

# Infective Endocarditis Caused by *Abiotrophia Defectiva*: A Case Report

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**Abstract** Although relatively rare, infective endocarditis (IE) remains a severe disease that is associated with substantial morbidity and mortality especially in case of endocarditis caused by virulent microorganisms on valves in the left side. Appropriate antibiotic therapy is the most important component in the treatment of patients with IE. We report the case of a 67 year-old woman who was admitted for a native left sided IE. Transesophageal echocardiography (TEE) showed mitral valve vegetation with a moderate mitral regurgitation. Hemocultures were promptly positive but the identification of the germ needed an automated phenotypic system that isolated *Abiotrophia defectiva*, which is an exceptional entity. Despite the initiation of an appropriate antibiotic therapy, the patient experienced embolic episodes that prompted the decision for a surgical treatment.

**Keywords:** infective endocarditis, vegetations, microorganisms, *Abiotrophia defectiva*

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## 1. Introduction

*Abiotrophia defectiva*, *Streptococcus defectivus*, is usually found in the oral cavity, the oropharyngeal as well as the digestive and genitourinary tracts. It was first described in 1961 by Frenkel and Hirsch, as a new type of *Streptococcus* exhibiting satellitism around colonies of other bacteria [1]. Since 1995, and thanks to the sequencing of genes for the ARNr 16s, the deficient streptococcus has been separated from other viridans streptococci (oral) and reclassified into two new species called *Abiotrophia* and *Granulicatella* [2]. *Granulicatella* genus includes many species. Two of them were identified as responsible of IE: *G. adiacens* and *G. elegans*. The genus *Abiotrophia* includes the *Abiotrophia defectiva*. It can be responsible for rare septic localisations. Subacute endocarditis, occurring generally on a previous heart valve disease, is one of these infections.

In this article, we report a case of IE caused by *Abiotrophia defectiva* in an immunocompetent patient, with no known history of heart valve disease. We aim at making both the clinician and the microbiologist aware of this source of infection and discussing the related diagnostic and therapeutic difficulties.

## 2. Case Report

A patient N.L aged 67, without contributing medical history, was admitted to the cardiology department for a fever and palpitations that lasted for a month. The clinical examination revealed a conscious and well-oriented patient, a good hemodynamic and respiratory status (blood pressure: 110/60 mm/Hg, pulse rate: 100 beats/minute, respiratory rate : 16 cycles /minute), temperature 38°C, cardiac auscultation revealed a grade 3/6 mitral regurgitation systolic murmur radiating to the axilla and to the left border of the sternum. Mouth examination showed the presence of several dental caries. Physical examination did not show any more significant findings, mainly no splenomegaly, no cutaneous signs in favour of IE. As to laboratory tests, the patient had a high CRP at 48 mg/l, Leukocyte count of 9900 elements/mm<sup>3</sup>, an inflammatory anaemia with serum haemoglobin of 9.9g/dl. Transthoracic and TEE revealed the presence of two mobile vegetations appended on the mitral valve of 15 and 17 mm of diameter respectively with a grade II mitral regurgitation, but with no chordal perforation or leaflets rupture (Figure 1 and Figure 2). There was no sign of heart failure with a left ventricular ejection fraction by echo of 68%. Four sets of hemocultures were withdrawn for both aerobic and anaerobic culture, hemoculture bottles were incubated in an automated microbial detection system (bactalert).

