Editorial on Risk Factors for Perioperative Acute Kidney Injury After Adult Cardiac Surgery: Role of Perioperative Management

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Background

The development of acute kidney injury (AKI) after adult cardiac surgery is associated with increased morbidity and mortality. Our aim was to assess the risk factors for postoperative AKI and whether the addition of perioperative management variables can improve AKI prediction.

Methods

We studied 3,219 patients operated from January 2006 to December 2009. The AKI was defined as proposed by the Acute Kidney Injury Network. Patient preoperative characteristics, as well as intraoperative, cardiopulmonary bypass (CPB), and postoperative management variables, were evaluated for association with AKI with logistic regression analysis. The model including all variables was assessed first, then separate models including only preoperative variables followed by the sequential addition of intraoperative, CPB, and postoperative management variables were tested; receiver operating characteristic analysis was used to evaluate and compare models' discriminatory power.

Results

The AKI occurred in 288 of 3,219 patients (8.9%). Logistic regression analysis identified 15 predictors of AKI; 4 were preoperative (age, diabetes, smoking, and serum creatinine), 4 intraoperative (inotropes, erythrocytes transfusion, cross-clamp time, and need of a new pump run), 2 CPB-related (urine output and furosemide administration during CPB), and 5 postoperative (erythrocytes transfusion, administration of vasoconstrictors, inotropes, diuretics, and antiarrhythmics). Model-discrimination performance improved from an area under the curve of 0.830 (95% confidence interval 0.807 to 0.854) for the model including only preoperative variables to an area under the curve of 0.904 (95% confidence interval 0.886 to 0.921) for the model including all variables ($p < 0.001$).

Conclusions

Several factors influence AKI development after cardiac surgery and perioperative patient management significantly affects AKI occurrence. Predictive models can be sensibly improved by the addition of these variables.

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