Two Case Reports of Group B Streptococcal Infective Endocarditis Complicated by Embolism

Rie Aoyama1,2, Ayumi Kobayashi1, Yusuke Tubokou1, Kazuhiro Takeda1, Hajime Fujimoto1, Kazumasa Harada1 and Shunei Kyo3

Abstract

Streptococcus agalactiae (Group B streptococcus, GBS) is the major pathogen encountered in the perinatal period, although the incidence of GBS infection has recently increased among non-pregnant adults. Nevertheless, GBS infective endocarditis (IE) is uncommon and often accompanies aortic embolism. We experienced two cases of GBS IE. In Case 1, mobile vegetation of the aortic valve caused an infective cerebral aneurysm. In Case 2, the patient experienced an acute aortic embolic episode. Generally, early surgery for large mobile sites of vegetation is recommended as a class IIb therapy in the guidelines. GBS IE often exhibits a severe clinical course and specificity of vegetation. Therefore, early surgery should be considered in such cases.

Key words: GBS, infective endocarditis, embolism

(Intern Med 54: 2333-2336, 2015)
(DOI: 10.2169/internalmedicine.54.4709)

Introduction

Streptococcus agalactiae, commonly known as Group B streptococcus (GBS), is a Gram-positive coccus and only member of Lancefield group B. GBS colonizes the genital tract in up to 40% of women, where it subsequently migrates to the reproductive system and becomes a major pathogen of infective disease in the perinatal period. Recently, the incidence of invasive infection caused by Streptococcus agalactiae has increased among non-pregnant adults, particularly elderly patients, and over half of cases in which GBS is detected in blood cultures are reported to involve elderly subjects (1).

GBS infective endocarditis (IE) is thought to be an uncommon and aggressive disease, with a higher mortality than other streptococcal pathogens. The associated vegetation tends to be very large and fragile, and the endocarditis often accompanies aortic embolism. In addition, the incidence of emboli is reported to be very high (50%) (2), and embolic phenomena are often the primary manifestations leading to a diagnosis of infective endocarditis. Notably, cardiac surgery is usually required due to the high rate of local and systemic complications.

Case Reports

Case 1

A 66-year-old woman with juvenile Alzheimer’s presented with a high fever and was prescribed antibiotics by her home doctor under a diagnosis of urinary tract infection that had lasted for two weeks. However, her general condition did not improve, and she was admitted to the emergency department of our hospital. Previously, the patient was found to have moderate aortic regurgitation by her home doctor, although she did not present with symptoms of heart failure on admission. She was treated for a fever of unknown origin with intravenous antibiotics (ceftriaxone at a dose of 2 g per 12 hours). However, on the night of the third day, she presented with dyspnea of sudden onset and a chest X-ray showed severe lung congestion. Therefore, she received intensive care under a diagnosis of acute congestive heart failure.

Upon admission to the ICU, the patient’s blood pressure was 168/105 mmHg, her pulse rate was 125 beats per min-

1Department of Cardiology, Tokyo Metropolitan Geriatric Hospital, Japan, 2Department of Cardiovascular Medicine, Nippon Medical School, Japan and 3Department of Cardiac Surgery, Tokyo Metropolitan Geriatric Hospital, Japan

Received for publication December 19, 2014; Accepted for publication January 27, 2015
Correspondence to Dr. Rie Aoyama, r-aoyama@nms.ac.jp
Figure 1. a: Transthoracic echocardiographic image in Case 1. Mobile areas of vegetation (△) attached to the right coronary cusp and non-coronary cusp. b: Transesophageal echocardiographic image in Case 2. Mobile areas of vegetation attached to the aortic valve associated with severe aortic valve regurgitation.

Figure 2. Brain CT image in Case 1. A brain CT scan showed left subcortical hemorrhage, subarachnoid hemorrhage perforating the brain room and a cerebral hernia.

A 69-year-old woman with moderate aortic and mitral valve stenosis had been referred to our outpatient clinic two years prior to the present admission. The patient had undergone closed mitral commissurotomy 38 years earlier and received radiotherapy for cancer of the uterine cervix two years earlier. She had remained in relatively good physical condition until recently. She currently presented with a high fever of sudden onset and was admitted to the emergency department of our hospital. Her blood pressure was 75/50 mmHg, her pulse rate was 83 beats per minute and her body temperature was 39.6°C. She was diagnosed as having sepsis and shock. There were no Roth’s spots or Osler nodes, and a blood examination revealed the following data: WBC 8,490/μL; platelet (PLT) 49,000/μL; CRP 23.44 mg/dL; creatine phosphokinase (CPK) 5 IU/L; activated partial thromboplastin time (APTT) 38.9 seconds; and fibrinogen 449 mg/dL. Transesophageal echocardiography showed mobile areas of vegetation attached to the aortic valve (Fig. 3), and, based on these findings, the patient was diagnosed with infective cerebral aneurysm.
IE affecting the aortic valve as well as septic shock and disseminated intravascular coagulation (DIC). Antibiotic treatment was immediately started with gentamicin (120 mg per day) and vancomycin (1 g per day). Blood cultures from two sites revealed growth of *Streptococcus agalactiae*, and we subsequently changed the intravenous antibiotics to gentamicin (120 mg per day) and ampicillin (12 g per day). In addition, intravenous noradrenaline and gabexate mesilate (FOY 1,000 mg per day) were administered to control the septic shock and DIC. The administration of noradrenaline was continued for three days and that of FOY was continued for two weeks. The DIC was successfully controlled; however, the serum CRP level remained elevated and a low-grade fever persisted, despite the continuation of antibiotics. Three weeks after hospitalization, the patient experienced an acute embolic episode in the right dorsalis pedis artery (Fig. 4a), and echocardiography performed at that time revealed the disappearance of the mobile areas of aortic vegetation. We judged that the infective endocarditis remained active and that the patient required aortic valve replacement (AVR). Before the operation, CT showed an anomalous origin of the right coronary artery arising from the left sinus of Valsalva at an acute angle (Fig. 4b), which is known to be a risk factor for myocardial ischemia. Therefore, we decided to perform coronary artery bypass grafting of the right coronary artery (RCA). Aortotomy subsequently showed that the right coronary cusp and non-coronary cusp were fused completely, giving the appearance of a single leaflet, and all leaflets had become thickened and sclerotic, although the aortic annulus appeared to be normal. Vegetation was attached to the tips of all leaflets. Therefore, we performed AVR with a 19-mm CEP MAGNA prosthetic valve (Edwards Lifescience, Irvine, USA) and coronary artery bypass grafting using a saphenous vein graft for the RCA. After the operation, the same antibiotic regimen as that applied before the operation was continued for four weeks. The patient remained afebrile after stopping the antibiotic therapy, and a blood examination revealed an improvement in the inflammatory response postoperatively; i.e., the serum WBC count decreased to 2,870/μL and the serum CRP level decreased to 0.7 mg/dL. The patient was discharged from the hospital one month later.

