



## Septic Arthritis Caused by *Myroides odoratimimus*: A Case Report

### *Myroides odoratimimus*'un Neden Olduğu Septik Artrit: Bir Olgu Sunumu

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#### ABSTRACT

In recent years, there has been a significant increase in the frequency of infections caused by *Myroides* spp. both on a case-by-case basis and in the form of minor epidemics. It is often seen as a disease factor in immunocompromised people and can sometimes be life threatening. The most common clinical presentations are bloodstream infections, skin infections and urinary tract infections. *Myroides odoratus* and *Myroides odoratimimus* are the two most common types of Myroid as infectious agents in humans. In this study, a case of septic arthritis caused by *Myroides odoratimimus* in a 71-year-old female patient who did not receive regular treatment for her underlying diseases was presented.

**Key Words:** Septic arthritis; *Myroides odoratimimus*; Infection

#### ÖZ

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*Myroides* spp. ile ortaya çıkan enfeksiyonların sıklığında son yıllarda gerek olgu bazında gerekse ufak çaplı salgınlar şeklinde önemli artış gözlenmektedir. Genellikle bağışıklık sistemi baskılanmış kişilerde hastalık etkeni olarak görülmektedir ve bazen yaşamı tehdit edebilir. En sık görülen klinik tablolar kan dolaşımı enfeksiyonları, cilt enfeksiyonları ve idrar yolu enfeksiyonlarıdır. İnsanlarda enfeksiyon etkeni olarak en sık görülen iki Myroid türü *Myroides odoratus* ve *Myroides odoratimimus*'tur. Bu çalışmada 71 yaşında, altta yatan hastalıkları için düzenli tedavilerini almayan, kadın bir hastada ortaya çıkan *M. odoratimimus*'un etken olduğu septik artrit olgusu sunulmuştur.

**Anahtar Kelimeler:** Septik artrit; *Myroides odoratimimus*; Enfeksiyon

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## INTRODUCTION

*Myroides odoratimimus* is a gram-negative, asporogenic pathogen found in natural environments such as water and soil<sup>[1]</sup>. This agent, which is not a part of the human microbiome, can cause nosocomial and community-acquired infections. *M. odoratimimus* acts similarly to opportunistic pathogens, causing serious infections in patients with immunodeficiency and rarely in patients with a healthy immune system<sup>[2]</sup>. This article is a case report of the first reported case of septic arthritis caused by *M. odoratimimus*.

## CASE REPORT

The patient is a 71-year-old woman who had deterioration of general condition and high fever for two days. Patient mentioned drowsiness, reduction in oral intake and coughing with yellow-colored sputum for 15 days in her anamnesis. The patient had a history of hypertension, diabetes mellitus, congestive heart failure, chronic obstructive pulmonary disease, and rheumatoid arthritis. She did not take her prescribed medicine for said conditions regularly. In first examination, the patient was lethargic with a body temperature of 38.6°C, blood pressure of 120/70 mmHg, heart rate of 110 beats per minute, and respiratory rate of 18 per minute. She had rales in the right hemithorax. Blood test results outside the reference range were white blood cell count of 13.500/mm<sup>3</sup> (reference range: 4000-10.500/mm<sup>3</sup>), neutrophil ratio of 89%, C-reactive protein of 138 mg/L (reference range: 0-8 mg/L), blood urea nitrogen of 44.1 mg/dL (reference range: 6-20 mg/dL) and creatinine 1.34 mg/dL (reference range: 0.7-1.2 mg/dL). In brain magnetic resonance imaging, a lesion with the size of 38x40x49 mm was found and interpreted as a glial tumor; also chronic infarction zones were present. Thorax computed tomography imaging findings were bilateral ground-glass opacities mainly located in right inferior lobe. The patient was admitted with an early diagnosis of pneumonia. After blood and urine cultures were taken, the patient was put on antibiotherapy consisting of ampicillin-sulbactam and clarithromycin with proper doses after calculation of creatinine clearance rate. On the fourth day of admittance, the patient described pain, swelling, increased sensi-

tivity, and heat in her left knee. These findings supported septic arthritis. Joint aspiration was performed on the left knee with a pre-diagnosis of septic arthritis. In macroscopic inspection, the opacity of synovial fluid was increased. In microscopic inspection, 2400 leukocytes (95% MNL, 5% PMNL) and 180 erythrocytes per cubic millimeters were seen. There were no specific findings in gram staining. Since the patient did not show any positive clinical response, ampicillin-sulbactam and clarithromycin treatments were stopped and meropenem treatment was initiated. The sample of synovial fluid sent to the laboratory produced bacterial colonization in EMB and blood agar mediums, shown in Figure 1.

Mentioned bacteria have been defined as *M. odoratimimus* with a score of >2 using Matrix-Assisted Laser Desorption-Ionisation-Time of Flight Mass Spectrometry (MALDI-TOF MS) based Bruker IVD MALDI Biotyper 2.3 (Bruker Daltonik GmbH, Bremen, Germany) device. The synovial liquid in the left knee was completely drained because of the bacterial growth in the aspiration sample. There is no standardized antibiogram recommendation for *Myroides* spp. in The European Committee on Antimicrobial Susceptibility Testing (EUCAST) criteria<sup>[3]</sup>. Considering *M. odoratimimus* is non-fermentative when antibiotic susceptibility was interpreted using disc diffusion technique and zone diameters for *Pseudomonas*



Figure 1. *Myroides odoratimimus* colonies on sheep blood agar.

