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Research Letter

Outcomes of 30-Day Readmission in Patients With Gastrointestinal Bleeding on Index Hospitalization Undergoing Mitral Transcatheter Edge-to-Edge Repair: Insights From the United States Nationwide Readmission Database

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Mitral transcatheter edge-to-edge repair (TEER) has been deemed to be safe and effective in the treatment of patients with severe functional mitral regurgitation and degenerative mitral regurgitation.[1] Post-procedural gastrointestinal bleeding (GIB) is known to be associated with worse outcomes following transcatheter aortic valve replacement procedures.[2] Hence, we aimed to evaluate the 30-day readmission outcomes in patients undergoing TEER with GIB on index admission.

We used the United States Nationwide Readmission Database to identify patients who underwent TEER between October 1, 2015, and November 30, 2019. TEER and GIB were identified using the International Classification of Diseases, tenth edition, codes 02UG3JZ and K92, respectively. Categorical variables are presented as percentages and were compared using the Pearson χ^2 or Fisher exact test. Continuous variables are reported as means with standard deviations. A multivariable logistic regression model was developed to compute the adjusted odds ratio and 95% confidence interval for the 30-day readmission outcomes adjusted for the Charlson comorbidity index. The cumulative incidence of 30-day readmission was assessed using the log-rank function. A 2-tailed *P* value of .05 was considered statistically significant.

A total of 30,624 weighted hospitalizations for TEER were included, of which 404 (1.3%) had GIB during index hospitalization. Among patients who were readmitted at 30 days, the readmission rate (21.9% vs 12.4%, $P < .01$) and readmission mortality (8.7% vs 6.7%, $P < .01$) were higher in the GIB group. The GIB group also had higher rates of acute kidney injury, cardiogenic shock, and the need for transfusions at 30-day readmission. Among patients who developed GIB, 16.8% underwent upper gastrointestinal (GI) endoscopy, whereas <2.7% underwent colonoscopy. Urgent upper-GI endoscopic intervention was performed in 8.3% of the patients to control GIB. The independent predictors of GIB are shown in Figure 1. The length of stay and cost of hospitalization were significantly higher for both index admission and during the 30-day readmission episode. The cumulative incidence of readmission for patients with GIB on index admission was higher than that of readmission for patients without GIB (*P* log-rank < .01) (Figure 1).

In our large-sample, retrospective study, we reported the following principal findings: (1) patients with GIB undergoing TEER on index admission have higher 30-day readmission rates and mortality; (2) emergent index admission, congestive heart failure, coagulopathy, chronic liver disease, chronic kidney disease, peptic ulcer disease, and peripheral vascular disease are independent predictors of GIB; and (3) in terms of resource utilization, hospitalizations for TEER complicated by GIB have a higher length of stay and hospitalization cost during index admission and readmission hospitalization.

GI bleeding during index admission for TEER is an adverse prognostic marker that leads to a 3-fold higher risk of death within 30 days of discharge. Our 30-day readmission mortality rates (8.7%) are consistent with a previously reported rate of 10% by Paukovitsch et al.[3] Similarly, we also reported the independent predictors of GIB related to patient factors, which included peptic ulcer disease, chronic kidney disease, congestive heart failure, and nonelective index admission. Such patients are at a high risk and need to be a focus of preventive efforts against GI bleeding. Previous studies have shown that iatrogenic injury during transesophageal echocardiography may contribute to an increase in the risk of bleeding.[4] For instance, longer procedural time and poor or suboptimal image quality during TEER are independently associated with gastric and esophageal lesions.[5] Similarly, with the extension of findings from the literature on transcatheter aortic valve replacement, an approach of preprocedural endoscopy and the use of postprocedural proton-pump inhibitors may be beneficial in high-risk populations undergoing TEER.[2] Furthermore, GIB, in addition to poor

Abbreviation: GIB, gastrointestinal bleeding; TEER, transcatheter edge-to-edge repair; NRD, Nationwide Readmission Database; LOS, length of stay; AKI, acute kidney injury.

Keywords: 30-day mortality; 30-day readmission; gastrointestinal bleeding; mitral transcatheter edge-to-edge repair.

