Korean J Thorac Cardiovasc Surg 2012;45:408-411 □ Case Report □
ISSN: 2233-601X (Print) ISSN: 2093-6516 (Online) http://dx.doi.org/10.5090/kjtcs.2012.45.6.408

Tuberculous Aortitis Complicated with Pseudoaneurysm Formation in the Descending Thoracic Aorta: A Case Report

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A 51-year-old male with sustained fever was diagnosed with military tuberculosis and tuberculous aortitis complicated with pseudoaneurysm formation at the proximal descending aorta. A follow-up computed tomography evaluation showed an increased size of the pseudoaneurysm in this area, suggestive of a contained rupture. Consequently, the patient underwent emergency excision and replacement of the aorta using a left heart bypass. The patient was discharged without postoperative complications on post-operative day 12. During the one-year follow-up period, the patient was free of any complications or recurrence of tuberculosis. We report a case of pseudoaneurysm of the descending aorta that was successfully surgically repaired.

Key words: 1. Tuberculosis
2. Aneurysm, false
3. Aorta
4. Left heart bypass

CASE REPORT

A 51-year-old male was transferred to Asan Medical Center with sustained fever for 2 months. Being suspected of having an upper respiratory infection, he had been treated with antipyretic medication in a primary clinic, but the fever persisted. Consequently, the patient was referred to a regional tertiary hospital a month earlier, and was found to have multiple tiny nodular lesions in both lung fields on computed tomography (CT), which was compatible with military tuberculosis. On the CT evaluation, a 1.0×1.5 cm out-pouching pseudoaneurysm of the proximal descending thoracic aorta into the left upper lobe of the lung was found (Fig. 1A). Being assessed as military tuberculosis complicated by aortitis with pseudoaneurysm formation, anti-tuberculous medications (isoniazid, rifampicin, and ethambutol) were started, and were maintained for the following four weeks. As the fever persisted despite the medications, he was transferred to Asan Medical Center.

At the time of admission, his vital signs were stable without fever (36.3°C). The findings of the physical examination were unremarkable. Laboratory studies revealed hemoglobin of 14.3 g/dL, a white blood cell count of 5,200/mm^3, platelets of 279,000/mm^3, and C-reactive protein of 1.82 mg/dL. Sputum staining and culture for acid-fast bacilli were negative.

As the size of the aortic pseudoaneurysm had decreased significantly on follow-up CT evaluation (Fig. 1B), provision of the anti-tuberculous medications continued. On the fifth day, however, another follow-up CT evaluation showed in-

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Received: July 9, 2012, Revised: August 23, 2012, Accepted: August 24, 2012
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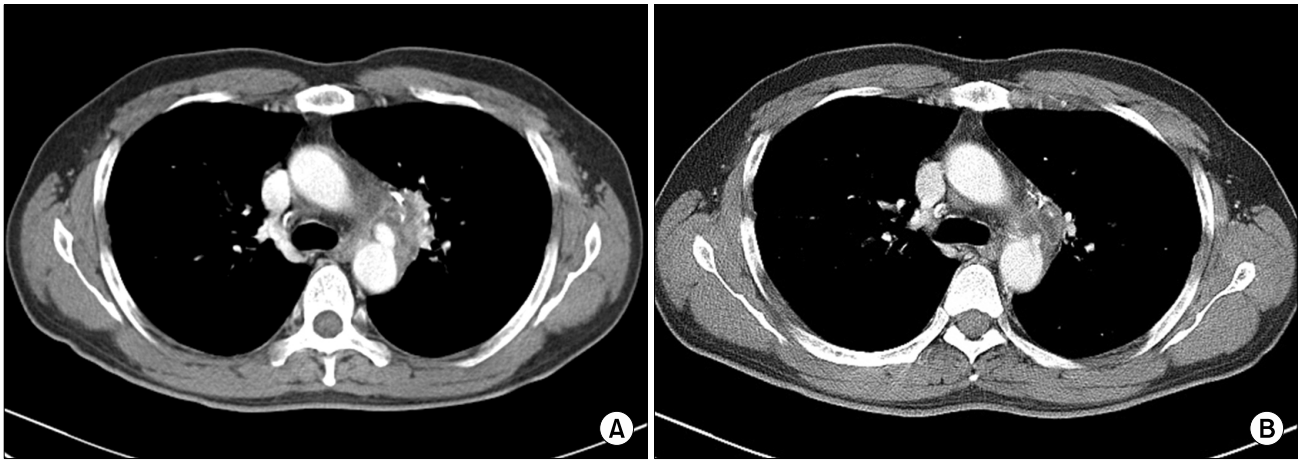

