



# Rhizopus Azygosporus in a High-risk AML Case

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## ABSTRACT

- Mucormycosis is a rare but life-threatening fungal infection with high mortality, particularly in immunocompromised patients.
- Diabetes mellitus (DM), hematologic malignancies, transplantation, and prolonged neutropenia are major risk factors for its development.
- We present a challenging case of a diabetic patient with high-risk acute myeloid leukemia (AML) who developed *Rhizopus azygosporus* mucormycosis.

## PATIENT CASE

- A 58-year-old male with type 1 DM was diagnosed with acute myeloid leukemia (AML) after presenting with severe anaemia and neutropenia. Bone marrow evaluation confirmed 70% blasts, cytogenetic studies revealed an ETV6 translocation and BCOR mutation, categorizing him as high-risk. He received induction chemotherapy with cytarabine and idarubicin along with Posaconazole prophylaxis.
- During aplasia, he developed fever and respiratory symptoms (cough and dyspnoea), initially managed with broad-spectrum antibiotics.
- A CT scan revealed an anterior mediastinal mass and a left pleural effusion. Despite drainage his symptoms persisted, and bronchoscopy deemed non-diagnostic. Given the suspicion of invasive fungal infection, he was empirically started on amphotericin B.
- The bone marrow biopsy showed persistence of the disease, so FLAG-IDA salvage chemotherapy was administered. His condition worsened with persistent fever, weight loss, worsening cough, and haemoptysis.
- A biopsy of the progressing mediastinal mass showed fungal elements initially suggestive of *Aspergillus*, but fungal PCR & molecular testing confirmed diagnosis of *Rhizopus azygosporus*.
- Given the poor prognosis of AML complicated by mucormycosis, we decided to withhold further AML treatment to avoid exacerbating *Rhizopus* proliferation. Oral Isavuconazole was prescribed to facilitate hospital discharge and outpatient palliation.

## RADIOLOGICAL INVESTIGATIONS

- CT Thorax – Identified the anterior mediastinal mass and pleural effusion, raising suspicion of an invasive process.



Left: CT TAP Jul 5, 2024 - shows an anterior mediastinal mass and left pleural effusion. High suspicion for invasive process. 6 x 3.8cm mass

