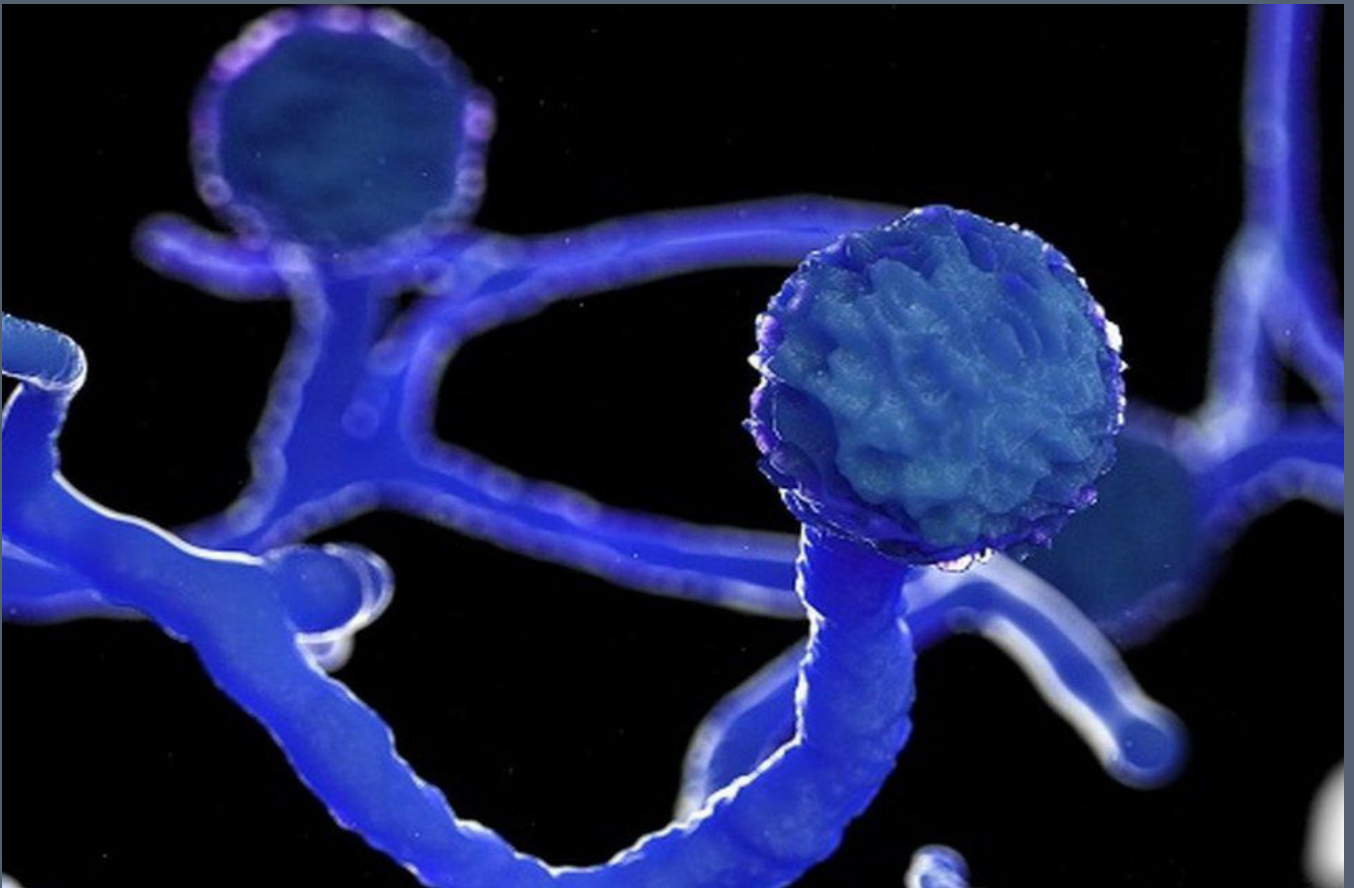


# MUCORMYCOSIS

## A Conceptual Āyurvedic Approach



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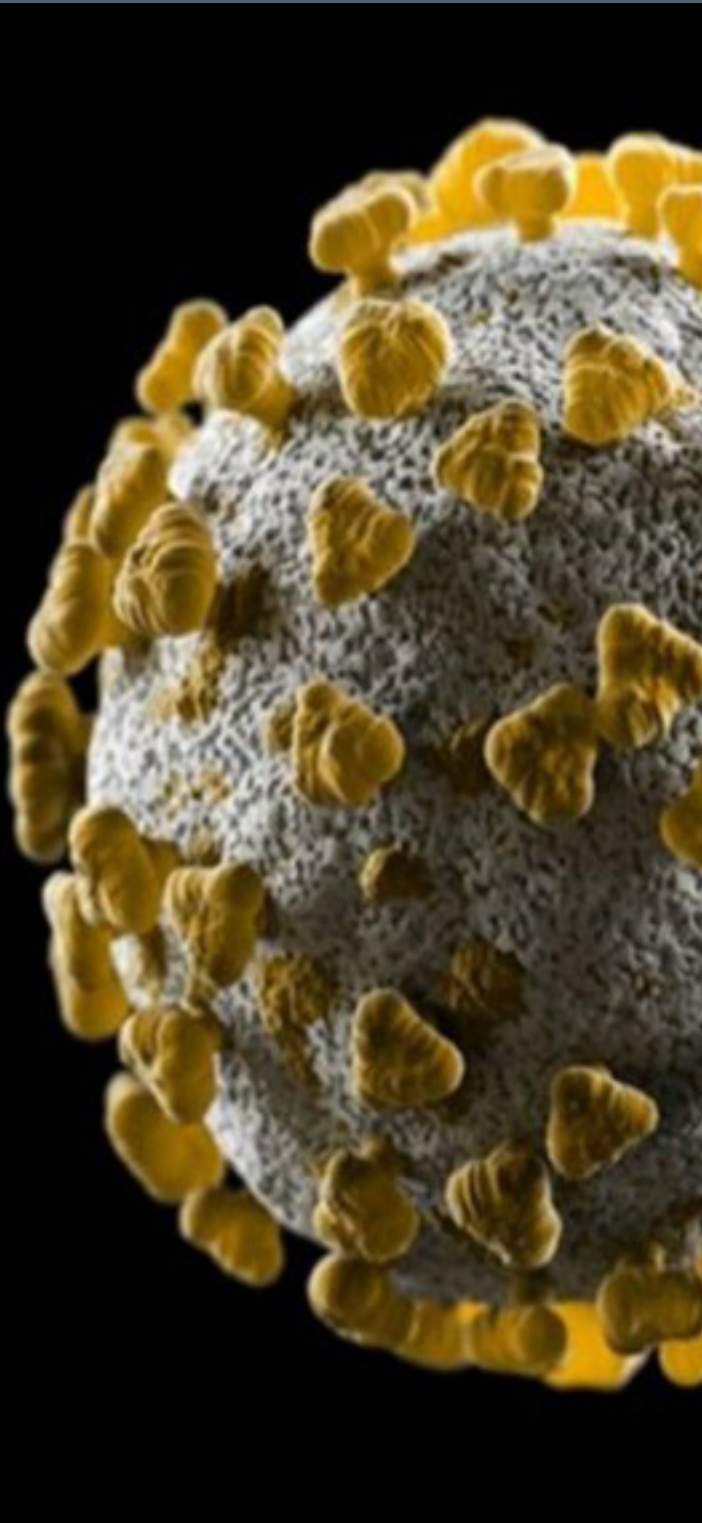
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## DISCLAIMER

Mucormycosis has been declared as an epidemic in many states of India. It is a devastating disease that can cause mortality and may lead to removal of the affected part. We are presenting a conceptual study on mucormycosis and formulated a treatment protocol. This is for circulation among BAMS students and Ayurveda Vaidyās. We keep in mind that based on Avastha, the treatment methods may vary from Vaidya to Vaidya.

# WHAT IS MUCORMYCOSSIS



- Mucormycosis (sometimes called zygomycosis) is a serious but rare fungal infection caused by a group of fungal moulds called Mucormycetes.
- These fungi live throughout the environment, particularly in soil and in decaying organic matter, such as leaves, compost piles, or rotten wood.

