Council on Clinical Cardiology. Council on Functional Genomics and Translational Biology. Stroke Council. methodological standards for meta-analyses and qualitative systematic reviews of cardiac prevention and treatment studies: a scientific statement from the American Heart Association. *Circulation* 2017;136:e172–e194.
4. Gaudino M, Bakaeen FG, Benedetto U, Di Franco A, Fremes S, Glineur D, Girardi LN, Grau J, Puskas JD, Ruel M, Tam DY, Taggart DP, ATLANTIC (Arterial Grafting International Consortium) Alliance members. Arterial grafts for coronary bypass: a critical review after the publication of ART and RADIAL. *Circulation* 2019;140:1273–1284.
5. Taggart DP, Gaudino MF, Gerry S, Gray A, Lees B, Dimagli A, Puskas JD, Zamvar V, Pawlaczyk R, Royse AG, Flather M, Benedetto U, ART investigators ART investigators. Effect of total arterial grafting in the arterial revascularization trial. *J Thorac Cardiovasc Surg* 2020. https://doi.org/10.1016/j.jtcvs.2020.03.013. S0022-5223(20)3091-2.

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Gender Disparities in Percutaneous Mitral Valve Repair (from the National Inpatient Sample)

Gender disparities are well known in cardiovascular disease and interventional procedures whether these exist in percutaneous mitral valve repair (PMVR) is unknown.[1,2] The purpose of this study is to look at the gender disparities and outcomes in PMVR.

National Inpatient Sample (NIS) database from the years 2010 to 2017 was used for this study. The NIS is a part of deidentified, publicly available federally funded databases under the Agency for Healthcare Research and Quality. NIS is derived from all States for national estimates of healthcare utilization, costs, and outcomes. We used the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) codes and ICD-10-CM codes. All patients who underwent PMVR and 18 years or above were identified using ICD-9-CM code of 35.97 & ICD-10-CM code of 02UG3JZ. Pearson chi-square test for categorical variables and Mann-Whitney *U* test for continuous variables was used for statistical testing. Continuous variables were reported as medians with interquartile range (IQR). Multivariable analysis was done by using multiple logistic regression model to estimate odds ratios (ORs) with 95% confidence intervals (CIs). A total of 15,264 weighted hospitalizations for PMVR were included in our analysis. In the overall cohort, 52.9% (8,080) were men and 47.0% (7,184) were women. However, over the years woman

