Section: Ophthalmology

Original Research Article

OCULAR MANIFESTATIONS IN RHINOORBITAL CEREBRAL MUCORMYCOSIS

Received : 04/07/2023
Received in revised form : 12/08/2023
Accepted : 24/08/2023

Keywords:
Covid19, Rhino Orbital Cerebral Mucormycosis, Diabetes Mellitus, Juvenile diabetes, Proptosis, Ptosis, exentration.

Corresponding Author:
Dr. D.Kesava Rao,
Email: drdkesavarao@gmail.com

DOI: 10.47009/jamp.2023.5.5.13

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2023; 5 (5); 63-67

B. Chandrasekhar Rao[1], D. Malathi Christina[2], P. Vasudevnanad[3], D. Kesava Rao[4], K. Sowjanya Kumari[5], K. Ravisekhar Rao[6], P. Modini[7], Likhitha[8], Devika Sexena[9], D. Kowsalya Rishitha[10], C. Shiva Kumar[11]

[1]Associate Professor of Ophthalmology, Sarojini Devi Eye Hospital/ Gandhi Medical College, Hyderabad, Telangana, India.
[2]Assistant Professor of Ophthalmology, Sarojini Devi Eye Hospital / Osmania Medical College, Hyderabad, Telangana, India.
[3]Assistant Professor of Ophthalmology, Sarojini Devi Eye Hospital / Osmania Medical College, Hyderabad, Telangana, India.
[4]Associate Professor of Ophthalmology, Sarojini Devi Eye Hospital/Osmania Medical College, Hyderabad, Telangana, India.
[5]Assistant Professor, Government ENT Hospital, (Osmania Medical College) Koti, Hyderabad. Telangana, India.
[6]Professor & HOD, Gandhi Medical College, Secunderabad, Telangana, India.
[7]Professor & HOD, Sarojini Devi Eye Hospital / Osmania Medical College, Hyderabad, Telangana, India.
[8]Internee, Gandhi Medical College, Secunderabad, Telangana, India.
[9]Post graduate, Sarojini Devi Eye Hospital / Osmania Medical College, Hyderabad, Telangana, India.
[10]Kamineni Institute of Medical Sciences, LB, Nagar, Hyderabad, Telangana, India
[11]DEO, Sarojini Devi Eye Hospital, Hyderabad, Telangana, India.

Abstract

Background: A study on Ocular manifestations in Rhinorbital Cerebral Mucormycosis. **Materials and Methods:** This is a cross sectional study done at the tertiary health care centre at Gandhi Medical College, Secunderabad and Sarojini Devi Eye Hospital, Hyderabad, Telangana between 1-4-2021 to 21-6-2021 and the study subjects were post covid-19 patients with fungal invasion. The patients were evaluated and managed for associated ENT, Neuro and Dental and Ophthalmic comorbidities and systemic diseases like diabetes mellitus. A thorough descriptive and analytical study was done and presented as numbers and calculated percentages. **Result:** 50- 59 years age group is predominate with Gender Ratio: male (120): female (62)it is 1:2. patients developed irreversible sudden loss of vision mainly with CRVO / CRAO / Optic neuritis / Papillitis / Optic atrophy / Retinal or Choroidal detachment. Patients developed pre and post septal cellulitis, proptosis, ophthalmoplegia and exposure keratitis associated with corneal ulcer leading to gradual loss of vision. **Conclusion:** It is concluded that some patients developed irreversible sudden loss of vision mainly with CRVO, CRAO and panopthamitis. Knowledge of various presenting anterior and posterior segment manifestations of the disease as described in the present study will guide clinicians to recognize the disease early and make every effort to prevent complications.

INTRODUCTION

The most unprecedented, disastrous and devastating pandemic of the century – COVID-19, has devastated the whole planet and shattered the health and socio economy of all the people around the world. With the inappropriate knowledge about the disease and its medication the spread and contact even the medical fraternity had to strive hard for its curtailment. The environment pollution and its implications which lead to the mutations of these viruses and lead to its fast spread. Because of less knowledge about the disease and its virulence, injudicious use of systemic steroids, though increased the survival rate of some patients had decreased the immunity and increased the hyperglycemic state of the many patients which had ultimately lead to the increased Diabetic status thus leading to delayed wound healing and increased necrosis of the paranasal sinuses, palate, base of skull and orbit leading to the proptosis, devastating loss of vision and even death of the patients.[1-3] we aim to study on Ocular manifestations in Rhinorbital Cerebral Mucormycosis.

