Recalibration of population-based GFR formulae by pharmacokinetic methods

Sir,

In the interesting article ‘Estimating glomerular filtration in the general population: the second Health Survey of Nord-Trondelag (HUNT II)’ by Hallan et al. [1], attention is drawn to the increasing documentation of ‘large underestimation of glomerular filtration rate (GFR) in older subjects using the Cockcroft-Gault formula’. The authors present a new population-based GFR formula and postulate recalibration of such formulae. Unfortunately, they do not discuss explicitly the experimental and mathematical procedures necessary for correct determination of GFR.

As we have shown elsewhere [2,3], underestimation of GFR stems from constant-infusion experiments, theoretically requiring the achievement of steady states, but practically not fulfilling this requirement because of experimental protocols which are generally too short. Despite this obvious weakness, constant-infusion techniques are celebrated as ‘gold standards’.

It appears to us that the only mathematically correct, and at the same time clinically practicable solution, for the GFR standardization problem consists in the use of pharmacokinetic models that are adapted to dynamic concentration courses of physiologically suitable markers. This appears to be all the more valid, since the theoretically correct technique of GFR determination by constant-infusion experiments using infinitely long experimental protocols can be shown with mathematical rigor to be a special case within the wider concept of kinetic techniques.

Kinetic methods are already successfully applied in many fields of biomedicine and biotechnology [4], and a renewed discussion of the GFR-standardization problem as stimulated by the intriguing biometric study by Hallan et al. [1] could pave the way to recalibrated population-based formulae for future nephrological studies.

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