

Complexities of eGFRs in a Study of Glomerular Physiology

In a recent article in *JASN*, Collard *et al.*¹ used a new method to indirectly determine glomerular pressures (P_{glom}) from renal artery pressures and flows that were measured in 28 patients undergoing angiography. Kidney function was expressed as a patient's eGFR by the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation.² After analysis, higher renal perfusion pressure, higher body mass index (BMI), and the presence of diabetes were associated with higher P_{glom}.

The use of eGFRs in this study may have introduced certain complexities. An eGFR is a size-indexed GFR, in milliliters per minute per 1.73 m². The ratio of GFR to body surface area (BSA) is indexed to a standard BSA of 1.73 m².² Normally, with the same eGFR, larger people have higher BSAs, BMIs, and measured GFRs (in milliliters per minute), and smaller people have the opposite. An advantage of screening with eGFRs in this study was to be sure that reasonably healthy kidneys were studied, *i.e.*, with function appropriate to body size. But when kidney function was expressed as eGFR and BMI was used as an independent variable, higher BMIs selected for higher nonindexed GFRs (in milliliters per minute). Therefore, the more fundamental association might have been between (higher) nonindexed GFR and (higher) P_{glom}, not (higher) BMI and P_{glom}. It may be relevant that, in the early days of continuous ambulatory peritoneal dialysis, we found misleading correlations when multiple size-related terms were studied in the same patient. This happened, for example, when both protein catabolic rate and dialytic clearance were normalized to body size.³ In this study, multiplying the eGFRs by each individual's BSA/1.73 to "unindex" them might help clarify the results. This was proposed in the report of the original Modification of Diet in Renal Disease equation to achieve accurate drug dosing.⁴

Another possible problem is that a Modification of Diet in Renal Disease or CKD-EPI eGFR is an estimate of a size-indexed GFR, not a measured value. A patient with a CKD-EPI eGFR of 70 ml/min per 1.73 m² could well have a measured, size-indexed GFR of 60 or 80 ml/min per 1.73 m², or—less likely—55 or 85 ml/min per 1.73 m², *etc.*^{2,4} This introduces unappreciated heterogeneity into a small, carefully assembled database. In other words, the study assessed the relationship of individually determined patient

characteristics with P_{glom}, but used estimates for glomerular filtration. "Unindexing" the eGFRs would still leave estimates, not measured values.

DISCLOSURES

The author has nothing to disclose.

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See related Letters to the Editor, "Authors' Reply," and article "Estimation of Intraglomerular Pressure Using Invasive Renal Arterial Pressure and Flow Velocity Measurements in Humans" on pages xxx–xxx and xxx–xxx, respectively.

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