



THE MUCORMYCOSIS MALADY: OUR EXPERIENCE

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ABSTRACT **OBJECTIVES-** This survey aims to find out various factors that contribute to the occurrence of orbital mucormycosis in patients admitted in tertiary care center in North West Rajasthan during second wave of Covid-19 pandemic. **METHODS AND MATERIALS-** The data was collected over a period of 2 months with the means of a questionnaire that was filled by the researcher. **RESULTS-** Sample size was 106 patients. Out of them, 22% of patients presented to the hospital with ocular symptoms as their main complaint. 77% of them were tested positive for Covid-19 virus in the past. 65% patients told that they had taken systemic steroids during their treatment for Covid-19 infection. 82% of the patients were diabetic. **CONCLUSION-** The present trend of rise in cases of mucormycosis is of grave concern for the medical fraternity. Hence, the knowledge of contributing factors in mucormycosis will help in further modifying the existing treatment of the disease.

KEYWORDS : Epidemiology, Mucormycosis, covid-19

INTRODUCTION-

Covid-19 virus was first reported in Wuhan, Hubei province in China and spread to other parts of the world forming a global pandemic.^[1] The Covid-19 pandemic in India is a part of the worldwide pandemic of corona virus disease 2019 (Covid-19) caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). The first case of COVID-19 in India was reported on 30 January 2020.^[2] Currently, India has the largest number of confirmed cases in Asia.^[3] As of 12 June 2021, India has the second-highest number of confirmed Covid-19 cases in the world (after the United States) with 29.3 million reported cases of COVID-19 infection and the third-highest number of COVID-19 deaths (after United States and Brazil) at 367,081 deaths.^[4,5,6]

In the midst of the Covid-19 pandemic when the healthcare professionals were fighting with the pandemic, another epidemic in the form of rhino orbital cerebral mucormycosis (ROCM) emerged^[12]. The causative factors that could be explained were impaired immune system, uncontrolled diabetes; environmental factors an injudicious use of steroids, and other drugs and weak immune system of the patients.^[13,18]

The clinical presentations of mucormycosis are classified on the basis of anatomic localization, such as ROCM, pulmonary, gastrointestinal, cutaneous, renal, and disseminated mucormycosis.^[9]

The estimated prevalence of mucormycosis is around 70 times higher in India than that in global data.^[10] Very few cases of mucormycosis were reported during 1st wave of Covid-19. The first series of mucormycosis cases in India reported in February 2021.^[21] Although immunocompromised patients are more affected by mucormycosis, it has been found to infect immunocompetent hosts as well^[11]. Diabetes mellitus is the most common risk factor, followed by hematological malignancy and solid-organ transplant^[10].

MATERIALS AND METHODS

A cross sectional survey was done for all the patients between the age of 1 to 80 years who were admitted in the hospital were surveyed between 1st April 2021 to 31st May 2021. The questionnaire [APPENDIX 1] was filled through Google forms. The questionnaire comprised of demographic profile of the patient, history of Covid-19 infection, drug history and presence of any comorbidities.

RESULTS

Out of 106 patients, 66% were males and 34% were females [TABLE 1]. 76.2% patients hailed from rural areas and the remaining 23.8% were residents of urban areas. 22% of patients with mucormycosis in this study presented with ocular symptoms as their first complaint [FIGURE 1]. Rest 78% of patients presented to the hospital with extra ocular complaints. 84% had unilateral involvement, 16% had bilateral presentation. 77.1% of the patients were tested RT-PCR positive in the past. [FIGURE 2]. 65% of them had a positive history of injudicious use of steroid intake during their treatment for Covid-19 viral infection

[FIGURE 3]. 82.4% of total patients were diabetic [FIGURE 4]. Family history was found to be negative in all patients. Nasal and sinus involvement was seen in 22 patients, rhino-orbital involvement was detected in 65 patients and rhino-orbital-cerebral mucormycosis was diagnosed in 14 patients. Interestingly, 4 patients had cutaneous involvement whereas 1 patient had pulmonary mucormycosis.

