The Heart Surgery Forum 2022-4983
25 (5), 2022 [Epub September 2022]
doi: 10.1532/hsf.4983

Online address: http://journal.hsforum.com

A Case of Thoracic Aortic Endovascular Repair of a Ruptured Mycotic Aortic Aneurysm Due to Pasteurella Multocida

Fumihiro Kitashima, MD, Ryo Itagaki, MD, PhD, Akira Sezai, MD, PhD, Makoto Taoka, MD, PhD, Shunji Osaka, MD, PhD, Yojiro Machii, MD, Taisuke Hanamura, MD, Masashi Tanaka, MD, PhD

Department of Cardiovascular Surgery, Nihon University School of Medicine, Tokyo, Japan

ABSTRACT

An 81-year-old man was admitted for general fatigue of one month's duration. Two sets of blood cultures revealed bacteremia, due to Pasteurella multocida, while computed tomography (CT) revealed a 47-mm descending aortic saccular aneurysm. After transfer to our hospital, the saccular aneurysm rapidly grew to 54 mm. An emergency thoracic endovascular aortic repair was performed, due to the aneurysm immediately rupturing after the CT scan. The patient was discharged on postoperative day 28.

INTRODUCTION

Mycotic aortic aneurysm (MAA) is a rare pathology that carries significant morbidity and mortality. MAAs account for only 0.6%–2% of all aortic aneurysms in Western countries and are mostly reported in East Asia. They exhibit a high risk of rupture, due to their rapidly growing size [Sörelius 2019]. The most common pathogens associated with MAAs are Streptococci, Staphylococci, and Salmonella; however, in rare cases, Pasteurella multocida may be the cause. P. multocida infects humans after animal bites, licks, or scratches. Only seven cases of MAA due to P. multocida have been reported thus far. The traditional surgical management of MAA involves open surgical repair (OSR) with debridement of the infected area, followed by revascularization. Endovascular aortic repair (EVAR) for MAA was first reported in 1998 [Semba 1998], and offers a less invasive treatment option suitable for high-risk surgical patients. Herein, we report a case of a ruptured MAA, caused by P. multocida, that was managed by thoracic aortic endovascular repair (TEVAR).

CASE REPORT

An 81-year-old man with type 2 diabetes mellitus was admitted for general fatigue of one month's duration. Laboratory examination revealed a severe inflammatory reaction. Two sets of blood cultures were positive for P. multocida. Computed tomography (CT) revealed a 47-mm descending aortic saccular aneurysm (Figure 1), and the patient subsequently was transferred to our hospital. (Figure 1)

Intravenous antibiotic therapy was initiated upon admission to our hospital. On physical examination, he had a high fever and normal blood pressure. Numerous wounds, due to frequent scratches by his domestic cat, were observed. The laboratory examination performed at our hospital showed a leucocyte count of 8.6×109 /L, C-reactive protein level of 19.1 mg/dL, and glycated hemoglobin level of 9.1%. On day 3 post-admission, CT revealed rapid growth of the descending aortic saccular aneurysm to 54-mm. (Figure 2) Because of

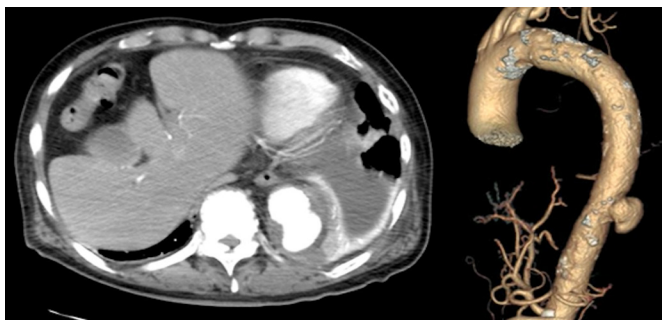

Figure 1. Computed tomography scan showing a 47-mm mycotic saccular aneurysm in the descending aorta.

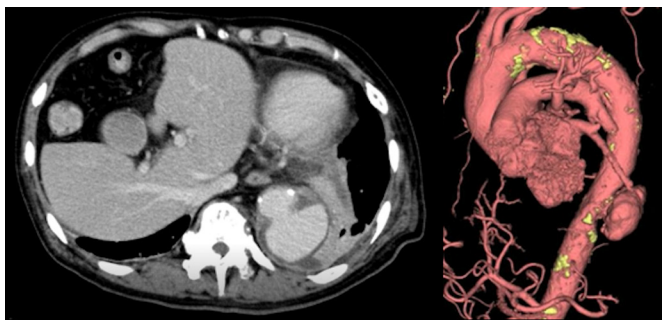

Figure 2. Computed tomography scan showing a rapidly growing 54-mm saccular aneurysm.

