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Case Report
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Endovascular Correction of Ascending Aortic Pseudoaneurysm

Lucas Regatieri Barbieri, Thais Amarante Couto, Eliane Cruz, Rubens Andreole Carvalheiro, Oscar Jaime Morales Medranos and Noedir Antônio Groppo Stolf*

Department of Cardiovascular Surgery, Beneficência Portuguesa de São Paulo, Brazil

Abstract

A common complication that has been reported after cardiac surgery is the Aortic Pseudoaneurysm (PSAs). The safety and efficacy of endovascular therapies for this pathology is still controversial. However surgical management of aortic PSAs is associated with high mortality and morbidly and in some cases is not even feasible so percutaneous closure has been described as an alternative.

In this paper, we present a review of the literature and a case of an endovascular replacement of Aortic PSAs after aortic valve replacement.

Keywords: Aneurysm; Endovascular; Pseudoaneurysm; Aorta; Reoperation

Introduction

Aortic pseudoaneurysm is a common complication that have usually been reported after thoracic surgery, including coronary artery bypass grafting, aortic valve replacement, orthotropic cardiac transplantation and aortic dissection repair.

Aortic PSAs are associated with anastomosis or cannulation of the vessel, leading to a poor healing process and defects in the layers of the wall additionally, and traumatic, inflammatory, or infectious event can be associated with the development of aortic PSAr.

Case Presentation

A 67 years old female was referred to the service with an aortic bioprostheses dysfunction. She was reoperated and another pericardial bioprostheses was implanted. The patient had an uneventful recovery. After three months, she was readmitted with bleeding through sternal incision. A CT scan showed a pseudo aneurysm of distal ascending aorta (Figure 1-3). The patient was reoperated with hypothermia and circulatory arrest. The lesion was in the previous aortic canulation site and it was closed with pledget stitches and a pericardial patch sutured around. After a few days, the patient had another bleeding in the incision and CT scan showed similar pseudo aneurysm. Due to the fragile tissue in aneurysm neck, an endovascular procedure was indicated through the ventricular apex. A guide wire was introduced in the right subclavian artery until brachiocephalic trunk. A pigtail catheter was positioned in coronary sinus of Valsalva through femoral artery. A Gore-Ctag endoprosthesis was introduced through a purse in left ventricle apex and it was positioned with the aid of angiography and transesofageal echocardiograph the control angiography showed excellent result (Figure 4-7). The patient had an excellent post-operative recovery and was discharged in the 7th day. One month later, CT scan showed complete occlusion of pseudo aneurysm (Figure 8-9).

Discussion

Pseudoaneurysm of ascending aorta is being reported in literature more frequently as single case and less frequently as series of cases. A systematic review published in 2014 of the period of 1980 to 2014 found 3044 citations with 355 treated pseudoaneurysms, 91.5% single case and 8.5% series of cases [1-45].

In regard to etiology, 76% of cases is due to previous cardiovascular surgery, particularly Surgery of the aorta, 5% thoracic trauma, 4.4% inflammatory; infectious; autoimmune and 14.6% undetermined Conventional Surgery should be well planned with alternative cannulation site (femoral vessels; auxiliary artery) for cardiopulmonary by-pass, deep or moderate hypothermic Cardiopulmonary by-pass should be initiated before sternotomy in part of cases. Series of 10 to 60 cases report mortality of 6.7% to 46% and recurrence up to 12% within 10 years [1,3-7,9,11-18,40,43].

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Correspondence:
Lucas Regatieri Barbieri, Department of Cardiovascular Surgery, Beneficência Portuguesa de São Paulo, Brazil, E-mail: drlucasbarbieri@gmail.com

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Figure 1: Computed angiotomography: ascending aortic pseudoaneurysm in its distal portion.

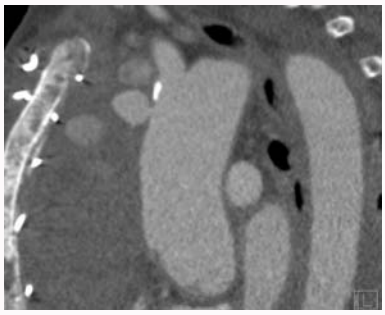

Figure 2: Computed angiotomography: ascending aortic pseudoaneurysm at its distal portion.

Figure 3: Computed angiotomography: ascending aortic pseudoaneurysm at its distal portion.

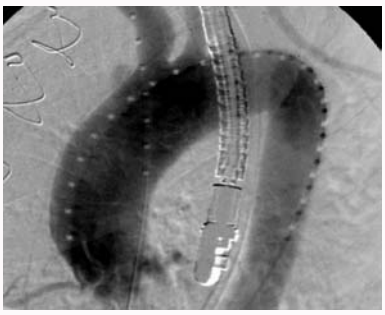

Figure 4: Aortography: ascending aortic pseudoaneurysm in its distal portion, presence of transesophageal echocardiogram.

