

Saphenous Vein to Internal Mammary Artery End-to-end Composite Grafts for Coronary Artery Bypass. Late Follow-up



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Received 6 August 2014; received in revised form 13 September 2014; accepted 22 September 2014; online published-ahead-of-print 30 September 2014

Background

Internal mammary artery (IMA) grafts provide equal or superior graft patency compared to other conduits. The IMA length limits extensive myocardial revascularisation with IMA grafts alone. This study aimed to determine the results of lengthening free IMAs with a short proximal segment of saphenous vein (SV) to enable more extensive myocardial revascularisation.

Methods

Patients (n = 92) who underwent end-to-end composite SV-IMA grafts were followed up through cardiology and death register databases.

Results

The mean patient age was 57.5 years and median follow up 10.9 years. There was no perioperative mortality and 10-year survival was 89.6%. Thirty-one patients (34%) underwent repeat angiography at a median of 2.8 years postoperatively. The 10-year freedom from angiography showing SV segment occlusion was 89% with a median time to angiography of 2.3 years (nine patients). The number of distal anastomoses was the only independent predictor of SV segment occlusion HR per anastomosis = 0.26 (p = 0.01). In five sequential grafts to the circumflex and right coronary systems, the IMA portion of the graft remained patent following SV segment occlusion.

Conclusions

Graft patency is improved by a greater number of coronary artery anastomoses.

Keywords

Ischaemic heart disease • Coronary artery bypass surgery • Internal mammary artery • Saphenous vein • Coronary angiography • Composite graft

Introduction

The benefits of a left IMA graft to the left anterior descending coronary artery (LAD) have been widely reported. The benefits of adding a right IMA graft to the non-LAD territories have also been described [1,2]. Composite IMA grafts allow more extensive myocardial revascularisation with IMAs with an associated theoretical benefit. Early and late results of end-to-end (tandem) and end-to-side (T configuration) composite IMA grafts were reported by Tector *et al*, [3], with similar

outcomes for both. Composite tandem arterial grafts using the radial artery with inflow from the in situ right IMA have also been described with excellent short-term results [4,5]. This might seem to be an extravagant use of arterial conduit for a benefit not yet determined but it substantially increases the versatility of arterial grafting in coronary surgery. There have been no reported outcomes of composite tandem SV-IMA grafts although the use of a SV graft hood or aortic vein patch has been recommended for proximal anastomoses of free IMA grafts [6,7]. In theory, the durability of the

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composite conduit will be limited by the occurrence of atherosclerosis in the SV segment of the composite graft and so the benefit of the arterial conduit might be lost. However, short segments of SV, particularly segments without valves, may be relatively resistant to SV graft atherosclerosis [8], and might also be readily treated by angioplasty and stenting if necessary. A composite SV-IMA graft from the aorta can revascularise the circumflex and right coronary arteries and for non-LAD double vessel disease it preserves the left IMA for later use if required. There is limited information on the incidence of development of significant LAD disease after coronary surgery for non-LAD double vessel disease [9] such that surgeons might tailor the surgery for double vessel disease to account for a later need to revascularise the LAD.

Methods

All patients under the care of a single surgeon (HSP) who underwent SV-IMA end-to-end composite grafts were identified from a cardiac surgical database of prospectively collected data. Operation reports were retrieved for acquisition

of data regarding coronary artery and bypass graft quality and size. Late follow-up was obtained by cross-matching patient data against hospital and cardiology databases in western Sydney and against the New South Wales Register of Births, Deaths and Marriages which is linked to death registers in other states. This method of database follow-up has been shown to achieve over 99% follow-up accuracy [10]. The project was approved by Western Sydney Local Health District Human Research Ethics Committee.

Surgery

All procedures were performed through a midline sternotomy with harvesting of IMAs by a semi-skeletonising technique [11]. The right IMA was used for the composite graft in all but six patients. The SV was harvested from the ankle through a longitudinal incision or from the upper thigh through a transverse incision. Only one patient underwent off-pump surgery. Cardiopulmonary bypass with intermittent blood cardioplegia was used in all others.

