



**ORIGINAL RESEARCH PAPER**

**ENT**

**MUCORMYCOSIS UBIQUITOUS FUNGUS THRIVING IN IMMUNOCOMPROMISED COVID PATIENT IN PATNA**

**KEY WORDS:** COVID-19, mucormycosis, diabetes, corticosteroids

<b>Dr. Manish Ranjan*</b>	Post Graduate Resident, Department of ENT, Patna Medical College, Patna. *Corresponding Author
<b>Dr. Vineet Sinha</b>	Associate Professor, And Head of Department ENT, Patna Medical College, Patna
<b>Dr. Neha Giri</b>	Post Graduate Resident, Department of Radiology, Patna Medical College, patna
<b>Dr. Abhisek Kishore Dayal</b>	Post Graduate Resident, Department of ENT, Patna Medical College, patna
<b>Dr. Surbhi</b>	Senior Resident, Department of ENT, Patna Medical College, Patna
<b>Dr. Amit Kumar</b>	Assistant Professor, Department of ENT, Patna Medical College, Patna

<b>ABSTRACT</b>	<b>OBJECTIVE.</b> To study various predisposition for sudden upsurge in mucormycosis in second wave of COVID To study pattern of involvement and spread of disease and to correlate clinicoradiologically
	<b>METHOD:</b> A prospective observational study was conducted at a tertiary care centre over 2 months, involving all patients with mucormycosis of paranasal sinuses with history of corona virus infections and having positive KOH fungal staining on nasal biopsy.
	<b>RESULT:</b> 30 patients were studied. maxillary and ethmoid sinuses were most affected sinuses. eye involvement was seen in 83.3 percent cases while intracranial extension was seen in 13.3 percent. 22 patients give the history of steroid usage. comorbid condition Diabetes mellitus was being the most common.
	<b>CONCLUSION:</b> The association between coronavirus and mucormycosis of paranasal sinuses must be given utmost importance. uncontrolled Diabetes and overuse of steroids are main factors.

**INTRODUCTION:**

Mucor is ubiquitous fungus present in our environment be it air, water, soil, decaying food and even as commensal in our nose. It is least potent organism to cause disease in itself and requires various prerequisite host factors to thrive. This group of fungus belong to class phycomycetes (zygomycetes) order Mucorales includes Rhizopus oryzae, mucor, Rhizomucor, Cunninghamella, Saksenaia and Apophysomyces. (3) These fungi lifecycle comprises of spores and hyphae. Hyphae are ribbon like structure visible on microscopy on staining with specific stains and are diagnostic of fungal infection. The spores are like seeds for these species to multiply and reproduce.

Recent second wave of COVID had a disastrous consequences on health of Indians and posed a tremendous load on Indian healthcare infrastructure. More than 2.5 crore Indians have been infected by SARS cov2 in the second wave and still there are more than 2.5 lakh active cases across the length and breadth of country. More than 3.15 lakhs people have succumbed to this illness with case fatality rate of 1.15%. These numbers are humongous for any healthcare system over the world to tackle and thereby really stretched rather tore apart the healthcare system of India. Self prescription, quack prescription, blanket prescription on social media became prevalent during last month leading to overuse and misuse of certain prescription drugs. Adding to that we already are diabetic capital of world and poor socioeconomic condition making a large chunk of our population predisposed to deadly angioinvasive mucor infection. (2) Mucormycosis infection of the sinuses is a life threatening invasive fungal sinusitis that typically affects immunocompromised individuals with an impaired neutrophilic response. (1) Other predisposition which led to the epidemic of mucormycosis is SARS cov 2 mutants which weakens immune system of body, misuse of broad spectrum antibiotics disturbing local commensal of nose, excessive steam inhalation causing mucociliary dysfunction and excessive intake of iron and zinc tablets which are substrate on which this fungus thrives. (5,7) Nosocomial infection through ventilator tubings, oxygen tubings and excessive oxygen in itself can be a cause for mucormycosis surge. (9) Extensive use of steroids in COVID-19 in management can suppress

immunity, opportunistic fungal infections to colonise. (6,8) Hence, it is important to be aware that COVID 19 patients can develop fungal infection during late stage of the disease, especially ill patients.

**AIM:**

To study various predisposition for sudden upsurge in mucormycosis in second wave of COVID.

To study the pattern of involvement and spread of disease and to correlate clinicoradiologically.

