CASE REPORT

**Gemella sanguinis endocarditis: First case report in Taiwan and review of the literature**

Ching-Huei Yang a,*, Kuei-Ton Tsai b

a Division of Infectious Diseases, Department of Internal Medicine, Buddhist Tzu Chi General Hospital, Taipei Branch, New Taipei City, Taiwan
b Division of Cardiovascular Surgery, Department of Surgery, Buddhist Tzu Chi General Hospital, Taipei Branch, New Taipei City, Taiwan

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We describe a case of infective endocarditis of the native aortic valve due to *Gemella sanguinis* in a 67-year-old Taiwanese man who had pre-existent valvular heart disease. He was successfully treated with aortic valve replacement accompanying a 6-week intravenous antibiotic treatment. To the best of our knowledge, this is the first report of *G. sanguinis* endocarditis in Taiwan.

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**Introduction**

Infective endocarditis (IE), a severe form of valve disease, is associated with a high mortality and is mostly caused by Gram-positive bacteria including *Staphylococcus* and *Streptococcus*. However, *Gemella* spp. have become an emerging opportunistic bacterial etiology in infective endocarditis. *Gemella* spp. are catalase-negative, facultatively anaerobic, Gram-positive coccoid organisms associated with low G+C content DNA that form in pairs, tetrads, or short chains when grown in culture medium.1 There are four species in this genus. Among them, *G. morbillorum* had been reported to be the cause of IE in more than 40 cases and *G. sanguinis* as a cause of IE for 4 cases from a review of the English language literature.2–6 The aortic valve tends to be the most commonly involved in *G. sanguinis* endocarditis. Dental disease seems not to be mandatory in patients with *G. sanguinis* endocarditis; nevertheless, previous valvular heart disease should be an important predisposing factor. Early surgery accompanying an extended period of parenteral antimicrobial therapy is key for successful treatment. Here, we describe the first reported case of bacterial endocarditis caused by

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*Corresponding author. Division of Infectious Diseases, Department of Internal Medicine, Buddhist Tzu Chi General Hospital, Taipei Branch, 289 Jianguo Road, New Taipei City 231, Taiwan. E-mail address: frankchy@tzuchi.com.tw (C.-H. Yang).*
Case report

A 67-year-old man was admitted to hospital with a 1-week history of fever, chills, and generalized weakness and malaise. Initially he had received treatment for a common cold at the outpatient clinic; however, symptoms progressed. Medical history was significant for rheumatic heart disease diagnosed by a cardiovascular specialist in the outpatient clinic and gouty arthritis for many years. There was no evidence of dental problems. His blood pressure remained lower, around 100/70 since he was young. The patient had a right inguinal hernia repair as a teenager. Physical examination revealed temperature on admission of 39°C, heart rate 94 beats/min, respiratory rate 22 breaths/min, and blood pressure 110/77 mmHg. Basal rhonchi and crackles were noticed on lung auscultation. Cardiac auscultation revealed Grade III aortic and pulmonary valve pansystolic murmur and Grade II early systolic crescendo—decrescendo and diastolic murmur at left middle and lower sternal border. The other physical examination was not remarkable.

Significant laboratory investigations on admission revealed a total white blood cell count 17.3 × 10^9/L with neutrophilia (neutrophils 90%; lymphocytes 5%); hemoglobin 12.0 g/dL [reference range (rr) 13–18 g/dL]; platelet count 282 × 10^9/L (rr 120–245 × 10^9/L); fibrinogen 456.2 mg/dL (rr 200–400 mg/dL) and D-dimer 1260.94 ng/mL (rr 0–500 ng/mL); C-reactive protein 22.39 (rr < 5.0 mg/dL). The colonies of Gemella sanguinis grew in pairs or short chains on blood agar. They were tiny ovoid, nonsporing, nonpigmented, and translucent cocci that resembled those of viridans streptococci, characterized by the fact that it can produce acid from mannitol, sorbitol, and sucrose and also produce acid from lactose, mannitol, and sucrose. The organism was susceptible to vancomycin, erythromycin, clindamycin, linezolid, ampicillin, levofloxacin, ceftriaxone, and cefepime. A transthoracic echocardiography (TTE) showed a calcified aortic valve with severe aortic stenosis and mild to moderate aortic regurgitation, and no definite mobile vegetation; however, there was an increasing echo density of aortic valve and an echolucent space around paravalvular area with a suspicious paravalvular abscess. In addition, mild mitral regurgitation, atrial fibrillation, and a small amount of pericardial effusion were found in this examination. Shortly thereafter, antibiotic therapy was adjusted to penicillin (3 × 10^6 U every 4 hours) and the surgeon was consulted. The patient subsequently underwent surgery with a successful aortic prosthetic valve replacement. At surgery, the operative findings included a congenital calcified bicuspid aortic valve and a large perianular abscess, which extended downward to the interventricular septum and upward to the aortic root. Thus the previous diagnosis of rheumatic heart disease in this patient was absent. After excision of diseased aortic valve and radical debridement of this root abscess, the abscess cavity was exteriorized with a piece of autologous pericardium to reconstruct left ventricular outflow tract continuity. A 23 mm SJM mechanical valve (St Jude Medical Inc., St Paul, MN, USA) was then implanted onto this newly repaired aortic annulus. Pathological findings showed leukocytic infiltrate, focal necrosis, and foci of calcification consistent with the diagnosis of acute endocarditis. He continued to receive intravenous penicillin treatment for 6 weeks and was discharged with a stable condition. There was no evidence of recurrence after 3 months of evaluation.

