

Abiotrophia defectiva endocarditis of bicuspid aortic valve: a case report

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Background

Patients with a bicuspid aortic valve have increased risk of infective endocarditis, but common organisms are not always the culprit. We describe a case of an otherwise healthy young gentleman with bicuspid aortic valve who experienced *Abiotrophia defectiva* endocarditis. The aim of this case report is to highlight an uncommon cause of endocarditis associated with significant morbidity and mortality in order to improve the care provided by trainees and clinicians.

Case summary

A 37-year-old male presented with a 1-month history of fever, weight loss, myalgia, and night sweats. On transoesophageal echocardiography, he was found to have a bicuspid aortic valve with large vegetation and severe aortic insufficiency. Blood cultures were positive for *A. defectiva*. The endocarditis was successfully treated with surgical aortic valve replacement and 6 weeks of antibiotic therapy.

Discussion

Bicuspid valves are known to have increased susceptibility to endocarditis. The difficulty of isolating *A. defectiva* typically leads to delayed diagnosis and significant complications. This case is a reminder to have a high degree of suspicion for organisms which are rare and difficult to isolate because prompt recognition and surgical intervention may improve the outcome of care.

Keywords

Infective endocarditis • *Abiotrophia defectiva* • Bicuspid aortic valve • Case report

ESC Curriculum

4.1 Aortic regurgitation • 4.11 Endocarditis • 7.5 Cardiac surgery

Learning points

- *Abiotrophia defectiva* can cause infective endocarditis but is difficult to isolate and diagnose.
- Providers should be cognizant that organisms such as *A. defectiva* require specialized media and 16S rRNA sequencing; however, not all microbiology laboratories currently possess this technology.
- Prompt recognition of this organism, early surgical intervention, and proper antibiotics course prompted full recovery.

Introduction

Bicuspid aortic valves (BAVs) are associated with an increased risk of infective endocarditis (IE) in patients, but the pathophysiologic mechanism remains difficult to define.¹ Most documented cases involve *viridans* species of *Streptococcus* or *Staphylococcus* genera.² In this case report, we present a young healthy male with *Abiotrophia defectiva* endocarditis in the setting of BAV. The bacterium *A. defectiva* is part of the normal flora within human oropharyngeal, gastrointestinal, and urogenital

tracts. When associated with IE though, this organism can cause significant morbidity and mortality and therefore requires recognition for which treatment is essential.³ Unfortunately, *A. defectiva* is a fastidious organism which requires specialized media to culture, likely contributing to sources of its underreporting as a cause of infection.⁴ This case report serves as a reminder for clinicians to be diligent towards uncommon causes of common diseases because prompt recognition improves clinical outcomes when treatment is applied with properly targeted antibiotics.⁵

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Timeline

1 month prior to admission	The patient experiences an onset of myalgia, chest pain, night sweats, weight loss, and headaches.
Day 1: admission	Fever, chills, fatigue, headache, and chest pain are reported by the patient.
Day 2	Transthoracic echocardiogram (TTE) reveals aortic insufficiency (AI), dilated left ventricle, large aortic vegetation, and >55% left-ventricular ejection fraction. Gram-positive cocci show growth on preliminary blood cultures. The patient is therefore started on empiric antibiotics.
Day 4	TTE reveals severe AI with multiple regurgitant jets and aortic valve vegetation.
Day 5	Blood culture speciation shows <i>A. defectiva</i> , so antibiotics are updated based on guidelines and susceptibility testing.
Day 6	Aortic valve replacement with mechanical prosthesis is performed.
Day 14	A peripheral catheter is inserted for outpatient IV antibiotics, and the patient is discharged home afterward.

