

Title: Predictors of 30-Day Readmission After Coronary Artery Bypass Grafting: A Review of Variables Used in Published Prediction Models

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Background:

Thirty-day hospital readmission after coronary artery bypass grafting (CABG) is an important quality metric associated with increased healthcare utilization, financial burden, and adverse clinical outcomes. Although several prediction models for CABG readmission have been developed over the past decade, the identified risk factors vary widely. Given evolving surgical techniques, treatment strategies, and postoperative management, this study aims to identify factors consistently associated with CABG readmission between 2006 and 2024 to support the development of more standardized risk prediction tools.

Methods:

We searched PubMed, Embase and Web of Science data to identify and review published studies that evaluated predictors of 30-day readmission after CABG. After identifying the relevant studies, for each study, variables included in the final multivariable regression models were extracted. Predictors were grouped into domains including demographics, preoperative comorbidities, cardiovascular disease severity, postoperative factors, laboratory measures, and healthcare-related variables. Each variable was recorded if it was included in the final predictive model.

Results:

Across studies, several predictors appeared consistently in multivariable models. The most commonly reported demographic predictors included age, sex, and body mass index. Frequently identified clinical risk factors included chronic lung disease, congestive heart failure, diabetes, kidney dysfunction, and reduced left ventricular ejection fraction. Cardiovascular disease severity indicators such as multi-vessel coronary artery disease (CAD), left main CAD, and prior cardiac procedures were also commonly included. Some studies incorporated markers of more advanced illness, including cardiogenic shock and New York Heart Association (NYHA) heart failure classification. In addition, several models also included healthcare-related factors such as hospital length of stay and discharge destination, suggesting that both patient characteristics and perioperative care factors contribute to readmission risk. Overall, there was considerable variability in the predictors selected across models.

Conclusions:

Hospital Readmission seen post-CABG persists as one of the most significant clinical consequences and healthcare expenditure costs. Published prediction models for CABG readmission include a wide range of demographic, clinical, and perioperative variables, with notable differences across studies. Our review highlights a core group of clinical predictors that appear consistently across models, while also demonstrating substantial variation in how readmission risk has been modeled. These findings are being used to enhance post-discharge care strategies, improve risk stratification to further guide clinical decision making and development of a new risk calculator for predicting 30-day readmission after CABG using contemporary registry data.