Letter to the editor

Tamara Soler[1]
Begoña Santos[2]
Lech Mayor[2]
Antonio Fernández[2]
José A. Sánchez[2]
Laura Cardeñoso[1]
Diego Domingo[1]

Peritonitis caused by *Blastomonas natatoria* in a patient submitted to peritoneal dyalisis

[1]Department of Microbiology, Instituto de Investigación Sanitaria Princesa, Hospital Universitario La Princesa, Madrid, Spain.
[2]Department of Nephrology, Instituto de Investigación Sanitaria Princesa, Hospital Universitario La Princesa, Madrid, Spain.

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Sir,

Peritoneal dialysis is a method of renal replacement therapy for renal disease patients. Peritonitis is a major complication of peritoneal dialysis and increasing morbidity and mortality of patients. Peritoneal dialysis-related peritonitis can be caused by different microorganisms. *Staphylococcus* spp., *Enterococcus* spp. and Enterobacteriaceae are the main pathogenic producers of peritoneal dialysis-related peritonitis. Here we describe the first case of an infection caused by *Blastomonas natatoria* which is a microorganism that has been found as a frequent contaminant of medical devices.

We report the case of a 65-year-old man on automated peritoneal dialysis (APD) who presented an episode of peritonitis caused by an exceptional microorganism. The patient, a native of Morocco, had been diagnosed with of mellitus diabetes type 2 more than twenty-five years ago, with retinopathy and nephropathy. He also had a medical history of arterial hypertension, dyslipidemia, and recurrent thrombosis of peripheral and main vessels, needing anticoagulation. He started renal replacement therapy by hemodialysis in October 2011. In March 2014 he received a kidney transplant, which failed, so the patient remained dependent on hemodialysis. In March 2014 he presented superior cave vein syndrome with extended thrombotic occlusion of the superior cave vein, innominate trunks and central region of both subclavian veins. In October 2014 he showed thrombosis of the inferior cave vein and the iliac common vein. After this event, it was not possible for him to continue in hemodialysis because of the lack of vascular accesses, so the only renal replacement therapy possible for him was the peritoneal dialysis.

In September 2016, after a trip to Morocco, the patient presented an episode of abdominal pain with diarrhea. Physical examination revealed diffuse abdominal pain, with peritonism. His blood pressure, heart rate and temperature were 162/79 mmHg, 90 beats per minute and 36.2ºC, respectively. In blood analysis, he presented a leukocytosis of 12.800/mm^3 (84.6 of neutrophils). The dialysis effluent shown in figure 1, was cloudy, with a white blood cell (WBC) count of 38.300/mm^3, with 92% neutrophils. The appearance and the characteristics of the effluent are shown in table 1 and figure 1. Ambulatory intraperitoneal empiric antibiotic treatment with vancomycin, tobramycin and ampicillin intraperitoneal at home was started. Blood cultures were not taken but a sample of peritoneal fluid was aseptically collected and sent to the microbiology laboratory for culture purposes. Direct Microscopic observation of the sample was performed after Gram staining, and it revealed abundant polymorphonuclear cells as well as Gram-negative rods. Vancomycin and ampicillin were stopped and intraperitoneal cefotaxime was added to the treatment. The dosage regimen consisted of two doses of tobramycin, the first dose of 100 mg at the beginning of treatment and a second dose of 50 mg. Cefotaxime (500 mg four times a day) was added to the infusion bag of peritoneal dialysis fluid (2000 cc).

The sample was plated onto 5% sheep blood Columbia agar medium incubated at 36ºC under aerobic and anaerobic conditions, onto Chocolate agar incubated at 37ºC in a 5% CO_2 atmosphere, and onto Schaedler agar + 5% sheep blood, Pheniletanol blood agar and Schaedler Neomycin plus Vancomycin agar + 5% sheep blood incubated at 36ºC under anaerobic conditions (all media were from bioMérieux, Marcy l'Etoile, France). Additionally, 1 ml of the suspensions was injected into a pair of aerobic and anaerobic culture bottles (BACTEC Plus Aerobic/F and Plus Anaerobic/F) and incubated for 7 days in a BACTEC 9240 Blood Culture System (Becton Dickinson Microbiology Systems, Sparks MD, USA). After 3 days of incubation, yellow colonies were observed on aerobic and microaerophilic incubation plates. Furthermore, broth aerobic medium yielded positive growth on the 4th day. The microorganism was doubly

Correspondencia:
Tamara Soler Maniega
Department of Microbiology, Hospital Universitario La Princesa, Madrid, Spain.
E-mail: tamara.soler13@gmail.com

