Filtration Markers as Predictors of ESRD and Mortality: Individual Participant Data Meta-Analysis

Lesley A. Inker*, Josef Coresh†, Yingying Sang†, Chi-yuan Hsu‡, Meredith C. Foster*, John H. Eckfeldt§, Amy B. Karger§, Robert G. Nelson‖, Xun Liu*, Mark Sarnak*, Lawrence J. Appel†, Morgan Grams†, Dawei Xie¶, Paul L. Kimmel**, Harold Feldman¶, Vasan Ramachandran††, Andrew S. Levey*, for the CKD Biomarkers Consortium

[+] Author Affiliations

Correspondence:
Dr. Lesley A. Inker, Division of Nephrology, Tufts Medical Center, 800 Washington Street, Box #391, Boston, MA 02111. Email: Linker@tuftsmedicalcenter.org

Abstract

Background and objectives Serum β-trace protein (BTP) and β-2 microglobulin (B2M) are associated with risk of ESRD and death in the general population and in populations at high risk for these outcomes (GP/HR) and those with CKD, but results differ among studies.

Design, setting, participants, & measurements We performed an individual patient-level meta-analysis including three GP/HR studies (n=17,903 participants) and three CKD studies (n=5415). We compared associations, risk prediction, and improvement in reclassification of eGFR using BTP ($eGFR_{BTP}$) and B2M ($eGFR_{B2M}$) alone and the average ($eGFR_{avg}$) of $eGFR_{BTP}$, $eGFR_{B2M}$, creatinine ($eGFR_{cr}$), and cystatin C ($eGFR_{cys}$), to $eGFR_{cr}$, $eGFR_{cys}$, and their combination ($eGFR_{cr-cys}$) for ESRD (2075 events) and death (7275 events).

Results Mean (SD) follow up times for ESRD and mortality for GP/HR and CKD studies were 13 (4), 6.2 (3.2), 14 (5), and 7.5 (3.9) years, respectively. Compared with $eGFR_{cr}$, $eGFR_{BTP}$ and $eGFR_{B2M}$ improved risk associations and modestly improved prediction for ESRD and death even after adjustment for established risk factors. $eGFR_{avg}$ provided the most consistent improvement in associations and prediction across both outcomes and populations. Assessment of heterogeneity did not yield clinically relevant differences. For ESRD, addition of albuminuria substantially attenuated the improvement in risk prediction and risk classification with novel filtration markers. For mortality, addition of albuminuria did not affect the improvement in risk prediction with the use of novel markers, but lessened improvement in risk classification, especially for the CKD cohort.

Conclusions These markers do not provide substantial additional prognostic information to $eGFR_{cr}$ and albuminuria, but may be appropriate in circumstances where $eGFR_{cr}$ is not accurate or albuminuria is not available. Educational efforts to increase measurement of albuminuria in clinical practice may be more cost-effective than measurement of BTP and B2M for improving prognostic information.

chronic kidney disease | albuminuria | glomerular filtration rate | follow-up studies | humans | prostaglandin R2 D-isomerase | intramolecular oxidoreductases | kidney failure, chronic | lipocalins | renal insufficiency, chronic | risk factors | beta 2-microglobulin

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