

An unusual case of *Microascus* brain abscess in an immunocompetent child and a review of the literature

Shruti Malik¹, Vijeta Bajpai¹, Sagar Betai², Lily Pal³, Rungmei S. K. Marak¹

¹Departments of Microbiology, ²Neurology and ³Pathology, SGPGIMS, Lucknow, Uttar Pradesh, India

ABSTRACT

We present a case of brain abscess in an immunocompetent child due to the dematiaceous fungus *Microascus cinereus*, an organism commonly found in soil and stored grains. The etiologic agent was demonstrated by direct microscopy and culture. The patient responded well to surgical excision of abscess along with a course of amphotericin B and voriconazole. *Microascus* species have emerged as significant invasive pathogens especially in the immunocompromised patients. To the best of our knowledge, this is the first reported case of brain abscess caused by *M. cinereus* in an immunocompetent individual with no underlying risk factors.

Keywords: Amphotericin B, brain abscess, cerebral phaeohyphomycosis, immunocompetent, *Microascus cinereus*

Introduction

Microascus cinereus is an ascomycetous mold, one of the most common species of the genus *Microascus* and has been recovered from a wide geographical range. Though relatively uncommon in humans, *Microascus* species have recently emerged as significant invasive pathogens causing opportunistic human and animal diseases.^[1-3]

We report here a case of brain abscess caused by *M. cinereus* in an immunocompetent child, probably the first reported case of central nervous system involvement in an immunocompetent individual and discuss and clinical significance of *M. cinereus* in the causation of human disease.

Case Report

A 13-year-old male child, resident of a suburban area in Uttar Pradesh, India presented to the Neurology department at Sanjay Gandhi postgraduate Institute of Medical Sciences, Lucknow

Address for correspondence: Dr. Vijeta Bajpai, Department of Microbiology, AIIMS, New Delhi, India.
E-mail: vijetabajpaikgm@gmail.com

Received: 20-11-2019

Revised: 20-01-2020

Accepted: 03-02-2020

Published: 28-02-2020

Access this article online

Quick Response Code:



Website:
www.jfmipc.com

DOI:
10.4103/jfmipc.jfmipc_1038_19

with complaints of recurrent episodes of focal seizures with secondary generalization for 20 days associated with altered sensorium and frontal headache for 7 days before admission. He had no history of fever, ear discharge, vomiting, visual blurring, diplopia, head trauma, or weight loss, tuberculosis, diabetes, dyspnea, cyanosis, or any other chronic illness.

On examination, patient had a left sided hemiparesis with a Glasgow coma scale of 12 (E3M4V5). Neck rigidity and Kernig's sign were absent and fundus examination was normal. Examination of other systems including cardiovascular system did not reveal any obvious abnormality. Chest roentgenogram and electrocardiography were normal. Laboratory investigations revealed a total leukocyte count of 10,400/mm cu. with 73% neutrophils. Serum electrolytes, renal function tests, and liver function tests were within normal limits. Blood and urine cultures were sterile. The patient tested negative for HIV antibodies and his CD4 count was 782/cu mm. Noncontrast computed tomography (CT) scan of the head showed a right high frontoparietal granuloma after which the patient was started on first-line antitubercular treatment (ATT). Patient was continued on ATT for almost 2 weeks; however, his complaints did not resolve and a magnetic resonance imaging (MRI) scan of head

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Malik S, Bajpai V, Betai S, Pal L, Marak RS. An unusual case of *Microascus* brain abscess in an immunocompetent child and a review of the literature. J Family Med Prim Care 2020;9:1244-7.

was done with gadolinium contrast agent which revealed a well capsulated abscess in the right frontoparietal region [Figure 1]. A right frontal craniotomy with complete surgical excision of the abscess was performed revealing a 3 cm deep cavity with xanthochromia fluid and yellowish flakes. Direct microscopy of the abscess contents revealed plenty of pigmented, septate fungal hyphae. Hence, antitubercular treatment was stopped and he was started on intravenous amphotericin B (0.7 mg/kg, cumulative dose 400 mg) and continued for one month with close monitoring of renal functions and serum electrolytes. Culture from abscess material grew *M. cinereus* and subsequently voriconazole (200 mg daily) was added to his antifungal regimen for a month. The patient's overall condition improved and follow up MRI scan demonstrated resolution of the lesion and patient was eventually discharged after one and a half months of intensive therapy. He was in regular follow-up for 2 years and continued to be asymptomatic without any neurological deficits.

