Expanding the armamentarium for reoperative coronary artery bypass grafting

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Reoperative coronary artery bypass grafting (CABG) is associated with increased patient mortality and morbidity as compared to primary coronary revascularization.[1-5] This increased risk is due not only to the potential for increased patient comorbidities, but also to the risk of injury to cardiovascular structures on re-entry and mediastinal dissection.[1-5] Potential pitfalls during re-entry and mediastinal dissection in reoperative CABG include injury to internal thoracic artery or vein grafts, native coronary vessels, the right ventricle, or the innominate vein.[1] Therefore, a meticulous image-guided and multidisciplinary team-based

approach for preoperative assessment of reoperative cardiac surgery has been proposed.[6] Furthermore, novel techniques are required in patients undergoing reoperative CABG with limited bypass conduit options.

In this issue of the Journal, Shiraishi et al. document the outcomes of reoperative CABG using the right gastroepiploic artery (RGEA) through a left anterolateral thoracotomy at a single cardiac center.[7] The goals of the study are to specifically examine perioperative morbidity and mortality and to assess the impact of reoperative CABG with RGEA grafting through a left anterolateral thoracotomy by evaluating cardiac functional values between pre- and postoperative status. This is a retrospective cohort study examining the outcome of eleven patients from a single institution that underwent reoperative CABG with RGEA and RGEA-saphenous vein composite grafts through a left anterolateral thoracotomy and midline epigastric approach. Ten of these patients underwent off-pump CABG. Bypass target vessels of both RGEA and RGEA-saphenous vein composite grafts included the left anterior descending, diagonal, circumflex, and right coronary arteries. All grafts were patent on angiogram or coronary computed tomography at postoperative day seven. No in-hospital deaths were observed. Postoperatively, improvements were observed in left ventricular end-diastolic volume, left ventricular end-systolic volume, and left ventricular ejection fraction. From these findings, the authors concluded that in select patients, off-pump reoperative CABG with RGEA grafting through a left anterolateral thoracotomy is a safe and effective surgical procedure.

Shiraishi et al. present an interesting and topical premise. Historically, the RGEA was first proposed for indirect myocardial revascularization in the 1960's.[8] In 1987, Pym et al. first described direct revascularization of the right coronary artery and obtuse marginal branches using RGEA grafts.[9] That same year, Suma et al. described the use of RGEA for reoperative coronary revascularization of the left anterior descending artery through a transdiaphragmatic approach in two patients.[10] The transdiaphragmatic approach facilitates avoidance of both full sternotomy and cardiopulmonary bypass.[7] Since that time, others have described off pump reoperative CABG using the RGEA, primarily to the right coronary artery circulation. [11, 12, 13, 14, 15] Nevertheless, the RGEA is an infrequently used bypass conduit.

As Shiraishi and colleagues concede, RGEA use should be limited to select appropriate bypass candidates.[7] This judicious patient selection is reflected in their small cohort size. Similar to radial artery bypass grafts, RGEA graft patency rate is highly dependent on the degree of stenosis of the native target vessel.[16, 17] When used to bypass native vessels with greater than 90% stenosis, RGEA patency rates were reported as 94.7% and 90.2% at 5 and 8 years after surgery, respectively.[18] Therefore, the RGEA has good patency when bypassing critically stenosed or occluded native coronary arteries; however, native coronary competitive flow may lead to RGEA bypass spasm and occlusion. Its small caliber and predisposition to vasospasm have limited widespread RGEA use as a bypass graft.[13, 19]

Despite these limitations, there has been more recent interest in RGEA grafts for full arterial revascularization. Within the last year, Kim and colleagues have shown comparable results between the ten year patency rates of both RGEA and right internal thoracic artery composite grafts.[20] Furthermore, Yamamoto et al. recently published patency rates for free gastroepiploic artery (GEA) bypass grafts.[21] The early patency rate of free GEA grafts was 98.6%. The long-term patency rates of the free GEA grafts were 96.5%, 95%, and 86.6% at 5, 10, and 15 years, respectively.[21]

As cardiac surgeons, we face an increasing number of complex patient presentations, including reoperations. Knowledge of a broad range of bypass conduit options will surely strengthen our armamentarium for reoperative CABG when there may be limited conduit availability. I commend Shiraishi and colleagues for their surgical ingenuity and mastery.

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