

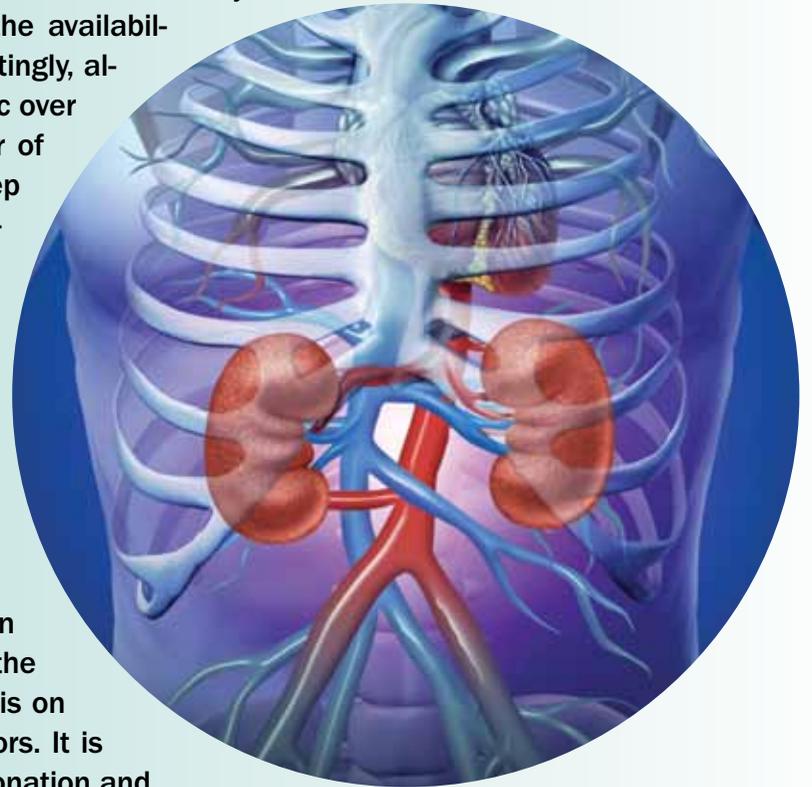
The Living Kidney Donor

By Sindhu Chandran and David Wojciechowski

The increasing prevalence of end stage renal disease (ESRD) has led to a steady growth in the kidney transplant waiting list, rapidly outpacing the availability and transplantation of organs from deceased donors. Interestingly, although overall living donation rates have remained relatively static over the last several years the one exception is a rise in the number of living non-spouse unrelated donors, including altruistic donors. The first step in addressing the disparity between the waiting list and access to living donation involves education of the public about the process of living kidney donation. It is our responsibility as a medical community to emphasize donor safety and insist upon data to support the appropriate medical counseling of donors.

In this special issue of *ASN Kidney News*, we address issues pertinent to donor health and safety by drawing upon the experience and knowledge of experts in the field. First, we bring you the latest trends in donor screening and advances in the donor surgical procedure. In order that physicians may better counsel potential donors, long-term outcomes in living kidney donors are discussed next. Given the disproportionately high incidence of ESRD in racial and ethnic minorities, we then review unique issues associated with the evaluation of potential donors in these vulnerable groups, with an emphasis on long-term donor health. We then discuss the appropriate follow-up of donors. It is our hope that this series will improve your understanding of living kidney donation and better equip you to counsel patients and families about living donation.

Sindhu Chandran, MBBS, and David Wojciechowski, DO, editors of this special section, are assistant clinical professors of medicine in the division of nephrology at the University of California, San Francisco.



Trends in the Screening and Acceptance of Living Kidney Donors

By Didier A. Mandelbrot

The use of living donors for kidney transplantation in the United States has become increasingly common, with recipients of a living donor kidney demonstrating better outcomes and shorter waiting times. Substantial differences exist between transplant centers in their choice of protocols and exclusion criteria for potential living donors. Nevertheless, certain trends in living donation practices over the past 20 years, reflecting a relaxation of some acceptance criteria and a tightening of others, have become apparent from surveys of transplant programs (1) and analysis of registry data collected by the United Network for Organ Sharing (UNOS) (2).

Donor-recipient relationships

One of the most dramatic trends among living donors is in the relationships between donors and recipients. Over the past 12 years, genetically unrelated, nonspousal donors have more than doubled (Figure 1). In a 1986 survey, only 16 percent of transplant programs in the United States reported that they would accept living unrelated donors—compare this to 31 percent in 1995 and 100 percent in 2007. The acceptance of nondirected (altruistic or Good Samaritan) donors has also increased, from 8 percent of programs in 1989 to 38 percent in 2000 to 61 percent in 2007.

