

Case Study

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A Native Valve Endocarditis with *Abiotrophia defectiva* - An Emerging Pathogen of Concern

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ABSTRACT

Abiotrophia defectiva has emerged as a recognized cause of culture negative endocarditis. It poses significant diagnostic and therapeutic challenges. Patients with *Abiotrophia defectiva* endocarditis are at significant risk for developing severe valve damage and experiencing relapse after completion of treatment. We present a case of microbiologically confirmed *Abiotrophia* endocarditis in a patient with no comorbidity and no underlying cardiac disease. The patient had progressive dyspnoea and orthopnoea for which he was evaluated. ECG findings were suggestive of left ventricular hypertrophy and echocardiogram revealed aortic and mitral valve destruction with vegetations over anterior mitral leaflet. *Abiotrophia defectiva* was isolated from 3 sets of blood culture and the patient was treated with Ceftriaxone and gentamicin. Repeat blood cultures were negative and ceftriaxone was continued for 6 weeks to prevent relapse. Valve replacement was planned after the complete course of antibiotics. In summary, the increasing incidence of *Abiotrophia defectiva* endocarditis is accompanied by disturbingly high rates of relapse, valve destruction, and embolic complications, underscoring the urgent need for prompt diagnosis and aggressive management to prevent devastating outcomes.

Introduction

Abiotrophia defectiva is a recognized cause of culture-negative infective endocarditis due to the challenges associated with isolating and identifying this fastidious organism. It is increasingly reported now with the advent of MALDI TOF MS, attributing to 5-6% of microbiologically proven endocarditis. Though it affects

the diseased or prosthetic heart valves in 90% of the cases, it has propensity to infect native valve without underlying cardiac disease. ⁽¹⁾ It is notable for its devastating embolic complications such as valvular destruction, crystalline keratopathy, deep seated abscesses, osteomyelitis and septic arthritis despite being sensitive to antibiotics. Therefore, timely and accurate diagnosis is crucial to initiate appropriate antibiotic

therapy, mitigating morbidity and mortality associated with *Abiotrophia defectiva* infections.^(1, 2) Continuous close monitoring is essential due to the high bacteriological failure rate of 41%, and the significant risk of embolization, which affects approximately one-third of patients, despite the formation of relatively small vegetations.⁽³⁾ We report a case of microbiologically confirmed *Abiotrophia defectiva* endocarditis involving a native valve in an otherwise healthy individual with no pre-existing cardiac or systemic comorbidities.

Case history

A 77-year-old man presented to the emergency department with progressively worsening dyspnoea over the preceding two months. He reported an unintentional weight loss of 3.5 kg during this period. Over the previous two weeks, he had developed orthopnoea and a productive cough. He also experienced intermittent fever three days prior to presentation. There was no history of diabetes mellitus, hypertension, or underlying cardiac disease. On respiratory system examination, bilateral air entry was present with basal crepitations. The respiratory rate was 17 breaths/min, and oxygen saturation was 97% on room air. Cardiovascular examination revealed an early diastolic murmur in the aortic area and a pansystolic murmur at the apex. Electrocardiography showed left axis deviation, a widened QRS complex, and a tall R wave in lead V5, suggestive of left ventricular hypertrophy. A cardiology consultation was obtained, and transthoracic echocardiography was advised. Echocardiography demonstrated an ejection fraction of 50%, dilatation of the left atrium and left ventricle, severe mitral regurgitation, severe aortic regurgitation, moderate aortic stenosis, and vegetations on the anterior mitral leaflet, with a suspicion of a periaortic abscess. Transesophageal echocardiography was subsequently attempted to further evaluate the possibility of a periaortic abscess; however, the procedure could not be completed due to resistance encountered during esophageal probe insertion. ECG gated CT coronary angiography was done which ruled out periaortic abscess. Fundoscopy was done to rule out Roth spots.

Infective endocarditis was suspected and 3 sets (2 aerobic bottles in each set) of blood culture were drawn, and processed in BACT/ALERT Virtuo, BioMérieux automated blood culture system. All 6 bottles flagged positive in less than 20 hours with a mean time to positivity of 16.2 hours. Direct gram stain from the positively flagged blood culture bottle revealed gram

positive cocci in pairs and short chains. MALDI-TOF-MS identified *Abiotrophia defectiva* from the centrifuged pellet of the blood culture broth with high certainty (99.9% confidence score). Subculturing on to blood agar showed α hemolytic colonies (Figure 1) and satellitism was seen with *Staphylococcus aureus* streak.

