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Angiología

Case Report

Mycotic aneurysm in descending thoracic aorta: emergency endovascular resolution

Aneurisma micótico en aorta torácica descendente: resolución endovascular de urgencia

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Abstract

Introduction: mycotic aneurysms are a type of aneurysm caused by infection of the blood vessel tissue, usually secondary to bacteria. They occur in preexisting aneurysms or due to aneurysmal degeneration resulting from infection. The clinical presentation is nonspecific, with symptoms including fever, chest or abdominal pain, and chills. The diagnosis is based on clinical presentation, laboratory and imaging, and treatment consists in use of antibiotics, blood pressure control and surgical management, traditionally open.

Case report: we present the case of a 76-year-old patient who presented with cough, hemoptysis, and night sweats. CT shows a juxta-aortic abscess measuring 6.6 cm × 3.8 cm with three mycotic pseudoaneurysms in the descending aorta. She was admitted hemodynamically stable, but progressed with hemoptysis and compromised consciousness. In the emergency room, a thoracic aortic endoprosthesis was implanted, distal to the left subclavian artery to the celiac trunk, and subsequently, drainage of the periaortic collection was performed by interventional radiology.

Discussion: endovascular treatment has been proposed as an alternative for repair in patients at high surgical risk, with comparable results in terms of survival to open surgery.

Keywords:
Mycotic aneurysm. TEVAR. Thoracic aorta. Arterial pseudoaneurysms. Infection.

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Resumen

Introducción: los aneurismas micóticos son un tipo de aneurisma causado por la infección del tejido del vaso sanguíneo, habitualmente secundaria a bacterias. Ocurren en aneurismas preexistentes o por degeneración aneurismática producto de la infección. La presentación clínica es inespecífica, con síntomas que incluyen fiebre, dolor torácico o abdominal y calofríos. El diagnóstico se basa en la presentación clínica, pruebas de laboratorio e imágenes, y el tratamiento consiste en el uso de antibióticos, en el control de la presión arterial y en el manejo quirúrgico, tradicionalmente abierto.

Caso clínico: se presenta el caso de un paciente de 76 años que consulta por tos, hemoptisis y sudoración nocturna. El angio TAC muestra absceso yuxtaaórtico de 6,6 cm × 3,8 cm con tres pseudoaneurismas micóticos en aorta descendente. Ingresa hemodinámicamente estable, pero evoluciona con hemoptisis y compromiso de conciencia. En el Servicio de Urgencias se realiza el implante de una endoprótesis aórtica torácica, distal a la arteria subclavia izquierda hasta el tronco celíaco, y posteriormente se realiza drenaje de colección periaórtica por el Servicio de Radiología Intervencional.

Discusión: se ha planteado el tratamiento endovascular como alternativa para la reparación en pacientes de alto riesgo quirúrgico, con resultados comparables en términos de supervivencia a los de la cirugía abierta.

Palabras clave:
Aneurisma micótico. TEVAR. Aorta torácica. Pseudoaneurisma arterial. Infección.

INTRODUCTION

Mycotic aneurysms (MAs) are a type of aneurysm caused by infection of the vessel tissue, often due to bacterial infection. In the post-antibiotic era, gram-negative microorganisms are responsible for more than 40 % of cases. They can be located in any segment of the aorta, but predominantly in the descending aorta (75.7 %) (1).

It has been reported that the aortic wall with atherosclerotic disease is more vulnerable to colonization by microorganisms, either through bacteremia or adjacent infectious processes (2).

In Western countries, they represent between 0.6 % and 2.6 % of all aortic aneurysms reported; however, in Asia, they amount for up to 13 % (3). MAs of the thoracic aorta represent 30 % of all MAs, with a male predominance (with a ratio of 3:1) and a mean age at presentation of 65 years (4,5).

Risk factors for MAs include atherosclerotic disease, pre-existing aneurysms, contiguous infection, immunosuppression, aortic injury associated with catheterization, surgery, or trauma.

They have a non-specific clinical presentation, depending on the site and severity of the infection, the size of the aneurysm, or the patient's comorbidities, among other variables. The most common symptoms include fever, chest, and abdominal pain. Local expansion of the aneurysm can generate compressive symptoms such as dysphagia, dyspnea, or cough (6,7).

Diagnosis is based on clinical presentation (pain, fever, and evidence of infection), elevated inflammatory parameters, positive blood cultures, and findings made on the angio-CT or angio-MRI: aneurysm with contrast enhancement associated with edema, abscess, or a periaortic mass.

