Tandem aneurysms of an internal mammary-aortocoronary bypass graft

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Graft aneurysms following aortocoronary surgery are a rare occurrence in clinical practice. Reported cases have mostly involved saphenous vein grafts. Here we report the rare finding of a tandem aneurysm of an internal mammary artery graft which was incidentally detected 17 years following bypass surgery. (*Neth Heart J* 2009;17:300-2.)

Keywords: aneurysm, coronary artery bypass grafting, internal mammary artery, spiral computed tomography

A 69-year-old male patient was admitted to the accident and emergency department at Klinikum Braunschweig (Germany) because of recurrent upper gastrointestinal bleeding. Upper gastrointestinal endoscopy revealed a duodenal ulcer which was treated by coagulation. Thereafter, the patient was admitted to the intensive care unit for blood transfusions and observation. His past medical history included aortic valve replacement 13 years ago as well as aortocoronary bypass surgery 17 years earlier with an internal mammary artery graft to the left anterior descending artery and two further venous bypass grafts; carotid endarterectomy for symptomatic stenosis was performed at the same time. His cardiovascular risk factors included hyperlipidaemia and arterial hypertension.

Upon his admission to the intensive care unit, a chest radiograph was obtained, which showed a well-defined soft tissue-density mass, apparently arising from the left heart border (figure 1). An echocardiogram did not yield further information and a contrast medium-enhanced chest CT was therefore arranged for further evaluation. A helical acquisition using a 16-slice scanner (Siemens Somatom 16, Siemens Medical Systems, Erlangen, Germany) revealed a tandem aneurysm of the internal mammary artery bypass graft (figure 2): more proximally, a small, non-perfused aneurysm with a maximum diameter of 2.2 cm and, distally, a second aneurysm with a maximum diameter of 5.7 cm, corresponding to the pericardial mass on the chest X-ray. The larger aneurysm was partly perfused. On the thin-section primary reconstructions the connection between the larger aneurysm and the internal mammary artery could be seen. Formal catheter coronary arteriography provided no additional information regarding the aneurysms; specifically, no further aneurysm of a coronary artery was detected. Both the venous bypass grafts were occluded. Despite being asymptomatic, an operative revision was advised. Intraoperatively, the aneurysms of the internal mammary artery bypass were confirmed and could be resected. The patient made an uneventful recovery and could leave hospital for rehabilitative therapy soon thereafter.

Discussion

Graft aneurysms are rare following aortocoronary bypass surgery. These have mostly been case reports in the context of saphenous venous graft aneurysms (SVGA). Given that, the true incidence of SVGA is unclear.¹ As in our case, most saphenous vein graft aneurysms are found incidentally; however, their rupture may constitute a fatal complication.^{1,2} In contrast, aneurysms of internal mammary artery are rare. In native vessels aneurysms could be found post-operatively following sternotomy.³ In internal mammary bypass grafts aneurysms are extremely rare. A Medline review with the index terms *internal mammary artery, graft, aneurysm* revealed no more than three case reports of graft aneurysms involving this vessel.⁴⁻⁶

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Figure 1. Conventional frontal chest radiograph showing a large pericardial mass with focal loss of the silhouette of the left cardiac border.

The aetiology of graft aneurysms remains unclear, but atherosclerotic changes found in coronary arteries are virtually always also present in other arterial segments of the body and may predispose to aneurysm development.¹ No evidence-based treatment for such graft aneurysms has been established. In one case series of SVGA, an open surgical repair was found to provide no benefit in the short-term survival rate when compared

with a conservative management.⁴ However, endovascular approaches in SVGA have also been reported.⁷

Here we report a tandem aneurysm of an internal mammary artery bypass graft, incidentally detected 17 years following the original procedure. Apart from generalised atherosclerotic disease, the patient had no other illnesses that may lead to aneurysm formation; specifically, there was no evidence of Marfan disease, fibromuscular dysplasia or Takayasu arteritis.

All of the reported cases referred to above were treated either endovascularly^{4,5} or by re-operation. Given its large size and the partial perfusion of the aneurysm discussed here, an operative revision was also advised in our case.

High spatial and contrast resolution images of vascular pathologies can today be obtained non-invasively prior to intervention using contrast medium-enhanced multi-detector row computed tomography (MDCT). ECG-gated CT angiography of the coronary vessels provides even better depiction of anatomical and aneurysm details. Additional benefits of MDCT as compared with formal catheter coronary angiography are the availability of multi-planar reconstructions, visualising the entire vessel with its surrounding anatomy as opposed to the exclusive demonstration of the vascular lumen.⁸ This is a particular advantage in therapeutic decision making, i.e. when making a decision on the question of open repair vs. endovascular treatment.⁹

In conclusion, we report a rare case of tandem aneurysms of an internal mammary aortocoronary bypass. The possibility of aneurysm formation in relation to arterial bypass grafts should be kept in mind. We speculate that the increasing use of CT may lead to an increase

Figure 2. Contrast medium-enhanced transverse axial CT slices (A, B), showing two aneurysms of the distal internal mammary artery aortocoronary bypass. The more proximal and smaller aneurysm (A) is thrombosed, the larger distal aneurysm (B) is partly perfused. A parasagittal reformation of the same data set (C) shows both aneurysms along the course of the bypass graft.

in the detection of such cases which may in turn help to clarify both the aetiology as well as the best management of these lesions. ■

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