Saphenous vein graft marker and coronary artery bypass graft stenosis in a patient 19 years after coronary artery bypass surgery

Murat Ugurlucan[1], Turkan Tansel[1], Sabahattin Umman[2], Faruk Erzengin[2], Mehmet R. Calay[3], Ertan Onursal[1]

[1]Istanbul Medical Faculty, Cardiovascular Surgery Department, Istanbul, Turkey
[2]Istanbul Medical Faculty, Cardiology Department, Istanbul, Turkey
[3]CORMED Radiology Centre, Istanbul, Turkey

Submitted: 6 September 2007
Accepted: 15 November 2007

Arch Med Sci 2007; 3, 4: 399-401

Corresponding author:
Murat Ugurlucan, MD
Bozkurt Caddesi, No. 110-112
Benli Apt., Daire 6
80250 Kurtulus/Istanbul
Turkey
Phone: + 49 174 380 54 52
Fax: + 49 381 494 62 14
E-mail:
muratugurlucan@yahoo.com

Abstract

The saphenous vein is one of the most commonly used conduits during coronary artery bypass grafting. Saphenous vein graft markers have been introduced to facilitate coronary angiography procedures in the follow-up of patients with ischaemic heart disease. However, today these markers have only a historical aspect. This report presents a 61-year-old patient who had undergone coronary artery bypass grafting 19 years ago. A saphenous vein graft marker had been used during the operation, and there was stenosis formation at the patent vein graft coincidentally where the graft overlapped the marker.

Key words: coronary atherosclerosis, coronary artery bypass grafting, saphenous vein, grafts, marker.

Introduction

Coronary artery disease is the leading cause of death throughout the world. Coronary artery bypass grafting (CABG) has been shown to be the most effective way of relieving symptoms of patients with ischaemic heart disease [1, 2]. Use of the saphenous vein as a graft during CABG was first accomplished by Favaloro in 1967 [3] and since then, it has been one of the most commonly used conduits during bypass surgery.

In the early 1970s, saphenous vein graft (SVG) markers were introduced to facilitate post-CABG coronary angiographies [4]. Eisenhauer et al. [5] showed that marked grafts were easily identified during subsequent angiographies. The marked grafts also used lower contrast media and reduced the time for radiation exposure. However, these markers have lost their popularity during CABG.

Saphenous vein graft markers were routinely used during CABG procedures in our institution between 1987 and 1989 by one of the senior surgeons. In this report, we present a patent bifurcated SVG 19 years after CABG. There was stenosis formation at the proximal segment of the graft and it was coincidentally where it overlapped the marker.

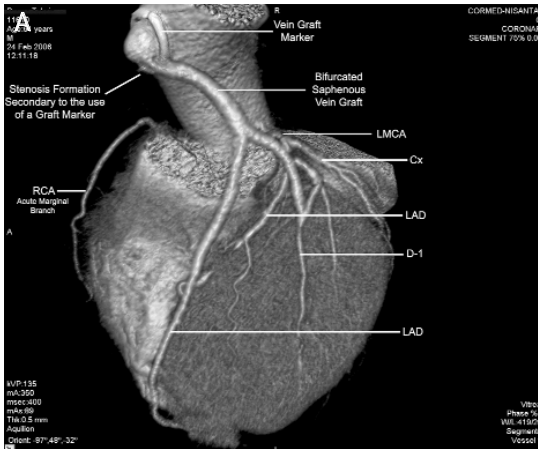

Figure 1A. Multi-slice CT angiography demonstrating CABG procedure, coronary artery anatomy, vein graft marker and stenosis (LMCA – left main coronary artery, LAD – left anterior descending coronary artery, D-1 – first diagonal coronary artery, Cx – circumflex coronary artery, RCA – right coronary artery)

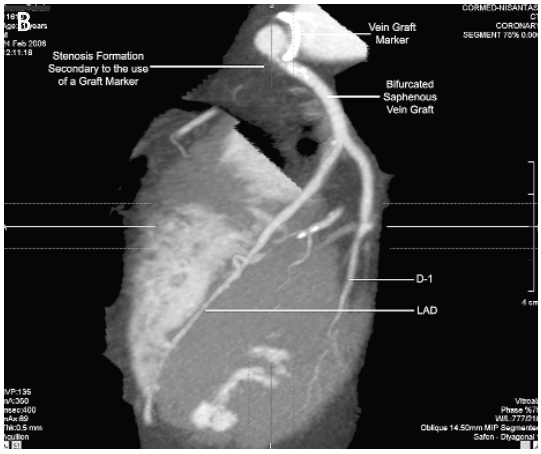

Figure 1B. Multi-slice CT angiography demonstrating the coronary artery bypass grafting procedure, vein graft marker and graft stenosis (LAD – left anterior descending coronary artery, D-1 – first diagonal coronary artery)

