



## **ABIOTROPHIA DEFECTIVA SEPTIC ARTHRITIS OF A NATIVE KNEE**

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<p><b>Article Info</b> Received 22/03/2016 Revised 27/03/2016 Accepted 05/04/2016</p> <p><b>Key words:</b> Pleiomorphic coccobacillus, Abiotrophia defectiva, Genitourinary.</p>	<p><b>ABSTRACT</b> Abiotrophia defectiva (<i>A. defectiva</i>), previously known as nutritionally variant streptococci (NVS), is part of the normal human flora, found most commonly in the oral, genitourinary, and intestinal cavities. It is a fastidious, gram-positive bacterium that often appears as a pleiomorphic coccobacillus. Commonly associated with endocarditis, the microbe is difficult to both isolate as well as eradicate. Few examples are provided in the orthopaedic literature, mostly involving prosthetic joint infections. To our knowledge, this is the first documented case report describing infection of <i>A. defectiva</i> in a native knee joint, which highlights the clinical significance of the organism.</p>
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### **INTRODUCTION**

Abiotrophia defectiva, previously known as nutritionally variant streptococci (NVS), is part of the normal human flora [1]. Found most commonly in the oral, genito Abiotrophia defectiva urinary, and intestinal cavities, it has long been associated with endocarditis infections [2-4]. Isolation of *A. defectiva* is difficult requiring the addition of l-cysteine or pyridoxal to the culture medium. Diagnosis is often aided by 16s rRNA gene sequencing [5]. This method is an expeditious alternative to traditional methods of culture plating affording accurate identification of many bacteria.

Although *A. defectiva* has been described in prosthetic joint infections and endocarditis, to our knowledge this is the first documented case report describing infection of *A. defectiva* in a native knee joint, which highlights the clinical significance of the organism, which is often difficult to isolate and treat.

### **Case Report**

A 76-year-old gentleman initially presented to our clinic with a chief complaint of bilateral knee pain, right worse than left. He stated that it had been present for approximately 10 years, but had recently worsened. He denied any trauma to the right knee. Previously, he had taken non-steroidal anti-inflammatories for the pain, but they provided little relief at this time. The patient denied any previous corticosteroid injections or surgery. The patient's past medical history includes diabetes mellitus, cancer of the intestine, hypercholesterolemia, and vitiligo. Based on his clinical history, physical exam and radiographs, he was diagnosed with bilateral knee osteoarthritis.

In clinic, he received an intra-articular injection composed of 0.5 cc triamcinolone 40 milligrams/milliliter and 5.0 mL bupivacaine 0.25% bilaterally. This was half of the usual dose of triamcinolone given his diabetes mellitus. Over the next 2 days, the patient's blood sugars were monitored and found to be stable.



Three days after the injection the patient called the clinic reporting a significant increase in swelling and pain in the right knee. He was seen in the clinic urgently, where he was found to have a right knee effusion, with warmth, but minimal erythema. The knee was aspirated and 60 ml of cloudy yellow fluid was obtained and sent for synovial fluid analysis and culture. The aspiration revealed 29,115 white blood cells with 90% segs and no crystals. His complete blood count revealed a normal white count of 10.00. Given the concern for infection, he was taken to the operating room for an arthroscopic irrigation and debridement. The knee was re-aspirated at that time, and 30 cc of cloudy yellow fluid was sent again for synovial fluid profile and bacterial culture. At the time of this procedure, the patient was found to have moderate synovitis, significant degenerative joint disease of all three compartments and tears of the medial and lateral menisci, but no frank purulence. A debridement and synovectomy was performed, and the knee was copiously irrigated.

Vancomycin 1250 mg daily was initially started after all cultures were obtained. *A. defectiva* was isolated from the culture broth the following day at which point the infectious disease service at the institution was consulted. They recommended using ampicillin 2 g intravenous every 4 hr in addition to rifampin 600 mg by mouth daily for six weeks. The patient was discharged on hospital day 5, following PICC line placement, in stable condition. He was contacted 2 days later status post discharge and was found to be doing well following the irrigation and debridement.

Approximately one month postoperatively, the patient was seen in the clinic and was noted to have worsening pain. The knee was aspirated in the orthopaedic clinic, and synovial fluid analysis revealed 87,400 WBC, 97 segs, and no crystals. His ESR and CRP both remained elevated at 93 and 16.2, respectively. He was sent to the emergency department where he was admitted for repeat irrigation and debridement.

Intraoperatively, three bacterial and fungal cultures were sent, none of which were positive. At the recommendation of infectious disease, the patient's PICC line was discontinued, and he was changed to PO Amoxicillin 1g 3 times daily and Rifampin 600mg daily given negative cultures. The patient remained stable throughout the hospitalization and was discharged to a skilled nursing facility on postop day 6 in stable condition.

Roughly three weeks later, while at his skilled nursing facility, the patient was found unresponsive secondary to ventricular fibrillation. He was brought to the hospital where he was pronounced dead from cardiac arrest. Upon performing an autopsy, he was found to have significant coronary artery disease with multiple vessel occlusions though no endocarditis was noted.

## DISCUSSION

*Abiotrophia defectiva* is a fastidious, gram-positive bacterium that often appears as a pleiomorphic coccobacillus. The morphology is fitting for the organism, given its previous classification as a nutritionally variant streptococcus. While *A. defectiva* and other nutritionally variant streptococci can be grown by routine blood cultures, they are uniquely identified in the laboratory for their fastidious nature, requiring pyridoxal or thiol group supplementation for growth [1]. However, newer techniques, such as 16S rRNA gene sequencing has recently been utilized in diagnosing infection with this fastidious microorganism, often misidentified using traditional identification methods [6].

The bacterium is an indigenous part of the human oral cavity, as well as the urogenital and intestinal tracts [7]. Systemic infection with *Abiotrophia defectiva* can result in bacteremia and endovascular pathology, being estimated as the etiologic agent of bacterial endocarditis in 2-6% of cases [8, 9]. Binding to extracellular matrix proteins is a common virulence mechanism of *A. defectiva*, providing insight into the pathogenicity of endovascular infections caused by this organism [10].

Osteoarticular infection with *A. defectiva* is rare, often associated with a concomitant dental procedure or endovascular infection, and has only been reported in association with arthroscopic manipulation, or prior prosthesis in the cases of septic arthritis [11, 12]. Although the pathogenesis is incompletely understood, arthroplasty involves deposition of fibronectin on biomaterial surfaces, potentially creating a nidus for *Abiotrophia* growth [13]. Without history of pre-existing prosthetic material, spontaneous seeding of a native joint with *A. defectiva* has not yet been reported without an inciting cause of infection.

Early studies describing the antimicrobial susceptibility of the nutritionally variant streptococci, *Abiotrophia*, demonstrated their susceptibility to clindamycin, chloramphenicol, erythromycin and vancomycin, yet noted decreased susceptibility to penicillin [1,14]. Alarming, resistance rates to penicillin have been previously reported in 9 percent of isolates, creating a significant challenge in achieving a microbiologic cure [15]. When comparing common species of *Abiotrophia*, *A. adiacens* was found to be less resistant to penicillin than *A. defectiva* [16]. Further complicating successful treatment of osteoarticular and endovascular infections, penicillin resistance is often associated with decreased susceptibility or resistance to other beta-lactam antibiotics, including ceftriaxone.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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None



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