RESPONSE TO 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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Thank you for attention to our recent article and the comments from Drs. Delanaye and Scheen (1). First, as described in the limitation section of our article (2), our study was performed using a relatively small number of Japanese patients ($n = 80$) from a single hospital at Osaka City University Hospital, and further large-scale studies with a greater number of patients in several hospitals will be necessary to confirm the clinical validity of estimated glomerular filtration rate (eGFR) correction by hemoglobin A1c. However, we consider that performing this laborious and relatively complicated study of inulin clearance (C_{in}) using a constant infusion technique with the stable technique performed in a single hospital by the authors (A.T. and E.I.) had some advantages, in that it was conducted in a single hospital by the authors and that inter-hospital or inter-investigator bias could be avoided. Second, in addition to measuring serum creatinine, we also measured serum cystatin C, another different physiological parameter, to calculate three different eGFRs (i.e., eGFR based on serum creatinine [$eGFR_{cr}$], serum cystatin C [$eGFR_{cys}$], and both serum creatinine and cystatin C [$eGFR_{cr\text{-}cys}$]) (3). In our study, all three measures of $eGFR_{cr}$, $eGFR_{cys}$, and $eGFR_{cr\text{-}cys}$ overestimated the measured GFR (C_{in}) in diabetic patients, particularly in those with poor glycemic control, thus showing that this phenomenon was not affected by serum creatinine alone. Third, while it may be desirable to measure inulin concentration by mass spectrometry, this method requires specific and costly equipment and is not usually used clinically. Accordingly, in our study, inulin concentrations were measured enzymatically, which is the method generally used by most others for clinical studies (4,5). To the best of our knowledge, glucose concentrations do not affect the enzymatic measurement of inulin concentrations. Last, we calculated the intraclass coefficient between C_{in} and the three distinct eGFR measures, $eGFR_{cr}$, $eGFR_{cys}$, and $eGFR_{cr\text{-}cys}$, which are not based on the same physiological parameters, with and without correction by hemoglobin A_{1c}. Using these three distinct eGFR measures, the intraclass coefficient was found to be increased, particularly in diabetic patients, when each eGFR measure was corrected by hemoglobin A_{1c}. We consider that we avoided bias as best as possible. Through this study, we demonstrated that eGFR overestimates measured GFR (C_{in}) as glycemic control worsens. eGFR corrected by hemoglobin A_{1c} or glycated albumin is considered to be clinically useful and feasible. We agree with Delanaye and Scheen (1) that further studies are needed to construct formulae that adjust for glycemic control indices in other races, and further large-scale studies with greater numbers of patients are needed to confirm the clinical validity of eGFR correction by hemoglobin A_{1c}.

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

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