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Modified APACHE II and SOFA scores in patients requiring continuous renal replacement therapy

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Objectives: Based on the worse outcomes of intensive care unit patients, acute physiology and chronic health evaluation II (APACHE II) and sepsis-related organ failure assessment (SOFA) scores have been frequently used to predict mortality. Nevertheless, these prediction models have not been optimized to the patients receiving continuous renal replacement therapy (CRRT) because of acute kidney injury.

Methods: A total of 828 patients who underwent CRRT from June 2010 to December 2015 were retrospectively reviewed. All the components of APACHE II and SOFA were collected at the time of starting CRRT. End-points were 7-day and 30-day mortality. Based on the restricted cubic spline results, modified scores were assigned to each variable. Additionally, abbreviated model including the best predictable variables alone was developed after stepwise selection analysis.

Results: The prediction powers indicated by c-statistics were 0.683 and 0.668 for 7- and 30-day mortality by APACHE II; and 0.683 and 0.660 for 7- and 30-day mortality by SOFA. After modification of these models, the prediction powers increased upto 0.765 for APACHE II and 0.775 for SOFA. Using multivariate stepwise analysis, the respiratory rate, FiO2, bilirubin, pH, and inotropics used were selected in the abbreviated 7-day mortality model (c-statistics = 0.765). For a 30-day mortality model, alveolar-arterial oxygen difference, respiratory rate, Glasgow coma scale, hematocrit, whole blood cells, bilirubin, potassium, and inotropics used were selected (c-statistics = 0.771).

Conclusions: Modified APACHE II and SOFA models are better than the originals in predicting mortality of patients receiving CRRT, which may ultimately be helpful in clinical practice.