

## ***Moellerella wisconsensis* as a cause of peritonitis in a continuous ambulatory peritoneal dialysis patient**

*Sürekli ayaktan periton diyalizi hastasında peritonit nedeni olarak Moellerella wisconsensis*

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### **Abstract**

In this article, a 16-year-old girl who developed peritonitis due to *Moellerella wisconsensis* while being treated by continuous ambulatory peritoneal dialysis (CAPD) as renal replacement therapy is presented. *Moellerella wisconsensis* is a gram-negative, facultative anaerobic bacillus and a member of the Enterobacteriaceae family. Its natural habitat is not well known. However, it has been isolated from patients with diarrhea, cholecystitis and bacteremia. In recent years, unexpected bacteria have been observing as the cause of peritonitis in CAPD patients, and this is the first case of peritonitis due to *Moellerella wisconsensis* in a child with CAPD in the English medical literature.

**Key words:** Peritonitis, children, peritoneal dialysis, enterobacteriaceae.

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### **Öz**

Bu yazıda, böbrek replasman tedavisi olarak sürekli ayaktan periton diyalizi (SAPD) ile tedavi edilirken *Moellerella wisconsensis*'e bağlı peritonit gelişen 16 yaşında bir kız çocuğu sunulmuştur. *Moellerella wisconsensis*, gram negatif, fakültatif anaerobik bir basildir ve Enterobacteriaceae ailesinin bir üyesidir. Doğal yaşam alanı çok iyi bilinmemektedir. Ancak ishal, kolesistit ve bakteriyemili hastalardan izole edilmiştir. Son yıllarda SAPD hastalarında peritonit nedeni olarak beklenmedik bakteriler gözlemlenmektedir ve bu, İngiliz tıp literatüründe CAPD'li bir çocukta *Moellerella wisconsensis*'e bağlı ilk peritonit olgusudur.

**Anahtar kelimeler:** Peritonit, çocuklar, periton diyalizi, enterobacteriaceae.

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### **Introduction**

Bacterial peritonitis is one of the major complications in patients undergoing peritoneal dialysis. Notably, unexpected bacteria have observed as peritonitis agents among such patients in recent years. We present a case of a girl with continuous ambulatory peritoneal dialysis (CAPD) who developed peritonitis due to *Moellerella wisconsensis*.

### **Case report**

A 16-year-old girl with CAPD who had been followed up in another pediatric nephrology division for 5 years was admitted to our

pediatric nephrology department for the first time with complaints of abdominal pain and cloudy dialysate. Her medical history revealed that 6 years prior, she had undergone kidney transplantation with her mother as a donor at the same center, but rejection developed 1 year after the transplant due to non-compliance with the immunosuppressive medication. Her medical epicrisis revealed that she suffered from 5 peritonitis attacks due to *Acinetobacter lwoffii*, *Enterobacter cloacae*, and *Klebsiella oxytoca* (two times, two times, and one time, respectively). A catheter had been re-implanted due to a technical failure during this period.

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Physical examination revealed normal body temperature (36°C), abdominal tenderness, and a normal catheter exit site. Microscopic examination showed increased leukocyte count in the dialysate (6459/mm<sup>3</sup>, 90% neutrophil dominance), but no microorganisms were observed in Gram staining. Cefepime (500 mg/L loading and 125 mg/L maintenance) was started empirically. Leukocytes disappeared in the peritoneal fluid, and the symptoms improved within 3 days after treatment. *M. wisconsensis* was isolated from the patient's peritoneal fluid (Table 1), but the antibiotic regimen was not changed because of clinical and laboratory improvement. On the 14th day, the patient had completely normal clinical and laboratory findings. The catheter was not removed. During the 1-year follow-up of the patient, there was no peritonitis attack.

## Discussion

According to the English medical literature (PubMed/MEDLINE, Google Scholar, Scopus), this is the first report of a case of peritonitis due to *M. wisconsensis* in a child with CAPD. In Turkish medical literature, however, there is a case report of peritonitis due to *M. wisconsensis* associated with peritoneal dialysis in a 33-year-old adult with CAPD. Intravenous meropenem and intraperitoneal 8" gentamicin were given to that patient, who recovered without the need for catheter replacement [1]. Intraperitoneal antibiotic treatment was administered for 14 days in this case. Similarly, we treated our patient with intraperitoneal antibiotics for 2 weeks, which is the recommended duration of treatment for single Gram-negative organisms except for *Pseudomonas/Stenotrophomonas* species, for which therapy should be 3 weeks [2].