Mycologic findings

Direct microscopy of pus sample, using 10% KOH and Hematoxylin and Eosin staining, revealed plenty of pigmented, septate fungal hyphae [Figures 2 and 3]. In addition, sample was inoculated onto Sabouraud's dextrose agar. Growth was first visible on day 6 of incubation and developed into small mold colonies over the next few days. The colonies initially were pale but developed a grey-olive color after 2 weeks. Lacto-phenol Cotton blue mounts of the colonies showed pigmented, septate fungal hyphae without sporulation. Slide cultures was put on cornmeal agar (CMA) [Figure 4a]. Microscopic examination of CMA slide cultures revealed catenulate, dematiaceous annelloconidia ($3.5\text{-}5 \times 3\text{-}4 \mu\text{m}$), and arising from either single or penicillate flask-shaped conidiophores attached to dematiaceous, septate hyphae. These features were consistent with a dematiaceous *Scopulariopsis* species [Figure 4b]. After 2 weeks of incubation, small black fruiting structures were seen growing first on the surface of CMA. Microscopic examination of these structures revealed globose perithecia ($150\text{-}350 \mu\text{m}$) with a short cylindrical ostiolar beak [Figure 4c]. Pale brown to reddish and planoconvex ascospores ($5\text{-}6 \times 2.5\text{-}4 \mu\text{m}$) were seen almost after 4 weeks of incubation. These characteristics are consistent with an identification of *M. cinereus*.^[4] The isolate was deposited at the Centre of Advance Research in Medical Mycology and WHO Collaborating Centre, Post Graduate Institute of Medical Education and Research, Chandigarh, India and identity were confirmed under the accession number IL- 980.

Discussion

Brain abscess is “invariably fatal,” condition in children, until and unless it is diagnosed by physician for their etiology. Progress in diagnosis and treatment, significantly increased the chances of survival of the patients. Recognizing the common cause brain abscess, such as bacterial, fungal, tubercular, and parasitic especially in pediatric population is a key part of any primary care practice. The diagnosis of atypical fungi as dematiuous fungi is rarely made by physician because these infections occur mainly

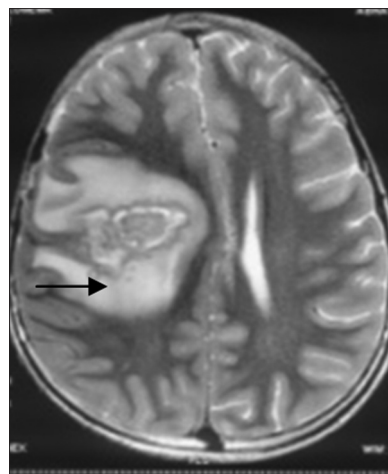


Figure 1: MRI scan of brain of the patient. Figure 1: Head MRI scan showing capsulated abscess in the right frontal region. It shows mixed intensity on T2W images with an irregular ragged hypointense capsule with significant perilesional vasogenic edema with mild midline shift to left side

