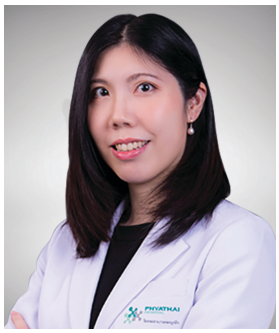
Case Report

Gemella haemolysans Native Valve Endocarditis

Supitcha Ongkittikul[1] ; Suchai Kanjanatarayont[2]



Supitcha Ongkittikul

[1] Division of Infectious Diseases, Department of Medicine, Phyathai3 Hospital, Bangkok, Thailand.
[2] Heart center, Phyathai3 Hospital, Bangkok, Thailand.

** Address Correspondence to author:*
Supitcha Ongkittikul, MD
Department of Medicine, Phyathai3 Hospital,
111 Phet Kasem Rd,
Pak Khlong Phasi Charoen, Phasi Charoen,
Bangkok 10160, Thailand.
email: drsupitchao@gmail.com

Received: May 5, 2023
Revision received: August 30, 2023
Accepted after revision: September 6, 2023
BKK Med J 2023;19(2): 124-127.
DOI: 10.31524/bkkmedj.2023.22.003
www.bangkokmedjournal.com

Abstract

Gemella haemolysans is a rare pathogen in cases of infective endocarditis. We report a case of *G. haemolysans* infective endocarditis in a 93-year-old woman with preexisting heart valves disease. The blood culture grew *G. haemolysans* and the echocardiogram revealed a 1.0cm x 0.49cm mobile mass attached to anterior mitral leaflet. Her condition improved after 6 weeks of intravenous ceftriaxone.

Keywords: *Gemella haemolysans*; endocarditis

Gemella spp. are facultative anaerobic gram-positive coccus and can be arranged in pairs, clusters, tetrads, and short chains.[1,2] They are found in the human oral cavity, upper respiratory, gastrointestinal tract, and genitourinary tract as a part of the normal flora. *Gemella haemolysans, G. morbillorum, G. bergeri, G. sanguinis, G. palaticanis, G. asaccharolytica, G. taiwanensis, G. parahaemolysans,* and *G. cuniculi* are the known species. Serious systemic infections with *Gemella* are uncommon, but they can cause infective endocarditis, spondylodiscitis, brain abscess, and endophthalmitis[3] To support the preceding statement, we present a case of *G. haemolysans* infective endocarditis of mitral valve in a 93-year-old Thai woman.

Case report

In December 2022, a 93-year-old Thai woman was admitted with a 2-day history of fever, generalized malaise and myalgia. Her medical history included moderate mitral valve regurgitation, coronary artery disease, hypertension and chronic kidney disease. She had no history of intravenous drug use, diabetes mellitus, dental infection, or manipulation. Her body temperature was 37.5°C at the time of admission and her vital signs were stable. Cardiac auscultation revealed a grade III/IV pansystolic murmur at the apex and lung auscultation was normal. On physical examination, no peripheral signs of endocarditis, such as Osler nodes, Roth spots, or Janeway lesions, were found.

A complete blood cell count revealed no evidence of leukocytosis. The electrocardiogram indicated a normal sinus rhythm and the chest X-ray confirmed no abnormality. The transthoracic echocardiogram (TTE) showed a 1.0cmx0.49cm mobile mass attached to anterior mitral leaflet (Figure 1, 2). Moderate mitral regurgitation with mitral valve prolapse were also detected. On admission, two sets of blood cultures were taken. One of them grew colonies of gram positive cocci in a cluster after 72 hours. On day 7, the isolates were identified as *Gemella haemolysans* using a Biomerieux Vitek 2 XL Microbiology Analyzer. The antimicrobial susceptibility testing revealed penicillin, ceftriaxone, clindamycin, erythromycin and vancomycin susceptibility. The minimal inhibitory concentration (MIC) to penicillin was 0.75 mcg/ml. The 16S rRNA gene sequencing method was not performed in our case because causative organisms can be identified by hemoculture.

