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CLINICAL IMAGE

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Disseminated *Saprochaete capitata* fungal infection in a patient with acute myeloid leukemia

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Abstract

The case highlights the importance of actively obtaining informative samples at an early stage and of prompt initiation of combination therapy with antifungal drugs.

KEYWORDS

acute myeloid leukemia, fungal infection, leukemia, microbiology, pathology

We report the case of a 66-year-old Caucasian woman who presented with fatigue, fever, anemia, thrombocytopenia, and hyperleukocytosis. Past medical history included obesity and hypertension. The diagnosis of de novo acute myeloid leukemia (AML) with FLT3-ITD mutation was established. The patient initiated 7 + 3 induction chemotherapy with cytarabine and idarubicin.

At the onset of aplasia, the patient developed cellulitis of the right arm, which resolved with large-spectrum empirical antibiotherapy. At day 13 (D13) of initiation of chemotherapy, the patient developed a new febrile syndrome with no obvious focus of infection. Septic screening was performed, and the central catheter replaced. Empirical meropenem and vancomycin were initiated, prophylactic itraconazole suspended due to hepatotoxicity, and liposomal amphotericin B (L-AmB) started. At D20, the patient was transferred to the intensive care unit (ICU) due to respiratory failure. She had sustained neutropenia. Thoracic x-ray revealed no abnormalities. Despite broad antimicrobial coverage with meropenem, vancomycin, azithromycin, trimethoprim/sulfamethoxazole, and L-AmB, the patient's condition deteriorated, with septic shock ensuing.

Saprochaete capitata (previously *Geotrichum capitatum*) was isolated in blood cultures from three different days

