



Letter to the Editor

Is preoperative atrial fibrillation an independent predictor of worse outcomes after coronary artery bypass graft surgery?


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In a retrospective study including 21,534 patients who underwent coronary artery bypass graft (CABG) surgery, Saxena et al. [1] showed that preoperative atrial fibrillation was an independent predictor of early and late mortality. Strengths of this study are its use of a large dataset from the Australasian Society of Cardiac and Thoracic Surgeons National Cardiac Surgery Database Program containing most known risk factors that can affect postoperative mortality of such surgical patients. Furthermore, the authors used univariate and multivariate logistic regression analyses to identify the predictors of early and late mortality after CABG surgery, and openly discussed some limitations of their work. However, in our view, several important issues of this study were not well addressed.

First, perioperative anemia and transfusion were not included in the data analysis. Actually, preoperative anemia is common among patients undergoing CABG surgery and can increase the postoperative 30-day mortality risk by 3.4-fold [2]. In the patients undergoing CABG surgery, the lowest hemoglobin level during cardiopulmonary bypass has been associated independently with postoperative low-output syndrome, renal failure, and mortality [3]. Similarly, postoperative anemia is also common with an incidence of 44% and frequently persists for months after CABG surgery. Sustained postoperative anemia is associated with increased risks of adverse cardiovascular events and mortality. When postoperative hemoglobin level is considered as a continuous variable, every 1 mg/dl decrease in hemoglobin level is associated with a 13% increase in postoperative adverse cardiovascular events and a 22% increase in all-cause mortality [4]. We are concerned that any imbalance in the above factors among patients with and without preoperative atrial fibrillation would have confounded the interpretation of the results.

Second, health status, burdens of surgery, and comorbidities are mostly important determinants of early mortality, and the

majority of predictors of early mortality after CABG surgery are cardiac-related variables [5]. In this study, patients with preoperative atrial fibrillation were older, had more comorbidities, lower ejection fractions, higher New York Heart Association classification, and additive EuroSCORE, and were more likely to have recent myocardial infarction, congestive heart failure, critical preoperative state, and triple-vessel disease. These results imply that patients with preoperative atrial fibrillation have worse health status and cardiac function, and heavier surgery and comorbidity burdens than those without preoperative atrial fibrillation. In our opinion, no matter how refined the adjustment is for differences in health status, cardiac variables, burdens of surgery, and comorbidity, it is never possible to ensure a complete adjustment for differences between patients with and without preoperative atrial fibrillation. In fact, a “kitchen sink” approach of adjusting for all available variables by a multivariable analysis may lead to over-adjustment and therefore bias the true effect of preoperative atrial fibrillation. Furthermore, multivariable analysis is unlikely to clarify whether preoperative atrial fibrillation is a true determinant of early mortality after CABG surgery. Perhaps, propensity-matching patients with and without preoperative atrial fibrillation on the prior-defined confounders is a desirable approach to elucidate the total effect of preoperative atrial fibrillation on early mortality after CABG surgery via all possible pathways.

Third, if surgery is successful without severe postoperative complications, CABG surgery should improve cardiac function, physical health status, and quality of life in most patients. This is significantly different from noncardiac surgery, which cannot improve postoperative cardiac variables or even may lead them to deteriorate by perioperative stress and complications. It has been reported that there are important differences in mortality risk factors between the early and late periods after CABG surgery, i.e. the majority of predictors of late mortality are noncardiac-related variables [5]. Furthermore, only persistent vital organ dysfunctions at hospital discharge are important predictors of late mortality following cardiac surgery. In this study, the authors did not specify whether preoperative atrial fibrillation had disappeared after CABG surgery in some patients, and whether postoperative new atrial fibrillation occurred in some patients. It was also unclear whether postoperative cardiac variables of patients with preoperative atrial fibrillation were improved. For patients undergoing cardiac surgery with modified postoperative cardiac variables, we argue that use of preoperative cardiac variables in the multivariable model to identify the independent predictors of late mortality is incorrect. This can not only decrease sensitivity and specificity of identified predictors, but also may tamper with inferences of multivariable hazard adjustment for late mortality.

Conflict of interest

All the authors have no financial support and potential conflict of interest for this work.

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