# ಕರ್ನಾಟಕ ಸರ್ಕಾರ

ಸಂಖ್ಯೆ: ಆಕುಕ 199 ಅಮುಕಾ 2021

ಕರ್ನಾಟಕ ಸರ್ಕಾರ ಸಚಿವಾಲಯ
ವಿಕಾಸ ಸೌಧ
ಬೆಂಗಳೂರು, ದಿನಾಂಕ: 09.06.2021

## ಪರಿಷ್ಕೃತ ಸುತ್ತೋಲೆ

ವಿಷಯ: ಮ್ಯುಕೋರ್ ಮೈಕೋಸಿಸ್ ಸೋಂಕಿನ ಚಿಕಿತ್ಸೆ ಹಾಗೂ ಬಿಡುಗಡೆ ಕುರಿತಂತೆ ಕ್ಲಿನಿಕಲ್ ತಜ್ಞರ ಪರಿಷ್ಕೃತ ಶಿಫಾರಸ್ಸುಗಳನ್ನು (Revised Recommendations of Clinical Expert Committee ) ಅನುಸರಿಸುವ ಬಗ್ಗೆ.

ಉಲ್ಲೇಖ: 1) ಸುತ್ತೋಲೆ ಸಂಖ್ಯೆ: ಆಕುಕ 163 ಅಮುಕಾ 2021, ದಿನಾಂಕ: 18.5.2021
2) ಪರಿಷ್ಕೃತ ಸುತ್ತೋಲೆ ಸಂಖ್ಯೆ: ಆಕುಕ 181 ಅಮುಕಾ 2021, ದಿನಾಂಕ: 26.5.2021

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ಕೋವಿಡ್-19 ಸೋಂಕಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಮ್ಯುಕೋರ್ ಮೈಕೋಸಿಸ್ (ಬ್ಲಾಕ್ ಫಂಗಸ್) ಸೋಂಕಿನ ಚಿಕಿತ್ಸೆ ಹಾಗೂ ನಿರ್ವಹಣೆ ಕುರಿತಂತೆ ಉಲ್ಲೇಖ (1) ಮತ್ತು (2) ರ ಸುತ್ತೋಲೆಗಳಲ್ಲಿ ಚಿಕಿತ್ಸಾ ವಿಧಾನಗಳನ್ನು ರಾಜ್ಯದ ಎಲ್ಲಾ ಆಸ್ಪತ್ರೆಗಳಲ್ಲಿ ಅನುಸರಿಸಲು ಈಗಾಗಲೇ ಸೂಚಿಸಲಾಗಿತ್ತು.

ಮುಂದುವರೆದು, ಮ್ಯುಕೋರ್ ಮೈಕೋಸಿಸ್ ಸೋಂಕಿನ ಚಿಕಿತ್ಸೆ ಹಾಗೂ ಆಸ್ಪತ್ರೆಯಿಂದ ಬಿಡುಗಡೆ ಕುರಿತಂತೆ ರಾಜೀವ್ ಗಾಂಧಿ ಆರೋಗ್ಯ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಕ್ಲಿನಿಕಲ್ ತಜ್ಞರ ಸಮಿತಿಯ ಪರಿಷ್ಕೃತ ಶಿಫಾರಸ್ಸುಗಳನ್ನು (Revised Recommendations of Clinical Expert Committee, dated 5.6.2021) ಈ ಸುತ್ತೋಲೆಯೊಂದಿಗೆ ಲಗತ್ತಿಸಿದ್ದು, ಸದರಿ ಮಾರ್ಗಸೂಚಿಗಳನ್ನು ಕಡ್ಡಾಯವಾಗಿ ಪಾಲಿಸುವಂತೆ ಈ ಮೂಲಕ ಸೂಚಿಸಲಾಗಿದೆ.

9/6/21
(ಜಾವೇದ್ ಅಖ್ತರ್)
ಸರ್ಕಾರದ ಅಪರ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿ
ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಇಲಾಖೆ

**ಇವರಿಗೆ :**

1. ಸರ್ಕಾರದ ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿಗಳು, ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಇಲಾಖೆ
2. ಮುಖ್ಯ ಆಯುಕ್ತರು, ಬಿ ಬಿ ಎಂ ಪಿ, ಬೆಂಗಳೂರು
3. ಎಲ್ಲಾ ಜಿಲ್ಲೆಯ ಜಿಲ್ಲಾಧಿಕಾರಿಗಳು,
4. ಎಲ್ಲಾ ಜಿಲ್ಲೆಗಳ ಮುಖ್ಯ ಕಾರ್ಯನಿರ್ವಹಣಾಧಿಕಾರಿಗಳು,
5. ವಿಶೇಷ ಆಯುಕ್ತರು, ಬಿ ಬಿ ಎಂ ಪಿ, ಬೆಂಗಳೂರು

