Comorbidities can predict the mortality of acute kidney injury requiring continuous renal replacement therapy: comparison with the Charlson comorbidity index

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Background: Comorbid conditions are important in the survival of patients with severe acute kidney injury (AKI) requiring continuous renal replacement therapy (CRRT). The weights assigned to comorbidities to predict survival may vary based on the type of index disease and advances in the management of comorbidities. We developed a modified Charlson comorbidity index (mCCI) in patients with AKI requiring CRRT (mCCI-CRRT), thereby improving risk stratification for mortality.

Methods: A total of 1,583 patients received CRRT from 2008 to 2016 from two university hospital cohort were included to develop a comorbidity score. The weights of the comorbidities, per the CCI, were recalibrated using a Cox proportional hazards model including age, sex, albumin, hemoglobin, and 15 types of CCI disease. The modified index was validated by 419 patients received CRRT from 2008 to 2016 from other two university hospital cohort. The c statistic of the area under curve as well as the net reclassification improvement values were confirmed in order to test the accuracy of the classification by CCI and mCCI-CRRT.

Results: A total of 1,583 participants were included in development cohort where average age was 62.04±14.29 years, males were 970 (61.3%), 777 deaths (49%) occurred, and average following days were 17.59±1.68. The patients of 33% had cancer. The mCCI-CRRT showed no difference in c statistics (0.73) compared with the original CCI, but improved net mortality risk reclassification by 25.27% (95% confidence interval, 0.0878–0.4176; P=0.00267) relative to the original CCI. When stratified by CCI and mCCI-CRRT score, the survival probability of CRRT patients was well-categorized according to the mCCI-CRRT score while CCI does not adequately classify the survival probability by score.

Conclusions: The mCCI-CRRT stratifies the risk for mortality in AKI patients who requiring CRRT better than the original CCI, suggesting that it may be a preferred index for use in clinical practice.

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