

Endovascular Stent Grafting for Type B Acute Dissection: A Case Report and Literature Review

Abdelilah ben el Makki^{1*}, Mohamed Malki¹, Achraf Zaimi¹, Faliouni Hicham¹, Atif Benyas¹, Ali Chaib¹

¹Department of Cardiology, Mohammed V Military Teaching Hospital, Faculty of Medicine and Pharmacy, Mohammed V University, Rabat, Morocco

DOI: [10.36347/sjmcr.2022.v10i07.004](https://doi.org/10.36347/sjmcr.2022.v10i07.004)

| Received: 17.04.2022 | Accepted: 25.05.2022 | Published: 12.07.2022

*Corresponding author: Abdelilah Ben El Makki

Department of Cardiology, Mohammed V Military Teaching Hospital, Faculty of Medicine and Pharmacy, Mohammed V University, Rabat, Morocco

Abstract

Case Report

Aortic dissection is an absolute cardiovascular emergency, its diagnosis has benefited from the development of modern imaging techniques including transoesophageal echocardiography, CT scan and Magnetic resonance angiography, its management can be medical, surgical or interventional depending on the type of the dissection and the potential associated complications. Thanks to its recent development, aortic stent-grafting technique is now extending its indication to high-risk patients even before clinical complications in order to prevent their occurrence. We present the clinical case of a patient admitted for uncomplicated type B aortic dissection with a contraindication to beta-blockers who successfully underwent a stent-graft implantation with positive outcome.

Keywords: Aortic dissection, stent-grafting, surgical repair.

Copyright © 2022 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Aortic dissection is an extreme cardiovascular emergency, it is defined by a longitudinal cleavage of the medial layer, dividing aorta into two lumens, the true and the false one, communicating through an entry and an exit tear, most often occurring in the context of arterial hypertension.

The Stanford classification and the possible presence of complication are the two main elements to be taken into account to guide the therapeutic strategy. Current progress made both in the field of medical imaging and in interventional techniques, increasingly allows invasive management of this serious condition by stent-graft implantation, as we will illustrate through this observation.

OBSERVATION

This is a 55-year-old patient with history of a severe form of chronic obstructive pulmonary disease and blood hypertension, who presented to the emergency room for prolonged acute chest pain with

dorsal irradiation. The clinical examination of the patient showed a heart rate of 95 bpm, the blood pressure was at 155/95 mmHg with no remarkable other findings. The electrocardiogram was normal and the chest X-ray showed a slight mediastinal enlargement. Ultrasensitive troponin was slightly positive. The echocardiography did not reveal any left ventricular segmental kinetic disorders, pericardial effusion or ascending aortic abnormalities. A CT angiogram was performed showing a descending aortic aneurysm with Stanford type B dissection extending from the left subclavian artery to the aortic bifurcation without extension to the visceral arteries. The patient was quickly admitted to the intensive care unit and received antihypertensive drugs and calcium channel blockers to control his blood pressure and his heart rate, after initial stabilisation he underwent an endovascular stent-graft implantation via the femoral route deployed 1 cm after the origin of the subclavian artery up to 4 cm before the origin of the celiac trunk (figures 1 and 2). The patient was placed under double antiplatelet therapy with positive outcome.

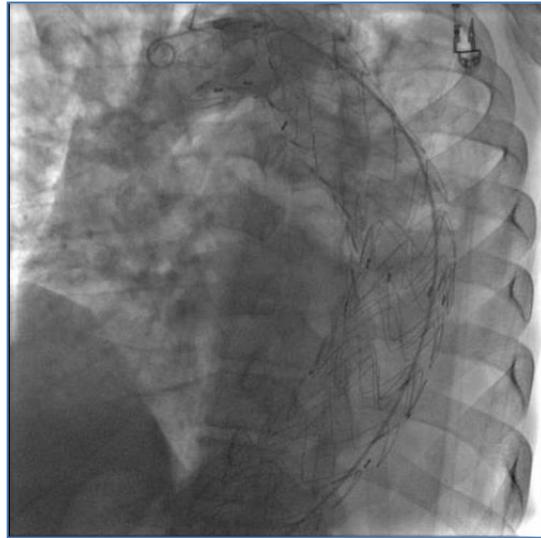


Fig-1: Per-procedural view showing the stent deployed in the descending aorta

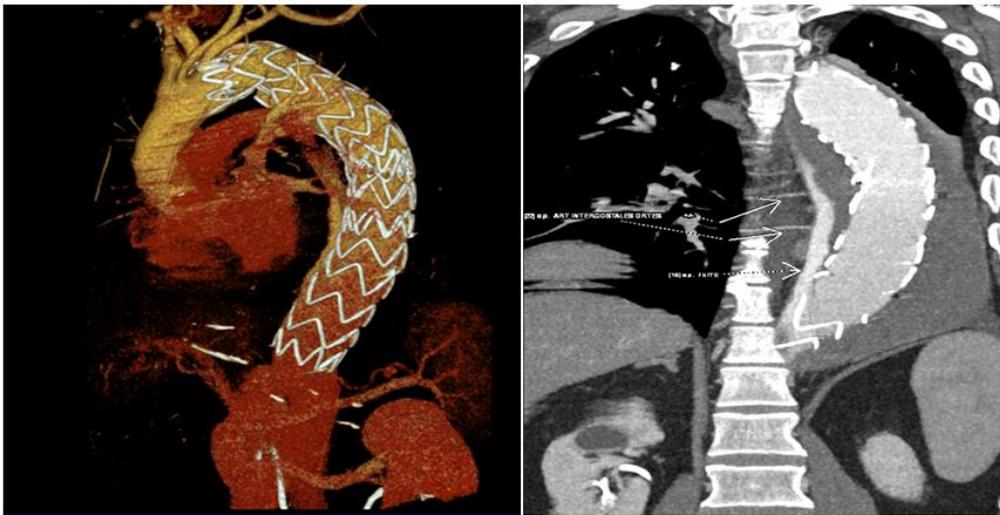


Fig-2: CT angiogram showing the stent covering the descending aorta from the left subclavian artery to 4 cm prior to the celiac trunk

