Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/14108
DOI URL: http://dx.doi.org/10.21474/IJAR01/14108

RESEARCH ARTICLE

MUCORMYCOSIS IN COVID 19- 2ND WAVE : CLINICAL PROFILE IN CENTRAL INDIA

Seema Patel[1], B.D Bokare[1], A. Keche[2], D. Birhade[3], A. Kuthe[3] and R. Darokar[3]

1. Associate Professor Department of ENT GMC, Nagpur.
2. Assistant Professor Department of ENT GMC, Nagpur.
3. Junior Resident Department of Ent GMC, Nagpur.

Manuscript Info

Manuscript History
Received: 20 November 2021
Final Accepted: 23 December 2021
Published: January 2022

Key words:-
Rhino, Orbito, Cerebral Mucormycosis (ROCM), COVID-19, Immunocompromised, Diabetes Mellitus

Abstract

A sudden surge of Rhino-Orbito-Cerebral Mucormycosis (ROCM) was observed following second wave of Covid-19 in India. Diabetes mellites (DM) , steroids, hypoxia, hyperglycemia ,metabolic acidosis or Diabetic ketoacidosis, high serum iron levels, zinc supplementation, immunosuppression along with other risk factors have been found to facilitate fungal germination. Patients diagnosed with ROCM, a total of 273, were included in the study. Detailed history was noted and assessment was done. Male:Female ratio was 2.59:1. Most common presenting age group was 31 to 50 yrs (51.65%). The commonest presenting symptom was nasal obstruction (58.97%) followed by ipsilateral facial swelling (53.11%). Palatal ulceration, blood stained nasal discharge ,orbital swelling, diminution or loss of vision, headache, loosening of teeth were among other presentations. Common associated comorbidity was diabetes(84.61%), hypertension (HTN) , anemia, immunocompromised state etc. History of associated past covid infection was seen in 75.52% while 18.68% had coexisting mucor with covid. History of steroid use was in 86.81%, O2 administration by mask in 64.10%, ventilatory support in 5.12 % and tablet zinc intake in 86.45%. Covid-19 along with DM, HTN, anemia, steroid therapy and oxygen therapy are the risk factors for ROCM. Thus regular blood sugar monitoring , judicious use of corticosteroids, maintaining hygiene of mask and circuit during oxygen therapy is recommended while treating covid.

Introduction:-

Mucormycosis is a life threatening opportunistic fungal infection caused by fungus belonging to order *Mucorales,* mostly occurring in Diabetic patients. *Rhizopusarrhizus*is present in 85% of Rhino- cerebral forms, compared with only 17% of non-Rhino-cerebral forms in French Retrozygo study[1]. It can also occur in immunocompetent patients following a trauma or burns[2]. Most common clinical presentations are Rhino-orbito-cerebralMucormycosis(ROCM) and Pulmonary Mucormycosis[3]. A sudden surge of ROCM was observed following second wave of COVID-19 in India. In a French study, mucormycosis incidence had increased by 7.3% per year, especially in patients with neutropenia[4]. India contributed to approximately 71% of the global cases of Mucormycosis in patients with COVID-19 based on published literature from December 2019 to the start of April 2021[5].

Corresponding Author:- Bhagyashree Bokare
Address**:-** Associate Professor Department of ENT, GMC, Nagpur.

Diabetes and steroids used in covid are noted to be the major risk factors. Other risk factors include hematological disorders, AIDS, liver cirrhosis and treatment with high dose steroids. Decreased numbers and impaired function of monocytes and neutrophils are important risk factors as they inhibit spore germination[6,7] .

Treatment of mucormycosis is an emergency and needs combined approach with surgery and antifungal treatment owing to angioinvasive and necrotic character of infection[4].Sudden increase in ROCM in Covid19 cases led us to undertake this study to study its associations with comorbidities, drugs used in treatment of covid and details of clinical presentations.

