

Case Report of a Pseudoaneurysm of Ascending Aorta Treated by Stent

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Abstract

Pseudoaneurysms of the ascending aorta are a rare complication of aortic and cardiac surgery. In this article, we present a clinical case of a 56-year-old patient with a fortuitous diagnosis of a pseudoaneurysm of ascending aorta that was treated by an endovascular stent-graft. We discuss in this article the diagnostic and therapeutic aspect of the case and the place of endovascular treatment for the ascending aorta.

Keywords

Pseudoaneurysm, Ascending Aorta, Bentley Stent-Graft, Endovascular Treat

1. Introduction

Pseudoaneurysms of the ascending aorta are a rare pathology. Its diagnosis is often incidental when performing an exhaustive CT scan like in our case, but can be demonstrated following dyspnea [1], and multiple other symptoms. The pseudoaneurysm is unpredictable and can get complicated at any time by aortic rupture, fistulation, or the compression of adjacent structures [2], therefore, it requires an urgent intervention. Reoperation of an ascending aortic pseudoaneurysm is associated with a high risk of death and perioperative morbidity [2].

The development of endovascular treatment presents a major evolution in the management of aortic disease, and especially for the descending thoracic aorta and type b aortic dissections whose endovascular treatment has become the reference [3]. In this article, we present a clinical case of a 56-year-old patient with a fortuitous diagnosis of a pseudoaneurysm of ascending aorta that was treated by an endovascular stent-graft.

2. Case Report

In December 2021, a 54-year-old Bulgarian male patient was transferred to our

emergency department for a mass in the right axillary space. In his history, we note a coronary artery bypass graft in 2016 and an aortic dissection Stanford A treated by a gore-tex patch in 2018. At the physical exam the mass appears to be pulsatile and exuding a serious discharge, the patient admits having repeatedly punctured this mass using a needle. The radial pulse was well perceived (**Figure 1**).

The patient underwent a CT scan that demonstrates a pseudo aneurysm of the right subclavian artery. He was then operated on urgently. The procedure was performed through the brachial artery and percutaneously. We proceeded with the surgical placement of a Bentley stent (7 mm, 37 mm), to which we added a second stent (8 mm, 37 mm). We then drained the hematoma. This allowed us to confirm that it was the cannulation site for the first intervention that was the etiology of the pseudoaneurysm, to which the patient added repeated punctures (**Figure 2** and **Figure 3**).

As discussed in **Figure 3**, we decided to operate again for the pseudoaneurysm through the brachial artery via the left side. We placed of an introducer sheet and then a guide wire on which we kept a pigtail for angiography. We also punctured the right primitive carotid by a surgical cervicotomy, we placed an introducer sheet, and a guide wire. We then changed the introducer for a large introducer of 14 French required for the Bentley. After heparinization of the patient, we did a landmark angiography which clearly shows us the aortic valve, the coronaries and the proximal leak. We placed a covered stent graft (Bentley aortic 24 mm, 36mm). The Realization of a control angiography shows that the result is not optimum. We hence deployed a second identical stent, which we completed by an in-stent dilation with two different balloons. The final angiography shows a satisfactory result without any leak.

A computed tomography (angio-CT) scan performed in January 2021 5 days after the surgery, showed that the stent was well positioned without any complication. The patient has been treated successfully by the endovascular treatment of the ascending aorta. The patient's hospital stay in the cardiovascular surgery ward was event free he was discharged on day 5 (**Figure 4**).

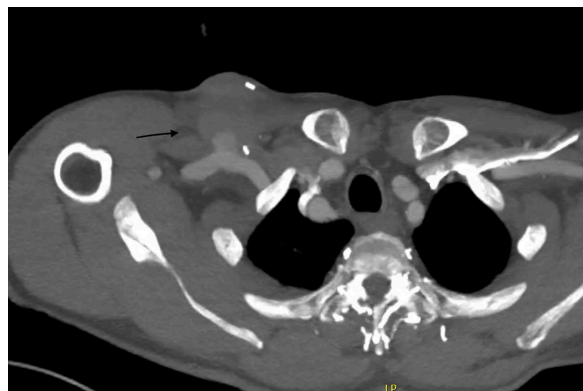


Figure 1. The patient underwent a CT scan that demonstrates a pseudo aneurysm of the right subclavian artery.

