

Case report of a very serious endocarditis course with an aortic pseudo-aneurysm and concomitant right and left heart endocarditis

Cas sévère d'un pseudo-anévrisme aortique concomitant à une endocardite cardiaque droite et gauche

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Résumé

Introduction : Le pseudo-anévrisme de l'aorte ascendante est une complication rare mais potentiellement mortelle survient principalement après une chirurgie cardiaque. Nous rapportons un cas sévère d'un pseudo-anévrisme aortique avec une endocardite cardiaque droite et gauche. Une situation sévère gérée avec succès.

Observation : Un homme de 47 ans a eu deux remplacements valvulaires mécaniques aortiques pour deux épisodes d'endocardite infectieuse, puis un stimulateur cardiaque. Une endocardite récurrente a été confirmée par des hémocultures qui ont isolé un staphylocoque à coagulase négative et une échocardiographie montrant des végétations sur les dérivations du stimulateur cardiaque, un abcès de l'anneau aortique et une fuite paravalvulaire. Une semaine plus tard sous antibiothérapie, l'échocardiographie a identifié un pseudo-anévrisme de l'aorte ascendante proximale. L'élargissement antérieur de l'aorte, l'état infectieux et le débit aortique pulsatile élevé ont été identifiés comme des facteurs qui ont probablement favorisé la formation d'un pseudo-anévrisme. L'échocardiographie a également montré une dysfonction ventriculaire droite due à une compression externe de l'artère coronaire droite par le pseudo-anévrisme. Le patient a eu une racine homogreffe aortique et un remplacement réussi du tube aortique avec extraction du stimulateur cardiaque infecté. Le traitement antibiotique a été poursuivi pendant 5 semaines. Un stimulateur cardiaque a été implanté au 15^{ème} jour. Après 18 mois de suivi, le patient se portait bien et avait repris son activité professionnelle.

Conclusion : Le cas était particulier par une endocardite infectieuse continue concomitante qui augmentait la gravité de la maladie. La chirurgie reste le traitement de référence, lorsque le risque opératoire est surmonté, le pronostic est favorable.

Mots-clés

Echographie, aorte ascendante, valve aortique, endocardite infectieuse, pseudoanevrisme

Summary

Introduction : Ascending aortic pseudoaneurysm occurs mainly after cardiac surgery. It is a rare but a potentially fatal complication. We report a case of a highly life-threatening condition with a large aortic pseudo-aneurysm and an ongoing right and left heart endocarditis that was successfully managed.

Case report: A 47-years-old man had two recent aortic mechanical valve replacements for two infective endocarditis episodes, then he received a pacemaker. He presented for fever and weight loss. He had a severe infectious clinical and biological syndrome. Recurrent endocarditis was confirmed by hemocultures that isolated a coagulase negative staphylococcus and echocardiography that showed vegetations on the pacemaker leads, an aortic annulus abscess and a paravalvular leak. Parenteral adapted antibiotics were prescribed, and a surgical treatment was indicated. One week later, echocardiography identified a pseudoaneurysm of the proximal ascending aorta (on the site of the previous aortotomy). It rapidly developed than was partially thrombosed. Previous enlargement of the aorta, infectious condition and the high pulsatile aortic flow were identified as factors that probably favored the pseudoaneurysm formation. Echocardiography showed also a right ventricular dysfunction due to right coronary artery external compression by the pseudoaneurysm. The condition was complex, surgery was performed under femoro-femoral extracorporeal circulation and deep hypothermia cardiac arrest. The patient had an aortic homograft root and aortic tube successful replacements with extraction of the infected pacemaker. Antibiotic therapy was continued for 5 weeks. A pacemaker was implanted at day 15 The immediate outcome was favorable, mechanical ventilation was stopped at day 1 and inotropic support at day 4. On 18 months follow-up the patient was doing well, and he had resumed his professional activity.

Conclusion ; Ascending aorta pseudoaneurysms a rare but a severe complication of cardiac surgery. This case was particular by a concomitant ongoing infective endocarditis that increased the severity of disease. Surgery remains the reference treatment, when the operative risk was overcome, the prognosis was favorable.

