



Tandem Saphenous Vein Graft Aneurysms with Right Atrial Fistula: Evaluation of a “Rarest of a Rare Complication” Using CT Coronary Angiography

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Abstract

Keywords

- ▶ saphenous graft aneurysm
- ▶ right atrial fistula
- ▶ CT coronary angiogram

Saphenous vein graft (SVG) aneurysm after coronary artery bypass grafting (CABG) is a rare complication. A fistula between an SVG aneurysm and a cardiac chamber is even rarer. Herein, we report a middle-aged man who underwent CABG with five grafts 13 years prior presenting with multiple aneurysms in the venous graft with a fistula between the aneurysm and the right atrium. The computed tomographic angiogram findings and the subsequent treatment of the patient are addressed in the report.

Introduction

Aneurysm developing in a saphenous vein graft (SVG) is a rare complication after coronary artery bypass grafting (CABG). We report a case of a patient with two aneurysms in the SVG graft to the posterior descending artery (PDA) with a fistula between the proximal aneurysm and the right atrium (RA).

Case Presentation

A 48-year-old man who had CABG for triple vessel disease 13 years ago presented with progressive dyspnea on exertion for the past year. Electrocardiogram, troponin T, and pro-brain natriuretic peptide were normal. Echocardiogram showed a dilated RA and right ventricle (RV) with a suspicious extracardiac mass abutting the RA. Frontal chest X-ray (CXR) showed cardiomegaly with a right paracardiac lesion (▶ Fig. 1A).

Coronary computed tomographic (CT) angiogram done in 256 slice scanner (Philips iCT, Netherlands) revealed patent SVG to PDA with two aneurysms in the proximal and distal segments of the graft (▶ Fig. 1B and C). The proximal aneurysm (measuring 33 × 37mm) showed an irregular mural thrombus with a 6 mm fistulous communication with the RA with left to right shunting (▶ Fig. 1D). The distal aneurysm (measuring 60 × 41 mm) showed thrombus and wall calcification with a small patent lumen filling the distal anastomosis. All other three venous grafts were occluded (▶ Fig. 1F). Given the risk of repeat surgery, the presence of collaterals in the right coronary artery (RCA) territory, and patient preference, percutaneous embolization of the proximal aneurysm was done using Amplatzer vascular plug. The plug was placed proximal to the aneurysm and ischemic changes were checked in electrocardiogram (ECG) for 10 minutes (▶ Fig. 2). The plug was deployed after confirming no

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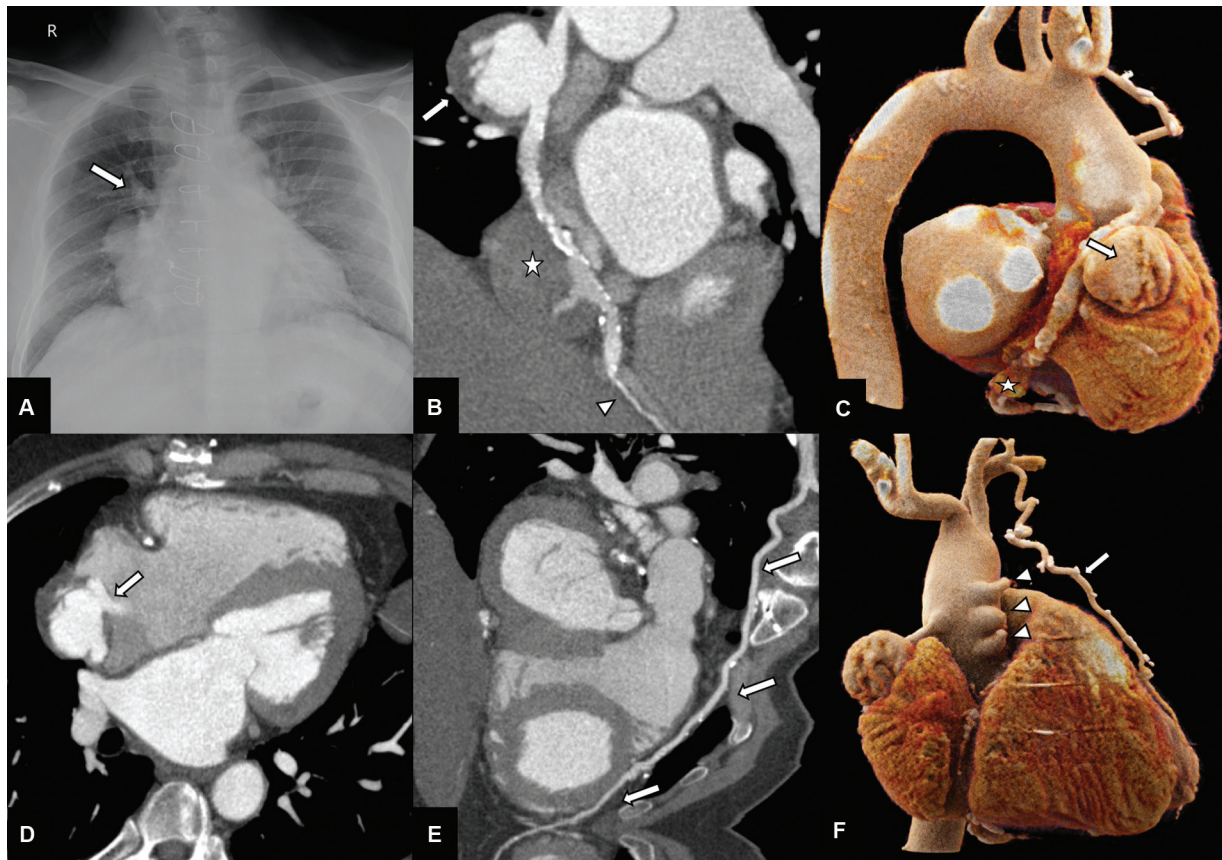