ISSN 2287-0237 (online)/ 2228-9674 (print)

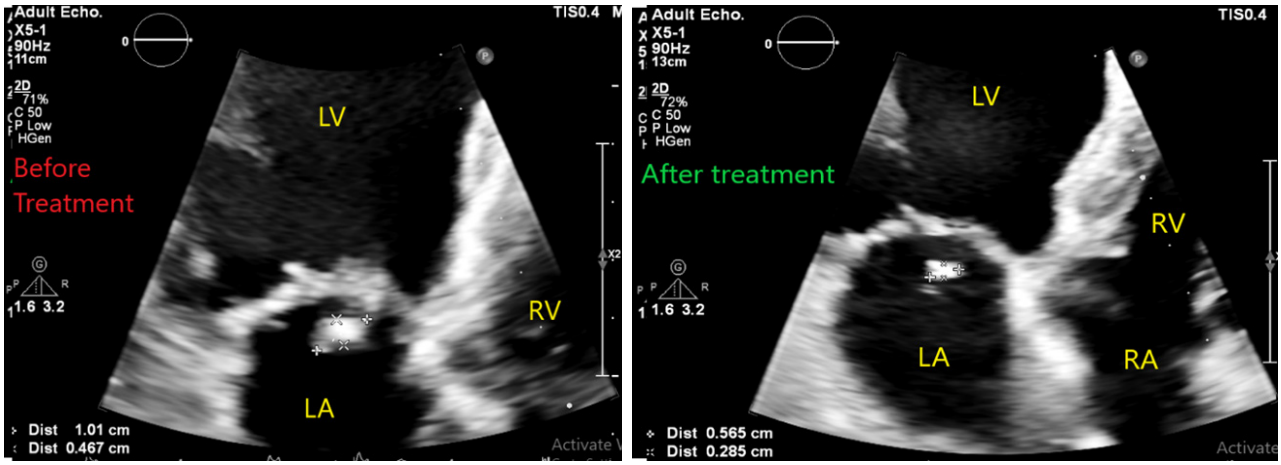


Figure 1: Transthoracic echocardiogram in apical 4 chambers view showed vegetation attached to anterior leaflet of mitral valve at the time of diagnosis (before treatment), and residual vegetation with reduction in size from to 1.01cm to 0.565cm at 4 weeks after completion of treatment (after treatment).

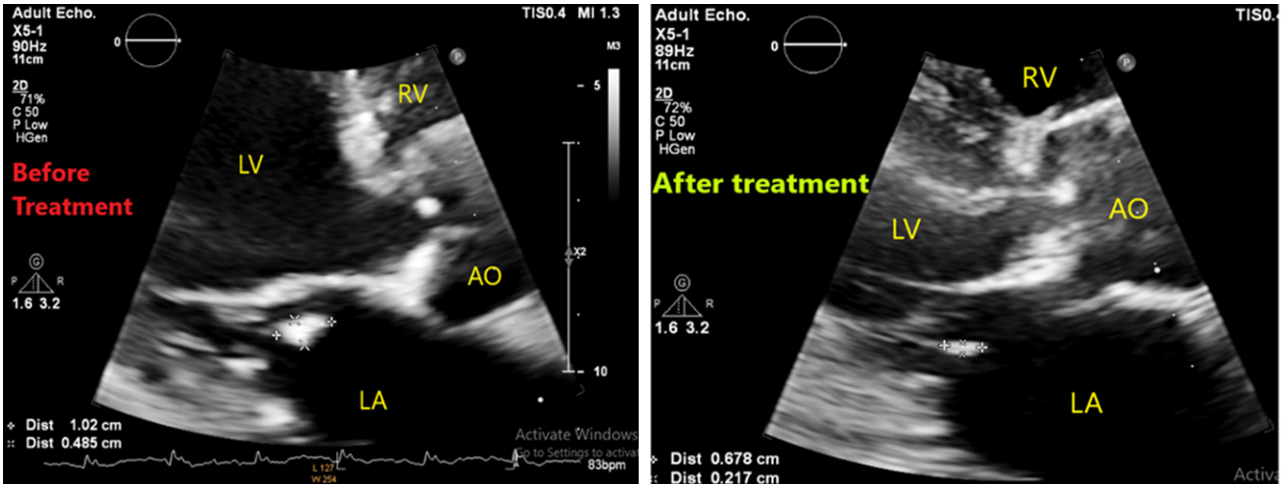


Figure 2: Transthoracic echocardiogram in parasternal long axis view showed vegetation attached to anterior leaflet of mitral valve at the time of diagnosis (before treatment), and residual vegetation with reduction in size from to 1.02cm to 0.678cm at 4 weeks after completion of treatment (after treatment).

