Primary mycotic abscess of the brain caused by *Fonsecaea pedrosoi*

Case report

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A case of cerebral abscess caused by *Fonsecaea pedrosoi* is reported in a nonimmunocompromised, 15-year-old boy. In the absence of a primary cutaneous lesion, this fungus was considered to be a primary neuropathogen. The fungus was cultured and characterized from the abscess material obtained at surgery. Prompt therapy using amphotericin B and 5-flucytosine helped in the successful recovery of this patient.

**KEY WORDS** • brain abscess • chromoblastomycosis • *Fonsecaea pedrosoi*

*Fonsecaea pedrosoi* is one of the dematiaceous fungi, which rarely involve the central nervous system.1,3,6 Among these brown-olive-green, pigment-producing chromomycoses, *Cladosporium trichoides* has been recognized to be neurotropic, causing cerebral abscess and meningoencephalitis.2,3,8,10–12 On the other hand, isolation of *F. pedrosoi* from a cerebral abscess, as reported in this paper, in a nonimmunocompromised host and in the absence of cutaneous lesions, suggests that this fungus can also be a primary neuropathogen. Very few cases of cerebral infection caused by this dematiaceous fungus have been reported in the literature,1 and only one case of fungal infection of the paranasal sinuses caused by *F. pedrosoi* has been reported from India.9

**Case Report**

This 15-year-old boy presented to our neurosurgical services with a history of headache, vomiting, blurring of vision for 4 months, and right sensory seizures for 10 days.

**Examination.** On examination, the patient had early papilledema, right-sided homonymous hemianopsia, dysgraphia, acalculia, and agraphasthesia. A provisional clinical diagnosis of left-sided supratentorial space-occupying lesion was made and the patient was then further investigated.

A computerized tomography (CT) scan of the head revealed a large, well-demarcated, mixed density lesion with cystic areas and focal calcification in the left temporal region. Perilesional edema and mass effect were also evident on CT (Fig. 1). A diagnosis of oligodendroglioma or ganglioglioma with cystic change and calcification was then considered, although the possibility of a multiloculated abscess could not be excluded.

**Operation.** At surgery, a well-encapsulated, cystic mass with a good plane of cleavage from the surrounding compressed brain parenchyma was encountered. The luminal aspect of the cystic mass was covered by necrotic purulent material. Squash smears made from the fresh tissue that had been submitted for intraoperative rapid diagnosis showed evidence of a granulomatous inflammation with giant cells that were suggestive of a tubercular pathology. However, on careful scrutiny, tangles of thin, long, brownish fungal hyphae were detected. A provisional diagnosis of chromomycosis was conveyed to the operating surgeon. The temporal abscess was then totally resected, along with the compressed perilesional ring of brain tissue.

**Histopathological Examination.** On histological examination of the resected lesion, an abscess capsule with an external strip of gliosed brain parenchyma was revealed. The wall of the capsule had numerous ill-defined granulo-
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**Fig. 1.** Axial computerized tomography scan showing a mixed density cystic lesion with focal calcification in the left temporal lobe and midline shift.

**Fig. 2.** Photomicrographs of the abscess capsule of the resected lesion. H & E. A: The wall of the capsule has numerous ill-defined granulomas with a foreign-body type of giant cells containing fungal hyphae. Original magnification × 120. B: At a higher magnification, fungal hyphae that are partially encrusted with calcium within the giant cells are revealed. Original magnification × 600.

**Fig. 3.** Photograph of a fungal slide culture showing obovate conidia arranged singly or in short chains (arrows) over the erect, septate conidiophore which are characteristic of *Fonsecaea pedrosoi*. Lactophenol cotton blue, original magnification × 400.

mas and foreign-body type of giant cells (Fig. 2A). Both hyphae and thick-walled spherical forms of brown pigmented fungi were seen within the giant cells and extracellularly. In many places, the intracellular hyphae were found to be encrusted with calcium (Fig. 2B). Periodic acid–schiff and methanamine-silver stains revealed the branching and septate nature of the fungi. These histological features were consistent with the diagnosis of a chromomycotic brain abscess.

