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Case Report

Rhino-orbital COVID-19 associated mucormycosis- A case report

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ABSTRACT

COVID-19 Associated Mucormycosis (CAM) is an emerging infectious disease that has caused increased mortality & morbidity in India during this second wave of the pandemic. The country has reported more than 30,000 cases and over 2,000 deaths by Mucormycosis so far, according to sources from Union Health Ministry. CAM is now a notifiable disease. At our Tertiary care teaching hospital, which caters for COVID 19 management, we are reporting the first case of Rhino orbital CAM, which was caused by Rhizopus spp. Our patient had a history of contact with a suspected COVID 19 patient and was recently diagnosed with uncontrolled diabetes mellitus. A direct KOH microscopic examination of purulent material aspirated from the sinonasal polyp of the patient revealed fungal elements, and Rhizopus spp was isolated. Due to a shortage of Amphotericin B, the patient was referred to a government higher speciality centre for further management. The patient was followed up & was noted that he was treated with antifungal and discharged following recovery.

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1. Introduction

Many cases of Covid-19 Associated Mucormycosis (CAM) are reported from India, which is now causing increased morbidity & mortality. Few cases are reported from other parts of the world as well. Rhizopus is the most commonly reported aetiology of CAM.

As per World Health Organisation (WHO), the incidence rate of Mucormycosis globally varies from 0.005 to 1.7 per million populations. In India, the prevalence of Mucormycosis is estimated as 140 per million populations, which is about 80 times higher than the prevalence in developed countries.¹

Also, according to a study published in March 2021 by Prakashetal,² Mucormycosis in India is 70 times more than global prevalence. The findings of this study attributed the high prevalence of diabetes cases in India to the increasing

reports of Mucormycosis

Following the surge of CAM and the Government of India directive, several states in India made Mucormycosis a notifiable disease since May 2021

To identify case reports/case series pertaining to CAM, PubMed and Google Scholar databases was searched using appropriate keywords till June 30th, 2021. Identification of more than 40 such case reports/case series from more than 100 Patients with CAM was reported, and more than 70% have been recorded from India.³⁻⁸

We are adding one case report of rhino-orbital CAM, which is caused by Rhizopus spp, from our tertiary care teaching institute to the existing database. We are reporting the findings of this case to emphasize the significance of appropriate initiation of the treatment for a specified period following accurate earlier identification can lead to resolution of Mucormycosis.

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2. Case History

A 30-year-old male visited the ENT outpatient department (OPD) with C/O right nasal obstruction along with foul-smelling mucopurulent discharge & right eye swelling for one week. He is an alcoholic and a recently detected case of uncontrolled diabetes mellitus diagnosed ten days back (Fasting Blood Sugar level -388 mg/dl). He had a contact history of suspected COVID-19 from his brother 25 days before, who had symptoms of severe myalgia. Both the patient & his brother had an RT-PCR test done for SARS COV-2, and the test report was negative for COVID-19. The negative report might have been due to Swab collection at an earlier stage of the disease. The patient had himself home quarantined and later on reported to our ENT OPD with the above complaints.

On general examination patient's vitals were stable & ENT examination recorded a Greyish white Polyp on the right nostril with brownish discharge and right nasal obstruction (Figure 1). CT scan of the ANS (Anterior Nasal sinus) report was suggestive of invasive sinusitis with Orbital cellulitis. A provisional diagnosis of Right Sino nasal Polyp with invasive fungal sinusitis & Mucormycosis was reported. The patient was admitted for further workup. CT thorax was done, which showed a Categorical CT assessment scheme (CORAD) score of 8/25 suggestive of COVID -19.

2.1. Microbiological Investigation

Purulent aspirate from the Nasal polyp of the patient was submitted for direct microscopic examination and fungal culture. The Pus aspirate was examined in 10% KOH (Himedia laboratories-Mumbai-India), Lacto phenol Cotton Blue (LCB) (Himedialaboratories – Mumbai – India) mount and Gram stain (Himedia laboratories-Mumbai-India). The aspirate was also inoculated onto blood agar and Sabouraud's dextrose agar (Prepared with Dehydrated media from Himedia laboratories – Mumbai, India). The growth of the same fungus on one or more media (or) its growth in at least one medium, with direct microscopy revealing the presence of fungal hyphae in the smear, was considered as indicative of a diagnosis of Mucormycosis. Table 1 gives the results of the microbiological workup for the patient

2.2. Other Laboratory investigation

Basic clinical Pathology & Biochemical blood works were within normal limits except for Blood sugar level (Fasting Blood Sugar -307 mg/dl, Postprandial Blood sugar-378 mg/dl)



Fig. 1: Rhino orbital swelling & Nasal Polyp (Greyish white Polyp on the right nostril with brownish discharge)

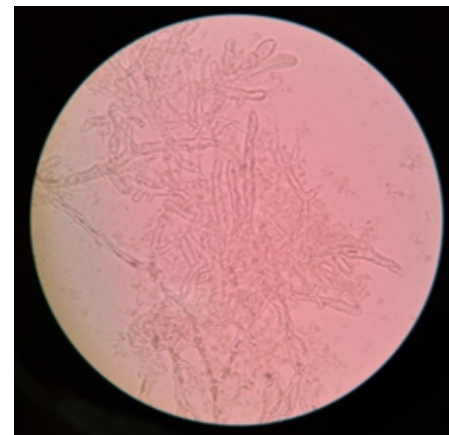


Fig. 2: Direct Microscopic examination -KOH Mount (Branching aseptate fungal elements)

