flora

OLGU SUNUMU/CASE REPORT

FLORA 2012;17(2):87-89

Continuous Ambulatory Peritoneal Dialysis Peritonitis Caused by *Pseudomonas stutzeri*

Pseudomonas stutzeri Tarafından Oluşturulan Sürekli Ayaktan Periton Diyalizi Peritoniti

Nazlım AKTUĞ DEMİR[1], Hayati DEMİRASLAN[2], Mesut AKÇAKAYA[3], Emine ALP MEŞE[2]

[1] Clinic of Infectious Diseases and Clinical Microbiology, Adiyaman State Hospital, Adiyaman, Turkey
[2] Department of Infectious Diseases and Clinical Microbiology, Faculty of Medicine, University of Erciyes, Kayseri, Turkey
[3] Clinic of Nephrology, Istanbul Umraniye Training and Research Hospital, Istanbul, Turkey

SUMMARY

Herein we present a case of continuous ambulatory peritoneal dialysis (CAPD) peritonitis caused by Pseudomonas stutzeri. The patient is a 20-year-old man who has been receiving CAPD since he was diagnosed with chronic renal failure four years ago. A gram-negative bacillus grew in his peritoneal specimen. It was identified as Oligella ureolytica by the Vitek 2 GN-ID system. However, after being tested by using 16S rRNA gene sequence analyses, it was reported to be as P. stutzeri. In conclusion, this organism is an opportunistic pathogen pseudomonas bacterium for CAPD patients. We think that 16S rRNA gene sequence analyses should be considered for the identification of bacteria in cases where diagnosis cannot be made using conventional methods and automated systems.

Key words: *Pseudomonas stutzeri, Peritoneal dialysis, Continuous ambulatory, Peritonitis, RNA, Ribosomal*

ÖZET

***Pseudomonas stutzeri* Tarafından Oluşturulan Sürekli Ayaktan Periton Diyalizi Peritoniti**

Nazlım AKTUĞ DEMİR[1], Hayati DEMİRASLAN[2], Mesut AKÇAKAYA[3], Emine ALP MEŞE[2]

[1] Adıyaman Devlet Hastanesi, İnfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Kliniği, Adıyaman, Türkiye
[2] Erciyes Üniversitesi Tıp Fakültesi, İnfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Anabilim Dalı, Kayseri, Türkiye
[3] İstanbul Ümraniye Eğitim ve Araştırma Hastanesi, Nefroloji Kliniği, İstanbul, Türkiye

Bu olgu sunumunda, Pseudomonas stutzeri'nin neden olduğu bir sürekli ayaktan periton diyalizi (SAPD) peritoniti olgusu sunulmaktadır. Yirmi yaşındaki erkek hasta, dört yıl önce kronik böbrek yetmezliği tanısı aldığından beri sürekli ayaktan periton diyalizi uygulamaktadır. Periton kültüründe gram-negatif basil üremiş, Vitek-2 GN-ID sistemi tarafından Oligella ureolytica olarak saptanmıştır. Fakat 16S rRNA gen sekans analizi kullanılarak P. stutzeri olarak tanımlanmıştır. Sonuç olarak; SAPD uygulayan hastalar için bu bakteri patojenik bir psödomonas türüdür. Ayrıca, 16S rRNA gen sekans analizinin, klasik yöntemler veya otomatize sistemler kullanılarak tanımlaması yapılamayan olgularda bakteri tanımlaması için akılda tutulması gereken bir yöntem olduğunu düşünmekteyiz.

Anahtar Kelimeler: *Pseudomonas stutzeri, Periton diyalizi, Sürekli ayaktan, Peritonit, RNA, Ribozomal*

Geliş Tarihi/Received: 29/06/2011 - Kabul Ediliş Tarihi/Accepted: 21/01/2012

INTRODUCTION

Pseudomonads can contaminate solutions such as distilled water, disinfectants, and intravenous solutions. *Pseudomonas stutzeri* belongs to the non-fluorescent group of pseudomonads. It is an uncommon clinical isolate but has been reported to cause bacteremia, nosocomial brain abscess, and meningitis in immunocompromised and immunocompetent hosts[1,2]. Peritoneal dialysis catheter infection caused by *Pseudomonas* spp. such as *P. luteola*, *P. oryzihabitans* and *P. stutzeri* have been reported[1,3,4] This case indicates that this organism is also an opportunistic pathogen for continuous ambulatory peritoneal dialysis (CAPD) patients. The diagnosis of *P. stutzeri* with conventional methods and automated system can be difficult.

