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See Article page 1744.

Commentary: To BIMA or not to BIMA, that should be the question, rather than how to BIMA

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Observational studies uniformly report the benefits of bilateral internal mammary artery (BIMA) grafting,^{1,2} yet the only randomized trial did not corroborate these benefits.³ Not surprisingly, there is skepticism regarding BIMA grafting, and its adoption remains at less than 5% among patients who undergo coronary artery bypass grafting (CABG).⁴ Marzouk and colleagues⁵ compare outcomes between patients whose second internal mammary artery was either used as an situ (is-BIMA) or as a free (f-BIMA) graft. Among their highly selected (12% of entire CABG population) young and healthy CABG cohort, 2464 (95%) is-BIMA patients were compared with 136 (5%) f-BIMA patients. The authors found that f-BIMA was associated with significantly increased risk of long-term mortality but with similar hospital readmission and repeat revascularization rates. Significantly, despite the young age and absence of comorbidities, the mediastinitis rate was disturbingly high; 2.5% vs 1.08% reported for CABG patients in the Society of Thoracic Surgeons database⁶.

These results have to be considered cautiously despite the commendable statistical risk adjustment. The investigators

CENTRAL MESSAGE

BIMA grafting will remain a niche, rather than a routine, procedure pending convincing randomized data.

postulate that the increased f-BIMA mortality risk may be due to a greater failure rate of the f-BIMA versus is-BIMA. Although possible, given the additional anastomosis inherent to f-BIMA, this hypothesis is difficult to reconcile without an accompanying increase in hospitalization or repeat revascularization rates, which would be expected if worse f-BIMA durability was the culprit. Recognizing this conundrum, the authors further posit that f-BIMA failure may result in sudden cardiac death which would not increase the hospitalization or repeat revascularization rates. That seems implausible, given the findings of the PREVENT IV (Project of Ex-vivo Vein Graft Engineering via Transfection) trial,⁷ in which graft failure was associated with increased repeat revascularization rates but not increased mortality. Moreover, a number of reports document excellent free IMA patency.^{8,9} Thus, we are left without a credible basis for the main finding of the study.

This study is unfortunately not likely to change surgeons' practice patterns or impact their views of the value of BIMA grafting. To move the BIMA utilization needle will require convincing randomized data, and the only such trial¹⁰ is still years away. Short of that, BIMA grafting will likely remain

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a niche technique (as it was in this study) rather than the standard of care. Gone are the days when a single retrospective study could transition the standard of care as did Loop and colleagues's seminal study, which almost single handedly moved our field from all venous to left internal mammary artery-based CABG.¹¹ For the BIMA enthusiasts, there is little in the current study to cast doubt on the orthodoxy that not using BIMA unnecessarily deprives patients of enhanced survival. Although a 2.5% rate of mediastinitis, a "never event," seems high, this is consistent with the overwhelming majority of other BIMA reports.³ The BIMA believers will counter that the risk of mediastinitis can be mitigated by surgeon experience and skeletonization and thus the risk of mediastinitis is not an insurmountable impediment to more routine BIMA use. Conversely, BIMA skeptics will most certainly point to this increased risk of BIMA associated mediastinitis as its mortal flaw. They will also rightfully point out that this study offers no compelling reasons to consider the BIMA strategy preferentially over the current left internal mammary artery/saphenous vein graft approach.

Despite the excellent clinical outcomes and intentions of this study, it does not settle the BIMA controversy, and we will certainly see multiple future BIMA reports that will continue to perpetuate the current debate but sadly will almost certainly not convince surgeons to increase BIMA use in CABG.

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