

Negative results - Vascular thoracic Late thoracic pseudo-aneurysm causing collapse of vascular prostheses

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Abstract

The outcome of patients with thoracic vascular prostheses is usually uneventful. We report two cases of collapse of thoracic vascular prostheses which occurred ten and forty years, respectively, after the implantation. The diagnoses were obtained preoperatively by CT-scan or NMR and angiography. Both patients were successfully treated with prosthetic replacement by an open approach.

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1. Introduction

The aortic pseudo-aneurysm is a rare but well described complication of thoracic vascular prosthesis. In this paper we describe two peculiar cases of pseudo-aneurysm leading to the collapse of the original tube without compression of the surrounding structures. This complication did not occur in the early postoperative course, as a consequence of a technical failure, but very late without detectable causes.

2. Case report

2.1. Case 1

A 75-year-old male patient was referred to our unit for recurrent episodes of hemispheric transient ischemic attacks. Ten years earlier, he had undergone a double CABG with a left internal mammary artery to the left anterior descending artery and a saphenous vein graft to the right coronary artery. The operation was complicated by a type-2 aortic dissection that required ascending aorta replacement with a 22-mm Dacron fabric and reimplantation of the venous graft on the vascular prosthesis. The surgeon did not wrap the prosthetic tube with the native aorta. The postoperative course was uneventful and a postoperative CT-scan showed the absence of residual false lumen. At admission, the nuclear magnetic resonance imaging (NMR) showed the typical pattern of a dissection of the ascending aorta that presented a regular circular shape, a diameter of 33 mm and a very thick flap (Fig. 1a). The angiographic study confirmed this finding (Fig. 1b) showing the antegrade perfusion of the pseudoaneurysm. At echocardiography a moderate aortic regurgitation caused by cusp

fibrosis was found. Because of recurrent embolic phenomena, the operation was planned expeditiously. Before sternotomy, a right axillary arterial inflow and a central venous drainage from the right femoral vein were established. Sternal re-entry was uneventful and the great vessels were freed from the surrounding structures without cardiopulmonary bypass. The ascending aorta did not present the usual crimped surface but a smooth and yellow one. We were able to cross-clamp the old prosthesis and open it longitudinally. There was a partial dehiscence of the proximal suture so that the old prosthesis moved freely inside the neo-aorta. The aortic root was replaced with a composite 21/26-mm tube by means of the Cabrol technique. Once the systemic temperature reached 26 °C, the circulation was stopped and the aortic clamp released. The medial half of the distal suture was also interrupted, exposing a raw surface between the old prosthesis and the aortic arch intima. The composite graft was then anastomosed to the healthy aortic arch during a brief period of selective cerebral perfusion from the axillary artery. Finally, the venous bypass was reimplanted on the composite graft. The patient recovered completely and was discharged home on postoperative day 10.

2.2. Case 2

A 56-year-old female patient was referred to our unit for a new onset of arterial hypertension associated to claudicatio intermittens of six months duration. Forty years earlier, she had undergone an aortic coarctectomy with interposition of a 16-mm Dacron fabric. A diagnosis of recoarctation was made at NMR but the CT-scan showed a typical dissection localized at the isthmus portion of the aorta (Fig. 2a and b). The thickness of the flap suggested the hypothesis of collapse of the vascular prosthesis. The angiography confirmed the diagnosis and showed the ret-

