

A Patient in Whom Survival Was Achieved by Acute-Stage Surgery for Infective Endocarditis Complicated by a Cerebral Hemorrhage

Wataru Hashimoto, MD,¹ Masayoshi Hamawaki, MD,² Koji Hashizume, MD,¹ and
Kiyoyuki Eishi, MD¹

We report a patient who underwent mitral valve replacement despite acute-stage cerebral hemorrhage related to a complication of infective endocarditis (IE) and rupture of intracerebral mycotic aneurysm, achieving survival. The patient was a 24-year-old female. She consulted our hospital because of a fever and was diagnosed with IE and a cerebral hemorrhage. A blood culture test on admission revealed methicillin-sensitive *Staphylococcus aureus*. Transthoracic echocardiography revealed giant vegetation in the left atrium. Besides the management of an acute-stage cerebral hemorrhage, medical therapy for IE was performed. However, a severe infection was refractory, and mitral-regurgitation-related heart failure deteriorated. Despite acute-stage cerebral hemorrhage, mitral valve replacement was performed 10 days after admission because advanced disseminated intravascular coagulation syndrome made conservative management difficult. After surgery, neither exacerbation of cerebral symptoms nor recurrent IE was noted, and the patient was discharged. (Ann Thorac Cardiovasc Surg 2009; 15: 257–260)

Key words: infective endocarditis, cerebral hemorrhage, intracerebral mycotic aneurysm, cardiac surgery

Introduction

Extra cardiac complications of infective endocarditis (IE) include mycotic aneurysms and peripheral embolism related embolism of various organs. In particular, mycotic aneurysms are frequent in the cranium. When rupture occurs, the mortality rate is 80%. In this study, we report a patient in whom IE was complicated by a

cerebral hemorrhage related to the rupture of an intracerebral mycotic aneurysm, but mitral valve replacement was performed in the acute stage, thus allowing the patient to survive.

Case

The patient was a 24-year-old female. At the age of 16, she underwent clipping by craniotomy to treat an intracerebral mycotic aneurysm, and mitral regurgitation (MR) was diagnosed. Whether she had a history of IE was unclear, but she did not seek further consultations. In late December 2003, fever (39°C or higher) and general malaise persisted. On January 1, 2004, she was admitted as an emergency patient.

A physical examination on admission showed the following results: Glasgow coma scale (E = 4, V = 4, M = 6); pulse, 140/min, regular; blood pressure, 80/60 mmHg;

From ¹Department of Cardiovascular Surgery, Nagasaki University; and ²Department of Cardiovascular Surgery, National Hospital Organization Nagasaki Medical Center, Nagasaki, Japan

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Address reprint requests to Wataru Hashimoto, MD: Department of Cardiovascular Surgery, Nagasaki University, 1-7-1 Sakamoto, Nagasaki 852-8501, Japan.
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Janeway's spot Osler's node

Fig. 1. Janeway's spots and Osler's nodes were observed.

body temperature, 39°C. In the cardiac apex, Levine IV/VI systolic murmurs were heard. In the hands and feet, Janeway's spots and Osler's nodes were observed (Fig. 1). Laboratory results on admission were white blood cell count of 26,200/ μg , red blood cell count of $259 \times 10^4/\mu\text{l}$, hematocrit of 24.4%, hemoglobin level of 8.4 g/dl, platelet count of 8,000/ μg , fibrin less than 50 mg/dl, and C-reactive protein levels of 23.8 mg/dl, suggesting marked inflammation. On blood culture, methicillin-sensitive *Staphylococcus aureus* (MSSA) was detected. A chest X-ray showed pulmonary congestion, and on transthoracic echocardiography, rodlike giant vegetation involving the left atrium adhered to the posterior cusp of the mitral valve. Marked MR was noted, but cardiac contractility was favorable (Figs. 2a and 2b). Thoracic and abdominal computed tomography (CT) revealed splenic/renal infarction. Brain CT showed a cerebral hemorrhage in the left parietal and right frontal lobes, as well as an intraventricular hemorrhage in the right lateral ventricle (Fig. 3a).

