

Renal Transplantations in African Americans: A Single-center Experience of Outcomes and Innovations to Improve Access and Results

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OBJECTIVE	To report a single-center 10-year experience of outcomes of kidney transplantation in African Americans (AAs) vs Caucasian Americans (CA) and to propose ways in which to improve kidney transplant outcomes in AAs, increased access to kidney transplantation, prevention of kidney disease, and acceptance of organ donor registration rates in AAs.
METHODS	We compared outcomes of deceased donor (DD) and living donor (LD) renal transplantation in AAs vs CAs in 772 recipients of first allografts at our transplant center from January 1995 to March 2004. For DD and LD transplants, no significant differences in gender, age, body mass index, or transplant panel reactive antibody (PRA) existed between AA and CA recipients.
RESULTS	Primary diagnosis of hypertension was more common in AA, DD, and LD recipients. Significant differences for DD transplants included Medicaid insurance in 23% AA compared with 7.0% CA ($P < .0001$) and more frequent diabetes mellitus type 2 in AAs (15% vs 4.1%, $P = .0009$). Eighty-three percent of AAs had received hemodialysis compared with 72% of CAs ($P = .02$). AAs endured significantly longer pretransplant dialysis (911 ± 618 vs 682 ± 526 days CA, $P = .0006$) and greater time on the waiting list (972 ± 575 vs 637 ± 466 days CA, $P < .0001$). In DD renal transplants, AAs had more human leukocyte antigen (HLA) mismatches than CAs (4.1 ± 1.4 vs 2.7 ± 2.1 , $P < .0001$). Mean follow-up for survivors was 7.1 ± 2.5 years. Among LD transplants, graft survival and graft function were comparable for AAs and CAs; however, among DD transplants, graft function and survival were substantially worse for AAs ($P = .0003$). In both LD and DD transplants, patient survival was similar for AAs and CAs.
CONCLUSION	Our data show that AAs receiving allografts from LDs have equivalent short- and long-term outcomes to CAs, but AAs have worse short- and long-term outcomes after DD transplantation. As such, we conclude that AAs should be educated about prevention of kidney disease, the importance of organ donor registration, the merits of LD over DD, and encouraged to seek LD options. UROLOGY 84: 68–77, 2014. © 2014 Elsevier Inc.

In the United States, disparities in health and health care access, delivery, and outcomes are apparent among different racial and ethnic groups. African Americans (AAs) in particular represent the group, which most often suffers disproportionately from health disparities, that is, greater incidence and burden of disease compared with Caucasian Americans (CAs).^{1,2} Health

disparities in AAs are well documented in the arena of chronic kidney disease, kidney transplant access and allocation, and kidney transplant outcomes.^{2,3} Compared with CAs, AAs sustain a greater risk for developing end stage renal disease (ESRD) than CAs because of higher rates of hypertension and/or diabetes mellitus.^{2–12} Although AAs represent only 13.6% of the general population in the United States, they represent 30% of ESRD patients.^{1,4} According to the 2011 United States Renal Data System, the incidence of ESRD among AAs is 1010 per million populations per year, 3.6 times greater than for CAs.^{4,12,13} In addition, the prevalence of ESRD is the highest among AAs at 5004 per million populations.⁴

Renal transplantation provides improved patient survival and quality of life compared with dialysis,^{5,6} regardless of recipient gender, race, age, and etiology of ESRD or donor quality and the use of extended criteria

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donors.⁷ In addition, transplantation has been found to be less costly than dialysis, particularly by the second post-transplant year.^{4,8-12}

Factors contributing to the greater prevalence of renal failure in AAs and consequently a greater need for renal transplantation are higher rates of hypertension and/or diabetes, less access to health care, and poverty and/or lower socioeconomic conditions.⁹

Disparities in access to renal transplantation begin early in the transplant candidacy process in which potential AA transplant candidates have been documented to be less often referred for transplant evaluation than CA candidates.^{10-12,14-19}

In 2008, despite accounting for 35% of the waiting list and 29% of waiting list additions, AAs received only 22% of kidney transplants and had a longer mean waiting time.¹² After 2 years of listing, United Network for Organ Sharing (UNOS) reported only 20% of listed AAs were transplanted compared with 30% of CAs.^{4,11,12,14,17,19}

