

## Pseudoaneurysm of the Mitral-Aortic Intervalvular Fibrosa Following Infective Endocarditis in a Patient With Acute Heart Failure: A Case Report

Yosuke TAKAMIYA, MD  
Shin-ichiro MIURA, MD, FJCC  
Hideto SAKO, MD  
Kazuyuki SHIRAI, MD  
Noritsugu MORISHIGE, MD\*  
Tadashi TASHIRO, MD, FJCC\*  
Keijiro SAKU, MD, FJCC

### Abstract

A 22-year-old male presented with infective endocarditis and aortic regurgitation with congenital bicuspid aortic valve. Echocardiography revealed vegetation on the aortic valve and a pseudoaneurysm in the region of the mitral-aortic intervalvular fibrosa (MAIVF) with severe aortic and mitral regurgitation. His clinical condition, acute heart failure due to severe aortic and mitral regurgitation, became worse. Since the MAIVF complication indicates advanced disruption of tissue at the MAIVF, urgent cardiac surgery was indicated because of the evidence of pseudoaneurysm. He received successful aortic valve replacement and restoration of normal mitral-aortic continuity. Pseudoaneurysm of the MAIVF is a relatively rare complication of infective endocarditis, but should be considered in patients who are suspected to have vegetation because echocardiography can easily establish the correct diagnosis.

*J Cardiol* 2007 Jun; 49(6): 353–356

### Key Words

- Aneurysms (mitral-aortic intervalvular fibrosa)
- Endocarditis (infective)
- Heart failure (acute)

### INTRODUCTION

Pseudoaneurysm of the mitral-aortic intervalvular fibrosa (MAIVF) is a rare complication of infective endocarditis.<sup>1, 2)</sup> The accurate detection of pseudoaneurysm of the MAIVF is crucial in overall patient management and in surgical guidance because the pseudoaneurysm may not be readily identified during surgery. In addition, cardiac surgical intervention is increasingly important in the treatment of patients with infective endocarditis.<sup>3, 4)</sup> Mortality is unacceptably high when patients with

complications are treated with only antibiotics, but mortality is reduced when antibiotics are combined with surgical intervention.<sup>5, 6)</sup> Accordingly, complications have become indications for cardiac surgery.

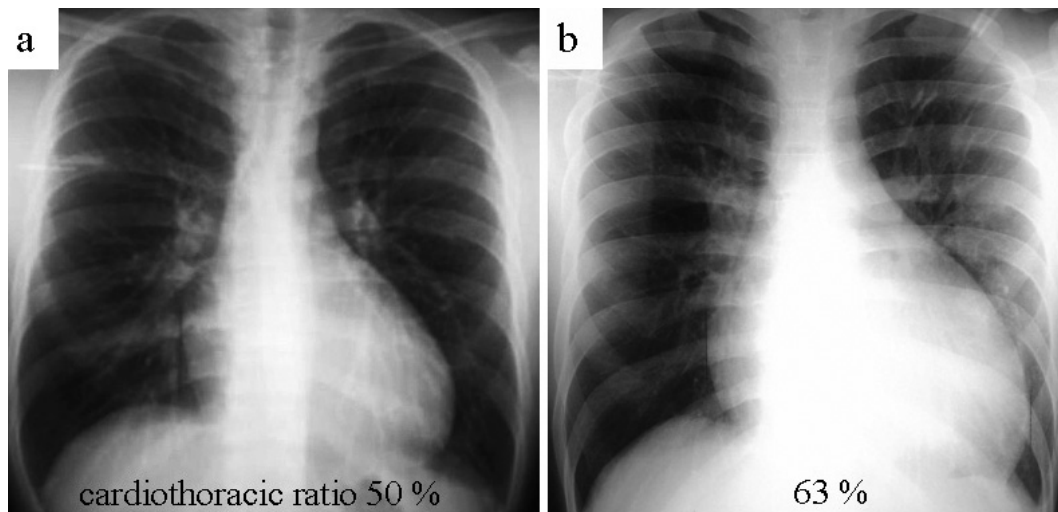
We report a case of infective endocarditis with congenital bicuspid aortic valve complicated by the development of a pseudoaneurysm of MAIVF with acute heart failure. The diagnosis was confirmed at surgery and appropriate treatment was instituted. The postoperative course was uncomplicated.

