

CASE REPORT

Resection of Advanta stent with thrombus and Dacron graft implantation in thoracic aorta

Alfredo M. Martínez-Pérez¹, Haydee I. Estrada-Castañeda¹, Carolina Álvarez-Moreno¹, Juana M. Abraham-Aguirre², and Elvia E. Monreal Carrillo³

¹ Department of Cardiac Surgery; ²Department of Cardiovascular Anesthesiology, ³Department of Extracorporeal Circulation. Unidad Médica de Alta Especialidad Bajío León, Guanajuato. Instituto Mexicano del Seguro Mexicano del Seguro Social. León, Guanajuato, MEXICO.

We present the case of a 21-year-old male patient with a history of Advanta thoracic aortic endoprosthesis placement in 2015, with the presence of a thrombus by computed tomography angiography. During surgery, the endoprosthesis was resected, as well as the placement of the Dacron graft. The finding was a thrombus with an infectious process that occluded almost the entire lumen. This case suggests that the surgical approach is the ideal management, considering the high morbidity and mortality in this type of cases. Interdisciplinary management is essential in any hospital center.

Key words: ADVANTA; TEVAR; Thoracic aortic endoprosthesis.

Se presenta el caso de un paciente masculino de 21 años con antecedente de colocación de endoprótesis aórtica torácica Advanta en 2015, con presencia de trombo mediante angiografía. Durante la cirugía se realizó resección de la endoprótesis, así como la colocación del injerto de dacrón. El hallazgo fue un trombo con proceso infeccioso que ocluía casi todo el lumen. Este caso sugiere que el abordaje quirúrgico es el manejo idóneo, teniendo en cuenta la alta morbilidad y mortalidad en este tipo de casos. Es indispensable el manejo interdisciplinario en cualquier centro hospitalario.

Palabras clave: ADVANTA; TEVAR; Endoprótesis aórtica torácica.

Cir Card Mex 2022; 7(1): 11-13.

© 2022 by the Sociedad Mexicana de Cirugía Cardíaca, A.C.



Thoracic aortic aneurysms are at high risk of rupture insofar they commonly continue expanding. Annual risk of rupture ranges from 2% when smaller than 5 cm in diameter, up to 7% once larger than 6 cm [1]. They can be approached by means of two main methods. The traditional open surgical repair which entails the replacement of the affected segment by a surgical graft by using cardiopulmonary bypass, hypothermia, with or without circulatory arrest. Thoracic Endovascular stent aortic repair (TEVAR) grafting is used across the aneurysm has become an alternative to conventional open surgery. Therefore, a faster and safer can be obtained by using stents for this purpose [2]. To date, data comparing both modalities are not enough clear and robust and is still on the way [3]. Nevertheless, Potential complications presented with this kind of devices are leaks, esophageal and bronchial fistulas, migration, rupture and infectious processes. Surgical removal and replacement with a Dacron graft is technique of choice. However, high rates for mortality and morbidity have been reported as survival of 70%, 65%, 61%, 56%, and 51% at 1, 2, 3, 4, and 5 years, respectively, after reoperation by graft infection [4]. We report here one case

of ADVANTA stent graft occluded with an infective thrombus formation successfully treated by open surgery including stent resection and substitution with a Dacron graft.

CLINICAL CASE

A 21-year-old- male patient with past history of TEVAR for aortic coarctation was diagnosed as infective endocarditis of the stent graft. After several weeks of fever of unknown etiology, and failure in the medical treatment, A transthoracic echocardiogram was performed on suspicion of endocarditis without finding evidence of vegetations or thrombi and with a residual gradient that suggests re-coarctation at the level of the stent. CT scan (angioTAC) was performed finding aortic endoprosthesis, the isthmic portion and proximal descending aorta, with collapse in proximal end and image suggestive in relation to probably acute chronic thrombosis (Fig. 1).

Urgent surgery was carried out. Arterial cannulation in “Y” to the right axillary artery with a Dacron tube in chimney and descending aorta distal to the thrombosed stent, and left femoral venous cannulation. Cardiopulmonary bypass was used. The approach to the thoracic aorta was by means of

Corresponding author: Dr. Alfredo Miguel Martínez Pérez
email: per_mig@hotmail.com



Figure 1. Angiotomographic study. Aortic endoprosthesis in the isthmic portion and proximal descending aorta with collapse in the proximal end and image in relation to probably acute chronic thrombosis.

left thoracotomy through the fourth intercostal space. Once on cardiopulmonary bypass, fully and extensive dissection of the aortic arch including the second, third trunk and the descending aorta was performed. An endoprosthesis was located in the thoracic aorta with severely fibrotic and swollen tissues around. After proximal and distal aortic clamping, an aortotomy was performed. Thrombosed and infected TEVAR stent graft was found (**Fig. 2**). After removal, both end-to-end proximal and distal anastomosis with 20 mm x 10 cm Dacron graft with 4-0 polipropilene suture were made (**Fig. 3**). Aortic cross-clamping time was 88 min and cardiopulmonary bypass time was 298 min. In ICU, he was operated on for vascular exploration of the left pelvic limb, finding thrombus in the popliteal artery. Acute kidney injury remits on the fifth postoperative day. On the tenth day, he presented a left pleural effusion of approximately 40 %, with increased drainage from chest tubes of 60 milliliters per hour. Clinically with tachycardia and fever. Presenting a drop-in hemoglobin of 4 grams. So, two globular packages and two fresh plasmas were transfused. A left thoracic surgical exploration was performed, finding hemothorax of approximately 1500 milliliters. Right subclavian hematoma was also drained from the site of arterial cannulation. A drug-induced liver injury with a cholestatic pattern probably associated with vancomycin was also observed, associated to very high levels of hepatic enzymes. Thus, it was decided to switch to another antibiotic regime. In-hospital discharge took place on the 24th postoperative day. Cultures obtained from the surgical resected material from the ADVANTA endoprosthesis reported group C Streptococcus.

