



## Mitral and aortic valve endocarditis due to a rare microorganism: *Abiotrophia defectiva* and literature review

*Nadir bir mikroorganizmaya bağlı mitral ve aort kapak endokarditi:  
Abiotrophia defectiva ve literatür incelemesi*

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### ABSTRACT

*Abiotrophia defectiva* belongs to the nutritionally variant streptococci group and can colonize in oropharyngeal, gastrointestinal and genitourinary systems. *Abiotrophia defectiva* rarely causes infective endocarditis while infections caused by *Abiotrophia defectiva* have high morbidity and mortality rates. In this case report, we present a case of infective mitral and aortic valve endocarditis caused by *Abiotrophia defectiva*.

**Keywords:** *Abiotrophia defectiva*; infective endocarditis; variant streptococci.

### ÖZ

*Abiotrophia defectiva* besinsel olarak varyant streptokoklar grubuna aittir ve orofarengeal, gastrointestinal ve genitouriner sistemlerde kolonileşebilir. *Abiotrophia defectiva* nadiren enfektif endokardite yol açarken *Abiotrophia defectiva*'nın yol açtığı enfeksiyonlar yüksek morbidite ve mortalite oranlarına sahiptir. Bu olgu sunumunda, *Abiotrophia defectiva*'nın yol açtığı enfektif mitral ve aort kapak endokarditi olgusu sunuldu.

**Anahtar sözcükler:** *Abiotrophia defectiva*; enfektif endokardit; varyant streptokoklar

*Abiotrophia defectiva* (*A. defectiva*) was first identified by Freckle and Hirsch back in 1961, and then included in nutritionally defective streptococci group.<sup>[1]</sup> *A. defectiva* is difficult to isolate on standard media, it grows more easily in Columbia agar containing L-cysteine and pyridoxal hydrochloride when inoculated with *Staphylococcus aureus* strain.<sup>[2]</sup> *A. defectiva* can colonize in oropharyngeal, gastrointestinal and genitourinary systems.<sup>[2]</sup> It can cause local and systemic infections like wound infections, bacteremia, septic arthritis, pancreatitis and meningitis.<sup>[3]</sup> *A. defectiva* rarely causes infective endocarditis (IE). However, infections caused by *A. defectiva* have high morbidity and mortality rates.<sup>[4]</sup> Nutritionally defective streptococci cause 4-8% of all IE cases.<sup>[5,6]</sup>

The mortality and relapse rates in IE cases caused by *A. defectiva* are higher when compared to other streptococci due to complications such as valve insufficiency.<sup>[2,6,7]</sup> In this article, we present a case of infective mitral and aortic valve endocarditis caused by *A. defectiva*, which was isolated in a 26-year-old male patient.

### CASE REPORT

A 26-year-old male patient attended to emergency service with deterioration and dyspnea. Patient's history revealed that he had fatigue, fever and weight loss for two months. He did not have any chronic disease. He did not receive any medical treatment. He stated that his tooth was broken but he did

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not receive any dental intervention. Vital signs at admission were as follows: body temperature 37.8 °C, heart rate 98 beats per minute, arterial blood pressure 80/130 mm/Hg and respiratory rate 24/minute. Systolic and diastolic murmurs, decrease in pulmonary sounds and basal rales in right lung were present at auscultation. White blood cells: 23,100K/ $\mu$ L, neutrophil-to-lymphocyte ratio: 17.35, erythrocyte sedimentation rate: 21 mm/30 minutes, 69 mm/60 minutes, creatinine: 1.33 mg/dL, urea: 30 mg/dL, C-reactive protein: 116 mg/L (<5 mg/L), and procalcitonin: 1.67 ng/mL (<0.5 ng/mL) were the prominent laboratory findings; other laboratory parameters were within normal ranges. There was sign of pleural effusion at posteroanterior pulmonary X-ray, which led the clinician to the diagnosis of pulmonary edema. Then, the patient was hospitalized in cardiology clinic. Transesophageal echocardiography revealed severe mitral insufficiency and mitral valve vegetations were detected on mitral valve. According to the Duke's criteria, the patient was diagnosed as IE with two major (vegetation at transesophageal echocardiography and new murmur) and zero minor criteria.<sup>[8]</sup> Vancomycin 2 $\times$ 1 g and ceftriaxone 2 $\times$ 1 g via intravenous route were administered as an empirical treatment. Two sets of blood culture samples with two hour-intervals were drawn from the patient and the culture bottles were incubated in BacT/ALERT 3D (Biomérieux, France) automated blood culture instrument. Intraoperative native culture was not cultured. At the fourth day of incubation, positive signal was received and pleomorphic chain forming gram-positive cocci were detected on Gram stain. Samples from blood culture bottles were inoculated on blood agar base and eosin methylene blue agar plates and incubated for 18-24 hours at 35 $\pm$ 2 °C. After the incubation period, alpha hemolytic tiny colonies were seen on the blood agar plate. Catalase test was

negative. The isolate was identified as *A. defectiva* by the VITEK 2<sup>®</sup> (Biomérieux, France) automated identification system. Disc diffusion method and gradient test strips were used for antimicrobial susceptibility testing. Penicillin, gentamycin, linezolid, clindamycin and quinolone and macrolide group antibiotics were tested for susceptibility. The results were evaluated according to Clinical and Laboratory Standards Institute 2015 criteria. The isolate was found to be susceptible to all antibiotics tested. A written informed consent was obtained from the patient.