**Table 1.** In vitro susceptibility profile of *Moellerella wisconsensis* isolate

Antibiotic	Susceptibility	MIC Values (mg/L)
Amikacin	Susceptible	≤8
Amoxicillin clavulanate	Susceptible	≤1
Ampicillin/sulbactam	Susceptible	≤0.125
Ampicillin	Resistant	>16
Ceftazidime	Susceptible	≤2
Gentamicin	Susceptible	≤2
Ceftriaxone	Susceptible	≤1
Imipenem	Susceptible	≤0.25
Meropenem	Susceptible	≤0.125
Piperacillin/tazobactam	Susceptible	≤1
Trimethoprim/sulfamethoxazole	Susceptible	≤0.052

*M. wisconsensis* is a Gram-negative, facultative, anaerobic bacillus in the family Enterobacteriaceae. Although its pathogenicity is not fully known, it has attracted attention since Hickman Brenner et al. [3] isolated it for the first time from the stool of a patient with diarrhea. Its natural habitat is not well known, but it has been isolated from un-chlorinated water and food. Generally, *M. wisconsensis* has been isolated from patients with diarrhea, cholecystitis, and bacteremia [4].

*M. wisconsensis* has the general characteristics of the Enterobacteriaceae family, but some of its biochemical properties and antibiotic sensitivities distinguish it from other Enterobacteriaceae species. *M. wisconsensis*

colonies can be distinguished from *E. coli* by a positive citrate-test result, as well as negative and immobile results in indole and lysine decarboxylase tests. However, complete identification cannot be achieved in routine practice. API 20E (BioMe'rieux, Marcy l'Etoile, France) and Micronaut-E (Merlin-Diagnostika, Bornheim, Germany) are frequently used automated identification systems that can accurately identify the bacteria at the species level [5].

In our microbiology laboratory, the patient's peritoneal fluid was inoculated in agar medium with 5% sheep blood, eosin methylene blue medium, and chocolate medium. After 18-24 hours of incubation at 37°C, the tests performed

comprised microorganism colony morphology, staining characteristics, oxidase and catalase, Gram-negative identification, citrate, indole, urea, triple sugar iron agar, and motility tests. The exact identification of the bacteria was achieved with a Phoenix 100 (Becton Dickinson, Maryland, USA) automated culture and antibiotic susceptibility system [6]. Antibiotic sensitivities were evaluated according to the EUCAS T recommendations with the same automated system (Table 1).

*M. wisconsensis* is sensitive to many antibiotics that are effective against Gram-negative bacteria. It is sensitive to doxycycline, aminoglycosides, oxacillin,  $\beta$ -lactam antibiotics, fluoroquinolones, chloramphenicol, and nitrofurantoin, but rarely, it is resistant to tetracycline and trimethoprim/sulfamethoxazole [5]. In our case, it was found to be sensitive to all antibiotics except ampicillin (Table 1).

This microorganism is mostly isolated from the gastrointestinal system as a cause of disease in humans, and its virulence is not exactly known. A low prevalence of 0.75% is reported in the stools of adults with diarrhea [7]. However, it is appropriate to consider that in easily contaminated patients such as those with peritoneal dialysis, it can be easily treated, even if catheter removal is not required.

The patient is a textile worker and lives in a family of 8 people. She does not have a room of her own. There was no hemodialysis center close to the patient's residence. She had chosen CAPD as renal replacement therapy and has been performing CAPD on her own. She has not been denying that she has problems in terms of compliance with hygiene rules while applying CAPD. Therefore, we concluded that her peritoneal fluid might have been contaminated as a result of not paying attention to hand hygiene. Patients and families should be given detailed information about the sources and transmission routes of this type of microorganism, which is rarely seen as a cause of peritonitis.

**Conflict of interest:** The authors declare no conflict of interest.

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**Informed consent:** Written informed consent was obtained from the patient.

## Contributions of the authors to the article

N.Y., A.Ç, T.B. and S.Y. contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript. In addition, all authors discussed the entire study and approved its final version.