

CASE REPORT

Brain Abscess Caused by *Cladophialophora* Species*Sunayana. M. Jangla*^{1*}, *Iyer Vishwanathan*²

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Abstract:

We report a case of 55-year-old male who presented with history of double vision on left side, slurred speech and loss of memory since a week. Computerized tomography scan was done which showed space occupying lesion in occipital region. Pus was drained by craniotomy. Histopathological examination and ten percent potassium hydroxide mount of pus showed septate dematiaceous hyphae. Culture grew dematiaceous mould which was reported as *Cladophialophora species*. Patient responded to surgical drainage along with voriconazole therapy.

Keywords: *Cladophialophora* Species, Brain Abscess, Voriconazole

Introduction:

Infections caused by dematiaceous fungi that have ability to cause subcutaneous and systemic infections are called phaeohyphomycosis [1]. In cases of cerebral infection, the fungus is found in hyphal forms in tissues and characterized by brown melanin pigment in cell walls [1]. Dematiaceous (darkly pigmented) fungi is rarely a cause of Cerebral phaeohyphomycosis [2, 3]. *Cladophialophora* is one of the dematiaceous fungus involved in cerebral abscess and *Cladophialophora bantiana* (*C. bantiana*) is the most commonly described dematiaceous fungi in the etiology of brain abscess [1, 2]. According to Suri *et al*, 28 species have been reported from

India between 1962 and 2009 [3]. We present a case of a highly rare fungus, *Cladophialophora* species causing brain abscess.

Case Report:

Fifty-five-year-old male presented in a tertiary care hospital with history of double vision on left side, slurred speech and loss of memory since one week. Patient was a known case of diabetes mellitus on oral hypoglycemic agents and hypertension. There was no history of fever nausea, vomiting, dyspnea, head injury or history of slow developing polymorphic skin lesions, past respiratory or paranasal sinus infection, brain injury or significant occupational history. On examination, there was left sided diplopia, amnesia and slurred speech. There were no significant respiratory findings. Computerized Tomography (CT) scan of brain showed space occupying lesion in occipital region. Craniotomy was done and abscess drained. Pus drained was sent for Histopathological Examination (HPE) which revealed septate dematiaceous hyphae with dense neutrophilic, predominant inflammatory exudate and scattered foreign body giant cells. Gram stain from the pus showed plenty of pus cells but no bacteria. Staining of pus for Acid Fast Bacilli (AFB) was negative. Ten percent of Potassium Hydroxide (KOH) mount showed septate dematiaceous hyphae. Pus was inoculated on both Sabouraud Dextrose Agar

slants, with and without antibiotics (Himedia, Pathare distributors, Maharashtra, India) and incubated at 24°C and 37°C respectively. On day seven of incubation there were small, grayish black compact colonies with a velvety texture around 0.5 millimeter on both Sabouraud Dextrose Agar slants which increased in diameter of up to two centimeters at the end of 14 days of incubation (Fig.1). Reverse of the colonies was black (Fig.2). Lacto phenol Cotton Blue Mount (LPCB) from the colony showed brown septate hyphae. Conidia were single celled, brown, smooth walled, ellipsoid. Conidia were arranged in long sparsely branched chains. The chains of conidia were seen arising directly from hyphae. Chlamydoconidia were seen occasionally (Fig. 3).



Fig.1: Growth of Isolate on Sabouraud Dextrose Agar



Fig.2: Reverse of Colonies on Sabouraud Dextrose Agar



Fig. 3: Lactophenol Cotton Blue Mount of the Colonies(x400)

Slide culture was put from the colony which showed a similar arrangement. The slant was also inoculated at 42°C but there was no growth at this temperature and maximum growth occurred at 37°C, that is, the thermal tolerance test was negative. Urease test (Himedia, Pathare distributors, Maharashtra, India) of the isolate was negative. Based on these findings the isolate was reported as *Cladophialophora* species. In addition, the pus sample was sent for fungal culture to Hinduja hospital, Mumbai and they also eventually reported the isolate as *Cladophialophora* species. On the basis of KOH findings, the patient was treated with injectable voriconazole for 14 days which improved his condition.

