

Rhodotorula mucilaginosa: Rare Cause of Fungal Peritonitis

Fungal infections are an uncommon but serious cause of peritoneal dialysis (PD)-associated peritonitis.^[1] The incidence worldwide is heterogeneous, with rates varying from 2% to 23.8%.^[2] Despite its rarity, fungal peritonitis (FP) is important due to its associated higher rates of catheter loss, morbidity, and mortality. *Candida* species are the commonest pathogen isolated in FP, accounting for 70%–90% of the cases described.^[3] Both early PD catheter removal and prompt antifungal treatment are considered the best strategies to improve patients' survival in FP.^[4] Permanent transfer to hemodialysis remains frequent among survivors, although PD resumption has been described, especially in less-fragile patients.^[5] We describe a case where *Rhodotorula mucilaginosa* was isolated from a patient's peritoneal dialysate. The organism has also been isolated from central venous catheters, suggesting that the hemodialysis population could also be at risk.^[6]

A 58-year-old female with chronic kidney disease (CKD) stage 5 along with comorbidities of hypertension and hypothyroidism was started on PD. She underwent training for PD and performing the procedure by herself. She had three exchanges per day, two with 2.5% and one with 1.5% with glucose-based PD solution. Her urine output was 1800 ml/day. After 4 months of PD, she presented to us with cloudy PD fluid. She was, however, asymptomatic, having no pain abdomen or fever. In view of suspected peritonitis, her PD fluid was drawn for relevant investigations and she was started on intraperitoneal injections of vancomycin (1 g) every fourth day and meropenem (1 g) daily. PD fluid total leukocyte count was 650/mm³ along with 55% lymphocytes. No organism was seen on gram stain and KOH preparation. On culture of PD fluid, the colonies were grown after 7 days of incubation in Sabouraud medium and identified as *R. mucilaginosa*. Her other investigation reports revealed hemoglobin (Hb)- 9.8 g/dl, total leukocyte count (TLC)- 8100/mm³, platelet count- 108,000/ μ l, blood urea nitrogen- 91 mg/dl, serum creatinine- 4.9 mg/dl, serum potassium- 4.9 mEq/l, serum sodium- 143 mEq/l, serum calcium- 9.2 mg/dl, serum phosphorus- 4.4 mg/dl, aspartate aminotransferase- 12 IU/l, alanine aminotransferase- 16 IU/l, alkaline phosphatase- 107 IU/l, total serum protein- 5.8 g/dl, serum albumin- 3.6 g/dl, prothrombin time- 14.2 s, and international normalized ratio (INR)- 1.04.

On identification of fungus *R. mucilaginosa* in her PD dialysate, her PD catheter was removed and she was started on intravenous injection of amphotericin B deoxycholate (1 mg/kg/day) and was continued for

2 weeks. She was shifted to hemodialysis through right internal jugular tunneled cuff catheter (TCC) and subjected to right radiocephalic arteriovenous fistula (AVF) formation. Her AVF started working after 2 months and TCC was removed thereafter. On follow-up after 6 months, she is stable and doing well on hemodialysis.

Fungal infections are becoming an increasing health-care burden. Unfortunately, the number of causative pathogens, particularly affecting immunocompromised patients, is growing, without an expansion in treatment options.^[7] *R. mucilaginosa* is a common environmental yeast that is isolated from air, ocean, soil, and plants.^[8] In humans, it is a temporary commensal microorganism of the skin, nails, and gastrointestinal, urinary, and respiratory tracts.^[9] *Rhodotorula* spp. is emerging as a causative agent in catheter-associated fungemia and peritonitis which is more relevant in context to our renal patients. It is also responsible for other infections such as meningitis, endocarditis, and prosthetic joint infections.^[10,11]

We describe the first case of *R. mucilaginosa* causing PD peritonitis from India. According to Franconieri, till now, there are 10 reported cases of *R. mucilaginosa* that has been isolated in peritoneal dialysate. Ninety percent of these patients had received antibiotics for peritonitis, but in our patient, there was no history of prior peritonitis and antibiotics. Also, there was no associated predisposing comorbidities like diabetes or use of immunosuppressive therapy in our patient. Simultaneous removal and reinsertion of PD catheter was tried in one of the patients among 10 patients, but it was not successful. Similar to other patients, our patient was also shifted to hemodialysis.^[12]

