

## Author Contributions

Moo Hyun Kim has full access to all study data and takes responsibility for the integrity of the data and the accuracy of the data analysis. Concept and design: Moo Hyun Kim. Acquisition, analysis, or interpretation of data: All authors. Drafting of the manuscript: Cai De Jin. Critical revision for important intellectual content: Victor Serebruany. Statistical analysis: Kwang Min Lee. Obtained funding: Moo Hyun Kim. Supervision: Moo Hyun Kim, Sung-Cheol Yun.

## Role of the Funder/Sponsor

The funder was involved in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication by way of individuals employed by the funding institution who are included as authors or in the acknowledgments.

Cai De Jin, MD<sup>a,b,\*</sup>

Moo Hyun Kim, MD<sup>a,\*</sup>

Kwang Min Lee, PhD<sup>a</sup>

Jong Sung Park, MD<sup>a</sup>

Dong Sik Jung, MD<sup>c</sup>

Sung-Cheol Yun, PhD<sup>d</sup>

Victor Serebruany, MD, PhD<sup>e,\*\*</sup>

<sup>a</sup> Department of Cardiology, Dong-A University Hospital, Busan, Korea

<sup>b</sup> Department of Cardiology, Zunyi Medical University, Guizhou, China

<sup>c</sup> Department of Internal Medicine, Dong-A University Hospital, Busan, Korea

<sup>d</sup> Department of Clinical Epidemiology and Biostatistics, Asan Medical Center, University of Ulsan, Seoul, Korea

<sup>e</sup> Department of Neurology/Stroke Unit, Johns Hopkins University, Baltimore, Maryland

\* Both authors have contributed equally.

23 June 2020

1. Warren-Gash C, Smeeth L, Hayward AC. Influenza as a trigger for acute myocardial infarction or death from cardiovascular disease: a systematic review. *Lancet Infect Dis* 2009;9:601–610.
2. Corrales-Medina VF, Madjid M, Musher DM. Role of acute infection in triggering acute coronary syndromes. *Lancet Infect Dis* 2010;10:83–92.
3. Steptoe A, Kivimaki M. Stress and cardiovascular disease. *Nat Rev Cardiol* 2012;9:360–370.
4. Xiong TY, Redwood S, Prendergast B, Chen M. Coronaviruses and the cardiovascular system: acute and long-term implications.

[Published online March 18, 2020]. *Eur Heart J* doi:10.1093/eurheartj/ehaa231.

5. Zaleski AL, Taylor BA, McKay RG, Thompson PD. Declines in acute cardiovascular emergencies during the COVID-19 Pandemic. *Am J Cardiol* 2020 <https://doi.org/10.1016/j.amjcard.2020.05.029>.

<https://doi.org/10.1016/j.amjcard.2020.06.065>

## Multiple Arterial Grafting: A Critical Analysis



We have major concerns with regard to the meta-analysis titled “Meta-analysis Comparing Multiple Arterial Grafts versus Single Arterial Graft for Coronary-Artery Bypass Grafting” and recently published in the American Journal of Cardiology.<sup>1</sup>

First, and most importantly, a major error in study selection is evident. The authors aim at including only randomized trial that evaluated the outcomes of multiple versus single arterial grafting. However, they include a post hoc analysis of the Evaluation of XIENCE versus Coronary Artery Bypass Surgery for Effectiveness of Left Main Revascularization (EXCEL) trial. The EXCEL trial was a randomized trial comparing coronary surgery with percutaneous interventions in the treatment of left main coronary disease<sup>2</sup> – randomization in the surgery group was not stratified by the number of arterial grafts so the comparison between patients receiving multiple versus single arterial grafts is in fact observational. The study by Thujis does not meet the authors’ inclusion criteria and should not have been included.

We have also major concern with the use of a fixed model for data pooling. Current recommendations requires than in meta-analyses of cardiac treatment studies the choice between a random and a fixed effect model is not based on statistical heterogeneity, but rather on methodological heterogeneity.<sup>3</sup> As the authors pool studies performed in Asia, North America and Europe, with sample size varying from 60 to 3102 patients, follow-up varying from 1 to 10 years and publication date from 2000 to 2019, a high level of methodological heterogeneity must be assumed and a random model should have been used.

Finally, the Arterial Revascularization Trial (ART), by far the largest of

the pooled studies including 3,102 of the 6,392 total patients, has been heavily criticized because of the high crossover rate and use of the radial artery in 23% of patients in the single arterial graft group.<sup>4</sup> The overall results of the published meta-analysis are clearly driven by a methodologically fragile study. Indeed, when multiarterial versus single arterial grafting was examined within the arterial revascularization trial, the results favored the multiarterial group.<sup>5</sup> Based on the previously mentioned recommendations, in this situation a decision not to pool the data should have been made or at least a sensitivity analysis using leave-one-out analysis should have been performed.

In conclusion, significant methodological flaws limit our ability to derive meaningful information from this report regarding the benefits (or lack thereof) of multiple versus single arterial grafting. Moreover, careful examination of the data presented might well lead the opposite conclusion.

## Acknowledgments

None.

