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Case Report

Infective endocarditis caused by *Granulicatella adiacens*

T.S. Shailaja^{a,*}, K.A. Sathivathy^b, Govindan Unni^c^a Associate Professor, Department of Microbiology, Jubilee Mission Medical College and Research Institute, Thrissur 680005, Kerala, India^b Professor & HOD, Department of Microbiology, Jubilee Mission Medical College and Research Institute, Thrissur 680005, Kerala, India^c Professor & HOD, Department of Cardiology, Jubilee Mission Medical College and Research Institute, Thrissur 680005, Kerala, India

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ABSTRACT

Granulicatella adiacens, a recently nomenclatured bacterium, was considered as one of the nutritionally variant streptococci (NVS) and is a mouth commensal. It is redesignated as a streptococcus like bacterium since it differs from streptococci. We report a case of infective endocarditis (IE) caused by this fastidious and unusual bacteria in a 63-year-old man with rheumatic valvular heart disease. *G. adiacens* was isolated from four of his blood culture samples, which was sensitive to beta lactams, moderately sensitive to gentamicin and resistant to erythromycin and co-trimoxazole. Patient recovered completely on treatment with high dose of ampicillin and gentamicin for 28 days.

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1. Introduction

Infective endocarditis (IE) is a relatively uncommon but life-threatening disease for which cardiac valvular abnormalities are strong risk factors.¹ Among the etiological agents of IE, streptococci come to 60–80%, of which, viridans streptococci contribute to 30–40%, enterococci 5–18% and other streptococci 15–25%.² Most predominant pathogens of IE are bacterial species in the oral cavity and being a mouth commensal, the transmission of *Granulicatella* from the mouth should be noted as a possible cause of IE.¹

The genus *Granulicatella* is one of the streptococcus like bacteria. In 1995, Kawamura and others in Japan relocated and renamed some NVS as *Abiotrophia*, based on 16S rRNA sequencing.³ Since then, Collins and Lawson⁴ have proposed that three species members of the genus *Abiotrophia* be reclassified in a new genus *Granulicatella*, as *Granulicatella*

adiacens, *balaenopterae* and *elegans* and lately one more species *G. para adiacens* was also added.³ *Granulicatella* is seen as the normal flora of human mouth, genital and intestinal tracts. *Abiotrophia* and *Granulicatella* cause sepsis and bacteremia and are the causes of 5–6% of infective endocarditis. They are also associated with pulmonary, CNS and ocular infections. Though there are reports on IE caused by *G. adiacens*, to the best of our knowledge no such case has been reported from India.

2. Case report

A 63-year-old man with rheumatic valvular heart disease admitted in the cardiology department of our hospital with complaints of high grade irregular fever associated with chills and rigor of two months duration. He also had dyspnea of grade III, chest pain, cough and fatigue. The patient was a

* Corresponding author. Tel.: +91 9446522641 (mobile).

E-mail address: shailabraj@gmail.com (T.S. Shailaja).

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known case of rheumatic mitral regurgitation and mitral valve prolapse on regular treatment for diabetes mellitus and systemic hypertension. In 2004, he had a cerebellar infarct with subsequent hydrocephalus and underwent ventriculoperitoneal shunt surgery. On examination his temperature was 101 °F, auscultation of the chest revealed a pan systolic murmur, abdominal examination showed hepatomegaly and mild splenomegaly. No other relevant findings were elicited. His blood investigations were as follows, hemoglobin – 9.4 g%, Total WBC count – 10,140 with P – 72% and L – 22%, platelet count – 1, 49,000 and ESR – 60 mm/h. Widal test was non-reactive. USG abdomen showed gall bladder calculus and moderate splenomegaly and echocardiogram revealed multiple vegetations attached to mitral valve (Fig. 1, echocardiogram picture showing vegetations). Subsequently a diagnosis of infective endocarditis was made.

On the day of admission, three blood culture samples were collected at an interval of half an hour from three different sites and were processed in BacT ALERT automated blood culture system (Bio Merieux). As he had high temperature, 102 °F, on the next day, another blood sample was also collected and processed in the same manner. All the four samples were positive within 48 h and the direct Gram smear from the broth showed Gram positive cocci arranged predominantly in pairs. Subcultures were done on human blood agar (HBA), chocolate agar (CA) and Mac-conkey's agar (MA). Direct sensitivity was performed on HBA. After overnight incubation, minute semi translucent, moist colonies appeared on HBA, CA and on the sensitivity plate. The colonies were non-hemolytic, Gram stain of which showed Gram variable cocci arranged in pairs, short chains and as tetrads. Some coccobacillary forms, and short club shaped bacilli were also observed (Fig. 2). The isolate was found to be catalase negative, bile esculin negative, optochin and bacitracin resistant. Satellitic type of growth around staphylococcus streak on BA plate was obtained. It failed to grow at 10 °C and on sheep BA (SBA).³ The identification of the isolate was confirmed as *G. adiacens* using Vitek 2 automatic bacterial identification system (Bio Merieux) and it was found to be sensitive to penicillin, ampicillin, cefotaxime, linezolid, clindamycin and vancomycin, moderately sensitive to gentamicin and resistant to cotrimoxazole and erythromycin by disc diffusion method.