TABLE 1

PATIENTS	PERCENTAGE
MALES	64%
FEMALES	36%

FIGURE 2

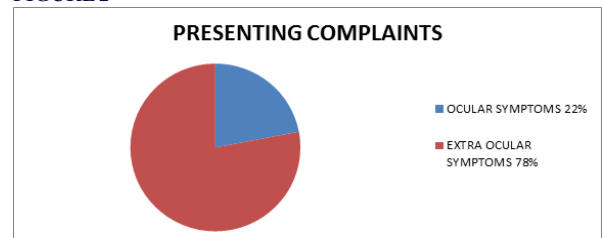


FIGURE 3

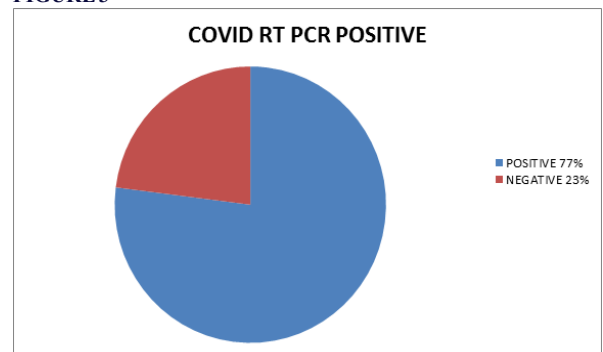
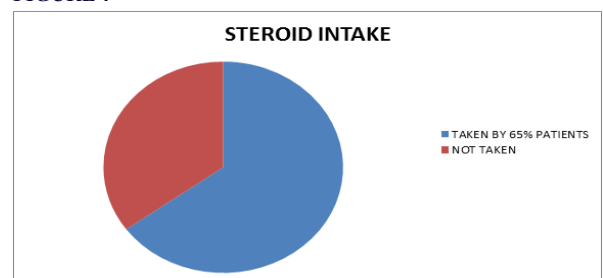


FIGURE 4



All the patients in this study were clinically, microbiologically (KOH mount) and radiologically diagnosed to be mucormycosis.

DISCUSSION-

In this study we found 64% males and 34% females.[TABLE 1] . It shows male preponderance. Male gender have more severe Covid-19 infection and associated with greater outdoor exposure compared to female so fungal spores may be the possible reason for this.

Similar results are seen in COSMIC 1 study in which data of 2826 patients was collected at national level and they found 71% cases were male. In other study Singh AK et.al. reported cases of Covid-19 associated ROCM, there were 79% males.^[20]

In this study 76.2% patients belongs to rural areas and the remaining 23.8% were residents of urban areas. This is because of more rural population in North Western Rajasthan and second wave affected rural population more than urban. Uncontrolled diabetes is rampant in India and specially in rural areas where majority of patient do not have regular testing of blood glucose.

Spectrum of mucormycosis has not been defined by any specific age group because in this survey 5 patients were of pediatric age group [FIGURE 1]. Prevalence of mucormycosis was higher in rural areas as compared to urban areas Occurrence of mucormycosis in those patients who were tested positive for Covid-19 virus by RT PCR signifies that Covid-19 infection might have caused immune dysregulation. 2 out of 5 pediatric patients who were covid-19 negative with RT PCR were found to be seropositive for covid-19. This study has shown that diabetic patients, patients with malignancy, renal disease and those patients who used steroids injudiciously were more prone to develop mucormycosis due to their immunocompromised state. Prof. Amol Gupta et. al also found that there is a surge in ROCM cases in the context of Covid-19 in India. Patients with uncontrolled diabetes, immune dysfunction due to Covid-19 and injudicious use of steroids is largely responsible for this malady. Immunocompromised state of the patients and other comorbidities like diabetes have been the contributing factors to the enormous rise in cases of mucormycosis in our country. This fact has also been supported by other researches.^[14,15] The exact pathophysiology behind the development of fungal infection has yet not been explored. It seems that immune dysregulation plays a significant role. So patients should be encouraged to properly manage their blood sugar levels. Also, physicians and patients should use steroids judiciously. The identification of other possible contributing risk factors will help in efficient management of mucormycosis in health care centers.^[16] COSMIC 1 report found that Corticosteroids and diabetes are the most important predisposing factors for Covid-19 associated ROCM.^[19]