福岡大学医学部 心臓血管内科, \*心臓血管外科: 〒814-0180 福岡市城南区七隈 7-45-1

Departments of Cardiology and \*Cardiovascular Surgery, Fukuoka University School of Medicine, Fukuoka

**Address for correspondence:** MIURA S, MD, FJCC, Department of Cardiology, Fukuoka University School of Medicine, Nanakuma 7-45-1, Jonan-ku, Fukuoka 814-0180; E-mail: miuras@cis.fukuoka-u.ac.jp

Manuscript received January 31, 2007; revised March 21, 2007; accepted March 22, 2007



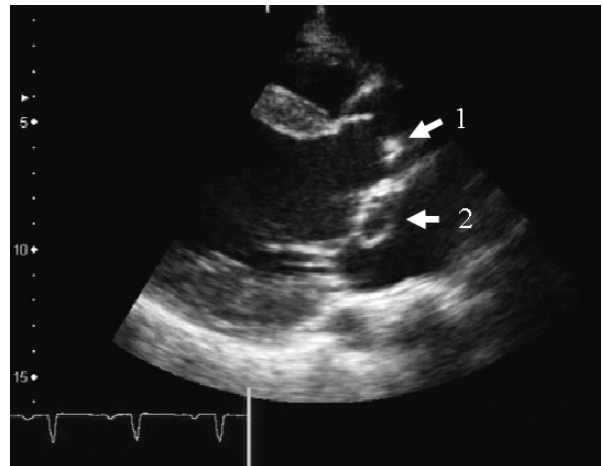
**Fig. 1** Chest radiographs at 4 months before admission (a) and at admission (b)

### CASE REPORT

A 22-year-old male was admitted with high fever and abnormal echocardiography findings suggesting infective endocarditis. The diagnosis was aortic regurgitation with congenital bicuspid aortic valve 4 months earlier and surgery was scheduled for aortic valve replacement. About 2 weeks prior to admission, his physician had treated him with antibiotics for cellulitis. He was subsequently admitted for intravenous antibiotic treatment because of severe infection.

Physical examination revealed his blood pressure was 152/52 mmHg, and his pulse was 89/min and regular. Auscultation of the heart revealed grade 4/6 to and fro murmur and grade 3/6 diastolic murmur. Lung examination revealed no abnormalities. The extremities did not show any peripheral edema. Blood chemistry values were within normal limits except for C-reactive protein and brain natriuretic peptide, which were 4.5 and 912 pg/ml, respectively. All blood cultures remained negative. Chest radiography showed cardiomegaly (cardiothoracic ratio 62%) and severe pulmonary vascular congestion, although the cardiac silhouette was normal (cardiothoracic ratio 50%) and no evidence of congestion at 4 months before admission (**Fig. 1**).

Echocardiography was important in the diagnosis of this case (**Fig. 2**). The two-dimensional view revealed vegetation on the aortic valve and a 10 × 10 mm pseudoaneurysm in the region of the MAIVF. The size did not change in systole and