Keywords

Echocardiography, ascending aorta, pseudoaneurysm, aortic valve, infective endocarditis

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INTRODUCTION

Ascending aortic pseudoaneurysm is a very rare but potentially fatal complication. It can be due to infectious or traumatic etiologies, but It occurs mainly after cardiac surgery. (1-3) The reference treatment is surgery (redo) which is challenging and yields a high mortality. It was not previously reported a surgical management of ascending aorta pseudoaneurysm with right and left heart endocarditis.

CASE PRESENTATION

The patient was a 47-year-old man with history of two mechanical prosthetic aortic valve replacements (table 1). The first surgery was performed seven months ago it was indicated for an aortic valve endocarditis with an annular abscess. The aortic valve was tricuspid and stenotic. The ascending aorta was enlarged (4.8 cm). The second surgery was performed 38 days after the first one for an early infective endocarditis complicated by a severe paravalvular leak. An *Acinetobacter Baumannii* was identified as the causal bacteria. A permanent pacemaker was implanted 12 days later for a persistent complete atrioventricular block.

The patient presented to our service with the chief complaints of fever and weight loss that began from several days. He also complained from chills fatigue and anorexia. On examination the patient had a high temperature (40°C), a tachycardia (110 bpm), a blood pressure of 110/60 mmHg, a transcutaneous oxygen saturation of 95%, and he had pulmonary crackles. He did not have peripheral edema nor cutaneous signs. There were no local signs of pacemaker infection. On ECG the ventricular rhythm was paced. He had a low hemoglobin level 6.8g/dl, leucocytes 14600/mm³ and C reactive protein 43mg/l were elevated. Renal and hepatic functions were normal.

These findings were highly suggestive of a recurrence of infective endocarditis. The patient was admitted to our intensive care unit and monitored. After blood sampling for hemocultures, the patient received a triple parenteral antibiotic therapy.

Hemocultures isolated a multi-resistant coagulase-negative staphylococcus. Antibiotics were adapted.

The first transthoracic (TTE) and transesophageal (TOE) echocardiography showed an aortic annular posterior abscess, a paravalvular leak and vegetations on the pacemaker leads. (Figure1). A surgery was indicated. Seven days later the TTE was repeated before referral to surgery. It showed a pseudoaneurysm (8*4.5 cm) on the anterior side of the proximal tubular ascending aorta (Figure 2), (See supplementary video 1, which show the pseudoaneurysm rising from the anterior aortic wall), we also noted a right ventricular dysfunction. We did not

perform TEE due to the anterior location of the pseudoaneurysm and risks of rupture if there is a sudden increase in blood pressure. One week later a thick thrombus lined the pseudoaneurysm wall (Figure 3) and may be contributed to its stabilization.

