



Myroides Bacteremia and Ventriculitis

Chad Harris*, Swetha Musty, Sanchit Kundal, Kavita Sharma and Chanaka Seneviratne

Department of Medicine, Maimonides Medical Center, USA

Abstract

The bacterial genus *Myroides* is a gram negative Bacilli found ubiquitously in nature, isolated from both soil and water bodies. Although uncommon in human microflora, infections with *Myroides* bacteria have been observed. Due to increasingly advanced technologies in the detection of microorganisms, more number of these infections has been identified. Most cases of *Myroides* infection appear to occur in immunocompromised patients or patients who have existing comorbidities. So far, the documented infections are soft tissue related, ranging from mild cellulitis to fulminant necrotizing fasciitis. However, cases of endocarditis, bacteremia, UTI, pneumonia, and one case of ventriculitis in an infant due to *Myroides* bacteria have been reported. Here we present a case of a 52-year-old man presented with increased twitching, muscle spasms and shaking after a fall with head and left foot injury. Physical exam was significant for diffuse tetany, tremors, and chronic stasis dermatitis with a 10 cm × 10 cm ulcerated weeping ulcer on the lateral aspect of the right ankle overlying the lateral malleolus extending to the dorsum of the foot. Magnetic resonance imaging of brain suggested ventriculitis/meningitis with pus in the posterior horn of the ventricles. Blood cultures grew *Myroides* species. Antibiotic therapy was optimized to Levofloxacin and Piperacillin-Tazobactam based on sensitivities. There are few cases published on *Myroides* species related infections, but most were related to cellulitis or diabetic foot ulcer. Our case is unique because the patient is diagnosed with *Myroides* bacteremia, which is rare presentation, with ventriculitis/meningitis, an extremely rare phenomenon.

Introduction

The bacterial genus *Myroides* is a gram negative bacilli found ubiquitously in nature, isolated from both soil and bodies of water [1]. Although uncommonly found in human microflora, and previously thought to be non-pathogenic, although very rare, human infections with *Myroides* have been observed, and due to increasingly advanced technologies in the detection of microorganisms, there has been an increased number of these infections observed. Most cases of *Myroides* infection appear to occur in those who are immunocompromised or have existing comorbidities. Most documented infections are soft tissue, ranging from mild cellulitis to fulminant necrotizing fasciitis. However, other cases of endocarditis, bacteremia, UTI, pneumonia, and one case of ventriculitis in an infant have been reported [2,3].

Case Presentation

A 52-year-old man presented to the emergency department with increased twitching and muscle spasms and shaking after a mechanical fall hitting his head and traumatic foot injury. His past medical history includes end stage renal disease, diabetes mellitus, history of endocarditis with AICD infection and removal, peripheral vascular disease with chronic cellulitis with multiple debridement's, osteomyelitis of the left foot with hallux amputation. He also described weakness and inability to walk with feelings of his legs giving out from under him. He was discharged from the hospital five days prior to presentation for right lateral foot wound debridement.

His initial vital signs were stable. Physical exam was significant for diffuse tetany, tremors, and chronic stasis dermatitis with a 10 cm × 10 cm ulcerated weeping lesion on the lateral aspect of the right ankle overlying the lateral malleolus extending to the dorsum of the foot. Labs demonstrated leukocytosis with white blood cell count of 12.5, left shift with 85% neutrophils, mild anemia with hemoglobin of 9, and electrolyte abnormalities consistent with a hemodialysis patient. Patient received hemodialysis and the foot wound was sutured closed. CT head was completed and demonstrated diffuse atrophy out of proportion for age. Two days later, the patient had a witnessed grand mal seizure, aborted with 1mg of Ativan. Levetiracetam was added to his regimen for seizure prophylaxis. Patient remained postictal and was altered the following day. Two days following, patient complained of severe headache during hemodialysis and was unable to complete it. MRI

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*Correspondence:

Chad Harris, Department of Medicine,
Maimonides Medical Center, 4802
Tenth Avenue Brooklyn, NY 1121, USA,
Tel: 718-283-8343/321-693-4956; Fax:
718-283-8498;
E-mail: Chaharris@maimonidesmed.
org

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brain suggested ventriculitis/meningitis with pus in the posterior horn of the ventricles. Patient's antibiotics regimen was changed to empiric broad spectrum for suspected meningitis which included Ampicillin, Ceftriaxone, Vancomycin, and also a dose of Amikacin and Acyclovir were given. Patient remained afebrile, but altered. On day 7, patient spiked fever 100.8°F. Blood was cultures grew *Myroides* species, detected using Biofire PCR. Speciation was unable to be performed. Antibiotic sensitivities of *Myroides* showed resistance to Amikacin, Ceftriaxone, Cefepime, Aztreonam, Gentamycin, and Tobramycin. Susceptibly to Ciprofloxacin, Levofloxacin, Meropenem and Piperacillin-Tazobactam. Based on the sensitive, Cefepime was changed to Piperacillin-Tazobactam. On day 9, LP was performed and CSF analysis demonstrated protein 138, WBC 163, Lymphocytes 88, neutrophil 10%, glucose 56. *H. simplex* negative. Culture was negative, suggesting a partially treated bacterial ventriculitis or aseptic meningitis. Antibiotic therapy was optimized to just Levofloxacin and Piperacillin-Tazobactam.