*aeruginosa*, it was found to be susceptible to meropenem and also cefepime, levofloxacin in high doses. It was found to be resistant to imipenem, piperacilin/tazobactam, ciprofloxacin, aztreonam, amikacin, ceftazidime. Considering the information found in the literature, meropenem treatment was continued<sup>[4]</sup>. There was no bacterial growth in the synovial fluid culture sample taken on the third day of the treatment. The patient showed improvement in general condition, remission in pain, and heat in the left knee. She was discharged after completing 28 days of meropenem treatment.

## DISCUSSION

This article is a case review of septic arthritis caused by *M. odoratimimus*. This is the first documented case of septic arthritis caused by *M. odoratimimus* as far as we know. Septic arthritis is a medical emergency often caused by bacteria, leading to severe morbidity and mortality. For this reason, it is highly important to diagnose early and start aggressive antimicrobial and surgical treatment for a better prognosis<sup>[5,6]</sup>. The reported incidence of septic arthritis in the general population is between 2 to 12 cases per 100.000 patients. Septic arthritis incident increases as surgery rates and patients under risk increase. This ratio increases in old patients with rheumatoid arthritis, 28 to 70 cases per 100.000 patients. The most common factor in adults and risk groups is *Staphylococcus aureus*, followed by streptococci. The predisposing factor for septic arthritis is joint diseases such as rheumatoid arthritis, gout, osteoarthritis; old age, patients who have a history of knee or hip prosthesis surgeries or joint operations, immunosuppressant medication usage, diabetes mellitus, chronic kidney failure, cancer, endocarditis, organ transplants, and etc<sup>[7-9]</sup>.

The number of nosocomial and society-acquired infections caused by unusual pathogens showing out of the ordinary symptoms are increasing in recent years. The increase in these newly defined pathogens is the result of the introduction of the MALDI-TOF mass spectrometry to clinical microbiology laboratories. The underlying cause of the appearance of these microorganisms is mainly associated with infection control in the

units and antimicrobial management. Especially, improper use of antibiotics results in the increase of antibiotic-resistant bacteria<sup>[10-12]</sup>.

*Myroides* spp. infections' number increases significantly on a case-by-case basis and also in the form of small epidemics. *Myroides* spp. is a gram-negative, obligate aerobic, urease, catalase, oxidase-positive bacillus. They grow on many agar mediums including Mac-Conkey agar and produce yellow-colored colonies. They are clinically associated with sepsis, pneumonia, ventricular infections, tricuspid valve endocarditis, pericardial effusion, prosthesis infections, acalculous cholecystitis, necrotizing pancreatitis, canaliculus, cellulitis, necrotizing fasciitis, catheter-related bloodstream infections, and urinary tract infections.

*Myroides* spp. was isolated for the first time in 1923 from human intestines and classified as *Flavobacterium*. After specialties of these bacteria were discovered (halotolerant, reproduction at 37°C, and differences in fatty acid configuration) they were reclassified as a new species (*Myroides* spp.) in 1996. *Myroides odoratus*, *M. odoratimimus*, and *Myroides injenensis* were isolated from various clinical samples and were associated with infections. Other members of this species (*Myroides phaeus*, *Myroides pelagicus*, *Myroides profundus*, *Myroides marinus*, *Myroides guanensis*, and *Myroides xuanwensis*), are not shown to be infectious to humans<sup>[1,2,13,14]</sup>. The increasing numbers of *Myroides* spp.-related infections are accompanied by some co-morbid diseases. Patients with long-term usage of corticosteroids, organ or bloodstream malignancy, terminal kidney disease, alcohol or viral infection related cirrhosis, history of physical trauma, kidney stones, cardiovascular diseases, obesity, diabetes mellitus, rheumatoid arthritis, chronic obstructive pulmonary disease, etc. are affected. Some case reviews did not mention any co-morbidity<sup>[15,16]</sup>. Our patient had underlying diseases such as new glial tumor diagnosis, diabetes mellitus, rheumatoid arthritis, chronic obstructive pulmonary disease, which affect the immune system and are documented risk factors for *M. odoratimimus* infections. Yet, no apparent environmental source for *M. odoratimimus* infections could be found. Yet again, unfitness associated with infection control and

antimicrobial management that will cause a *M. odoratimimus* infection could not be found in the last three months.

In conclusion, different clinical manifestations of rare pathogens can be seen in populations with compromised immune systems. This case review is presented to show that *M. odoratimimus* is an unusual agent in septic arthritis etiology and raise awareness in clinicians.

### CONFLICT of INTEREST

No conflict of interest declared.

### AUTHORSHIP CONTRIBUTIONS

Concept/Design: SAB, MH

Analysis: SAB, MH

Data Acquisition: MÖ, CÖ

Writing: SAB, MÖ, CÖ

Revision and Correction: SAB, MH

Final Approval: SAB

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