National Trends in Mechanical and Bioprosthetic Valve Replacement Among Women of Childbearing Age

Prosthesis choice among women of childbearing age needing valve replacement surgery remains a clinical conundrum.[1] The durability advantage of mechanical valves is often offset by the considerable burden and morbidity of anticoagulation management during planned or unanticipated pregnancy. Indeed, >1/3 of women with mechanical valves have a serious maternal or fetal complication during pregnancy.[1] In addition, the emergence of transcatheter valve in valve therapies might contribute to the preference of bioprosthetic valves in this age group.[2,3] This focused analysis aimed to assess the contemporary trends of prosthesis choice among women of childbearing age undergoing aortic or mitral valve replacement in the United States.

Women age 15 to 49 years who underwent isolated surgical aortic valve replacement (AVR) or mitral valve replacement (MVR) were identified in the Nationwide Inpatient Sample (2003 to 2018) using validated international classification disease 9th/10th Revision codes.[4,5] Patients who had concomitant bypass grafting were included, while those who had double-valve surgery were excluded. The end point of the study was the temporal trends in the use of bioprosthetic versus mechanical valves. Data are presented as national estimates using the discharge weight variable, which is provided by the database. We used the Cochrane-Armitage test to assess the statistical significance

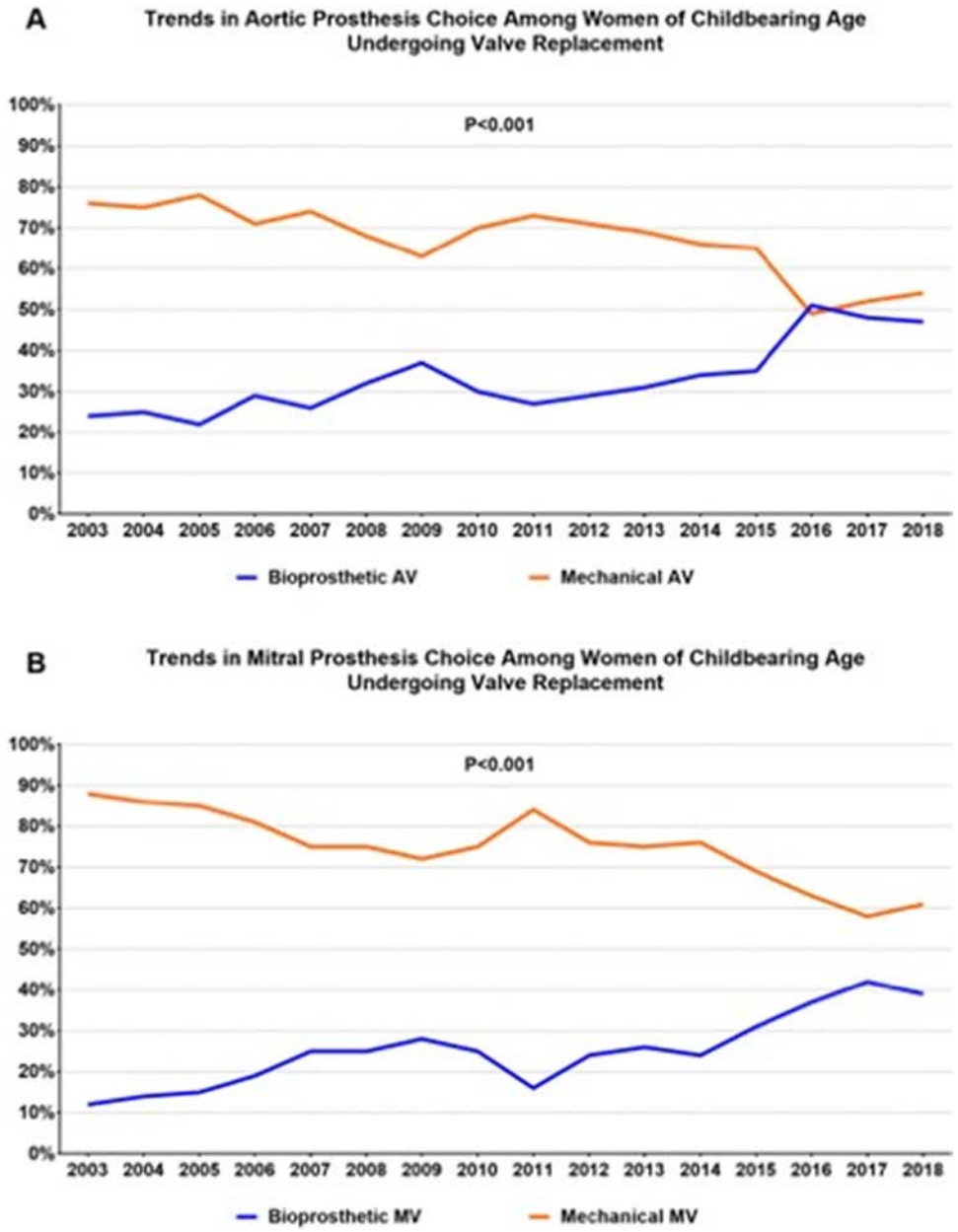

Figure 1. Trends in aortic and mitral prosthesis choice among women of childbearing age undergoing valve replacement.

in the trend analysis. The study was exempted by the institutional review board because it used a public de-identified database.

