



**Information for Ayurveda Practitioners for
Prophylactic, Symptomatic Management of
Suspected and Diagnosed cases of
Mucormycosis**

**Government of India
Ministry of Ayush
Drug Policy Section**



Information for Ayurveda Practitioners for Prophylactic, Symptomatic Management of Suspected and Diagnosed cases of Mucormycosis

Preamble

India has been battling with a significant rise in COVID-19 cases in the second wave. A severe and rare fungal illness, Mucormycosis also known as “black fungus”, affecting some coronavirus patients is causing a double blow to the country. Mucormycosis infections are more severe in people with comorbid conditions like Diabetes, Hypertension etc. and immune-compromised state. Because of the increase in the number of patients with this deadly infection, many states have declared Mucormycosis as an epidemic and has become a matter of huge concern.

Mucormycosis is classified mainly into five types depending on the part of the body affected. The clinical features described of **Rhino-orbito-cerebral Mucor mycosis** are similar to Raktaja Pratishyaya and Krimija Shiroroga (unilateral facial swelling, Headaches, Nasal congestion, Nasal discharge, Fever etc). Presentation of **Pulmonary Mucor mycosis** are very much similar to Kshayaja Kasa, (Cough with pericardial chest pain, foul smelling, greenish, purulent, mucoid and blood stained/ haemoptysis sputum and cough associated with fever (Jvaro-mishrakriti) or chest pain (Parshvaruka) or recurrent coryza (Pinasa) are the clinical features found in Pulmonary Mucormycosis. The **Gastrointestinal Mucormycosis** can be included under the spectrum of Udara roga especially Sannipatika udara roga and pathogenesis of **Disseminated mucormycosis** in later phase can be compared with Dushtavrana where as **Cutaneous mucormycosis** can be correlated with Kushtha and Visarpa.

Breaking the cycle of infection, boosting an individual’s immune system, detecting the infection early, and providing proper medical care are the best ways to avoid Mucormycosis. The Ayurvedic principle of management includes **Kledahara, Pramehahara, Agnivardhaka, Aampachaka, Krimihara, Ojovardhaka, Rasayan and Balya** chikits. Therefore, to deal with the Mucormycosis infection, Ayurvedic Immuno-modulatory supplements coupled with Covid-19 management regimen may be started at earliest as prophylaxis.

All the standing instructions issued by Health authorities (Ministry of Health & Family Welfare, World Health Organization and state and local health authorities) are to be adhered completely and Ayurveda Management may stand as 'ADD ON' to the present contemporary line of management of Mucormycosis. The medicines recommended here are based on discussion in National level meeting conducted by AIIA New Delhi with various national institutes, like Institute of Teaching and Research in Ayurveda-Jamnagar, National Institute of Ayurveda –Jaipur, Faculty of Ayurveda Banaras Hindu University (BHU), Varanasi., Govt. Ayu College Ahmedabad, Govt. Ayu. College Trivandrum including the subject experts from all over the India.

General disclaimer

- Physicians have their own discretion to select drugs based upon the stage of the disease, complexity of symptoms, availability of the medicines in their locality and dose/duration has to be decided according to condition/stage of disease.
- Patients need to have a general consultation/advice of qualified physicians before starting any intervention.
- Patients in whom already some medications are going on for health issues such as hypertension, diabetes, cancer chemotherapy etc. are to be continued.
- This is for the use of physicians only and strictly not intended for self-medication by patients. Use the medicines under the prescription of registered medical practitioners only.
- It is the responsibility of the practitioner, lying on his or her own experience and knowledge of the patient, to make a diagnosis, to determine combinations, dosages and best treatment for each patient, and to take all appropriate safety precautions. List provided gives an idea about the different drugs of choice available for the said condition. Physician may select medicines from the list provided above or other than the list as per the complaints and availability.
- This document contains the collective views of a group of experts. Use these medicines is subject to Epidemic Disease Act and Disaster Management Act, if at all applicable. It is the physician's responsibility to check with local applicable laws. Contributors are no-way held responsible for the same.

How to prevent

Dos

1. Proper nutrition is to be ensured through freshly cooked, warm, light diet like green vegetables, Moonga dala, Masoora Daal, Daliya, Soup etc. considering individual's Agni (digestive power).
2. Intake of Herbal tea (Ayush kaada)/ Medicinal water should be used as a regular drink to maintain hydration (As per AYUSH COVID -19 guidelines.).
3. Adequate sleep of 7-8 hours at night is essential and should be encouraged.
4. Maintain personal hygiene.
5. COVID appropriate behaviour and general protective measures advised by health authorities such as social distancing, using appropriate mask properly, hand washing and sanitization, vaccination etc. for Covid-19 must be followed.
6. Control hyperglycaemia and consult the physician accordingly if required.
7. Use clean sterile water for humidifiers during oxygen therapy.
8. Follow the guidelines published time to time by Ministry of AYUSH & MoHFW, ICMR.