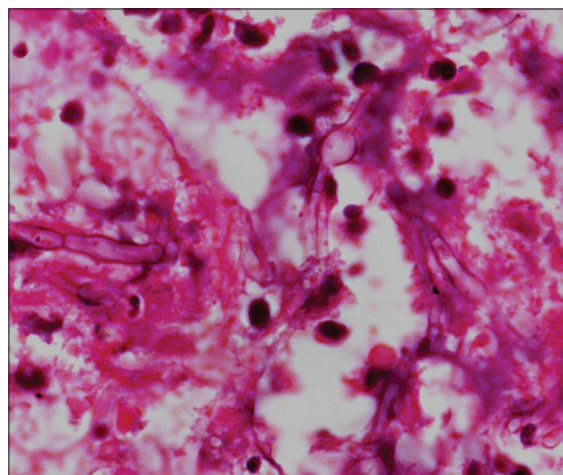


Figure 2: Hematoxylin and eosin stain showing septate branching fungal hyphae (magnification $\times 400$)

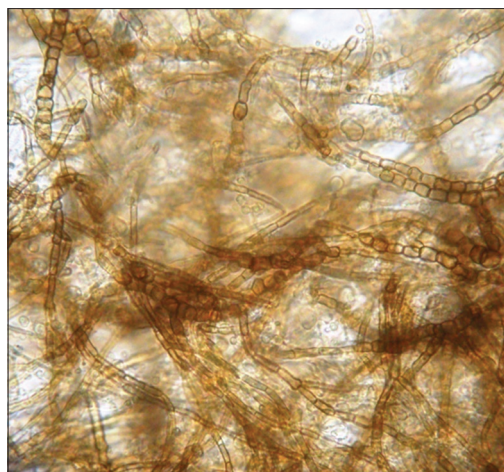


Figure 3: Direct KOH mount showing septate, pigmented fungal hyphae in immunocompromised patients. Therefore, this case report highlights this fact that the physician practicing in primary care

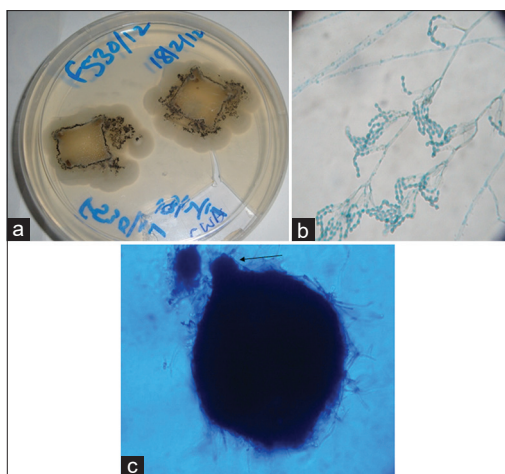


Figure 4: (a) Two weeks growth on CMA showing the dematiaceous character and perithecia (pinpoint black dots). (b) Dematiaceous scopulariopsis species. Magnification $\times 400$. (c) A perithecium with the ostiole (arrow) borne on a very short neck. Magnification $\times 200$

should keep the diagnosis of these rare fungi in their mind to avoid the delay in diagnosis of pediatric patients.

Common *Microascus* species associated with dematiaceous *Scopulariopsis anamorphs* include *M. cinereus*, *M. cirrosus*, and *M. trigonosporus*. It is therefore important to consider the possibility of an associated *Microascus teleomorph* (sexual stage) when a dematiaceous *Scopulariopsis species* is recovered and to hold cultures for up to 6 weeks for mature ascospore formation. The species described in this case report, *M. cinereus* is culturally very close to *M. cirrosus* but differs in the darker color and less-stable habit. Microscopically differences between these two species are seen in the size and shape of the ascospores, the length of perithecial necks, and the diameter of ripe perithecia. The ascospores of *M. cinereus* are plano-convex or slightly concavo-convex, shaped like segments of an orange and appearing oval in end view whereas those of *M. cirrosus* are concavo-convex or heart shaped.^[4-6]

Microascus species have been reported as significant invasive pathogens especially in the immunocompromised patients. They are frequently recovered as the *Scopulariopsis anamorph* in more superficial sites and are known to be agents of onychomycosis.^[7-9] *M. cinereus* has been isolated from nails^[1] and was reported to be causing suppurative cutaneous granulomata in an immunocompromised host with underlying chronic granulomatous disease.^[10] Aznar *et al.* reported isolation of the fungus from maxillary sinus in conjunction with *Aspergillus repens* and the abundance of sexual fructifications in the tissue indicating the pathogenic role of *M. cinereus*.^[7]

