Commentary: Off-pump and on point: Sex-stratifying multiple arterial grafting

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There has been growing interest in the use of multiple arterial grafting (MAG) and off-pump coronary artery bypass grafting (CABG). Although both procedures have shown promise in improving outcomes, the evidence has been mixed, largely due to differences in patient characteristics, surgery volumes, and surgeon experience. Cardiac surgery outcomes commonly differ between men and women, underscoring the need for sex-stratified analyses to better understand the influence of these procedures on different patient populations.1

Rubens and colleagues2 present a retrospective, population-based analysis of isolated CABG with MAG (16,209 men and 2989 women) stratified by pump status using health administrative data from across Ontario, Canada. At a median follow-up of 5.0 years (interquartile range, 2.7-8.0 years), all-cause mortality was not influenced by pump status (hazard ratio in women: 1.25; 95% CI, 0.83-1.88 and men: 1.08; 95% CI, 0.85-1.37). However, there was an increased risk of major adverse cardiovascular and cerebrovascular events (MACCE) in women undergoing off-pump MAG-CABG (hazard ratio, 1.45; 95% CI, 1.04-2.03), suggesting the need for caution in the concomitant use of off-pump approaches and MAG. The authors should be applauded for their important and well-conducted study using a comprehensive data source and applying a rigorous methodology with sensitivity analyses accounting for variation in institutional volumes. Stratification of analyses by sex and pump status enables a more nuanced insight into tailoring the best possible coronary revascularization treatment to different patients.

Some limitations and questions remain. The definition of MACCE employed by the authors did not include death, which may hinder comparisons with findings from other studies. Additionally, administrative data carry inherent limitations, including potential misclassification of MAG and pump status and the absence of more granular procedural details. Although sensitivity analyses were performed to evaluate whether results were consistent in high-volume centers only, the study was unable to assess the variability in experience among individual surgeons who performed the procedures, which may have a more pronounced effect than hospital volume.3 Lastly, although results were sex-stratified, the authors were unable to account for other sociodemographic variables that are known to influence cardiac surgical outcomes, including but not limited to race, ethnicity, and indigeneity.4,5

Investigations to date have primarily been conducted on cohorts with a disproportionate number of men. Sex-stratified research is essential for the development of interventions that consider the specific needs and challenges faced by women. Despite documented sex-based disparities in cardiac surgical outcomes, women continue to be significantly underrepresented in trials.6,7 To date, investigations examining the influence of MAG on the outcomes of CABG in women have produced inconsistent findings, ranging from improved survival and freedom from MACCE8 to moderately improved results that were restricted to small

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CENTRAL MESSAGE

Off-pump coronary artery bypass grafting does not appear to influence all-cause mortality with multiple arterial grafting, but more work is needed to explore the risk of major adverse events in women.
studies to a lack of benefit, possibly due to a higher proportion of women being considered high-risk. The current study adds to this array of findings. These mixed results underscore the need for additional research to clarify the benefits and limitations of MAG, particularly for specific patient populations. Beyond sex, there also remain other factors that warrant further investigation because a multitude of patient characteristics have been shown to influence outcomes following CABG, including race, ethnicity, indigeneity, and socioeconomic status, which need to be elucidated to improve long-term outcomes and patient-centeredness of CABG.

The study by Rubens and colleagues supports the use of MAG regardless of pump status. However, the study also highlights the need to explore the association between off-pump MAG and an increased risk of MACCE in women. Further research will be needed to ensure that we remain on point, even when off-pump, to ensure that all patients receive the best possible care.

References