Hemocultures' results were positive in less than 24 hours of incubation, direct Gram stain examination

revealed Gram-positive cocci, rod-shaped and globular bacteria, immobile and of irregular morphology, sometimes in chains. The culture was performed on blood agar plates enriched in vitamin B6 and L-cysteine (100mg/l). The satellitism test with a strain of *Staphylococcus aureus* was negative. The plates were incubated at 37°C in 5% of CO<sub>2</sub> rich atmosphere. The API 20 strep was non-contributory in identifying the bacteria which obtained by a rapid ID 32 strept and confirmed by the use of an automated phenotypic system VitekR2 (bioMérieux, French) that isolated the *Abiotrophia defectiva*. Unfortunately, we don't have access to identification of *Abiotrophia defectiva* by spectrophotometry, Maldi-Tof or molecular biology. An antibiogram was performed on a Mueller Hinton (MH) plate supplemented with vitamin B6, according to the recommendations of CA-SFM 2013 for the Alpha-hemolytic Streptococci other than pneumonia streptococcus. The strain was sensitive to penicillin G, amoxicillin, cefotaxime, erythromycin, imipinem and glycopeptides but was resistant to tetracycline.

The patient was given amoxicillin (12g/day) for four weeks and gentamicin (3mg/kg) for 2 weeks with a clinical and biological improvement, and with negativation of hemocultures. Nevertheless, a surgical intervention was decided because of the size and mobility of the valvular vegetations but mostly because of the occurrence of a splenic embolic episode documented by an abdominal echo. Surgical findings revealed a macroscopic evidence of endocarditis with the presence of vegetations and active leaflet inflammation but with no abscess formation. A mitral valve replacement was performed with an uneventful post operative course.

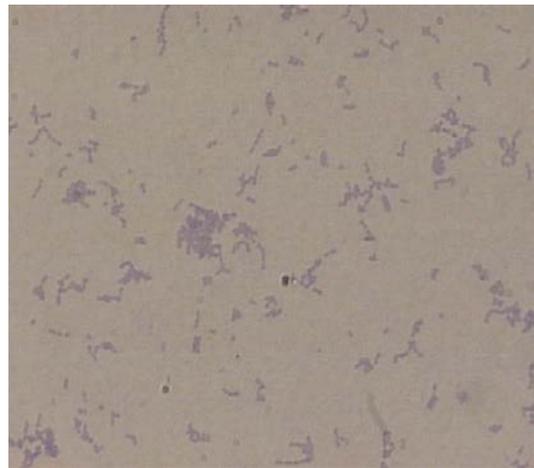


Figure 1. Microscopic appearance of *A.defectiva*



Figure 2. Susceptibility to Antibiotics of *A.defectiva*



Figure 3. Api 20 Strept

### 3. Discussion

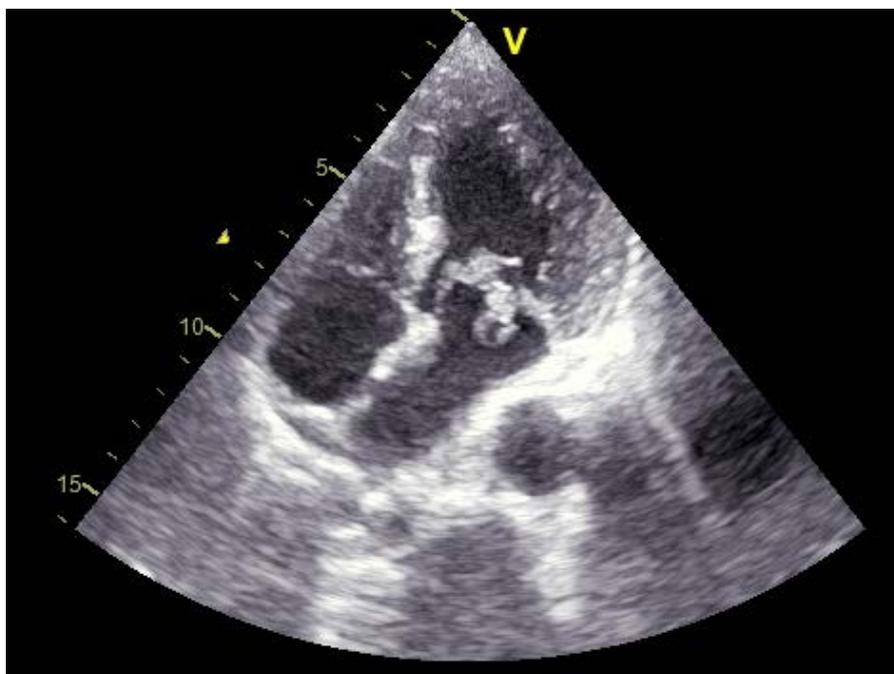
*Abiotrophia defectiva* is responsible for rare cases of infections. It was found to be the cause of articular prosthesis infections, acute meningitis and exceptionally

