Section: Community Medicine

Original Research Article

OUTCOME OF MUCORMYCOSIS AMONG COVID-19 PATIENTS ADMITTED AT TERTIARY CARE HOSPITAL DURING THE SECOND WAVE

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Abstract

Background: Mucormycosis is caused by the fungi belonging to the order Mucorales. In the backdrop of COVID-19 expression, there has been notable increase in the incidence of invasive fungal infection (IFI), namely Mucormycosis and aspergillosis. We tried to study the outcome of mucor cases during the second wave to have a better insight and understanding of the disease. **Materials and Methods:** Study design: descriptive study; Study setting: VIMS hospital, Ballari; Study period: May 2021 –July 2021; Study subjects: COVID-19 patients with mucormycosis admitted to VIMS hospital, Ballari; Method of data collection: data was collected using a semi structured questionnaire, secondary data related to clinical profile and management was obtained from the case records. Sample size- 154. **Result:** Out of 154 subjects studied 148(96.1%) of the cases had rhino-cerebral type of mucormycosis. Majority 101(65.58%) of them received exclusive medical treatment and 54(34.41%) of the patients had to undergo surgery as a part of the management, most common being Endoscopic sinus surgery. Among 154 cases 24(15.6%) of them died and the direct cause of death was due to mucormycosis in 9(5.8%). **Conclusion:** Mucormycosis is a life-threatening fungal infection. Our study revealed that 5.8% of the deaths among COVID-19-mucormycosis patients were due to mucormycosis. Although majority of the cases were treated successfully, further studies need to be carried out to completely understand the outcomes of mucormycosis for better management in future use.

INTRODUCTION

Mucormycosis is caused by the fungi belonging to the order Mucorales. In the backdrop of COVID-19 expression, there has been notable increase in the incidence of invasive fungal infection (IFI), namely Mucormycosis and aspergillosis.[1] Mucormycosis, commonly known as black fungus, is a rare but severe fungal infection. Mucormycosis is so dreadfully morbid that it may cause rapid deterioration of eyes, leading to permanent loss of vision. Once Mucor enters brain, patient deteriorates faster leading to paralysis, organ failure, other complications and death.[2] The spectre of the COVID-19 pandemic loomed large over India. People lucky enough to survive infection by COVID-19, later faced the danger of acquiring the dreaded fungal infection, mucormycosis. This fungal infection is not unusual in India, as the case-rate in pre-Covid era was estimated at 70 times to the developed world.[3]

The second wave of COVID-19 in India has seen a surge in the number of cases of mucormycosis among COVID-19 patients. We tried to study the outcome of mucor cases admitted to VIMS hospital, Ballari, during May 2021 to July 2021 during the second wave to have a better insight and understanding of the disease.

Aims of the Study

The overall objective of this study was to describe the clinical profile, management, and outcomes of COVID-19 patients with mucormycosis admitted to VIMS hospital, Ballari

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MATERIALS AND METHODS

This study employed a descriptive case series design and was conducted at VIMS hospital, Ballari, from May 2021 to July 2021. The study included 154 patients with current or post-COVID-19 status diagnosed with mucormycosis, data were analysed using frequency and proportion. Inclusion criteria were all patients with current or post-COVID-19 status diagnosed with mucormycosis with exclusion criteria being patients who absconded mid-treatment. Data were collected using a semi-structured questionnaire, and secondary data related to clinical profile and management were obtained from case records.

Statistical Analysis

Data collected were entered into Microsoft Excel spreadsheet and analysed using SPSS software. The data was presented in frequency, proportion and association using chi square test.

RESULTS

Most patients presented with symptoms such as swelling of the eye, headache, sinus pain and congestion, and decreased vision. The most common cause of death was COVID-19 pneumonia, followed by rhino cerebral mucormycosis and respiratory failure. Comorbid conditions such as diabetes mellitus, immunocompromised status, and hypertension were most commonly present. Most patients presented with rhino cerebral type of mucormycosis, followed by pulmonary and rhino orbital types. Out of 154 subjects studied 148(96.1%) of the cases had rhino-cerebral type of mucormycosis. Majority 101(65.58%) of them received exclusive medical treatment and 53(34.41%) of the patients had to undergo surgery as a part of the management, most common being Endoscopic sinus surgery. Among 154 cases 24(15.6%) of them died and the direct cause of death was due to mucormycosis in 9(5.8%). Out of 154 patients, 90(58.44%) were discharged, 40(25.97%) were discharged against medical advice, and 24(15.58%) expired.