# RISK GROUP

Diabetes, especially with diabetic ketoacidosis( It is a serious complication of diabetes that occurs when your body produces high levels of blood acids called ketones)

Cancer

Organ transplant

Stem cell transplant

Neutropenia (low number of white blood cells) N.Value – 45-75% WBC

Long-term corticosteroid use

Injection drug use

Too much iron in the body (iron overload or hemochromatosis) –Normal value of iron - 60 to 170 mcg/dL)

Skin injury due to surgery, burns, or wounds

Prematurity and low birth weight (for neonatal gastro-intestinal mucormycosis)

Industrial oxygen may have fungal spores that may have been a reason for outbreak of mucormycosis

## TYPES OF MUCORMYCOSIS

Rhinocerebral (sinus and brain) mucormycosis

Pulmonary (lung) mucormycosis

Gastrointestinal mucormycosis

Cutaneous (skin) mucormycosis

Disseminated(widespread) mucormycosis

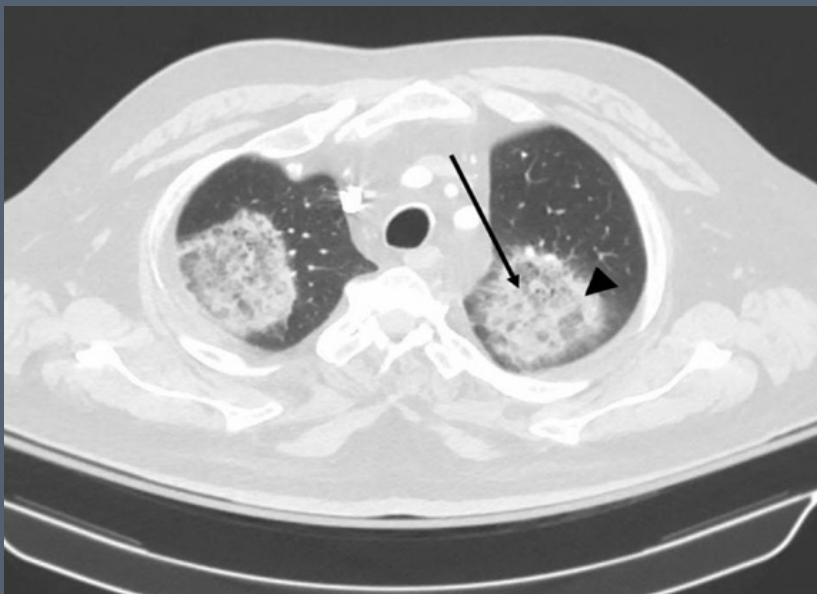
# RHINOCEREBRAL (SINUS AND BRAIN) MUCORMYCOSES



# COMMON SYMPTOMS

TYPE OF MUCORMYCOSIS	SYMPTOMS
Rhino Cerebral Mucormycosis (Most Common) (Diabetic/ Renal Transplant Patients)	<ul style="list-style-type: none"><li>• Unilateral facial swelling</li><li>• Headaches</li><li>• Nasal / sinus congestion/pain</li><li>• Serosanguinous (fluid that is both serous and bloody) nasal discharge</li><li>• Fever</li></ul>
Pulmonary mucormycosis (most common) (hematologic malignancy & neutropenic patients)	<ul style="list-style-type: none"><li>• Non-specific symptoms</li><li>• Fever</li><li>• Cough</li><li>• Chest pain</li><li>• Dyspnoea</li></ul>

## CT SCAN OF PULMONARY MUCORMYCOSIS



- Computed tomography of the chest showing the reversed halo sign. Central ground glass opacities (arrow) are surrounded by areas of peripheral consolidation (arrow head).
- The reversed halo sign may be considered pathognomonic of pulmonary mucor mycosis in the right clinical context

# COMMON SYMPTOMS

## TYPE OF MUCORMYCOSIS

Cutaneous skin mucormycosis  
(Direct inoculation of the fungus into disrupted skin – burns, injuries)

