

Bartonella henselae Infective Endocarditis Detected by a Prolonged Blood Culture

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Abstract

A 65-year-old Japanese man was admitted with a 4-month history of fatigue and exertional dyspnea. Transthoracic echocardiography revealed a vegetation on the aortic valve and severe aortic regurgitation. Accordingly, infective endocarditis and heart failure were diagnosed. Although a blood culture was negative on day 7 after admission, a prolonged blood culture with subculture was performed according to the patient's history of contact with cats. Consequently, *Bartonella henselae* was isolated. *Bartonella* species are fastidious bacteria that cause blood culture-negative infective endocarditis. This case demonstrates that *B. henselae* may be detected by prolonged incubation of blood cultures.

Key words: blood culture, subculture, infective endocarditis, *Bartonella henselae*

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Introduction

Blood culture-negative infective endocarditis (IE) represents 2.5-31% of all cases of IE (1), and *Bartonella* species accounts for 9-10% of blood culture-negative IE (2). *Bartonella* species cannot be cultured easily because of very slow growth, and therefore the diagnosis of *Bartonella* IE is usually made with serological testing and/or polymerase chain reaction (PCR). We herein report a blood culture-negative IE patient whose serological testing and blood PCR results were negative for *Bartonella* species, but the pathogen was eventually isolated by a prolonged blood culture.

Case Report

In August 2015, a 65-year-old man was admitted with a 4-month history of fatigue and exertional dyspnea. He denied having any fever, chills, chest pain, neurological symptoms, or upper respiratory tract symptoms. He had a history of contact with cats and dental extraction had been performed 8 months previously. He had no known valvular heart disease and had not taken antimicrobial therapy for his symptoms. On examination, his temperature was 36.9°C,

blood pressure was 116/35 mmHg, pulse rate was 71/min (regular), respiratory rate was 16/min, and peripheral oxygen saturation (SpO₂) was 98% on room air. There were no punctate hemorrhages of the bulbar conjunctiva, and no Osler's nodes or Janeway lesions. A grade 3/6 diastolic murmur with maximum intensity at the apex was detected, as well as pitting edema of both lower limbs, and cat scratches on the upper and lower limbs. Laboratory tests revealed that the white blood cell count was 5,500×10⁶/L, hemoglobin was 9.6 g/dL, mean corpuscular volume was 89.3 fL, serum iron was 22 µg/mL, serum ferritin was 302 ng/mL, C-reactive protein was 1.0 mg/dL, and brain natriuretic peptide was 1,481 pg/mL. Transthoracic echocardiography revealed severe aortic regurgitation and a mass attached to a string-like structure on the noncoronary cusp of the aortic valve, extending into the left ventricular outflow tract (Fig. 1). According to these findings, a diagnosis of IE with heart failure (New York Heart Association function class III) was made. Treatment with ceftriaxone and gentamicin was started, and emergency aortic valve replacement was performed on the day of admission. Microscopy of the resected aortic valve vegetation did not reveal any bacteria. Initial blood cultures were negative, and cultures obtained when the patient first presented to the hospital remained negative

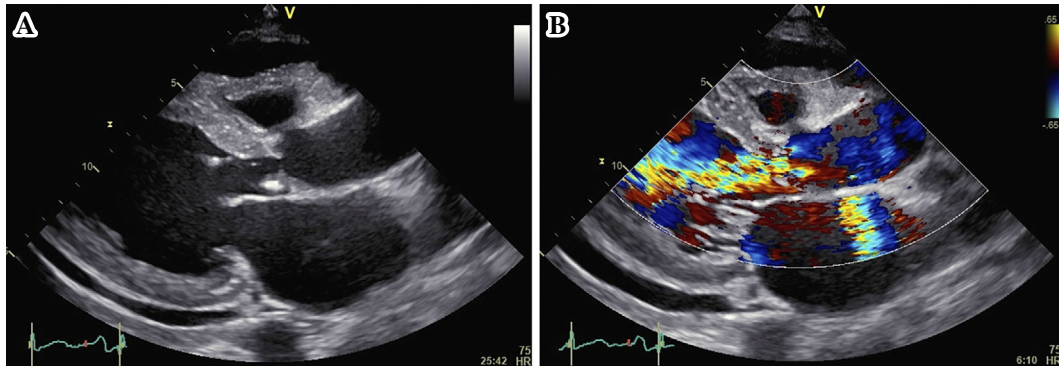


Figure 1. Transthoracic echocardiography. (A) A longitudinal view of the left ventricle. There is a hyperechoic lesion, which is probably a vegetation, on the noncoronary cusp of the aortic valve, which extended into the left ventricular outflow tract. (B) A color Doppler image shows a regurgitant jet that reaches the apex.

