Letter

Cystatin C: unsuited to use as a marker of kidney function in the intensive care unit

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Published online: 10 May 2005
This article is online at http://ccforum.com/content/9/5/531

Critical Care 2005, **9:**531-532 (DOI 10.1186/cc3541)

See related research by Villa *et al*., issue 9.2 [http://ccforum.com/content/9/2/R139]

We read with interest the article by Villa and coworkers [1] advocating the use of cystatin C as a measure of glomerular filtration rate (GFR) in critically ill patients. However, we should like to draw attention to several flaws in this study. First, Villa and coworkers compared cystatin C with creatinine as a measure of GFR, using body surface corrected creatinine clearance as, what they call, a 'gold standard'. However, in the Discussion section of that report inulin and iothalamate clearances are mentioned as gold standards, but they were not used by these investigators. The use of body surface area corrected creatinine clearance is questionable in both obese and excessively lean individuals because the correlation between surface area and lean body mass may be lost. Both types of patients are frequently encountered in intensive care. Second, Villa and coworkers employ a cutoff of 80 ml/min to identify renal dysfunction, whereas a value of 50 ml/min is generally accepted [2]. This could have a major influence on the presented results. Third, patients with thyroid disorders or on corticosteroid therapy were excluded. Almost all patients with critical illness have low tri-iodothyronine values because of changes in thyroid hormone metabolism ('nonthyroidal illness'), thus making recognition of thyroid disorders problematic. Finally, we showed [3] that, in patients with thyroid dysfunction, cystatin C is not a suitable measure of GFR. In hypothyroidism creatinine levels are elevated but cystatin C levels are low, whereas in hyperthyroidism creatinine levels are low and cystatin C levels elevated.

Taken together, we disagree with the authors that cystatin C could be used as a marker of GFR in intensive care patients.

Authors' response

P Villa, M Jiménez, M-C Soriano, J Manzanares and P Casasnovas

We read with interest the letter from Wulkan and coworkers about the use of cystatine C as a marker of glomerular filtration. The gold standard parameters for monitoring renal function are clearances of exogenous substances (inulin, [125]iothalamate, etc.), and in clinical practice the more extensively used markers of glomerular function, despite their limitations, are serum creatinine and creatinine clearance. In our opinion creatinine clearance represents a reasonably accurate and reliable estimate of GFR and is better than serum creatinine, at least in critically ill patients. Therefore, we compared serum cystatin C and serum creatinine with body surface corrected creatinine clearance. Morbidly obese patients were excluded from the study because of the possible perturbation in the calculation of body surface corrected creatinine clearance.

In their letter, Wulkan and coworkers comment on the fact that we employed 80 ml/min per m^2 creatinine clearance as the cutoff point to identify renal dysfunction instead of the more generally accepted 50 ml/min per m^2. Although 50 ml/min per m^2 is the more commonly used cutoff point, other studies [4,5] used a cutoff point of 84 ml/min per m^2. We felt that it would be interesting to evaluate a more sensitive marker of early renal dysfunction in critically ill patients, and therefore we employed a cutoff point of 80 ml/min per m^2 in our study.

In relation to the impact thyroid dysfunction has on serum cystatin C, the study reported by Wulkan and coworkers [3] was conducted in a hyperthyroid or hypothyroid population, and so patients with known thyroid disease were excluded

GFR = glomerular filtration rate.

from the study. 'Nonthyroidal illness' is common in critically ill patients. This disorder typically presents with low free triiodothyronine values, generally normal free tetraiodothyronine and normal thyroid-stimulating hormone, which confounds extrapolation of published data in this population. We feel that future studies to evaluate this issue are warranted.

Competing interests

The author(s) declare that they have no competing interests.

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