Method:-

This is a prospective study of 273 cases who were diagnosed with Rhino-Orbital-CerebralMucormycosis during the second wave of COVID-19. This was carried out in department of ENT, GMCH Nagpur from April 2021 to August 2021. All patients with symptoms and signs of ROCM were registered. Patients were asked about covid infection in past, hospitalization,use of oxygen,steroidadministration,vaccination in details. They were thoroughly evaluated and clinical findings were noted. COVID-19 RT-PCR test was done for every patient. Opthalmologist opinion was taken for those with eye complaints. Nasal endoscopy, CT PNS and/ MRI Brain + PNS+ Orbit was done. KOH mount from the nasal secretions were sent for fungal staining and crusts or necrosed part was sent for Histopathology for confirming Mucormycosis. As medical management, antifungal therapy- Liposomal Amphotericin B 5mg/kg/day or conventional Amphotericin or lipid emulsion was given for 6 weeks. Higher antibiotics and treatment of any co-morbid conditions was done. Surgical management was the mainstay of treatment in mucormycosis. Mostly endoscopic debridement was done.Combined open & endoscopic approach was used in extensive cases.

Results:-

Total 273 patients of Mucormycosis were included in this study. There were total 197(73%) males and 76(27%) females ,M:F ratio = 2.59:1 (TABLE 1) . Patients belonged to age group between 11-90 years, most common being 31 to 50 yrs with 141 (51.65%) patients . Commonest presenting complaints were nasal obstruction in 161 (58.97%) followed by ipsilateral facial swelling in 145(53.11%) and blood stained nasal discharge in 89 (32.6%). Facial swelling was mostly in maxillary region (cheek), over zygoma in a few cases. Other complaints included orbital swelling in 67 (24.54%), palatal ulceration in 27(9.89%),headache in 24(8.79%),diminution of vision in 21(7.69%), loss of vision in 17 (6.23%) and loosening of teeth in 14(5.12%) (FIG 1) . Most common associated comorbidity was Diabetes Mellitus in 231(84.61%), Hypertension in 78(28.57%), Anaemia in 71(26%) and Diabetic ketoacidosis in 44 (16.11%). Other comorbidities documented were Chronic Kidney disease in 14 (5.12%) , Heart disease in 6 (2.19%), Hypothyroidism in 5 (1.83%) and Pancreatitis in 1(0.36%) .Immunocompromised status was seen in 10 (3.6%) patients with HIV, Hepatitis B, Lymphoma, leukemia, leprosy as underlying causes (TABLE 2) .

Blackish eschar and necrosed tissue with/without purulent nasal discharge was seen in all patients on nasal endoscopy. On eye examination Proptosis was the main finding followed by eyelid oedema, chemosis, diminution of vision, ophthalmoplegia. Out of 273 patients all 100% had paranasal sinus involvement,67(24.54%) had intraorbital involvement, 43(15.75%) had intracranial and 3(1.09%) had pulmonary involvement. Nasal swab for KOH was positive in 142 (52.01%) while histopathology was mucor in all cases.

Past history of Covid-19 was present in 198 (75.52%) cases, coexisting covid with mucormycosis was seen in 51 (18.68%). In 24 (8.79%) cases there was no history of covid 19 or they may be asymptomatic for Covid which went unnoticed (FIG 2) . Covid positive patients who received steroids were 237 (86.81%) whereas in 35 (12.82%) cases steroid status was not known. History of hospitalization for Covid was present in 224 (82.05%) ,home quarantine in 25 (9.16%) cases. Oxygen administration with mask was given in 175 (64.10%) cases and ventilatory support in 14 (5.12%) cases. Tablet Zinc was given in 236 (86.45%) (TABLE 3).

Vaccination history was present in 27 (9.90%) cases with 1st dose in 22 (8.05%) and 2nd dose in 5 (1.83%) cases.

