African-American Women and Older Patients Are at Risk for a Greater Decline in Renal Function Following Living Kidney Donation

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ABSTRACT

Living donor kidney transplantation offers many advantages to the recipients. Longer allograft survival, fewer postoperative complications, and better renal function are some of the benefits of receiving living donor kidneys compared to deceased donor organs. However, the consequences to the donor in terms of renal function are not as well defined. Moreover, it is not clear whether all donors share an equal risk to their renal function following donation regardless to ethnicity, sex, and age. In this retrospective study, we identify and compare the reduction in estimated glomerular filtration rate (eGFR) among ethnic groups, women, and older donors prior to, immediately after, and 1 year postdonation. We compared the percentage decline in renal function among various ages and other demographic groups using individual patients as their own controls. Medical records of 103 consecutive living donors (mean age 40.3 ± 9.6 years) were reviewed. On average, donors experienced a 34.7% fall in eGFR at 273 days posttransplant. A greater decline was noticed in the African-American (AA) group (41% compared to 34% in white patients, $P = .03$). The majority of the decline in the AA eGFR was among women, in whom the fall was 46% compared to AA men at 31%. White women had a 34% fall in eGFR ($P = .02$). The percentage decline in eGFR was not different among the different age groups; however, donors older than 50 years had a postdonation eGFR of 55.1 mL/min versus 60.9 mL/min in those less than 50 years old ($P = .03$), reflecting lower eGFR predonation (older 84.7 mL/min vs younger 95.2 mL/min, $P = .02$). The percent decline in eGFR did not change with time after donation (0–1 month 37%, 1–12 months 34%, >1 year 30%). eGFR declines abruptly post–kidney donation in all patients but remains stable and improves afterwards. AA women and older donors are more prone to reduction in eGFR post–kidney donations.

LIVING KIDNEY TRANSPLANTATION, whether from related or unrelated donors, offers patients with renal failure better graft survival and fewer complications compared to deceased or extended criteria donors.[1] In recent years, there has been a noticeable increase in the number of living kidney donation worldwide, mostly attributed to unrelated donors and altruistic donation, as well as paired kidney donation programs.[2] Although the safety of living kidney donation is supported by many reports with long-term follow-up,[3–6] there are still some concerns regarding kidney donation in the African-American (AA) population and other minority ethnic groups.

Diabetes and hypertension, the two major causes of renal failure, are more prevalent in AA patients.[7–11] Therefore, there are increased concerns about the long-term safety of kidney donation in this population. To assess the impact of living kidney donation among different groups, particularly AA and olders, we retrospectively studied the short-term outcomes and the residual renal function after living donation.

METHODS

Between April 1993 and November 2007, 341 living kidney donor transplantations were performed in our center. One hundred three patient charts were available for review, and the data are included in this study. We assessed renal function as estimated glomerular

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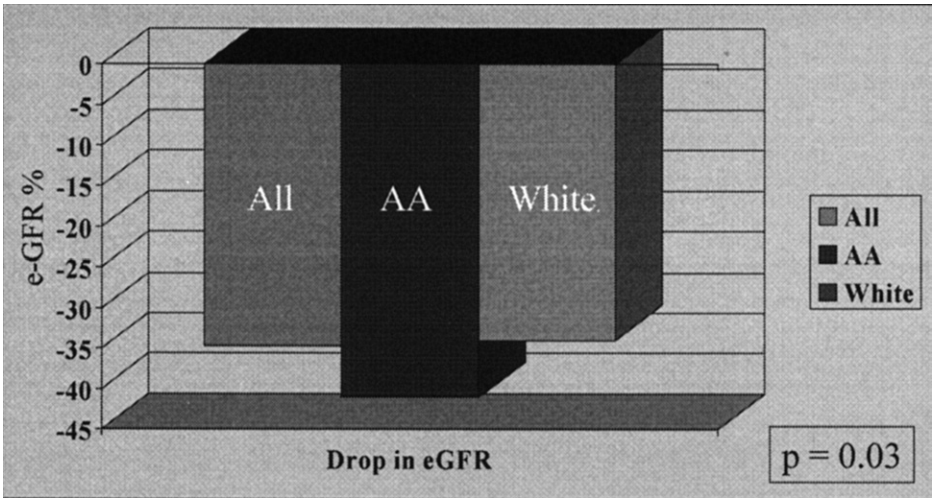

