

## Case Study

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## ***Myroides* spp. Causing Urinary Tract Infection in an Immunocompromised Patient: A Case Report**

Nivedita Thass\*, Manoj Kumar and Ravinder Kaur

Department of Microbiology, Lady Hardinge Medical College, New Delhi-110001, India

\*Corresponding author

### ABSTRACT

#### Keywords

*Myroides*, Urinary tract infection, Immunocompromised, Multidrug resistant

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*Myroides* spp. have historically been rare opportunistic pathogens although present widely in nature. Their notorious resistance to most classes of antibacterials and invasive potential leading to serious infections among the immunocompromised population calls for appropriate testing and management of the infections caused by *Myroides* spp.

### Case Study

A 12 year old girl presented to the paediatric OPD with complains of generalised swelling and decreased urine output for the past ten days. The swelling started from the face followed by the abdomen and limbs. The patient also had cough, difficulty in breathing and episodes of vomiting for the past 2 days. The vomiting was non-bilious and non-projectile. There was no history of fever, pain abdomen, loose stools, burning micturition or haematuria. There was no history of headache, or any evidence of focal neurological defect. On examination her blood pressure was found to be raised. Her cardiovascular and motor system functions were found to be within normal limits. On per abdomen examination,

abdomen was found to be soft and distended, no organomegaly found and bowel sounds were normal. Her haemogram was within normal limits, ANA was negative. Chest X-ray showed signs of pleural effusion and pleural fluid was negative for TB by Genexpert. Her C3 and C4 complement levels were within normal limits. On urine analysis showed protein to creatinine ratio of 2.57. Urine dipstick showed- albumin (3+) and sugar (nil). Serum protein was 3.5-4 g/dl (normal: 6-8.3 g/dl) and serum albumin 1.3-1.5 g/dl (3.5-5 g/dl). Her total blood cholesterol was 912 mg/dl (normal <200 mg/dl). The patient had hypoalbuminemia, hyper albuminuria, hyperlipidemia and generalised edema, thus a presumptive diagnosis of nephrotic syndrome was made.

She was started on tab. Furosemide, tab. Wysolone, tab. Lasix and inj. Ceftriaxone. On day 6 of her admission, she received albumin infusion. The patient was kept on a high protein diet. The patient was stable and responding to the treatment. However on day 22 of her admission, the patient had a seizure and was shifted to the ICU. The patient was started on tab. Phenytoin. The patient continued to have decreased urine output and she started to develop edema again. Over the next 24 hours patient also developed fever. Urine routine and microscopy was done. It again showed hyper albuminuria, also this time patient had pyuria (5-10 pus cells/hpf) and microscopy revealed presence of bacilli. Urine sample was sent for culture.

Culture revealed non-lactose fermenting, smooth, non-mucoid colonies measuring 2-3 mm on CLED agar and blood agar incubated under aerobic conditions showed round, convex, smooth, yellowish colonies measuring 1-2 mm. Gram stain showed gram negative bacilli. The organism was non-motile, indole negative, oxidase and catalase positive. The organism was identified as *Myroides* spp. By VITEK 2 system with an identification score of 96%. Unfortunately species level identification could not be done.

The antimicrobial testing was done using Muller Hinton agar by Kirby-Bauer disc diffusion method using CLSI guidelines 2016. Zone diameters for *Pseudomonas* were used as no standards are available for *Myroides* spp. The isolate was found to be resistant to all antimicrobials (Table 1). The MIC was obtained by VITEK 2 system and the organism was resistant to all antibiotics except Minocycline and intermediate susceptibility was seen for Tigecycline (Table 2).

The patient was started on inj. minocycline. On day 3 of starting minocycline her urine output started increasing. Further management

of nephrotic syndrome continued with steroids and high protein diet.

