

Incidence of Reactivation of Tuberculosis in cases of Aspergilloma Secondary to Previously treated Cavitory Tuberculosis

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ABSTRACT

Background: Aspergilloma is a condition in which a fungus ball is formed within a pre-existing intrapulmonary cavity. Cavitory tuberculosis is the most common cause of aspergilloma in our settings.

Aim: To observe the incidence of reactivation of tuberculosis in cases of Aspergilloma secondary to previously treated Cavitory Tuberculosis.

Methodology: This descriptive prospective interventional study was conducted at the department of Thoracic Surgery, King Edward Medical University/Mayo Hospital, Lahore between December 2015 and May 2018.

Results: 58 patients, 38 males and 20 females, with aspergilloma after a previously treated cavitory tuberculosis were subjected to flexible bronchoscopy to obtain Bronchoalveolar lavage which was sent for detection of MTB using GeneXpert method, as well as for detection of fungal spores. None of the samples tested positive for MTB in the presence of aspergilloma.

Conclusion: Based on our results, we concluded that reactivation of tuberculosis was not seen in patients with aspergilloma after a previously treated cavitory tuberculosis.

Keywords: Aspergilloma, Cavitory Tuberculosis, Bronchoalveolar Lavage, GeneXpert.

INTRODUCTION

Cavitation is a feature in 40–87% of pulmonary TB¹. Perpetuation and contagiousness of pulmonary tuberculosis is attributable to cavity formation from liquefactive necrosis of caseum. Such a cavity harbors a bacterial load of up to 10¹¹ bacilli/gram, thereby leading to its high contagiousness. The relapses and treatment failures are also mostly seen in cavitory pulmonary tuberculosis². Cavitating disease is also seen in most cases of MDR and almost all cases of extensively drug-resistant TB (XDR-Tb)³. Liquefied caseous zone within the cavity shows a very high bacillary load on semi-quantitative reading on Lowenstein–Jensen medium. 80% of closed cavities have more than 200 bacillary colonies.⁴ Bronchoalveolar Lavage (BAL) in patients with cavitating disease demonstrates positive acid fast bacilli (AFB) in over 83% of cases⁵.

An **aspergilloma**, also known as a mycetoma or fungus ball, is a clump of mold which most commonly involves lung where it infests a pre-existing cavity within the lung parenchyma, even though it may occur in such parts of the body as sphenoid or paranasal sinuses, the ear canal, or in brain or kidney where it can lead to abscess formation usually in immunocompromised individuals, and it may rarely occur on surfaces such as heart valves. Aspergillomata are caused by fungi of the genus *Aspergillus* by definition⁸.

Pulmonary aspergilloma is mainly seen in patients with underlying cavitory lung diseases including tuberculosis, sarcoidosis, bronchiectasis, cystic fibrosis and systemic immunodeficiency. Cavitory tuberculosis is the commonest cause leading to pulmonary aspergilloma in our settings. *Aspergillus fumigatus* spores (2 to 3 micron) are inhaled, which settle within the pre-existing cavity where they are able to grow freely without interference of critical elements of the immune system which are unable to gain access into the cavity. The growth of the fungus along with incorporation of dead pulmonary parenchyma, mucus and debris leads to formation of a ball⁷, commonly referred to as fungus ball.

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Pulmonary aspergilloma remains asymptomatic initially, but as the condition advances, it may manifest itself clinically, the commonest complaint being hemoptysis⁸ which is a consequence of erosion of a neighboring blood vessel by the disease. Hemoptysis may be life-threatening and is the most important indication of therapeutic intervention such as surgical resection being treatment of choice⁹⁻¹², bronchial artery embolization or transbronchial catheter instillation of Amphotericin B or Potassium iodide¹³.

Chest X-ray and Thoracic CT scan are the principal modalities which are helpful in diagnosing pulmonary aspergilloma. Fiberoptic bronchoscopy is the mainstay in ascertaining the exact site of hemoptysis in patients with symptomatic pulmonary aspergilloma. As cavitory tuberculosis is the commonest cause of pulmonary aspergilloma in our settings, it is vital to establish the status of activity of AFB's in such patients as an active tuberculous infection would alter the course of management altogether, which can best be achieved by obtaining BAL via fiberoptic bronchoscopy, for MTB detection using GeneXpert method as well as AFB culture. No definitive data is available regarding the incidence of reactivation of pulmonary tuberculosis in patients with pulmonary aspergilloma after cavitory tuberculosis, demonstrated by positive AFB on BAL.