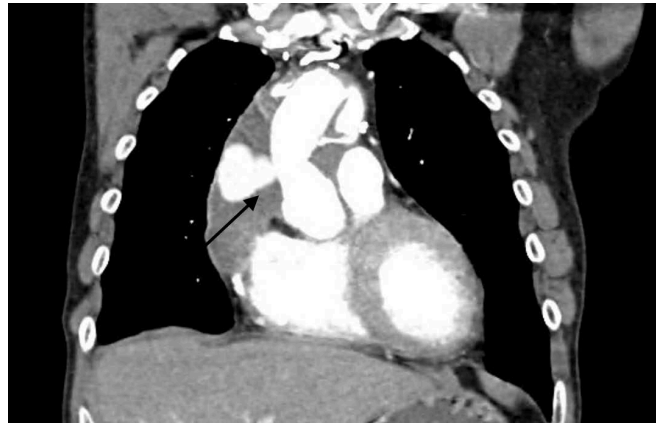


Figure 2. The day after surgery, a revision of the imaging was carried out and revealed a pseudoaneurysm of the ascending aorta that had not been seen.



Figure 3. Due to its location, the extent of the pseudoaneurysm and the double sternotomy in his history an open surgical approach was deemed to be high risk. We decided to try an endovascular treatment. The aortic diameters at the proximal and distal landing zones were (sino tubular junction 26 mm, valsalva 39 mm, root 25 mm).

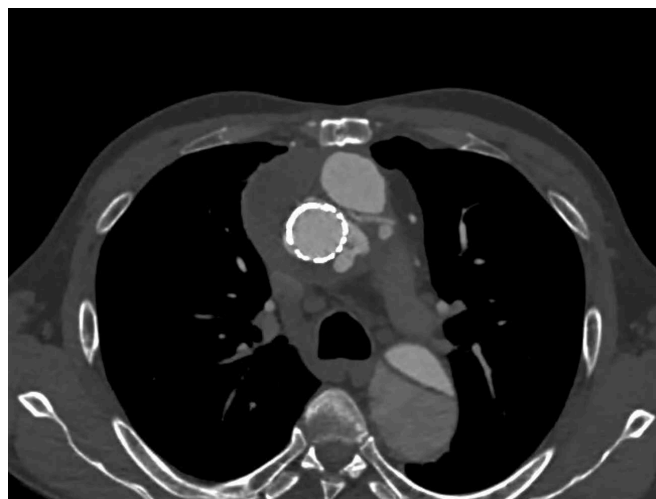


Figure 4. A computed tomography (angio-CT) scan performed 5 days after the surgery, showed that the stent was well positioned without any complication.

3. Discussion

Nowadays endovascular treatment of the ascending aorta remains the last barrier to overcome. Surgery remains the first option for its treatment even if mortality remains high [4], and endovascular treatment with stent grafts and coils remains reserved for high-risk patients and inoperable patients [5].

The delay in the development of endovascular treatment of the ascending aorta is secondary to its anatomy and its proximity to the coronary ostia and the aortic valve which can induce myocardial infarction if the stent is very proximal. It is also very close to the brachiocephalic trunk which can be obstructed in the event of migration distally. There is also a high risk of distal embolization.

Our case and previous cases have shown that the endovascular treatment of the ascending aorta is feasible and can be done successfully and safely with stent grafts [6]. In the following case, we used 2 stent grafts (Bentley) followed by an in-stent dilatation. A systemic review of endovascular repair of ascending aorta has shown that even if there are no dedicated stent grafts of the ascending aorta, patients are successfully treated with different stent grafts [7], and a diverse range of vascular access (in our case we used carotid access). Whereas femoral artery access is preferred, some delivery devices are not long enough to reach the ascending aorta. The axillary and carotid arteries are less likely to be affected by peripheral vascular disease and therefore can often provide viable access in patients with severely diseased femoral or iliac vessels [8].

The main complication of endovascular treatments of the ascending aorta is the endoleak. There are other complications that need reinterventions: aortic rupture, aortic dissection, and migration of the stent. A case study of reinterventions after endovascular treatment of aortic disease shows that the complication most encountered in patients treated with ascending aortic stents was Endo leak, with an overall rate of 18.2%. The overall endoleak rate encountered in TEVAR ranges from 3.6% to 8.7% and represents a significant limitation of this technology [9].

The endoleak is the main complication and can create a false lumen and increase the risk of rupture. In response to this issue, several promising technologies including EndoAnchors, branched stent grafts, and in situ fenestration are currently being used both to prevent and to treat endoleak in the abdominal aorta and aortic arch [10].

Endovascular treatment of the ascending aorta is a promising aortic treatment that is now possible and feasible safely, although its indications remain limited to high-risk patients. The current situation leaves a lot of room for improving the treatment of the ascending aorta.

4. Conclusion

The ascending aorta is considered the final frontier for endovascular therapy. Several cases report that include this one show that endovascular treatment of ascending aorta is feasible and gives great results for selected patients and pa-

tients undergoing aortic endovascular is increasing. Hopefully, the current situation leaves a lot of room for improving the endovascular treatment of the ascending aorta.

Statement of Ethics

All procedures followed were in accordance with ethical standards and the Helsinki Declaration. Informed consent was obtained from the patient for the publication of this case report and accompanying images. Ethical approval is not required for this study in accordance with local and national guidelines.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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