International Journal of Health care and Biological Sciences

Content available at www.saap.org.in Online ISSN: 2582-7499

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CASE REPORT ON PULMONARY MUCORMYCOSIS

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Article History

Received on: 05-09-2023
Revised on: 22-09-2023
Accepted on: 28-10-2023

Abstract

Pulmonary mucormycosis (PM) is an uncommon fungal infection most often seen in immunocompromised patients. The fungus grows on decaying food, soil, and animal excrement. Patients usually become infected by inhalation of spores. The most common risk factors include diabetes mellitus, hematologic malignancy, and solid organ or stem cell transplant. PM can have a nonspecific appearance at imaging. For example, early imaging may show peribronchial ground-glass opacity. Later, the disease progresses to consolidation, nodules, or masses. Because patients are usually immunocompromised, the differential diagnosis often includes invasive pulmonary aspergillosis (IPA). Various radiologic findings suggestive of PM have been identified to help differentiate it from IPA. For example, the reverse halo sign is more closely associated with PM than with IPA. The reverse halo sign is an area of ground-glass opacity surrounded by a rim of consolidation. In addition, the presence of pleural effusions and more than 10 nodules is more suggestive of PM than it is of IPA. PM can progress rapidly in neutropenic patients. Identification of the hyphae in tissue by using endobronchial or percutaneous sampling can allow differentiation from IPA and help confirm the diagnosis of mucormycosis. Because of the high mortality rate associated with PM, early identification of the disease is critical for an improved likelihood of survival. A multimodality treatment approach with antifungal agents and surgical débridement has been shown to improve outcomes. The authors review the risk factors for PM, describe its imaging appearance and disease process, and describe the treatment of the disease.

Keywords: Pulmonary mucormycosis, pulmonary aspergillosis, surgical debridement.

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DOI: https://doi.org/10.46795/ijhcbs.v4i4.550

Introduction

Pulmonary mucormycosis (PM) is an uncommon fungal infection most often seen in immunocompromised patients. The fungus grows on decaying food, soil, and animal excrement. Patients usually become infected by inhalation of spores.

Epidemiology

Mucormycosis is not a reportable disease thus rendering the true incidence of infection unknown and may be under-recognized [2]. Pulmonary mucormycosis is considered a rare disease most commonly encountered in patients with prolonged neutropenia, Including those with a history of solid organ or hematopoietic stem cell transplantation.

Clinical Manifestations

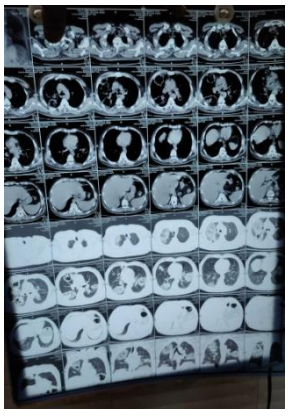
- Pulmonary infection is clinically indistinguishable from more common moulds such as invasive pulmonary aspergillosis (IPA).
- Symptoms may comprise fever refractory to broad-spectrum antibiotics, nonproductive cough, and progressive dyspnoea. Pleuritic chest pain, haemoptysis, and pleural effusion are seen less frequently. Invasion of the major pulmonary blood vessels by hyphae may lead to massive, potentially fatal haemoptysis. Invasion of adjacent organs by traversing tissue planes, including the diaphragm, chest wall, and pleura have also been described.

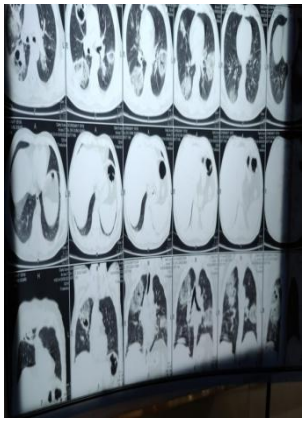
Pathology

- Agents of mucormycosis are ubiquitous fungi commonly found in decaying organic substrates, including but not limited to bread, fruits, vegetable matter, soil, compost piles and animal excreta. They comprise a group of filamentous fungi in the subphylum Mucoromycotina with spores ranging from 3-11 µm in diameter. Thus easily aerosolised and dispersed they can cause infections in humans by either inhalation or when introduced through a cutaneous or percutaneous route. Although frequently harmless for the immunocompetent, they are capable of causing severe, frequently life threatening infections in humans.
- Pathogenesis and immunology;
- The innate immune response to mucormycosis is supplied by mononuclear and polymorphonuclear phagocytes. Only by overcoming these mechanisms can spores germinate into hyphal forms, i.e. the angioinvasive form of infection.
- While most spores can reach the distal alveolar spaces due to their size, larger spores (>10 µm) may lodge in the nasal turbinates, potentially causing isolated sinusitis [1, 2]. Even immunocompetent hosts can develop slowly progressing pulmonary mucormycosis when exposed to inhalation of high spore inoculums 1. equently life-threatening infections in humans.

