



Case Report

Serial MRI Findings Over Four Years in a Patient with Suspected Rhino-Orbital Mucormycosis Managed with Standalone Ayurveda Treatment: A Case Report

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ABSTRACT:

Background: Rhino-orbital mucormycosis is a potentially life-threatening invasive fungal infection that gained increased clinical significance during the COVID-19 pandemic. This case report describes the clinical and radiologic course of a possible case of post-COVID rhino-orbital mucormycosis managed with standalone Ayurvedic therapy. **Clinical findings:** A 60-year-old male from Surat, Gujarat, presented with right eye pain, heaviness, minimal ptosis, right-sided nasal obstruction, facial numbness, mild right facial swelling, toothache, and mobility of the upper right teeth for 7 days. He had a history of COVID-19 infection 3 weeks earlier and no known history of diabetes mellitus or hypertension. MRI of the brain, orbits, and paranasal sinuses performed on 15 May 2021 showed findings suggestive of invasive fungal sinus pathology within the mucormycosis spectrum, with early orbital extension. **Intervention:** The patient received a 6-month standalone Ayurvedic treatment protocol based on kledahara, krimihara, and enhancement of vyadhikshamatva. Adherence to the prescribed treatment and dietary recommendations was satisfactory. The interventions were well tolerated, with no reported treatment-related adverse events. **Outcome:** Symptoms gradually resolved completely. At 4-year follow-up, the patient remained asymptomatic. Follow-up MRI findings suggested healing, with no clinical evidence of disease recurrence, with residual chronic osteomyelitic changes. **Conclusion:** This case documents the long-term clinical and radiological course of a possible rhino-orbital mucormycosis case following standalone Ayurveda therapy. While the observed clinical improvement and absence of recurrence over 4 years are noteworthy, causality cannot be established from a single case. Further prospective clinical and mechanistic studies are required to evaluate the potential role of Ayurveda in selected cases.

KEYWORDS: Ayurveda, Case Report, COVID-19, Mucormycosis, Orbital Diseases, Rhino-Orbital Mucormycosis, Sinusitis.

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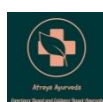
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1. INTRODUCTION

Mucormycosis is an opportunistic fungal infection caused by molds belonging to the order Mucorales, Rhino-orbital mucormycosis is a common clinical presentation and is often a life-threatening condition characterized by tissue necrosis. [1] These fungi can cause severe disease in immunocompromised patients. [2] Clinically, mucormycosis can manifest in different forms such as rhino-orbito-cerebral, pulmonary, cutaneous, gastrointestinal, and disseminated types. [3] India has reported a relatively high burden of mucormycosis. During the COVID-19 pandemic, the reported incidence of COVID-19-associated mucormycosis (CAM) in India between September 2020 and June 2021 ranged from 0.27% to 3.36%, depending on the study population and diagnostic criteria, among hospitalized and microbiologically confirmed COVID-19 patients. [4] The standard treatment approach includes systemic antifungal therapy with drugs like liposomal amphotericin B, posaconazole, or isavuconazole, along with aggressive surgical debridement. Although these treatments are effective, they are associated with several challenges, including nephrotoxicity, high treatment cost, antifungal resistance, and sometimes disfiguring surgical procedures such as orbital exenteration.

Ayurveda describes several therapeutic principles that may be useful in the management of such infections. These include the use of *krimihara* (antimicrobial), *kledahara* (agents that reduce pathological moisture and congestion), and *rasayana* (immunomodulatory and rejuvenative) therapies. In addition, certain external treatment procedures are also described, may support recovery by promoting local tissue health and supporting host immune function. Despite these theoretical benefits, there is limited scientific documentation regarding the effectiveness of standalone Ayurvedic management in confirmed cases of rhino-orbito-cerebral mucormycosis.

The present case report describes the sequential changes observed in MRI findings over a period of four years in a patient who possibly developed rhino-orbital mucormycosis

following COVID-19 infection [5]. The patient was managed exclusively with Ayurvedic treatment and did not receive standard biomedical treatment.

The uniqueness of this case report is that, to the best of the authors' knowledge, this may be the first reported case of possible rhino-orbital mucormycosis managed with standalone Ayurvedic therapy and followed for four years.

2. CASE REPORT

Patient Information: A 60-year-old male patient presented with symptoms that had developed over the past 7 days. The symptoms included right eye pain, heaviness and minimal ptosis, right side nasal blockage, right facial numbness, and mild swelling over the right side of the face, teeth ache, and mobility of the upper right teeth. He had a history of COVID-19, 3 weeks before the consultation.

