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RESEARCH ARTICLE

A STUDY OF FEQUENCIES OF CRAO CASES IN POST COVID 19 RHINO ORBITAL MUCOR MYCOSIS

Dr. Aparna Patel and Dr. Reshma R.

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Abstract

Introduction: Mucormycosis is a life-threatening fungal infection that occurs in patients who are immune compromised because of diabetic ketoacidosis, neutropenia and/or organ transplantation. In pandemic of COVID 19 an unusual epidemic of rhino-orbital-cerebral mucormycosis was observed affecting post COVID patients mainly. Covid 19 causes endothelial dysfunction due to inflammatory induced homeostasis and a pro coagulant state with multi-organ involvement[1]. All these inflammatory and hypercoagulable states are established risk factors for retinal artery occlusion. Direct invasion of vessels by fungal hyphae leading to widespread occlusive vasculitis and thrombosis can also lead to complications like Central Retinal Artery Occlusion in patients of mucormycosis.

Aim: To report a series of CRAO cases in Post Covid Rhino-orbital cerebral mucormycosis patients and describe clinical profile and outcome.

Methodology: In a cross sectional study all adult patients at SDU medical college from 1st April to 31st August 2021 diagnosed as Rhino-orbital-cerebral Mucormycosis were included. Epidemiological data of all cases and relevant history were noted. Detailed history regarding COVID hospitalization and treatment received were noted. Detailed ocular examination including fundus examination was done. Primary outcome measure was CRAO.

Results: A total of 34 patients were included in study out of which 26.47% were females and 73.52% were males. CRAO was observed in a total of 10 patients (27.02) out of which 9(90%) were males and 1(10%) was female.

Conclusion: Association of invasive mucormycosis with COVID-19 is dangerous and has serious consequences. Detailed ophthalmological surveillance in such patients is mandatory to avoid sight threatening complications.

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Introduction:-

Recent pandemic of COVID19 has caused a panic in many countries especially because of unavailability of definite treatment of this deadly viral infection. Mainstay of treatment was supportive oxygen therapy and heavy dosage of steroids and immunomodulators. Many patients of COVID19 acquired secondary infections and mucormycosis was

one among them.

Mucormycosis (zygomycotic), a fungal infection caused by Zygomycetes is a serious, potentially deadly fungal infection caused by different fungi. Infections with the Mucoraceae family of fungi predominates and thus many investigators use the term mucormycosis instead of zygomycosis. Mucormycosis is an opportunistic fungi, which is angio-invasive and is associated with high morbidity and mortality. More commonly mucormycosis occurs in patients who are immune compromised due to diabetic ketoacidosis, immunodepressant drugs, neutropenia, organ transplantation or increased serum levels of iron. But recently, an epidemic of Rhino-orbito cerebral mucormycosis was observed among COVID19 patients. Various risk factors including high blood sugar and use of immune modulators have been implicated. Depending on the site of involvement, various clinical presentations have been described, the most common being rhino-orbito-cerebral mucormycosis (ROCM). [4][5] Rapid progression of Mucormycosis makes its early diagnosis and treatment critical, considering that a delay of even six days doubles 30-day fatality from 32% to 66% [2]. The characteristic feature of the disease is tissue necrosis due to angioinvasion and vascular thrombosis. A high index of suspicion is necessary in patients presenting with unilateral facial pain or swelling, orbital swelling or proptosis.

Orbital extension of mucormycosis can involve optic nerve, 3rd, 4th and 6th nerves, nasociliary nerve and orbital apex resulting in total ophthalmoplegia, visual loss, proptosis, ptosis and neuralgia. Sudden blindness can occur in patients with ROCM due to CRAO, optic nerve necrosis, infarction and involvement of optic nerve due to infection.

