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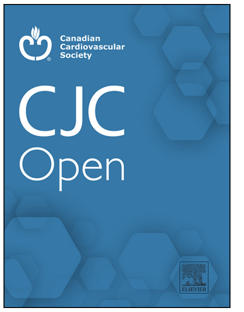

In-Hospital Outcomes and the Impact of Transfer Status in Non-Elective Versus Elective Transcatheter Aortic Valve Replacement

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In-Hospital Outcomes and the Impact of Transfer Status in Non-Elective Versus Elective Transcatheter Aortic Valve Replacement

Short Title: **Trends in Transcatheter Aortic Valve Replacement**

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Abstract

Background: Non-elective transcatheter aortic valve replacements require additional research to be fully understood.

Methods: Using the National Inpatient Sample Database (2016-2019), we conducted a retrospective cohort study comparing non-elective versus elective transcatheter aortic valve replacement. The primary outcome of interest was the in-hospital mortality rate among patients undergoing non-elective transcatheter aortic valve replacement compared to patients undergoing elective transcatheter aortic valve replacement. We matched patients in a greedy nearest neighbor 1:1 model and multivariable logistic regression, which was adjusted for demographics, hospital factors and comorbidities, was used to compare mortality in our matched cohort.

Results: There were 4389 patients in each cohort. When adjusted for age, race, sex and comorbidities, non-elective transcatheter aortic valve replacement patients had 1.99 times higher odds of suffering in-hospital mortality compared to elective admissions (aOR 1.99, 95% CI: 1.42-2.81; $p < 0.001$). When separated by transfer status, non-elective patients admitted as regular hospital admissions or transferred from other acute care centers also had higher odds of suffering in-hospital mortality compared to elective admissions.

Conclusion: Our findings illustrate that non-elective transcatheter aortic valve replacement patients are a vulnerable population that require additional medical support in the acute care setting. As the demand for transcatheter aortic valve replacement increases, it is imperative we have further discussions regarding the access to healthcare in underserved regions, national physician shortage and future of the transcatheter aortic valve replacement industry.

Key Words

Transcatheter Aortic Valve Replacement, TAVR, Non-Elective, Elective

Brief Summary

We conducted a retrospective cohort study comparing non-elective versus elective transcatheter aortic valve replacement. Non-elective transcatheter aortic valve replacement patients had 1.99 times higher odds of suffering in-hospital mortality compared to elective admissions (aOR 1.99, 95% CI: 1.42-2.81; $p < 0.001$). When separated by transfer status, non-elective patients admitted as regular hospital admissions or transferred from other acute care centers also had higher odds of suffering in-hospital mortality compared to elective admissions.

Introduction

Transcatheter aortic valve replacement (TAVR) is being increasingly used as a treatment for symptomatic severe aortic stenosis (AS).[1-5] Some of the current benefits of TAVR versus surgical aortic valve replacement (SAVR) include less procedural invasiveness and in high-risk surgical patients, lower rates of postoperative major bleeding and atrial fibrillation.[1-5] However, most of these studies are conducted on patients undergoing elective TAVR. Non-elective TAVRs are less frequently studied and require additional research to fully understand its clinical context. From 2011 to 2016, approximately 10% of all TAVRs performed were non-elective urgent or emergent TAVR.[6] Recent literature comparing the outcomes between non-elective and elective TAVR illustrates significantly higher 30-day and 1-year mortality rates and steeper in-hospital costs with non-elective TAVRs. [7-11] To our knowledge, there remains limited information on the impact of transfer status from non-acute care and acute care centers when analyzing these two cohorts.[12-16] Hence, the purpose of this study was to compare the most recent in-hospital outcomes, hospitalization trends and impact of transfer status on mortality between patients who underwent non-elective versus elective TAVR using a nationally representative database. We hypothesized that patients undergoing non-elective TAVR, irrespective of transfer status, had increased odds of suffering in-hospital mortality compared to elective admissions.