Discussion:

Phaeohyphomycosis is a subcutaneous and systemic infection caused by various heterogenous groups of phaeoid dematiaceous fungi [1]. *Bipolaris*, *Curvularia*, *Exserohilum*, *Alternaria*, *Exophiala*, *Phialophora*, *Wangiella*, *Cladophialophora*, *Chaetomium* species and *Dactylaria* are the most common genera causing phaeohyphomycosis [1]. Anamorph members of the ascomycetes in the order Chaetothyriales in the family Herpotrichiellaceae which consists of the black-yeast like fungi belong to the genus *Cladophialophora* [4]. They are normally associated with soil and vegetative matter and

hence possible mode of transmission are traumatic implantation and inhalation of spores leading to hematogenous dissemination [4,5]. Para nasal sinus and ear infection is another possible mode of acquiring it [6]. The brain is commonly involved in human infections caused by this genus [4]. Organisms belonging to this genus prefer warm and humid climate for their growth [5]. Organisms of this genus grow at 24°C and 37°C and produce small black colonies. Microscopically, the genus shows dematiaceous hyphae with one-celled, ellipsoidal to fusiform, dry conidia arising through blastic, acropetal conidiogenesis, and arranged in branched, coherent chains. [5]. Our isolate from brain pus of an Indian male also showed dematiaceous hyphae on KOH mount and HPE and similar appearance and arrangement of conidia. Hence, it belonged to genus *Cladophialophora* which had been probably acquired through respiratory tract and hematogenous dissemination of spores to the brain is possible as in our case there was no other relevant or occupational history. Various species of this genus are involved in different infections. *Cladophialophora carionii* (*C. carionii*) which is the type species of this genus causes chromoblastomycosis. *Cladophialophora bantiana* (*C. bantiana*) and *Cladophialophora modesta* (*C. modesta*) cause brain abscess. *C. boppii*, *C. emmonsii* and *C. saturnica* cause cutaneous infections. *C. deviresii* and *arxii* cause disseminated diseases [7]. *Bantiana* is the commonest species of *Cladophialophora* that has a high affinity for the brain and causes brain abscess [8, 9]. It is observed that *Cladophialophora* brain abscess occurs in immunocompromised as well as healthy patients [10]. In our case, the patient had a long standing history of diabetes mellitus. In their mini review, Ajantha and

Kulkarni observed that microscopically *C. bantiana* also shows a similar appearance of hyphae and conidia as that of genus *Cladophialophora* mentioned above, with conidial size approximately 2.5-5×6-11 micrometers and conidia arranged in long, sparsely branching chains arising directly from hyphae. It has a moderate growth rate and colonies are olivaceous gray with a velvety texture and black reverse. *C. bantiana* grows at 24°C and 37°C and also at 42°C and urease test is positive [7]. Our isolate also showed dematiaceous hyphae on KOH mount and had similar growth requirements and macroscopic and microscopic findings but it did not grow at 42°C and urease test was negative.

In 1999, McGinnis *et al.* reported a case of *Cladophialophora modesta* causing brain abscess after head trauma in which the isolate showed dematiaceous hyphae with short unbranched chains of broadly ellipsoidal conidia with ability to grow at 45°C also [11]. However, our findings were not similar to this. So, the isolate was reported as *Cladophialophora species*. According to Badali *et al.*, *Cladophialophora species* are known for being difficult in identification and hence molecular identification methods, are more reliable than classical morphological methods [4]. No such method was available with us. Regarding its antifungal sensitivity pattern, voriconazole has good penetration into the CNS and hence was found to be effective [7]. Voriconazole is commonly used agent for treating many other invasive mold infections, especially those caused by dematiaceous fungi [12]. In our case also, the brain abscess pus was drained by craniotomy and patient was given voriconazole for 14 days to which he responded. Thus, in our case, the dematiaceous fungus isolated from pus of brain abscess of an Indian diabetic male, with growth

rate, growth temperature, morphological and microscopical findings and antifungal response as above, was *Cladophialophora*, though it did not display certain features of the commonest species of this genus causing brain abscess and in the absence of molecular methods, it could not be identified up to the species level. However, the finding of this genus from human sample itself is significant and needs to be reported. Keeping in mind the rarity of this fungus, in addition, we had sent the pus sample for fungal culture to Hinduja hospital, Mumbai and they also reported the isolate as *Cladophialophora* species.

Conclusion:

In our case we would like to emphasize that the possibility of isolating an uncommon species was kept in mind and hence test to identify it and differentiate, were conducted. The need of the time is development of rapid and accurate methods for identification of such rare isolates. Identification of a rare isolate is required for specific treatment to avoid use of broad spectrum antifungal agents thereby preventing emergence of resistance. But till the time such methods are developed, identification of such rare fungus even till the genus level should be reported.

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