in the case of peritonitis in peritoneal dialysis patients [3,4,5]. It is responsible for 1-2% of IE [6].

Because it is difficult to be detected and identified with the usual methods, *A. defectiva* is often responsible for endocarditis with “negative hemocultures”. It is associated with a higher risk of mortality and morbidity in

comparison to endocarditis caused by other viridans streptococci [7,8]. The main complications reported in the literature are: acute cardiac insufficiency and septic emboli justifying increasing the high rate of surgical interventions [9,10]. The genus *Abiotrophia* colonizes the rhinopharyngeal, digestive and genital flora. In the case of our patient, IE was most likely of oropharyngeal origin as revealed by the mouth examination. According to a literature review [7], endocarditis caused by the genus *Abiotrophia* occurs in the case of previous valvular heart disease in 61% of the cases. In our case, the patient had no known valvulopathy, and the presence of mitral insufficiency could be explained by the important size of the vegetation. Unlike genera *Granulicatella* which is observed in neutropenic patients, endocarditis caused by the genus *Abiotrophia* can occur in immunocompetent environment [11]. *A. defectiva* presents factors of virulence which enable it to adhere to the endovascular tissue of the host thanks to a strong link to fibronectins. Other factors increasing the virulence of the strain are exopolysaccharide secretion, the long generation time of the bacteria which can have an impact on the tolerance of the strain in vivo [1,12]. The morphological characteristics on direct examination are difficult to identify because of the polymorph and irregular Gram stain. In our case the distinction between cocci and Gram-positive bacilli was difficult. In fact, inside the vegetation, the bacteria can undergo structural, metabolic and phenotypical modifications rendering the bacteriologic analysis difficult and to be able to identify it, we had to use special culture environments that need to be enriched in L-cysteine (thiol grouping), pyridoxalphosphate (vitamin B6) and vitamin K3. Bacterial growth is slow and is enhanced by the enriched environment in 5% of Co2. The identification of

defective streptococci by the API 20 Strep (bioMerieux, France ) present few limitations. The exact nature of the specie was determined by a system of automated phenotypical identification VitekR2 (bioMerieux, France). The identification can also be achieved by spectrophotometric analysis giving a fast and reliable result. Indeed, a comparative study between the MALDI-TOF MS system and Vitek2, for the diagnosis of the *Granulicatella* and *Abiotrophia* species causing invasive infections, demonstrated that MALDI-TOF MS is a fast and useful diagnostic tool whereas the phenotypic tests obtained by Vitek2 were only partially effective for a precise identification of the strains [13]. In fact, the techniques of molecular biology mainly the sequencing of the ARN 16s gene represent a method of choice for the diagnosis of this kind of pathogen [14]. *A. defectiva* is sensitive, in vitro, to penicillin, but this sensitivity is much less important in comparison with oral streptococcus. A high resistance rate to betalactamins as well as to macrolides was found in several reports [15]. Resistance to cephalosporins as well as to fluoroquinolones were also reported [2,16]. However, the association of penicillin - gentamicin remains the combination of choice for the treatment of endocarditis to *A. defectiva*. In fact, the synergy between penicillin oral vancomycin and aminosid was also observed in vitro in some models of animal experiments [3]. Mean while, it is difficult to draw the profile of sensitivity to the antibiotics for this species and the methods used vary according to the authors. The results obtained in vitro are not correlated to those in vivo because of the rarity of the isolation of *A. defectiva* and the absence of standardized data for the study of the antibiogram.