Methods

This was a retrospective cohort study comparing the short-term, in-hospital outcomes between patients undergoing non-elective and elective TAVR between 2016 to 2019. Patients were selected from the National Inpatient Sample (NIS) database, which is a stratified sample of all-payer inpatient hospital stays in the United States (U.S.). Annually, the NIS data contains approximately 7 million hospital stays which, when adjusted for discharge weight, estimates more than 35 million hospitalizations nationally.[17] Each identified discharge record includes one primary diagnosis and up to 29 secondary diagnoses, using the International Classification of Diseases, Tenth Edition, Clinical Modification (ICD-10-CM). The year 2016 was chosen as the beginning of the study period as this was the first full calendar year for ICD-10-CM code usage.[17]

Hospitalized patients who were at least 18 years or older were our demographic of interest. Transfer status was determined using the NIS data element “TRAN_IN.” Patients were admitted either as regular hospital admissions or transferred from acute or non-acute care centers. Elective or non-elective admissions were determined by using the NIS data element “ELECTIVE.” Using ICD-10-CM codes, we then identified hospitalizations with a primary diagnosis of aortic stenosis and a primary procedure of TAVR. The specific ICD-10-CM codes that were included are listed in the Appendix. The primary outcome of interest was the in-hospital mortality rate among patients undergoing non-elective TAVR compared to patients undergoing elective TAVR. The secondary study outcomes included mortality by race, postoperative complications, length of stay and total cost to the hospital.

In our unmatched cohort, regular Student’s t-tests were performed to compare normally distributed continuous variables, while Pearson χ^2 tests were used to compare categorical variables. We then utilized logistic regression to calculate a propensity score based on the patient’s demographics (race, sex, age and health insurance), hospital factors (region, location and bed size) and comorbidities (acute decompensated heart failure, hypertension, atrial fibrillation, coronary artery disease, prior myocardial infarction, chronic kidney disease, type 2 diabetes mellitus, obesity and chronic obstructive pulmonary disease). Covariate balance was evaluated by standardized mean difference (SMD), with a standardized mean difference of less than 0.1 deemed acceptable. We then conducted 1:1 greedy nearest neighbor matching to match non-elective TAVR patients with elective TAVR patients based off of propensity scores. The caliper was set at 0.2.

Multivariable logistic regression, adjusted for demographics, hospital factors and comorbidities, was used to compare mortality in our matched cohort. The adjustment consisted of demographics (race, sex, age and health insurance), hospital factors (region, location and bed size) and comorbidities (acute decompensated heart failure, hypertension, atrial fibrillation, coronary artery disease, prior myocardial infarction, chronic kidney disease, type 2 diabetes mellitus, obesity and chronic obstructive pulmonary disease). The final effect size is reported as an odds ratio (OR) for binary variables and median with interquartile range (IQR) for continuous variables. We set the threshold for significance at $p < 0.05$ and our analysis was two-tailed. All analyses were performed using STATA Version 17.

Results

Among the 160,290 patients who met our inclusion criteria, 22,745 (16.5%) underwent non-elective inpatient TAVR (Table 1). In our unmatched cohort, non-elective patients were more racially diverse, less likely to have Medicare (89.3% vs 90.3%, $p < 0.001$) and more likely to be treated in urban teaching hospitals (92.7% vs 89.4%, $p = 0.001$, Table 1). In terms of comorbidities, non-elective TAVR patients had higher rates of decompensated heart failure (47.2% vs 25.4%, $p < 0.001$), atrial fibrillation (35.5% vs 33.3%, $p < 0.001$) and chronic kidney disease (36.9% vs 29.9%, $p < 0.001$), but decreased rates of coronary artery disease (59.8% vs 63.0%, $p < 0.001$), chronic obstructive pulmonary disease (18.2% vs 19.3%, $p < 0.001$), hypertension (18.3% vs 26.0%, $p < 0.001$), obesity (13.1% vs 16.4%, $p < 0.001$), prior myocardial infarction (8.4% vs 9.9%, $p < 0.001$) and type 2 diabetes mellitus (16.6% vs 19.7%, p

< 0.001, Table 1). Patients undergoing non-elective TAVR were more likely to have concurrent mitral regurgitation (5.8% vs 5.1%, p < 0.001) and tricuspid regurgitation (1.8% vs 1.4%, p < 0.001).

