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Comparison of Creatinine-based Glomerular Filtration Rate Equations for Mortality Prediction in Korean Population: a Retrospective Kangbuk Samsung Health Cohort study

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Objectives : Several creatinine-based equations have been developed for estimating glomerular filtration rate (GFR). However, their relative performance for mortality prediction in Koreans is unclear, and the creatinine-based equations continue to evolve. We aim to compare the CKD-EPI 2009 and 2021 (race-free) equations to the European Kidney Function Consortium (EKFC) equation for mortality prediction in a large Korean cohort.
Methods : We analyzed 670,320 participants who underwent a comprehensive health examination, enrolled in Kangbuk Samsung Health Cohort from January 1, 2002 to December 31, 2019 and followed them up for mortality until December 2019.
Results : The participants' median follow-up period was 8.8 years, mean age was 39.8 years old (minimum 18, maximum 97), and 53.6% were male. Mean eGFR using 2009 CKD-EPI was 95.1 ml/min/1.73m^2, 100.6 ml/min/1.73m^2 using 2021 CKD-EPI, 94.0 ml/min/1.73m^2 using EKFC. The EKFC equation had the highest discriminatory power to predict all-cause mortality (Harrell's C index of EKFC = 0.694 (95% confidence interval 0.687-00.701), 2021 CKD-EPI = 0.665 (95% CI 0.659-0.672), 2009 CKD-EPI = 0.667 (0.636-0.648), $p < 0.001$) and cardiovascular disease (CVD) mortality (Harrell's C index of EKFC = 0.745 (95% CI 0.728-0.762), 2021 CKD-EPI = 0.716 (95% CI 0.699-0.732), 2009 CKD-EPI = 0.716 (95% CI 0.699-0.732)).
Conclusions : In this large cohort of Koreans, the EKFC equation showed superior discrimination for predicting all-cause and CVD morality versus CKD-EPI equations. These findings support the adoption of the EKFC equation for GFR estimation and mortality risk prediction in this population.