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Acute Infective Endocarditis Due to *Streptococcus gordonii* in a Young Patient with a Bicuspid Aortic Valve

Harpreet Dosanjh, MD *, Mackenzie Geisman, MD, Zafar Hammad, MD and Sofia Cestero, MD

HCA Los Robles Regional Medical Center GME, Thousand Oaks, CA 91360, USA
* Corresponding author: harpreet.dosanjh@hcahealthcare.com

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Abstract: Infective endocarditis (IE) is a life-threatening infection of the endocardial surface, often affecting individuals with predisposing cardiac abnormalities or recent invasive procedures. This report describes a rare case of acute IE in a previously healthy 22-year-old male with a bicuspid aortic valve and recent dental work, who presented with prolonged fever, myalgias, and peripheral embolic signs. Blood cultures confirmed *Streptococcus gordonii* as the causative pathogen, a virdans group streptococcus commonly associated with dental flora. Transthoracic and esophageal echocardiography revealed a bicuspid aortic valve with severe aortic insufficiency and a 1cm vegetation with suspected valve perforation. The patient was treated with a four-week course of intravenous ceftriaxone and referred for surgical management. Given the extent of valvular damage and the patients age, a Ross procedure was elected for the most appropriate surgical intervention. This case highlights the need for high clinical suspicion for IE in patients with recent dental procedure, even in the absence of typical risk factors, and emphasizes the importance of early diagnostic imaging and multidisciplinary management.

Keywords: infectious disease; internal medicine; *Streptococcus gordonii*; infective endocarditis

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Introduction

Infective endocarditis (IE) is a serious, potentially life-threatening condition characterized by infection of the endocardial surface of the heart, typically involving heart valves. It most commonly occurs in individuals with underlying structural heart conditions such as valvular abnormalities, congenital

heart defects, or prosthetic valves. The majority of cases are caused by bacterial pathogens, with *Streptococcus* species, particularly *Streptococcus gordonii*, being frequently implicated in patients with risk factors like poor oral hygiene or recent dental procedures. Clinical presentation varies, but common symptoms include fever, chills, myalgia, tachycardia, and the development of specific signs such as heart murmurs, Janeway lesions, or splinter hemorrhages. Early diagnosis and treatment are critical to prevent severe complications such as valve destruction, embolic events, and heart failure.

This case report presents a young, otherwise healthy male with a recent history of dental work who developed acute IE due to *S. gordonii*. The patients clinical course was complicated by a bicuspid aortic valve with significant aortic insufficiency and the presence of a large vegetation on echocardiography. This case underscores the importance of considering IE in patients with risk factors and atypical presentations. It also highlights the need for a multidisciplinary approach, including timely antimicrobial therapy and surgical evaluation.

Case Presentation

A 22-year-old male with past medical history of asthma presented with 12 days of fever and chills. The patient had been experiencing fevers ranging from 100 °F to 104 °F for 12 days, accompanied by myalgias, headache, tachycardia, cough and decreased oral intake. Acetaminophen intermittently reduced the fevers. To note the patient had presentation to the emergency department 5 days prior to the instant admission for the same symptoms, and had received intravenous fluids, dexamethasone 10 mg, ketorolac 30 mg, and intravenous ceftriaxone 1 gm. During that evaluation, blood cultures were drawn, and later on day of admission, were found to be positive for *S. gordonii*. During this admission process the patient indicated that two days prior, he had noticed the development of a painful, erythematous nodule on his left hand.

On examination, the patient appeared ill, with tachycardia and a painful nodule on his left hand and plantar surface of his right foot. Initial laboratory tests revealed leukocytosis of 18.9 $\times$ $10^3/\mu$L with 85% neutrophils and elevated inflammatory markers (C-reactive protein 63.2 mg/L, erythrocyte sedimentation 36 ng/mL). The patient was started on intravenous fluids and intravenous ceftriaxone 2 gm daily due to concerns for endocarditis.

After the patients tachycardia improved, a holosystolic murmur in the right second intercostal space became evident. Infectious disease and cardiology were consulted for a high suspicion for endocarditis. Transthoracic echocardiogram (TTE) revealed a bicuspid aortic valve with moderate to severe aortic insufficiency. Subsequent transesophageal echocardiogram (TEE) revealed evidence of bicuspid aortic valve with severe aortic insufficiency, along with 1 cm vegetation with a possible perforation of the aortic valve around the vegetation site (Figure 1). During hospitalization, HIV screen, hepatitis panel, and rheumatoid factor were negative. Computed tomography maxillofacial scan was negative for abscess. Drug toxicology was negative, and the patient denied any history of intravenous drug use. Patient admitted to dental work within the previous 3 months, which was determined to be the source.

Cardiothoracic surgery was consulted, and the team determined that a Ross procedure would be best for the patient. Due to the need for higher level of care, once stable, the patient was discharged home with a 4-week course of intravenous ceftriaxone 2 grams daily and follow-up at a university hospital nearby.

