SAPHENOUS VEIN GRAFT HARVESTING AND PATENCY: NO-TOUCH HARVESTING IS THE ANSWER

To the Editor:

In their recent reply to the Editor, “Saphenous vein graft harvesting and patency: still an unanswered question,”¹ Benedetto and Angelini clearly have reservations regarding the use of the no-touch technique of harvesting the saphenous vein (SV). Although they agree “every effort should be made to avoid SV damage and overdistension during harvesting,” they believe “the role of the no-touch technique and surrounding soft tissues still needs to be clarified.” Apart from comments regarding potential increased risk of surgical-site infection in the leg, their main concern appears to be related to the preparation of the SV in the “control/conventional” group that “underwent aggressive manual distension with saline at 300 mm Hg for 1 minute.” Clearly, many surgeons seem unaware of the alarmingly high pressures required to overcome spasm when distending the SV during coronary artery bypass grafting (CABG). The authors have described pressures in excess of 2000 mm Hg² when manually distending an SV with a syringe, so the use of 300 mm Hg is quite conservative in this regard. An excellent study published more than 2 decades ago³ showed that distension pressures in such situations reached 479.2 ± 27.5 , with authors subsequently describing the use of unregulated, manual distension pressures as high as 600 to 700 mm Hg.⁴

In previous publications, the Bristol group state that 50% of SV grafts used in CABG fail within 10 years when using conventional harvesting.⁵ It is noteworthy, therefore, that those patients in our 16-year follow-up receiving conventionally harvested SV grafts showed a patency of 64%⁶ despite being subjected to 300 mm Hg saline distension for 1 minute. Our previously published data may be pertinent regarding the comment, “whether the observed superior patency rate in the no-touch group was related to the presence of surrounding tissues or to the avoidance of overdistension.” We have described a protective role of the no-touch technique on the endothelium.⁷ First, as there is no direct handling of the SV by instruments, no spasm occurs and distension is not required; thus, the endothelium remains intact. Also, the surrounding tissue in no-touch SVs protects

FIGURE 1. Effect of distension on endothelial integrity in no-touch versus conventional SV grafts. Large portions of the adventitia (A) are removed in conventionally when compared with no-touch-harvested SV grafts. There is a marked thinning of the vessel wall in conventionally harvested/distended compared with other SV preparations caused by 300 mm Hg distension for 1 minute (modified from Dashwood et al⁷). Endothelial integrity (CD31 immunostaining) is reduced in conventional/distended (arrow indicates remaining endothelial cells) when compared with nondistended conventional, distended no-touch and nondistended no-touch SV. Western blot analysis of CD31 confirmed a significant reduction in conventional/distended versus all other SV segments (Dashwood et al⁷).

against distension-induced endothelial damage, where it acts as a buffer. There is marked endothelial denudation in conventional/distended SVs, whereas the endothelium of conventional SVs that are not distended is mainly preserved (Figure 1). If this occurs using 300 mm Hg distension pressure, it seems reasonable to assume that the surrounding cushion of tissue protects the endothelium against arterial hemodynamics once SV graft implantation is completed.

The technique of harvesting the SV without surrounding tissue and avoiding manual distension was tested in a randomized trial comparing this technique with both the conventional and the no-touch techniques.⁸ This group showed a patency of 86.2% after 1.5 years versus 88.9% for the conventional group and 95.4% for the no-touch group.

It is reassuring that the Bristol group shares our interest in the effect of pressure distension and no-touch soft tissue pedicle harvesting and we wait with interest the results of the 1-year follow-up study from this group.

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DISTENDED OR NOT DISTENDED? FAT OR NUDE SAPHENOUS VEIN? IN MEDIO STAT VIRTUS

Reply to the Editor:

In an editorial comment, Michael Jessen¹ argues that although most surgeons² are advocating the use of all arterial grafts for coronary artery bypass grafting, 70% of patients in the United States still

received at least 1 saphenous vein graft (SVG). In addition to the underuse of all arterial grafting, an SVG is considered a good option to graft the right coronary system, especially in case of target stenosis less than 80%³ and the bilateral internal thoracic artery is grafted to the left coronary system. Moreover, in elderly patients, the use of a single internal thoracic artery to the left anterior descending artery along with the SVG has been widely considered to achieve good outcomes.

Thus, along with Jessen,¹ we wonder why so few efforts have been made to improve SVG patency. In this scenario, the idea by Souza and coworkers^{4,5} to harvest the SVG with surrounding tissue looks appealing and promising. In fact, as brilliantly argued by the authors, with this harvesting technique there is no manipulation of the graft, preserving both adventitia and endothelium, and avoiding graft spasm. But if it is true that surrounding tissue acts as a buffer as demonstrated by Dashwood and colleagues,⁶ SVG distention, even at 300 mm Hg for 1 minute, can be dangerous for endothelial integrity.⁶ In fact, the same group evaluated the effect of graft distention on the luminal endothelium by CD31 staining. Even if conventional SVG harvesting with denudation and distention showed the highest degree of endothelium damage (4.66), veins with perivascular tissue (PVT) and distention (no-touch technique) showed CD31 staining (7.54) similar to veins without PVT and no distention (7.50), whereas veins with PVT without distention showed the lowest grade of damage (8.38). In the same study, this trend was confirmed by other analyses. Although PVT plays a protective role in the case of SVG distention, the latter is somewhat dangerous for vein endothelium and should be avoided, even in case of low pressure distention (300 mm Hg).

Finally, another issue to solve is where harvested SVG should be stored before grafting: saline solution, warm blood, or other solution. Some in vitro or animal studies are consistent in demonstrating the detrimental effects of saline on vascular endothelium and therefore graft patency, but there is no agreement to decree warm blood superior as a storage medium.⁷

We believe that the protective role of surrounding tissue in case of SVG harvesting is flawless and separated from the action of avoiding overdilation, but as in Latin, in medio stat virtus, that is, virtue stands in the middle. The best choice may be harvesting the SVG with the surrounding tissue to take advantage of its effect as a buffer, but connecting the SVG to the arterial cannula allows the vein to distend at the patient's own arterial pressure, as suggested by Angelini and coworkers.⁸

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