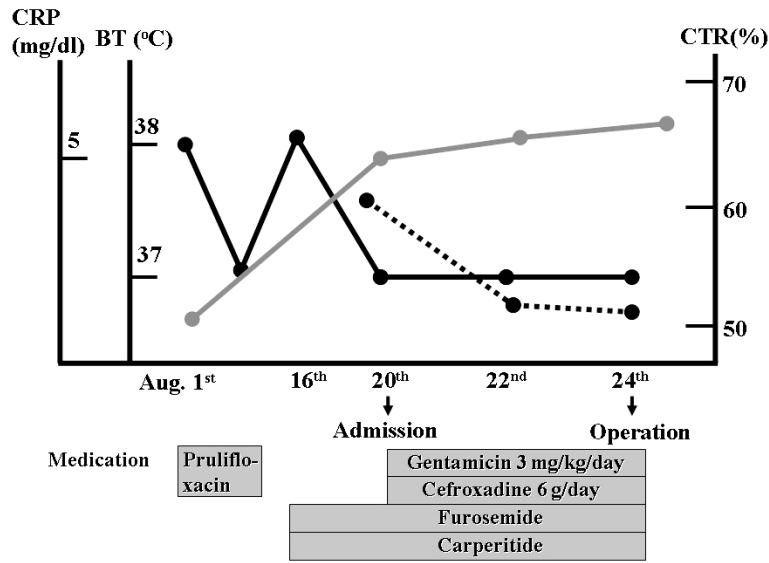


**Fig. 2** Two-dimensional echocardiogram

Arrows indicate aortic valve with vegetation (No. 1) and pseudoaneurysm in the region of the mitral-aortic intervalvular fibrosa (No. 2), respectively.

diastole. Color Doppler echocardiography demonstrated slight forward flow from the left ventricle into the pseudoaneurysm. Color flow imaging showed aortic regurgitation (degree IV) and mitral regurgitation (degree III–IV). Tricuspid regurgitation was also observed and the pressure gradient was 33 mmHg. In addition, the left ventricular internal diameter was extremely enlarged in diastole (82 mm) and systole (60 mm).

The clinical course of the patient is shown in **Fig. 3**. Although he was given gentamicin and ceftriaxone after admission, his clinical condition, acute heart failure due to severe aortic and mitral regurgi-



**Fig. 3 Clinical course of the patient**

Solid, gray and dotted lines indicate body temperature, cardiothoracic ratio and C-reactive protein, respectively.

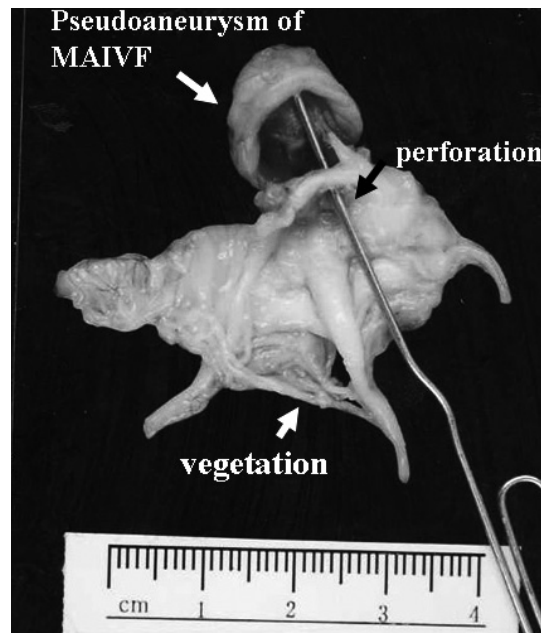
CRP = C-reactive protein; BT = body temperature; CTR = cardiothoracic ratio.

tation, became worse. He underwent an urgent operation and received successful aortic valve replacement and excision of the pseudoaneurysm (Fig. 4). Perforation was implicated in the entry of pseudoaneurysm. He also underwent reconstruction of the intervalvular fibrous body and restoration of normal mitral-aortic continuity.

**DISCUSSION**

Echocardiography is important in the visualization of valvular vegetations, abscesses and other complications in patients with infective endocarditis. One such complication is the development of MAIVF. Aneurysms are prone to rupture, embolize or even cause further destruction of the aortic or mitral valve apparatus.<sup>7,8)</sup> Therefore, it is important to recognize the complication early, and to institute appropriate surgical treatment in a timely fashion to decrease morbidity and mortality. This case report describes a patient with a protracted course of infective endocarditis who presented with MAIVF complication.

MAIVF is the junction between the left half of the non-coronary cusp and the adjacent third of the left coronary cusp of the aortic valve and the anterior mitral leaflet. Among 55 consecutive patients with aortic valve endocarditis, 24 showed involvement of the subaortic structures.<sup>1)</sup> Thus, MAIVF is an important complication of infective endocarditis.



**Fig. 4 Mitral valve and pseudoaneurysm of the mitral-aortic intervalvular fibrosa**

MAIVF = mitral-aortic intervalvular fibrosa.

