



# Older Kidneys Donor Transplantation: Five Years' Experience Without Biopsy and Using Clinical Laboratory and Macroscopic Anatomy Evaluation

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## ABSTRACT

**Introduction.** The exponential increase in organ demand is not associated with a similar increase of available kidneys. This emergency led to expanded criteria to consider a kidney transplantable. The aim of this retrospective study was to explain our use of older donor kidneys without biopsy.

**Materials and Methods.** Between 2000 and 2005, 58 older kidneys were harvested: 27 were transplanted in our center; 13 were discarded; and 18 were transplanted in other centers. We considered 3 factors to define kidney quality: macroscopic anatomy, multiple factors linked to the donor, and clinical-laboratory data. After transplantation, we observed the patients for at least 1 year and up to 6 years.

**Discussion.** At 1 year, 24/27 (89%) patients had a functional kidney, 2 patients showed an initial renal failure and 1 patient lost the kidney. At maximum follow-up, 19 patients (70%) had functional kidneys, 4 with initial renal failure. These results compared with the kidneys harvested using Standard Donor Kidney Criteria are acceptable. Obviously we need long-term follow-up to increase, the amount of data and obtain a definitive outcome.

**Conclusion.** Biopsy is the gold standard for the definition of an older kidney's quality. When a biopsy is not feasible, the study of the macroscopic anatomy the kidney's donor and of some donor's parameters represent an acceptable biopsy alternative, being able to rescue some organs that would be otherwise lost.

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**T**HE exponential increase of organ demand is not associated with a similar increase in available kidneys. The median wait for a kidney transplant in the United States is 2 to 6 years with 6% of patients dying each year without a potentially life-enhancing and life-prolonging transplant.<sup>1</sup> This emergency has led to expanded criteria to consider a kidney transplantable. Thus, we now use organs from older donors that only few years ago were considered nontransplantable. The problem linked to use of older donor is to evaluate the kidney's quality and especially to understand the organ's functional state. Currently the solution to this problem is to routinely biopsy. Unfortunately not every center has this possibility to perform a kidney biopsy. The aim of this retrospective study was to explain our use of older donor kidneys without biopsy.

## METHODS

Between 2000 and 2005, 58 older kidneys were harvested: 27 were transplanted in our center; 13 were discarded; and 18 were transplanted in other centers. The donor age range was 61 to 72

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(average age, 66 years); recipient age range was 47 to 68 years (average, 59 years). The recipients was  $\pm$  15 years younger than the donors. We cannot use the biopsy due to an organizational problem. We considered 3 factors to define a kidney's quality: macroscopic anatomy, multiple historical donor factors, and clinical-laboratory data. Macroscopic vascular pathology included the following: (1) renal artery stenosis or aneurysm, (2) vascular anomalies like multiple and separate ( $>3$ ) kidney vessels, (3) conditions causing a difficult vascular anastomosis, and (4) urinary pathology anomalies like megaureter or a double district. The donor's clinical criteria used for decision-making were the Cockcroft-Gault formula<sup>2</sup> as well as the clinical history of the following (1) hypertension, (2) smoking, (3) serum creatinine, (4) obesity, (5) diabetes, (6) hypercholesterolemia, (7) reanimation stay, (8) inotropic drug use or (9) heart failure. Absolute contraindications were a glomerular filtration rate  $<80\%$ , serum creatinine level  $>1.8$  mg/dL, or multiple cardiovascular arrests. In all recipients, we considered ABO and HLA compatibility, age, and body mass index. Age matching was used according the preference to the recipient nearest to the donor's age. Weight matching was used according the preference to a recipient whose weight was less than the donor weight. All recipients had a cardiovascular preoperative evaluation and underwent at Echo-color doppler to evaluate the iliac vessel.

## RESULTS

After the transplantation we observed the patients for 1 to 6 years. Of 27 transplantations at 1 year 26 kidneys were functional with a range of serum creatinine level of 1–3.8 mg/dL (average, 1.6) and a clearance of 19–66 mL/min (39.8 mL/min). One kidney showed primary nonfunction and the patient continued dialysis. At the maximum follow-up, 19 transplanted kidneys are functioning with a range of serum creatinine level of 1–3.6 mg/dL (average, 1.6 mg/dL) and a creatinine clearance level of 18–67 mL/min (average, 32.5 mL/min). Five patients died with normal functional kidneys: 3 due to cardiac failure, 1 due to infection, and 1 due to hematologic disease. Two patients with infection required immunosuppressive therapy suspension and a return to dialysis.

## DISCUSSION

A remarkable quota of dialyzed patients are older than 60 years. For these patients survival after transplantation is better when compared with dialysis.<sup>3–5</sup> Older kidneys show decreased renal blood flow/glomerular filtration rate (GFR) accompanied by a number of histopathologic changes, such as glomerulosclerosis, tubular atrophy, vascular changes, and interstitial fibrosis. In addition, older donor kidneys lose the ability to undergo compensatory hypertrophy and are more susceptible to nephrotoxicity, hypertension, and immune-mediated damage.<sup>6</sup> Some of these patients may not survive to receive a kidney through conventional allocation methods.<sup>7</sup> However, studies have demonstrated convincingly that transplantation offers both cost and survival benefit to virtually all patients with end-stage renal disease, regardless of age. Longevity of a kidney harvested from an expand criteria donor (ECD) is believed to be much shorter; the half-life is estimated to be 4

to 6 years compared with 8 to 12 years for a kidney harvested using a standard criteria donor (SCD).<sup>8,9</sup> In the ECD era, the gold standard to define kidney quality is the biopsy. This procedure is an objective test that minimizes the uncertainty associated with posttransplantation renal function.<sup>10,11</sup>

Between 2000 and 2005 we could not use the biopsy technique due to organizational problems. Thus, in our experience, to evaluate kidney quality we considered 3 factors: macroscopic anatomy, donor's factors, and clinical-laboratory data. In the older donor the anatomical anomalies and pathologic state of vessels were considered independent risk factors to exclude a kidney.<sup>12,13</sup> In our report we observed 3 failures: 1 primary nonfunction (0.3%) and 2 linked to recipient infections (7%) and suspension immunosuppressive therapy. At the maximum follow-up, 5 patients (18%) had died; 3 due to acute myocardial infarction (IMA), 1 due to mycotic infection, and 1 due to hematologic disease (multiple myeloma). In our series, 80% of recipients had high cardiovascular risk because they were of average age older than the standard recipient population. At 1 year, of 27 patients, 24 (89%) had a functional kidney (average serum creatinine level, 1.6 mg/dL); 2 patients showed initial renal failure (serum creatinine level 3.6 mg/dL). At maximum follow-up, 4 patients showed initial kidney failure: one is the patient mentioned above. One patient with initial kidney failure died. These results are acceptable compared with kidneys harvested using a standard donor. Obviously we need long-term follow-up to increase the amount of data and to obtain a definitive outcome. In our center the impossibility to use biopsy should have produced the loss of older donor kidney but, using our policy, we were able to curb this loss transplanting a significant number of older donor kidney. In other words, on the one hand using biopsy probably some discarded kidney, presenting vascular anomalies or some anomalous laboratory data, should be transplanted, and on the other hand our approach was able to rescue some kidneys otherwise lost.

In conclusion, the biopsy is the gold standard for the correct definition of older kidney's quality. When it isn't feasible, the study of macroscopic anatomy of kidney's donor and some donor's parameters represent an acceptable biopsy alternative, being able to rescue some organ otherwise lost.

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