

## Disseminated Cutaneous Trichosporonosis in an Adult Bone Marrow Transplant Patient

### Abstract

The *Trichosporon* species are yeast-like opportunistic pathogens in immunocompromised patients. *Trichosporon asahii* infections have been reported in pediatric bone marrow transplant (BMT) patients. However, its incidence is low in the adult literature. A 52-year-old Chinese woman who was diagnosed with acute myeloid leukemia received induction chemotherapy and underwent allogeneic bone marrow transplant, which was complicated by a relapse and required salvage chemotherapy. She developed persistent non-neutropenic fever secondary to presumed hepatosplenic candidiasis. Antifungal therapy with fluconazole and anidulafungin was administered. She remained febrile and tender dusky nodules appeared over all the four limbs. Histopathological examination and fungal culture identified *T. asahii*. Oral voriconazole was initiated with complete resolution of her lesions. The *Trichosporon* species is a frequently isolated yeast species from cancer patients. Voriconazole has become the first choice agent against *Trichosporon*. We highlight the increased awareness and clinical suspicion required for diagnosis and subsequent management in similar adult patients.

**Keywords:** Immunocompromised host, opportunistic infections, *Trichosporon asahii*, voriconazole

### Introduction

The *Trichosporon* species are yeast-like organisms which predominate in temperate areas.<sup>[1]</sup> Comprising part of the gastrointestinal and oral cavity microbiota, they also colonize the respiratory tract and skin and have been recognized as an emerging opportunistic pathogen in immunocompromised patients.<sup>[2]</sup> Pediatric cases describing *Trichosporon asahii* infection after bone marrow transplant have been reported, however reports in the adult literature are low.<sup>[3-5]</sup> We describe a 52 year-old lady with refractory acute myelogenous leukemia and presumed disseminated candidiasis, who developed cutaneous *T. asahii* infection 86 days following bone marrow transplant, and subsequently responded well to voriconazole.

### Case Report

A 52-year-old Chinese woman was diagnosed with acute myelogenous leukemia and received induction chemotherapy consisting of daunorubicin (60 mg/m<sup>2</sup>) and cytarabine (100 mg/m<sup>2</sup>). Three months later, she underwent allogeneic bone marrow transplant (BMT), complicated by

persistent non-neutropenic fever. Bacterial and fungal blood cultures remained sterile and a computed tomography (CT) scan of the thorax, abdomen, and pelvis revealed microabscesses in the liver and spleen [Figure 1a].

In view of a positive Fungitell (1→3)-β-D-glucan Assay (321 pg/mL) with a negative serum galactomannan optical density index (0.1), a presumed diagnosis of disseminated candidiasis was made and oral fluconazole 400 mg daily was instituted. A repeat bone marrow examination was done in view of persistent neutropenia. This revealed frank relapse, and she underwent salvage chemotherapy.

Fluconazole was substituted for intravenous anidulafungin to prevent further neutropenia and thrombocytopenia post chemotherapy. She developed neutropenic fever on the second day of salvage chemotherapy (absolute neutrophil count: 0.24). Blood cultures from her peripherally inserted central catheter (PICC) port yielded *Pseudomonas aeruginosa*, which was adequately treated with a 2-week course of appropriate antibiotics including meropenem, gentamicin, and ciprofloxacin. The PICC line was substituted. A repeat

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CT scan showed resolution of the liver and spleen microabscesses [Figure 1b].

However, she declined clinically and continued to experience fever and hypotension with sterile blood and urine cultures. On day 86 of BMT, she developed tender dusky nodules over the upper and lower limbs [Figure 2a-c]. A 4-mm punch biopsy of the skin revealed dermal infiltrate of fungal hyphae and yeast forms [Figure 3a and b]. Fungal cultures of the skin biopsy specimen were positive for *T. asahii* via adoption of the matrix-assisted laser desorption/ionization time of flight mass spectrometry (MALDI-TOF-MS). Antifungal therapy was switched to oral voriconazole 200 mg twice daily. She improved clinically and experienced complete non-scarring resolution of her lesions within 7 days. A 30-day course of voriconazole was completed without further complications.

