

Efficacy of transcutaneous retrobulbar amphotericin B in post-COVID-19 rhino-orbito-cerebral mucormycosis: A single-center retrospective observational study.

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Page | 1

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Abstract

Background

Rhino-orbito-cerebral mucormycosis (ROCM) emerged as a severe opportunistic fungal infection during the post-COVID-19 period, particularly among patients with diabetes and those treated with corticosteroids. The angioinvasive nature of mucormycosis often limits the efficacy of systemic antifungal therapy due to poor tissue penetration. The present study aimed to evaluate the clinical outcome of transcutaneous retrobulbar amphotericin B (TRAMB) as an adjunctive, globe-sparing treatment in patients with post-COVID-19 ROCM.

Methods

A retrospective observational study was conducted on 40 biopsy-confirmed cases of post-COVID-19 ROCM admitted to the Government General Hospital, Nizamabad. Patients were categorized into four stages (3a–3d) according to the classification proposed by Honavar. All patients received retrobulbar injections of liposomal amphotericin B (3.5 mg/mL) in addition to systemic antifungal therapy and sinus debridement. Demographic characteristics, clinical features, and treatment responses were analyzed.

Results

The study population predominantly comprised males (82.5%) with a mean age of 54.6 years. The majority of patients were within the 40–60-year age group (55%) (Table 1, Table 2). Common presenting features included proptosis, extraocular muscle (EOM) restriction, and ptosis, which varied across disease stages (Table 3). Complete clinical recovery was achieved in all patients with early-stage disease (Stages 3a and 3b), whereas partial improvement was observed in Stage 3c, and minimal response in Stage 3d (Table 4). Two patients with advanced disease succumbed to cranial involvement.

Conclusion

TRAMB was found to be a safe, effective, and minimally invasive adjunct in managing mild-to-moderate orbital mucormycosis. Early administration improved ocular outcomes and prevented progression to irreversible orbital damage or exenteration.

Recommendations

Prompt diagnosis and early initiation of TRAMB therapy should be considered in patients with limited orbital involvement to maximize visual preservation. Incorporating TRAMB into multidisciplinary treatment protocols may enhance recovery and reduce morbidity in ROCM.

Keywords: Post-COVID-19 mucormycosis; Retrobulbar amphotericin B; Rhino-orbito-cerebral mucormycosis; Orbital involvement; Globe-sparing therapy

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Introduction

Mucormycosis, an aggressive and potentially fatal angioinvasive fungal infection, gained alarming prominence during the second wave of the COVID-19 pandemic in India. The disease, primarily caused by *Rhizopus* and *Mucor* species, predominantly affects immunocompromised individuals, particularly those with uncontrolled diabetes mellitus, corticosteroid exposure, or prolonged oxygen therapy, leading to high morbidity and mortality [1,6]. Post-COVID-19 rhino-orbito-cerebral mucormycosis (ROCM) thus emerged as a major clinical challenge because of its rapid progression and frequent orbital or intracranial extension [2,3]. The pathogenesis of ROCM involves vascular invasion, causing thrombosis and ischemic necrosis, which impede the delivery of systemic antifungal agents to infected tissues [1,4]. Conventional management typically combines systemic amphotericin B therapy and surgical debridement; however, systemic toxicity, delayed response, and irreversible vision loss remain major limitations [5,6]. In response, transcutaneous retrobulbar amphotericin B (TRAMB) has been introduced as a minimally invasive, targeted therapy that delivers high antifungal concentrations directly into the orbit, achieving better local control while minimizing systemic side effects. Recent studies have demonstrated that TRAMB, when used as an adjunct to systemic therapy, improves ocular outcomes and reduces the need for orbital exenteration in mild-to-moderate disease [1-5]. Clinical evidence from multicenter and retrospective analyses further supports TRAMB as a safe and effective globe-sparing intervention in the management of post-COVID-19 ROCM [2-4]. Given the increasing incidence of post-COVID-19 ROCM and the pressing need for targeted, cost-effective therapies, the present study was undertaken to evaluate the clinical outcome of transcutaneous retrobulbar amphotericin B (TRAMB) as an adjunctive, globe-sparing treatment in patients with post-COVID-19 ROCM.

