

CASE REPORT

Mucormycosis – An emerging complication in post-covid 19 patients: A case series

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Received: 28 April, 2023

Accepted: 05 June, 2023

ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) is the primary cause of an emergency worldwide pandemic, driven by the new severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Immune suppression was discovered in COVID-19 patients, which was linked to injudicious use of corticosteroids and previous uncontrolled diabetes and hematological malignancies. As a result, a wide spectrum of bacterial and fungal illnesses develop. Mucormycosis is a zygomycete-related opportunistic fungal infection of the order mucorales that can cause a variety of infections¹. In immunocompetent people, the fungi responsible are typically non-pathogenic since they are common environmental organisms. Based on clinical and radiological appearance, it might be difficult to tell the difference between a bacterial or fungal infection in an existing viral pneumonia³. Microbiological examination followed by histopathological confirmation add great value to diagnosis⁵. **Objective:** To evaluate mucormycosis fungal infection in rt-PCR confirmed post covid 19 patients in clinically suspected biopsies. **Method:** This study was conducted in Department of Pathology, KLE Hospital, Belagavi, Karnataka from April 2021 – June 2021. All medical records were reviewed and clinical details including age, sex, and predisposing conditions were obtained from the requisition forms of the patients available in the department. Post - COVID-19 patients with associated clinical suspicion of fungal infections were included in the study. **Results:** Our study included 100 clinically suspected of fungal infection most probably mucormycosis in post covid 19 patients. 22 patients were female and 78 were male. Mean age of the case was 52 years. Out of 100 suspected mucormycosis patients, 81 biopsy specimens turned out to be positive for mucormycosis on histopathology and 19 patients as Sinusitis. Out of 100 suspected mucormycosis patients, 93 patients were immunosuppressed and 7 patients immunocompetent. Among the immunosuppressed patients, majority were having Diabetes Mellitus followed by allergic sinusitis and bronchial asthma, followed by chronic kidney disease and hematological malignancies.

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) is the primary cause of an emergency worldwide pandemic, driven by the new severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Immune suppression was discovered in COVID-19 patients, which was linked to injudicious use of corticosteroids and previous uncontrolled diabetes and hematological malignancies. As a result, a wide spectrum of bacterial and fungal illnesses develop. Only a handful of the hundreds of papers with clinical data have mentioned secondary infection, and evidence on bacterial or fungal infection in viral pneumonia caused by coronavirus (COVID) is scarce. Mucormycosis is a zygomycete-related opportunistic fungal infection of the order mucorales that can cause a variety of infections¹. In immunocompetent people, the fungi responsible are typically non-pathogenic

since they are common environmental organisms². However, in immunocompromised people, these usually harmless organisms might turn into a dangerous and difficult-to-treat opportunistic infection. Infections can manifest themselves in a variety of clinical forms, including lung, gastrointestinal, cutaneous and rhino cerebral. Allergic fungal sinusitis, which is a non-invasive, local overgrowth in immunocompetent individuals, must be distinguished from the latter. Mucormycosis is characterized by tissue necrosis caused by blood vessel invasion and subsequent thrombosis, which generally occurs rapidly. Mucorales are thermotolerant fungi that can be found in soil and decomposing matter, although they are rarely pathogenic due to their poor virulence³. Based on clinical and radiological appearance, it might be difficult to tell the difference between a bacterial or

fungal infection in an existing viral pneumonia. Microbiological examination followed by histopathological confirmation add great value to diagnosis⁴. Based on clinical and radiological appearance, it might be difficult to tell the difference between a bacterial or fungal infection in an existing viral pneumonia³. Microbiological examination followed by histopathological confirmation add great value to diagnosis⁵. Thus this study was conducted to evaluate mucormycosis fungal infection in rt-PCR confirmed post covid 19 patients in clinically suspected biopsies.