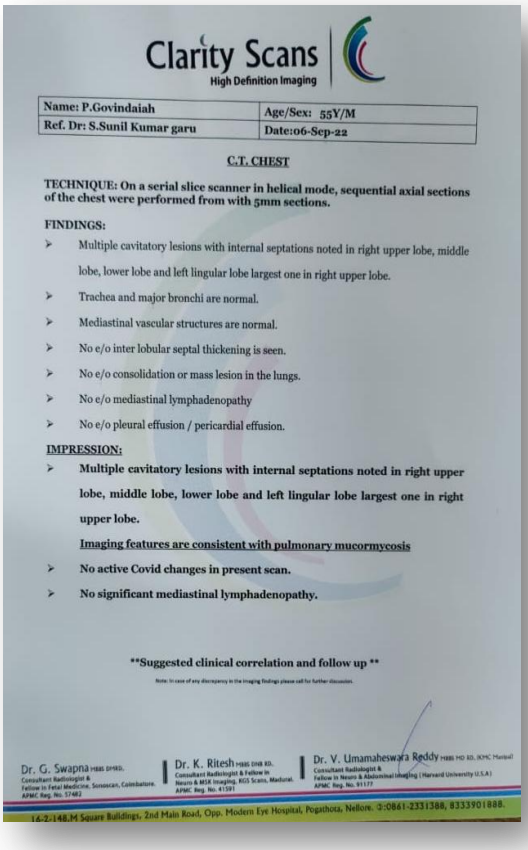
Diagnosis

- Clinical signs and symptoms of mucormycosis are nonspecific. Microbiological assessment usually makes the diagnosis, but can be hampered by contamination with normal flora. Samples from the nasal cavity are often included (see above). A high level of suspicion in susceptible patient populations is of paramount importance.





CT scan Images image details



Clarity Scans
High Definition Imaging

Name: P.Govindaiah	Age/Sex: 55Y/M
Ref. Dr: S.Sunil Kumar garu	Date:06-Sep-22

C.T. CHEST

TECHNIQUE: On a serial slice scanner in helical mode, sequential axial sections of the chest were performed from with 5mm sections.

FINDINGS:

- Multiple cavitatory lesions with internal septations noted in right upper lobe, middle lobe, lower lobe and left lingular lobe largest one in right upper lobe.
- Trachea and major bronchi are normal.
- Mediastinal vascular structures are normal.
- No e/o inter lobular septal thickening is seen.
- No e/o consolidation or mass lesion in the lungs.
- No e/o mediastinal lymphadenopathy
- No e/o pleural effusion / pericardial effusion.

IMPRESSION:

- **Multiple cavitatory lesions with internal septations noted in right upper lobe, middle lobe, lower lobe and left lingular lobe largest one in right upper lobe.**
- **Imaging features are consistent with pulmonary mucormycosis**
- **No active Covid changes in present scan.**
- **No significant mediastinal lymphadenopathy.**

**Suggested clinical correlation and follow up **

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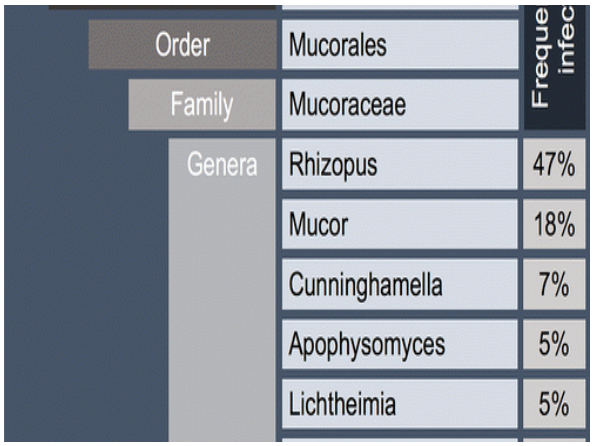
Treatment

- If feasible, attempts to reverse the underlying predisposing factors for infection should be made. Treatment may include control of blood glucose levels, treatment of metabolic acidosis, or tapering of immunosuppressive agents [1]. Treatment then consists of antifungal therapy and, if possible, surgical débridement of affected tissue.
- Prompt initiation of appropriate therapy is critical for patients with PM. In a study of 70 patients, the majority with PM or disseminated disease, a delay in the initiation of amphotericin B–based therapy was associated with a twofold increase in mortality [1]. Lipid formulations of amphotericin B are associated with less renal impairment compared with conventional amphotericin B deoxycholate.
- Most azole antifungal agents have no significant activity against mucormycosis . These agents include fluconazole and voriconazole, which are commonly used as antifungal prophylaxis or for treatment of Candida and Aspergillus infection. Posaconazole is a newer broad-spectrum triazole that has shown activity against many species of the order Mucorales . However, posaconazole is not currently approved by the U.S. Food and Drug Administration (FDA) for the treatment of mucormycosis, although open-label studies evaluating its use as a salvage therapy for PM have shown a success rate between 65% and 70%, Isavuconazole is another newer broad-spectrum triazole. It is FDA approved for primary and salvage

treatment of mucormycosis, although data comparing its effectiveness with that of amphotericin B are limited

- Surgery is recommended for patients with localized disease and results in improved outcomes compared with in those treated with antifungal therapy alone. Surgery is usually reserved for patients with unifocal disease and can consist of wedge resection, lobectomy, or pneumonectomy. Surgery for bilateral disease is uncommon but has been shown to be effective for source control.

Taxonomic hierarchy of the genera that most commonly cause mucormycosis.



Conclusion

PM has a high mortality rate, in part because of the underlying risk factors for the disease. The most common risk factors include diabetes mellitus, hematologic malignancy, and solid organ and stem cell transplant. Early imaging findings may be nonspecific with peribronchial ground-glass opacity. Infection can progress rapidly to consolidation and masses, and it can involve both lungs. Because of the angioinvasive nature of the disease, pulmonary necrosis is common. It can appear as a reverse halo at CT and correlates with necrosis found at pathologic analysis. Delays in treatment are associated with a greater mortality rate, and empiric treatment is often necessary before histologic identification and culture. Therefore, knowledge of the risk factors and imaging appearances is necessary for the radiologist to suggest the correct diagnosis.

Conflict of Interest

Authors are declared that no conflict of interest

Funding

No Funding

Ethical Considerations and Inform Consent

Not Applicable

Author Contribution

Authors are contributed equally.

References

1. Susmitha N, Venkatesh P. Review on infectious diseases. International Journal of Indigenous Herbs and Drugs. 2022 Jan 30:18-21.