Commentary: The race for the second best—The no-touch saphenous vein versus the radial artery

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Disclosures: Authors have nothing to disclose with regard to commercial support.

Received for publication Sept 26, 2019; revisions received Sept 26, 2019; accepted for publication Sept 26, 2019; available ahead of print Oct 9, 2019.

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J Thorac Cardiovasc Surg 2021;161:631-3

0022-5223/$36.00

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https://doi.org/10.1016/j.jtcvs.2019.09.130

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Central Message

In their single-center, randomized, controlled trial, Dreifaldt and colleagues investigated the long-term (8 years) patency of the no-touch saphenous vein graft compared with the radial artery. The findings of this study are very encouraging for the use of saphenous vein grafts, which remains one of the commonly utilized grafting conduits.

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Coronary artery bypass grafting (CABG) is the indicated revascularization strategy to improve survival in patients with advanced coronary artery disease.[1] The optimal grafting strategy in CABG, however, especially with respect to the second conduit, remains controversial.[2,3] In the last decade, evidence has been growing for the use of additional arterial grafting,[4-6] including the radial artery (RA).[4,5,7] Major societal guidelines in North America and Europe have supported the use of additional arterial grafting.[1,8,9]

Historically, one of the factors on which the search for alternate arterial conduits in CABG has been predicated is poor long-term saphenous vein graft (SVG) patency.[10] Approximately 10% to 20% of SVG conduits fail after 1 year, and 50% fail after 10 years[11] (compared with a 10-year patency rate of 90% for the internal thoracic artery).[2] In parallel with the search for alternative arterial conduits, the surgical community have also undertaken investigations to look for measures that can improve SVG patency. One such measure is a novel method of harvesting the SVG with a no-touch technique (NT-SVG), led by Souza and colleagues[12] from Sweden. Moreover, in a single-center, randomized, controlled trial (RCT) comparing NT-SVG conduits with conventionally harvested SVG conduits, this Swedish group has shown that NT-SVG conduits have superior early,[12] midterm,[13] and late[14] patencies to conventionally harvested SVG conduits. Aggregate data, including a multicenter trial, further supports superior patency of NT-SVG conduits to conventionally harvested SVG conduits.[15] Data comparing performance of NT-SVG conduits with that of other arterial conduits (not internal thoracic arterial conduits) is scarce.

In this issue of the *Journal*, Dreifaldt and colleagues[16] of the Swedish group report the 8-year patency results of a single-center RCT comparing the NT-SVG conduit with the RA conduit.[16] Early (36 months) patency results were reported in 2013.[17] More specifically, 108 patients with 3-vessel disease undergoing CABG with 1 NT-SVG conduit and 1 RA conduit underwent randomization; within-patient randomization was performed for the study grafts to be placed to either the left or right coronary artery territory. Sequential grafting was common, and all patients received a left internal thoracic artery graft to the left anterior descending coronary artery. At 8 years, 84 of 108 patients (78%) underwent a computed tomographic angiogram, which showed high and similar patency rates overall between the 2 conduits (NT-SVG, 86%; RA, 79%; $P = .22$). In an analysis at the level of anastomoses, the NT-SVG conduit demonstrated superior patency to the RA conduit (NT-SVG, 91%; RA, 81%; $P = .046$).

There are some important points to discuss about this article by Dreifaldt and colleagues.[16] First, the data are very encouraging with respect to the overall high patency rate of the NT-SVG conduit at 8 years, further corroborating the limited but consistent data supporting use of the NT-SVG conduit.[15] It is also postulated that arterial grafts are more resistant to atherosclerosis,[18] and as such, it is encouraging that overall the patencies at 8 years were similar between the NT-SVG and the RA conduits.

Second, this study also highlights some of the important properties that have been established about the performance of the RA as a conduit. In this trial, more than 60% of radial targets had less than 90% stenosis, with almost one-third of the RA conduits targeted to a vessel with less than 70% stenosis. Previous studies have shown that the RA has superior patency if grafted to a target vessel with a stenosis of 90% or more[4,19]; when targeted to vessels less than 90% stenosed, however, they are prone to spasm and eventual occlusion associated with competitive flow.[4,19] In the study of Dreifaldt and colleagues,[16] the patency of the NT-SVG conduits was high regardless of the severity of the target vessel stenosis, whereas a gradient in patency was observed for the RA conduits.

Another factor that may account for the lower RA patency in this study was the infrequent use of calcium-channel blockers (CCBs) in these patients (24% of patients received CCB therapy for hypertension). A recent meta-analysis by Gaudino and associates[20] of 6 RCTs involving the RA as a conduit showed that patients receiving CCB therapy had significantly less RA occlusion at 108 months (RA occlusion with CCBs of 14.3% vs 38.9% without CCBs; adjusted Cox hazard ratio, 0.20; $P < .001$), supporting the use of CCBs for at least 1 year after CABG. The same meta-analysis[20] also showed that CCB therapy was protective against major adverse cardiac events (adjusted Cox hazard ratio, 0.52; $P = .02$). The Society of Thoracic Surgeons practice guidelines state that it is reasonable to place RA grafts to targets with severe stenosis and support the use of pharmacotherapy to reduce perioperative graft spasm.[8]

Third, it has been shown that SVG conduits tend to have a lower patency than RA conduits in patients with diabetes.[21] The proportion of patients with diabetes in the study of Dreifaldt and colleagues[16] was only 19%, however, compared with other studies in which there were larger cohorts of patients with diabetes (25%-35%).[21,22] As such, the results in this study may not apply to patients with diabetes.

Overall, Dreifaldt and colleagues[16] are to be congratulated for undertaking this longitudinal RCT. In addition to having all the strengths of a RCT, the within-patient randomization further eliminates potential patient-level biases between the conduits, because every patient received both study conduits. The findings of this study are very encouraging for the NT-SVG technique, and relevant for the cardiac surgical community, because the SVG remains the most commonly used conduit in CABG.[23] As such, additional long-term studies are required to corroborate these findings. Furthermore, one of the limitations of NT-SVG harvesting is early leg wound infections.[15] To this end, given the popularity of endoscopic harvesting, future research incorporating a no-touch technique in endoscopic or other minimally invasive harvesting methods is needed.

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