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Evaluation of equations for measuring eGFR based on serum creatinine and 6 cystatin C values in top level rugby players

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Abstract

Equations to estimate the glomerular filtration rate (GFR) have recently been advocated over serum creatinine values as a means to more accurately assess kidney function. The Cockcroft-Gault (CG) equation requires a body weight parameter, whereas the Modification of Diet in Renal Disease (MDRD) Study and Mayo Clinic Quadratic Equation (MCQE) formulae do not. We measured the serum creatinine and cystatin

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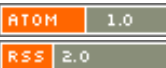
C concentrations in male athletes belonging to the Italian National Rugby team. Blood was obtained before the start of training and during competitive season. The serum creatinine level was measured by Jaffe and enzymatic reactions, cystatin C by nefelometry. The same parameters were measured in a control group of male, sedentary and overweight subjects. The concentrations of cystatin C were always into the reference ranges. The concentrations of creatinine were often higher than reference interval. The use of enzymatic method did not improve the specificity. The equations based on cystatin C and creatinine were not correlated. The two equations based on cystatin C were correlated. Two equations based on creatinine values were correlated (MDRD and MCQE); they were not correlated with CG. 29 level athletes, characterized from a high release of creatinine. The use of equations should be accurately evaluated: the CG equation can overestimate the eGFR, the MDRD and MCQE formulae systematically underestimates it. The use of equations to estimate GFR in the general population needs examination of their behaviour in subjects having atypical anthropomorphic characteristics.

Key words: equations; rugby; glomerular filtration rate; serum creatinine

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1. Evaluation of creatinine, cystatin C and eGFR by different equations in professional cyclists during the Giro d'Italia 3-weeks stage race