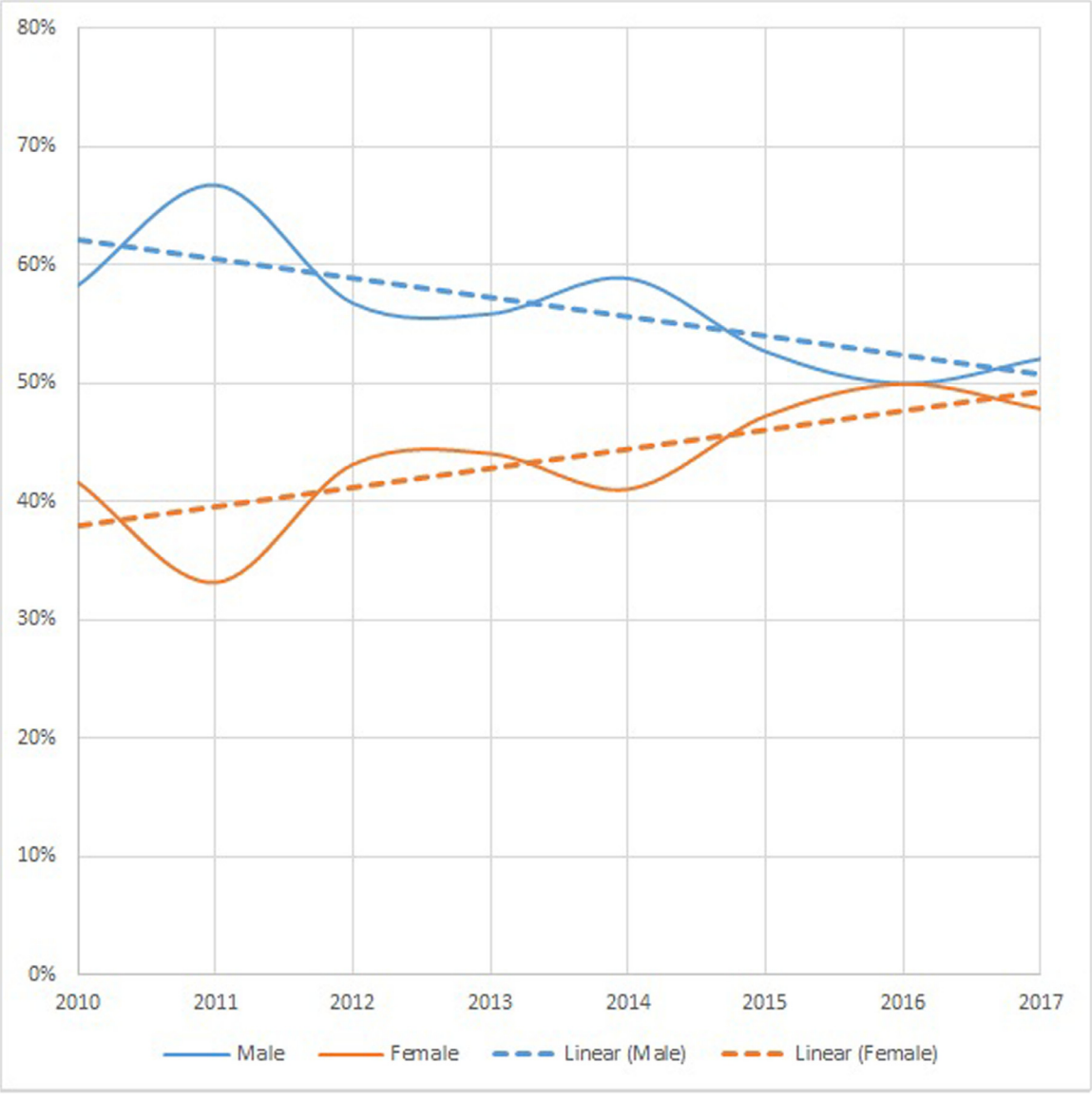

Figure 1. Gender trends in percutaneous mitral valve repair.

Table 1
Gender disparities in percutaneous mitral valve replacement

No. (%)	Male (n = 8080)	Female (n = 7184)	p value
Comorbidity burden			
Congestive heart failure	6452 (79.8%)	5627 (78.3%)	0.02
Coronary artery disease	5457 (67.5%)	3696 (51.4%)	<0.01
Coagulopathy	1072 (13.3%)	752 (10.5%)	<0.01
Diabetes (with complications)	894 (11.1%)	700 (9.7%)	<0.01
Hypertension	4043 (50.0%)	3488 (48.5%)	0.07
Peripheral vascular disorders	1134 (14.0%)	814 (11.3%)	<0.01
Pulmonary hypertension	50 (0.6%)	25 (0.3%)	0.02
Renal failure	3470 (42.9%)	2170 (30.2%)	<0.01
smoking	384 (4.8%)	279 (3.9%)	<0.01
Prior PCI	1546 (19.1%)	895 (12.5%)	<0.01
Prior CABG	2428 (30.0%)	939 (13.1%)	<0.01
Outcomes			
Died at discharge	179 (2.2%)	184 (2.6%)	0.16
Home and Routine discharges	7013 (88.8%)	5942 (84.9%)	<0.01
Non-home discharges	888 (11.2%)	1058 (15.1%)	<0.01
Complications and resource utilization			
Tracheostomy	64 (0.8%)	40 (0.6%)	0.07
PEG	74 (0.9%)	35 (0.5%)	<0.01
Ventilator use	477 (5.9%)	449 (6.2%)	0.37
Cardiac complications	689 (8.5%)	593 (8.2%)	0.54
Vascular complications	150 (1.9%)	135 (1.9%)	0.9
Pulmonary complications	483 (6.0%)	583 (8.1%)	<0.01
Post Op/procedure stroke	21 (0.3%)	40 (0.6%)	<0.01
Acute Kidney Injury	1390 (17.2%)	1037 (14.4%)	<0.01
Length of stay, median (IQR), days	2 (1-6)	3 (1-6)	0.12
Cost of stay median (IQR), $	1748160 (119121-250321)	170139 (116814-253456)	0.02

PCI = percutaneous coronary artery intervention; CABG = coronary artery bypass graft; PEG = Percutaneous gastrostomy tube.

representation has increased while man representation has decreased (Figure 1). Men were younger than women (79 [IQR 71 to 85] versus 80 [IQR 72 to 80] years). Men also had a higher comorbidity burden (Table 1). There was no significant difference in In-hospital mortality between men and women who underwent PMVR intervention (2.2% vs 2.6%, p value 0.16 and OR woman (reference man), 1.169, [95% CI 0.949 to 1.44], p value = 0.14). Acute kidney injury was more common in men (17.2% vs 14.4%, p value <0.01) while pulmonary complications (8.1% vs 6%, p value 0.01) and postprocedure stroke (0.6% vs 0.3%, p value <0.01) were more common in women. Nonhome discharges were more common in women (15.1% vs 11.2%, p value <0.01; Table 1). Adjusted multiple logistic regression analysis revealed that women had higher odds of developing pulmonary complications (OR 1.37 [95% CI 1.21 to 1.55], p value 0.01) and postprocedure stroke (OR 2.13 [95% CI 1.25 to 3.61], p value <0.01). Conversely, women had lower odds of developing acute kidney injury (OR 0.79 [95% CI 0.72 to 0.87], p value <0.01). There was no difference in length of stay but the cost of stay was higher in men as compared with women (Table 1).

