found in 52 patients aged 80 ± 5 years a bias of –5.2 mL/min for the CG formula, and of 6.4 mL/min for the MDRD formula. Our results and the literature show that the CG formula underestimates the GFR and that the MDRD formula overestimates it. To conclude, these different studies show that the MDRD formula doesn’t estimate better the GFR in very old patients. On the opposite, it seems that the CG formula could be more appropriate (and easier to use) in this particular population, good classification of renal impairment was better than with the MDRD formula (Table I). All these studies emphasize the fact that none of the two formulas is perfect to estimate the renal function and that more research is needed to find a better way to simply assess renal function in the elders.

Conflict of interest: none

References


Sophie Chauvelier1, Renaud Péquignot2, Olivier Hanon3, Joel Belmin1
1Université Pierre-et-Marie-Curie Paris 6, Hôpital Charles-Foix, Service de gériatrie, 94200, Ivry-sur-Seine, France
2Hôpital national Saint-Maurice, Service de médecine et de réadaptation, 94410 Saint-Maurice, France
3Université Paris 5, Hôpital Broca, Service de gériatrie, 75013, Paris, France

Correspondence: Sophie Chauvelier, Hôpital Charles-Foix, 7, avenue de la République, 94200 Ivry-sur-Seine, France. sophie.chauvelier@cfx.aphp.fr

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Authors’ response to the letter on the article “Plasma creatinine, Cockcroft and MDRD: Validity and limitations for evaluation of renal function in chronic kidney disease”

Réponse des auteurs à la correspondance à propos de l’article « Mesure et estimation du débit de filtration glomérulaire : quels outils pour la prise en charge de la maladie rénale chronique ? »

Chauvelier et al. raise here the problem of Glomerular Filtration Rate (GFR) estimation in very old subjects. Based on their recent work in very old hospitalized patients, they argue that the 4-variables Modification of Diet in Renal Disease formula (MDRD) overestimates GFR in this population, and recommend the use of Cockcroft’s formula (Cockcroft) [1].

In this study, Pequignot et al. used a non-standardized creatinine assay. Plasma creatinine assays have been largely modified within the past decades. A long quest for better specificity was marked by successive improvements such as ultrafiltration or dialysis of samples, widespread use of kinetic colorimetric methods and more recently through compensation for non-creatinine chromogens of colorimetric assays and progressive rise of enzymatic assays allowing standardization to Isotope Dilution Mass Spectrometry (IDMS) with reference to Standard Reference Materials (SRM). MDRD has been recently updated in order to be used with these standardized creatinine assays. On the other hand, Cockcroft has not been analytically re-evaluated as the creatinine assay evolved. As a consequence, GFR estimation performances using Cockcroft are directly dependent on which creatinine assay method is used, and the results of this study don’t remain valid with current standardized creatinine assay.

The study by Pequignot et al. relies on the urinary creatinine clearance (U24CICreat) as reference for GFR value. It should be noticed that U24CICreat is only a poor estimator of GFR, as creatinine is partially excreted by tubular secretion. Nevertheless, it’s important to outline here that Cockcroft was established in comparison to U24CICreat, unlike MDRD, which was established in comparison to gold standard GFR measurements (Body Surface Area normalized urinary iothalamate clearance). This could partially explain the better performance of Cockcroft when U24CICreat is used as reference for renal function, but does not presume the respective performances of MDRD and Cockcroft when compared with measured GFR.
Several works have established the superiority of MDRD over Cockcroft in patients older than 65 years [2–4]. Chauvelier et al. suggest that this would not be the case in very old patients, referring to two other publications, from which only the one of Lamb et al. was conducted with both standardized creatinine and radioisotopic method for GFR measurement [5]. In this study, enrolling 52 patients of 80 ± 5 years old, the mean bias was +8.1% and −10% of the GFR value, for MDRD and Cockcroft respectively, whereas it was + 22.3 and −3.7 ml/min/1.73m² in the study by Pequignot et al. The very large difference in the GFR overestimation with MDRD between these two studies is disturbing. This discrepancy could be at least in part attributed to the major difference in the physical characteristics of patients, since mean BSA and mean weight were approximately 0.2 m² and 14 kg less in Pequignot’s study, reflecting a greater and unusual proportion of bedridden or sarcopenic patients in the latter. Such a population is clearly not a representative cross-section subset of the elderly community.

Taken together, these results suggest that old age is not directly associated with a misleading MDRD overestimation of GFR, and should not be considered as a criteria for substituting MDRD by Cockcroft.

Finally, we uphold the opinion that MDRD is overall easier to use in elderly patients than Cockcroft. Mathematic complexity of MDRV is no longer an obstacle to its use in our current era of computers and network calculators. Moreover, the fact that we don’t need to know the weight nor the body surface area is a major advantage in elderly subjects.

It is important that general practitioners get a clear and simple message about this subject. Cockcroft is methodologically outdated and should not be used anymore, except in individual cases with unusual and very low muscular mass, as for young anorectic patients. With exception to pediatric population in which a specific formula was recently updated [6], age does not influence performance of MDRD and has to be preferred, even in the elderly or very elderly population.

Conflicts of interest: None.

References

Martin Flamant1,2, Henri Boulanger1,2, Lubica Findova1, François Vrtovsnik1,2
1AP–HP, hôpital Bichat, service de physiologie, 75877 Paris cedex 18, France
2Inserm U699, Université Denis Diderot, Paris, France
3Clinique de l’Estrée, service de néphrologie, 93240 Stains, France
4AP–HP, hôpital Bichat, service de néphrologie, 75877 Paris cedex 18, France
Correspondence: Martin Flamant, AP–HP, hôpital Bichat, service de physiologie, 46, rue Henri-Huchard, 75877 Paris cedex 18, France. martin.flamant@bch.aphp.fr
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