ISSN: 2755-1067

Journal of Diseases Disorders & Treatments

SCIENTIFIC Research and Community

Case Report

Open Access

The High Mortality of Aerococcus Urinae Infective Endocarditis

Abdel Rhman Mohamed[1]*, Eunice Kwak[1], Joel Kammeyer[2], Amy Waters[3] and Meghan Sawyer[3]

[1]Department of Internal Medicine, The University of Toledo, Toledo, OH, USA

[2]Department of Infectoius Diseases, The University of Toledo, Toledo, OH, USA

[3]The University of Toledo College of Medicine and Life Sciences, The University of Toledo, Toledo, OH, USA

ABSTRACT

The presence of Aerococcus endocarditis remains to be rare with a high mortality rate and a poor prognosis with some literature suggesting as high as 50%. We present a case involving a 43-year-old male patient with Aerococcus urinae infective endocarditis that, unfortunately, led to his death. It is thought that there was an abscess formation that may have interfered with the hearts innate conduction system leading to asystole.

Our case serves as a poignant reminder of the urgent need for CardioThoracic Surgery evaluation in the management of Aerococcus endocarditis, particularly in cases characterized by severe valve dysfunction and extensive vegetations. The 2015 guidelines from the American Heart Association for treating infective endocarditis suggest that early valve replacement surgery may be warranted in instances where there is evidence of congestive heart failure due to significant valve malfunction, as well as in cases involving severe valve regurgitation accompanied by large mobile vegetations exceeding 1 cm in size. We recommend that identifying Aerococcus IE warrant CardioThoracic Surgery assessment given its high mortality.

***Corresponding author**

Abdel Rhman Mohamed, Department of Internal Medicine, University of Toledo; 2100 W. Central Ave, Toledo, OH, USA, 43606; Tel: 419-902-9110.

Received: July 01, 2024; **Accepted:** July 04, 2024; **Published:** July 15, 2024

Keywords: Aerococcus Urinae, Infective Endocarditis

Abbreviations List
IE: Infective Endocarditis
TEE: Transesophageal Echocardiogram

Introduction

The bacteria, Aerococcus urinae, is primarily associated with urinary tract infections, especially among individuals with pre-existing urinary abnormalities, and males over the age of 65 [1]. However, more reports in medical literature indicate these organisms are also linked to complex bloodstream infections, such as infective endocarditis. Infective endocarditis (IE) refers to inflammation of the heart valves, the inner lining of the heart and the endocardium. IE is commonly caused by bacterial infections with the majority being gram positive streptococci, staphylococci and enterococci. These groups of bacteria represent approximately 90% of all cases of IE. Staphylococcus aureus is responsible for approximately 30% of cases worldwide [2]. The next largest group of organisms responsible for IE are the HACEK organisms: Haemophilus, Actinobacilus, Cardiobacterium, Eikenella and Kingella. These organisms are less frequent causes of IE. Fungal sources are responsible for approximately 1% of cases [3]. Currently, the mainstay treatment is intravenous antibiotics for at least 6 weeks. However, surgery is warranted when a patient experiences acute heart failure, extensive infection with abscess formation, arterial embolization, or a fungal source. The AHA/ACC recommend surgical treatment in the event of atrioventricular block, paravalvular abscess, mobile native valve vegetations greater than 10 mm, or the presence of destructive infiltrative lesions. We present a case of Aerococcus urinae infective endocarditis that, unfortunately, resulted in the patient expiring. Our goal is to highlight the high mortality of Aerococcus urinae Infective Endocarditis.

Case Report

Our patient was a 43-year-old male with a medical history significant for essential hypertension, type 2 diabetes mellitus, dyslipidemia, gout, hemorrhagic cystitis, remote history of a deep venous thrombosis not on anti-coagulation, and morbid obesity. He initially presented to the emergency department for diffuse joint pain starting in his bilateral knees followed by hip and then bilateral wrists. He also had associated shortness of breath and chills. In the ED, his labs were significant for an elevated white count at 27K with neutrophilia as well as an acute kidney injury. The patient was started on broad-spectrum antibiotics for sepsis. Erythrocyte Sedimentation Rate (ESR), uric acid, rheumatoid factor, and procalcitonin were elevated; however, ANA, ANCA, CCP Ab, dsDNA, HIV, and Hepatitis panel were all negative. Blood cultures came back positive for Aerococcus Urinae; Infectious Disease was consulted who recommended intravenous (IV) Penicillin Gas guided by susceptibility testing, as well as a transthoracic echocardiogram (TTE) to assess for intracardiac valvular vegetations. The TTE was suspicious for an aortic vegetation, so Cardiology was consulted to perform a transesophageal echocardiogram (TEE). The TEE showed a

trileaflet aortic valve with severe regurgitation, as well as a large mobile vegetation on the aortic valve measuring approximately 1.5 cm by 1 cm with no obvious abscess. It appeared to be involving both the non-coronary and left coronary cusp and was seen on both the aortic and ventricular side of the valve but mostly involving the ventricular side.