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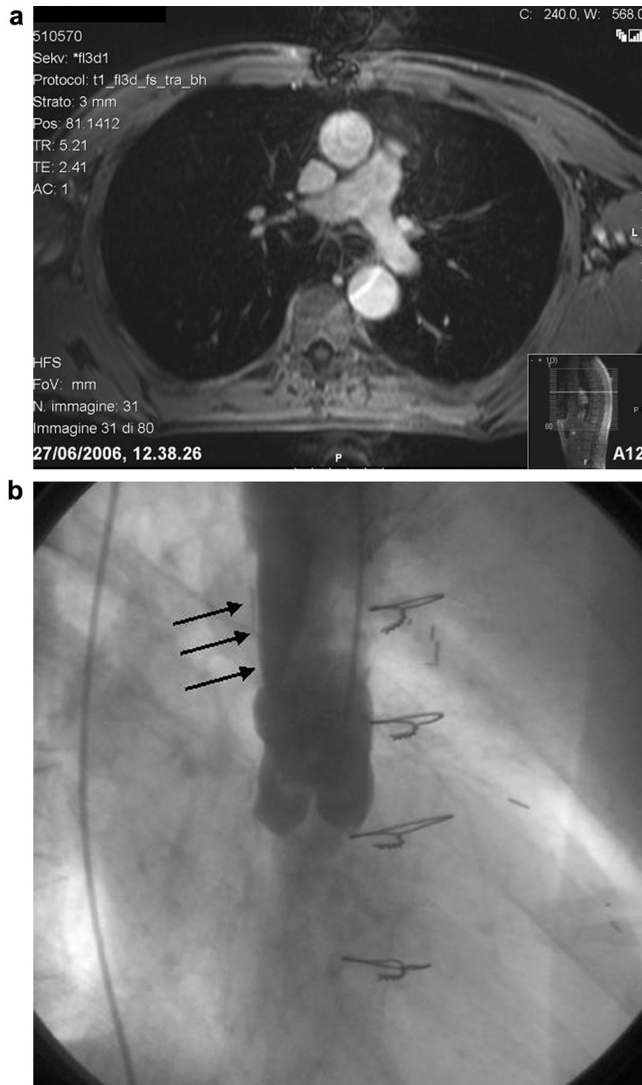


Fig. 1. (a) NMR imaging depicts the typical dissection flap in the ascending aorta. (b) Angiographic view of the collapse of the ascending aorta prosthesis.

rograde filling of the pseudo-aneurysm from the distal anastomosis (Fig. 2c). The residual lumen of the collapsed prosthesis was estimated to be 6 mm and the distal aorta presented a mild dilatation (30 mm). The deployment of a stent-graft was found to be too perilous because of the difficulty to engage the small residual lumen by the sheath of the stent-graft. Then, a surgical correction was planned. The patient was placed in the right lateral decubitus with the left arm raised upward. The left axillary artery was easily cannulated by means of a temporary 8-mm Dacron conduit and a central venous drainage was accomplished through the left femoral vein. The patient was cooled to 20 °C and the lung was separated from the aorta. The external surface of the isthmus presented a smooth and very thin wall and we were able to separate it from the surrounding structures. The pump flow was reduced to 10 ml/kg/min and the left subclavian artery was clamped so as to perfuse the brain through the left vertebral artery. When the neo-aorta was opened, the old prosthesis