## SYMPTOMS

- **Primary infection**
- Acute inflammatory response with pus formation
- Abscess formation
- Tissue swelling
- Necrosis
- Lesion progresses to black eschars (dry, black necrotic tissue)
- **Secondary infection**
- Typically begins as a an erythematous, indurated, and painful cellulitis & then progresses into an ulcer covered with black eschar



**CUTANEOUS MUCORMYCOSIS**

# COMMON SYMPTOMS

TYPE OF MUCORMYCOSIS	SYMPTOMS
Gastrointestinal mucormycosis (Less common type ) Affected group- neonates	<ul style="list-style-type: none"><li>• Non-specific abdominal pain and distension,</li><li>• Nausea</li><li>• Vomiting</li></ul>
D/D – Necrotising entero colitis	<ul style="list-style-type: none"><li>• Gastro intestinal bleeding may occur</li></ul>
Disseminated Mucormycosis	<ul style="list-style-type: none"><li>• Seen followed by other types of mucormycosis</li><li>• The infection spreads from the actual site and spreads to other part of the body.</li><li>• Common site affected – brain</li></ul>

## DIAGNOSIS

Radiological Study- X-Ray

Tissue Biopsy

MRI- brain, orbit, PNS (Rhino cerebral)

Computed Tomography (CT Scan) of the lungs, sinuses and other parts of the affected parts.





# COVID ASSOCIATED MUCORMYCOSIS

The two important factors contributing to Mucormycosis in India

Uncontrolled Diabetes

Widespread Use of Cortico steroids

Use of Corticosteroids have been the only promising treatment in severe cases of COVID 19 in Modern Medicine.

However, it leads to Hyperglycemia that favours secondary infections like Mucormycosis.

Rhino Orbital Mucormycosis have been the most frequent presentation.

Mortality rate – 49%

Furthermore, a significant proportion of surviving patients suffered life-changing morbidities (loss of vision in 46% of survivors).

Most commonly used treatment for mucormycosis in patients in modern medicine include –

Anti fungal therapies – Most commonly lipid formulations of Amphotericin B (Antifungal medication used for serious fungal infections)

Surgical removal of affected parts (In order to prevent further spread of the fungal infection)

# MUCORMYCOSIS IN ĀYURVEDA

## Nidāna

Prameha / Prameha upadrava

Ojokṣayam

Sthānam – kapha sthānam (Ura, ghrana, kaṅṭha, śira )

Lakṣaṇam

(With specific reference to Rhinocerebral Mucormycosis)

Āma avastha – Jvara, Nāsarodha

Pacyamāna avastha – Jvara, mukha śopha, pratiṣyāya, raktapitta, śūlam

Pakvā avastha – Mukha śopha, rakta vidagdha, dhātupāka

## Samprāpti

There are 4 important factors that contribute to the samprāpti

Kleda vṛddhi – as seen in prameha

Ojokṣayam – Vyādhi akṣamtavm

Dhātu daurbalyam – Vyādhi rūpam

Pitta vidagdha – Śigrapāki

## Lakṣaṇa stages

STAGE I – Kaphapradurbhava

STAGE II - Kaphavilayanam – Pitta duṣṭi

STAGE III - Pitta vidagdha – Vāta pradurbhavam

Doṣās - Kapha, Pitta, Vāta

Dūṣya- Rasa, Rakta, Māmsa, Medas

## Treatment Protocol

Kaṣāya Tikta Rasa Prayoga

Rakta Prasādanam

Ojo Vṛddhi

Kṛmighna

Initially, Kapha pitta haram, Rūkṣa,

# MUCOR MYCOSIS IN ĀYURVEDA - Stage I

## Kaṣāyam

Āragvadādi kaṣāyam

Amṛtottaram kaṣāyam

Guḍūcyādi kaṣāyam

Nimbādi kaṣāyam

Ṣoṇitāmṛtam kaṣāyam

Katakakadirādi kaṣāyam (Toya kalpana - For Diabetes)