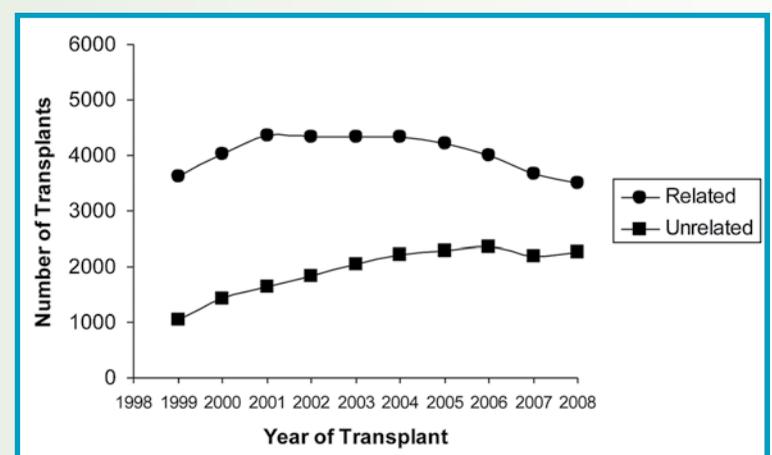
Donor age

Living kidney donors are now older. In 2008, 1.5 percent of living kidney donors were over the age of 65, compared to 0.7 percent in 1988. Between 1995 and 2007, the percentage of programs without a set upper-age limit more than doubled to 59 percent. In contrast, programs became stricter with respect to younger candidates. No programs reported an age cutoff of 14 or 16 years in 2007, and almost none reported having no lower age limit at all. Quantitatively, however, young donors are less common than older donors, so the increase in the median age of donors from 35 to 41 years between 1988 and 2008 suggests an overall trend toward less restrictive age criteria for donors.

Kidney function

Most transplant programs in the United States continue to use a 24-hour collection to measure creatinine clearance, although some use a direct measure of GFR (e.g., iodinated marker) or an estimated GFR formula. Although UNOS data suggest no statistically significant changes in the mean serum creatinine or eGFR of donors over the past decade, surveys indicate changes in specific practices. In contrast to 1995, when some programs reported using lower creatinine clearance cutoffs of 60 mL/min/1.73 m² or even 40 mL/min/1.73 m², by 2007 no programs reported using a cutoff below 80 mL/min/1.73 m².

Figure 1. Trends in living related versus living unrelated, nonspousal donors in the United States.



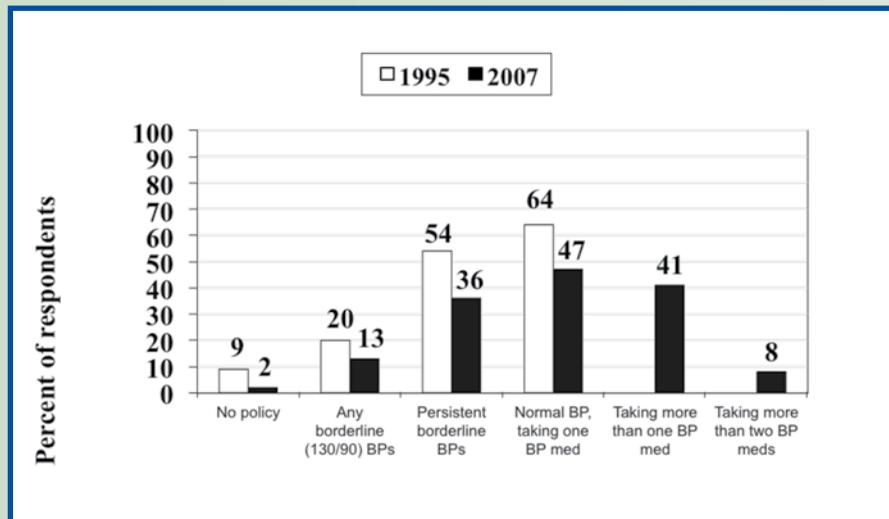
Data from www.UNOS.org.

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Trends

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Figure 2. Exclusion criteria by category of blood pressure reported in surveys from 1995 and 2007.



From Mandelbrot et al. (1). Abbreviation: BP = blood pressure.

Hypertension

Exclusion criteria for blood pressure have become less restrictive, although they remain highly variable among centers. In 1995, most programs excluded candidates taking antihypertensive medications or having borderline hypertension. By 2007, 47 percent of programs excluded candidates on any antihypertensive medication, but 41 percent excluded donors only if they were taking more than one medication, and 8 percent excluded donors only if they were taking more than two medications (Figure 2). This trend may be partly due to data suggesting that donation by selected patients with well-controlled hypertension appears to be safe in the short term.