Table 1:- Age and Gender wise distribution of patients:

Age group(yrs)	Male	Percentage	Female	Percentage	Total	Percentage
11-30	09	3.30%	03	1.10%	12	4.40%
31-50	105	38.46%	36	13.19%	141	51.65%
51-70	77	28.21%	33	12.09%	110	40.29%

71-90	06	2.20%	04	1.47%	10	3.66%
Total	197	72.16%	76	27.84%	273	100 %

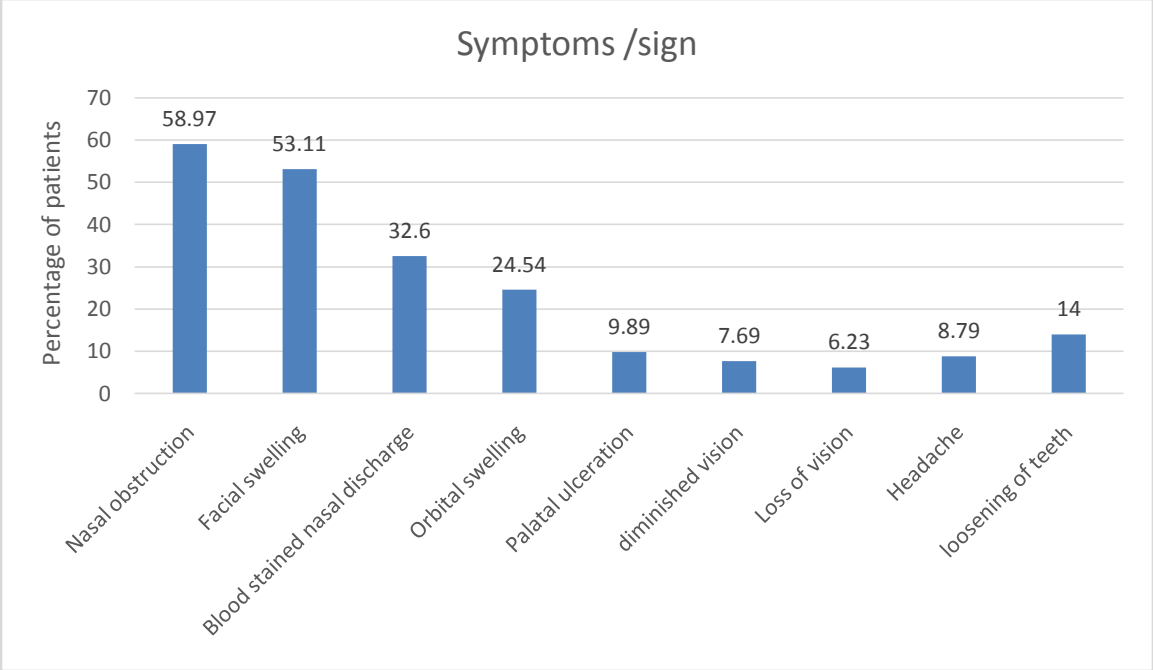

Fig 1:- Distribution of Symptoms/signs in patients:

Table2:- Comorbidities association:

Comorbidity	**No of patients**	**Percentage**
1. Diabetes	231	84.61%
2. Hypertension	78	28.57%
3. Anaemia(hb<11)	71	26.0%
4. Diabetic ketoacidosis	44	16.11%
5. Kidney disease	14	5.12%
6. Heart disease	06	2.19%
7. Hypothyroidism	05	1.83%
8. HIV	05	1.83%
9. Hepatitis B	02	0.73%
10. Leukemia	01	0.36%
11. Lymphoma	01	0.36%
12. Leprosy	01	0.36%
13. Pancreatitis	01	0.36%

