



## Original Research Article

# Turbinates involvement in rhino orbital cerebral mucormycosis in covid positive cases - A study on 100 cases

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## ABSTRACT

**Background:** Mucormycosis also called as zygomycosis previously refers to several different diseases caused by infection with fungi belonging to the order Mucorales. Rizopus species are the most common causative organism. The infections are life threatening. Risk factors such as Diabetic Ketoacidosis and Neutropenia are present in most cases. During the pandemic period of COVID-19 2<sup>nd</sup> wave rhino orbital mucormycosis was commonly effected with probable reasons are due to over dosage of steroid usage and o2 therapy. Uncontrolled diabetes etc.

**Aim:** To know the percentage of involvement of turbinates (MT,IT)in Rhino orbito cerebral mucormycosis cases in covid positive patients by doing endoscopic sinus surgery.

**Materials and Methods:** A total of 100 covid positive patients with ROMM were selected and taken for radiological evaluation and selected for ESS during intraoperatively turbinates involvement with mucor (eschar/pus/crusting) was noted diagnosis of ROMM was based on CECT findings and symptoms in covid positive cases. Patients who are attending to Gandhi hospital during the pandemic of 2<sup>nd</sup> wave of covid 19 were selected in study.

**Observations and Results:** Common age group with ROMM are 36to 55 years, with male predominance, commonest symptoms are unilateral facial pain & swelling, nasal crusting and dental complaints, commonest sinus to be involved is maxillary sinus, comorbid condition is Diabetes mellitus and moderate percentage of involvement of turbinates(common is middle turbinate) were noted. On microbiological and pathological examination of specimen showed positive KOH mount and mucorales order fungi are common followed by rizopus species.

**Conclusion:** Main conclusions in this study are turbinates involvement with mucor in covid positive cases (eschar/necrosis/pus discharge) is more common in 43 patients (43%), most common mucor pathology seen in maxillary sinus in 58 patients(58%),followed by ethmoid sinus and sphenoid and orbit, teeth.

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## 1. Introduction

Mucormycosis is a fungal infection seen in individuals with weak immune system, with an upsurge of cases of COVID 19 a drastic increase in cases of ROMM is being witnessed at present. ROMM is seen due to 3 entities the agent, host, environment. Responsible factors are uncontrolled

diabetes, overzealous usage of steroids, haematological malignancies, antibiotics, post solid organ transplantation, usage of chemotherapeutic drugs, o2 therapy and ventilater etc. Mucormycosis is classified into 6 forms they are Rhinocerebral, Pulmonary, Cutaneous, Gastrointestinal, Disseminated, Uncommon types. ROMM has 80times highest incidence (0.14 per1000) in India, prevalence or mucormycosis varied from 0.005 to 1.7 per million population compared to other countries in recent estimare

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in 2019–2020. Injectable Liposomal amphotericin B and posaconazole oral antifungals and surgery are the treatment of choices. Mucor is also called as blackfungus because it causes tissue necrosis and any necrosed decomposed tissue produces eschar and that is colored black. Fungal hyphae have high affinity to internal elastic lamina of blood vessels, so they invade blood vessels and cause local tissue necrosis as well as thromboembolism and thrombotic infarcts. Skull base, cranial nerve and brain involvement carries grave prognosis. Patients attending to emergency department Gandhi hospital during the pandemic period of COVID 19 2<sup>nd</sup> wave with features of black fungus(ROMM) were selected and admitted in inpatients wards of ENT department from those patients symptoms with severe unilateral facial pain, and swelling, nasal crusting, nasal discharge, hyposmia, loose tooth, associated with co morbid conditions like diabetes and hypertension were selected in study (100patients) and sent them for CECT examination and DNE evaluation, both the findings are compared and from that patients who needs Endoscopic sinus surgery and ESS with maxillectomy, ESS with maxillectomy and orbital exentration were selected. Those patients evaluated by above said surgeries according to the patient need pre and post operatively liposomal amphotericin given during surgery involvement of turbinates with mucor (eschar/pus/necrosis) were seen along with sinuses involvement (maxillary, ethmoid, sphenoid, frontal), lamina, teeth, maxilla bone, hard palate, orbit etc., and results are taken in the study for most common and less common involvement of structures intraoperatively. And the involved structures(specimen) taken and sent for microbiological and pathological examination to see for commonest organism involved in mucormycosis in covid 19 positive cases.<sup>1–5</sup>

## 2. Aim

To see the percentage of involvement of turbinates (IT,MT) in ROMM cases in COVID-19 positive patients by doing endoscopic sinus surgery and ESS combined with other procedures according to the need of patient. And to see the results by sending intra op specimen for microbiological and pathological examination.

## 3. Materials and Methods

A total number of 100 patients who were fit for sinus surgery and combined procedures (maxillectomy, orbital exentration) were selected from who are attending to emergency department of Gandhi hospital from a period April 2021 to September 2021(6 months). Patients were admitted and evaluated and taken into study.

### 3.1. Inclusion criteria

1. COVID 19 positive patients with Rhino orbito cerebral mucormycosis symptoms who are fit for surgery

selected.

2. Female and male patients both are included.
3. Patients above the age of 15 years were selected.

### 3.2. Exclusion criteria

1. Patients who unfit for surgery excluded.
2. Patients below the age of 15 years were excluded.
3. Patients who COVID 19 negative are excluded.

