COMMENT ON TSUDA ET AL.

Poor Glycemic Control Is a Major Factor in the Overestimation of Glomerular Filtration Rate in Diabetic Patients. Diabetes Care 2014;37:596–603

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Diabetes Care 2014;37:e83 | DOI: 10.2337/dc13-2703

Accurate assessment of kidney function is of major clinical importance for the management of patients with diabetes. We read with interest the article by Tsuda et al. (1). The authors proposed a new equation to estimate glomerular filtration rate (GFR), including glycemic control as a new variable. They concluded that poor glycemic control is a major factor in the overestimation of GFR in diabetic patients. There are several important limitations in this study. First, the sample (n = 80, all Japanese subjects) must be considered as too limited to propose a new equation. For example, the development data set for the Modified Diet in Renal Disease (MDRD) study equation included 1,628 subjects. The Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) consortium proposed a new equation from the analysis of a development data with 5,504 individuals. Even in equations developed for a specific population such as older patients, the Berlin Initiative Study (BIS equation) included 285 elderly subjects (2). Second, performance of all creatinine-based equations is very dependent on the GFR levels. This concept of proportional bias is fundamental. In other words, it is frequent that an equation, including the CKD-EPI equation, overestimates measured GFR (mGFR) in low GFR levels (i.e., ~30 mL/min/1.73 m^2) and underestimates mGFR in high GFR levels (>90 mL/min/1.73 m^2). The authors do not take into account this possible bias linked to different GFR levels, which could be of particular importance in diabetic subjects (3,4). Third, colorimetric measurement of inulin is subject to analytical interference with glucose. Therefore, poorly glycemic-controlled subjects could actually have false-high plasma inulin concentration, leading to falsely lower inulin clearance. This analytical error in the measurement of GFR could, at least in part, explain the overestimation by the equation proposed by the authors (5). Last, Tsuda et al. (1) studied the performance of equations according to intraclass coefficient of correlation. The fact that estimated GFR (eGFR) and mGFR are correlated is the least we can expect as they are measuring and estimating the same physiological parameter. Also, using the ratio eGFR/mGFR omits the concept of proportional bias, which is, once again, especially relevant in diabetic patients. Measurement of bias, precision, and accuracy within 30% (defined as the percentage of patients with eGFR within 30% of mGFR) are recommended in this type of analysis (4). Because of all these limitations, the added value of a "glycemic control" variable in equations to estimate mGFR in the diabetic population must be considered as highly speculative and remains to be validated in studies that take into account the abovementioned concerns.

Duality of Interest. No potential conflicts of interest relevant to this article were reported.

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