Discussion

First discovered in 1923, the genus was originally identified as *Flavobacterium* due to their unique fruit-like odor in culture medium. However, later speciation in the 1990s led to the name change. The bacterial genus *Myroides* is a gram negative rod found ubiquitously in nature. It has been isolated from both soil and bodies of water [1]. Although uncommonly found in human microflora, and previously thought to be non-pathogenic, although very rare, human infections with *Myroides* have been observed, and due to increasingly advanced technologies in the detection of microorganisms, there has been an increased number of these infections observed. Based on literature review, less than 70 cases of *Myroides* infection have been reported. Three species have been identified as causing human infection: *Odoratus*, *odoratimimus*, and *injenensis* [4]. Case reports have demonstrated that these bacteria can cause significant morbidity and mortality [2,3]. These bacteria have the capability of being particularly pathogenic due to their ability to form a biofilm [5,6].

Most cases of *Myroides* infection appear to occur in those who are immunocompromised or have existing comorbidities. Most documented infections are soft tissue, ranging from mild cellulitis to fulminant necrotizing fasciitis [7,8]. However, other cases of endocarditis, bacteremia, UTI, pneumonia, and one case of ventriculitis have been reported [1,9].

Treatment of *Myroides* can be particularly difficult owing to its intrinsic antibiotic resistance. Most isolated strains are resistant to Beta-lactam antibiotics, while its sensitivity to quinolones, aminoglycosides, and sulfamethoxazole are variable [9]. This resistance is thought to be related to its production of metallo-beta-lactamases [1].

This patient was particularly interesting in several circumstances. First the patient developed bacteremia. In literature, only 6 cases of bacteremia have been reported, 4 of which were related to cellulitis or diabetic foot ulcer. This patient possessed was not only a diabetic, but complicated with bilateral chronic cellulitis and ulcer. Patient presented following traumatic injury to foot, which may have initiated seeding of the bacteria in the blood. Additionally, a

chronically infected lower extremity with disrupted skin barrier not only provides a nidus for propagation on the bacteria, but also a route to the blood stream.

Additionally, this case is unique in that the patient also developed ventriculitis. Ventriculitis can be secondary: Meningitis-bacterial and viral, Cerebral abscess with intraventricular rupture, Catheter-related-shunt or EVD related, Head trauma, Cerebrospinal Fluid (CSF) leak, Complication of neurosurgery, Complications of intrathecal chemotherapy [10].

Although the CSF did not demonstrate any organism, with given radiographic evidence of abnormal enhancement/debris in the lateral ventricles compatible to meningitis and ventriculitis, and the patient had been receiving antibiotic therapy for more than 9 days before the LP was completed, it could be likely partially treated meningitis. So far, only one case is reported of ventriculitis caused by *Myroides* bacteria, published in 1985, Macfarlane et al. [2] a case report of a 6 week old infant that developed ventriculitis due to *Myroides* in which treatment initially consisted of IV cefotaxime, but after 5 days there was no significant improvement in bacterial load, and therapy was changed to intraventricular cefotaxime [2]. If our patient's had bacterial meningitis/ventriculitis, it would be very significant as it is the only documented case of ventriculitis and bacteremia caused by *Myroides* in an adult [11].

References

- Beharrysingh R. *Myroides* Bacteremia: A Case report and concise review. Case Reports. 2017;8:34-6.
- Macfarlane D, Baum-Thureen P, Crandon I. *Flavobacterium odoratum* ventriculitis treated with intraventricular cefotaxime. J Infect. 1985;11(3):233-8.
- LaVergne S, Gaufin T, Richman D. *Myroides injenensis* bacteremia and severe cellulitis. Open Forum Infec Dis. 2019;6(7):ofz282.
- Cho SH, Chae SH, Im WT, Kim SB. *Myroides marinus* sp. nov., a member of the family Flavobacteriaceae, isolated from seawater. Int J Syst Evol Microbiol. 2011;61(Pt 4):938-41.
- Crum-Cianflone N, Matson R, Ballon-Landa G. Fatal case of necrotizing fasciitis due to *Myroides odoratus*. Infection. 2014;42(5):931-5.
- Prateek S, Gupta P, Mittal G, Singh A. Fatal case of pericardial effusion due to *Myroides odoratus*: A rare case report. J Clin Diagn Res. 2015;9(11):DD01-2.
- Harris L, Munakomi S. Ventriculitis. Stat Pearls. 2020.
- Benedetti P, Rassa M, Pavan G, Sefton A, Pellizzer G. Septic shock, pneumonia, and soft tissue infection due to *Myroides odoratimimus*: Report of a case and review of *Myroides* infections. Infection. 2011;39(2):161-5.
- Bremer P, Monk I, Butler R. Inactivation of *Listeria monocytogenes/Flavobacterium* spp. biofilms using chlorine: impact of substrate, pH, time and concentration. Letters in Appl in Mico. 2002;35.
- Pompilio A, Garlardi G, Verinelli F, Muzzi M, Giulio A Di, Bonaventura G Di. *Myroides odoratimimus* forms structurally complex and inherently antibiotic-resistant biofilm in a wound-like *in vitro* model. Fron Microbiol. 2017;8:2591.
- Meyer A, Dang H, Roland W. *Myroides* spp. cellulitis bacteremia: Case Reports. IDCases. 2019;18:e00638.