

Recurrent Urinary Tract Infection in a Renal Transplant Patient by Pan-resistant *Myroides* Spp

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ABSTRACT

The *myroides* bacteria species are multidrug-resistant gram-negative aerobic bacilli. The genus *myroides* comprises two species, i.e., *M. odoratimimus* and *M. odoratus*, and is usually associated with infections in immunocompromised patients; though infections in immunocompetent individuals have also been reported. They are a rare cause of infection worldwide. So far, only 53 cases have been reported in the literature. Here, we report a case of recurrent urinary tract infection by *myroides* species. This is the first documented case in Saudi Arabia to the best of our knowledge.

Key Words: *Myroides*, Recurrent UTI, Renal transplant recipient, Immunosuppression.

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INTRODUCTION

The *myroides* bacteria species are ubiquitous in the environment and are found in soil and water.¹ They are a rare opportunistic bacterial species. The nature of their multidrug-resistance is not fully understood.² The organisms had been implicated in skin and soft tissue infections, urinary tract infections (UTIs), pericarditis, and bacteremia. The cases had been reported from the USA, Greece, Italy, India, Turkey, Tunisia, and China.³

As the resistance mechanisms of *myroides* spp. are still not fully elucidated, and in view of the pan-drug resistant nature of these bacteria and risk of potential nosocomial outbreaks, it is imperative that the hospital infection control authorities should remain vigilant about infections by *myroides* spp.

CASE REPORT

A 62-year male presented to the hospital in September 2019 with mild fever, cough, left-sided abdominal pain, and intermittent self-catheterisation. The patient had a history suggestive of hypertension, type 2 diabetes mellitus, hepatitis C infection, nodular hyperplasia prostate, kidney transplant since 2013, and neurogenic bladder.

The patient had significant co-morbidities suggestive of immunosuppression. He was on immunosuppressive therapy with cyclosporine 150 mg/d, mycophenolate 1500 mg/d, and prednisone 10 mg/d.

A few months earlier, the patient developed an episode of sepsis by *escherichia coli*, for which he was treated with antimicrobials; and improved with the treatment. On examination, the patient was febrile with no other notable findings. The patient's white blood cell count was 6,800 cells/ μ L with 48% neutrophils. Urine analysis showed a pus cell count of 40-50 cells/HPF. Microbiology workup revealed the growth of *myroides* spp. The colony count was significant, i.e., more than 100,000 CFU/ml. Identification and sensitivity of the organisms were achieved via the microscan automated system for microbial identification and sensitivity testing, with a 97.5% confidence level. Anti-microbial sensitivity testing revealed that the organism was resistant to all anti-microbials tested. The sensitivity pattern is shown in Table 1. The treatment was challenging due to the pan drug-resistant nature of the organism. The patient was discharged on conservative measures and reassurance; and was asked to drink plenty of water. The patient returned two weeks later with similar complaints; and the repeat culture showed isolation of *myroides* spp. with a similar sensitivity pattern. The patient was put on a trial of colistin but returned a month later with the persistence of symptoms and repeat isolation of the *myroides* spp. The organism was isolated repeatedly on three more occasions on further follow-up visits of the patient.

Prior to his last visit, he had developed right foot cellulitis for which he was admitted and treated with a combination of linezolid and augmentin empirically.

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The patient again visited a month later with urinary complaints; however, a different organism was isolated *i.e.*, *escherichia coli*, sensitive to many available antibiotics, while *myroides* infection was no more there.

Table I: Sensitivity pattern of the *Myroides* species.

Anti-microbial name	MIC	Susceptibility
Amikacin	>32	R
Cefepime	>16	R
Cefotaxime	>32	R
Ertapenem	>4	R
Gentamicin	>8	R
Imipenem	>R	R
Nitrofurantoin	>64	R
Ciprofloxacin	>2	R
Piperacillin/tazobactam	>64	R
Trimethoprim/sulfamethoxazole	>2/38	R

DISCUSSION

The *myroides* genus comprises two species, *i.e.*, *myroides odoratus* and *myroides odoratimimus*. The genus itself was conceived in 1996 after being excluded from the older *flavobacterium* genus due to important genetic differences. They are gram-negative aerobic bacilli, producing mucoid yellow colonies and a fruity odour.⁴ The microorganisms produce yellow color colonies on culture because of the pigment flexirubin. These colonies give rise to the characteristic strawberry-like odour. *Myroides* spp. bacteria have the capability to form biofilm and possess a polysaccharide capsule.¹

Myroides are rare human pathogens with low-grade pathogenicity. They have been known to cause infections predominantly in immunocompromised hosts. There had been limited reports of infections in immunocompetent hosts, as well.^{5,6} The present case also confirms the opportunistic nature of the organism as the patient went through a renal transplant and was immunocompromised.

In the present case, the organism was repeatedly isolated from the urine culture of a renal transplant patient. This management was problematic because the organism was resistant to all antibiotics being tested. The patient was treated conservatively and on separate occasions by colistin and piperacillin-tazobactam. He favourably responded, indicating the role of the patient's own immune response tackling the organism or the self-limiting nature of the infection.

This case also draws attention to the outcome of infection due to pan-resistant bacteria. The case highlights the fact that the isolation of a pan-resistant microorganism does not always lead to an adverse outcome. This has been discussed in detail by Falagas *et al.* in their study measuring the outcome of infections by pan-resistant organisms. The authors concluded that the concentration achieved by antibiotics in urine might be in excess compared to *in-vitro* susceptibility testing. Secondly, infections, may at times, be self-limiting and countered by the patient's own immune response. Thirdly, pan drug-resistant bacteria may exhibit decreased virulence and fourthly, the organisms may simply be colonisers.⁷

The outcome is in contrast to a case report by Ahamed *et al.*, whereby the *myroides* species isolated from the urine culture of a 74-year male was pan-resistant and the patient did not respond to the antibiotic therapy; and succumbed to death.³

The present patient suffered from the neurogenic bladder with a history of incomplete urinary voiding and residual urine stasis. He practised manual self-catheterisation twice a day.

As per Licker *et al.*, all these factors pose risk to infection by *myroides*.⁸ There had been two outbreaks of UTIs by *myroides* in Tunisia and Turkey; and on both these occurrences, urinary catheterisation was noted to be an important risk factor for urinary infection.^{9,10}

Given the potential for the pan-resistant nature of this micro-organism and threat of inter-species transfer of resistance genes to other micro-organisms in the hospital, it is important that clinicians should remain vigilant about infection by *myroides* spp. and document and report this organism wherever and whenever isolated.

PATIENT'S CONSENT:

Informed consent was obtained from the patient.

CONFLICT OF INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

AF: Acquisition of data, conception and design, conducted the relevant laboratory testing, and drafted the manuscript.

KF: Acquisition of data, conducted the relevant laboratory testing.

SYK: Edited, critically reviewed and revised the manuscript for important intellectual content.

ASAM, UBG, MAF: Approval of the version of the manuscript to be published.

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