Pulmonary Mucormycosis With Staphylococcus Aureus Presenting As Bilateral Pneumonia In A Patient With Diabetes Mellitus:Dual Infection And Diagnostic Dilemma!

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ABSTRACT

Middle aged diabetic female presents with acute lung infection. Response to antibiotics is suboptimal. Imaging by CT scan reveals bilateral lung consolidation and bronchoscopy appearance is consistent with extensive tracheobronchitis. Tuberculosis is highly suspected. However culture of bronchioloalveolar lavage grows Staphylococcus aureus leading to further extension of antibiotics. Ultimately, histpathology of endobronchial biopsy unfolds the final diagnosis of pulmonary mucormycosis.

Key words: Pulmonary mucormycosis, non resolving pneumonia, co-infection

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INTRODUCTION

Mucormycosis is an opportunistic infection caused by fungus belonging to order Mucorales of class Zygomycetes. Immunocompromised state attributable to organ transplants, haematological malignancies and neutropenia predisposes to this otherwise uncommon infection[1,3].Pulmonary mucormycosis accounts for22- 30% of all the burden of mucormycosis in different series.It is second only rhinocerebral mucormycosis in occurence[6,17].Diabetes mellitus has been reported as risk factor in 36% of cases[2].

Pulmonary mucormycosis is notorious for its life threatening complications and warrants early diagnosis and prompt treatment.Its clinical presentation in lung is defined as acute, if symptoms are present for less than 30 days[4,5].

This is a case of acute pulmonary mucormycosis in middle age female with suboptimaly controlled diabetes. Radiologically it showed as bilateral lung consolidation and bronchoscopy revealed severe endobronchial changes. Initially tuberculosis was suspected as

there was suboptimal response to antibiotics. However bronchoalveolar lavage(BAL) grew Staphylococcus aureus whic lead to further delay in diagnosis. Histopathology of endo-dobronchial biopsy finally established pulmonary mucomycosis.

CASE REPORT

Fifty year old lady presented with fever and non productive cough for last one week. Her medical history was significant for diabetes mellitus type II for last 10years.She was on non-allopathic medicines supervised by her husband ,an ayurvedic physician himself. Her glycemic control was reported suboptimal. Blood biochemistries including total and differential counts, liver function, renal functions were within acceptable limits. Chest skiagram showed illdefined opacities in both lung fields[Fig 1].She was started on antibiotics combining Betalactum + Betalactamase inhibitor and macrolide along with optimized sugar control with mutilple injections of insulin. However, even after one week of treatment she remained symptomatic. Contrast enhanced CT scan was performed. It revealed consolidation involving both the lower lobes and left upper lobe of lungs with breakdown in right lower lobe consolidation[Fig 2a,b,c,d].She was submitted to bronchoscopy in view of non resolving pneumonia and high suspicion mycobacterial infection.Bronchoscopy revealed extensive tracheobronchitis. Mucosa was nodular, irregular and hypervascular.There was white coating of mucosa in patches suggestive of pseudomembrane formation. These changes extended from mid-trachea till segmental bronchi on both sides. Left upper lobe lumen was almost occluded obscuring vision of apicoposterior and anterior segments. Bronchial washings from involved segment and biopsy from inflammed mucosa of left upper lobe were procured.AFB stain in bronchial washing was negative and so was the gene Xpert. Aerobic culture was positive for Staphylococcus aureus(MSSA).Gram positive coverage was enhanced. Although fever subsided but cough still persisted.Patient took discharge after ten days of antibiotics with resolved fever, residual cough and partially improved chest skiagram [Fig3]. Histpathological examination of the biopsy specimen is received after patient leaves the hospital.It reports extensive ulceration and destruction of mucosa with colonies of zygomycetes lying in acute inflammatory exudates[Fig4].However patient does not return of further treatment and was lost to follow up.

Fig:1 ct scan consolidation left upper lobe

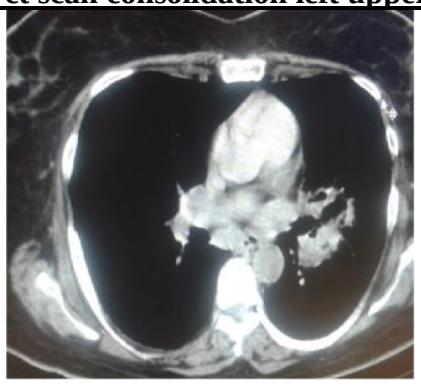


Fig:2 chest skiagramcafter one week of antibioticks

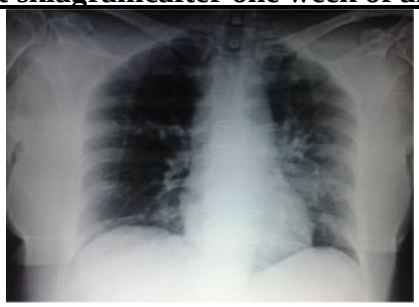
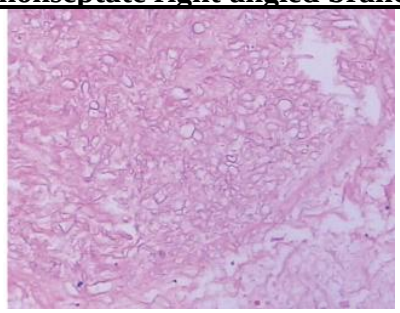


Fig: 3 broad nonseptate right angled branching hyphae



DISCUSSION

Mucormycosis is an opportunistic infection by Rhizopus, Absidia or Mucor which are ubiqituos and saprophytic fungi belonging to class zygomycetes[6].