tooth abscess 8 years prior to the onset of symptoms which required uncomplicated dental surgery. The patient denied recent travel, high-risk sexual intercourse, and intravenous drug use. A soft early diastolic murmur was auscultated at the left second intercostal space, but his physical examination was otherwise normal. On presentation, electrocardiography (ECG) showed PR prolongation to 231 ms (Figure 1). All other laboratory findings including complete blood count and complete metabolic panel were normal. TTE demonstrated normal left-ventricular ejection fraction, dilated left ventricle, large aortic vegetation (Figure 2A and B), and moderate AI (Figure 3). Two separate blood cultures showed gram-positive cocci in chains and pairs, so daily infusion of 8 mg/kg intravenous daptomycin was initiated. A transoesophageal echocardiogram was performed which revealed a BAV not previously seen on TTE (Figure 4, see Supplementary material online, Video S1a) with a large vegetation on the aortic valve (see Supplementary material online, Video S1b) and severe AI (see Supplementary material online, Video S1c). Aortic root abscess and aortic root dilation were not present. When specialized cultures enriched with L-cysteine or vitamin B₆ later speciated to reveal the presence of *A. defectiva*, antibiotics were switched to 4 million units of intravenous Penicillin G every 4 h and 5 mg/kg of daily intravenous gentamicin after susceptibility testing. The cardiothoracic surgery service team thereafter evaluated the patient and proceeded with aortic valve replacement with a 23 mm Onyx mechanical valve. All subsequent blood cultures were negative. The postoperative course was uncomplicated, and our patient was discharged with a peripherally inserted central catheter to continue 6 weeks of antibiotics from the date of negative blood cultures. On multiple subsequent clinic visits, he progressed well without complications.

Case presentation

A male of age 37 with no significant medical history and no medications was presented to the emergency department with a fever duration of 1 month. He also complained of diffuse myalgias, chest pain, night sweats, rapid 16-pound weight loss and daily headaches. He further reported a

Discussion

Patients with BAV have an increased risk of IE, but *A. defectiva* is an uncommon aetiology for this condition.¹ Including successful and alternative treatment in patients with no underlying valve disease, complications of mitral valve leaflet infection, and infection related to fixed dental braces, there are few documented cases of *A. defectiva*

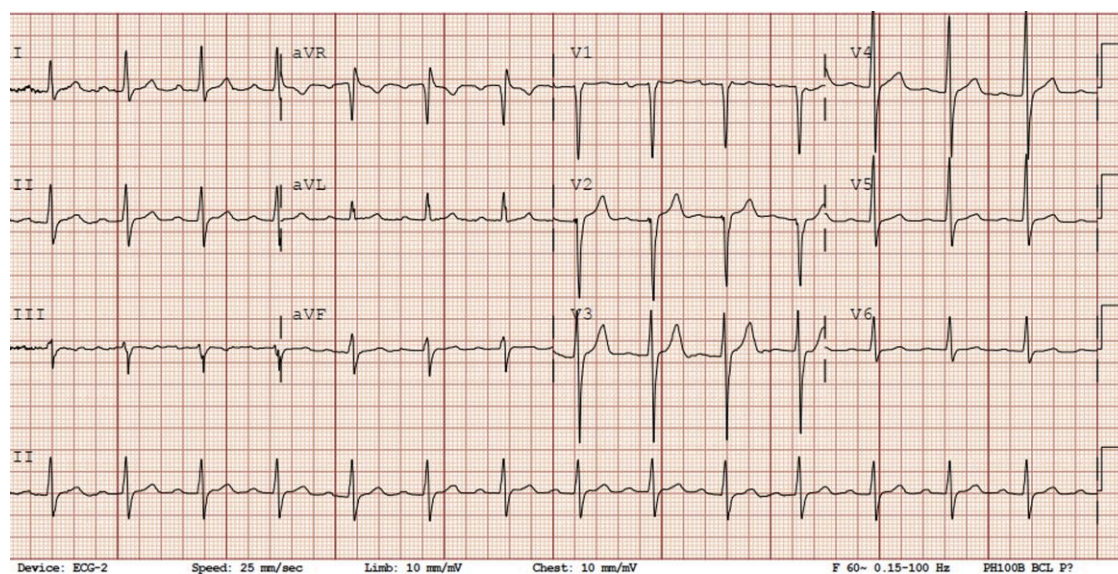


Figure 1 Electrocardiography on admission showing normal sinus rhythm with PR prolongation to 231 ms.

