Editorial Comments

Defining and classifying AKI: one set of criteria

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Over the last several years there have been consistent calls for a consensus definition and classification system for the syndrome now known as acute kidney injury (AKI) [1,2]. The major aim of such a system, it was argued, would be to bring this major intensive care syndrome to a standard of definition and a level of classification similar to that achieved by other common ICU syndromes (e.g. sepsis and acute lung injury). Following such advocacy and through the persistent work of the Acute Dialysis Quality Initiative (ADQI) group, such a system was developed through a broad consensus of experts [3].

The classification system that resulted is the RIFLE criteria, an acronym for three levels of severity: risk, injury and failure, and two outcomes: persistent acute renal failure termed loss and end-stage kidney disease. RIFLE was initially greeted with skepticism by both the critical care and nephrology communities. Concern was raised over the use of very small alterations in the serum creatinine and urine output and some objected to the use of an acronym instead of a numerical stages used in chronic kidney disease. Interestingly, others were concerned that a 50% increase in serum creatinine was too conservative and sought to demonstrate that even smaller changes were important [4]. However, the original publication of the RIFLE criteria has now been accessed more than 100 000 times [5] and RIFLE has become the most widely used definition of acute renal failure in both the critical care and nephrology literature [6–10]. The total number of patients included in studies validating RIFLE now exceeds 200 000.

Thus, the goal of standardizing a definition and classification system for one of the most common ICU syndromes would appear to have been realized. However, standards do not mean complacency, and efforts to include more recent evidence has led the AKI Network (AKIN), a somewhat larger, multi-disciplinary, international group to propose some small modifications to the RIFLE criteria [11]. These modifications can be summarized as follows: (a) broadening of the ‘risk’ category of RIFLE to include an increase in serum creatinine of at least 0.3 mg/dl even if this does not reach the 50% threshold; (b) setting a 48-h window on the first documentation of any criteria and (c) categorizing patients as ‘failure’ if they are treated with renal replacement therapy regardless of what their serum creatinine or urine output is at the point of initiation. AKIN also proposed that stages 1, 2 and 3 be used instead of R, I and F.

These differences between ADQI-RIFLE and AKIN stages might therefore appear quite modest—that was precisely the intent. However, until now, even these proposed changes had not been evaluated and as such the study by Bagshaw et al. [12] is most welcome. The results clearly show that, as expected, by broadening the criteria for ‘risk’ (stage 1) there is increased sensitivity (more individuals are classified as having AKI). However, this difference affects only 1% of patients. Moreover since the data available to Bagshaw and colleagues was only from Day 1 of the ICU stay, a large proportion of those 1% of patients would likely have been classified, ultimately, as having AKI by RIFLE anyway. Unfortunately this new study cannot address the other two modifications to RIFLE. This may not ultimately matter very much however, since the proposal to classify patients treated with RRT as stage 3 only applies to their maximum stage and does not preclude investigators from reporting the stage of AKI just prior to RRT. Other studies will need to explore whether the proposed 48-h time window for reaching at least stage 1 criteria excludes patients that should be included in the AKI diagnosis.

ADQI also included GFR in the original RIFLE criteria but with the understanding that it would only be used as a rough ‘guide’ since few patients will have GFR measured, and a non-steady-state GFR is of limited value in any case. Another recommendation from ADQI was how to handle the absence of a baseline creatinine. The ADQI group recommended using the MDRD equation to back-estimate a baseline creatinine using a low normal value for GFR (75 ml) [3]. This approach was first operationalized
by Hoste et al. [13] who used the lowest of the following as the baseline when no true baseline was available: hospital admission creatinine, ICU admission creatinine and MDRD estimated creatinine. By using the lowest of these three, the authors insured that a subject admitted with a low creatinine would have that information included (and thus a higher maximum RIFLE class if the creatinine increased) while a subject admitted with a high creatinine and no history of CKD would be classified based on a change from a theoretical baseline estimated from MDRD. Although logical, this approach has yet to be validated and may still over- or underestimate the degree of renal impairment on admission. The study by Bagshaw et al. [12] used the estimated baseline criteria from the MDRD equation for both RIFLE and AKIN staging. However, the authors also estimated the change in GFR from the MDRD equation for RIFLE but not for AKIN staging. This resulted in a few more cases classified as stage 3 instead of stage 2 but was otherwise inconsequential.

In conclusion, Bagshaw and colleagues have clearly shown us that the proposed modification to RIFLE will result in a mere 1% change in the number of patients diagnosed with AKI. This is good news because RIFLE has now been validated in over 200,000 patients and is widely used. For all intents and purposes RIFLE and AKIN are the same. Now it is time to move on from this promising start and concentrate on treatment recommendations that are tied to AKI staging. The RIFLE/AKIN classification for AKI is already quite analogous to KDOQI chronic kidney disease (CKD) staging, which is well known to correlate disease severity with cardiovascular complications and other morbidities [14]. CKD stages have also been linked to specific treatment recommendations, which have proved extremely useful in managing this disease [14]. As the epidemiology of AKI becomes clearer and as treatments emerge (both made all the more possible by standard criteria for diagnosis and classification) RIFLE/AKIN classifications will undoubtedly be used to reference recommendations for prevention and treatment. Now that we have one uniform classification system, it is time to concentrate on making this a reality.

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References


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