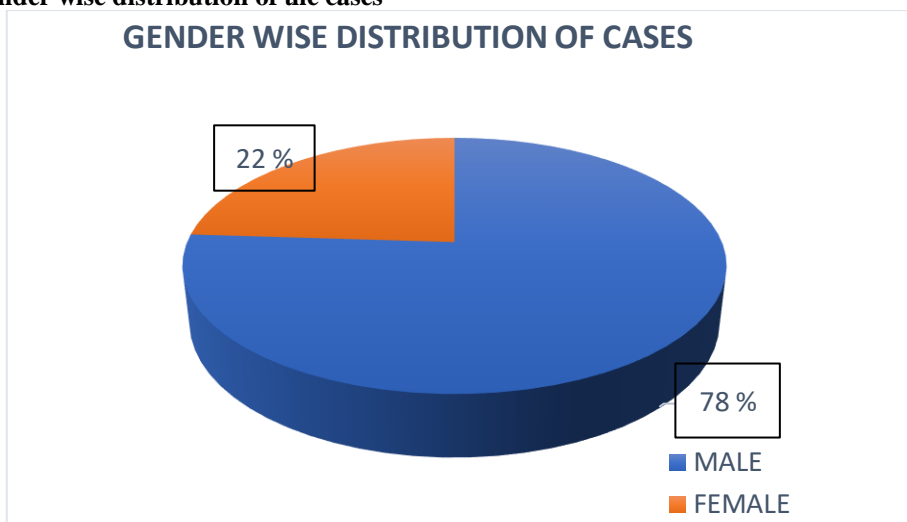
predisposing conditions were obtained from the requisition forms of the patients available in the department. Post - COVID-19 patients with associated clinical suspicion of fungal infections were included in the study and Patients with incomplete data or lost follow-up were excluded from the study. Specimens were received in department of pathology Jawaharlal Nehru Medical College and KLE Hospital. All the tissue biopsy were fixed in 10% Neutral Buffered Formalin (NBF) and were processed using LIECA Automated tissue processor. Paraffin blocks were made and 3 to 4 μ thin ribbon section were taken on the slide and projected to Haematoxylin & Eosin (H&E) staining and the findings were confirmed by Gomori Methenamine Silver (GMS) and Periodic Acid Schiff (PAS) staining.

MATERIALS AND METHODS

This study was conducted in Department of Pathology, KLE Hospital, Belagavi, Karnataka from April 2021 – June 2021. All medical records were reviewed and clinical details including age, sex, and

