Implementing Change to Increase Living Donor Kidney Transplant Rate in the United States: a Multi-Strategy Approach

Jessica K. Costales, MBS
Western University of Health Sciences, Pomona, CA, USA

There are over 106,000 patients registered on the United States (U.S.) kidney transplant wait list, and only an average of 14,000 kidney transplants are performed each year.\(^1,2\) Consequently, patients with end stage renal disease or kidney failure typically wait 4 to 7 years for a kidney transplant, often requiring dialysis during this waiting time.\(^1\) Although dialysis is a life-saving treatment, it is frequently accompanied by complications, including anemia, hypertension, and cardiovascular disease.\(^3\) Kidney transplantation is a more effective alternative than lifelong dialysis, since it reduces the risk of mortality and improves quality of life for these patients. However, despite these advantages, there are not enough donor kidneys to meet the demand. Adding to the concern is that the gap between the supply and demand for kidneys has potential to grow at an even faster rate, as the increasing prevalence of diabetes mellitus in the U.S. puts more individuals at risk for end-stage kidney disease. As a result, the medical community is in urgent need of novel methods to increase the rate of kidney transplantation to lower the average wait time and avoid the serious long-term complications of dialysis, including death.

There have been numerous studies on strategies to reduce the kidney transplant wait list. These strategies aim to boost either the number of willed organ donations or the number of living organ donations. To raise the number of deceased organ donor transplants in the U.S., organ allocation has been extended to non-heart-beating donors. Donors are considered “non-heart-beating” when the individual was pronounced dead from cardiocirculatory criteria prior to organ allocation. Organs procured from individuals that were considered dead from neurological criteria are considered heart-beating donors. Initially, only organ allocation from cadaveric heart-beating donors were performed, but the extension to include non-heart-beating donors has made more cadaver kidneys available for transplant. Implementation of the Expanded Criteria Donors (ECD) list in 2003 has positively

As a result, the medical community is in urgent need of novel methods to increase the rate of kidney transplantation to lower the average wait time and avoid the serious long-term complications of dialysis, including death.”
impacted the availability of cadaver kidneys in the U.S. as well. The kidneys available through this system would not have passed the standard criteria for deceased donor kidneys prior to 2003, as the kidneys on the ECD list are from donors classified with “medical complexities” at the time of organ allocation. These include patients either 65 years of age or older at the time of death or between the age of 50-59 with a history of one or more of the following: 1) cerebrovascular accident as the cause of death; 2) a history of hypertension; or 3) a creatinine level of 1.5 mg/dL or greater at the time of death. Registration on the ECD list is optional, as these kidneys are not expected to have as long of a graft survival compared to standard criteria kidneys. Nevertheless, this is a viable option for certain patients.

Other proposed strategies to improve allocation of deceased donor kidneys in the U.S. involve legislative changes. Currently, the U.S. operates under “opt-in” and mandated choice systems where consent to donate organs must be given by the individual upon state registration or through the family at the time of death. The alternative is the “opt-out” or presumed consent system, as seen successfully implemented in Spain. Under this system, individuals are automatically registered as an organ donor unless a formal request to be opted out of the program is made. Though the “opt out” system has contributed to a short six-month wait time in Spain, the switch to this system has been controversial in the U.S.

Proposed strategies to increase deceased donation that involve legislative change are drastic and are not likely to be implemented in the U.S. in the near future. Thus, these strategies are beyond the scope of this discussion. However, strategies that aim to increase living kidney donation do have the potential to impact the average wait time for kidneys in the near future.

**Living Donation**

Living donation makes up over 25% of all kidney transplants in the U.S. Living donations can be further classified into two types: directed and non-directed. Directed living donation involves the donor—whether a blood relative, spouse, friend, or altruistic stranger—donating to a specific patient. This type of donation includes paired exchange donation, where a non-compatible donor-recipient pair is matched with another non-compatible donor-recipient pair due to compatible blood and tissue typing of the opposite pair. In non-directed donation, an anonymous altruistic stranger (or “Good Samaritan”), donates a kidney to a non-specific individual, allowing the transplant center to allocate the kidney accordingly. While directed donation from emotionally attached blood relatives, spouses, or friends are the most common type of living donation, non-directed donation has increased in the past two decades. In 1992, there were no anonymous donations performed in the U.S., whereas there were 161 anonymous donations performed out of a total of 5,617 living kidney donations in 2012.

Strategies to increase living kidney donation that have already been implemented in the U.S. include extending living donor transplants to both blood-related and unrelated donors. The widespread use of laparoscopic living-donor nephrectomy during kidney acquisition has also increased living donation, because acquiring kidneys from living donors with this procedure, as opposed to the traditional method of open-nephrectomy, leads to decreased hospital stays, recovery time, and less scarring for the donor.

A more controversial strategy is Iran’s paid and regulated living donation system. In this program, if a transplant candidate lacks a living relative suitable for donation, they are referred to the “Dialysis and Transplant Patients Association” (DATPA), which locates an
appropriate match among its pool of registered living donor volunteers. After transplantation, the government grants the donor an award and health insurance. An additional award, pre-arranged by the DATPA before surgery, is also given to the donor from the patient or from a charitable organization (if the patient cannot afford to give a gift). This system was implemented in 1988 and completely eliminated the country’s wait list by 1999.5

In the current model practiced in the U.S., deceased and living donation rates are only sufficient to transplant a fraction of the total number of patients on the wait list every year.2 With respect to deceased donor kidneys, the rate of transplantation has remained relatively steady in the U.S. Organ allocation has already been expanded to include non-heart-beating donors and donors with medical complexities through the ECD list. Without making significant national legislative changes or hoping for change in the social perception of kidney donation, the rate of deceased donor kidney transplantation is likely to remain steady. Therefore, the most rational option left to lower the wait time for a kidney is to increase living donor transplantation. This article proposes a multi-strategic approach to bolster living donation rates by making changes at the level of the transplant center. This involves establishing local living donor networks and dedicating subgroups within the transplant team that specialize in living donor outreach and awareness.