After collecting the fourth blood sample, the patient was started on ampicillin 2 g IV 4th hourly and gentamicin 60 mg

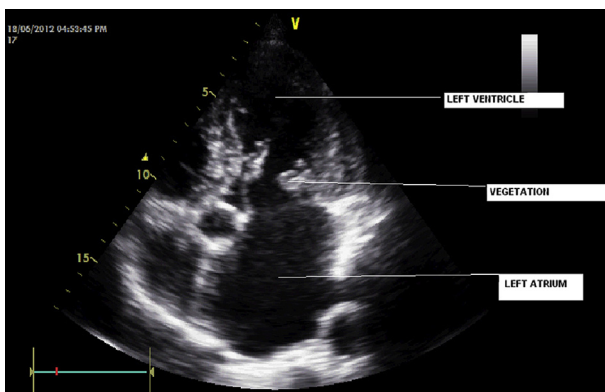


Fig. 1 – Echocardiogram picture showing vegetations.

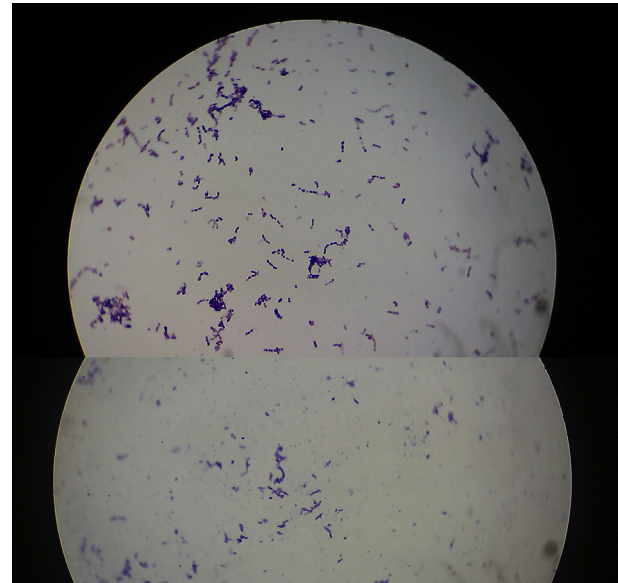


Fig. 2 – Gram stained smear of bacterial colony showing pleomorphic Gram positive cocci, 1000×.

IV 8th hourly for two weeks and then tapered gradually over a period of another two weeks. His temperature came down on initiation of the therapy and he was completely afebrile after 7 days. Rest of the hospital stay was uneventful and the blood counts and ESR came down gradually. The patient was discharged after one month of admission and he was doing well on review after one month.

3. Discussion

Among the members of the genus *Granulicatella*, *G. adiacens* appears to have higher degree of infectivity, and this has been attributed to its capacity to bind to the cardiac valvular tissue. IE due to NVS is indolent in onset and pre existing valvular pathology is, as in our case, frequent.² Nevertheless, classic endocarditis signs such as digital clubbing, petechiae and Osler nodes are rare. The most common valves affected are the aortic and the mitral valves with detectable vegetations being observed in about 64% of cases.⁵ Long-term combination therapy with penicillin and an aminoglycoside is usually recommended. Vancomycin is an effective alternative against resistant strains. In spite of *in vitro* results, treatment failure is observed in about 41% of cases, and almost 27% require prosthetic valve replacement, especially due to congestive heart failure or major systemic emboli,⁶ relapse and death are also common, 17–27%.²

Since *G. adiacens* is a bacterium which is nutritionally deficient, requiring pyridoxal and L-cysteine as growth factors, it is difficult to obtain growth of this bacterium on ordinary culture media like SBA even from specimens and blood culture broths showing Gram positive cocci in direct smears. It may fail to grow on conventional blood culture media, since many of them lack pyridoxal unlike the automated blood culture broths like BACTEC or BacT ALERT. Hence *G. adiacens* is considered as one of the causes of culture negative IE.

Granulicatella and Abiotrophia are more resistant to antibiotics than viridans streptococci. Most strains are sensitive to clindamycin, erythromycin, rifampicin and vancomycin. Notably, the present susceptibility profile is in agreement with those of other NVS isolates; many of the previous strains were also susceptible to penicillin whereas they exhibited variable susceptibility to aminoglycosides.^{7,8}

Due to the clinical significance and the exacting cultural requirements of this bacterium, it is essential that the clinicians and the microbiologists should consider this bacterium in culture negative cases of IE.

Conflicts of interest

All authors have none to declare.

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