SIMPLE CYSTATIN C FORMULA COMPARED TO NEWER CKD-EPI CYSTATIN C FORMULA FOR ESTIMATION OF GLOMERULAR FILTRATION RATE IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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INTRODUCTION. Accurate assessment of glomerular filtration rate (GFR) is essential for detecting and managing chronic kidney disease (CKD). Recently, serum cystatin C-based formula (CKD-EPI cystatin formula) was proposed as a new GFR marker (1-3). The aim of our study was to compare CKD-EPI cystatin formula and simple cystatin C formula (100/serum cystatin C) against ^{51}CrEDTA clearance in a large group of CKD patients.

PATIENTS and METHODS. In this study 800 adult Caucasian patients (339 women, 461 men; mean age 58 ±15.5 years) with CKD were enrolled. In each patient serum cystatin C (immunonephelometric method) was determined. GFR was calculated using the CKD-EPI cystatin formula and simple cystatin C formula. GFR was also measured using ^{51}CrEDTA clearance, and the correlation, accuracy, bias and precision of both equations were determined. Ability to correctly estimate patient's GFR with different equations compared to ^{51}CrEDTA clearance below and above 60 ml/min/1.73m^2 was analyzed.

RESULTS. The mean ^{51}CrEDTA clearance was 47.2±33.6 ml/min/1.73m^2, mean serum cystatin C was 2.53±1.53 mg/l. Statistically significant correlations between ^{51}CrEDTA clearance and both formulas were found (P<0.0001). The Receiver Operating Characteristic (ROC) curve analysis (cut-off for GFR 60 ml/min/1.73m^2) showed that simple cystatin C formula (area under the ROC curve (AUC)=0.972)) had a higher diagnostic accuracy than CKD-EPI cystatin formula (AUC=0.922) (P=0.0001) (figure). Bland and Altman analysis for the same cut-off value showed that CKD-EPI cystatin formula (bias: -10.8 ml/min/1.73m^2) underestimated and simple cystatin C formula (bias: 9.4 ml/min/1.73m^2) overestimated measured GFR. All equations lacked precision. It was 21.8 ml/min/1.73m^2 for CKD-EPI cystatin formula and 15.4 ml/min/1.73m^2 for simple cystatin C formula. Analysis of ability to correctly predict GFR below and above 60 ml/min/1.73m^2 showed that simple cystatin C formula had higher prediction than CKD-EPI cystatin formula (simple cystatin C formula 89.1% vs. CKD-EPI cystatin formula 81.5%; P<0.0005).
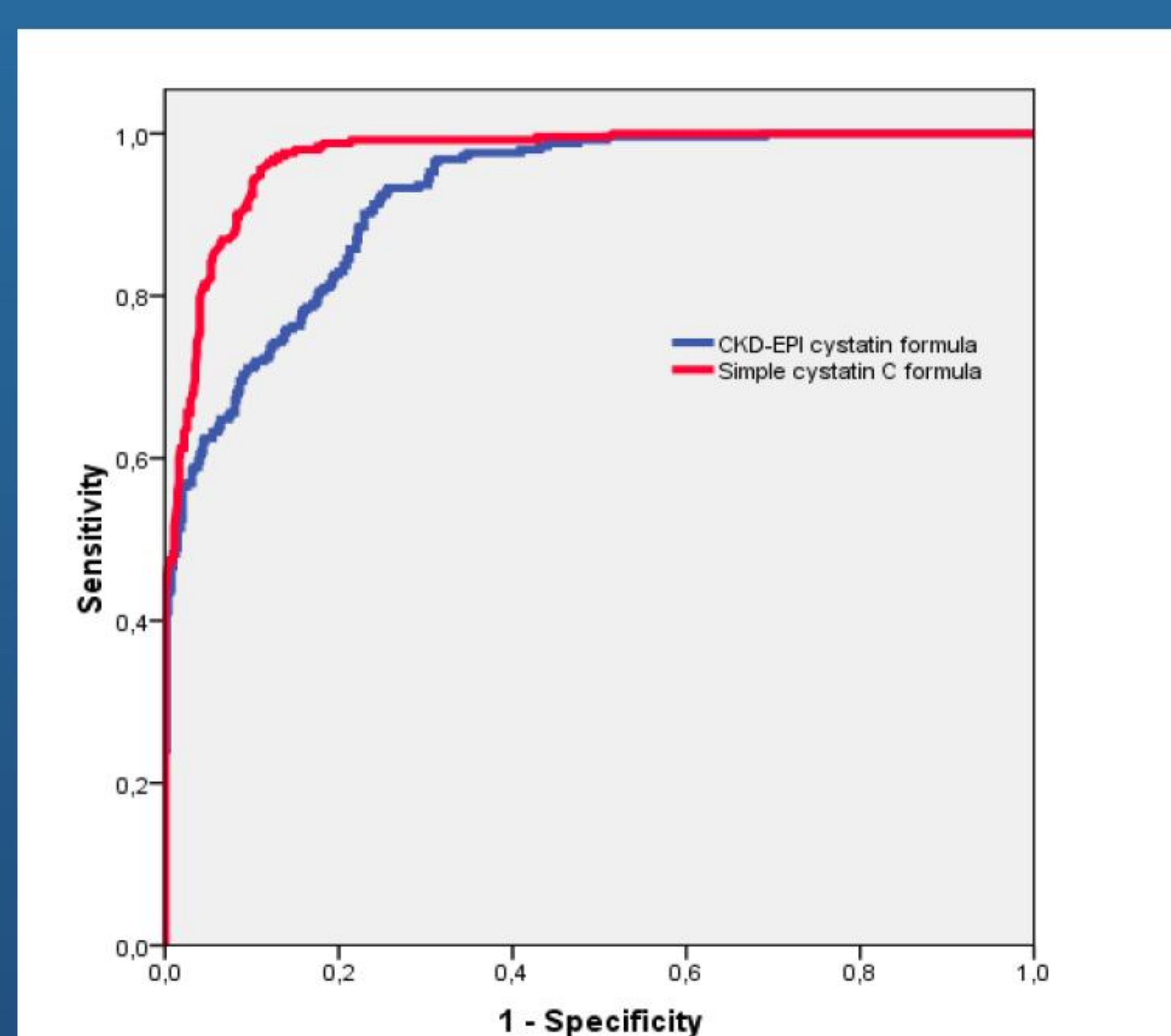

Figure. ROC analysis (cut-off for GFR 60 ml/min/1.73m^2) for CKD-EPI cystatin formula and simple cystatin C formula.

CONCLUSIONS. Our results indicate that the simple cystatin C formula is a reliable marker of GFR in CKD patients and comparable to the newer sophisticated CKD-EPI cystatin formula.

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H) Clinical Nephrology, CKD. H1) Lab methods, progression & risk factors for CKD 1-5, nutrition in CKD, renal diseases (except GNs and cystic diseases).
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