After nearest neighbor propensity-score matching, 4389 patients were in each cohort. In our non-elective TAVR cohort, 3078 (70.1%) were admitted as regular hospital admissions, 1184 (27.0%) were admitted as acute care transfers and 127 (2.9%) were admitted as non-acute care transfers. All 4389 patients in our elective TAVR cohort were admitted as regular hospital admissions. Non-elective TAVR patients tended to be younger (79.8 years vs 80.2 years), have lower median household income and higher average APRDRG-Mortality scores, which are calculated from discharge billing codes and based on discharge diagnosis, pre-existing medical conditions and age (Table 2). Non-elective TAVR patients still had lower rates of Medicare (89.4% vs 90.8%), but higher rates of being treated in small bed sized hospitals (6.9% vs 4.8%, Table 2). 2108 (48.0%) non-elective TAVR patients also presented with decompensated heart failure compared to 2090 (47.6%) elective TAVR patients (Table 2). Additionally, 1305 (29.7%) non-elective TAVR patients had concurrent mitral regurgitation, compared to 1330 (30.3%) elective TAVR patients. 395 (9.0%) non-elective TAVR patients had concurrent tricuspid regurgitation, compared to 365 (8.3%) elective TAVR patients.

When adjusted for age, race, sex and comorbidities, non-elective TAVR patients had 1.99 times higher odds of suffering in-hospital mortality compared to elective TAVR admissions (aOR 1.99, 95% CI: 1.42-2.81; p < 0.001). Our non-elective cohort was also separated by transfer status. Non-elective TAVR patients who were transferred from other acute care centers had 2.12 times higher odds of suffering in-hospital mortality compared to elective TAVR admissions (aOR 2.12, 95% CI: 1.21-3.71; p = 0.01, Figure 1). Non-elective TAVR patients who were admitted as regular hospital admissions had 2.18 times higher odds of suffering in-hospital mortality compared to elective TAVR admissions (aOR 2.18, 95% CI: 1.38-3.46; p = 0.001, Figure 1). There was no significant difference in mortality between non-elective TAVR patients who were transferred from non-acute care centers and elective TAVR patients (p = 0.46, Figure 1). When separated by race, White (2.2% vs 1.1%, p < 0.001) and Hispanic (4.6% vs 1.6%, p = 0.04) patients had a higher mortality rate in the non-elective TAVR cohort (Figure 2 and Table 3).

In terms of operative complications, non-elective TAVR patients were more likely to have intraoperative cardiac arrest (OR 1.61, 95% CI: 1.07-2.43; p = 0.02), postoperative acute respiratory failure (OR 1.91, 95% CI: 1.40-2.63; p < 0.001), postoperative cardiogenic shock (OR 2.16, 95% CI: 1.30-3.61; p = 0.003) and postoperative pneumothorax (OR 1.97, 95% CI: 1.08-3.61; p = 0.03, Table 4). There was no difference between our two cohorts in regards to intraoperative cerebral infarction (OR 1.81, 95% CI: 0.50-6.60; p = 0.37), postoperative cardiac arrest (OR 1.62, 95% CI: 0.92-2.87; p = 0.10), postoperative cerebral infarction (OR 1.26, 95% CI: 0.88-1.81; p = 0.21), postoperative heart failure (OR 1.15, 95% CI: 0.40-3.36; p = 0.80) and postoperative hypotension (OR 0.93, 95% CI: 0.68-1.27; p = 0.66, Table 4). Additionally, non-elective TAVR patients had an average length of stay of 7.9 days (Median 6 days, IQR 3-11 days), compared to 3.0 days for elective admissions (Median 2 days, IQR 1-3 days). Non-elective TAVR patients were also more likely to be discharged to a skilled nursing or intermediate care facility (23.7% vs 9.9%, p < 0.001) and had higher mean hospital costs ($276,455.40 vs $203,902.50, p < 0.001).

