J Korean Med Sci 2003; 18: 589-91
ISSN 1011-8934

Spontaneous Disruption of Mycotic Aneurysm Involving Innominate Artery

We report a case of ruptured mycotic aneurysm involving innominate artery requiring an urgent surgical treatment. A 62-yr-old woman presented with fever and dyspnea. Previously, she was diagnosed with colon cancer and received right hemicolectomy and one cycle of adjuvant chemotherapy. On echocardiogram, pericardial effusion was noted and emergency pericardiocentesis was performed. CT scan revealed aortic aneurysm involving ascending aorta and innominate artery, and thrombi surrounding those structures. Patch repair of the defect in the ascending aorta and ringed Goretex graft to bypass the innominate and ascending aorta were performed. We believe that this is the first case of ruptured mycotic aneurysm involving innominate artery.

Key Words : *Aneurysm, Infected; Brachiocephalic Trunk*

Sungjin Oh, Young Won Yoon, Gil Jin Jang, Jung Bae Ahn*, Gee pyo Hong†, Gyung hoon Gang†, Myun-sik Gang†, Yong uk Hong‡, Jung Hae Gee§

Cardiovascular Center, Department of Hemato-oncology*, Department of Cardiovascular Surgery†, Department of Radiology‡, Department of Anatomic Pathology§, National Health Insurance Corporation, Ilsan Hospital, Goyang, Korea

Received : 28 June 2002
Accepted : 11 September 2002

Address for correspondence
Gil Jin Jang, M.D.
Cardiovascular Center, National Health Insurance Corporation, Ilsan Hospital, 1232 Baeksuk-dong, Ilsan-gu, Goyang 411-719, Korea
Tel : +82.31-900-3164, Fax : +82.31-900-0639
E-mail : janggj@nhimc.or.kr

INTRODUCTION

Documented mycotic aneurysms involving the innominate arteries are rare. Systemic infection usually accompanies these aneurysms, and arterial trauma and depressed host immunity are important risk factors for the development of these lesions (1). Prompt surgical treatment including resection of the aneurysm and adjacent necrotic tissue and bypass grafting to a distal vessel is indicated to minimize the risk of distal embolization or rupture with resultant tamponade, and combined bactericidal antibiotics are essential for cure (2-4). We experienced a patient with ruptured mycotic aneurysm involving innominate artery requiring an urgent surgical treatment and we report this case with a brief review of the literature.

CASE REPORT

A 62-yr-old woman was diagnosed with colon cancer in July 2001 at National Health Insurance Corporation, Ilsan Hospital. She underwent right hemicolectomy and had one cycle of adjuvant chemotherapy (July 26, 2001-July 30, 2001). She was admitted to the hospital 42 days after chemotherapy due to fever for 3 days and methicillin-resistant *Staphylococcus aureus* (MRSA) was isolated from blood culture done on the day of admission. Abdominal surgical wound was not completely healed and MRSA was also isolated from abdominal surgical wound. Intravenous combined antibiotics were administered. Chest roentgenogram (CXR) on admission revealed a normal cardiac silhouette with no pleural effusion. An echocardiogram taken on the next day revealed a small amount of pericardial effusion without evidence of hemodynamic compromise. Three days after admission, the patient complained of sudden development of severe dyspnea. CXR taken on that day revealed mediastinal widening and mild cardiomegaly compared with the previous CXR. Dyspnea and tachycardia worsened for the following hours. Emergent echocardiography revealed a moderate amount of pericardial effusion but the physiology of cardiac tamponade was not disclosed definitely. Pericardiocentesis was performed and the intrapericardial pressure was measured 10 mmHg. The drained pericardial fluid was pinkish and gush-out of blood was not observed during pericardiocentesis. Isolation of MRSA was reported later also from the culture study with the pericardial fluid. The patient still complained of severe dyspnea after pericardiocentesis, and computed tomographic (CT) scan taken after pericardiocentesis revealed an aortic aneurysm involving the ascending aorta and innominate artery (Fig. 1, 2). Urgent surgical intervention was decided. In the surgical field, fresh and organized thrombi surrounding the ascending aorta, innominate artery, and superior vena cava were noted. On removal of the thrombi, free rupture of the innominate artery was shown in the vicinity of its

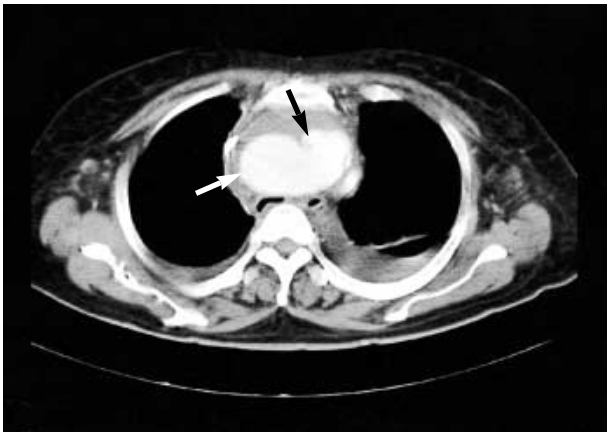

Fig. 1. About 6-cm sized aneurysm sac (white arrow) right to the aortic arch and innominate artery (black arrow) is indicated.