There is direct invasion of vessels by fungal hyphae leading to widespread occlusive vasculitis and thrombosis leading to Central Retinal Artery Occlusion [3]. Invasion of walls of central retinal artery by fungal hyphae can lead to ischemia and infarction of retina leading to marked visual loss. The association between CRAO and Mucormycosis in post Covid 19 patients has been shown in various studies. Present study is aimed to know prevalence and clinical profile of patients of CRAO in Post Covid Rhino-orbito cerebral mucormycosis patients.

Materials & Methods:-

Study design and setting:

A cross sectional study including all adult indoor patients at Sri Devaraj Urs Medical College from 1st April to 31st August 2021 diagnosed as Rhino-orbital-cerebral Mucormycosis after permission from institutional ethical committee.

Study participants:

Post COVID rhino-orbito-cerebral mucormycosis (PC-ROCM). Patients diagnosed with ROCM clinically and/or based on diagnostic nasal endoscopy and/or contrast-enhanced MRI/CT scan with laboratory confirmation on direct microscopy (KOH/ Calcofluor white) or Culture or histopathology or molecular diagnostic methods.

Method of data collection:-

Epidemiological data of all case and relevant history were noted. Detailed history regarding COVID hospitalization and treatment received were noted. Detailed ocular examination including fundus examination was done. Primary outcome measure was CRAO. Diagnosis of CRAO was based on clinical signs of CRAO like pale retina, cherry red spot at macula, venous stasis, segmentation of arterioles and edema or pallor of optic disc.

Results:-

A total number of 37 patients were included in study. Majority patients were male i.e. 83.78% while 16.21% were females. All patients were between 30-70 years of age

Table 1:- Age distribution.

Age group	Number	%
31-40	9	24.32
41-50	10	27.02
51-60	9	24.32
61-70	5	13.51
71-80	4	10.81
Total	37	100

As per age group majority (27%)patients were in 41-50 years of age

Graph 1:- Age distribution.

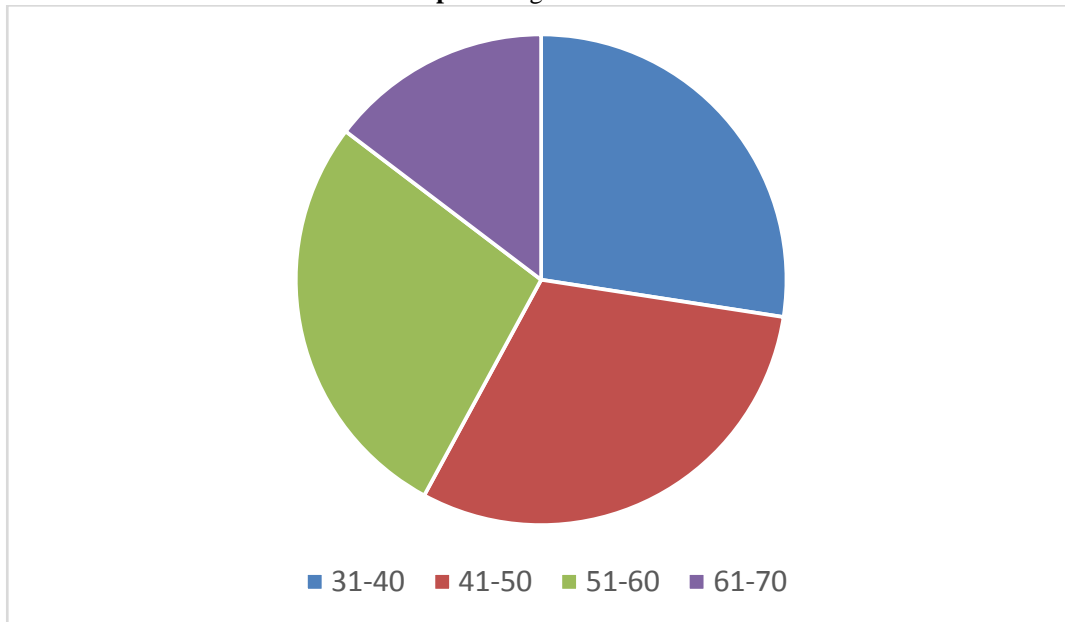


Table 2:- Systemic association.

