Case Report:
Successful Treatment of Septic Shock with Purpura Fulminans Caused by *Trichosporon asahii* in an Immunocompetent Patient

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Abstract. *Trichosporon asahii* is an emerging mycosis characterized by high mortality rate in immunocompromised patients. Only a few cases have been reported in immunocompetent subjects. We report a 46-yr-old man who had been healthy and who presented with septic shock and purpura fulminans caused by *Trichosporon asahii*. He responded well to antifungal therapy with amphotericin B and voriconazole.

Keywords: *Trichosporon asahii*, septic shock, purpura fulminans

Introduction

The genus *Trichosporon* is a part of the normal flora of the human skin, respiratory tract, and feces [1]. *Trichosporon* species can cause fatal infections, particularly in immunocompromised patients. The infection may be localized or disseminated in multiple organs. The mortality rate in patients with disseminated trichosporonosis is 64-80% [2,3]. Although many cases of disseminated trichosporonosis have been reported in immunocompromised patients, few have been reported in persons without an underlying disease. We describe a rare case of septic shock caused by *Trichosporon asahii* in an immunocompetent patient who was treated successfully.

Case Report

A 46-yr-old unconscious man was admitted to Kangnam St. Mary’s Hospital in April 2007. He had been healthy until 5 days prior to admission, when he developed generalized weakness. He visited a primary care clinic 2 days before admission and was referred to the hospital because of fever and thrombocytopenia. He had no significant past medical history and was unemployed. At the time of admission, his blood pressure was 70/40 mm Hg; pulse rate, 130 beats/min; respiratory rate, 24 breaths/min; and temperature, 40°C. He did not smoke cigarettes but he consumed considerable soju, a Korean alcoholic beverage, 3 times/week.

Physical examination revealed several irregular-shaped, blue to purple patches with erosion and crusting on the left lower leg and left forearm, which were consistent with purpura fulminans, and an eschar on a toe (Fig. 1, page 368).

Results of laboratory tests were as follows: blood white-cell count, 16,810/mm³, with 45% polymorphonuclear cells, 5% stab neutrophils, 5% lymphocytes, 9% monocytes; hematocrit, 36.9%; platelet count, 5,000/mm³; serum creatinine, 4.6 mg/dl; total bilirubin, 4.6 mg/dl; direct bilirubin, 2.2 mg/dl; AST, 384 U/L; ALT, 184 U/L; albumin, 3.2 g/dl; and non-fasting glucose, 149 mg/dl. Urinalysis revealed proteinuria and microscopic hematuria. The serum C-reactive protein level was 19.1 mg/dl and profiles for disseminated intra-vascular coagulation (DIC) were positive. Chest X-
ray and computed tomographic (CT) scan of the abdomen were normal.

The patient was treated initially with ceftriaxone and inotropic agents. After 48 hr of incubation, cream-colored fungal colonies with a raised surface grew on Sabouraud dextrose agar (SDA) and were subcultured in one-fourth bottle of a blood sample (Fig. 2, page 368). At that time, amphotericin B (1 mg/kg) was added to the treatment regimen. The fungus was identified as *T. asahii* by using the Vitek API 20C biochemical testing system (bioMérieux). No organisms grew on tissue culture of the skin.

The patient's serum immunoglobulin levels were normal and serum complement levels including C3 and C4 were within the normal ranges. Tests for antinuclear antibody (ANA), antineutrophil cytoplasmic antibody (ANCA), and rheumatoid factor were negative. ELISA for human immunodeficiency virus (HIV) was negative.

The skin lesions of the left lower leg and left forearm gradually progressed from necrosis to eschar. On day 12 after admission, the patient regained consciousness and his vital signs became stable without inotropic agents. The platelet count increased, and the serum creatinine level and liver enzyme activities decreased to the normal ranges. Proteinuria and microscopic hematuria were not evident. On hospital day 13, escharotomy was performed and the tissue specimen was inoculated on routine media including SDA. The same fungus was identified after 96 hr of incubation.