**Discussion**

Systemic embolism occurs in 22-50% of patients with IE,
with the majority of cases involving the central nervous system. Patients with embolism show a high rate of mortality, and systemic embolism is often noted two to four weeks after the start of antibiotic treatment.

In Case 1, the patient’s heart failure was well controlled with diuretics and carperitide, and the inflammatory reaction improved following antibiotic therapy. However, a cerebral aneurysm ruptured on the 16th day, and she suffered from subarachnoid and intracerebral hemorrhage. The amount of hemorrhage was so great that she subsequently developed cerebral herniation. Therefore, areas of aortic vegetation may embolize the cerebral artery and cause infective cerebral aneurysm.

In Case 2, the mobile aortic valve vegetation embolized the right dorsalis pedis artery on the 17th hospital day. Fortunately, the patient did not suffer from any further episodes of embolism.

GBS IE is thought to be rare, reported to account for only 1.7% of cases of IE (3). The sites of vegetation tend to be very large and fragile, and GBS IE thus often accompanies aortic embolism and carries a poor prognosis. The incidence of emboli is reported to be very high (50%) (2), and embolic phenomena are often the primary manifestations leading to a diagnosis of IE. Cardiac surgery is usually required due to the high rate of local and systemic complications.

The large size and friability of areas of vegetation may explain the high rate of systemic emboli in patients with GBS. In addition, GBS IE is associated with valvular destruction, similar to Staphylococcus aureus IE. The lack of fibrinolysin production at site of vegetation induced by S. agalactiae may also be involved in the pathogenesis of these complications.

Both of our cases were complicated with systemic embolism two or three weeks after the start of antibiotic treatment, and the inflammation was stabilized.

Various evidence has been reported regarding the indications for surgical treatment of IE. Although surgery is recommended for IE associated with congestive heart failure (4, 5), the timing of surgery to prevent systemic embolism is currently under discussion. According to the 2014 American College of Cardiology/American Heart Association (ACC-AHA) guidelines (6), early surgery for large mobile sites of vegetation is recommended as class IIb therapy and should be limited to cases of recurrent embolism and prolonged vegetation. It has been reported that early surgery in patients with IE and large areas of vegetation significantly reduces the composite endpoint of death from all causes and embolic events by effectively decreasing the risk of systemic embolism, as compared with conventional treatment (7).

In Case 1, a previous urinary tract infection may have caused the infection progressing to valvular disease. In Case 2, the medical treatment for gynecological disease may have been responsible for the GBS infection and caused the repeated infection leading to valvular disease.

The percentage of GBS carriers among elderly people is reported to be approximately 25%, the same as that observed in fertile women (1). However, the number of cases of GBS infection occurring outside of the perinatal period has increased (8), and more than half of all GBS-positive blood cultures are obtained in elderly patients in the United States (1). The decreased immune function and other underlying diseases noted in elderly subjects are associated with a serious clinical course. As Japanese society is continuing to age, the incidence of GBS is expected to increase and physicians should thus pay attention to the prevention and treatment of this disease.

**The authors state that they have no Conflict of Interest (COI).**

**References**

1. Edwards MS, Baker CJ. Group B streptococcal infections in elderly adults. Clin Infect Dis 41: 839-847, 2005.
2. Sambola A, Miro JM, Tornos MP, et al. *Streptococcus agalactiae* infective endocarditis: analysis of 30 cases and review of the literature, 1962-1998. Clin Infect Dis 34: 1576-1584, 2002.
3. Backes RJ, Wilson WR, Geraci JE, Group B streptococcal infective endocarditis. Arch Intern Med 145: 693-696, 1985.
4. Prendergast BD, Tornos P. Surgery for infective endocarditis: who and when? Circulation 121: 1141-1152, 2010.
5. Mylonakis E, Calderwood SB. Infective endocarditis in adults. N Engl J Med 345: 1318-1330, 2001.
6. Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol 63: e57-e185, 2014.
7. Kang DH, Kim YJ, Kim SH, et al. Early surgery versus conventional treatment for infective endocarditis. N Engl J Med 366: 2466-2473, 2012.
8. Lerner PI, Gopalakrishna KV, Wolinsky E, McHenry MC, Tan JS, Rosenthal M. Group B streptococcus (*S. agalactiae*) bacteremia in adults: analysis of 32 cases and review of the literature. Medicine (Baltimore) 56: 457-473, 1977.