Vancomycin and ceftriaxone, which were started empirically, were continued to the patient. On the second day of treatment, the patient was admitted to the cardiovascular surgery clinic with severe mitral regurgitation, pulmonary edema and endocarditis. He was urgently taken under surgery for mitral valve replacement (Carbomedics 33 mm, Carbomedics Inc., Austin, Texas, USA) on the same day. Aortic valve replacement (Mosaic<sup>®</sup> bioprosthesis number 23, Medtronic, Inc. MN, USA) was also performed due to vegetation on the aortic valve detected during surgery. The patient recovered and was discharged at the third week after surgery. The treatment was completed in four weeks.

## DISCUSSION

*Abiotrophia defectiva* is a member of the normal human microbiota, which may colonize at the oral cavity, genitourinary and intestinal tracts. Rate of oral colonization is approximately 11.8% in healthy people and it is suggested that infections usually originate from that part of the body.<sup>[9]</sup>

*Abiotrophia defectiva* rarely causes IE leading to high mortality and morbidity rates.<sup>[9]</sup> Recently, *A. defectiva* has been identified as a causative agent in

**Table 1. Infective endocarditis cases due to *Abiotrophia defectiva* in the literature**

References	Age/Gender	Involved valve	Dental treatment	Underlying disease	Treatment
Park et al. <sup>[3]</sup>	62/K	Mitral	Yes	Valve replacement	Medical+surgery
Carleo et al. <sup>[9]</sup>	74/E	Aorta	No	Immunosuppressive treatment	Medical+surgery
Pinkey et al. <sup>[14]</sup>	27/E	Mitral	No	None	Medical+surgery
Ramos et al. <sup>[4]</sup>	60/E	Aorta	No	DM, HT	Medical+surgery
Kalegeropolus et al. <sup>[17]</sup>	19/E	Aorta	Yes	None	Medical+surgery
Botta et al. <sup>[18]</sup>	39/K	Mitral	No	None	Medical+surgery
Bajaj et al. <sup>[19]</sup>	40/E	Aorta	Yes	Aortic valve replacement	Medical+surgery
Akkoyunlu et al. <sup>[10]</sup>	23/K	Mitral	No	Rheumatoid arthritis	Medical+surgery
Bozkurt et al. <sup>[15]</sup>	42/K	Mitral, aorta	Yes	None	Medical+surgery
Yemişen et al. <sup>[2]</sup>	66/K	Mitral	No	Mitral valve replacement	Medical+surgery

DM: Diabetes mellitus; HT: Hypertension.

IE following dental interventions.<sup>[10]</sup> There was a history of tooth break in our case but no dental intervention was accomplished. The difficulties in culturing the bacterium and lack of typical colony morphology may cause problems in identification. So, in culture-negative IE cases, this bacterium should be kept in mind and not be overlooked in treatment planning.<sup>[3]</sup> It has been reported that the incidence of complications in IE cases caused by *A. defectiva* is higher than in other viridans streptococci. Deaths usually develop due to congestive heart failure or systemic embolism.<sup>[3]</sup> The aortic and mitral valves are generally affected in IE cases due to *A. defectiva*. The vast majority of patients have underlying cardiac disease, valvular replacement, or recent history of dental treatment.<sup>[9-12]</sup> However, these risk factors were not present in our case. The American Heart Association suggests that enterococcal endocarditis treatment protocol may be applied in the treatment of IE cases that are caused by *A. defectiva*. Gentamicin may be added to ampicillin or penicillin G treatment protocol, for usually four-six weeks. Alternatively, a combination of vancomycin and gentamicin is recommended.<sup>[13]</sup> However, despite the treatment with *in vitro* effective antibiotics in IE due to *A. defectiva*, in the majority of cases, affected valves have serious disruption and surgical treatment is indicated in the future due to relapses. This causes doubts about the reliability of antibiotic susceptibility testing results.<sup>[4,9,10,12,14]</sup> Studies suggest that early surgical intervention provides more favorable outcomes in patients with severe valve disease and widespread vegetations.<sup>[15]</sup> In the literature review, we determined three case reports from Turkey, listed with other cases from other countries in Table 1.<sup>[2,10,15-19]</sup> In the case of Yemişen et al.,<sup>[2]</sup> there was a history of mitral valve replacement, while in other cases, there was no history of underlying heart disease, as was in our case.<sup>[10,15]</sup> The aortic and mitral valves are affected with similar frequencies.<sup>[2,10,15-19]</sup>

In conclusion, the prognosis of endocarditis due to *A. defectiva* is worse than that of other viridans streptococci. However, rapid identification of the causative agent and early implantation of antimicrobial treatment together with surgical intervention in early phase of the disease are important factors in the prognosis.

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