Cutaneous lesions showing giant yeast forms of Blastomyces dermatitidis

**Background:** The yeast forms of Blastomyces dermatitidis usually range from 8 to 15–20 μm in diameter. Larger yeast forms have previously been reported only twice in immunosuppressed patients. In both patients these large forms were seen within the lung.

**Case report:** We present a 14-year-old cardiac transplant patient, who presented 36 days following his transplantation with acute respiratory distress followed a few days later by erythematous cutaneous papules.

**Results:** Biopsy of a skin lesion showed yeast forms, some greater than 40 μm in diameter, within and surrounding dermal vessels. Cultures later grew Blastomyces dermatitidis.

**Conclusion:** To our knowledge this is the first reported case of giant forms of Blastomyces dermatitidis within the skin. With increased iatrogenic immunosuppression, we may expect to see more diverse morphologic forms with deep fungal infections.


North American blastomycosis is caused by Blastomyces dermatitidis. This organism grows in tissue as a thick-walled yeast form, 8 μm to 15–20 μm in diameter with broad based budding. Multiple nuclei can be seen in well fixed tissue. In endemic areas of this country, the organism has been isolated from soil. With the exception of accidental laboratory inoculations, infections are probably primarily pulmonary. However, pulmonary involvement may not be apparent when secondary lesions appear in the skin, bone, genitourinary tract, or elsewhere.

Although blastomycosis is one of the four major endemic mycoses in North America, including histoplasmosis, cryptococcosis, and coccidioidomycosis, not until recently has it been recognized as an opportunistic infection in immunocompromised hosts. In intact cellular immunity is important in the prevention of progressive blastomycosis; however, adequate neutrophil function also appears important in the host response. We present an additional case of systemic blastomycosis in a cardiac transplant patient. Giant yeast forms, which have previously only been reported within the lung in two other patients, were seen within the skin in this patient.

**Case report**

The patient was a 14-year-old white male who had received a donor heart transplant 36 days earlier. The patient’s medications included tacrolimus, mycophenolate mofetil, and prednisone. Over approximately a 48-h period the patient experienced increasing shortness of breath, with a low-grade fever. Chest X-ray was performed and showed a diffuse interstitial infiltrate. Sputum and blood were obtained for bacterial, mycobacterial, and fungal cultures, and the patient was started on antibiotics including tobramycin and cefuroxime.

Approximately 48 h later, the patient’s condition had deteriorated and he developed diffuse erythematous dermal papules over the trunk and proximal extremities. Biopsy material was obtained and sent for culture as well for routine histologic examination.
Cutaneous lesions showing *B. dermatitidis*

**Fig. 1.** Low-power view showing medium-sized vessels in the mid to lower reticular dermis packed with yeast forms with a mild associated mixed inflammatory infiltrate (×120).

**Fig. 2.** High-power view showing abundant yeast forms with thick capsules and multiple nuclei, some greater than 40 μm in diameter. Broad-based budding was seen as well as organisms showing binary fission (×192).

**Fig. 3.** As Fig. 2, but at magnification ×288.

**Biopsy findings**

The biopsy specimen showed a relatively mild inflammatory infiltrate. However, medium size vessels in the mid to lower reticular dermis were packed with yeast forms (Fig. 1). In addition, these organism were immediately surrounding the vessels with an associated mild mixed inflammatory infiltrate. These yeast forms had thick capsules and multiple nuclei. They varied in size from approximately 20 μm to over 40 μm in diameter, and showed occasional broad-based budding forms (Figs. 2 and 3). Rare organisms were present that showed binary fission (Fig. 3).

Although the patient was then started on amphotericin B with a presumptive diagnosis of blastomycosis, he showed a progressive downhill course and died 12 days later. The organism was later confirmed as *B. dermatitidis* by standard culture methods.

**Discussion**

In immunocompromised patients, blastomycosis is often more aggressive than in immunocompetent hosts. Over 30% of the reported immunocompromised patients have died secondary to their blastomycosis, and they usually die relatively rapidly. A high index of suspicion for possible development of *B. dermatitidis* infection is difficult because of the lack of reliable skin and serologic tests needed for establishment of prior exposure in immunosuppressed patients. In addition, a specific diagnosis may be delayed, even if tissue is obtained, because of the wide variation in the morphology of *Blastomyces* in tissue.

Some variation in size, shape, staining, and wall thickness of yeast forms of *B. dermatitidis* can occur in different fields of the same specimen in immunocompetent hosts. However, the greatest variation in yeast forms are seen in immunosuppressed patients, and in these patients there may also be hyphal forms present.

To our knowledge this is the first case of giant yeast forms in the skin of *B. dermatitidis* reported. What specific immunologic and/or inflammatory factors are playing a role in the variable morphologic patterns seen with deep fungal infections is not known. However, with an ever-expanding group of immune and inflammatory modulators in use and in development for autoimmune disease, malignancies, and transplantation, we can expect to see even more atypical forms.

**References**