6. ಜಿಲ್ಲಾ ಆರೋಗ್ಯಾಧಿಕಾರಿಗಳು/ ಜಿಲ್ಲಾ ಸರ್ಜನರು/ಆಡಳಿತ ವೈದ್ಯಾಧಿಕಾರಿಗಳು/ ತಾಲ್ಲೂಕು ವೈದ್ಯಾಧಿಕಾರಿಗಳು ಹಾಗೂ ಎಲ್ಲಾ ಸಾರ್ವಜನಿಕ ಆಸ್ಪತ್ರೆಗಳ ವೈದ್ಯಕೀಯ ಅಧೀಕ್ಷಕರು.
7. ಜಿಲ್ಲಾ ಸರ್ವೇಕ್ಷಣಾಧಿಕಾರಿಗಳು, ಎಲ್ಲಾ ಜಿಲ್ಲೆಗಳು
8. ಮುಖ್ಯ ಆರೋಗ್ಯಾಧಿಕಾರಿಗಳು, ಬಿ ಬಿ ಎಂ ಪಿ, ಬೆಂಗಳೂರು.

**ಪ್ರತಿಯನ್ನು ಮಾಹಿತಿಗಾಗಿ :**

1. ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿಯವರು, ಕರ್ನಾಟಕ
2. ಆಯುಕ್ತರು, ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಸೇವೆಗಳು, ಬೆಂಗಳೂರು.
3. ಅಭಿಯಾನ ನಿರ್ದೇಶಕರು, ಎನ್ ಹೆಚ್ ಎಂ, ಬೆಂಗಳೂರು.
4. ನಿರ್ದೇಶಕರು, ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಸೇವೆಗಳು, ಬೆಂಗಳೂರು.
5. ನಿರ್ದೇಶಕರು, ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ, ಬೆಂಗಳೂರು.
6. ಮಾನ್ಯ ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಹಾಗೂ ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿ
7. ಕಚೇರಿ ಪ್ರತಿ.

# PROCEEDINGS OF THE CLINICAL EXPERT COMMITTEE MEETING OF RGUHS, CONDUCTED THROUGH CIRCULATION (Dated. 05/06/2021)

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**Circulation of documents for deliberation and opinion was done to following members on 05/06/2021:**

1. Dr. S. Sacchidanand, Vice Chancellor, RGUHS, and Chairman, COVID-19 Clinical Expert Committee.
2. Dr. M.K. Sudarshan, Chairman, COVID-19 Technical Advisory Committee and Retired Dean & Professor, Department of Community Medicine, Kempegowda Institute of Medical Sciences, Bengaluru.
3. Dr. C.N. Manjunath. Director, Jayadeva Institute of Cardiology, Bengaluru
4. Dr. B.L. Shashi Bhushan, Professor & Head, Department of Pulmonary Medicine, BMCRI, Bangalore, Technical Expert Member for State Task Force Committee, Nodal Officer for Centre of Excellence, GOK.
5. Dr. C. Nagaraj, Director, S.D.S & Rajiv Gandhi Institute of Chest Disease, Bengaluru and Member of State COVID Expert Committee.
6. Dr. Balakrishna Shetty, Vice Chancellor and Consultant Radiologist, Siddhartha Institute of Medical Sciences, Tumkur.
7. Dr. Pradeep Rangappa, Intensive care physician, Columbia Asia Referral Hospital, Bengaluru & and National Vice President, Indian Society of Critical Care Medicine.
8. Dr. George Dsouza, Dean & Professor, Department of Medicine, St. Johns Medical College, Bengaluru.
9. Dr. Bala Bhaskar. S, Professor, Department of Anaesthesiology, Vijayanagara Institute of Medical Sciences, Ballary and Past President, Indian Association of Anaesthesiologist.
10. Dr. Farooq Ulla Khan, Consultant Intensivist, Jain Hospital and Bowring & Lady Curzon Hospital, Bengaluru
11. Dr. Ravindra Mehta, Consultant Pulmonologist, Chief of Critical Care, Apollo Hospitals, Bangalore.
12. Dr. K.S. Satish, Pulmonologist, Vikram Fortis Hospital, Bengaluru & President of Karnataka Pulmonology Association.
13. Dr. G.B. Sattur, Senior Consultant Physician & Diabetologist, Sattur Medical Care, Hubballi.
14. Dr. Ramesh. K.N, Senior Consultant Physician & Geriatrician, Fortis Hospital, Bengaluru and Member of State COVID Expert Committee.
15. Dr. Sunil Karanth, Chairman, Critical Care Services, MHEPL, Adjunct Professor, Manipal University, Chairman-HICC and Member of Medical Advisory Board, Manipal Hospital.

