



## Case Report

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# *Aerococcus Urinae*, an Uncommon Pathogen as Cause of Urinary Tract Infection- A Case Report

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## Abstract

*Aerococcus urinae* is an uncommon cause of urinary tract infection, mostly in elderly patients with multiple comorbidities and underlying urological diseases. We present a case of an 80-year-old, multimorbid patient who was diagnosed with *Aerococcus urinae* UTI.

**Keywords:** *Aerococcus Urinae*; Urinary Tract Infection; Multimorbidity

**Abbreviations:** UTI: Urinary Tract Infections; EUCAST: European Committee on Antimicrobial Susceptibility Testing; MALDI-TOF MS: Matrix-assisted laser desorption/ionization-time of flight mass spectrometry

## Introduction

*Aerococcus urinae* is a Gram positive, catalase negative bacterium that grows in clusters and forms colonies similar to those of streptococci. Therefore, it is often misidentified as Staphylococcus, Streptococcus or Enterococcus, and this problem contributes to the underestimation of its role as a human pathogen. As the identification methods are being further developed, the role of aerococci as human pathogen is increasingly acknowledged, especially in infections of the urinary tract and infectious endocarditis [1]. *Aerococcus urinae* has been found to produce biofilms and induce aggregation to human platelets, possessing two potential virulence mechanisms capable to explain its ability to cause human infections. Not much is known regarding the normal habitat of the aerococci met in humans, but they have been isolated as members of the normal urinary tract flora and of the oral flora of patients under cytostatic therapy [2].

The identification of *Aerococcus urinae* was greatly facilitated by the implementation of MALDI-TOF MS and 16S rRNA sequencing in clinical diagnostic microbiology, allowing a more realistic evaluation of its role as a pathogen, but still reserved to the few laboratories employing these methods [2-4].

## Case Report

An 80-year-old patient was admitted to the Emergency Department with fever (38.8 °C). He didn't complain of dysuria. He mentioned he was receiving medication for the following diseases: arterial hypertension, dyslipidaemia, paroxysmal atrial fibrillation, chronic obstructive pulmonary disease, B12 deficiency, colon diverticulosis, depression and sleep apnoea. He was diagnosed with rheumatic polymyalgia since 2019 and he was being treated with corticosteroids, which led to diabetes mellitus type 2.

Moreover, the patient had a history of prostate hypertrophy, ureterocele and bladder diverticula, whilst a previous urological examination revealed urinary retention. Due to suspicion of bladder papilloma's, an appropriate urological examination was scheduled. Two months ago, the patient was admitted in a tertiary hospital with a diagnosis of prostatitis. However, the isolation and identification of a specific pathogen was not achieved. Ciprofloxacin and amikacin were prescribed as empirical antibiotic therapy.

Upon admission, initial laboratory tests demonstrated: FBC: WBC 9690/μL, Neutrophil-Lymphocyte Ratio (NLR) 8, indicating

mild stress level, Haemoglobin 9.7gr/dL, Haematocrit 33.3%. The patient's biochemical profile was as follows: glucose 228 mg/dL, urea 53 mg/dL, creatinine 0.86 mg/dL, K 4.1mmol/L, Na139 mmol/L, SGOT 10U/L, SGPT 13U/L,  $\gamma$ GT 11U/L, ALP 37U/L, amylase 27.1 U/L, CRP 0.50mg/dL.

Further sample testing included urine chemical analysis using an automated urine analyzer (iChem Velocity Urinalysis Analyzer, Leriva), urine sediment microscopy and conventional urine culture. Urine microscopy showed pyuria, mild hematuria and the presence of cocci. After 48-hour incubation, the urine culture revealed  $10^5$ cfu/mL of a Gram (+) positive, catalase (-) negative, alpha-hemolytic coccus in tetrads, on blood agar. The identification testing was performed using the semi-automated Microscan Autoscan-4 System (Siemens). The microorganism was identified as *Aerococcus urinae* (Microscan ID: 99.99%) and was susceptible to penicillin, ampicillin, ciprofloxacin, levofloxacin and vancomycin, and resistant to nitrofurantoin, according to the criteria of the European Committee on Antimicrobial Susceptibility Testing (EUCAST).

## Discussion

Current international medical literature suggests that the aerococci have been found as human path-ogens causing a wide range of infections, such as UTIs and several invasive infections (bacteremia, infective endocarditis, spondylodiscitis, hip abscess, lymphadenitis, acute pyelonephritism peritonitis) and also soft tissue infections. The prevalence of *Aerococcus urinae* UTIs has been reported to be 0.2-0.8%, although in a 2015 study, a 4% prevalence has been observed [4].

*Aerococcus urinae*'s association to urinary tract infections is supported by a growing number of case reports [5-12]. The case reported by Higgins and Garg [12] presents many similarities to the case we describe in this article, since they both regard elderly patients with bladder neoplasms and multiple comorbidities. The conclusions derived are strongly supported by the retrospective, observational cohort study conducted by Sahu et al. [13].

The pathogenicity mechanisms of *Aerococcus urinae* include biofilm formation [2,14,15], human platelet aggregation [2,15] and cytotoxicity to human urothelial cells [15]. In a mouse model described by Gilbert et al. [16], *Aerococcus urinae* exhibits tropism for the kidney and causes histological inflammation and neutrophil recruitment to the kidney. These findings may help understand better its potential to act as an uropathogen.

## Conclusions

Noted conditions that predispose to *Aerococcus urinae* urinary tract infections are underlying comorbidities and seniority. The continuous progress of diagnostic methods allowed the misidentification obstacle to be overcome, thus leading to an increased detection of *Aerococcus urinae* infections and to the realization that this is a microbe of non-negligible clinical interest

in geriatric, multimorbid patients.

## Acknowledgements

None

## Conflict of Interest

None.

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