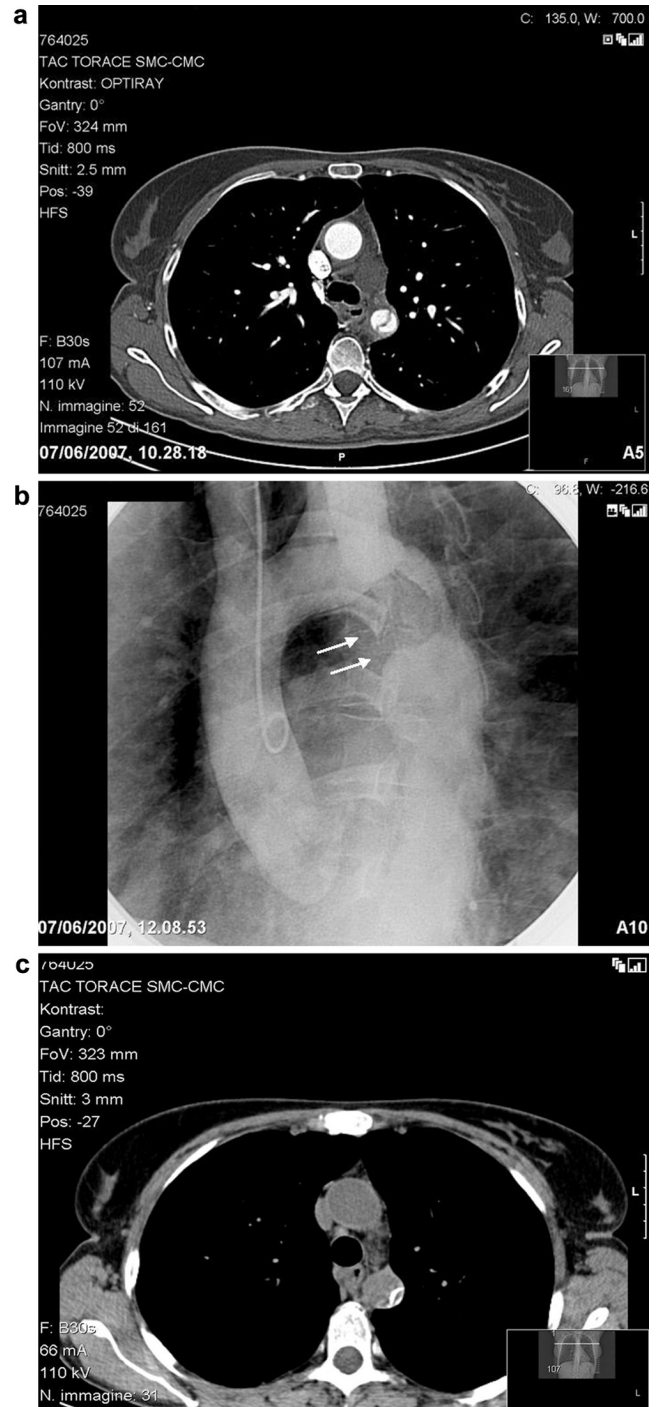


Fig. 2. (a) Chest CT-scan showing the dissection of the isthmus. There is no thrombosis in the external lumen. (b) Direct examination without contrast enhancement. The collapsed prosthesis at distal anastomosis is clearly visible. (c) Angiographic view of the collapse of the interposition graft.

appeared detached for two-thirds of the circumference of the distal line. There was no organized thrombus in the false lumen. The old prosthesis was removed and the previous proximal anastomosis was enlarged by opening the lateral wall of the left subclavian artery to 15 mm. So, a 22-mm Dacron fabric was anastomosed proximally. The prosthesis was clamped and the circulation resumed. The



Fig. 3. Postoperative NMR imaging shows the surgical correction.

prosthesis was beveled to spare the third pair of intercostal arteries and anastomosed distally, so as to exclude the portion of dilated aorta. The postoperative course was smooth and the patient was discharged on the sixth day without any hypotensive drug. The postoperative NMR disclosed a good surgical correction (Fig. 3).

3. Discussion

The pseudo-aneurysm is a well-known complication of vascular prostheses. However, the diagnosis of 'pseudo-aneurysm' implies a saccular bulging leading to rupture or compression of the surrounding structures [1]. In our cases, the pseudo-aneurysm did not present the usual thrombotic process but caused the compression of the original tube mimicking a chronic dissection. Only the medical history of the patient suggested the presence of a vascular complication, otherwise reported as 'iterative aortic dissection' by the radiologist. The symptoms were also related, as in chronic dissection, to the peculiar type of lesion. In the first case, the blood was exposed to a raw and then thrombogenic surface, leading to recurrent cerebral ischemic episodes. In the second case, the tube was compressed by the retrograde flow causing the typical pattern of recoarctation. It is difficult to understand completely the mechanism responsible of this complication. It occurred very late (ten and forty years after) without symptoms or

signs of infection. In fact, the re-entry was uneventful and easier than commonly encountered in the usual pseudo-aneurysm, suggesting the absence of a significant inflammatory reaction. Both prostheses were smaller than usually employed (22 mm and 16 mm, respectively). Probably, the mechanical strain induced by the dilatation of the native aorta could have led to the laceration of the suture and the subsequent separation of the Dacron fabric from the fibrous external sheath, leading to the pattern of a complete dissection.

To our knowledge, there is no report in the English literature about this uncommon complication. Some cases of acute or sub-acute collapse of thoracic prostheses have been reported after deployment of a stent-graft with similar symptoms [2, 3] but the mechanism is completely different (failure to complete expansion of the stent-graft or oversizing of the graft). In the case 1, the surgical approach was mandatory. Responding the case 2, we thought the endovascular repair too risky because of small residual lumen at the distal anastomosis (6 mm). Nonetheless, the endovascular repair is an attractive option for the complications of coarctectomy [4], the association of a small distal arch with a pseudo-aneurysm is considered challenging because of mismatch between the proximal and distal diameters [5] and entails the off-label use of components of the abdominal stent-graft [6] to avoid excessive oversizing.

From the operative point of view, the lesions were easily approached and corrected. Nonetheless, a peripheral cannulation and the use of deep hypothermia seem to be a safe option.

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