

# Mycotic Aneurysm of the Descending Aorta with Hemoptysis

Mamoru Munakata, MD, Takashi Hirotsu, MD, Tsukasa Nakamichi, MD,  
and Shigeyuki Takeuchi, MD

**Mycotic aneurysm of the descending aorta is usually described as rare. We present two recent cases of mycotic aneurysm of the descending aorta complicated with hemoptysis. Urgent tube graft replacements were successfully performed under cardiopulmonary bypass support. Bacterial causes of the aneurysms were methicillin-resistant *Staphylococcus aureus* in the first case and *Staphylococcus aureus* in the second case. Although the first patient died fifteenth months after surgery, the second patient remains well fourteenth months after the operation. (Ann Thorac Cardiovasc Surg 2004; 10: 314–6)**

**Key words:** mycotic aneurysm, descending aorta, antibiotics, cardiovascular surgery, hemoptysis

## Introduction

Mycotic aneurysm of the descending aorta is relatively rare. We recently experienced two such cases, complicated with hemoptysis and we present these cases with discussion of the treatment.

## Case Reports

### Patient 1

A 67-year-old homeless and alcoholic male was transferred to the emergency room suffering muscular weakness in the legs. He had had diabetes mellitus for 10 years. One month after admission he had high grade fever, with white blood cell (WBC) and C-reactive protein (CRP) elevated to 11,000/ $\mu$ l and 9.2 mg/dl, respectively. Although blood culture was negative, a culture of bronchial lavage 2 weeks before elevation of fever showed methicillin-resistant *Staphylococcus aureus* (MRSA). The focus of the inflammation was unclear, and empirical ciprofloxacin was administered orally for 3 days. Subsequently, the findings of inflammation improved. Two weeks later, the patient had a small amount of hemopty-

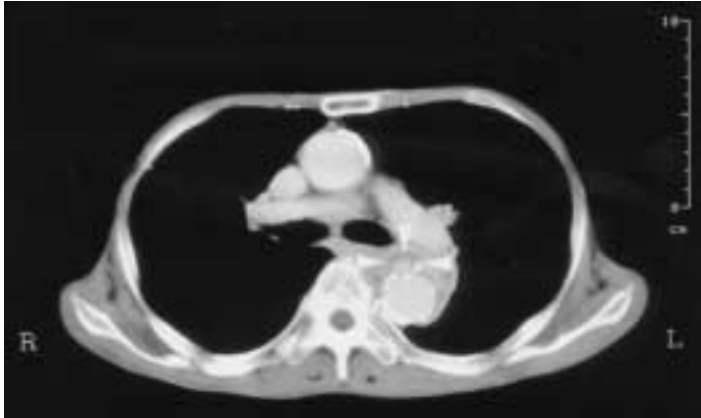
*From Department of Cardiovascular Surgery, Tokyo Saiseikai Central Hospital, Tokyo, Japan*

Received January 7, 2004; accepted for publication April 20, 2004. Address reprint requests to Mamoru Munakata, MD: Department of Cardiovascular Surgery, Tokyo Saiseikai Central Hospital, 1-4-17 Mita, Minato-ku, Tokyo 108-0073, Japan.

sis. Enhanced computed tomography (CT) revealed a pseudoaneurysm of the descending aorta (Fig. 1). Tube graft replacement (InterGard Woven Straight, InterVascular, La Ciotat, France) after irrigation was performed urgently under the support of cardiopulmonary bypass by cannulating the left femoral and pulmonary arteries. Operative findings revealed a pseudoaneurysm that had penetrated to the left lung with severe adhesion. There was no abscess formation around the aneurysm. It was still not sure whether this case was mycotic. The penetration was closed with free pericardium. Pathological findings revealed severe atherosclerosis in the ruptured portion of the aortic wall. Culture of the aneurysmal aortic wall showed MRSA, and intravenous vancomycin was started. Cultures of blood, chest drainage, and a subcutaneous abscess of the wound were MRSA positive, post-operatively, but drainage and vancomycin improved the inflammation. Vancomycin was continued for 5 months after the operation, under strict control of peak and trough blood levels, and the patient was well without obvious inflammatory findings. However, the patient suddenly died with hematoemesis in another hospital fifteenth months after surgery.

### Patient 2

A 62-year-old male who had undergone hemodialysis for 22 years was admitted for congestive heart failure and paroxysmal atrial fibrillation with high grade fever. Blood culture revealed *Staphylococcus aureus* and panipenem



