Giant Saphenous Vein Graft Aneurysm Presenting as ST-Elevation Myocardial Infarction

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 Percutaneous coronary intervention (PCI) continues to increase in popularity, although coronary artery bypass grafting (CABG) is still performed in a large number of patients, especially given the prevalence of obstructive coronary artery disease. While arterial conduits are generally preferred, saphenous vein grafts (SVGs) are utilized in most procedures. Aneurysmal dilatation of aortocoronary SVG (SVGA) is an infrequent late complication of CABG that portends significant morbidity. Herein, we present the imaging studies of a 61-year-old man who presented with ST-elevation myocardial infarction (STEMI) secondary to SVGA. We discuss the presentation of SVGAs, their diagnosis, imaging and implications for management.

A 61-year-old man presented to a referring hospital with a few weeks of crescendo angina culminating in rest pain. Electrocardiogram indicated ST-elevation in the inferior leads and he was transferred to the University of Ottawa Heart Institute with a diagnosis of STEMI for primary PCI. On arrival, he was experiencing only minimal rest pain and remained hemodynamically stable throughout his course. His past medical history was significant for CABG 24 years prior to presentation, with SVGs to his left anterior descending artery (LAD), second obtuse marginal (OM) and posterior descending artery. Urgent cardiac catheterization indicated complete occlusion of the native circulation. The SVG to the OM was occluded and the SVG to the LAD had 80% stenosis in the mid-portion of the graft. The SVG to the right coronary artery was injected, showing a large aneurysm, estimated at 4 cm in its proximal third, and a distal SVG stenosis of 95%, although the possibility of pseudoaneurysm could not be excluded (Figure 1A; Movie S1). Contrast extravasation suggested contained rupture or an intraluminal filling defect in the aneurysmal segment (Figure 1B; Movie S1). Urgent cardiac surgery consultation was obtained and, given the resolution of symptoms and 

Figure 1. Coronary angiography of a saphenous vein graft (SVG) to the posterior descending artery in a 61-year-old man presenting with an inferior ST-elevation myocardial infarction. (A) Left anterior oblique projection at 30° showing aneurysmal dilation of the SVG (SVGA). (B) Right anterior oblique projection at 30° demonstrating SVGA. Red arrows, aneurysmal vein graft; white arrows, 95% stenoses at the distal end of the aneurysm and at vein graft anastomotic site.
As with other aneurysms, SVGAs followed over time continue to grow at variable rates. Thus, once identified, definitive management—either surgically or percutaneously—is advised. Imaging of SVGAs often requires a multi-modality approach for determining the optimal management strategy. Although coronary angiography is essential for defining the coronary anatomy and determining the need for revascularization, intraluminal thrombi often lead to underestimation of the true size of the aneurysm. Similarly, SVGAs can be missed on echocardiography, and, although visualized in this patient, it remains impossible to rule out mechanical complications. Thus, cross-sectional modalities such as CT or magnetic resonance imaging are necessary to definitively establish the diagnosis and to assess for the presence of mechanical complications.

Traditionally, management of SVGAs has been exclusively surgical ligation, but with the advancement of percutaneous techniques, management options include closure with Amplatzer devices, covered stents, and arterial coiling. Based on a systematic review we have proposed a management algorithm to select optimal patients for each approach. As with other aneurysms, SVGAs followed over time continue to grow at variable rates. Thus, once identified, definitive management—either surgically or percutaneously—is advised. Imaging of SVGAs often requires a multi-modality approach for determining the optimal management strategy. Although coronary angiography is essential for defining the coronary anatomy and determining the need for revascularization, intraluminal thrombi often lead to underestimation of the true size of the aneurysm. Similarly, SVGAs can be missed on echocardiography, and, although visualized in this patient, it remains impossible to rule out mechanical complications. Thus, cross-sectional modalities such as CT or magnetic resonance imaging are necessary to definitively establish the diagnosis and to assess for the presence of mechanical complications. Traditionally, management of SVGAs has been exclusively surgical ligation, but with the advancement of percutaneous techniques, management options include closure with Amplatzer devices, covered stents, and arterial coiling. Based on a systematic review we have proposed a management algorithm to select optimal patients for each approach.
In the present patient, the need for revascularization of other territories, compression of the right atrium, and the diffuse nature of aneurysmal degeneration of the SVG precluded a percutaneous approach. Hence, definitive surgical management was pursued with an excellent outcome. Although an exceedingly rare and late complication of CABG, clinicians should be aware of SVGA, their complications, imaging and management options.

References


Supplementary File

Supplementary File 1
Movie S1. Coronary angiography of a saphenous vein graft aneurysm.

Supplementary File 2

Please find supplementary file(s);