Discussion

Gemella spp. belongs to a genus of Gram-positive, nonfaecalis and nonfaecium enterococci with facultative anaerobic bacteria, primarily found in the mucous membranes of humans, particularly in the oral cavity and upper digestive tract as normal commensals. Because of the similarities, it was difficult to differentiate Gemella spp. from Streptococcus spp. before 1988, when the genus of Gemella was identified by its genetic analysis and its physiologic characteristics, which are quite different from Streptococcus spp. It rarely causes infection in humans. Study has shown that they thrive best at high partial pressure of CO₂. Most strains of these species are pyrrolidonyl arylamidase and leucine aminopeptidase positive, catalase and oxidase negative, and produce colonies on blood agar that resemble those of viridans streptococci, characterized by pairs, tetrads, or short chains. Four species, G. haemolyicans, G. morbillorum, G. bergeriae, and G. sanguinis are recognized, with G. sanguinis being the latest species identified: in a 1998 report, where it was found to be responsible for IE in a 69-year-old man. However, no further relevant data were reported in that patient. G. sanguinis differs from other Gemella spp. by the fact that it can produce acid from mannitol, sorbitol, and sucrose and also alkaline phosphatase, acid phosphatase, and ester lipase C8. Although Staphylococcus or Streptococcus have been the leading pathogens in IE, Gemella spp. may have become an emerging bacterial etiology. G. morbillorum had been reported to be the cause of IE for more than 40 cases and G. sanguinis for four cases. The exact cause for a lower case number of G. sanguinis IE than
G. morbillorum IE is unknown, but this could be because G. sanguinis had not been recognized until 1988, and as a result most of the isolated strains might have been regarded as G. morbillorum before that time. However, we still do not know whether G. morbillorum is more virulent because there is no relevant report about the comparison of virulence between Gemella spp. in the literature. Most of the cases with IE due to Gemella spp. had previous cardiac abnormalities and/or dental lesions as an infectious source. The current case had no obvious dental lesion at presentation. However, as G. sanguinis is most commonly found in oral mucosa, the occult injury in the patient’s oral cavity could be the possible infectious route. Subsequently this microorganism adhered to his congenitally calcified bicuspid aortic valve and led to the severe infection.

The diagnosis of G. sanguinis endocarditis in this case was based on the cardiac ultrasonography, the isolation of the bacteria from blood culture, the operative findings, and the definite pathologic results that fulfilled the Duke’s criteria. This case has been successfully treated by a long course of parenteral antimicrobials in treating G. sanguinis endocarditis due to G. sanguinis.

The main indications of surgical treatment in infective endocarditis are heart failure due to valvular regurgitation and uncontrolled infection because of periannular extension or difficult-to-treat microorganisms. Perivalvular abscess was found in Case 4 and this reported case, and both survived after medical—surgical treatment. Despite the negative finding of valvular vegetation in TTE, it was crucial that the TTE findings of paravalvular abscess with periannular extension in the aortic valve that prompted the early surgical intervention for successful treatment in our case.

In conclusion, this case illustrates a rare example of infectious endocarditis caused by G. sanguinis that was successfully treated with an extended period of intravenous antibiotic combined with early surgical intervention. This is the first case reported in Taiwan of infective endocarditis caused by G. sanguinis.

References


