

# Aortic Valve Endocarditis by a Rare Organism: *Abiotrophia defectiva*

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## Abstract

Abiotrophia defectiva or nutritionally variant Streptococcus (NVS) is rare but important cause of infective endocarditis. We present a case of a 40 year old man with history of aortic valve replacement 14 years ago admitted for fever and chills. Blood culture grew *A. defectiva* in 4 out of 4 bottles. Patient became afebrile within few days after starting Ceftriaxone but subsequently had renal infarct due to septic embolization. Echocardiogram showed vegetations on aortic valve but no significant aortic regurgitation. After an 8 weeks course of Penicillin and Gentamicin was completed the patient had severe aortic regurgitation. Finally, aortic valve replacement and aortic root replacement was performed and patient did well after the surgery. Clinicians should be aware of this fastidious and aggressive organism when dealing with infective endocarditis. Complications rates are very high even on antibiotics and surgical treatment is needed in at least 50% of the cases.

**Keywords:** *Abiotrophia defectiva*; Echocardiogram; Embolization; Blood culture

## Introduction

*Abiotrophia defectiva* or nutritionally deficient streptococcus (NDS) is a rare but important cause of infective endocarditis. It accounts for about 5% of all cases of infective endocarditis [1] and is a major cause of blood culture negative infective endocarditis. *A. defectiva* is a very slow growing organism with special nutrition requirements and challenging phenotype testing; hence difficult to identify [2]. However accurate and quick identification of organism is important because of its aggressive nature and propensity to cause serious infections such as pancreatic abscess, brain abscess, osteomyelitis, septic arthritis, crystalline keratopathy [3-7]. *A. defectiva* affects diseased valve in 90% of cases [8] and it is notorious for embolic complications and valvular destruction despite being sensitive to antibiotics. Previous studies have shown a relapse rate of as high as 17%, despite antibiotics use [8,9].

## Case Study

A previously healthy 40 year old male with a past medical history of aortic valve replacement with porcine tissue valve due to bicuspid aortic valve 14 years ago was seen in the office for fever and chills. About 2 weeks back he had an episode of chills and small spontaneous abscess on his left chin. Patient was prescribed levofloxacin, and fever and abscess resolved over next few days. One week later fever and chills returned. He had no recent history of dental work or instrumentation. Examination was significant for a temperature of 102F, pulse rate of 104/min and normal Blood pressure. No murmur was appreciated. Blood cultures were obtained for suspected endocarditis. Laboratory studies revealed mildly elevated white blood cell (WBC) count. Within 24 hrs, blood culture turned positive for gram positive cocci in 4 out of 4 bottles, subsequently identified as *Abiotrophia* species. Initial transthoracic and transesophageal echocardiogram showed no evidence of vegetation or other stigmata of endocarditis. Ceftriaxone and gentamicin were started for possible endocarditis as per modified Duke Criteria. The patient defervesced in 3 days on antibiotics administered at home via peripherally inserted central catheter. A week later, the patient was admitted to the hospital for acute onset of right flank pain. WBC count was elevated to 12000/cu/mm and CT scan of abdomen showed a right renal infarct (shown in Figure 1). A

repeat transesophageal echocardiogram showed 4-6 mm vegetation on aortic cusp consistent with infective endocarditis without aortic regurgitation (Figure 2). The patient was discharged on outpatient treatment after change in antibiotics to penicillin G and gentamicin. Patient continued to feel better and completed 8 weeks of antibiotics without further complications. Repeat blood cultures 10 days after completion of antibiotic course were negative. Repeat transesophageal echocardiogram at that time showed resolved vegetation (Figure 3). Follow up in cardiology clinic revealed a new diastolic murmur at the aortic area. A repeat transthoracic echocardiogram at this time showed severe aortic regurgitation with no vegetation (Figure 4) and patient



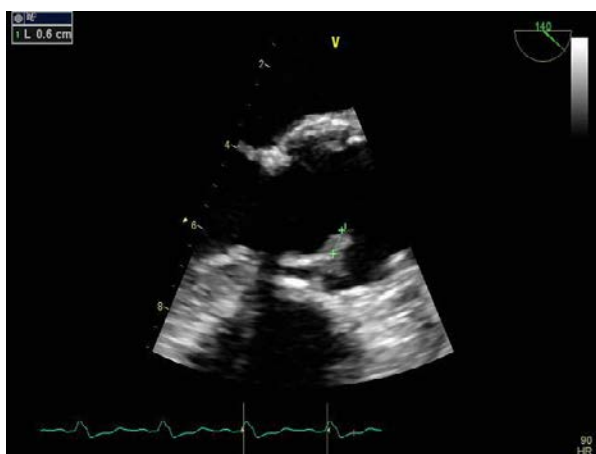
Figure 1: CT image of right kidney infarct.