Discussion

Our study illustrates that patients undergoing non-elective TAVR had higher odds of inpatient mortality compared to elective TAVR patients. Even when separated by transfer status, patients transferred from an acute care center and those admitted as regular hospital admissions had higher odds of inpatient mortality when undergoing non-elective compared to elective TAVR. Patient undergoing non-elective TAVR were more likely to have intraoperative cardiac arrest, postoperative acute respiratory failure, postoperative cardiogenic shock and postoperative pneumothorax.

Previous studies have explored why non-elective TAVR patients are more likely to suffer in-hospital mortality. The presumed explanation is that patients undergoing non-elective TAVR have more decompensated aortic stenosis.[13,18] According to Kolte et al, patients undergoing non-elective TAVR had worse aortic valve disease and presented with worse New York Heart Association functional class status and left ventricular ejection fraction.[6] In both our unmatched and matched cohorts, non-elective TAVR patients had higher rates of decompensated heart failure, concurrent tricuspid regurgitation and APR-DRG mortality scores. While the reason for this decompensated aortic stenosis is multifactorial, it is possible that non-elective TAVR patients did not have as close provider follow-up as elective TAVR patients. This may be due to a variety of reasons such as poor healthcare literacy, access to a healthcare provider and proximity to a facility that has the resources to perform TAVR. Consequently, their aortic stenosis and other chronic medical conditions may not be as medically optimized prior to undergoing intervention, causing longer hospital stays and higher rates of discharge to a skilled nursing or intermediate care facility.[13]

Another contributing factor for increased non-elective TAVR mortality is that patients who undergo non-elective TAVR may have more concomitant comorbidities. According to Kolte et al, hypoxia, immunocompromised status, atrial fibrillation and elevated baseline creatinine are all predictors of higher mortality in patients undergoing non-elective TAVR.[6] Our data reaffirms this notion as non-elective TAVR patients had higher rates of atrial fibrillation, decompensated heart failure, chronic kidney disease and tricuspid regurgitation in both our unmatched and matched cohorts.

Currently, there is limited literature on how transfer status, specifically between acute care centers, impacts TAVR patients. Unfortunately, increased acute care transfer mortality is a multifaceted problem. One major component is the lack of access to healthcare, with the discrepancy more prominent in underserved regions. As of 2020, approximately 60 million people reside in rural America and depend on local hospitals for medical care.[19,20] However, 161 rural hospitals have closed since 2005 and as of February 2019, 673 additional rural hospitals were at risk of closing as well.[19,20] Factors that have contributed to rural hospital closures include costly medications, workforce shortages and inadequate reimbursements.[21] Furthermore, TAVR programs are predominantly located in urban tertiary care centers and less likely to expand into lower socioeconomic regions, such as rural America.[22] This leads to patients in lower socioeconomic regions to routinely seek care at rural hospitals that do not have the financial means to provide specialized procedures like TAVR. These challenges force patients receiving care from rural hospitals to be transferred to specific tertiary care centers for further management. Additionally, the specific tertiary care center also matters as hospitals that have a higher volume of urgent or emergent TAVR procedures have improved in-hospital outcomes.[23] Thus, this delay in medical care and variability in TAVR volume status between hospitals can negatively impact a patient’s outcome.

In the setting of an increasing world population, there is rising concern for a global physician shortage, as this may further exacerbate the strains on access to healthcare. This pattern is further exemplified in the United States. A study by the U.S. Census Bureau estimated a 34.2% increase in the 65-and-older population from 2010 to 2020, which corresponded to a growth of 13,787,044 individuals.[24] The AAMC predicts that the American population is projected to grow from 328 million in 2019 to 363 million in 2034, with a 42.4% increase in those aged 65 and above.[25] As our population grows, the demand for TAVR will continue to increase as well. A meta-analysis conducted by Osnabrugge et al. showed the prevalence of aortic stenosis and severe aortic stenosis among those 75 years and older in North America and Europe to be 12.4% and 3.4%, respectively.[26] Unfortunately, the AAMC also predicts a shortage of between 3,800 to 13,400 physicians in medical specialties, such as cardiology, in the same time frame.[25] This population growth and increased demand for TAVR, in conjunction with the physician shortage, will continue to exacerbate the disparities in access to healthcare.

