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Fungal peritonitis in a patient on peritoneal dialysis caused by *Hyphopichia burtonii*: A rare pathogen in human infection

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ABSTRACT

Fungal peritonitis in peritoneal dialysis (PD) patients is rare but is associated with high morbidity and mortality. *Candida* species are the most common causative agents, but infections caused by unusual, often "nonpathogenic," fungi are being increasingly reported. *Hyphopichia burtonii* is typically associated with food spoilage and has rarely been reported in human infections.

We describe the case of a 44-year-old female with end-stage renal disease on continuous ambulatory peritoneal dialysis (CAPD) who developed peritonitis caused by *Hyphopichia burtonii*. Following the identification of the fungus, the patient was put on hemodialysis, the peritoneal dialysis catheter was removed, and he was given fluconazole for two weeks having favorable clinical development.

1. Introduction

Fungal peritonitis in patients undergoing peritoneal dialysis is a rare but serious complication that frequently has high morbidity and mortality [1]. The incidence varies from 1 % to 23 % of episodes, with Candida species being the most common causative agent. Non-Candida fungal species account for less than 10 % of cases, but uncommon, frequently "nonpathogenic" fungi are increasingly being reported as etiologic agents in fungal peritonitis [2,3]. One such pathogen is *Hyphopichia burtonii*, a yeast-like fungus that is ubiquitous and has been isolated from spoiled foodstuffs, caterpillars, silage, pollen, and animals. Recently, it has also been used in the production of bread. Infection in humans caused by this microorganism has been reported in only a few cases [4–6].

In tropical regions, the incidence of fungal peritonitis increases during the wet season, likely due to the high humidity and moisture in the air, creating ideal conditions for the growth of environmental fungi. In Colombia, fungal infections represent a significant public health burden, particularly among immunocompromised populations such as those with HIV, cancer, or chronic kidney disease [7].

The present report describes the case of a Colombian woman with an infection by *Hyphopichia burtonii related to peritoneal dialysis.*

2. Case presentation

A 44-year-old female with end-stage renal disease secondary to hypertension had been on continuous ambulatory peritoneal dialysis (CAPD) for one year. Approximately one week before her admission, she developed intermittent abdominal pain without diarrhea or other gastrointestinal symptoms, and her peritoneal fluid became cloudy. Despite these symptoms, she remained afebrile and did not exhibit any systemic signs of infection.

The patient was referred to the hospital from the renal unit. Upon admission on Day 0, peritoneal fluid analysis revealed a white cell count >100/μL, with >50 % polymorphonuclear cells. Empirical intraperitoneal amikacin and vancomycin were initiated (Day 0). The peritoneal fluid culture was made in blood culture bottles at 35 °C ± 2 °C and subsequently grown on blood agar, CNA Agar (Columbia Nalidixic Acid Agar), and chromogenic Candida agar. After 36 hours of incubation, small, opaque colonies were isolated (Fig. 1). These colonies were identified using the **MALDI–TOF system** (Matrix-Assisted Laser Desorption/Ionization Time-of-Flight). This rapid and accurate proteomic analysis technique identifies microorganisms based on their unique protein profiles. The system works by ionizing the microbial proteins with a laser and analyzing their mass-to-charge ratio, producing a

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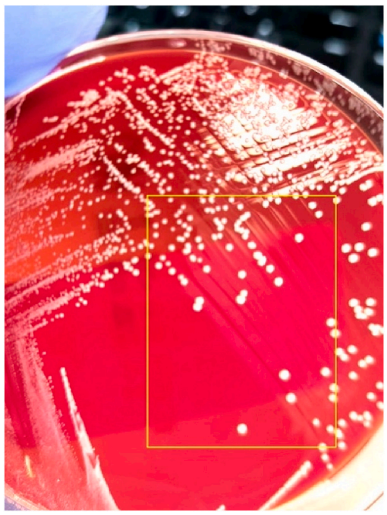

Fig. 1. Colonies of *Hyphopichia burtonii* in blood agar display small and opaque characteristics consistent with this emerging yeast's morphology.

spectral fingerprint compared to a database of known organisms. In this case, the isolate was identified as *Hyphopichia burtonii* (Day + 2) [8].

