

Aortocoronary Saphenous Vein Graft Aneurysm Misdiagnosed as Aortic Arch Aneurysm

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ABSTRACT

Coronary artery bypass grafting is the mainstay of revascularization worldwide. However, the most widely used saphenous vein grafts are related to a number of late sequelae. Aortocoronary saphenous vein graft aneurysms mainly diagnosed incidentally are one of these complications. Although rare, given the fatal risk of rupture if left untreated, management either with percutaneous intervention or open redo surgery should be considered. However, no guidelines are established in current scarce literature. Hereby, we present the successful percutaneous management of a huge saphenous vein graft aneurysm via coiling, avoiding the risks of repeat sternotomy.

Keywords: Aortocoronary saphenous vein graft aneurysm, coils, percutaneous intervention

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INTRODUCTION

Revascularization by coronary artery bypass grafting (CABG) is widely performed worldwide.^[1] Despite superior patency of arterial conduits,^[2] saphenous vein grafts (SVG) are largely used in nearly every CABG operation.^[1-3] However, up to 25% of them will occlude in the first year and many other complications like graft degeneration, stenosis due to intimal hyperplasia and aneurysm formation may occur later on.^[1] Riahi and colleagues^[4] was the first one to describe the very rare complication of aortocoronary SVG aneurysm in 1975. Its incidence widely ranges from 0.07% up to 14% in literature.^[1,2] Although its treatment has traditionally been surgical, percutaneous techniques are increasingly used nowadays.^[1,2] We hereby present a case of an aortocoronary SVG aneurysm initially misdiagnosed as an aortic arch aneurysm. A written informed consent was obtained by the patient and was approved by the

Institutional Committee on Human Research of our institution.

CASE HISTORY

A 72-year-old man with a pertinent history of CABG 15 years ago was transferred to our hospital firstly diagnosed by the submission hospital as distal aortic arch aneurysm rupture by a chest computed tomography (CT) scan offered to him due to shortness of breath and a heavy feeling in the chest. Despite the first diagnosis, our radiologists had a more detailed look on CT images and they finally diagnosed an aortocoronary SVG aneurysm measuring 5.5 × 7 cm, [Figure 1], so a diagnostic coronary angiogram was urgently performed. The coronary angiogram was typically performed under local anesthesia through the right femoral artery. The latter confirmed the

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presence of an aneurysm of the SVG anastomosing the first obtuse marginal coronary branch (OM1) while no distal flow and a central hemodynamically significant graft stenosis were detected [Figure 2a]. Given a decreased to 30% ejection fraction on echocardiogram, the big size of the aneurysm and the high risk of a redo sternotomy, percutaneous coiling was decided. Via right femoral access, a 5-French Vertebral catheter and a 2.7-French Ashahi microcatheter was used to gain access into the SVG aneurysm. Twelve coils (Penubra Detachable Coils) were deployed into the aneurysm and the graft body. Final angiography revealed complete aneurysm occlusion and no residual flow in neither the venous aneurysm nor the graft itself [Figure 2b]. Local anesthesia was adequate until the completion of the procedure. The patient discharged on the third postinterventional day in good condition and a 6-month follow-up revealed no residual symptoms.

DISCUSSION

Over 1.5 times the proximal diameter of the graft is suggestive of an aortocoronary SVG aneurysm, however giant aneurysms over 10 cm have been reported.^[1] A combination of the high-pressure of the arterial bed with induced vessel wall ischemia, graft endothelial dysfunction, atherosclerotic degeneration, and changes in medial smooth muscle cell orientation are possible pathophysiologic mechanisms.^[1,5] Half of the patients are asymptomatic on diagnosis which happens by an incidental radiological examination, but sudden death or shock due to rupture, hemoptysis due to fistula formation, tamponade, hemothorax, chest pain/angina, shortness of breath, myocardial infarction and symptoms due to compression

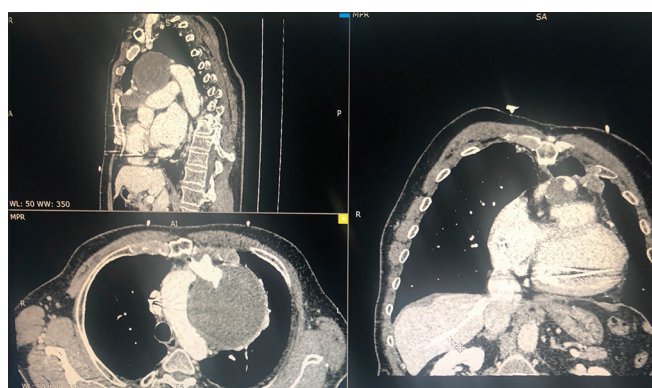


Figure 1: Aorticoronary saphenous vein graft aneurysm on CT scan of the thorax. Axial CT angiography imaging (to the lower left) and sagittal (to the upper left) and coronal (to the right of the image) CT reconstruction showing a giant mediastinal mass causing compression to the adjacent aortic arch suggestive of a saphenous vein graft aneurysm of 5.5 × 7 cm. A misdiagnosis as a distal aortic arch aneurysm was initially made. The risk of rupture is great

