

Huge anastomotic false aneurysm complicating Bentall procedure: A case report and literature review

Enorme faux anévrisme anastomotique compliquant une intervention de Bentall : Cas clinique et revue de la littérature

Hèla Ben Jmaà¹, Zied Ben Ayed¹, Faten Dhoubi¹, Hafedh Daly¹, Mohamed Seddik¹, Hanène Abida², Aiman Dammak¹, Imed Frikha¹.

1. Department of cardiovascular surgery Habib Bourguiba Hospital Sfax Tunisia.

2. Department of anesthesiology Habib Bourguiba Hospital Sfax Tunisia.

SUMMARY

False aneurysm is a late and severe complication after cardiac surgery.

A 60-year-old man underwent a Bentall procedure of aortic dissection. The post-operative course was uneventful.

Twenty years later, he was admitted for the apparition of a pulsatile mass lateral to the sternum. CT scan revealed a huge false aneurysm in the distal anastomosis between the prosthesis and the aorta. He was re-operated under peripheral cardiopulmonary bypass, deep hypothermia, and circulatory arrest.

Surgery was interposition of graft between the tube and the aorta;

KEYWORDS

ascending aorta,
Bentall procedure,
false aneurysm,
surgery, circulatory
arrest.

RÉSUMÉ

Un faux anévrisme est une complication tardive et grave de la chirurgie cardiaque.

Un homme âgé de 60 ans, a eu une intervention de Bentall pour une dissection aortique.

Vingt ans plus tard, il a été admis pour l'apparition d'une masse pulsatile latéro-sternale. Un scanner a révélé un volumineux faux anévrisme au niveau de l'anastomose distale prothéto-aortique. Il a été réopéré sous circulation extracorporelle périphérique, hypothermie profonde et arrêt circulatoire.

L'intervention était une interposition d'un greffon entre le tube et l'aorte.

MOTS-CLÉS

aorte ascendante,
intervention de
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Correspondance

Dr Hèla Ben Jmaà

Address mail: benjemaa_hela@medecinesfax.org

INTRODUCTION

Post-operative anastomotic pseudo-aneurysms are rare but potentially lethal complications after the Bentall procedure. They can occur several months to years after the initial operation. Their management is challenging and emergent. Their incidence is 1,6%, and they originate usually from distal anastomosis or coronary re-implantation [1]. We report a case of a distal anastomotic false aneurysm, that occurred twenty years after Bentall procedure, and was treated surgically with success.

TECHNIQUE

A 60-year-old man had a past-medical history of Bentall procedure of acute ascending aortic dissection, fifteen years ago.

The post-operative period was uneventful, but he was not regularly followed-up.

He was admitted to our department for pulsatile mass in the chest anterior wall lateral to the sternum, appeared since one month (figure 1).



Figure 1. Photography showing a pulsatile mass lateral to the sternum

So, CT scan was performed and revealed a huge false aneurysm in the distal anastomosis between the prosthesis and the horizontal aorta.

Because of the risk of rupture of the false aneurysm and death by bleeding, emergent surgery was decided.

He underwent surgery by cardiopulmonary bypass between a surgical cannula of the axillary artery and a percutaneous cannula of the femoral vein.

Because of the high risk of rupture during the redo-sternotomy, cardiopulmonary bypass was initiated.

He was operated by redo-sternotomy, with deep general hypothermia and circulatory arrest.

Myocardial protection was made by injection of cold cardioplegia directly in the coronary ostia.

Macroscopic exploration revealed a complete release of the distal anastomosis, without macroscopic signs of infection.

We implanted a Dacron tube. The distal anastomosis was made under circulatory arrest. Then, proximal anastomosis was made with the pre-existing tube during rewarming of the patient, clamping the aorta and, cardiopulmonary bypass (figure 3).



Figure 2. CT scan revealing a false aneurysm of the distal anastomosis between the prosthesis and the aorta



Figure 3. Intra-operative photograph showing the confection of the distal anastomosis

The duration of circulatory arrest was 22 minutes, the duration of clamping of the aorta was 43 minutes, and the duration of circulatory assistance was 60 minutes.

The postoperative course was difficult, with renal insufficiency requiring dialysis and pneumopathy treated with antibiotics.

The duration of intensive care unit stay was 8 days.

Then, he was discharged from hospital after 20 days, and reviewed one month later with a good result on the control CT scan.

DISCUSSION

False aneurysms or pseudo-aneurysms develop whenever blood leaks from a large vessel and becomes walled off by the surrounding tissues. They occur in less than 5% of all cardiac operations [2].

The causative factors of false aneurysms after cardiac and aortic surgery are infection, intrinsic disease of the aortic wall, dissection of the native aorta, and excessive use of biological glue [3].

Patients can present with chest pain, dyspnea, and fever, and less frequently with symptoms of compression or erosion of surrounding structures [2]. Patients can consult because the apparition of cervical or thoracic pulsatile mass, such as the case of our patient. They can also be asymptomatic, and the lesion is diagnosed by control echocardiography or scan.

Sabzi F et al [4] described an exceedingly rare case of sub-aortic ring pseudo-aneurysm in a patient presenting with high fever (39° C) a few months after Bentall operation.

High-resolution CT scan provides accurate description of the pseudo-aneurysm and detect eventual sternal erosion [5].

