

Granulicatella Elegans Induced Sepsis; A Rare Case of Nutritionally Variant Streptococcal Infection

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Abstract Granulicatella genus, a nutritionally mutant variant of viridans streptococci was originally classified as a part of abiotrophia group until 1995 and later in 2000 as a separate genus are considered as a rare cause of blood stream infections. They are part of normal flora of human oral cavity, intestinal and urogenital tracts and are notorious for causing odontogenic infections. We present a rare case of sepsis in a 90 year old male caused by Granulicatella elegans and some of the proposed methods of diagnosis and treatment of this uncommon infection.

Keywords: granulicatella, streptococci, sepsis

Cite This Article: Ladan Mohammadi, Noman Ahmed Jang Khan, and Lavanya Vuppu Panghat, "Granulicatella Elegans Induced Sepsis; A Rare Case of Nutritionally Variant Streptococcal Infection." *American Journal of Medical Case Reports*, vol. 5, no. 3 (2017): 77-78. doi: 10.12691/ajmcr-5-3-8.

1. Introduction

Granulicatella genus, a nutritionally mutant variant of viridans streptococci, was originally classified as a part of *Abiotrophia* group until 1995 and later in 2000 as a separate genus. It is considered as a rare cause of blood stream infections. Nutritionally variant streptococci (NVS) are part of normal flora of human oral cavity, intestinal and urogenital tracts and are notorious for causing odontogenic infections. NVS can be classified into *Abiotrophia* and *Granulicatella*. *Abiotrophia* genus includes *Abiotrophia defectiva* whereas *Granulicatella* genus comprises *G. adiacens*, *G. balaenopterae*, and *G. elegans*. *Granulicatella elagans* is a rare cause of sepsis associated with oral flora.

2. Case History

A 90 year-old male presented to the emergency department with an unresponsive episode. His past medical history is significant for severe dementia, hypertension, hyperlipidemia, severe systolic heart failure with left ventricular ejection fraction of 20%, severe pulmonary hypertension and atrial fibrillation with pacemaker. Physical examination was remarkable for tachypnea and poor oral hygiene. An urgent computerized tomography (CT) of the head without contrast was performed and did not reveal any acute intracranial pathology. Initial laboratory work-up showed white blood cell count elevated at 28,000/mm³ and bandemia. The patient's oxygen saturation continuously decreased despite oxygen therapy and a trial of BiPAP. He was admitted to the intensive care unit, intubated and put on mechanical

ventilator. The patient met systemic inflammatory response syndrome (SIRS) sepsis criteria and was started empirically on vancomycin and zosyn. The blood cultures collected from his right and left arm grew gram positive cocci suggestive of streptococcus resembling *Granulicatella elegans* on VITEK 2XL using antibiotic susceptibility testing (AST) and identification (IT) cards and was found susceptible to penicillin, ampicillin, streptomycin and vancomycin. Antimicrobials were tailored to penicillin G of 18,000,000 units daily. Patient's leukocytosis and bandemia resolved and repeat blood cultures were negative. Patient's mental status did not change despite negative blood cultures and IV antimicrobial administration. Upon family's request, he was transferred to palliative medicine care for comfort care measures. In the light of patient's clinical presentation, multiple co-morbidities, poor oral hygiene and positive blood cultures, this is a rare case of *G. elegans* induced sepsis. As per thorough literature search very few cases of *G. elegans* induced sepsis have been reported to date.

3. Discussion

Viridans streptococci are one of the most common organism involved in native valve endocarditis. Nutritionally variant streptococci are nutritionally mutant viridans streptococci implicated in a variety of clinical infections. A typical source for bacteria to enter the bloodstream is via tooth-tissue with *Granulicatella elegans* being the most fastidious bacteria.

Granulicatella species are uncommon clinical isolates, with the majority of reported isolates recovered from blood cultures [1]. Bacteremia has also been reported in absence of endocarditis. [2] Specimens from dental plaque which had been cultured, showed isolates of gram-positive

cocci in chains with bacteriolytic activity and satellitism. Very few case reports of *Granulicatella* infections have been reported so far with infective endocarditis and sepsis being the most common infections [3,4]. *Granulicatella* has also been associated with osteomyelitis, meningitis, various abscesses, peritonitis, pneumonia, and severe infections of foreign bodies such as pacemaker wires or prosthetic valves.

Biomedical testing and/or molecular confirmation are used to identify *Granulicatella* isolates. Although false identification of species has been reported with biomedical testing, reporting *G. elegans* as *Streptococcus acidominimus*, *Gemella morbillorum* and *G. adiacens*. [5] Accelerating the identification of *Granulicatella* has been challenging, many methods such as the ribosomal 16S-23S intergenic spacer region [6] and fluorescence in situ hybridization has been used [7]. Due to its fastidious nature, slow growth and increased resistance to antibiotics, *Granulicatella* spp. infection should be always suspected in isolates having gram positive cocci suggestive of streptococci especially in elderly and showing some resistance to conventional anti streptococcal antimicrobials including cephalosporins and macrolides.

Antibiotic susceptibility testing by disc diffusion is not recommended for *Granulicatella* isolates but broth micro dilution is suggested. [8] *G. elegans* has a susceptibility rate of 100% to penicillin, 0% to cefuroxime and 33% to ceftriaxone. [9] It shows resistance to clindamycin, tetracyclin, ciprofloxacin and erythromycin and β -lactam antibiotics but not to vancomycin or rifampin has been reported. [9] Since many infections are managed without susceptibility testing, the need to routinely perform them is unclear. [8]

4. Conclusion

Granulicatella species being considered a rare cause of infection are suggested in patients with slow-growing, α -hemolytic streptococci isolated from blood cultures or other sterile site. Early diagnosis and initiation of

antibiotic treatment including a combination of benzyl penicillin, ampicillin/ amoxicillin, or vancomycin alongside gentamicin [10] is highly recommended before further results are obtained.

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