

# Patency of Saphenous Vein Coronary Artery Bypass Grafts from the Vascular Prosthesis of the Ascending Aorta

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**Background:** Patients who have Stanford type A aortic dissection with impaired coronary arteries or who have aneurysms from the ascending aorta to the aortic arch with coronary artery disease need coronary artery bypass grafting (CABG) with tube graft replacement of the ascending aorta simultaneously. When vein grafts are used for CABG in these patients, the proximal anastomoses of vein grafts are attached to the prosthetic tube graft of the ascending aorta. However, the validity of proximal anastomoses of vein grafts to the prosthetic tube graft of the ascending aorta has not been confirmed.

**Patients and Methods:** We retrospectively analyzed patients who underwent venous coronary bypass grafting with prosthetic graft replacement of the ascending aorta. Between January 1984 and October 2002, 35 patients underwent CABG using saphenous vein grafts at the time of tube graft replacement of the ascending aorta, and the proximal anastomoses of the vein grafts were attached to the tube graft of the ascending aorta. Thirty-three venous bypass grafts were analyzed in 24 survivors.

**Results:** The postoperative catheterization showed only one early vein graft occlusion of 16 vein grafts anastomosed distally to the left anterior descending artery (LAD). All 14 venous grafts anastomosed to the right coronary artery (RCA) and 3 to the left circumflex artery (LCX) were patent. Therefore, the postoperative patency rate at discharge was 97.0% (32/33). Spiral computed tomography performed for long term follow-up revealed occlusion of two vein grafts (3.5 years and 9.7 years) anastomosed to the LAD.

**Conclusions:** The patency rate of vein grafts anastomosed from prosthetic grafts of the ascending aorta to the native coronary arteries was similar to that of conventional CABG using saphenous vein grafts. (*Ann Thorac Cardiovasc Surg* 2003; 9: 170–3)

**Key words:** CABG, vein graft, graft patency, vascular prosthesis, spiral computed tomography

## Introduction

When coronary artery disease coexists with ascending thoracic aortic disease, coronary artery bypass grafting

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(CABG) and tube graft replacement of the ascending aorta should be performed simultaneously. When vein grafts have been used for CABG in these patients, the proximal anastomosis of vein grafts were attached to the prosthetic tube graft of the ascending aorta.<sup>1,2)</sup> However, the validity of proximal anastomoses of vein grafts to the prosthetic tube graft of the ascending aorta has not been confirmed. Therefore, we retrospectively analyzed patients who underwent venous coronary bypass grafting with prosthetic graft replacement of the ascending aorta.

**Table 1. Baseline patient characteristics**

Number of patients	24	
Mean age (years)	65.0±13.9	
Sex	Male 13	Female 11
Clinical diagnosis	Aortic dissection	12
	Aortic arch aneurysm	9
	Annuloaortic ectasia	2
	False aneurysm of the ascending aorta	1
Operation	Replacement of ascending-transverse arch	14
	Replacement of ascending aorta	6
	Root replacement	3
	Root replacement + MVR	1

MVR, mitral valve replacement.

**Table 2. Venous grafts**

Number of patients		
	Single graft	17
	2 grafts	5
	3 grafts	2
	Total	24
Location of grafts		
	RCA	14
	LAD	16*
	LCX	3
	Total	33

\*: early occlusion 1, late occlusion 2

RCA, right coronary artery; LAD, left anterior descending artery; LCX, left circumflex artery.

