Early Prosthetic Valve Endocarditis Due to *Finegoldia magna*

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ABSTRACT: *Finegoldia magna* is a Gram-positive anaerobic cocci frequently reported in human diseases. We report a rare case of mechanical prosthetic endocarditis due to this microorganism in a patient with heart disease. A 50-year-old man with prosthetic mitral and aortic valve presented with pericardial effusion, cardiac tamponade, and multiorgan dysfunction. Anaerobic blood cultures yielded a positive result, allowing further identification as *F magna* by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry. The patient suffered replacement of mechanical mitral prosthesis by a new mechanical prosthesis, growing also *F magna* in the valvular culture. The isolate was identified as *F magna* by 16S ribosomal RNA sequence analysis. As a complication, a convulsive episode occurred, but a positive outcome was finally observed.

Dear Editor,

Infective endocarditis (IE) is a serious and life-threatening disease with high rates of morbidity and mortality, although those caused by anaerobic bacteria are uncommon and still poorly characterized. Anaerobes account for 2% to 16 % of cases of IE,[1] but in some studies represent less than 1% of them.[2] Main anaerobic microorganisms implicated in IE are *Cutibacterium acnes* (formerly *Propionibacterium acnes*), *Bacteroides fragilis*, and *Clostridium* species.[1,2]

Finegoldia magna (formerly *Peptostreptococcus magnus*) is a member of Gram-positive anaerobic cocci group which mainly causes soft tissue infections within a polymicrobial etiology. Until now, few cases of IE due to *F magna* have been published in the medical literature.[3-8] We have recently diagnosed a rare case of mitral prosthetic valve endocarditis caused by this microorganism. To our knowledge, only one additional case was previously reported with a blood and positive valvular culture.[3]

A 50-year-old man underwent heart surgery on February 2019 due to severe aortic insufficiency and moderate-to-severe mitral insufficiency, with replacement of native valves using mechanical prosthetic valves. One month later, the patient was admitted again due to severe pericardial effusion, cardiac tamponade, and multiorgan dysfunction. A pericardiocentesis was performed and the patient improved. Three days later, the patient had a fever of 38.7°C and 2 set of blood cultures were taken. At this stage, treatment with vancomycin (30 mg/kg/d) plus gentamicin (3 mg/kg/d) was started. The analytical profile showed only a decrease in hemoglobin level (9.1 g/dL [reference value, 11-17 g/dL]). The remaining parameters were normal. On the second day of incubation, both anaerobic blood culture bottles yielded a positive result. Gram staining of blood cultures showed Gram-positive cocci, growing only on the anaerobic plates from the subculture. A Bruker Biotyper (Billerica, MA, USA) matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) method was applied. The strain was sent for identification to the National Center for Microbiology (Majadahonda, Madrid, Spain), which identified the isolate by 16S ribosomal RNA sequence analysis using a previously reported method.[9] A fragment of 1133 bp was obtained, yielding 99.5% similarity with the *F magna* Gene Bank sequence NR1134383 and NR041935. The Etest method was performed for antimicrobial susceptibility testing based on 2019 EUCAST (European Committee on Antimicrobial Susceptibility Testing) criteria.[10] The strain was susceptible to all antimicrobials tested, except for clindamycin, with the following minimum inhibitory concentration values: penicillin (0.094 µg/mL), amoxicillin-clavulanate (0.25 µg/mL), piperacillin-tazobactam (0.19 µg/mL), imipenem (0.047 µg/mL), meropenem (0.032 µg/mL), metronidazole (1.5 µg/mL), vancomycin (0.19 µg/mL), and clindamycin (>256 µg/mL). A second couple of blood cultures were taken, yielding a positive result with *F magna*. To discard an early prosthetic endocarditis, a transesophageal echocardiography was carried out showing signs of endocarditis in the mechanical mitral prosthetic valve with extensive infiltration of the native ring; small vegetation on the prosthetic ring was also observed, along with 2 large dehiscence and severe regurgitation. The diagnosis of early mechanical prosthetic endocarditis due to *F magna* was established, and therapy was changed to penicillin G sodic (4 g intravenously for 4 hours) plus gentamicin (240 mg/d) was started. The patient was surgically treated urgently with mitral valve replacement using mechanical prosthesis. The excised valve was sent to the microbiology laboratory and it was inoculated onto brain heart infusion broth and subsequently subcultured on both aerobic and anaerobic blood agar (BD Columbia Agar 5% Sheep Blood; Becton Dickinson, Franklin Lakes, NY), chocolate agar (BD Choco Agar; Becton Dickinson), and thioglycolate broth (BD Fluid Thioglycollate Medium; Becton Dickinson), incubating all media at 37°C for 5 days. The AnaeroGen Compact anaerobic system was used (Oxoid Ltd,

Table 1. Main characteristics of infective endocarditis due to *Finegoldia magna*.

