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Case Report

Infective Endocarditis of an Early Biological Prosthetic Aortic Valve Caused by Streptococcus Gallolyticus Associated with Colon Carcinoma, a Case Report

Santome Vizarretea Erick Migue[1*], Solis Garcia Uriel Gadiel[1], Martínez López Edna Mariana[1], López Yaco Daniel Santiago[1]

[1]Resident Physician in Internal Medicine, Regional Hospital Presidente Juárez ISSSTE, Oaxaca de Juárez, Mexico

***Corresponding Author:** Santome Vizarretea Erick Migue
Resident Physician in Internal Medicine, Regional Hospital Presidente Juárez ISSSTE, Oaxaca de Juárez, Mexico

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Abstract: Infective endocarditis is a disease characterized by endocardial involvement, where vegetations infected by microorganisms form on the valves, cardiac chambers, and endothelium of large blood vessels. It is potentially fatal, with an incidence of 3 to 7 cases per 100,000 people per year. Diagnosis is made according to the modified Duke criteria, which include two major and five minor criteria. The most common infectious agents are Streptococcus viridans, Streptococcus bovis, HACEK group, and Staphylococcus aureus. Streptococcus gallolycticus is a rare causative agent in infective endocarditis, occurring in 18% of cases. Colorectal cancer is almost pathognomonic, present in up to 71% of cases, and of these, 5% are associated with prosthetic valves. For colorectal cancer, blood cultures, echocardiograms, and colonoscopies are necessary. According to the evolution time of the biological prosthetic valve, it is considered early when it presents clinical symptoms within the first year and late when it presents 1 year after the replacement.

Keywords: Streptococcus, Endocarditis, Blood Culture, Echocardiogram, Duke, Blood Culture, Fever.

INTRODUCTION

Infective endocarditis (IE) is defined as a disease characterized by involvement of the endocardium where vegetations infected by microorganisms are formed located in the valves, the cardiac chambers, as well as in the endothelium of the great vessels [1].

Its annual incidence ranges from 3 to 7 per 100,000 people per year, according to surveys by the American Heart Association, being the fourth most common life-threatening infectious syndrome [2].

The diagnosis is made according to the modified Duke criteria, which include two major and five minor criteria. The major criteria are, firstly, typical compatible microorganisms in two separate blood cultures for Streptococcus viridans, Streptococcus bovis, HACEK group, Staphylococcus aureus, community-acquired enterococci, or a positive blood culture for Coxiella burnetii or anti-phase 1 IgG antibodies >1:800; secondly, evidence of endocardial involvement via echocardiogram with vegetation, abscess, partial dehiscence of the prosthetic valve, or regurgitation. The minor criteria are, firstly, a history of predisposing cardiac conditions or intravenous drug use; secondly, evidence of fever (temperature >38°C); and thirdly, vascular phenomena, including major arterial emboli, septic pulmonary infarctions, mycotic aneurysms, intracranial hemorrhage, conjunctival hemorrhages, and Janeway lesions. Fourth, immunological phenomena such as glomerulonephritis, Osler's nodes, Roth spots and presence of rheumatoid factor; fifth, microbiological evidence: positive blood culture but not meeting a major criterion as indicated above (excluding single positive cultures for coagulase-negative staphylococci and organisms that do not cause endocarditis) or serological evidence of active infection with an organism compatible with infective endocarditis [3].

A confirmatory diagnosis is established by meeting two major criteria, one major criterion plus three minor criteria, or five minor criteria; a probable case is established by meeting one major criterion plus one minor criterion or three minor criteria. The term HACEK refers to species of Haemophilus spp., Aggregatibacter actinomycetemcomitans, Cardiobacterium hominis, Eikenella corrodens, and Kingella kingae, which are Gram-negative bacteria that are part of the normal flora of the mouth and upper respiratory tract in humans. These organisms cause a wide range of infections, of which infective endocarditis is one of the most notable [4].

A useful classification for studying infective endocarditis considers four types: native valve endocarditis, prosthetic valve endocarditis, intravenous drug endocarditis, and nosocomial or procedure-related endocarditis. This classification is based on risk factors, clinical conditions, and the most common causative agents [5].

Transthoracic echocardiography (TTE) is the first-line imaging method for identifying endocarditis; however, multiple surgeries, scarring, placement of conduits in extra-anatomical positions, stents or metallic devices, and high thoracic impedance necessitate multiple off-axis projections to investigate right-sided structures when rheumatic endocarditis is suspected [6].

The risk increases with age and is more prevalent in women. The most frequently isolated etiological agent was Streptococcus pyogenes in 57% of patients, with a history of diabetes in 63% and hypertension in 60%. Streptococcus gallolycticus is a rare causative agent, present in 18% of cases. The association with colorectal cancer is almost pathognomonic, occurring in up to 71% of cases. Of these 18% of reported cases, 7% involved native valves, 2% were related to drug users, 5% were associated with prosthetic valves, and 4% were associated with medical procedures [5]. The most prevalent symptoms were fever (80%) and dyspnea (56%). The aortic valve was the most frequently affected (36.6%), and the most frequent complications were acute renal failure (39%), sepsis (21.9%), and heart failure (19.5%) [7].

Clinical Case

We present the case of a 70-year-old male patient with a history of lymph node tuberculosis diagnosed in 1987, treated for 6 months, and currently experiencing primary hypothyroidism diagnosed in June 2023 and under treatment. He underwent aortic valve replacement with a 21mm EPIC Plus bioprosthesis in August 2023 and subsequently developed chronic heart failure with a reduced ejection fraction of 35%, and is currently experiencing infective endocarditis of the native valve.