Their complications are rapid growing in size, compression of the surrounding organs, and sudden death by rupture. So, emergent surgical or endovascular repair is mandatory.

We can prevent false aneurysms by a perfect intra-operative hemostasis, and a regular follow-up of the patients undergoing Bentall intervention.

Lacoste V et al [6], reported an exceptional case of extrinsic compression of the right coronary artery and the right ventricle by a false aneurysm at the distal suture, in a 50-year-old woman who underwent mechanical Bentall before two months. It caused inferior ST-segment elevation myocardial infarction and was treated surgically.

Surgical repair is challenging, particularly when the lesion is close to the thoracic wall, because of the risk of rupture and death during sternotomy [7].

So, cardiopulmonary bypass can be initiated before opening the sternum, in order to collect and reinject the blood, and begin the cooling of the patient in order to perform a circulatory arrest. We opted to this procedure in our patient.

After evacuating the hematoma, we can reinforce the anastomosis with pledgets Prolene sutures, or interpose prosthetic tube, or homograft [8].

Proximity to the supra-aortic vessel and hostile anatomies make endovascular management difficult.

Hybrid procedures may represent a safe and feasible alternative to open surgery, with a full supra-aortic trunk debranching and TEVAR with a single parallel graft to the brachiocephalic trunk [9].

Total endovascular treatment can be performed if there is a sufficient neck before the brachio-cephalic trunk. Santoro G et al [10] reported two case reports of post-surgical ascending aortic false aneurysms occluded by Amplatzer vascular plug.

Sousa J et al [9] reported the case of a 53-year-old man with a previous Bentall procedure for De Bakey type 1 dissection was admitted with chest pain. CT angiography revealed a distal anastomotic pseudo-aneurysm. He had percutaneous occlusion with a septal occluder plug, with significant clinical improvement but without total sac thrombosis. Six months later, he had recurrence of the pseudo-aneurysm. A hybrid repair was then performed, with a full supra-aortic trunk debranching, and zone 0 TEVAR with a single parallel graft to the brachio-cephalic trunk.

CONCLUSION

Anastomotic false aneurysms are rare and life-threatening complications after cardiac and aortic surgery.

Reoperation is a complex and challenging procedure. Surgical management under circulatory arrest and deep hypothermia is the gold standard. But, it is associated with high mortality and morbidity rate.

The endovascular approach appears to be promising, but its limits are the absence of long-term follow-up of endovascular procedures, and not all anatomies are suitable for this minimally invasive technique.

REFERENCES

1. El Oumeiri B, Louagie Y, Buche M. Reoperation for ascending aorta false aneurysm using deep hypothermia and circulatory arrest. *Interactive CardioVascular and Thoracic Surgery* 2011; 12 : 605-608.
2. Atik FA, Navia JL, Svensson LG, Vega PR, Feng J, Brizzio ME, et al. Surgical treatment of pseudo-aneurysm of the thoracic aorta. *J Thorac Cardiovasc Surg* 2006; 132(2): 379-85.
3. Kirsch M, Ginat M, Lecerf L, Houel R, Loisan D. Aortic wall alterations after use of gelatin-resorcinol-formalin glue. *Ann Thorac Surg* 2002; 73(2): 642-4.

4. Sabzi F, Heydari A, Moghaddam R H, Asadmobini A. A Rare Location of Pseudoaneurysm in Sub-aortic Ring after Bentall Operation. *Folia Medica* 2021 ; 63(6): 981-984.
5. Hussain J, Strumpf R, Wheatley G, and Diethrich E. Percutaneous Closure of Aortic Pseudo-aneurysm by Amplatzer Occluder Device : Case Series of Six Patients. *Catheterization and Cardiovascular Interventions* 2009 ; 73:521-529.
6. Lacoste V, Levesque S, Patouiller V, Combeau M, Allain G, Colombier C, Ramonatxo A. Inferior ST-Segment Elevation Myocardial Infarction Due to Extrinsic Compression Caused by an Aortic False Aneurysm. *JACC Case Reports* 2025 : VOL. 30, NO. 25.
7. Doria E, Ballerini G, Pepi M. Giant anastomotic pseudoaneurysm after Bentall operation causing late postoperative cardiogenic shock. *Ital Heart J* 2001; 2: 627-30.
8. Carrel T, Czerny M, and Reineke D. Huge Ruptured and Infected Pseudoaneurysm of the Ascending Aorta and Aortic Arch With Erosion of Sternum After Previous Cardiac Surgery. *Semin Thoracic Surg* 2012 ; 24:229-231.
9. Sousa J, Oliveira-Pinto J, Soares T, Lachat M, Teixeira J. Symptomatic Distal Anastomotic Pseudo-aneurysm After the Bentall Procedure Successfully Treated by Supra-aortic Trunk Debranching and Zone 0 Thoracic Endovascular Aneurysm Repair. *EJVES Vascular Forum* 2020 ; 47 : 90-96.
10. Santoro G, Gasparotti E, Celi S, Rizza A, Capellini K, Pizzuto A, Berti S, Cantinotti M, Cuman M, Clemente A. Transcatheter Treatment of Ascending Aorta Pseudo-aneurysm Guided by 3D-Model Technology. *JACC Case Reports* 2022 : 4, NO 6 : 343-347.