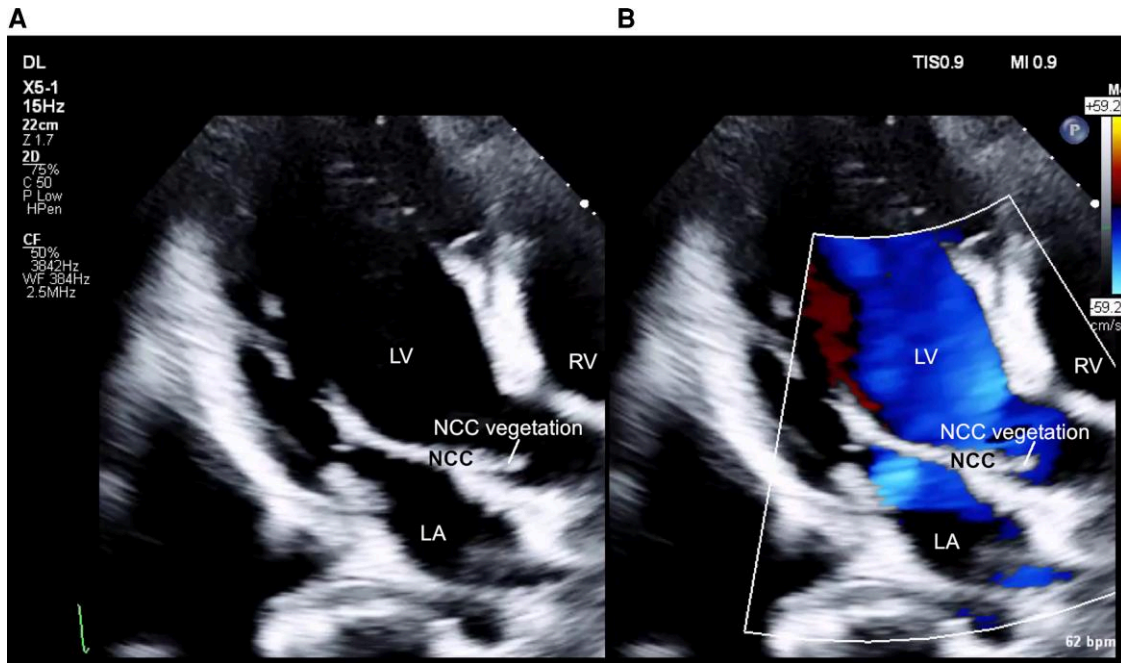


Figure 2 (A and B) transthoracic echocardiogram, parasternal long-axis view, depicting a large aortic valve vegetation on the non-coronary cusp with associated aortic regurgitation. LA, left atrium; LV, left ventricle; NCC, non-coronary cusp; RV, right ventricle.

endocarditis.⁶ Guidelines recommend an aminoglycoside for at least the first 2 weeks of treatment accompanied by Penicillin G, ceftriaxone, or vancomycin for 6 weeks. Vancomycin combined with gentamycin is recommended for culture negative and also empiric treatment of

endocarditis, but this management is not expected to be continued long-term in most cases. Given the breadth of potential bacterial causes which may result in endocarditis and the potential for unusual aetiology, it is prudent to isolate organisms in order to identify susceptibilities for