DISCUSSION

The clinical presentation of an acute aortic syndrome (AAS) most often consists of intense and migrating chest pain potentially associated to a cerebral or extra-neurological ischemia or signs of hemodynamic compromise. The essential element when exploring an AAS is the evaluation of the entire aorta. CT scan, MRI, and transoesophageal echocardiography are all reliable tests for confirming or excluding the diagnosis of acute aortic dissection. While, CT scan and MRI are superior to transoesophageal echocardiography for dissection extension assessment and collateral branch involvement, as well as for the diagnosis of intraparietal hematoma, the transoesophageal echocardiography remains essential for identifying tear location, it can also be of great interest in very unstable patients, and is often used to monitor changes in the operating room and in the postoperative period [1]. The most widely used classification of aortic dissection is the Stanford classification, because of its therapeutic

implications, it differentiates type A which affect the ascending aorta or the aortic arch requiring an emergent surgical repair and type B which is confined to the descending aorta, after the left subclavian artery origin [2], and whose treatment is classically medical except for complicated cases in which surgical or interventional treatment should be discussed on a case-by-case basis [3, 4]. However, due to its recent technical improvement, endovascular stent-grafting is increasingly offered to type B uncomplicated patients who would be at higher risk to prevent a potential complication, those situations include patients with contraindications to beta-blockers such as chronic obstructive respiratory syndrome, as in the case of our patient, elderly patients, persistent pain, uncontrolled arterial hypertension [5]. As well as patients with several unfavourable anatomical criteria such as: the size of the aorta > 40 mm or a rapid increase in diameter, or a fusiform dilation of the isthmus of the aorta. This invasive endovascular treatment intends to

cover the entry-tear and lead to a decompression of the false lumen and its thrombosis, the main problem in the setting of acute dissections is the fragility of the aortic wall which could be increased by the mechanical stress linked to the metal skeleton of the stent or by the presence, for certain prosthesis, of lateral hooks intended to fix the prosthesis and prevent its migration [4]. The closure of the false lumen might compromise the vascularization of the visceral arteries when they arise from it. This phenomenon should be anticipated and the false membrane should be perforated next to the concerned arteries to maintain their patency by placing a stent from the true lumen [6].

CONCLUSION

Patients with acute type B dissection remain difficult to manage. The use of aortic stent-graft represents a real advance in the treatment of this potentially fatal condition. Although surgical repair is feasible, it remains technically difficult and may be associated with significant morbidity and mortality. Clearly, endovascular treatment has an advantage in the treatment of acute uncomplicated aortic dissection; however, further studies are required to refine the criteria for selecting patients and to clarify its precise role in this acute condition.

REFERENCES

1. Erbel, R., Aboyans, V., Boileau, C., Bossone, E., Di Bartolomeo, R., Eggebrecht, H., Evangelista, A., Falk, V., Frank, H., Gaemperli, O., Grabenwöger, M., Haverich, A., Iung, B., Manolis, A.J., Meijboom, F., Nienaber, C.A., Roffi, M., Rousseau, H., Sechtem, U., Sirnes, P.A., von Allmen, R.S., Vrints, C.J. (2014). Grupa Robocza Europejskiego Towarzystwa Kardiologicznego (ESC) do spraw rozpoznawania i leczenia chorób aorty. Wytyczne ESC dotyczące rozpoznawania i leczenia chorób aorty w 2014 roku [2014 ESC Guidelines on the diagnosis and treatment of aortic diseases]. *Kardiol Pol.* 2014;72(12):1169-252.
2. Rousseau, H., Marcheix, B., Auriol, J., Cron, C., Maracher, M. A., Dambrin, C., ... & Chabbert, V. (2011). Dissections aortiques aiguës non compliquées. Des stent-grafts pour qui?. *La Presse Médicale*, 40(1), 81-87.
3. Verhoye, J. P., Miller, D. C., Sze, D., Dake, M. D., & Mitchell, R. S. (2008). Complicated acute type B aortic dissection: Midterm results of emergency endovascular stent-grafting. *The Journal of Thoracic and Cardiovascular Surgery*, 136(2), 424-430.
4. Rousseau, H., Heautot, J. F., & Verhoye, J. P. (2009). *Les syndromes aortiques aigus* (pp. 286-p). Paris: Springer.
5. Juvonen, T., Ergin, M. A., Galla, J. D., Lansman, S. L., McCullough, J. N., Nguyen, K., ... & Griep, R. B. (1999). Risk factors for rupture of chronic type B dissections. *The Journal of thoracic and cardiovascular surgery*, 117(4), 776-786.
6. Evangelista, A., Isselbacher, E. M., Bossone, E., Gleason, T. G., Eusanio, M. D., Sechtem, U., ... & Eagle, K. A. (2018). Insights from the international registry of acute aortic dissection: a 20-year experience of collaborative clinical research. *Circulation*, 137(17), 1846-1860.