The family history was unremarkable. The patient had no known history of diabetes mellitus or hypertension.

Clinical findings: Modern Clinical Examination

The relevant clinical findings at presentation were:

General: 60-year-old male.

Ocular: Right eye pain and heaviness with minimal right ptosis.

Nasal: right-sided nasal obstruction.

Neurological: Right facial numbness.

Facial: Mild right-sided facial swelling.

Dental: toothache and mobility of the upper right teeth.

Relevant history: COVID-19 infection approximately three weeks before consultation.

Diagnostic Assessment: MRI of the brain, orbits, and paranasal sinuses (PNS), performed on 15/05/2021, revealed invasive sinonasal pathology considered likely fungal in origin, within the mucormycosis spectrum, with early orbital extension ([Fig. 1](#)). The diagnosis was considered possible rather than microbiologically or histopathologically confirmed because definitive tissue-based confirmation was not available. The patient declined the proposed surgical treatment and choose standalone Ayurvedic management after providing informed consent.

Table 1: Timeline

Date	Event
April 2021	COVID-19 infection
May 2021	right eye pain, heaviness and minimal ptosis, right-sided nasal obstruction, right facial numbness, and mild swelling over the right side of the face, toothache and mobility of the upper right teeth for 7 days
15 May 2021	MRI PNS Orbit Brain on 15/05/2021 – (Fig. 1)
May- Nov 2021	Ayurveda treatments given (Table no.3)
July 2021	MRI PNS Orbit Brain on 15/07/2021 (Fig.2)
15 August 2021	Further clinical improvement documented
15 September 2021	Further clinical improvement documented
05 October 2021	Near-complete to complete resolution of the major presenting symptoms
05 November 2021	Completion of the documented treatment period; facial numbness had resolved and dental symptoms had substantially improved
September 2025	MRI PNS Orbit, Brain on 12/09/2025 – (Fig.3)

*This table presents the timeline of overall clinical course

Table 2: Differential diagnosis

Differential diagnosis	Findings supporting inclusion	Findings supporting exclusion / making it less likely
Bacterial osteomyelitis	Facial pain, swelling, dental symptoms, and maxillary involvement	MRI showed extensive invasive sinonasal disease with extrasinus extension into the premaxillary soft tissue, lower eyelid, and retro-orbital fat, making isolated bacterial osteomyelitis less likely.
Odontogenic sinusitis	Toothache and mobility of upper right teeth	No clinical or radiological evidence of a primary dental source; multisinus involvement with extrasinus extension was atypical for isolated odontogenic sinusitis.
Chronic invasive aspergillosis	Invasive fungal sinonasal disease may occur with Aspergillus infection.	Acute symptom progression, recent COVID-19 infection, MRI findings, and early orbital extension made this less likely as the working diagnosis.
Possible rhino-orbital mucormycosis	Recent COVID-19 infection, rapidly progressive symptoms, invasive fungal-appearing sinonasal disease, and orbital extension	Definitive microbiological or histopathological confirmation was unavailable; therefore, the diagnosis was retained as a possibility.

Diagnostic challenges: Establishing the diagnosis during the COVID-19 pandemic was challenging because of restricted access to healthcare facilities and limited availability of diagnostic investigations.

Ayurvedic intervention: The treatment approach aimed to reduce *kleda*, clear *srotas*, eliminate *krimi*, and normalize *vata*. A multimodal Ayurvedic regimen incorporating oral and intranasal formulations, *dhūma nasya*, and dietary and lifestyle modifications was prescribed [Table 2]. Dietary recommendations emphasized *Kapha*-balancing and Agni-supportive measures to support digestion and physiological

balance. Follow-up consultations were scheduled every 15 days to assess clinical progress and guide ongoing management.

Follow-up and outcomes: During treatment, symptoms progressively improved, with facial swelling resolving by the second follow-up and near-complete to complete resolution of presenting complaints by the sixth follow-up (Table 4). MRI on 15 July 2021 showed persistent right maxillary sinus disease, orbital cellulitis, minimal proptosis, and bony erosions involving the right orbital floor, maxillary sinus walls, alveolar process, and anterior hard palate; A

fungal infectious etiology was recognized, and a favorable outcome remained suspected (Fig. 2). At four-year follow-up (September 2025), the patient remained asymptomatic without clinical recurrence. MRI on 12 September 2025 showed right maxillary, ethmoid, and sphenoid sinusitis,

with persistent bony erosions and a loose bony fragment/sequestrum involving the right maxillary alveolar process and anterior hard palate, suggestive of chronic osteomyelitis (Fig. 3).