Methodology

Study design and setting

This hospital-based, single-center retrospective observational study was conducted in the Department of Ophthalmology, Government General Hospital, Nizamabad, Telangana, a tertiary care teaching institution providing specialized multidisciplinary

care for rhino-orbito-cerebral mucormycosis. The study was conducted from January 2023 to March 2023. Medical records from May 2021 to December 2022 were retrospectively reviewed. The study included 40 biopsy- and KOH mount-confirmed cases of post-COVID-19 rhino-orbito-cerebral mucormycosis admitted during the pandemic period.

Study population and inclusion criteria

Patients of either sex, aged 20–80 years, who developed ROCM following recovery from COVID-19 infection and had radiologically or histopathologically confirmed orbital involvement were included. Cases with prior orbital exenteration, incomplete medical records, or coexisting fungal infections other than mucormycosis were excluded.

Staging and grouping

All patients were categorized into four stages (3a–3d) according to the staging system proposed by Honavar et al. (2021) based on clinical and radiological features of orbital involvement.

Stage 3a: Limited orbital involvement without vision loss

Stage 3b: Diffuse orbital disease with preserved vision

Stage 3c: Disease with loss of vision but limited intracranial extension

Stage 3d: Extensive orbital and cranial involvement

Intervention protocol (TRAMB administration)

All enrolled patients received transcutaneous retrobulbar amphotericin B (TRAMB) as adjunctive therapy along with systemic antifungal treatment and surgical debridement when indicated.

Drug preparation: A vial of liposomal amphotericin B (50 mg) was diluted with 10 mL of distilled water to achieve a concentration of 5 mg/mL. Subsequently, 0.7 mL of this solution was mixed with 0.3 mL of 5% dextrose to obtain a final concentration of 3.5 mg/mL.

Technique: Under aseptic precautions, 1 mL of the prepared solution (3.5 mg) was injected into the retrobulbar space using a 26-gauge, 1.5-inch needle, directed toward the region of orbital disease under local anesthesia. Gentle orbital pressure was applied post-injection to prevent compartmental pressure rise.

Data collection and outcome assessment

Demographic details, clinical features (proptosis, extraocular muscle restriction, and ptosis), and treatment outcomes were recorded. Patients were assessed for improvement in ocular movements, resolution of proptosis, visual acuity changes, and overall survival. The response to TRAMB was analyzed for each disease stage.

Page | 3

Statistical analysis

Data were compiled and expressed as frequencies and percentages. Results were tabulated (Tables 1–4) to summarize demographic distribution, clinical presentation, and therapeutic outcomes. Descriptive analysis was performed using Microsoft Excel.

Ethical considerations

Ethical approval was obtained from the Institutional Ethics Committee of Government General Hospital, Nizamabad, Telangana, before data collection.

Results

A total of 40 patients diagnosed with post-COVID-19 rhino-orbito-cerebral mucormycosis (ROCM) who underwent transcutaneous retrobulbar amphotericin B (TRAMB) therapy were included in this retrospective study. All patients were biopsy and KOH mount–confirmed cases, and their clinical profiles, staging, and treatment outcomes were systematically analyzed.

Participant flow

During the study period, all confirmed ROCM patients admitted to the tertiary care center were screened for eligibility. Of these, patients who met the inclusion criteria and had documented orbital involvement were enrolled. Those with incomplete data, previous exenteration, or non-mucormycotic fungal infections were excluded. Ultimately, 40 patients received TRAMB injections, and all completed the treatment course and follow-up. No patient was lost to follow-up, and data from all participants were included in the final analysis (Figure 1).