There are some limitations to our study. When using the NIS database, there is an inherent risk of miscoded diagnoses. Data such as the severity of aortic stenosis, left ventricular ejection fraction, imaging results, route of access, type of transcatheter valve placed, procedure details, medications given, readmission rate and outcomes after discharge was also not available. Concomitant coronary artery disease, mitral regurgitation and tricuspid regurgitation were also inadequately captured in the NIS database and whether any of these conditions were also addressed during the index admission was also not analyzed. The aforementioned clinically relevant variables can be confounding factors, which can affect our study results. We are also unable to confirm if the rationale between determining if a patient is undergoing an elective versus non-elective procedure is consistent throughout the hospitals in our dataset. Our data showed that when separated by race, only White and Hispanic patients had higher odds of suffering mortality in non-elective TAVR. However, both our original dataset and propensity matched cohorts consisted of predominantly White patients. Other races having less representation creates the possibility of a type II error. Finally, out of the 22,745 non-elective TAVR patients in our dataset, only 4389 (19.2%) were included in our final analysis. These patients were selected based off of the propensity scores we calculated, which can cause a selection bias. This can potentially affect the generalizability of our results as the patients selected can change based off of the variables used to calculate the propensity score.

Conclusion

In our nationally representative sample of inpatient hospitalizations across the United States, patients undergoing non-elective TAVR had higher odds of suffering in-hospital mortality compared to elective TAVR admissions. Even when separated by transfer status, patients transferred from an acute care center and those admitted as regular hospital admissions had higher odds of inpatient mortality when undergoing non-elective compared to elective TAVR. Additional research should be conducted on TAVR outcomes by race and how to improve the safety of non-elective TAVR. As the demand for TAVR increases, it is imperative we have further discussions regarding access to healthcare in underserved regions, the national physician shortage and future of the TAVR industry.

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Tables

Table 1. Baseline Characteristics of Non-Elective and Elective TAVR Patients before Propensity Score Matching

	Non-Elective	**Elective**	**p-value**
n	22,745	137,545	
Age (mean)	79.8	79.7	0.56
Sex (%)			0.46
Male	12,533 (55.1)	75,100 (54.6)	
Female	10,213 (44.9)	62,445 (45.4)	
Race (%)			<0.001
Asian	341 (1.5)	1651 (1.2)	
Black	1205 (5.3)	4952 (3.6)	
Hispanic	1569 (6.9)	5777 (4.2)	
Native American	68 (0.3)	413 (0.3)	
Other	455 (2.0)	5914 (4.3)	
White	18,605 (81.8)	121,865 (88.6)	
Median Household Income by Quartile (%)			0.14
Quartile 1 ($1-47,999)	5027 (22.1)	28,334 (20.6)	
Quartile 2 ($48,000-60,999)	5550 (24.4)	35,487 (25.8)	
Quartile 3 ($61,000-81,999)	6232 (27.4)	36,862 (26.8)	
Quartile 4 ($82,000+)	5936 (26.1)	36,862 (26.8)	
APR-DRG Mortality Score[a] (%)			
Score = 0-1 (Minor)	1205 (5.3)	15,680 (11.4)	
Score = 2 (Moderate)	6778 (29.8)	69,873 (50.8)	
Score = 3 (Major)	10,031 (44.1)	44,702 (32.5)	
Score = 4 (Extreme)	4731 (20.8)	7290 (5.3)	
Payer Status (%)			<0.001
Medicare	20,311 (89.3)	124,203 (90.3)	
Medicaid	455 (2.0)	1238 (0.9)	
Private Insurance	1410 (6.2)	9353 (6.8)	
Self-Pay	159 (0.7)	550 (0.4)	
No Charge	0 (0)	0 (0)	
Other	409 (1.8)	2201 (1.6)	
Hospital Region (%)			<0.001
Northeast	6141 (27.0)	31,360 (22.8)	
Midwest or North Central	3230 (14.2)	33,836 (24.6)	
South	8347 (36.7)	45,527 (33.1)	

