Utility of Noninvasive Imaging in Suspected Saphenous Vein Graft Aneurysm Thrombosis

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A 70-year-old man presented with 2 weeks of progressive typical angina without myocardial infarction. He had undergone coronary artery bypass grafting (CABG) in December 2006, using a left internal mammary graft to the left anterior descending artery, saphenous vein grafts (SVG) to the distal right coronary artery, and the second obtuse marginal branch of the left circumflex coronary artery. Coronary angiography showed a patent left internal mammary and SVG to the right coronary. The SVG to the circumflex filled slowly and was occluded midgraft without apparent distal perfusion of the circumflex system. Instead, on late angiographic images, contrast diffusion into an indistinct aneurysmal structure was noted (online-only Data Supplement Video 1). The native circulation had a calcified 95% distal left main stenosis and no critical disease in the left circumflex system. No competitive flow from the SVG was noted in the second obtuse marginal consistent with an occluded SVG (online-only Data Supplement Video 2). A putative diagnosis of vein graft aneurysm with thrombosis was made and therefore revascularization through the graft was not attempted due to concern for SVG rupture or embolization of thrombus into the native obtuse marginal. Cardiac CT demonstrated a fusiform 3.5×2.8 cm vein graft aneurysm with extensive thrombus (Figure). Revascularization with rotational atherectomy and stenting of the left main artery into the left circumflex artery was performed without complications.

The largest case series of vein graft aneurysms suggests that they are rare, occurring in approximately 0.1% of cases.1 Two-thirds of aneurysms in the series were classified as true aneurysms and one-third as pseudoaneurysms, although distinction between the two types is not always feasible. Diagnosis is typically made more than 10 years after bypass surgery; however, occurrence as early as 4 years after CABG has been reported. Symptomatology can include chest pain, angina, heart failure, or mass effect; rarely, rupture, embolization, or fistulization have been reported.2 Vein graft aneurysms may be diagnosed during the workup for cardiac masses or abnormalities on chest radiography or as an incidental finding on chest or cardiac imaging. Multimodality imaging such as was used in our case may be required to make the diagnosis and is useful for determining treatment options.

Various methods to treat SVG aneurysms have been reported, including coiling, thrombolytics, percutaneous therapy with covered stent, and surgical repair.3,4 Treatment in each case must be individualized and depends on several factors including the importance of SVG circulation, the need to relieve mass effect, the risk of rupture from enlargement, saccular versus fusiform morphology, and comorbidities. In our case, cardiac CT provided a definitive diagnosis and in turn averted potential complications related to attempts at revascularization of the thrombosed aneurysm. Given the

Figure. Cardiac CT demonstrating a fusiform 3.5×2.8 cm vein graft aneurysm with thrombus (small arrow). Arrowheads mark the ostium and thrombosed segments of the left circumflex graft proximal to the aneurysmal segment. A patent left internal mammary artery to the left anterior descending artery (large arrow) and saphenous vein graft to the right coronary artery (asterisk) are also visualized. Ao indicates aorta.
fusiform appearance and lumen thrombosis, the aneurysm in our case was suspected to be a true aneurysm. Because there was an option for native vessel revascularization and there were no other aneurysm-related complications, no treatment of the SVG aneurysm was required. Follow-up imaging was not planned due to the characteristics of the aneurysm and degree of thrombosis but should be considered on a case-by-case basis. Our case demonstrates the importance of considering an SVG aneurysm in the differential of an acute or subacute SVG occlusion and the usefulness of cardiac CT in this setting.

Disclosures

None.

References


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SUPPLEMENTAL MATERIAL

Legends for video files

Video 1. Selective angiography of the left circumflex graft showing abnormal filling with mid graft occlusion.

Video 2. Selective angiography of the native left coronary showing critical distal left main stenosis and no competitive flow from the saphenous vein graft to the second obtuse marginal artery.