## Patients and Methods

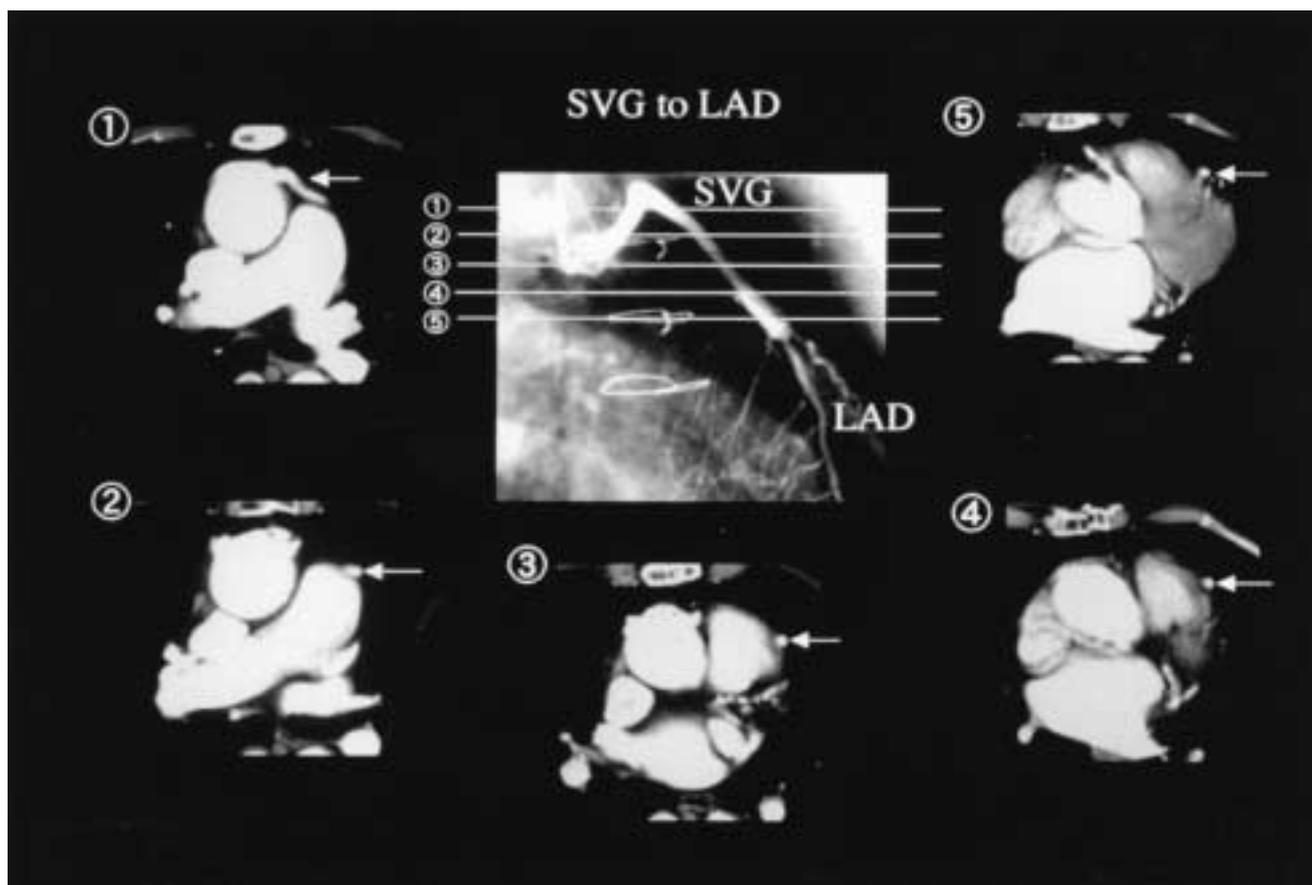
Between January 1984 and October 2002, 35 patients underwent CABG using saphenous vein grafts and proximal anastomoses of vein grafts were attached to the prosthetic tube grafts of the ascending aorta. Twenty-four out of 35 patients survived and were discharged. Therefore, these 24 patients were examined. Clinical characteristics of the study population are summarized in Table 1. The clinical diagnoses of the patients were as follows: Stanford type A aortic dissection, 12; true aneurysm of the aortic arch, 9; annuloaortic ectasia, 2; false aneurysm of the ascending aorta because of tuberculosis, 1. Various operations were performed in these patients (Table 1) and the ascending aorta was replaced with a prosthetic tube graft in all patients. The distal vein graft anastomoses were made with continuous 7-0 polypropylene suture and the

proximal anastomoses were made to the tube graft of the ascending aorta with continuous 6-0 polypropylene suture. The number and distal anastomosis sites of vein grafts are summarized in Table 2.