MATERIALS AND METHODS

This is a descriptive cross sectional and analytical study to establish the direct correlation between the diabetes and post covid mucurmycosis which lead to proptosis and ultimately leading to the loss of vision. Between 1-4-2021 to 21-6-2021, total 182, cases who got admitted at GandhI Medical College and Hospital, which is a premier tertiary health care centre in Telangana, India. Patients with diagnosed with distinctive rhinorbital clinical features like swelling in and around the orbital region and face, proptosis associated with orbital pain, redness of eye, lacrimation, photophobia, loss of pupillary reflexes / RAPD, ophthalmoplegia etc.

Inclusion Criteria

All post covid-19 patients with high index of clinical features and suspicion of rhinorbital mucur in both sexes presenting to the department of ophthalmology, ENT and Endocrinology.

Exclusion Criteria

All the post covid-19 patients with bacterial invasion and those who did not give consent were excluded.

Sample Size: The following formula was used for calculating the adequate size in the prevalence study n=Z 2P(1-P) /d 2 where in is the sample size, Z is the statistic corresponding to the level of confidence, P is the expected prevalence (that can be obtained from the same studies or pilot study conducted by the researchers) d is the precision (Corresponding to the effect size).

Statistical Analysis

Descriptive analysis was done and presented as numbers and percentages were calculated.

RESULTS

50-59 years age group is predominated in present study. Gender Ratio: male (120): female (62)it is 1:2. [Table 1]

Table 1: Age and gender Distribution

	Number of cases	Percentage
0-9 years	0	0
10-19 years	1	0.5%
20-29 years	1	0.5%
30-39 years	22	12%
40-49 years	51	28%
50-59 years	59	32%
60-70 years	41	22%
70- above years	2	0.5%
Gender		
Male	120	66.7%
female	62	33.4%

Table 2: Common Ophthalmic clinical features

Clinical features	Number of cases	Percentage
Visual acuity	No PL	
Orbital swelling	182	100%
Facial swelling	182	100%
Proptosis	182	100%
Punctual discharge	109	60%
Ophthalmoplegia	182	100%
Ptosis	161	89%
Corneal ulcer	101	56%
Panophtalmitis	108	69%
Ocular movements	Ophthalmoplegia	100%
Proptosis	Progressive	86%
Eyelids	Odematous	100%
Periorbital region	Odematous	100%
Conjunctiva	Congestion Chemosis	100%
Cornea	Keratitis Ulcer present (Fungal)	100%
Anterior chamber	Irregular depth Shallow Deep Cells Flare Hypopyon Hyphea	80% 10% 10% 90% 90% 90% 10%
Iris	Irregular muddy Occasionally cheesy fluffy material / exudates Neovascularization (rubeosis iridis)	100% 100% 62%
Pupil	RAPD No reaction	64% 26%
Lens	Immature senile cataract Mature senile cataract Complicated cataract	38% 28% 36%
Vitreous	Hazy due to exudates / vitreous hemorrhage	96%

ISSN (O): 2687-5365; ISSN (P): 2753-6556

	Vitreous detachment	84%
Retina	Media – Hazy	96%
	Optic Disc	
	Optic neuritis	3.7%
	Optic Atrophy	6.3%
	Papillitis	1.5%
	Myopic fundus	0.52%
	Macula- Visual reflex dull	4.2%
	Vessels engorged	80%
	CRVO	65%
	CRAO	30%
	NPDR	
	Mild	4.7%
	Moderate	3.7%
	Severe	2.6%
	Post PRPC	1.58%
	CSME	13.17%
	Medullated nerve fibre	1.05%
	Retinal detachment	83%
	Choroidal detachment	63%

Diminished vision, Orbital swelling, Facial swelling, Proptosis, Ophthalmoplegia, Bloody nasal discharge, Nasal crusting and Eschar over the palate are common feature seen in all patients with mucormycosis.