Cardiothoracic Surgery was consulted for aortic valve replacement, who recommended ischemic workup prior to surgery as well as imaging for concern of a small aortic annulus. During this period, the patient's white blood cell count continued to rise to 49K, and he was becoming more hypotensive with an increasing lactate and troponin. Infectious Diseases recommended switching Penicillin to Ceftriaxone and Gentamicin.

After discussion between the Internal Medicine team, Infectious Diseases team, and the Critical Care team following patients' continuous hypotension with signs of end-organ damage refractory to fluid resuscitation as well as the high mortality of Aerococcus Urinae Infective Endocarditis, the decision was made to transfer the patient to the intensive care unit (ICU), for closer monitoring. A diagnostic heart catheterization remonstrated a large, highly mobile aortic valve vegetation near the coronary ostia not amenable to AngioVac. Cardiology felt that a coronary angiogram would risk potential embolization of vegetation, and a coronary CTA was recommended. In order for a Coronary CTA to be done, they needed his heart rate to be reduced to a range of 60-70 as he was tachycardic in the 101s. The patient was given oral metoprolol with no change to his tachycardia, and he was then given IV metoprolol multiple times. Later that day, the patient had multiple asystolic cardiac arrests on the floor. He was given glucagon for concern for beta-blocker toxicity and returned to the cath lab undergoing CPR, and a temporary pacemaker wire was placed with good capture. Continuous renal replacement therapy (CRRT) was to be initiated, however the patient arrested again for the ninth time, and ROSC was unable to be achieved leading to the patient expiring on his eight day of admission. It was unclear whether the asystolic cardiac arrest was attributed to the medication toxicity or if the vegetation was potentially affecting the conduction system.

Discussion

The presence of Aerococcus endocarditis remains to be rare with a high mortality rate and a poor prognosis with some literature suggesting as high as 50% [1]. However, due to the low number of cases that exist, there could be publication bias regarding the mortality rates [4]. The pathogenicity of Aerococcus urinae was previously believed to be low, however, as more literature is published, it is known to be a cause bacteremia leading to infectious endocarditis [1]. Risk factors include patients aged 65 years and older and patients with underlying urologic abnormalities [4]. The virulence of Aerococcus urinae is thought to be due to its ability to form a biofilm and induce platelet aggregation leading to worse outcomes in patients with baseline valvular disease [1].

The classification of the genus Aerococcus dates to 1953, established to characterize a group of gram-positive, microaerophilic, and catalase-negative bacteria with a morphology that distinguishes them from Streptococcus species [5]. This genus has since been expanded to encompass eight species including Aerococcus viridans, A. urinae, A. sanguinicola, A. christensenii, A. urinaehominis, A. urinaeequi, A. suis, and A. vaginalis [5]. Previously dismissed as contaminants and nonpathogenic, Aerococcus species have gained recognition as human pathogens in recent times. Advances in culturing methods and the broader application of microbiological identification technologies, such as 16S rRNA sequencing and matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS), have contributed to a rise in the detection of Aerococcus species in clinical samples. This enhanced detection rate has heightened understanding of these organisms' potential pathogenic nature [6-8].

Our case report represents a young male patient with additional comorbidities not commonly seen with Aerococcus endocarditis. Our patient's decline was rapid with a cause of mortality not related to embolization but rather multiple episodes of asystolic cardiac arrest. It was possible he had an aortic root abscess due to severe aortic insufficiency. It is crucial to be able to isolate this bacterium in a timely manner so treatment can be optimized. The 2015 guidelines from the American Heart Association for treating infective endocarditis suggest that early valve replacement surgery may be warranted in instances where there is evidence of congestive heart failure due to significant valve malfunction, as well as in cases involving severe valve regurgitation accompanied by large mobile vegetations exceeding 1 cm in size [4]. To the best of our knowledge, fewer than 50 cases of Aerococcus urinae infective endocarditis have been reported, most affecting the mitral or aortic valve [9].

