

Performance of GFR estimation equations in living kidney donors - A single centre study

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Introduction: CKD-EPI is routinely used to determine estimated glomerular filtration rate (eGFR). For potential living kidney donors (PLD) accurate assessment of kidney function is essential, and is achieved by measured GFR (mGFR) using plasma clearance of either crEDTA or Iohexol. At our renal unit Cystatin C is also routinely measured in PLD. We aimed to assess the role of Cystatin C eGFR (CySC) and combined CKD-EPI and CysC eGFR (Epi-CysC), versus CKD-EPI alone, against mGFR in a cohort of PLD.

Methods: Data were retrospectively collected from 113 PLD between 2015-18. Epi-CysC was calculated using NKF-KDIGO application. Statistical analysis was performed using PRISM and Excel. We analysed accuracy of eGFR equations within $\pm 30\%$ (P30) and $\pm 10\%$ (P10) of mGFR. Ethics approval was obtained from the Health Research Authority.

Results: Correlation analysis (eGFR vs mGFR) with Pearson's r coefficient was; 0.59 (P <0.001) for CKD-EPI; and 0.43 (P <0.001) for CySC. Corresponding R² values on regression analysis were 0.35 and 0.19 for CKD-EPI and CySC vs mGFR, respectively. Accuracy (P30) was; 90.2% for CKD-EPI (n=113); 80.6% for CySC (n=108); and 89% for Epi-CysC. Accuracy (P10) was; 42% for CKD-EPI; 33.3% for CySC; 37.4% for Epi-CysC. Mean (SD) bias (eGFR-mGFR); CKD-EPI 2.3 (16.3); CySC 4.1 (20.6); Epi-CysC 3.7 (17.4). Precision (Root-Mean-Square-Deviation): CKD-EPI 16.2; CySC 20.3; Epi-CysC 17.1.

Discussion: CKD-EPI correlated better with mGFR than CySC in PLD. Both equations demonstrated acceptable P30 accuracy values, with CKD-EPI being superior to CySC. Both equations showed poor accuracy assessed by P10 values. Combined Epi-CysC did not improve the accuracy of eGFR. CKD-EPI demonstrated lower bias compared to CySC and Epi-CysC.

CKD-EPI and CySC eGFR equations showed significant correlation with Iohexol mGFR, but neither demonstrates acceptable accuracy to replace mGFR in PLD. Cystatin C does not add value to the accuracy of eGFR equations in PLD.