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Glomerular Size on Time Zero Kidney Allograft Biopsies and Change in Kidney Function after Live Kidney Donation

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BACKGROUND: Identification of predictors of kidney function after live kidney donation may help expand the living donor pool or identify donors for long-term clinical follow-up.

METHODS: In this study, we determined the association of demographic factors (donor age at transplantation, gender, race, body mass index), pre-donation kidney function (eGFR), and kidney allograft biopsy findings (glomerular diameter and volume as determined by Weibel-Gomez method) at time of transplantation (time zero) with change in kidney function (% decrease in eGFR 1 year after live kidney donation) among n=60 live kidney donors in our centre from 2000-2009.

RESULTS: Mean±std pre- and post-donation eGFR were 93±14 and 61±15 ml/min/1.73m^2, respectively. Mean±std percent change in eGFR after donation was 34±12%, with 91% having ≥ 30% decrement in eGFR. Mean glomerular diameter was 163±17 µm, while mean glomerular volume was 2.81±0.98•10^6 µm^3. No donors had glomerulomegaly (defined as volume ≥6.81•10^6 µm^3). In regression analyses, contrary to previous reports, glomerular volume was not associated with donor age, gender, race or BMI. Donor age and overweight BMI were associated with percent decrease in kidney function after donation (3% decrement in pre-donation eGFR for each decade older, p=0.018; 6% decrease in overweight compared to normal BMI, p=0.04), but there was no significant association with pre-donation eGFR, glomerular diameter or volume, donor race or gender.

CONCLUSIONS: We conclude that eGFR percent decrement post-kidney donation is highly variable, and associated with donor age and overweight BMI at transplantation. eGFR decline in donors with increased BMI is independent of glomerular size. The absence of an association between glomerular diameter and volume with change in kidney function after donation in this study may be due to conservative donor selection. These parameters may still prove useful in the screening of higher-risk donors with other co-morbidities or more marginal levels of pre-donation kidney function.