16. Dr. V. Ravi, Retired Professor & Head, Department of Neuro-Virology, NIMHANS.
17. Dr. Riyaz Basha, Professor, Dept of Community Medicine, BMCRI, Bengaluru.
18. Dr. Vishal Rao, Dean, Centre for Academic Research, HCG hospital.
19. Dr. Lohith Kumar. R, Assistant Professor, Dept of Forensic Medicine, CHIMS, Chikkamagaluru (Convenor of the meeting)

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On 05/06/2021, SOPs submitted by Dr. Shashi Bhushan were sent to the Expert Committee Members for deliberation and opinion.

**Agenda-01: Guidelines on management approach to Mucormycosis.**
**Decision:** After elaborate discussion and observations on the draft document circulated by Dr. Shashi Bhushan, the committee decided to recommend the document prepared on Mucormycosis and its management **(Annexure-01)**

**Agenda-02: Guidelines on discharge policy following COVID infection.**
**Decision:** After elaborate discussion and observations on the draft document prepared and circulated by Dr. Shashi Bhushan, the committee decided to recommend the guidelines on discharge policy for COVID patients **(Annexure-02)**

**Any other recommendations-** NIL

**DR. S. SACCHIDANAND**
**VICE CHANCELLOR & CHAIRMAN**
**CLINICAL EXPERT COMMITTEE**

# ANNEXURE-01 (Dated:05.06.2021)

# COVID ASSOCIATED MUCORMYCOSIS

MUCORMYCOSIS is a rare, non-contagious fungal infection which occurs in patients with the underlying conditions and predisposing factors such as diabetes mellitus, rampant misuse/overuse of steroids, malignancies, organ transplantation etc. Mode of infection is through inhalation of fungal spores from air. It is not contagious.

COVID19 Associated Mucormycosis (CAM) can occur with active COVID-19 infection (**concomitant**) and can occur sequentially in weeks or months following recovery (**sequential**).

COVID19 Associated Mucormycosis (CAM) based on clinical presentation is classified as:

1. Rhino-orbito-cerebral Mucormycosis (ROCM): - most common in people with uncontrolled diabetes, Post-kidney transplant
2. Pulmonary Mucormycosis: - most common in people with cancer, organ transplant or a stem cell transplant
3. Gastrointestinal Mucormycosis: - more common among young children than adults, especially premature and low birth weight infants less than 1 month of age
4. Disseminated Mucormycosis: - Occurs when the infection spreads through the bloodstream to affect another part of the body. Seen in diabetes ketoacidosis or in severe immunosuppression. Most commonly affects the brain, but also can affect other organs such as the spleen, heart, and skin.
5. Primary cutaneous Mucormycosis: - occurs after the fungi enter the body through a break in the skin (for example, after surgery, a burn, or other type of skin trauma). This is the most common form of Mucormycosis among people who do not have weakened immune systems.

**Prevention**

- Do not Self-Medicate even in mild cases. Always follow the instruction of a healthcare worker.
- Do not delay the reporting of symptoms/signs of Mucormycosis to the doctor.
- Do not ignore any medical advice issued by a competent authority.
- Always provide adequate history of comorbidities to your doctor, especially diabetes or any immunocompromised states.
- Maintain basic hygiene and cleanliness.
- Avoid unnecessary use of Iron supplements and Chelating agents like Deferoxamine.
- Use of Steroids must be strictly according to the State Guidelines for management of COVID19 only. The Duration of treatment with steroids should not exceed 7-10 days unless clinically indicated.
- The Oxygen Humidifiers must be cleaned every day and filled with Sterile water/Distilled Water and appropriate infection control measures must be followed.
  - Do not use Tap Water or Mineral water or Normal Saline/ Dextrose in the humidifier.
  - Fill only up to the maximum marked level.
- Once a week (for the same patient) and in between patients, all components of the humidifier should be soaked in mild antiseptic solution for about 30 minutes, rinsed with clean water and dried. A Good Glycemic Control should be maintained during the management of COVID19.
- Universal Masking should be strictly followed.
- Disposable and N95 masks to be used for 8 hours in a day and disposed. Cloth masks to be used for one day, washed, dried under the sun, and then reused.
- During discharge of the patients, advice about the early symptoms or signs of Mucormycosis
- No construction/ renovation activities with-in premises of COVID hospital
- Restricted entry inside COVID wards (Just like ICU)
- Wet Mopping of floor, patient surroundings /articles with appropriate disinfectant for every shift.

