Apophysomyces elegans species complex, a Cause of Malignant Otitis Externa Complicated By Skull Base Osteomyelitis In An Immunocompetent Host: An Uncommon Form of Mucormycosis From North India

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INTRODUCTION

Fungal Malignant otitis externa (MOE) leads to serious morbidity in elderly patients with diabetes mellitus. Over the last decade, mucormycosis caused by *Apophysomyces elegans* has emerged as an important disease affecting immunocompetent individuals.

We present a successfully treated case of an uncommon form of mucormycosis with *A. elegans species complex*, causing fungal MOE complicated by skull base osteomyelitis, in an otherwise healthy non-diabetic individual.

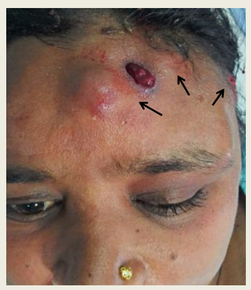
CASE REPORT

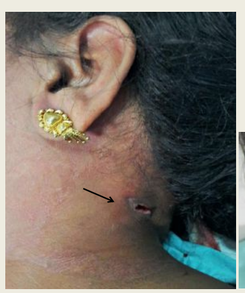
A previously healthy 35-years-old non-diabetic female was admitted in Neuro-otorhinolaryngology ward with 4-months history of severe left sided earache, ear discharge, decreased hearing and left sided multiple cranial nerve palsies, subsequent to an episode of left ear canal cleaning from a local quack by a wooden-stick. Patient's vitals, other clinical and biochemical parameters were within normal limits.

Patient was diagnosed as a case of malignant otitis externa with ear canal pus culture growth showing *pseudomonas spp.* for which she was treated with broad spectrum antibiotic (piperacillin-tazobactam) at a peripheral hospital. Patient was also given antifungals (oral azoles for 2 weeks) for a suscpected fungal infection.

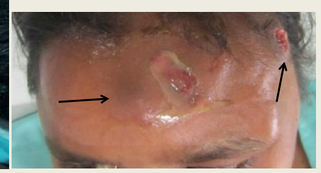
Despite treatment, she developed multiple left sided posterior triangle lymphedenopathy, hence, she was started with trial of anti-tuberculous therapy.

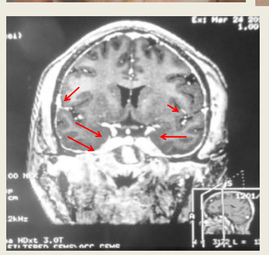
Clinically, differential diagnosis based on her condition was kept as malignant otitis externa, jugulare foramen lesions and rare possibility of atticoantral type of chronic suppurative otitis media with intracranial extension. Patient's fasting & random blood sugar levels, hematological, hepatic & renal parameters were within normal limits.

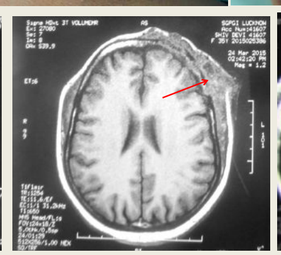


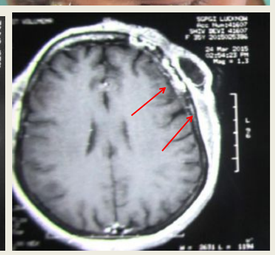


Later, patient developed multiple abscesses in posterior triangle neck and forehead on left side









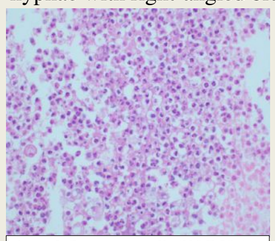
Radioimaging (CT & MRI Head with contrast) revealed findings consistent with skull bone osteomyelitis with subglaleal extension along with diffuse pachymeningeal enhancement - Inflammation ??Tubercular

REFERENCES
1. Padhye AA, Ajello L. Simple method of inducing sporulation by *Apophysomyces elegans* and *Saksenaea vasiformis*. J Clin Microbiol 1988; 26: 1861-63.
2. De Hoog GS, Guarro J, Gene J, Figueras MJ. Atlas of Clinical Fungi. Utrecht, The Netherlands: Centraalbureau voor Schimmelcultures, 2000.

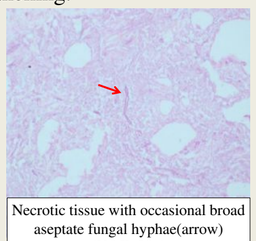
HISTOPATHOLOGICAL & MYCOLOGICAL FINDINGS

Direct microscopy and culture of exudates/aspirate (15 ml) from forehead and neck swellings sent to microbiology laboratory, could not reveal any etiology initially. Bacterial cultures (exudate/aspirate, blood) were sterile.

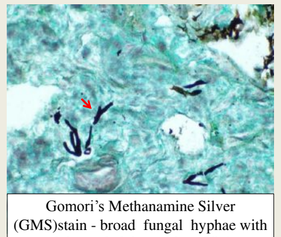
Biopsy from left postauricular swelling (H&E, GMS stain) revealed acute inflammatory reaction with large areas of necrosis and many broad, aseptate fungal hyphae with right-angled branching.



