CASE REPORT

Enterococcus faecalis endocarditis in an immunocompetent patient: a case report

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ABSTRACT

Infective endocarditis is a disease characterized by inflammation of the endocardium secondary to the entry of pathogens into the circulation, which may include bacteria, fungi and even viruses. Its etiology may vary among microorganisms; however, *Enterococcus faecalis* bacteria is the third most frequent, after *S. aureus* and *S. pyogenes*. For each of these causative agents of the disease, it is necessary to assess the appropriate treatment aimed at eradicating the microorganism, based on the international guidelines of the European Society of Cardiology (ESC), institutional parameters and local epidemiology. We present the case of a 44-year-old man of African descent with no comorbidities, whose only significant history includes dental procedures in the context of *Enterococcus faecalis* infective endocarditis. With this case, we aim to give visibility to the causative microorganism and the clinical picture that prompted the patient to seek medical attention, highlighting pathognomonic and non-pathognomonic clinical signs of the disease. It is also important to emphasize the need to promptly initiate antibiotic therapy, suspect the disease, exclude multiple differential diagnoses and perform early surgical management, as all of these can influence the prognosis and outcome of the patient, with death being the most serious of these. Likewise, we intend to provide guidance to healthcare professionals who may face similar cases. Finally, we would like to emphasize the importance of effective communication between institutions, as there may be delays due to transfers, the need to repeat paraclinical and imaging tests to confirm the diagnosis, and delays in surgical management due to a lack of necessary resources, which can lead to the worsening of the disease.

Keywords: Endocarditis, Bacterial; Infective Endocarditis; Aortic Valve Disease; Enterococcus faecalis (Source: MeSH NLM).

INTRODUCTION

Infective endocarditis is a disease that mainly affects the endocardium, impairing its function and structure. However, in terms of prevalence, it is not commonly found in patients without preexisting endothelial or cardiac abnormalities. It occurs mainly when there is hematogenous dissemination of some microorganisms such as fungi and bacteria. As healthcare professionals, we should inquire about significant medical history such as recent surgeries or procedures, use of psychoactive substances, tattoos and conditions in the oral cavity, including abscesses and periodontal disease. The history can be considered to entail risk factors that may predispose each patient to the disease [1].

Infective endocarditis is characterized by vegetations, abscesses, fistulas, aneurysms and pseudoaneurysms caused by microorganisms, which are located on the heart valves [15], the endothelium of great vessels, or within the cardiac chambers [2], where they later calcify. If not diagnosed and treated in a timely manner, they can lead to complications such as regurgitation, heart failure or septic embolism, all of which may result in death.

Prompt diagnosis can be challenging, as the clinical presentation of the disease is nonspecific. Therefore, it is essential to rely on diagnostic tools such as echocardiography and blood cultures [2].

We present a case report of a 44-year-old patient with bacterial endocarditis caused *by Enterococcus faecalis*, which was a diagnostic challenge for healthcare professionals considering that it is an uncommon pathogen and the clinical manifestations were not very suggestive. However, a diagnosis was established, followed by adequate antimicrobial and surgical treatment for the patient with successful recovery. The final version of the manuscript was approved by the Institutional Review Board of Fundación Universitaria Sanitas (Unisanitas) under Act No. 001-24 dated January 9, 2024.

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CLINICAL CASE

A 44-year-old man from Chocó, residing in Bogotá, was seen at Clínica Universitaria Colombia for a clinical picture that had evolved over four months, consisting of fever, which began with an evening pattern and then became intermittent, with a maximum temperature of 38.8 °C. The clinical picture included other symptoms such as hyporexia, asthenia, adynamia, nocturnal diaphoresis and pain in the fingertips. In addition, he experienced an involuntary loss of 10 kg from January to April 2023.

His relevant medical history did not include any underlying conditions, except for endodontic treatment on two teeth performed two months apart; he also had a family history of colon cancer.

On physical examination, his vital signs showed a heart rate of 112 beats per minute. Heart sounds were rhythmic, with a grade 3 systolic murmur at the aortic area, radiating to the mitral area, rhomboidal in shape, with low-pitched tone, which intensified with the Harvey maneuver. On inspection of the skin and skin appendages, distal vascular phenomena consistent with endocarditis were observed, including a splinter hemorrhage under the nail of the first digit of the right hand and an Osler node on the right heel (Figure 1).

