriers to living kidney donor transplantation (LKDT).

clinic, there is a great deal of information to take in. It is very stressful to learn that one of your vital organs is failing, and it would be natural for Mary to feel overwhelmed and have trouble processing the necessary information to make medical decisions. Some patients refer to this as "kidney brain." Some patients with kidney disease also have low health literacy (12). It is also possible Mary will not receive complete information from her health professionals.

Mary may feel conflicted about living donor kidney transplantation. She may feel uneasy or unsure of how to go about the process or believe she does not deserve someone else's kidney. She may be hesitant to ask potential donors in case they feel pressured, feel afraid that no one will come forward to offer her a kidney, or anticipate disappointment about being turned down for her request (13). As highlighted in one national campaign, "many people won't get a transplant simply because they don't know how to ask" (US National Kidney Foundation, the Big Ask Big Give campaign) (14). Beyond asking, Mary may fear for the future health of the donor, feel guilty because she thinks the donor will be inconvenienced or put at risk, or become anxious about being indebted to the donor and wonder if their relationship will change (13). She may not understand that many donors benefit from the donation process. For example, her children may take on care responsibilities were she to begin dialysis treatments, which would be relieved were she to receive a transplant (15). In a systematic review of 51 studies describing 5139 donors who were assessed on average 4 years after donation, most donors reported no change or an improved relationship with their recipient, spouse, family members, and nonrecipient children, and some experienced an increase in self-esteem (16).

Mary will also need to be assessed for transplant eligibility. Although this may occur concurrently with her search for a living donor, some transplant centers in Ontario, Canada advise nephrologists not to complete transplant evaluation

testing before dialysis initiation unless they have a reasonable prospect of a living kidney donor (given that the current wait time for a deceased donor kidney is 4 years, and doing the testing early means that it becomes outdated). Many transplant centers prefer or require intended recipients to have a body mass index <35 kg/m^2, which may mean Mary will need to lose at least 15 pounds. Mary can expect to undergo many tests. In addition to standard and infectious disease blood work, Mary will need to have up-to-date colon, cervical, and breast cancer screening, an abdominal/kidney ultrasound and, because she has risk factors for heart disease, a cardiology consult, which can include an echocardiogram and noninvasive cardiac testing (*e.g.*, a nuclear stress test). At the transplant center, Mary might have consultations with nurses, a social worker, a nephrologist, and a surgeon–a process that takes many months. These evaluation requirements will require Mary's time and she may incur substantial expenses for travel and accommodation depending on how far she lives from her transplant evaluation center.

Barriers Experienced by Family and Friends of Patients with Advanced Kidney Disease

Mary has not shared her current situation with her three children or her extended family and friends because she has not wanted to worry them. They are completely unaware of how they can support Mary in her decision-making to pursue a kidney transplant. They may be unaware of the opportunity of living kidney donation, or may have cultural barriers (*e.g.*, [mis]interpretations within their community about living donation) (17), genetic or environmental barriers (*e.g.*, familial diseases or shared risk factors [diabetes, obesity]), or socioeconomic barriers (the donor will be off work for several weeks for the evaluation, surgery, and recovery). As with the recipient, donor candidates undergo extensive evaluation to assess their eligibility to donate. Approximately four out of every five candidates who contact a center do not proceed with donation (some are screened out after some initial questions, some are screened out after consults and testing, some never complete the testing to assess eligibility, and some do not donate because the recipient dies, becomes ill, receives a deceased donor kidney, or receives a kidney from another living donor) (18,19). Some candidates will also need to make some lifestyle changes (*e.g.*, to quit smoking or achieve a body mass index <30 kg/m^2). Donor candidates must complete screening questionnaires, blood and urine tests, diagnostic tests (abdominal computed tomography angiography), and specialist consultations (nephrologist, surgeon, and an assessment of psychosocial health). These evaluation visits take time (including time off work), and many candidates incur expenses for travel and accommodation, which are not always reimbursed (20). In many regions, the average time from when the donor first contacts a transplant center to the date of donation is almost a year (18,21).

