Endovascular treatment of a tuberculous infected aneurysm of the descending thoracic aorta: A word of caution

Louis Labrousse, MD,[a] Michel Montaudon, MD, PhD,[b] Alexandre Le Guyader, MD,[c] Emmanuel Choukroun, MD,[a] François Laurent, MD,[b] and **Claude Deville, MD,[a]** *Bordeaux-Pessac and Limoges, France*

An infected aneurysm of the thoracic aorta due to mycobacterium tuberculosis is an unusual entity for which the classical treatment is antituberculosis chemotherapy and open-chest surgery. Recent improvements in endovascular treatments have led to their proposed use for infected aneurysms in patients for whom open surgery poses too high a risk. We report on a 68-year-old man with a tuberculous aortic aneurysm who had been treated with an endoprosthesis and antituberculosis chemotherapy. His clinical and radiological follow-up was uneventful and led to the discontinuation of pharmacological treatment after 16 months. However, a recurrence of the infection led to a fatal aortic rupture 4 months after discontinuation of therapy. (J Vasc Surg 2007;46:786-8.)

Endovascular aortic repair of infected thoracic aortic lesions has been introduced in an attempt at reducing operative morbi-mortality. Although only a few cases have been reported, this innovative option is increasingly gaining acceptance and is becoming, for some surgeons, the first option for the treatment.[1,2] We report a rare case of the endovascular treatment of an infected aneurysm of the thoracic aorta due to mycobacterium tuberculosis. Although initial control of disease was successfully attained, recurrence of the infection 4 months after discontinuation of the antitubercular drug therapy led to a fatal aortic rupture.

CASE REPORT

A 68-year-old man was admitted to the department of pulmonary disease for a giant tuberculous cavern (involving the entire upper left lobe), associated with a cutaneous fistula. His history included tobacco use, chronic pulmonary insufficiency with hypoxia, hypertension, and angina. Recent signs were fever, weight loss, and severe asthenia. Sputum cultures were positive for mycobacterium tuberculosis and susceptible to usual antituberculosis drugs. Thus, a classic therapy was started with pyrazinamide, isoniazid, rifampin, and ethambutol. After 2 months, the treatment was switched to a double therapy of isoniazid and rifampin. Two months later, the patient received an emergency transfer to our department for a large blood effusion from the cutaneous fistula. A computed tomography (CT) scan showed an aneurysm of the isthmic part of the aorta, in contact with the pulmonary cavern. The necks of the aneurysm were suitable for an endovascular approach (proximal aortic diameter: 27 mm, distal aortic diameter: 25 mm). Because of the patient's poor condition, an emergent endovascular procedure was planned. In the operating room, the patient was given general anesthesia and an aortic angiography confirmed the diagnosis (Fig 1). After right femoral surgical access was obtained, the endoprosthesis (Talent, Medtronic Inc, Minneapolis, Minn, diameter 30 mm, length 11 cm) was tracked into the distal aortic arch over a stiff guidewire, under fluoroscopic guidance.

The endoprosthesis was deployed across the tuberculous aneurysm, overlapping 3 cm of healthy aorta both distally and proximally. Balloon inflation at both ends of the endoprosthesis completed the procedure. A final angiogram indicated total exclusion of the aortic aneurysm. After a short postoperative course (extubation time: 3 hours, ICU stay: 1 day) the patient was discharged on postoperative day 8. A new complete treatment of tuberculosis was started with the same previous four drugs for 2 months followed by the same two-drug therapy. The patient's fever resolved quickly, with a normalization of the white blood cell count and inflammatory markers.

Four months later, the patient underwent a radical nephrectomy for a clear cell renal carcinoma. No associated treatment was planned for the tumor. Postoperative recovery was particularly long because of chronic asthenia, and the patient declined any new surgical therapy for his pulmonary cavitation, such as thoracoplasty and/or pulmonary resection.

Follow-up was performed every 3 months by clinical and sputum examination and thoraco-abdominal CT scan. At every assessment, the CT scan showed a perfect exclusion of the aneurysm with no abnormal features compared with the preoperative CT scan (Fig 2). The patient's recovery was uneventful, with a weight gain of 4 kg and no microbiological evidence of persistent infection. White blood cell counts were below 8500/ml and C-reactive protein (CRP) <25 U/ml (normal: below 10), compared with a preoperative level at more than 80 U/ml. The antituberculosis treatment was stopped (total dura-

From the Department of Cardio-Vascular Surgery[a] and the Department of Radiology,[b] Bordeaux Heart University Hospital, Bordeaux-Pessac, and the Department of Thoracic and Cardiovascular Surgery and Angiology, Dupuytren University Hospital, Limoges.[c]

Competition of interest: none.