West	5027 (22.1)	26,821 (19.5)	
Hospital Location & Teaching Status (%)			0.001
Rural	91 (0.4)	1513 (1.1)	
Urban Non-Teaching	1569 (6.9)	13,067 (9.5)	
Urban Teaching	21,085 (92.7)	122,965 (89.4)	
Hospital Bed Size (%)			0.14
Small	1615 (7.1)	8940 (6.5)	
Medium	3958 (17.4)	28,059 (20.4)	
Large	17,172 (75.5)	100,545 (73.1)	
Comorbidities (%)			
Atrial Fibrillation	8065 (35.5)	45,780 (33.3)	<0.001
Coronary Artery Disease	13,610 (59.8)	86,695 (63.0)	<0.001
Chronic Kidney Disease	8385 (36.9)	41,085 (29.9)	<0.001
Chronic Obstructive Pulmonary Disease	4145 (18.2)	26,585 (19.3)	<0.001
Decompensated Heart Failure	10,740 (47.2)	34,960 (25.4)	<0.001
Hypertension	4160 (18.3)	35,800 (26.0)	<0.001
Obesity	2990 (13.1)	22,565 (16.4)	<0.001
Previous Myocardial Infarction	1915 (8.4)	13,575 (9.9)	<0.001
Type 2 Diabetes Mellitus	3765 (16.6)	27,035 (19.7)	<0.001

[a]APR-DRG scores are calculated from discharge billing codes and based on discharge diagnosis, pre-existing medical conditions and age.

Table 2. Baseline Characteristics of Non-Elective and Elective TAVR Patients after Propensity Score Matching

	Non-Elective	**Elective**	**Standardized Mean Differences**
n	4389	4389	
Age (mean)	79.8	80.2	0.027
Sex (%)			0.014
Male	2410 (54.9)	2360 (53.8)	
Female	1979 (45.1)	2029 (46.2)	
Race (%)			0.002
Asian	64 (1.5)	67 (1.5)	
Black	233 (5.3)	193 (4.4)	
Hispanic	303 (6.9)	257 (5.9)	
Native American	14 (0.3)	23 (0.5)	
Other	187 (4.3)	206 (4.7)	
White	3588 (81.8)	3643 (83.0)	
Median Household Income by Quartile (%)			0.023
Quartile 1 ($1-47,999)	944 (21.9)	894 (20.6)	
Quartile 2 ($48,000-60,999)	1052 (24.5)	1100 (25.4)	
Quartile 3 ($61,000-81,999)	1175 (27.3)	1136 (26.2)	
Quartile 4 ($82,000+)	1131 (26.3)	1209 (27.9)	
APR-DRG Mortality Score[a] (%)			0.414

