# Fantastic Bugs and Where to Find Them (in the Brain and Bone): Atypical Abiotropha Defectiva Endocarditis Complicated by CVA and Spinal Osteomyelitis

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**Abstract**

67-year-old presented with subacute left temporal lobe infarction, lumbar spine osteomyelitis, and aortic valve vegetation. Further investigations demonstrated Abiotrophia defectiva bacteremia. He was treated with penicillin and gentamicin, discharged with 4 weeks ceftriaxone. We wish to raise awareness of complications of A. defectiva endocarditis and encourage further research into treatment.

## Introduction

Abiotrophia defectiva is a nutritionally deficient streptococci species that has significant potential for endovascular damage, and is implicated in many cases of culture-negative endocarditis [1]. Due to its fastidious nature, diagnosis and treatment can typically be delayed, which leads to suboptimal outcomes. A. defectiva has been implicated in distal embolization to organs, leading to multiorgan failure [2]. We present the rare case of A. defectiva endocarditis, leading to simultaneous anterior choroidal artery infarction with spinal osteomyelitis and discitis.

## Case Presentation

We present the case of a 67-year-old male with past medical history of mitral valve prolapse, aortic stenosis treated with aortic valve replacement (AVR), coronary artery disease treated with coronary artery bypass graft (CABG) and essential hypertension who presented to the hospital with a 2-day course of dizziness and frequent falls. He reported multiple falls over the course of three months that had worsened recently. In addition, he reports incidental right-sided hearing loss, as well as nights sweats, anorexia, and a 26-lb weight loss during this 3-month period. He denied any head trauma, focal weakness or bowel/bladder incontinence. No evidence of infective endocarditis was found on physical examination, such as Janeway lesions or finger clubbing.

Vital signs were stable on admission. Laboratory studies were positive for elevated leukocytes at 13.6 white blood cells (WBCs), and hyponatremia at 126 mEq/L. CT imaging of the head demonstrated chronic microvascular disease with no acute intracranial abnormalities. Initial blood cultures were positive for Gram positive cocci in chains; empiric vancomycin was started. MRI brain demonstrated a subacute infarct in the medial aspect of the left temporal lobe, likely in the anterior choroidal artery (Figure 1).

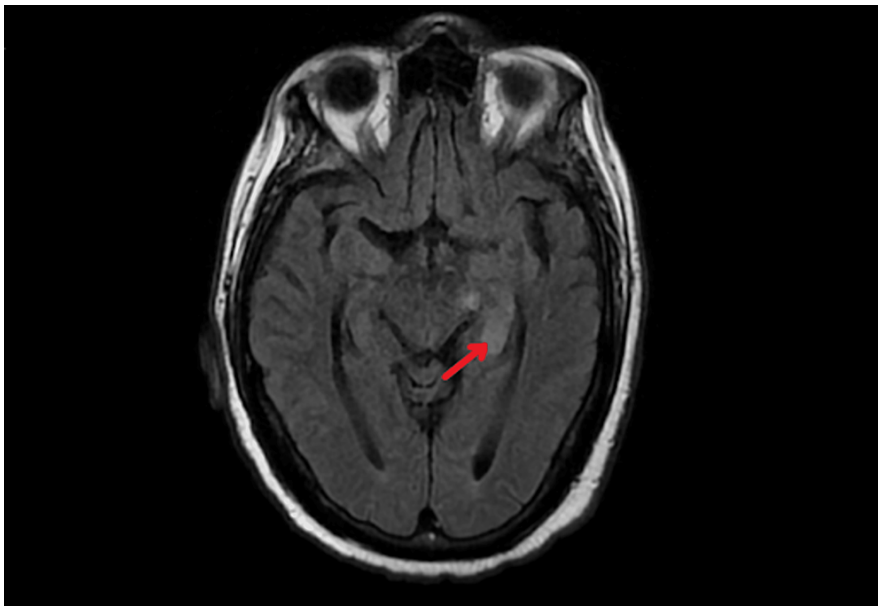

Figure 1: T2-weighted MRI Brain. Red arrow indicates area of subacute infarct in the left temporal lobe of the brain.

CT angiogram of the head and neck revealed a right posterior communicating aneurysm with arterial sclerotic plaques at the right vertebral artery. MRI of the T-spine and L-spine were positive for signal changes at L2-3, L4 -5, and L5-S1, concerning for osteomyelitis (Figure 2).