**Every Case of Mucormycosis must be notified to the competent health authorities.**

The detailed history of the case must be elucidated to know the source of fungus, and the same must be conveyed to the health authorities.

At the hospital level, each case of Mucormycosis must be audited to identify the source of infection, and the infection site must be tagged, and the Government Health Authorities must be notified about the Source of the infection that was tagged.

- Mucorales are not Black Fungi. *Black fungi are different category of fungi having melanin in their cell wall.*
- Mucormycosis is *not contagious*. It does not spread from one person to another.

| Do's | Don'ts |
|---|---|
| • Give history of diabetes to doctor<br>• Get Sugar levels checked<br>• Watch for early signs of Mucor listed above.<br>• Maintain basic hygiene and cleanliness.<br>• Follow medical advice; Take complete course of treatment as suggested by doctor | • Self-medicate, especially steroids<br>• Delay reporting symptoms of Mucor<br>• Ignore medical advice |

| Sentinel Signs and Symptoms: (Checklist) | Predisposing factors are: |
|---|---|
| • Nasal blockade or congestion,<br>• Nasal discharge (blackish/bloody/purulent),<br>• Local pain on the cheek bone,<br>• One sided facial pain, numbness or swelling,<br>• Blackish discoloration over bridge of nose/palate/around the eye,<br>• Loss of sensation of the area,<br>• Toothache, loosening of teeth, jaw involvement,<br>• Intraoral pus discharge,<br>• Ulceration & Blackening of mucosa,<br>• Exposed palatal bone,<br>• Sinus tract,<br>• Blurred or double vision with pain,<br>• Sudden loss of vision,<br>• Chemosis,<br>• Exophthalmos,<br>• Ophthalmoplegia,<br>• Fever, headache, skin lesion: thrombosis & necrosis (eschar),<br>• Chest pain, pleural effusion, haemoptysis, worsening of respiratory symptoms,<br>• Altered mental state, Rapid deterioration of general condition. | • Uncontrolled Diabetes Mellitus.<br>• Immunosuppression by steroids/immunomodulator drugs.<br>• Prolonged ICU stays.<br>• Co-morbidities– Post-Transplant/malignancy/Sickle Cell Anemia.<br>• Voriconazole therapy<br>**When to suspect:**<br>• Sinusitis – nasal blockade or congestion, nasal discharge (blackish/bloody), local pain on the cheek bone<br>• One sided facial pain, numbness or swelling<br>• Blackish discoloration over bridge of nose/palate<br>• Toothache, loosening of teeth, jaw involvement<br>• Blurred or double vision with pain; fever, skin lesion; thrombosis & necrosis (eschar)<br>• Chest pain, pleural effusion, hemoptysis, worsening of respiratory symptom |

**Pulmonary Mucormycosis:** Fever, Cough, Hemoptysis, Chest pain, Pleural Effusion, Worsening Respiratory Symptoms.

**CT Thorax:** Suspect Mucormycosis in patients with thick-walled Lung Cavity (Need to differentiate from COVID Associated Pulmonary Aspergillosis-CAPA), Reverse Halo Sign, Multiple nodules, Pleural Effusion. Presence of Reverse Halo Sign (Atoll Sign), more than 10 pulmonary nodules, and pleural effusion is more in favor of CAM than CAPA. *Presence of bronchial thickening, tracheobronchial involvement, peri bronchial collection, and tree-in-bud nodules are in favor of CAPA. Tuberculosis must be ruled out with appropriate tests.*

**Diagnosis:**

***Mucormycosis is a Medical Emergency and proper/correct context should be started on Empirical therapy even prior to diagnostic confirmation.***

- Suspected patients must undergo appropriate radio-imaging study at the earliest. MRI-PNS with brain contrast study for ROCM, and plain CT thorax for pulmonary Mucormycosis must be done.
- Diagnosis is confirmed by fungal staining/ culture from appropriately collected specimens. KOH mount and microscopy, histopathology of debrided tissue (presence of Ribbon like aseptate hyphae 5-15μ thick that branch at right angles).
- Molecular Diagnostic Methods such as Immunohistochemistry, PCR can be done.