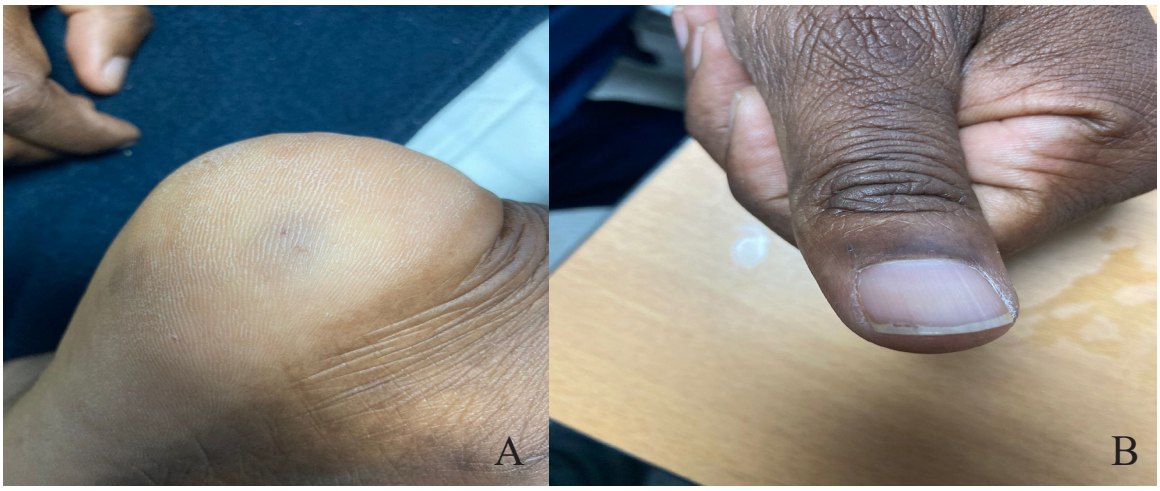

Figure 1. Clinical manifestations due to vascular phenomena. A) Osler node on the right heel. B) Splinter hemorrhage under the nail of the first digit of the right hand (Table 1).

Both imaging and laboratory tests were requested. A first blood culture obtained at Clínica Bienaventuranza yielded *Enterococcus faecalis* susceptible to ampicillin (Table 1).

Table 1. Antimicrobial susceptibility profiling of *E. faecalis*

Antibiotic	Interpretation	MIC
High-level gentamicin	Susceptible	SYN-S
High-level streptomycin	Susceptible	SYN-S
Benzylpenicillin	Susceptible	2
Ampicillin	Susceptible	≤ 2
Vancomycin	Susceptible	2
Daptomycin	Intermediate	4

MIC: minimum inhibitory concentration.

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Subsequently, a second blood culture was obtained, indicating persistent bacteremia. A fecal occult blood test was performed to rule out colon cancer, but the result was negative. Serology tests for HIV and hepatitis B surface antigen (Table 2) were conducted to rule out immunodeficiency, and the results were also negative. In addition, a transthoracic echocardiogram (TTE) was performed, which revealed aortic valve vegetation measuring 1.4 cm × 0.4 cm, mitral valve stenosis secondary to valve sclerosis—consistent with the patient's age—and dilated cardiomyopathy of valvular origin (Figure 2). As part of the presurgical evaluation, a coronary computed tomography angiography was also requested; however, despite the administered doses of beta-blocker, the scan could not be completed due to the absence of adequate negative chronotropic control. Consequently, a coronary arteriography with right and left heart catheterization was performed, with moderate pulmonary hypertension being the only positive finding.

