# WEEKLY EPIDEMIOLOGICAL REPORT

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## Recent increase of Mucormycosis (black fungus) in Sri Lanka - Part II

***This is the second article of two in a series on "Recent increase of Mucormycosis (black fungus) in Sri Lanka"***

**Diagnosis:**

The diagnosis of mucormycosis is complex and necessitates a high index of suspicion, particularly among high-risk populations. The capability of diagnosing mucormycosis depends on the availability of imaging techniques, trained personnel, and mycological and histological investigations. The diagnostic process typically involves several key components.

- **Clinical Evaluation**

The first step in diagnosing mucormycosis is a thorough clinical evaluation. This includes an assessment of symptoms and a detailed medical history, with a particular focus on the patient's immunocompromised status, as this greatly increases the risk of infection.

- **Radiological Imaging:**

Radiological imaging is crucial for identifying areas of infection and assessing the extent of the disease. For suspected rhino-orbito-cerebral mucormycosis, urgent radiological studies such as CT or MRI scans of the para-nasal sinuses and brain are necessary. A CT scan can reveal the involvement of several sinuses, particularly the ethmoid and sphenoid sinuses, which are commonly affected. Typical findings include a clear unilateral predilection, the absence of air-fluid levels, thickening of the sinus linings, and destruction of surrounding bone. MRI is preferred over CT in some cases, as it is more effective at detecting the extension of infection into adjacent soft tissues of the orbit and brain.

- **Microbiological/Mycological/ Histopathological analysis:**

Definitive diagnosis of mucormycosis requires microbiological/ mycological analysis. This includes fungal direct microscopy, fungal cultures, histopathological examination of tissue samples, and molecular diagnostics.

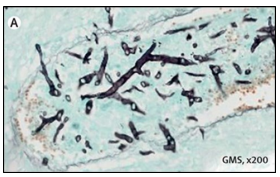


Figure 2: Typical hyphal morphology in mucormycosis lesions (Global guideline for the diagnosis and management of mucormycosis)

These tests are essential for confirming the presence of the fungal pathogen and distinguishing it from other potential causes of infection. Specimens include, clinical material from necrotpale lesions (in a sterile screw capped container with sterile saline) for fungal studies, sputum & BAL (in sterile screw capped containers) for fungal studies. All samples should be sent to Department of Mycology, Medical Research Institute, Colombo 8 which is the National Reference Laboratory for Medical Mycology in Sri Lanka. Same specimens should be sent in formal saline for histopathological diagnosis to the hospital Consultant Histopathologist.

Pulmonary mucormycosis presents its own diagnostic challenges. High-resolution CT (HRCT) of the thorax is typically used, but diagnosis can be difficult due to overlapping signs with COVID-19 pneumonia and COVID-19 Associated Pulmonary Aspergillosis (CAPA). Radiological findings in pulmonary mucormycosis may include thick-walled or multiple pulmonary cavities, infiltrates, reverse halo signs, and the presence of multiple nodules.

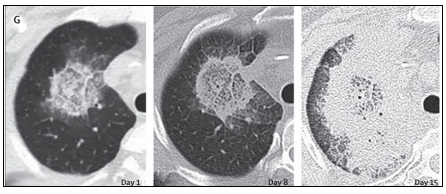


Figure 3: Typical rapidly progressive pulmonary mucormycosis on CT, associated with clinical deterioration (Global guideline for the diagnosis and management of mucormycosis)

**Treatment:**

The management of mucormycosis involves a multi-faceted approach aimed at effectively treating the infection and improving patient outcomes.

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- **Antifungal therapy:**

The primary treatment for mucormycosis is amphotericin B, which is effective against the fungal pathogens responsible for this infection. Early initiation of antifungal therapy is crucial, as delays can lead to worse outcomes.

- **Surgical debridement:**

Timely surgical intervention is essential in managing mucormycosis. Surgical debridement involves the prompt removal of necrotic and infected tissue, which helps control the infection and prevents further spread to adjacent structures and penetration of antifungal drugs. This procedure may need to be repeated, depending on the extent of the disease and the patient's response to treatment.

- **Supportive care:**

Supportive care is also a vital component of the treatment strategy. This includes addressing and managing any underlying medical conditions, particularly uncontrolled diabetes, which is a significant risk factor for mucormycosis. If possible, minimizing immunocompromised therapy is also important. Optimizing the management of these underlying conditions can significantly improve patient outcomes and reduce the risk of complications.

**Prevention:**

Given the high costs and significant morbidity associated with mucormycosis, implementing effective prevention strategies is crucial, particularly for at-risk groups.