Barriers at the Level of Healthcare Providers

Mary will require the support of her primary nephrologist and healthcare team in her decision to seek a transplant (22). Without sufficient information on her treatment options, Mary may believe that dialysis and living donor kidney transplantation offer similar outcomes. If Mary is experiencing uncertainty, she and her provider may delay making a difficult decision and opt to start hemodialysis with a catheter when kidney replacement is needed. The kidney clinic is a busy environment, and health professionals may lack the time and resources to fully guide and educate Mary in her transplant decision-making, and to enable her transplant evaluation should she wish to proceed. They should keep accurate notes on transplant discussions, which often need to be repeated on several occasions (23). Mary's healthcare professionals may lack knowledge or have misunderstandings about the benefits, risks, and process of living donor kidney transplantation. Complicating matters is the lack of consensus even among experts that the risks are fully determined, or that the risks are always justifiable. In addition, any education and supportive materials to help Mary make an informed decision need to be culturally appropriate (24).

The best time to refer someone like Mary for transplant evaluation remains uncertain. If Mary begins her transplant evaluation too soon and her kidney function does not decline as quickly as expected, her initial testing may become outdated and need repeating. Her provider may also be concerned that, on the basis of her characteristics, Mary's chance of dying or having a major adverse cardiovascular event in the next 2 years is approximately 15%, which could preclude a kidney transplant (estimates from a calculator developed by the CKD Prognosis Consortium: ckdpcrisk.org/lowgfrevents) (25). Communication between the primary nephrologist and transplant center can be poor, which can prolong the evaluation. The primary nephrologist is often uncertain whether a living donor candidate will be approved and may need to support their patient in finding more candidates.

Barriers at the Level of the Healthcare System

The healthcare system should be designed to support Mary in her pursuit of kidney transplantation when her kidneys fail (if that is her treatment choice). General nephrologists and kidney clinics may lack adequate resources to provide the education and support Mary needs to make fully informed transplant decisions. Financial incentives may also be misaligned: each successful transplant in some healthcare systems may mean the nephrology program and the nephrologist lose the associated income that would come from dialysis. The electronic medical information from nephrology programs and transplant centers may not be linked, making processes inefficient and difficult to analyze.

Solutions to Improve Patient Experiences and Safely Increase Access to Living Donor Kidney Transplantation

Mary's case description illustrates how complex it can be for her to receive a living donor kidney transplant, particularly one that is preemptive and avoids exposing her to dialysis. In the province of Ontario in Canada, health professionals, researchers, living donors, recipients, and patients with kidney failure are working together to better understand the barriers that prevent living donor kidney transplants, and to advance solutions which overcome them (26). The literature was reviewed, and expert

colleagues were consulted. Ontario is not alone; efforts to improve standards and opportunities in living kidney donation are the focus of many professional groups (7,27,28).

A patient with kidney failure needs to complete their evaluation and be approved to receive a kidney transplant (irrespective if it is from a deceased or living donor). Connecting patients with peer mentors may help more patients receive a kidney transplant; peer mentors are uniquely able to provide practical guidance and emotional support on the basis of their lived experience. Peer mentorship was highly ranked by recipients and donors at a workshop hosted in Ontario (26), and two clinical trials have shown that more patients receive transplant referrals and progress through the evaluation process when they interact with kidney transplant recipients trained as peer mentors (29,30). In one of these trials (conducted in 134 dialysis centers in Georgia) only about 11% of patients were referred for transplant evaluation in the year after dialysis initiation; this increased to 17% after the intervention (30). In this trial, peer mentorship was included as part of a multicomponent strategy that provided education and engagement activities targeting dialysis directors, staff, and patients. Compared with usual care, dialysis centers that received the intervention had a significant increase in (*1*) referrals for transplant evaluation, (*2*) completed transplant evaluations, and (*3*) transplant wait-listing. This intervention also reduced racial disparities in access to transplantation.

Adding home visits to routine clinic-based education shows promise for specifically increasing access to living donor kidney transplantation. Clinical trials conducted by Rodrigue *et al.* (31,32) and Ismail *et al.* (33) have evaluated novel interventions with home visits, where these visits occurred over one or two occasions, were led by an allied health professional, and provided an opportunity to engage a patient's family members, friends, and significant others in a discussion about transplantation. Beyond providing education, these visits assisted patients in mobilizing their social network to build consensus on what their best treatment option might be (taking the onus off the patient with kidney failure from doing it on their own). Importantly, these interventions achieved an >50% increase in the number of living donor evaluations and kidney transplants compared with the control group.