The patient was admitted on December 4, 2023, presenting with intermittent fever without a specific time of day, diaphoresis, palpitations, hyporexia, and an 8 kg weight loss over the last 3 months. Vital signs were as follows: BP: 110/68 mmHg, HR: 75 bpm, RR: 18 rpm, Temp: 38.5 °C, SpO2: 94%. On physical examination, the patient was conscious and oriented, with a four-point score of 16. The neck showed second-degree right jugular venous distension, the chest was symmetrical with normal breath sounds, the precordium was arrhythmic, a grade 3/6 end-diastolic murmur was heard with accentuation of S2 at the aortic area, the abdomen was free of peritoneal irritation, the extremities were free of edema, and capillary refill was 2 seconds. Control laboratories with blood count showing neutrophilic predominance leukocytosis and a 12-lead electrocardiogram (image 1) was taken with sinus rhythm, heart rate of 77 bpm, normal cardiac axis at 80 degrees, regular RR, P wave 148 ms, PR segment of 188 ms, QRS segment of 80 ms, QT of 460 ms, with RR progression from V3 to V4, with the presence of left ventricular hypertrophy by Peguero Lopresti index with 3.8 mV, without waves of ischemia, injury or necrosis.

Image 1: 12-lead electrocardiogram

12-lead EKG with sinus rhythm, interatrial conduction delay, minimal lateral repolarization disorder, with the presence of left ventricular hypertrophy.

Due to persistent fever without an evident infectious focus, blood cultures were taken on December 7 and 10 (table1), which were positive for Streptococcus gallolyticus;

Table 1: Peripheral blood culture with Gram stain

Study date	07/12/2023	10/12/23
Report	Streptococcus gallollyticus subspecies pasteurianus	Streptococcus gallollyticus subspecies pasteurianus

However, due to the history of valve replacement, a TT-ECO was performed (Image 2) with a report of left ventricle: moderate systolic dysfunction with LVEF 35%, right ventricle: systolic dysfunction and valvulopathies: tricuspid aortic valve, severe aortic insufficiency, mitral and tricuspid insufficiency.

A cardiac profile was taken with CPK 16, DHL 249, CPK.MB 21, Troponin 41.8, Myoglobin 22, BNP 7230, D dimer 1030. Since there was no specific cause for the weight loss, a serum quantiferon test was requested, which was negative. Therefore, it was decided to perform a colonoscopy on December 17, 2023, which revealed a tumor in the right colon, uncomplicated diverticular disease, and uncomplicated hemorrhoidal disease.

Image 2: Echocardiogram - Transthoracic December 14, 2023

Global cardiomegaly, LVH, RVH, LVEF 35%, tricuspid aorta, fluctuating hyperreflective mass in aortic valve, severe aortic insufficiency.

The treatment was symptomatic, with antibiotic therapy with cephalosporins and glycopeptide for 14 days, he is sent to a third level hospital for definitive treatment of infective endocarditis of early biological prosthetic aortic valve.

Results and Discussion

Infective endocarditis should be suspected in patients with risk factors such as previous endocarditis, valvular surgery, intracardiac devices, congenital heart disease, and dental surgical procedures. The most frequent clinical manifestations are fever, diaphoresis, and a new-onset murmur. The diagnosis is based on the modified Duke criteria.

The mechanism of infection is intestinal translocation secondary to underlying colorectal disease or transient bacteremia from digestive procedures. Its presence in a patient with endocarditis necessitates ruling out colorectal cancer or premalignant polyps via colonoscopy. Transthoracic and transesophageal echocardiography are very useful for detecting vegetations, perivalvular abscesses, or prosthetic valve dehiscence. Endocarditis is a leading cause of mortality, and its pathological mechanism is bacteremia. Multidisciplinary management is vital, including the management of comorbidities, detection of colorectal neoplasms, assessment of the risk of endocarditis recurrence, monitoring for reintervention criteria, and periodic evaluation of prosthetic valve function to detect structural complications and prevent recurrence. Early surgical intervention is important to consider, as the patient met the criteria for urgency: severe aortic insufficiency with ventricular dysfunction, the presence of large vegetations with a high embolic risk, and progressive hemodynamic deterioration (cardiomegaly and biventricular dysfunction). The differential diagnosis should be based on blood cultures, echocardiography, inflammatory markers and clinical history; if the patient has negative cultures, it is key to rule out valvular thrombosis, marantic endocarditis or autoimmune diseases [8].

Conclusions

Endocarditis of a bioprosthetic aortic valve, representing 7-25% of infective endocarditis cases, was diagnosed in a 70-year-old patient with a significant history of bioprosthetic aortic valve surgery four months prior to the definitive

diagnosis. The infection was caused by blood cultures positive for Streptococcus gallolycticus subspecies pasteurianus. The patient presented with symptoms typical of an elderly person with risk factors, accompanied by an 8 kg weight loss over three months, confirmed by colonoscopy biopsy as colorectal carcinoma. The endocarditis was classified as early due to the time elapsed since the bioprosthetic valve was replaced. Early endocarditis is defined as presenting within the first year and late endocarditis as presenting one year or more after valve replacement [9].

The importance of the association in infective endocarditis caused by Streptococcus gallolycticus, a rare causative agent present in 18% of cases, with the association of colorectal cancer being almost pathognomonic (up to 71%). Of these, 5% were associated with a prosthetic valve [5].

Long-term follow-up should be strict and coordinated between cardiology, infectious diseases, and gastroenterology to prevent complications, detect recurrences, and reduce mortality associated with this condition. This patient with prosthetic valve endocarditis complicated by severe aortic regurgitation and ventricular dysfunction requires urgent surgery. Follow-up should focus on postoperative hemodynamic recovery, monitoring of the new prosthesis, and management of heart failure [10].

Conflicts of Interest: The authors declare no conflicts of interest.

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