Don'ts

1. Do not miss warning signs like facial swelling, headache, blackish lesions in oral/ nasal cavity, bulging out of eyeballs, difficulty in breathing, fever etc particularly in the context of immunosuppression and/or COVID-19 patients on steroid and oxygen support.
2. Avoid fermented food items, refrigerated items, cold drinks, packed food, junk food etc
3. Do not lose crucial time to initiate treatment for Mucor mycosis.
4. Avoid self-medication.
5. Do not sleep during the daytime.

Prophylactic Measures

Daily regimen

1. Daily practice of *Yogasana, Pranayama* and meditation for at least 30 minutes as advised by Ministry of AYUSH.
2. *Kavala/Gandusha* (Gargling) with lukewarm water along with an added pinch of turmeric/*Triphala/ Panchavalkala* or *Sphatika*.
3. *Nasya* (Nasal instillation/ application of medicated oil) - (*Anu taila* or *Shadbindu Taila*) or cow ghee (*Goghrita*), once or twice a day, especially before going out and after coming back home.
4. Steam inhalation with *Karpur* (Camphor) or Eucalyptus oil (1-5 drops) or Ajwain (*Trachyspermum ammi*), Pudina (*Mentha spicata*) once a day.
5. *Dhumapana* with *Guggulu* (commiphora mukul), *Nimba* (*Azadirachta indica*), *Haridra* (*Curcuma longa*), *Agaru* (*Aquilaria agallocha*), *Devadaru* (*Citrus devdar*) or *Aparajita* (*Clitoria ternatea*) mixed with ghee/Oil.
6. Frequent intake of water prepared with *Shunthi* (*Zingiber officinale*), *Dhanyaka* (*Coriandrum sativum*), *Musta* (*Cyperus rotundum*), *Tulasi* (*Ocimum sanctum*), *Lavanga* (*Syzyium aromaticum*) or *Jeera* (*Cuminum cyminum*) seeds.
7. Drinking of Golden Milk (Half tea spoon Haldi (*Curcuma longa*) powder in 150 ml hot milk) once at night, but should be avoided in case of indigestion.

The medicines listed in the below table as prophylactic can be used alone or along with the other medicines listed in different types of Mucormycosis accordingly.

Sr. No	Stage/Condition	Medicine
01	Post-COVID-19 regimen for preventing opportunistic infections/Prophylactic	<ul style="list-style-type: none">• Dashmoola kwatha, Manjishthadi Kashaya, Aaragvadhadi Kashaya• Sanshamani Vati, Arogyavardhini vati, Chandraprabha vati• Kaishor Guggulu, Triphala Guggulu, Laxmi Vilas Rasa• Krimikuthar Rasa, Gandhak Rasayana• Amritarishta, Vidangarishta / Vidangasava, Kumari Aasava• Chyavanaprash Avaleha, Chitraka Haritaki Avaleha• Nisha-Amalaki Churna, Sitopaladi Churna, Avipattikar Churna, Sudarshana churna• Guggulutikta ghrita, Jeevantyadi Ghrita

Management of Symptomatic, Suspected and Diagnosed cases of Mucormycosis:

Sr. No.	Types of Mucormycosis	Clinical features	Medicine
1.	Rhino-orbito-cerebral Mucormycosis	Facial swelling, headache, visual loss, proptosis, and/or palatal ulcer, black lesions on nasal bridge or upper inside of mouth, double vision	<ul style="list-style-type: none"> • Amritadi guggulu • Saptamrita lauh • Haridra Khanda • Triphala Ghrita • Kasisadi tail Pratimarsha Nasya
2.	Pulmonary Mucormycosis	Fever, difficult breathing, cough, chest pain, pleural effusion.	<ul style="list-style-type: none"> • Gandhaka Rasayana along with decoction of Neem Patra+ Triphala+ Giloy+ Madhuyasti churna. • Kantkari ghrita / Dadimadi ghrita along with Trikatu churna/Mallasindura/Rasasindura /Yavakshara
3.	Cutaneous Mucormycosis	Necrotic scar surrounded by an erythematous and indurated region of skin	<ul style="list-style-type: none"> • Nimbadi Kashaya • Khadirarishta • Kalyanaka Guda
4.	Gastrointestinal mucormycosis	Nonspecific abdominal pain and distention associated with nausea and vomiting, GI Bleeding	<ul style="list-style-type: none"> • Sankha Vati • Arka Ajamoda • Narayana Churna • Bolbadha Ras • Kaharava pisti • Mauktikyukta Kamdudha Ras
5.	Disseminated Mucormycosis	typically occurs in people who are already sick from other medical conditions, so it can be difficult to know which symptoms are related to mucormycosis. Patients with disseminated infection in the brain can develop mental status changes or coma	<ul style="list-style-type: none"> • Rasamaikya, • Vyadhikaran Rasayan, For local application • Jatyadi taila • Jatyadighrita • Panchatiktaghrita