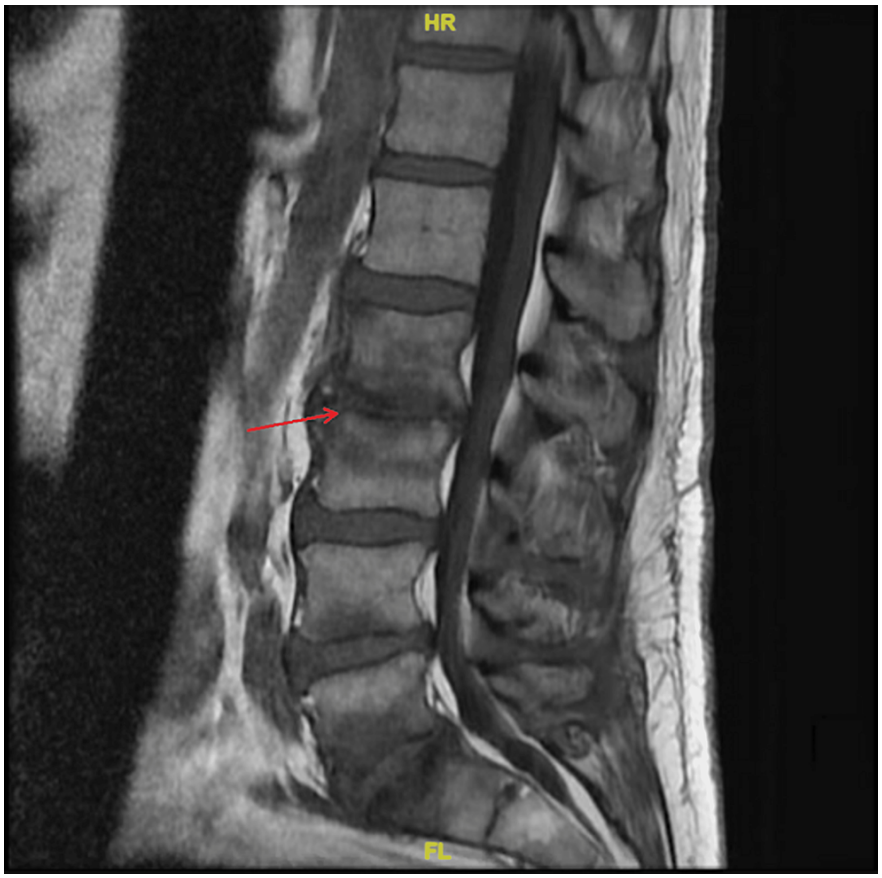


Figure 2: T1 sagittal MRI L-spine. Red arrow at the L4-L5 level demonstrates marked marrow signal changes suggestive of osteomyelitis/discitis

Initial blood cultures returned positive for Abiotrophia defectiva. At this time vancomycin was replaced with penicillin and gentamicin. There was suspicion for left-sided endocarditis with sequelae from septic emboli. Trans-thoracic Echocardiogram (TTE) revealed an ejection fraction (EF) 55% with severe mitral regurgitation. Trans-esophageal Echocardiogram (TEE) revealed EF 60-65%, with a probable mobile mass on the aortic valve with undefined origins along with mild-to-moderate aortic stenosis (Figure 3)

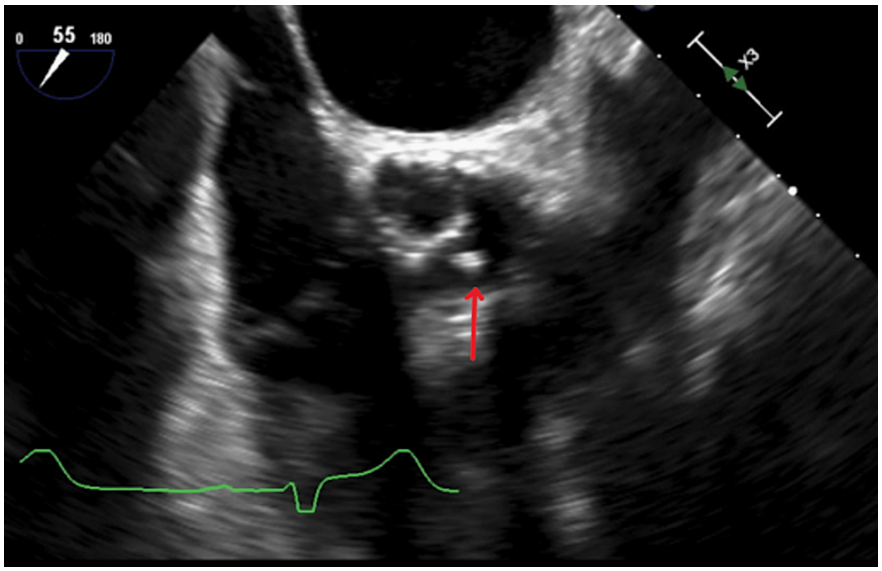


**Figure** 3: Mid-esophageal short-axis aortic valve imaging with trans-esophageal echocardiogram. Red arrow indicates a mobile aortic mass with mild to moderate aortic stenosis.

