Multiple aneurysm of saphenous vein graft with low symptoms
16 years after coronary artery bypass grafting

E.M. Choukroun*, L.M. Labrousse, F.P. Madonna, C. Deville

Service de Chirurgie Cardiaque et Vasculaire, Hôpital Cardiologique du Haut-Lévêque, Pr Deville, 4, Avenue de Magellan, 33604 Pessac Cedex, France

Received 27 January 2003; received in revised form 27 February 2003; accepted 13 March 2003

Abstract
Aneurysms of saphenous vein graft are a known but rare complication of coronary artery bypass grafting (CABG). In this report, we present a case of a 59-year-old man who presented 16 years after CABG, three aneurysms of the saphenous vein graft to the right coronary artery compressing right atrium but with low symptoms. Transoesophageal echocardiography and CT scan were used to identify the aneurysm which was confirmed by cardiac catheterization. A favourable course was obtained after surgical treatment. We also review the literature on saphenous vein graft aneurysms interesting symptoms, diagnosis, pathophysiology and treatments.

Keywords: Aneurysm; Coronary artery bypass grafting; Saphenous vein graft

1. Introduction
In 1986, a 59-year-old man presented severe angina symptoms and was referred for cardiac catheterization. Severe three vessels coronary artery disease was revealed and he underwent four coronary artery bypass grafting (CABG): left internal thoracic artery (LITA) anastomosis to mid left anterior descending artery and saphenous grafting to the first diagonal, to the first marginal and right coronary arteries. He was physically active, smoker known.

Since his CABG surgery, physical examination and exercise tests were regularly done and revealed normal. The patient was symptom-free during 16 years, when mild dyspnea and atypical thoracic pain appeared. The chest radiograph revealed a right-side homogenous anterior mediastinal mass, with cardiac silhouette enlarged. Transesophageal echocardiography (TEE) was performed and showed a right para-aortic mass compressing slightly the right atrium. TEE and CT scan show three soft-tissue mass, lateral to right atrium, slightly heterogeneous. They measure 5 cm in maximal diameter.

Because of location close to the site of the previous bypass graft, the possibility of a vascular lesion was raised. A cardiac catheterization was performed to determine with greater precision the origin of the mass (Fig. 1). The right coronary bypass reveals three successive aneurismal dilatations. Other saphenous graft were not found and LITA CABG was well.

Surgical treatment was decided and patient underwent resection of the graft and redo CABG on the distal right coronary artery. Concomitantly, a marginal CABG was performed with saphenous vein graft. At surgery, the three aneurysms were opened, and were partially filled with thrombotic material (Fig. 2). Distal anastomosis was excised and a new graft inserted on these old anastomosis. The patient made an uneventful recovery and was discharged home.

2. Discussion
Aneurysmal disease of the native coronary circulation is recognized in 1.4–4.9% of angiographic studies [1], but aneurysms of saphenous vein grafts are rare.

In 1975, Riahi and coworkers reported the first false aneurysm of aortocoronary saphenous vein graft [2].

This entity has been classified as true aneurysm and pseudo or false aneurysm. Pseudoaneurysm can be associated with technical problems at the distal or proximal suture line, or with infectious processes.

In his study, Kalimi [3] reviews 42 reports in the English-language literature and his own experience. Although

* Corresponding author.
E-mail address: emmanuel.choukroun@wanadoo.fr (E.M. Choukroun).
moderate irregular dilatation are frequently found in venous graft, the occurrence of true aneurysms, defined as dilatations greater than 3 cm in diameter, has been reported in less than 30 cases in literature.

2.1. Pathogenicity

Saphenous vein graft false aneurysms can be located anywhere along the graft. Iatrogenic trauma to the saphenous vein during harvesting is a known cause. Inherent weak sites in the venous graft have been described as well, found at valve sites or at branch points, where the normal circumferential arrangement of the smooth muscle layers in the media takes on a longitudinal orientation, thereby creating a weak point of resistance to the stress generated by arterial pressure [1].

True aneurysms represent expansion of all layers of the wall, and are more commonly found within the body of the graft. They usually present 5 years or more after the initial intervention with a reported range of 2 months–21 years [4]. The pathogenesis is not fully understood. They probably develop because of progressive atherosclerosis; exposure of vein graft to systemic blood pressure results in atherosclerotic changes in the graft. Indeed, only 40–45% of graft [5] have normal angiographic appearances 10 years after the grafting procedure, and Teja and co-workers [6] have shown an increased incidence of aneurysm in patients who continue to show hyperlipidemia after CABG. Mycotic infection and sepsis may also result in aneurysmal formation.

By the law of Laplace \( (T = P \times \frac{r}{h}) \), aneurysmal changes in the vein, by increasing the radius \( r \) and decreasing vein wall thickness \( h \) will facilitate subsequent expansion of the aneurysm, if it remains exposed to distending arterial pressure \( P \).

2.2. Diagnosis

False and true venous graft aneurysms are often asymptomatic and discovered as an incidental finding, as in our patient. When it is symptomatic, it is usually due to myocardial ischemia. It is established that the aneurysm is potentially thrombosed in about one half of patients, thereby leading to occlusion or episodic distal embolization. Complications of venous graft aneurysms include myocardial infarction, fistula formation to the right atrium or right ventricle [7], compression, rupture, and secondary hemorrhage [3].

Both true aneurysms and pseudo aneurysms can be detected as hilar masses on chest roentgenogram. A CT scan with intravenous contrast is helpful in identifying the consistency, vascularity, and potency of aneurysms. Furthermore, it is particularly important to demonstrate the location of the mass and its effects on nearby structures.

Some authors also advocated the use of TEE [3] for evaluating these aneurysms.

We strongly believe that when a diagnosis of aorto-coronary aneurysm is evocated, a patient should undergo cardiac catheterization. It will show the aneurysm, but more importantly it will identify other areas of ischemia that might require revascularization during surgery.

2.3. Treatment

Although few reported cases [7] of saphenous vein graft aneurysms were not treated surgically, most of the aneurysms are treated with either exclusion or resection of the aneurysm and revascularization. In some reports the aneurysm was either resected or excluded, without revascularization [8]. Those patients had a postoperative anterior wall myocardial infarction. Several studies reported successful embolization of pseudo aneurysm using coils [9]. However, embolization of aneurysm could preclude blood flow not only in the aneurysm but also to the coronary artery distal to aneurysm.
It is often not possible to resect entirely the aneurysm so we believe that these aneurysms should be surgically excluded from the circulation and the coronary artery distal to the aneurysm should be revascularized. At surgery, concomitantly, other coronary disease could be treated by CABG if necessary [10].

3. Conclusion

In a patient having undergone a CABG procedure, the appearance of a mediastinal mass on a chest radiograph should raise the suspicion of a dilatation of the venous graft. Early recognition will help to prevent complication associated with delayed diagnosis, and decide to treat these lesions surgically.

References


