

# Infective endocarditis caused by *Abiotrophia defectiva* presenting as anterior mitral leaflet perforation mimicking cleft anterior mitral leaflet

Parakriti Gupta<sup>1</sup>, Sourabh Agstam<sup>2</sup>, Archana Angrup<sup>1</sup>, Rohit Kumar Manoj<sup>2</sup>, Rimjhim Kanaujia<sup>1</sup>, Pallab Ray<sup>1</sup>

Departments of <sup>1</sup>Medical Microbiology and <sup>2</sup>Cardiology, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

## ABSTRACT

Infective endocarditis (IE) is primarily a bacterial infection of the heart valves. The most common organisms implicated include *Staphylococcus* and *Streptococcus* species. However, with the advent of MALDI-TOF and molecular techniques, the reports of IE being caused by rare organisms are on a rise. Here we describe a case of IE due to *Abiotrophia defectiva*. This is the first report of simultaneous infection of both mitral and aortic valves by *Abiotrophia defectiva* from India. IE caused by *Abiotrophia defectiva* has been seen to be more severe, associated with higher failure rates and relapse. This emphasizes the accurate identification of nutritionally variant *Streptococcus* (NVS) species as the management of choice varies between *Abiotrophia* and *Granulicatella*.

**Keywords:** *Abiotrophia defectiva*, case report, infective endocarditis, MALDI-TOF, resistance

## Introduction

Infective endocarditis (IE) is a chronic infection of lining or valves of the heart, primarily bacterial in origin, which can be either culture positive or negative.<sup>[1]</sup> The most common organisms implicated in IE include *Staphylococcus* and *Streptococcus* species. However, reports of IE being caused by other rare organisms like nutritionally variant *Streptococcus* (NVS), *Bartonella* spp., *Coxiella burnetii*, *Tropheryma whippelii*, HACEK (*Haemophilus aphrophilus*, *Actinobacillus actinomycetemcomitans*, *Cardiobacterium hominis*, *Eikenella corrodens*, *Kingella kingae*) group and some of the fungi are on a rise.<sup>[2]</sup> Sporadic cases by rare organisms like

*Abiotrophia defectiva*, *Gemella*, *Finegoldia*, *Propionibacterium humerusii*, *Haemophilus parainfluenzae* have also been reported in literature. The identification of these rare organisms has been possible with the advent of newer diagnostic modalities like matrix-assisted laser desorption ionization–time of flight (MALDI-TOF), VITEK, molecular methods (16S rDNA PCR) and sequencing.

## Case Report

A 22-year-old male was presented with a history of continuous, high-grade fever for the past 20 days. He was a known case of congenital bicuspid aortic stenosis and underwent balloon aortic valvotomy of the bicuspid aortic valve 14 years back. Physical examination revealed pulse rate of 110 bpm, respiratory rate of 25/min and blood pressure of 110/40 mmHg. Cardiac apex was displaced and hyperdynamic. On auscultation, there was early systolic murmur of grade IV/VI, best heard at apex and radiating

**Address for correspondence:** Dr. Archana Angrup, Department of Medical Microbiology, Postgraduate Institute of Medical Education and Research, Sector 12, Chandigarh - 160012, India.  
E-mail: archanaangrup@yahoo.com

Received: 13-11-2019

Revised: 28-12-2019

Accepted: 08-01-2020

Published: 28-02-2020

Video Available on: [www.jfmpc.com](http://www.jfmpc.com)

Access this article online

Quick Response Code:



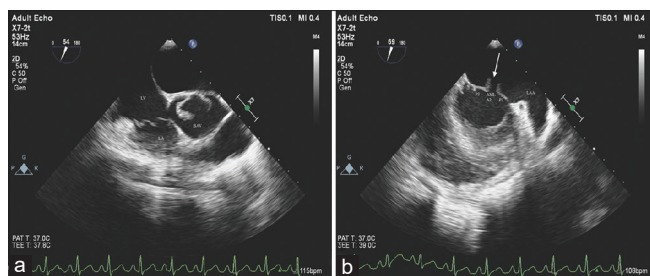
Website:  
[www.jfmpc.com](http://www.jfmpc.com)

DOI:  
10.4103/jfmpc.jfmpc\_1004\_19

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: [reprints@medknow.com](mailto:reprints@medknow.com)

**How to cite this article:** Gupta P, Agstam S, Angrup A, Manoj RK, Kanaujia R, Ray P. Infective endocarditis caused by *Abiotrophia defectiva* presenting as anterior mitral leaflet perforation mimicking cleft anterior mitral leaflet. J Family Med Prim Care 2020;9:1229-31.

