Acute thrombosis of the left internal mammary artery graft 14 years after coronary bypass surgery

Şükrü Akyüz, Tuğba Kemaloğlu Öz, Nihat Özer
Department of Cardiology, Siyami Ersek Cardiovascular and Thoracic Surgery Center; İstanbul-*Turkey*

Introduction

Causes for stenosis of the left internal mammary artery (LIMA) graft are flow competition from the native vessel, narrowing at the anastomotic sites, atherosclerosis, fixed kinks within the graft, smooth tubular stenosis, dissection, and spasm (1, 2). Acute thrombosis of the LIMA, however, is rare and usually presents in the *early* post-operative period due to inadequate anti-thrombotic treatment or incompetent surgical technique (3-5). In this report, we represent a case of acute thrombotic occlusion of the LIMA, 14 years after coronary artery bypass grafting surgery (CABG), presenting with acute myocardial infarction (AMI), and managed with primary percutaneous coronary intervention (PCI).

Case Report

A 55 year-old man was admitted to the emergency department with a severe chest pain of 4 h duration. Clinical examination was unremarkable. Electrocardiogram showed left bundle branch block (LBBB) that was presumed to be new (Fig. 1). Fourteen years ago, he had undergone two-vessel CABG with LIMA graft to the left anterior descending artery (LAD) and saphenous vein graft (SVG) from the aorta to the posterior descending artery. Emergent coronary angiography revealed proximal chronic total occlusion of the LAD and the right coronary artery, and critical diffuse stenosis of the circumflex artery (Fig. 2, and Video 1. See correspondening video/movie images at www.anakarder.com). The SVG was patent but the LIMA was occluded with fresh thrombus at distal anastomotic site (Video 2. See correspondening video/movie images at www.anakarder.com). Since the native vessel, LAD was considered unsuitable for PCI due to its chronicity and long length, the LIMA was approached by a 6F guide catheter via the right femoral access. The lesion was successfully crossed with a floppy guide-wire after administering a bolus of 5000 U intravenous heparin, and was pre-dilated with a 2.0x12 mm balloon catheter up to 12 atm. After achieving adequate coronary blood flow; a 2.5x24 mm drug-eluting stent (Coracto®, Alvimedica, Turkey) covering the distal LIMA and extending into the LAD across the anastomotic site was successfully implanted at 14 atm (Video 3. See correspondening video/movie images at www.anakarder.com). Normal coronary flow was established with diminution of chest pain however, a small amount of thrombus embolized into the distal circulation (Video 4. See correspondening video/movie images at www.anakarder.com). Manual thrombus aspiration for this embolus was not performed because of small caliber of the vessel and its very distal location. Bail-out glycoprotein IIb/IIIa inhibitor, tirofiban was administered accordingly. Follow up transthoracic echocardiography showed a left ventricular ejection fraction of 25% and moderate mitral valve insufficiency. Later, past medical reports demonstrated that severe systolic dysfunction and the LBBB were already present pre-operatively. The patient was discharged on the fourth day in a clinically stable condition with a schedule for elective circumflex artery intervention during a different session.

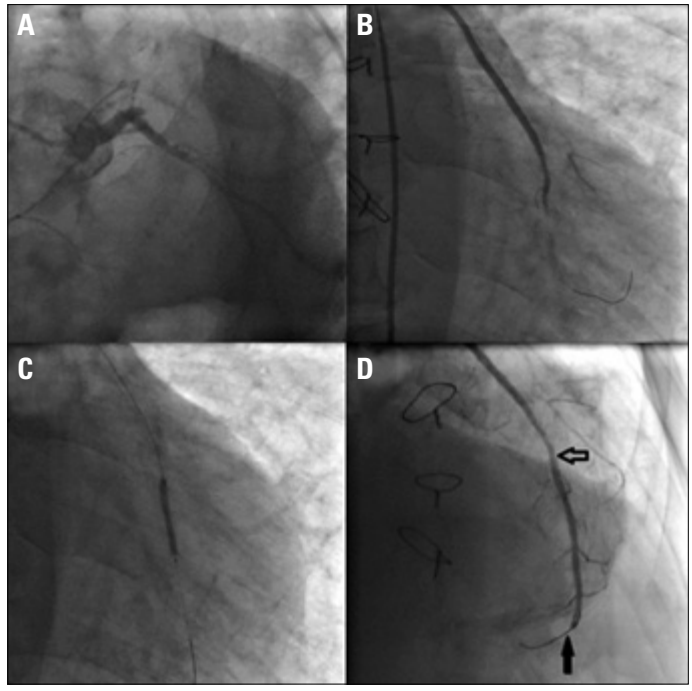

Figure 2. Images of coronary angiogram and intervention. (A) Left anterior oblique projection with caudal angulation demonstrates the occluded left anterior descending artery and critical stenosis of the circumflex artery. (B) Occlusion of the left internal mammary artery graft with fresh thrombus at distal anastomotic site. (C) Drug-eluting stent implantation at 14 atm, covering the distal left internal mammary artery graft and extending to the left anterior descending artery across the anastomotic site. (D) Establishment of coronary flow (*filled arrow* indicates the thrombus embolized into the distal circulation, and *blank arrow* indicates the site of the implanted stent)