Several other strategies show promise in increasing access to living donor kidney transplantation whereas other strategies do not (summarized in a review by Barnieh *et al.* [34]). These strategies involve complex processes and include greater education for patients with kidney failure, removing disincentives (such as the expenses incurred by donors), a web-based system for donor-candidate screening, use of transplant champions to help intended recipients prepare for kidney transplantation (including finding living kidney donors), and creating dedicated multidisciplinary healthcare teams to support living kidney donation (34,35). Rigorous research methods are needed to assess the effects of complex interventions (36). Our team has responded by launching a cluster-randomized trial of 26 CKD programs in Ontario; these programs care for about 10,000 patients on dialysis and 15,000 patients with advanced CKD. We will test whether a multicomponent strategy (which includes data audit and feedback, transplant ambassadors, educational resources, and provincial coordination with administrative support) improves access to living donor kidney transplantation (the Enable Access to Kidney Transplantation and Living Kidney Donation trial) (ClinicalTrials.gov: NCT03329521).

Promoting Living Kidney Donation in a Defensible System of Practice

Living kidney donation raises ethical considerations for health professionals who help patients and their families pursue this treatment option (35). A person who becomes a living donor (and to a lesser extent a person who is evaluated as a living donor) is accepting some degree of personal risk that they would not otherwise incur. Diverse issues may arise during evaluation. Discovered health conditions may affect a person's insurability, and occasionally candidates may have an adverse reaction to the intravenous contrast used in computed tomography angiography. Misattributed paternity is sometimes discovered in father-child relationships (37). Candidates may have negative psychosocial consequences if they are deemed ineligible to donate (35). The evaluation process takes time and energy for all those involved, and the candidate can incur substantial financial costs (38). For every 3000 people who proceed with donation, one may die due to the surgery, and another 15 may suffer a serious postoperative complication such as a pulmonary embolism or a need to return to the operating room (39). The donor will be on restricted duties for 6 weeks while recovering from the surgery, and on occasion may have a poor psychologic outcome, particularly if the recipient's graft fails (in 2%–5% of transplants, the graft will not take or will last less than a year) (40). Long-term medical outcomes include a higher risk of ESKD (the absolute risk is <0.5% over 15 years), and uncertainty remains about the lifetime risk of several other outcomes (41). When promoting living kidney donation, health professionals may "subject" some donors (who would have not come forward otherwise) to these risks; professionals can experience significant distress when a living donation they enabled has a poor outcome. Health professionals must be comfortable in their belief that the expected benefits outweigh the harm and be confident that the donor and recipient are proceeding with a full understanding of the possible outcomes. A donor can derive several benefits from a successful transplant, including a better family life when their loved one with kidney failure is healthier.

Advocates and professionals on the donor's evaluation team, who are separate from the intended recipient's care, play an important role in a defensible system of practice. The operating procedures for donor evaluation teams continue to evolve. An international team of experts developed updated guidelines for the evaluation and care of living kidney donors, summarized in the 2017 Kidney Disease Improving Global Outcomes International Clinical Practice Guidelines (27). A key responsibility of health professionals who evaluate donor candidates is to approve only those candidates with an acceptably low forecasted risk of postdonation complications (appreciating this is sometimes easier said than done as in the community

there are ongoing debates on what level of risk is acceptable, for whom and under what circumstances). For donors who proceed with surgery, health professionals should enable pre- and postdonation care that minimizes the risk of complications. In the past decade, living donor outcomes have received more attention than ever before (38,42–47). Ongoing efforts are needed to better understand and mitigate poor donor outcomes on the basis of a candidate's specific characteristics, and share new information with the estimated half a million living kidney donors worldwide.

In conclusion, increasing the rate of living kidney donation will decrease reliance on dialysis, the most expensive and high-risk form of kidney replacement therapy. Safely increasing the rate of living kidney donation will require better programs and policies to improve the experiences of living donors and their recipients and to safeguard the practice for years to come.

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