A total of 1,323,110 hospitalizations for AVR and MVR were identified in the Nationwide Inpatient Sample during the study period, of which 56,251 (4.0%) involved women of childbearing age. Among patients who underwent isolated AVR (n = 25,319), the utilization of mechanical valves declined significantly from 70% to 65% and 54% for the periods between 2003 to 2008, 2009 to 2013, and 2014 to 2018, respectively (Ptrend < 0.001; Figure 1). Between 2003 and 2018, the prevalence of infective endocarditis (IE) increased from 20% to 24% in the bioprosthetic AVR group and from 8% to 13% in the mechanical AVR group, Ptrend < 0.001. Among patients who underwent isolated MVR (n = 21,837), there was similarly a substantial decline in mechanical valve use from 79% to 72% and 61% between 2003 to 2008, 2009 to 2013, and 2014 to 2018, respectively (Ptrend < 0.001; Figure 1). The prevalence of IE increased from 2003 to 2018 in patients who underwent bioprosthetic MVR (22% to 35%, Ptrend < 0.001) but remained stable at ~13% among patients who had mechanical MVR.

This focused analysis reveals a continuous shift towards bioprosthetic versus mechanical valves among women of childbearing age in the United States. In 2018, approximately 50% of AVR and 60% of MVR in women age 15 to 49 were bioprosthetic valves. There was also a temporal increase in the prevalence of IE among women of childbearing age who underwent AVR and MVR. These trends are in line with the documented decline in the use of mechanical valves across all ages and the increase in IE prevalence among younger adults undergoing valve replacement surgery.

Disclosures

All the authors have no relevant disclosure.

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Meta-Analysis of Prospective Studies of Risk stratification by Syntax Score for Unprotected Left Main Coronary Artery Revascularization

Current guidelines for the treatment of left main coronary artery disease (ULMCD) with percutaneous or surgical revascularization is debatable. The syntax score, established based on the results of the Synergy between Percutaneous Coronary Intervention with Taxus and Cardiac Surgery (SYNTAX) trial, is a well-respected risk stratification method for choosing the optimal revascularization strategy.[1] However, the trial had limitations including inadequate power due to very small number of ULMCD patients incorporated. Although several studies have demonstrated percutaneous coronary intervention (PCI) to be a reasonable alternative to coronary artery bypass grafting (CABG), controversy remains about whether SYNTAX score can be utilized to guide management in high-risk individuals. This meta-analysis aims to compare the outcomes between PCI and CABG among syntax risk scores subgroups.

We developed a search strategy to cover multiple sources that include Ovid, Medline, PubMed, Embase, Scopus, Google Scholar, and the Cochrane central register of controlled trials. We included all randomized and prospective non-randomized studies that included data on the risk of MACE (major adverse coronary event) based on Syntax score in patients who underwent PCI in comparison with CABG for unprotected left main coronary artery (LMCA). Where necessary we contacted corresponding authors for clarification of missing data. Review manager 5 was used to calculate relative risk, 95% confidence interval and p- value of ≤0.05 was taken significant.

We reviewed a total of 102 studies and identified 94 clinical human studies. After screening titles and abstracts, 60 were excluded. The remaining 34 full text studies were assessed for eligibility. Only 5 studies reported the outcomes by Syntax scores.[1-5] [1-5] There were 3,108 patients (mean age 66 years, 76% males) that underwent PCI and 3,386 individuals (mean age 66.1 years, 77% males) underwent CABG. The mean syntax score was 24.3 and 25.3 for patients who underwent PCI and CABG, respectively.

The mean follow-up was available for up to 5 years. There were 510 (20.4%) MACE in PCI and 436 (16.1%) in CABG group. Compared with CABG, PCI was associated with higher risk of MACE in group with syntax score ≥33 (Risk ratio; RR for MACE; 1.67; 95% CI 1.27 − 2.19, p = 0.0002) in random effect model. PCI was non inferior to CABG among groups with syntax score 23 − 32 (RR 1.22; 95% CI 0.97 − 1.55, p = 0.09) and syntax score 1 − 22 (RR 1.21; 95% CI 0.95, 1.55, p = 0.13). Figure 1 shows the comparison of MACE outcomes between PCI and CABG among syntax risk subgroups. The net reclassification index for syntax ≥33 was 0.29 and 38.8% of the patients were reclassified.

Disclosures: The authors approve that they have known competing interests related with the work.

Ethics approval: Ethics approval was not required as the study is meta-analysis is a meta-analysis of published trials.