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# Catheter associated urinary tract infection by multidrug resistant *Myroides* in a Diabetic patient: A case report

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**Abstract**
In the past, many life threatening infections caused by *Myroides*, a Gram negative bacteria have been reported. These include sepsis, bacteraemia, pneumonia, wound infections and urinary tract infections. It is challenging to treat infections caused by *Myroides* as it is resistant to most of the antibiotics. We report a 66 years old diabetic patient developing catheter associated urinary tract infection due to *Myroides* resistant to commonly used antibiotics.

**Keywords:** diabetes, urinary tract infection, *Myroides*, antibiotic resistance

## Introduction
M*yroides* (*Myroides* spp.) is a gram-negative, non-fermentative bacilli and is widely distributed in nature [1]. They are frequently encountered in wet environments, sea water, soil and sewage treatment plants. In the past, many life threatening infections caused by this Gram negative bacteria have been reported [2, 3]. These include sepsis, bacteraemia, pneumonia, wound infections and urinary tract infections (UTI) among other infections [4-6]. It is challenging to treat infections caused by *Myroides* as it is resistant to most of the antibiotics [7].

## Case Report
We received a urine sample from catheterised patient in the microbiology laboratory for culture and sensitivity. Urine wet mount showed 5-8 white blood cells (WBC)/hpf along with micro-organisms. Culture showed growth of round, smooth, convex, yellow-pigmented colonies (>$10^5$ CFU/ml) of 1–2 mm size on blood agar and non-lactose fermenting, smooth, non-mucoid colonies on MacConkey agar. Gram stained smears from these colonies revealed pure growth of gram negative bacilli. The organisms were catalase negative and delayed oxidase positive. Sugar fermentation test revealed the organism to be non-fermenter. It was non-motile and indole test negative. The isolate was processed in Vitek-2 compact system. This non-fermenting isolate was identified as *Myroides spp* by Vitek 2 system with good identification score of 97%. Unfortunately, species identification was not possible by Vitek 2 system.

The antibiotic sensitivity testing was performed both by Kirby Bauer disk diffusion method and Vitek 2 compact (BioMerieux) and interpreted as per CLSI 2018 guidelines (CLSI 2018). The organism was resistant to all antibiotics tested except minocycline (minimum inhibitory concentration [MIC] <1 µg/mL) (Table 1). Clinician was consulted for relevant clinical details. The patient was a 66-year-old male with a history of long standing diabetes mellitus Type II with complications like diabetic nephropathy, retinopathy and neuropathy, anaemia as well as autonomic dysfunction. Patient also had hypertension, BPH and subclinical hypothyroidism. He presented to the hospital with retention of urine and symptoms of Acute Kidney Injury (AKI). Urine was sent which showed no pyuria on microscopy and no growth on culture. During his stay, patient was intubated with Foley's catheter, Ryle's tube, and peripheral venous line. After 10 days of his hospital stay, patient developed fever and pain in lower abdomen for which urine was sent again for culture and sensitivity. Simultaneously blood culture was sent which showed no growth. As patient's general condition improved, he was discharged on empirical antibiotics. Foley's catheter was removed on discharge. Patient was advised to follow up with urine culture report in OPD.

**Table 1:** Minimum inhibitory concentration (MIC, µg/ml) of *Myroides* spp for various antimicrobial agents determined by using the VITEK 2 system

| S. No | Antibiotic tested | MIC | Result |
|---|---|---|---|
| 1 | Piperacillin/Tazobactam | >= 128 | R |
| 2 | Ceftazidime | >=64 | R |
| 3 | Cefoperazone/Sulbactam | >=64 | R |
| 4 | Cefepime | >=64 | R |
| 5 | Aztreonam | >=64 | R |
| 6 | Imipenem | >=16 | R |
| 7 | Meropenem | >=16 | R |
| 8 | Amikacin | >=64 | R |
| 9 | Gentamicin | >=16 | R |
| 10 | Ciprofloxacin | >=4 | R |
| 11 | Levofloxacin | >=8 | R |
| 12 | Minocycline | <= 1 | S |
| 13 | Tigecycline | >=8 | R |
| 14 | Colistin | >=16 | R |
| 15 | Trimethoprim/Sulfamethoxazole | >=320 | R |

## Discussion
*Myroides* spp., an environmental commensal, has established itself as a true pathogen over the last few years. Cases of UTI caused by *Myroides* have been reported in the past in patients with chronic nephritis, urinary retention, urinary calculi, and diabetes mellitus [8, 9]. Hospital acquired outbreaks of *Myroides* UTI have also been reported in the published literature [4, 10]. Diabetes is one of the major risk factors associated with UTIs caused by *Myroides spp*. There are few

studies/reports exploring UTI due to *Myroides* in catheterised diabetic patients. Patient in our report had long-standing diabetes with its complications as well as BPH. A similar study from Apollo hospital reported 7 out of 13 cases of *Myroides* UTI in diabetic patients [9]. Another apparent risk factor in our patient was urine retention due to BPH. Insertion of Foley's catheter was another predisposing factor. *Myroides* spp. has a strong tendency to form biofilms [11]. So, it becomes important to discriminate colonisations from true infection to ease out the decision as to whether to treat or not to treat such cases. Hu *et al*. [8] reported that *Myroides* isolation from urine from 9/11 catheterized patients showed no pyuria. Urine culture became negative after removal of catheter in these patients without giving any treatment.

However, our patient had signs and symptoms compatible with CA-UTI as per the CDC guidelines. Therefore, an antibiotic therapy was intended to be used. Diabetes Mellitus, urinary retention, indwelling catheter, and prolonged hospital stay may be considered as associated risk factors in our case. In case of *Myroides* UTI, the susceptibility to various antibiotics reported in literature is quite variable. However, majority of the isolates are known to be multi or pan drug resistant and difficult to treat. In a case of end-stage renal disease patient reported from Taiwan the isolate was found to be sensitive to imipenem and piperacillin-tazobactam and was successfully treated [12]. However, Solanki *et al*. [9] reported that the isolates of *Myroides* recovered from urine were resistant to all the antibiotics tested. Similarly, Ktari *et al.* [10] isolated *Myroides* spp. resistant to all the antibiotics tested.

The *Myroides* isolate reported in our case was also resistant to all the antibiotics tested except minocycline. A case of *Myroides* causing urosepsis in an immunocompromised patient has been reported from Pune, recently, where the isolate was resistant to all antibiotics tested except minocycline. The patient, however, succumbed to the infection despite the antimicrobial therapy including minocycline [13].

Hence, it should be kept in mind that *Myroides* is capable of causing serious infections in diabetic patients and is becoming increasingly common. Further studies on *Myroides* infections in diabetic patients (both catheterised and non-catheterised) and its antibiogram for effective treatment are required.

## Conclusion

Clinicians should consider the possibility of *Myroides* being a pathogen in urinary tract infections when reported by the lab in diabetic patients especially in nosocomial settings. Microbiologists should also suspect Myroides spp in oxidase positive non-fermenting bacterial isolates especially in immunocompromised patients which are inadvertently reported as Pseudomonas spp. Otherwise a lacuna in the knowledge will lead to large number of undiagnosed and untreated infections which can be life threatening in immunocompromised patients.

It is rightfully *said that "The eyes see what mind knows".*

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