Score = 0-1 (Minor)	235 (5.4)	333 (7.6)	
Score = 2 (Moderate)	1311 (29.9)	1865 (42.5)	
Score = 3 (Major)	1932 (44.0)	1834 (41.8)	
Score = 4 (Extreme)	911 (20.8)	357 (8.1)	
Payer Status (%)			0.031
Medicare	3924 (89.4)	3987 (90.8)	
Medicaid	88 (2.0)	49 (1.1)	
Private Insurance	269 (6.1)	260 (5.9)	
Self-Pay	28 (0.6)	22 (0.5)	
No Charge	4 (0.1)	0 (0)	
Other	76 (1.7)	71 (1.6)	
Hospital Region (%)			0.007
Northeast	1204 (27.4)	1048 (23.9)	
Midwest or North Central	624 (14.2)	891 (20.3)	
South	1629 (37.1)	1582 (36.0)	
West	932 (21.2)	868 (19.8)	
Hospital Location & Teaching Status (%)			0.003
Rural	18 (0.4)	23 (0.5)	
Urban Non-Teaching	279 (6.4)	264 (6.0)	
Urban Teaching	4092 (93.2)	4102 (93.5)	
Hospital Bed Size (%)			0.030
Small	303 (6.9)	212 (4.8)	
Medium	767 (17.5)	838 (19.1)	
Large	3319 (75.6)	3339 (76.1)	
Comorbidities (%)			
Atrial Fibrillation	1555 (35.4)	1537 (35.0)	0.005
Coronary Artery Disease	2631 (59.9)	2591 (59.0)	0.001
Chronic Kidney Disease	1624 (37.0)	1609 (36.7)	0.003
Chronic Obstructive Pulmonary Disease	789 (18.0)	755 (17.2)	0.036
Decompensated Heart Failure	2108 (48.0)	2090 (47.6)	0.010
Hypertension	801 (18.3)	828 (18.9)	0.015
Obesity	572 (13.0)	561 (12.8)	0.018
Previous Myocardial Infarction	371 (8.5)	346 (7.9)	0.012
Type 2 Diabetes Mellitus	724 (16.5)	692 (15.8)	0.007

[a]APR-DRG scores are calculated from discharge billing codes and based on discharge diagnosis, pre-existing medical conditions and age.

Table 3. Total Population and Number of Deaths Stratified by Race after Propensity Score Matching

Race	**Total Number of Non-Elective Patients** (%)	**Total Number of Non-Elective Deaths** (%)	**Total Number of Elective Patients** (%)	**Total Number of Elective Deaths** (%)	**p-value**
Asian or Pacific Islander	64 (1.5)	1 (1.6)	78 (1.8)	2 (2.6)	0.68
Black	233 (5.3)	3 (1.3)	189 (4.3)	2 (1.1)	0.83

Hispanic	303 (6.9)	14 (4.6)	253 (5.8)	4 (1.6)	0.04
Other	187 (4.3)	2 (1.1)	199 (4.5)	3 (1.5)	0.70
White	3588 (81.8)	79 (2.2)	3643 (83.0)	41 (1.1)	<0.001

Table 4. Post-Operative Complications after Propensity Score Matching

Outcomes	**Non-Elective TAVR**	**Elective TAVR**	**OR (95% CI)**	**p-value**
Intraoperative (%)				
Cardiac Arrest	29 (0.7)	14 (0.3)	1.61 (1.07-2.43)	0.02
Cerebral Infarction	3 (0.1)	4 (0.1)	1.81 (0.50-6.60)	0.37
Postoperative (%)				
Acute Kidney Injury	4 (0.1)	3 (0.1)	1.86 (0.61-5.71)	0.28
Acute Respiratory Failure	50 (1.1)	35 (0.8)	1.91 (1.40-2.63)	<0.001
Cardiac Arrest	15 (0.3)	7 (0.2)	1.62 (0.92-2.87)	0.10
Cardiogenic Shock	20 (0.5)	9 (0.2)	2.16 (1.30-3.61)	0.003
Cerebral Infarction	36 (0.8)	20 (0.5)	1.26 (0.88-1.81)	0.21
Fever	6 (0.1)	6 (0.1)	0.76 (0.32-1.77)	0.52
Heart Failure	4 (0.1)	7 (0.2)	1.15 (0.40-3.36)	0.80
Hypertension	6 (0.1)	5 (0.1)	1.13 (0.47-2.71)	0.78
Hypotension	45 (1.0)	39 (0.9)	0.93 (0.68-1.27)	0.66
Hypothyroidism	27 (0.6)	35 (0.8)	0.90 (0.62-1.32)	0.59
Intestinal Obstruction	1 (0)	0 (0)	1.21 (0.14-10.35)	0.86
Pneumothorax	14 (0.3)	11 (0.3)	1.97 (1.08-3.61)	0.03

Figure

Legend

Figure 1: The Effect of Transfer Status on Mortality in Non-elective Compared to Elective TAVR patients after Propensity Score Matching

Figure 2: Mortality in Non-elective and Elective TAVR Stratified by Race after Propensity Score Matching

