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Infective Endocarditis Caused by *Finogoldia magna* Following Aortic Dissection Repair: A Case Report and Data Evaluation

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Conflict of interest: None declared

Patient: Male, 45
Final Diagnosis: Endocarditis
Symptoms: —
Medication: —
Clinical Procedure: Antibiotic treatment and aortic repair
Specialty: Surgery

Objective: Unusual clinical course
Background: *Finogoldia magna* (*F. magna*) is a rare pathogen causing infective endocarditis (IE). Only 7 cases are documented in the literature.

Case Report: We report a case of infective endocarditis in a 45-year-old male due to *F. magna* 2 months after a Bentall procedure. He presented with fever, dyspnea, and chest pain. Aerobic and anaerobic blood samples were drawn before empirical antibiotic treatment was initiated. A transesophageal echocardiogram (TEE) demonstrated several findings involving the prosthetic valve, including a vegetation. The patient underwent a second aortic repair procedure. Tissue cultures obtained from 2 sources in the infected area during the operation were positive for *F. magna*. The antibiotic regimen was changed in accordance with susceptibility testing to piperacillin/tazobactam. Two weeks after the operation, the patient was released with a recommendation for antibiotic treatment for 8 weeks.

Conclusions: We report this case because *F. magna* is a rare pathogen causing endocarditis. This was a case of prosthetic valve *F. magna* IE in which the definitive diagnosis was based on tissue cultures following sterile blood cultures. Data evaluation of all *F. magna* IE reported cases illustrated that tissue cultures were the predominant microbiologic diagnostic tool used.

MeSH Keywords: Endocarditis • Heart Valve Prosthesis • Peptostreptococcus

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Background

Finogoldia magna (formerly *Peptostreptococcus magnus*) is part of the normal human mucocutaneous flora and is one of the most common gram-positive anaerobic cocci isolated from clinical specimens [1]. *Peptostreptococcus* species have been described as pathogens of upper respiratory infections, ear, sinus and mastoid infections, osteomyelitis, and soft tissue abscesses and ulcers [1–3]. In addition, these species have been reported to cause nosocomial infections, including lung and soft tissue abscesses, sinusitis, and bone infections [4].

Over the last 3 decades, anaerobic bacteria have been identified as the causative agent in up to 16% of published infective endocarditis cases [5]. Specifically, there have been 21 published reports of IE caused by *Peptostreptococcus* spp. [6]. *F. magna* was identified as the agent in only 7 cases, mostly by tissue culture taken during surgical procedure following sterile blood cultures [7–11].

Case Report

A 45-year-old man was admitted to the department of internal medicine for evaluation in March of 2012 following complaints of fever, dyspnea, and chest pain. Two months prior to his admission, the patient had undergone resection and replacement of the ascending aorta due to a dissecting aneurysm. The procedure included a composite aortic graft incorporated with a 25-mm aortic mechanical valve. The patient was discharged 8 days after the operation in good general condition. On re-admission the patient reported 2 days of chest pain and dyspnea. He had a documented fever of 39°C at home with a single episode of night sweats.

Vital signs on admission included an oral temperature of 37°C, blood pressure 95/60, respiratory rate 30 breaths per minute and blood oxygen saturation level of 96% while breathing room air. Physical examination demonstrated no remarkable findings. Laboratory tests revealed a slight leukocytosis of 12,400 cells/ μ l (normal range 4,500–10,000 cells/ μ l), hemoglobin level of 11.8 g/dL (13.5–16.5 g/dL), cardiac t-Troponin peak value of 0.12 ng/mL (<0.02 ng/mL), and elevated erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) levels of 65 mm/hr (20–25 mm/hr) and 196.33 mg/L (<6 mg/L), respectively. The patient was receiving warfarin therapy and the international normalized ratio (INR) was in the therapeutic range (2.69). Chest X-ray showed no pathologic findings. ECG demonstrated incomplete right bundle branch block and inverted T waves in leads V2-3, unchanged from previous tracings. Aerobic and anaerobic blood cultures were drawn before empirical antibiotic treatment was initiated with vancomycin, rifampin, and gentamicin.