Figure 1: Diabetic Type-II, patient with facial swelling, lid edema, proptosis and ptosis

Figure 2: Juvenile Diabetic Type-I patient

Figure 3: Juvenile Diabetic Type-I patient with necrosis of the with ptosis and facial swelling encroching the orbit

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Figure 4: Patient with necrosis of the soft and hard palate involving paranasal sinuses and orbit

Figure 5: Patient with post exentration status

DISCUSSION

The Covid-19 which was caused by SARS COV-2 had rapidly increased across the globe in the year 2021, killed millions of people, shattered their families and destroyed the mere socio-economy of the state. Mucorales are the molds found abundantly in the environment, predominantly in hot and humid conditions of tropical countries like India. Rhizopus and Mucor are the two most common species causing mucormycosis belonging to family mucoraceae. The prevalence of mucormycosis in India is attributed around 140 cases per million population, and it is much less in European countries and the United States of America.[3] Mucormycosis has emerged as one of the life-threatening complications of COVID-19 infection in India. Many people lost their lives and vision. One of the significant causes of these morbidity and mortality is due to the uncontrolled diabetic state in the already existing Diabetes mellitus Type-II and Type-I, including children and also due to the donovo development of diabetes, stress and decreased immunity which has laid to decreased wound healing.[4,5]

Invasive mucormycosis has not only been seen in severe cases but also in mild and moderate cases of SARS-CoV-2 infections. These patients found to have uncontrolled hyperglycemia or steroid-induced hyperglycemia and were on immunosuppresants (renal recipients). Low dose and short duration of corticosteroids have shown benefit in patients of moderate to severe illness. But in second wave of SARS-CoV-2 infection, higher doses and longer duration of corticosteroids have been used in many patients with severe diseases. The invasive fungal infections in such patients alter the natural history of disease resulting in poor prognosis. The incidence varies from 0.005 to 1.7 per million population and the global case fatality rate is as high as 46%.[6,7] Depending on the site of infection it is classified as rhinocerebral/sino-orbital, pulmonary, cutaneous, gastrointestinal, and disseminated.

In present study Diminished vision, Orbital swelling, Facial swelling, Proptosis, Ophthalmoplegia, Bloody nasal discharge, Nasal crusting and Eschar over the palate are common features seen in all patients with mucormycosis. Nasal or palatal black eschar clinches the diagnosis in multi-centric case series by Dave et al.[8] Further, intracranial involvement occurs from invasion of superior orbital fissure, ophthalmic vessels and cribriform plate.

In most of the cases sudden loss of vision is due to cavernous sinus thrombosis. The septic thrombus from the palate, paranasal sinuses, mastoid region, face and orbit spread along the superior and inferior ophthalmic veins, superior and inferior petrosalveins, mastoid emissary vein, pterygoid venous plexus which drain into the cavernous sinus. This septic thrombus subsequently traverse and spread along the central retinal vein and central retinal artery and its branches of eye and orbit ultimately leading to the spread of sepsis and blockage of blood supply to the optic disc and retina leading to sudden loss of vision.[9,10]

Oculomotor nerve, Trochlear nerve and Abdusent nerve traverse from the cavernous sinus gets infected and lead to their palsy leading to ophthalmoplegia, diplopia and neuroparalysis of lid leading to lagophthalmos subsequently causing exposure keratitis and finally fulminating corneal ulcer. Necrotic lesions from the palate, paranasal sinuses and face spread directly to the lids, paraorbital region, orbits and eye causing melting of the tissue mainly conjunctiva, sclera, cornea and other intraocular musculature leading to endophthalmitis and finally panophthalmitis.[11,12]

CONCLUSION

It is concluded that some patients developed irreversible sudden loss of vision mainly with CRVO / CRAO / Optic neuritis / Papillitis / Optic atrophy / Retinal or Choroidal detachment.

Some developed pre and post septal cellulitis, proptosis, ophthalmoplegia and exposure keratitis associated with corneal ulcer leading to gradual loss of vision. These above clinical features can be taken

ISSN (O): 2687-5365; ISSN (P): 2753-6556

as warning and alarming signs which if diagnosed early and if dealt promptly and appropriately by taking immediate measures vision can be saved and restored most of the patients. Knowledge of various presenting anterior and posterior segment manifestations of the disease as described in the present study will guide clinicians to recognize the disease early and make every effort to prevent complications.

