Giant venous aneurysm jeopardising internal mammary arterial graft patency

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Abstract

The authors report a 79-year old man with a history of coronary bypass surgery, presenting with acute heart failure and elevated troponin. Coronarography revealed a giant saphenous vein graft aneurysm, which was compressing the left internal mammary artery bypass graft. This was confirmed by a multislice enhanced-ECG gated cardiac CT, showing the venous aneurysm responsible for external compression of the arterial graft and its functional occlusion. Myocardial ischaemia, the mechanism leading to cardiac failure, was confirmed by hypoperfusion of the sub-endocardial area shown by the CT. The aneurysm was surgically removed without complications. The patient recovered and his cardiac function improved. This is the first recorded case of compression of the left internal mammary artery by a giant saphenous vein graft aneurysm having triggered severe myocardial ischaemia and heart failure. The authors review the incidence and complications of giant venous bypass graft aneurysms reported in the literature.

Keywords: Venous graft · Aneurysm · Heart failure · Myocardial ischaemia

CASE REPORT

Twenty-three years ago, in 1988, a man now aged 79 underwent coronary bypass surgery with the left internal mammary artery (LIMA) on the left anterior descending artery (LAD), a saphenous vein graft (SVG) on the circumflex (Cx) and an SVG on the right coronary artery (RCA). In 2007 a control coronary angiogram, performed because of exercise angina, showed a preserved left ventricular function, patent LIMA in the LAD, occlusion of the SVG on the RCA and a severe stenosis on the SVG on the Cx (culprit lesion). An angioplasty of the SVG on the Cx was performed successfully. One year later, the patient was admitted for unstable angina and acute heart failure with troponin I level increased to 0.62 ng/ml. Chest X-ray on admission confirmed lung oedema and showed a convexity of the left side of the heart, suggestive of aneurysm (Fig. 1). Coronary opacification revealed a dilatation of the SVG on the Cx beyond the patent stent, with downstream occlusion of the bypass and a compression of the LIMA with decreased distal run-off (Fig. 2 A and B). Left ventricular function was severely impaired (LVEF <35%). We assumed that heart failure symptoms and depressed LVEF resulted from ischaemia. Enhanced-ECG gated cardiac CT (Brillance 64, Philips Healthcare, Cleveland, OH, USA) was performed with 90 ml of iomeprol 400 (Lomeron, Bracco, Milan, Italy) followed by 40 ml of saline, both injected at a rate of 4.5 ml/s, and acquisition occurred at the arterial phase without dose modulation. It confirmed the presence of a partially thrombosed aneurysm of the SVG, 11 cm across (Fig. 2 D and E), responsible for sub-endocardial hypoperfusion (Fig. 2C) resulting from the functional occlusion of the LIMA due to external compression. After multidisciplinary discussion, we decided to reoperate on this patient. His standard EuroSCORE was 12 and his logistic EuroSCORE 31%. The intervention was performed using a cardiopulmonary bypass (CPB) machine. A true aneurysm of the SVG on the Cx was resected (Fig. 2F) and a new SVG was implanted. Total duration of the CPB procedure was 30 min. Due to postoperative low cardiac output, an inotropic support with dobutamine and norepinephrine was initiated. At postoperative day (POD) 1, a right haemothorax was surgically drained.

Figure 1: Chest X-ray showing bilateral infiltrates compatible with lung oedema, cardiomegaly and an abnormal convexity of the left side of the heart, suggesting the aneurysm (black arrow).
patient was extubated on POD 2. Inotropic support was weaned on POD 4. The patient was discharged from intensive care on POD 7. He later developed a urine infection that was successfully treated by antibiotics and finally left the hospital at POD 34. He is currently doing well, in heart failure NYHA functional class II, without angina. At the postoperative control visit, six months after the intervention, the left ventricular ejection fraction measured by echocardiography had increased from less than 35% to 50%.

DISCUSSION

Aneurysms of vein grafts after bypass surgery are a very uncommon late complication: despite thousands of patients undergoing coronary revascularisation, only some tens of cases have been reported in the literature [1]. The potential effects of these aneurysms are thrombosis and/or distal embolisation, myocardial infarction, arrhythmias, fistula, compression of adjacent structures, rupture with haemothorax and sudden death [2–4]. In respect of these catastrophic consequences, most patients are treated surgically by ligature and resection of the aneurysm. Some cases of successful coil embolization have been reported [5].

Echocardiography can be helpful in diagnosis but the large size of the aneurysm and the lack of flow when thrombosed make interpretation difficult. Multislice contrast CT is the first choice for diagnostic testing, since it can identify the consistency, vascularity, location of the aneurysm and its relationship with the adjacent structures. The use of magnetic resonance has been reported, although it is more difficult to perform in acute situations. In our case, multislice CT (MS-CT) revealed the thrombosed aneurysm, the compression of the LIMA and the subsequent cardiac ischaemia proved by the myocardial hypoperfusion during the contrast phase. To the best of our knowledge we report the first case of compression of LIMA by a SVG aneurysm triggering severe myocardial ischaemia and heart failure.

Conflict of interest: none declared.

REFERENCES