

한국인 신이식 환자에서 사구체 여과율의 추정치의 비교

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Comparison Of Glomerular Filtration Rate Estimation Between Creatinine Clearance, Creatinine Based Equations And Cystatin C Based Equations In Korean Renal Transplant Recipients

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BACKGROUND : Accurate measurement of glomerular filtration rate (GFR) is critical for the management of kidney transplant recipients. Numerous equations based on creatinine have been developed to estimate GFR. However, these equations have not been shown to be reliable in renal transplant recipients. We aimed to compare the performance of creatinine clearance, creatinine based equations and cystatin C based equations in Korean renal transplant patients.

METHODS : We measured ⁵¹Cr- EDTA clearance as a reference GFR in 37 stable kidney transplant recipients. For accurate measurement, 6 plasma samples were taken at 10, 20, 30, 60, 180 and 300 minutes after 50 μ Ci ⁵¹Cr- EDTA bolus injection. Serum creatinine was measured by rate- blanked compensated kinetic Jaffe assay. Because the creatinine concentration measured by compensated kinetic Jaffe assay was traceable to an isotope dilution mass spectrometry (IDMS) determination, we estimated GFR using the IDMS traceable MDRD equation in addition to the abbreviated MDRD equation. GFR was estimated using 13 creatinine based equations and 8 cystatin C based equations as well as creatinine clearance. The bias, precision, accuracy within 30% and 50% and relative difference of each methods were compared.

RESULTS : The mean ⁵¹Cr- EDTA GFR was 71.83 ± 20.41 mL/min/1.73m². Each GFR equation correlated significantly with ⁵¹Cr- EDTA GFR. Abbreviated MDRD equation overestimated GFR significantly with a bias of 5.14 mL/min/1.73m² and an accuracy within 30%, 50% of 81.08%, 94.59% respectively. The IDMS traceable MDRD equation had the highest accuracy (accuracy within 30%, 50% of 86.49%, 97.3% respectively) with a bias of 0.59 mL/min/1.73m² and a precision of 12.57 mL/min/1.73m². The Walser equation based on creatinine also showed high accuracy (accuracy within 30%, 50% of 86.49%, 94.59% respectively) with a bias of - 0.96 mL/min/1.73m². Among the cystatin C based equations, the MacIsaac equation had the highest accuracy (accuracy within 30%, 50% of 83.78%, 94.59% respectively) with a bias of - 2.27 mL/min/1.73m². Creatinine clearance had the lowest accuracy (accuracy within 30%, 50% of 33.33%, 55.56% respectively) with a bias of 3.98 mL/min/1.73m².

CONCLUSION : Among the various GFR equations, IDMS traceable MDRD equation was the most accurate equation for GFR in Korean renal transplant recipients. The cystatin C based GFR equations, especially MacIsaac method exhibits similar diagnostic characteristics to the IDMS traceable MDRD equation.

Key Words : 신이식, 사구체여과율, cystatin C
Renal transplant, GFR, Cystatin C