Acute Inflammatory cells (H&E,20x)

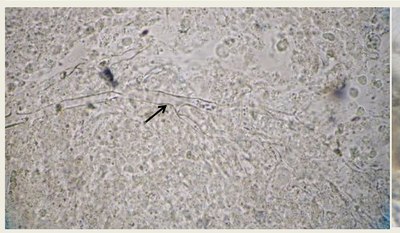


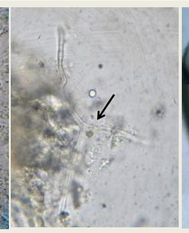
Necrotic tissue with occasional broad aseptate fungal hyphae(arrow) (H&E, 20x)

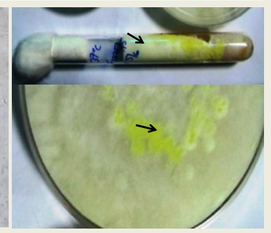


Gomori's Methanamine Silver (GMS)stain - broad fungal hyphae with right angled branching.(20x)

IV Liposomal amphotericin B (1mg/kg/day) was started with suspicion of mucormycosis based on clinical history and histopathological findings. Patient underwent an extensive surgical debridement and craniectomy of frontal bone.



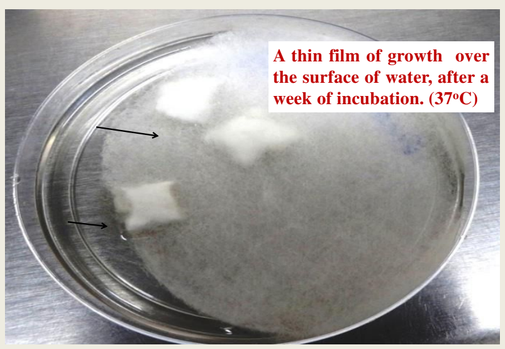




KOH wet mount of the frontal bone tissue showed a very few broad, aseptate, thin hyaline hyphae with irregular non-dichotomous branching-characterisitic of mucormycetes

After 7 weeks of aerobic incubation, fungal culture of the frontal bone tissue on SDA (37°C) yielded growth of white cottony fluffy colonies with yellow pigmentation without any sporulation.

Since further incubation of the isolate on SDA failed to induce sporulation, portions of the isolate were transferred to potato dextrose agar (PDA).

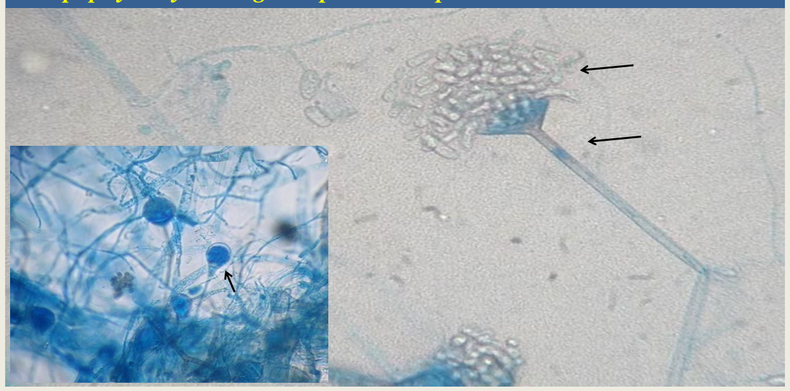


A thin film of growth over the surface of water, after a week of incubation. (37°C)

A lack of sporulation on routine media prompted the use of water culture [1], resulting in abundant sporulation at 37°C.

After three days of incubation at 30°C on this medium, a block of agar, 1x1cm, containing the fungus was placed in sterile distilled water supplemented with 0.2 ml of a 10% filter sterilized yeast extract solution and incubated at 25°C & 37°C [1]

LPCB mount from slide culture : Hyaline hyphae with rhizoids, sporangiophores, with a conspicuous, dark pigmented thickening below the funnel or champagne glass shaped apophysis & smooth walled subglobose sporangiospores [2]; morphologically, identified as *Apophysomyces elegans species complex*



FOLLOW UP & OUTCOME

Postoperatively, patient was started with combination therapy of IV lipososmal amphotericin B (1.5mg/kg/day) and posaconazole (600 mg/day orally).

The patient showed clinical improvement with liposomal amphotericin B (cumulative dose: 2.5g; 3 months) and posaconazole (for 6 months).

Follow-up outpatient clinical visits have not shown any evidence of infection since last one year . The patient is still on regular follow up.

CONCLUSION

To the best of our knowledge this is the first case of Fungal Malignant Otitis Externa (MOE), an uncommon presentation of otocerebral mucormycosis in an otherwise healthy non-diabetic individual caused by *Apophysomyces elegans species* complex which presented as a clinical enigma; however the fungal etiology was confirmed both by histopathology & cultur and successfully managed with combined medical and surgical therapy.

- We believe that the portal of entry for *A.elegans spp. complex* might have been the transcutaneous inoculation of the spores through trauma or minor abrasions probably while ear cleaning with contaminated wooden stick in our case.
- In our case, inadequate response to antibacterial agents early in the course of illness along with the absence of a necrotic skin patch/dark colored ear discharge contributed the delay of an appropriate diagnosis of mucormycosis in a non-diabetic, an otherwise healthy individual.
- Water agar culture is a simple method for inducing sporulation in *Apophysomyces spp.* and rapid fungal identification in resource poor settings.
- High index of clinical suspicion, prompt treatment with extensive surgical debridement and amphotericin B formulations along with posaconazole are of great significance to survival outcomes of mucormycosis.