Table 2. Serologic tests for HIV and hepatitis B surface antigen

Paraclinical tests	Date performed	Patient's result	Normal ranges
HIV antibodies	February 27, 2023	0.14	Nonreactive: < 1.0
	May 1, 2023	0.21	
Hepatitis B surface antigen	February 27, 2023	0.45	

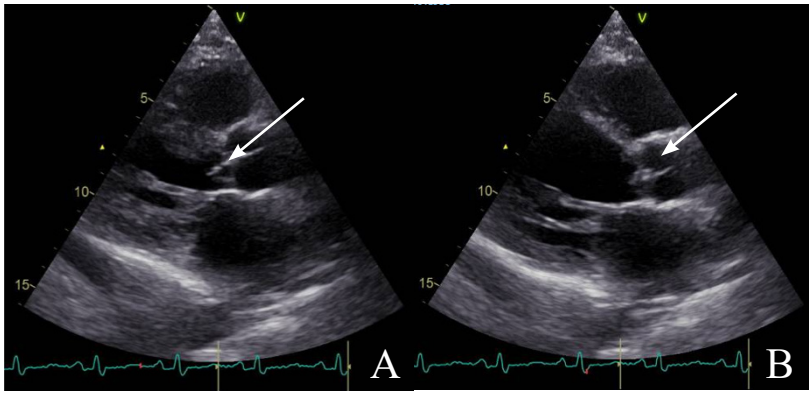

Figure 2. Transthoracic echocardiogram showing vegetation on the native aortic valve. A) and B) Closed aortic valve.

The patient was being treated at Clínica Bienaventuranza with intravenous ampicillin 2 g every 4 hours and intravenous gentamicin 240 mg every 24 hours, which is the first-line therapy for infective endocarditis of indeterminate etiology. Once the causative agent was confirmed (*E. faecalis* susceptible to ampicillin [Table 1]), the treatment was modified by the infectious disease department, which indicated antimicrobial coverage that was adjusted according to the 2023 ESC Guidelines for the Management of Infective Endocarditis [3]. Therefore, intravenous ampicillin 2 g every 4 hours was continued and intravenous ceftriaxone 2 g every 24 hours was added, until completing 42 days in total, considering valve replacement after medical management. However, due to the international shortage of mechanical heart valves, the patient was discharged with a plan for hospitalization at home.

Two months later, the patient was readmitted to the emergency department with a clinical picture consisting of a cardiogenic syncopal event, precordial pain, dyspnea and hemoptysis. Upon evaluation, a new TTE was performed, which revealed vegetative lesions on the aortic valve with severe aortic regurgitation, as well as mitral valve annular dilation with severe regurgitation. The opinion of the cardiovascular surgery department was sought, and they recommended surgical interventions. During a multidisciplinary meeting, it was determined that the most appropriate course of action was aortic and mitral valve replacement, along with compensation for heart failure within the same week.

The patient underwent a procedure on July 19, 2023, in which the mitral valve was replaced with a 25 mm On-X mechanical prosthesis and the aortic valve was replaced with a 23 mm On-X mechanical prosthesis. The cardiopulmonary bypass time was 176 minutes and the cross-clamp time 157 minutes. The procedure was successfully performed, resulting in an improvement in the patient's symptoms.

DISCUSSION

Infective endocarditis is a disease that is difficult to diagnose and highly complex [2]. Epidemiologically, it is associated with high rates of morbidity and mortality (20 %-25 % per year) [1]. Although some of its clinical manifestations—such as Osler nodes, Janeway lesions and splinter hemorrhages under

the nail plate—can be recognized as signs of distal vascular phenomena, patients often present with a clinical picture that, besides being complicated, is quite unspecific to the disease [4,5]. As is well known, bacterial endocarditis is usually preceded by a bacteremia process in which *Enterococcus faecalis* enters the bloodstream through the intestinal epithelial cells by mechanisms that are not yet entirely understood [5]. The microorganism responsible for the disease in this patient ranks as the third most common cause of infective endocarditis, following other gram-positive cocci such as *S. aureus* and *S. pyogenes* [1].

In this case report, the proposed causal hypothesis is that *Enterococcus faecalis* was acquired through healthcare exposure. Pericàs et al. reported that the most common comorbidities and risk factors included being male (72.6 %), having diabetes (22.4 %), undergoing long-term hemodialysis (8.4 %), having cancer (11.2 %), previous episodes of infective endocarditis (12.5 %) and healthcare-associated infection (23.4 %) [6,7]. None of these risk factors were present in the case, except for the healthcare-associated infection; the patient had undergone two therapeutic dental interventions performed on an outpatient basis, a risk factor described by Osler as early as 1885 [8]. Therefore, they are considered the portal of entry for the causative microorganism, in contrast to the classic risk factors for acquiring *viridans* group streptococci.

