

# Iatrogenic dissection of the descending aorta: Conservative or endovascular treatment?

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## ABSTRACT

Transcatheter aortic valve implantation (TAVI) is without any doubt a standard technique and the treatment of choice of severe aortic valve stenosis (AVS) in very high-operative risk patients. However, a number of complications may occur and has been described. Improper valve position, valve migration, paravalvular regurgitation, conduction disturbances, stroke and aortic dissection have been succeeded despite the perfection of the technique. For anyone of the complications above described, a solution may be invented. We present an interesting case of an 81-year-old woman with severe AVS treated through TAVI due to very high operative risk. This female, 12 days later presented with thoracic pain and shortness of breath and through the computed tomography of the chest performed was diagnosed a dissection of the descending aorta. She successfully underwent on thoracic endovascular aortic repair. In this report, we refer the bibliographic data and we discuss the treatment options in these cases.

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## INTRODUCTION

Transcatheter aortic valve implantation (TAVI) has become a major clinical reality in the treatment of patients with severe aortic valve stenosis (AVS) who are deemed to be a high or indeed a prohibitive surgical risk.<sup>[1-3]</sup> Current understanding of the likely complications associated with this procedure is rapidly evolving.<sup>[1]</sup> TAVI continues to be associated with the potential for serious complications including vascular injury, stroke, cardiac injuries such as heart block, coronary obstruction, cardiac or aortic rupture, paravalvular leak, and valve misplacement and migration.<sup>[1]</sup> Iatrogenic dissection of the aorta has to be early recognized and treated. According to the international bibliography, acute aortic dissection of the descending aorta could be treated conservatively<sup>[4]</sup> or through an endovascular stent-graft deployment, thoracic endovascular aortic repair (TEVAR). In contrast to a standard surgical procedure, if the complications do occur, they are very difficult to control.<sup>[5,6]</sup> According to international

guidelines and the international bibliography, stable patients with uncomplicated Type B aortic dissection should receive optimal medical treatment.<sup>[7,8]</sup> In cases with impending rupture, uncontrolled pain, malperfusion and uncontrolled blood pressure, the endovascular treatment could be followed.<sup>[8]</sup>

## CASE REPORT

We present an interesting case of an 81-year-old woman with a medical history

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of severe AVS, chronic obstructive pulmonary disease (COPD) angiodysplasia of the gastrointestinal tract, renal dysfunction, atheromatosis of both carotid arteries, and porcelain ascending aorta with atheromatosis in the descending aorta. Due to severe and symptomatic AVS, it has been discussed an intervention. The aortic valve area was  $0.7 \text{ cm}^2$  with peak pressure gradient (PG) 60 mmHg and mean PG 40 mmHg. The ejection fraction of the left ventricle (LVEF) was 50%. She frequently had episodes of syncope and dyspnea. Dyspnea could also be attributed to the severe COPD (forced expiratory volume in 1 s [ $\text{FEV}_1$ ] = 0.44, the 26.51 of the predicted) in oxygen therapy at home;  $\text{FEV}_1$ . In the coronary artery, angiography has been revealed atheromatosis without hemodynamically significant stenosis up to 50%. She was also a renal dysfunction with creatinine clearance 31.2 ml/min. For the reasons above described, the EuroSCORE calculated was 21.32% and the TAVI was decided. She underwent in this intervention and an Evolute number 26 valve was successfully implanted through the right femoral artery. A small paravalvular leak was detected and the left ventricle end diastolic pressure was 18 mmHg. Due to diffuse atheromatic disease and for the valve protection, she discharge home with clopidogrel 75 mg once daily (OD), acetylsalicylic acid 100 mg OD, simvastatin 20 mg OD, bisoprolol 10 mg twice a day while she continued the nebulizer therapy for the COPD. Twelve days postoperatively, she was admitted to the internal medicine department with severe shortness of the breath despite the oxygen and the nebulizer therapy. She referred also an episode of syncope and severe pain in the thorax worsening day by day. In the blood analysis, a very low hematocrit was detected (22%). An urgent esophagogastrosocopy was performed and the known angiodysplasias were found without bleeding.