- **Glycemic control:**

One of the most important preventive measures is maintaining tight control of blood glucose levels in diabetic patients. Uncontrolled hyperglycemia creates a favorable environment for the growth of fungal pathogens, significantly increasing the risk of mucormycosis. Regular monitoring and management of blood sugar levels, along with adherence to diabetes care plans, can help mitigate this risk.

- **Minimizing corticosteroid use:**

The judicious use of corticosteroids is vital in managing various conditions, including COVID-19. While corticosteroids can be effective in reducing inflammation, excessive or prolonged use can suppress the immune response and increase susceptibility to fungal infections. Healthcare providers should carefully evaluate the necessity and dosage of corticosteroids to minimize potential risks.

- **Environmental precautions:**

Reducing exposure to environments where fungal spores are prevalent is another critical preventive strategy. This includes avoiding areas such as construction sites or locations with decaying organic matter, where spores are more likely to be present. Individuals, particularly those who are immunocompromised, should take precautions such as wearing masks or avoiding these environments altogether, especially during periods of high fungal spore dispersion.

**Sri Lankan situation:**

Mucormycosis has been diagnosed from Sri Lankan immunocompromised patients over the years and it is not uncommon among Sri Lankan patients. The Department of Mycology at the Medical Research Institute has reported a surge in mucormycosis patients since 2022, necessitating further investigation into the true burden of the disease.

**Table 1: Mucormycosis cases in Sri Lanka**

| Year | Rhino cerebral Mucormycosis | Pulmonary Mucormycosis |
|---|---|---|
| 2018 | 42 | 01 |
| 2019 | 38 | 01 |
| 2020 | 43 | 05 |
| 2021 | 139 | 02 |
| 2022 | 118 | 05 |
| 2023 | 87 | 11 |
| 2024 up October | 87 | 18 |

Table 1 describes the rising trend of mucormycosis cases in Sri Lanka. Many patients presented with rhino-cerebral and pulmonary mucormycosis, predominantly among those with uncontrolled diabetes. A significant number of cases also involved post-kidney transplant patients. Most cases were reported from Teaching Hospital Anuradhapura and the National Hospital of Sri Lanka, indicating possible localized outbreaks or higher incidence rates in these areas.

The sudden increase in mucormycosis cases initiated the issuing of general circular no 01-30/2023 regarding "Surveillance, notification, investigation and laboratory testing of cases of mucormycosis (Black fungus)" in 29th September 2023 from the Ministry of Health. It highlights the need of taking measures to strengthen surveillance activities to identify, notify and manage suspected cases of mucormycosis to prevent serious consequences.

According to the circular, once a suspected case is identified, all healthcare institutions should report immediately to the Chief Epidemiologist, Epidemiology Unit. The Department of Mycology at the Medical Research Institute is the technical focal point to provide assistance in confirmation of the case. The detailed account of the procedure related to specimen collection and transport, management of Mucormycosis, administration of amphotericin B, prevention of these invasive fungal infections was annexed with the circular.

Treatment of mucormycosis in Sri Lanka incurs substantial costs. Antifungal therapy such as liposomal amphotericin B costs at least LKR 150,000 per day for a 50 kg patient. Surgical interventions such as repeated surgical debridement is often required, adding to the financial burden. Laboratory testing, CT scans, and MRIs are necessary for accurate diagnosis and ongoing evaluation. Some patients may require intensive care support, further increasing costs. The cumulative treatment costs pose a significant economic burden on patients and the healthcare system.

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**Table 1: Selected notifiable diseases reported by Medical Officers of Health 28th – 04th Oct 2024 (40th Week)**