The merits of living donor (LD) renal transplantation include dialysis avoidance, shorter waiting times, and superior graft survival compared with deceased donor (DD) renal transplantation. The 1-year graft survival for DD renal transplants is 89% compared with 95% for LD renal transplants.^{14,15} Despite the observed advantages of LD transplantation, AAs are less likely to present with a potential living donor, and thus AAs more commonly receive DD allografts.^{12,16,17}

Newer immunosuppressive agents developed over the past decade have resulted in decreased 1-year acute rejection rates of <10% and have contributed to the excellent 1-year graft survival rates for both LD and DD renal transplants. Nevertheless, despite these advances from immunosuppressive agents, AAs continue to exhibit twice the incidence of acute rejection in the first post-transplant year compared with CA recipients.^{12,17} In addition, AAs continue to carry a greater risk of late renal allograft loss. The long-term graft survival half-life in AA renal transplant recipients has been reported to be just 30%-40% that of CA recipients.^{18,19} Despite the fact that 1-year graft survival rates in AAs are comparable with those in CAs, 5-year graft survival in AAs is 60% compared with 73% in CAs.^{12,18,20-22}

In this study, we analyzed the outcomes of DD and LD renal transplantation at our center over a period of >9 years. Our objective was to identify predictors of graft and patient outcomes in AA vs CA renal transplant recipients. We also attempted to identify ways in which to improve access of kidney transplantation, acceptance of organ donation, and outcomes of kidney transplantation in AAs.

METHODS

From January 1, 1995, to March 1, 2004, a total of 806 patients underwent first kidney or kidney and/or pancreas transplantation at Cleveland Clinic.^{1,19,22} Included in the analysis were 772 patients (recipients of first allografts); 604 (78%) were

CA and 168 (22%) were AA. For the purposes of this study, 17 Hispanic recipients and 4 Hispanic donors were categorized as CA. After obtaining approval of the institutional review board,¹ data were obtained retrospectively from the Uniform Transplant Database, a comprehensive database maintained for all transplants performed at Cleveland Clinic.^{1,12,20-22}

Data Analysis

Descriptive statistics included mean and standard deviation for continuous variables and frequencies and percentages for categorical variables. *P* values displayed in descriptive tables were obtained using *t* tests or chi-square tests for continuous and categorical variables, respectively. Risk-unadjusted patient and graft survival were estimated nonparametrically using the method of Kaplan and Meier and parametrically using a multiphase hazard decomposition method. All data description and analyses were carried out separately by donor type (LD vs DD).¹⁹

Risk factors for graft and patient survival were ascertained using nonproportional, multiphase, multivariable hazard methodology. This methodology allows modeling of recipient, donor, and transplant variables in all phases of the hazard model simultaneously.²¹ Bootstrap bagging was used for variable selection with a probability for inclusion of .05; variables appearing in at least 50% of bootstrap analyses were considered reliably statistically significant at *P* < .05.^{19-21,23} The following risk factors were considered in the multivariable hazard analyses of graft and patient survival.

Recipient factors: gender, race, age at transplant, body mass index (kilogram per meter squared), insurance coverage (Medicare, Medicaid, and Private^{12,19,24}), cause of ESRD (glomerular disease, hypertension, and polycystic disease), diabetes (types 1 and 2), duration of pretransplant dialysis, panel reactive antibody (PRA) at transplant, time from referral to listing, time from listing to transplant, and time from referral to transplant.

Donor factors: gender, race, age, age <10 years, age >50 years, body mass index, creatinine level, and cause of death (anoxia, cerebral bleed, cardiovascular accident/stroke, head trauma, and other).²⁵

Transplant factors: race match, gender match, female-to-male, Free Kidney Disease Prevention Clinics, transplant, adult dual transplants, cold ischemic time, and years from January 1, 1995 to transplant date.¹⁹

RESULTS

Recipient Characteristics

Table 1 shows recipient characteristics for DD and LD transplants, demonstrating no significant differences in gender, age, or body mass index (BMI) transplant panel reactive antibody between AA and CA recipients. The primary diagnosis of hypertension was more common in AAs: 36% of AAs compared with 6.2% of CAs for DD transplants (*P* < .0001*) and 22% of AAs compared with 4.6% of CAs for LD transplants (*P* < .0001*). Conversely, polycystic disease was more common in CAs: 13% of CAs compared with 3.4% of AAs for DD transplants (*P* = .003), 18% of CAs compared with 2% of AAs for LD transplants (*P* = .003). Among LD transplants, AAs had a higher rate of glomerular disease than CAs: 40% for AAs vs 26% for CAs (*P* = .04). For DD

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