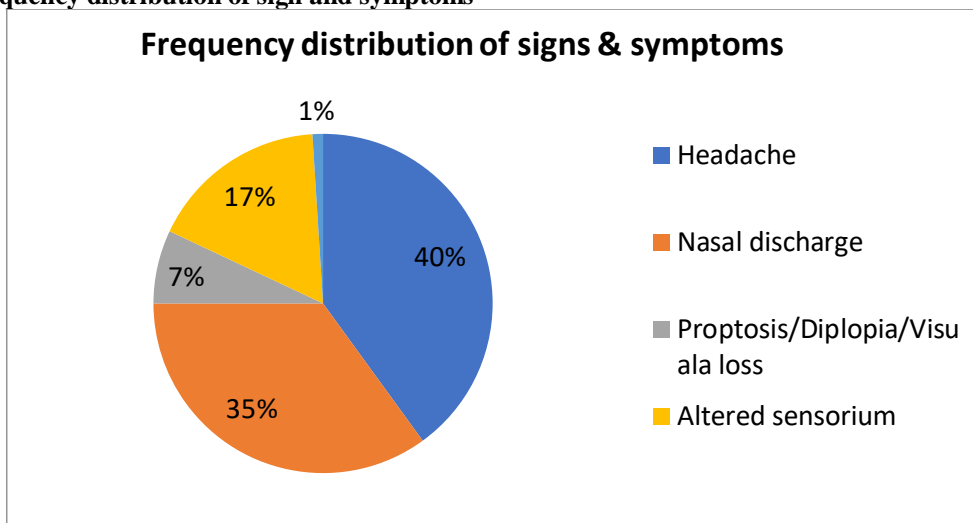
OBSERVATIONS AND RESULTS

Figure 1: gender wise distribution of the cases



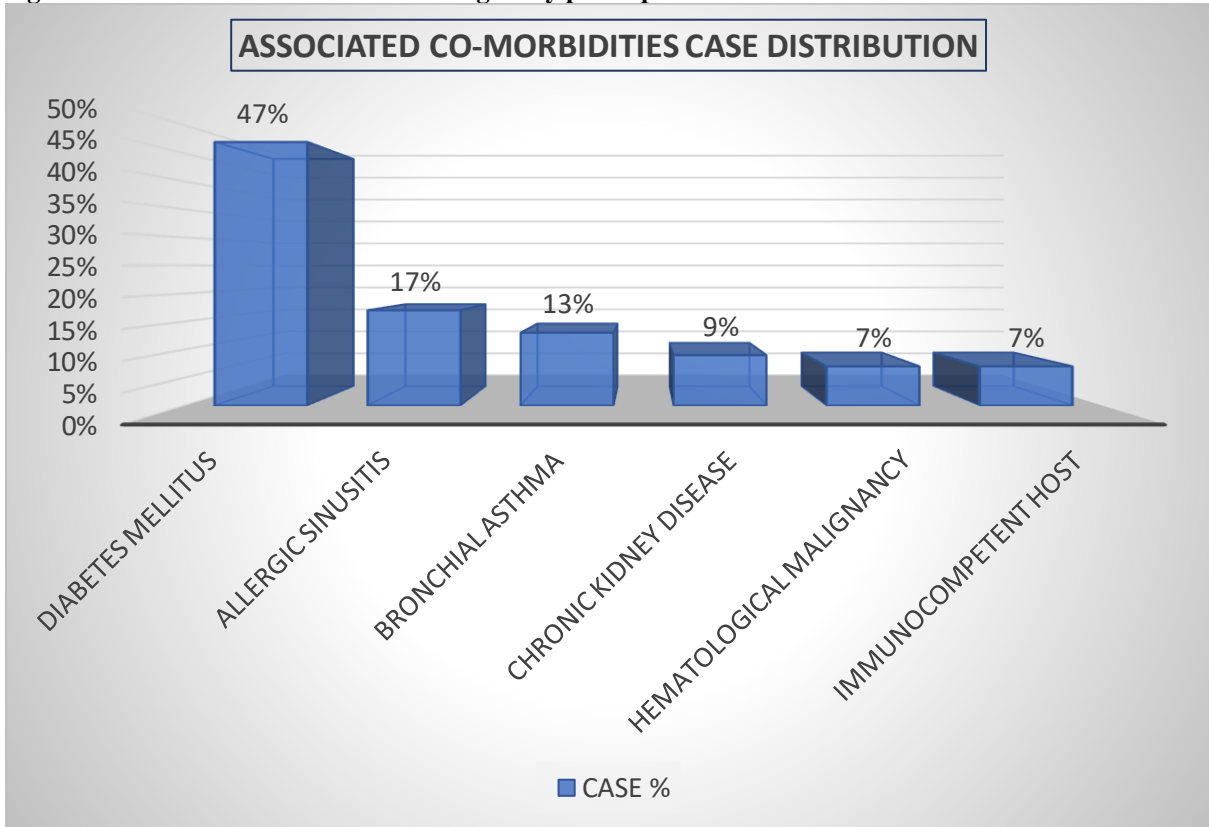
Result showed that 78% of the study participants were males and 22% were females.

Figure 2: Frequency distribution of sign and symptoms



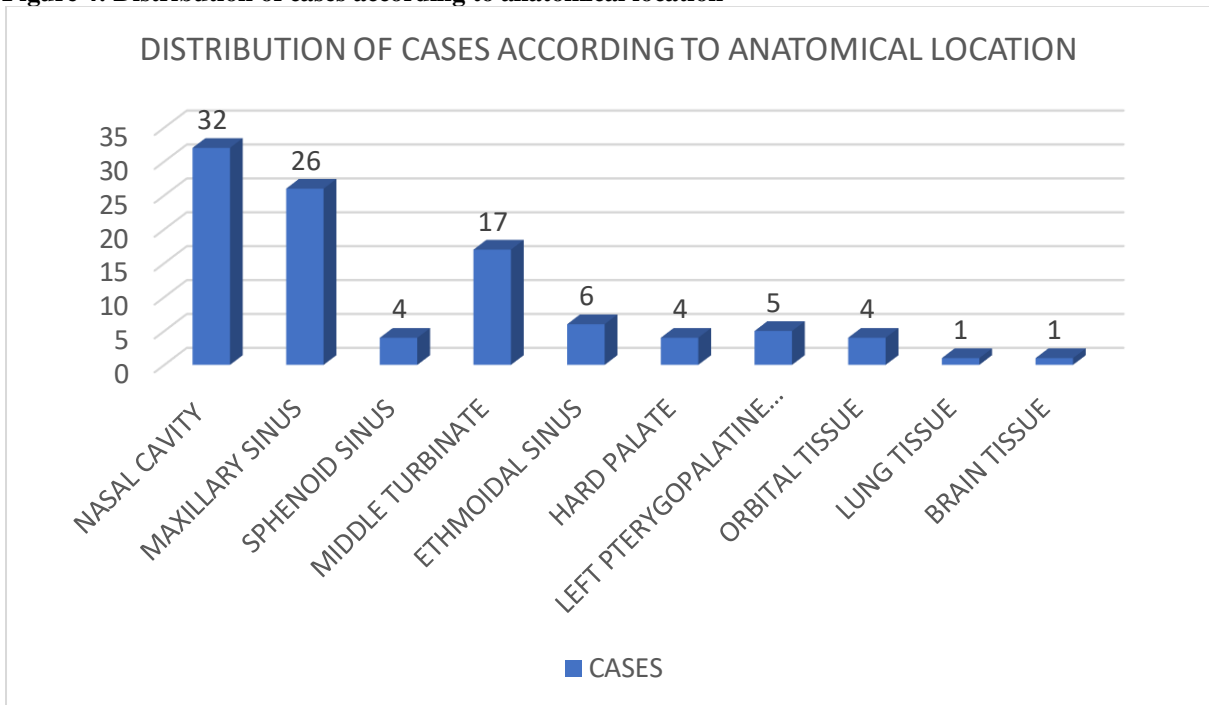
Result showed that majority of the study participants had headache (40%), followed by nasal discharge (35%) and altered sensorium (17%).