**METHOD:**

A prospective observational study carried out in patients with rhino-orbital - cerebral mucormycosis post COVID presented in ENT department of Patna medical college and hospital, Patna, India over a period of two months from June to July 2021. All patients with invasive mucormycosis who presented to ENT department either as out-patient or in ENT causality or following departmental referral and who are recovered from coronavirus infection and positive KOH fungal staining on nasal biopsy, the biopsy material was collected in sterile container with normal saline and processed in department of microbiology. The direct demonstration of fungal filament in the clinical sample is essential in establishing diagnosis. Clinico-demographic profile, imaging findings, with special reference to diabetes (known and new diabetic) steroid usage (salt, dose and duration) were obtained. This data were recorded and analysed

**RESULTS:**

30 patients presented with rhino-orbital - cerebral mucormycosis were studied. 19 of these were male and 11 were Female (table 2). 2 of these were corona positive at the time of presentation but had been infected for more than 14 days; rest had been infected earlier and had recovered. Out of these 25 had orbital symptoms and sign when they presented to us. 6 of them had vision loss. (Figure 1 and table 1). Ethmoid and maxillary sinuses were most commonly involved sinuses. Sphenoid and frontal involvement were less commonly involved (table 3). Middle turbinate and lateral wall of nose was involved in most cases. Palatal involvement was less

common and seen 5 patients with classical black eschar on hard palate. Ptosis was the most common symptom which alarmed the patient however nasal crusting was the most common symptom which went unnoticed to patient. intracranial involvement seen in 4 patients.(table 4).Data regarding diabetes status of COVID associated mucormycosis (CAM)patient also gathered.18 patients were known diabetic and 5 were newly diagnosed during the treatment.3 patient had diabetic ketoacidosis.24 patients gives the history of use steroids during treatment of coronavirus associated illness.other co morbidities apart from diabetes mellitus encountered in out patient were hypertension in 2,AKI in 1 patient and 2 patients with lung involvement.there were 2 casualties during the period of study.(table 5)

**DISCUSSION:**

mucormycosis or zygomycosis also called phycomycosis initially described in 1885 by Paltauf, is an uncommon and aggressive fungal infection that usually affects patients with alteration of their immunological system.(11) It is a lethal fungal disease, with rhino orbital cerebral presentation being its most common form.(12) Although it has low incidence rate, varying from 0.005 to 1.7 per million population, many cases have been seen recently, amounting to significant increase in its incidence in the wake of ongoing coronaviruspandemic. Our observation revealed, middle aged (40-60years), male, rural, low middle class were most affected. More than50% cases were found to be diabetic at the time of presentation of mucormycosis. Most of the subjects were diagnosed to have new onset of diabetes during or following course of COVID-19 illness.

**CONCLUSION:**

there is a trend of late presentation of patient to doctors at our centre when the disease has already spread. Most presented when ptosis and ophthalmoplegia already occurred leading to very poor prognosis,. Being a painless disease we must make an effort to disseminate the specific symptomatology of mucor and predisposed group, screening of all predisposed patients 2-3 weeks post covid should be made a norm in the state.Proper steps should be taken to prevent COVID associated mucormycosis(CAM) including judical steroid usage for treatment of COVID-19 and control of blood sugar levels.

**Table 1. Age distribution**

Age in years	Number of patients
Less than 20	0
20 to 40	8
40 to 60	17
60 to 80	5

**Table 2. Sex distribution**

Sex	Number of patients
Male	19
Female	11

**Table 3. Incidence of paranasal sinus affected**

Sinuses affected	Cases
Ethmoid	27
Maxillary	25
Sphenoid	7
Frontal	4

**Table 4. Spread of adjacent sites**

Adjacent spread	Number of patients
Orbit	25
Intracranial	4
Palate	5

**Table 5 associated. Comorbid condition**

Comorbidities	Status	Cases
Diabetes mellitus (known)	Controlled	10
	Uncontrolled	5
Diabetes mellitus (new)	Controlled	3

	Uncontrolled	2
Diabetic ketoacidosis		3
Hypertension	Controlled	1
Lungs	Pneumothax	1
	Pleural effusion	1
Kidney	Acute kidney injury	1

**Table 6** type of steroid used by patient during COVID-19 treatment (few patients used multiple salts)

Type of seroids	Number of patients
Dexamethasone	15
Methyleprednisolone	5
Prednisolone	2

**Table 7** duration of steroid used by patient during COVID-19 treatment

Duration of use of steroid	Number of patients
Less than 10days	7
10 to 20days	10
More than 20days	7

**Table 8** severity of COVID infection in patient with post COVID fungal infection.

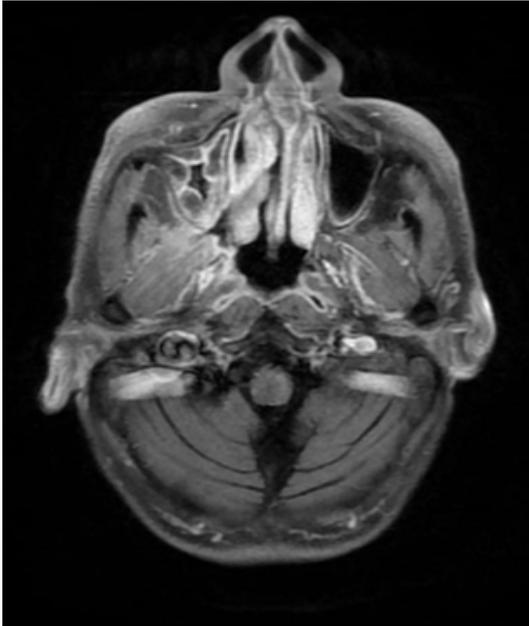
CT severity index	Number of patients	COVID type	Staging
Less than 8	0	Mild	-
8 to 15	12	Moderate	1,2,3
15 to 2	14	Severe	2,3