The reduction of mortality in infective endocarditis over the past three decades (from 25–30% to 10–20%) may be due mainly to more aggressive surgical intervention based on increased experience. The indications for surgery<sup>3)</sup> are now defined more pre-

cisely than in the past.<sup>9)</sup> Since MAIVF complication indicates advanced disruption of tissue at the MAIVF, there is an indication for urgent cardiac surgery because of evidence of pseudoaneurysm.<sup>3)</sup> The present patient had pseudoaneurysm of the MAIVF, so underwent an urgent operation.

Therefore, although pseudoaneurysm of the MAIVF is a relatively rare complication of infective endocarditis, it may affect mortality in patients with infective endocarditis. This point should be kept in mind in patients with suspected vegetation when echocardiography is performed.

— 要 約 —

急性心不全を合併した感染性心内膜炎における僧帽弁-大動脈弁間の偽性瘤形成

高宮 陽介 三浦伸一郎 佐光 英人 白井 和之

森重 徳継 田代 忠 朔 啓二郎

症例は22歳，男性．先天性大動脈二尖弁を合併した大動脈弁閉鎖不全と感染性心内膜炎と診断された．心エコー図法において大動脈弁に疣贅と重度の大動脈弁と僧房弁閉鎖不全を伴い，さらに僧帽弁-大動脈弁間に偽性瘤形成が認められた．臨床症状は，両弁の閉鎖不全により急激な心不全を呈した．僧帽弁-大動脈弁間における偽性瘤形成は，進行した組織破壊を意味しているため，本症例は緊急手術の適応であった．したがって，ただちに大動脈弁置換術と未破裂瘤切除術を実施した．偽性瘤形成は，感染性心内膜炎の合併症としてはまれであるが，心エコー図法により容易に診断できるため，合併症として留意しておくべきである．

— J Cardiol 2007 Jun; 49(6): 353-356 —

References

- 1) Karalis DG, Bansal RC, Hauck AJ, Ross JJ Jr, Applegate PM, Jutzy KR, Mintz GS, Chandrasekaran K: Transesophageal echocardiographic recognition of subaortic complications in aortic valve endocarditis: Clinical and surgical implications. *Circulation* 1992; **86**: 353-362
- 2) Agirbasli M, Fadel BM: Pseudoaneurysm of the mitral-aortic intervalvular fibrosa: A long-term complication of infective endocarditis. *Echocardiography* 1999; **16**: 253-257
- 3) Olaison L, Pettersson G: Current best practices and guidelines indications for surgical intervention in infective endocarditis. *Infect Dis Clin North Am* 2002; **16**: 453-475
- 4) Shimada T, Osakada G, Wakabayashi A, Kawai C, Noguchi K, Tatsuta N, Hikasa Y: Acute aortic regurgitation with congestive heart failure due to bacterial endocarditis: Diagnosed by echocardiogram and treated successfully by surgery (a case report). *Jpn Circ J* 1979; **43**: 59-65
- 5) Mullany CJ, McIsaacs AI, Rowe MH, Hale GS: The surgical treatment of infective endocarditis. *World J Surg* 1989; **13**: 132-136
- 6) al Jubair K, al Fagih MR, Ashmeg A, Belhaj M, Sawyer W: Cardiac operations during active endocarditis. *J Thorac Cardiovasc Surg* 1992; **104**: 487-490
- 7) Chesler E, Korns ME, Porter GE, Reyes CN, Edwards JE: False aneurysm of the left ventricle secondary to bacterial endocarditis with perforation of the mitral-aortic intervalvular fibrosa. *Circulation* 1968; **37**: 518-523
- 8) Afridi I, Apostolidou MA, Saad RM, Zoghbi WA: Pseudoaneurysms of the mitral-aortic intervalvular fibrosa: Dynamic characterization using transesophageal echocardiographic and Doppler techniques. *J Am Coll Cardiol* 1995; **25**: 137-145
- 9) Verheul HA, van den Brink RB, van Vreeland T, Mouljijn AC, Duren DR, Dunning AJ: Effects of changes in management of active infective endocarditis on outcome in a 25-year period. *Am J Cardiol* 1993; **72**: 682-687