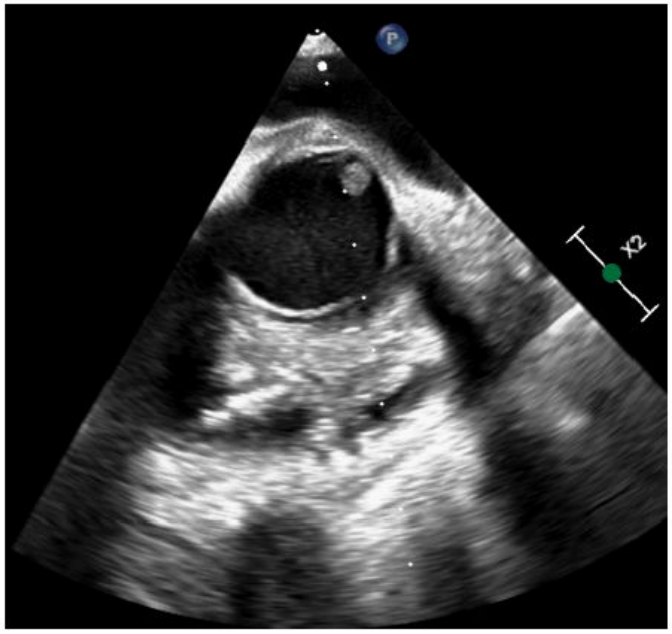

Figure 1: One centimeter vegetation noted on bicuspid aortic valve.

Discussion

Infective endocarditis (IE) is an infection of the endocardial surface, commonly affecting heart valves, and is associated with significant morbidity and mortality if not promptly diagnosed and treated. It is an uncommon infectious disease with an annual incidence ranging from 3 to 7 per 100,000 person–years, globally IE reported 1.58 million adjusted years of healthy life lost as a result of death or impairments [1]. The most common pathogens implicated in IE are *Streptococcus* and *Staphylococcus* species, with *Streptococcus gordonii* being a member of the viridans group streptococci that are frequently associated with IE, especially in patients with poor dental hygiene or subsequent to dental procedures [2]. This case highlights the critical importance of recognizing IE in a young, otherwise healthy patient, particularly when risk factors such as recent dental work are present.

Early diagnosis of IE is critical for effective treatment and prevention of complications. The diagnosis of IE is straightforward in the minority of patients who present with a consistent history and classic Oslerian manifestations: sustained bacteremia or fungemia, evidence of active valvulitis, peripheral emboli, and immunological vascular phenomenon [1,2]. Blood cultures remain the gold standard for confirming the diagnosis, with *S. gordonii* being a common pathogen in cases associated with dental procedures [3]. In our patient, the positive blood culture was obtained early in the course of his presentation. Additionally, echocardiography plays a central role in diagnosing valvular involvement and vegetation formation. In this case, TTE revealed moderate to severe aortic insufficiency with a bicuspid aortic valve, which predisposes to aortic valve infections. The TEE confirmed a 1 cm vegetation on the aortic valve, which is a hallmark finding in IE.

Initial management included intravenous fluids and broad-spectrum ceftriaxone. Following confirmatory diagnosis of IE, he was continued on a prolonged course of ceftriaxone due to the concern for persistent infection and complications such as valve destruction or embolic events. IE treatment typically involves high-dose intravenous antibiotics tailored to the specific pathogen identified, with duration of therapy typically ranging from 4 to 6 weeks, depending on the microorganism and the severity of the disease [4].

Given the significant valve damage and the large vegetation seen on the TEE, the decision was made to consult cardiothoracic surgery. The patients case was discussed with the cardiothoracic team, and after thorough consideration, it was decided that a Ross procedure—replacement of the aortic valve with the patients own pulmonary valve—would be the best option for this young patient. The Ross procedure is particularly useful in younger patients as it offers good long-term outcomes, averts the need for lifelong anticoagulation, and provides better hemodynamic results compared to mechanical valves [5]. Due to the unavailability of the Ross procedure at our facility, the patient was unable to undergo surgical intervention during the initial hospitalization. The patient was eventually evaluated and received the Ross procedure at a university hospital, and he is doing well post-procedure.

Conclusion

Infective endocarditis (IE) is a serious, often life-threatening condition that requires prompt diagnosis and intervention, particularly in patients with risk factors such as recent dental procedures. This case highlights the importance of considering IE in young, otherwise healthy individuals presenting with fever and nonspecific symptoms, especially when there is a history of recent dental work. Through early identification, the use of appropriate antibiotics, and collaboration with cardiology and cardiothoracic surgery, this patient was effectively managed, preventing further complications such as embolic events or irreversible valve damage. The decision to proceed with a Ross procedure in this young patient was a strategic one, ensuring optimal long-term outcomes without the need for lifelong anticoagulation. This case underscores the critical role of a multidisciplinary approach in the management of IE and the need to maintain a high level of suspicion in patients with risk factors for the condition.

Our institution does not require ethical approval for reporting individual cases or case series.

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

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