

Donor Kidney Evaluation



Nasreen Mohamed, MD, FRCPA^a, Lynn D. Cornell, MD^{b,*}

KEYWORDS

• Kidney transplant • Donor biopsy • Expanded criteria donor • Zero time biopsy

ABSTRACT

In patients with end-stage renal disease, kidney transplantation is the best means to extend survival and offer a better quality of life. The current shortage of organs available for transplantation has led to an effort to expand the kidney donor pool, including the use of nonideal donor kidneys. Assessment of the quality of the donated kidney is essential, and would facilitate the decision to transplant a potential organ or discard it. Multiple clinical and histologic parameters have been examined to evaluate the donor kidney and relate the findings to the graft outcome, but clear-cut criteria are yet to be defined.

OVERVIEW

Kidney transplantation is the best choice of treatment for most patients with end-stage renal disease. Patients who do not have an acceptable living kidney donor may turn to the deceased donor waiting list. The shortage of organs available for donation with the growing waiting list has been a major challenge in the field. Clinicians started to turn their focus toward expanding the kidney donor pool by using nonideal kidneys, and in recent years, there has been an increasing use of kidneys from older donors and from donors with comorbidities, such as hypertension.^{1,2}

Expanded criteria donor (ECD) kidneys are generally defined as those from patients 60 years or older, or age 50 to 59 with 2 of 3 of the following factors: death due to cerebrovascular cause, history of hypertension, or serum creatinine greater than 1.5 mg/dL (or creatinine clearance < 60 mL/min).³ Kidneys retrieved from ECDs are at higher risk of delayed graft function and primary nonfunction, and

have decreased graft survival compared with kidneys from standard criteria donors (SCDs).⁴ ECD kidneys are typified by having reduced creatinine clearance with a higher percentage of sclerotic glomeruli as a sequel to aging or other coexisting diseases. The remaining viable nephrons might not have the capacity to withstand additional stress during the transplantation procedure, nephrotoxic immunosuppression, and requirement to function instead of 2 kidneys. Thus, the quality of the donor organ is a critically important matter, that is, the number of surviving nephrons having the ability to withstand the injury will determine the long-term function and survival. One study found that donor factors accounted for 64% of the variability in allograft function at 6 months posttransplant.^{5,6} The greater risk of delayed graft function and poor long-term function might compel the surgeon to err to the side of discarding the organ.

The increasing evidence of reduced graft survival rate from deceased donors necessitates assessment of the quality of the donated kidney before transplantation. Many institutes have acquired the practice of biopsy evaluation before transplantation. Evaluation of the donor biopsy can help determine the functional reserve of a donor kidney under consideration for transplantation and to improve both short-term and long-term graft function. In the United States, approximately 75% of kidneys from ECDs are biopsied and 41% of those are discarded because of the histopathologic characteristics.⁷ Azancot and colleagues showed poor reproducibility of donor biopsy evaluation between on-call (non-renal) pathologists and renal pathologists.⁸ Recipient outcomes (one-year eGFR and death censored graft survival) correlated with scores by the renal pathologists but not by the on-call

Disclosure and Conflict of Interest: None.

^a Department of Pathology and Laboratory Medicine, King Fahad Specialist Hospital-Dammam, Amer Bin Thabet Street-mbc035, PO Box 15215, Dammam 31444, Kingdom of Saudi Arabia; ^b Division of Anatomic Pathology, Department of Laboratory Medicine and Pathology, Mayo Clinic, 200 First Street Southwest, Rochester, MN 55905, USA

* Corresponding author.