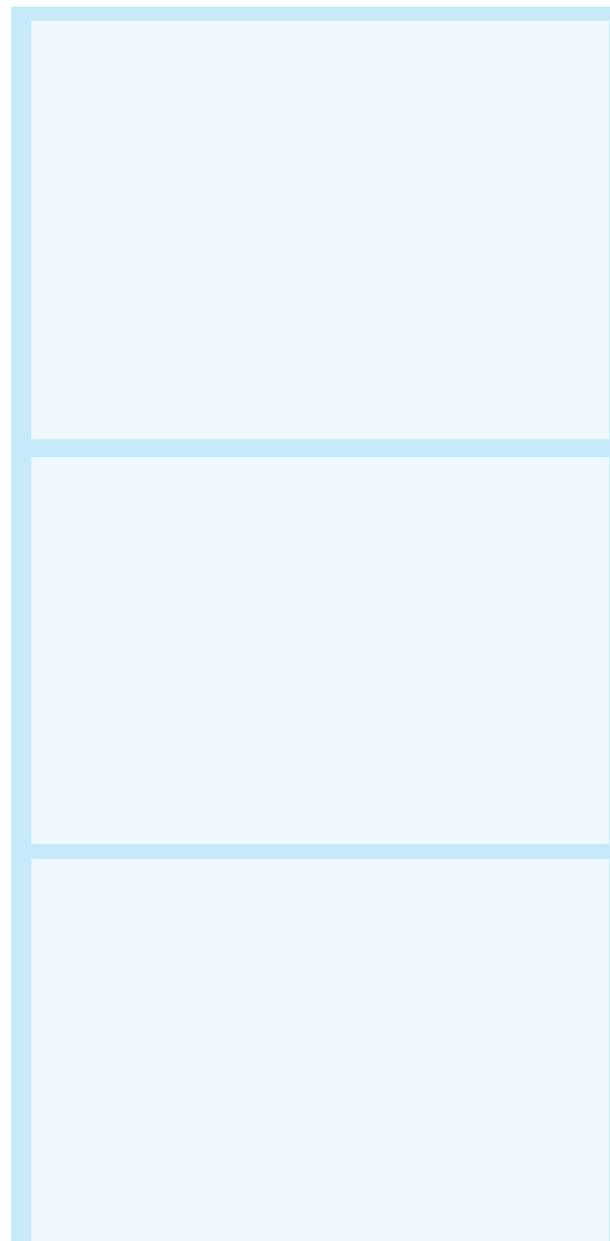


Figure 1 : 1A: Transoesophageal echocardiography, aortic long axis mid oesophageal view; posterior aortic abscess (white arrow). 1B: Transoesophageal echocardiography Color Doppler long axis mid oesophageal aortic view; severe posterior aortic regurgitation (yellow arrow). 1C: Transthoracic parasternal right 2-chamber view: multiple vegetations on the ventricular pacemaker lead (blue arrows). Ao: Ascending aorta

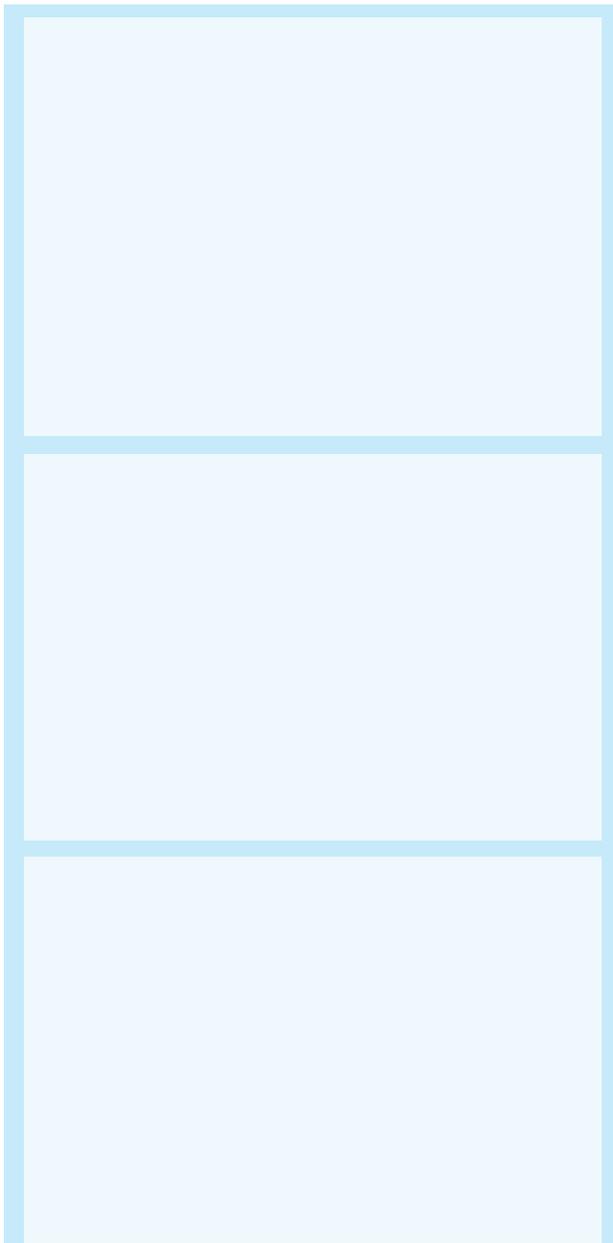


Figure 2: Transthoracic echocardiography. 2A: Parasternal long axis view; Aortic pseudoaneurysm (yellow lozenge) rising from the anterior wall of the proximal ascending aorta
2B: basal parasternal short axis view; pseudoaneurysm (yellow lozenge) rising from the anterior aortic wall
Ao: Ascending aorta