In clinical features, 22% of patients with mucormycosis in this study presented with ocular symptoms as their first complaint [FIGURE 2].Ocular features included periocular edema,eyelid discoloration, drooping of eye lids, protrusion of eyeball, ocular pain, chemosis of conjunctiva and loss of vision. Non ocular symptoms included nasal stuffiness, fowl smell, Epistaxis, nasal discharge, paresthesia, headache, fever, facial pain, facial palsy, dizziness, drowsiness, altered sensorium, vertigo, loss of consciousness, paralysis and focal seizures.

Nasal swab taken from inferior meatus were examined after KOH mounting for microbiological confirmation of mucormycosis. Further diagnostic nasal endoscopic biopsy was done and KOH mount and fungal culture were done. Contrast enhanced MRI of sinus, bilateral orbits and brain were studied and analysed for radiological confirmation of mucormycosis.

CONCLUSION

The need of the hour is to develop facilities and infrastructure for the surveillance, early diagnosis and management of mucormycosis in India. Mucormycosis is here to stay with us for the next few weeks and probably months, hence strengthening of facilities, public education regarding early sign and symptoms and survey of high risk patients to identify them early will help us in the long run. This will contribute in efficient management of cases which will further reduce the economic burden on our healthcare system.

APPENDIX 1

MUCORMYCOSIS QUESTIONNAIRE

Q1. NAME

Q2. AGE

Q3. SEX

Mark only one oval.

MALE

Female

Other: _____

Q4. OCCUPATION

Q5. RESIDENCE

Mark only one oval.

RURAL

URBAN

Other: _____

Q6. RELIGION

Mark only one oval.

HINDU

MUSLIM

SIKH

CHRISTIAN

Other: _____

Q7. HISTORY OF COVID-19 INFECTION

Mark only one oval.

RT PCR NEGATIVE

RT PCR POSITIVE

Other: _____

Q8. COVID TREATMENT

Mark only one oval.

HOSPITALIZED

DAY CARE TREATMENT

Other: _____

Q9. COVID TREATMENT

Check all that apply.

INJ STEROIDS INJ- REMDESIVIR

INJ-TOCILIZUMAB

OTHER IMMUNOSUPPRESSANTS

Other: _____

Q10. OXYGEN THERAPY GIVEN

Mark only one oval.

YES

NO

Other: _____

Q11. ICU CARE

Mark only one oval.

YES

No

Q12. SYSTEMIC ILLNESS

Check all that apply.

PRE EXISTING DIABETES MELLITUS

NEW ONSET DM AFTER COVID-19 INFECTION

MALIGNANCY

LIVER DISEASE RENAL DISEASE

RHEUMATOID ARTHRITIS HYPERTENSION

Other: _____

Q13. DIAGNOSIS OF MUCORMYCOSIS

Check all that apply.

CLINICAL

RADIOLOGICAL

MICROBIOLOGICAL

Other: _____

Q14. ORGAN INVOLVED

Check all that apply:

- NOSE
- SINUS
- EYE
- BRAIN
- Other: _____

Q15. SYMPTOMS SINCE

Mark only one oval.

- 5 DAYS
- 5 TO 10 DAYS
- 10 TO 15 DAYS
- 15 TO 30 DAYS
- MORE THAN 30 DAYS
- Other: _____

Q16. FIRST SYMPTOMS

Mark only one oval.

- ocular
- non ocular

Q17. TREATMENT FOR MUCORMYCOSIS

Check all that apply:

- INJ-AMPHOTERICIN B RETROBULBAR
- AMPHOTERICIN B SINUS DEBRIDEMENT
- SURGERY EXENTERATION
- POSACONAZOLE
- Other: _____

Q18. PERSONAL HISTORY

Q19. CT chest score

Q20. MRI finding

Q21. Current covid status

Mark only one oval.

- Positive
- Negative
- Other: _____

Q22. REMARKS

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