**Improve Transplant Center Coordination of Living Donation**

Over the past two decades, the number of living donations has increased by 58.4%.2 Despite this increase, the current system of living donation coordination at transplant centers nationwide poses limits to the number of theoretically possible living donations. For instance, some patients do not seek potential living donors because they find the search uncomfortable or overwhelming. These patients then lose the possibility of having a living donor transplant. If transplant centers provided assistance, it would maximize the opportunity for a kidney transplant for these patients. Improved local transplant center advocacy and coordination would potentially help living kidney donation reach its full potential. U.S. kidney transplant centers can achieve this through adoption of three specialized subgroups: (1) Hospital-Coordinated Altruistic Donor Network, (2) Hospital-Coordinated Kidney-Paired Donation Network, and a (3) Living Donor Advocacy Group. The remainder of this discussion will focus on benefits of these types of specialized coordination.

**Hospital-Coordinated Altruistic Donor Network**

Various ethical considerations arise with respect to directed or non-directed stranger donations, where the living donor is a non-blood relative or friend of the potential recipient. By law, stranger donations occur at the discretion of the transplant center. For transplant centers that allow this, it is important that the transplant team determines whether the donor is psychologically stable, not coerced, and not gaining financial or social incentive for donation. It is currently the responsibility of patients to find a stranger for directed donation on their own. This can be done by word of mouth in the patient’s community or through the use of external websites. With respect to non-directed donations, interested altruistic donors have the option of contacting their local transplant center. The center is then responsible for finding a suitable recipient. This has been implemented by centers like the Mayo Clinic;6 however, many
centers do not have similar standard protocols to address these types of situations.

Under this proposal, each transplant center allowing stranger donation would have a subgroup within their team dedicated to coordinating their own “Altruistic Living Donor Network.” This network would serve as a type of hub where interested directed and non-directed altruistic donors can register and receive personalized help in facilitating the donation process. The transplant center can then initiate matching of interested candidates to recipients. Furthermore, this network would make it easier for interested candidates to obtain further information from the transplant team and ensure that an educated decision is made.

**Hospital-Coordinated Kidney-Paired Donation Network**

At most transplant centers, if a healthy donor proves to be an incompatible blood or tissue match to the patient, the transplant is not performed and typically no further action is taken. In the ideal case, paired-donations would be actively coordinated by transplant centers whenever an interested donor is not a match for the intended recipient. However, this is not commonly practiced since transplant teams do not have enough personnel or time to coordinate this type of complex and intensive process. Whereas Good Samaritan donors who are altruistically motivated to donate may be more likely to continue searching for a suitable recipient after an initial rejection, emotionally attached potential donors may have a lower likelihood of seeking another recipient because their intention is for donation to a specific person, such as a spouse, relative, or friend. Regardless, this illustrates the need for better hospital coordination of kidney-paired donation to avoid the loss of potential donors in either type of situation.

In October of 2010, the National Organ and Procurement Network (OPTN) established a pilot program for paired kidney donations. In collaboration with participating transplant centers, this system performs matched runs every four to five weeks searching for compatible donors and recipients that have completed screening at participating transplant centers. Though this type of national network can certainly increase the number of living donations, moving this type of responsibility to the level of the transplant center is a safer and more efficient way to identify matches and coordinate surgeries. In the proposed Hospital-coordinated Kidney-paired Donation Network, the coordinating transplant team would be familiar with the medical histories, registered patients, and potential donors, which would aid in both safety and identification of suitable matches. Familiarity would also increase patient safety during such intensive surgeries. Finally, having the surgery at the same transplant center, where both pairs are registered, would save money and avoid the inconvenience involved in the long-distance travel associated with the national kidney paired network provided by OPTN.

**Living Donor Advocacy**

The process of asking individuals to be a potential living donor can be stressful for the patient. Assistance in this process removes the added pressure for patients that are embarrassed or find it difficult to ask relatives and friends for a kidney. Modeled on the approach to living kidney donation practiced in Norway, in which physicians act as patient advocate by contacting possible living donors for their patient, this proposal would establish a dedicated subgroup within the transplant team specializing in patient advocacy. This group would have the responsibility of consulting the patient for a list
of potential living donors and contacting those individuals on behalf of the patient. This Living Donor Advocacy Group is yet another avenue that transplant teams can use to improve the living donation transplant rate.

The current demand for kidneys in the U.S. far exceeds the supply, and the gap is likely to expand in the future. Changes must be made to increase the rate of kidney transplants and decrease the average wait time from the current 4 to 7 year wait. Significant improvements in the number of available deceased donor kidneys will likely involve major legislative or social changes; thus, increasing the rate of living donations is a more promising avenue. Better coordination of living donation through established networks and patient outreach at the level of the transplant center could improve the living donation rate in the U.S. The Hospital-coordinated Altruistic Donor Network, Hospital-coordinated Kidney-paired Donation Network, and Living Donor Advocacy Group are three approaches for better coordination of living donation proposed in this paper. Widespread implementation of one or more of these programs at transplant centers nationwide could greatly improve transplant rates and make an impact on the average wait time for kidney transplants in the U.S.

“**The current demand for kidneys in the U.S. far exceeds the supply, and the gap is likely to expand in the future.**”

---

**ACKNOWLEDGEMENTS**

The authors would like to thank Christopher R. Cantrell, MBS.

---

**REFERENCES**