A TEE demonstrated a large mass surrounding the ascending aorta with multiple cavitations and dehiscence of the intervalvular fibrosa, with a vegetation extending to the left ventricle outflow tract and involving the prosthetic valve (Figure 1). These findings were consistent with a large infected hematoma and/or abscess.

The patient underwent a second aortic repair procedure and the proximal aortic graft was replaced with a new composite mechanical valve and prosthetic aortic graft. Surgical findings included a large peri-valvular abscess extending around the detached proximal aortic graft and extensive tissue damage involving the coronary graft insertions. While 5 sets of aerobic and anaerobic blood cultures taken prior to the surgery were negative, tissue cultures obtained from 2 sources in the infected area during the operation were positive for *F. magna*. Anaerobic cultures were performed on Centers for Disease Control (CDC) anaerobe 5% sheep blood agar plates (Hy Laboratories, Rehovot, Israel) incubated for 5 days in an anaerobic jar. Isolate identification was performed on the Vitek-2 system (bioMérieux, Marcy l'Etoile, France) with the anaerobic and coryneform bacteria (ANC) card. Susceptibility to antibacterial agents was performed using E-test (AB Biodisk, Solna, Sweden) in accordance with the manufacturers' instructions. Results were interpreted according to breakpoints defined by the Clinical and Laboratory Standard Institute (CLSI) [12]. The patient recovered slowly from the operation and the antibiotic regimen was modified in accordance with susceptibility testing to piperacillin/tazobactam administered through a peripherally inserted central catheter (PICC).

TEE performed 10 days after the surgery revealed normal morphology and function of the prosthetic valve and proper graft integrity. A single peak of white blood cells (20,000 cells/ μ l) was observed shortly after the surgery and resolved the following day. Two weeks after the operation the patient was released with a plan for continued ambulatory treatment with piperacillin/tazobactam for a total of 8 weeks.

Four weeks after the surgery the patient visited the surgical post-op clinic following an oral temperature of 38.2°C. Blood workup revealed mild leukopenia. TEE demonstrated no pathological findings. After ruling out other possible causes, a diagnosis of drug-related fever was made and piperacillin/tazobactam was replaced with meropenem. The patient completed the 8-week course of antibiotic therapy, with normalization of leukocyte levels and without recurrence or complications up to a year afterwards.

Discussion

As part of the *Peptostreptococcus* spp., *F. magna* rarely cause IE and was first documented as a causative agent in 1985,