When the use of a SV-IMA composite graft was planned preoperatively, the free composite graft was prepared synchronously with the institution of cardiopulmonary bypass.

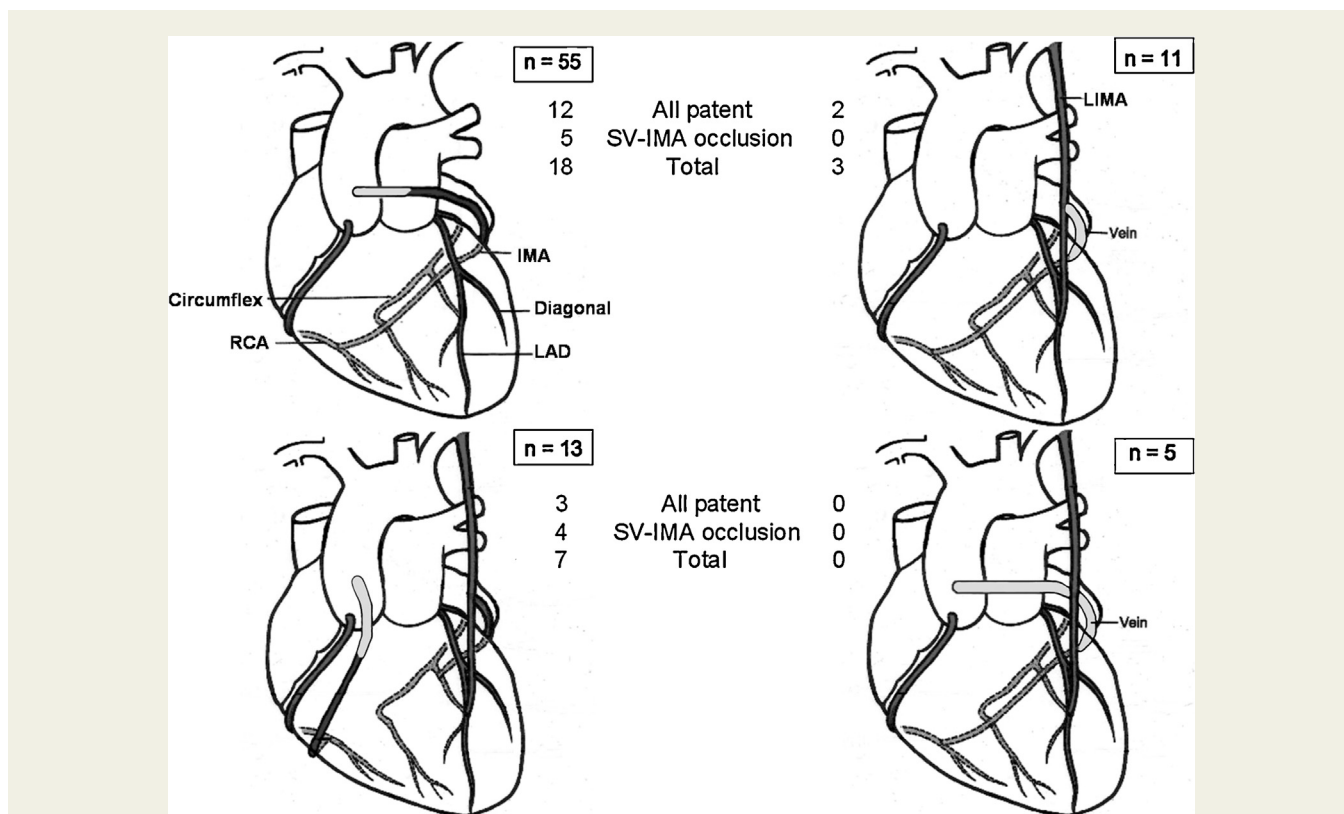


Figure 1 The 4 most common graft configurations are shown along with the number of angiograms performed in each group, identifying numbers with all grafts patent, occlusion of the proximal segment of the SV-IMA graft, and the total number of angiograms. The 2 configurations on the right represent group 3 as described in the methods, where the right IMA was too short to complete a bilateral IMA Y graft configuration.

RCA = right coronary artery, LAD = left anterior descending artery, LIMA = left IMA.

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