Annexure 1:

Bibliography/Articles reviewed

1. Ministry of AYUSH Govt. of India, Guidelines for Ayurveda practitioner's for covid-19 <https://www.ayush.gov.in/ayush-guidelines.html#pra-guideline>
2. Advisory from Ministry of AYUSH for meeting the challenge arising out of spread of corona virus (COVID-19) in India; available at <https://www.ayush.gov.in/docs/25.pdf>.
3. Guidance document on appropriate management of suspect/confirmed cases of COVID-19 published by Ministry of Health & Family Welfare, Directorate General of Health Services, EMR Division available on https://www.mohfw.gov.in/assessed_on_9th_April_2020
4. Evidence Based Advisory in the Time of COVID-19 (Screening, Diagnosis & Management of Mucormycosis)-ICMR; available at <https://www.icmr.gov.in/cmucormycosis.html>
5. Home care for patients with suspected or confirmed COVID-19 and management of their contacts; available at [https://www.who.int/publications/i/item/home-care-for-patients-with-suspected-novel-coronavirus-\(ncov\)-infection-presenting-with-mild-symptoms-and-management-of-contacts](https://www.who.int/publications/i/item/home-care-for-patients-with-suspected-novel-coronavirus-(ncov)-infection-presenting-with-mild-symptoms-and-management-of-contacts)
6. Symptoms of Mucormycosis, Centre for Disease Control and Prevention, available at <https://www.cdc.gov/fungal/diseases/mucormycosis/symptoms.html>
7. Yadavji Trivikramji Acharya, Charaka Samhita Agnivesha, Chakrapani Commentary, Chaukhambha Sanskrit Sansthan, Varanasi Reprint 2009
8. Yadavji Trivikramji Acharya & Narayan Ram Acharya, Sushruta Samhita of Sushruta, Commentary of Dalhana, Nibandhasamgraha, Chaukhambha Sanskrit Sansthan, Varanasi Reprint 2009
9. Kaviraja Atrideva Gupta, edited by Vaidya Yadunandana Upadhyaya, Astangahrdayam composed by Vagbhata with the Vidyotini Hindi Commentary, Published by Chaukhambh Prakashan Varanasi, Reprint edition 2009
10. Awadhesh Kumar Singh, Ritu Singh, Shashank R. Joshi, Anoop Misra, Mucormycosis in COVID-19: A systematic review of cases reported worldwide and in India, Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 2021
11. Akshay Raut, Nguyen Tien Huy, Rising incidence of mucormycosis in patients with COVID-19: another challenge for India amidst the second wave? Published on June 3, 2021 [https://doi.org/10.1016/S2213-2600\(21\)00265-4](https://doi.org/10.1016/S2213-2600(21)00265-4)
12. John TM, Jacob CN, Kontoyiannis DP. When Uncontrolled Diabetes Mellitus and Severe COVID-19 Converge: The Perfect Storm for Mucormycosis. *Journal of Fungi*. 2021; 7(4):298. <https://doi.org/10.3390/jof7040298>
13. Revannavar SM, P S S, Samaga L, et. al. COVID-19 triggering mucormycosis in a susceptible patient: a new phenomenon in the developing world? *BMJ Case Reports CP* 2021;14:e241663 <http://dx.doi.org/10.1136/bcr-2021-241663>
14. Mehta, S., & Pandey, A. (2020). Rhino-Orbital Mucormycosis Associated With COVID - 19. *Cureus*, 12(9), e10726. <https://doi.org/10.7759/cureus.10726>
15. Sarkar, Sandip; Gokhale, Tanmay; Choudhury, Sushmita Sana1; Deb, Amit Kumar COVID-19 and orbital mucormycosis, Indian Journal of Ophthalmology: April 2021 - Volume 69 - Issue 4 - p 1002-1004 https://journals.lww.com/ijo/Fulltext/2021/04000/COVID_19_and_orbital_mucormycosis.52.aspx
16. MISHRA, Neha et al. A case series of invasive mucormycosis in patients with COVID-19 infection. *International Journal of Otorhinolaryngology and Head and Neck Surgery*, [S.l.], v. 7, n. 5, p. 867-870, apr. 2021. ISSN 2454-5937. Available at: <<https://www.ijorl.com/index.php/ijorl/article/view/2925>>. Date accessed: 10 Jun. 2021. doi:<http://dx.doi.org/10.18203/issn.2454-5929.ijohns20211583>.
17. Essential Drug List (EDL) AYURVEDA published by Dept of AYUSH (Drug Control Cell), March 2013 available at <https://main.ayush.gov.in/tenders-vacancies-and-announcements/publications/essential-drugs-list-ayurveda-siddha-unani-and-homeopathy>
18. Walsh TJ, Gamaletsou MN, McGinnis MR, et al. Early clinical and laboratory diagnosis of invasive pulmonary, extrapulmonary and disseminated mucormycosis (zygomycosis). *Clin Infect Dis* 2012;2013(Suppl 1):S55-60
19. Aparna M. Evaluation of antimicrobial effectiveness of licorice and Triphala mouthwashes against *Streptococcus mutans*. JAHM [Internet]. 2021Apr.20 [cited 2021May24];6(3). ayurvedic formulation. *International Journal of Recent Trends in Science and Technology*, 8 (2); 2013; 134-137.
20. AK. Shobha Bhat, B. N. Vishwesh, Manoranjan Sahu, and Vijay Kumar Shukla, clinical study on the efficacy of Panchavalkala cream in Vrana Shodhana w.s.r to its action on microbial load and wound infection, Ayu. 2014 Apr-Jun; 35(2): 135-140.

