Unilateral Vineberg Arterial Graft With a Patency of 30 Years

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A 65-year-old patient with severe 3-vessel coronary artery disease was admitted to our institution in October 1999 with increasing angina and dyspnea despite intensive medical therapy. After 2 myocardial infarctions at the age of 34 years, he had undergone a Vineberg operation on October 14, 1969, with implantation of the left internal thoracic artery (ITA) into the anterior wall of the left ventricle without a vascular anastomosis. During this operation, the artery, after distal ligation, was perforated artificially and then implanted into a tunnel 3 cm long and parallel to the left anterior descending coronary artery (LAD). The operative course was uneventful, and for almost 30 years the patient was free of complaint.

Three months before his current admission, he experienced recurrent angina. Coronary angiography revealed severe 3-vessel disease with proximal occlusion of the LAD. The distal LAD was perfused by the implanted left ITA via numerous collaterals (Figure 1). We performed a repeat coronary bypass operation. Special care was taken during sternotomy and dissection of adhesions not to damage the Vineberg graft. The proximal ITA before it entered the myocardium was completely dissected free (Figure 2). Using cardiopulmonary bypass and cardioplegic cardiac arrest, we anastomosed 2 saphenous vein grafts to the distal LAD and the proximal posterior descending branch of the right coronary artery. There were no suitable target vessels among the branches of the circumflex artery. The postoperative course was completely uneventful, and the patient was discharged home free of angina 14 days later.

In 1945, the Canadian surgeon Arthur Vineberg undertook experiments in dogs in which he dissected the ITA free from the chest wall and, after ligation of its distal end, pulled it into a tunnel created in the superficial myocardium. The hope was that the vessel would arborize and develop communications with the native myocardial vasculature. This operative procedure and its numerous variations are known as the Vineberg operation. Vineberg performed the first implantation operation on a human in 1950.1 During the following 2 decades, the procedure became established as an indirect revascularization method for the treatment of coronary artery disease, and it is estimated that between 1950 and 1975, 10 000 to 20 000 Vineberg operations were undertaken worldwide.

Initially, the Vineberg procedure received little support among surgeons until after the development of coronary angiography, when Effler and coworkers2 demonstrated angiographically the flow of contrast media through an implanted ITA into the surrounding coronary arteries.

The perioperative mortality after Vineberg procedures was much higher than that today with coronary artery bypass operations. However, after 7 to 10 years, Ochsner and coworkers3 found 77% of the grafts to be patent, with 42% filling a major coronary artery. After exclusion of patients who were operated on in the early years of the Vineberg operation, when coronary angiography was not yet available for patient selection, the 7-year patency rate in Ochsner’s series was as high as 95%. With the development of coronary artery bypass grafting in the late 1960s, this method became obsolete, and the ITA is now used exclusively as a graft for direct anastomosis. From today’s point of view, it is to Vineberg’s credit that he recognized the value of the ITA for myocardial revascularization.

The observation of collaterals joining large coronary arteries from within a blunt myocardial tunnel appears to prove the existence of “sinusoids” within the human, ie, mammalian, heart and their usefulness for myocardial perfusion, which is the theoretical basis of all methods of “indirect” revascularization, including transmyocardial laser revascularization.

References

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Figure 1. Visualization of distal LAD via collaterals after contrast medium injection into left ITA.

Figure 2. Intraoperative view of dissected ITA pedicle.
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