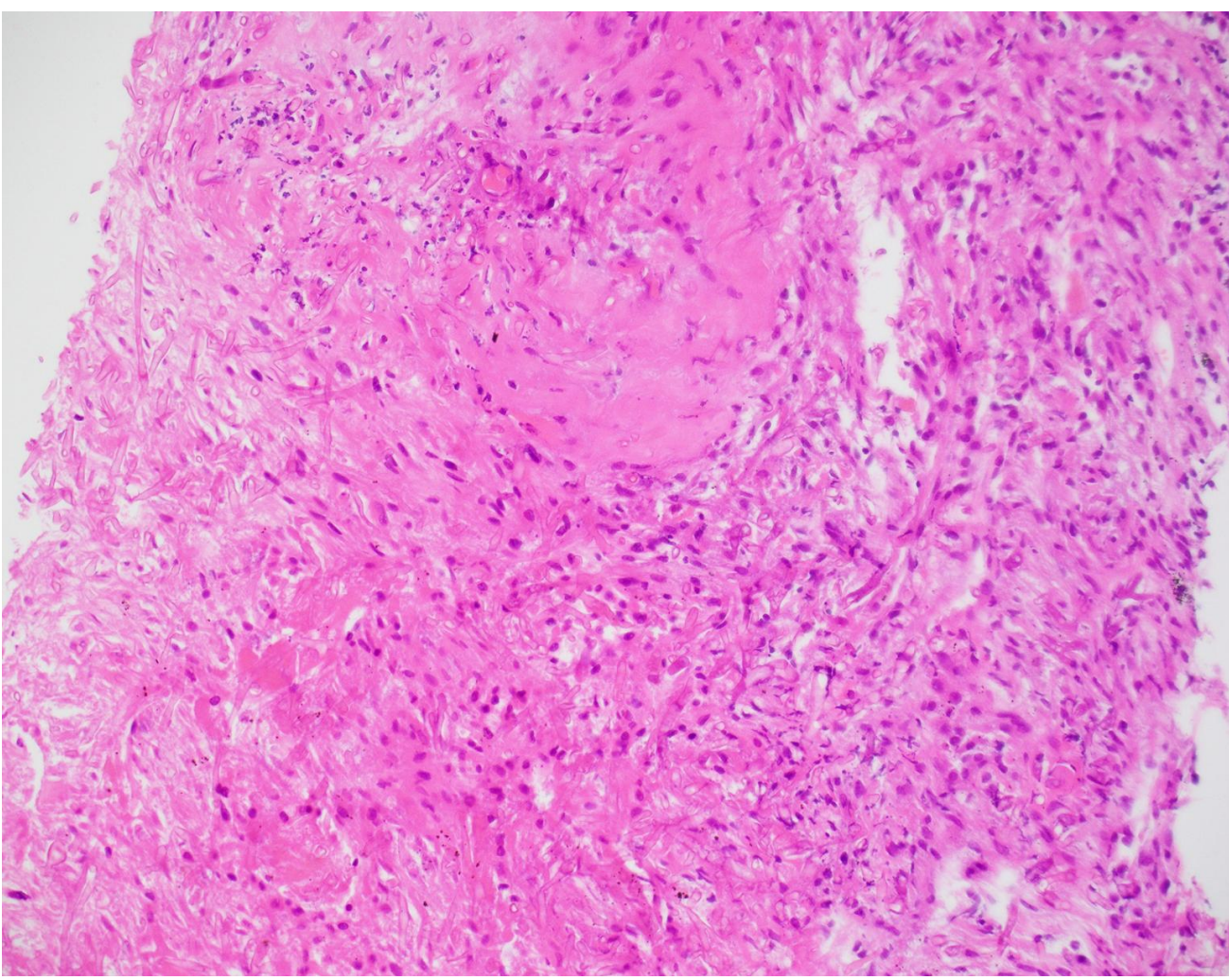
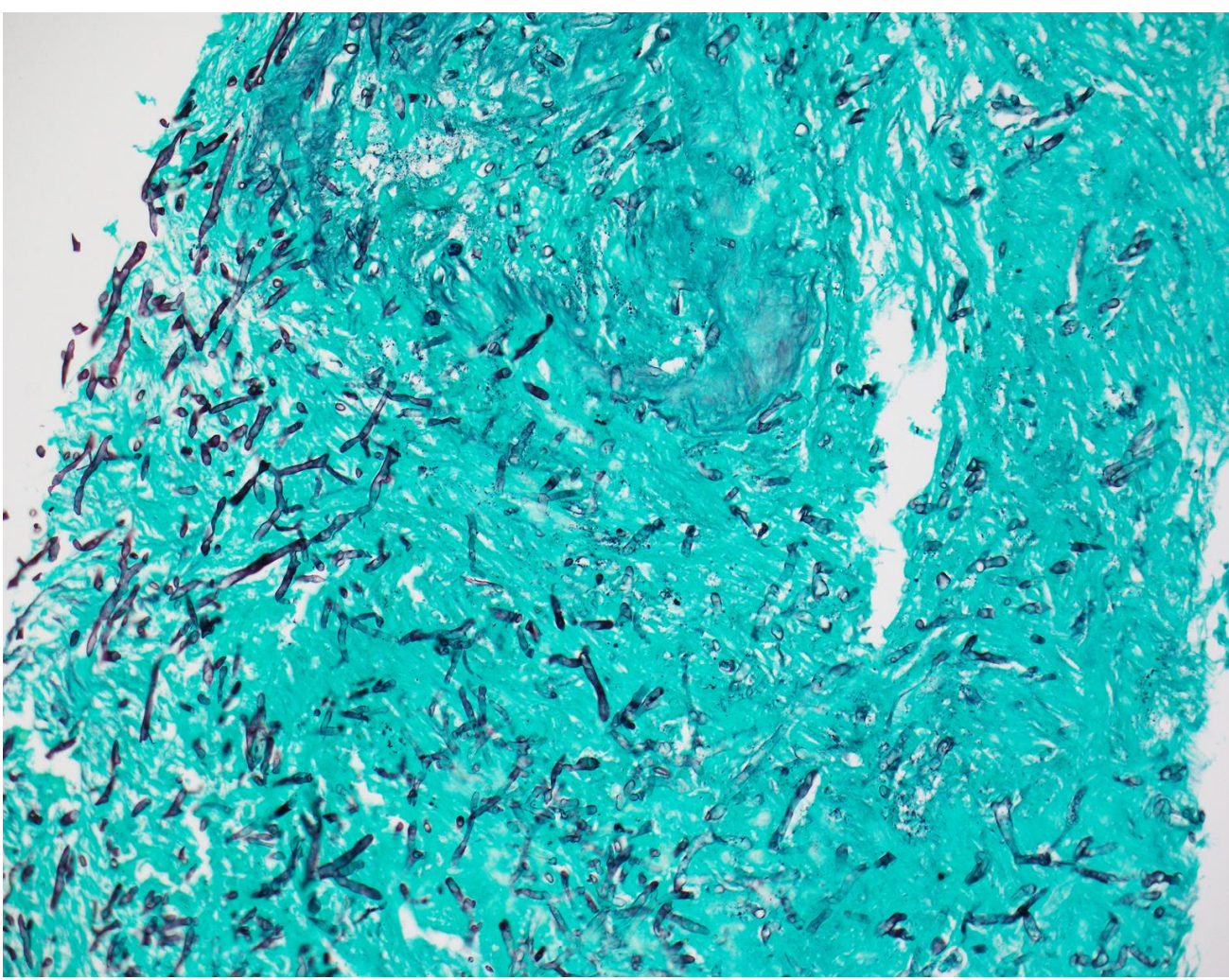
Right: CT TAP Aug 21, 2024 – shows progression with interval increase in size of the contiguous left upper lobe and anterior mediastinal mass measuring approximately 5.6 x 4.8cm in axial dimensions