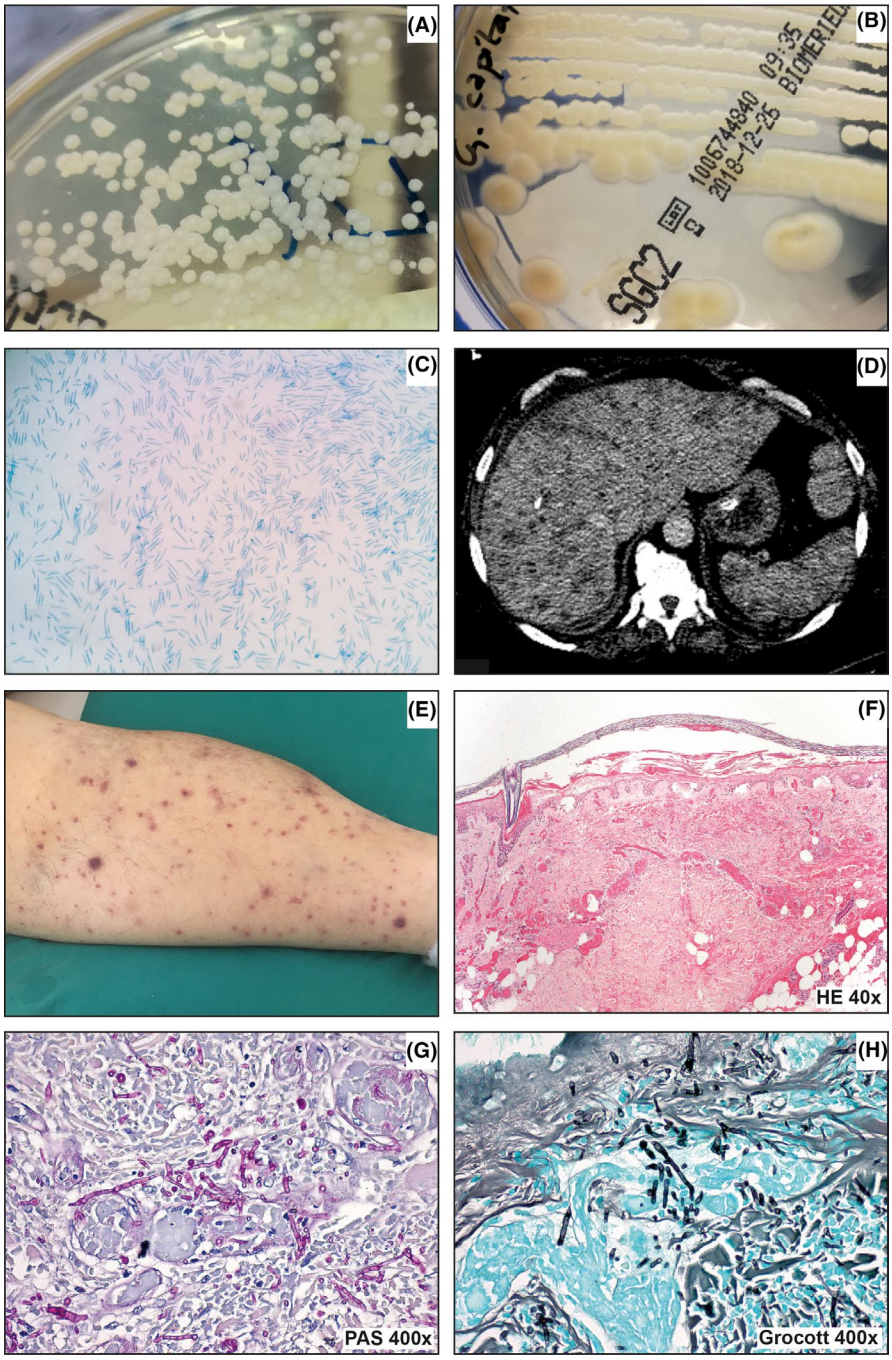

FIGURE 1 A, *Saprochaete capitata* macroscopic aspect in Sabouraud Gentamicin Chloramphenicol 2 agar (SGC2) after 48 h incubation at 37°C, showing creamy smooth to wrinkled yeast-like colonies of white to cream color. B, *Saprochaete capitata* macroscopic aspect in SGC2 agar after 7 days of incubation at 37°C, with a white to creamy reverse. C, *Saprochaete capitata* light microscopy observation after Lactophenol cotton blue stain using the adhesive strip technique. Numerous arthroconidiae and annelloconidiae are observed. (400× amplification). D, Abdominal CT scan revealed hepatomegaly and multiple small, round lesions disseminated throughout the liver and spleen. E, Petechial lesions with necrotic centers appeared suddenly in both legs at day 25 postchemotherapy. F, Biopsy of one of the skin lesions was performed, and the pathological examination revealed partial necrosis of the epidermis, vascular ectasia, fibrinoid necrosis of vascular walls, and interstitial hemorrhage. G, H, Closer examination revealed septate hyphae abundantly present in the dermis

(the first obtained at D19) (Figure 1A). Blood cultures revealed a rapid growth of smooth cream yeast-like colonies (Figure 1B), and a short and finely funiculose mycelium. Light microscopy revealed numerous arthroconidiae and some annelloconidiae (Figure 1C). Time of flight mass spectrometry identified *S. capitata*.[1] *Saprochaete capitata* is an ascomycetous yeast found in water, feces, and human skin. *Saprochaete capitata* is a rare opportunistic pathogen that causes invasive infections in neutropenic patients, particularly in those with hematologic malignancies.[2]

There were no signs of fungal infection on echocardiogram and eye examination but CT scan was compatible with disseminated fungal infection of the liver and spleen (Figure 1D). At D25, the patient developed dispersed petechial lesions with necrotic centers in both legs (Figure 1E). Biopsy of the lesions revealed segmented hyphae in the dermis and translocating blood vessels (Figure 1F-H) and *S. capitata* was isolated in skin cultures. Despite directed therapy with L-AmB and flucytosine, the patient's condition worsened, and she died on D28.

This case highlights the poor outcome of disseminated fungaemia caused by *S. capitata* (mortality exceeds 50%[2]) and displays rare pathological findings of invasive fungal infection in the skin. Patients with acute leukemia, particularly with acute myeloid leukemia, account for the majority (>90%) of opportunistic infections caused by *S. capitata*.[2]

Nevertheless, the incidence of *S. capitata* systemic infection remains low, at 0.5%, even in patients with acute leukemia.[2] Diagnosis of invasive fungal infection, particularly caused by rare agents such as *S. capitata* is challenging. Blood cultures, imaging, and histological evidence of fungal infection as shown in our case are important but can be time-consuming and lead to delay of appropriate treatment. (1 → 3)-β-d-glucan is a cell wall polysaccharide found in several fungi that has been proposed as an early sensitive and nonspecific biomarker for invasive fungal disease by the European Organization for Research and Treatment of Cancer/Mycoses Study Group (EORTC/MSG).[3] Elevated levels of (1 → 3)-β-d-glucan have been reported in cases of *S. capitata* infection[4,5] and may anticipate a positive blood culture by several days.[5] Early detection of (1 → 3)-β-d-glucan in the serum of high-risk patients can lead to immediate treatment combination of antifungals and reduce mortality. In our case, the (1 → 3)-β-d-glucan assay was not performed and the antifungal treatment was guided by clinical suspicion and other laboratorial evidence, as discussed before. Our patient was treated with L-AmB (which has high in vitro antifungal activity against *S. capitata*[6]), and later with L-AmB associated with flucytosine. This combination regimen is often used as first-line in patients with invasive *S. capitata* although single-agent treatment with L-AmB seems to produce similar results.[2] Voriconazole is emerging as an alternative therapeutic option.[7] Nevertheless, the advanced level of infection and the immunodepression of the patient may lead to lack of in vivo effectiveness of these agents. The abundant microbiological and pathological evidence of *S. capitata* in our case illustrates the aggressiveness of a low-virulence fungus in severely immunocompromised leukemic patients.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

DD and CIM wrote the article and did literature review. RA performed the histological examination. All authors were involved in the patient's care and editing of the paper.

ETHICAL APPROVAL

Ethical review and approval of the study are not applicable in this case.

DATA AVAILABILITY STATEMENT

Data may be available from the corresponding author on reasonable request.

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