

CASE REPORT

Case Report: A rare case of prosthetic valve infective endocarditis caused by *Aerococcus urinae* [version 1; referees: awaiting peer review]

Muhammad Adeel ¹, Saman Tariq², Hisham Akthar², Ahmed Zaghloul³, Corina Iorgoveanu³, Carina Dehner ⁴

¹Yale New Haven Health, Bridgeport Hospital, Bridgeport, CT, USA

²Galway University Hospital, Galway, Ireland

³University of Connecticut Health Center, Farmington, CT, USA

⁴School of Medicine, Yale University, New Haven, CT, USA

v1 First published: 13 Nov 2017, 6:1998 (doi: [10.12688/f1000research.12776.1](https://doi.org/10.12688/f1000research.12776.1))

Latest published: 13 Nov 2017, 6:1998 (doi: [10.12688/f1000research.12776.1](https://doi.org/10.12688/f1000research.12776.1))

Abstract

Infective endocarditis (IE) is a serious and life threatening cardiac condition, most commonly caused by staphylococci, streptococci, enterococci and rarely by HACEK organisms (*Haemophilus*, *Aggregatibacter*, *Cardiobacterium*, *Eikenella corrodens* and *Kingella*). Here, we present a case of IE caused by *Aerococcus urinae* in a 75-year-old man with a bioprosthetic aortic valve. *Aerococcus urinae* is a gram-positive, catalase negative microorganism, and is usually an isolate of complicated urinary tract infections in the elderly male population. It is associated with high morbidity and mortality. Awareness of this organism as a cause of IE is important, since failure to recognize the condition may lead to adverse clinical outcomes and significant complications with even fatal outcome, as in this case.

Open Peer Review

Referee Status: Awaiting Peer Review

Discuss this article

Comments (0)

Corresponding author: Carina Dehner (verdaderamente88@gmail.com)

Author roles: Adeel M: Conceptualization, Data Curation, Investigation, Methodology, Validation, Writing – Original Draft Preparation; Tariq S: Investigation, Methodology; Akthar H: Conceptualization, Writing – Review & Editing; Zaghloul A: Methodology, Writing – Review & Editing; Iorgoveanu C: Methodology, Supervision, Writing – Review & Editing; Dehner C: Conceptualization, Formal Analysis, Investigation, Software, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

How to cite this article: Adeel M, Tariq S, Akthar H *et al.* Case Report: A rare case of prosthetic valve infective endocarditis caused by *Aerococcus urinae* [version 1; referees: awaiting peer review] *F1000Research* 2017, 6:1998 (doi: [10.12688/f1000research.12776.1](https://doi.org/10.12688/f1000research.12776.1))

Copyright: © 2017 Adeel M *et al.* This is an open access article distributed under the terms of the [Creative Commons Attribution Licence](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Grant information: The author(s) declared that no grants were involved in supporting this work.

First published: 13 Nov 2017, 6:1998 (doi: [10.12688/f1000research.12776.1](https://doi.org/10.12688/f1000research.12776.1))

Introduction

The diagnosis of infective endocarditis (Habib *et al.*) is based on a number of factors, including patient history, physical examination, as well as diagnostic tools (blood cultures, chest X-ray and echocardiography) (Durack *et al.*, 1994), (Lukes *et al.*, 1993). Risk factors for IE include advanced age (> 60 years), male gender, history of intravenous drug use, poor dentition, structural or valvular heart disease and presence of prosthesis. It is most commonly caused by *Staphylococcus aureus*, *Streptococcus viridans*, and enterococci, and rarely by HACEK (Sharara *et al.*, 2016) organisms. Here, we describe a rare case of IE secondary to *Aerococcus urinae*, a gram-positive, catalase negative coccus that grows in clusters. It is associated with high mortality and neurological complications (Ebnother *et al.*, 2002).