Received July 5, 2022; accepted July 18, 2022.

Correspondence: Masashi Tanaka, MD, PhD, The Department of Cardiovascular Surgery, Nihon University School of Medicine, 30-1 Oyaguchi-kamimachi, Itabashi-Ku, Tokyo, 173-8610 Japan, Telephone 81-3-3972-8111, Fax 81-3-3955-9818 (e-mail address: tanaka.masashi@nihon-u.ac.jp).

his severe diabetes mellitus, he was considered at risk of surgical site and graft infections after OSR. Therefore, emergency endovascular repair was planned to prevent a rupture.

However, on the same day, the patient experienced cardiopulmonary arrest, due to MAA rupture. Cardiopulmonary resuscitation immediately was performed. Spontaneous circulation was achieved, and the patient underwent emergency endovascular repair of the ruptured MAA using a 31 × 150 mm Gore thoracic endoprosthesis (W. L. Gore & Associates, Flagstaff, AZ). Under general anesthesia, an occlusion balloon was inserted into the femoral artery and the indwelling proximal ruptured aorta. The device subsequently was deployed to the ruptured aorta. Angiography revealed no stent endoleaks or dislocations.

Postsurgical antibiotic therapy with sulbactam/ampicillin was continued for four weeks. No bacterial growth was noted in the left pleural effusion. The patient soon became afebrile and achieved a normal white blood cell count of 4,500 cells/μL and a C-reactive protein level of 3.50 mg/dL. No postoperative complications were noted. The patient was discharged on postoperative day 28 with oral antibiotics. No signs of infection were noted at six months postoperatively. Further, a follow-up CT scan showed no stent endoleaks, dislocation, stent-graft infection, or appearance of new MAAs. (Figure 3)

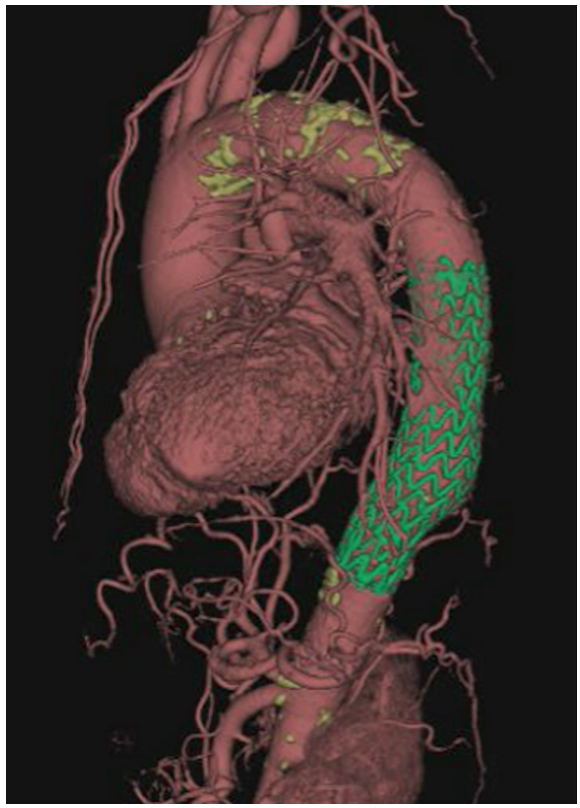

Figure 3. No new mycotic aortic aneurysms or endoleaks are seen on a computed tomography scan taken 6 months postoperatively.

DISCUSSION

MAA is a rare disease with a high mortality rate due to the increased incidence of rupture and sepsis. Until 2000, the published preoperative mortality rate was 26%–44% [Sörelius 2019]. The most common causative pathogens of MAA include Salmonella, Staphylococcus, and Streptococcus.

