Cardiac diseases. Surgery seems to be the treatment of choice to reduce the risk of rupture and embolism. Symptoms in patients with a previous history of CABG because of its rarity and overlap of symptoms with other thoracic, pulmonary, and stable hemodynamic status. SVG aneurysm should be considered while encountering mediastinal mass or undiagnosed cardiopulmonary junction near the origin of brachiocephalic artery was resected and replaced with a tube graft. The patient was transferred to ICU with stable hemodynamic status. SVG aneurysm should be considered while encountering mediastinal mass or undiagnosed cardiopulmonary symptoms in patients with a previous history of CABG because of its rarity and overlap of symptoms with other thoracic, pulmonary, and cardiac diseases. Surgery seems to be the treatment of choice to reduce the risk of rupture and embolism.

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Keywords: Coronary artery bypass graft; Saphenous vein; Aneurysm

1. Introduction

Aneurysm of a saphenous vein graft (SVG) is a rare but fatal complication of coronary artery bypass graft (CABG) surgery. The development of SVG aneurysms appears usually about 10–20 years after the operation at an estimated rate of <1%. A 68-year-old male was referred to the emergency department after frequent episodes of dyspnea, chest pain and hemoptysis. He previously had CABG surgery one year before. The physical examination was normal. Chest radiogram showed a left pulmonary midzone mass. CT-angiogram demonstrated a large aortic pseudoaneurysm (6.36 × 6.06 cm) in the middle part of the ascending aorta. After sternotomy, the ascending aorta above sinotubular junction near the origin of brachiocephalic artery was resected and replaced with a tube graft. The patient was transferred to ICU with stable hemodynamic status. SVG aneurysm should be considered while encountering mediastinal mass or undiagnosed cardiopulmonary symptoms in patients with a previous history of CABG because of its rarity and overlap of symptoms with other thoracic, pulmonary, and cardiac diseases. Surgery seems to be the treatment of choice to reduce the risk of rupture and embolism.

2. Case report

A 68-year-old male was referred to our emergency department after frequent episodes of dyspnea, chest pain and hemoptysis. He previously had CABG one year before. His physical examination was normal, blood pressure was 100 over 60 mmHg with regular pulse rate of 90/min. ECG showed normal sinus rhythm and inverted T-waves in inferior leads. Chest radiogram showed mild cardiomegaly and a left pulmonary midzone mass (Fig. 1).

Transthoracic echocardiography revealed mild right ventricular hypertrophy in addition to marked hypertrophy of the left ventricle associated with mild mitral regurgitation, aortic valve insufficiency, and pulmonary valve stenosis. Ejection fraction was about 45%. Further diagnostic evaluation included fiberoptic bronchoscopy, which showed blood clot in the right lower and upper lobes of the left lung. CT-angiogram demonstrated a large aortic pseudoaneurysm (6.36 × 6.06 cm) in the middle part of the ascending aorta. It was limited to the ascending aorta and finished at 2.88 cm distance to aortic knob (Fig. 2), and the rest of the aorta was normal.

Left internal mammary artery (LIMA) graft was patent but it was under pressure of thrombotic clot from the left side. The patient was transferred to the operating room with the diagnosis of SVG aneurysm compressing the left lung and fenestrated into the alveolar space. The cannulation was performed through the femoral artery and vein. After establishing the CPB by peripheral cannulation, median sternotomy was performed. We found a giant aneurysm of aortocoronary saphenous vein graft (SVG → OM2), which was extended to hilar zone of the left lung. Aorta was clamped just proximal to the origin of the inominate artery, cardioplegic solution was first administered into coronary sinus and then directly into coronary arteries. LIMA to LAD graft was patent. The aorta was incised. Hematoma and thrombotic material was carefully evacuated, then the aneurysmal segment of ascending aorta was excised and because of very large deflection, being repaired was not possible, therefore, the ascending aorta was replaced with a tube graft. After rewarming and beating of the heart, CPB was discontinued and the patient was transferred to ICU with stable hemodynamic status.

3. Discussion

Aneurysms of saphenous veins grafted to coronary arteries (SVG) were first reported in 1975, but they still remain as...
Fig. 1. Patient’s chest X-ray. The opaque mass attached to the left lung can be easily observed. LM, lung mass.

Fig. 2. CT-angiogram of the heart. The saphenous vein graft aneurysm is shown with the white arrow. AAO, arch of aorta; DA, descending aorta.

an unusual complication of CABG surgery occurring at an estimated rate of <1% [1, 2]. The development of SVG aneurysms usually seems to happen approximately 10–20 years after the operation [3].

As Benchimol and associates described [2], the suspected cause of SVG aneurysm formation includes graft wall weakness especially in five regions as follow:

1. Vicinity of the venous valves because of a lack of circular muscle. The smooth muscle in this area formed longitudinal rather than being circumferential fashion, which makes weak spots to degeneration due to increased stress of arterial pressure.
2. At the branched sites.
3. Areas that were damaged during surgical procedures which will cause aneurysm formation in the first few months after surgery.
4. Atherosclerotic degeneration of the vein wall that occurs after about 8–10 years post operation.
5. Vein’s wall necrosis and infection [2, 4].

SVG aneurysms usually manifest as cardiac events like chest pain or worsening dyspnea as a result of myocardial ischemia or infarction due to graft thrombosis or distal embolism, in rare cases by occlusion of the coronary arteries due to aneurysm formation following the operation [5]. There are other usual symptoms and signs such as bleeding, embolism, rupture of aneurysms, hemotorax or hemoptysis, SVC syndrome, and finally sudden death. Some conditions like acute MI or rupture of the aneurysm are considered as an indication for emergency surgical intervention [6]. Acute congestive heart failure because of fistula formation between the graft and cardiac chambers is an atypical presentation [3]. The fistula usually drains into the right atrium and may cause atrial arrhythmia as a result of atrial wall tension. And in very rare cases, it can be drained into ventricles [5].