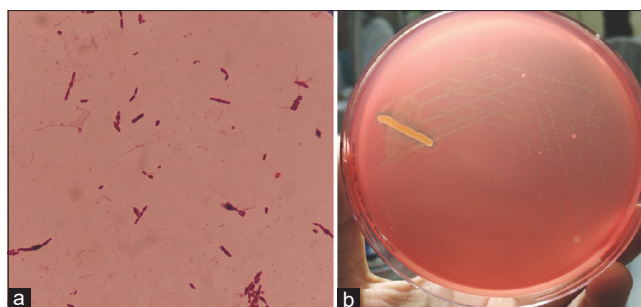


**Figure 1:** (a) TEE (Apical two-dimensional view) showing perforation of A2 scallop of AML with normal P1 and P3 scallop of PML. (b) TEE showing thickened bicuspid aortic valve

to axilla suggestive of acute mitral regurgitation. Another early diastolic murmur, heard in neo-aortic area was suggestive of severe aortic regurgitation. Echocardiography revealed a large vegetation of size  $12 \times 2$  mm attached to aortic side of bicuspid aortic valve and anterior mitral leaflet perforation with vegetation at the tip of AML of size  $2 \times 2$  mm. [Figure 1a and b]. Parasternal long-axis 2D echocardiography with color doppler showed large vegetation attached to bicuspid valve and anterior mitral leaflet perforation along with severe mitral regurgitation and severe aortic regurgitation. [Video 1] Routine laboratory investigations showed a white blood cell count of 21.4 cu/mm, hemoglobin of 8.6 g/dl, hematocrit of 27.3%, and reticulocyte count of 6.3%. Based on Modified Duke's criteria, a diagnosis of IE was made. Blood culture was collected under aseptic conditions and it grew *Abiotrophia defectiva* after 3 days of incubation in BACTEC. The smear showed pleomorphic gram-positive coccobacilli in chains, with no capsule or spores [Figure 2a]. The colonies were very sparse on 5% sheep blood agar plate, with satellitism near *Staphylococcus aureus* streak due to the fastidious nature of this organism [Figure 2b]. The identification was done using MALDI-TOF with a score of 1.8. Empirical therapy with I/V ceftriaxone and gentamicin was initiated. Antimicrobial susceptibility was performed on blood agar plate using Kirby-Bauer method and the isolate was found to be sensitive to ampicillin, ceftriaxone, gentamicin, erythromycin, teicoplanin, and vancomycin. The patient was continued on ceftriaxone and gentamicin and became afebrile after 2 days of treatment. As patient had no symptoms of heart failure, he received antibiotics for duration of 4 weeks and is currently awaiting elective aortic valve replacement with mitral valve repair.

## Discussion

*A. defectiva* is a non-motile, gram-positive cocci in chains that is catalase negative, pyridoxine dependent and exhibit satellitism around *Staphylococcus* streak.<sup>[3]</sup> It needs L-cysteine, pyridoxal, and other factors for its proper growth.<sup>[4]</sup> It is a commensal flora of oral, intestinal, and genitourinary tract.<sup>[5]</sup> These sites serve as the portals from where the bacteria gain entry into bloodstream and causes endocarditis, brain abscess, keratitis, peritonitis, septic arthritis, meningitis, and osteomyelitis.<sup>[6]</sup> CVS is the preferred site due to its ability to secrete exopolysaccharide and propensity to adhere to fibronectin of endothelial tissue.<sup>[5,7]</sup> NVS contribute



**Figure 2:** (a) Smear showing gram-positive cocci in chains. (b) Alpha hemolytic satellite colonies of *Abiotrophia defectiva* on blood agar

approximately 3–5% of IE cases and out of this, ~6% (3–5%) is attributed by *Abiotrophia*.<sup>[5]</sup> The major risk factors include any dental procedure in the recent past, pre-existing cardiac problems; prosthetic heart valves; antibiotic therapy and excessive alcohol intake.<sup>[8]</sup> The frequency of mitral valve being affected is more.<sup>[9]</sup>

IE caused by *A. defectiva* is associated with greater morbidity and mortality (17%)<sup>[10]</sup> Rhodes *et al.* have reported significant neurological findings, specifically intracranial aneurysm (ICA), in 100% of their cases.<sup>[11]</sup> The major causes of mortality include congestive cardiac failure (CCF) or multiple emboli. The size of vegetations due to *Abiotrophia* is small and have high propensity to embolize (one-third of cases). Approximately 27% of patients require prosthetic valve replacement and 50% of the patients require surgery.<sup>[6]</sup> Treatment failure has been recorded in 41% of cases, despite the susceptibility pattern *in vitro*.<sup>[9]</sup> Some of the recent studies have shown that it might be due to the generation of L-forms and thereby these antibiotics are of no use in such cases.<sup>[12]</sup> Resistance up to 50% has been noted against beta-lactams and up to 90% against macrolides, contributing to relapse in ~ 17% of cases. In case of treatment failure to this combination therapy, vancomycin is the preferred drug.<sup>[13]</sup> The American Heart Association guidelines recommend the use of ampicillin and gentamicin with 18–30 million units of penicillin per 24 h divided into six doses or 12 g of ampicillin per 24 h I/V divided into six doses with I/V gentamicin at 3 mg/kg/24 h divided into three doses for 4–6 weeks.<sup>[14]</sup> Studies have shown that early surgical intervention can reduce the mortality in these cases.<sup>[15]</sup>