Paul Kurlansky, MD<sup>a</sup>

Mario Gaudino, MD, MSCE<sup>b,\*</sup>

<sup>a</sup> Department of Surgery, Center for Innovation and Outcomes Research, Columbia University Medical Center, New York, New York

<sup>b</sup> Department of Cardiothoracic Surgery, Weill Cornell Medicine, 525 E 68th St, New York, New York 10065

30 June 2020

1. Chagal K, Masroor S, Elzanaty A, Patel M, Mir T, Khan S, Nazir S, Soni R, Oostru C, Khuder S, Eltahawy E. Meta-analysis comparing multiple arterial grafts versus single arterial graft for coronary-artery bypass grafting. *Am J Cardiol* 2020 <https://doi.org/10.1016/j.amjcard.2020.06.012>.
2. Kappetein AP, Serruys PW, Sabik JF, Leon MB, Taggart DP, Morice M, Gersh BJ, Pocock SJ, Cohen DJ, Wallentin L, Ben-Yehuda O, van Es G, Simonton CA, Stone GW. Design and rationale for a randomized comparison of everolimus-eluting stents and coronary artery bypass graft surgery in selected patients with left main coronary artery disease: the EXCEL trial. *EuroIntervention* 2016;12:861–872.
3. Rao G, Lopez-Jimenez F, Boyd J, D’Amico F, Durant NH, Hlatky MA, Howard G, Kirley K, Masi C, Powell-Wiley TM, Solomonides AE, West CP, Wessel J. American Heart Association Council on Lifestyle and Cardiometabolic Health. Council on Cardiovascular and Stroke Nursing. Council on Cardiovascular Surgery and Anesthesia.

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, Bakaen 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, Royle 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.

<https://doi.org/10.1016/j.amjcard.2020.07.001>

### 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.<sup>1,2</sup> 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

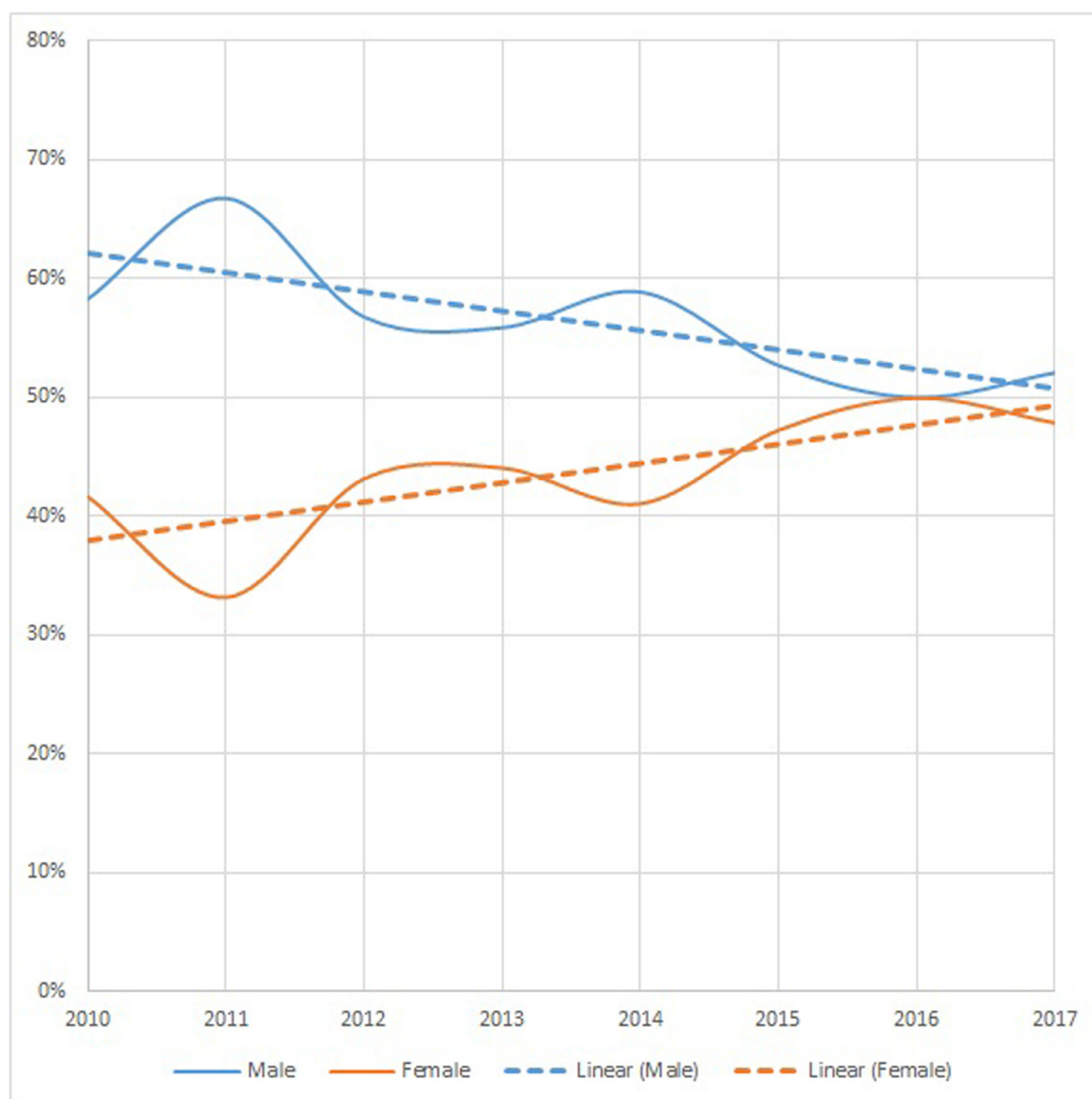


Figure 1. Gender trends in percutaneous mitral valve repair.