**What to do if you have these symptoms?**

• Consult your doctor immediately
• Doctor will examine you clinically. If required, the doctor will take swabs from nose and test them for fungus
• If the infection is strongly suspected or confirmed, you may need treatment with antifungal medications and surgery

## Management Approach for Rhino-Orbito-Cerebral Mucormycosis.

**Possible ROCM:** Typical Symptoms and Signs in a clinical setting of concurrent or recently treated COVID19, Diabetes Mellitus, Immunosuppression, Use of Corticosteroids and/or other Immunomodulatory drugs like Tocilizumab, Supplemental Oxygen or Mechanical Ventilation.

**Possible ROCM:** No Supportive Evidence on Diagnostic Nasal Endoscopic and/or Contrast-Enhanced MRI/CT scan.

Close Observation on Supportive Treatment with repeat Diagnostic Nasal Endoscopy q24hr and Contrast Enhanced MRI/CT scan after 72 hours.

**ROCM Unlikely:** Clinically improving on supportive treatment. *No supportive evidence on repeat endoscopy or imaging.*

Continued Observation for 3 weeks.

**Probable ROCM:** Supportive evidence clinically and on diagnostic Nasal Endoscopy and/or Contrast enhanced CT/MRI Scan.

*No Evidence on direct microscopy or Culture or Histopathology with special stains or Molecular diagnostics.*

**Probable ROCM:** Clinically Worsening, with new onset Supportive evidence on diagnostic Nasal endoscopy and/or Contrast enhanced CT/MRI Scan.

*No Evidence on direct microscopy or Culture or Histopathology with special stains or Molecular diagnostics.*

**Proven ROCM:** Supportive Evidence clinically and on diagnostic Nasal Endoscopy and/or Contrast Enhanced CT/MRI Scan.

*Confirmation on Direct microscopy or Culture or Histopathology with special Stains or Molecular Diagnostics.*

1. **Prepare the patient and Prioritize Surgery.**
2. **Liposomal Amphotericin B** in initial dose of 5mg/kg body weight (10 mg/kg body wt. in case of CNS involvement) is the treatment of choice. It should be diluted in 5% dextrose; it is incompatible with normal saline/ Ringer Lactate. It should be given over 2-3 hours and should be started with full dose from day 1. Monitoring for kidney function tests and serum electrolytes is recommended.

   It must be continued till a favourable response is achieved and disease is stabilized which may take 3-6 weeks following which step down to oral Posaconazole (300 mg delayed release tablets twice a day for 1 day followed by 300 mg daily) or Isavuconazole (200 mg 1 tablet 3 times daily for 2 days followed by 200 mg daily) shall have to be taken for prolonged period as per advice of the physician.
3. The therapy must be continued until clinical resolution of signs and symptoms of infection as well as resolution of radiological signs of active disease and elimination of predisposing risk factors such as hyperglycaemia, immunosuppression etc., It may have to be given for quite long periods of time.
4. Conventional Amphotericin B (deoxy cholate) in the dose 1-1.5mg/kg may be used if liposomal form is not available.

## Treatment:

***Mucormycosis is a Medical Emergency and proper/correct context should be started on Empirical therapy even prior to diagnostic confirmation.***

One should have a high index of suspicion of invasive fungal infection such as Mucormycosis in the presence of predisposing conditions as mentioned above. Timely initiation of treatment reduces mortality. Multidisciplinary Team approach is required. Treatment of Mucormycosis involves combination of surgical debridement and antifungal therapy.

- Liposomal Amphotericin B in initial dose of 5mg/kg body weight (10 mg/kg body wt. in case of CNS involvement) is the treatment of choice. It should be diluted in 5% dextrose; it is incompatible with normal saline/ Ringer Lactate, given through Peripherally Inserted Central Catheter (PICC) line/Central Venous Catheter (CVC). It should be given over 2-3 hours and should be started with full dose from **day 1**. Monitoring for kidney function tests and serum electrolytes is recommended. It must be continued till a favorable response is achieved and disease is stabilized which may take 3-6 weeks following which step down to oral Posaconazole (300 mg delayed release tablets twice a day for 1 day followed by 300 mg daily) or Isavuconazole (200 mg 1 tablet 3 times daily for 2 days followed by 200 mg daily) shall have to be taken for prolonged period as per advice of the physician.
- The therapy must be continued until clinical resolution of signs and symptoms of infection as well as resolution of radiological signs of active disease and elimination of predisposing risk factors such as hyperglycemia, immunosuppression etc., It may have to be given for quite long periods of time.
- Conventional Amphotericin B (deoxycholate) in the dose 1-1.5mg/kg may be used if liposomal form is not available.
- Kidney Functions must be monitored during the entire management period.