The objective of this study is to find out the incidence of reactivation of pulmonary tuberculosis in patients with pulmonary aspergilloma after previously treated cavitory TB

PATIENTS AND METHODS

This descriptive prospective interventional study was conducted at the department of Thoracic Surgery, King Edward Medical University/Mayo Hospital, Lahore between December 2015 and May 2018. The approval of the study was taken from ethical and institutional review boards. A total 58 patients, 38 males and 20 females between ages 25 and 60 were registered in this study. Patients were evaluated clinically and history was taken on questionnaire.

Inclusion Criteria

1. Patients with radiologically proven aspergilloma with BAL positive for aspergillus spores
2. Pts with a history of diagnosed cavitory tuberculosis

3. Pts with completely treated previous cavitary TB
4. Patients with resolving hemoptysis
5. Patients physically fit to undergo flexible bronchoscopy

Exclusion Criteria

1. Pts with aspergilloma in non-TB cavitary disease
2. Pts with inadequately treated previous cavitary TB
3. Patients with active hemoptysis
4. Asymptomatic patients
5. Patients unable to tolerate flexible bronchoscopy

Data Collection: 58 patients with a known history of adequately treated cavitary pulmonary tuberculosis presenting with radiological evidence of aspergilloma and complain of hemoptysis were admitted at the department of Thoracic Surgery. All patients underwent flexible bronchoscopy during resolving phase of hemoptysis and BAL was obtained in all cases. BAL fluid was sent to PMRC laboratory for detection of MTB using GeneXpert method as well as AFB culture. A positive report would confirm reactivation of pulmonary tuberculosis whereas a negative result would rule out reactivation with a high probability. BAL was also analyzed for fungal spores for confirmation of aspergilloma.

RESULTS

Fifty eight patients, 38 males and 20 females (Table 1) between ages 25 and 60, with previous history of adequately treated cavitary tuberculosis and radiological evidence of aspergilloma who presented with active hemoptysis were admitted at Thoracic Surgery Department. Thirty out of 38 males and 14 out of 20 females were also known cases of diabetes mellitus. Active hemoptysis was controlled using injectable broad-spectrum antibiotic, tranexamic acid in bolus as well as infusion forms, oral cough suppressant and oral anxiolytic. Patients in resolving phase of hemoptysis were subjected to flexible bronchoscopy to ascertain the exact site of source of hemoptysis and obtain BAL. All BAL samples were sent to PHRC laboratory for MTB detection using GeneXpert technique as well as AFB culture. All BAL samples turned out to be negative for MTB. None of the samples tested positive for AFB's (Table 2).

Table 1

Male	38
Female	20
Total	58

Table 2

BAL positive for AFB's	0
BAL negative for AFB's	58

DISCUSSION

Cavitary pulmonary tuberculosis is a common disease in our part of the world, involving 40-87% of all patients with pulmonary tuberculosis¹. Cavitation is never seen in primary pulmonary tuberculosis, and is a feature of secondary pulmonary tuberculosis only. Cavitary pulmonary tuberculosis has a very high yield of positive AFB's on BAL. Aspergilloma is one of the well-established complications of cavitary pulmonary tuberculosis. In fact, cavitary tuberculosis is the commonest cause of aspergilloma in our part of the world. Surgical management of symptomatic aspergilloma continues to be the cornerstone in treating potentially life-threatening hemoptysis in these cases. However, presence of an active pulmonary tuberculosis infection would change the course of management in cavitary disease. Therefore it is

imperative to rule out active tuberculosis in these cases before proceeding with surgical resection of the involved lobe of the lung. BAL is an invaluable tool in this regard as it carries a particularly high yield in diagnosing pulmonary tuberculosis when subjected to MTB detection via gene Xpert as well as AFB culture. One study has reported the overall BAL yield in diagnosing pulmonary tuberculosis to be 83%⁵. In another study, BAL was positive in 81% cases of cavitary tuberculosis¹⁴, whereas another study revealed this frequency to be 91.86%¹⁵.

In our study, none of the 58 BAL samples obtained from patients with aspergilloma in post-tuberculosis cavitary disease tested positive for AFB's. This is in stark contrast to the overall yields of BAL in diagnosing active pulmonary TB in the previously mentioned study (over 83% yield).

CONCLUSION

Based on the preceding results, we have concluded that reactivation of pulmonary tuberculosis is not seen in patients with pulmonary aspergilloma after a previously treated cavitary pulmonary tuberculosis. However, since no other definitive study or data is available in this regard, this topic remains open to further more extensive and refined research on a larger sample size.

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