



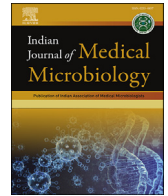
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Case Report

Acanthamoeba species from a post-covid patient with CSF rhinorrhea; a next possible post covid menace? A case report

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ABSTRACT

A case of *Acanthamoeba* rhinorrhea in a 32 years female, who was recently recovered from COVID-19 infection at a tertiary care institute in India. Though, there was no standard treatment protocol for management of amoebic-meningo encephalitis. The patient was managed successfully with combination therapy of amphotericin B and miltefosine. Agents having trophicidal and cysticidal activities are used for treatment of CNS *Acanthamoeba* infection. COVID 19 infection, steroid therapy and diabetes mellitus which lead to low immunity were found to be associated contributing factors.

1. Introduction

Acanthamoeba, a free-living amoeba because granulomatous amoebic encephalitis (GAE) & keratitis is widely distributed in the environment [1, 2]. Diagnosis is made by Microscopy & cultivation of protozoa [3]. With the surge in the cases of Covid associated Mucormycosis, a case of CSF rhinorrhea with fever and headache was accidentally detected with *Acanthamoeba* trophozoites reported in this study.

2. Case history

A 32-year-old female visited to ENT ward with continuous watery discharge from nostrils with on and off fever and headache for fifteen days. Discharge had no smell and not bloody and she was unable to sniff back. She was Covid-19 positive by RTPCR 15 days back which was managed conservatively with oxygen, remdesivir and oral dexamethasone. She was recently diagnosed with diabetes mellitus. On examination, she was afebrile, restless and irritable with no neck stiffness and negative Kernig's and Brudzinski's signs. The rhinorrhea fluid was clear with few white fibrillar material. Protein and glucose concentration were 138.35mg/dl and 90 mg/dl respectively and showing 100% lymphocytes. Beta trace protein (BTP) in CSF was found to be 27.8 mg/L and BTP(CSF)/BTP serum ratio was 79.43 ml/L. Serum

calcium, magnesium & ferritin levels were 3.4 mg/dl, 1.26 mg/dl and 248.7 respectively which were critical. Glycosylated hemoglobin (HbA1c) was 7.7%. CECT cisternography revealed a defect in right cribriform plate while brain parenchyma appeared normal. A Contrast enhanced MRI (CE-MRI) cisternography revealed a bony defect on right cribriform plate & suspected leak in left cribriform plate. On Microbiological evaluation CSF, (microscopy & culture), wet mount examination revealed many cells with amoeboid movement showing vacuolated cytoplasm, nucleus and a central nucleolus ($\times 1000$), having a single nucleus centrally or slightly eccentrically which was suggestive of *Acanthamoeba* trophozoites (Fig. 1A). On Gram stain few pus cells and Giemsa stain many trophozoites and few cystic forms were revealed (Fig. 1B). The CSF sample was inoculated in non-nutrient agar medium with overlaid *Escherichia coli* suspension. There was evidence of trophozoites with characteristic acanthopodia (Fig. 1C). Simultaneously, a suspension of *Escherichia coli* was made in sterile distilled water adjusted to pH~6.5 in which 2-3 drops of CSF was inoculated. There was no growth on bacterial & fungal culture. The patient was treated with Injectable Ceftriaxone, Amphotericin B deoxycholate, Azithromycin & oral Miltefosine and fluconazole. The number of observed amoebae decreased with subsequent sample and the last CSF sample sent before discharge was free from amoebae.

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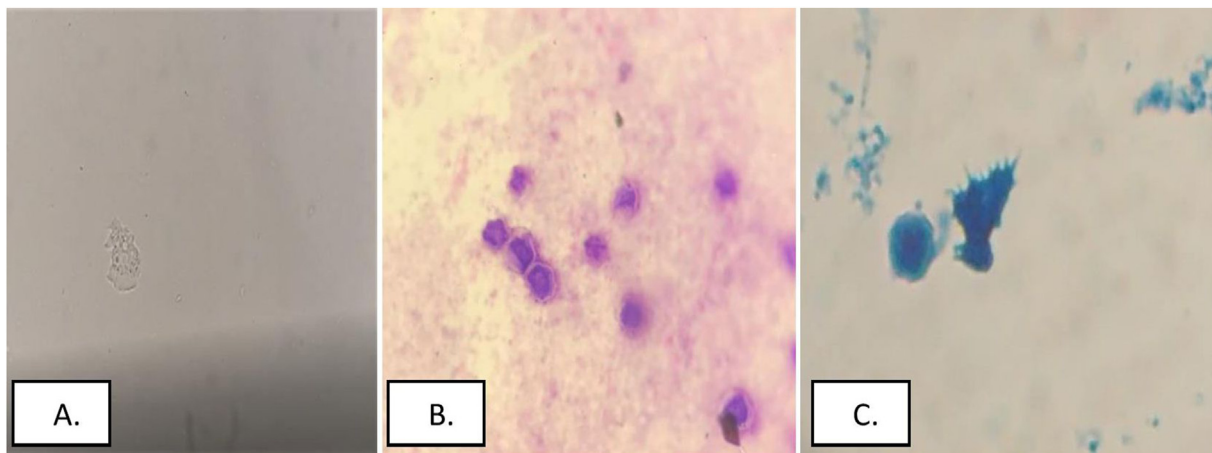


