

# A Rare Peritonitis Cause in a Peritoneal Dialysis Patient: *Brevundimonas diminuta*: Case Report

## Periton Diyalizi Hastasında Nadir Bir Peritonit Etkeni: *Brevundimonas diminuta*

Orçun ALTUNÖREN,<sup>a</sup>  
 Özkan GÜNGÖR,<sup>a</sup>  
 Selma GÜLER,<sup>b</sup>  
 Yasemin COŞKUN YAVUZ,<sup>a</sup>  
 Hanife BOLAT,<sup>c</sup>  
 Elif İNANÇ,<sup>c</sup>  
 Suna KALKAN<sup>c</sup>

Departments of

<sup>a</sup>Nephrology,

<sup>b</sup>Infectious Diseases and

Clinical Microbiology,

<sup>c</sup>Internal Medicine,

Kahramanmaraş Sütçü İmam University

Faculty of Medicine,

Kahramanmaraş

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Yazışma Adresi/Correspondence:

Orçun ALTUNÖREN

Kahramanmaraş Sütçü İmam University

Faculty of Medicine,

Departments of Nephrology,

Kahramanmaraş,

TÜRKİYE/TURKEY

orcunaltunoren@hotmail.com

**ABSTRACT** Peritonitis is the most common complication of peritoneal dialysis. Empiric antibiotic treatment should target the frequently seen microbial agents. Clinicians faced with serious problems if peritonitis doesn't improve with empirical antibiotic treatments and this often results in loss of catheter. Therefore, special attention should be given to culture - antibiogram of peritoneal fluid in treatment of peritonitis and centers should apply required techniques to detect microorganisms seriously. There is not any reported case with *Brevundimonas diminuta* as peritonitis cause among peritoneal dialysis patients. *Brevundimonas diminuta* is an opportunistic microorganism and a rare cause of infection among humans and this microorganism has wide antibiotic resistance profile. We present a peritonitis attack with *Brevundimonas diminuta* which is a rare peritonitis cause in a peritoneal dialysis patient.

**Key Words:** Kidney failure, chronic; peritonitis; peritoneal dialysis

**ÖZET** Peritonit, periton diyalizinin en sık görülen komplikasyonudur. Başlangıç antibiyotik tedavisi en sık görülen mikroorganizmaları kapsayacak şekilde seçilmelidir. Ampirik antibiyotik tedavileri ile peritonit düzelmediği takdirde hastada antibiyotik seçimi konusunda problem yaşanmakta ve bu durum sıklıkla kateter kaybı ile sonuçlanmaktadır. Bu nedenle peritonit tedavisinde kültür-antibiogramı özel önem verilmeli ve merkezler mikroorganizma tespit edebilmek için gerekli teknikleri ciddiyle uygulamalıdır. Daha önce periton diyalizi hastalarında *Brevundimonas diminuta* ile bildirilmiş peritonit vakası bulunmamaktadır. *Brevundimonas diminuta* insanlarda nadiren enfeksiyon etkeni olabilen, geniş bir antibiyotik direnci profiline sahip fırsatçı bir mikroorganizmadır. Bu yazıda standart ampirik tedavilere yanıt alınamayan bir periton diyalizi hastasında nadir bir peritonit etkeni olan *Brevundimonas diminuta* ile ortaya çıkan peritonit vakasını sunduk.

**Anahtar Kelimeler:** Böbrek yetmezliği, kronik; peritonit; periton diyalizi

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Peritonitis is one of the most common complications of peritoneal dialysis and a cause of catheter removals as well.<sup>1</sup> In peritoneal dialysis centers peritonitis rate should be less than 1 per 18 months (0,67/year).<sup>1</sup> Gram positive cocci are usually responsible for peritonitis but Gram negative cocci are cause in 20% of the cases.<sup>2</sup> Guidelines recommend obtaining peritoneal fluid and blood cultures and start empiric antibiotic treatment immediately when peritonitis is diagnosed.<sup>1</sup> Empirical antibiotic treatment should cover Gram positive and Gram negative microorganisms. Resistance to treatment despite empirical antibiotic treatment or extended

spectrum antibiotic in culture negative patients may be seen frequently and leads peritoneal dialysis catheter removal. In our case there was not response to wide spectrum antibiotic treatment and peritoneal fluid culture revealed the presence of *Brevundimonas diminuta*. *Brevundimonas diminuta* is an infection cause among immune suppressed patients and has wide antibiotic resistance. This is the first *Brevundimonas diminuta* caused peritonitis in a peritoneal dialysis patient.

## CASE REPORT

A 39 year old woman who had undergone continuous ambulatory peritoneal dialysis (4 exchanges a day) for 3 year for end-stage renal disease due to chronic glomerulonephritis was admitted to hospital with abdominal pain, nausea and vomiting. In her medical history 1 month ago she used intraperitoneal cephazoline and oral ciprofloxacin 2 weeks for peritonitis. Physical examination revealed widespread abdominal tenderness. Laboratory values of the patient were as follow; BUN: 25 mg/dL, Creatinine: 8.4 mg/dL, Na: 137 mEq/L, K: 4,1 mEq/L, Albumine: 3.3 g/dL CRP: 57 mg/L, leukocyte count: 17,200/mm<sup>3</sup>, Hemoglobin: 11.6 g/dL, Platelet count: 442.000/mm<sup>3</sup>. In her peritoneal fluid analysis leukocyte count was 1.270/mm<sup>3</sup> and neutrophile count was 710/mm<sup>3</sup>. Peritoneal fluid culture was obtained and then intraperitoneal 1 g vancomycin every 72 hour and 1 g/day ceftazidime were started. At the 3<sup>th</sup> day of antibiotic treatment peritoneal neutrophil count did not decrease, intraperitoneal 160 mg/day amikacin was added to treatment. Computed tomography scan didn't show any abscess formation. Gram stain did not reveal any fungal hyphae but detected Gram negative bacilli organisms. In peritoneal fluid culture a Gram negative bacillus *Brevundimonas diminuta* was detected. Antibiogram showed that *Brevundimonas diminuta* was resistant to ceftazidime, cefuroxim aksetil, ceftriaxone, cefepime, ceftazidime and colistin but susceptible to amikacin, gentamicine, imipenem, meropenem, cefoperazone and piperacilline. After antibiogram result vancomycine and ceftazidime were ceased and cefoperasone-sulbactam 2x1 g/day intravenous was