Case report

The patient was a 61-year-old male who presented with angina pectoris 19 years after CABG. His exercise capacity was NYHA Class II. At the age of 42 years, he had presented with compressive chest pain radiating to the back and left arm at rest. He had been diagnosed with unstable angina pectoris, and the angiography conducted at the time revealed a critical occlusive lesion in the left anterior descending coronary artery (LAD). Thus, he had undergone emergent CABG in our institution. The intervention included distal anastomoses on the LAD and first diagonal coronary artery with a bifurcated SVG, and the proximal end of the SVG had been anastomosed to the ascending aorta. An SVG marker (A/C LOCATOR graft marker, SCANLAN Graft Markers, USA) had been implanted into the ascending aorta around the proximal SVG anastomosis. He had been asymptomatic for one year until when he started to feel dyspnoea and chest pain on exertion that had progressed in the past three months. Exercise electrocardiography was positive for myocardial ischaemia in the anterolateral regions of the heart. 64-slice CT angiography of the coronary artery revealed 80% stenosis in the proximal segment of the SVG where it overlapped the SVG marker (Figure 1A, 1B, 2A). Balloon angioplasty and stent implantation were considered for the treatment and on an elective

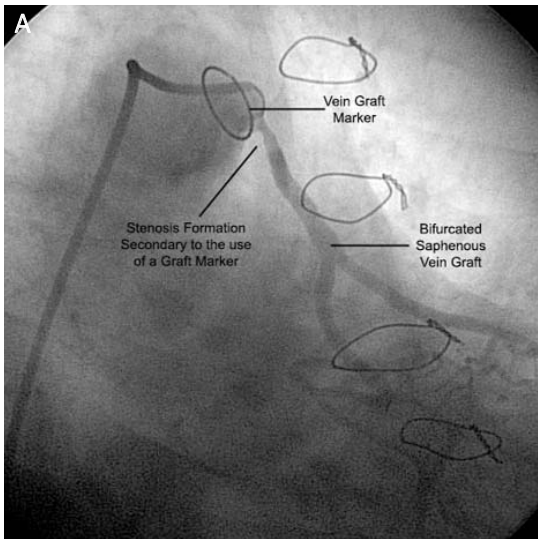

Figure 2A. Coronary angiography showing the coronary artery bypass grafting, the left main system coronary artery anatomy, vein graft marker, and graft stenosis

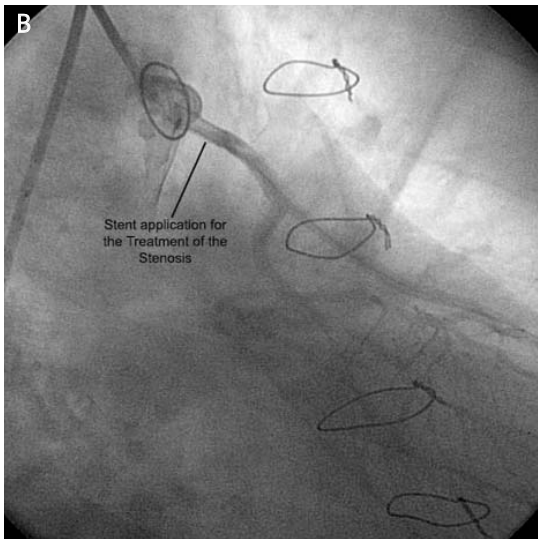

Figure 2B. Relief of the graft stenosis after balloon angioplasty and stent implantation

basis, the stenotic region of the SVG was dilated successfully with a 3.5×16 mm JO coronary stent (Figure 2B).