Our study reports no difference in In-Hospital mortality between men and women. Previously, Vlastra et al and Zadok et al studies on TAVR also reported no difference in mortality between the 2 genders.[1,3] Previous studies have shown that women tend to present at an older age compared with men for mitral valve intervention procedure.[2,4] This was also noted in our study. Previous studies have shown that increasing age increases cardiovascular complications in the women and could be partly responsible for the increased postprocedure complication observed.[5] Our cohort showed men had a higher co-morbidity burden. However, even adjusted for age and other co-morbidities women had worse side effects profile and more nonhome discharges. The reason for the increased postprocedure complications and none home discharges could be multifactorial and need to be explored further to address these in the future.

In summary, although no significant difference was noticed in mortality, women tend to have higher side effect profile and nonhome discharges as compared with men in PMVR.

Disclosures

Authors have no disclosures or conflict of interests.

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1. Vlastra W, Chandrasekhar J, García Del Blanco B, Tchétché D, Brito FSJ de, Barbanti M, Kornowski R, Latib A, D'Onofrio A, Ribichini F, Baan J, Tijssen JGP, Moreno R, Dumonteil N, Tarasoutchi F, Sartori S, D'Errigo P, Tarantini G, Lunardi M, Orvin K, Pagnesi M, Berenguer A, Modine T, Dangas

G, Mehran R, Piek JJ, Delewi R. Sex differences in transfemoral transcatheter aortic valve replacement. *J Am Coll Cardiol* 2019;74:2758–2767.
2. Seeburger J, Eifert S, Pfannmüller B, Garbade J, Vollroth M, Misfeld M, Borger M, Mohr FW. Gender differences in mitral valve surgery. *Thorac Cardiovasc Surg* 2013;61:42–46.
3. Zadok O, Kornowski R, Finkelstein A, Barbash I, Danenberg H, Segev A, Guetta V, Halkin A, Vaknin H, Planer D, Assali A, Barsheshet A, Orvin K. Temporal-trends in sex-related differences and outcomes in patients undergoing transcatheter aortic valve implantation (from the Israeli TAVI Multicentre Registry). *Am J Cardiol* 2019;123:108–115.
4. Attizzani GF, Ohno Y, Capodanno D, Cannata S, Dipasqua F, Immé S, Mangiafico S, Barbanti M, Ministeri M, Cageggi A, Pistritto AM, Giaquinta S, Farruggio S, Chiarandà M, Ronsivalle G, Scandura S, Tamburino C, Capranzano P, Grasso C. Gender-related clinical and echocardiographic outcomes at 30-day and 12-month follow up after MitraClip implantation in the GRASP registry. *Catheter Cardiovasc Interv Off J Soc Card Angiogr Interv* 2015;85:889–897.
5. Regitz-Zagrosek V, Oertelt-Prigione S, Seeland U, Hetzer R. Sex and gender differences in myocardial hypertrophy and heart failure. *Circ J* 2010;74:1265–1273.

https://doi.org/10.1016/j.amjcard.2020.07.021

Meta-analysis of Left Atrial Appendage Closure Versus Anticoagulation in Patients With Atrial Fibrillation

Oral anticoagulation (OAC) (vitamin-K-antagonists or direct oral anticoagulants) is the standard-of-care to prevent systemic thromboembolism in patients with atrial fibrillation (AF). However, a growing number of patients have a contraindication or are deemed inappropriate for long-term OAC therapy[1] and therefore an alternative mechanical strategy to prevent left atrial appendage (LAA) thrombus migration has emerged to treat this population. We conducted a meta-analysis of all randomized clinical trials (RCTs) to assess the safety and efficacy of LAA closure (LAAC) versus anticoagulation in high-risk AF patients.