Reprint requests: Louis M. Labrousse, MD, Department of Cardio-Vascular Surgery, Hôpital Haut Lévèque, Avenue de Magellan, 33 604 Bordeaux-Pessac, France (e-mail: louis.labrousse@chu-bordeaux.fr).

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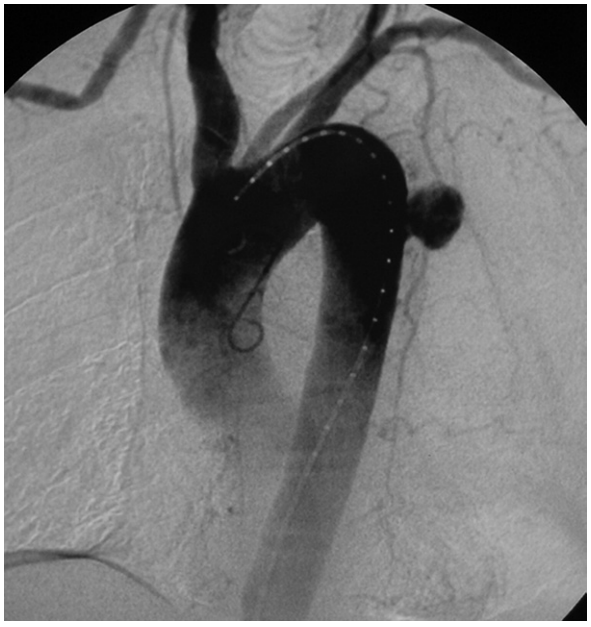

Fig 1. Perioperative angiogram of the tuberculous aneurysm of the proximal part of the descending aorta.

tion: 16 months) at 1 year follow-up since multiple fiberscopic lavages and sputum cultures were negative.

The next CT scan 3 months later was also without new specific abnormalities. However, 1 month later, the patient was referred to another hospital for collapse and thoracic pain. Diagnosis of aortic rupture was made based on the chest X-ray and the patient died few hours after admission. A review of the previous CT scan confirmed the absence of preliminary features of a recurrence of the disease.

DISCUSSION

A tuberculous aneurysm of the thoracic aorta is a rare entity resulting from either direct extension to the vessel or hematologic contamination.[3] In our patient, the mechanism seems to have been mainly attributable to the contiguous extension from a cavernous lesion in the left superior lobe of the lung. This mechanism explains the sacciform feature of the aneurysm, which was in fact a pseudoaneurysm. As in previously published cases,[3,4] the aneurysm appeared in spite of ongoing adjusted antituberculosis chemotherapy, which probably reflects poor drug penetration into the necrotic tissue.[9] In addition, the coexistent renal cancer may have played a role by compromising the patients' immune status.

The traditional approach to a tuberculous infected aneurysm of the descending thoracic aorta is antituberculosis chemotherapy combined with surgery, which involves extensive excision and debridement of the infected field, with in situ prosthetic repair.[3-8] Surprisingly, excellent results in this difficult setting have been reported. An extensive review of the literature (PubMed, National Library of Medicine) shows that 95% (19 of 20 published cases) of patients surgically treated for a descending tuberculous aneurysm survived.[3-8] However, the follow-up has been usually short (less than 18 months) and never exceeded 3 years. Even if published open-chest surgical series are satisfactory in terms of morbidity and mortality, the clinical presentation of patients such as ours is usually challenging, with acute hemorrhage, age over 60 years, immunosuppressive status, malnutrition, and weight loss.[3,4] In such patients, a less invasive endovascular option is attractive.[9,10]

The main problem with the endovascular approach is the impossibility of performing extensive excision and de-