Subsequently, A. defectiva was confirmed to be the causative organism by two sets of positive blood cultures. Our patient was advised to complete a 4 week antibiotic course of penicillin and gentamicin. Sensitivity studies demonstrated that this strain was susceptible to ceftriaxone, and our patient was shortly discharged with outpatient follow-up.

**Discussion**

Abiotrophia defectiva is a nutritionally-variant streptococci (NVS) that is typically found in normal conditions in the oral cavity, GI tract, and GU system. It can be a rare cause of infectious endocarditis, and historically has a high incidence rate of valvular complications. The incidence of A. defectiva is implicated to be approximately 5-6% of streptococcal endocarditis cases, and 1-2% of all causes of infective endocarditis [1], with most common cause being dental manipulation [3]. Fewer than 150 cases of Abiotrophia endocarditis have been published in the literature thus far, and to our knowledge very few involve simultaneous cerebrovascular accidents with hematogenous seeding to the bone.

Our patient's history was complicated by a previous history of bioprosthetic AVR with CABG, which is the likely nidus for infection. Interestingly, there is low evidence to suggest a predilection for prosthetic valves, in contrast to Viridans group streptococci which favor prosthetic valve infection [3]. Approximately 50% of patients require surgical resection of valvular vegetations [4]. The 2012 EASE trial suggests that patients with severe valvular disease and larger mass would likely benefit from earlier operative intervention and decrease risk of systemic embolic events [5]. Endocarditis as a result of Abiotrophia spp. typically result in smaller vegetations compared to streptococcal endocarditis [6]. Surgical resection was unnecessary in our patient, who sustained only mild-moderate stenosis of the aortic valve and recovered with antibiotic therapy alone.

Due to difficulty of treatment, AHA guidelines recommend treatment of A. defectiva endocarditis with dual agent antibiotic therapy similar to treatment of enterococcal endocarditis. Optimal therapy entails use of penicillin G with gentamicin, typically for 4-6 weeks. There is evidence to suggest a synergistic effect when using beta-lactam agents alongside aminoglycosides, however vancomycin and gentamicin have also been used with varying degrees of success [7]. One retrospective study revealed a 30% success rate with penicillin/gentamicin treatment regimens, with one case requiring vancomycin and ceftriaxone due to failure

of gentamicin therapy [8]. Abiotrophia spp. resistance to traditional antibiotic therapy is a field that may require further investigation.

Infections due to Abiotrophia spp. are known to cause septic embolization and resultant cerebrovascular ischemic effects at higher rates compared to Streptococcal spp. [9]. Previous investigation has demonstrated that early operative (e.g. valvular surgery) interventions are not associated with worsened outcomes in cardioembolic strokes; however, mortality is significantly elevated in patients undergoing operative intervention with hemorrhagic transformation [7]. There have been previously documented cases of Abiotrophia spp. endocarditis resulting in hemorrhagic strokes [10], however the majority of cerebrovascular complications are cardioembolic without hemorrhagic transformation. Further investigation into incidence of hemorrhagic complications from embolic strokes as a result of Abiotrophia spp. is warranted.

In addition to cerebral complications, our patient also sustained osteomyelitis and discitis from Abiotrophia defectiva endocarditis. Puzzolante et al describes a series of A. defectiva osteomyelitis, all of which were treated medically with antibiotic therapy and eventually recovered, of which only two cases required spinal surgical intervention. [11]. The majority presented with identifiable risk factors for native vertebral osteomyelitis (NVO), including IV drug usage, degenerative spinal disease, and infective endocarditis. With the exception of the obvious nidus of infective endocarditis, our patient presented with no other risk factors for osteomyelitis, and reported no symptoms of spinal osteomyelitis, including back pain or discomfort.

The treatment for NVO due to A. defectiva is typically 4-6 weeks of antibiotics - this is identical in nature to our current treatment course. Guidelines per the Infectious Disease Society of America (IDSA) do not specifically point to treatment guidelines for NVO, however treatment suggestions can be assumed from enterococcal infections, for whose treatments in turn do not differ significantly from AHA guidelines [12]. Puzzolante et al suggests that antibiotic treatment length beyond 6 weeks does not seem to affect the general favorable clinical outcome in these cases, especially in the context of surgical intervention.

## Conclusions

Abiotrophia defectiva is a rare cause of infective endocarditis that is a typical inhabitant of the GI tract. Embolization of an endocarditis nidus is more frequent compared to other infectious species, however our patient also experienced dissemination to the bone and embolization to the brain, an infrequent occurrence. Our patient recovered without complications after treatment with a course of penicillin and gentamicin in the inpatient setting, and with outpatient management on ceftriaxone. It is our goal to raise the awareness of clinicians to the existence and complications that can result from A. defectiva endocarditis, as well as encouraging further research into efficacious antibiotic treatment. We hope this will result in prompt treatment and avoid further complications from A. defectiva endocarditis.

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