Based on these findings, we considered that cardiac surgery should be indicated to treat IE, but antibiotic therapy was continued in consideration of the risk of cardiopulmonary-bypass-related exacerbation of encephalopathy in the presence of cerebral hemorrhage. We started 12 g/day of sulbactam sodium/ampicillin sodium and 120 mg/day of gentamycin sulfate, based on the results of a drug sensitivity test on blood culture and according to guidelines. Artificial respiration was required because of advanced disseminated intravascular coagulation (DIC) and heart failure related to unfavor-

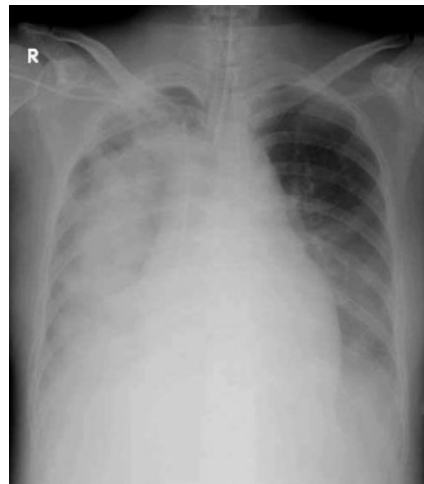
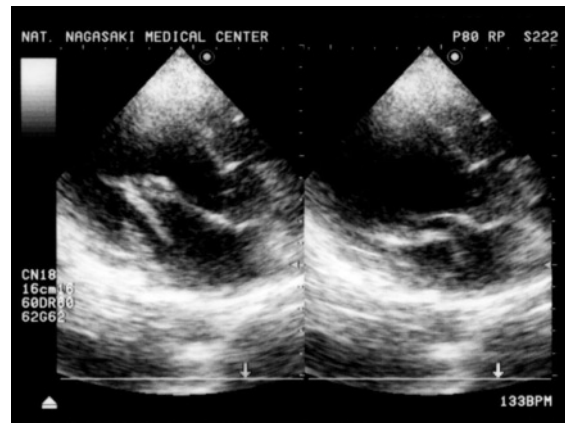


Fig. 2.

- a,b: Rodlike giant vegetation involving the left atrium was adhered to the posterior cusp of the mitral valve.
- c: Advanced heart failure was observed.

a
b
c

able infection control (Fig. 2c), leading to multiple organ failure (MOF). Cardiac surgery was considered necessary to achieve survival. On cerebral angiography, no hemorrhagic point nor intracerebral mycotic aneurysm (Fig. 3b).

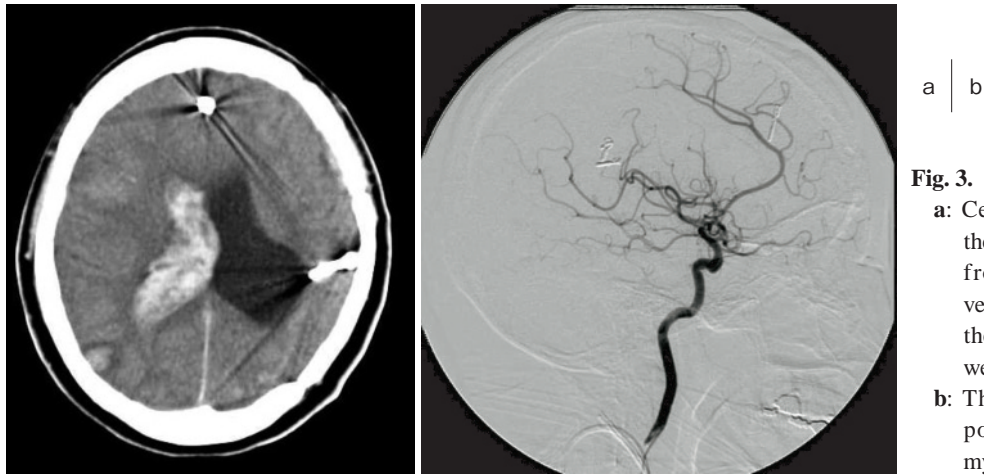


Fig. 3.