To the best of our knowledge, this is the third report of *Abiotrophia* IE from India. Two cases of *Abiotrophia* IE have already been reported from India in 2000 and 2001, respectively.<sup>[16,17]</sup> Our isolate was sensitive in all drugs, thereby suggesting that the resistance is not that high in our region, as earlier reports have also reported the isolate to be sensitive to all antibiotics.<sup>[16,17]</sup>

## Conclusion

IE caused by *Abiotrophia defectiva* is associated with higher mortality and relapse. Due to a high risk of embolization, early surgical intervention is recommended. This emphasizes the accurate identification of NVS species. The present case also

calls for increased awareness amongst the clinicians for prompt diagnosis and management of the disease.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

## References

- Fowler VG, Scheld WM, Bayer AS. Endocarditis and intravascular infections. In: Mandell GL, Bennett JE, Dolin R, editors. Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases. Vol 6. Philadelphia: Churchill Livingstone; 2005. p. 975-1021.
- Millar BC, Altwegg M, Raoult D, Moore JE. Culture-negative endocarditis—causes, diagnosis and treatment. *Rev Med Microbiol* 2000;11:59.
- Christensen JJ, Facklam RR. Granulicatella and abiotrophia species from human clinical specimens. *J Clin Microbiol* 2001;39:3520-3.
- Carey RB, Gross KC, Roberts RB. Vitamin B6-dependent Streptococcus mitior (mitis) isolated from patients with systemic infections. *J Infect Dis* 1975;131:722-6.
- Bouvet A, Villeroy F, Cheng F, Lamesch C, Williamson R, Gutmann L. Characterization of nutritionally variant streptococci by biochemical tests and penicillin-binding proteins. *J Clin Microbiol* 1985;22:1030-4.
- Kiernan TJ, O'Flaherty N, Gilmore R, Ho E, Hickey M, Tolan M, *et al.* Abiotrophia defectiva endocarditis and associated hemophagocytic syndrome- A first case report and review of the literature. *Int J Infect Dis* 2008;12:478-82.
- Okada Y, Kitada K, Takagaki M, Ito HO, Inoue M. Endocardiac infectivity and binding to extracellular matrix proteins of oral Abiotrophia species. *FEMS Immunol Med Microbiol* 2000;27:257-61.
- Roberts RB, Krieger AG, Schiller NL, Gross KC. Viridans streptococcal endocarditis: The role of various species, including pyridoxal-dependent streptococci. *Rev Infect Dis* 1979;1:955-66.
- Je H, Song D, Chang CL. Bacterial endocarditis caused by *Abiotrophia defectiva* in a healthy adult: A case report with literature review. *Ann Clin Microbiol* 2019;22:23-7. Korean.
- Tuazon CU, Gill V, Gill F. Streptococcal endocarditis: Single vs. combination antibiotic therapy and role of various species. *Rev Infect Dis* 1986;8:54-60.
- Rhodes HM, Hirigoyen D, Shabnam L, Williams DN, Hansen GT. Infective endocarditis due to Abiotrophia defectiva and Granulicatella spp. complicated by infectious intracranial cerebral aneurysms: A report of three cases and review of the literature. *J Med Microbiol* 2016;65:493-9.
- Frenkel A, Hirsch W. Spontaneous development of L forms of streptococci requiring secretions of other bacteria or sulphhydryl compounds for normal growth. *Nature* 1961;191:728-30.
- Stein DS, Nelson KE. Endocarditis due to nutritionally deficient streptococci: Therapeutic dilemma. *Rev Infect Dis* 1987;9:908-16.
- Baddour LM, Wilson WR, Bayer AS, Fowler VG, Bolger AF, Levison ME, *et al.* Infective endocarditis: Diagnosis, antimicrobial therapy, and management of complications: A statement for healthcare professionals from the committee on Rheumatic Fever, Endocarditis, and Kawasaki Disease, council on Cardiovascular Disease in the young, and the councils on clinical cardiology, stroke, and cardiovascular surgery and anesthesia, American heart association: Endorsed by the infectious diseases society of America. *Circulation* 2005;111:e394-434.
- Houpikian P, Raoult D. Blood culture-negative endocarditis in a reference center: Etiologic diagnosis of 348 cases. *Medicine (Baltimore)* 2005;84:162-73.
- Verghese S, Mulasari A, Padmaja P, Mathew T, Elizabeth SJ, Chitra AK, *et al.* Bacterial endocarditis caused by abiotrophia defectiva (nutritionally variant streptococci). *Indian Heart J* 2000;52:594-6.
- Ray M, Subramanian C, Ray P, Singhi P. Infective endocarditis in a child due to Abiotrophia defectivus. *Indian Pediatr* 2002;39:388-92.