Timely diagnosis and treatment with antibiotics (ABT) + surgery are key to successfully treat this disease.

CASE REPORT

A 76-year-old woman presented with a 7-day history of cough and hemoptysis, intermittent night sweats 1 month prior to consultation, and unquantified weight loss. Lab test results showed high inflammatory parameters; angio-CT showed a 6.6 cm × 3.8 cm juxta-aortic abscess of the descending thoracic aorta with three 12 mm, 21 mm, and 21 mm mycotic pseudoaneurysms in the descending thoracic aorta spreading towards the lung parenchyma of the left upper lobe.

The patient was hemodynamically stable. Empirical antibiotics were prescribed, and the Vascular Surgery Service evaluated the patient for surgery.

Forty-eight hours after admission, the patient started experiencing hemoptysis, an altered level of consciousness, and distal hypoperfusion, and was admitted to the ER, where a thoracic aortic stent-graft was implanted to exclude the ruptured mycotic pseudoaneurysms. The diameter of the thoracic aorta distal to the subclavian artery was 26 mm, and 20 mm at celiac trunk level, with a 15 % to 16 % oversizing.

In the Angiography Service, a first Terumo® Relay Plus stent-graft with a proximal diameter of 28 mm (28-N4-22-159-22S) was deployed from the thoracic aorta to 15 mm proximal to the celiac trunk, without covering it. Afterwards, one Cook® Zenith Alpha Thoracic stent-graft—with a 28 mm diameter (ZTA-P-28-155)—was deployed immediately distal to the left subclavian artery. An overlap of, at least, 8 cm inside the first stent-graft was achieved. The final aortography confirmed the total exclusion of the ruptured segments, and the integrity of the left subclavian artery and the celiac trunk.

Three days after surgery, norepinephrine was discontinued, and the patient was uneventfully extubated. Cultures of endotracheal aspirate tested positive for multi-sensitive *Escherichia coli*. Eight days after surgery, the Interventional Radiology Service drained the periaortic collection, with a culture positive for *E. coli*.

The Infectious Diseases Service adjusted the antibiotic treatment, and the patient showed lower inflammatory parameters. She was discharged in good condition with Cotrimoxazole Forte for an indefinite period. The angio-CTs performed 1 and 4 months after the procedure, confirmed the thoracic endovascular aortic repair (TEVAR) without endoleak and resolution of the periaortic collection. Inflammatory parameters remained slightly high 6 months after surgery. The Infectious Diseases Service monitored the patient outpatiently and suggested keeping antibiotics until parameters normalized, without proposing a follow-up PET-CT for the time being.

DISCUSSION

Mycotic aneurysms are a condition associated with a high risk of morbidity and mortality, regardless of the type of patient or management. Treatment consists of using broad-spectrum ABT (adjusted by cultures), blood pressure control, and surgical management.

Preoperative ABT is often used unless the patient's condition requires emergency surgical resolution, as in our patient's case, who exhibited hemodynamic instability.

Traditionally, open surgery was the standard of care, but since 2007 the use of TEVAR has increased to treat these cases. For stable patients who respond well to immediate medical management, deferred surgical repair may be an option to maximize the benefit of ABT. However, in unstable patients, with refractory pain or aneurysm progression, emergency surgical resolution should be considered.

To improve the outcomes of patients treated with TEVAR, the use of broad-spectrum ABT as soon as a mycotic aneurysm is suspected, the use of stent-grafts pre-instilled with ABT, surgical debridement, or percutaneous drainage to help eliminate the infection source, along with extended postoperative ABT therapy, have been described (7).

Endovascular treatment offers multiple advantages over open surgery, including less physiological stress, less blood loss, and avoidance of the need for thoracotomy or sternotomy, among others. Additionally,