## Results and Discussion

Members of the genus *Myroides* were first isolated by Stutzer in 1923 and classified them as *Bacterium faecale aromaticum*. Later, in 1929 Stutzer and Kwaschnina, renamed it as *Flavobacterium odoratus* (Elantamilan *et al.*, 2015). In 1996 on the basis of extensive polyphasic taxonomic analysis it was determined that the organism formerly classified as *Flavobacterium odoratum* consisted of a heterogeneous group comprising of *Myroides odoratus* and *Myroides odoratimimus* (Vancanneyt *et al.*, 1996). Genus *Myroides* are not part of normal human microflora, rather they are encountered in the wet environments, sea water, soil and sewage treatment plants (Manish Rajan *et al.*, 2017). Over the last few years this organism has been reported to be associated with various life threatening infections including recurrent cellulitis, post-operative wound infections and severe septicaemia (Elantamilan *et al.*, 2015). They are mostly low grade opportunistic pathogens, infecting immunocompromised hosts such as those suffering from liver cirrhosis, end stage renal disease and chronic obstructive pulmonary disease on long term corticosteroid therapy (Beharrysingh, 2017). A case of *Myroides odoratimimus* bloodstream infection in a patient with chronic diabetic foot ulcer has been reported (Endocott Yazdani *et al.*, 2015). Another report documented a case of soft tissue infection, septic shock and pneumonia due to *M. odoratimimus* in an immunocompetent male (Benedetti *et al.*, 2011). Few cases of central venous catheter blood stream infections, soft tissue infections, endocarditis and ventriculitis have also been reported due to *Myroides* spp. (Ferrer *et al.*, 1995; Mac Farlane *et al.*, 1985; Motwai *et al.*, 2004).

**Table.1** Kirby Bauer disc diffusion method on Muller Hinton agar showing inhibition zone size for antibacterials

Antimicrobial agent	Zone of inhibition (mm)
Piperacillin- tazobactam	12
Norfloxacin	No zone
Amikacin	No zone
Nitrofurantoin	No zone
Trimethoprim-sulphamethoxazole	No zone
Colistin	No zone
Ertapenem	No zone

**Table.2** MICs of antimicrobial agents obtained using the VITEK 2 system

Antimicrobial agent	MIC ( $\mu$ l/ml)
Piperacillin tazobactam	$\geq 128$
Ticarcillin/clavulanic acid	$\geq 128$
Ceftazidime	$\geq 64$
Cefoperazone/ sulbactam	$\geq 64$
Cefepime	$\geq 64$
Aztreonam	$\geq 64$
Imipenem	$\geq 16$
Meropenem	$\geq 16$
Amikacin	$\geq 64$
Gentamicin	$\geq 16$
Ciprofloxacin	$\geq 4$
Levofloxacin	$\geq 8$
Minocycline	$\leq 1$
Tigecycline	4
Colistin	$\geq 16$
Trimethoprim-sulphamethoxazole	$\leq 320$

Two studies reported nosocomial outbreaks of urinary tract infections in the setting of urinary stones or cancer (Ktari *et al.*, 2012; Yagci *et al.*, 2000). In nosocomial infections the source is mostly unknown, however water has been suspected to carry this organism (Hugo *et al.*, 2006). Animal bites have also been implicated as one of the sources of infections (Maraki *et al.*, 2012). Very few cases of infections due to *Myroides spp.* has been published in India till date. A case of septicaemia from Shillong (Elantamilan *et al.*,

2015), case of urosepsis from Pune (Manish Ranjan *et al.*, 2017) and a case of pericardial effusion from Uttarakhand (Prateek *et al.*, 2015) due to *Myroides spp.* have been reported in the past. Here we report a case of urinary tract infection due to *Myroides spp.* in a child suffering from nephrotic syndrome. Immunocompromised status of the patient due to prolonged hospitalisation and treatment with steroids could have been the reasons why the patient got infected with this rare pathogen.

Treatment of *Myroides spp.* infections is often difficult as they have been found to harbour a KPC-2 carbapenemase, which can hydrolyse expanded-spectrum cephalosporins and carbapenems (Kuai *et al.*, 2011). The production of chromosome encoded metallo- $\beta$ -lactamases has also been documented in both *M. odoratus* (TUS-1) and *M. odoratimimus* (MUS-1) (Mammeri *et al.*, 2002). Majority of the strains are resistant to beta-lactams, including aztreonam and carpenems, they exhibit variable susceptibility to aminoglycosides, quinolones and trimethoprim-sulphamethoxazole. Our patient showed susceptibility for Minocycline and intermediate susceptibility for Tigecycline. Patient responded well to minocycline. However, she remained hospitalised for further management of Nephrotic syndrome.

Empirical therapy is usually ineffective due to the multidrug resistance found in *Myroides spp.* Physicians thus need to carefully consider this organism as a pathogen among the immunocompromised patients. This can lead to timely intervention and prompt switching to definitive treatment of infections caused by *Myroides spp.*

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