The no-touch saphenous vein graft in elderly coronary bypass patients with multiple comorbidities is a promising conduit to substitute the left internal thoracic artery

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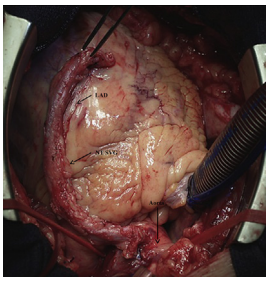
ABSTRACT

Objectives: We investigated the patency rates of no-touch saphenous vein grafts anastomosed to the left anterior descending artery compared with the left internal thoracic artery. Further, we compared the patency of no-touch vein grafts to the left anterior descending artery with the patency of no-touch vein grafts to other coronary arteries.

Methods: Of 2635 consecutive patients undergoing coronary artery bypass grafting between 2003 and 2008, 168 (6.3%) were given at least a saphenous vein graft to the left anterior descending artery to avoid harvesting complications in high-risk patients or in response to a left internal thoracic artery injury. A total of 97 patients were consecutively included after informed consent. A clinical examination and computed tomography angiography were performed on 91 patients at a mean of 6 (4-9) years.

Results: The mean age of patients was 75.6 ± 8.5 years. Postoperatively, 88.7% of patients (86/97) were free of angina. The 91 examined patients had 163 grafts with 286 distal anastomoses. Crude patency, according to distal anastomoses, was 94.4% (270/286). The patency of single versus sequential no-touch vein grafts to the left anterior descending artery was 98% (50/51) versus 92.5% (37/40). The total patency rate was 95.6% (87/91), similar to the reported patency rate for the left internal thoracic artery. The no-touch grafts to the left anterior descending artery versus other coronaries had a patency of 95.6% (87/91) versus 93.8% (183/195), a high similarity confirmed by an equivalence analysis.

Conclusions: In elderly coronary bypass patients with multiple comorbidities, a no-touch saphenous vein graft is a promising substitute for the left internal thoracic artery. (J Thorac Cardiovasc Surg 2017;154:457-66)



An NT SVG to the LAD.

Central Message

In elderly coronary bypass patients with multiple comorbidities, the NT SVG is a promising substitute for the LITA.

Perspective

The NT SVG harvesting technique was demonstrated to be an effective approach in prevention of late vein graft failure. The NT SVG should be included in the arsenal of conduits in CABG.

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Ischemic heart disease is currently the leading cause of death globally and is expected to account for 14.2% of all deaths by 2030.[1] Coronary artery bypass grafting (CABG) is among the most common operations performed in the world[2] and is the best treatment for advanced ischemic heart disease.[3-5]

Graft patency in CABG is a major determinant of clinical prognosis, measured by reoperation rates and long-term survival.[6] The decision on what conduit to use to bypass the left anterior descending (LAD) artery is a settled issue.[3,4,7] Since the definitive article by Loop and colleagues[8] in 1986, surgeons have strived to use a left internal thoracic

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Abbreviations and Acronyms

CABG	= coronary artery bypass grafting
CI	= confidence interval
COPD	= chronic obstructive pulmonary disease
CTA	= computed tomography angiography
euroSCORE	= European System for Cardiac Operative Risk Evaluation
LAD	= left anterior descending
LITA	= left internal thoracic artery
NT	= no-touch
SVG	= saphenous vein graft

Scanning this QR code will take you to supplemental tables and video for this article.

artery (LITA) to bypass the LAD to capture the benefits of greater patency than achieved with conventional saphenous vein grafts (SVGs), and thus improve survival. Since the LITA as a conduit choice for the LAD was made a quality issue by the Society of Thoracic Surgeons, LITA use in the United States has increased, from 87.7% in 2000 to 94.7% in 2009.[9] However, given that CABG is a common operation, the 5.3% of patients who do not receive a LITA are a large number of patients.

There is still discussion about the best choice of conduit for the LAD when a LITA is injured during harvesting or when a surgeon wants to avoid LITA harvesting because of severe frailty, obesity, chronic obstructive pulmonary disease (COPD), intermediate LAD stenosis, or other reasons that place the patient in a particularly high-risk category. In these situations, multiple other conduits are available, such as the radial artery or the right internal thoracic artery, yet none are ideal, and their use sometimes presents difficult technical challenges.

An improved saphenous vein conduit might simplify a complex CABG procedure and would be valuable if the patency was similar to that of the LITA. A conventional harvest causes severe saphenous vein trauma. When SVGs are stripped from the surrounding tissue, spasm is induced, which is overcome by dilatation with normal saline or blood. Mechanical dilatation and suboptimal preservation solution cause vessel wall damage[10] and may explain the higher incidence of early graft occlusion, progressive intimal hyperplasia, atherosclerosis, and late graft occlusion seen in conventional SVGs.[11]

Since the beginning of the 1990s, we have been using a technique for SVG preparation whereby the vein is harvested with a pedicle of surrounding tissue intact and no dilatation is used, called the ''no-touch [NT] technique'' (Video 1).[12] This technique provides a superior patency rate,[13-15] preserved left ventricular function,[16] and a better clinical outcome[17] compared with conventional harvesting, in both the short and the long term. Above all, in a previous study by our group, the NT SVG patency to non-LAD targets was comparable to that of LITA to LAD at a mean time of 16 years postoperatively.[15] With this experience, it seemed reasonable to assume that the NT SVG would achieve an equal, if not greater, patency rate if anastomosed to the LAD.

The primary aim of the present study was to document the patency rates and clinical outcomes in patients with NT SVGs placed to the LAD at a mean of 6 years postoperatively. The secondary aim was to compare the patency of the NT vein grafts placed to the LAD with that of NT vein grafts placed to non-LAD territories.

MATERIALS AND METHODS

Study Design

In this observational cohort study,[18] 2635 consecutive patients who had undergone CABG between 2003 and 2008 were screened for eligibility. A total of 168 patients were consecutively identified as having received an SVG to the LAD (Figure 1) and having been operated at the Department of Cardiothoracic and Vascular Surgery, Örebro University Hospital, Örebro, Sweden. Our local registry and patient files were used to identify this group. Baseline data were retrieved retrospectively from our local registry. The follow-up was performed at a mean of 6 years postoperatively. The study was approved by the Regional Ethical Review Board in Uppsala. Patients were included at follow-up after informed consent had been obtained.

All surviving patients who had received an NT SVG, as a single or a sequential graft, to the LAD were offered a clinical assessment and a computed tomography angiography (CTA). Exclusion criteria were allergy to contrast media, impaired renal function, or inability to participate in the study according to protocol. A total of 97 patients were enrolled in the

VIDEO 1. Surgical notes on the NT SVG harvesting technique in CABG. Video available at: http://www.jtcvsonline.org/article/S0022-5223(17)30558-5/addons.