As definite infective endocarditis was diagnosed by 2 major clinical Duke's criteria (blood cultures positive for endocarditis and evidence of endocardial involvement), the patient was treated with ceftriaxone intravenously for 6 weeks. Blood culture was negative one week after treatment. The patient gradually recovered and became afebrile. TTE performed at the end of treatment revealed the reduction of vegetation size at mitral valve, the following TTE performed 4 weeks later revealed smaller residual vegetation (Figure 1, 2), and unchanged moderate to severe mitral regurgitation while the patient remained in stable cardiac condition without recurrent fever.

Two weeks after recovering from infective endocarditis, the patient was admitted to the hospital with abdominal pain and fever. Her body temperature was 38°C and her vital signs were stable. The abdomen was soft, mild abdominal tenderness was elicited in the right upper quadrant without guarding or rebound tenderness. An ultrasound scan of the abdomen showed markedly distended gallbladder with sludge and several sandstones, diffuse gallbladder wall thickening and small pericholecystic fluid. Two specimens of hemoculture were negative. She was diagnosed with acute calculous cholecystitis. Only antibiotics treatments were prescribed because of her age. The patient's pain lessened and presented no fever after medical treatment for two weeks.

Discussion

G. haemolysans was first proposed by Thjotta and Boe as *Neisseria haemolysans* in 1938, then Berger changed it to a new genus, *Gemella*, in 1961. *Gemella* spp. are easily decolorized during the gram-staining process, allowing them to appear in either gram-negative or gram-positive bacteria. As the structure of the cell wall is similar to gram-positive bacteria, it was classified as *Gemella*. When examined microscopically, they

can be arranged in pairs, clusters, tetrads, and short chains. These bacteria grow on blood agar plates very poorly which often take 48 hours to grow.[1,2] They are difficult to identify with standard techniques because of their slow growth characteristics, thus the 16S rRNA sequencing method can assist in the diagnosis.[3,4]

Gemella are commensal flora of the upper respiratory, oropharynx, gastrointestinal tract, and genitourinary tract. The number of patients with *Gemella*-associated infections has recently increased, especially among the elderly and *G. haemolysans* has been identified as the most common causative agent. According to a retrospective study, *G. haemolysans* has been identified as a pathogen in infective endocarditis, osteomyelitis, spondylodiscitis, liver abscess, keratitis, meningitis, and bacteremia.[3-9] As for *Gemella* infective endocarditis, the predisposing factors include underlying mitral or aortic valve disease, previous mechanical valvular replacements, poor dental hygiene, dental procedures, intravenous drug use, and colon malignancies. The majority of cases reported are left-sided endocarditis and more likely to involve the aortic valve than the mitral valve. [5,10]

The treatment of *G. haemolysans*-caused infective endocarditis is similar to that of Streptococcal-like organisms with penicillin resistance (defined by the American Heart Association guideline as penicillin MIC ≥ 0.5 mcg/mL). These patients are typically treated with beta-lactam antibiotics combined with gentamicin for four to six weeks.[11,12] In our case, the penicillin MIC was 0.75 mcg/ml, so our patient received only intravenous ceftriaxone for 6 weeks, without gentamicin because of her age and renal function.

G. haemolysans is commonly sensitive to penicillin, ampicillin, ceftriaxone, meropenem, erythromycin, clindamycin, and vancomycin. However, there have been a few reports of intrinsic resistance to trimethoprim-sulfamethoxazole and low resistance to aminoglycosides.[5,13,14]

Regarding the issue of residual vegetation, the prognostic impact of residual vegetation after medical treatment for endocarditis is unknown. A recent retrospective cohort study from France[15] concluded that residual vegetation is common (49%) but has no clear prognostic impact in and of itself; however, its size, particularly in comparison to the start-of-treatment data, merits special attention as being potentially associated with an increased risk of embolic events, recurrence of endocarditis, or death from any cause at median follow-up of 16.3 months. In this case, the residual vegetation size was smaller than the start-of-treatment size, making such events less likely to occur, as in a recent study. However, we intend to closely monitor the patient as an OPD case for the first 12 months following treatment, including TTE.