We performed a comprehensive electronic databases search for RCTs. Two authors extracted and analyzed the data using R v3.3.1 and STATA v15.1 software. The primary outcome was all-cause death. We calculated hazard ratios (HRs) and 95% confidence intervals (CIs) to account for differences in follow-up duration using a random-effects model. A unique Kaplan-Meier curve for all-cause death was reconstructed from the included trials and a Cox proportional-hazards model was calculated. The proportional-hazards assumption was tested using the residual Schoenfeld test.

We identified 3 RCTs with 1,516 total patients (age 73.0 ± 8.1 years; females 31%), randomizing 5,038.9 patient-years of follow-up.[2,3] The mean CHA2DS2-VASc score was 4.0 ± 1.5 and 31.1% of the patients had permanent AF. Successful device deployment was achieved in 91.9% of the study participants. Early procedural complications (within 7 days) included 3.1% pericardial effusion, 0.6% device embolization, 0.5% major bleeding, 0.5% stroke, and 0.1% death (combined risk of serious complications 5.0%).

Compared with OAC, LAAC was associated with a statistically significant reduction of all-cause death (incident-rate-ratio = 0.74, 95% CI 0.56 to 0.99, p = 0.02; HR 0.73, 95% CI 0.56 to 0.97, p = 0.03; absolute-risk-difference = 2.6%) and cardiovascular death (HR 0.63, 95% CI 0.42 to 0.94, p = 0.02). There were no significant differences between groups in terms of all stroke or systemic embolism (HR 0.99, 95% CI 0.65 to 1.50, p = 0.96) or overall bleeding (HR 0.88, 95% CI 0.65 to 1.20, p = 0.43). However, LAAC was associated with a significant reduction of nonprocedural bleeding compared with OAC (HR 0.49; 95% CI 0.35 to 0.70; p <0.01) (Figure 1). Subgroup analysis of all-cause mortality based on the type of anticoagulants (vitamin-K-antagonists vs direct oral anticoagulants) showed no significant interaction.

This investigation demonstrated for the first time that LAAC was associated with a significant reduction of all-cause death. LAAC was also associated with a significant reduction in cardiovascular death and nonprocedural related bleeding.

The observation of lower mortality in the LAAC group is paramount considering 2/3 of the enrolled population were above 75 years which may impose significant competing mortality risks in this population. The primary driver for the lower mortality could be explained by the significant reduction in bleeding.

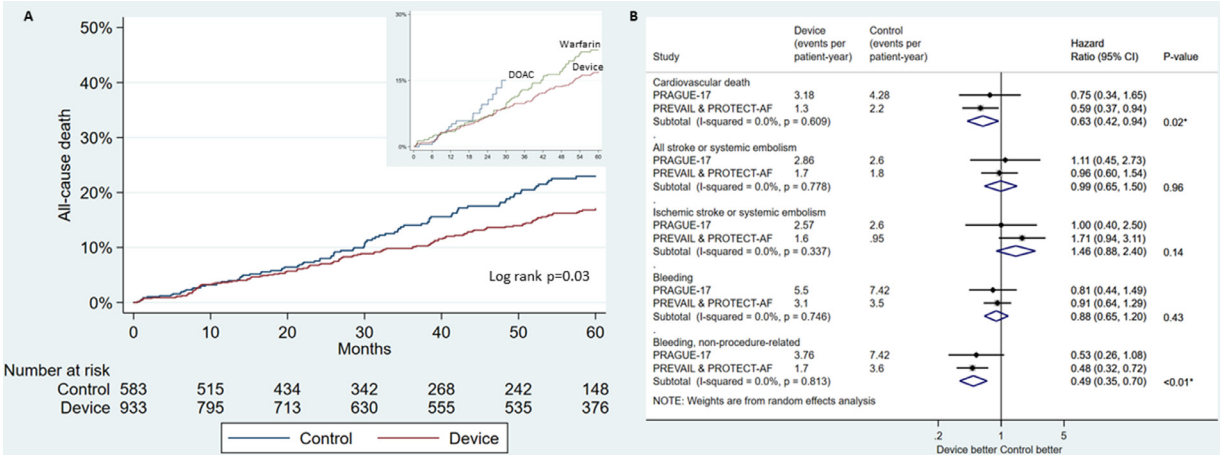

Figure 1. Kaplan Meier curve for all-cause death *(A)* and forest plot for clinical outcomes *(B)*. DOAC = direct oral anticoagulants; PRAUGE-17 = Left Atrial Appendage Closure vs Novel Anticoagulation Agents in Atrial Fibrillation; PREVAIL = Prospective Randomized Evaluation of the Watchman LAA Closure Device In Patients With Atrial Fibrillation Versus Long-Term Warfarin Therapy; PROTECT AF = WATCHMAN Left Atrial Appendage System for Embolic Protection in Patients With Atrial Fibrillation.