

COVID-19-associated mucormycosis: An emerging challenge

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COVID-19-associated mucormycosis in India

Patients with
COVID-19 who
require oxygen
supplementation

Improper sanitisation and handling

- Non-sterile water in humidifiers / water not changed regularly
- Contaminated tubing and masks
- Poor air filtration
- Contamination of oxygen supplies

Use of industrial oxygen

- Oxygen shortage during the second wave led to use of industrial oxygen
- The oxygen itself is pure, but the industrial cylinders are not sterile
- Contaminated oxygen administered to patients

Mucormycosis: risk factors



The major risk factor for mucormycosis is diabetes



Other risk factors include:

- Cancer
- Stem cell and solid organ transplant
- Neutropenia
- Chronic kidney disease, pulmonary tuberculosis and chronic obstructive pulmonary disease
- Long-term corticosteroid use
- Prolonged hospitalization
- Chronic alcoholism
- Malnutrition
- Intravenous drug use
- Low birthweight infants
- Acquired immune deficiency syndrome

Signs of mucormycosis



Face

- Facial and lid oedema
- Facial skin discoloration
- Tenderness over the sinuses



Palate

- Palatal discoloration
- Palatal ulcers and necrosis



Eyes

- Ptosis
- Proptosis
- Restricted extra-ocular movements



Nose

- Black necrotic turbinates
- Brownish discharge from nose
- Epistaxis



The signs of mucormycosis often mimic orbital cellulitis

Medical management of mucormycosis



General measures

- Reversal of underlying risk factors and improving general patient health
- Early diagnosis: encourage patients to seek care early for suspicious symptoms
- COVID-19 vaccination



Pharmacological - antifungals

Amphotericin B¹

- Standard treatment
- Lipid formulations are superior to conventional AmB, but more expensive
- Combination of LFAmB and posaconazole/caspofungin can also be effective

Posaconazole^{2,3}

- Not approved for primary therapy
- Salvage therapy after AmB failure
- >60% success rates

Isavuconazole⁴

- New anti-fungal drug
- Efficacy rates unknown

AmB, amphotericin B deoxycholate, LF, lipid formulation.

1. Gleissner B, et al. *Leuk Lymphoma*. 2004;45:1351–60; 2. Reed C, et al. *Clin Infect Dis*. 2008;47:364–71. 3. Manesh A, et al. *Mycoses*. 2016;59:765–772;

4. Prakash H, et al. *Microorganisms*. 2021;9:523.