Discussion

CABG operation is the most efficient method of treatment for patients with ischaemic heart disease in the current era [1, 2]. Although both arterial and venous grafts can be utilized during CABG, autologous SVG is one of the most commonly used conduits since its first proposal at Cleveland Clinic in 1967 by Favaloro [3]. Vein grafts possess a remarkably higher stenosis rate when compared to the arterial conduits. Atherosclerosis and degenerative changes occur at least in 50% of the venous grafts in five years following CABG [6]. Thus, regular follow-up of patients after CABG by conventional coronary angiography or by recent radiological methods such as multislice CT angiography is mandatory. Today, conventional angiography is the gold standard method to evaluate the coronary arteries and the status of the bypass conduits with its major advantage of immediate direct intervention to the diseased vessels. However, conventional coronary angiography may become imperative especially in occluded grafts.

Graft markers implanted into the ascending aorta around the bypass grafts were introduced in the 1970s. They precisely point to the proximal anastomosis region of the bypass conduits. In various studies, the advantages of these markers have been clearly presented [4, 5, 7-9]. They lower the morbidity of cardiac catheterization in patients with a history of CABG. They indicate the number and location of the aorto-vein anastomoses, facilitate emergent coronary angiography, shorten the catheterization duration and exposure to radiation, decrease the amount of contrast usage and thus contrast-related complications, and reduce unnecessary probing and thromboembolic complications [4, 5]. Eisenhauer et al. [7], in their retrospective review, investigated the effect of graft markers on subsequent graft patency, and they showed that there was no increased risk of graft occlusion in patients who received graft markers during CAGB when compared to the ones without a marker. However, these markers lacked broad use in time, and today they only have a historical place in the cardiac surgery field.

The tendency of surgeons in the late 1980s in our institution, as well as the requests of the cardiologists performing the angiographies, was for the use of these markers. They were routinely used for a short period in our institution. Interestingly, the SVG of one of our patients is still patent even 19 years after the CABG. The SVG, SVG marker, previous coronary artery lesions, and the stenosis in the SVG were demonstrated by 64-slice CT angiography and the patient was treated with angioplasty and stenting.

In conclusions, although SVG markers have a historical use during CABG, at the time of their popularity they facilitated the follow-up of patients. This is one of the rare reports briefly reviewing the use of graft markers with a case presentation, in which a saphenous vein graft had been patent for 19 years and the patient presented with coincidental stenosis formation in the graft where it overlapped the marker and was treated successfully.

Acknowledgments

The authors would like to thank Ms. Safak Ugur and Ms. Toni Spring for their valuable contribution in linguistic revision of the manuscript.

References

1. Tunstall-Pedoe H, Kuulasmaa K, Amouyel P, Arveiler D, Rajakangas AM, Pajak A. Myocardial infarction and coronary deaths in the World Health Organization MONICA Project. Registration procedures, event rates, and case-fatality rates in 38 populations from 21 countries in four continents. Circulation 1994; 90: 583-612.
2. Rusiecka E, Banach M, Drozdz J. The cardiologists' dream may come true – vascular therapy. Arch Med Sci 2005; 1: 187-94.
3. Favalaro RG. Saphenous vein autograft replacement of severe segmental coronary artery occlusions: operative technique. Ann Thorac Surg 1968; 5: 334-9.
4. Peterson LR, McKenzie CR, Ludbrook PA, et al. Value of saphenous vein graft markers during subsequent diagnostic cardiac catheterization. Ann Thorac Surg 1999; 68: 2263-6.
5. Eisenhauer MD, Collier E 3rd, Eisenhauer TL, Cambier PA. Beneficial impact of aorto-coronary graft markers on post-operative angiography. Cathet Cardiovasc Diagn 1997; 40: 249-53.
6. Campeau L, Enjalbert M, Lesperance J, et al. The relation of risk factors to the development of atherosclerosis in saphenous-vein bypass grafts and the progression of disease in the native circulation: a study 10 years after aortocoronary bypass surgery. N Engl J Med 1984; 311: 1329-32.
7. Eisenhauer MD, Malik JA, Coyle LC, Arendt MA. Impact of aorto-coronary graft markers on subsequent graft patency: a retrospective review. Cathet Cardiovasc Diagn 1997; 42: 259-61.
8. Clark DA. Circumferential aorto-coronary graft markers – no more debate! Cath Cardiovasc Diagn 1997; 40: 254.
9. Cikirikcioğlu M, Ozbay G, Duran E. Proximal anastomotic marker use in coronary artery bypass operations [Turkish]. Anadolu Kardiyol Derg 2002; 2: 138-41.