The pus sample from the abscess cavity and fresh lesional tissue were processed for routine bacterial, mycobacterial, and fungal cultures. Samples were wet mounted and stained with Lactophenol cotton blue; they both revealed the presence of brownish, septate, fungal hyphae. Fungal cultures were set in multiple tubes of Sabouraud’s dextrose agar, both at room temperature (25°C to 27°C) and at 37°C. Fungal growth was observed in the Sabouraud’s dextrose agar on the 8th day from the tissue sample and on the 20th day from the pus. The colonies were flat and olive-green colored initially and subsequently turned grayish black with a velvety, heaped, and folded surface. The growth was subcultured on potato dextrose agar for the study of its conidial morphology.

Microscopic examination revealed pale brown fusiform to obovate, one-celled to multicellular conidia arranged...
along erect conidiophores as loose heads (Fig. 3). The conidia had dense basal scarring. These morphological features were characteristic of *F. pedrosoi*. Furthermore, the conidia were differentiated from *C. trichoides* by their slower rate of growth and an absence of long chains of conidia with disjunctures between them along the septate conidiophore.

**Outcome.** The patient made an uneventful clinical recovery, with no residual neurological deficits, following the surgery and treatment with amphotericin B and 5-flucytosine. A follow-up clinical examination at 3 months revealed a discharging sinus at the site of the surgery. A repeat CT scan demonstrated only a residual abscess wall and accumulation of fluid at the abscess site. The pathological area was reexplored and resected. Histological examination and culture of this tissue did not reveal any fungal elements.

**Discussion**

*F. pedrosoi* is one of the pigmented pathogenic fungi that usually cause lesions confined to the skin and subcutaneous tissue.1 The organism is ubiquitous in soil and usually gains access to the body after cutaneous or wound inoculation with vegetable matter or soil containing pathogenic fungi. Because these fungi are frequently associated with wood, they may be introduced into the skin by splinters, thus resulting in a lesion limited to the skin and subcutaneous tissue.5 Invasion of underlying structures and metastatic spread to distant sites through the lymphatic vessels or through hematogenous dissemination are extremely rare.13 Cases of cerebral lesions caused by *F. pedrosoi* with paranasal sinus and skin as the primary site have been reported.6,9 However, isolation of *F. pedrosoi* from the cerebral abscess in the absence of an apparent cutaneous disease, as in the present case, indicates that, similar to *C. trichoides*, this organism is also a neuropathogenic dematiaceous fungus. Among the seven cases of primary chromomycosis diagnosed at our center during the past 10 years, six of them were caused by *C. trichoides*.2 The cerebral lesions caused by *C. trichoides* varied from meningoencephalitis to cerebral abscess. The fungus could be recovered in culture from the lesion tissue in five cases and cerebrospinal fluid collected post-mortem in one other case.

The neuroinvasive property of *F. pedrosoi* appears to be relatively low. Felger and Friedman10 noted cerebral invasion in mice only after intracerebral inoculation; in contrast, spores that were introduced intravenously required administration of cortisone and antibiotic medication to cause virulent cerebral infection.13 An interesting histological feature in the present case was calcium encrustation over the fungal hyphae, which were located both within the giant cells and extracellularly in the granulomas. This observation further suggests the low pathogenic nature of this fungus and the relative chronicity in the evolution of the pathology. The mechanism of hematogenous transportation of the organism to the nervous system is not yet clear; however, altered immunological status does not appear to be a prerequisite for cerebral involvement.

Cerebral chromomycosis has been diagnosed during life only in those cases in which evidence of a localized lesion led to surgical resection, thus providing an opportunity to examine the contents of the abscess. In areas like India, where tuberculosis is common, all granulomatous lesions are generally grouped as tubercular in nature and treated empirically with antituberculous therapy; many patients show clinical improvement. However, a small percentage of such lesions are discovered to be fungal granulomas. The vital lesson from this case is to consider relatively low virulent mycotic infections when histological examination of the lesion reveals ill-formed granuloma with numerous foreign-body types of giant cells; these cases must then be treated appropriately. Because all pigmented fungi are indistinguishable in tissue sections, submitting the inflammatory granulation tissue and/or the purulent material for fungal culture is essential to identify the exact species of the infective fungal agent by its characteristics in culture.4,7,13

**References**


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