Diagnostic: Brain abscesses caused by infection due to Cladosiphialophora bantiana.

Following MRI (figure 1) and biopsy of the brain abscesses, histopathologic examination of the biopsy sample revealed brown, pigmented, and septated hyphal forms with right angle budding (figure 2). Microscopic examination of tissue culture identified this organism as C. bantiana (figure 3).

C. bantiana is a fungus that is darkly pigmented because of melanin in the septated hyphae cell wall [1–4]. Former names for C. bantiana include Xylophypha emmonsii, Xylophypha bantiana, Cladosporium bantianum, and Cladosporium trichoides [5]. The mode of transmission is probably by subcutaneous inoculation (causing soft-tissue infection) or inhalation and subsequent hematogenous spread from an initial subclinical pulmonary focus [3, 6, 7]. Dematiaceous fungi are darkly pigmented, and the infections that they cause are referred to as phaeohyphomycosis [1, 3]. Although infections caused by dematiaceous fungi are rare, such fungi are increasingly being recognized as human pathogens, particularly in immunocompromised hosts [4, 8]. C. bantiana is highly neurotropic and has a predilection for brain tissues [9]. Clinically, patients may present with headache, fever, and altered mental state, and there may be a single brain abscess or multiple brain abscesses.

Suppression of innate cellular immunity caused by corticosteroid use can promote C. bantiana infection [10], and it is likely that this was the risk factor in our patient. The diagnosis is made on the basis of the histologic features of a biopsy sample and growth in culture [11, 12]. Histopathologically, C. bantiana is characterized by darkly pigmented, sparsely branched, often moniliform, septate hyphae in unstained or hematoxylin and eosin stained tissue [13]. The colonies appear to have a velvety texture and are olive gray to black on the surface, whereas the
back of the colonies is black. On microscopic examination, the hyphae are brown and septate, with smooth oval conidia [8].

Although the optimal treatment is unknown, azoles, such as itraconazole and voriconazole, have the most consistent and potent in vitro activity against dematiaceous fungi [14]. Voriconazole achieves good penetration into the CSF and brain tissue. In a review by Revankar et al. [3], patients with primary CNS phaeohyphomycosis who were treated with amphotericin B, itraconazole, and 5-flucytosine had a mortality rate of 17%, compared with a mortality rate of 74% among patients who were treated with other drug combinations, although the sample size in the review was small. In a mouse model of infection, posaconazole therapy was associated with a better outcome, compared with other antifungal drugs, but did not sterilize the brain at the end of 8 weeks [6]. Successful therapy requires a complete resection of the lesion supplemented by adequate antifungal treatment [10, 11].

After reviewing the findings of a histopathologic examination of the brain biopsy specimen, we initially treated the patient with high-dose voriconazole (500 mg administered twice per day) and caspofungin. Amphotericin B was later added to the treatment regimen, and 5-flucytosine was substituted for caspofungin when cultures grew C. bantiana. The patient also underwent suboccipital decompressive craniectomy and duraplasty.

Despite maximum therapy, the lesions progressed, and the patient's condition continued to worsen. On hospital day 31, care was withdrawn by the patient’s family, and she died later that day.

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References


Figure 2. Low-power (A) and high-power (B) views of hematoxylin and eosin stain showing pigmented and septated fungal hyphal forms (small arrow) and right-angle budding. The star indicates a microvascular reactive change inclusive for perivascular acute-neutrophilic infiltrate. The large arrow head indicates a polymorphonuclear leukocyte. The rectangular inset delineates the portion of the low-power view shown in the high-power view.

Figure 3. Lactophenol-aniline blue stain of the tissue culture showing septate hyphae with a conidiophore, which produces long chains of smooth oval conidia (arrow).

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