Table 3. Treatment and dietary recommendations

No.	Medicine / Intervention	Manufacturer / Manufacturing Licence No.	Particulars	Dose	Duration (From-To)	Rationale
1	Brihat Vata Chintamani Rasa (Oral)	Shree Dhootpapeshwar Ltd.; AYU-150	Herbo-mineral formulation containing purified Rasa (purified mercury), Gandhaka (purified sulfur), and Abhraka Bhasma (calcined mica).	1 tablet twice daily	15-05-2021 to 05-11-2021 (175 days)	Used considering its indication in diseases of <i>Vata dosha</i> .
2	Krumikuthara Rasa (Oral)	Dhanvantari Herb; GA-428	Herbo-mineral formulation containing Kajjali (black sulfide of mercury) and Tankana Bhasma (borax).	1 tablet three times daily	15-05-2021 to 15-08-2021 (93 days)	Used considering its indication in <i>Krimi roga</i> .
3	Krumighna Vatika (Oral)	Nagarjuna Herbal Concentrates Pvt. Ltd.; 69/25-D/88	Herbal formulation containing Vidanga (Embelia ribes), Ajamoda, and Haritaki (Terminalia chebula).	1 tablet three times daily	15-05-2021 to 15-09-2021 (124 days)	Used considering its indication in <i>Krimi roga</i> .
4	Serenkottai Nei Capsule (Intranasal)	SKM Siddha & Ayurveda Company Pvt. Ltd.; 739	Herbal combination containing Shuddha Bhallataka (Semecarpus anacardium), milk, and ghee.	1 capsule three times daily as nasal drops; half capsule instilled into each nostril	15-05-2021 to 05-11-2021 (175 days)	Used considering its indication in <i>Kapha vyadhi</i> .
5	Boniheal Tablet (Oral)	AIMIL Pharmaceuticals (India) Pvt. Ltd.; HP-15/Ay	Ayurvedic proprietary formulation. Contains mainly Godanti Bhasam (Classical Ayurvedic Preparation, Prcd.) –, Jahar Mohra Pishti (Classical Ayurvedic Preparation, Prcd.) –, Shalaki (Boswellia serrata, Exd.) –, Mukta Shukti Bhasam (Classical Ayurvedic Preparation, Prcd.) –, Sudh Laksha (Laccifera lacca purified, Secretion and so on.	1 tablet twice daily	10-06-2021 to 05-11-2021 (149 days)	Used to support bony tissue.
6	Vidanga Choorna (Oral)	Not Applicable	Herbal powder containing Vidanga (Embelia ribes).	As prescribed; incorporated with food and taken with water	15-05-2021 to 30-07-2021 (77 days)	Used considering its traditional indication in <i>Krimi roga</i> .
7	Palasha Choorna +	Not Applicable	Palasha (Butea monosperma) 400 g + Bhallataka (Semecarpus anacardium)	Mixture used for medicated	15-05-2021 to 05-10-2021	Combination used considering

	Bhallataka Choorna + Vilwadi Gulika + Vidanga Choorna (Intranasal fumigation)		50 g + Vilwadi Gulika 100 tablets + Vidanga (Embelia ribes) 100 g.	fumigation; smoke inhaled/exhaled morning and evening	(144 days)	the traditional indications of the individual components.
8	Vranaphari Rasa (Oral)	Shri Jwala Ayurved Bhavan; 15/1977	Herbo-mineral formulation containing purified Rasa (purified mercury), Gandhaka (purified sulfur), Hartal (purified arsenic trisulfide), Manashila (purified arsenic disulfide), and Guggulu (Commiphora wightii).	1 tablet twice daily	25-06-2021 to 05-10-2021 (103 days)	Used considering its <i>Shothahara</i> and <i>Vranaropana</i> indications.
9	Pathya/Apathya (diet and lifestyle recommendations)		Recommended (Pathya): Easily digestible, Kapha- reducing foods, including garlic, red rice, cooked raw banana, pointed gourd, bitter neem leaves, bitter gourd, betel leaf, honey, camel milk, carom seeds, and barley. To be avoided (Apathya): Milk and dairy products, ghee, jaggery, fruits and fruit juices, black gram, leafy greens, sweet or sour foods, raw and fermented foods, refined wheat preparations, sugary drinks, and other heavy or Kapha-increasing foods.		15 May 2021,	<i>Kapha</i> balance and <i>Agni</i> support.