Fig. 1 Frontal chest radiograph (A) shows cardiomegaly with right paracardiac mass (arrows). Curved planar reformat of coronary computed tomographic (CT) angiogram (B) shows two aneurysms in the proximal and distal segments of the venous graft (arrow and asterisk) with patent distal right coronary artery (arrowhead) with the findings better depicted in cinematic rendering (C). Four-chamber CT reformat showing the communication of the distal aneurysm with the right atrium (arrowheads 1 day). The left internal mammary artery to the distal left anterior descending graft is patent (arrowheads in E) with occluded rest of the venous grafts (arrows in F).

ischemic changes in ECG. The symptoms of patient improved postprocedure. A follow-up chest radiograph after 6 months (→ Fig. 2D) showed mild reduction in cardiomegaly.

Discussion

Post-CABG SVG aneurysm is a rare complication with a reported incidence of 0.07%.¹ There are a few reported cases of multiple aneurysms in the same graft.^{2,3} Seventy percent of these aneurysms occur 10 years after surgery and are seen in RCA (38%), followed by left anterior descending artery (25.3%), obtuse marginal artery (OM) (10.9%), and left circumflex artery (10.5%).⁴ Most aneurysms are asymptomatic (45–55%)⁵ and incidentally detected on radiographs or CT.⁶ They can be classified into true and pseudoaneurysms. True aneurysms develop secondary to atherosclerotic degeneration and exposure of the thin vein vessel wall to high arterial pressures. The dilation usually begins near venous valves, where the muscle fibers of the media have a longitudinal orientation compared with a circular orientation in the rest of the vein. They present late, around 5 years after the surgery. Pseudoaneurysms arise due to anastomotic suture disruption, and graft injury during harvesting, preparation, and grafting.⁵ Nonanastomotic location and extensive atherosclerosis of the SVG with wall calcifications showed our

case to be a true SVG aneurysm. A combination of chest pain, mediastinal mass on CXR in a patient with CABG should lead to a strong suspicion of SVG aneurysm.

SVG aneurysms can lead to multiple complications including compression of adjacent cardiac chambers (commonly the RA and RV), fistula formation, rupture, and myocardial ischemia from distal embolization.^{3,7} Aneurysmal rupture leading to hemothorax, hemopericardium, and massive hemoptysis also has been described.⁴ CT angiogram trumps catheter angiography in depicting the accurate dimensions of an aneurysm that can be underestimated due to mural thrombosis in catheter angiogram.⁸ There are only two reported cases of SVG aneurysm with right atrial fistula.^{9,10} However, multiple graft aneurysms with the simultaneous occurrence of a fistula to RA have not been reported previously to the best of our knowledge. The fistulas can present as left to right shunt causing dyspnea and pulmonary hypertension.

If the supplied territory of the aneurysmal graft having fistula is nonviable, the patient is unlikely to benefit from revascularization of graft. In such cases, closure of aneurysm and fistula is recommended. The high risk of redo-surgery, patient preference for nonsurgical management, and lack of ischemic changes in ECG after vascular plug placement (before deployment) tipped the scales favoring percutaneous management in our case.

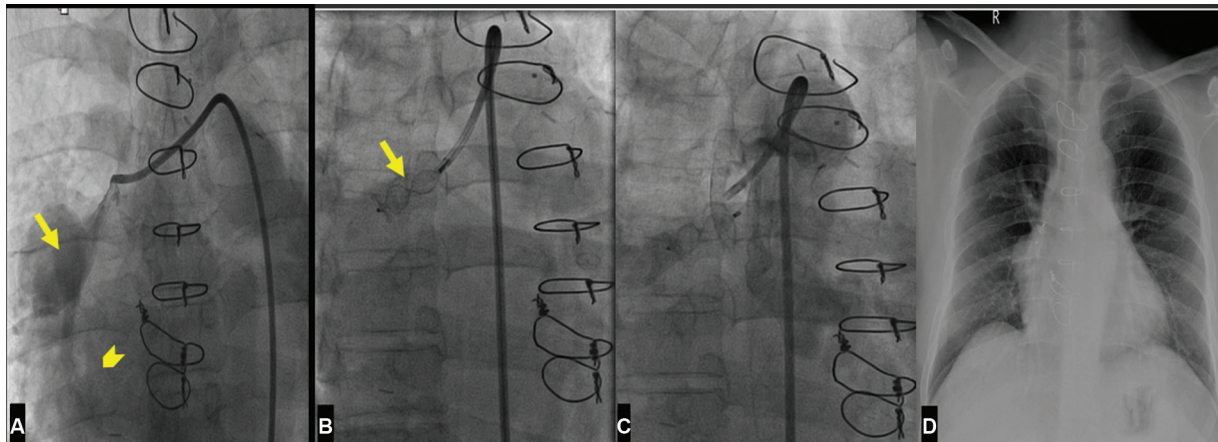


Fig. 2 Coronary angiogram (A) of the graft vessel showing the aneurysm (arrow in A) with fistula (arrowhead) into the right atrium. Amplatzer vascular plug 4 (8 mm) was positioned in the proximal part of the graft (arrows in B). After confirming there is no electrocardiogram changes for 10 minutes, the plug was deployed (C). Follow-up chest radiograph (D) after 6 months showed a minimal reduction in the size of the aneurysm.

Conflict of Interest

None declared.

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