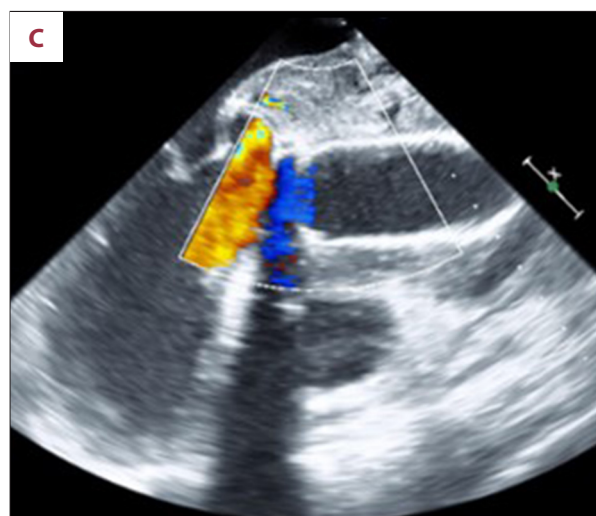
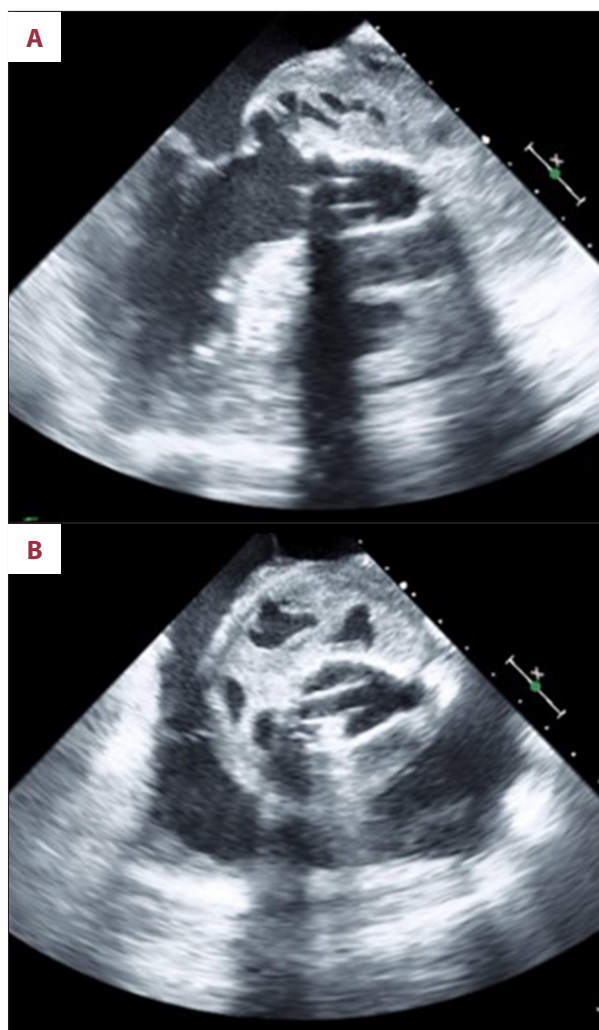


Figure 1. Transesophageal echocardiogram demonstrating a large mass surrounding the ascending aorta with multiple cavitations (**A** – short axis) and dehiscence of the intervalvular fibrosa, with a vegetation extending to the left ventricle outflow tract (LVOT) and involving the prosthetic valve (**B** – long axis, **C** – color flow showing connection between the mass lumen and the LVOT). Findings were consistent with a large infected hematoma and/or abscess.

presenting as an infection of a native mitral valve [7]. Since then, only 6 additional cases of IE due to *F. magna* have been published, all in patients with prosthetic valves [8–11], a major risk factor for IE [13]. In our case, we present the 8th reported case of *F. magna* as an early post-operative IE.

Table 1 summarizes data regarding previous *F. magna* IE cases. The mean age of patients (including the individual presented above) is 53, with a male-to-female ratio of 3:1. Except for 1 patient, all cases followed valve-replacement surgery and 6 out of 7 of these were an early complication. The median delay between the surgical procedure and the onset of *F. magna* IE was 2 months. All cases involved the mitral or aortic valves, with an aortic-to-mitral ratio of 5:3. The most frequent echocardiogram findings were vegetations on the prosthetic valves and paravalvular leak. Surgery was required in all the cases involving artificial valves, including ours, and 6 of 7 patients that underwent surgery were diagnosed with *F. magna* endocarditis only through tissue culture results and not by blood cultures. The statistical data analysis is shown in Table 2.

F. magna IE should be considered as a serious complication of valve replacement surgeries. There have been 21 published reports of IE caused by *Peptostreptococcus* spp., including two that were fatal—both of them due to *F. magna* [6]. The mortality rate of *F. magna* IE is therefore 25% [2/8], despite operative and antibiotic treatments.

In most of the *F. magna* IE cases, including ours, blood cultures were negative and definitive diagnosis was made only by tissue cultures obtained during the surgical procedure. Regarding other rare diseases, Solen et al. reported a case of postoperative mediastinitis due to *F. magna* with repeated negative cultures and final diagnosis based on mediastinal fluid cultures [14].