The patient was seen at the output clinic with a postoperative echocardiogram with a maximum gradient of 10 mmHg and a maximum velocity of 1.6 m/ sec. Subsequently, an CT scan control was performed two months after surgery (**Fig. 4**).

COMMENT

Infected thrombosis of the thoracic aortic stent is a devastating complication that forces the surgeon to take urgent measures. There is no general consensus for the management of these patients. Many published articles related to endoprosthesis infection were case reports and treatment strategy taken on a case by case basis depends on the surgeon's experience and hospital center. Descending thoracic aortic surgery can lead toward serious morbidity, such as paraplegia, one of the most feared with rates of up to 18% [5].

According to other previously published articles, the mean morbidity in general is 35%, mortality 11% and the in-hospital length of stay was 23 days, while our patient was 24 days [4].

As stated by Cernohorsky et al., the incidence of thoracic aortic endoprosthesis infection is less than 1%, the time of diagnosis of the infection from the TEVAR implant is 115 days (range 7 to 3,748). The incidence of infection is higher in patients treated emergency versus elective was 2.9% versus 0.56%. All patients were first treated with antibiotic therapy regardless of whether surgical treatment was performed. The isolated microorganisms were Staphylococcus species, Streptococcus species, Pseudomonas aeruginosa and Listeria monocytogenes [6].



Figure 2. Thrombosed endoprosthesis. Aortic thoracic endoprosthesis segment during surgical removal.

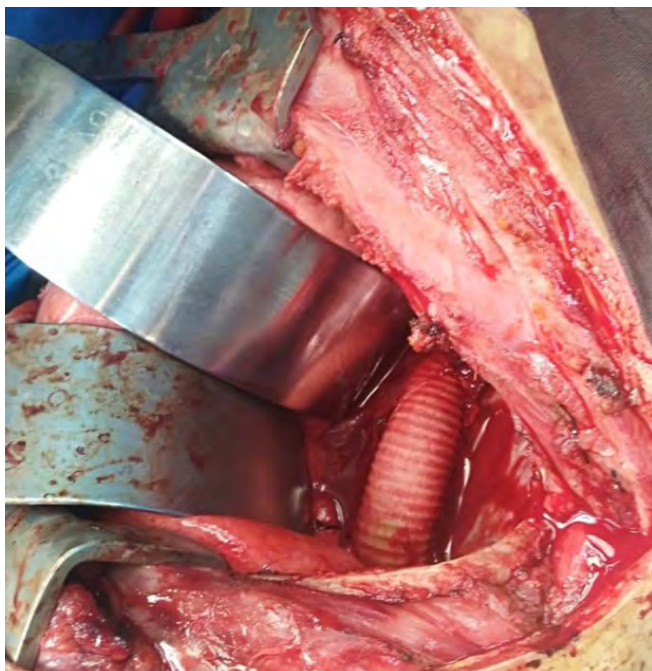


Figure 3. Anastomosed dacron graft



Figure 4. CT scan at 2 months after operation

The TEVAR thoracic aortic stent promisingly emerged as a less invasive alternative treatment to thoracic aortic surgery. Infection of the endovascular prosthesis is potentially possible including perioperative contamination, bacterial translocation, hematogenous route and through esophageal or bronchial fistulas [7]. However, the surgical management of complications such as infection of the thoracic aortic endoprosthesis is technically complex and with the possibility of even further unexpected complications.

FUNDING: None

DISCLOSURE: The authors have no conflicts of interest to disclose.

REFERENCES

1. Akin I, Kische S, Rehders TC, et al. . Endovascular repair of thoracic aortic aneurysm. Arch Med Sci 2010;6:646–52. doi: 10.5114/aoms.2010.17075.
2. Sastry P, Hughes V, Hayes P, et al. . The ETAA study protocol: a UK-wide observational study of 'Effective Treatments for Thoracic Aortic Aneurysm'. BMJ Open 2015;5:e008147. doi: 10.1136/bmjopen-2015-008147.
3. McCarthy A, Gray J, Sastry P, et al. Systematic review of endovascular stent grafting versus open surgical repair for the elective treatment of arch/descending thoracic aortic aneurysms. BMJ Open. 2021;11(3):e043323. doi:10.1136/bmjopen-2020-043323.
4. Smeds MR, Duncan AA, Harlander-Locke MP, Lawrence PF, Lyden S, Fatima J, Eskandari MK; Vascular Low-Frequency Disease Consortium. Treatment and outcomes of aortic endograft infection. J Vasc Surg. 2016;63(2):332-40. doi: 10.1016/j.jvs.2015.08.113.
5. Rimbau V. Tratamiento endovascular de las lesiones de la aorta tórácica: estado actual. Rev Esp Cardiol, 2005; 58 (1): 1-5. doi:10.1157/13070500.
6. Cernohorsky P, Reijnen MM, Tielliu IF, van Sterkenburg SM, van den Dungen JJ, Zeebregts CJ. The relevance of aortic endograft prosthetic infection. J Vasc Surg. 2011;54(2):327-33. doi: 10.1016/j.jvs.2010.12.067.
7. Arqué JM, Porras C, Such M, Pinedo J, Urbano C, Ramos C. Cirugía Inusual en un caso de coartación aórtica. Cir Cardio 2016; 23 (3):138-142. doi: 10.1016/j.circv.2015.09.005.