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Cyberlindnera fabianii fungemia complicating psoas muscle abscess successfully treated by surgical drainage and echinocandin therapy

Dear Editor,

Cyberlindnera fabianii (previously known as *Hansenula fabianii*, *Pichia fabianii*, and *Lindnera fabianii*) is an ascomycetous yeast rarely involved in deep-seated infections.[1,2] Although Candida species remain the leading cause of fungemia and invasive fungal infections (IFI), the number of other isolated fungal pathogens is increasing.[3] More specifically, *C. fabianii* has been described to cause endocarditis, catheter-related bloodstream infections, pneumonia, and prostatitis, and its infection is usually treated with azole agents such as ketoconazole, fluconazole, or voriconazole.[1–3] However, azole resistance has been detected in some invasive *C. fabianii* infections.[1–3] Such antifungal resistance may be facilitated by the ability of this species to form biofilms.[1] In addition, commercial biochemical fungal identification kits often misidentify *C. fabianii* as *Candida utilis*.[1–3] Here, we report a case of fungemia caused by *C. fabianii* complicating a psoas muscle abscess. The diagnosis was confirmed by proteomic method (MALDI-TOF), and the infection was successfully treated with micafungin and surgical drainage.

A 79-year-old woman was diagnosed with left psoas muscle abscess at the emergency department. She had underlying diseases, namely normocytic anemia and peptic ulcer. After admission, empiric antibiotics were administered to treat the psoas muscle abscess. She had a history of complicated *Candida albicans* urinary tract infections and had received fluconazole therapy for 14 days before admission. Abdominal computed tomography revealed a 0.85-cm stone in the left upper-third portion of the ureter. A urologist was consulted for percutaneous nephrolithotomy and smooth ureteral stone removal. CT-guided pigtail drainage of the left psoas muscle abscess was performed, and the drain tube function was found to be satisfactory.

Blood and pus cultures yielded *C. fabianii* (Figs. A, B, and C). The isolate (*C. fabianii*) was analyzed by matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF) using a Bruker Biotyper (Bruker Daltonik GmbH, Bremen, Germany) and was identified as *C. fabianii* (score value, 2.189). We used YeastOne YO10C for the antifungal susceptibility testing methods. The minimal inhibition concentrations (MICs) showed Amphotericin B(AB) 0.5 μg/ml、Anidulafungin (AND) $<$ 0.015 μg/ml、Caspofungin(CAS) 0.06 μg/ml、Fluconazole(FZ) 32 μg/ml、Itraconazole(IZ) 0.25 μg/ml、Micafungin(MF) 0.06 μg/ml、Posaconazole(PZ) 0.5 μg/ml、Voriconazole(VOR) 0.06 μg/ml respectively. The fluconazole exhibited the highest MIC value, we prescribed a micafungin loading dose of 150 mg via intravenous drip (ivd) and maintained a dose of 100 mg ivd qd. During hospitalization for systemic candidiasis workup, cardiac echo ruled out obvious valvular vegetation, and ophthalmologist consultation did not reveal endophthalmitis. A bone scan revealed no definite evidence of osteomyelitis of the lumbar spine. An inflammatory survey of the gallium scan showed results compatible with a psoas muscle abscess. The second CT-guided drainage and pus aspiration was performed 14 days later on account of obstruction of the drain tube. After a complete course of 8 weeks of micafungin therapy, the patient was discharged and followed up at the outpatient department with no recurrence.

Non-albicans candidiasis has been associated with an emergent increase in IFI among hospitalized patients in the past decade.[4–6] Several less frequently isolated yeast species have also been implicated in IFI, such as species