Six anatomical sites of mucormycosis are recognised namely rhino-orbito-cerebral, cutaneous, pulmonary, gastrointestinal and miscellaneous others including bone, breast and kidneys.

Pulmonary Mucormycosis is localized in the lungs or the mediastinum and is second most common in occurrence after the rhinocerebral disease. Pulmonary mucormycosis was first reported by Furbringer in 1876[18].Its estimated incidence is 1.7 cases per million people per year in the United States[14]. In India, few cases have been reported but exact prevalence is not known.

Mucormycosis occurs in immunocompromised state.Most common predisposing factors are hematologic malignancies,solid organ transplants, renal failure,immunosuppressive therapy,neutropenia,uncontrolled diabetes and ketoacidosis[9,15].Only 6.25% patients do not have underlying risk factors[2,16].

Pulmonary mucormycosis occurs after inhalation of sporangiospores.Being vasotopic fungus,it causes infarction of the infected tissue.Tissue necrosis followed by local spread and systemic dissemination is natural tendency of the Mucor[2,7].

Clinical manifestation of pulmonary mucormycosis is non-specific and may range from mild to severe symptoms. Fever, cough pururlent sputum, chest pain, breathlessness, hypoxia and even massive hemoptysis involving pulmonary artery. Physical examination may reveal crackles, local wheeze or pleural friction rub.[6,7]

Diagnosis of pulmonary mucormycosis may be challenging because of its rarity on one hand and its similarity with more common entities like tuberculosis and pulmonary aspergillosis[8]

Radiological presentation may be diverse comprising multiple nodules or focal consolidation, masses, pleural effusion or cavitation[1,4,9]. High-resolution chest CT scan is the most sensitive method of determining the extent of pulmonary mucormycosis. CT can show findings that alter the management or diagnostic approach in as many as 26% of patients[20].Right upper lobe involvement and reverse halo sign have been described as most common radiological presentation[19].

The most common method used for diagnosis is microscopic examination of specimens obtained via flexible fiber-optic bronchoscopy[4].However yield of culture from sputum, lavage or needle aspirate fluid remains miserably low, usually below 5%.Direct histological examination of the tissue biopsy remains the gold standard for diagnosis. The histopathological findings reveal irregular broad non-septate hyphae with right angled branching pattern[8].Bronchoscopy can be used to obtain transbronchial biopsies in patient of pulmonary mucormycosis despite potential risk of pneumothorax[20]. Donahue et al have reported predilection for endobronchial disease in patient who have diabetes[21].This patient had extensive tracheobronchitis and stenosis of left upper lobe.

Pulmonary mucormycosis mostly has rapid clinical course with fatal outcome (60-90%) thanks to its angioinvasive nature[2].

Management of pulmonary mucomycosis is three pronged: Anti fungals. surgical debridement and control of risk factor(s).Amphotericin B or its newer lipid formulation—liposomal Amphotericin—B (L-AmB) is the first line antifungal agent. Oral posaconazole is also recommended. However they are likely to fail without surgical debridement to remove the necrotic tissue [9,11]. The duration of therapy is individualized to the patient, but the near normalization of radiographic abnormalities, negativity of cultures, or resolution of the immunosuppressed state can be used as surrogates to stop therapy.

It is important that clinicians maintain a high degree of suspicion for pulmonary mucormycosis in case of immunocompromised patients with nonresolving pneumonia. Early diagnosis and aggressive treatment might reduce the mortality associated with this devastating fungal infection.

Pulmonary mucormycosis is associated with bacterial pneumonia in 30% of cases, which can delay the diagnosis of the fungal infection[22].This is what happened in the present case. Staphylococcus aureus was isolated in BAL culture lead to continuation of antibiotics and even discharge of patient on oral form after defervescence of fever.Histopathology of endobronchial biopsy later confirmed mucormycosis and it was consistent with endobronchial changes as revealed in bronchoscopy. Almost all bacterial co-infectionswith pulmonary mucormycosis have been reported in severely immunocompromised state attributable to malignancy and on chemotherapy. There are isolated case reports of dual infection with mycobacterium tuberculosis in diabetic[10] ,stem cell transplant[11] and acute myeloid leukemia[12] patients which portend common risk factors for both the infections. Acinetobator infection in tandem with pulmonary mucormycosis has been reported by Hou Panfei et al[13].However there is no reported incidence in the literature describing coinfection of pulmonary mucormycosis with staphylococcus in a patient with diabetes.

CONCLUSION

1. Fungal infection, need to be considered as an alternative pathogen when antibiotic regimens targeting traditional bacterial etiologies fail to achieve a cure in case of non resolving pneumonia
2. Pulmonary mucormycosis is relatively uncommon disease but with an increasing prevalence of diabetes in India, it is likely to be seen more commonly than before.
3. High index of suspicion and comprehensive screening of diabetics and possibly all immunocompromised patients for possible co-infections is pertinent even if a single agent has been isolated.

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