As per previous reports, amphotericin B and flucytosine demonstrated good activity against this yeast. We started intravenous amphotericin B deoxycholate in our patient and she improved significantly. Caspofungin and azoles should not be used in the treatment of this fungus because of high minimum inhibitory concentration (MIC) for these drug agents. New azole molecule, isavuconazole, can be used as an alternative therapeutic agent in *Rhodotorula* infections, but well-designed studies are needed to evaluate this treatment.^[13] We should suspect *Rhodotorula* infection in cases of nonresponse in FP despite the use of fluconazole.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Asheesh Kumar, Naresh Chauhan

Department of Nephrology, Indira Gandhi Medical College and Hospital
Shimla, Himachal Pradesh, India

Address for correspondence:

Dr. Asheesh Kumar,
Department of Nephrology, Indira Gandhi Medical College and Hospital
Shimla, Himachal Pradesh, India.
E-mail: asheesh03.kapil@gmail.com

References

- Matuszkiewicz-Rowinska J. Update on fungal peritonitis and its treatment. *Perit Dial Int* 2009;29:161-5.
- Auricchio S, Giovenzana ME, Pozzi M, Galassi A, Santorelli G, Dozio B, *et al.* Fungal peritonitis in peritoneal dialysis: A 34-year single centre evaluation. *Clin Kidney J* 2018;11:874-80.
- Hu S, Tong R, Bo Y, Ming P, Yang H. Fungal peritonitis in peritoneal dialysis: 5-year review from a North China center. *Infection* 2019;47:35-43.
- Wang AYM, Yu AWY, Li PKT, Lam PKW, Leung CB, Lai KN, *et al.* Factors predicting outcome of fungal peritonitis in peritoneal dialysis: Analysis of a 9-year experience of fungal peritonitis in a single center. *Am J Kidney Dis* 2000;36:1183-92.
- Nadeau-Fredette A-C, Bargman JM. Characteristics and outcomes of fungal peritonitis in a modern North American cohort. *Perit Dial Int* 2015;35:78-84.
- Duggal S, Jain H, Tyagi A, Sharma A, Chugh T. Rhodotorula fungemia: Two cases and a brief review. *Med Mycol* 2011;49:879-82.
- Carnall VJ, Murdock S, Auckland C, Mulgrew CJ. Along came a spider: An unusual organism identified in a peritoneal dialysis patient, a case report and literature review. *BMC Nephrol* 2020;21:1-5.
- Chaud LC, Lario LD, Bonugli-Santos RC, Sette LD, Junior AP, Felipe MdGdA. Improvement in extracellular protease production by the marine antarctic yeast *Rhodotorula mucilaginosa* L7. *N Biotechnol* 2016;33:807-14.
- Capoor M, Aggarwal S, Raghvan C, Gupta D, Jain A, Chaudhary R. Clinical and microbiological characteristics of *Rhodotorula mucilaginosa* infections in a tertiary-care facility. *Indian J Med Microbiol* 2014;32:304-9.
- Tuon FF, Costa SF. *Rhodotorula* infection. A systematic review of 128 cases from literature. *Rev Iberoam Micol* 2008;25:135-40.
- Ünal A, Koc A, Sipahioglu M, Kavuncuoglu F, Tokgoz B, Buldu H, *et al.* CAPD-related peritonitis caused by *Rhodotorula mucilaginosa*. *Perit Dial Int* 2009;29:581-2.
- Franconieri F, Bonhomme J, Doriot A, Bonnamy C, Ficheux M, Lobbedez T, *et al.* Fungal peritonitis caused by *Rhodotorula mucilaginosa* in a capd patient treated with liposomal Amphotericin B: A case report and literature review. *Perit Dial Int* 2018;38:69-73.
- Gomez-Lopez A, Mellado E, Rodriguez-Tudela JL, Cuenca-Estrella M. Susceptibility profile of 29 clinical isolates of *Rhodotorula* spp. and literature review. *J Antimicrob Chemother* 2005;55:312-6.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online	
Quick Response Code: 	Website: https://journals.lww.com/ijon
	DOI: 10.4103/ijn.ijn_79_22

How to cite this article: Kumar A, Chauhan N. *Rhodotorula mucilaginosa*: Rare cause of fungal peritonitis. *Indian J Nephrol* 2023;33:77-8.

Received: 22-02-2022; **Revised:** 05-04-2022; **Accepted:** 06-04-2022; **Published:** 16-07-2022

© 2022 Indian Journal of Nephrology | Published by Wolters Kluwer - Medknow