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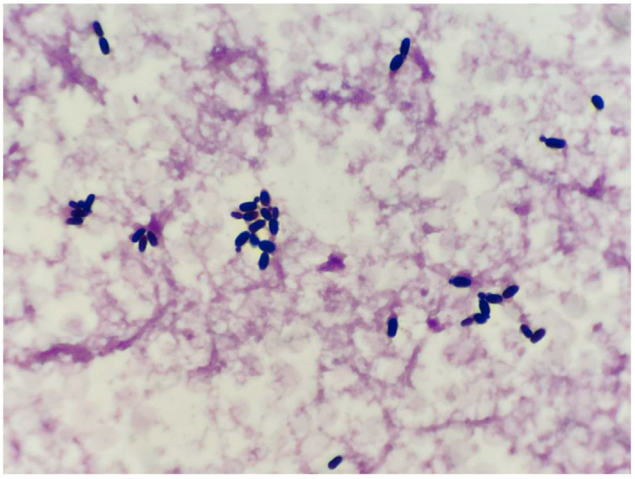
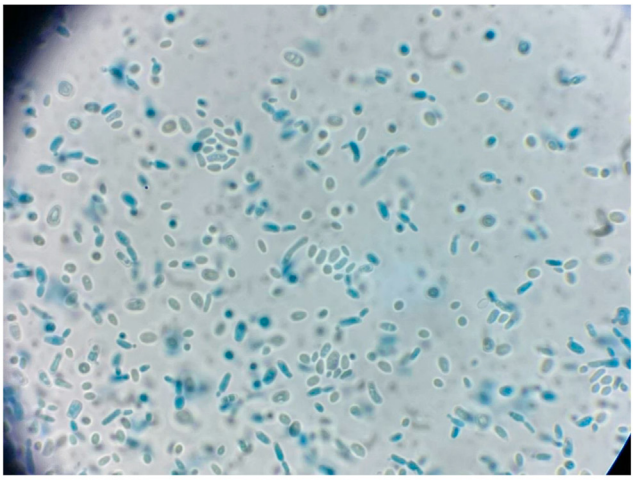
(A)



(B)



(C)

Figure 1. (A) *Cyberlindnera fabianii* on the EMB agar revealed grey-colored colonies. (B) Gram staining revealed deep-blue-colored yeast-like micro-organisms (1000 X) and identified as *Cyberlindnera fabianii* by MALDI-TOF.(C) Lacto-phenol cotton-blue staining revealed shallow-blue-colored yeast-like microorganisms (1000 X) and identified as *Cyberlindnera fabianii* by MALDI-TOF.

belonging to the yeast genera *Cryptococcus*, *Tricosporon*, and *Rhodotorula*.[5,6] Some of them are considered frequent colonizers of the skin or mucosal surfaces. Their clinical significance varies from causing superficial infections in normal hosts to invasive infections in immunocompromised patients. Due to the rare incidence of invasive *C. fabianii* fungemia, published data mostly consist of case reports and small case series and thus, management recommendations are derived mainly from clinical experience.[1—3] Given the complexity of patients at risk for infection and the increasing array of rare fungal pathogens with intrinsic resistance to azole agents, treatment remains challenging.[1—5]

C. fabianii forms a biofilm that may facilitate azole resistance.[1] In 2008, Hamal et al. reported a case of aortic valve endocarditis caused by *P. fabianii*. Antifungal therapy with fluconazole and voriconazole led to the development of resistant strains with high MIC values for both antifungal agents.[1,4,6] This may have resulted from the development of cross-resistance to azoles and biofilm formation, which can prevent antifungal agents from accessing the fungal cell wall.[3—5] According to the clinical practice guidelines for the management of invasive candidiasis from the Infectious Diseases Society of America (IDSA), echinocandins are preferred for patients with recent azole exposure, sepsis, or a high risk of infection with non-albicans candidiasis.[3—6] As our patient had prior exposure to azoles before admission, echinocandin therapy was considered a treatment option.

C. fabianii has been described as an yeast with a low virulence.[1,2] However, only a few case reports have highlighted its pathogenic activity in high-risk patients, suggesting that invasive *C. fabianii* and other fungal infections are emerging pathogens associated with fungemia, sepsis, and intra-abdominal abscesses.[1—3] Conventional laboratory techniques usually cannot identify rare fungal species such as those described in the present study. Novel molecular methods, such as MALDI-TOF and sequencing of multiple genomic regions, are useful for the identification of uncommon fungal pathogens.[4—6] However, according to previous reports, the fungus has the ability to develop biofilms and resistance to different antifungals, such as azoles and amphotericin B.[1—3,6] To the best of our knowledge, this is the first report of breakthrough fungemia caused by *C. fabianii* complicated by a psoas muscle abscess that was successfully treated with surgical drainage and echinocandin therapy.

Author contributions

Integrity of the data and accuracy of data analysis: C.-H. Wang. Concept and design: Y.-S. Su. Acquisition, data analysis, and manuscript drafting: C. H. Wang, Y.-S. Su, and W.-S. Lee.

Critical revision of the manuscript: W. S. Lee. All the authors have read and agreed to the published version of the manuscript.

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Ethics approval

Ethics approval was not required for this study.

Conflict of interest

The authors have no competing interests to declare.

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