Case report

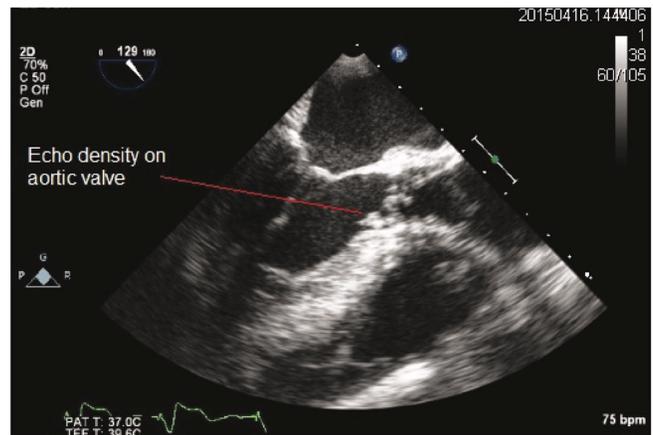
A 75-year-old Caucasian man presented to his local hospital with malaise, fever and nausea for 5 days. He had a bio prosthetic aortic valve replacement for mixed aortic valve disease 12 years ago, further significant past medical history included placement of a permanent pacemaker for complete heart block, right total hip replacement, hypertension and benign prostatic hyperplasia (BPH). The patient had no history of smoking, alcohol consumption or illicit drug use. The patient had no recent surgeries or dental work and the review of systems was unremarkable. The physical exam revealed vital parameters of HR 97 bpm regular, BP 134/87, temperature of 101.5°F, respiratory rate of 18 per minute and oxygen saturation of 96% on room air. On precordial auscultation a systolic and a diastolic murmur were heard in aortic area, mild bi-basal crepitation, but no JVD or peripheral edema. The rest of the physical exam was unremarkable. His labs showed a normal white cell count (WCC) of $9.9 \times 10^6/L$, but his C-reactive protein (CRP) was elevated to 214.9 (normal <5mg/L) with a stable haemoglobin (11.2 g/dl), further labs were unremarkable. His mid-stream urine showed WCC < 20; red cell count (RCC) of 20-50 and it grew mixed organisms, all considered part of the normal flora. Chest X-ray, CT scan of the brain, thorax, abdomen and pelvis did not show any significant cause of sepsis.

The patient was empirically commenced on IV piperacillin-tazobactam and vancomycin for sepsis treatment. His blood cultures grew *Aerococcus urinae* sensitive to penicillin within 24 hours of admission.

A trans-thoracic echocardiogram showed mild aortic regurgitation and mitral regurgitation with no clear vegetation, however, trans-esophageal echocardiogram (TOE) showed a moderate aortic regurgitation due to a large mobile vegetation on the bio-prosthetic aortic valve with normal left ventricular function, no peri-valvular abscess was noted (See Image 1a and 1b).

Clinical presentation, echocardiographic findings and positive blood cultures fulfilled Duke's criteria (Hoen *et al.*, 1996) for IE. Patient was managed as prosthetic aortic valve endocarditis from *Aerococcus urinae* with IV amoxicillin 2 grams every 4 hours, and gentamicin 1 mg/kg twice daily as per local guidelines. Antibiotic

A



B

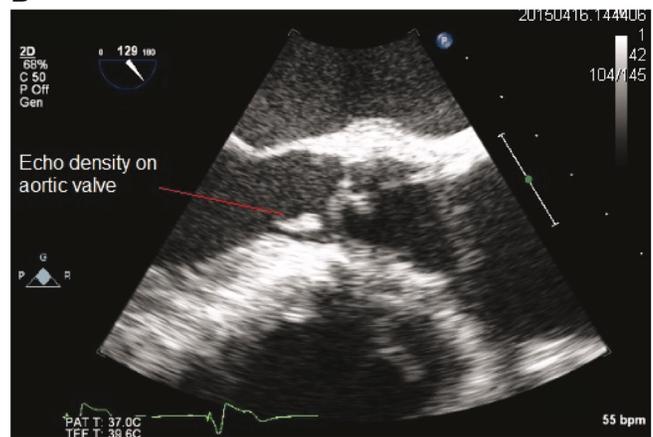


Figure 1. **1A:** Transesophageal echocardiogram (TEE), mid-esophageal view showing mobile echo density on prosthetic aortic valve. **1B:** Transesophageal echocardiogram (TEE), mid-esophageal view enlarged to show mobile echo density on prosthetic aortic valve.

therapy for 6 weeks in total with early surgery for prosthetic valve replacement was planned (Truninger *et al.*, 1999).

Despite prompt initiation of appropriate antibiotic treatment and intensive clinical monitoring, the patient failed to improve this hospitalization and developed a large pulmonary edema and progressive aortic regurgitation, and died before definitive surgery. As per family's wishes, an autopsy was not performed.

Discussion

Aerococcus urinae is a gram-positive, catalase negative coccus which grows in clusters. It is mostly associated with urinary tract infections in elderly men, especially in the setting of structural abnormalities e.g. BPH, urethral strictures and nephrolithiasis. It has been associated with culture negative infective endocarditis (Slany *et al.*, 2007). It is reported to be sensitive to penicillins/

cephalosporins and resistant to sulfonamides and aminoglycosides (Skov *et al.*, 2001). There are less than 20 reported cases of IE caused by *Aerococcus urinae* worldwide.

