

FROM CRISIS TO CURE

THE MULTIDISCIPLINARY MAGIC AGAINST THE MIGHTY MUCOR

PULMONARY MUCORMYCOSIS IS A RARE BUT LIFE-THREATENING FUNGAL INFECTION THAT CAN OCCUR IN IMMUNOCOMPROMISED INDIVIDUALS.

A 66-year old male patient presented to the outpatient department in March 2023 with complaints of generalised weakness persisting for four months, associated with weight loss of 8 kg and poor appetite. He also reported hoarseness of voice, a history of intermittent fever over the same duration, and cough with mucoid expectoration.

Notably, the patient had a history of uncontrolled type 2 diabetes mellitus and had previously been hospitalized for COVID-19 pneumonia, requiring a two-week hospital stay and corticosteroid treatment. He had a regular alcohol intake and tobacco chewing habit but was a non-smoker.

The initial investigations revealed anemia (hemoglobin - 8.7g/dL), while the sputum microbiological tests were negative for tuberculosis, fungal or bacterial infections.



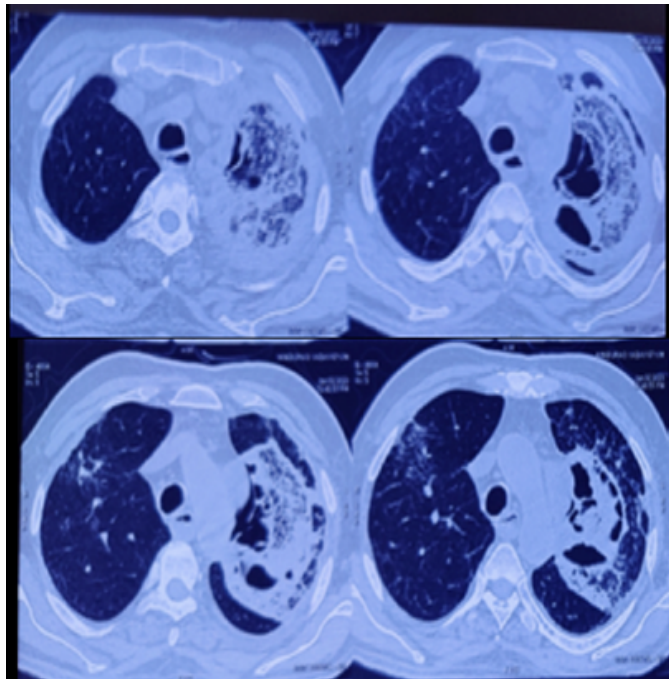
Presenting symptoms

- Weakness since 4 months
- Poor appetite
- Weight loss
- Hoarseness of voice
- Intermittent fever
- Cough



Medical history

- Uncontrolled diabetes
- Corticosteroid treatment for Covid-19 pneumonia
- Regular alcohol and tobacco consumption



Detailed investigations were performed, including a plain HRCT chest and sputum microbiological tests.

However, owing to the patient's clinical presentation and HRCT findings, empirical anti-tubercular therapy (ATT) was initiated in December 2022 - comprising HRZE (isoniazid, rifampicin, pyrazinamide and ethambutol)

Unfortunately, the patient's clinical condition worsened three months after initiating ATT, prompting referral to Jupiter Hospital's Pulmonology Department by an internal medicine specialist, for further evaluation.

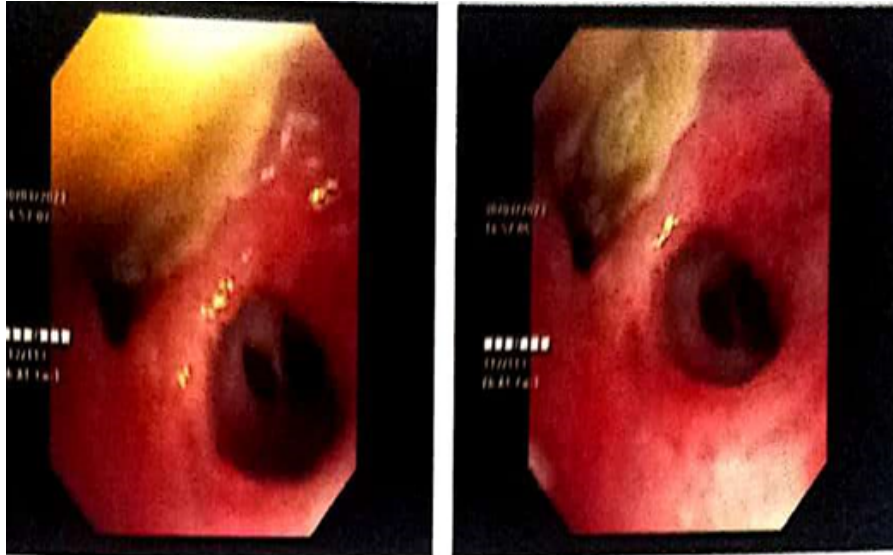
- **Repeat HRCT chest revealed left upper lobe consolidation with central breakdown changes.**
- **Upon examination the patient had significant pallor, tachycardia, grade 3 clubbing, and coarse crepitations in the left suprascapular and infrascapular areas.**
- **Blood tests indicated persistent anaemia, uncontrolled blood sugar levels, and elevated erythrocyte sedimentation rate.**