| RDHS | Dengue Fever | | Dysentery | | Encephalitis | | En. Fever | | F. Poisoning | | Leptospirosis | | Typhus F. | | Viral Hep. | | H. Rabiies | | Chickenpox | | Meningitis | | Leishmania- | | Tuberculosis | | WRCD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | T* | C** |
| Colombo | 169 | 9380 | 4 | 33 | 0 | 11 | 0 | 47 | 0 | 22 | 10 | 417 | 0 | 8 | 0 | 9 | 0 | 0 | 8 | 458 | 1 | 35 | 0 | 2 | 45 | 1690 | 100 | 100 |
| Gampaha | 101 | 4371 | 0 | 37 | 1 | 31 | 1 | 14 | 0 | 77 | 10 | 628 | 0 | 11 | 0 | 9 | 0 | 0 | 11 | 362 | 1 | 114 | 0 | 23 | 20 | 960 | 64 | 100 |
| Kalutara | 44 | 2325 | 3 | 29 | 0 | 2 | 2 | 33 | 0 | 36 | 43 | 676 | 0 | 8 | 0 | 10 | 0 | 1 | 11 | 519 | 1 | 54 | 0 | 1 | 17 | 493 | 100 | 100 |
| Kandy | 58 | 3752 | 0 | 34 | 2 | 5 | 0 | 9 | 1 | 57 | 10 | 213 | 1 | 29 | 0 | 11 | 0 | 2 | 6 | 337 | 0 | 13 | 0 | 46 | 18 | 512 | 96 | 100 |
| Matale | 26 | 660 | 0 | 13 | 0 | 1 | 0 | 8 | 1 | 25 | 2 | 85 | 0 | 4 | 1 | 7 | 0 | 0 | 2 | 131 | 0 | 13 | 9 | 278 | 3 | 102 | 100 | 100 |
| Nuwara Eliya | 7 | 306 | 3 | 121 | 0 | 7 | 0 | 10 | 0 | 202 | 1 | 150 | 0 | 38 | 1 | 9 | 0 | 0 | 7 | 213 | 0 | 16 | 0 | 1 | 5 | 216 | 100 | 100 |
| Galle | 35 | 1777 | 2 | 45 | 0 | 21 | 0 | 12 | 2 | 95 | 37 | 710 | 6 | 105 | 0 | 10 | 0 | 1 | 22 | 668 | 4 | 73 | 0 | 3 | 13 | 354 | 95 | 100 |
| Hambantota | 10 | 725 | 0 | 26 | 0 | 3 | 0 | 5 | 1 | 46 | 12 | 406 | 0 | 46 | 0 | 6 | 0 | 2 | 6 | 268 | 0 | 26 | 21 | 423 | 2 | 131 | 92 | 100 |
| Matara | 75 | 919 | 1 | 9 | 0 | 6 | 0 | 2 | 0 | 26 | 12 | 430 | 1 | 24 | 3 | 16 | 0 | 0 | 14 | 310 | 3 | 68 | 1 | 96 | 3 | 139 | 94 | 100 |
| Jaffna | 11 | 5261 | 0 | 58 | 0 | 2 | 1 | 26 | 1 | 35 | 0 | 17 | 4 | 465 | 0 | 7 | 0 | 1 | 2 | 195 | 0 | 28 | 0 | 1 | 10 | 209 | 100 | 93 |
| Kilinochchi | 2 | 290 | 0 | 17 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 18 | 0 | 11 | 0 | 0 | 0 | 2 | 2 | 11 | 0 | 6 | 0 | 1 | 5 | 25 | 100 | 100 |
| Mannar | 2 | 280 | 2 | 11 | 0 | 0 | 0 | 1 | 0 | 4 | 1 | 23 | 1 | 13 | 0 | 1 | 0 | 0 | 2 | 10 | 0 | 5 | 0 | 1 | 9 | 55 | 100 | 100 |
| Vavuniya | 0 | 166 | 0 | 13 | 0 | 1 | 0 | 2 | 0 | 21 | 4 | 91 | 0 | 5 | 0 | 4 | 0 | 0 | 0 | 39 | 0 | 22 | 0 | 9 | 1 | 34 | 100 | 100 |
| Mullaitivu | 1 | 204 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 18 | 1 | 68 | 0 | 11 | 0 | 0 | 0 | 2 | 1 | 7 | 0 | 5 | 0 | 10 | 0 | 27 | 100 | 100 |
| Batticaloa | 5 | 1437 | 3 | 111 | 0 | 13 | 0 | 7 | 1 | 59 | 0 | 65 | 0 | 2 | 0 | 20 | 0 | 2 | 3 | 111 | 1 | 44 | 0 | 4 | 2 | 131 | 100 | 100 |
| Ampara | 4 | 231 | 0 | 29 | 0 | 3 | 0 | 0 | 0 | 19 | 2 | 168 | 1 | 2 | 0 | 5 | 0 | 1 | 5 | 105 | 0 | 34 | 0 | 21 | 2 | 100 | 100 | 100 |
| Trincomalee | 2 | 632 | 1 | 16 | 0 | 1 | 0 | 3 | 0 | 9 | 0 | 136 | 0 | 12 | 0 | 3 | 0 | 0 | 0 | 78 | 0 | 20 | 1 | 17 | 6 | 100 | 100 | 100 |
| Kurunegala | 17 | 1980 | 2 | 47 | 1 | 33 | 0 | 3 | 0 | 351 | 9 | 546 | 3 | 27 | 0 | 7 | 0 | 4 | 17 | 471 | 6 | 233 | 21 | 507 | 3 | 404 | 97 | 100 |
| Puttalam | 23 | 977 | 0 | 8 | 0 | 4 | 0 | 3 | 0 | 3 | 3 | 213 | 0 | 34 | 0 | 4 | 0 | 1 | 1 | 116 | 2 | 61 | 1 | 33 | 3 | 182 | 92 | 100 |
| Anuradhapura | 4 | 654 | 0 | 32 | 0 | 6 | 0 | 2 | 0 | 39 | 15 | 378 | 1 | 30 | 0 | 14 | 0 | 1 | 6 | 244 | 2 | 49 | 26 | 729 | 1 | 230 | 91 | 100 |
| Polonnaruwa | 8 | 340 | 0 | 21 | 0 | 3 | 0 | 1 | 9 | 25 | 1 | 234 | 0 | 2 | 0 | 51 | 0 | 0 | 2 | 129 | 0 | 29 | 13 | 434 | 0 | 91 | 100 | 100 |
| Badulla | 6 | 743 | 0 | 31 | 0 | 6 | 0 | 7 | 0 | 56 | 3 | 433 | 2 | 38 | 4 | 39 | 0 | 0 | 12 | 310 | 0 | 32 | 0 | 37 | 8 | 197 | 94 | 100 |
| Monaragala | 30 | 741 | 0 | 18 | 0 | 4 | 0 | 3 | 0 | 85 | 5 | 591 | 1 | 31 | 2 | 42 | 0 | 1 | 5 | 137 | 1 | 89 | 4 | 208 | 2 | 101 | 100 | 100 |
| Ratnapura | 31 | 2368 | 1 | 97 | 0 | 7 | 0 | 8 | 2 | 27 | 58 | 1577 | 0 | 25 | 1 | 26 | 0 | 2 | 19 | 307 | 2 | 114 | 8 | 148 | 12 | 288 | 100 | 100 |
| Kegalle | 15 | 1756 | 2 | 20 | 0 | 8 | 0 | 9 | 1 | 13 | 19 | 629 | 3 | 30 | 1 | 11 | 0 | 1 | 21 | 733 | 0 | 60 | 1 | 24 | 2 | 292 | 82 | 100 |
| Kalmunai | 0 | 676 | 0 | 17 | 0 | 0 | 0 | 2 | 0 | 28 | 2 | 66 | 0 | 5 | 0 | 4 | 0 | 0 | 0 | 197 | 3 | 16 | 0 | 0 | 2 | 114 | 92 | 100 |
| **SRILANKA** | **686** | **42951** | **24** | **901** | **4** | **178** | **4** | **219** | **19** | **1380** | **260** | **8968** | **24** | **101** | **13** | **325** | **0** | **24** | **185** | **6466** | **27** | **1259** | **106** | **3057** | **194** | **7111** | **96** | **99** |