Table 1 **Characteristics of the peritoneal effluent.**

Peritoneal dialysis effluent	Aspect	Colour	Leukocytes (absolute number)	Neutrophils (%)	Lymphocytes (%)
First day	Cloudy	White	38.300	92	8
Third day	Transparent	Colourless	233	10	90
Sixth day	Transparent	Colourless	12	8	92

Figure 1 **Macroscopic aspect of the peritoneal effluent.**

identified as *Blastomonas ursincola* (score: 1.98) by matrix-assisted laser desorption/ionization time of flight mass spectrometry, MALDI-TOF MS (Maldi Byotyper 3.0 System, Bruker Daltonics GmbH, Leipzig, Germany). The strain was sent to the Spanish National Microbiology Reference Center in order to confirm the identification. The outright result from sequencing was the determination of *Blastomonas natatoria* as the species causing the infection.

Antibiotic susceptibility test was performed by commercial broth microdilution using MicroScan Panel Type 71 (Beckman Coulter, Inc., Brea, CA). Minimum Inhibitory Concentrations (MIC) were determined for piperacillin (MIC ≤8 mg/L), ampicillin/sulbactam (MIC ≤8/4 mg/L), piperacillin/tazobactam (MIC ≤8 mg/L), ceftazidime (MIC = 0.5 mg/L), aztreonam (MIC = 4 mg/L), imipenem(MIC ≤1 mg/L), meropenem (MIC ≤1 mg/L), gentamicin (MIC >8 mg/L), tobramycin (MIC = 2 mg/L), amikacin (MIC ≤8 mg/L), ciprofloxacin (MIC ≤0,5mg/L), levofloxacin (MIC ≤1mg/L) and cotrimoxazole (MIC ≤ 2/38mg/L). There are no analytical thresholds described for this microorganism and European Committee on Antimicrobial Susceptibility Testing (EUCAST) endpoints used for non-fermenters were applied to the bacteria. Cefotaxime MIC was determined by the gradient MIC method (Etest, bioMérieux, Lyon, France) on to Mueller-Hinton agar and the result was 0.125 mg/L. Threshold for Clinical and Laboratory Standards Institute (CLSI) Other Non-*Enterobacteriaceae* were used in order to interpretate the result.

The pattern of peritoneal dialysis was changed to continuous ambulatory peritoneal dialysis (CAPD). During the next few days, the patient presented a favorable clinical evolution, with a decrease of the number of WBC in the effluent (table 1).The function of the peritoneal membrane was not altered by infection.

Etiology of peritoneal dialysis-related peritonitis depends on the source of the infection [1]. *Staphylococcus* species, commonly colonizers of the skin are the most common microorganisms isolated in this pathology. Other microorganisms, such as enterobacteria, *Enterococcus* or anaerobic species can cause peritonitis by transmural migration or by direct perforation. The infection can also be produced by dialysis fluids that may be contaminated. In the present case, we describe the first infection caused by *B. natatoria* a Gram-negative, strictly aerobic, oxidase negative and catalase positive rod that belongs to the family of *Sphingomonadaceae*. The microorganism was previously classified in the genus *Sphingomonas* and *Blastobacter*. The identification was correctly obtained at the genus level using MALDI-TOF technology. With the advent of this system, the identification of non-fermenters has become easy and it has led to a better understanding of the clinical significance of some uncommon microorganisms isolated from human clinical samples as has been shown in different works [2, 3]. Besides, it may reduce the need for molecular identification and offer more-rapid diagnosis.

B. natatoria strains have been previously isolated from aquatic environments and biofilms. This bacteria, in relation to others, such as *Porphyrobacter* and *Sphingomonas*, have been found present in shower hose biofilms, and in water-related environments, such as swimming pools, bulkwater, and faucets, presumably because of their ability to survive disinfection regimes [4]. An important aspect is their role in the formation and dynamics of biofilms due to their high production potential for exopolysaccharide and ability to colonize surfaces. Members of these genera are also able to coaggregate with other ecology members, contributing to enhance the expansion of biofilms [5, 6]. Some of these bacteria, including *Blastomonas,* have been frequently found as often-occurring contaminants of medical devices. The mechanism of entrance in this patient remains unclear but it could be related to the capacity of the microorganism in biofilm production.

We conclude that *B. natatoria* and related genus and species [6] should be considered in the pathogenesis of peritoneal dialysis in these patients.

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None to declare

CONFLICT OF INTEREST

The author declare that they have no conflicts of interest

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