The therapeutic guideline for treatment of dematiaceous fungal brain infections in general advocates complete excision of abscess. It also suggests preference of voriconazole or posaconazole over amphotericin B due to latter's poorer outcomes.^[11] We treated the patient successfully with complete surgical excision of the

abscess along with the combination therapy of amphotericin B and voriconazole. Though the antifungal susceptibility testing for the isolate could not be performed, the combination therapy worked well in our case.

Conclusion

The recovery of this organism from brain abscess definitely establishes its identity as a neurotropic dematiaceous fungus capable of causing cerebral phaeohyphomycosis even in immunocompetent host. To the best of our knowledge, this is the first documented case of human brain abscess caused by *M. cinereus* in an immunocompetent individual with no predisposing factors. Early diagnosis along with complete surgical excision and appropriate antifungal treatment seems to provide favorable outcome.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Acknowledgements

The authors would like to acknowledge Post Graduate Institute of Medical Education and Research, Chandigarh, India for their assistance with organism identification.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

- Baddley JW, Moser SA, Sutton DA, Pappas PG. *Microascus cinereus* (Anamorph *scopulariopsis*) brain abscess in a bone marrow transplant recipient. *J Clin Microbiol* 2000;38:395-7.
- Sandoval-Denis M, Gené J, Sutton DA, Cano-Lira JF, de Hoog GS, Decock CA, *et al.* Redefining *Microascus*, *Scopulariopsis* and allied genera. *Persoonia* 2016;36:1-36.
- SP, Lumley TC, Sigler L. Use of holomorph characters to delimit *Microascus nidicola* and *M. soppii* sp. nov., with notes on the genus *Pithoascus*. *Mycologia* 2002;94:362-9.
- SP, Sigler L. Heterothallism in the *Microascaceae* demonstrated by three species in the *Scopulariopsis brevicaulis* series. *Mycologia* 2001;93:1211-20.
- Tullio V, Banche G, Allizond V, Roana J, Mandras N, Scalas D. Non-dermatophyte moulds as skin and nail foot mycosis agents: *Phoma herbarum*, *Chaetomium globosum* and *Microascus cinereus*. *Fungal Biol* 2010;114:345-9.
- Udagawa SI. *Microascus* species new to the mycoflora of Japan. *J Gen Appl Microbiol* 1962;8:39-51.

7. Aznar C, De Bievre C, Guigen C. Maxillary sinusitis from *Microascus cinereus* and *Aspergillus repens*. *Mycopathologica* 1989;105:93-7.
8. Celard M, Dannaoui E, Piens MA, Guého E, Kirkorian G, Greenland T, *et al.* Early *Microascus cinereus* endocarditis of a prosthetic valve implanted after *Staphylococcus aureus* endocarditis of the native valve. *Clin Infect Dis* 1999;29:691-2.
9. Baddley JW, Moser SA, Sutton DA, Pappas PG. *Microascus cinereus* (anamorph *Scopulariopsis*) brain abscess in a bone marrow transplant recipient. *J Clin Microbiol* 2000;38:395-7.
10. Marques AR, Kwon-Chung KJ, Holland SM, Turner ML, Gallin J. Suppurative cutaneous granuloma caused by *Microascus cinereus* in a patient with chronic granulomatous disease. *Clin Infect Dis* 1995;20:110-14.
11. Chowdhary A, Meis JF, Guarro J, Hoog GD, Kathuria S, Arendrup MC, *et al.* ESCMID and ECMM joint clinical guidelines for the diagnosis and management of systemic phaeohyphomycosis: Diseases caused by black fungi. *Clin Microbiol and Infect* 2014;20:47-75.