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CKD & associated complications

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Diagnostic accuracy of conventional urine dipstick for screening of chronic kidney disease: a population-based study

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Background: Urine dipstick is widely used as a screening tool for detection of albuminuria, which is a marker of chronic kidney disease (CKD). However, its accuracy for CKD screening in the general population has not been fully evaluated. The aim of this study is to evaluate the diagnostic accuracy of urine dipstick using a population-representative sample.
Methods: We analyzed a total of 19,966 adults aged ≥20 years, in whom data of urinalysis and serum creatinine were available, among 23,417 adults participating in the Korea National Health and Nutrition Examination Survey 2011–2014. We defined CKD as estimated glomerular filtration rate (eGFR) <60 mL/min/1.73 m^2 and/or albumin-to-creatinine ratio (ACR) ≥30 mg/g. The reference standard of albuminuria was defined as ACR ≥30 mg/g or ACR >300 mg/g. We used trace or 1+ as a cutoff value for urine dipstick positivity.
Results: The prevalence estimates of ACR ≥30 mg/g and ACR >300 mg/g for adults aged ≥20 years in Korea were 7.2% and 0.9%, respectively. For detection of ACR ≥30 mg/g, the accuracy values of urine dipstick were as follows: the sensitivity, specificity, and positive/negative predictive values of dipstick with a cutoff of trace were 43.6%, 93.6%, 34.6%, 95.5%, respectively, and those of dipstick with a cutoff of 1+ were 14.9%, 99.9%, 92.3%, 93.8%, respectively. For detection of ACR >300 mg/g, the sensitivity, specificity, and positive/negative predictive values of urine dipstick with a cutoff of trace were 93.3%, 91.7%, 9.4%, 99.9%, respectively, and those of dipstick with a cutoff of 1+ were 75.4%, 99.5%, 59.1%, 99.8%, respectively. The prevalence estimate of CKD in Korean adults was 8.4%. When urine dipstick positivity along with eGFR <60 mL/min/1.73 m^2 was used for CKD diagnosis, the sensitivity, specificity, and positive/negative predictive values of dipstick with a cutoff of trace were 58.9%, 93.6%, 45.7%, 96.1%, respectively, and those of dipstick with a cutoff of 1+ were 38.1%, 99.9%, 97.6%, 94.6%, respectively.
Conclusion: Although urine dipstick can be used for screening of ACR >300 mg/g with high negative predictive value and fair sensitivity, it cannot be recommended as a screening tool for CKD diagnosis in the general population owing to its low sensitivity for CKD as well as ACR ≥30 mg/g.

Keywords: Albuminuria, chronic kidney disease, Dipstick