Table 4. Clinical response during treatment and follow-up

15 May 2021	First visit with right eye pain, heaviness and minimal ptosis, right-sided nasal obstruction, right facial numbness, and mild swelling over the right side of the face, toothache, and mobility of the upper right teeth- 7 days
28 May 2021	right eye pain, heaviness and minimal ptosis- 10% improvement right-sided nasal obstruction- 20 % improvement right facial numbness- 20 % improvement mild swelling over the right side of the face-80 % improvement toothache, and mobility of the upper right teeth- Unchanged
28 June 2021	right eye pain, heaviness and minimal ptosis- 50 % improvement right-sided nasal obstruction- 70 % improvement right facial numbness- 30 % improvement mild swelling over the right side of the face-100 % improvement toothache, and mobility of the upper right teeth- 30 % improvement
15 Aug 2021	right eye pain, heaviness and minimal ptosis- 70 % improvement right-sided nasal obstruction- 90 % improvement right facial numbness- 50 % improvement toothache, and mobility of the upper right teeth- 50 % improvement
15 Sept 2021	right eye pain, heaviness and minimal ptosis- 90% improvement right-sided nasal obstruction- 100 improvement right facial numbness- 80% improvement toothache, and mobility of the

	upper right teeth- 70 % improvement
5 Oct 2021	right eye pain, heaviness and minimal ptosis- 100 % improvement right facial numbness- 90 % improvement toothache, and mobility of the upper right teeth- 70 % improvement
5 Nov 2021	right facial numbness- 100 % improvement toothache, and mobility of the upper right teeth- 80% improvement
12 Sept 2025	No clinical symptoms reported

Treatment adherence, including compliance with prescribed interventions and dietary recommendations, was assessed through patient self-report and considered satisfactory. Treatment tolerance and potential adverse events were

assessed during documented follow-up consultations. The prescribed interventions were reported to be well tolerated, with no treatment-related adverse events reported or documented during the treatment period

3. RESULTS

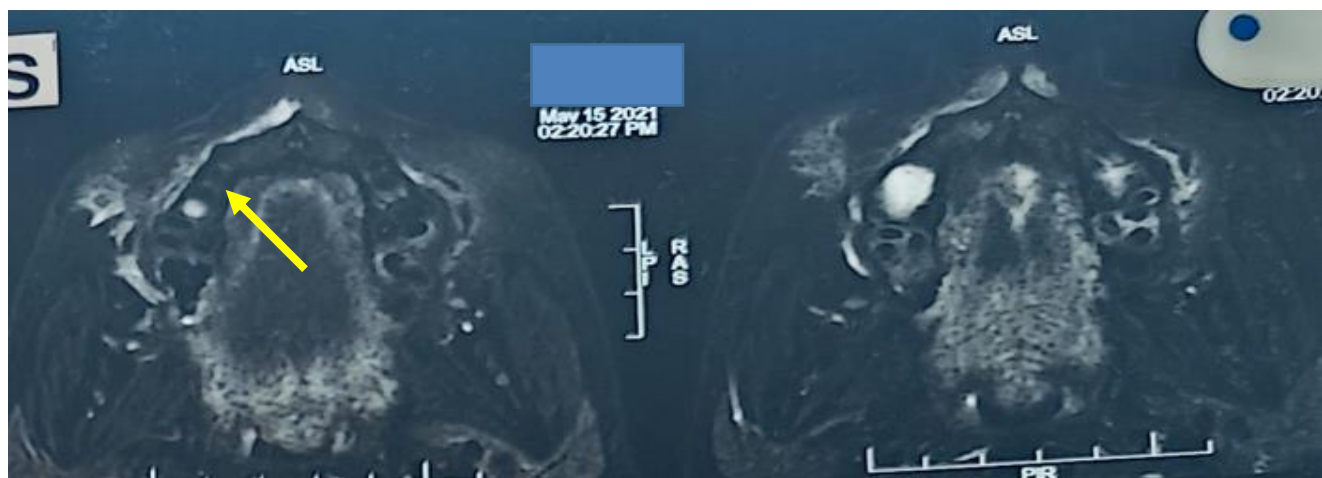


Figure 1A. MRI obtained on May 15, 2021, showing the right anterior maxillary alveolar process and hard palate. No significant abnormal signal intensity is evident in the right anterior maxillary alveolar process (yellow arrow).