This is further supported by the definition of healthcare-associated endocarditis found in various prospective studies, which consider the onset of symptoms following an invasive procedure performed within six months prior to diagnosis [7,8], and the low probability of other routes of acquisition such as genitourinary (one-third of cases) or gastrointestinal procedures (in one-quarter of cases)—e.g., urinary catheterization or retrograde cholangiography—followed by catheter-related bacteremia and an unknown portal of entry in approximately 25 % of cases [9,10].

Blood cultures are a key diagnostic tool for this disease, allowing detection of 96 % to 98 % of cases of bacteremia [13]. In the present case report, although blood cultures were taken, delays in communication between the healthcare provider and the lack of timely treatment caused the disease to progress to the point of causing valvular damage. Another of the complementary diagnostic methods for bacterial endocarditis is echocardiography. Dahl et al. conducted one of the first studies to systematically use this imaging technique in patients with *E. faecalis* bacteremia to diagnose bacterial endocarditis. They highlight the risk of underdiagnosing endocarditis when an echocardiogram is not performed during the management of bacteremia [5]. In the case described, the accurate diagnosis of bacterial endocarditis was made possible by broadening the diagnostic approach to bacteremia through the use of transthoracic echocardiography, which revealed valvular vegetations.

Given that *Enterococcus faecalis* endocarditis generally affects older adult patients—and this population has a higher prevalence of colorectal diseases—a causal relationship has been identified between the microorganism and colorectal cancer. However, the role of such microorganism in carcinogenesis is not yet fully understood [11]. Considering the patient's involuntary weight loss and family history of colon cancer, the treating department decided to request a fecal occult blood test to perform timely screening for this disease, which yielded a negative result.

Regarding treatment, although first-line therapy for infective endocarditis (ampicillin plus gentamicin) was initially started, it was later adjusted by replacing gentamicin with ceftriaxone, in accordance with the recommendations of the 2023 ESC Guidelines for the Management of Infective Endocarditis and supporting evidence. It has been demonstrated that the combination of two beta-lactams, such as ampicillin and ceftriaxone, exerts a synergistic and bactericidal effect against the microorganism, since both antibiotics saturate at least four of the five penicillin-binding proteins in enterococci [3,6]. Pericàs JM et al. suggest that a short course of ampicillin and ceftriaxone may be sufficient to treat *Enterococcus faecalis* native valve infective endocarditis. However, they note that further research is needed to determine whether this recommendation applies exclusively to a specific group of patients within that population [14].

Infective endocarditis is usually difficult to diagnose, since it lacks a clear clinical presentation. Nevertheless, as in the case described above, patients seek medical attention due to constitutional signs and symptoms suggestive of infection. Despite this, the patient fulfilled both major and minor criteria for endocarditis, representing a classic presentation of the disease [7].

For *Enterococcus faecalis* infective endocarditis, it is essential to initially consider risk factors that may guide diagnostic suspicion. However, most of these factors may be absent, which poses a challenge for the clinician and a worse prognosis for the patient. On the other hand, confirmation of the causative agent is necessary to begin targeted treatment. This patient was treated empirically with first-line antibacterial coverage for infective endocarditis using ampicillin and gentamicin, and in a second instance, treatment was targeted to the causative agent. Finally, the case per se emphasizes the importance of not discharging a patient with positive blood cultures and the importance of an adequate initial approach.

Regarding the limitations of this case, several articles in our search were not fully consistent with or similar to the clinical picture observed; therefore, further investigation was necessary to propose a hypothesis aligned with our patient's case. Among the strengths of this case is the visibility of unusual clinical presentations with nonspecific symptoms that may lead to the diagnosis of infective endocarditis in patients without significant medical history.

The burden of the disease has been important for the patient, since it has limited his daily life in the various areas in which he previously functioned, preventing him from attending work and limiting his daily activities. Likewise, he stated that he felt that his current situation could have been prevented if a diagnosis had been made in the first place, leading to an adequate therapeutic intervention.

The patient signed the informed consent for the publication of the manuscript in accordance with the requirements of the Institutional Review Board of Clínica Colsanitas.

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