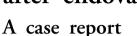


Aortic arch pseudoaneurysm on penetrating ulcer: delayed closure after endovascular treatment.





Ann Ital Chir, Digital Edition 2019, 8 pii: S2239253X19030986 - Epub, July19 free reading: www.annitalchir.com

Luciano Izzo*, Sara Izzo*, Francesco Razionale*, Pieretti Gorizio**, Pierfrancesco Di Cello*, Paolo Izzo*, Messineo Daniela***

Aortic arch pseudoaneurysm on penetrating ulcer: delayed closure after endovascular treatment. A case report.

Standard open repair of true or false aneurysms of the aortic arch usually require cardiopulmonary bypass, hypothermia and circulatory arrest, associated with increased mortality and morbidity rates. Thus, an alternative strategy that avoids cardiopulmonary bypass (CPB) and hypothermic circulatory arrest would benefit the patient. Endovascular stent-grafting has developed as a safe and effective treatment for descending aortic pathologies.^{5,6}

We share our experience with the endovascular approach to pseudoaneurysm of the aortic arch in a patient with high risk for aortic arch replacement under extracorporal circulation.

KEY WORDS: Aortic arch, Endoprosthesis, Evar, Penetrating ulcer

Introduction

Penetrating atheromatous ulcer (PAU) describes the condition in which ulceration of an aortic atherosclerotic lesion penetrates the internal elastic lamina into the media ¹. It was Stanson who described PAU as a distinct clinical and pathological entity ². PAU is at risk of pseudoaneurysm, intramural hematoma, aortic rupture, or an acute aortic dissection and it accounts for 2% to 7% of all acute aortic syndrome ³.

PAU is typically seen in elderly individuals with hypertension and atherosclerosis and in ascending aorta is a very rare condition and very few cases are reported in literature ⁷. Troxler ⁴ described only 6 patients of PAU in ascending aorta out of 130 patients of PAU.

Standard open repair of true or false aneurysms of the aortic arch usually require cardiopulmonary bypass, hypothermia and circulatory arrest, associated with increased mortality and morbidity rates. Thus, an alternative strategy that avoids cardiopulmonary bypass (CPB) and hypothermic circulatory arrest would benefit the patient.

Endovascular stent-grafting has developed as a safe and effective treatment for descending aortic pathologies. 5,6 We share our experience with the endovascular approach to pseudoaneurysm of the aortic arch in a patient with high risk for aortic arch replacement under extracorporal circulation.

Pervenuto in Redazione Giugno 2019. Accettato per la pubblicazione Luglio 2019

Case Report

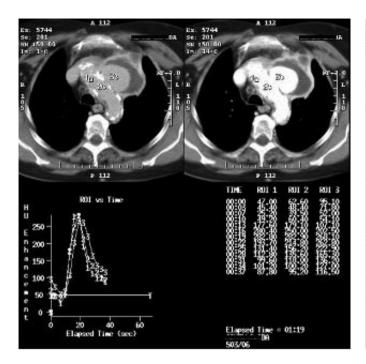
A 65-year-old patient with history of hypertension, chronic obstructive pulmonary disease, non-insulin dependent diabetes, obesity, and hyperlipidemia was

^{*}Department of Surgery, Policlinico "Umberto I" Sapienza University, Rome, Italy

^{**}Multidisciplinary Department of Medical-Surgical and Dental Specialties, Plastic Surgery Unit, Università degli Studi della Campania "Luigi Vanvitelli", Naples, Italy.

^{***}Department of Radiological Oncological And Anatomical-Pathological Sciences, Sapienza University, Rome, Italy

Correspondence to: Luciano Izzo, MD, Dipartim,ento di Chirurgia "P. Valdoni" Università degli Studi di Roma "La Sapienza", 00161 Roma, Italy (e-mail: luciano.izzo@uniroma1.it)



In: 13 to 12 to 12 to 13 to 14 to 15 to 15

Fig. 1: A: axial CT image that show a large pseudoaneurysmal sac located on the anterior left side of the aortic arch towards the wall chest; **B**: axial CT image Contrast material-enhanced shows an aneurysm containing thrombus **C**, d: HU enhancement diagram, and ROI evaluation: the first ROI is within the aorta; the second ROI is at the collar of the pseudo-aneurysmatic formation; the third ROI is within the lamp of the pseudoaneurysm. High HU after the introduction of contrast medium presence of blood.

Fig. 3: **A, B**: axial CT image before and after contrast enhancement. CT scan performed 7 days later, confirmed the presence of a small endoleak with slow pseudoaneurysm refilling. **C, D**: HU enhancement diagram, and ROI evaluation. The presence of bleeding and ulceration is evidenced by variability of the Hounsfield units a tenuously hyperdense image shows a supply with slight contrast imbibition within the plaque.



Fig. 2: Three-dimensional VR sagittal view. CT image shows the endoprosthesis and the large pseudoaneurysmal sac.

referred to our Hospital for evaluation of thoracic pain and dysphonia. A chest Computerized Tomography (CT) scan showed a penetrating ulcer 1,2 cm distal to the origin of the left common carotid artery and immediately proximal to the left subclavian artery. A large pseudoaneurysmal sac measuring 63 mm x 67 mm, was located on the anterior left side of the aortic arch towards the wall chest (Fig. 1). The patient's EuroSCORE was 13, and predictive mortality was 41,12%.

We approached the aortic arch through a left femoral artery approach. Endoprosthesis was introduced under fluoroscopy control and controlled hypotension (80 mm Hg). Medtronic Valiant endoprosthesis with a diameter of 26 mm and a length of 100 mm was used.