of adjacent cardiac and vascular structures have also been reported.^[1-3] Cardiac catheterization is used for their diagnosis and management planning in 66.5% of the cases, whereas CT is performed in 60.3% of them. Only 4.2% of patients are diagnosed within the first post-CABG year, whereas 6.1%, 21.2%, and 68.5% are detected between 1 and 5 years, between 5 and 10 years and over 10 years, postoperatively.^[1]

Once diagnosed, management approaches consist of conservative management or invasive approach via redo cardiac operation or percutaneous coiling, occlusion with an Amplatzer device or deployment of a covered stent.^[1-3,5] Provided that even aneurysms of 2 cm-diameter are related to a 33.3% hazard of mechanical complications, myocardial infarction, aneurysm rupture or death, no safe size for surveillance only can be suggested. However, an increase in size is associated with greater risk of complications reaching 69.2% for diameters over 10 cm.^[1,2] Given the high risk of a redo sternotomy and patients' possible advanced age and comorbidities, percutaneous treatment by coiling, Amplatzer device or covered stent deployment gain ground.^[1,2,5] Remarkably, only 6.1% of patients died after percutaneous management in a small systematic review compared to 13.9% after redo surgical operation and 23.8% after conservative treatment.^[1] However, in case of mechanical complications (fistula, rupture, or compression of adjacent cardiac or vascular structures), redo surgery for aneurysm resection and subsequent bypass if feasible is the only option. Otherwise, if the affected graft is patent, a covered stent deployment is the optimal treatment, or else, if no flow is detected through the graft, aneurysmal occlusion by coiling or Amplatzer plug should be chosen.^[1]

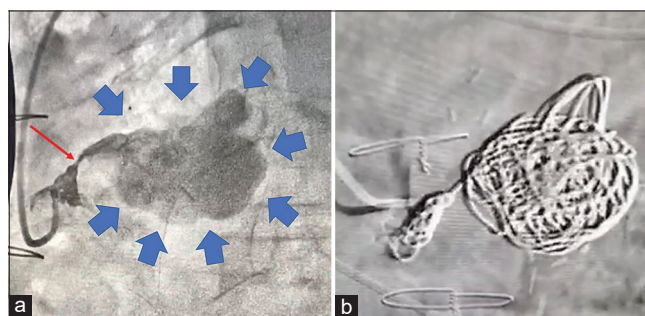


Figure 2: Angiography images of the aorticoronary saphenous vein graft aneurysm and its management. (a) Demonstration of a massive aneurysm communicating with a saphenous vein graft (blue arrows). No distal flow to the bypassed obtuse marginal coronary branch is detected. Moreover, a stenosis of the proximal anastomosis to the aorta is also detected. (red arrow). (b) Angiography after successful placement of numerous coils. No persistent flow in neither the venous aneurysm nor the non-viable graft itself is detected. Complete aneurysm occlusion has been achieved

In conclusion, a mediastinal mass on chest X-ray and a history of CABG may be suggestive of an SVG graft aneurysm.^[3] Once diagnosed, a very high complication rate including rupture is reported. Percutaneous intervention, either delivering of covered stents or coiling, is a safe and feasible approach for their management,^[1,2] eliminating the risk related to a redo open surgical approach.^[5]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Ramirez FD, Hibbert B, Simard T, Pourdjabbar A, Wilson KR, Hibbert R, *et al.* Natural history and management of aortocoronary saphenous vein graft aneurysms: A systematic review of published cases. *Circulation* 2012;126:2248-56.
2. Walters D, Patel M, Penny W. Saphenous vein graft aneurysm: A case-based review of percutaneous management. *Cardiovasc Revasc Med* 2019;20:1190-5.
3. Knoery C, Ashcroft M, Smith JA, Leslie SJ. Percutaneous treatment of a massive saphenous vein graft aneurysm. *Catheter Cardiovasc Interv* 2019;93:923-6.
4. Riahi M, Mark Vasu C, Tomatis LA. Aneurysm of saphenous vein bypass graft to coronary artery. *J Thoracic Cardiovasc Surg* 1975;70:358-9.
5. Khan A, Briennes S, Boyle A, Collins N. Percutaneous treatment of saphenous vein graft aneurysm: Contemporary procedural considerations. *Catheter Cardiovasc Interv* 2019;93:927-32.