Systemic condition	Number	%
COVID infection	28	75.67
Diabetes mellitus	28	75.67
Steroid use	14	37.83

Majority of patients had history of covid infection (75.67%) and diabetes mellitus (75.67%)
 History of steroid use was present in 14(37.83%) patients.

Graph 2:- Systemic association.

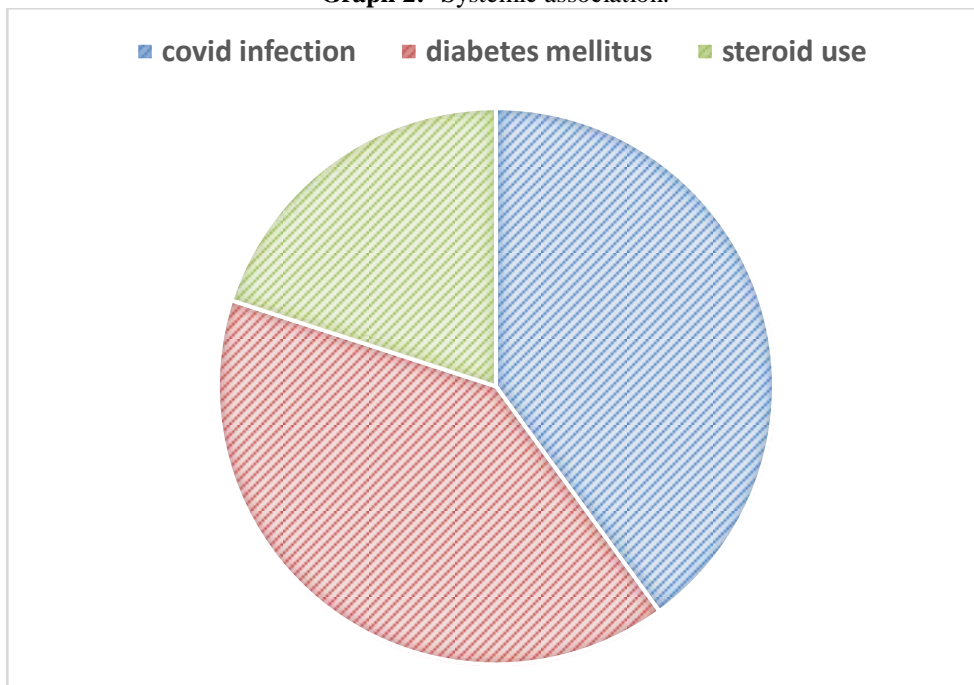
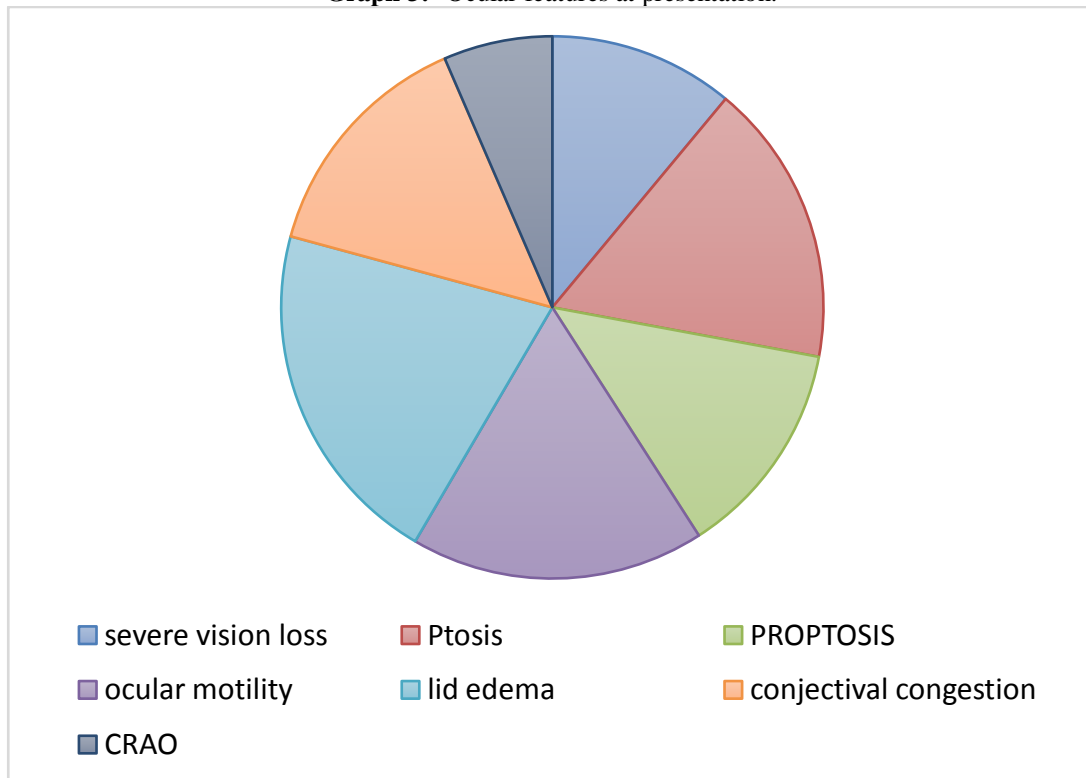


