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Comparison of methods for determination of glomerular filtration rate: Tc-99m-DTPA renography, predicted creatinine clearance method and plasma sample method

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Background: The gamma camera uptake method with Tc-99m-DTPA is simple and less time consuming for the determination of the glomerular filtration rate (GFR). However, its diagnostic accuracy is debated. Gates' method and predicted creatinine clearance method were compared with plasma clearance method with Tc-99m-DTPA for the measurement of GFR. ***Materials and Methods:*** Tc-99m-DTPA renography was performed on 133 patients (69 males and 64 females; age range being 24 to 84 years) with a wide range of renal function. The GFR was determined simultaneously by 3 methods; (1) gamma camera uptake method (modified Gates, Gates); (2) predicted creatinine clearance method (Cockcroft-Gault, CG); (3) single- or two-plasma clearance method (plasma sample clearance method, PSC). The PSC was chosen as a reference. ***Results:*** The regression equation of the Gates and the CG against the PSC was $Y = 11.89 + 1.041X$ ($r = 0.790$, $p < 0.001$, RMSE = 23.55 m*l*/min/1.73 m^2) and $Y = 8.845 + 0.7899X$ ($r = 0.8270$, $p < 0.001$, RMSE = 16.27 m*l*/min/1.73 m^2), respectively. In comparison with the GFR by PSC, the Gates tended to overestimate the GFR, and contrarily the CG tended to underestimate the GFR. ***Conclusion:*** The Gates correlates well with the PSC. However, the Gates is even less precise than the CG. The Gates' method in Tc-99m-DTPA renography is not suitable for the estimation of GFR in routine practice.

Key words: glomerular filtration rate, renography, Cockcroft-Gault's equation, plasma sample method, Tc-99m-DTPA