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Chryseobacterium indologenes peritonitis in automated peritoneal dialysis patient; rare but real

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ABSTRACT

Peritonitis is a common and serious complication of peritoneal dialysis (PD), associated with significant morbidity. Most peritoneal dialysis-associated peritonitis (PD peritonitis) is caused by gram-positive bacteria group. Gram-negative bacteria are uncommon but have a poor prognosis, associated with an increased likelihood of catheter loss, hospitalization, and death. *Chryseobacterium indologenes* is a gram-negative, glucose non-fermenting, aerobic oxidase and catalase positive bacillus. It is a rare cause of PD peritonitis, especially in Europe. We report a case of a 75-year-old man who has under automated peritoneal dialysis for 8 months, presenting with a PD peritonitis caused by *C. indologenes*. The patient was successfully treated with intraperitoneal ceftazidime therapy without the need to remove the PD catheter. This case shows the importance of considering uncommon causes of PD peritonitis, such as *C. indologenes*, as well as the importance of home visits to patients on PD with the aim of detecting technique errors.

Implication for health policy/practice/research/medical education:

Peritoneal dialysis-associated peritonitis caused by gram-negative bacteria are uncommon and have a poor prognosis, associated with an increased likelihood of catheter loss, hospitalization, and death. *Chryseobacterium indologenes* is a gram-negative infection and it is a rare cause of peritoneal dialysis peritonitis, especially in Europe. We report the third case in Europe of peritoneal dialysis peritonitis by *C. indologenes*. This case shows the importance of considering uncommon causes of peritoneal dialysis peritonitis, such as *C. indologenes*, as well as the importance of home visits to patients on peritoneal dialysis with the aim of detecting technique errors.

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Introduction

Peritonitis is a common and serious complication of peritoneal dialysis (PD), associated with significant morbidity (1). This complication can affect the clinical state of the patient and the technique viability (2). PD-associated peritonitis is defined as peritoneum inflammation brought on by peritoneal contamination with bacteria, irritant chemicals, or both (3).

Peritonitis diagnosis is made when at least two of three criteria are present; clinical signs and symptoms of peritonitis (cloudy effluent, abdominal pain), effluent white cell count >100/μL with >50% polymorphonuclears after at least 2 hours of dwell time, or a positive dialysis effluent culture (1).

Most PD peritonitis is caused by gram-positive bacteria group, such as coagulase-negative *Staphylococcus*,

Staphylococcus aureus or *Streptococcus*. Gram-negative bacteria are uncommon, but are associated with a bad prognosis: increased likelihood of catheter loss, hospitalization and death (1,2). Rarely, fungi can be the responsible microorganism, in approximately 3-5% of cases (4).

The International Society for Peritoneal Dialysis (ISPD) guidelines propose starting empiric intraperitoneal antibiotics when peritonitis is suspected, treating both gram-positive and gram-negative bacteria. Local history of infections and antimicrobial sensitivity should be considered (1).

Chryseobacterium indologenes is a rare cause of PD peritonitis. It is a gram-negative, glucose non-fermenting, aerobic oxidase and catalase positive bacillus (3).

The reported cases of PD peritonitis caused by *C.*

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indologenes are rare, especially in Europe, and no definitive guidelines for its treatment have been established (1,5). Herein, we report the third case in Europe of PD peritonitis by *C. indologenes*.

Case Report

We present the case of a 75-year-old white man with end-stage renal disease due to unknown etiology, with a medical history of arterial hypertension and atrial fibrillation. He was on automated PD for 8 months, when he presented with diffuse abdominal pain. Two months before, he had an episode of peritonitis due to *Klebsiella oxytoca*.

On admission, his blood pressure was 130/70 mm Hg, his heart rate was 82 beats per minute and his oxygen saturation was 97% without supplementation. On physical examination, he presented pain in all abdominal quadrants, without inflammatory signs on the tunnel or catheter exit site. The peritoneal effluent was cloudy. Laboratory results showed; hemoglobin 13.3 g/dL, leukocyte count 17500/ μ L (80% neutrophils), platelets 170000/ μ L, normal hepatic enzymes, C-reactive protein 10.8 mg/dL. PD effluent had a leukocyte count of 5000/ μ L (90% neutrophils). These findings raised the suspicion of peritonitis and effluent culture were collected. Empirical intraperitoneal antibiotic treatment was started with vancomycin and ceftazidime, according to our unit protocol. One week later, *C. indologenes* was identified in peritoneal fluid cultures. Vancomycin was discontinued, and intraperitoneal ceftazidime was maintained for a total of 21 days. The patient evolved with good clinical and analytical evolution, with no need for Tenckhoff catheter removal. The evolution of dialysis effluent analysis is shown in Table 1.