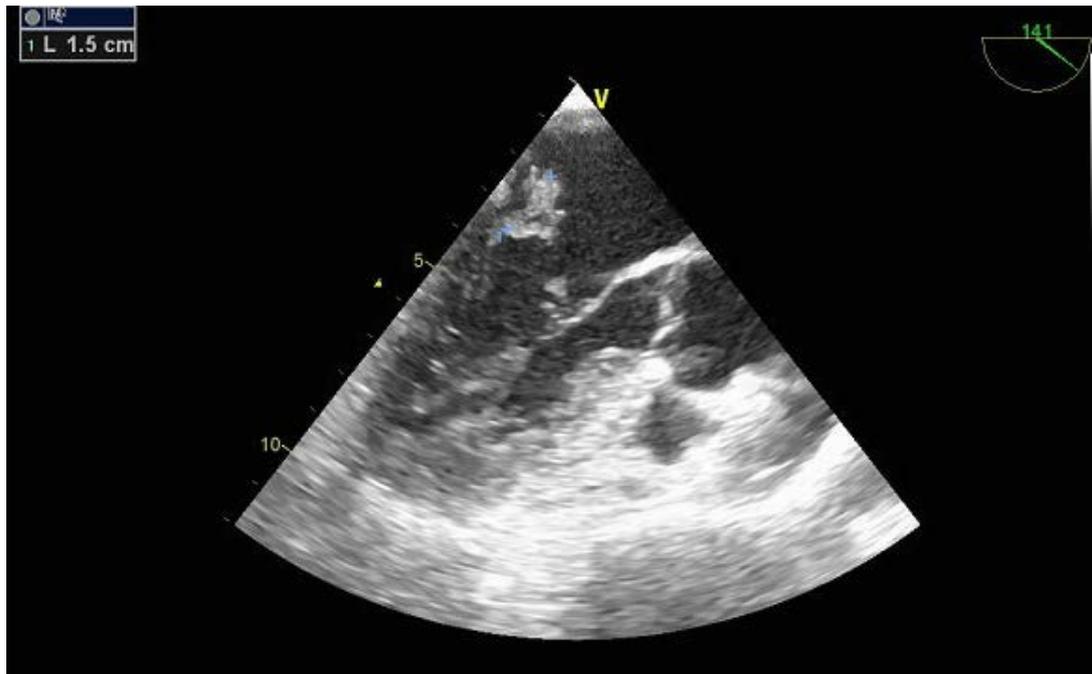


**Figure 4.** Four chamber view show mobile image, which size is 17 mm, appended to the atrial side of the anterior mitral leaflet

A tolerance phenomenon was observed in relation to the penicillin G and the vancomycin may explain the relapses and therapeutic failures [17]. Although, a treatment duration of six weeks was necessary according to the literature [15,17], we observed a favourable clinical and

biological improvement in our patient with the use of gentamicin for 2 weeks and ampicillin for 4 weeks only.

A very strict surveillance of these patients is necessary to detect early failure of antibiotic therapy and to avoid its clinical consequences.



**Figure 5.** Mobile vegetation appended on the mitral valve of 15 mm

## 4. Conclusion

IE due to *A. defectiva* is a rare entity. The identification of such pathogens is difficult but vital, as it can be the origin of a therapeutic failure because of its low sensitivity to penicillin thus necessitating the use of higher doses. The techniques of molecular biology are very useful in establishing an early diagnosis of this type of infection. A multidisciplinary approach involving microbiologists and specialists in infectious disease, cardiology, and cardiac surgery is necessary for the management of these patients to ensure a favourable outcome.

## Conflict of Interest Statement

The authors have no conflict of interest.

## List of Abbreviations

CRP: C-reactive protein  
 IE: Infective endocarditis  
 TEE: transesophageal echocardiography.

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