**Source: Weekly Returns of Communicable Diseases (esurvillance.epid.gov.lk). T=**Timeliness refers to returns received on or before 04th Sep, 2024 Total number of reporting units 358 Number of reporting units data provided for the current week: 358**C****-Completeness *

**A = Cases reported during the current week. B = Cumulative cases for the year.**

## Table 2: Vaccine-Preventable Diseases & AFP

28th Sep – 04th Oct 2024 (40th Week)

| Disease | No. of Cases by Province | | | | | | | | | Number of cases during current week in 2024 | Number of cases during same week in 2023 | Total number of cases to date in 2024 | Total number of cases to date in 2023 | Difference between the number of cases to date in 2024 & 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | C | S | N | E | NW | NC | U | Sab | | | | | |
| AFP* | 00 | 00 | 00 | 00 | 00 | 01 | 00 | 00 | 00 | 01 | 00 | 57 | 72 | -20.8% |
| Diphtheria | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 0 % |
| Mumps | 00 | 00 | 00 | 00 | 01 | 00 | 01 | 00 | 00 | 02 | 06 | 226 | 180 | 25.5 % |
| Measles | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 32 | 285 | 599 | -52.4 % |
| Rubella | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 02 | 05 | -60% |
| CRS** | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 02 | 0 % |
| Tetanus | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 05 | 06 | -16.6 % |
| Neonatal Tetanus | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 0 % |
| Japanese Enceph-alitis | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 06 | 02 | 200 % |
| Whooping Cough | 01 | 00 | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 02 | 00 | 55 | 07 | 685.7 % |

### Key to Table 1 & 2

**Provinces:** **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

**RDHS Divisions:** **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

**Data Sources:**

**Weekly Return of Communicable Diseases:** Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

**Special Surveillance: AFP*** (Acute Flaccid Paralysis ), Japanese Encephalitis

**CRS** =**Congenital Rubella Syndrome

**NA** = Not Available

**Take prophylaxis medications for leptospirosis during the paddy cultivation and harvesting seasons.**

**It is provided free by the MOH office / Public Health Inspectors.**

Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

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