## DISCUSSION

- Mucormycosis is a rare but aggressive angio-invasive fungal infection caused by fungi from the order Mucorales, including *Rhizopus*, *Mucor*, and *Lichtheimia* species. It predominantly affects immunocompromised individuals, and the prognosis remains poor with mortality rates ranging from 45% to 90%.
- Clinical presentations can be pulmonary, rhinocerebral, cutaneous or even disseminated. Diagnosis requires imaging techniques such as CT/MRI, histopathologic examination showing broad, ribbon-like hyphae with right-angle branching and molecular testing with PCR and sequencing for species identification.
- A multidisciplinary approach and a prompt diagnosis are essential for optimal management, control of predisposing factors such as DM/immunosuppression, surgical debridement whenever possible and antifungal therapy - first line liposomal amphotericin B and Isavuconazole as salvage therapy.

## TISSUE BIOPSY

- CT-Guided Biopsy of the Mass – Showed fungal elements, initially suggestive of *Aspergillus*.
- Fungal PCR & Molecular Testing – Confirmed *Rhizopus azygosporus*, establishing the diagnosis.



Left: Grocott Methanamine Silver stain - Black (Fungi) on green background with dichotomous branching

Right: Hematoxylin and Eosin stain

## MUCORMYCOSIS BRIEF OVERVIEW

- Mucormycosis is a rare but aggressive angio-invasive fungal infection caused by fungi from the order Mucorales, including *Rhizopus*, *Mucor*, and *Lichtheimia* species.
- It predominantly affects immunocompromised individuals, particularly those with hematologic malignancies, prolonged neutropenia, or hematopoietic stem cell transplantation (HSCT). Despite advancements in medical management, the prognosis remains poor, with mortality rates ranging from 45% to 90%.
- **Clinical Forms of Mucormycosis**
  - Pulmonary mucormycosis – Fever, cough, dyspnea, pleuritic chest pain, and hemoptysis.
  - Rhinocerebral mucormycosis – Sinus involvement, facial pain, orbital and cerebral invasion, common in diabetics.
  - Cutaneous mucormycosis – Necrotizing fasciitis from direct inoculation.
  - Disseminated mucormycosis – Multi-organ involvement with >90% mortality.
- **Diagnosis**
  - CT/MRI – Identify masses, pleural effusion, and angioinvasion.
  - Histopathology – Broad, ribbon-like hyphae with right-angle branching.
  - Molecular Testing – PCR and sequencing for species identification.
- **Management Plan**
  - 1. Early Diagnosis – Timely recognition and initiation of diagnostics.
  - 2. Reversal of Predisposing Factors – Control diabetes, adjust immunosuppression.
  - 3. Surgical Debridement – Essential for localized infections.
  - 4. Antifungal Therapy:
    - First-line: Liposomal Amphotericin B.
    - Salvage: IV isavuconazole or posaconazole delayed-release tablets.
  - 5. Adjunctive Therapies – Consider hyperbaric oxygen if appropriate.
  - 6. Multidisciplinary Approach – Involve infectious disease, surgery, and hematology teams.

**REFERENCES.** Suo, T., Xu, M. & Xu, Q. Clinical characteristics and mortality of mucormycosis in hematological malignancies: a retrospective study in Eastern China. *Ann Clin Microbiol Antimicrob* 23, 82 (2024). <https://doi.org/10.1186/s12941-024-00738-8>

## CONCLUSION

This case illustrates an uncommon yet severe presentation of mucormycosis with a fungal mediastinal mass and underscores the diagnostic challenges in differentiating *Rhizopus* from *Aspergillus*, highlighting the importance of molecular diagnostic techniques for accurate identification.