

The AKIN and the RIFLE Limping Criteria to Predict Renal Injury and Mortality Following Cardiac Surgery

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When published in 2006, the RIFLE criteria filled the gap for the failing definition of acute kidney injury [1]. The criteria were scheduled to be evaluated. According to the authors who used these criteria in assessing renal impairment, acute kidney injury (AKI) occurred in 67% of ICU (intensive care unit) admissions, with maximum RIFLE class R and F in 12% and 28% respectively. They warned as to the risk of in hospital mortality compared to those who did not pass class R. Events happened in a general ICU. Later, Bagshaw et al retrospectively studied the fate of the patients admitted in 57 New Zealand adult ICUs including over 120,000 critically ill patients, of which 27.8% had a primary diagnosis of sepsis. They concluded that compared to the RIFLE criteria, the AKIN criteria were unable "to improve the sensitivity, robustness and predictive ability of the definition and classification of AKI in the first 24 hours after admission to ICU" [2].

Recently, a group of investigators from the local Clinic of Cardiovascular Surgery compared the patients submitted to open heart surgery by their AKIN and RIFLE criteria [3]. They ran a prospective clinical observational study on 178 patients included between October 2010 and March 2011 and further studied the morbidity and mortality in patients with renal dysfunction in terms of the aforementioned criteria [3]. The urinary output was intentionally omitted in diagnosing or staging of the patients since altered by the diuretics used to fight hemodilution in the first postoperative day and then to maintain it. Thus both classifications were limping due to the exclusion of urinary output, but as "the urinary criteria were identical in these two classifications", it seemed to be an affordable loss [3]. All patients on RRT (renal replacement therapy) died. They were all staged III by AKIN.

In the subpopulation submitted to elective open heart surgery studied by Balos et al, a correct method outlined that the AKIN criteria were more sensitive in detecting renal injury post cardiac surgery and also better for predicting mortality. It is generally considered that class R for the RIFLE has high sensitivity, while class F has high specificity. Englberger et al studied retrospectively 4836 consecutive patients undergoing cardiac surgery with cardiopulmonary bypass at the Mayo clinic [4]. They obtained a lower pre-

dictable value of RIFLE for mortality and, among other, a potential misclassification of AKI higher in AKIN, attributed to moving the 48 hour diagnostic window applied in AKIN criteria only [4]. The authors found the largest disagreement between RIFLE and AKIN in patients with initial postoperative decrease of serum creatinine. In the Balos study, early renal injury was better predicted by the AKIN score (an excess of 16 cases versus RIFLE), but the difference did not reach statistical significance ($p=0.1084$). Thus the RIFLE score tended to under diagnose renal injury [3]. Moreover, class R (RIFLE) and stage I (AKIN) revealed minor differences in serum creatinine level – that is, lower with the AKIN classification. The outcome of these patients was favorable, deprived of postoperative complications.

Keeping this information, the authors suggested that the AKIN criteria were more sensitive in detecting renal injury following cardiac surgery, and a better predictor for mortality compared to the RIFLE. Suggestions are always welcome, but they do not exclude anything. The RIFLE and the AKIN criteria continue to coexist despite the accumulating evidence for a higher sensitivity of the AKIN scores for patients benefiting of cardiac surgery. Earlier studies considering the parameters of the RIFLE classification in patients submitted to cardiac surgery found the aforementioned classification to be an independent risk factor for 90-day mortality, unlike change in GFR (glomerular filtration rate) and plasma creatinine [5]. The drawback of the RIFLE criteria were already identified in 2006, by a group who suggested further refinement with the arrival of other parameters allowing for an earlier detection of AKI, parameters to reflect "not only the declined excretory function of the injured kidney, but also the underlying tubular damage" [6].

Definitions focusing on kidney function alone in an era of aggressive medical and surgical approach are self-limiting, and therefore not enough [7].

References

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