## 4. Observations and Results

From the COVID 19 positive patients who are attended to Gandhi hospital emergency department with mucormycosis symptoms like nasal crusting, discharge, unilateral facial pain and swelling, with co morbid conditions like diabetes mellitus and hypertension were selected in study and sent for CECT examination and involvement of orbit, sinuses, maxilla bone, palate and teeth are confirmed and from them who are fit for surgery are taken for necessary procedures like ESS, ESS with maxillectomy, ESS with orbital exentration etc. And accordingly percentage of involvement of turbinates (IT,MT) are studied and results are summarised.

**Table 1: Age Incidence**

| Group | Age in Years | No of Pts | Percentage |
|-------|--------------|-----------|------------|
| 1     | 16-25        | 8         | 8%         |
| 2     | 36-55        | 63        | 63%        |
| 3     | >55          | 29        | 29%        |

**Table 2: Sex Incidence**

| Sex    | No of Pts | Percentage |
|--------|-----------|------------|
| Male   | 72        | 72%        |
| Female | 28        | 28%        |

**Table 3: Symptomatology Index**

| Symptom                        | No of Pts | Percentage |
|--------------------------------|-----------|------------|
| Unilateralfacialpain, swelling | 46        | 46%        |
| Dental Complaints              | 34        | 34%        |
| Nasal Obstruction/crusting     | 23        | 23%        |
| Nasal Discharge                | 22        | 22%        |
| hyposmia                       | 19        | 19%        |
| Blurring of vision             | 6         | 6%         |

## 5. Discussion

Rhino orbito cerebral mucormycosis is sudden unexpected disease due to over and counter usage of steroids and improper sterilization oxygen cylinders in COVID 19 positive cases during the era of phase 1 which was resulted in 2<sup>nd</sup> wave of COVID 19 pandemic with different types of diseases like ROMM. Patients attending to Gandhi hospital

**Table 4:** ENT Examination Index

| Sign                             | No of Pts | Percentage |
|----------------------------------|-----------|------------|
| Unilateral Peri Orbital Swelling | 63        | 63%        |
| Mobile Tooth                     | 30        | 30%        |
| DNS with Turbinate Hypertrophy   | 20        | 20%        |
| Hard palate bulging              | 11        | 11%        |
| CNS Involvement                  | 5         | 5%         |
| Skin Involvement                 | 2         | 2%         |

**Table 5:** CECT findings

| Site             | No of Pts | Percentage |
|------------------|-----------|------------|
| Maxillary Sinus  | 69        | 69%        |
| Ethmoid sinuses  | 44        | 44%        |
| Sphenoid sinuses | 34        | 34%        |
| Orbits           | 33        | 33%        |
| Turbinates       | 20        | 20%        |
| Frontal Sinus    | 12        | 12%        |
| Brain            | 6         | 6%         |

**Table 6:** Endoscopic sinus surgery findings

| Structure Involved | No of Pts | Percentage |
|--------------------|-----------|------------|
| Maxillary Sinuses  | 58        | 58%        |
| Turbinates         | 43        | 43%        |
| Ethmoid Sinuses    | 37        | 37%        |
| Sphenoids          | 11        | 11%        |
| Frontals           | 2         | 2%         |

**Table 7:** ESS with maxillectomy

| Gender | No of Pts | Percentage |
|--------|-----------|------------|
| Male   | 8         | 8%         |
| Female | 3         | 3%         |

**Table 8:** ESS with maxillectomy and orbital exentration

| Gender | No of Pts | Percentage |
|--------|-----------|------------|
| Male   | 2         | 2%         |
| Female | 0         | 0%         |

**Table 9:** Microbiological findings

| KOH mount | No of Pts | Percentage |
|-----------|-----------|------------|
| Positive  | 72        | 72%        |
| Negative  | 28        | 28%        |

**Table 10:** Comorbid conditions

| Condition    | No of Pts | Percentage |
|--------------|-----------|------------|
| Diabetes     | 67        | 67%        |
| Hypertention | 43        | 43%        |

emergency in 6 months period with ROMM symptoms in COVID 19 positive cases 100 patients were selected and evaluation done by clinical, endoscopical and radiological based and taken for surgery results are tabulated according to the present study the results are out of 100 cases commonest age group is 36 to 55 years(63%), male sex predominance with 72 patients (72%), symptomatologically

unilateral facial pain and swelling is common 46pts (46%), followed by dental complaints (34%), nasal obstruction (23%). On ENT local examination periorbital swelling in 63pts (63%), mobile teeth in 30pts (30%), DNS with turbinates hypertrophy in 20pts (20%), hard palate bulging in 11pts (11%), CECT findings showed changes in maxillary antra in 69 pts (69%), orbits (33%), ethmoids (44%), sphenoids (34%), turbinates (20%). After surgery FESS turbinates are 43%, maxillary antra 58%, ethmoids 37%, FESS with partial maxillectomy in 11pts (11%), total maxillectomy in 1pt,orbital exentration in 2pts(2%). KOH mount results showed positive in 72 pts (72%), HPE of intraoperative specimen showed mucorales order in 58pts(58%), rhizopus species in 16pts(16%), aspergillus 6pts(6%), at the end of this study accuracy of turbinate (MT) involvement in mucor cases is more common along with maxillary sinus and middle meatus. when compare to orbit, dental and maxilla bone. Frontal sinus and CNS involvement is rare as per this study.<sup>6,7</sup>

## 6. Conclusion

Main conclusions of this study are male gender predominance, 36to 55 years common age, unilateral facial pain and swelling is common symptom, maxillary sinus is the commonest sinus to be involved, mucorales is the common order of fungi, diabetes is the commonest co morbid condition, turbinates most commonly middle turbinate along with maxillary sinus and middle meatus are more involved in ROMM as per this study.

## 7. Source of Funding

None.


## 8. Conflict of Interest

None.

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