## Microbiological Surveillance for COVID Associated Mucormycosis in Healthcare settings

**Sample locations:**

ICU/HDU/ Wards

Preference to be given to areas from where Mucormycosis cases are reported.

**Method of sampling:**

1. The Sabouraud Dextrose Agar (SDA) plates should be examined for contamination, prior to use.
2. Assemble the plates and ensure that the correct information is written on the base of the plate (the part containing the media) with ink or another marker. *Do not mark on the lid of the plate, as there is always a possibility of lids coming off and being replaced on the incorrect sample plate.*

   The following details must be marked on each plate or recorded separately:
   - date and time of day sample taken.
   - area/location of sample.
   - position/sample number.
3. Plates must be kept in the ICU/ HDU/ Ward where they are to be exposed. Four side tables next to beds to be identified to ensure it falls within 10 cubic ft
4. Place the plates in the appropriate positions with the lids still on.
5. Raise the lids to expose the surface of the medium, rest the lid on the very edge of the plate so that the entire agar surface is completely exposed. *Take care not to put fingers on plates. Avoid passing anything over the top of plates being exposed, where possible.*
6. Leave plates exposed for one hour. The exposure time should be recorded before sending the plates for incubation.
7. After exposure:
   - Replace lids of plates.
   - clean the areas where plates have been exposed with a suitable disinfectant (70% isopropyl alcohol solution)
   - Remove from area/room/cabinet

- Collect all plates exposed, and transport in sample transportation container to department of Microbiology.

8. The following items to be swabbed and sterile swabs must be labelled appropriately:
   a. Patient linen (dress, bedspread, and blanket)
   b. Patient cot railings and IV Stand
   c. Inner surfaces of Nasal cannulas or oxygen mask
   d. Inner surface of Oxygen humidifiers
9. 50-100 mL of water used for oxygen humidifiers should be sent in a sterile container after proper labelling.
10. SDA plate must be exposed to oxygen outflow 21/ min for 5 minutes
11. Complete and enclose the necessary documentation (Date/time/location)

**At Microbiology Department:**

*Incubation conditions at Mycology section, Department of Microbiology:*

Settle Plate:
1. Check the plates for appropriate label.
2. Place the plates with lids upright at 25° C incubator
3. Check next day and second day for initial growth, also rule out plate contamination
4. Take final reading on day 5 for fungal growth, speciate and record CFU/cu.ft

Swabs:
Each swab should be inoculated on separate SDA plate (appropriately labelled), incubated at 25° C and further processed similar to settle plate and any fungal growth should be speciated and recorded.

Water:

50-100 ml should be passed through membrane filter (0.4/0.2 micrometre) using 10 ml syringe, membrane should be removed aseptically using sterile forceps and area of membrane facing upwards should be inverted and placed on SDA agar plate and further reading must be taken as in settle plate method and any fungal growth should be speciated and recorded.

Oxygen:

Exposed SDA plates to be incubated and further reading taken as in settle plate method and any fungal growth should be speciated and recorded.

**Laboratory Diagnosis of Mucormycosis:**

Clinical Specimens: (In order of Preference)
1. Biopsy from Functional endoscopic sinus surgery (FESS)
2. Biopsy from suspected lesions.
3. Exudates from nares, hard palatal lesions, sinus material or from any suspected lesion

Following Investigations must be done on the samples:
1. Microbiology laboratory: KOH (10 %) and Fungal Culture (sample in sterile saline)
2. Pathology laboratory: HPE (sample in formalin).

KOH mount: KOH helps in screening and has short Turn Around Time.
*Sample is put in 10% KOH and observed after 30 min to 1 hour to look for broad, aseptate hyphae with obtuse angle branching.*
Culture: SDA with antibiotics is used for culture. Check the plates for appropriate label. Place the plate with lid upright in 25°C incubator.
Reading is taken every day up to 5 days to look for growth suggestive of any fungal growth, and, in particular, Mucorales.

## ANNEXURE-02 (Dated: 05.06.2021)

## DISCHARGE FOLLOWING COVID19 INFECTION

This clinical practice guidelines aims to bring into practice a discharge processes unique to COVID-19, including protocols for monitoring of disease progression/regression and follow-up care; and care for social and functional needs during the post-discharge period, and preventing any complications which may or may not be foreseen at the time of discharge.