Fig. 1. Computed tomography findings (A) at four weeks before and (B) at the time of admission. Contrast-enhancing aortic pseudoaneurysm is found at the transition between the distal arch and proximal descending thoracic aorta. The size of the pseudoaneurysm had decreased significantly following four weeks of anti-tuberculous medication.

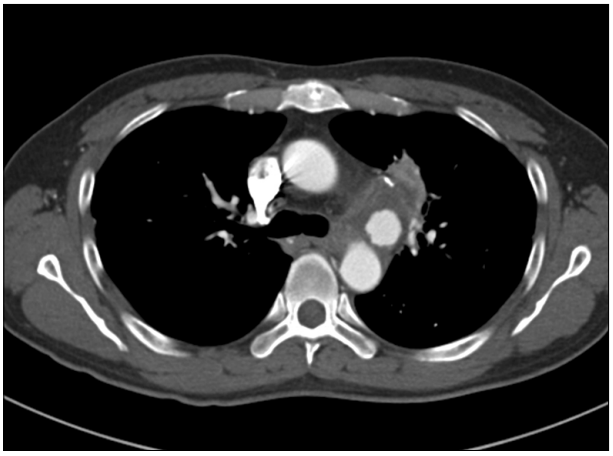

Fig. 2. Follow-up computed tomography shows increased size of pseudoaneurysm in the descending thoracic aorta, leading to suspicions of contained rupture on hospital day 5.

creased size of the pseudoaneurysm in the descending thoracic aorta, suggestive of a contained rupture (Fig. 2). Consequently, an emergency operation on the descending thoracic aorta was undertaken.

A double-lumen endotracheal tube was used for anesthesia. The descending thoracic aorta was exposed through the 5th intercostal space via a left lateral thoracotomy. Diffuse adhesion of the left upper lobe of the lung to the proximal descending aorta was very tight, and the contained rupture of the aorta was surrounded by the necrotic left upper lobe. Systemic heparinization was performed with a single dose of 6,000 IU, intravenously. For the distal perfusion during the aortic replacement, a left heart bypass was used with a centrifugal pump; blood was drained via a left atrial cannula that was placed through the inferior pulmonary vein, and oxygenated blood returned through a cannula placed at the distal descending thoracic aorta. Adhesiolysis then proceeded on the lesion. Since an aortic rupture is highly likely to occur with adhesiolysis, the aorta was clamped first, and then the adhesiolysis was completed. The aortic clamp was placed in the left subclavian artery, the distal arch between the left common carotid artery and the left subclavian artery, and the mid-descending thoracic aorta.

There was a 1 cm opening in the distal aortic arch covered with necrotic lung parenchyma. En bloc resection of the diseased aortic segment and the necrotic lung parenchyma was performed in the form of wedge resection of the lung. Then the resected distal arch and the proximal descending aorta were replaced with a 22 mm artificial graft (Hemashield Platinum; Maquet Inc., Wayne, NJ, USA).

The durations of the total bypass, the descending aorta clamping, and the total operation were 78 minutes, 73 minutes, and 209 minutes, respectively. Extubation was performed at post-operative 19 hours. On post-operative day 2, the patient was transferred to the general ward. Pathologic examination of the resected specimen (both the aorta and

