

Impact of Severe Mitral Regurgitation on Postoperative Outcomes After Noncardiac Surgery

Navkaranbir S. Bajaj, MD,^a Shikhar Agarwal, MD, MPH, CPH,^b Anitha Rajamanickam, MD,^c Akhil Parashar, MD,^b Kanhaiya Lal Poddar, MD,^b Brian P. Griffin, MD,^b Thadeo Catacutan, MD,^c E. Murat Tuzcu, MD,^b Samir R. Kapadia, MD^b

Departments of ^aInternal Medicine, ^bCardiovascular Medicine, and ^cHospital Medicine, Cleveland Clinic, Cleveland, Ohio.

ABSTRACT

OBJECTIVE: Preoperative cardiac risk assessment scoring systems traditionally do not include valvular regurgitation as a criterion for adverse outcome prediction. We sought to determine the impact of significant mitral regurgitation on postoperative outcomes after planned noncardiac surgeries.

METHODS: Patients with significant mitral regurgitation (moderate-severe or severe) undergoing noncardiac surgery were identified using surgical and echocardiographic databases at the Cleveland Clinic. The mechanism of mitral regurgitation was identified and classified as ischemic or nonischemic. By using propensity score analysis, we obtained 4 matched controls (patients undergoing noncardiac surgery without mitral regurgitation) for each case. The primary outcome was defined as a composite of 30-day mortality, myocardial infarction, heart failure, and stroke. Secondary outcomes included 30-day mortality, myocardial infarction, heart failure, stroke, and atrial fibrillation.

RESULTS: A total of 298 cases and 1172 controls were included in the study. The incidence of primary outcome was significantly higher among patients with mitral regurgitation (22.2%) compared with controls (16.4%, $P = .02$). Analysis of the secondary outcomes revealed significant differences in perioperative heart failure (odds ratio, 1.4; 95% confidence interval, 1.02-2.0) and perioperative myocardial infarction (odds ratio, 2.9; 95% confidence interval, 1.2-7.3). Of patients with mitral regurgitation, those with ischemic mitral regurgitation had significantly more events than those with nonischemic mitral regurgitation (39.2% vs 13.3%, $P < .001$).

CONCLUSIONS: Patients undergoing noncardiac surgery with significant ischemic mitral regurgitation are at higher risk of a composite adverse postoperative outcome, including short-term mortality, heart failure, myocardial infarction, and stroke.

© 2013 Elsevier Inc. All rights reserved. • *The American Journal of Medicine* (2013) 126, 529-535

KEYWORDS: Mitral regurgitation; Noncardiac surgery; Postoperative outcomes

The complexity and number of noncardiac surgeries in individuals with preexisting cardiovascular disease have increased considerably in the past few decades.^{1,2} The traditional perioperative outcome prediction scores, such as the Revised Cardiac Risk Index,³ do not include valvular heart disease as a criterion for predicting adverse outcomes.

A few small observational studies have suggested that severe valvular disease affects perioperative outcomes in noncardiac surgery.^{4,5}

Mitral regurgitation is the most common valvular disorder encountered in modern clinical practice.⁴ Moderate to severe mitral regurgitation has been shown to be the most common valvular disorder requiring surgery in the United States.⁵ The prevalence of mitral regurgitation has been estimated to be approximately 2% in the US population, affecting 2.0 to 2.5 million adults in 2000.^{6,7} Despite a significant reduction in rheumatic heart disease in the western world, mitral regurgitation is a rapidly growing public health concern. It is estimated that the number of patients affected by mitral regurgitation will double by 2030 because of an increase in the number of aging adults.⁷ The current

Funding: None.

Conflict of Interest: None.

Authorship: All authors had access to the data and played a role in writing this manuscript.

Requests for reprints should be addressed to Samir R. Kapadia, MD, Professor of Medicine, Director, Sones Cardiac Catheterization Laboratories, Heart and Vascular Institute, J2-3 Cleveland Clinic, 9500 Euclid Ave, Cleveland, OH 44195.

E-mail address: kapadis@ccf.org

American College of Cardiology/American Heart Association (ACC/AHA) and European Society of Cardiology guidelines do not recognize severe mitral regurgitation as a contraindication for noncardiac surgeries but suggest using caution in patients with severe mitral regurgitation who have symptoms or severe left ventricular dysfunction.^{8,9} Further, there are no specific recommendations for preoperative evaluation in patients with mitral regurgitation before noncardiac surgery; it is recommended that the management be tailored according to the general valvular heart disease guidelines.⁹ However, these recommendations are driven primarily by expert opinion without objective evidence. One small observational study has suggested that clinically significant mitral regurgitation may lead to increased perioperative cardiac complications.⁵ We therefore sought to determine the impact of severe mitral regurgitation on the perioperative outcomes after noncardiac surgery by focusing on the mechanism of mitral regurgitation.

