Efforts to improve bypass graft patency have not been “in vein”

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Coronary bypass grafting (CABG) surgery remains the most common cardiac operation performed throughout the world. The operation has a history that spans nearly 5 decades, and most early iterations of this procedure involved the use of saphenous vein grafts to bypass coronary obstructions to enhance myocardial blood flow.¹ Later, clinical studies revealed a significant limitation of CABG with vein grafts: Over time, these conduits were at risk for the development of thrombosis, intimal hyperplasia, and atherosclerotic changes.² A consequence of these changes was that a substantial fraction of bypass grafts eventually failed; they either became severely stenotic or occluded—placing patients at risk for developing recurrent symptoms—or needed repeat revascularization.

Surgeons have made important alterations in the CABG procedure to improve outcomes. Perhaps the most significant was the identification of a different conduit—the internal thoracic artery (ITA)—which, when used to bypass the left anterior descending coronary artery, results in dramatically improved bypass graft patency and superior clinical results, including long-term survival.³ The ITA is now used in more than 90% of CABG procedures and is tracked as an important quality indicator of surgical programs.

Although some surgeons advocate bilateral ITA grafting or adding radial artery grafts to perform so-called all-arterial grafting, the fact remains that today more than 70% of all coronary bypass grafts performed in the United States are constructed with saphenous vein conduits. It is therefore somewhat surprising that efforts to improve vein graft patency have received such little attention. Studies have shown that antiplatelet agents improve vein graft patency,⁴ mechanical force damages vein graft integrity,⁵ storage solutions affect vein endothelia,⁶ and gene therapy has not been effective.⁷ Harvesting techniques have rarely been reported, except to detail minimally invasive endoscopic methods.

The report by Souza and colleagues⁸ in this issue of the *Journal* offers another approach that may move the needle toward improved CABG outcomes. The authors describe

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Central Message

A novel method of vein graft harvest for CABG shows potential for improved long-term patency, but further studies will be needed.

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a “no-touch” technique of vein harvesting that involves preserving a pedicle of surrounding tissue instead of stripping it off, avoiding any distention of the vein during preparation, leaving veins in situ until they are used, and avoiding the use of papaverine to reduce spasm. This group embarked on a randomized clinical trial comparing their method to a strategy of conventional harvesting (in which veins are stripped of surrounding tissue, distended, and stored in saline). Early results at 1.5 years and 8.5 years of follow-up have been previously reported,^{9,10} demonstrating superior patency in vein grafts harvested with the no-touch technique. The present report expands these observations out to 16 years and shows statistically superior results in vein grafts procured with this novel method.

These encouraging results come with several caveats. No-touch veins differed from the control group veins in several ways (ie, surrounding tissue, distention, and storage) and the relative contribution of each component is not established. Patients in each group had similar use of antiplatelet drugs, statin drugs, and diabetes medications at the time of study reporting, but similarity in the pattern of use of these drugs or the effectiveness of blood lipid or blood glucose control over the 16 years of study is difficult to ensure. No patients undergoing coronary endarterectomy were included in the most recent report. The technique may favor veins harvested from the thigh because patency rates

were higher in veins harvested from the thigh in the no-touch group, suggesting that greater external surrounding tissue is an important factor.

The study is limited by the small number of patients and by the fact that virtually all experience with this procedure came from a single surgeon. It remains to be seen whether these results can be duplicated by others. It will also be important to define whether the method results in a higher incidence of leg wound complications and whether the method can be performed in a minimally invasive manner, which seems to be preferred by many patients and surgeons today. An assessment of the effect of this technique on clinical outcomes (eg, freedom from recurrent angina, revascularization, and major adverse cardiac events) is needed. Finally, despite encouraging results, one must be cautious in suggesting that saphenous vein grafts can achieve outcomes that match those obtained with ITA grafting. In fact, evidence in support of expanded use of bilateral ITA grafts is increasing and surgeons should be encouraged to pursue this practice, particularly in younger patients.

The no-touch technique is intriguing and warrants further study. Because a multicenter randomized trial (SUPERIOR-SVG [[ClinicalTrials.gov](https://clinicaltrials.gov/ct2/show/study?term=NCT01047449) identifier: NCT01047449]) is now underway, we may get a better understanding of the merits of this method in the future. Perhaps the surgeons who originated this operation with vein grafts will be shown to have been on the right path all along.

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