Thus, significant variability remains among transplant programs in the medical criteria used to evaluate donors, but there are clear overall trends. Protocols for the evaluation of potential donors will continue to evolve as more data on outcomes emerge, especially regarding medically complex donors. ●

Didier A. Mandelbrot, MD, is medical director of the Living Kidney Donor Program at Beth Israel Deaconess Medical Center, director of clinical trials at the Transplant Institute, and associate professor of medicine at Harvard Medical School, in Boston.

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Advances in Living Donor Nephrectomy

By Dorry Segev

In 1995, Ratner, Kavoussi, and colleagues at Johns Hopkins University revolutionized live kidney donor transplantation through the development of the laparoscopic donor nephrectomy (1). Since then, the number of live donor transplants in the United States doubled, the number of live donors who are not biologically related to the recipient rose by more than fivefold, and the proportion of donor nephrectomies performed laparoscopically (or laparoscopically assisted) neared 100 percent. Today, approximately one-third of donor nephrectomies are performed using pure laparoscopic techniques, and approximately two-thirds are performed with the additional insertion of one of the surgeon's hands into the abdomen.

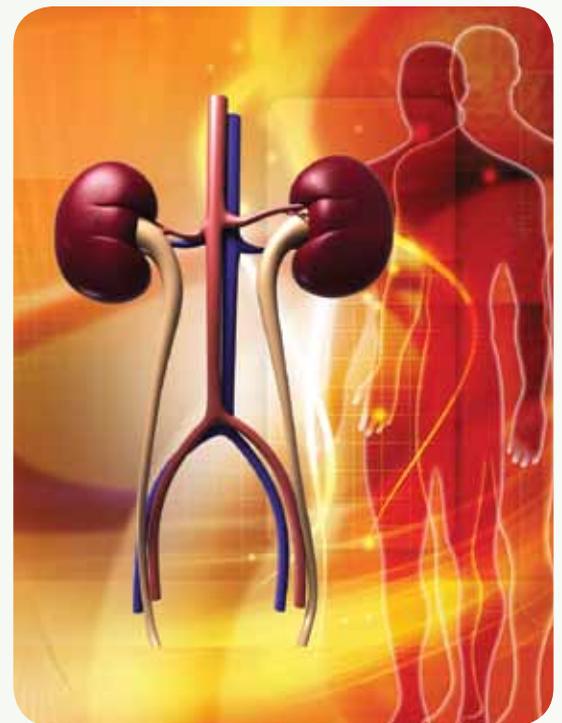
In an effort to further minimize the already minimally invasive donor nephrectomy, several approaches have been recently explored. One concept reported by multiple centers, first among urologists excising diseased kidneys and later for the purposes of donation, is the single-port approach (2). Instead of separate ports for dissection and an additional (usually Pfannenstiel) incision for extraction of the kidney, a multiport device is placed through a peri-umbilical incision, and through this device are introduced all of the dissecting instruments. When the kidney is ready for extraction, it is removed through the same peri-umbilical incision after removing the multiport device. Obviously, the size of this incision is the Achilles heel of this approach, and the size can vary based on the size of the kidney and the size of the patient. In the setting of excising diseased kidneys, the kidney can be removed piecemeal and generally does not require an umbilical incision larger than the smallest possible dissecting multiport. However, in the setting of kidney donation, obviously the kidney must be removed intact without any compromise to its anatomic integrity, and this defines the length of the inci-

sion. While patients are reportedly pleased with the cosmetic results, demonstrating medical benefits has been more challenging in the early experience of this operation. It remains unclear if the risks associated with this technique, including the narrower window of laparoscopic instrument triangulation, are outweighed by its benefits.

We recently described a modified laparoscopic technique that maintains the traditional dissection ports (and hence the window of triangulation) but obviates the larger incision for extracting the kidney. Instead of using the traditional Pfannenstiel extraction, our team, led by Robert Montgomery, removed the kidney transvaginally through a posterior colpotomy used to communicate with the abdomen (3). Patient outcomes were excellent, including a very short postsurgical hospital stay, minimal need for analgesia, and no apparent sequelae of the colpotomy; however, the total world experience with this procedure remains very small.

While surgical innovations are exciting and possibly compelling, they must be explored in the context of maximizing patient safety. Recent reports by Friedman, Ratner, and Peters of persistent use of Hem-o-Lok clips, despite clear evidence that these non-transfixing clips have on multiple occasions dislodged from the renal artery and led to donor deaths, are sobering reminders of the need to maintain patient safety above all else (4). Unfortunately, given the extreme rarity of major adverse events in the context of live kidney donation (5), it will likely require large experiences with given innovative surgical approaches before enough evidence can be accumulated to support (or call into question) their safety. ●

Dorry Segev, MD, PhD, is associate professor of surgery and epidemiology and director of Clinical Research Transplant Surgery at Johns Hopkins University in Baltimore, MD.



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