Giant saphenous vein graft pseudoaneurysm: treatment with a vascular occlusion device

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Abstract

We report the case of a 74-year old male who was evaluated for progressively enlarging right heart border on serial chest radiographs. Computed tomography of the chest revealed a pseudoaneurysm arising from the saphenous vein graft (SVG) to the posterior descending artery with mass effect on the right atrium. Coronary angiography showed severely compromised distal flow and an angiographically small territory at risk. Using a minimally invasive, catheter-based approach, an Amplatzer Vascular Plug II occlusion device was utilized successfully for embolizing the SVG pseudoaneurysm.

Keywords: Saphenous vein • Pseudoaneurysm • Embolization

CASE SUMMARY

A 74-year old male with a history of hypertension, hyperlipidaemia and coronary artery disease with prior four-vessel coronary artery bypass grafting (left internal mammary to the left anterior descending artery and saphenous vein grafts (SVG) to the posterior descending artery (PDA), diagonal and circumflex arteries) was noted to have a progressively enlarging right heart border on serial posteroanterior (PA) and lateral chest radiographs completed during his annual medical evaluations (Fig. 1). He denied symptoms of any kind and had an active lifestyle. Because of suspicion of a possible pericardial cyst or slow-growing neoplasm, the patient underwent imaging with a non-gated, contrast-enhanced computed tomography (CT) of the chest.

CT examination revealed a 5.1 × 4.2 × 5.5 cm (transverse, anteroposterior and craniocaudal dimensions) lesion, felt to be a pseudoaneurysm arising from the right SVG to the PDA (Fig. 2). Mural thrombus was appreciated within the pseudoaneurysm extending from the mid-portion distally. Contrast opacified the entire lumen of the vein graft and no other connections were observed. A mass effect on the right atrium was noted. A transesophageal echocardiogram with colour-flow Doppler and agitated saline injection was performed to assess potential venous in-flow obstruction and to further assess for structural anastomoses. A prominent right atrial mass effect was again appreciated, but without evidence of obstruction in caval or tricuspid in-flow. Colour-flow Doppler identified blood flow within the vein graft but no evidence of anastomoses. The patient had normal left ventricular (LV) and right ventricular (RV) systolic function, without regional wall motion abnormalities.

A coronary angiogram of the native and graft vessels documented advanced disease in the native right system, with complete occlusion distally, just proximal to the origin of the PDA. The posterolateral branches were collateralized by the left circumflex artery. The SVG to the PDA had a large pseudoaneurysmal sac arising from the mid-portion of the graft, with stasis within the pseudoaneurysm and TIMI grade I flow to the distal graft. The PDA anastomosis was only faintly visualized (Supplementary Video 1).

Due to the progressive enlargement of the pseudoaneurysm, as well as the severely compromised distal vessel flow and angiographically small territory at risk, the decision was made to exclude the SVG. Surgical and nonsurgical options were explored, both with the goal of interrupting arterial in-flow to the SVG. Using a minimally invasive, catheter-based approach, an 8.0-mm Amplatzer (AGA Medical Corporation, Plymouth, MN, USA) Vascular Plug II occlusion device was deployed in the neck of the vein graft, successfully and uneventfully embolizing the SVG (Supplementary Video 2). The patient recovered without incident, and his peak post-procedure troponin-T value was 0.19 ng/ml. Repeat echocardiogram at 4-week follow-up revealed no change in LV or RV systolic function or pseudoaneurysm size with interval development of thrombus within the SVG lumen.

Aneurysms and pseudoaneurysms of SVGs are uncommon and are usually suspected because of an abnormal chest radiograph [1, 2]. They occur, on average, 12 ± 4.2 years after bypass surgery and measure ~6.0 ± 3.0 cm at the time of diagnosis. They are potentially catastrophic with an in-hospital mortality of 15.7% [1]. Because of the modest blood flow in the aneurysm, it was amenable to percutaneous closure. To our knowledge, this case represents only the fifth reported use of an Amplatzer® vascular occlusion device for the non-surgical treatment of a severe SVG dilation [3–6].
Figure 1: Posteroanterior PA chest radiographs from 2006 (a), 2007 (b) and 2008 (c). Progressively enlarging right heart border appreciated (arrows) with stable left-sided dimensions.

Figure 2: Contrast-enhanced, non-gated CT of the chest depicting the 5.1 × 4.2 × 5.5 cm SVG pseudoaneurysm arising from the SVG to the right PDA (dotted circle). Contrast opacification of the pseudoaneurysm, with laminated mural thrombus, and mass effect on the right atrium are evident. The lumen of the vein graft is faintly visible (arrow).

Supplementary Video 1: SVG angiogram, LAO projection, with reduced pseudoaneurysmal filling and TIMI I flow in the distal graft. The PDA is only faintly visualized during the end of the cine cycle.

Supplementary Video 2: SVG angiogram, LAO projection, with graft injection 10-min status-post Amplatzer® Vascular Plug II deployment. Complete occlusion of the neck of the vein graft is visualized.

Conflict of interest: none declared.

REFERENCES