

Ascending Aortic Pseudoaneurysm: A Rare Complication of Aortic Valve Surgery

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1. Abstract

1.1. Introduction: False aneurysm of the ascending aorta is a rare complication of aortic valve surgery. It can be associated with significant mortality.

1.2. Caser report: We report the case of a false aneurysm of the ascending aorta, diagnosed 1 year after aortic valve replacement and a replacement of the ascending aorta by a supra coronary tube for an endocarditis in a patient already operated within the framework of tight aortic stenosis on bicuspidia with dilatation of the ascending aorta. The patient was reoperated with placement of extracorporeal circulation in femoro-femoral associated with selective cannulation of carotids. Peroperatively, we found a dehiscence between the proximal aorta and the Dacron tube that was closed by patches patched by the right trans-auricular approach in circulatory arrest. The bacteriological examination of the specimen was positive for negative Staphylococcus coagulase. The follow-up was simple with a total of 40 days of antibiotic therapy.

1.3. Conclusion: The ascending aortic pseudoaneurysm is a rare or even exceptional complication of cardiac surgery, the etiology, pathophysiology and natural course of which are still poorly understood. This complication of cardiac surgery remains fraught with high mortality, despite advances in cardiovascular surgery. Each case of ascending aortic pseudoaneurysm is individual and should be managed accordingly.

2. Introduction

Ascending aortic pseudoaneurysm is a rare complication of aortic valve surgery. It can occur several months or even years after surgery and can be associated with significant mortality. We report a case of ascending aorta pseudo aneurysm, occurred one year after redux aortic valve and ascending aorta replacement for infectious endocarditis. We discuss in this article the diagnostic and therapeutic aspects of this entity.

3. Case Report

A 36-years-old man, with a medical history of aortic valve replacement with super coronary aorto-aortic graft for bicuspid aortic valve stenosis and a 50 mm ascending aorta aneurysm four years ago. Two years later, he was operated again for infective endocarditis on the aortic prosthesis related to aortic prosthesis disinsertion with non-coronary sigmoid valve abscess. He underwent an exclusion of the abscess and reconstruction of the aortic ring by bovine pericardium patch below the coronary ostia, an aortic valve replacement by a mechanical prosthesis and replacement of the old supra-coronary tube with another dacron tube. On leaving cardiopulmonary bypass, the heart rate was in full AVB (abscess of the ring), requiring the installation of an epicardial pace maker. In addition, the postoperative course was simple, with a totalization of 40 days of antibiotic therapy and control by satisfactory trans-thoracic ultrasound with a preserved left ventricular function and a

good profile of the aortic prosthesis. The patient was readmitted after one year for chest pain associated with clinical and laboratory inflammatory syndrome. Transthoracic cardiac ultrasound showed systolic heart function within normal limits and normal function of the aortic prosthesis. There was no evidence for infective endocarditis. The examination also revealed a hyperechoic formation on

the anterior side of the ascending aorta from the aortic root with no visible flow within it.

A CT scan of the thoracic aorta was performed and showed a formation on the right anterior aspect of the ascending aorta of 93×77 mm, consistent with a partially thrombosed false aneurysm (Figure 1).

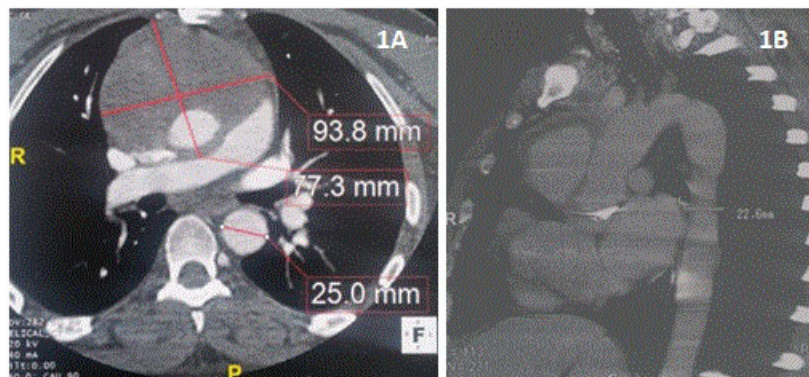


Figure 1: CT scan of the thoracic aorta showing a formation of the ascending aorta of 93×77 mm, consistent with a partially thrombosed false aneurysm

The patient was then resumed surgically with establishment of an extracorporeal circulation in the femoro-femur associated with selective cannulation of the carotids and discharge through the tip of the left ventricle by thoracotomy. We did a revision of the old scar and a sternotomy. We discovered a dehiscence between the proximal aorta and the Dacron tube which was closed with points patched via the right transauricular approach in circulatory arrest. Bacteriological examination of the surgical specimen was positive for negative *Staphylococcus coagulase*. The follow-up was simple with a total of 40 days of antibiotic therapy. The CT scan objectified peri-aortic fluid formation without extravasation of contrast product in favor of a non-circulating hematoma. Given the lack of systemic repercussions of this training, we opted for medical treatment with regular ultrasound and radiographic monitoring in cardiology consultation.

