

# Giant Saphenous Vein Graft Aneurysm: A Rare Cause of Hilar Mass

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## Abstract

Aneurysm formation of saphenous vein graft (SVG) after coronary artery bypass graft (CABG) surgery is rare but potentially fatal. This complication may mimic a mediastinal mass by plain film. The SVG aneurysm usually develops 10-20 years after the operation with the estimation of less than 1%. There is no consensus about the management of asymptomatic SVG aneurysm. Traditionally, it is considered an indication of operation. In this article, we report a 64-year-old man who developed a giant SVG aneurysm 18 years after CABG surgery. Angina pectoris and exertional dyspnea develop after years of asymptomatic periods. Finally, he was treated successfully by resection of aneurysm and placement of new bypass grafts. (J Intern Med Taiwan 2016; 27: 207-211)

**Key Words:** Coronary artery bypass grafting, Saphenous vein graft, Aneurysm

## Introduction

Coronary artery revascularization with SVG has become a surgical standard for treatment of coronary artery disease since Favalaro first described it in 1967. Riahi and associates described the rare complication of saphenous vein graft aneurysm (SVGA) in 1975.<sup>2</sup> Aneurysm of an aortocoronary SVG is a rare but potentially fatal after CABG.

Aneurysms are generally defined as a focal dilatation of vessels >1.5 times the proximal reference diameter; however, aneurysmal dilatation of

aortocoronary SVGs has led to “giant” aneurysm formation, with reports of cases exceeding 10 cm. SVGAs reported in literature range from 1-14 cm in diameter.<sup>3,4,5</sup> The precise incidence of aortocoronary SVGA remains uncertain, although in 1 case series, an incidence of 0.07% was estimated from a review of 5500 grafts at a single institution.<sup>1</sup>

We reported a rare case report who had recurrent chest tightness due to huge aneurysm formation. He underwent successful aneurysm resection and replacement of bypass graft. Causative factors are described and suggestions are proposed.

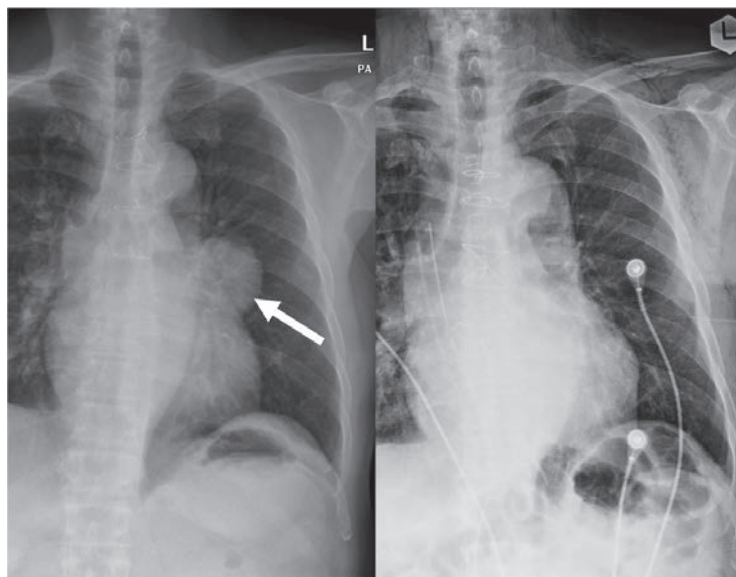


Figure 1. A large, ovoid of the left lateral aspect of the cardiac silhouette (left); compared with the normalized chest radiograph after operation (right).

## Case report

A 64-year-old man who had undergone 3-vessel coronary artery bypass graft surgery in 1995 presented with a 5-month history of chest compression pain while resting. At the time of his coronary artery bypass operation, the left internal mammary artery (LIMA) was used to graft the left anterior descending coronary artery (LAD). Separate SVG was placed to the obtuse marginal branch (OM) of the left circumflex (LCX) and diagonal branch of the left anterior descending artery. His medication included aspirin (100 mg daily), amlodipine (5 mg daily), and rosuvastatin (10 mg daily). Alcohol consumption and smoking were irrelevant considerations.

Upon physical examination, he was obesity with the body-mass index 30. The blood pressure was 142/78 mmHg with a regular heart rate of 86 beats per minute. The cardiac examination was normal. Auscultation of the neck showed normal carotid sounds but revealed a middle-pitched bruit only in systole at the angle of the left jaw. The standard 12-leads electrocardiogram showed normal sinus rhythm with left anterior hemi-block. Initial laboratory data such as biochemistry, electrolytes

and blood cell count were normal. However, his chest radiograph revealed . (Figure 1)

Subsequent images of coronary angiography showed left main with triple vessels disease (left main artery (LM): distal 30% stenosis; LAD: proximal total occlusion; LCX: distal total occlusion; right coronary artery (RCA): total occlusion at proximal segment; LIMA: patent but small; SVG: patent from aorta to diagonal branch of the left anterior descending artery). Aside from this, the coronary angiography also demonstrated a huge aneurysm(46.48 mm x 48.31 mm) which was distal to the site of anastomosis. (Figure 2)

