Infective endocarditis is an uncommon heart infection, typically involving heart valves. *Abiotrophia defectiva* is a rare cause of endocarditis, typically found within the GI tract, and is usually difficult to isolate and requires specialized media. We report a case of *Abiotrophia defectiva* endocarditis following a root canal.

2. Case Presentation

The patient was a 58-year-old Caucasian female with a medical history of Hashimoto’s thyroiditis and hyperlipidemia who presented to her primary care provider for a weight loss of 26 lbs. over three months. She had noted double vision and feelings of lightheadedness over the last
month. She had no fevers, chills, night sweats, shortness of breath, chest pain, or generalized weakness. She was afebrile with normal vital signs and incidentally was found to have developed a new systolic murmur, but an otherwise unremarkable physical exam. On further investigation, she had a root canal performed approximately three months prior to hospitalization. She received no antibiotics prior to the procedure and no indication for antimicrobial agents to be used for prophylaxis.

For evaluation of the patient’s complaints, a complete metabolic profile, complete blood cell count, coagulation studies, blood cultures, urinalysis with reflex culture, thyroid stimulating hormone, and antinuclear antibody initially demonstrated only mild anemia. Transesophageal echocardiogram was significant for vegetation present on the aortic valve. A transesophageal echocardiogram demonstrated a left ventricular ejection fraction of 60–65%, a medium-sized and pedunculated mobile aortic valve vegetation (Figure 1), as well as a patent foramen ovale.

Additionally, a computed tomography (CT) angiogram was performed and showed severe obstructive coronary artery disease involving the left anterior descending and ramus arteries, true bicuspid aortic valve, and large vegetation measuring at 10 mm × 6 mm.

Magnetic resonance imaging (MRI) brain without contrast, performed due to complaints of double vision, identified three separate 3 mm small acute infarcts involving the right cerebral hemisphere. Magnetic resonance angiogram (MRA) of the neck and brain was negative.

Blood cultures performed on the day of admission were found to be positive in 2 out of 4 bottles for *Abiotrophia defectiva*, and the patient was subsequently started on gentamicin and penicillin G.

Cardiothoracic surgery was then consulted and performed an aortic valve replacement with a bioprosthetic valve as well as a mitral valve repair. He then remained on penicillin and gentamicin postoperatively for treatment of the *Abiotrophia defectiva* endocarditis and bacteremia. Postoperatively, his course was complicated by sinus node dysfunction/junctional rhythm which ultimately progressed to sick sinus syndrome requiring ventricular pacing, and a dual chamber pacemaker was implanted. Cultures taken from the aortic valve during the procedure were positive for *Abiotrophia defectiva* though Gram stain was unremarkable. Upon discharge, the patient’s antibiotics were deescalated from penicillin G every 4 hours and gentamicin every 8 hours to ceftriaxone daily as blood culture sensitivities showed the organism was susceptible to ceftriaxone. *Abiotrophia defectiva* has been found to be a rare cause of infective endocarditis, as well as brain abscesses, osteomyelitis, and septic arthritis. It has also been found that up to 11.8% of healthy individuals are colonized with this microbe [11, 12].

*Abiotrophia* species are known for growing in satellite colonies and for their particular nutritional requirements. Though these bacteria can be grown on routine media, as with our patient, growth media enhanced with vitamin B6 or cysteine allow for selective growth [10, 13]. As routine growth media can be used in routine blood cultures, both overgrowth of other bacteria and limited growth due to insufficient nutrients can lead to *Abiotrophia* species being undetectable [10, 13]. With advances in microbiology since the first reported case of this microbe, primary isolation media have changed in composition considerably [10]. In our patient’s case, she had positive blood cultures which allowed for targeted antibiotic therapy.

Notably, *Abiotrophia* species and *Granulicatella* species are two rare causes of endocarditis with prior studies noting that endocarditis caused by these micro-organisms is nearly twice as prevalent (1.51% vs 0.88%) as endocarditis caused by the HACEK organisms (*Haemophilus, Aggregatibacter, Cardiobacterium, Eikenella, and Kingella*) [14]. Typically, patient’s with *Abiotrophia* species endocarditis are younger on average than patients with viridans group streptococci endocarditis by approximately two decades with a mean age of diagnosis of 42 [15]. Dental manipulation has been identified in approximately 32% of cases of *Abiotrophia* defective endocarditis [15], prompting the question of if antibiotic prophylaxis could be justified in this patient population. *Abiotrophia* species have also had a predilection of affecting the mitral valve in cases of endocarditis though the aortic valve has been involved in a minority of cases [16].

Additionally, these patients also have a lower rate of intravenous drug use in comparison to viridans group streptococci endocarditis [15]. In our patient’s case, she had a recent history of a root canal 3 months prior to presentation with no history of intravenous drug use.

*Abiotrophia defectiva* endocarditis was previously believed to have a higher mortality rate than viridans group streptococci [14], but recent evaluation of the available data suggests that the mortality rate is similar (approximately

3. Discussion

Nutritionally variant streptococci were first described in 1961 and have been isolated from oral, intestinal, and genitourinary flora, as well as blood [9, 10]. A particular subspecies of this, *Abiotrophia defectiva*, has been found to be a rare cause of infective endocarditis, as well as brain abscesses, osteomyelitis, and septic arthritis. It has also been found that up to 11.8% of healthy individuals are colonized with this microbe [11, 12].

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*Abiotrophia defectiva* endocarditis was previously believed to have a higher mortality rate than viridans group streptococci [14], but recent evaluation of the available data suggests that the mortality rate is similar (approximately
9.2% vs. 9.6%, $p = 0.043$) [15]. Of note, there is a higher rate of periannular complications, 28.9% vs. 22%, in comparison to viridans group streptococci, though there has been no evidence of difference greater predilection for prosthetic valves [15]. Interestingly, the rate of cardiac surgical intervention was higher in patients with Abiotrophia defectiva endocarditis in comparison to endocarditis caused by viridans group streptococci (65.8% vs. 50%, $p = 0.003$) [14, 15].

A study by Bouvet et al. compared different treatment regimens for nonviridans streptococci-induced endocarditis and found that treatment with penicillin and gentamicin was more efficacious than monotherapy with penicillin alone [17]. They also discovered that treatment with vancomycin itself was at least as effective as penicillin plus an aminoglycoside, thereby suggesting that vancomycin would be a viable option in patients showing poor response to the former [17]. This has led to the American Heart Association recommending a regimen of penicillin G and gentamicin for 4–6-week period with an alternative regimen of vancomycin and gentamicin if the patient is unable to receive penicillin G [18]. Further studies since that time revealed that increasing resistance has emerged towards beta-lactam and macrolide antibiotics, as well as to penicillins [17]. Our patient was started on combined therapy with penicillin G and gentamicin upon initial cultures and responded well. She continued this regimen while hospitalized and was subsequently discharged on ceftriaxone for a simplified antibiotic regimen as blood cultures had shown the microbe was sensitive to the antibiotic.

4. Conclusion

Infective endocarditis is an infection of a native or prosthetic of the heart, mural endocardium, or an indwelling cardiac device. Most commonly, infective endocarditis is caused by Staphylococcus aureus. Abiotrophia defectiva is a rare cause of infective endocarditis and is typically unable to be isolated in blood cultures. It is a common micro-organism found in the gastrointestinal tract and was likely introduced to the blood stream following her root canal. Unique to this patient, his blood cultures were positive, allowing for early identification of the infection and initiation of appropriate antibiotic therapy. Once Abiotrophia defectiva is isolated, treatment usually begins with penicillin and gentamicin, and in our patient, he was responsive to this regimen.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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