4. Discussion

The ascending aortic pseudoaneurysm, occurring in the course of aortic valve replacement surgery, could be explained by total or partial dehiscence between the graft and the walls of the aorta [1]. This is a rare, if not exceptional, complication of this type of surgery.

Its incidence remains to be considered in patients who have already undergone coronary or aortic surgery and, in particular in patients who have undergone aortic valve replacement for whom the incidence is approximately 0.6% [2, 3]. Like all aneurysms, it presents a vital risk linked mainly to a significant increase in its diameters and the frequency of serious complications that it can cause (rupture, fistula, compression of the underlying organs and thrombosis) [4]. This risk can be reduced by early diagnosis. The indication for surgery depends on its diameter and location.

Despite advances in surgery, this pathology is still fraught with significant morbidity and mortality [3].

The time between a pseudoaneurysm diagnosis and aortic surgery varies widely. The literature reports an interval which can vary from a few hours [5], a few weeks to a few years [6]. Sites deemed to be potential locations for pseudoaneurysms are the aortotomy scar, the cannulation point of the aorta or the distal anastomosis of the aortic graft [7, 8].

The pathophysiology of the development of ascending thoracic aortic pseudoaneurysm in patients with a history of aortic surgery appears to be related to deterioration of the anastomosis site or graft infection [9].

After aortic valve surgery, a quarter (25%) of patients who develop an ascending aortic pseudoaneurysm remain asymptomatic. In the other cases, the clinical presentation is variable. It can be dyspnea, stridor by compression of the mediastinal organs, congestive heart failure most often be related to a fistula in the heart chambers, nonspecific chest pain by compression or erosion of mediastinal structures, angina by compression of the coronary arteries, hemoptysis or massive hematemesis (secondary to aorto-bronchial or aorto-esophageal fistula, respectively), dysphagia by compression of the esophagus [10, 11].

The diagnosis of an ascending aortic pseudoaneurysm is most often made by systematic morphological exploration as part of an unexplained thoracic symptomatology after aortic valve surgery. The different imaging techniques that are the most effective to confirm the diagnosis are: aortic angiography (aortography), trans-esophageal cardiac ultrasound, thoracic CT angiography and thoracic MRI angiography [1]. These different examinations provide important informations that can help in the choice of the surgical

strategy.

The main surgical challenge is to choose an approach that provides the most secure access to the cardiac area, especially in the presence of a false aneurysm anterior to the contact with the sternum.

An appropriate choice of the cannulation modality will prevent fatal hemorrhage during the sternotomy. Other surgical challenges are dissection and control of the aorta and maintaining adequate brain perfusion.

Several authors favor the placement of the CPB before the sternotomy. However, the best approach to the cannulation sites remains undefined and depends mainly on the site and the size of the pseudoaneurysm [12, 13].

Femoro-femoral or axillary cannulation is essential. However, in cases of large false aneurysms, selective cannulation of the carotids is often necessary.

In their series, [1, 13] assert that this approach preserves cerebral perfusion and maintains a correct systemic flow of extracorporeal circulation. However, patients in both series presented neurological sequelae. Because of the risk of stroke, carotid cannulation has not been widely used.

Another alternative has been described which is circulatory arrest by profound hypothermia to protect the brain, to dissect and control the aorta more easily and to prevent sudden and extreme blood loss.

Surgery for false aneurysms of the ascending aorta remains burdened with a high operative mortality of around 20% [3, 4]. This mortality is increased by the urgency of the surgery.

Other operative risk factors are large aneurysms, pre-existing dilation of the ascending aorta, obesity and high blood pressure.

In addition to the usual complications of cardiac surgery, there is the increased risk of stroke during selective carotid cannulation [2, 5].

All the authors agree that early diagnosis and repair can overcome the late stage and avoid this high morbidity and mortality rate.

The best surgical strategy to limit the risk of perioperative death and recurrence of pseudoaneurysm remains uncertain [16].

Surgical repair should be offered even in asymptomatic patients due to the unpredictable course of pseudoaneurysms. Radical replacement of the diseased portion and removal of any foreign material should be favored over simple repair procedures because of the recurrence of false aneurysms and the risk of infection [17,18].

The choice of the aortic substitute is another problem that the surgeon faces. The ideal would be a replacement with an aortic homograft, especially in the face of an inflammatory syndrome.

5. Conclusion

The ascending aortic pseudoaneurysm is a rare, if not exceptional complication of cardiac surgery, the etiology, pathophysiology and

natural course of which are still poorly understood. The diagnosis is often accidental. The clinical polymorphism of the condition requires the use of morphological investigations to establish an early diagnosis and determine the appropriate therapeutic attitude. Careful preoperative planning allows for safe entry to the cardiac area. A combination of techniques can alleviate and minimize blood loss. Methods of preserving cerebral perfusion should be considered and the modalities of cannulation depend on the nature of each case. This complication of heart surgery remains fraught with high mortality, despite advances in cardiovascular surgery. Each case of ascending aortic pseudoaneurysm is individual and should be managed accordingly.

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