Antimicrobial management was adjusted, suspending antibiotics and starting fluconazole (200 mg intravenously every 12 hours) on Day +2, and the peritoneal catheter was promptly removed on Day +3. Hemodialysis was started and well tolerated. The patient completed a **total of 14 days of fluconazole therapy**, including intravenous treatment during hospitalization and oral therapy at home, with marked symptom improvement. At discharge, she was stable and continued outpatient follow-up.

3. Discussion

A few clinical *Hyphopichia burtonii* infections have been documented; the first human case of *H. burtonii* peritonitis in a patient on peritoneal dialysis was reported by Chamroensakchai et al. The diagnosis was confirmed through broad-range PCR targeting ribosomal DNA, as initial cultures and automated yeast identification platforms did not identify the organism. An example of secondary peritonitis in a cirrhosis patient was reported by Feldman et al. [5], *H. burtonii* was isolated from peritoneal fluid and identified by BD Phoenix an automated microbiology instrument used for the identification and antimicrobial susceptibility testing of bacteria and yeast, this case indicates that the fungus might exploit immunocompromised conditions such as cirrhosis or dialysis [5]. Moreover, *H. burtonii* has been isolated from animal cutaneous infections, as observed in a case of cutaneous mycosis in a barbastelle bat [6]. In our case, the patient had no history of recent animal contact, bakery products, silage, or pollen, which are typical environments where this fungus has been isolated.

Fungal peritonitis is often challenging to diagnose owing to its nonspecific presentation, which can be easily confused with bacterial or sterile peritonitis, particularly when initial cultures fail to isolate the pathogen [9]. There is limited data on the antifungal susceptibility of this microorganism, but it is sensitive to various antifungal agents, including fluconazole, itraconazole, and amphotericin B. In the case reported by Chamroensakchai et al., the fungus demonstrated susceptibility to fluconazole, allowing for effective treatment following peritoneal catheter removal [4]. However, *H. burtonii* is a slow-growing yeast, and its susceptibility profile may vary, which supports the need for antifungal susceptibility testing in individual clinical cases. **The rapid growth of *Hyphopichia burtonii* in our case (within 36 hours) is noteworthy, as this organism is typically described as slow-growing. However, the growth rate of fungi can vary depending on the culture conditions, such as the type of media used, incubation temperature, and the initial inoculum size. In this case, the use of enriched media (blood agar and CNA agar) and optimal incubation conditions (35°C ± 2°C) could facilitate faster growth.**

In our case, antifungal susceptibility testing was not performed; we administered empirical treatment with fluconazole to rely on previous reports documenting susceptibility to antifungals, and the patient responded favorably to fluconazole therapy. The absence of susceptibility data introduces uncertainty regarding potential intrinsic or acquired resistance in this emerging pathogen.

The treatment of fungal peritonitis requires prompt removal of the peritoneal dialysis catheter, as the catheter can serve as a nidus for infection and impair the efficacy of antifungal therapy. Guidelines from the International Society for Peritoneal Dialysis recommend catheter removal followed by antifungal therapy for at least two weeks [10]. In this case, fluconazole was chosen because of its efficacy against yeasts, favorable safety profile, and ability to penetrate the peritoneal cavity.

This case highlights the potential for rare fungal organisms such as *Hyphopichia burtonii* to cause serious infections in patients undergoing peritoneal dialysis. Early identification through molecular diagnostics and timely intervention, including catheter removal and antifungal therapy, is critical for successful treatment.

Hyphopichia burtonii is rarely reported in human infections, and its diagnosis can be delayed due to difficulties in culture. This case reinforces the importance of considering non-*Candida* fungi in peritonitis cases and following established guidelines for the management of fungal peritonitis in PD patients.

CRediT authorship contribution statement

Estacio Mayra: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Reino Alberto:** Validation, Supervision, Software, Resources, Funding acquisition. **Rodelo Joaquin:** Resources, Project administration, Formal analysis. **Ustariz Jose:** Visualization, Data curation.

Conflict of interest

There are none.

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