added to amikacin treatment. After antibiotic changes the patient's symptoms improved, peritoneal fluid became clear and peritoneal leukocyte and neutrophil count decreased to 60/mm<sup>3</sup> and 10/mm<sup>3</sup> respectively. Antibiotic drugs were stopped after 21 day with successful treatment.

## DISCUSSION

Peritonitis is an important problem that affects the patients survival and catheter life. We presented a case of peritonitis due to *B. diminuta* as it is the first case in the literature.

The most common peritonitis causes among peritoneal dialysis patients are Gram positive cocci that include *Staphylococcus aureus*, *Staphylococcus epidermidis* and *Streptococcus* but infrequently Gram negative microorganisms may be cause as well. Empirical antibiotic treatment should cover the most common pathogens. Vancomycine or first generation cephalosporins should be started for Gram positive microorganisms and aminoglycoside or third generation cephalosporins should be started for Gram negative microorganism.<sup>1</sup> If hospital admission takes a long time guidelines recommend starting empirical treatment at home except this situation peritoneal fluid culture should be obtained before antibiotic treatment.<sup>1</sup> If peritoneal culture result is positive for a microorganism, antibiotic treatment should be changed due to susceptibility profile of antibiotic. But if the peritoneal fluid culture is negative antibiotic spectrum is extended and patients' catheters are usually removed. In resistant peritonitis, intraabdominal abscess, fungal peritonitis, pseudomonas peritonitis and secondary peritonitis should be considered. Peritoneal culture results are quite important because if the microorganism is isolated, treatment is usually successful with specific antibiotic. There is not any reported peritonitis case due to *B. diminuta* in literature. In our case peritonitis did not improve with empirical antibiotics then antibiotic spectrum was extended. After *B. diminuta* isolation in peritoneal fluid culture cephaloperazone-sulbactam was initiated and peritonitis improved quickly.

*Brevundimonas diminuta* was previously classified as members of Pseudomonas, and termed as

*Pseudomonas diminuta*.<sup>3</sup> Based on genetic studies, these microorganisms have been reclassified as *Brevundimonas* species.<sup>4</sup> *Brevundimonas* species are aerobic, non-sporulating, slender, motile, and non-fermenting Gram-negative bacilli.<sup>3,5,6</sup> They are environmental organisms and they have a distribution all around the world.<sup>3,5</sup> These microorganisms have been isolated from water, soil, plants, and various clinical specimens. However, they are also rarely isolated from the environment and from clinical specimens.<sup>3,5-8</sup> Human infections involving these organisms are rarely observed clinically. Reported cases are usually immunosuppressed patients that involve cancer patients under treatment and have intravascular catheter. In a tertiary hospital in Taiwan 30 bacteriemia with *Brevundimonas* species were reported in 30 patients between 2000-2010, 57% of these patients have malignancy and 40% have intravascular catheter.<sup>9</sup> Han and Andrade detected *B. diminuta* in 7 cancer patients and infection source was central venous catheter in 5 patients.<sup>10</sup> Chi et al. reported a spontaneous bacterial peritonitis due to *B. diminuta* in a cirrhosis patient.<sup>11</sup> In literature keratitis, pneumonia and soft tissue infection in a systemic lupus erythematosus (SLE) patient due to *B. diminuta* were reported as well.<sup>12-14</sup> This case is the first reported peritonitis case in a peritoneal dialysis patient due to *B. diminuta*. Our patient has not any malignancy and did not use any immunosuppressed agent.

It is known that uremia may cause immune system dysfunction and leads predisposition to in-

fections. In literature the source of microorganisms are usually central venous catheters. A peritoneal catheter is the most appropriate site for the common environmental bacteria to make infection. Hygiene situation of patient's environment is a quite important factor. *Brevundimonas* species are rarely isolated but they exhibit multiple antibiotic resistance. In literature aminopenicilline, first generation cephalosporin, third generation cephalosporin (include antipseudomonal antibiotics), colistine and quinolone resistance were reported. This bacteria are usually susceptible to aminoglycoside, piperacillin-tazobactam and imipenem.<sup>9-14</sup>

The true mechanisms of the resistance to various antibiotics are unclear. Carbapenem together with piperacillin/tazobactam may be the most reliable antibiotic for treating bacteriemia caused by *Brevundimonas* species.

## CONCLUSION

*Brevundimonas diminuta* is a rarely isolated infection cause especially among immune suppressed patients and has wide antibiotic resistance. *B. diminuta* treatment is quite difficult due to multiple antibiotic resistance. Clinicians should obtain peritoneal fluid samples for culture before starting treatment because rare microorganisms may cause peritonitis. Specific treatment for responsible microorganism may increase success of treatment.

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