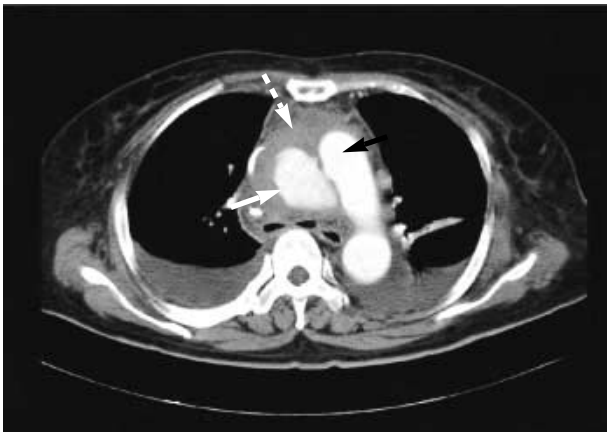

Fig. 2. Seven slices below Fig. 1. Extended aneurysmal sac (white arrow), aortic arch (black arrow), and thrombi (dotted white arrow) are indicated.

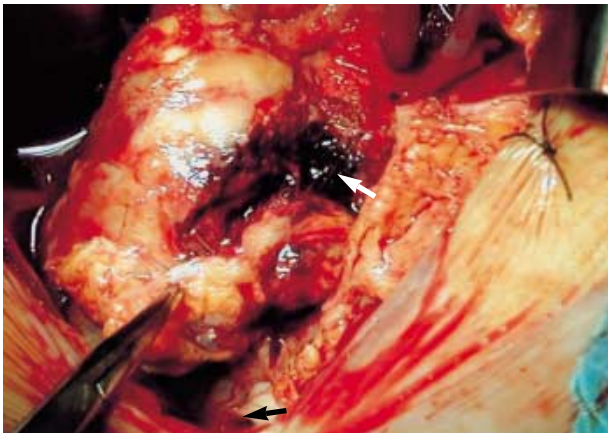

Fig. 3. Aneurysmal ascending aorta having ruptured surface and thrombi (white arrow) and disrupted innominate artery (black arrow) are observed. Scissor is indicating thymic remnants.

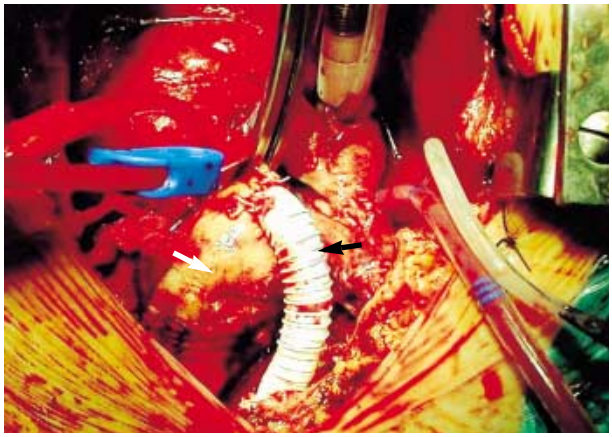

Fig. 4. The defect in the ascending aorta was repaired using a Vascutek patch (white arrow). A single ringed Goretex graft was constructed to bypass the innominate and ascending aorta in an end-to-side manner (black arrow).

origin (Fig. 3). Bacteriologic cultures of the tissue resected from the disrupted area also showed MRSA. The defect in the ascending aorta was repaired using a Vascutek patch. A single ringed Goretex graft was constructed to bypass the innominate artery and ascending aorta in an end-to-side manner (Fig. 4). Pathologic examination of resected tissue revealed the findings compatible with mycotic aneurysmal dissection by bacterial colonization with acute suppurative inflammation. Three days after surgical correction, the patient expired after rapid loss of a large amount of blood through inserted chest tubes following sudden development of cough.

DISCUSSION

First described by Osler in 1885, mycotic aneurysms of the innominate arteries caused by bacterial infection are rare with a reported incidence of 0.4% of all mycotic aneurysms (5). Previously, the recognition of mycotic aneurysms was limited to postmortem identification. With the advent of CT scan and cardiac catheterization, antemortem identification of mycotic aneurysms is now possible. With an overall incidence of less than 2% in the general population (6), acquired aneurysms are most commonly atherosclerotic in nature, although other etiologies including dissection, Kawasaki disease, syphilis, and infection have been identified (7). Risk factors for development of a mycotic aneurysm include arterial trauma from any causes, various immunocompromised states (diabetes mellitus, malignancy, alcoholism, collagen vascular disease, AIDS, steroids, etc.), concurrent sepsis, endocarditis, and congenital cardiovascular defects (1). Diagnosis is frequently delayed because the clinical manifestations are nonspecific. In our case, gush-out of blood, which is one of the nonspecific findings during pericardiocentesis, was not observed. In the field of surgical

correction of mycotic aneurysm, organized thrombi surrounding disrupted aneurysm segments was supposed to block the communication between the disrupted aneurysm and pericardial space. CT scan is currently considered the modality of choice for diagnosis (8, 9). In addition to demonstrating the size and extent of aneurysm, CT scan also demonstrates leak and perianeurysmal hemorrhage in a noninvasive manner. Angiography could be one of methods demonstrating the aneurysm and active leak with the limitation of invasiveness. The most common causative organisms are *Staphylococcus aureus*, Salmonella species, and *Streptococcus viridans*. It is clear that a wide variety of bacteria, Gram-Positive and Gram-negative, are capable of infecting the aorta, while Salmonella species may remain the dominant agent of infected aortic aneurysm (10, 11). In this immunocompromised case, the port of entry of MRSA isolated from blood culture was supposed to be the abdominal wound probably made during surgical treatment of colon cancer. In most cases prompt surgical intervention is required, and surgical resection of the aneurysm with a bypass graft in combination with administration of combined bactericidal antibiotics for at least six weeks is indicated (2-4). The prognosis is poor and a 67% overall mortality was reported (1, 11).

In conclusion, mycotic aneurysm of the innominate artery is extremely rare. Clinical manifestations are nonspecific. A high index of suspicion and utilization of radiologic modalities such as CT scan and angiography are needed to make an early diagnosis and a combination of prompt surgical intervention and bactericidal antibiotic therapy based on sensitivity data are mandatory.

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