PATIENT (REFERENCE/ YEAR OF PUBLICATION) AUTHOR	AGE (YEARS)/ SEX	UNDERLYING CONDITIONS AND/OR RISK FACTORS	AFFECTED VALVE	TYPE OF VALVE	CLINICAL MANIFESTATIONS	MICROBIOLOGICAL DIAGNOSIS	TREATMENT	OUTCOME
1 (5/1985) Cofsky RD	18/M	Inflammatory syndrome	Mitral	Native	Fever, multiple emboli	Blood cultures	Antibiotics	Death
2 (6/1992) Pouedras P	77/F	Valvulopathy	Aortic	Bioprosthetic	Heart failure, pulmonary subedema	Abscess material culture	Antibiotics + surgery	Cure
3 (7/2000) Van der Vorm ER	65/M	Valvulopathy	Mitral	Mechanical	Fever, pulmonary congestion	Valve culture	Antibiotics + surgery	Death
4 (7/2000) Van der Vorm ER	39/M	Valvulopathy	Aortic	Mechanical	Inflammatory syndrome	Valve culture	Antibiotics + surgery	Cure
5 (8/2003) Bassetti S	68/M	Valvulopathy	Aortic	Mechanical	Fever, inflammatory syndrome	Aortic wall culture	Antibiotics	Cure
6(3/2008) Fournier PE	55/M	Valvulopathy	Aortic	Bioprosthetic	Fever, inflammatory syndrome	Valve culture	Antibiotics + surgery	Cure
7 (3/2008) Fournier PE	59/F	Rheumatic fever	Mitral	Mechanical	Cerebrovascular accident, inflammatory syndrome	Blood + valve culture	Antibiotics	Cure
8 (4/2017) Bonnet E	78/F	Valvulopathy, diabetes mellitus	Aortic	Bioprosthetic	Fever, dyspnea	Blood cultures	Antibiotics + surgery	Cure
9 (PR/2017) Cobo F	50/M	Valvulopathy	Mitral	Mechanical	Pericardial effusion, cardiac tamponade, multiorgan dysfunction	Blood + valve culture	Antibiotics + surgery	Cure

M: male; F: female; PR: present report.

Basingstoke, UK) to create an anaerobic environment. Gram staining of the valve showed abundant Gram-positive cocci. On the first day of incubation, dotted colonies grew only on the anaerobic plate. The strain was identified by MALDI-TOF MS as *F magna* (log score of 2.20). After 2 days in the intensive care unit, a convulsive episode occurred and a computed tomographic scan was then performed. This technique showed a small hemorrhagic focus on the right parietal lobe. The patient was treated with levetiracetam with satisfactory evolution. No more complications were observed, and after 1 month of hospitalization the patient was discharged with a positive outcome.

Infective endocarditis is a life-threatening disease whose mortality remains high, with more than one-third of affected patients dying within a year following diagnosis.[11] Most cases of culture-positive endocarditis are caused by Gram-positive microorganisms (*Staphylococci* and *Streptococci*), followed by Gram-negative microorganisms and fungi. On the contrary, anaerobes are uncommon causes of IE, and most episodes are caused by *Cutibacterium acnes* (formerly *Propionibacterium acnes*) and *Clostridium* species.[1,2] Other species of anaerobic bacteria such as *F magna* are very rare microorganisms isolated as causative agents of IE.[3-8] The main characteristics of these cases are shown in Table 1. Regarding the features of IE caused by anaerobes, a study showed that these infections mainly affect prosthetic valves (especially aortic and mitral) and frequently require surgery, but no major differences between this kind of endocarditis and those caused by other microorganisms were observed.[3] Moreover, predisposing factors and symptomatology caused by anaerobic IE were similar to IE caused by other organisms. However, another study demonstrated that there was a lower incidence of previous valvular heart disease, a higher incidence of thromboembolic events, and a higher mortality rate in IE caused by anaerobes.[1] As most data reported in the literature are based on case reports, a large multicenter study would be necessary to clarify the characteristics of IE caused by anaerobes. The source of infection in our patient was unknown, and neither previous dental manipulations nor dental diseases were observed. Most causes of prosthetic valve endocarditis are of nosocomial acquisition or related to patient health care.

Infective endocarditis is associated with the permanent presence of microorganisms in blood, so blood cultures are the *gold standard* to obtain the microbiological diagnosis. However, the identification of anaerobic bacteria could be problematic due to the difficulties associated with the phenotypic identification. Now, the performance of proteomic techniques such as MALDI-TOF MS for routine analyses in most clinical laboratories may be highly useful for the final identification of these bacteria and may help to detect new species of anaerobes, knowing the true incidence as causative agents. In fact, a recent study validated the Bruker MALDI-TOF MS database using a large set of anaerobic strains isolated from human clinical specimens.[12] The rapid diagnosis of the etiological agent is crucial for patient survival; the lack of an adequate antimicrobial treatment against anaerobic bacteria, which are not usually covered with empirical therapy, may lead to failures in treatment, appearance of complications, and increase in mortality. Modern automated continuous-monitoring blood culture systems provide excellent recovery of almost all cultivable microorganisms causing IE. These systems along with the new proteomic techniques have improved both the detection and identification of microorganisms. In our case, in addition to demonstrating the positivity of blood cultures, the culture of the excised valve resulted positive with *F magna*. Only a previous case of endocarditis by this anaerobe was positive to both cultures.[3]

In conclusion, this is a rare case of IE by *F magna*. Although IE by anaerobic microorganisms is uncommon, physicians and microbiologists should keep this infection in mind in patients with prosthetic valves. The validation of MALDI-TOF MS platforms for anaerobic diagnostic stresses the need for the introduction of this technology in all diagnostic laboratories to increase the accuracy in the diagnosis of anaerobes.

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Author Contributions

FC: designed the study and wrote article, EC: searched the medical literature. JMNM: reviewed and criticism of the article.

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