

Demographic variability of kidney function in live donors- a large single Centre analysis

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Introduction:

Living kidney donation contributes to 30% of transplants in the UK1. This practice is encouraged due to better outcomes in transplant recipients. Donor assessment requires thorough evaluation but there are variations in kidney function with changes in age, between ethnic groups (BAME) and gender. Age-, gender- and ethnicity-specific measured GFR (mGFR) reference ranges derived from large healthy donors' series are lacking. In this large single centre study, we provide mGFR range in different healthy donor groups and compare mGFR with the performance of estimated GFR formulas and creatinine clearances.

Methods:

We have analysed data from 997 live donors between February 1995 and October 2019. Using pre-donation measured GFR (Tc EDTA-GFR) as the gold standard, we compared the performance of CKD-MDRD, CKD –EPI (represented in units ml/min/1.73m²), 24-hour creatinine clearance (Cr Cl) and Creatinine clearance by Cockcroft Gault (CrCl C-G) (represented in units ml/min) between age, ethnicity, and gender. We also calculated the Relative Bias ((mGFR-eGFR)/mGFR), and the accuracy (P30) of different eGFR equations compared to mGFR. P30 was defined as the percentage of patients whose eGFR was within +/-30% of the mGFR.

Results:

422 (42.32%) donors were male. 616 (62%) donors were Caucasian, 228 (23%) South Asian, 114 (11%) Afro Caribbean and 39 (4%) of other ethnic groups (Arabic, oriental and mixed ethnicity) (Graph 1). The mean mGFR was 100.08 ml/min/1.73m² (SD 10.87). The mean mGFR for males and females were 105.77 vs 95.72 ml/min/1.73m², respectively (p=0.05).

63 (6%) donors were older than 65 years. Mean mGFR compared between young and > 65 years old donors were 103.44 vs 82.27, respectively (p= 0.0028). Afro Caribbean males had the highest function and Asian females had the lowest function by mGFR amongst all compared groups, but this difference was not significant (p=0.54). As predicted, there is a linear decline in mGFR with increasing age.

Creatine clearance measured in 24-hour urine collection overestimates function in all compared groups. Creatinine clearance by Cockcroft-Gault tends to underestimate function in healthy living donors over 65 years old (Table 1). GFR calculated by CKD-EPI formula was comparable to mGFR amongst all age groups, genders and ethnically diverse living donors (Table 2+3). CKD-EPI performed better in terms of least bias and highest accuracy compared to MDRD for all donor subgroups (Table 3).

Conclusions:

mGFR declines with age and healthy older donors (>65) have significantly lower mGFR compared to younger donors. Afro-Caribbean donors have higher pre-donation GFR and female South Asian donors the lowest GFR, however, these differences were not statistically significant. 24-h Cr Cl overestimates kidney function and should be used with caution and corrected for size. Calculated GFR by CKD EPI formula comes closest compared to mGFR in all groups and it could be reliably used as a first screening tool for assessing the function of living donors pre-donation, irrespective of age, gender or ethnicity.

Reference:

1. <https://www.odt.nhs.uk/living-donation/living-donor-kidney-transplantation/>