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Cystatin C의 유용성과 cystatin C에 기반한 한국인의 추정 사구체여과율

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Clinical Usefulness of Serum Cystatin C and the Pertinent Estimation of Glomerular Filtration Rate Based on Cystatin C

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Background : Although cystatin C has been developed as an alternative marker for estimating glomerular filtration rate (GFR), its clinical use is as yet limited. We evaluated the significance of cystatin C for differentiating chronic kidney disease (CKD) stages and established cystatin C based equations estimating GFR.

Methods : We examined the fresh frozen serum samples (−80° C) from CKD (n=119) and healthy volunteers (n=22). Serum creatinine (SCr) was measured by the kinetic Jaffé method (mg/dL), and recalibrated to the isotope dilution mass spectrometry (IDMS). Cystatin C was measured using a particle enhanced nephelometric assay (mg/L).

Results : CKD stages were more sensitively differentiated by cystatin C compared to SCr, especially in moderate and severe kidney dysfunction. The correlation between cystatin C and systemic inulin clearance (Clin) was more linear when systemic Clin was less than 60 mL/min/1.73m^2. Gender and body mass index did not affect cystatin C level. Pearson's correlation coefficients of reciprocal of cystatin C, measured, and recalibrated SCr compared to systemic Clin were 0.757, 0.734, and 0.709, respectively. We derived novel pertinent equations based on cystatin C [Model 1:1.404×cystatin C (mg/L)−0.895×age (years)0.006×weight (kg)1.074×height (cm)−1.562×(0.865; if female), Model 2: 43.287×cystatin C (mg/L)−0.906×age (years)0.101×(0.762; if female)]. Model 1 and 2 showed superior performance in representing systemic Clin than the IDMS MDRD study equations did (adjusted r^2=0.76 and 0.72 for model 1 and 2, and 0.64 and 0.65 for 4 and 6 variable IDMS MDRD study equations, respectively).

Conclusions : Cystatin C reflects kidney dysfunction sensitively, and thus cystatin C based estimation of GFR could provide a reliable support for clinical practice.

Key Words : Cystatin C, 사구체여과율, 이눌린 청소율
Cystatin C, Glomerular filtration rate, Inulin clearance