

Advance Access publication 26 July 2011

Age- and gender-adjusted eGFR to estimate baseline creatinine for RIFLE criteria

Sir,

In 2004, the Acute Dialysis Quality Initiative (ADQI) developed a consensus definition of acute kidney injury (AKI): the risk, injury, failure, loss and end-stage kidney disease (RIFLE) criteria [1]. AKI is divided into three classes (risk, injury and failure) based on urine output or a rise in serum creatinine compared to baseline creatinine. Often, a baseline creatinine value is not available. In that case, ADQI recommends back-estimation using the Modification of Diet in Renal Disease (MDRD) formula, assuming an estimated glomerular filtration rate (eGFR) of 75 mL/min/1.73m² [1]. It is known that this formula leads to under- and over-classification of AKI [2]. Since GFR decreases with age, the use of eGFR 75 mL/min/1.73m² might result in over-classification in the elderly. Several alternative methods have been suggested, e.g. the use of creatinine value taken at the time of hospital admission, the use of the lowest creatinine level during admission, calculating baseline creatinine by using a newly developed equation or the use of a gender-fixed eGFR [2]. However, none of these alternatives offered an improvement compared to the MDRD-based estimates [2]. In our study, we investigated the use of an age- and gender-adjusted eGFR to classify patients according to the RIFLE criteria compared with the use of a fixed eGFR of 75 mL/min/1.73m².

We analysed data from 271 patients >18 years of age, hospitalized with community-acquired pneumonia, who participated in two consecutive trials [3, 4]. Serum baseline creatinine (defined as creatinine-actual) was obtained by searching for creatinine values in hospital and general prac-

itioner database. Preferably, the sample was taken in the 3 months before admission.

We back-calculated baseline creatinine using the MDRD formula, first with a fixed eGFR of 75 mL/min/1.73m² (defined as creatinine-75) [1]. Next, we back-calculated baseline creatinine with an age- and gender-adjusted eGFR (defined as creatinine-age), obtained in a Dutch population [5]. We compared the RIFLE classification based on creatinine-75 and creatinine-age, with the RIFLE classification based on creatinine-actual as reference value.

We found that the use of creatinine-75 compared to the use of creatinine-actual led to a significantly different classification in RIFLE class (P = 0.007) (Table 1). The use of creatinine-age resulted in a comparable RIFLE classification compared to the use of creatinine-actual (P = 0.76). The numbers of under-, over- and correct classification in specific RIFLE classes are shown for both groups in Figure 1. Especially for patients aged >76 years, RIFLE classification was more accurate with the age- and gender-adjusted eGFR (Figure 1).

We conclude that use of an age- and gender-adjusted eGFR is more comparable with actual baseline creatinine values compared to a back-calculated value with a fixed eGFR of 75 mL/min/1.73m². However, further research is needed to evaluate whether this age- and gender-adjusted eGFR classification in RIFLE class has the same prognostic value on outcome compared with the classification in RIFLE class based on the actual baseline creatinine.

Conflict of interest statement. None declared.

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Table 1. Classification in RIFLE Classes 1–3 or RIFLE Class 0^a.

	RIFLE 1–3	RIFLE 0	P-value
All patients (n = 271)			
Creatinine-actual	34	237	reference
Creatinine-75	55	216	0.007
Creatinine-age	37	234	0.76
Age >76 years (n = 96)			
Creatinine-actual	11	85	reference
Creatinine-75	31	65	<0.001
Creatinine-age	15	81	0.45

^aP-values present RIFLE classification based on creatinine-75 and creatinine-age compared with classification based on creatinine-actual.