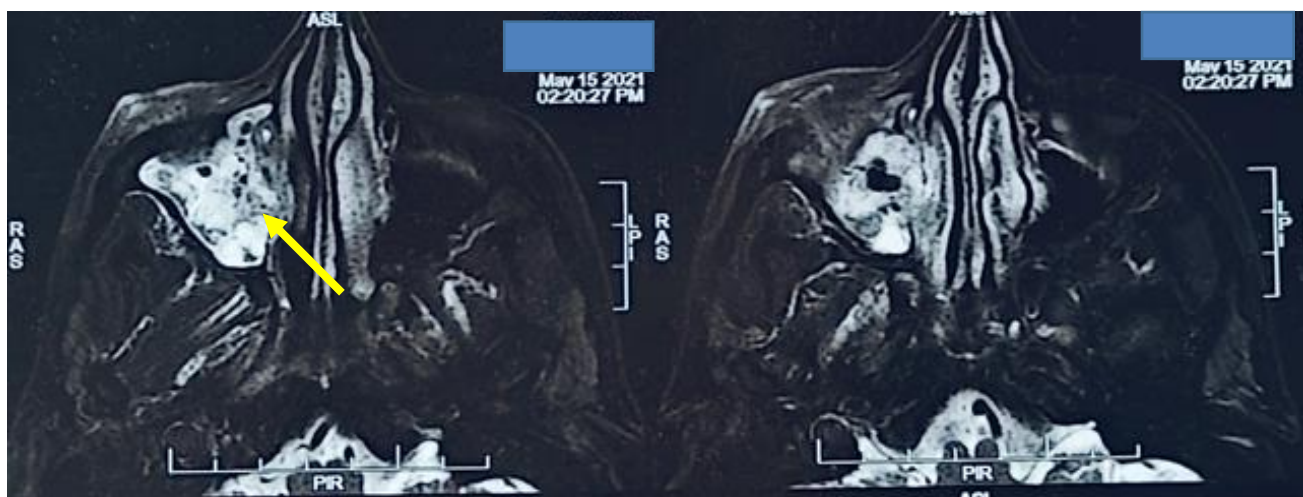


Figure 1B. MRI obtained on May 15, 2021, showing the medial wall of the right maxillary sinus, the ostiomeatal complex, and the right middle turbinate. Ill-defined T2-weighted hyperintense signal with small T2-weighted hypointense foci involves the medial wall of the maxillary sinus and adjacent right middle turbinate (yellow arrow), suggesting acute fungal sinusitis.

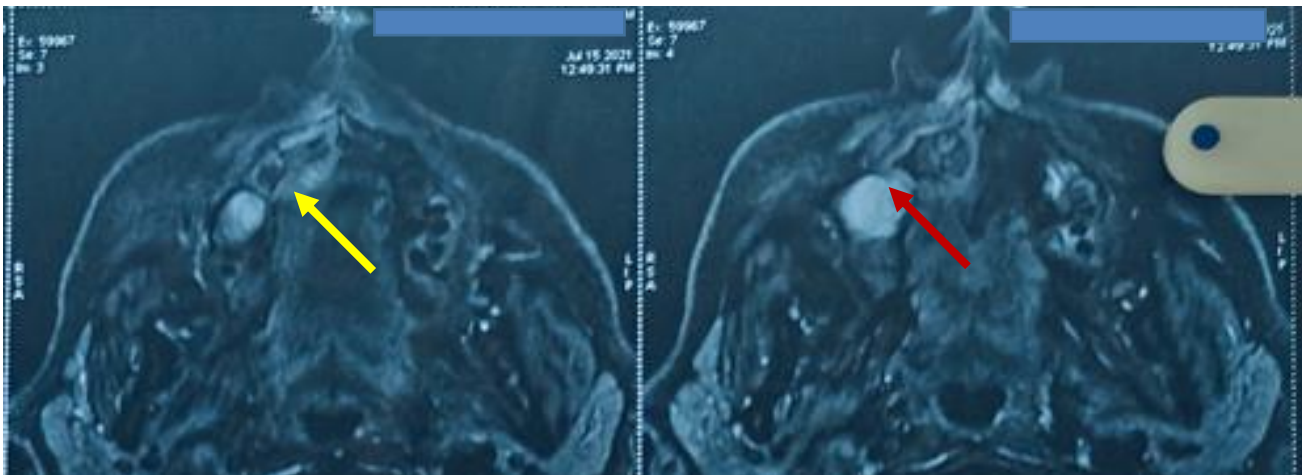


Figure 2A. MRI obtained on July 15, 2021, showing the right anterior maxillary alveolar process and adjacent hard palate. Ill-defined T2-weighted hyperintense periosseous soft tissue containing T2-weighted hypointense osseous fragments involves the right anterior maxillary alveolar process (yellow arrow) and adjacent hard palate (red arrow), suggesting an infectious process, possibly of fungal origin.