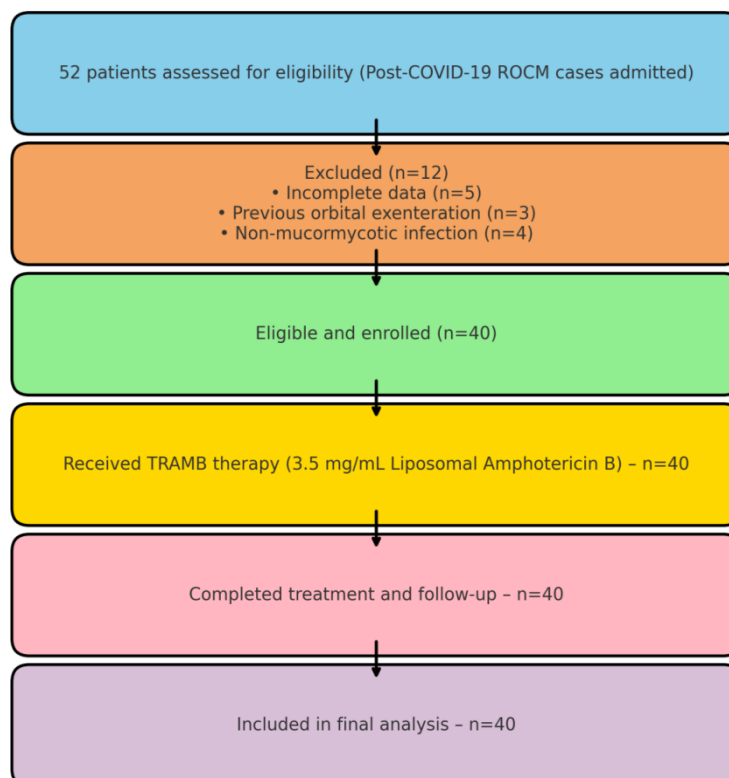


Figure 1: participant flow diagram

Demographic distribution

The age distribution of patients ranged between 20 and 80 years, with the majority (55%) belonging to

the 40–60-year age group, followed by 37.5% in the 60–80-year group and 7.5% between 20 and 40 years. This indicates that middle-aged and elderly individuals were predominantly affected (Table 1).

Table 1. Age-wise Distribution of ROCM Patients (n = 40)

Age Group (years)	Number of Patients	Percentage (%)
20–40	3	7.5
40–60	22	55.0
60–80	15	37.5
Total	40	100.0

A distinct male predominance was observed, accounting for 82.5% (33 cases), whereas females

constituted 17.5% (7 cases), suggesting higher susceptibility among men (Table 2).

Table 2. Sex-wise distribution of patients

Sex	Number of Patients	Percentage (%)
Male	33	82.5
Female	7	17.5
Total	40	100.0

Clinical presentation

Clinical manifestations varied according to the disease stage. The most common symptom complex observed was a combination of proptosis with extraocular muscle (EOM) restriction and ptosis, particularly among patients in Stage 3c (61.5%).

Patients in Stage 3a primarily presented with isolated proptosis (80%), while Stage 3b cases predominantly showed EOM restriction alone (66.6%). Severe forms with combined ocular involvement were mainly seen in Stages 3c and 3d, reflecting the progressive orbital invasion typical of advanced ROCM (Table 3).

Table 3. Distribution of clinical symptoms by stage of ROCM

Stage	Proptosis Only	EOM Restriction Only	Proptosis + EOM Restriction	Proptosis + EOM Restriction + Ptosis	Total Patients
3a	12 (80.0%)	2 (13.4%)	1 (6.6%)	0	15
3b	0	4 (66.6%)	2 (33.3%)	0	6
3c	1 (7.6%)	2 (15.3%)	2 (15.3%)	8 (61.5%)	13
3d	0	3 (75.0%)	1 (25.0%)	0	4
Total	13	11	6	8	40

Treatment outcome following TRAMB administration

All patients received 3.5 mg/ml of liposomal amphotericin B through the retrobulbar route under aseptic precautions. Remarkable clinical improvement was noted in early-stage disease. Stages 3a and 3b demonstrated complete recovery

(100%), with full resolution of proptosis and restoration of EOM function. In Stage 3c, proptosis improved in all patients, while partial EOM recovery was documented in 8 cases, and no recovery was seen in 5; two patients succumbed to intracranial extension of infection. Stage 3d showed only limited improvement, with partial recovery of ocular movements in two patients (Table 4).