Fig. 1. A) Trophozoite of Acanthamoeba in wet mount from culture. B) Geimsa stain of Acanthamoeba C) Wet mount examination of culture with methylene blue drop.

3. Discussion

Acanthamoeba is responsible for Central nervous system infection including meningoencephalitis, granulomatous amoebic encephalitis (GAE) and amoebic keratitis, primarily in immunocompromised and also in few immunocompetent people [4,5]. Humans usually acquire amoebic meningitis by swimming or bathing in ponds, lakes, or streams. In present case, patient might have acquired the infection through the respiratory route with a history of swimming 6 months back and current diabetic status with use of steroids might have made the patient more vulnerable for infection.

In this study, CECT cisternography revealed a defect in right cribriform plate with suspected CSF leak. Hypocalcemia could not correlate clinically till discharge. During & after second wave of COVID-19 there was surge in COVID associated mucormycosis cases which were presented with variable clinical signs and symptoms. Nasal sample of CSF was sent to rule out mucormycosis. Microscopy & culture were negative for Mucorales but, acanthamoeba species was accidentally detected in wet mount. Hence, wet mount examination proved to be key for detection which was later confirmed with culture on non-nutrient medium with *Escherichia coli*.

She was treated symptomatically to prevent superadded bacterial or fungal infections and simultaneously given antiparasitic agent to eliminate the free-living amoeba. she was discharged from hospital after complete disappearance of initial neurological symptoms.

In case series reported by Das et al. a case was presented with recurrence of amoebic encephalitis who succumbed to illness. Rest cases responded clinically with a combination of amphotericin-B, trimethoprim-sulfamethoxazole, and rifampicin [6]. Similar case management was also describe by Siripurapu et al. [7]. Hence variable outcome may be seen with these cases.

Most of the time accidental detection of Acanthamoeba was reported in clinical samples [8–10]. Khanna et al. reported a case which was clinically suspected extrapulmonary tuberculosis, after microbiological evaluation diagnosis was changed to *Acanthamoeba* meningitis and treated successfully [9]. Histologically few cases of *Acanthamoeba* had been mistakenly diagnosed as a case of inflammatory debris and histiocytes as well as Yeast in another case [10,11]. In present study, patient might have acquired the infection through the respiratory route and comorbidity diabetes and steroid therapy had made more prone for this infection. Previous history of swimming six months could be linked with this infection.

In this pandemic, SARS-CoV-2 coinfection of *Aspergillus*, *Candida*, and *Klebsiella* have been reported with fatal outcome [12]. Present case is coinfection of SARS-COV & Acanthamoeba. It was managed

conservatively with combination therapy containing amphotericin B, miltefosine. Combination therapy with miltefosine was also proved effective in the previous reports [13–15].

Miltefosine is also recommended by CDC on page (Parasite – Granulomatous Amoebic Encephalitis (GAE) treatment; keratitis) This is a fatal disease can be cured if detected early & treated effectively. Wet mount examination of CSF is still an important tool to suspect & detect unusual pathogen in the era of this molecular diagnostic techniques.

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None.

Conflicts of interest

None.

Ethics approval

Not Required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms.

Credit author statement

Archana Keche: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data Curation, Writing - Original Draft, Writing - Review & Editing, Visualization, Supervision, Project administration, Funding acquisition. **Sharmistha Chakravarty:** Conceptualization, Methodology, Software, Investigation, Resources, Funding acquisition, Writing - Review & Editing. **Shagufta Khatoon:** Conceptualization, Methodology, Software, Investigation, Resources, Funding acquisition, Writing - Review & Editing. **Pankaj Kannauje:** Conceptualization, Methodology, Software, Investigation, Resources, Funding acquisition, Writing - Review & Editing. **Ripu Daman Arora:** Conceptualization, Methodology, Software, Investigation, Resources, Funding acquisition, Writing - Review & Editing.

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