In the chest computed tomography, an acute dissection of the descending aorta was revealed. The dissection was extended from the distal aortic arch, soon after the origin of the left subclavian artery and for 7 cm. The dissection was limited to the descending aorta and did not include the ascending aorta. The diameter of the descending aorta was 3.7 cm [Figure 1]. In this figure other than the extension of the aortic dissection, we can also see the aortic valve and the atherosclerosis of the whole aorta. We really had the dilemmas between conservative or endovascular treatment. Due to uncontrolled chest pain and the risk of impending aortic

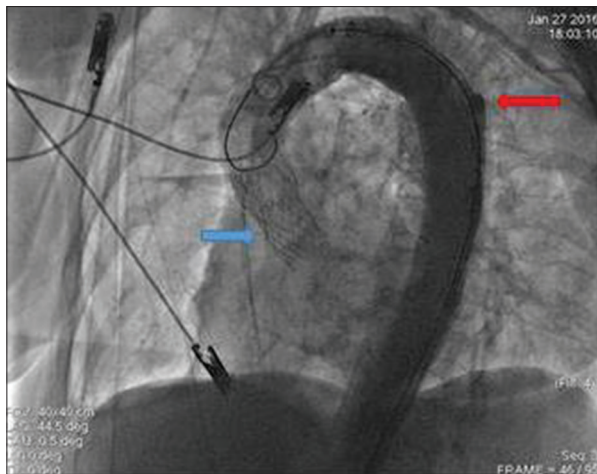


**Figure 1:** Angiographic catheter and extra-stiff guide-wire (green arrow) positioned at the level of Aortic valve and advancement of the stent-graft at the level of thoracic aorta (orange arrow). The aortic valve previously implanted is also well seen (blue arrow)

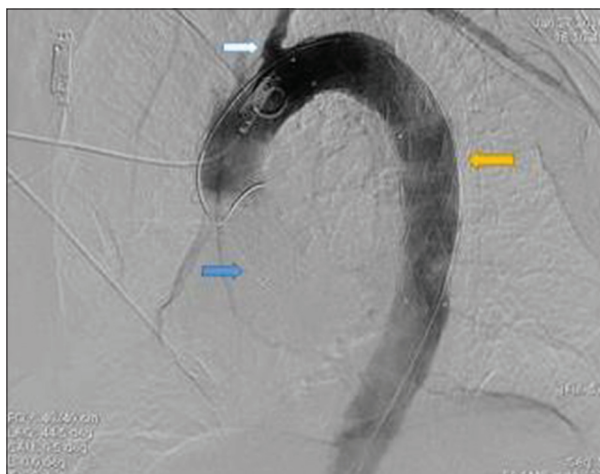
rupture the endovascular therapy was chosen; thoracic endovascular (TEVAR). In the angiographic laboratory through the right femoral artery a stent-graft of  $28 \text{ mm} \times 150 \text{ mm}$ , JOTEC was successfully implanted in the descending thoracic aorta as shown in Figure 2 with coverage of the whole dissected aorta [Figure 3]. The patient was discharged home in the 4<sup>th</sup> postoperative day in good clinical condition.

## DISCUSSION

The fact that TAVI is new implies learning from experience but also from mistakes.<sup>[2,3]</sup> The TAVI team must be vigilant to recognize and diagnose intra-procedure severe complications.<sup>[1-3]</sup> Retroperitoneal bleeding from access site rupture, aortic dissection or rupture, pericardial tamponade, coronary ostial obstruction, and acute severe aortic insufficiency, may be recognized immediately to be treated.<sup>[1]</sup> Dissection of the ascending or descending aorta can similarly occur due to catheter trauma.<sup>[3]</sup> Hypotension, hypovolemia, or cardiac tamponade are the common clinical scenarios whenever a vascular perforation or dissection takes place.<sup>[1]</sup> There are yet guidelines for the treatment of iatrogenic dissection of the descending aorta. In the case of local and uncomplicated dissection, the conservative treatment and vigilance could be enough. However, in the case of extended dissection, with hemodynamic instability and complications due to dissection, TEVAR should be the treatment of choice.<sup>[3,8,9]</sup> The classical, open surgical intervention is not recommended taken in



**Figure 2:** Pre-stent graft deployment angiogram. Descending thoracic aorta dissection with rupture (red arrow). The aortic valve previously implanted is also well seen (blue arrow)



**Figure 3:** Final angiogram after stent graft deployment shows correct deployment of the graft with exclusion of the dissection and perfect remodeling of descending thoracic aorta (yellow arrow). The transcatheter aortic valve implantation is well seen (blue arrow)

mind that patients who underwent on TAVI are usually very old and have a very high operative risk.

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### Conflicts of interest

There are no conflicts of interest.

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