Fig 1. Drop in estimated glomerular filtration rate (eGFR; MDRD) in African-American (AA) donors.

filtration rate (eGFR) calculated by Modification of Diet in Renal Disease (MDRD) formula before donation and 1 month and 1 year post–kidney donation. In our center, donors with hypertension, abnormal urinalysis, and albuminuria as measured by 24-hour collection are excluded from living donation. We compared the percentage reduction in the eGFR between whites and AA donors and between AA male and female donors, and also measured the reduction in eGFR in donors older than 50 years of age.

Demographic and nonparametric outcome variables were assessed using chi-square and Fisher exact test. Unpaired Student *t* test was used for comparison of parametric data. A .05 nominal significance level was used in all testing.

RESULTS

Thirty-eight males and 65 females, 11 AA and 92 whites (mean age 40.3 ± 9.6 years, eGFR predonation 93.3 ± 17.7 mL/min comprised our study population). On average, donors experienced a 34.7% fall in eGFR from 93.3 ± 17.7 to 59.8 ± 10.9 mL/min determined at 1 year postdonation. A significant reduction in eGFR was noticed in the AA group compared to white patients (41% vs 34%, $P = .03$; Fig 1). The greatest decline in AA eGFR was found in women in whom the eGFR dropped 46% compared to AA men at 31% and white women, 34% ($P = .02$; Fig 2). The percentage decline in eGFR was not different among the various age groups except for donors older than 50 years compared to those <50 (mean eGFR 55.1 vs 60.9 mL/min, respectively, $P = .03$; Fig 3). Overall, the decline in eGFR remained unchanged over the course of 1 year (0–1 month 37%, 1–12 months 34%, >1 year 30%; Fig 4).

DISCUSSION

Over the past decade, living donor kidney transplant has increased. However, the impact of living kidney donation by minorities and different ethnic groups has not been well studied. The incidence of hypertension, diabetes, and familial disease is more prevalent in the AA population.[12] Furthermore, AA donors are at approximately 3.7 times higher risk for developing renal failure compared to other ethnic groups.[12] Our study shows that AA females are at greater risk for a significant decline in their eGFR post–

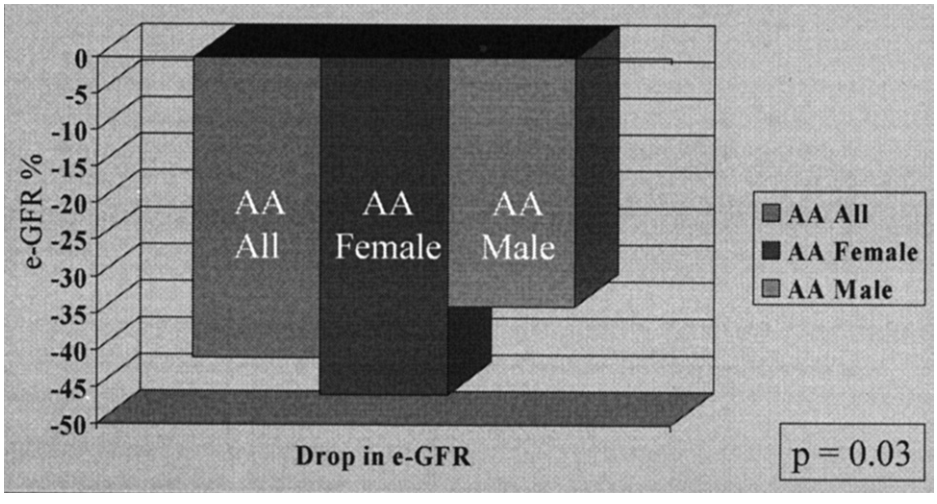

Fig 2. Drop in estimated glomerular filtration rate (eGFR; MDRD) in African-American (AA) male and female donors.