The left lower leg showed an abscess with central necrosis. Multiseptated fungal hyphae were detectable by silver stain in the upper dermis and vessel (Fig. 3, page 368). Antifungal therapy was changed to voriconazole (400 mg/day, po) because of the nephrotoxicity of amphotericin B. On hospital day 39, split thickness skin grafts onto the left lower leg and left forearm from his thigh were performed successfully. On hospital day 44, the patient was discharged without complications.

**Discussion**

*Trichosporon* species are emerging pathogens that have been increasingly reported recently. *Trichosporon* species inhabit the soil, vegetation, and water. They can also reside in human skin, respiratory tract, and nails [4]. In 1999 the taxonomy of the genus *Trichosporon* was revised by Guého et al [5], and six species: *T. asahii*, *T. asteroides*, *T. cutaneum*, *T. inkin*, *T. mucoides*, and *T. ovoides*, were implicated as human pathogens. *T. asahii*, which was formerly known as *T. beigelii* or *T. cutaneum*, can cause life-threatening infection in immunocompromised hosts such as HIV-positive patients, bone marrow transplant recipients, and solid organ transplant recipients, in patients with prolonged neutropenia or burns, and in premature infants.

In non-immunocompromised patients, there have only been two reports of disseminated trichosporonosis [2,6]. Our patient showed no signs of HIV, diabetes mellitus, neutropenia, malignancy, or connective tissue diseases. We speculate that binge drinking may have had a deleterious effect on our patient’s immune system.

The pathophysiology of invasive trichosporonosis involves colonization of the respiratory tract, gastrointestinal tract, or skin, with seeding of the bloodstream through a break in the integrity of a mucosal surface [1]. The portal of entry in our patient is uncertain. Endoscopy was performed to check mucosal integrity, but the findings were negative.

Infections with *Trichosporon* species present diverse clinical courses that range from a localized infection to a disseminated fatal disease. Multiple organs including the lung, kidney, heart, and gastrointestinal tract have been involved in disseminated trichosporonosis [7]. Cutaneous involvement is observed in approximately 30% of patients [8]. Several reports indicate that the skin manifestations of *T. asahii* infection in immunocompromised subjects include purpuric papular, vesicular, or pustular lesions, multiple nodules, erythematous indurated plaques (with or without necrosis), edematous purpuric patches, and scaly patches [9]. Initially our patient’s skin manifestation was purpura fulminans, which showed irregular-shaped, blue to purple patches with erosions and crusting on the left lower leg and left forearm and an eschar on the right second toe. The skin lesions on the leg and arm progressed to necrosis, followed eventually by eschar formation.
Fig. 1. Panel 1 (far left) and Panel 2 (near left) show multiple, irregular-shaped, blue to purple patches with erosion and crusting on the left lower leg and left forearm that are consistent with purpura fulminans. Panel 3 (above) shows an eschar on the right second toe.

Fig. 2. Panel 1 (left): After 48 hr of incubation, white to cream-colored colonies with raised surfaces and radial furrows were subcultured on Sabouraud dextrose agar (SDA). Panel 2 (right): Hyphae were stained blue with lactophenol cotton blue stain.

Fig. 3. Panel 1 (left): After escharectomy, pathologic examination of tissue from the left lower leg revealed an abscess with central necrosis (H&E, x40). Panel 2 (center) shows fungal hyphae and spores in the dermis (H&E, x100). Panel 3 (right) shows multiseptated fungal hyphae and spores in the upper dermis and vessels (silver stain, x100).
Until recently there were no clearly effective antifungal drugs for trichosporonosis. Therapy with amphotericin B has been recommended, but poor efficacy of this drug has also been reported [10]. In vitro studies have suggested that azoles, including a new triazole, voriconazole, might induce a better therapeutic response than amphotericin B [11]. However the in vitro antifungal efficacy of a drug and its in vivo therapeutic outcome are not always correlated. Ultimately, the treatment should be decided clinically case by case. Clinical testing of the efficacy of combination antifungal regimens is much needed.

In summary, *T. asahii* infection is not limited to immuno-deficient patients. *T. asahii* can cause fatal septic shock in healthy people as well as immunocompromised hosts. Our case suggests that *T. asahii* may be considered a life-threatening pathogen in heavy drinkers.

References