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*Chryseobacterium indologenes*에 의해 발생한 복막투석 관련 복막염 1예

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Peritoneal Dialysis-associated Peritonitis Caused by *Chryseobacterium indologenes*

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Chryseobacterium indologenes (*C. indologenes*) is a nonmotile, gram-negative bacillus that is widely distributed in nature. Generally considered nonpathogenic, *C. indologenes* rarely infects humans and is not normally present in the human microflora. *C. indologenes* infections have been observed in cases of peritoneal dialysis (PD)-associated peritonitis, although the incidence of these infections is low. Although *C. indologenes* is generally susceptible to trimethoprim-sulfamethoxazole, levofloxacin, ciprofloxacin, piperacillin-tazobactam, and cefepime, no guidelines have been established for the treatment of PD-associated peritonitis. Here we report the first case of PD-associated peritonitis in Korea with *C. indologenes* identified as the sole etiologic agent. The patient recovered after intraperitoneal antibiotic treatment without the need for Tenckhoff catheter removal.
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Keywords: *Chryseobacterium indologenes*; Peritonitis; Peritoneal dialysis, Continuous ambulatory; Catheters, Indwelling

INTRODUCTION

Continuous ambulatory peritoneal dialysis (CAPD) is an important treatment option for patients with end stage renal disease [1]. Although the rate of peritonitis has declined in recent years because of improvements in CAPD, peritoneal dialysis (PD)-related peritonitis remains a major complication in patients with end-stage renal disease [2].

Chryseobacterium indologenes (*C. indologenes*) is a nonmotile, gram-negative bacillus that is widely distributed in nature. Generally considered nonpathogenic, *C. indologenes* rarely infects humans, and it is not normally present in the human microflora [3,4]. *Chryseobacterium* are typically characterized as catalase-positive, oxidase-positive, indole-positive, and

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non-glucose-fermenting bacilli [4]. Only a few cases of PD-associated peritonitis caused by *C. indologenes* infection have been reported, and no definitive guidelines for treatment have been established.

Of these infections, only a single case of PD-associated peritonitis caused by *C. indologenes* as the sole etiologic agent has been reported worldwide [2]. To the best of our knowledge, this is the first case of peritonitis caused by *C. indologenes* alone in Korea, and we were able to cure it without removal of the Tenckhoff catheter. Here we describe a case of PD-associated peritonitis caused by *C. indologenes* that improved after a 16-day course of intraperitoneal antibiotic therapy.

CASE REPORT

A 24-year-old Korean woman who had been treated with CAPD for 1.5 years was admitted to our hospital with turbid peritoneal effluent. She did not have any abdominal pain. The underlying cause of her end-stage renal disease was diabetes mellitus, and she had had no prior episodes of peritonitis. She exchanged 2 L dialysis solution four times per day with a dwell time in the abdomen of 6 h; her daily urine output was ~1,000 mL.

On admission, her vital signs were blood pressure, 120/80 mmHg; heart rate, 80 beats/min; respiratory rate, 20 breaths/min; and body temperature, 36.4°C. Her abdomen was diffusely distended with normal bowel sounds, with no infection observed around the catheter exit site. Laboratory findings were indicative of PD-associated peritonitis based on a white blood cell (WBC) count of 1,050/mm^3 in the peritoneal effluent, characterized by a predominance of neutrophils (63%). Other clinical measurements included a hemoglobin level of 8.3 g/dL, WBC count of 10.8 × 10^9/L, erythrocyte sedimentation rate of 90 mm/h, and C-reactive protein level of 0.48 mg/dL. Although bacteria were not observed on gram staining, two peritoneal fluid samples were inoculated into a BACTEC plus Aerobic/F culture bottle (Becton Dickinson, Drogheda, Ireland) and incubated in a BACT/ALERT 3D blood culture system (Biomerieux, Marcy-l'Étoile, France). While awaiting bacterial culture results, the patient was treated with 1.25 g cefazolin and 1.25 g ceftazidime administered intraperitoneally once daily.

By the fourth day of treatment, the patient's peritoneal WBC count decreased to 370/mm^3, which suggested a bacterial infection. Culture of the peritoneal dialysate revealed a *C. indologenes* infection characterized by resistance to cefotaxime and ceftazidime but susceptible to cefepime, aztreonam, ciprofloxacin, levofloxacin, minocycline, and tigecycline. Based on these results, the patient's antibiotic regimen was changed to a combination of 1.25 g cefepime administered intraperitoneally and 750 mg levofloxacin administered via intravenous injection. On the 14th day, her peritoneal WBC decreased to 14/mm^3 and her clinical condition improved. Based on these results, the patient was deemed to have recovered without removal of the catheter. She was therefore discharged on day 16 and given a 16-day course of intraperitoneal antibiotics.

DISCUSSION

PD-associated peritonitis caused by *C. indologenes* is rare. Prior to the present study, there had been no reports of this organism being a single causative pathogen of PD-associated peritonitis in Korea. Here we reported a case of PD-associated peritonitis due to *C. indologenes* that was cured after a 16-day course of intraperitoneal antibiotic therapy without removal of the Tenckhoff catheter.

The genus *Chryseobacterium* comprises a group of nonmotile, catalase-positive, oxidase-positive, indole-positive, non-glucose-fermenting gram-negative bacilli. *Chryseobacterium* are not part of the normal human flora but are widely distributed throughout soil, plants, and water [4,5]. Although *Chryseobacterium* infections are rare, their incidence has increased in recent years, with *C. indologenes* identified as the primary cause in cases of bacteremia, wound sepsis, cellulitis, pyelonephritis, peritonitis, biliary tract infection, urinary tract infection, and pneumonia [2,6]. Among these infections, *C. indologenes* is most commonly identified in patients with indwelling devices, in particular intravascular catheters, and mechanical ventilators. In our case, the patient had an indwelling device in the peritoneum for CAPD treatment.

Despite increases in the number of *C. indologenes* infections,

cases of PD-associated peritonitis caused by *C. indologenes* alone are extremely rare, with only one case reported to date [2]. A separate case of peritonitis caused by *C. indologenes* was observed in Korea; however, in this case the peritonitis was caused by multiple organisms, including *Sphingomonas* [7]. To the best of our knowledge, this is the first case of PD-associated peritonitis in Korea with *C. indologenes* identified as the sole etiologic agent.

The International Society for Peritoneal Dialysis guidelines do not include any recommendations for treating *C. indologenes*-induced peritonitis [8], although some treatment options can be inferred from published reports. The most effective drugs for treating *C. indologenes* infections include quinolones, trimethoprim-sulfamethoxazole, and piperacillin-tazobactam, with widespread resistance to drugs such as carbapenem, aminoglycosides, chloramphenicol, tetracycline, macrolide, linezolid, and vancomycin [4,9]. Furthermore, removal of indwelling catheters may not be required for successful treatment of infections associated with medical devices [4]. Of the three reported cases of PD-associated peritonitis due to *C. indologenes* (including our case), only one case required removal of the catheter, with the other two patients exhibiting a full recovery after antibiotic treatment alone. These findings highlight the importance of appropriate antibiotic treatment of cases of *C. indologenes*-induced PD-associated peritonitis, which may require additional testing to assess the possibility of polymicrobial peritonitis.

In summary, we described a case of PD-associated peritonitis caused by *C. indologenes* that was cured after a 2-week course of intraperitoneal antibiotic therapy. Intraperitoneal antibiotics may therefore represent a useful strategy for treating PD-associated peritonitis caused by *C. indologenes* alone.

중심 단어: *Chryseobacterium indologenes*; 복막염; 지속적 복막 투석; 도관

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