Conclusion

Gemella haemolysans is an uncommon cause of infective endocarditis. The most common risk factors are pre-existing heart diseases, dental infection and procedures. These bacteria can be misidentified by gram staining. However bacterial culture and 16S rRNA sequencing tests may aid in the detection, leading to appropriate antibiotic therapy.

References

1. Facklam R, Elliott JA. Identification, classification, and clinical relevance of catalase-negative, gram-positive cocci, excluding the *Streptococci* and *Enterococci. Clin Microbiol Rev* 1995;8:479-95. doi: 10.1128/CMR.8.4.479.
2. Stackebrandt E, Wittek B, Seewaldt E, et al. Physiological, biochemical and phylogenetic studies on Gemella haemolysans. *FEMS Microbiology Letters* 1982;13(4):361-5. doi: 10.1111/j.1574-6968.1982.tb08288.x
3. Nazik S, Cingöz E, Şahin AR, et al. Evaluation of cases with *Gemella* infection: Cross-Sectional Study. *J Infect Dis Epidemiol* 2018;4:063. doi: 10.23937/2474-3658/1510063.
4. Woo PCY, Lau SKP, Fung AMY, et al. *Gemella* bacteraemia characterised by 16S ribosomal RNA gene sequencing. *J Clin Pathol* 2003;56(9):690-3. doi: 10.1136/jcp.56.9.690
5. Kodaka S, Uchida T, Gomi H. *Gemella haemolysans* as an emerging pathogen for bacteremia among the elderly. *J Gen Fam Med* 2021;23(2):110-2. doi: 10.1002/jgf2.497.
6. Fangous MS, F. Hémon P, Graf A, et al. Bone infections caused by *Gemella haemolysans. Med Mal Infect* 2016;46(8):449-52. doi: 10.1016/j.medmal.2016.06.005.
7. Zhai Y, Pang C, Sun S, et al. A Case Report of *Gemella haemolysans* Keratitis After Refractive Surgery. *Infect Drug Resist* 2021;14:5175-81. doi: 10.2147/IDR.S339018.
8. Malik I, Ghosh S, Nutt C, et al. *Gemella haemolysans* bacteraemia in a patient with solitary liver abscess. *J Microbiol Immunol Infect* 2010;43(5):438-41. doi: 10.1016/S1684-1182(10)60067-9.
9. Hayashi T, Uchiumi H, Yanagisawa K, et al. Recurrent *Gemella haemolysans* meningitis in a patient with osteomyelitis of the clivus. *Intern Med* 2013;52(18):2145-7. doi: 10.2169/internalmedicine.52.0436.
10. Ramanathan A, Gordon SM, Shrestha NK. A Case Series of Patients with *Gemella* Endocarditis. *Open Forum Infect Dis* 2019;6(Suppl 2):S103-4. doi: 10.1093/ofid/ofz360.230
11. Baddour LM, Wilson WR, Bayer AS, et al. Infective endocarditis in adults: Diagnosis, antimicrobial therapy, and management of complications: A scientific statement for healthcare professionals from the American Heart Association. *Circulation* 2015;132:1435-86. doi: 10.1161/CIR.0000000000000296.

ISSN 2287-0237 (online)/ 2228-9674 (print)

12. Habib G, Lancellotti P, Antunes MJ, et al. 2015 ESC Guidelines for the management of infective endocarditis: The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM). *Eur Heart J* 2015; 36:3075-128. doi: 10.1093/eurheartj/ehv319.
13. Kuriyama T, Karasawa T, Nakagawa K, et al. Bacteriology and antimicrobial susceptibility of gram-positive cocci isolated from pus specimens of orofacial odontogenic infections. *Oral Microbiol Immunol* 2002;17:132-5. doi: 10.1046/j.0902-0055.2001.00098.x.
14. Buu-Hoi A, Sapoetra A, Branger C, et al. Antimicrobial susceptibility of Gemella haemolysans isolated from patients with subacute endocarditis. *Eur J Clin Microbiol* 1982;1:102–6. doi: 10.1007/BF02014200.
15. Houard V, Porte L, Delon C, et al. Prognostic value of residual vegetation after antibiotic treatment for infective endocarditis: A retrospective cohort study. *Int J Infect Dis* 2020;94:34-40. doi: 10.1016/j.ijid.2020.03.005.