The selection of antibiotics should be based on the specific species identified, as susceptibility patterns can vary among different Aerococcus species [8]. As of 2022, an ideal antibiotic approach has not been identified, however there have been antibiotics that may be effective, such as penicillin G and aminoglycosides [1]. Since 1991, there have been approximately 11 cases published with patients receiving surgical interventions from infective endocarditis including 5 mitral valve replacements and 6 aortic valve replacements to prevent embolization [4]. Previous reports suggest that non-endocarditis bloodstream infections can be effectively treated with a two-week course of intravenous antibiotics. Oral antibiotics, like amoxicillin, could be a viable alternative with positive outcomes and survival [8]. As for endocarditis, a four-week treatment period appears sufficient, with intravenous penicillin monotherapy proving effective for Aerococcus urinae endocarditis. Ceftriaxone, administered daily, may also be considered as an alternative. There have been reports on the combined use of beta-lactams and aminoglycosides for synergistic effects, although with inconsistent data [6-9].

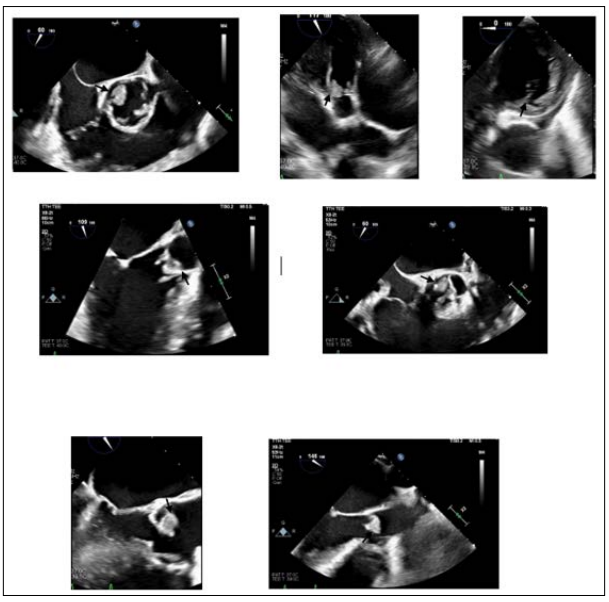

Figure 1

Conclusion

In our literature review, there have only been four reported cases of adult patients with Aerococcus urinae Infective Endocarditis who were less than 44 years of age. Similarly, our case is unique in that our patient was a young 43-year-old male without history significant for urinary tract abnormalities. We bring to attention a microbe that has a high mortality when responsible for infectious endocarditis. We believe judicious action must be taken when this microbe is identified to ensure proper management of clinical cases.

Conflict of Interest

The authors disclose no conflict of interest. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Funding Source

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical Approval Statement

This material is the author's own original work, which has not been previously published elsewhere. The paper is not currently being considered for publication elsewhere. The paper reflects the authors' own research and analysis in a truthful and complete manner. The paper properly credits the meaningful contributions of co-authors and co-researchers. All sources used are properly disclosed. All authors have been personally and actively involved in substantial work leading to the paper and will take public responsibility for its content. This manuscript does not report data generation or analysis. No consent was needed, as no patient identifiers are included.

References

1. Adomavicius D, Bock M, Vahl CF, Siegel E (2018) Aerococcus urinae Mitral Valve Endocarditis-Related Stroke: A Case Report and Literature Review. J Investig Med High Impact Case Rep 6: 2324709618758351.
2. Yallowitz AW, Decker LC (2023) Infectious Endocarditis. [Updated 2023 Apr 24]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK557641/.
3. Khaledi M, Sameni F, Afkhami H (2022) Infective endocarditis by HACEK: a review. J Cardiothorac Surg 17: 185.
4. Baddour LM, Wilson WR, Bayer AS (2015) Infective Endocarditis in Adults: Diagnosis, Antimicrobial Therapy, and Management of Complications: A Scientific Statement for Healthcare Professionals from the American Heart Association [published correction appears in Circulation 132: e215.
5. Williams Re, Hirch A, Cowan St (1953) Aerococcus, a new bacterial genus. J Gen Microbiol 8: 475-480.
6. Senneby E, Göransson L, Weiber S, Rasmussen M (2016) A population-based study of aerococcal bacteraemia in the MALDI-TOF MS-era. Eur J Clin Microbiol Infect Dis 35: 755-762.
7. Rasmussen M (2016) Aerococcus: an increasingly acknowledged human pathogen. Clin Microbiol Infect 22: 22-27.
8. Tai DBG, Go JR, Fida M, Saleh OA (2021) Management and treatment of Aerococcus bacteremia and endocarditis. Int J Infect Dis 102: 584-589.
9. Yabes JM, Perdikis S, Graham DB, Markelz A (2018) A rare case of Aerococcus urinae infective endocarditis in an atypically young male: case report and review of the literature. BMC Infect Dis 18: 522.