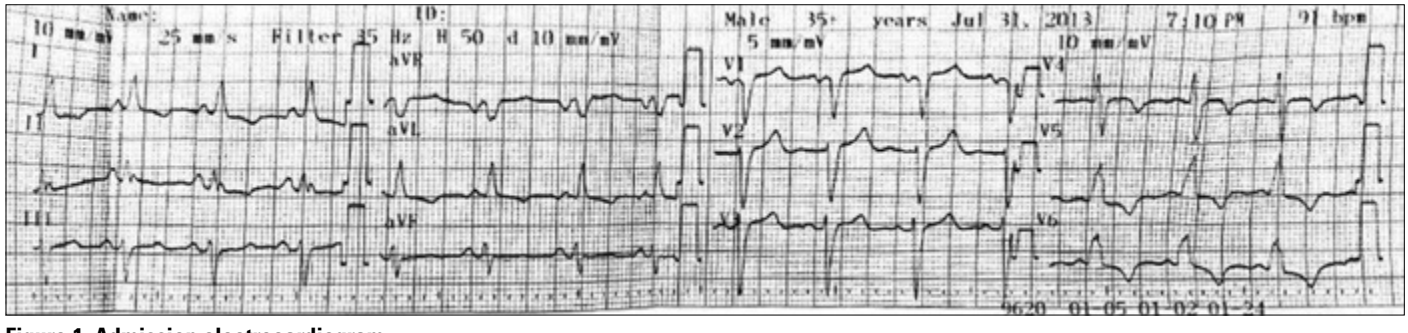

Figure 1. Admission electrocardiogram

Discussion

Late thrombotic occlusion of the LIMA graft is a very rare condition such that there has been only one report regarding this issue, in that, it was shown a proximal thrombus in the LIMA (6). The result was the patient's death without any intervention. As for our case, the LIMA graft was occluded at distal anastomotic site and partially recanalyzed by primary PCI. While the angiographic appearance of the occlusion had an onset within the LIMA graft, it is possible that first endothelial erosion could have begun just at or beyond the anastomotic site, and extended proximally into the LIMA. Whatever the origin of the first endothelial erosion, the final appearance was total occlusion of the LIMA, which needed to be opened. It is indeed widely accepted that an initial intervention on the native vessels rather than the grafts should be preferred in patients with CABG. However, this may not be possible every time, especially in the emergency situations where a direct intervention on the grafts should be considered, as in this case.

Conclusion

This is the first angiographic documentation of late thrombotic occlusion of LIMA graft which was managed with primary PCI. Although it is usually best to perform intervention on native vessels in patients with CABG; a direct intervention on grafts should always be considered, and may be lifesaving in the emergency situations.

Video 1. Left anterior oblique projection with caudal angulation demonstrates the occluded left anterior descending artery and critical stenosis of the circumflex artery

Video 2. Occlusion of the left internal mammary artery graft with fresh thrombus at distal anastomotic site

Video 3. Drug-eluting stent implantation at14 atm, covering the distal left internal mammary artery graft and extending to the left anterior descending artery across the anastomotic site

Video 4. Establishment of coronary flow. Please also note the thrombus embolized into the distal circulation

References

1. Goldman S, Zadina K, Moritz T, Ovitt T, Sethi G, Copeland JG, et al; for the VA Cooperative Study Group. Long-term patency of saphenous vein and left internal mammary artery grafts after coronary artery bypass surgery: results from a Department of Veterans Affairs Cooperative Study. J Am Coll Cardiol 2004; 44: 2149-56. [CrossRef]
2. Cameron AAC, Green GE, Brogno DA, Thornton J. Internal thoracic artery grafts: 20-year clinical follow-up. J Am Coll Cardiol 1995; 25: 188-92. [CrossRef]
3. Goldman S, Copeland J, Moritz T, Henderson W, Zadina K, Ovitt T, et al. Starting aspirin therapy after operation: effects on early graft patency: Department of Veterans Affairs Cooperative Study Group. Circulation 1991; 84: 520-6. [CrossRef]
4. Berger PB, Alderman EL, Nadel A, Schaff HV. Frequency of early occlusion and stenosis in a left internal mammary artery to left anterior descending artery bypass graft after surgery through a median sternotomy on conventional bypass: benchmark for minimally invasive direct coronary artery bypass. Circulation 1999; 100: 2353-8. [CrossRef]
5. Mariani MA, Drenth DJ, Boonstra PW, Grandjean JG. Angiographic evidence of thrombosis after off-pump coronary surgery. A case report. J Cardiovasc Surg 2001; 42: 61-3.
6. Yong A, Groenestein P, Brieger D, Lowe H, Kritharides L. Late thrombotic occlusion of a left internal mammary artery graft causing ST elevation myocardial infarction. Int J Cardiol 2010; 142: e42-e4. [CrossRef]

Address for Correspondence: Dr. Şükrü Akyüz,
Günal Sok. No:21, Gülevler Sitesi Blok 4 D:8 Acıbadem,
İstanbul-*Turkey*
Phone: +90 532 340 74 72
Fax: +90 216 444 52 57
E-mail: sukruakyuz@hotmail.com

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