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Early change in estimated GFR and renal outcome in patient with chronic kidney disease; comparison of creatinine-based and cystatin-C-based eGFR slope

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Objectives: This study compared the performance of creatinine-based eGFR slope (eGFRcre slope) with that of cystatin-C-based eGFR slope (eGFRcys slope) in identifying a high-risk group of progression to end-stage renal disease (ESRD) in patients with CKD.

Methods: From October 2012 to May 2017, patients who had simultaneous measurements of serum creatinine and cystatin C more than 3 times for 1 year were identified. We calculated baseline eGFR values and one-year eGFR slopes using all measurements of serum creatinine and cystatin C. The patients with baseline eGFR ≥ 60 mL/min/1.73m^2 were excluded. We defined a rapid progression as eGFR slope < -5 mL/min/1.73m^2/year. Primary outcomes were progression to ESRD.

Results: Total 1323 patients were included. Baseline eGFRcre were 39 (27 – 48) mL/min/1.73m^2 and eGFRcys were 38 (27 – 50) mL/min/1.73m^2. During follow-up of 2.9 (2.0 – 3.8) years, 134 (10%) subjects progressed to ESRD. Both eGFRcre slope and eGFRcys slope were associated with higher risk of ESRD, independently of baseline eGFR (HR = 0.986 [0.982 – 0.991], HR = 0.988 [0.983 – 0.993], respectively, all P < 0.001). Both creatinine and cystatin C based-rapid progression were associated with increased risk of ESRD (HR = 2.22 [1.57 – 3.13], HR = 2.03 [1.44 – 2.86], respectively, all P < 0.001). In subgroup analyses on rapid progression group by creatinine (N = 503), eGFRcys slope was not associated with risk of ESRD (HR = 0.96 [0.88 – 1.04], P = 0.31). Whereas, eGFRcre slope contributed to further discrimination of higher risk of ESRD in subjects with rapid progression by cystatin C (N=463) (HR = 0.91 [0.85 – 0.97]; P = 0.003).

Conclusions: These findings demonstrated that both eGFRcre slope and eGFRcys slope were associated with future ESRD risk. eGFRcre slope was not inferior to eGFRcys slope as a predictor of renal outcome in patients with CKD.