Abstract

Purpose: Hyperglycemia has been associated with postoperative morbidity in patients who undergo cardiac surgery. However, it remains unclear whether the duration of hyperglycemia is as important as its magnitude in the development of postoperative end-organ dysfunction (PEOD). This retrospective study investigated the hypothesis that the intraoperative blood glucose (BG) exposure index (GE index), calculated by the product of the magnitude and duration of BG concentration ≥180 mg/dL, which is an integration of the severity and duration of hyperglycemia, is associated with the incidence of PEOD in patients undergoing cardiac surgery with cardiopulmonary bypass.

Methods: The primary outcome in this study was PEOD within 72 h of surgery, which was defined as a composite of postoperative acute kidney injury, delirium, myocardial injury, and prolonged mechanical ventilation. The GE index (the magnitude of BG concentration deviation ≥180 mg/dL×duration of BG concentration ≥180 mg/dL) of each patient was calculated based on the intraoperative BG concentration. The relationship between the GE index and the primary outcome was examined via logistic regression model with adjustment for potential confounders.

Results: Within 72 h of surgery, 301 patients (54.5%) developed PEOD. PEOD was more common in patients with greater GE index quartiles (first versus third quartile; adjusted odds ratio, 5.65, 95% confidence interval (95%CI), 2.94–10.90; *P* <0.001; first versus forth quartile, adjusted odds ratio, 20.80; 95%CI, 8.01–54.00; *P* <0.001).

Conclusion: In patients undergoing cardiac surgery with cardiopulmonary bypass, the GE index was an independent predictor of PEOD.