CASE REPORT

A 20-year-old man had been receiving CAPD for four years because of chronic renal failure and recently stayed in hospital for one week due to hypertension has been discharged three days prior to his second admission. He was admitted to our clinic with complaints of fever (39.5°C), nausea, abdominal pain, and cloudy effluent in his dialysate bag on bag exchange. His peritoneal fluid contained 7900 WBC/mm^3; Gram staining did not reveal any microorganisms. As soon as we made the diagnosis of CAPD-related peritonitis, vancomycin intraperitoneal 1 g/week and ceftazidime 1 g/day intraperitoneal were started. A peritoneal specimen was inoculated into an aerobic BacT/ALERT FA (bioMérieux, Durham, NC) culture vial.

A positive peritoneal culture isolate was detected in the BacT/ALERT vial three days after inoculation. The contents of the BacT/ALERT vial was subcultured onto 5% sheep blood agar, eosin methylene blue agar (EMB), and chocolate agar plates (Salubris, Turkey) for isolation. Dry, non-hemolytic and irregular colonies grew on both the blood agar and EMB agar. No pigment was produced. The Gram staining of colonies on EMB agar revealed somewhat elongated gram-negative rods. The organism was identified by the Vitek 2 GN-ID system (bioMérieux, Durham, NC) as *Oligella ureolytica*. It did not produce any H_2S or indole. Oxidase was positive and motility test was weakly positive. Phenotypic tests were positive for urea, however, Gram staining and colony morphology on blood agar were not concordant. Therefore the specimen was confirmed by 16S rRNA gene nucleotide sequence analysis as *P. stutzeri* in Refgen Biotechnology Center (Ankara, Turkey). Consequently conventional tests for its identification were not performed again.

The antibiotic susceptibility test was performed by using the disk diffusion technique and interpreted according to the Clinical Laboratory and Standards Institute, and showed that the organism was susceptible to ciprofloxacin, piperacillin/tazobactam and imipenem[5]. However, it was resistant to cefepime, cefoperazone, and trimethoprim-sulfamethoxazole (Oxoid Ltd., London, United Kingdom).

On the fourth day of treatment ceftazidime was switched to imipenem 3 x 250 mg intravenous (IV) because the culture of the peritoneal fluid was grown as *O. ureolytica* that was resistant to cefepime and cefoperazone. Since the microbiological features of the microorganism were inconsistent, higher dose imipenem was started. However, a susceptibility test for ceftazidime could not be performed because a disk of ceftazidime was not available. Moreover, the patient's fever did not resolve, although the peritoneal leukocyte count decreased to 2380/mm^3. Multiloculated fluid was seen in the Douglas pouch and around the CAPD catheter by abdominal ultrasonography. The catheter was therefore removed. Imipenem was given for 14 days. The patient made a full recovery.

DISCUSSION

Pseudomonas species are aerobic, non-spore-forming, gram-negative rods. They are motile owing to the presence of one or more polar flagella. They are lactose non-fermenters and grow well on MacConkey agar. Most clinical isolates are oxidase positive. *P. stutzeri* colonies are hard, dry, tenaciously coherent and reddish brown on primary isolation media[6]. Our organism was grown as dry, non-hemolytic and non-small colonies both on blood agar and EMB agar. The Gram staining of colonies on EMB agar revealed somewhat elongated gram-negative rods. The organism was oxidase positive and the motility test was weak positive. It was identified by the Vitek 2 GN-ID system as *O. ureolytica*. However, it was not concordant, and was tested using 16S rRNA gene sequence analysis which identified as *P. stutze-*

ri. Because it was identified by using 16S rRNA gene sequence as *P. stutzeri*, conventional tests for it were not performed. Although a few reports indicated that Vitek 2 GN-ID system can be used for identification, it was reported that before the use of genomic approaches to identify bacteria became widespread, *P. stutzeri* strains were misidentified with other species[3,7].