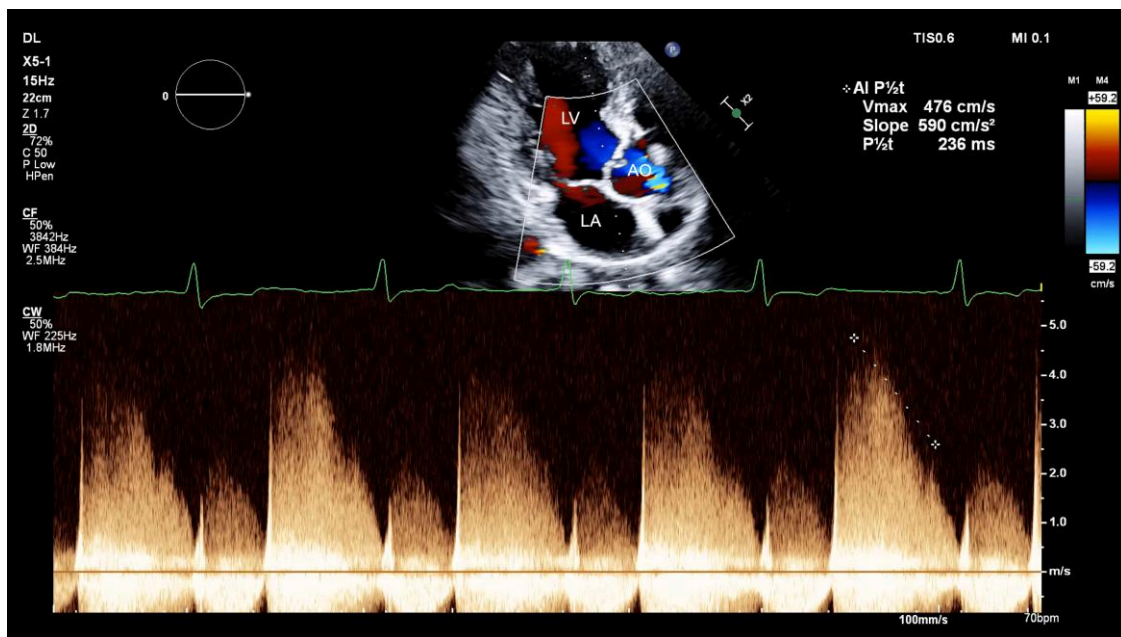


Figure 3 Transthoracic echocardiogram, parasternal long-axis view, and continuous wave Doppler depicting aortic regurgitation. AO, aorta; LA, left atrium; LV, left ventricle; RV, right ventricle.