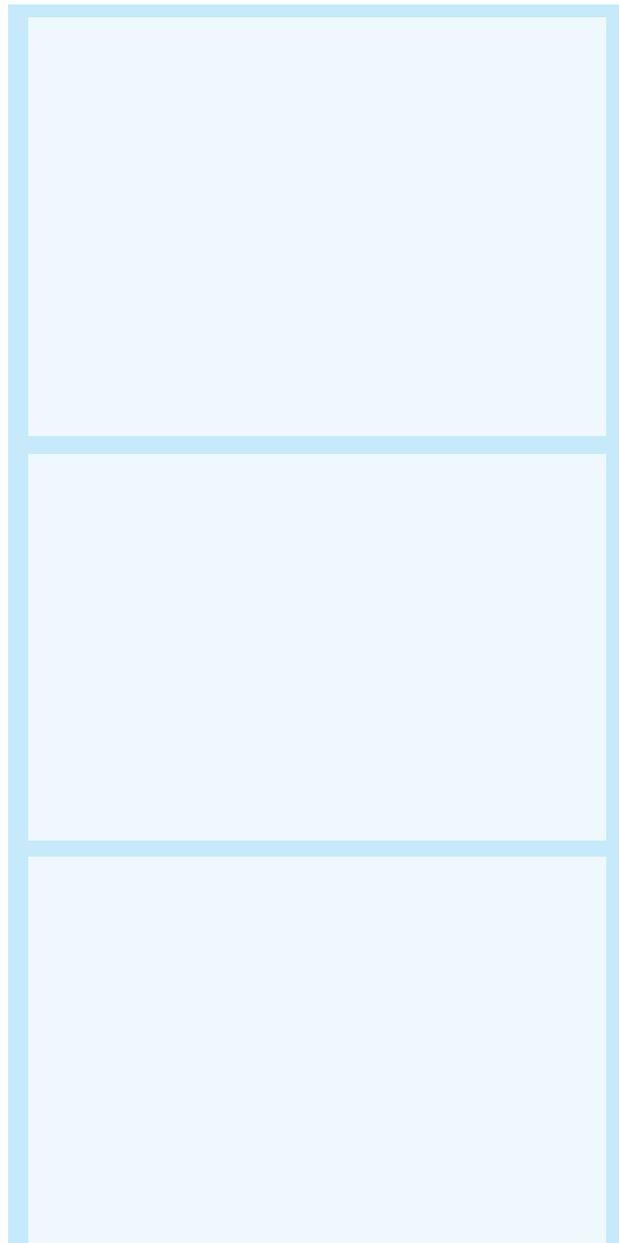


Figure 3: Transthoracic echocardiography (seven days after the previous one) . 2A: Parasternal long axis view; Aortic pseudoaneurysm (yellow lozenge) rising from the anterior wall of the proximal ascending aorta with a thick thrombus (T) lining its wall
2B: basal parasternal short axis view; pseudoaneurysm (yellow lozenge) rising from the anterior aortic wall with a thick thrombus lining its wall
Ao: Ascending aorta, T: Thrombus

Table 1: Important milestones related to interventions and diagnosis

Date	June 2016	July 2016	August 2016	September 2016	February 2017	April 2017	September 2019
Event	Infective endocarditis on a native stenotic aortic valve	Aortic mechanical valve replacement (Saint Jude® N°21)	Early post-operative prosthetic valve infective endocarditis	Aortic mechanical valve replacement (Saint Jude® N° 23) and pacemaker implantation	Infective endocarditis on the cardiac pacemaker and on the mechanical aortic valve Ascending aorta pseudo-aneurysm	Aortic root homograft replacement and aortic tube replacement Reimplantation of a pacemaker	Last follow-up point

The patient was transferred by plane with medical assistance to a reference cardiothoracic surgery in to undergo an aortic valve and aorta replacements. Surgical difficulties had to be identified and to be prevented, mainly the pseudoaneurysm rupture when performing the sternotomy due to its anterior location and its wideness. The patient had an active infective endocarditis on mechanical aortic prosthesis and cardiac device. A valve replacement by an aortic homograft was preferred.