**Fig. 1.** CT scan showing a pseudoaneurysm of the descending aorta.

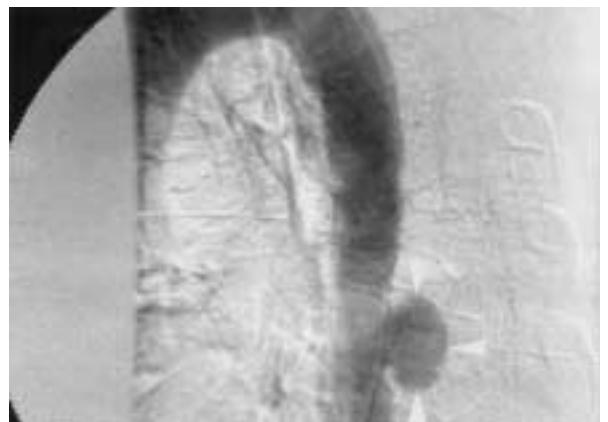
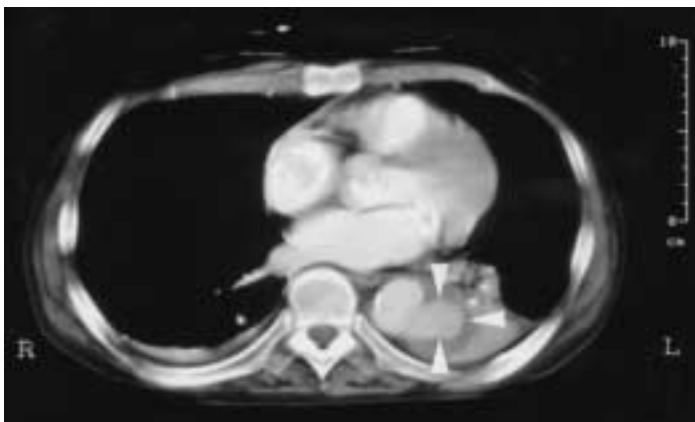
was administered. Two weeks later, he expectorated 250 ml of hemoptysis and was transferred to our hospital with a suspected descending aortic aneurysm in non-enhanced CT. Enhanced CT and aortography revealed pseudoaneurysm of the descending aorta (Fig. 2). Preoperative WBC and CRP were 15,300/ $\mu$ l and 15.4 mg/dl, respectively. After opening the descending aorta, irrigation and tube graft replacement were performed urgently under the support of femorofemoral bypass. As the aneurysm was firmly and continuously adhered to the left lung, without abscess, it was not resected. A culture of the aneurysm also showed *Staphylococcus aureus*, and vancomycin was administered for 3 days followed by cefazolin for 8 weeks. Postoperative pneumonia and a subcutaneous abscess of the wound induced severe inflammation (maximum CRP: 43.9 mg/dl), but these were gradually improved by cefazolin. CRP fell to about 2 mg/dl without fever and stabilized, and he was transferred back to the first hospital for hemodialysis and rehabilitation. He

remains well without inflammatory findings fourteenth months after the operation.

**Discussion**

Mycotic aneurysm is reported to occur most often in a bifurcation or the narrowing portion of the arterial wall,<sup>1)</sup> and the favored sites are the femoral artery, the abdominal aorta, and the peripheral arteries.<sup>2)</sup> Mycotic aneurysm of the descending aorta is relatively rare, and both the etiology and treatments are diverse.

The mechanism of mycotic aneurysm, particularly in larger vessels, is thought to be direct trauma with contamination, local extension of an infected focus, septic microemboli to the vasa vasorum, or hematogenous seeding from a remote focus in a previous report.<sup>3)</sup> Johansen et al. stated that the risk factors for mycotic aneurysms were depressed immunocompetence including chronic alcoholism, diabetes mellitus, and chronic renal failure.<sup>1)</sup>



**Fig. 2.** (a) CT scan demonstrating a pseudoaneurysm of the descending aorta. (b) Aortogram of a pseudoaneurysm arising from the descending aorta.

a | b

Furthermore, those authors suggested that the atherosclerotic intimal surface could facilitate the bacterial infection.<sup>1)</sup>

In the first case, it was strongly suggested that the cause of the mycotic aneurysm was the local extension of an infected focus because MRSA was positive only in the bronchial lavage (i.e. it was negative in the blood), preoperatively. This patient had chronic alcoholism with emaciation and diabetes mellitus associated with depressed immunocompetence, all of which could be additional etiological factors.<sup>1)</sup> On the contrary, pathological findings showed atherosclerosis corresponding with the ruptured portion, which was likely to be related to bacteremia; however, atherosclerosis might have influenced the etiology of a local extension from outside the aorta because bacteremia was not proved.

In the second case, septic microemboli to the vasa vasorum seemed to have resulted in the mycotic aneurysm because blood culture was positive. Depressed immunocompetence associated with chronic renal failure could also have been relevant to the etiology.<sup>1)</sup> In this patient, the pathology could not be confirmed because of severe adhesion, but the CT scan showed calcification coinciding with the aneurysm; thus the atherosclerosis might have been related bacterial infection, as an additional factor.

The general operative procedure is based on avoiding graft infection so as not to induce other complications. Extra-anatomic bypass is appropriate to avoid graft infection unless the patient is septic. If prosthetic graft replacement by means of anatomical positioning is chosen, all infected tissue – including the aneurysm – should be removed. It is desirable to delay surgical treatment of a mycotic aneurysm until improvement of inflammation by antibiotics, but rupture or impending rupture demands emergency operation – which is likely in cases, such as these, to be complicated with hemoptysis. Furthermore, Fichelle et al. have stated that omental flap coverage is important for preventing graft infection in in situ reconstruction of the aorta.<sup>4)</sup>

In the first case, it was not sure if the aneurysm was mycotic preoperatively and intraoperatively, because obvious inflammatory findings of blood were not apparent. Therefore, anatomic graft replacement was performed without complete resection of infected tissue. Consequently, sepsis and infection of the intrathoracic cavity

occurred, and he died fifteenth months after surgery presumably as a result of graft infection.

In the second case, complete resection of infected tissue including the aneurysm was avoided because of the necessity of lung resection which seemed to be too invasive in such high risk patients. In previous reports, it appears difficult in prosthetic graft replacement by means of anatomical positioning to avoid graft infection without complete resection of infected tissue.<sup>5,6)</sup> Fortunately, the culture of chest drainage was negative and he remains well fourteenth months after surgery, suggesting that intraoperative irrigation, postoperative drainage and the administration of effective antibiotics might have resulted in the avoidance of graft infection in this patient although the hard mass adhered to the lung without abscess was not removed.

It seems likely that a mycotic aneurysm with hemoptysis frequently penetrates to the lung. If complete resection of infected tissue is not possible in cases for which anatomic graft replacement has been chosen, omentopexy is thought to be necessary. Serious infection after this operation should be observed carefully, and adequate drainage and antibiotic administration may be effective. If the infection is not controllable, extra-anatomic bypass should be considered.

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