

Letter by Lee and Goldman Regarding Article, “Development and Validation of a Risk Calculator for Prediction of Cardiac Risk After Surgery”

To the Editor:

We read with interest the article by Gupta et al¹ on the development of a risk calculator for cardiac risk after noncardiac surgery based on data from the National Surgical Quality Improvement Program database, and write to dispute the conclusion that the performance of the resulting cardiac risk calculator “surpasses that of the Revised Cardiac Risk Index” (RCRI).²

The major issue is that Gupta et al are using a different outcome from that used by our research group in development of the RCRI. Their outcome includes cardiac arrests within 30 days after surgery and intraoperative events, as well. The likelihood that their outcomes were dominated by postoperative deaths that were not actually cardiac complications of surgery is suggested by the ratios of cardiac arrests to myocardial infarctions in their overall study (1.8:1) and during the postoperative period (2.5:1) versus the intraoperative period (0.2:1). That last ratio is much closer to the ratio of ventricular fibrillation/cardiac arrest episodes to acute myocardial infarction reported in our study—0.3:1. We would also note that the second-most common type of cardiac complication in our study was pulmonary edema, which (along with complete heart block) was not included in Gupta’s study because those variables are not included in the National Surgical Quality Improvement Program database.

Because 88% of the outcomes in Gupta’s study were in the postoperative period, when cardiac arrests predominated, our suspicion is that many of these arrests reflect the patients’ underlying conditions rather than the risk of surgery itself. It is difficult to explore this issue in depth because data collection in the National Surgical Quality Improvement Program (which is self-funded by participating hospitals) cannot be overseen with the same rigor as in a grant-supported research study, such as ours, in which every outcome is reviewed by investigators blinded to potential clinical risk factors.

On the other hand, the advantages of National Surgical Quality Improvement Program are that it provides much more statistical power for defining the risk of hard outcomes, such as overall mortality within 30 days, and for description of risk for procedures

such as brain and foregut/hepatopancreatobiliary procedures that were not performed in sufficient volume in our study for separate analysis. In fact, virtually all the variables selected in the stepwise logistic regression model of Gupta’s Table 2 are types of procedures.

We think these procedure-based risk estimates are of interest to clinicians, but we think that the RCRI continues to be of even greater use to clinicians seeking to address the question of risk of cardiac complications for noncardiac surgery. We were gratified to see that the 6 clinical variables in the RCRI were significant predictors of risk in Gupta’s data, including some that were not included in Gupta’s model (history of congestive heart failure, history of cerebrovascular disease, and insulin therapy for diabetes mellitus). We agree that there has been progress in prevention and detection of complications since we performed our study 2 decades ago, but we believe that the RCRI remains widely used because it has proven robust as a tool for addressing the question of great interest to clinicians managing patients through noncardiac surgery, which is the patient’s risk of cardiac complications.

Disclosures

None.

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Circulation. 2012;125:e385

doi: 10.1161/CIRCULATIONAHA.111.068999

Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

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Print ISSN: 0009-7322. Online ISSN: 1524-4539

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