First the surgeon cannulated the femoral artery and vein. He placed a balloon through the contralateral femoral artery for endo-clamping of the descending aorta. He performed a lateral thoracic incision for apical left ventricular discharge cannulation and a bilateral cervicotomy for carotid cannulation.

The hypothermic circulatory arrest technique was used. When performing the median sternotomy, the pseudoaneurysm which eroded the sternum was opened. An anastomosis of the 28mm polyester aortic tube to the brachiocephalic artery was realized, the tube was clamped after cardiac arrest by Custodiol perfusion. Pacemaker leads were extracted. Operative findings consisted in a total ventriculo-aortic disjunction, a fistula between the aortic root and the right ventricle, a pseudoaneurysm taking origin on the previous aortotomy and causing an occlusive compression of the right coronary artery.

The surgeon performed an implantation of an aortic root homograft with reimplantation of the left main coronary artery. He made a termino-terminal double over-lock sew of the aortic tube to the aortic root, then applied a bio glue on the suture. Ventricular stimulation was insured by an epicardial leads related to an external cardiac stimulator.

The mechanical ventilation was stopped at day 1 after surgery and the hemodynamic stability was obtained by low doses of continued dobutamine infusion for 4 days. The patient received a blood transfusion to correct a post-operative diffuse bleeding and deglobalization. Antibiotic therapy was continued for 5 weeks.

A pacemaker was implanted at day 15.

After 18 months follow-up the patient was doing well,

and he had resumed his professional activity

He had a moderate left ventricular hypertrophy with a left ventricular ejection fraction of 48% and a global longitudinal strain of -15%, aortic prosthetic valve had normal morphology and function (see Supplementary Video 2, which shows the normal aspect of the aortic prosthetic valve) as well as the aortic tube (see Supplementary Video 3, which shows the normal aspect of the aortic tube). The right ventricular function was normalized, and pulmonary systolic pressure was 25 mmHg.

DISCUSSION

Ascending aortic pseudoaneurysm is a very rare but severe complication after cardiac surgery. Its incidence was estimated to 0.5%. (4) It occurs at a variable delay, from few months, like in our patient, to several years. (5,6) It yields a high morbidity and mortality rate that ranged from 29%-46%. (6) It occurs usually in the site of aortic cannulation or aortotomy. (4) There are risk conditions that should be recognized, among them we identified in our patient, the previous aortic enlargement, the infectious state, and we incriminated the highly pulsatile aortic flow due to an important paravalvular leak. Other factors, like connective tissue disease, were not identified in this case. The partial thrombosis of this pseudoaneurysm probably aided to its stabilization and allowed differed surgery. The surgery was complex and aimed not only to treat the pseudoaneurysm but also to treat concomitant right and left heart infective endocarditis on a heart device and a mechanical aortic prosthetic valve.

It is important also to highlight in this case the right coronary occlusion by a compressive mechanism that yielded a right heart dysfunction and an additive operative and reanimation risk. This latter complication was previously described and worth to be recognized before surgery is performed. (7)

Some percutaneous procedures or less invasive surgery techniques to treat aortic pseudoaneurysms were

reported in the literature. (8,9) However, these techniques are only suitable for isolated non complicated pseudoaneurysms. In our patient the high-risk redo surgery was well planned and led in very secured manner. The immediate and long-term outcome were uneventful and favorable.

CONCLUSIONS

Ascending aorta pseudoaneurysm is a rare but life-threatening post heart surgery complication. One should suspect it in case of wound bleeding, infectious syndrome, or chest pain
Suspicion threshold should be low in patients having risk factors like aortic wall fragilization and infection.

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A redo surgery remains the reference treatment for this condition, even if other techniques can be discussed in frail patients with isolated non complicated aortic pseudoaneurysms.

This high-risk surgery is preferably led in reference centers with large experience in aortic surgery. When operative risk could be overcome, the later prognosis can be very favorable

Patient's perspective:

"I had been operated three times, every time, It was a new hope for me and not a new threat. Every time, I was so tired that surgery was the only salutary solution for me. Now, I am very happy to work without difficulty and assist my family"