Case report

Endovascular treatment of an aneurysm of the descending thoracic aorta in a heart transplant recipient: long-term result

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Abstract

Heart-transplanted patients have a known higher incidence of aortic aneurysms. However, there is paucity of information regarding thoracic localisation in this clinical setting and of the endovascular option in such patients with chronically high level of immunosuppressive agents. We describe long-term follow-up of a 72-year-old man who developed an aneurysm of the descending part of the thoracic aorta 10 years after an orthotopic cardiac transplantation. Because of comorbid medical conditions, classical open-chest procedure could not be performed. An alternative treatment by endovascular repair was applied successfully and allowed a perfect exclusion of the aneurysm. Chronically high level of immunosuppressive agents seems not to be a contraindication to the endovascular option. Consequently, extended cardiovascular screening of heart-transplanted patients is desirable to facilitate early detection and elective endovascular repair.

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1. Introduction

With the increasing number of heart transplant survivors, vascular complications such as aortic aneurysms are prone to happen more frequently [1—3]. Previous series reported in total only seven aneurysms of the descending thoracic aorta in heart transplant patients [1,2,4]. Although cautions have been raised about endoprosthesis’ use in patients treated with chronically high levels of immunosuppressive agents [3], the endovascular approach seems particularly appropriate in this clinical setting. We report the 6-year follow-up of such a technique in a heart-transplant patient presenting with a thoracic aneurysm.

2. Case report

A 72-year-old man came to the heart transplant clinic for routine follow-up in June 2001, and we noted an abnormal mediastinal opacity of about 8 cm diameter on his chest X-ray. After reviewing the chest X-ray performed at the previous follow-up (6 months before), the opacity was found to be already present but at only 5 cm. His past history revealed an ischaemic cardiomyopathy for which he required orthotopic heart transplantation in 1990. He was receiving maintenance immunosuppressive therapy with prednisone (5 mg/day), cyclosporine, and azathioprine. No other immunosuppressive drug was used in this patient. Recent medical events included bilateral claudication and progressive renal failure (creatininemia at 350 μmol/l). Thoracoabdominal magnetic resonance imaging (MRI) showed the presence of a large (8 cm diameter), partially thrombosed aneurysm of the descending aorta (Fig. 1). Left ventricular ejection fraction was at about 50% and there were only trivial lesions on the coronarography. Because of comorbid conditions (age, CPOD, renal failure, diffuse atherosclerotic disease), the patient could not be referred to the traditional surgical repair and we decided to manage this aneurysm by endovascular repair using the Excluder thoracic endoprosthesis (Excluder®, W.L. Gore and Associates, Flagstaff, AZ). The size chosen was a prosthesis of 10 cm in length and 31 mm in diameter (the diameter was oversized by 4 mm).

The procedure was achieved under general anesthesia, with fluoroscopy control (OEC Medical System. Inc., USA). A direct retroperitoneal surgical approach was performed to use the end of the abdominal aorta as vascular access because of bilateral iliac arteries occlusive disease (Fig. 1). The introducer was put in place through a purse-string under direct vision. In order to avoid multi-injection of ionic...
strategy is now well codified [3]. However, an extensive review of the literature (PubMed™, National Library of Medicine) has found only seven cases localised in the descending thoracic aorta [1,2,4]. Among these seven patients, only two have been operated on with success and in both cases by classical open-chest surgery [4]. In the other cases either the rupture occurred ($n=4$) or no treatment was planned although diagnosis has been established ($n=1$) [1,2].

Many factors resulting in, or coexisting with heart transplant, have been implicated in the development and growth of aortic aneurysms [1–3]. They included preoperative classical atherosclerotic risk factors associated with ischaemic cardiomyopathy such as dyslipidaemia, diabetes and hypertension, which are usually exacerbated in the post-transplant period by the anti-rejection treatment. Moreover, many authors consider that either immunosuppressive treatment or factors specific to heart transplantation may play an additive role [1–3]. So, postoperative increase of heart flow and systolic impulsion [5], and/or corticosteroid treatment [1–3] has been implicated. Indeed, studies on animals treated by corticosteroids have shown a high rate of aortic aneurysm formation [6], and same findings have been observed in long-term corticosteroid-treated patients [7]. Moreover, from published reports [1–3], and as in our case, the expansion rate of aortic aneurysms seems more elevated in transplant recipients [2] which could explain an apparent higher propensity to lethal rupture, even at relatively small size [1,2].

Muluk et al. [1] showed that the incidence of thoracic aneurysm is at 0.4% (3 pts/734 pts). So, if only one other group [4] has described successful management of this pathology, we can advocate that for other transplant centers, either the diagnostic was not done or most likely no open-chest surgical treatment appeared reasonable facing the comorbid conditions usually found in these patients. However, the endovascular option is now increasingly gaining acceptance and is becoming the first option for the treatment of high-risk patients.

Lastly, little is known and cautions have been raised about endoprosthesis’ use in patients treated with chronically high level of immunosuppressive agents [3]. This might theoretically induce less efficient results due to the chronic action induced by the oversized endoprosthesis on the native aortic wall at the landing zone level. Indeed, the oversizing induces by itself an internal additional pressure that might play a role in weakening the wall. Although stent-graft does not heal firmly within the aortic wall, there is a tissue-healing response and a typical foreign-body reaction at the proximal and distal oversized graft to artery interface [8]. As corticosteroids are well known to impair connective tissue regeneration [7], inhibit fibroblast proliferation [7] and suppress granulation tissue formation [7], their chronic use could theoretically be related to the weakening of the aortic wall. Similarly, the use of rapamycin is associated with a significant increase in the incidence of post-surgical wound healing in cardiac transplant recipients by affecting all steps of the wound healing process [9] and chronic administration might be related to similar risk. However, the 6-year follow-up of our patient without device related complication and other recent encouraging mid-term reports in transplanted
patients [3,10] strengthen the strategy of using the endovascular approach in this difficult clinical setting and consequently support the development of a large screening in this high-risk population.

In conclusion, our patient’s case confirms that endovascular treatment of thoracic aorta aneurysm can be successfully applied in high-risk transplant recipients. Long-term high levels of immunosuppressive agents seem not to modify the efficiency of the endovascular approach. Subsequently, as the number of long-term survivors after cardiac transplantation is increasing, extended cardiovascular screening is desirable to facilitate early detection and elective endovascular repair.

References


