Healthcare resource utilisation and safety outcomes in patients undergoing transcatheter mitral valve repair - A nationwide analysis

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Background: Since the publication of the EVEREST II, MITRA-FR and COAPT trials, the domain of transcatheter edge-to-edge repair (TEER) for mitral regurgitation has been rapidly progressing. However, real-world data on peri-procedural outcomes are still limited.

Purpose: To analyse outcomes of peri-procedural healthcare resource utilisation and in-hospital safety after TEER between 2016 and 2019 in the United States.

Methods: The US National Inpatient Sample was utilised to identify adult patients undergoing TEER. Primary outcomes (hospital resource utilisation) were hospital length of stay (LOS), hospital costs and adverse discharge disposition to a nursing or rehabilitation facility. Secondary outcomes (safety) were in-hospital mortality, post-procedural bleedings, vascular complications, ischemic strokes, cardiogenic shocks, cardiac arrests and pericardial tamponades. Multivariable regression models were used to analyse outcomes.

Results: 4,020 adult patients undergoing a TEER procedure were included. The included population was relatively frail: average age of 78.1 years (±9.7), average Charlson Comorbidity Index of 3 [IQR 1-4], average number of cardiovascular risk factors of 3 [2-4] per patient, average CHA2DS2-VASc score of 4 [3-5] and average simplified HAS-BLED score of 2 [2-3]. Distribution of the procedure was balanced between both sexes: 2,159 (53.7%) males vs. 1,861 (46.3%) females. Procedures were predominantly performed in large hospitals with 3,052 cases (75.9%), as well as in regional “hubs” at both US coastal regions with 543 cases (13.5%) in the Middle Atlantic region, 832 cases (20.7%) in the South Atlantic region, 535 cases (13.3%) in the East North Central region and 690 cases (17.2%) in the Pacific region. TEER procedure showed relatively save outcomes: 34 in-hospital deaths (0.8%), 119 (3.0%) post-procedural bleedings, 1 vascular complication requiring surgery, 24 (0.6%) ischemic strokes, 64 (1.6%) cardiogenic shocks, 20 (0.5%) cardiac arrests and 13 (0.3%) pericardial tamponades. Between 2016 and 2019, hospital LOS decreased by 22% [95% CI 0.73-0.83], hospital costs by 6% [95% CI 0.90-0.98] and post-procedural discharge rates to a nursing or rehabilitation facility by 40% [95% CI 0.41-0.88]; each P<0.001 (Figure). Post-procedural bleedings and cardiac arrests were reduced by 55% [95% CI 0.27-0.76] and 87% [95% CI 0.02-0.61] during the study period, respectively. In-hospital mortality, ischemic stroke, cardiogenic shock and pericardial tamponade decreased numerically but were not statistically significant (due to low overall event rates). Of note, there was a linear increase in all adverse outcomes with increasing patient comorbidity level (P for trend <0.001), particularly in patients with atrial fibrillation or flutter.

Conclusion: TEER procedure has become a safer and more efficient procedure. Careful considerations should be taken when performing the procedure in patients with multiple comorbidities.
Figure. Healthcare utilisation outcomes after transcatheter edge-to-edge repair between 2016 and 2019