Case report

Prosthetic valve endocarditis caused by Aerococcus Urinae

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ABSTRACT

Infective endocarditis (IE) caused by Aerococcus urinae is rare. The true incidence rate of this pathogen is likely underestimated as this is easily misidentified as Staphylococci or Streptococci. It is also associated with increased risk of complications such as systemic emboli. Aerococcus usually affects elderly males with underlying urological conditions. Here we present a case of IE with this rare Aerococcus urinae in a young man with a bioprosthetic aortic valve, despite negative urine cultures.

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Introduction

Aerococcus urinae was first described as an Aerococcus- like organism (ALO) in 1967 [1]. It was recognized as the newly emerging urinary pathogen that caused local and systemic urinary tract infection in 1991 [2] and was subsequently described as Aerococcus urinae in 1992 [3]. A. urinae accounts for approximately 0.2–0.8% of all cases of urinary tract infections (UTI) [4]. Invasive infections by A. urinae are infrequent, of which IE is the most commonly reported disseminated aerococcal bacteremia. This complication occurs in 0.5–3 cases per 1 million people per year [5,6]. Less than 50 cases of A. urinae IE have been reported in literature [7] of which prosthetic valve involvement is exceedingly rare, primarily due to misidentification as Streptococci or Staphylococci species. It has been reported as one of the causes of culture negative IE [9]. Other conditions associated with A. urinae include lymphadenitis, soft tissue infections in genital area, peritonitis in peritoneal dialysis patients, postpartum infections and joint infections [4,5].

Case presentation

A 43-year-old morbidly obese man with past medical history of uncontrolled type 2 diabetes mellitus, fungal endocarditis status post aortic valve replacement with bioprosthetic valve and tricuspid valve replacement, heart failure with reduced ejection fraction (30–35%), grade I diastolic dysfunction, atrial fibrillation, non-ischemic cardiomyopathy with biventricular pacemaker and automated implantable cardioverter defibrillator (AICD), and chronic kidney disease (CKD) secondary to diabetic nephropathy was admitted with sepsis secondary to UTI and an episode of syncope. Of note, the patient was not adherent to his prescribed medication regimen, and his past history was negative for urological abnormalities. His physical examination was remarkable only for obesity class III, no cardiopulmonary distress and bilateral 2+ pitting pedal edema.

Laboratory findings were notable for leukocytosis, elevated creatinine levels and elevated troponin. His urine was cloudy, though he denied urinary symptoms. After collection of blood and urine cultures, he received empiric antibiotic therapy with vancomycin and cefepime. Transesophageal echocardiogram revealed a well-seated bioprosthetic aortic valve with a large mobile vegetation measuring 1cmx0.6cm. His urine cultures showed no growth during the hospital course. Blood cultures initially speciated as Granulicatella adiacens within two days of admission. Two weeks later, the culture confirmed the growth of rare Aerococcus urinae. The patient met Duke’s criteria for diagnosis of IE, with both major criteria (positive blood cultures and echo cardiac evidence of vegetation) and minor criteria of fever and underlying heart condition [10]. No other immunologic or vascular features were noted. The antibiotics were deescalated to ceftriaxone and vancomycin, which were continued during his hospital stay. Cardiac catheterization showed diffuse left anterior descending artery stenosis, requiring CABG. Hospital course was complicated by worsening acute CKD that was attributed to acute tubular necrosis (ATN) and required hemodialysis. Given the patient’s underlying complicated medical background, he was considered high risk for cardiac surgery and was treated successfully with intravenous antibiotics.

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Discussion

Aerococcus urinae is a catalase negative, alpha hemolytic gram positive coccus, with forming colonies arranged in clusters or tetrads on blood agar. Often, the organism is misidentified as Streptococci or Staphylococci. It resembles microscopic characteristics of Staphylococci, biochemical, growth characteristics and hemolysis pattern of Streptococci and the antibiotic resistance patterns of enterococci [5,11]. Moreover, isolates of A. urinae have been wrongly assigned as Granulicatella adiacens [12]. Hence, the true incidence is underestimated.

The normal habitat of pathogenic aerococci is unknown, but the organism is considered part of the normal flora of the urinary tract [13]. Potential virulence mechanisms for Aerococcus include platelet aggregation and biofilm formation [14], both of which are considered in the pathophysiology behind A. urinae associated IE. Aerococcus species were rarely suspected to cause human disease and were usually considered as contaminants in clinical cultures from non-sterile sites [15].

A. urinae UTI often affects the elderly (age >65 years old), men and those with existing urological pathologies, such as prostatic hyperplasia, urethral stricture, renal calculi, and prior urinary tract surgery [5,16]. Many patients also have underlying comorbidities such as diabetes, heart disease, dementia and chronic renal failure [21]. This case of A. urinae IE involved a patient who was unusually young with no underlying urological abnormalities with uncontrolled diabetes as an underlying comorbidity. The most commonly involved valve in A. urinae is the aortic valve followed by mitral valve [11]. The mortality is reported to be high due to a significant incidence of embolic events. Cardiogenic shock, septic emboli, stroke, renal failure and disseminated intravascular coagulation are other complications [17]. Aortic wall ulceration is also a complication of A. urinae IE [18]. Hence, timely diagnosis and appropriate management is essential to prevent severe mortality and morbidity.

16S ribosomal RNA gene sequencing is the gold standard for accurate identification of Aerococcus, but this technique is costly, time-consuming, and impractical for most diagnostic clinical microbiology labs [19]. With improvement in diagnostic methods, especially matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS), Aerococcus has been increasingly recognized as a human pathogen. MALDI-TOF MS is rapid, accurate, and has demonstrated good sensitivity and specificity in identifying aerococci [20].

Despite the fact that A. urinae is a rare organism causing IE, most cases respond well to antibiotic therapy, and surgery is often not needed [16]. No definite treatment recommendations for either dosage or duration are mentioned in the literature. A. urinae is almost always sensitive to penicillin, ampicillin, carbapenem and aminoglycosides [4]. Based on the literature review, patients with endocarditis on native valves should be treated with intravenous penicillin for at least 4 weeks in combination with an aminoglycoside for at least the first 14 days with monitoring of clinical and laboratory results [21]. Aminoglycosides should be cautiously used due to their side effect profile, especially in elderly patients. Due to high mortality, extending the combination antibiotic therapy to 6 weeks might be reasonable. Such an extended course must uniformly be the practice in cases of prosthetic valve IE. In cases with penicillin allergy, clinicians may use vancomycin or daptomycin along with gentamicin [22,23].

The indications for surgical intervention for prosthetic valve endocarditis include severe prosthetic valve dysfunction, severe heart failure, large vegetation, and abscess or perivalvular involvement [24,25].

Conclusion

IE caused by Aerococcus urinae can present with complications even without any typical peripheral manifestations. Clinicians will benefit their patients by careful consideration of this diagnosis and by maintaining a wide differential when treating patients with valve replacement admitted with sepsis. Such practice will facilitate early diagnosis and appropriate treatment, to prevent significant morbidity and mortality.

CRediT authorship contribution statement

Reba Varughese: Writing - original draft. Achsah Mathew: Writing - original draft. Rishi Chadha: Writing - review & editing. Julia Kostka: Writing - review & editing. David Regelmann: Writing - review & editing.

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