Annexure 2:

Contributors: Expert Ayurveda physician

1. Prof. Raghunathan Nair, Principal NIASR –Puthur, Kollam, Kerala
2. Prof. Harshit Shah, Principal, Government Akhandanand Ayurveda college Ahmedabad
3. Prof. Harikrishnan Thirumangalath, Principal, Govt, Ayu College, Trivandrum
4. Vaidya G Prabhakhar Rao – Delhi
5. Prof. Sivakumar C.S. Department of Shalya Tantra, Govt, Ayu College, Trivandrum
6. Prof Ambika, HOD, Department of Kayachikitsa Govt, Ayu College, Trivandrum
7. Prof Hemangi Shukla, HOD Department of Shalaky, Government Akhandanand Ayurveda college Ahmedabad
8. Prof Rajesh Sharma Department of Shalya Tantra Government Akhandanand Ayurveda college Ahmedabad
9. Prof. Surendra A Soni, OSD Ayu 1200 bed COVID Civil Hospital, Ahmedabad
10. Prof. Ananthram Sharma, HOD Department of Panchakarma, AIIA New Delhi
11. Vaidya Ram Shukla Panchkarma OSD AYU SVP Hospital
12. Vaidya Rohini Salve Panchkarma OSD AYU IKD Hospital
13. Vaidya D B Vaghela, Department of Shalaky Tantra, ITRA Jamnagar
14. Vaidya Mandeep Goyal, Department of Kayachikitsa, ITRA Jamnagar
15. Vaidya T S Dudmal, Department of Shalya Tantra, ITRA Jamnagar
16. Vaidya Ramakantha Yadav, Department of Kayachikitsa, AIIA New Delhi
17. Vaidya Sreekural K Pillai Ayu College, Trivandrum
18. Vaidya Rajaram Mahato, Department of Kayachikitsa, AIIA, New Delhi
19. Vaidya Prashant Dharmarajan, Department of Panchakarma, AIIA New Delhi
20. Vaidya Divya Kajaria, Department of Kayachikitsa, AIIA, New Delhi
21. Vaidya Deepak Pawar, Department of Shalaky Tantra, ITRA Jamnagar
22. Vaidya Rahul Gandhi, Department of Pancha Karma, ITRA Jamnagar
23. Vaidya Sathya N Dornala –Delhi
24. Vaidya Manohar Palakurthi –USA
25. Vaidya I Murali Krishna – Hyderabad
26. Vaidya M ChanVaidyaashekar - Hyderabad
27. Vaidya Snehalatha S N Dornala –UP
28. Vaidya Raghuram Ayyagari – Delhi
29. Vaidya Kranthi Vardhan –Hyderabad
30. Vaidya Mahesh Kumar C S –Delhi
31. Vaidya Kameshwar Rao –Delhi
32. Vaidya Kapil Mehar, PhD Scholar, AIIA New Delhi
33. Vaidya Jinoop P, PhD Scholar, AIIA New Delhi

Coordinators

1. Prof. Manjusha Rajagopala, HOD Shalaky Tantra, AIIA New Delhi
2. Vaidya Narayan Bavalatti, Department of Shalaky Tantra, AIIA New Delhi
3. Vaidya Ankur Tripathi, Department of Shalaky Tantra, AIIA New Delhi

Mentors

1. Prof. Tanuja Manoj Nesari, Director AIIA, New Delhi
2. Prof. Sanjeev Sharma, Director/ Vice chancellor i/c NIA Jaipur
3. Prof. Anup Thakar, Director/ Vice chancellor ITRA Jamnagar