At surgery, the diagonal branch of the left anterior descending artery was bypassed with saphenous vein graft. In following, second saphenous vein graft was anastomosed to diagonal branch of the left anterior descending artery. The distal end of the second saphenous vein graft was anastomosed to distal ascending aorta under side clamping of aorta. The old saphenous vein graft stump was sutured and ligated near the aorta and previous anastomosis site was closed. The aneurysm contained fragments of fibrinoid material with neutrophils infiltration. The operation was considered successful and the patient recovered uneventfully. (Figure 1)

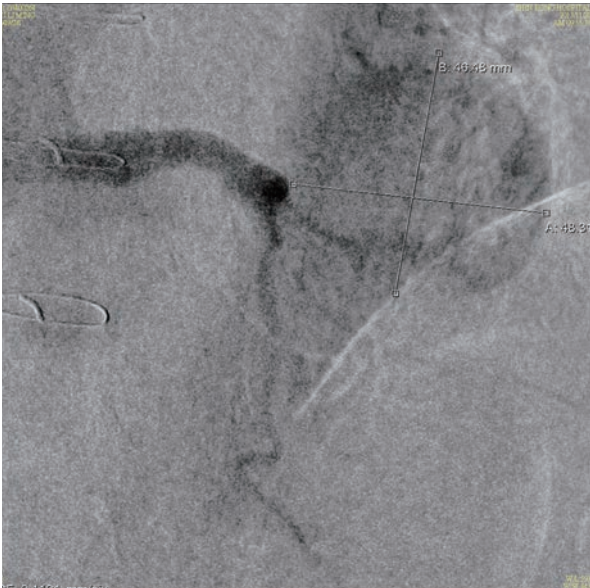


Figure 2. A huge aneurysm distal to the site of anastomosis by coronary angiography.

## Discussion

Aneurysm formation from saphenous vein graft is potentially fatal after CABG surgery, with a wide variation in clinical presentations, ranging from recurrent chest pain to sudden cardiac death. The mechanism is poorly understood. Late aneurysm formation (ie, >5 years after CABG) is thought to occur to SVG atherosclerotic degeneration secondarily. This process contributes to weakening of the vessel wall and then leads to graft dilatation.<sup>6,7,8</sup>

Ischemic symptoms (angina or infarction) can both occur by embolic event or direct compression. Most of saphenous vein graft aneurysms are asymptomatic and subclinical; thus, morbidity and mortality estimates are likely affected by a selection bias. SVGAs are often incidentally disclosed by imaging, but aneurysm rupture, fistula formation, and hemodynamic compromise from adjacent cardiovascular compression have been reported.<sup>9,10,11</sup>

A number of diagnostic imaging modalities were used to evaluate SVGAs. Two thirds of cases (66.5%) incorporated cardiac catheterization. Computed tomography (CT) was widely used, with 60.3% of patients undergoing CT studies and only 12.9%

using magnetic resonance imaging. Chest radiograph were reported in 54.1% of cases, although in many instances, they were performed for unrelated investigations and were not diagnostic. Echocardiograms (transthoracic or transesophageal) were documented in 28.2% of patients.<sup>12</sup> In fact, in only 4.2% of patients were diagnosed within the first year after CABG, 6.1% between 1 and 5 years, 21.2% between 5 and 10 years, and 68.5% at >10 years after surgery.

Despite a large proportion of SVGAs was identified incidentally, the in-hospital or 30-day mortality rate in the overall cohort was high. Ligation or excision of saphenous vein graft aneurysm with simultaneous revascularization appears to be the optimal therapy, with satisfactory midterm and long-term results. Individually, mortality rates of surgical, percutaneous, and conservative management were 13.9%, 6.1%, and 23.8%. A treatment algorithm for SVGA based upon patient co-morbidities and aneurysm characteristics is proposed.<sup>1,12</sup> We propose that patients should be assessed by a heart team comprising a cardiac surgeon and a cardiology. Ligation or excision of saphenous vein graft aneurysm with simultaneous revascularization may be optimal.

## Conclusion

Ischemic symptoms often accompany the aneurysm formation of of saphenous vein graft, and closure of the aneurysm is indicated whenever first identified, to remove the risk of graft rupture and to preserve graft patency and distal run-off. This case highlights the importance of early treatment of vein graft aneurysms. Return to the fundamentals, thorough history recording and carefully image interpretation are extremely important for accurate diagnosis. However, SVGAs often remain clinically silent and there are no existing guidelines to screen their development. Given the infrequent identification of SVGAs, our current understanding for the epidemiology and pathogenesis of these aneurysms

remains limited. We recommend that any patient with a history of previous coronary artery grafting who presents with a mediastinal mass be evaluated for the possibility of a graft aneurysm.

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# 移植之大隱靜脈血管瘤：罕見肺門腫瘤病例報告

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## 摘 要

在使用大隱靜脈移植的冠狀動脈繞道手術後，繼發之血管瘤屬罕見但可能致命。此病灶在胸部X光片看起來可像縱隔腔腫瘤。此靜脈瘤通常在術後10到20年形成，發生率不到1%。目前對無症狀血管瘤之處理仍無標準作法。傳統上，其被考慮為手術之適應症。本文中報告一例64歲男性，其在繞道手術後18年後發展出靜脈瘤，伴有胸痛及運動時氣促。此病人在接受數次手術切除及重新放置移植血管後成功治癒。