

RACE DETERMINES APPROPRIATE WEIGHT TO USE IN COCKROFT-GAULT EQUATION IN DIABETIC PATIENTS

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Current K/DOQI clinical practice guidelines recommend using the Cockcroft-Gault (CG) equation, the 6-variable Modification of Diet in Renal Disease (MDRD) equation, or the 4-variable MDRD equation for routine assessment of kidney function in adults.¹ Use of the CG equation is problematic because the patient's body weight is required and it is unclear which body weight results in the most accurate estimates. Furthermore, it is possible that choice of weights depends on race since the relationship between glomerular filtration rate (GFR) and serum creatinine differs between blacks and nonblacks.²

The purpose of this study was to determine if actual body weight (ABW), adjusted body weight (AdjBW), or ideal body weight (IBW) results in the most accurate estimates of GFR when using the CG equation in diabetic patients.

A retrospective chart review was conducted for all diabetic patients at an academic primary care clinic. Patients with all information required to estimate GFR using the 6-variable MDRD and CG equations were included. CG GFRs (normalized for body surface area) were estimated for all patients using ABW, AdjBW [IBW+0.4*(ABW-IBW)], and IBW. Accuracy of these estimates relative to the 6-variable MDRD GFR was determined using 1) median prediction errors (MPE), a measure of prediction bias and 2) median absolute prediction errors (MAPE), a measure of typical prediction error size.

Patient characteristics (n=222) included [number or median (range)]: 133 F/89 M; 55 years of age (23, 93); 130 blacks/92 nonblacks; height 66" (52, 78); ABW 94 kg (48, 174); BMI 33.7 kg/m² (17.7, 62.1); serum creatinine 0.96 mg/dL (0.50, 9.12); albumin 3.7 g/dL (2.3, 4.7), and MDRD GFR 84 mL/min/1.73 m² (6, 216). For blacks, the MPE was lowest when ABW was used [0.29% (95% CI: -3.37%, 5.61%)], followed by AdjBW (-19.8%) and IBW (-34.8%). For nonblacks, the MPE was lowest when AdjBW was used [-6.26% (95% CI: -8.38%, -3.65%)], followed by ABW (17.4%) and IBW (-23.2%). MAPE was lowest for blacks (12.0%) and nonblacks (8.84%) when ABW and AdjBW were used, respectively.

In this population, use of ABW in the CG equation provided the most accurate estimates of GFR in blacks, while use of AdjBW provided the most accurate GFR estimates in nonblacks. Accuracy substantially decreased in both groups when alternative weights were used. This suggests that the standard practice of using the same body weight for all races substantially degrades the accuracy of CG GFR estimates.

1. National Kidney Foundation. (2002) Am J Kidney Dis. 39(suppl 1), S1-S266.
2. Levey AS et al. (1999) Ann Intern Med. 130(6), 461-470.