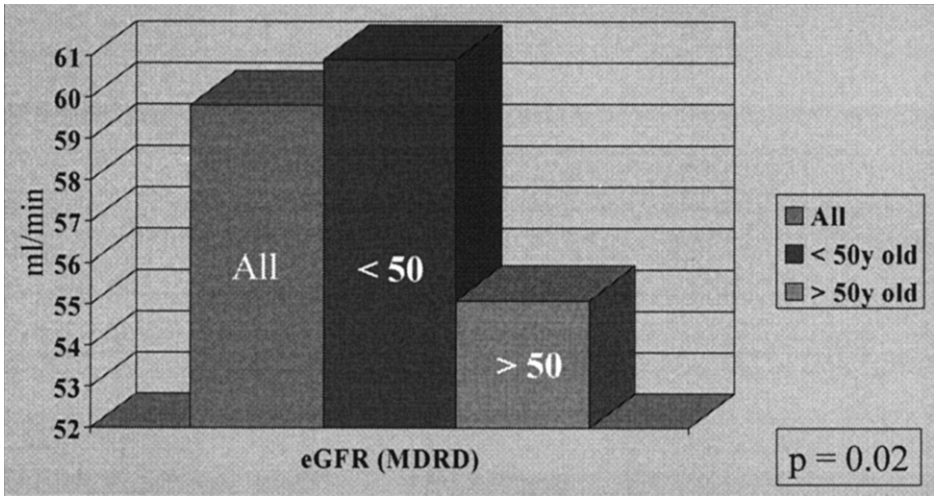

Fig 3. Estimated glomerular filtration rate (eGFR; MDRD) in older donors after kidney donation.

kidney donation. Although we did not study the long-term impact of this decline on the incidence of renal failure of this population, we believe that AA women should be meticulously and extensively evaluated before donation. It is well known that the relative risk of developing kidney failure is higher in the young compared to older individuals,[13] and therefore young AA women should undergo even greater scrutiny.

Our study shows that donors older than 50 years have a greater decline in their eGFR compared to younger donors (<50 years). This may occur due to lower baseline eGFR (older 84.7 mL/min vs younger 95.2 mL/min, $P = .02$). The relative risk of developing kidney failure in elderly patients is lower than young individuals.[13] Furthermore, older patients can do well with reduced renal function. Therefore, we believe that older donors can still be considered for living kidney donation, but the risk of a significant decline in their kidney function should be disclosed to potential donors before donation.

The inherent limitation of this study is the small sample size and short follow-up period. We also were unable to assess the impact of long-term outcomes of eGFR decline on renal failure. However, our study shows AA women are at higher risk for a greater decline in GFR compared to white and AA males donors. The repercussions of this decline on long-term outcomes need to be evaluated in a larger cohort of donors.

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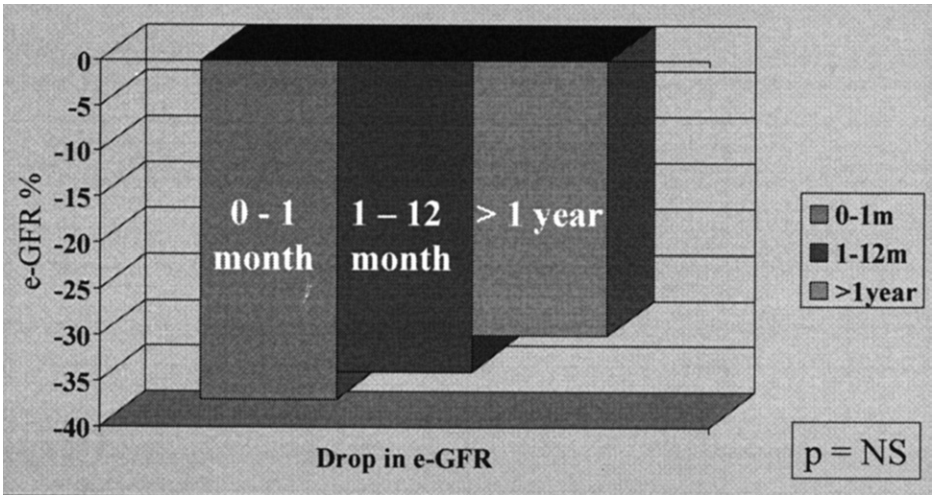

Fig 4. Drop in estimated glomerular filtration rate (eGFR; MDRD) after kidney donation.

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