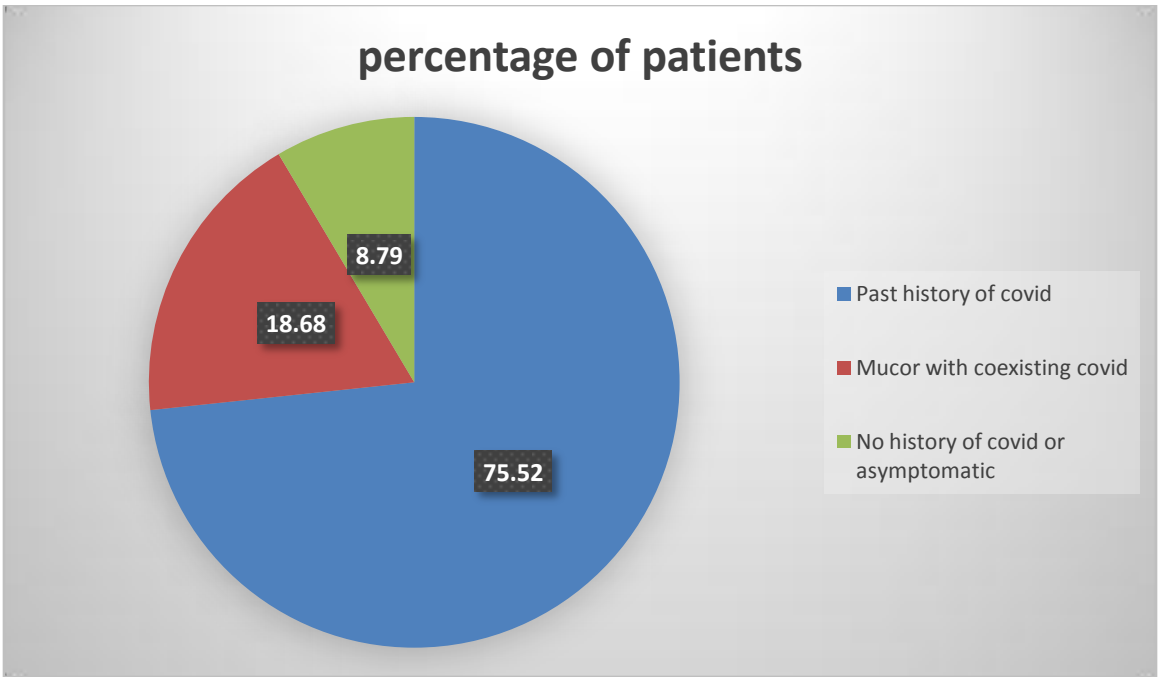

Fig 2:- Association of Covid-19 status with mucormycosis.

Table3:- Association of treatment for COVID 19 with mucormycosis:

Factors	Patients	Percentage
1. Steroids taken	237	86.81%
2. Steroid status unknown	35	12.82%
3. Tab. Zinc	236	86.45%
4. O2 by mask support	175	64.10%
5. Ventilatory support	14	5.12%

Discussion:-

Mucormycosis is a life-threatening fungal infection that occurs mostly in immunocompromised patients. It is associated with increased mortality and morbidity. Mucormycosis is characterized by its angioinvasive property, resulting in vascular thrombosis and ultimately tissue necrosis. Ketoacidosis and Desferoxamine are predisposing factors, revealing the importance of hyperglycemia, iron and acidifying ketone bodies in mucorales virulence. Decreased numbers and impaired function of monocytes and neutrophils are other important associated risk factors, as they inhibit *Mucorales* spore germination[6,7]. Covid-19 along with Diabetes melitus, Hypertension, uncontrolled use of steroids, hypoxia, increased free iron, anaemia, unhygienic oxygen therapy and decrease immunity, are found to play a role in fungal growth. Zinc supplements given to almost all patients is said to facilitate fungal germination

In the 1st wave of covid19, most of the patients presented with ROCM between 3-6 weeks after covid infection[8] but in 2nd wave we saw mucormycosis with Covidconcomittently.

Study conducted by Roden et al [2] mean age of patients was 38.8 years, of which 65% were male, it was seen more frequently in patients with Diabetes 33% compared with patients of malignancy 04%. In Study by Singh et al[8] Mucormycosis was predominantly seen in males 78.9%, both in people who were active 59.4% or recovered 40.6% from COVID-19 and Diabetes was seen in 80%. Corticosteroid intake for treatment of COVID-19 was recorded in 76.3% of cases[9]. In our study 72% patients were male, diabetes was seen in 84% of patients while active Covid 19 cases were 18.68%, recovered were 75.52% and corticosteroids intake was noted in 237(86.81%) cases.