REFERENCES

1. Khanna M, Challa S, Kabeil AS, Inyang B, Gondal FJ, Abah GA, Minnal Dhandapani M, Manne M, Mohammed L. Risk of Mucormycosis in Diabetes Mellitus: A Systematic Review. Cureus. 2021 Oct 16;13(10):e18827. doi: 10.7759/cureus.18827. PMID: 34804684; PMCID: PMC8592794.
2. Rammaert B, Lanternier F, Poirée S, Kania R, Lortholary O. Diabetes and mucormycosis: a complex interplay. Diabetes Metab. 2012 Jun;38(3):193-204.
3. Parshika Panwar, Anish Gupta, Amit Kumar , Bhavna Gupta, Shiv C Navriya, Mucormycosis in COVID Diabetic Patients: A Horrifying Triad!, Indian Journal of Critical Care Medicine, 2021: Volume 25 Issue 11.
4. Alanazi RF, Almalki A, Alkhaibary A, AlSufiani F, Aloraidi A. Rhino-Orbital-Cerebral Mucormycosis: A Rare Complication of Uncontrolled Diabetes. Case Rep Surg. 2022 Oct 5;2022:6535588.
5. Syeda Neelam Afroze, Rajani Korlepara, Guttikonda Venkateswara Rao, and Jayakiran Madala, Mucormycosis in a Diabetic Patient: A Case Report with an Insight into Its Pathophysiology, Contemp Clin Dent. 2017 Oct-Dec; 8(4): 662–666.
6. Dora E Corzo-León, Luis D Chora-Hernández, Ana P Rodríguez-Zulueta, Thomas J Walsh, Diabetes mellitus as the major risk factor for mucormycosis in Mexico: Epidemiology, diagnosis, and outcomes of reported cases, Medical Mycology, 2017Volume 56, Issue 1, January 2018, Pages 29–43,
7. Indraneel Sen Gupta, Tilak Nayak Coincidence or reality behind Mucormycosis, diabetes mellitus and Covid-19 association: A systematic review, Journal of Medical Mycology, 2022: Volume 32, Issue 3, August, 101257
8. Dave TV, Gopinathan Nair A, Hegde R, Vithalani N, Desai S, Adulkar N, et al. Clinical presentations, management and outcomes of rhino-orbital-cerebral mucormycosis (ROCM) following COVID-19:A multi-centric study. Ophthalmic Plast Reconstr Surg. 2021;37:488–95.
9. Rastogi, Ashu; Jude, Edward B, Diabetes, COVID-19 and Mucormycosis: Unanswered Questions, Indian Journal of Endocrinology and Metabolism 2021:25(3):p 191-192, May–June
10. Karat, Shubashree; Lobo, Aaron C1; Satish, Deepthi2 Devaraj, Rincy; Manjooran, Riya R; Nithyanandam, Suneetha, Uncontrolled diabetes mellitus exacerbated by COVID-19–induced inflammation is the risk factor for COVID-19–associated rhino-orbito-cerebral mucormycosis: A matched pair case–control study, Indian Journal of Ophthalmology 2022: 70(8):p 3096-3101
11. Banerjee M, Pal R, Bhadada SK. Intercepting the deadly trinity of mucormycosis, diabetes and COVID-19 in India. Postgrad Med J. 2022 Mar 1;98(e2):e108-e109.
12. Prakrut Paidisetty, Vaishali Nagose, Vikrant Vaze, Neha Mahajan, Shivanand Rathod, Changing Trend of Risk Factors of Mucormycosis Including Diabetes, Acidosis, and Serum Iron in the Second Wave of COVID-19 Indian Journal of Microbiology:2022: volume 62, pages 602–609 (2022)
13. Teny M. John, Ceena N. Jacob, Dimitrios P. Kontoyiannis, When Uncontrolled Diabetes Mellitus and Severe COVID-19 Converge: The Perfect Storm for Mucormycosis J. Fungi 2021, 7(4), 298.

ISSN (O): 2687-5365; ISSN (P): 2753-6556