

CASE REPORT



A rare case of peritonitis due to *Brevundimonas vesicularis*

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ABSTRACT

Healthcare associated infections due to gram negative bacilli are a major concern among healthcare institutions. While *Pseudomonas* and *Escherichia coli* species are known major organisms; other lesser known species can also cause primary infection. We present a case of peritonitis in a patient on a peritoneal dialysis regimen due to *Brevundimonas vesicularis*.

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1. Introduction

Infections by species of gram negative bacilli (GNB) in a hospital setting have been a growing concern for the past number of years. There are many known species of GNB that can cause opportunistic infections; one such species that has come under attention in the past few years is *Brevundimonas vesicularis*. This species was originally classified under the *Corynebacterium* genus, followed by the *Pseudomonas* genus and was finally reclassified into a new genus after recommendations in 1994 [1]. *B. vesicularis* is a gram negative, non-glucose fermenting, aerobic rod that produces yellow to orange/brown pigmentation and exhibits slow growth on many commercially used agars [2–4]. The organism has been cultured as both endogenous human flora⁵ as well as in soil and aquatic environments [5].

This organism has been an uncommon cause of infection, and review of literature performed in 2011 by Shang et al. [6] found only 15 cases of *Brevundimonas* that caused bacteremia in hospitalized patients. One such case report was a 55-year-old patient, first reported by Choi et al. 2006, who developed peritonitis while on peritoneal dialysis [7]. This was the first reported incident of peritonitis caused by *B. vesicularis*. We believe that our patient is a second case of peritonitis caused by *B. vesicularis* in the setting of peritoneal dialysis.

2. Case

The patient was a 67-year-old African American male, who initially presented to the ER with a 2-week history of right upper quadrant pain. At presentation, he reported no fever, no changes in his

dialysate, and his abdominal pain was unrelated to his oral intakes. The past medical history was significant for hypertension and end stage renal disease (ESRD) for which he has been undergoing peritoneal dialysis since January 2017. His initial blood pressure was 210/111, and he was admitted to ICU/IMC for 24 h. He was then transferred to a regular medical ward. During his admission on the medical wards, the patient continued experiencing constant gnawing abdominal pain while undergoing his scheduled peritoneal dialysis. It was during these dialysis sessions on the medical floor that the drained dialysate fluid began to take on a cloudy characteristic and the patient developed a low-grade fever. This initially led the team to suspect bacterial peritonitis. The patient was placed on empiric ceftriaxone and vancomycin. Gram staining and fluid analysis of the dialysate showed presence of gram negative rods and peritoneal fluid samples showed a WBC count of 528 cells/ μ L with 25% neutrophils and 75% lymphocytes. After 4 days of non-improving pain, the patient's peritoneal dialysis catheter was removed and a hemodialysis catheter was subsequently placed so dialysis could continue. Five days after peritoneal fluids were sent, *B. vesicularis* was identified by our lab with antibiotic sensitivities still pending. Clinically the patient had greatly improved since the removal of the catheter, with resolution of both the abdominal pain and fevers. This prompted the decision by the treatment team to stop antibiotic treatment at this time. The decision was then made that the patient could be discharged safely due to now normal blood pressure status, resolution of abdominal symptoms, and newly scheduled outpatient hemodialysis. Due to the nature and rare incidence of this organism, the antibiotic sensitivities were not

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returned until several days after his discharge showing resistance to almost all tested antibiotics except for ciprofloxacin and imipenem/cilastatin.

Note: The peritoneal fluid cultures were cultured on blood, chocolate, thioglycolate, and CDC anaerobic, and Columbia nutrient agar. Cultures were identified using both the Becton Dickinson Phoenix™ 100 automated identification and susceptibility testing system; and the API R 20 NE system for non-enteric Gram-negative rods. The extensive testing for both species and sensitivities led to the increased time course in obtaining both an identity of the organism and antibiotic susceptibilities.

3. Discussion

Infections by *B. vesicularis* are uncommonly rare, with the review by Shang et al. 2012 compiling only 15 reported cases of bacteremia caused by this organism [6]. Among these cases, our patient is most similarly compared to the case, reported by Choi et al., in which a patient on peritoneal dialysis developed peritonitis by identifying the offending organisms from culture of the peritoneal dialysate fluid. In the patient identified from Choi et al., culture of *B. vesicularis* was susceptible to all antibiotics tested including the anti-pseudomonals: piperacillin ceftazidime, cefepime, imipenem and ciprofloxacin [6]. The organism we isolated in our case showed the resistance pattern in Table 1, identified using Kirby Bauer diffusion testing. Resistance to cefepime and meropenem, both of which are known and trusted antipseudomonal antimicrobials, was noted in this organism. Sheng et al.'s review reported resistance patterns of *B. vesicularis* varying wildly across antibiotic classes. The only class of antibiotic in which resistance was not reported for in the summarized cases was trimethoprim-sulfamethoxazole but it should be noted that not every patient had every antibiotic class tested [6]; and it should be noted also that our laboratory did not test for susceptibility to this antibiotic class.

The scarcity of data, regarding infection by *B. vesicularis* and the individual testing methods of

the labs, makes generalization of antibiotic classes that can be used against this organism difficult [6]. It remains up to individual susceptibility testing to determine the best class of antimicrobial that should be used. It should be noted that the patient presented by Choi et al, presented again 4 months after removal of peritoneal dialysis catheter with abdominal pain and distension which was later revealed to be sclerosing peritonitis [7].

4. Conclusion

Opportunistic infections by gram negative rods continue to be a major concern among healthcare providers. More common infectious organisms such as *Pseudomonas* and *Escherichia coli* should be considered. However, less common and even rarer organisms such as *B. vesicularis* may end up as the offending agent. In the setting of *B. vesicularis*, more data regarding patient susceptibility and antibiotics sensitivities will need to be gathered; but individual culture and sensitivity should remain a top priority due to the varying patterns of resistance to ensure that patients are appropriately and effectively treated.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Table 1. Susceptibility VIA Kirby Bauer diffusion.

Antimicrobial	Disk diffusion (mm)
Amikacin	0
Amoxicillin + Clavulanate	0
Ampicillin	0
Aztreonam	0
Cefazolin	0
Cefepime	0
Ceftazidime	0
Ciprofloxacin	13
Gentamicin	1
Imipenem/Cilastatin	10
Meropenem	0
Piperacillin + Tazobactam	0
Tobramycin	0