In our study out of 273 patients all had paranasal sinus involvement, 67(24.54%) had intraorbital involvement, 43(15.75%) had intracranial and 3(1.09%) had pulmonary involvement. In another study out of 13 patients, 8

patients had intraorbital involvement, 2 patients had intracranial involvement, 2 had paranasal sinus involvement and 1 had pulmonary involvement[10]

Antifungals with aggressive surgical debridement is the mainstay of treatment of mucormycosis.

Conclusion:-

We have noticed more number of cases of ROCM in 2nd wave as compaired to 1st wave and more patient had concomittentcovid with mucormycosis . In 1st wave patient of ROCM presented by the end of the wave.

Covid19 along with Diabetes mellitus, Hypertension, Anaemia, Steroid therapy and Oxygen therapy are the risk factors for ROCM. Regular monitoring of blood sugar, judicious use of corticosteroids, maintaining hygiene of mask and circuit during oxygen therapy is recommended while treating covid.

Vigilance and high degree of suspicion is required for early diagnosis and treatment, to improve the chances of survival.

Creating awareness among treating physician about ROCM and patients to seek early medical attention (for any nasal symptom, facial or orbital swelling and vision disturbances) is needed as it is associated with high morbidity and mortality.

Monitoring of all covid19 patients for 6 weeks or more is required as they are more vulnerable to fungal infection.

References:-

1. Lanternier F, Dannaoui E, Morizot G, et al.: A global analysis of mucormycosis in France: the RetroZygo Study (2005-2007). Clin Infect Dis. 2012;54 Suppl 1:S35-43. 10.1093/cid/cir880
2. Roden MM, Zaoutis TE, Buchanan WL, et al. : Epidemiology and outcome of zygomycosis: a review of 929 reported cases. *Clin Infect Dis.* 2005;41(5):634–53. 10.1086/432579 [PubMed] [CrossRef] [Google Scholar]
3. Kauffman, C. A., &Malani, A.N. (2007). Zygomycosis: an emerging fungal infection with new options for management. Current infectious disease report,9(6),435-440. https://doi.org/10.1007/s11908-007-0066-4.
4. Bitar D, Lortholary O, Le Strat Y, et al. : Population-based analysis of invasive fungal infections, France, 2001-2010. *Emerg Infect Dis.* 2014;20(7):1149–55. 10.3201/eid2007.140087
5. Singh Y, Ganesh V, Kumar S, et al. (July 03, 2021) coronavirus Disease- Associated Mucormycosis from a Tertiary care Hospital in India: A Case Series. Cureus 13(7):e16152.doi:10.7759/cureus.16152
6. Xhaard A, Lanternier F, Porcher R, et al. : Mucormycosis after allogeneic haematopoietic stem cell transplantation: a French Multicentre Cohort Study (2003-2008). *ClinMicrobiolInfect.* 2012;18(10):E396–400. 10.1111/j.1469-0691.2012.03908.x
7. Pana ZD, Seidel D, Skiada A, et al. : Invasive mucormycosis in children: an epidemiologic study in European and non-European countries based on two registries. *BMC Infect Dis.* 2016;16(1):667. 10.1186/s12879-016-2005-1
8. Patel Seema, Nitnaware A, Pawar R, et al.: Covid-19 with rhino-orbito-cerebral mucormycosis : a sudden surge. Global journal for research analysis. 2021;10(03):130-133. 10.36106/gjra
9. Singh AK, Singh R, Joshi SR, et al. Mucormycosis in COVID-19: A systematic review of cases reported worldwide and in India, diabetes and metabolic syndrome: clinical research & reviews; 2021. 10.1016/j.dsx.2021.05.019
10. John TM. Jacob CN. Kontoyiannis DP- When uncontrolled diabetes mellitus and severe COVID-19 converge: the perfect storm for mucormycosis. J Fungi.2021;7:28.