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Clinical Accuracy of RIFLE and Acute Kidney Injury Network (AKIN) Criteria for Predicting Hospital Mortality in Critically Ill Patients with Multi-Organ Dysfunction Syndrome

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Abstract

Background: The Acute Dialysis Quality Initiative (ADQI) group developed RIFLE criteria and the Acute Kidney Injury Network published AKIN classification that modified form RIFLE criteria.
Objective: The authors aimed to compare the ability of RIFLE and AKIN criteria to measure the incidence of acute kidney injury (AKI) and to predict clinical outcomes in critically ill patients.
Material and Method: A retrospective cohort study, in Siriraj Hospital, Bangkok. The critically ill patients admitted to medical intensive care unit (ICU) during January 2006-December 2008 were classified according to the maximum RIFLE and AKIN classification reached during their hospital stay. Demographic data, hospital mortality, hospital length of stay, need of renal replacement therapy was collected.
Results: Three hundred patients were included in this study, AKI occurred in 200 (66.7%) patients: Risk 12.7%, Injury 20.7%, Failure 33.3% defined by RIFLE criteria. According to AKIN criteria, AKI occurred 230 (76.7%) patients: stage 1 16%, stage 2 13.3% and stage 3 47.3%. AKIN classification was diagnosed AKI, approximately 10% more than RIFLE ($p < 0.001$). The hospital mortality was 51.7% and the mortality in patients with AKI was significantly higher than patients without AKI ($p < 0.001$). The predictive ability using the AUC-ROC showed poor discrimination for the prediction of mortality of both RIFLE and AKIN: 0.63 and 0.69, respectively. However, AKIN showed superior prediction of mortality than RIFLE ($p = 0.003$). The APACHE II had the best discriminative accuracy for mortality (AUC = 0.80), followed by the SAPS3 scores (AUC = 0.77) and SAPS2 (AUC = 0.76).
Conclusion: AKIN criteria improved sensitivity for detection of AKI and its discrimination for prediction of in-hospital mortality was better than that of RIFLE criteria. However, APACHE II had the best discriminative value for prediction of mortality in the critically ill patients.

Keywords: RIFLE, AKIN, Acute kidney injury, Acute renal failure, Critically ill patient, Comparison

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