MATERIALS AND METHODS

Patient Population

All adults (aged > 18 years) undergoing any noncardiac surgery between January 2005 and February 2009 with echocardiographically diagnosed moderate-severe or severe mitral regurgitation (referred to as “significant mitral regurgitation”) before surgery were identified from the echocardiography and surgical databases maintained at the Cleveland Clinic. We determined the mechanism of mitral regurgitation by reviewing electronic medical records, echocardiograms, and coronary angiograms. The mechanism of mitral regurgitation was determined by review of echocardiograms and stratified as rheumatic, degenerative, infective endocarditis, hypertrophic cardiomyopathy, radiation-induced, and functional. Functional mitral regurgitation was defined as mitral regurgitation resulting from left ventricular dilatation with regional or global systolic dysfunction resulting in malcoaptation of structurally normal mitral valve leaflets. Functional mitral regurgitation was further characterized as ischemic or nonischemic on the basis of the mechanism of left ventricular dysfunction.¹⁰ Electronic medical records for each patient were reviewed for determination of primary and secondary outcomes.

The comparison group was derived from the pool of 7212 adult patients without significant mitral regurgitation undergoing noncardiac surgery. We used propensity score matching to identify a matched comparison group based on

age, sex, and the 6 Revised Cardiac Risk Index characteristics, namely, history of heart failure, preoperative creatinine greater than 2 mg/dL, preoperative insulin use, history of coronary artery disease, history of cerebrovascular disease, and high-risk surgery.³ For each case, 4 control patients were identified to maximize the statistical power of the study.

Patients with prior mitral valve repair or replacement were excluded from the analysis. The protocol was approved by the institutional review board at the Cleveland Clinic.

Outcomes

The primary outcome was a composite of 30-day mortality, myocardial infarction, heart failure, and stroke. Secondary outcomes that were compared between the 2 study groups included 30-day mortality, myocardial infarction, heart failure, stroke, and atrial fibrillation, because they result in significant morbidity and mortality in patients undergoing noncardiac surgery.^{11,12}

Postoperative myocardial infarction was defined as an increase in cardiac biomarkers (creatinine-kinase-MB > 8.8 ng/mL or troponin T > 0.1 ng/mL) in the appropriate clinical context of chest pain and electrocardiographic changes. Postoperative heart failure was identified on the basis of clinical signs and symptoms along with chest radiography indicative of pulmonary edema. Stroke was defined as new-onset focal neurologic symptoms confirmed by imaging studies (computed tomography or magnetic resonance imaging of the brain). Postoperative atrial fibrillation was identified using continuous electrocardiographic monitoring in the immediate postoperative period or serial electrocardiography in case of unexplained tachycardia.

Statistical Analysis

The continuous variables were expressed as mean \pm standard deviation, and the categorical variables were expressed as proportions. By using propensity score analysis, 4 controls were selected for every case after matching for age, sex, and the 6 Revised Cardiac Risk Index characteristics. Student *t* test was used to compare continuous variables and chi-square test was used to compare categorical variables between the 2 study groups. Kaplan-Meier survival analysis was used to compare the long-term mortality between the 2 groups. A multivariate logistic regression analysis using bootstrapping with 500 replicates was performed to determine the predictors of primary outcome in patients with significant mitral re-

CLINICAL SIGNIFICANCE

- Significant mitral regurgitation increases the risk of postoperative heart failure and myocardial infarction after a noncardiac surgery.
- Patients with severe ($\geq 3+$) ischemic mitral regurgitation are at higher risk of postoperative complications compared with those with nonischemic mitral regurgitation (39.2% vs 13.3% for composite of 30-day mortality, myocardial infarction, heart failure, and stroke).
- Ejection fraction less than 35%, ischemic cause of mitral regurgitation, and history of diabetes were important predictors of postoperative adverse outcomes after noncardiac surgery.

Download English Version:

<https://daneshyari.com/en/article/5878599>

Download Persian Version:

<https://daneshyari.com/article/5878599>

[Daneshyari.com](https://daneshyari.com)