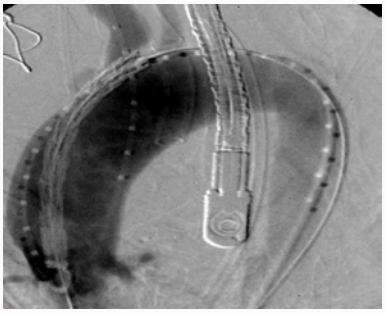

Figure 5: Aortography: pseudoaneurysm of ascending aorta, in its distal portion. Presence of the transesophageal echocardiogram probe. Placement of the endoprosthesis in the ascending aorta through the aortic transvalvar, referenced by the pigTail catheter positioned in the right valsava sinus, to identify the right coronary ostium.

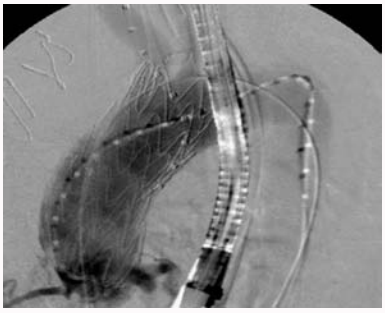

Figure 6: Aortography: Presence of the transesophageal echocardiogram probe. Release of the endoprosthesis in the ascending aorta *via* the aortic transvalvar, with filling of the right coronary ostia.

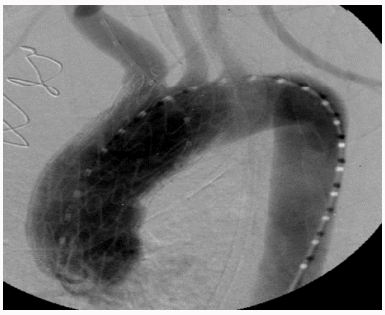

Figure 7: Aortography: occlusion of ascending aortic pseudoaneurysm by endoprosthesis.

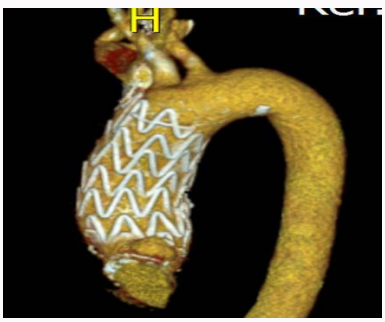

Figure 8: Computed angiotomography: occlusion of ascending aortic pseudoaneurysm by endoprosthesis.

In regard to pseudoaneurysm after cardiovascular Surgery it has been reported to occur after coronary by-pass surgery, valve Surgery, heart transplantation and especially after Surgery of the aorta. Its incidence varied from 0.5% to 13%, higher frequency in follow up with image. The location of pseudoaneurysm is the site of aortic cannulation, cardioplegia infusion, aortic clamping, saphenous vein anastomosis and aortic sutures (Figure 10).

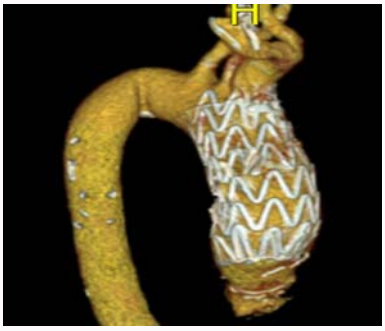

Figure 9: Computed angiotomography: occlusion of ascending aortic pseudoaneurysm by endoprosthesis.

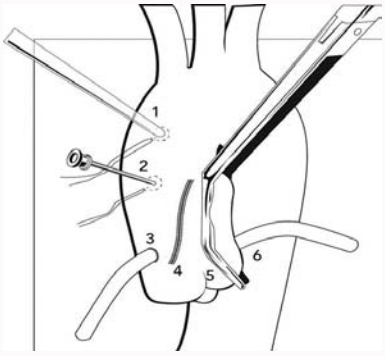

Figure 10: Schematic.
The location of the pseudoaneurysm is related to the site of cannulation (1), infusion site of cardioplegic solution (2), graft anastomosis (3), suture (4), aortic clamping (5) and aortic anastomosis (6).

Due to high mortality and morbidity especially in acute clinical presentation, it is very attractive the possibility of percutaneous treatment of post cardíaca Surgery pseudoaneurysm. On the other hand the treatment with Amplatzer septal occluder device. In the present case report the pseudoaneurysm was in the cannulation site in a reoperation of aortic valve surgery. Conventional surgery was performed with early recurrence. The percutaneous treatment was done with use of a endovascular prosthesis with early and medium term success [2,10,19-21,23-39,41-45].

This case report and literature review emphasizes the possibility of endovascular treatment of pseudoaneurysm after cardiovascular surgery in particular cases.

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