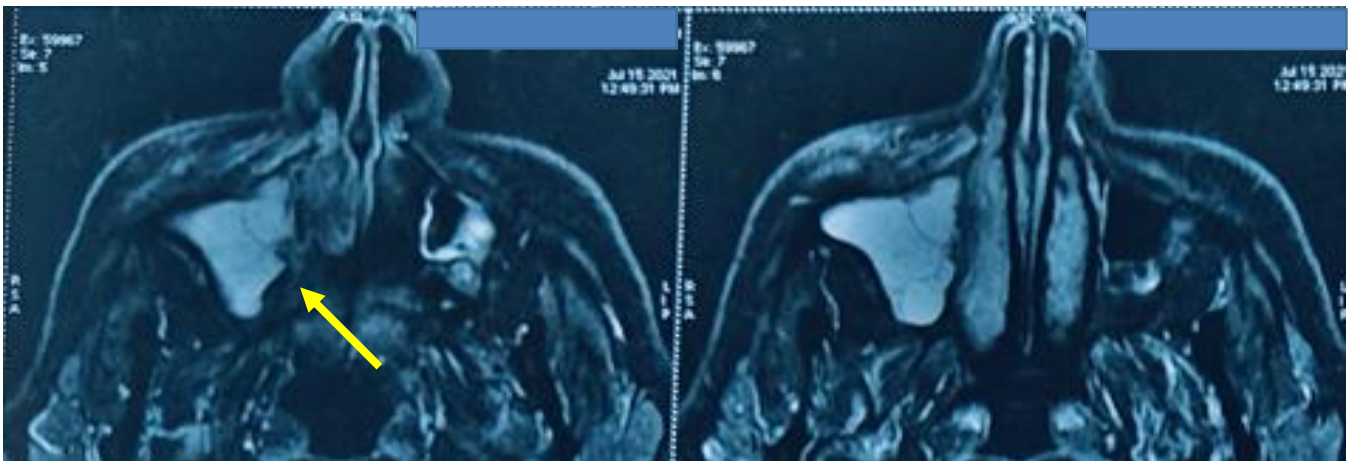


Figure 2B. MRI obtained on July 15, 2021, showing interval regression of the previously observed abnormal soft-tissue signal involving the medial wall of the right maxillary sinus and adjacent right middle turbinate (yellow arrow), suggesting a partial radiologic response.

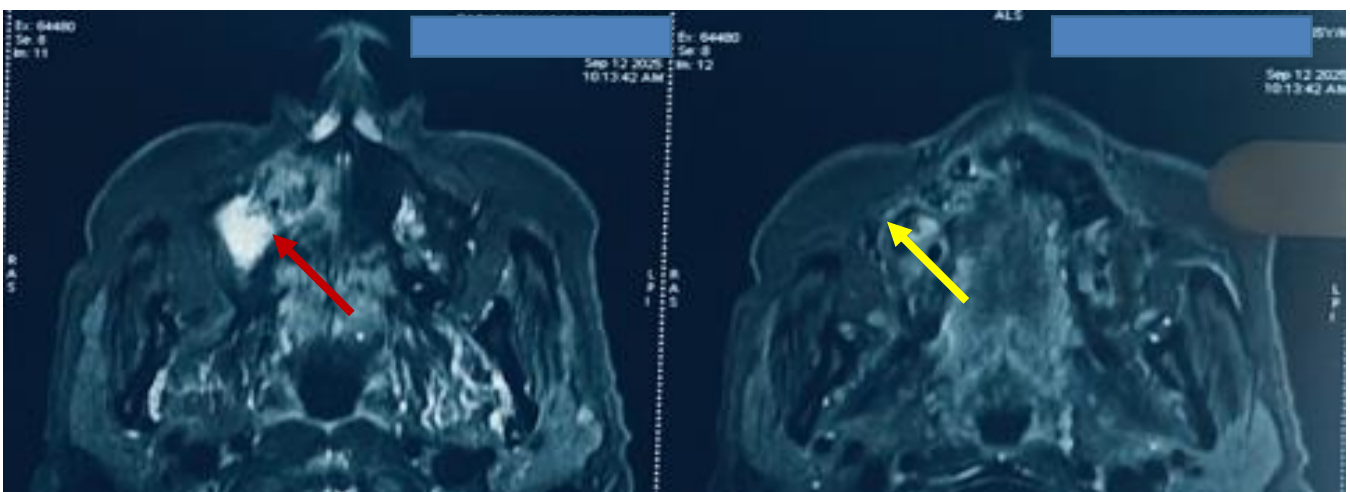


Figure 3A. MRI obtained on September 12, 2025, showing the medial wall of the right maxillary sinus, the ostiomeatal complex, and the right middle turbinate. Mild interval regression of the paraosseous soft tissue is observed, with a small sequestrum involving the right anterior maxillary alveolar process (yellow arrow) and adjacent anterior hard palate (red arrow), suggesting chronic osteomyelitis."