E-mail address: Cornell.Lynn@mayo.edu

Surgical Pathology 7 (2014) 357–365

<http://dx.doi.org/10.1016/j.path.2014.04.002>

1875-9181/14/\$ – see front matter © 2014 Elsevier Inc. All rights reserved.

pathologists. In addition, a subset of discarded kidneys deemed unsuitable by the on-call pathologist was considered by the renal pathologist to be adequate for transplantation. These results suggest that donor biopsies be evaluated by a renal pathologist. One possibility to consider is whole-slide imaging and evaluation by a renal pathologist on-call at a distant site, if a local renal pathologist is not available, particularly as these biopsies are not used for primary patient diagnosis.⁹ Although ECD kidneys are not ideal, they can be used for elderly recipients to offer a better quality of life and survival. Surgeons might also consider using dual kidney transplantation to improve the nephron mass and increase the GFR in the recipient.

CLASSIFICATION OF DONORS

The deceased donor kidneys are classified into 2 broad groups, reflecting the quality of the organ and driven by the risk of graft loss: SCDs and ECDs.^{4,10}

ECD

A donor at the time of death is 60 years or older or a donor aged 50 to 59 years and has any of the following 3 criteria: (1) cause of death is cerebrovascular accident, (2) history of hypertension, (3) terminal serum creatinine greater than 1.5 mg/dL.^{3,10,11} Other categories of deceased donor kidneys are donation after cardiac death (DCD) and donation after brain death (DBD).

SCD

Any donor who does not fulfill the criteria of ECD.¹⁰

DBD

A donor who has primarily brain death with maintained cardiac and respiratory circulation by medical measures. The donor can be SCD or ECD.¹⁰

DCD

DCD includes donors who do not fit the brain death category but who have cardiac standstill or cessation of cardiac function before organ procurement. They can be divided into controlled DCD and uncontrolled DCD. Controlled DCD includes donors whose life support will be withdrawn in the controlled environment of the operating room. The donor hemodynamic and respiratory functions are maintained. Uncontrolled DCD includes candidates who die in the emergency room before consent is obtained for organ

donation and a catheter is placed in the femoral vessels and peritoneum to cool the organs. It also includes candidates who consented for organ donation, but suffer a cardiac arrest requiring cardiopulmonary resuscitation during procurement of organs.¹⁰

CLINICAL AND LABORATORY EVALUATION OF DONORS

Clinical history and laboratory results of the potential donor should be reviewed before considering that patient's organs for donation. Patients with a history of diabetes, hypertension, and other conditions are considered as potential donors, as well as patients with perimortal disseminated intravascular coagulation and acute tubular injury.^{1,12} In patients with traumatic death, a complete clinical history may not be available, and so some centers have used donor age as a surrogate marker for renal function and a guide to suitability of the organ for transplantation. We know that global glomerulosclerosis and other chronic histopathologic changes increase with age on the whole in normal-functioning kidneys,^{13,14} but there is considerable variability among individual kidneys, and so age alone is not a satisfactory factor. Even among healthy living donors, glomerulosclerosis occurs with increasing age that is not explained by chronic kidney disease risk factors.¹³ The calculated donor glomerular filtration rate (GFR) may be a better clinical indicator of quality of a kidney for transplantation than age alone; one study suggested a calculated donor GFR of less than 85 mL per minute as an indicator of poor donor kidney quality.¹⁵ Some clinicians have used a creatinine clearance of greater than 60 to 70 mL per minute as the acceptable cutoff value for accepting organs for single kidney donation, whereas others recommend dual kidney transplantation with a lower creatinine clearance.^{16–18} Rao and colleagues¹⁹ put forth the Kidney Donor Profile Index (KDPI), which is a score that estimates the risk of graft failure and takes into account donor age, race/ethnicity, height and weight, history of hypertension and diabetes, serum creatinine, cerebrovascular cause of death, DCD, and hepatitis C status. KDRI values can help allocate kidneys and determine whether to transplant a single kidney or 2 kidneys.^{20,21}

DONOR BIOPSY ASSESSMENT

Renal biopsy is performed after procurement and before kidney transplantation, and serves as an important tool for evaluation of the kidney, particularly with ECD. In approximately 85% of potential

Download English Version:

<https://daneshyari.com/en/article/3334427>

Download Persian Version:

<https://daneshyari.com/article/3334427>

[Daneshyari.com](https://daneshyari.com)