Figure 3: Associated co-morbidities among study participants



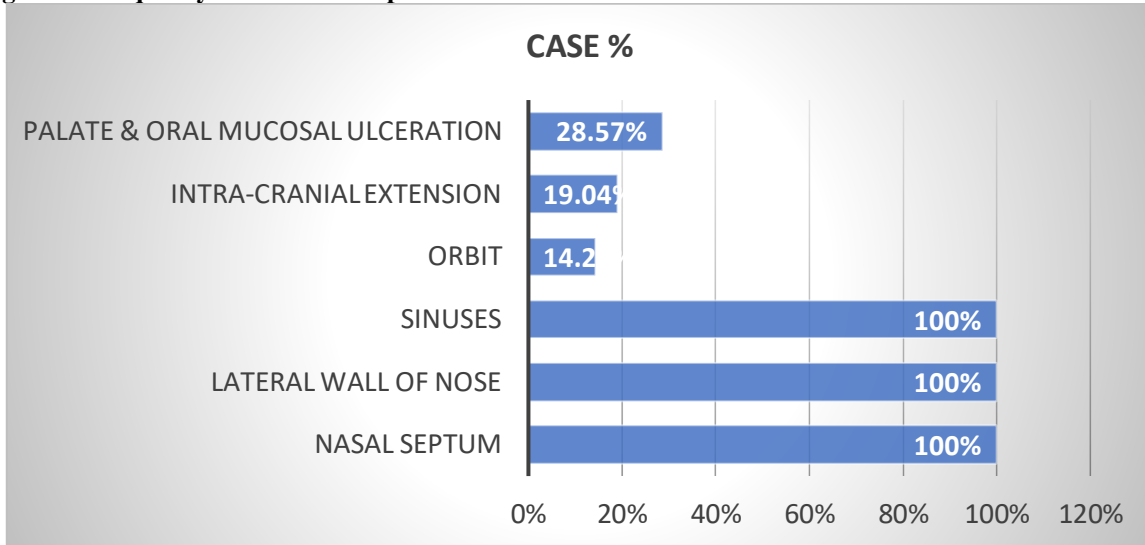
Result showed that 47% of the study participants had diabetes mellitus, followed by allergic sinusitis in 17% of the participants, bronchial asthma in 13% of the participants and chronic kidney disease in 9% of the study participants.

Figure 4: Distribution of cases according to anatomical location



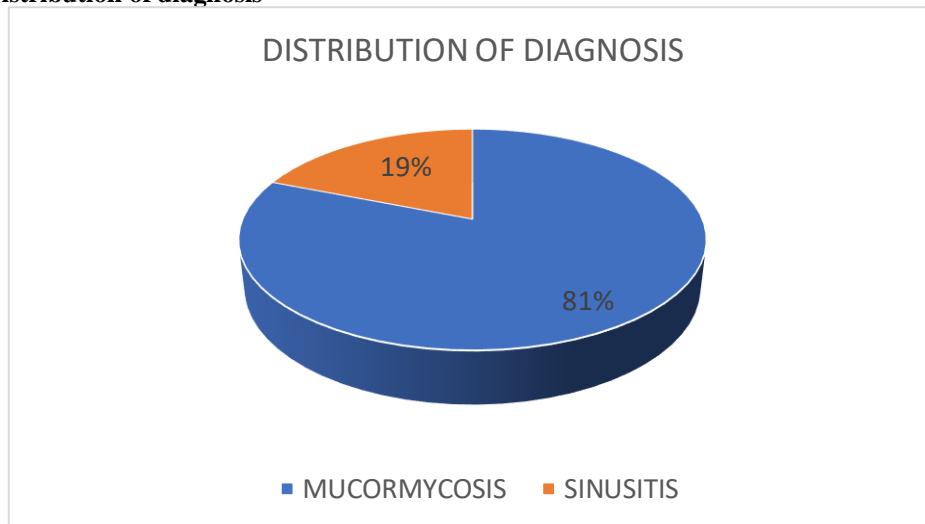
Results showed that 32% of the cases had anatomical location of nasal cavity, followed by 26% having in maxillary sinus, 17% in middle turbinate. Only 6% had in ethmoid sinus and 4% had in hard palate, orbital tissue.