The patient was not taking immunosuppressive drugs and denied recent travel or sick contacts. During the home visit, some errors were detected in the execution of the technique, namely drainage of the peritoneal effluent into an inappropriate container. We assume that contact with standing water was the most likely source of contamination.

Discussion

Chryseobacterium indologenes is a gram-negative, aerobic, non-fermenting, oxidase positive, catalase positive and

non-motile bacilli, that is intrinsically multi-drug resistant (3,6,7). On blood agar, it produces a recognizable yellow to orange color (8). *C. indologenes* is widely spread in soil, plants and water sources as it resists chlorination and can survive in municipal water supplies. It is not part of the normal flora (5).

Although its prevalence is rare, *C. indologenes*-related infections have become more common in recent years (8). Most of *Chryseobacterium* infection cases have been reported from China, and rarely from Europe, Australia, India and the United States (9).

The infection caused by this microorganism are mostly associated to the use of medical devices, in immunocompromised patients, including children (9).

Only a few cases of *C. indologenes* PD peritonitis have been documented in the literature to date (7). There are only six published cases of PD-associated peritonitis caused by *C. indologenes* (2,5,10-13) and in one case, the episode was caused by multiple organisms, including *Sphingomonas paucimobilis* (11).

Gram-negative peritonitis has a poor prognosis, with a higher probability of catheter removal and hospitalization (1). The ISPD guidelines do not include any special recommendation for treating *C. indologenes* peritonitis (1).

In a cohort of seven patients with bacteremia by *C. indologenes* presented by Alon et al the most potent agents reported against these bacteria were quinolones (gatifloxacin and levofloxacin) and trimethoprim-sulfamethoxazole (>95% susceptibility). Ceftazidime, ciprofloxacin, cefepime, piperacillin and rifampin showed significant susceptibility (14).

In our case, the antimicrobial susceptibility test was not available because it was not performed in our hospital's laboratory. Since he had started intraperitoneal ceftazidime and was responding favorably, this therapy was maintained with good clinical and analytical response. It was not necessary to remove the PD catheter. Only two of the five reported cases of PD peritonitis caused by this agent required the PD catheter removal (12,13).

The source of the *C. indologenes* infection in our patient is unknown, but it was assumed contact with standing water. This case highlights the importance of adhering to prophylactic measures and maintaining asepsis during the execution of the technique, as well as the importance of home visits to PD patients, aiming the detection of technique errors.

Conclusion

Chryseobacterium indologenes is a rare cause of PD peritonitis, but the number of cases reported has increased in the last few years. We report the third case of *C. indologenes* PD peritonitis in Europe. Our patient was successfully treated with intraperitoneal ceftazidime

Table 1. Analysis of peritoneal fluid during the clinical course

Day	Peritoneal fluid analysis
1	5000/ μ L Leukocytes, 90% neutrophils
5	720/ μ L Leukocytes, 90% neutrophils
9	480/ μ L Leukocytes, 90% neutrophils
15	400/ μ L Leukocytes, 60% neutrophils
23	30/ μ L Leukocytes, 60% neutrophils

monotherapy for three weeks without the need for PD catheter removal. This case shows the importance of considering uncommon causes of peritonitis, such as *C. indologenes*, which is emerging as an important pathogen in immunocompromised patients. In our patient, peritonitis was successfully treated with intraperitoneal antibiotic therapy alone. This case also demonstrates the importance of not having breaks in the sterility of the technique and the importance of home visits to confirm that the technique is being carried out correctly.

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Authors' contribution

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Conflicts of interest

The authors declare that they have no competing interests.

Ethical issues

This case report was conducted in accordance with the World Medical Association Declaration of Helsinki. The patient provided written informed consent for the publication of this case report. The authors have adhered to ethical considerations, including issues such as plagiarism, data fabrication, and double publication.

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