Anaerobic bacteria are overlooked or missed unless the specimen is properly collected and transported to the laboratory and then subjected to appropriate process for isolation, including the use of specialized media supplemented with growth factors. Anaerobes vary in their sensitivity to oxygen and in their nutritional requirements, but most isolates require vitamin K and hemin for growth. Proper collection media and incubation are vital to the recovery of anaerobes [15]. In general, reasons for negative blood cultures can be technical, linked to the type and the site of infection, due to the nature of the microorganism, and/or caused by prior administration of antibiotics. In our case, blood cultures were drawn before administration of antibiotics. However, we cannot exclude that the

Table 1. Characteristics of 8 patients with *F. magna* IE.

Case #	Year	Age	Sex	Predisposition	Echocardiography signs	Delay since valve surgery	Diagnostic method	Antibiotic treatment	Outcome	Reference
1	1985	18	M	Native mitral valve	Mitral regurgitation, Vegetation	No surgery	Blood culture	Penicillin followed by Vancomycin	Death	[7]
2	1992	77	F	Prosthetic aortic valve	Valve abscess, paravalvular leak	3 months	Valve culture	Penicillin + Gentamicin	Resolution	[8]
3	2000	65	M	Mechanical mitral valve	Paravalvular leak, dehiscence vegetations	23 days	Valve culture + PCR	Vancomycin + Gentamycin + Rifampin	Death	[9]
4	2000	39	M	Mechanical aortic valve	Paravalvular leak, dehiscence, vegetations, aortic root abscess	2 months	Valve culture	Penicillin + Metronidazole	Resolution	[9]
5	2003	68	M	Mechanical aortic valve	Paravalvular leakage	13 days	Aortic wall culture + PCR	Penicillin	Resolution	[10]
6	2008	55	M	Prosthetic aortic valve	Valvular abscess, paravalvular leakage	2 months	Valve culture + PCR	Amoxicillin/CA*	Resolution	[11]
7	2008	59	F	Mechanical mitral valve	Obstructive thrombus	2 years	Valve and blood culture + PCR	Amoxicillin/CA*	Resolution	[11]
8	2012	45	M	Mechanical aortic valve	Cavitations and dehiscence, vegetations, perivalvular abscess	2 months	Valve culture	Piperacillin/TA**	Resolution	Present case

* CA – clavulanate; ** TA – tazobactam.

Table 2. Statistics of *F. magna* IE cases.

Statistical estimation – 8 cases	
Mean age	53 years
M/F ratio	3:1
Aortic/Mitral ratio	5:3
Median delay between surgery and onset	60 days
Mortality	25% of cases
Echocardiogram findings	
Paravalvular leakage	62.5% of cases
Vegetations	50% of cases
Antibiotic treatment	
Penicillin	50% of cases
Amoxicillin	25% of cases

negative blood cultures were the result of the specific blood culture system being used in our center. Bassetti et al. reported that an *F. magna* strain causing endocarditis did not grow in BacT/AlertT and Bactec 9240 system but did grow in the Septi-Chek BHI-S and the Isolator system [10].

Therefore, it may be suggested that IE due to *F. magna* should be considered as a culture-negative endocarditis. Culture-negative IE patients require more time for initiation of antibiotic therapy [16]. Awaiting the operation and tissue cultures delays the diagnosis of *F. magna* and the appropriate antibiotic treatment according to susceptibility test (e.g., penicillin, amoxicillin, or piperacillin). Thus, clinical suspicion of IE presenting soon after a surgical valve operation, with sterile cultures, should raise the suspicion of an anaerobe IE, specifically *F. magna* IE, when initiating the appropriate empirical antibiotic therapy.

Conclusions

We present a case of early post-operative *F. magna* IE in which the patient fully recovered without any complications. This is

the 8th documented case of *F. magna* IE, a rare cause of endocarditis. Our data evaluation regarding *F. magna* IE strengthens the suggestion that this agent is often presented as culture-negative IE. As in our case, diagnosis is almost always based on tissue culture obtained during the surgical procedure. Thus,

one should consider *F. magna* as a possible etiology when clinical presentation of IE arises in a patient who has recently had replacement surgery and in who the blood cultures are negative. This consideration may affect the selection of empirical antibiotic agents.

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