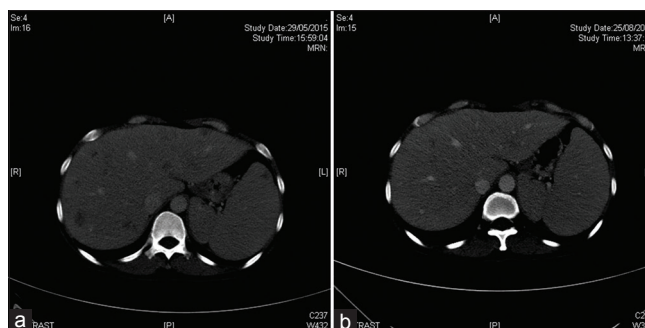
### Discussion

This clinical scenario is an approach to scattered papulonodules in an immunocompromised patient. A key consideration includes a host of disseminated deep fungal infections including histoplasmosis, cryptococcosis, penicilliosis, and coccidioidomycosis. Other diagnostic considerations included Sweet's syndrome and leukemia cutis given her medical background. *Trichosporonosis* should also remain on the clinician's differential list as it carries significant mortality, and impacts choice of antifungal therapy.

The *Trichosporon* species is the second most frequently isolated yeast species from cancer patients, after *Candida*.<sup>[6]</sup> The incidence of non-*Candida* yeast infections is increasing in light of the extensive usage of various antifungals and an increasing number and life expectancy of immunocompromised patients. Amongst the *Trichosporon* species, *T. asahii* is the most common cause of disseminated infection and has been shown to be difficult in prediction and diagnosis.<sup>[7]</sup>

Disseminated trichosporonosis has a significant mortality rate of 60–70%. The predisposing factors identified in our patient include recent chemotherapy, neutropenia, indwelling central catheters, and previous BMT, although there was no presence of underlying oral mucositis.

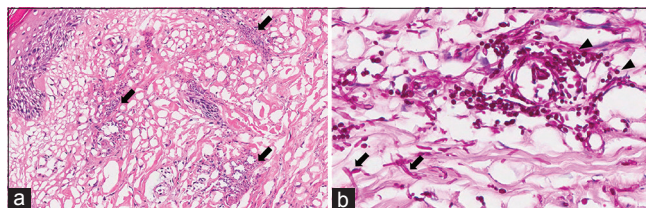
A joint clinical guideline for the diagnosis and management of rare invasive yeast infections was recently published by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and the European Confederation of Medical Mycology (ECMM), in which the optimal option to treat *Trichosporon* species has been established.<sup>[8]</sup> Voriconazole, the preferred antifungal agent, is recommended in Grade B strength, with level III evidence. *In-vitro* susceptibility and animal models have suggested that triazoles are the most effective drugs against *Trichosporon* infections; however, strains within a given species have variable susceptibilities.<sup>[9]</sup> On the other hand,



**Figure 1:** (a) Multiple hypodensities in the liver and spleen measuring up to 1.7 cm suggestive of microabscesses. (b) Interval computed tomography imaging of the abdomen and pelvis showing resolution of hepatic and splenic microabscesses



**Figure 2:** Erythematous nodules over bilateral forearms (a) and lower limbs (b). A close-up view of the nodule over the left knee (c) is shown



**Figure 3:** (a) Low magnification photomicrograph of the skin biopsy showing pale-staining fungal organisms (arrows) around blood vessels, accompanied by a mild lymphocytic infiltrate. (Hematoxylin and eosin, original magnification  $\times 100$ ) (b) Higher magnification photomicrograph showing presence of fungal yeast forms (arrowheads) and hyphae (arrows) in the dermis. (Periodic acid Schiff, original magnification,  $\times 400$ )

echinocandins demonstrated high minimum inhibitory concentrations when tested against the *Trichosporon* species. Voriconazole has emerged as the first-choice antifungal agent while maintaining efficacy against *Trichosporon* with the minimum inhibitory concentration ( $MIC_{50}$ ) estimated at 0.03–0.5  $\mu\text{g/mL}$  in the literature.<sup>[10]</sup> This case serves

to remind physicians to consider *Trichosporon* species in cases of breakthrough infection or treatment failure under echinocandins or amphotericin therapy.

We present a rare case of adult disseminated cutaneous trichosporonosis following BMT, which was successfully treated with oral voriconazole. This report seeks to raise awareness of this condition and the appreciation of an early skin biopsy to arrive at a correct diagnosis to inform management in similar adult patients.

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### *Conflicts of interest*

There are no conflicts of interest.

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