The endoprosthesis was deployed in such a way that the freeflo was on the origin of the left common carotid artery (Fig. 2).

Fluoroscopy was performed to confirm appropriate graft deployment and the presence of small type 1 endoleak partially refilling the pseudoaneurysm. Patient's pain resolved soon after placement of the stent graft. A CT scan, performed 7 days later, confirmed the presence of a small endoleak with slow pseudoaneurysm refilling (Figs. 3,4). The postoperative period was event free, and

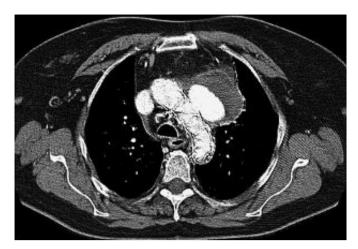


Fig. 4: Axial CT image Contrast material-enhanced follow-up at twenty days after the procedure, suggested progressive thrombosis of the pseudoaneurysm sac.

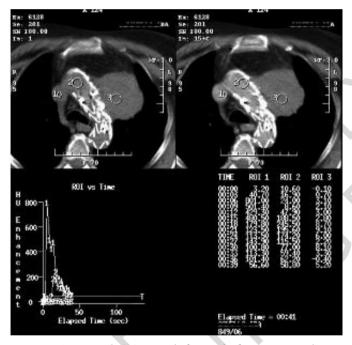


Fig. 5: 1 **A, B**: axial CT image before and after contrast enhancement. At 3 months, demonstrated occlusion of the pseudoaneurysm with complete resolution of the endoleak. **C, D**: HU enhancement diagram, and ROI evaluation. No more blood is detected inside the pseudoaneurysm.

the patient was discharged on day ⁸. A follow-up at twenty days after the procedure, suggested progressive thrombosis of the pseudoaneurysm sac. and, at 3 mounths, demonstrated occlusion of the pseudoaneurysm with complete resolution of the endoleak. The patient is actually alive and completely asyntomatic (Figs 5,6).

Conclusion

PAU located in the ascending aorta is uncommon and has higher incidence of aortic rupture and a prompt sur-

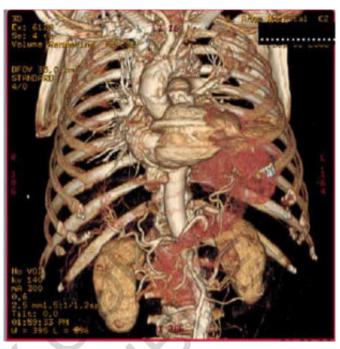


Fig. 6: Three-dimensional VR CT image frontal view shows the endoprosthesis and the large pseudoaneurysmal sac at 3 months, demonstrated occlusion of the pseudoaneurysm with complete resolution of the endoleak.

gical treatment is recommended ⁸. Surgical repair may be challenging and endovascular treatment should be considered as a potential alternative to conventional aortic arch aneurysm surgery in high-risk patients ^{9,10}. Our case show that an optimal result can be obtained in selected cases through a progressive obliteration of the pseudoaneurysm sac, secondary to the hemodynamic changes triggered by the endovascular prosthesis.

References

- 1. Singhal P, Lin Z: Penetrating atheromatous ulcer of ascending aorta: A case report and review of literature. Heart Lung Circ, 2008; 17(5):380-82.
- 2. Izzo L, Bolognese A, Izzo P, De Toma G, D'Angeli I: Multislice tomographic diagnosis of isolated right aortic arch in an elderly patients. Int J Cardiol, 2008; 125(2):e21-2. Epub 2007 Oct 25.
- 3. Patatas K, Shrivastava V, Ettles DF: *Penetrating atherosclerotic ulcer of the aorta: A continuing debate.* Clin Radiol, 2013; 68(8):753-59.
- 4. Troxler M, Mavor AID, Homer-Vanniasinkam S: Penetrating atherosclerotic ulcers of the aorta. Br J Surg, 2001; 88:1169-177.
- 5. Cervetti MR, Camporrotondo M, Ricapito P, Espinoza JC, Piccinini F, Vrancic M, Navia D: *Acute penetrating atherosclerotic ulcer of the ascending aorta*. J Card Surg, 2019; 34(4):214-15. doi: 10.1111/jocs.13999. Epub 2019 Mar 5.

- 6. Jin JL, Huang LJ, Yu FC, Lü JN, Jiang SL. Zhonghua Yi Xue Za Zhi: Endovascular stent-graft repair for penetrating atherosclerotic ulcer of the descending aorta. Zhongua Yi. 2006; 86(16):1115-117.
- 7. Ty Beckmann E, Dalia AA, Jelly CA, Melnitchouk S: *A intramural haematoma secondary to penetrating atherosclerotic ulcer of the ascending aorta*. Interact Cardiovasc Thorac Surg, 2019; 28(3):491-492. doi: 10.1093/icvts/ivy268.
- 8. El Hassani I, Van Damme H, Creemers E, Boesmans E, Defraigne JO: *Penetrating atherosclerosis aortic ulcer: A re-appraisal* Acta Chir Belg, 2017; 117(1)
- 9. Kappert U, Ghazy T, Ouda A, Hoffmann RT, Simonis G, Matschke K: *Transapical endovascular stenting of penetrating atherosclerotic ulcer of ascending aorta*. Ann Thorac Surg, 2013; 96:e101 e103.
- 10. Soyama A, Kono T, Matsuoka T, Otsuka K, Murakami S, Tsuji H, Sakamoto K, Minakata K: *A case of penetrating atherosclerotic ulcer treated with thoracic endovascular aortic repair*. K Circulation, 2015; 132(24):2352-353.