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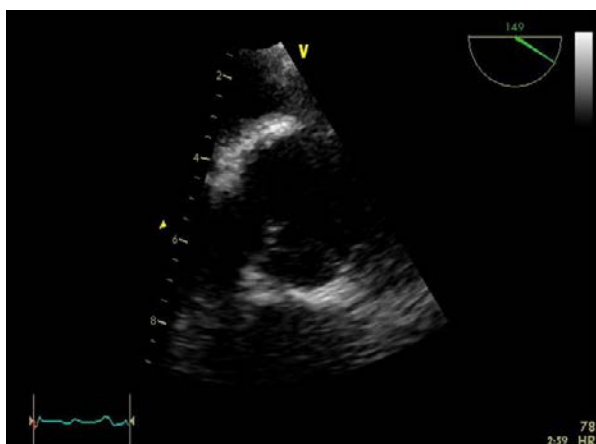
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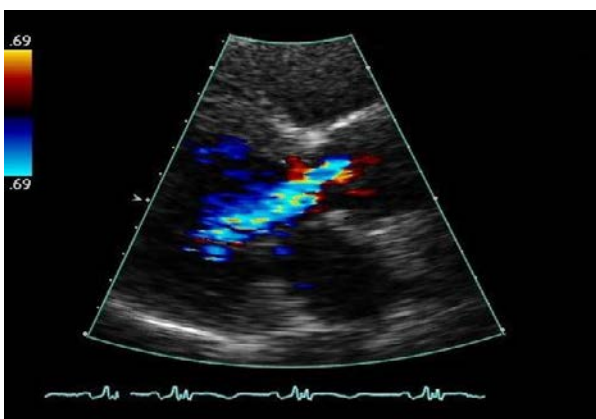
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**Figure 2:** Transesophageal echocardiogram showing vegetation on aortic valve.



**Figure 3:** Transesophageal echocardiogram showing no vegetation on aortic valve after antibiotic treatment.



**Figure 4:** Transthoracic echocardiogram showing Aortic regurgitation.

was taken for an aortic bioprosthetic valve and aortic root replacement. The rest of the course was uncomplicated and patient did well after the surgery.

## Discussion

Nutritionally variant *Streptococcus* (NVS) was first identified by Frenkle and Hirsh in 1961 in a case of subacute infective endocarditis [10]. NVS was initially classified as *Streptococcus defectiva* and *Streptococcus Adjacens* and later their names were changed to *Abiotrophia defectiva* and *Abiotrophia adjacens* [11]. Later many several other species such as *A. balaenopterae* and *A. paraadjacens* were identified [22-24]. Finally *A. defectiva* remained as a separate genus and others were renamed as *Granulicatella* species [12]. *A. defectiva* usually isolated from immunocompetent hosts and *Granulicatella* species from immunocompromised hosts. *A. defectiva* is a very important cause of blood culture negative infective endocarditis. It is notorious to cause serious complications like congestive heart failure, septic embolization and destruction of the valve despite of use appropriate antibiotics hence aggressive treatment is necessary including surgery with the first sign of complications. In vitro antibiotics susceptibility does not reflect clinical outcome. The aggressive nature of this organism is because of secretion of exopolysaccharide and ability to adhere to fibronectin [13]. *A. defectiva* has a special affinity for endovascular tissue. *A. defectiva* is difficult to identify because it is a very slow growing, pleomorphic [14], and has special nutritional requirements such as thiol containing compound pyridoxine and Vitamin b6 for growth. It is often seen as a satellite lesion around other bacteria that secrete pyridoxal such as *staphylococcus* [2]. On gram stain it can be seen as a gram positive cocci or coccobacillary or bacillary. It does not grow well on typical culture media however it does grow well on Columbia blood agar and Todd-Hewitt broth. Growth is enhanced by supplementation with pyridoxal hydrochloride and L-cysteine. It is often seen as white grey, non hemolytic colonies. It shows a positive reaction for production of pyrrolidonyl arylamidase and leucine aminopeptidase and negative for hydrolysis of hippurate. 16S RNA gene amplification follows by PCR-RFLP shown to be a rapid and more accurate method for identification. MALDI-TOF-MS (Matrix associated laser desorption ionization time of flight mass spectrophotometer) is another simple and inexpensive method of identification [15]. Prevalence of resistance to beta lactams is about 50% and to macrolide antibiotics is about 93% in this organism [16], however, resistance to aminoglycoside is not so high hence penicillin and gentamicin combination is better than penicillin alone. There is a bacteriologic failure rate of 17-40% [17]. American Heart Association guidelines recommend treatment of *A. defectiva* should follow the guidelines for the treatment of enterococcal endocarditis [18]. The regimen is penicillin or ampicillin with gentamicin for 4-6 weeks. As mentioned, previously complications are high with this organism even on appropriate antibiotics, hence close, frequent and long term follow up is necessary to look for complications. 50% of the patients require surgery [19-21].

## Conclusion

Clinicians should be aware of this highly aggressive organism when dealing with blood culture negative infective endocarditis. Isolation of *A. defectiva* is difficult due to special nutritional requirements hence special techniques are required. *A. defectiva* is known to cause complications even on sensitive antibiotics consequently close monitoring is required.

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