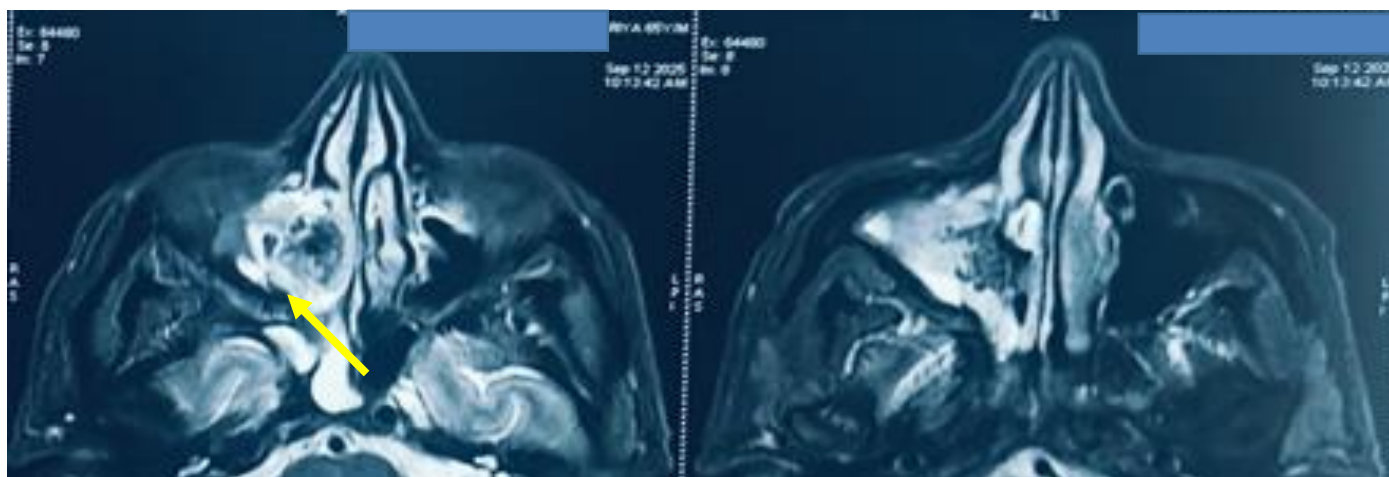


Figure 3B. MRI obtained on September 12, 2025, showing ill-defined small hypointense fragments intermixed with T2-weighted hyperintense mucosal thickening involving the ostiomeatal complex and right middle turbinate (yellow arrow). These findings suggest chronic inflammatory changes with osseous fragmentation.

4. DISCUSSION

This case describes the Ayurvedic management of a patient with a working diagnosis of possible rhino-orbital mucormycosis, established through clinical presentation and radiological findings. The discussion examines the diagnostic uncertainties, treatment rationale, and interpretation of clinical and radiological outcomes in the context of the available evidence [Tables 1–4; Figures 1–3]. Mucormycosis is a serious opportunistic fungal infection associated with immunosuppression, poorly controlled diabetes mellitus, and corticosteroid use. During the post-COVID period, its incidence increased substantially, with diabetes reported in 54%–76% of affected patients. [6] Radiological findings may include sinus opacification, bony erosion, orbital involvement, and intracranial extension. In this case, imaging demonstrated right-sided pansinusitis, orbital cellulitis, and erosive changes involving the paranasal sinus bones, maxilla, and hard palate, raising suspicion of invasive rhino-orbital mucormycosis (Fig. 1). Definitive diagnosis generally requires demonstration of fungal elements by microscopy or histopathology, supported by culture where possible. Rhino-orbital mucormycosis can spread through angioinvasion, causing vascular thrombosis and tissue necrosis. Infection typically begins in the nasal cavity or paranasal sinuses and may extend to the orbit, palate, cavernous sinus, or intracranial

structures. Clinical manifestations include facial pain or numbness, periorbital swelling, proptosis, visual disturbances, and ophthalmoplegia. [7]

Conventional management of mucormycosis generally involves systemic antifungal therapy, particularly liposomal amphotericin B, alongside surgical debridement when indicated. The angioinvasive nature of the infection can cause tissue necrosis and vascular thrombosis, complicating treatment and limiting drug penetration into affected tissues. Several studies and clinical reports suggest that better survival outcomes are achieved when antifungal therapy is combined with prompt and extensive surgical debridement. However, in some contexts, mucormycosis may progress despite treatments, and aggressive surgical procedures may result in significant impairments. [8] These observations emphasize that antifungal therapy like liposomal amphotericin B at a dose of approximately 5 mg/kg/day is commonly recommended. [9] In this case, no clinical adverse effects were reported during the four-year follow-up. This case explores the use of Ayurvedic formulations, including Brihat Vata Chintamani Rasa, Krumikutara Rasa, and Krumighna Vatika, in a patient with possible rhino-orbital mucormycosis (Table 3). Traditionally, these formulations are used for conditions associated with aggravated *Vata* and *Kapha* and disorders attributed to *krimi*.