The differentials we considered were –

1. Malignancy in view of hoarseness, cavitary lesion & weight loss
2. MultiDrug Resistant Tuberculosis
3. Non Tuberculous Mycobacterial Infection
4. Pulmonary Fungal Infections

Further investigations, including sputum tests, whole-body PET scan, and bronchoscopy, were performed to establish a definitive diagnosis.

- PET scan showed Peripheral metabolic activity in consolidation with central breakdown changes in left upper lobe with a SUV of 13.5.
- Bronchoscopy findings showed absent left vocal cord movement and thick purulent secretions occluding the left upper lobe segmental bronchus.



- Tests for Mycobacterium tuberculosis (MTB) using GeneXpert and acid-fast bacilli (AFB) stain and culture were negative but fungal stain was positive for aseptate hyphae, suggestive of mucor.
- Aspergillus galactomannan testing also returned positive results.

The patient was admitted and started on liposomal amphotericin B.

A multi-disciplinary approach

An infectious disease specialist was consulted, and a decision was made to initiate treatment with liposomal amphotericin B combined with Surgical resection of left upper lobe.

A thoracic surgeon's opinion was taken, and lobectomy was planned to remove the affected lung tissue.

Patient could not afford the liposomal Amphotericin, hence in consultation with ID specialist it was later replaced by conventional amphotericin B overlapping with posaconazole.

Patient had moderate risk of surgery in view of long standing uncontrolled DM, de-conditioning, poor nutrition, alcoholism, compromised lung functions and mucor mycosis.

Before subjecting the patient to high risk surgery we decided to reconfirm the tissue invasion as this mucor mycosis presentation was unusual with chronic slow progression.

To evaluate the extent of airway involvement and tissue invasion, a second bronchoscopy with biopsy was planned.

The bronchial biopsy was taken which revealed necrosis with broad aseptate fungal hyphae of mucor.

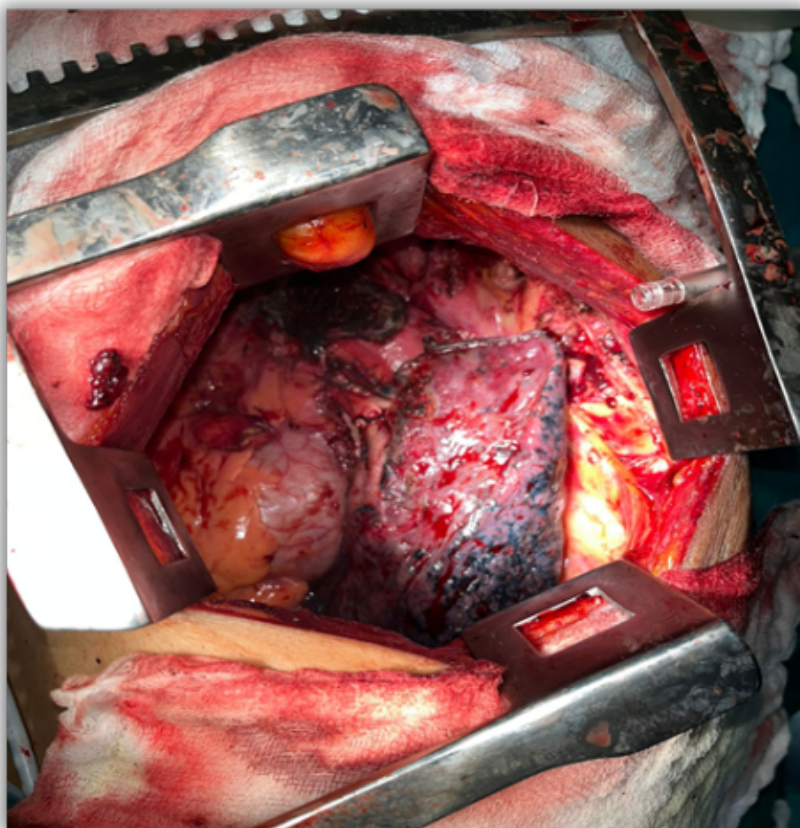
A repeat HRCT chest was performed to determine the extent of the lesions and progression of disease.