Figure 5: Frequency distribution of patients with clinical extension



Results showed that 100% of the cases had clinical extension in sinuses, lateral wall of nose and nasal septum. 28.5% of the cases had clinical extension in palate and oral mucosal ulceration, followed by 19.04% had intra cranial extension and only 14.2% of the cases had clinical extension in orbit.

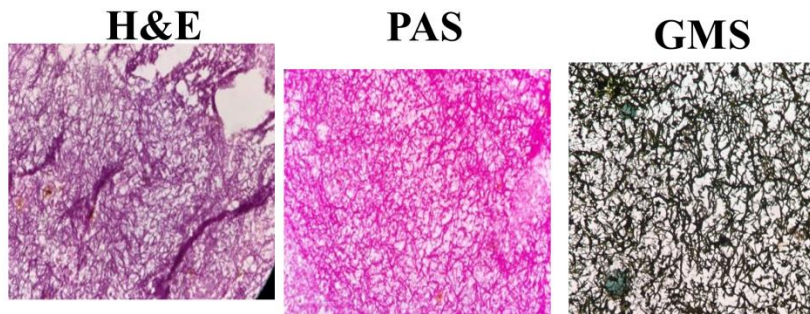
Figure 6: Distribution of diagnosis



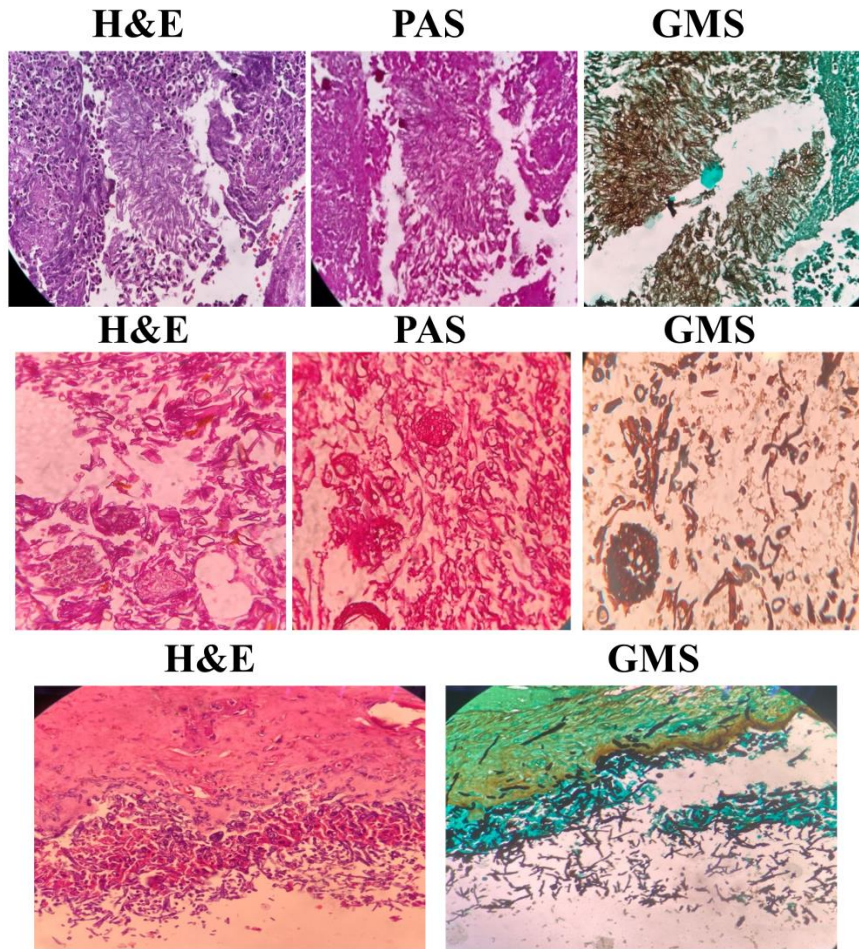
Result showed that 81% of the study participants had diagnosis of mucormycosis and only 19% had sinusitis.