Despite being sensitive to common antibiotics, prosthetic valve endocarditis (PVE) secondary to *Aerococcus urinae* can be difficult to manage with antibiotic therapy alone, and often requires surgical intervention (Wang *et al.*, 2007). The indications for surgical intervention for PVE include severe prosthetic dysfunction, severe heart failure, large persistent vegetation and abscess or peri-valvular involvement (Habib *et al.*, 2005). The presence of vegetation on the valve created a consistent source of bacteria that could embolize and can serve as a source of sepsis.

This case highlights the importance of source control by expediting prosthesis removal in presence of overt symptoms of worsening cardiac failure and worsening prosthesis dysfunction (regurgitation in this case), as medical therapy alone may not be sufficient to effectively treat *Aerococcus urinae* IE despite appropriate sensitivities. Early identification is crucial and can be life-saving. The main problem is current diagnostic testing for microorganisms – whereas 16s sequencing would be the most time-efficient method, it's rarely done, as the expertise is limited and costs

are high. Recently, there is good evidence for the use of MALDI-TOF (Senneby *et al.*, 2013), (Senneby *et al.*, 2016) due to increased detection rates, even in direct comparison to 16s sequencing.

In conclusion, *Aerococcus urinae* used to be a rare cause of IE but rates have been increasing significantly within the last 10 years. Therefore establishing a concise and broadly acknowledged protocol from diagnosis up to patient management is critical.

Consent

Written informed consent for publication of their clinical details was obtained from the patient. Permission was also granted from a next of kin for publication of the manuscript.

Competing interests

No competing interests were disclosed.

Grant information

The author(s) declared that no grants were involved in supporting this work.

References

- Durack DT, Lukes AS, Bright DK: **New criteria for diagnosis of infective endocarditis: utilization of specific echocardiographic findings. Duke Endocarditis Service.** *Am J Med.* 1994; **96**(3): 200–209.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Ebnöther C, Altwegg M, Gottschalk J, *et al.*: ***Aerococcus urinae* endocarditis: case report and review of the literature.** *Infection.* 2002; **30**(5): 310–313.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Habib G, Tribouilloy C, Thuny F, *et al.*: **Prosthetic valve endocarditis: who needs surgery? A multicentre study of 104 cases.** *Heart.* 2005; **91**(7): 954–959.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Hoen B, Béguinot I, Rabaud C, *et al.*: **The Duke criteria for diagnosing infective endocarditis are specific: analysis of 100 patients with acute fever or fever of unknown origin.** *Clin Infect Dis.* 1996; **23**(2): 298–302.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Lukes AS, Bright DK, Durack DT: **Diagnosis of infective endocarditis.** *Infect Dis Clin North Am.* 1993; **7**(1): 1–8.
[PubMed Abstract](#)
- Senneby E, Göransson L, Weiber S, *et al.*: **A population-based study of aerococcal bacteraemia in the MALDI-TOF MS-era.** *Eur J Clin Microbiol Infect Dis.* 2016; **35**(5): 755–762.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Senneby E, Nilson B, Petersson AC, *et al.*: **Matrix-assisted laser desorption ionization-time of flight mass spectrometry is a sensitive and specific method for identification of aerococci.** *J Clin Microbiol.* 2013; **51**(4): 1303–1304.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Sharara SL, Tayyar R, Kanafani ZA, *et al.*: **HACEK endocarditis: a review.** *Expert Rev Anti Infect Ther.* 2016; **14**(6): 539–545.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Skov R, Christensen JJ, Korner B, *et al.*: **In vitro antimicrobial susceptibility of *Aerococcus urinae* to 14 antibiotics, and time-kill curves for penicillin, gentamicin and vancomycin.** *J Antimicrob Chemother.* 2001; **48**(5): 653–658.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Slany M, Freiburger T, Pavlik P, *et al.*: **Culture-negative infective endocarditis caused by *Aerococcus urinae*.** *J Heart Valve Dis.* 2007; **16**(2): 203–205.
[PubMed Abstract](#)
- Truninger K, Attenhofer Jost CH, Seifert B, *et al.*: **Long term follow up of prosthetic valve endocarditis: what characteristics identify patients who were treated successfully with antibiotics alone?** *Heart.* 1999; **82**(6): 714–720.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Wang A, Athan E, Pappas PA, *et al.*: **Contemporary clinical profile and outcome of prosthetic valve endocarditis.** *JAMA.* 2007; **297**(12): 1354–1361.
[PubMed Abstract](#) | [Publisher Full Text](#)

The benefits of publishing with F1000Research:

- Your article is published within days, with no editorial bias
- You can publish traditional articles, null/negative results, case reports, data notes and more
- The peer review process is transparent and collaborative
- Your article is indexed in PubMed after passing peer review
- Dedicated customer support at every stage

For pre-submission enquiries, contact research@f1000.com

F1000Research