The patient underwent preoperative optimization, including pulmonary rehabilitation and nutritional supplementation, to enhance surgical outcomes.

Challenges during surgery included the removal of left upper lobe and lingula which was densely adherent to parietal and visceral pleura, arch of aorta and the entrapment of recurrent laryngeal nerve.

During surgery, cavity had to be opened as it could not be completely resected due to dense adhesions to aorta.

Our biggest challenge was patient's poor affordability. Fortunately we could mobilise financial support through Jupiter Foundation's CSR funds.



The small part of the adherent cavity had to be left behind.

Appropriate precautions were taken to prevent spillage.

Tissue biopsy confirmed the presence of both mucormycosis in the wall and aspergillosis in the cavity without any angioinvasion.

Post-operative care

During the post-operative period, the patient was extubated on the operating table but required two days of intensive care unit stay.

Amphotericin B was discontinued 2 days after surgery. The patient was continued on oral posaconazole, and the intercostal drain was eventually removed.

However, after one week of surgery, the patient experienced new onset of fever, tachycardia, hypotension, hypoxia, tachypnea, diminished appetite and depressive features.

Psychiatric consultation was sought, and was diagnosed with hypoactive delirium.

There was a raised total leukocyte count, while the chest X-ray revealed left lower zone opacities. C-reactive protein (CRP) levels increased up to 170.

There was suspicion of relapse of Mucor mycosis as part of the cavity was left behind with possibility of spillage due to opening of the cavity.

Repeat HRCT chest revealed extensive lesions in left lung.

Posaconazole was discontinued due to gastrointestinal intolerance, and suspected treatment failure.

Conventional amphotericin B was restarted, broad-spectrum antibiotic coverage was administered to address any secondary bacterial infection.

Several challenges were encountered during the course of treatment:

- The patient also exhibited intolerance to amphotericin B, which posed a hurdle in managing the condition.
- Cost-related issues also added complexity to the treatment process.
- Nephrotoxicity emerged as a concern, requiring close monitoring and QTC monitoring to ensure cardiac safety.
- Additionally, difficulties with IV cannula necessitated the eventual insertion of a central line.
- The management of electrolyte imbalances demanded daily monitoring and adjustments. The nephrology team was consulted for the same.

Clinically, the patient showed improvement in appetite, fever, and demonstrated a positive radiological response after 10 days.

Pulmonary rehabilitation was continued and patient was discharged after six weeks of treatment.



Dr. Alpa Dalal
Head of Pulmonary Medicine at Jupiter Hospital

"We extend our heartfelt gratitude to the hospital administration for their unwavering financial and administrative support, the treating doctors for their exceptional care, the crowd funding donors for their generosity, and the Jupiter consultants for their financial and professional contributions.

Their collective efforts, contributions and belief in our cause have demonstrated the transformative power of a multidisciplinary approach and reinforced the importance of collaboration in delivering exceptional patient care."

Pulmonary mucormycosis is a rare but devastating fungal infection that primarily affects immuno-compromised individuals. In this case, uncontrolled diabetes and history of COVID 19 pneumonia set the stage for invasive pulmonary mucormycosis.

The delay in diagnosis and treatment initiation in this case was likely due to overlap of symptoms with post-COVID complications and the high pretest probability of pulmonary tuberculosis.

Collaboration between internal medicine specialists, pulmonologists, infectious disease specialists, thoracic surgeons, nephrologists and psychiatric consultants allowed for a comprehensive approach in the diagnosis and management of pulmonary mucormycosis.

Early recognition of clinical deterioration and post operative relapse of mucor mycosis helped in prompt initiation of appropriate antifungal therapy. Additionally, aggressive surgical intervention led to the positive outcome observed in this usually fatal disease.



**Tha patient and family, with
Team Jupiter, on the day of discharge**

TAKE HOME MESSAGES

1. Pulmonary mucormycosis should be considered as a potential complication in patients with poorly controlled diabetes, a history of COVID-19 pneumonia, and persistent respiratory symptoms.
2. Prompt diagnosis and initiation of antifungal therapy are crucial for improving patient outcomes. Collaboration between various specialties, including pulmonologists, infectious disease specialists, and thoracic surgeons, is essential.
3. Surgical intervention, such as lobectomy, is necessary to remove the affected lung tissue and control the infection.
4. The involvement of a multidisciplinary team allows for a comprehensive and integrated approach to patient care, ensuring timely and appropriate management.
5. Post-operative care, including monitoring for complications and addressing comorbidities, plays a vital role in patient recovery.
6. This case report serves to raise awareness among general medical practitioners and the general public about the challenges associated with pulmonary mucormycosis and the importance of a multidisciplinary approach in patient care. Further research and guidelines are needed to guide optimal management strategies for this challenging fungal infection.