We retrospectively analyzed the vein graft patency of 24 discharged patients. Postoperative early graft patency was evaluated by coronary angiography and the late graft patency was evaluated by enhanced spiral computed tomography (CT). Coronary angiography was performed and confirmed the patency in the two late occluded cases.

## Results

The mean follow-up duration of 24 survivors was 4.9±2.8 years, ranging from 0.5 to 10.7 years. All survivors were free from angina attacks and myocardial infarction during the follow-up period. No patients showed any ST-T



**Fig. 1.** Spiral computed tomography. Number of each slice corresponds to that of angiography. Arrows indicate saphenous vein graft. SVG, saphenous vein graft; LAD, left anterior descending artery.

changes or new Q waves on an electrocardiography.

Thirty-three venous bypass grafts were analyzed in 24 survivors (Table 2). Postoperative catheterization showed only one occlusion out of 16 vein grafts anastomosed distally to the left anterior descending artery (LAD). All 14 vein grafts anastomosed to the right coronary artery (RCA) and 3 to the left circumflex artery (LCX) were patent. Therefore, the postoperative patency rate was 97.0% (32/33). Spiral CT was performed for the long-term follow-up of patency and revealed occlusion of two vein grafts anastomosed to the LAD at 3.5 and 9.7 years postoperatively. Coronary angiography was performed in these two patients and confirmed the graft occlusion. The identification of patent saphenous vein grafts was very easy using enhanced spiral CT. Therefore, it is a very effective and accurate approach for assessing vein graft patency (Fig. 1). The postoperative patency rate was 90.9% (30/33).

## Discussion

We retrospectively analyzed the patency of venous grafts from the prosthetic tube graft at the ascending aorta to the native coronary arteries. Postoperative catheterization performed in 24 survivors showed occlusion of one vein graft anastomosed distally to the LAD. Therefore, the early graft patency rate was 97.0% at discharge. Spiral CT revealed occlusion of two vein grafts anastomosed distally to the LAD at 3.5 and 9.7 years after operation. Therefore, the late graft patency rate was 90.9% (at  $4.9 \pm 2.8$  years). According to the previous reports, the postoperative vein graft patency rate of CABG performed in the usual manner was 85-98% at an early stage after surgery, 80-94% at 1 year, and 80-93% at 3 years after surgery, respectively.<sup>3-6</sup> The patency rate of the vein grafts anastomosed proximally to the prosthetic tube grafts was similar to that of conventional CABG using saphenous vein grafts.

In this study, the graft patency was analyzed using spiral CT. The identification of patent saphenous vein grafts was not difficult. However, the determination of vein graft diseases, such as stenotic change, was difficult. Engelmann et al.<sup>7)</sup> reported that spiral CT is a highly accurate approach for assessing not only saphenous vein graft patency but also internal thoracic artery (ITA) graft patency. According to their data, sensitivity, specificity, and accuracy were 89%, 83%, and 88% for ITA grafts, and 94%, 100%, and 96% for saphenous vein grafts, respectively. Spiral CT is a reliable and noninvasive approach for determining the patency of saphenous vein grafts.

## Conclusions

The graft patency of the saphenous vein grafts proximally anastomosed to the prosthetic tube graft of the ascending aorta was analyzed. The early vein graft patency rate was 97.0% and the late vein graft patency rate was 90.9%. The vein graft patency rate for grafts attached to the prosthetic tube graft was similar to that of conventional CABG using saphenous vein grafts.

Spiral computed tomography was an effective approach for determining the patency of saphenous vein grafts.

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