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doi: 10.1093/ndtplus/sfr090

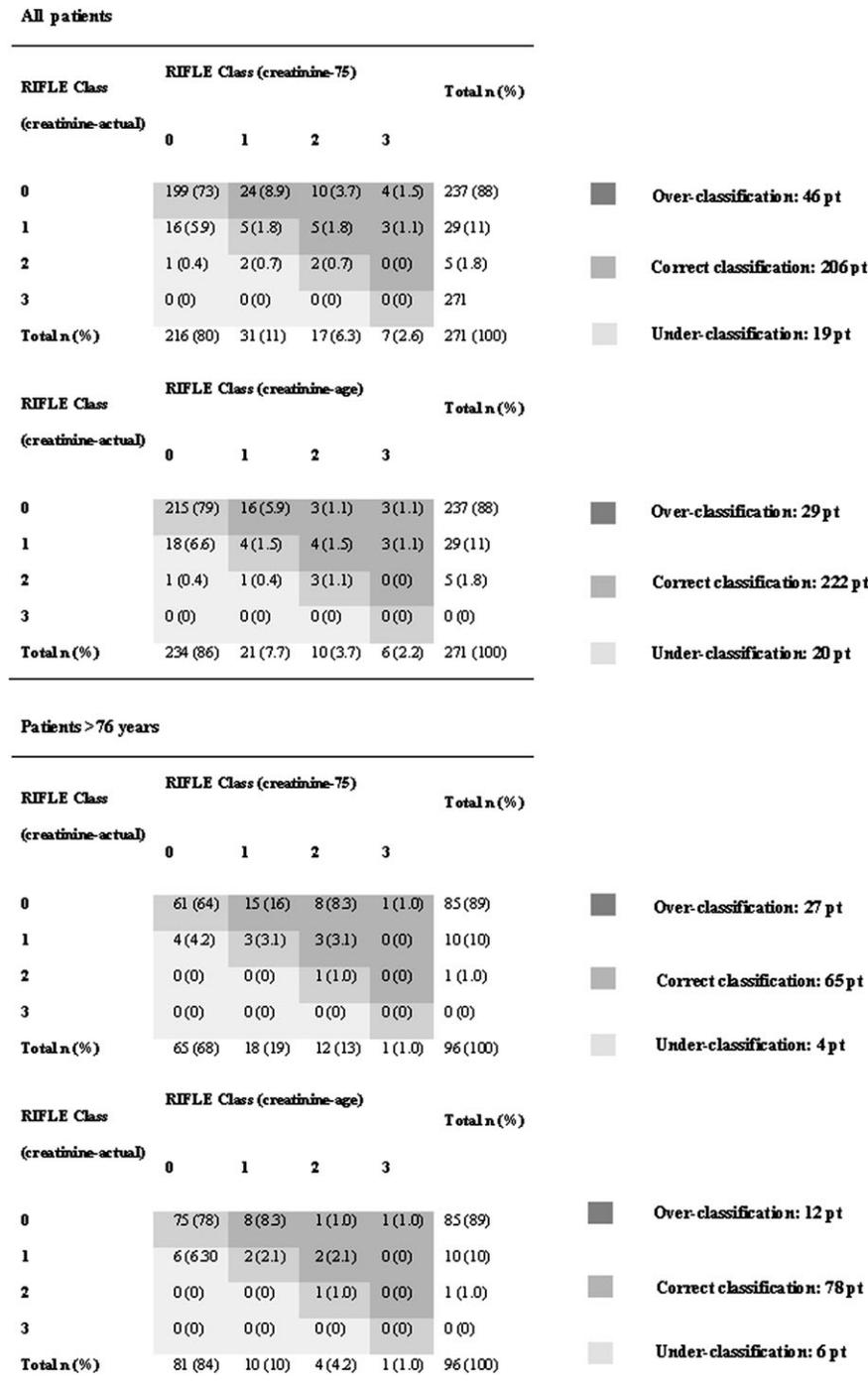


Fig. 1. RIFLE classification calculated with actual creatinine compared to RIFLE classification based on use of a fixed eGFR of 75 mL/min/1.73m² (creatinine-75) and compared to RIFLE classification based on use of an age-and-gender-adjusted eGFR (creatinine-age).