- a: Cerebral hemorrhage in the left parietal and right frontal lobes and intraventricular hemorrhage in the right lateral ventricle were detected.
- b: There were no bleeding points or intracerebral mycotic aneurysms.



Fig. 4. Giant vegetation was adhered to the posterior cusp of the mitral valve.

Cardiac surgery, performed 10 days after admission for cerebral angiography, also revealed no hemorrhagic point or intracerebral mycotic aneurysm.

For cardiac surgery, when the mitral valve from the right of the left atrium under cardiac arrest was investigated, a rodlike giant vegetation was found adhered to the posterior cusp of the mitral valve. Because valvular destruction was marked (Fig. 4), we selected valve replacement (CarboMedics, Inc., Austin, TX). The mitral valve was resected and debridement was performed. MSSA was detected on the bacterial culture. Concerning a cardiopulmonary bypass, an X-coating™ circuit (Terumo Corp., Tokyo, Japan) was used. The heparin level was 1.5 cc/kg, lower than the standard dose (2.5 cc/kg).

After surgery, antibiotic therapy was continued for 8 weeks. Brain CT revealed no changes in comparison with the preoperative findings. There has been no recurrent IE

during the 4-year postoperative follow-up.

Discussion

In patients with active IE, early surgery has been positively performed. Indications for IE surgery include heart failure, refractory infection, and embolism. In a multicenter cooperative study in Japan, cerebral complications such as cerebral infarction (64.6%), cerebral hemorrhage (31.5%), brain abscess (2.8%), and meningitis (1.1%) were noted in 9.7% of patients who underwent surgery.¹⁾

Cerebral complications in IE patients include both ischemic and hemorrhagic stroke. Intracerebral mycotic aneurysms are present in 1.2% to 5.6% of IE patients. They are frequent in the branching areas of the middle cerebral artery, and most lesions are multiple. When symptomatic cerebral hemorrhage occurs, the mortality

rate ranges from 60% to 90%.²⁾

The timing of cardiac surgery when cerebral complications occur during the course of IE, as demonstrated in the present case, remains controversial. Cardiopulmonary bypass-related systemic heparinization and hypotension may deteriorate these complications. Postoperative anticoagulant therapy may also exacerbate them. Concerning cardiac surgery for IE with cerebral complications, many studies have recommended that surgery should be performed after 2 to 4 weeks of preoperative therapy with antimicrobial agents.^{1,3,4)} Gillinov et al. reported the algorithm for the diagnosis and management of patients with acute neurologic deficit requiring cardiac operations for IE.⁵⁾ Parrino et al. reported that the results of acute-phase treatment for IE with cerebral complications were unfavorable.⁶⁾

According to Jara et al., when surgery is considered necessary for treating both IE and intracerebral mycotic aneurysms, cardiac surgery should be initially performed in the presence of advanced heart failure. In patients with advanced cerebral symptoms, craniotomy should be initially performed; therapeutic strategies must be selected in accordance with individual patients.⁷⁾ In this case, IE was complicated by cerebral hemorrhage, and medical treatment was administered. However, it became difficult to control heart failure symptoms and infection, and cardiac surgery was performed 10 days after admission. We selected a mechanical valve because of the patient's young age and her family's wishes. However, anticoagulant therapy was required after surgery; therefore, usually, vital valves are recommended.⁸⁾

Conclusions

In patients with IE and cerebral hemorrhage, it is diffi-

cult to determine whether surgery should be indicated for respective conditions and the timing; therapeutic strategies should be selected in accordance with individual patients. An abstract of this article was announced at the 37th Kyushu District Meeting held by the Japanese Society of Thoracic Surgery.

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