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Letter to the Editor

Breakthrough fungemia caused by *Rhodotorula mucilaginosa* during anidulafungin therapy

Dear Editor,

Rhodotorula spp. are emerging opportunistic pathogens, particularly in patients who are critically ill and immunocompromised, and are associated with peritonitis, endocarditis, meningitis, and catheter-associated infections.[1,2,6] Here, we report a case of breakthrough fungemia caused by *Rhodotorula mucilaginosa* in an elderly patient who received anidulafungin therapy for *Candida tropicalis* candidemia.

A 96-year-old male patient, who had chronic kidney disease, chronic obstructive pulmonary disease, and history of perforated peptic ulcer post subtotal gastrectomy, visited the emergency department of the hospital owing to fever, jaundice, pain, and tenderness over the right upper quadrant of the abdomen. The results of the laboratory tests after the admission of the patient revealed a white blood cell count of 2530/μL, hemoglobin level of 10.2 g/dL, platelet count of 137,000/μL, total bilirubin value of 2.33 mg/dL, direct bilirubin level of 1.8 mg/dL, aspartate aminotransferase level of 219 U/L, alanine transaminase level of 86 U/L, C-reactive protein level of 8.6 mg/dL, γ-glutamyl transpeptidase level of 189 U/L, and an alkaline phosphatase value of 344 U/L. Abdominal sonography revealed the evidence of gallbladder stones with acute cholecystitis. After admission, he underwent a percutaneous transhepatic gallbladder drainage (PTGBD), and received the following antibiotics empirically: 2000 mg of cefmetazole via intravenous (IV) infusion every 8 h, and 500 mg of amikacin via IV infusion every day. The blood culture revealed *Escherichia coli* on the 4th day of hospitalization. This organism was susceptible to the cefmetazole and amikacin as determined by BD Phoenix™ 100 AST System (Becton Dickinson, Sparks, MD, USA). On the 12th day of hospitalization, the cultures from the PTGBD drainage fluids and two peripheral blood samples showed the presence of *C. tropicalis*. Anidulafungin (a loading dose of 200 mg and a maintenance dose of 100 mg via IV infusion every day) was added because the *C. tropicalis* was resistant to fluconazole (minimum inhibition concentration of ≥64 mg/L) as determined using the broth microdilution method. However, on the 22nd day of hospitalization, the blood cultures from the central venous catheter (CVC) and peripheral blood samples yielded *R. mucilaginosa*. The organism was identified by matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS Biotyper™, Bruker Daltonik GmbH, Bremen, Germany) with an identification score value of 2.165. The antifungal agent was changed to 250 mg of liposomal amphotericin B stat, and a maintenance dose of 200 mg via IV infusion every day. Unfortunately, the patient died on the 25th day of hospitalization due to refractory septic shock.

R. mucilaginosa is an agent of opportunistic infection in immunocompromised patients; it is associated with high mortality despite antifungal treatments, particularly in patients who receive indwelling foreign catheter implantations such as PTGBD or central venous catheters.[1–3,5] *R. mucilaginosa* is a non-*Candida* unicellular pigmented yeast (Fig. 1B) part of the phylum Basidiomycota, which has been isolated from blood, skin, and environmental specimens.[1–4] Clinical manifestations of *R. mucilaginosa* infections include bloodstream infection, peritonitis, meningitis, and central venous catheter-related infections. In general, *Rhodotorula* spp. isolates are less susceptible to echinocandin agents (caspofungin, micafungin, and anidulafungin), like *Zygomycetes*, *Trichosporon*, and *Cryptococcus* spp., due to the lack of 1,3-β-D glucan in their cell walls.[4–6] As a result, patients undergoing treatment with echinocandins have been reported to have breakthrough fungal infections caused by these organisms.[1–4]

Modern therapeutic modalities and invasive procedures in critically ill patients have an increased risk of opportunistic fungemia.[1,4,5] Therefore, breakthrough fungal

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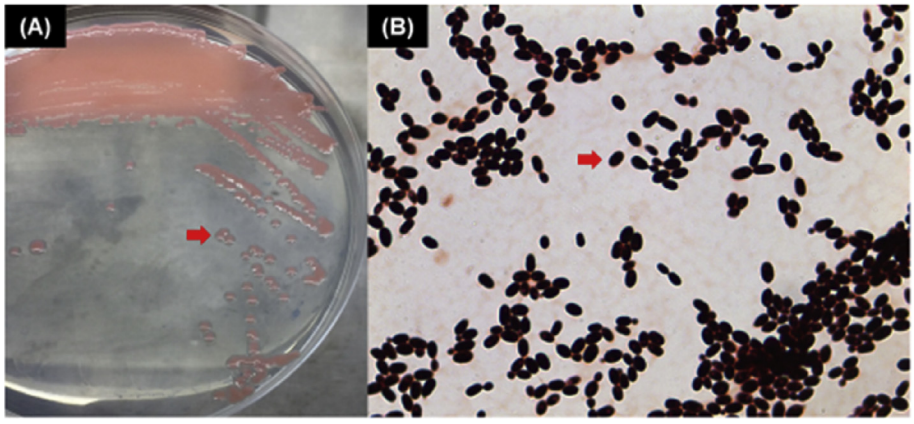

Figure 1. Microbiological characteristics of *R. mucilaginosa*. (A) the orange/red colonies of *R. mucilaginosa* on Sabouraud's dextrose agar (B) the unicellular yeasts of *R. mucilaginosa* (Gram stain, magnification 1000X).

infections have emerged as a major clinical issue.[4] The risk of *R. mucilaginosa* fungemia should not be overlooked in patients with risk factors and those receiving echinocandin therapy.

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