DISCUSSION

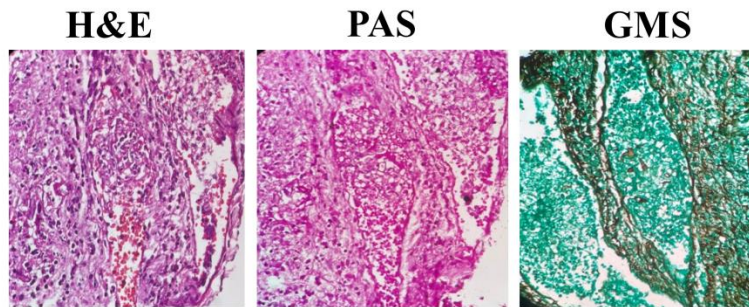
In this study one of the case, a 36 years male presented with nasal discharge, unilateral facial pain and nasal obstruction with history of previous unresected nasal polyp (3mm). No history of Hypertension, Diabetes, Bronchial asthma or any other chronic illness was seen.



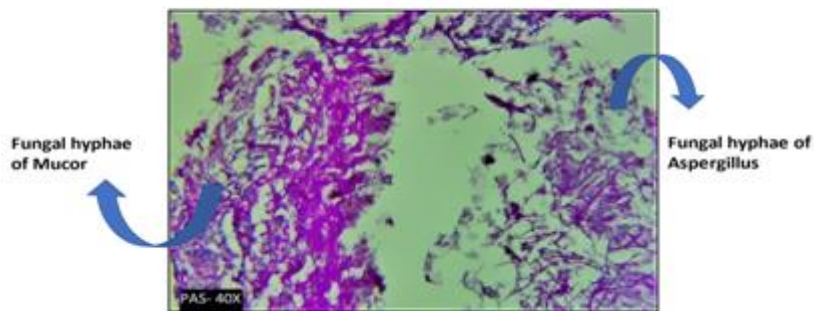
Other case, where a 71 Years male presenting with proptosis and visual disturbances with previous history of hospitalization for Covid-19 two months back in our hospital. History of Diabetes mellitus and COPD was present.



ANGIOINVASION



SURPRISING ASPERGILLUS WITH MUCOR



Our study included 100 clinically suspected of fungal infection most probably mucormycosis in post covid

19 patients.22 patients were female and 78 were male. Mean age of the case was 52 years.Out of 100

suspected mucormycosis patients, 81 biopsy specimens turned out to be positive for mucormycosis on histopathology and 19 patients as Sinusitis. Out of 100 suspected mucormycosis patients, 93 patients were immunosuppressed and 7 patients immunocompetent. Among the immunosuppressed patients, majority were having Diabetes Mellitus followed by allergic sinusitis and bronchial asthma, followed by chronic kidney disease and hematological malignancies. Among the immunocompetent patients, single paranasal sinus disease was a frequent presentation that should not be overlooked as a differential diagnosis in these patients. In a systematic review of cases of CAM including 101 cases, 82 cases were reported from India and just 19 cases from the rest of the world⁶. In a multicentric epidemiological study by Patel *et al.*, where 84.2% of the patients were identified as late CAM, *i.e.* presenting >8 days after the onset of COVID-19 symptoms^{6,7,8}. Most patients had recovered from their COVID-19 symptoms and had turned RT-PCR negative. Only 5 out of 22 (22.73%) had an ongoing oxygen requirement at the time of the diagnosis of mucormycosis. In the study by Patel *et al.*, 1.6% of the CAM patients were in the ICU⁶. Mekonnen *et al.* have reported a patient of CAM with ARDS, where the mucormycosis developed 9 days after the COVID-19 symptoms⁸. Diabetes mellitus (DM) was the commonest comorbidity observed in our study, similar to other studies^{2,6,9}.

CONCLUSION

Histopathological examination offers prompt provisional identification of fungal infections and reveals prognostic factors such as host tissue reaction, extent of invasion, tissue response to treatment which cannot be evaluated by other methods. The evidence of tissue invasion or an inflammatory reaction can help to determine whether an organism represents contamination, colonization, or true infection which plays an important role for treatment and prognosis. Sometimes even microbiological examination fails to

diagnose fungal infections, and contamination by other fungi can lead to misdiagnosis.

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