P. multocida is a gram-negative coccobacillus, a zoonotic infectious organism, and an uncommon cause of MAA. It is part of the normal bacterial flora that is transmitted to humans via bites, licks, or scratches. Immunocompromised patients, such as those with diabetes mellitus, are likely to develop a more severe form of the disease, presenting with meningitis, arthritis, and respiratory tract infections. Vascular complications are rare, especially if the native arteries are infected [Migliore 2009]. Seven cases of MAA caused by P. multocida previously have been reported by Kano et al. In their report, only one case of mycotic thoracic aortic aneurysm was treated with OSR [Kano 2020]. Approximately 44% of MAA cases present with aneurysm rupture due to rapid growth [Sörelius 2019]. Early diagnosis and management with surgery and antibiotics are essential for a good prognosis.

Conventional surgical management for MAAs includes OSR with resection of the aneurysm, debridement of the infected tissues, and revascularization by in situ reconstruction or extra-anatomic bypass. Until 2007, most studies focused on the results of OSR [Sörelius 2019], with reported short-term mortality rates of 20%–40% [Sörelius 2014]. Reports on long-term outcomes after OSR are rare because of the high mortality and morbidity rate, particularly when sepsis and immunodeficiency are present. EVAR for MAA first was reported in 1998 as a less invasive strategy that is more suitable for high-risk surgical patients. Since 2007, there has been an increase in the utilization of EVAR for MAA. Infection-related complications (IRCs) related to EVAR include sepsis, graft/stent graft infections, recurrent MAAs, and aorto-enteric fistulas. EVAR-associated IRCs occur in approximately 21% of cases, and approximately 90% of all IRCs occur within the first postoperative year, at a mean of three months [Sörelius 2019]. Sörelius et al. reported that TEVAR for MAAs may lead to acceptable short- and long-term survival (92% at 30 days, 88% at 3 months, 78% at 1 year, and 71% at 5 years) and is not associated with an increased risk of IRCs or re-operation [Sörelius 2019]. Conversely, in a series of OSR for MAAs, the reported 2-year survival was approximately 60% [Hsu 2004], and in a German single-center study, the 5-year survival rate was 35% [Müller 2001]. Thus, the outcomes of EVAR are superior to those of open repair. Additionally, a systematic review management reported that antibiotic treatment for >6 months postoperatively is associated with better outcomes [Sörelius 2019].

We experienced a case of a ruptured MAA due to P. multocida, successfully managed with TEVAR and long-term antibiotic treatment. TEVAR may be an alternative to OSR for MAA management, especially in patients unsuitable for major surgery. However, studies comparing EVAR and OSR as a first-line treatment of MAAs remain limited. Multi-center collaboration is necessary to determine the optimal MAA management approach.

CONCLUSION

MAA is a life-threatening condition. We described a case of ruptured MAA due to P. multocida, successfully managed with emergency TEVAR. We believe that TEVAR may be utilized as an alternative treatment option for MAA, especially in patients unsuitable for major surgery.

REFERENCES

Hsu RB, Chen RJ, Wang SS, Chu SH. 2004. Infected aortic aneurysms: clinical outcome and risk factor analysis. J Vasc Surg. 40:30–5.

Kano Y, Takamatu A, Honda H. 2020. Mycotic aneurysm due to Pasteurella multocida. QJM. 113:667–9.

Migliore E, Serraino C, Brignone C, et al. 2009. Pasteurella multocida infection in a cirrhotic patient: a case report, microbiological aspects and a review of the literature. Adv Med Sci. 54:1-4.

Müller BT, Wegener OR, Grabitz K, Pillny M, Thomas L, Sandmann W. 2001. Mycotic aneurysms of the thoracic and abdominal aorta and iliac arteries: experience with anatomic and extra-anatomic repair in 33 cases. J Vasc Surg. 33:106–13.

Semba CP, Sakai T, Slonim SM, et al. 1998. Mycotic aneurysms of the thoracic aorta: repair with use of endovascular stent-grafts. J Vasc Interv Radiol. 9:33–40.

Sörelius K, Budtz-Lilly J, Mani K, Wanhainen A. 2019. Systematic review of the management of mycotic aortic aneurysms. Eur J Vasc Endovasc Surg. 58:426–35.

Sörelius K, Mani K, Björck M, et al. 2014. Endovascular treatment of mycotic aortic aneurysms: a European Multicenter Study. Circulation. 130:2136–42.

Sörelius K, Wanhainen A, Wahlgren C-M, et al. 2019. Nationwide study on treatment of mycotic thoracic aortic aneurysms. Eur J Vasc Endovasc Surg. 57:239–46.