Table 4. Treatment outcome following TRAMB administration

Stage	Clinical Response	Description of Improvement
3a	Complete recovery (100%)	Resolution of proptosis and ptosis in all patients.
3b	Complete recovery (100%)	Full recovery of proptosis and EOM movements.
3c	Partial improvement	Proptosis improved in all; mild EOM improvement in 8 cases; 5 showed no EOM recovery; 2 deaths due to cranial involvement.
3d	Limited response	Improvement in proptosis in 2 cases; mild EOM improvement in 2; no improvement in others.

Discussion

The present study adds to the growing evidence that transcutaneous retrobulbar amphotericin B (TRAMB) is an effective adjunct in the management of post-COVID-19 rhino-orbito-cerebral mucormycosis (ROCM). The predominance of middle-aged men with diabetes and prior corticosteroid exposure in this cohort indicates that mucormycosis developed mainly in a high-risk biological setting characterized by hyperglycemia, steroid-related immunosuppression, and persistent post-viral immune dysfunction, rather than as an isolated sequel of COVID-19 alone [10,12].

The therapeutic rationale for TRAMB is biologically plausible. ROCM is marked by angioinvasion, vascular thrombosis, and tissue necrosis, all of which reduce penetration of systemic antifungal agents into the infected orbital tissues. Retrobulbar delivery of liposomal amphotericin B helps achieve a higher local drug concentration, thereby improving fungal control at the site of disease while limiting systemic adverse effects [7,12].

The findings of the present study are in agreement with previous reports showing that TRAMB has meaningful globe-sparing potential, especially in early to moderate orbital disease. Improved ocular outcomes and reduced need for exenteration have been reported in patients with limited orbital involvement, supporting the role of TRAMB as a vision-preserving intervention when used promptly and in conjunction with systemic antifungal therapy and surgical debridement [3,4,11,13]. Published treatment algorithms have also suggested that selected patients treated with TRAMB can achieve outcomes comparable to more aggressive surgical approaches, particularly when intervention occurs before extensive orbital or intracranial spread [4,13]. In contrast, the limited response observed in advanced stages such as 3c and 3d is also consistent

with prior evidence. Once the disease extends to the orbital apex, cavernous sinus, or cranial cavity, local antifungal injection alone is unlikely to arrest progression because of widespread tissue infarction, extensive fungal invasion, and poor drug diffusion in necrotic areas [7,8]. These advanced cases, therefore, continue to carry a guarded prognosis despite multimodal treatment.

From a practical perspective, TRAMB represents an important shift toward targeted and organ-preserving therapy in ROCM. Its relative simplicity, local effectiveness, and utility in tertiary care settings make it an attractive adjunct, particularly in circumstances where early intervention can prevent disfiguring surgery and preserve useful vision [9,10]. Overall, the available evidence supports incorporation of TRAMB into standard ROCM management protocols as a safe, cost-effective, and globe-sparing adjunctive treatment, especially when administered early alongside systemic antifungals and functional endoscopic sinus surgery [7–14].

Generalizability

The findings of this study can be generalized to similar tertiary care settings managing post-COVID-19 ROCM, particularly in regions with high diabetes prevalence, where early-stage disease presentation and timely TRAMB administration can achieve comparable therapeutic and globe-sparing outcomes.