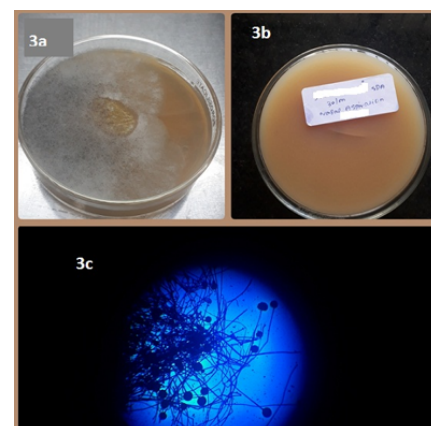


Fig. 3: Culture growth on SDA (Cottony fluffy white fungus, later turned to greyish black colour colonies) & Microscopy of Culture growth (LCB mounts of SDA culture showed many branching, aseptate fungal filaments with fruiting bodies)

Table 1: Results of Microbiological investigation

Direct microscopy*	Culture Growth Description**	Microscopic description of Slide culture growth	Fungus identified as
Branching aseptate fungal elements seen on KOH mount only (Figure 2) Presumptive identification of Mucorales was reported	Only the SDA plate showed a rapidly growing cottony fluffy white fungus within 24 hours, which later on turned into greyish black colour colonies (Figure 3a) The reverse of SDA had no colour. (Figure 3b) LCB mounts of SDA culture showed Many branching, aseptate hyaline fungal filaments and fruiting bodies. Still, the fungus was presumptively identified as Mucorales. Slide culture was done (Figure 3c)	LCB mounts of 48 hours old slide culture mounts (Figure 4a) showed branching, aseptate hyaline fungal filaments. Many collapsed and inverted umbrella-shaped sporangiophores with nodal Rhizoids (Figure 4b)	Fungus grown was identified as Genus Rhizopus. A supplementary report of the same was dispatched. Species identification was not made

*LCB mount, 10%KOH mount and grams stain

**blood agar and Sabourauds dextrose agar (SDA)

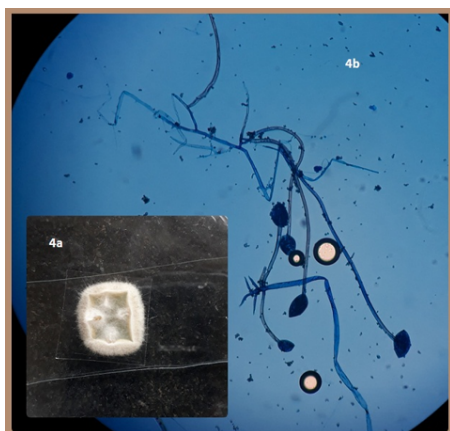


Fig. 4: Slide culture mount & microscopy (branching, aseptate hyaline fungal filaments and Many collapsed and inverted umbrella-shaped sporangiophores with nodal Rhizoids)

3. Discussion

The COVID-19 pandemic has led to an increase in Mucormycosis cases in India, and many reasons like uncontrolled DM, inappropriate glucocorticoid use and even industrial oxygen use has been attributed to the emergence of CAM. Mucorales like *Rhizopus arrhizus*, *Lichthemia*, *Mucor* spp, *Mortierella* spp, *Cunninghamella* spp, *Apophysomyces* spp, *Saksenaeeae* spp & *Cokeromyces* are agents of Mucormycosis.⁹

A Pubmed search and a literature search revealed more than 100 cases from India & from other parts of the world. The key morphological features which identify the Mucorales are Broad aseptate hyphae /rarely septate hyphae and genus *Rhizopus* identified by collapsed and inverted umbrella-shaped sporangiophores with nodal Rhizoids.^{9,10} An evidence-Based Advisory for Screening, Diagnosis &

Management of Mucormycosis was released by the Indian Council of Medical Research.¹¹

A preliminary reporting of Mucorales by microscopic identification was sent on the same day of receiving the clinical sample. A final microbiological diagnosis of Mucormycosis was reported after 48 hours base on growth characteristics. Because it is a notifiable disease, the report was sent to the district public health department. The treatment plan for the patient was IV Amphotericin B as per the guideline, and the patient was on insulin therapy for control of Diabetes. Due to a shortage of Amphotericin B, the patient was referred to a higher govt. speciality centre for further management

4. Follow up

The patient was followed up & was informed that he underwent Functional Endoscopic Sinus Surgery (FESS), and a repeat confirmed identification of Mucorales was made with FESS sample. He was treated with parenteral Amphotericin B for two weeks. He was discharged following recovery with oral Posoconazole for another two weeks. During the review visit to ENT OPD, his clinical signs were found to have completely resolved.

5. Summary - Timeline of identification & treatment

The patient attended our ENT OPD with a history of one week of clinical symptoms and was admitted. The next day clinical sample was sent, and presumptive identification of Mucormycosis was reported. Due to a shortage of antifungals patient was referred to a higher govt—speciality centre. Patient was reconfirmed for Mucormycosis following the FESS procedure, and antifungal treatment was initiated. Approximately ten days after clinical signs patient was started with Amphotericin

B for two weeks followed by oral Posoconazole for two weeks, which resulted in resolution of clinical signs. Hence timely initiation of appropriate treatment will save the patient.⁵

6. Conclusion

From the month after India reported its index case of CAM in the wake of the second wave of the novel Coronavirus disease (COVID-19) pandemic, there is a surge in cases of this fungal infection.

Literature evidence has indicated that an early accurate identification with immediate initiation of the appropriate antifungal therapy and continued treatment for a specified period helps in resolving Mucormycosis

In conclusion, CAM is an emerging problem necessitating increased vigilance in COVID-19 patients, even those who have recovered. CAM portends a poor prognosis and warrants a meticulous microbiological examination which is essential for earlier identification of Mucorales as this will help in the complete resolution of CAM.

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9. Conflicts of Interest

The authors declare no potential conflict of interest with respect to research, authorship, and/or publication of this article.

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