Assessing the prevalence of chronic kidney disease in the community: Estimating glomerular filtration rate is the Achilles heel

Studying the prevalence of chronic kidney disease (CKD) in the community is of great public health relevance, since it has been shown that even the early stages of CKD impose a significant economic burden to the society.[1] So far, almost all such studies in India have been carried out in the cities. Hence, the authors of the study published in the Journal need to be commended for their efforts to provide us a rural perspective.[2] They studied about 2000 adults in rural South India by door-to-door survey. The study design would have been more robust if cluster or systematic random sampling had been done. They surprisingly found a rather high prevalence (33.6%) of hypertension in the community. The prevalence of diabetes mellitus, on the contrary, is rather low (3.82%) when compared to existing published Indian data. The other revelation in the study was the wide variation in the prevalence of CKD (stage 3 and above) when estimated glomerular filtration rate (eGFR) was estimated by the four-variable Modification of Diet in Renal Disease (MDRD) formula (4.35%) when compared to the Cockcroft-Gault (CG) formula corrected for body surface area (15.6%). The use of the uncorrected CG formula gave a CKD prevalence of an unbelievable 30.3%! Obviously, a given patient actually has only one GFR, and the diagnosis of CKD necessitates a correct estimation of the subject's GFR.[3] However, in the absence of a practically usable test to easily measure the GFR, we take recourse to the estimated GFR, for which several formulae are now available. This study highlights the anomalous situation arising as a result of usage of different equations. In fact, the CG formula was derived about four decades back by correlation with 24 hour urinary creatinine clearance by studying only 236 patients.[4] To be fair, the CG formula has stood the test of time all these years in modification of drug dosing in patients with renal impairment. On the other hand, the MDRD formula was developed by correlation with diethylenetriaminepentaacetic acid (DTPA) GFR in 1070 patients followed by validation in a separate set of 558 patients. No doubt, the MDRD equation too has several drawbacks.[5] Recently, the

CKD-Epidemiology (EPI) formula, which uses the same variables as the four-variable MDRD formula was found best suited for epidemiological purposes. However to use this formula, the serum creatinine estimation has to be validated to isotope dilution mass spectrometry (IDMS). In fact, that was the reason the CKD-EPI formula could not be used in the study by Anupama *et al*.[2] In a recent publication, the CKD Consortium Group has shown that eGFR estimation by the cystatic-c based eGFR formula best correlated with clinical outcomes.[6]

Many of the Asian countries have now validated eGFR equations specifically for their respective populations. Although efforts to develop an equation for the Indian population are continuing, we do not as yet have such an equation. Apart from development of an eGFR equation, the other important issue is accurate estimation of serum creatinine itself, since in all these formulae the crucial variable is serum creatinine. As is well-known, of all the commonly used biochemical parameters, creatinine has the greatest inter-laboratory variation in its upper limit.[7] In fact, it is for that reason the measurement of serum creatinine should ideally be standardized to IDMS. As of now, in India routine use of creatinine estimation traceable to IDMS seems a distant possibility due to economic constraints. In its absence, estimation of creatinine by autoanalyzers, which use the kinetic alkaline picrate method (a modification of the classical Jaffe method) gives the most accurate value, since it eliminates the noncreatinine chromogens.[5]

Nephrologists owe it to the public health authorities and society in general to provide an accurate estimation of the CKD burden in the population. The concept of CKD introduced a decade back has definitely helped to increase awareness of an important public health problem. However, it is unfair to give inflated figures of CKD prevalence in the community. Until we have our own validated eGFR equation, it seems reasonable to use the four-variable MDRD equation for the calculation of eGFR in the Indian population for clinical and epidemiological use.

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