Conclusion

Transcutaneous retrobulbar amphotericin B (TRAMB) proved to be a safe, effective, and minimally invasive adjunct in managing post-COVID-19 rhino-orbito-cerebral mucormycosis (ROCM), especially in early and moderate stages. The procedure offered excellent local disease control, rapid symptomatic relief, and significant globe-

sparing benefits when combined with systemic antifungal therapy and sinus debridement. Advanced disease stages demonstrated limited improvement, emphasizing the importance of early intervention. TRAMB allows targeted drug delivery, minimizes systemic toxicity, and is practical in resource-limited settings. Early diagnosis, prompt initiation of therapy, and multidisciplinary collaboration remain crucial to improving outcomes and preventing irreversible orbital damage or the need for exenteration.

Limitations

The present study has certain limitations. Being a single-center retrospective analysis, it is constrained by a small sample size and lack of randomization, which may limit the strength of causal inference. The absence of long-term follow-up data prevented assessment of recurrence, visual acuity stability, and late complications. Radiological monitoring was not uniformly available for all patients.

Recommendations

Early recognition and prompt initiation of transcutaneous retrobulbar amphotericin B (TRAMB) should be strongly considered in all patients with post-COVID-19 rhino-orbito-cerebral mucormycosis presenting with mild-to-moderate orbital involvement. Incorporating TRAMB as a routine adjunctive therapy alongside systemic antifungal administration and timely surgical debridement can enhance treatment outcomes and preserve vision. Multidisciplinary coordination among ophthalmologists, otolaryngologists, and infectious disease specialists is essential for comprehensive management. Training programs for clinicians on TRAMB administration should be encouraged. Large-scale, prospective studies are recommended to refine dosing protocols, evaluate long-term outcomes, and develop uniform national guidelines for ROCM management.

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Ethics Committee for approving and supporting this research work.

Abbreviations

ROCM – Rhino-Orbito-Cerebral Mucormycosis
TRAMB – Transcutaneous Retrobulbar Amphotericin B
COVID-19 – Coronavirus Disease 2019
KOH – Potassium Hydroxide
EOM – Extraocular Muscle
FESS – Functional Endoscopic Sinus Surgery
L-AMB – Liposomal Amphotericin B
ICU – Intensive Care Unit
MRI – Magnetic Resonance Imaging
CT – Computed Tomography
DM – Diabetes Mellitus
OPD – Outpatient Department

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Conflict of interest

The authors declare no conflict of interest.

Author contributions

KD-Concept and design of the study, results interpretation, review of literature, and preparing the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript. PT-Concept and design of the study, results interpretation, review of literature, and preparing the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript. GN-Concept and design of the study, results interpretation, review of literature, and preparing the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript.