Table 3:- Ocular features at presentation.

Ocular features	Number	%
Severe loss of vision	17	45.94
Ptosis	26	70.27
Proptosis	20	54.64
Ocular motility	27	72.97
Lid edema	32	86.48
Conjunctival congestion	22	59.45
CRAO	10	27.02

Common presenting ocular features were severe loss of vision (45.94%), ptosis(70.27%) and proptosis (54.05%). Extra ocular muscle involvement was present in 72.97%. Diagnosis of CRAO was based on clinical signs of CRAO like pale retina, cherry red spot at macula, arteriolar attenuation, venous stasis, segmentation of arterioles and edema or pallor of optic disc. CRAO was observed in a total of 10 patients (27.02) out of which 9(90%) were males and 1(10%) was female. Out of CRAO patients 6(60%) presented with no perception of light while 4 (40%) had very low vision with perception of light present.

Graph 3:- Ocular features at presentation.**Discussion:-**

Mucormycosis is caused by a saprophytic fungi of the genus *Rhizopus*, *Mucor* & *Absida*. [6] They are commonly found in the environment, in soil, manure, fruits, etc but they infect only those individuals with a weakened immune system, mainly diabetes mellitus. [7] ROCM, usually starts by infecting the nose or sinus and gradually spreads to the orbit and central nervous system, thereby having a high incidence of mortality. [8] CRAO is a rare manifestation of ROCM and has an incidence of 16-20%. [9] A report by Ho et al. showed sudden loss of vision due to CRAO. The patient had fever and was diagnosed with ipsilateral ROCM and fungal endophthalmitis in the contralateral eye. [10] A study by Bansali [11] et al., and Yohai [12] et al., stated that the most common cause of visual loss in ROCM was CRAO and cavernous sinus thrombosis. A study by Pritam et al., [9] showed that CRAO as a manifesting sign of ROCM was rare and MRI with a biopsy was the most reliable in the diagnosis and confirmation of ROCM.

Conclusion:-

We are learning more about the new and long-term manifestations of the Covid-19 infection. Its association with invasive mucormycosis is dangerous and must be looked into, as early diagnosis and treatment is important in improving the outcome of the patient. The role of an Ophthalmologist in the team of mucormycosis has to be seriously considered as it is important in timely diagnosis and prevention of vision threatening complications like CRAO.

Author' contribution:

Dr Patel Aparna conceived and designed the study, collected and reviewed patient data and analysed the data. Dr Reshma R was a major contributor in writing the manuscript and interpretation.

Conflicts of interest and financial gain :

No conflict of interest declared among authors. No financial gain

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