Appendix

Aortic Stenosis ICD-10 Codes

I35.0

Transcatheter Aortic Valve Replacement ICD-10 Codes

02RF37H, 02RF37Z, 02RF38H, 02RF38Z, 02RF3JH, 02RF3JZ, 02RF48Z, 02RF4JZ, 02RF4KZ

Transfer Status	Adjusted Odds Ratio	95% Confidence Interval	p-value
Regular Admissions	2.18	1.38 - 3.46	0.001
Acute Care Transfers	2.12	1.21 - 3.71	0.01
Non-Acute Care Transfers	2.21	0.27 - 18.46	0.46

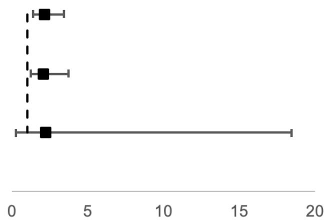

Figure 1: The Effect of Trasfer Status on Mortality in Non-Elective Compared to Elective TAVR Patients After Propensity Score Matching

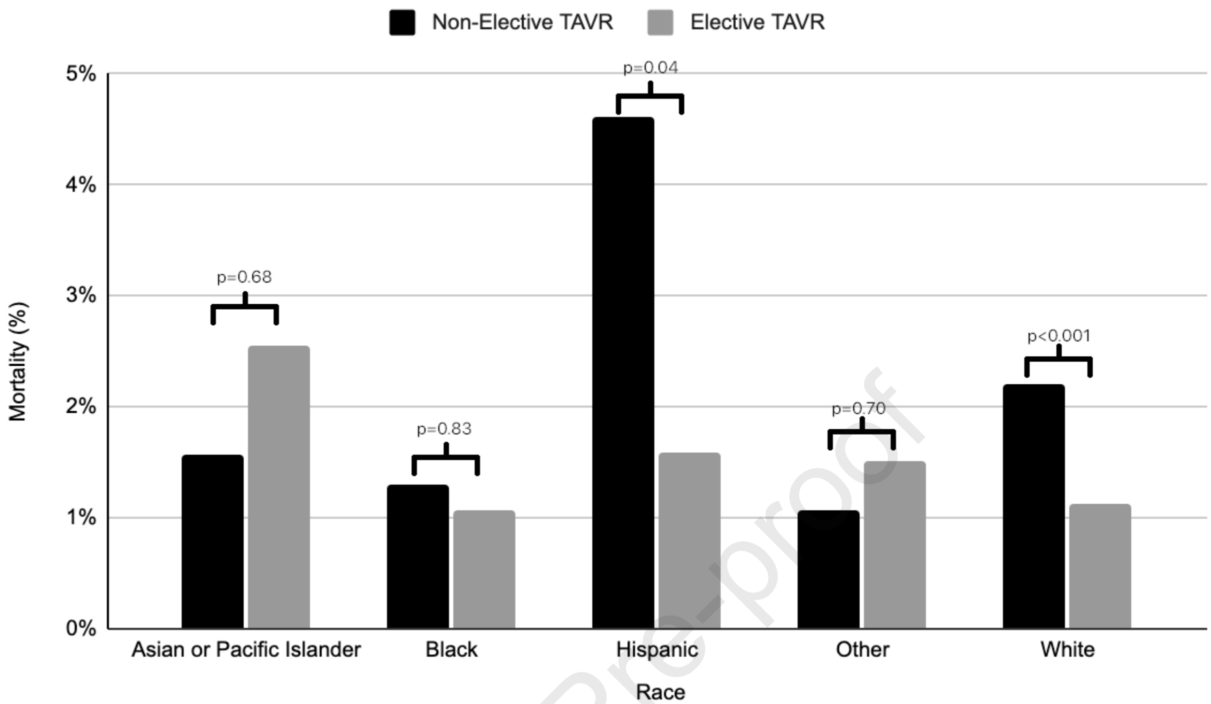

Figure 2: Mortality in Non-Elective and Elective TAVR Stratified by Race After Propensity Score Matching