## Cūrṇam

Sudarṣanam

Tṛphala cūrṇam

## Gulika

Kaiṣora guggulu

Ṣiva gulika

Kṛmighna ghana vaṭi

Viṣa vilvādi gulika

## Lehyam

Māñibhadra guḍam (Very minimal dosage)

## Arṣṭa

Vidangarishtam

## Rasa ouṣada

Ārogyavardini vaṭi

Mṛgāñka rasa (Ref: Vaidya Chinthāmani)



# VIṢA VILVĀDI GULIKA (KRIYĀ KAUMUDI)

## Ingredients

Bilvā

Tulasi

Karañja

Tagara

Devadāru

Mañca

Dāruharidra

Ajāmūtra

Harītaki

Vibhītaki

Āmalaki

Suñti

Pippali

Haridrā

Pāṭha

Nīlini

Īśvari (50%)

Viṣa vilvādi gulika – Dārvīkara viṣa cikitsa

Kaṣāya tikta rasa

Viṣahara

Ṣophahara

Raktadoṣahara

Sūlahara

Hṛdya

Vraṇaropaṇa

## Dose :

Kaṣāyam – 50 ml – 50 ml – 50 ml on empty stomach

Gulika – 2-2-2 after food

Lehyam – 20 gm at bed time

Aṣṭam – 20 ml with water thrice daily after food

## Ūrdvajatru viśeṣa kriyā

Nasya – Vāsā svarasa, Droṇapuṣpi svarasa

Kavala- Gaṇḍūṣa – Tṛphala kaṣāya

\* Dhūmapāna - Mūrdha virecana – Aparājita (Śveta),  
Jyotiṣmati, Haritālam, Manaṣila, Agarū (Ch.Su- 5/26)

## \* Note:

- This should be used by the assessment and supervision of an Āyurveda Vaidya
- Haritāla and Manaṣila should be used with care
- If hypoxia is present, Dhūmapāna is contraindicated

# MUCOR MYCOSIS IN ĀYURVEDA - Stage II

Madhusnuhi Rasāyanam

Gandhaka Rasāyanam

Svarṇamālini Vasanta Rasa

Mahātikataka Ghṛtam

Guggulu Tikataka Ghṛtam

Ghṛtam should be given in the appropriate condition (Later phase of recovery stage)

## KOṢĀTAKYĀDI YAVĀGU

(A.H.U.35/21-23) Viṣapraṭiṣeta adhyāya

விஷத்தை பேரக்கும் கஞ்சி

### Ingredients

Koṣātaki (பீர்க்கு)

Citraka (கொடுவேலி)

Pāṭa (வட்டதிருப்பி)

Arka (எருக்கு)

Amṛta (சீந்தில்)

Abhaya (கடுக்காய்)

Ṣelu (நறுவிலி)

Ṣirīṣa (வாகை)

Kiṇihi (வாலுஞ்சை)

Haridra (மஞ்சள்)

Dāruharidra (மரமஞ்சள்)

Punarnāvadavayam (மூக்கிரட்டை, சாரணை)

Tṛkaṭu (சக்கு மிளகு திப்பிலி)

Brhati (கண்டங்கத்திரி)

Kaṇṭakāri (முள்ளக்கத்திரி)

Sārivā dvayam (நன்னாறி, பெருநன்னாறி)

Balā (சிற்றாமுட்டி)

Kṣaudra (Svarṇamākṣikam) (பொன்னிமிளை)

A gruel made with the above said kaṣāya, added with honey and ghee is to be taken

# PATHYA (DIET)

## Avoid:

Urad dal  
Sesame seed / oil  
Dairy products  
Jaggery  
Sour foods  
Newly harvested rice  
Non vegetarian food

## APARĀJITHA DHŪPAM

(A.H.Chi. 1/163-165)

Preventive & precautionary

## Ingredients

Guggulu  
Truṇa  
Vacā  
Sarja  
Nimbā  
Arka  
Agaru  
Devadāru

## Phalaśruti

Jvarān sarvān vyāpohati,  
Viṣeṣāt viṣamān,  
Āgantu and  
Anubandhaja jvara

\* **Note :** Dhūpam should be used carefully in a patient with respiratory distress

The clinical study data will be provided later



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