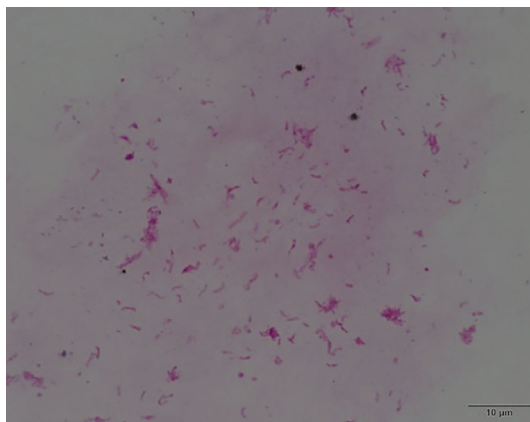


Figure 2. Gram staining of a colony after subculture. A colony of Gram-negative bacilli is observed (1,000 \times).

at 1 week after admission. Accordingly, blood culture-negative IE was provisionally diagnosed. Although the post-operative course was uneventful, taking the history of close contact with cats into consideration, a prolonged blood culture was performed with subculture for the possibility of infection with *Bartonella henselae* or *Coxiella burnetii*. No microorganisms were detected in the blood culture bottle by Gram staining at 3 weeks after admission. However, small colonies of Gram-negative bacilli were detected after 1 week of subculture (Fig. 2) and they were identified as *B. henselae* by the 16s RNA assay. In addition, some of the aortic valve specimens were positive for Warthin-Starry silver stain. The *B. henselae* IgG antibody titer was 1:512 by the indirect fluorescent antibody (IFA) method at 15 days after admission, while the *B. henselae* IgM antibody titer and blood PCR analysis findings were negative.

Discussion

Bartonella species are known to cause culture-negative IE, with most of these infections being attributed to *B. quintana* and *B. henselae*. While *B. quintana* infection is associated with homelessness or chronic alcoholism and occurs in

persons with no history of valvular disease, IE due to *B. henselae* is associated with preexisting valvular disease, cat scratches/bites, and contact with cat fleas (3). The presentation is subacute and patients have nonspecific systemic symptoms such as a fever, fatigue, and weight loss. A diagnosis is often only made after the patient develops heart failure, embolic skin lesions, and hepatosplenomegaly (2).

Bartonella species can be detected by a blood culture, serological testing, or PCR analysis of tissue and blood samples. The sensitivity of PCR using valvular tissue and blood samples is reported to be 92% and 58%, respectively, while the sensitivity of blood culture is only 20% (1, 4). A serum IgG antibody titer $\geq 1:800$ using the IFA method shows a sensitivity ranging from 58-89% (5, 6), with a specificity of 99% (6). In the present patient, the IgG titer for *B. henselae* was 1:512, and we could not diagnose *Bartonella* IE according to the serological test results. In addition, PCR of a blood sample was negative. Furthermore, we could not perform a PCR analysis of valve specimens because the limited amount available. Although a recent study reported that the sensitivity of Western blotting is higher than that of the IFA method (5), it is currently performed at a limited number of facilities and was not available in our facility. Therefore, we decided to perform a prolonged blood culture, which led to the eventual detection of *B. henselae*.

Bartonella species are fastidious bacteria that can only be isolated by a prolonged culture, thus incubation of blood cultures for more than 2 weeks and subculture for longer than 1 week are recommended for the detection of this microorganism (7). Due to the proven utility of complementary non culture-based methods, prolonged incubation and blind subculture are generally not recommended for culture-negative IE (8). However, the *Bartonella* IgG antibody test and blood PCR may yield false negative results, as seen in the present patient. For those cases, prolonging the duration of blood culture, which is a simple and specific technique, should increase the likelihood of detecting *Bartonella* species. In conclusion, a prolonged blood culture and subculture may therefore be recommended when *Bartonella* IE is

suspected, but complementary nonculture-based methods yield negative results.

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

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