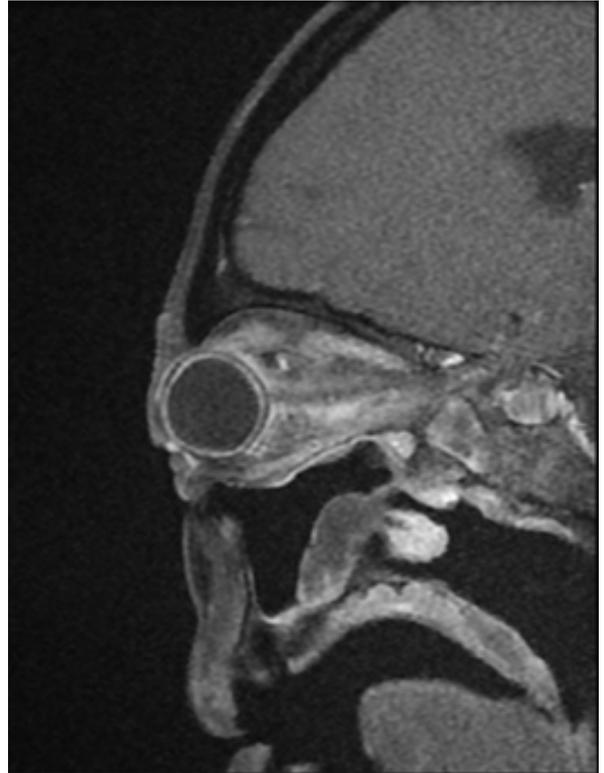
Axial NCCT PNS showing bilateral maxillary sinusitis.



Coronal NCCT PNS showing pan sinusitis,erosion of cribriform plate,right orbit optic neuritis,inflamed extraocular muscles and fat



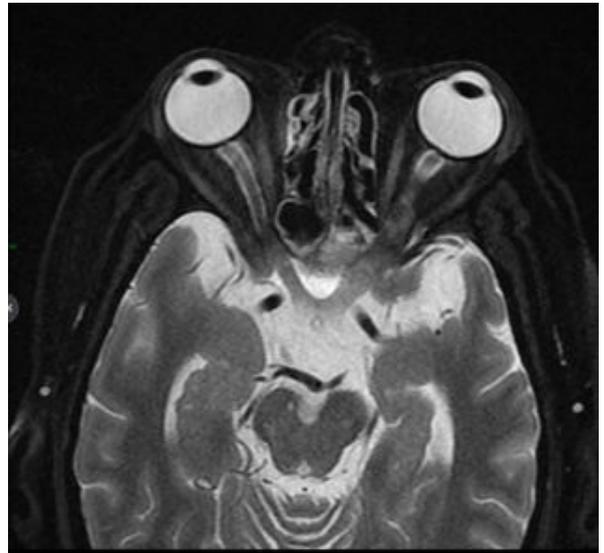
T1 post contrast axial images showing mucosal enhancement in maxillary sinus, infra temporal fossa on right side



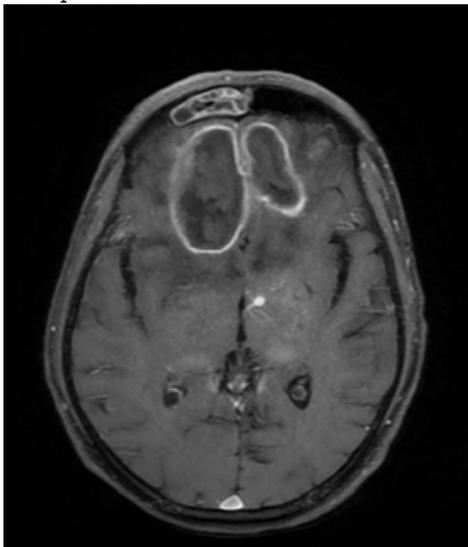
Sag T1 contrast images showing abnormal enhancement of extraocular muscles, optic nerve posterior sclera and intraocular and extraocular fat



Axial NCCT scan showing right orbit intra and extraconal fat stranding with bulky medial and lateral rictus, thickened inflamed optic nerve



Axial T2 images showing bulky prechiasmatic part of left optic nerve



Axial T1 contrast images showing bifrontal abscess and frontal sinusitis

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