The variable clinical course of COVID-19 complicates transitions of care because although some patients improve quickly, some worsen after a period of clinical stability and some require weeks to recover completely.

Patients of Mild-Moderate COVID19 disease (Category A, B, C, D, E) *who are not severely immunocompromised* do not require a repeat microbiological testing (RTPCR/RAT) before discharge. They can be discharged if:

- At least 10 days have passed *since symptoms first appeared* **OR** At least 10 days have passed since the date of their first positive viral diagnostic test.
- **AND** they are asymptomatic/Improving symptoms for last 3 consecutive days.
- ***AND*** *does not have any worsening or Severe Symptoms like Breathlessness/ Chest pain/ Altered Mental State/ etc.*
- ***AND*** *Patient must be maintaining a saturation more than 94% on room air.*

*If the patient has a Saturation of <94% with Room air, but otherwise is clinically stable and improving, he needs to be discharged on a Home Oxygen therapy, preferably on an Oxygen Concentrator. If not, he/she can be shifted down from a Designated COVID Hospital to a COVID Care Centre where appropriate Oxygen supply is available.*

Patients of Severe COVID19 disease (Category F), who is asymptomatic/ Symptoms are improving for a minimum of 3 consecutive days, after 10 days of appearance of first symptom, needs to be tested for Microbiological clearance before he/she can be discharged.

- If the sample is Negative, then the patient can be shifted to Non-COVID hospital/ward in case he/she requires further care for management of his/her comorbid illness.
- If the test is positive, it is advisable to repeat the test after 48 hours.

  *These Patients will receive:*
  - *Oral Anticoagulation for 21 days.* Continuation to be decided by treating physician on case-to-case basis.
  - *T. Pantoprazole 40mg 1-0-0 for 5 days.*

**Treatment to be reviewed on 7th day when he/she comes for follow-up.**

**All Patients >40 years, and all patients with comorbidities should get CBC, Blood Sugars, HbA1C, D-dimer, Ferritin, CRP levels 24 hours before discharge.**

- **A detailed summary must be given to the patient** when he is discharged from the hospital. It must include the demographic data, his/her presentation to the hospital, the course as the inpatient, any procedures performed, all the medications he received, all the investigations that was done. Also, the COVID appropriate practices to be followed must be properly advised to the patient.

The Medications he has to continue must be properly advised to the patient/caregiver. Special attention must be given to mention the duration for which the medications must be taken.

- All patients both at home isolation and those admitted in CCC/DCHC/DCH Should come for follow-up after 1 week of discharge to the respective hospital where they have been treated who had Elevated blood sugars, Elevated D-Dimers, Elevated Ferritin levels or Elevated CRP levels at the time of discharge.
  The values must be measured again during the Follow-up visit.
  As COVID19 itself can cause hyperglycaemia, the management of Hyperglycaemia must be vigorously managed with anti-hyperglycaemic medications

- **All patients with any underlying comorbidity**, must continue the medications that they were receiving for the management of the illness. Any modifications can be done as appropriate so as to shift from an injectable to orally administered medication by their treating physicians.
  All patients with any comorbidity must receive:
  T. Aspirin 75mg + Clopidogrel 75mg 0-0-1 for 15days, ***in consultation with treating physician on case-to-case basis***.

- **Any patient with elevated D-Dimer levels** above normal or Having any high-risk conditions for developing Thromboembolism or having any underlying comorbidity that predisposes to pro-coagulant status, at the time of discharge shall receive oral anticoagulation for a duration of 21 days.
  If Renal Functions are normal, the suggested oral anticoagulants are as follows:
  (Any derangements in Renal Function needs to consult a nephrologist before starting Oral Anticoagulation)

| Anticoagulants | eGFR<15 ml/min or ESRD on dialysis | eGFR 15-29 ml/min | eGFR 30-49 ml/min | eGFR ≥50 ml/min |
|---|---|---|---|---|
| DABIGATRAN | Not used | 75mg BD | 110mg BD | 150mg BD |
| RIVAROXABAN | Not used | 15mg OD | 15mg OD | 20 mg OD |
| APIXABAN | 5mg BD (FDA with caution) provided the patient is on regular uncomplicated haemodialysis | 2.5 mg BD | 5 mg BD | 5 mg BD |
| Duration: for 3 weeks after discharge. Continuation of oral anticoagulation to be decided by treating physician on case-to-case basis. | | | | |
| Source: Steffel J, Verhamme P, Potpara TS, et al. The 2018 European Heart Rhythm Association Practical Guide on the use of non-vitamin K antagonist oral anticoagulants in patients with atrial fibrillation. Eur Heart J. 2018;39(16):1330-1393. | | | | |

Patient to be clinically assessed after 3 weeks, and continuation of oral anticoagulation to be decided by treating physician on case-to-case basis.