The patient was treated with ceftriaxone 2g IV q4h and gentamicin 70mg (1mg/kg) IV q8h for 2 weeks. Patient developed gentamicin ototoxicity leading to mild bilateral sensorineural hearing loss, confirmed by pure tone audiogram. Therefore, gentamicin was withdrawn from the treatment protocol. Repeat blood cultures were sent which were sterile after 5 days of incubation in automated blood culture system and the patient was discharged advising to continue only ceftriaxone for the next 4 weeks and follow up in Cardiology OPD for valvular replacement.

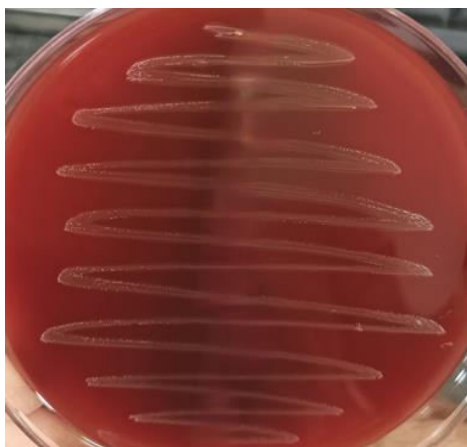
Discussion

Abiotrophia defectiva, a nutritionally variant *Streptococcus*, which was originally described in the mid-20th century by Frenkel & Hirsch, is now increasingly recognised as a causative agent of culture negative infective endocarditis. Initially classified as streptococci, because of its phylogenetic unrelatedness and nutritional considerations is reclassified into separate genus, *Abiotrophia*. It is a gram positive facultative anaerobic bacteria belonging to Aerococcaceae family exhibiting satellitism around other bacterial colonies. This satellitism is because of their fastidious nature requiring pyridoxine and cysteine for its growth.^(4, 5)

Limited but accumulating evidence in literature, illustrates the pathogenic potential of *A. defectiva*. As a common inhabitant of the oral cavity and gastrointestinal tract, it can exploit weakened host immunity to cause severe infections, including endocarditis, bacteremia, abscesses, prosthetic joint infections, and osteomyelitis. *A. defectiva*, an organism that is challenging to culture, is frequently linked to culture-negative endocarditis and accounts for approximately 5-6% of bacteriologically confirmed cases.⁽⁶⁾ As such in infective endocarditis, it affects diseased heart valves usually, complicating to embolic events and valvular destruction, despite being sensitive to antibiotics.⁽⁷⁾

In the present case, patient was diagnosed with infective endocarditis in the absence of any underlying cardiac disease and other comorbid conditions.

Fig.1 Alpha hemolytic colonies of *Abiotrophia* defective seen on 5% sheep blood agar



The portal of entry of the organism is obscure as no previous dental manipulations were done which is usual route of entry. Similarly, Carleo *et al.*, had described native valve endocarditis with *A. defectiva* in the absence of underlying cardiac disease and previous dental manipulations, in which the patient had completely recovered after valvular surgery.⁽⁶⁾

As recommended by the 2015 European Society of Cardiology (ESC) guidelines, the treatment of *Abiotrophia defectiva* endocarditis requires a 6-week course of penicillin G, ceftriaxone, or vancomycin, supplemented with an aminoglycoside for a minimum of 2 weeks.⁽⁸⁾

The patient in the present study was started on ceftriaxone and gentamicin combination therapy and gentamicin was discontinued after 2 weeks because of ototoxicity. *Abiotrophia* endocarditis is frequently complicated by valvular destruction, bacteriological failure and relapse after treatment, highlighting the need for vigilant monitoring and potential reintervention. Stein *et al.*, reported 27% embolization, 17% relapse, 41% bacteriological failure, and 17% mortality in patients with *Abiotrophia* endocarditis.⁽³⁾ In approximately 30% of cases, valvular destruction necessitates surgical intervention to repair or replace the damaged valve.⁽⁵⁾ Aortic valve is most commonly affected followed by mitral valve. Notably, our patient presented with concurrent damage to both the aortic and mitral valves, resulting in severe regurgitation, requiring valve replacement, despite the absence of any underlying comorbid conditions. Surgical management, complemented by concurrent antimicrobial treatment,

results in good prognoses for endocarditis patients, particularly those with persistent sepsis, vegetation, severe heart failure, or recurrent embolic complications.

In conclusion, the incidence of *A. defectiva* endocarditis is on the rise, characterized by alarming rates of relapse, valvular destruction, and embolic events, emphasizing the critical need for timely diagnosis and aggressive treatment to mitigate catastrophic consequences.

Author Contributions

Benedict Vinothini A: Writing – Original Draft Preparation. Hyma KPV: Writing - Review & Editing. Naveen Arul: Data Curation. K V Vinod: Supervision. Apurba S Sastry: Supervision. Mythilipraba S: Writing - Review & Editing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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