Brihat Vata Chintamani Rasa is traditionally indicated for Vata-predominant disorders with systemic debility. Experimental research has reported immunomodulatory and antioxidant activities associated with *Swarna Bhasma*, which is one of the major ingredients of Brihat Vata Chintamani. However, their relevance to mucormycosis remains unestablished. [10,11] Krumikutara Rasa is traditionally used for conditions attributed to *krimi*, while Krumighna Vatika contains ingredients such as Vidanga (*Embelia ribes*), traditionally recognized for anthelmintic applications. Some studies have investigated antimicrobial or antifungal properties of individual ingredients like vidanga (*Embelia ribes*), shunti (*Zingiber officinale*), ajamoda (*Trachyspermum roxburghianum*); however, these findings cannot establish the efficacy of the complete formulations against Mucorales. [12–17]

Asthiposhak Vati was administered in the context of bone erosion; however, evidence supporting its effectiveness in infection-associated bone damage remains insufficient. [18] The treatment also included *dhoopana* using Bhallataka (*Semecarpus anacardium*), Palasha (*Butea monosperma*), Vidanga, and Vilwadi Gutika. In Ayurveda, *dhoopana* is traditionally described for *rakshoghna* (disinfection), *krimighna* (antimicrobial), and *shodhana* (cleansing) purposes. Classical texts, including the Sushruta Samhita, describe its application in managing *dushta vrana* (chronic or infected wounds). [19] These traditional indications and preliminary pharmacological findings provide a rationale for further investigation but do not establish antifungal efficacy, mechanism of action, or clinical effectiveness against mucormycosis.

An earlier case report described a favorable clinical course following a similar Ayurvedic treatment approach in a patient with confirmed mucormycosis, with a three-year follow-up. [20] In the present case, the diagnosis remained possible mucormycosis, with four-year follow-up showing no documented clinical recurrence. However, these observations cannot establish treatment efficacy,

comparative safety, or the suitability of Ayurveda as an alternative to standard care.

5. CONCLUSION

This case describes a patient with possible post-COVID rhino-orbital mucormycosis who received approximately six months of standalone Ayurvedic management, comprising *Shamana Chikitsa*, local medicated fumigation, and *Pathya–Apathya* measures. Progressive clinical improvement was observed, with resolution of the presenting symptoms and no documented clinical recurrence over four years. Although follow-up MRI showed residual sinus and bony abnormalities suggestive of chronic osteomyelitis, no treatment-related adverse effects were reported. Given the absence of histopathological confirmation and limitations in laboratory documentation, these findings are hypothesis-generating and do not establish treatment efficacy or comparative safety.

Key Message: Stand-alone Ayurvedic management was associated with clinical improvement and no documented clinical recurrence over four years in a patient with possible rhino-orbital mucormycosis. The findings require cautious interpretation because definitive diagnostic confirmation and systematic safety documentation were lacking.

Limitations: This case report has important limitations. First, the diagnosis was based primarily on the clinical presentation and radiologic findings, without histopathologic confirmation. Second, baseline and serial laboratory investigations, including liver and renal function tests, were incompletely documented, limiting objective assessment of treatment safety.

Declaration of Patient Consent – The authors confirm that they have acquired a patient consent form, in which the patient or caregiver has granted permission for the publication of the case, including accompanying images and other clinical details, in the journal. The patient or caregiver acknowledges that their name and initials will not be disclosed, and sincere attempts will be undertaken to safeguard their identity. However, complete anonymity cannot be assured.

Patient perspective - I was going through a very difficult period in my life when I was diagnosed with a severe fungal infection involving the area around my nose and eyes. I was afraid after coming to know about the seriousness of mucormycosis and its possible complications. I choose

Ayurveda treatment due to personal reasons and fear of surgical procedures. During the treatment I had a gradual relief of my symptoms. The doctors explained the treatment procedures and medicines patiently which gave me confidence and emotional support throughout the course of management.

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