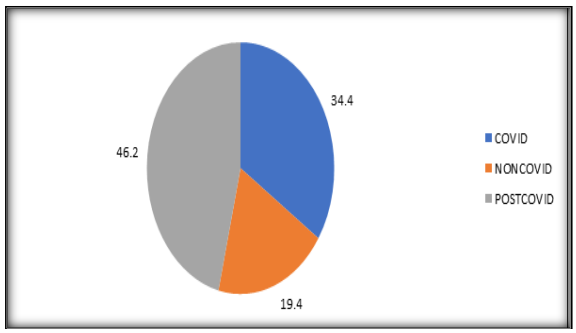

Figure 1: Covid Status

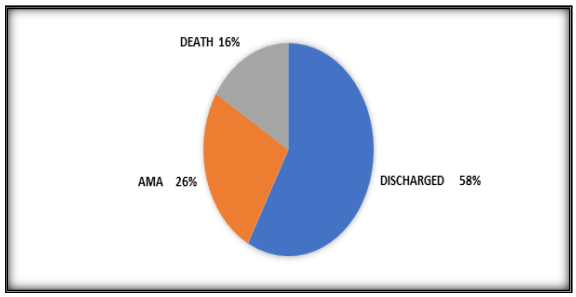

Figure 2: Outcomes

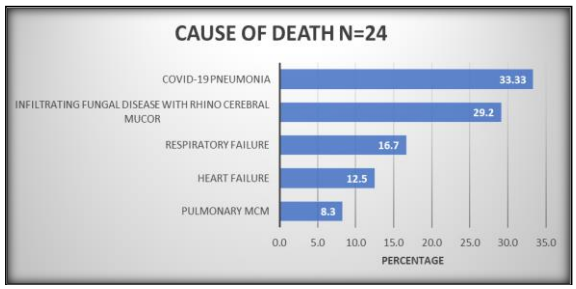

Figure 3: Cause of death

Table 1: Covid Status

Status	Frequency (n=154)	Percentage
Covid	53	34.4
Noncovid	30	19.4
Postcovid	71	46.1
Total	154	100.0

Table 2: Outcome of Mucormycosis patients

	Frequency (n=154)	Percentage
DISCHARGED	90	58.44%
AMA*	40	25.97%
DEATH	24	15.58%
Sum	154.0	100

*AMA-Against Medical Advice

This table depicts the outcome of mucormycosis patients, out of 154 patients, 90 were discharged, 40 were discharged against medical advice, and 24 expired.

Table 3: Cause of death among mucormycosis patients

Cause of Death	Frequency (n=24)	Percentage
Pulmonary Mcm	2	8.3
Heart Failure	3	12.5
Respiratory Failure	4	16.7

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Infiltrating Fungal Disease With Rhino Cerebral Mucor	7	29.2
Covid-19 Pneumonia	8	33.33
Total	24.0	100

This table shows the major causes of death among mucormycosis cases, there is a slight increase in the percentage of deaths due to COVID-19 when compared to other causes.

Table 4: Depicting the correlation between type of management and survival among them

Management	Death N (%)	Survival N (%)	Total N (%)	P-Value
Medical	22 (91.6%)	79 (60.76%)	101 (65.58%)	
Combined	2 (8.3%)	51 (39.23%)	53 (34.41%)	
Total	24 (100%)	130 (100%)	154 (100%)	0.003z

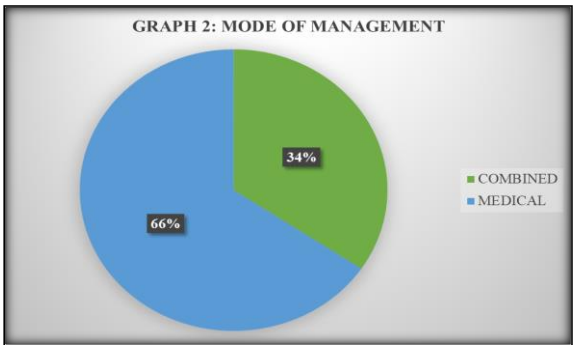

Figure 4: Mode of management

DISCUSSION

The purpose of this study was to examine the outcomes of mucormycosis cases during the second wave of the pandemic. Specifically, we aimed to investigate the mortality rate and treatment outcomes in mucormycosis patients. Our study included a total of 154 mucormycosis cases during the second wave of the pandemic, and in 33.3% of cases, mucormycosis was the direct cause of mortality among COVID-19 patients. The overall mortality rate was found to be 16%, indicating a significant impact on patient outcomes. Treatment outcomes varied, with 58% of patients showing improvement and proceeded to be discharged. Patients who received combined management had better survival rates, and the mortality rate among patients who received surgical management was statistically significant.

A study similar to ours which was conducted in Tehran, Iran, by Pakdel F, et al, showed comparable results regarding the patients who received both medical and surgical management who had better outcomes than those who received medical management alone.[4]

A multicentric observational study across India by A Patel, H Kaur, et al also had the same findings.[5]

A retrospective report of 15 cases carried out in Portugal, by Leão BP, Abreu I, et al showed a mortality rate of 47%, whereas our study showed a mortality rate of 37.5%. Another study observed a mortality rate of 49%, varying by 11.5% from our study.[6]

Previous studies done before the surge during COVID revealed the following findings about mucormycosis. During the SARS-CoV infection spread in 2003, the incidence of fungal infection was 14.8–27 per cent, and it was the main cause of death for severe acute respiratory syndrome patients, accounting for 25–73.7 per cent in all causes of death.[7,8,9]

The observed outcomes of mucormycosis during the second wave of the pandemic can be interpreted as a severe consequence of the disease. Several limitations of our study should be acknowledged. Firstly, the study was conducted in a single medical center, limiting the generalizability of the findings. Secondly, the retrospective nature of the study introduced potential selection bias. Additionally, incomplete medical records and missing data posed challenges in obtaining a comprehensive analysis. Based on the findings and limitations of this study, future research should aim to validate the results in larger multicentre studies. Prospective studies focusing on early diagnosis strategies, optimal treatment approaches, and the impact of comorbidities on mucormycosis outcomes are warranted. Long-term follow-up studies assessing the functional and quality-of-life outcomes of survivors would also be valuable. The outcomes of this study have practical implications for healthcare providers treating mucormycosis during the second wave of the pandemic. Prompt recognition, aggressive antifungal therapy, and meticulous surgical interventions are crucial in improving patient outcomes. These findings contribute to the existing knowledge on the management of mucormycosis and inform clinical decision-making.

CONCLUSION

In conclusion, our study on the outcomes of mucormycosis during the second wave of the pandemic revealed a significant mortality rate and variable treatment responses. The results emphasize the need for early diagnosis, optimized treatment approaches, and comprehensive management. Future research should focus on validating these findings and exploring strategies to improve patient outcomes in mucormycosis.

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