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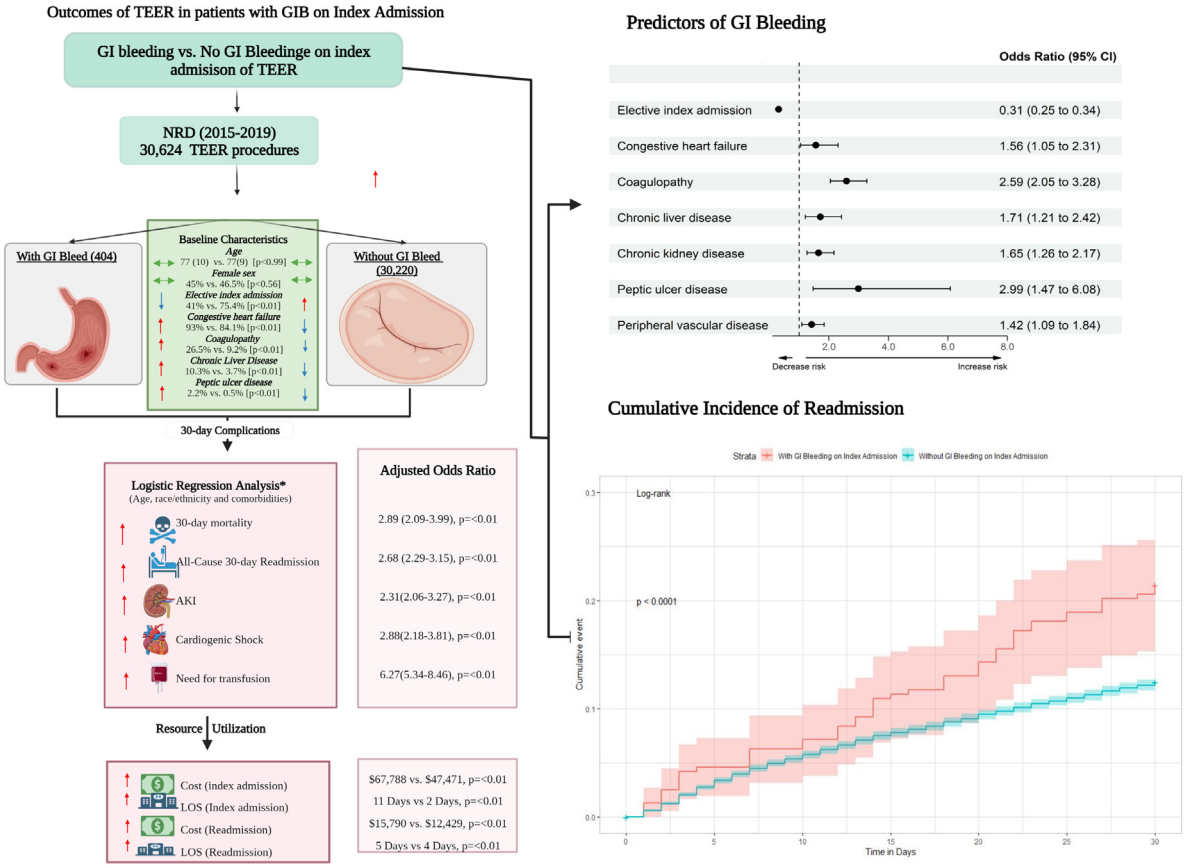

*Logistic regression analysis adjusted for: age, sex, mode of admission, charlson comorbidity index, congestive heart failure, chronic obstructive pulmonary disease, prior stroke, diabetes, hypertension, liver disease, chronic kdiney disease, end-stage renal disease, obesity, peptic ulcer disease, peripheral vascular disease and weigh loss

Figure 1.

Outcomes of TEER in patients with GIB on index admission. AKI, acute kidney injury; GI, gastrointestinal; GIB, gastrointestinal bleeding; LOS, length of stay; NRD, Nationwide Readmission Database; TEER, transcatheter edge-to-edge repair.

clinical outcomes, is associated with higher readmission rates and resource utilization in terms of length and cost of hospitalization. This could be because of the increased need for requiring further interventions such as endoscopies and colonoscopies.

In summary, we reported that patients undergoing TEER during index hospitalization complicated by GIB had worse 30-day outcomes, including readmission, mortality, in-hospital complications, and resource utilization. High-risk population groups need to be a focus of preventive efforts against GI bleeding in patients undergoing TEER. Further focused studies are required to confirm the findings of our study.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethics statement and Patient Consent

The research reported has adhered to the relevant ethical guidelines, and patient consent has been obtained if needed.

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