- **The total duration of Steroid use in management of COVID should be ideally not more than 7-10 days**.
  No patient must be continued/ advised Steroids at the time of Discharge. *(However, steroids can be given in patients in whom the indication is any pre-existing condition that requires therapy with steroid)*

- Every patient must be counselled regarding the danger signs and use of medications at discharge.

**Symptoms like Crusting/Discharge from nose, Blurred Vision, Proptosis, Double vision, Local pain on the cheek bone, One sided facial pain, numbness or swelling, Blackish discoloration over bridge of nose/palate/around the eye, Loss of sensation of the area around nose, Chest pain, Haemoptysis, Altered Mental State, Toothache, loosening of teeth, Intraoral pus discharge, Ulceration & Blackening of mucosa, Exposed palatal bone, Sinus tract, Sudden loss of vision must be compulsorily brought to the notice of concerned doctor.**

**Any of these symptoms in a patient who has recovered from COVID19 has to be evaluated for Mucormycosis as early evaluation and aggressive management forms the basis of successful treatment of Mucormycosis.**

These patients must be evaluated by an ENT specialist at the earliest.

- Before Discharge of patients from home isolation, the following enquiries to be done by the tele-monitoring team.
  - Have you taken Oxygen during your home isolation?

  If yes, through Cylinder or concentrator? Ask about the details from where they got it.
  - Have you used Oral steroids? If yes, which drug was used, for how long and dosage to be enquired.
  - Any other over-the-counter medication used or any AYUSH medications used may be noted.
  - Whether blood sugars were monitored during home isolation? And whether it under control?
  - what was the most recent blood sugar value? If possible, ask about charting of blood sugars if the patient has maintained.
  - If they have got any blood investigation by themselves, which were abnormal?
  - Are they taking any medication for any comorbid condition?

  Make special note to ask for any immunomodulatory drugs/ steroids/ Iron Chelators like deferoxamine / Voriconazole/Fluconazole, etc.

- All patients >18 years, if not yet vaccinated, must be advised to get vaccinated after 3 months of discharge.

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**DISCHARGE SUMMARY**

Name:

Age: Sex: SRF ID:

Date of Admission: BU number:

Date of Discharge: Phone Number:

**Course in Hospital:**

*To be described right from presentation to hospital to time of discharge.*

*Any procedures done should be mentioned. Clinical progress should be mentioned.*

**Treatment received:**

*All the medications received along with duration must be mentioned.*

**Investigations:**

*Blood Investigations: CBC, LFT, RFT, SE, RBS, HbA1C, S. Ferritin, CRP levels, LDH, Troponin, D-Dimer, ABGs, Triglycerides, Procalcitonin.*

*Radiological Investigations: Chest Xray, HRCT thorax.*

*ECG, 2D-ECHO.*

| | *Date **/**/2021* | *Date **/**/2021* | *Date **/**/2021* | | | *On the day of Discahrge* |
|---|---|---|---|---|---|---|
| *Hb* | | | | | | |
| *TC* | | | | | | |
| *N/L/E/M/B* | | | | | | |
| *Platelets* | | | | | | |
| *D-Dimer* | | | | | | |
| *LDH* | | | | | | |
| *CRP* | | | | | | |
| *Ferritin* | | | | | | |
| *RFT* | | | | | | |
| *LFT* | | | | | | |
| *S/E* | | | | | | |
| *RBS* | | | | | | |
| *HbA1C* | | | | | | |
| *Troponin* | | | | | | |
| *Triglycerides* | | | | | | |
| *Procalcitonin* | | | | | | |
| *ABGs(pH/pCO2/pO2/ HCO3)* | | | | | | |

*Any other clinically relevant investigations to be added.*

*The investigations done 24 hours before discharge must be mentioned separately.*

**Vitals at Discharge:**

*Important to document the vitals at the time of discharge.*

**Advice on Discharge:**

*All medications as described in the guidelines above.*

*Any clinically indicated medications as appropriate.*

*All COVID appropriate behaviours must be mentioned.*

*Emergency Contact number of the hospital must be provided.*

**DR. S. SACCHIDANAND**
**VICE CHANCELLOR & CHAIRMAN**
**CLINICAL EXPERT COMMITTEE**