Data availability: Data available on request

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References

1. Sinha S, Kumar VB, Kumar A, Singh V, Anand A, Kusumesh R, et al. Outcomes of transcutaneous retrobulbar amphotericin B in rhino-orbital-cerebral mucormycosis among patients recovering from COVID-19: a preliminary experience. *Cureus*. 2022;14(8):e27817. doi:10.7759/cureus.27817. PMID: 36106303.
2. Shakrawal J, Sharma V, Goyal A, Kumar D, Meena S, Tiwari S, et al. Outcomes of transcutaneous retrobulbar amphotericin B (TRAMB) as an adjuvant therapy for rhino-orbital-cerebral mucormycosis (ROCM) following COVID-19. *Int Ophthalmol*. 2023;43(6):1919-1926. <https://doi.org/10.1007/s10792-022-02591-0> PMID:36427099 PMCid:PMC9702621
3. Kaur R, Sehgal A, Gupta P, Budhiraja G, Sharma V, Aggarwal A. To determine the role of transcutaneous retrobulbar amphotericin B in COVID-19-related rhino-orbital-cerebral mucormycosis. *Oman J Ophthalmol*. 2024;17(2):198-204. https://doi.org/10.4103/ojo.ojo_19_23 PMID:39132108 PMCid:PMC11309535
4. Dallalzadeh LO, Ediriwickrema LS, Fung SE, Men CJ, Kossler AL, Kupcha AC, et al. Transcutaneous retrobulbar amphotericin B for rhino-orbital-cerebral mucormycosis: a multi-center retrospective comparative study. *Orbit*. 2024;43(1):41-48. <https://doi.org/10.1080/01676830.2023.2186435> PMID:36880205
5. Rizvi SWA, Khan S, Shahbaz M, Gounder MS, Saif M, Khalid S, et al. Long-term outcomes of transcutaneous retrobulbar amphotericin B in COVID-19-associated mucormycosis. *Indian J Ophthalmol*. 2023;71(2):452-456. https://doi.org/10.4103/ijo.IJO_1382_22 PMID:36727338 PMCid:PMC10228905
6. Choksi T, Agrawal A, Date P, Rathod D, Gharat A, Ingole A, et al. Cumulative mortality and factors associated with outcomes of mucormycosis after COVID-19 at a multispecialty tertiary care center in India. *JAMA Ophthalmol*. 2022;140(1):66-72. <https://doi.org/10.1001/jamaophthalmol.2021.5201> PMID:34882192 PMCid:PMC8662533
7. Zia Z, Sajadi MJ, Bazrafshan H, Khademi B, Janipour M. Survival and prognostic factors in rhino-orbital-cerebral mucormycosis: a 3-year cohort study. *Sci Rep*. 2025;15(1):16088. <https://doi.org/10.1038/s41598-025-98926-9> PMID:40341683 PMCid:PMC12062481
8. Chakraborty S, Satty SR, Sahu BK, Ray S. Resurgence of orbital mucormycosis during the COVID-19 pandemic: study from a tertiary care center in Eastern India. *Taiwan J Ophthalmol*. 2024;14(2):256-261. <https://doi.org/10.4103/tjo.TJO-D-23-00110> PMCid:PMC11253996
9. Wagner RT, Berardinelli J, Fukui MB, Khalili S, Mundi NS, Kassam AB, et al. Preoperative administration of amphotericin B in orbital mucormycosis management: a case report. *J Neurol Surg Rep*. 2025;86(2):e72-e76. <https://doi.org/10.1055/a-2558-6468> PMID:40276688 PMCid:PMC12020544
10. Vadivel S, Gowrishankar M, Vetrivel K, Sujatha B, Navaneethan P. Rhino-orbital-cerebral mucormycosis in COVID-19 crisis. *Indian J Otolaryngol Head Neck Surg*. 2023;75(Suppl 1):1014-1020. <https://doi.org/10.1007/s12070-023-03474-1> PMID:36855632 PMCid:PMC9948777



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11. Yadav R, Madan S, Rohatgi J, Ansari A, Sharma R, Gautam P, et al. Retrospective analysis of the role of retrobulbar amphotericin-B injection in the management of COVID-19-associated rhino-orbito-cerebral mucormycosis. *Pan Afr Med J.* 2022;42:312. <https://doi.org/10.11604/pamj.2022.42.312.34757>

PMid:36451988 PMCID:PMC9664513

12. Honavar SG. Code Mucor: guidelines for the diagnosis, staging, and management of rhino-orbito-cerebral mucormycosis in the setting of COVID-19. *Indian J Ophthalmol.* 2021;69(6):1361-1365.

https://doi.org/10.4103/ijo.IJO_1165_21

PMid:34011699 PMCID:PMC8302268

13. Ashraf DC, Idowu OO, Hirabayashi KE, Kalin-Hajdu E, Grob SR, Winn BJ, et al. Outcomes of a modified treatment ladder algorithm using retrobulbar amphotericin B for invasive fungal rhino-orbital sinusitis. *Am J Ophthalmol.* 2021;230:1-10. <https://doi.org/10.1016/j.ajo.2021.05.025>

PMid:34116011

14. Nair AG. Commentary: Data and COVID-19-associated mucormycosis: time to pause and reassess? *Indian J Ophthalmol.* 2022;70(3):1024-1025.

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Page | 8

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