SVG aneurysm can be asymptomatic and detected in routine exams or tests, for instance chest X-ray. Transthoracic echocardiography may play a role in detection of mediastinal mass lesions in routine assessment of coronary symptoms. Transesophageal echocardiography provides serial assessment of size, as well as intra-luminal pathology. Computed tomography and MRI usually reveal central enhancement of a mass with variable amounts of peripheral thrombus. The lumen of the aneurysm should be enhanced simultaneously with thoracic aorta on dynamic enhanced CT or MRI. Intravascular ultrasonography provides unique insight into the morphology, pathogenesis and management of SVG aneurysms [6, 7].

Surgical treatment – ligation of the graft or resection of the aneurysm and conduit replacement whereas the native coronary artery needs further revascularization – is still the first choice [3]. There are also different non-surgical treatment modalities such as percutaneous coil embolization, covered stent implantation, and amplatzer vascular plug occlusion. The mentioned modalities might be useful mainly in elderly and high-risk patients who are considered as poor surgical candidates [5, 8, 9].

4. Conclusion

SVG aneurysm is a diagnosis of suspicion because of its rarity and overlap of symptoms with other thoracic, pulmonary, and cardiac diseases. Therefore it should be remembered in case of mediastinal masses or undiagnosed cardiopulmonary symptoms in a patient with a previous history of CABG. Surgery can be nominated as the treatment of choice to decrease the risk of rupture and embolism from mural thrombi in the aneurysmal graft into the distal coronary or pulmonary arteries.
References


eComment: Saphenous graft aneurysms

Author: Karsten Knobloch, Hannover Medical School, Plastic, Hand and Reconstructive Surgery, Hannover, Germany
doi:10.1510/icvts.2008.201533A

I read with great interest the recent report by Dr. Abbasi and coworkers regarding a large saphenous graft aneurysm as early as one year after coronary artery bypass grafting (CABG) surgery [1]. Interestingly, the aforementioned case of a saphenous graft aneurysm occurred rather early.

Six years ago we encountered a 79-year-old patient who presented with dyspnea 12 years after previous CABG with a retroaortic mass identified by computer tomography [2]. Besides an aorta ascendens aneurysm (5 cm), a 4-cm aneurysm of a retroaortic venous saphenous graft was identified, which led to the first posterolateral branch. Surgical exclusion, CABG and aorta ascendens replacement were performed. The patient recovered early and remained asymptomatic over 13 months of follow-up. As far as imaging studies are concerned CT-angiography with or without three-dimensional reconstruction appears as a useful diagnostic measure in defining saphenous graft aneurysms [3, 4].

Notably, even internal mammary artery graft aneurysms may become evident as reported [5]. A 59-year-old male patient presented with a pulsating mass at the left sternal edge weeks after a CABG procedure. CT showed a false aneurysm of the left internal mammary artery (LIMA), confirmed by angiography. The leakage was treated using a 16-by-3.5-mm Jostent leading to complete lesion thrombosis.

References


eComment: Surgical technique can prevent saphenous vein wall damage during coronary artery bypass graft surgery

Authors: Nikolaos Barbetakis, Cardiothoracic Surgery Department, Euromedica – Geniki Kliniki, Paraliaki Ave, Thessaloniki, Greece; Theoharis Xenikakis, Andreas Efstatthiou, Ioannis Fessatidis

We read with great interest the article from Abbasi et al. [1] concerning a large saphenous vein graft aneurysm (SVGa) one year after coronary artery bypass grafting (CABG) surgery and we would like to congratulate them for their successful result. Even though reoperative coronary bypass surgery is very frequent today, we do not see a lot of venous aneurysms from previous grafts. However, it has to be highlighted that most lesions of this kind, especially early after surgery, could be originating from injury to the vein during harvesting.

SVGa is defined as a localized dilation of the vessel to 1.5 times the expected normal diameter. These are classified as true and false aneurysms (or pseudoaneurysms): true aneurysms involve all three layers of the vessel wall, whereas false aneurysms involve disruption of one or more layers of the vessel wall with a well-defined collection of blood or hematoma outside the endothelium [2]. Further classification of SVGAs as large or small is not well defined, although dilation to more than 2 cm has generally led to consideration for surgical therapy [2].

The initial event in SVGa formation is thought to be atheroma formation followed by plaque rupture, resulting in injury to the vessel wall, which is exacerbated by arterial pressures within the vein graft. Valve insertion points along the vein graft are especially prone to true SVGa formation, where smooth muscle in the media changes from circular to a weaker longitudinal orientation. Other possible contributing factors include variabilities in arterial elastic tissue integrity not detected at the time of harvesting, vascular injury from previous percutaneous intervention (PCI) and surgical trauma [3].

The most important point is the continuing improvement of surgical techniques to prevent vein wall damage during harvesting and implantation and this may contribute to a higher graft patency rate in follow-up. There is evidence that harvesting the saphenous vein together with a pedicle of surrounding tissue protects the vein from spasm, thereby obviating the need for vein distension [4]. The cushion of surrounding tissue also allows for careful handling of the vein. There is also enough evidence that the endothelial integrity is much better preserved in veins harvested by the ‘no touch’ technique than in veins harvested by the conventional technique [5].

References


