Abstract 10

Postoperative Myocardial Infarction and In-Hospital Mortality Predictors in Patients Undergoing Elective Noncardiac Surgery

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Introduction: Postoperative myocardial infarction (MI) is a well-known complication of surgery. However, predictors of postoperative MI and in-hospital mortality after noncardiac surgery (NCS) have not been well established.

Methods: Patients aged > 18 years undergoing elective NCS in 2005–2007 who required at least an overnight stay were identified. Demographics, diagnoses, labs, medications, and primary outcomes, including postoperative MI and in-hospital death, were obtained from the electronic medical record and the Social Security Death Index. All MI and in-hospital mortality events were validated by individual chart analysis. Missing values in the predictor variables were multiply imputed by chained equations in order to effectively utilize the sample size. A stepwise selection method identified the important predictive variables in the multivariable logistic regression. Concordance indices were calculated for the selected final models to assess the predictive accuracy.

Results: Of the 34,793 patients identified, 130 (0.4%) developed postoperative MI, with in-hospital death occurring in 19 of these MI patients (15%). 139 patients (0.4%) had in-hospital death due to any cause.

Multivariable analyses identified increased age, hematocrit and sodium values, vascular surgery, prior history of heart failure, prior history of MI, and prior history of coronary artery disease to be independent predictors of postoperative MI **(Table 1, below)**. Age, history of chronic kidney disease (Cr > 2), vascular surgery, increased bleeding risk, and BUN, sodium, creatinine, and hematocrit values were found to be independent predictors of in-hospital mortality **(Table 2, below)**. The reduced model achieved concordance indices of 0.869 and 0.78 for postoperative MI and in-hospital mortality, respectively, after internal cross-validation.

Conclusions: Predictive models of risk for postoperative MI and in-hospital mortality were generated. Components of the model contain easily determined factors that can be entered into risk stratification tools that may be used in preoperative assessments for NCS.

TABLE 1
Postoperative MI predictor variables included in the final logistic regression model

Predictor variables	*P* value	Odds ratio
Bleeding risk: 4 vs 3	0.083	1.19 (0.98, 1.46)
Patient age: 69 vs 47*	< 0.001	8.30 (3.60, 19.13)
Patient sex: male vs female	0.081	1.41 (0.96, 2.09)
Hypertension: yes vs no	0.076	0.65 (0.41, 1.05)
Myocardial infarction: yes vs no	< 0.001	3.45 (1.78, 6.67)
Heart failure: yes vs no	0.010	2.25 (1.21, 4.16)
Coronary artery disease: yes vs no	< 0.001	4.11 (2.49, 6.79)
Atrial fibrillation: yes vs no	0.092	0.48 (0.20, 1.13)
Hyperlipidemia: yes vs no	0.068	0.62 (0.37, 1.04)
Glucose: 114 vs 85*	0.107	1.32 (0.97, 1.78)
Hematocrit: 38 vs 32*	0.001	0.95 (0.67, 1.33)
Sodium: 145 vs 135*	0.018	0.82 (0.51, 1.31)
Statin use: yes vs no	0.110	0.71 (0.46, 1.08)
Insulin-dependent diabetes: yes vs no	0.084	1.88 (0.92, 3.85)
Vascular surgery: yes vs no	< 0.001	2.68 (1.77, 4.04)

* Restricted cubic splines were applied to numeric predictor variables to relax linearity assumption. Odds ratio for numeric predictors was measured for the amount of the third quartile compared with the first quartile.

TABLE 2
In-hospital mortality predictor variables included in the final logistic regression model

Predictor variables	*P* value	Odds ratio
Bleeding risk: 4 vs 3	< 0.001	1.52 (1.25, 1.85)
Patient age: 69 vs 47*	< 0.001	2.63 (1.71, 4.03)
Chronic kidney disease: yes vs no	0.030	0.19 (0.06, 0.67)
BUN: 26 vs 13*	0.005	1.93 (1.22, 3.04)
Creatinine: 1.6 vs 1.2*	0.032	1.06 (1.00, 1.13)
Glucose: 114 vs 85*	0.045	1.37 (1.02, 1.84)
Hemoglobin: 15 vs 10*	0.025	0.08 (0.01, 0.61)
Sodium: 145 vs 135*	< 0.001	0.55 (0.37, 0.82)
Statin before surgery flag: yes vs no	0.122	0.71 (0.46, 1.10)
Vascular surgery: yes vs no	< 0.001	2.42 (1.60, 3.65)

* Restricted cubic splines were applied to numeric predictor variables to relax linearity assumption. Odds ratio for numeric predictors was measured for the amount of the third quartile compared with the first quartile.