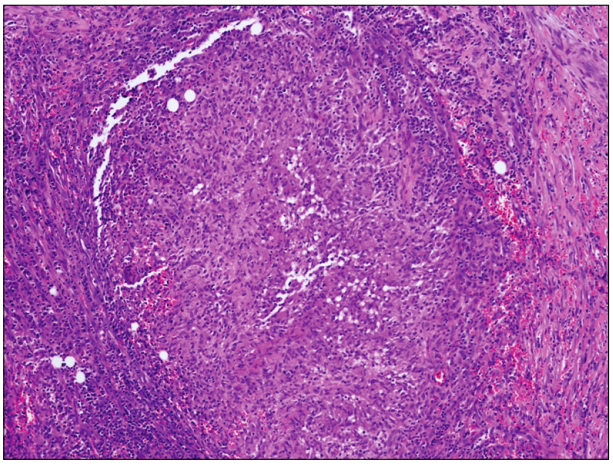

Fig. 3. Histopathologic findings of the resected aortic tissue. Chronic inflammation with granulomas and multinucleated giant cells is noted (H&E, ×100).

Fig. 4. Post-operative computed tomography reveals patency of graft without residual aortopathy.

lung) showed chronic inflammation with granuloma and multinucleated giant cells (Fig. 3), and polymerase chain reaction of mycobacterial tuberculosis was positive. Postoperative CT revealed patency of the graft without residual aortopathy (Fig. 4). On post-operative day 12, the patient was discharged without complications. Four weeks later, tissue culture study confirmed the growth of acid-fast bacillus. Anti-tuberculous medications (isoniazid, rifampicin, and pyridoxine) were continued for 6 months. During the one year follow-up, the patient was doing well without any complications or recurrence of tuberculosis.

DISCUSSION

A tuberculous pseudoaneurysm is a contained aortic rupture resulting from aortitis. Thoracic infectious aortitis caused by *Mycobacterium Tuberculosis* is rarely reported and has been known to be lethal when it does not respond to medical treatment [1]. Appropriate treatment of the disease is challenging as it requires a combined medical and surgical approach.

Mycobacterium infection of the aorta usually occurs as a result of direct extension from an adjacent focus or via hematogenous spread, but the former is believed to be more common [1,2]. A primary tuberculous infection in the lung spreads into the periaortic structures, causing tuberculous lymphadenitis, pericarditis, empyema, spondylitis, or paravertebral abscess. Subsequently, germs may invade the aortic wall. Caseation necrosis involving the entire thickness of the aortic wall results in perforation, either with massive hemorrhage or formation of perivascular hematoma. The latter may become encapsulated and retain communication with the lumen, known as pseudoaneurysm. Most tuberculous pseudoaneurysms from aortitis result in contained aortic rupture. The high mortality associated with this disease is related to the perforation of the pseudoaneurysm into the adjacent organs, causing fatal extravasation [1-4].

Clinically, a patient with a tuberculous aneurysm may initially present pain related to the location of the aneurysm. Other symptoms related to the infection include fever, night sweating, cough, weight loss, and hemoptysis. In this situation, CT is highly useful for early diagnosis [1,2]. Tuberculous aortic aneurysm might develop despite anti-tuberculous medication, probably due to poor drug penetration into caseous necrotic tissue. Therefore, medical treatment alone is not sufficient, and once tuberculous aortic aneurysm is suspected, surgery should not be delayed because of the high probability of aneurismal rupture [1-4]. Early diagnosis and appropriate surgical repair are of paramount importance for successful management. The anti-tuberculous regimen should be continued until the tuberculous lesion is cleared, along with a close postoperative follow-up to prevent recurrence [1,3].

In the present case, diffuse tight adhesion was present around the lesion, making the surgical approach to this area extremely challenging due to a high probability of aortic rupture. Postoperative surgical bleeding, especially from the manipulated lung, could have been a serious problem. Since the aortic pseudoaneurysm was located in the distal arch-to-proximal descending aorta, deep hypothermic circulatory arrest might have been the most plausible cardiopulmonary bypass technique, which may result in increased risk of bleeding, hypothermic damage to end organs and prolonged procedural time. With the use of the left heart bypass system in this case, this adverse scenario could have been circumvented due to its advantages of being able to use low-dose heparin, avoiding systemic hypothermia, and the use of a closed circuit system [5,6]. Even in cases of aortopathy in distal arch-to-proximal descending aorta, the left heart bypass is believed to be acceptable in significant proportions of cases using an appropriate aortic clamping technique according to the lesion location.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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