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Application of CKD EPI 2021 equation for estimation of glomerular filtration rate (eGFR) into an elderly Korean cohort to predict clinical outcomes

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Objectives: A new eGFR equation using serum creatinine(sCr) without race were developed in 2021. We projected the changes of eGFR and CKD prevalence in a prospective cohort of elderly Koreans, using current (MDRD and CKD-EPI2009) and new equation (CKD-EPI2021).

Methods: This study was a part of the Korean Longitudinal Study, which included randomly selected, community-based, aged over 65 years population. The base study was conducted from 2005 to 2006; the follow-up study, from 2010 to 2012, and the final survey about mortality and renal function, at 2023. Among 1,000 subjects originally included, 984 subjects with baseline sCr were included. We compared the difference of eGFR and predictability of mortality and renal survival between values calculated by equations.

Results: At baseline study, there were 436 males(44.3%). Age was 76.0 ± 9.1 years. Levels of eGFR were 74.2 ± 21.4 ml/min/1.73m2 by MDRD, 72.2 ± 16.9 ml/min/1.73m2 by CKD-EPI2009, and 76.6 ± 17.3 ml/min/1.73m2 by CKD-EPI2021. Between eGFRs by CKD-EPI2009 and CKD-EPI2021, the difference of eGFR was higher in females ($p<0.001$), but similar between age groups($p=0.139$), and lowest in subjects with <45 ml/min/1.73m2 of eGFR by CKD-EPI2009 compared to subjects with other values($p<0.001$). CKD stage was improved in 241(24.5%) participants and the others were not changed in CKD-EPI2021 group, and other eGFRs showed similar trend. During 8.3 ± 6.2 years, 255(25.9%) subjects were dead and 7(0.7%) subjects had ESRD before death. Any eGFR was an independent risk factor to mortality estimated by Cox's hazard proportional model adjusted by related factors. AUC to estimate survival by eGFRs was only different between CKD-EPI2021 and MDRD($p<0.001$). AUC to estimate renal survival was not different between equations.

Conclusions: The eGFR calculated by CKD-EPI2021 showed higher value compared to CKD-EPI2009 or MDRD. The power to estimate mortality and renal survival was not different between eGFRs by CKD-EPI2021 and CKD-EPI2009.