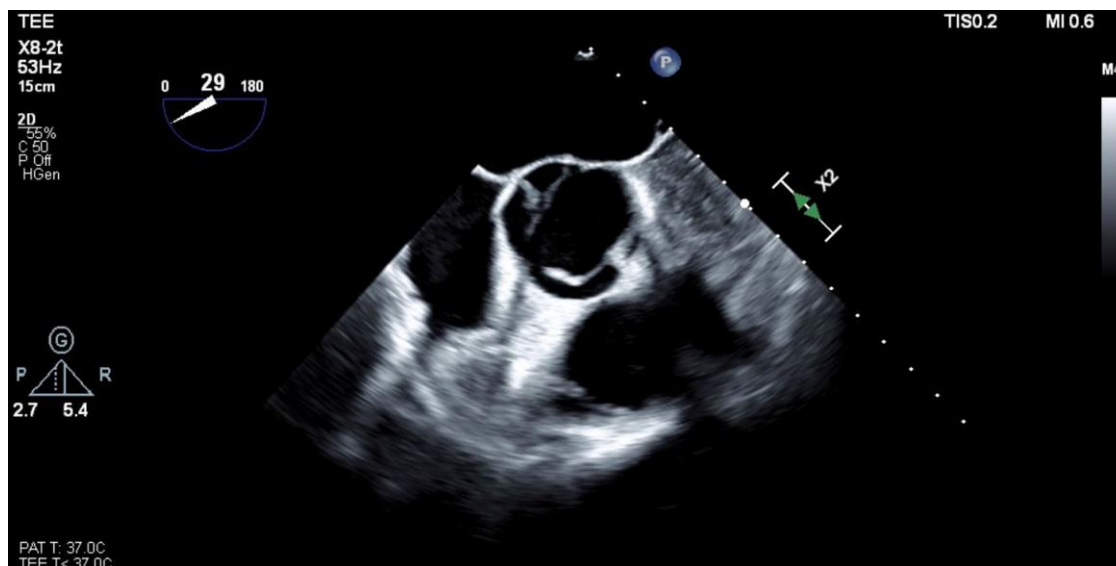


Figure 4 Transoesophageal echocardiogram, short-axis view, 30°, demonstrating vegetation on bicuspid valve.

target treatment which will certainly improve prognosis as opposed to treating for culture-negative endocarditis or keeping the patient on broad spectrum empiric antibiotics.⁷ Increased prevalence of resistance to penicillin makes isolation and susceptibility testing even more imperative.⁸ Healthcare providers should be mindful that that *A. defectiva* is often labelled as fastidious or culture negative because it requires a complex medium enriched with L-cysteine or vitamin B₆ to grow. It has significant virulent qualities, but inhabits the normal flora of healthy individuals and requires predisposing factors such as prosthetic valves, degenerative valve lesions, or congenital valvular abnormalities before proceeding to infection.⁹ In addition to endocarditis, this bacterium has been associated with osteomyelitis, meningitis, cerebral abscess, and septic arthritis.^{10,11} The risk for our patient of endocarditis was increased by a predisposing condition of BAV. When *Abiotrophia* infects heart valves, it becomes associated with valvular destruction and embolic events.¹² Even when antibiotics are employed, *A. defectiva* can be aggressive and cases potentially progress to severe heart failure despite treatment with antibiotics. Most reported cases of *A. defectiva* endocarditis have required surgery for successful recovery and for our patient, surgical valve replacement early before haemodynamic instability offered a much smoother course compared with cases treated initially only with antibiotics.⁸ In cases which are suspicious for this condition, *A. defectiva* can be accurately isolated with 16S rRNA sequencing but not all microbiology laboratories currently possess this technology.¹³ It is important to note that the development of PR interval prolongation can indicate extension of infection and possibly poor prognosis, though it is unknown if the PR interval prolongation for our patient is acute or reflects a long-standing baseline due to the lack of a prior ECG in this case for comparison.¹⁴ Surgery for IE is indicated in the setting of heart failure, uncontrolled infection, and prevention of septic emboli. Surgical intervention should be classified as emergent or urgent based on the patient's haemodynamic condition. It is best to plan for surgery within 7 days of admission after taking all prognostic indicators into consideration.¹⁵ Patients may be discharged after surgical recovery upon resolution of fever but administration of inpatient antibiotic treatment for 2 weeks is recommended when patients have increased complications.¹⁵ Fortunately, early identification of this bacterium at our facility aided by proper surgical and antibiotic treatment promoted full recovery.

Conclusion

We present this case because it is a unique presentation of an under-diagnosed organism which is difficult to isolate. A high index of suspicion and multidisciplinary approach is necessary to prevent devastating complications and to ensure patients are treated appropriately.

Lead author biography



Sadaf Fakhra is a third year Internal Medicine resident at University of Nevada, Las Vegas-Kirk Kerkorian School of Medicine. She was raised in Las Vegas Nevada and earned bachelor's in science from University of Nevada, Las Vegas. She then moved to Tennessee where she earned master's of science and doctor of Osteopathic Medicine from Lincoln memorial university. Her goal is to pursue a fellowship in cardiology.

Supplementary material

Supplementary material is available at *European Heart Journal – Case Reports* online.

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Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as [Supplementary data](#).

Consent: Informed consent was obtained and the consent form was signed by the patient in accordance with COPE guidelines.

Conflict of interest: None declared.

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