Using proteinuria and estimated glomerular filtration rate to classify risk in patients with chronic kidney disease: a cohort study.

BACKGROUND: The staging system for chronic kidney disease relies almost exclusively on estimated glomerular filtration rate (eGFR), although proteinuria is also associated with adverse outcomes.

OBJECTIVE: To validate a 5-category system for risk stratification based on the combination of eGFR and proteinuria.

DESIGN: Retrospective cohort study.

SETTING: A provincial laboratory registry in Alberta, Canada, and a representative sample of noninstitutionalized U.S. adults.

PATIENTS: A derivation data set of 474,521 adult outpatients, 2 independent internal validation cohorts with 51,356 and 460,623 patients, and an external validation cohort of 14,358 patients.

MEASUREMENTS: Glomerular filtration rate, estimated by using the Modification of Diet in Renal Disease Study equation, and proteinuria, measured by using urine albumin-to-creatinine ratio or dipstick urinalysis. Outcomes included all-cause mortality and a composite renal outcome of kidney failure or doubling of serum creatinine level.
RESULTS: Over a median follow-up of 38 months in the internal validation cohorts, higher risk categories (indicating lower eGFR or more proteinuria) were associated with a graded increase in the risk for the composite renal outcome. The projected number of U.S. adults assigned to risk categories 3 and 4 in the alternate system was 3.9 million, compared with 16.3 million assigned to stage 3 and 4 in the current staging system. The alternate system was more likely to correctly reclassify persons who did not develop the renal outcome than those who did, although some persons developed the renal outcome despite reclassification to a lower category. However, all analyses of patients reclassified to a lower category showed that substantially fewer such patients developed the renal outcome than did not. Correct reclassification by the alternate system was more likely when proteinuria was measured by using albumin-to-creatinine ratio than with dipstick testing, and also more likely for the composite renal outcome than for mortality.

LIMITATION: The study had a short follow-up time.

CONCLUSION: Using proteinuria in combination with eGFR may reduce unnecessary referrals for care at the cost of not referring or delaying referral for some patients who go on to develop kidney failure.

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