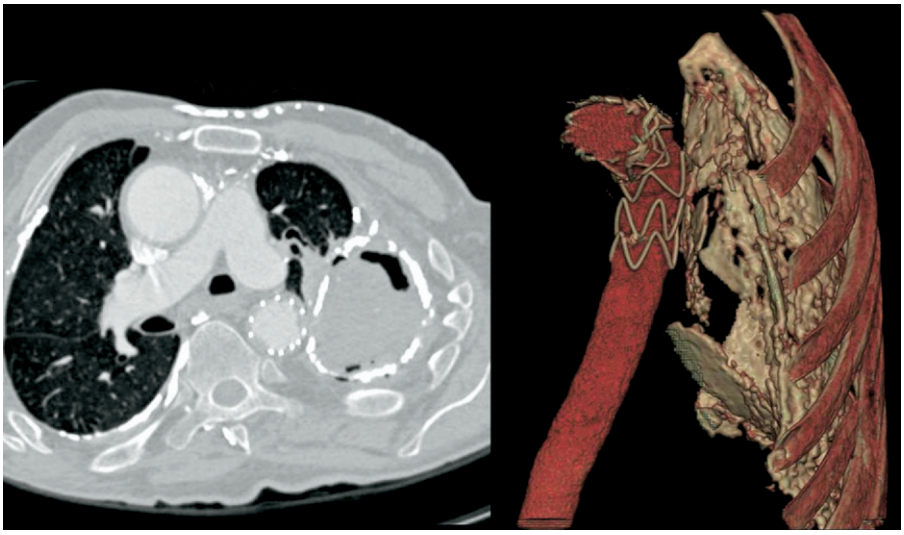

Fig 2. Postoperative computed tomography (CT) and CT-based three-dimensional reconstruction of the thorax with the endoprosthesis and the exclusion of the tuberculous aneurysm. Note the close anatomical contact between the endoprosthesis and the pulmonary cavitation.

bridement of the infected field, which are main parts of the surgical strategy. This debridement likely plays a key role in eliminating necrotic tissue and, thus, improving antimycobacterial drug efficiency.[3,5,8] Thus, the potential benefit from this minimally invasive approach has to be compared with the obvious, higher risk of infection recurrence. Our patient's debilitated status (and the patient's decision) led us to avoid a surgical procedure on the residual cavern, which was probably the main cause of the recurrence of the infection. Such a situation is likely different from the previously published cases of successful endovascular treatment of tuberculous aneurysms of the abdominal[10] and thoracic[11] aorta. In the two abdominal cases, the lesions did not have cutaneous fistulae. The usual antituberculous treatment is more effective in such cases than when there are large residual cavitations.[3,10] This difference due to the presence of cavitations is confirmed by a recently reported successful treatment of a tuberculous thoracic aneurysm[11] diagnosed by microbiology in the absence of observed lung lesions in contact with the aorta. Moreover, the follow-up of this last patient was limited to 12 months with no late follow-up after cessation of antimicrobial therapy. A secondary treatment of tuberculous cavitations seems mandatory in this clinical setting, and pulmonary resection is probably the more effective therapy. Depending of patient condition and clinical situation, the endovascular treatment should then be considered either as a bridge to a second open chest (curative) treatment or as a palliative "destination therapy". In case of palliative therapy, it seems appropriate to maintain lifelong antibiotic treatment when tuberculosis sequelae include large cavitations in contact with the aorta.

Our patient's recurrence occurred shortly after the discontinuation of antitubercular drug therapy. The decision to discontinue these medications was based on the duration of therapy (16 months), appropriate antimicrobial activity, decreased levels of inflammatory markers, unchanged imaging features, and negative results from all bacteriological analysis. However, CRP level was not strictly normal, and this should have been an indicator not to discontinue oral therapy. In the literature, there is no consensus regarding the duration of the antimicrobial therapy in this specific situation. The paucity of cases makes this decision difficult, and all authors recommend using a combination of clinical, biological, and radiographic information.[3-11] Here, the CT scans did not help to predict the recurrence. The unchanged appearance of the CT scan a few weeks before the rupture may be due to artifacts caused by calcifications in the cavern wall and by the stent's bars, which made analysis of the aortic wall and periaortic area difficult. Thus, an erosion of the aortic wall distal to the extremity of the endoprosthesis may have been unrecognized until the new pseudoaneurysm appeared. As CT-scan alone does not appear to provide accurate follow-up for such infected aneurysms, another imaging technique may be useful, such as In-labelled biotin scan, since it is considered to be highly sensitive in detecting graft infection.[12] The need for associated In-labelled biotin scan assessment will increase the cost of the follow-up, but might allow earlier diagnosis of recurrences that may be treated either surgically (if the patient's condition permits) or with an endovascular approach covering a supplemental aortic segment.

CONCLUSION

In conclusion, the endovascular treatment of a tuberculous aneurysm of the descending aorta may offer adequate temporary control but must be considered noncurative, especially if the aneurysm is in contact with a residual pulmonary lesion that is not entirely (and probably surgically) treated. Patient condition helps to distinguish those for whom the endovascular treatment might be a bridge to a second stage of a curative, open chest treatment from those for whom it will be a palliative treatment with lifelong monitoring. The classical length of the antimycobacterial therapy may be less likely to eradicate infection in the presence of a lesion that is in contact with a foreign body. Chronic or even lifelong antimycobacterial treatment, therefore, is recommended when surgical treatment of the residual tuberculosis lesion cannot be achieved.

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