Peritonitis due to the *Pseudomonas* species is one of the most important causes of technical failure in CAPD[8,9]. Peritoneal dialysis catheter infection can be caused by *Pseudomonas* spp.[1,10]. It has been reported that the *P. stutzeri* rate is 8% (15 cases) among the cases of *Pseudomonas* peritonitis[4]. The identification method of this bacterium, which was identified by 16S rRNA gene sequence analysis, is more important as it is a rare cause of CAPD peritonitis. Reported small number of *P. stutzeri* peritonitis cases may be related to the lack of subtype identification of *Pseudomonas* in previous studies.

In conclusion, *P. stutzeri* is an unusual pathogen as a cause of CAPD peritonitis. We think that 16S rRNA gene sequence should be considered for the identification of bacteria in cases where diagnosis cannot be made conclusively when using conventional methods and automated system.

REFERENCES

1. *Steinberg JP, Burd EM. Other gram-negative and gram variable bacilli. Pseudomonas species. In: Mandell GL, Bennett JE, Dolin R (eds). Principles and Practice of Infectious Disease. 7th ed. Philadelphia: Elsevier Churchill Livingstone, 2009:3015-33.*
2. *Sunbul M, Zivalioglu M, Fisgin NT. Community-acquired Pseudomonas stutzeri meningitis in an immunocompetent patient. Mikrobiyol Bul 2009;43:159-62.*
3. *Ceri M, Ortabozkoyun L, Altay M, Unverdi S, Kurultak I, Huddam B, et al. Peritonitis due to Pseudomonas stutzeri, an organism that may be difficult to culture. Perit Dial Int 2010;30:484-6.*
4. *Siva B, Hawley CM, McDonald SP, Brown FG, Rosman JB, Wiggins KT, et al. Pseudomonas peritonitis in Australia: predictors, treatment, and outcomes in 191 cases. Clin J Am Soc Nephrol 2009;4:957-64.*
5. *Clinical and Laboratory Standards Institute Performance Standards for Antimicrobial Susceptibility Testing, Nineteenth Informational Supplement M100-S19. Clinical and Laboratory Standards Institute, 2009, Wayne PA.*
6. *Schrenckerberger PC, Wong JD. Algorithm for identification of aerobe gram-negative bacteria. In: Murray PR, Bares ES, Jorgene JH, Pfaller MA, Yolken RH (eds). Manual of Clinical Microbiology. 8th ed. Washington DC: ASM, 2003:337-42.*
7. *Lalucat J, Bennasar A, Bosch R, Garcia-Valdes E, Palleroni NJ. Biology of Pseudomonas stutzeri. Microbiol Molecular Biol Rew 2006;70:510-47.*
8. *Szeto CC, Wong TY, Leung CB, Wang AY, Law MC, Lui SF, et al. Importance of dialysis adequacy in mortality and morbidity of Chinese CAPD patients. Kidney Int 2000;58:400-7.*
9. *Szeto CC, Chow KM, Leung CB, Wong TYH, Wu AKL, Wang AY, et al. Clinical course of peritonitis due to Pseudomonas species complicating peritoneal dialysis: a review of 104 cases. Kidney Int 2001;59:2309-15.*
10. *Chan MK, Chan PCK, Cheng IPK, et al. Pseudomonas peritonitis in CAPD patients: characteristics and outcome of treatment. Nephrol Dial Transplant 1989;4:814-7.*

Yazışma Adresi/Address for Correspondence

Uzm. Dr. Hayati DEMİRASLAN

Erciyes Üniversitesi Tıp Fakültesi
İnfeksiyon Hastalıkları ve
Klinik Mikrobiyoloji Anabilim Dalı
Kayseri-Türkiye

E-posta: tigin68@hotmail.com