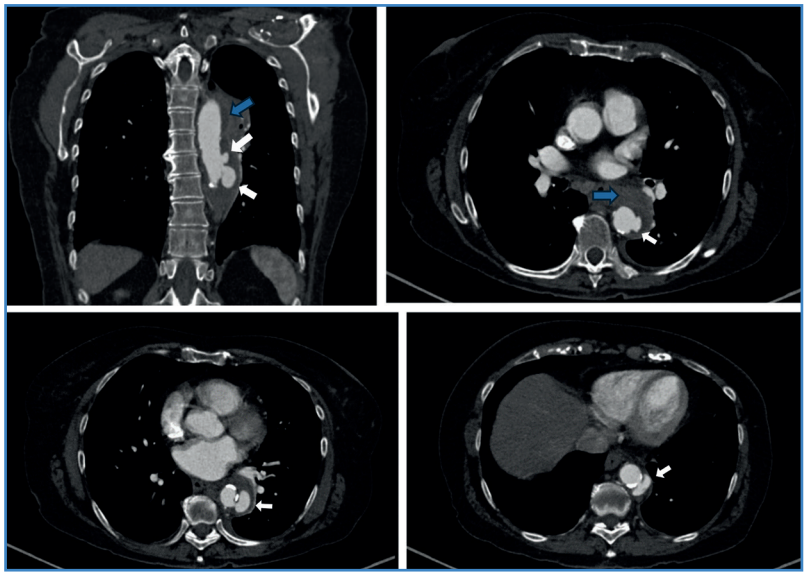

Figure 1. *Preoperative angio-CT showing a periaortic collection in relation to the left upper lung lobe (blue arrow) and images consistent with the 3 pseudoaneurysms described in the descending thoracic aorta (white arrows).*

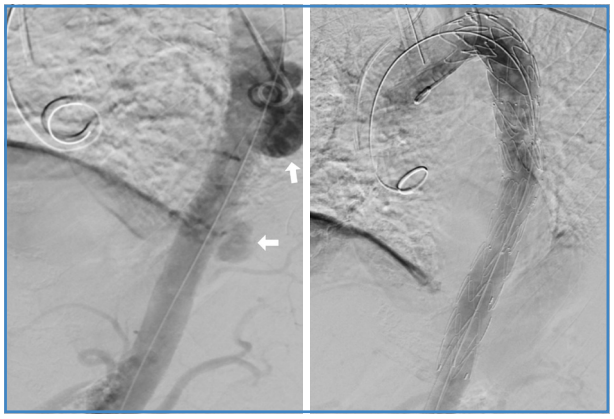

Figure 2. *Angiographic images. To the right, initial aortography showing contrast leakage in the descending thoracic aorta at 2 different locations, corresponding to mycotic pseudoaneurysms (pending treatment) (white arrows). To the left, TEVAR already deployed, with no contrast leakage from the descending thoracic aorta.*

it also reduces the risk of morbidity, mortality, renal failure, respiratory failure, limb ischemia, and organ ischemia.

The main disadvantage of TEVAR in the management of this disease is the placement of a foreign body in an infected field. Nonetheless, considering the patient's condition and the severity of the disease, this is an option that should not be ruled out. Although TEVAR does not include local debridement, the rate of reinfection is relatively low. In our patient's case, percutaneous drainage of the periaortic collection was chosen, allowing identification of the involved microorganism, subsequently adjusting antibiotic treatment and controlling the infection focus, and eventually yielding favorable results.

REFERENCES

1. Sörelius K, Budtz-Lilly J, Mani K, et al. Systematic review of the management of mycotic aortic aneurysms. Eur J Vasc Endovasc Surg 2019;58:426-35. DOI: 10.1016/j.ejvs.2019.05.004
2. Bickerstaff LK, Pairolero PC, Hollier LH, et al. Thoracic aortic aneurysms: a population-based study. Surgery 1982;92:1103-8.
3. Wilson WR, Bower TC, Creager MA, et al. Vascular graft infections, mycotic aneurysms, and endovascular infections: a scientific statement from the American Heart Association. Circulation 2016;134:412-60. DOI: 10.1161/CIR.0000000000000457
4. Kearney RA, Eisen HJ, Wolf JE. Nonvalvular infections of the cardiovascular system. Ann Intern Med 1994;121:219-30. DOI: 10.7326/0003-4819-121-3-199408010-00010
5. Gomes MN, Choyke PL, Wallace RB. Infected aortic aneurysms. A changing entity. Ann Surg 1992;215:435-42. DOI: 10.1097/00000658-199205000-00005
6. Kyaw WA, Lim CY, Khalil MA, et al. A fatal case of Ortner's syndrome and dysphagia aortic secondary to rapidly expanding mycotic thoracic aortic aneurysm in a chronic kidney disease patient. SAGE Open Med Case Rep 2018;6:2050313X18799247. DOI: 10.1177/2050313X18799247
7. Steverlynck L, Van de Walle S. Mycotic thoracic aortic aneurysm: review of the diagnostic and therapeutic options. Acta Clin Belg 2013;68:193-8. DOI: 10.2143/ACB.3271