

Correlation between Pulmonary Tuberculosis, Bronchiectasis and Chronic obstructive pulmonary disease in Burdwan District of West Bengal, India

Manish Kumar Munda¹ Suvendu Pal² niranjan Kumar Sit³

¹Deptt. Of Respiratory Medicine, Burdwan Medical College, Burdwan, West Bengal

²Pgt, Deptt. Of Respiratory Medicine, Burdwan Medical College, Burdwan, West Bengal

³Associate Professor, Deptt. Of Respiratory Medicine, Burdwan Medical College, Burdwan, West Bengal

Corresponding author: Manish Kumar Munda

Abstract

Introduction: Tuberculosis is very prevalent in India. According to WHO TB statistics about 40% population of India having tuberculosis infection till 2016. In spite of having complete course of anti-tuberculosis therapy patients has to continue treatment for post tubercular complications like restrictive and obstructive lung disease and bronchiectasis. This leads to increased treatment cost, increased morbidity and mortality.

Materials & Methods: This study was done on 90 patients of chronic obstructive pulmonary disease above 40 years of age with FEV1/FVC of 0.7 or less with associated symptoms of cough with expectoration and breathlessness and history of Tuberculosis noted and 40 cases of bronchiectasis with history of Pulmonary Tuberculosis. Bronchiectasis is diagnosed by HRCT in patients admitted for COPD.

Results: In this study it was found that 61.11% of patients having chronic obstructive pulmonary disease by were found to have a history of tuberculosis treatment. Post tubercular obstructive airway disease was more common in males (M: F 26:14). More than 50% of these patients were smokers. Among these cases of post tubercular bronchiectasis 34% had chronic obstructive pulmonary disease. Mean age of these patients of bronchiectasis associated with COPD was 59±7. This combination of patients had more exacerbations, less serum albumin levels and more mortality.

Conclusion: Tuberculosis causes bronchiectasis and chronic obstructive and restrictive lung disease similar to COPD. Chronic obstructive pulmonary disease and Tuberculosis can coexist. Chronic obstructive pulmonary disease is associated with bronchiectasis in a significant number of patients. Chronic obstructive pulmonary disease patients are more prone to develop secondary bacterial infections including tuberculosis. Bronchiectasis is associated with airway disease. The triad increases the complications, morbidity and mortality.

Key words: Bronchiectasis, COPD, Exacerbations, Morbidity, Mortality

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I. Introduction

Pulmonary Tuberculosis, obstructive airways disease and bronchiectasis is responsible for considerable morbidity and mortality in India. Tuberculosis disease of the lungs leads to fibrosis which leads to crippling obstructive restrictive lung disease similar to chronic obstructive pulmonary disease. Chronic obstructive pulmonary disease is common in smokers then tuberculosis and both may coexist. COPD patients are more prone to secondary infections like mycobacterial disease. Pulmonary Tuberculosis leads to bronchiectasis causing secondary infections and associated with airway disease. Chronic obstructive lung disease patients have associated bronchiectasis. These three lead to crippling secondary infections, increased morbidity and mortality. The problem is increased with coexistence of diabetes mellitus, HIV disease or in other immunocompromised individuals.

II. Materials & Methods

This study was done at Burdwan Medical College, Burdwan after obtaining written informed consent from each patient. First Study is to find relationship between patients of COPD and history of Tuberculosis. Second study is for study of post tubercular bronchiectasis and third study is for association of bronchiectasis in COPD patients. Results of the study was analysed and compared with other studies.

Study I was done on 90 cases of COPD diagnosed with FEV₁/FVC 0.7 or less presenting with symptoms of cough with expectoration and breathlessness in our centre. Among them 55 (61.11%) gave the history of tuberculosis. 48 were male and 9 were females.

Study II was done on the prevalence and clinical profile of post-tubercular bronchiectasis in our centre. We included the following patients

1. Who has taken full course of Anti-TB Treatment (ATT)
2. Symptoms like Cough with expectoration (recurrent), Dyspnoea, Fever, and Haemoptysis
3. Clinical examination and CT chest shows the signs of bronchiectasis, cystic fibrosis, consolidation.
4. Sputum for acid fast bacilli (AFB) - only sputum AFB negative cases

Sample size was 40 subjects with male-female ratio of 26:14 (65%:35%), age range of 20-69 years, of which majority were in the 31-45 years group (52%). Initial presenting symptom was productive cough (90%), dyspnoea (90%) and haemoptysis (40%). History of smoking was present in 55% of total sample. **RESULTS** Chronic obstructive pulmonary disease (COPD) is the major co-morbid condition associated with PTBX. Bronchiectatic changes which were identifiable on chest X-ray. Features of destroyed lung were evident in 6 cases (15%). Fungal ball was seen in 2 cases (5%). Right-sided involvement was seen in 15 cases (42%) followed by Bilateral involvement in (33%).

CT Thorax revealed the following types

1. Traction bronchiectasis: 21 cases (52.5%)
2. Mixed bronchiectasis: 11 cases (27.5%)
3. Saccular bronchiectasis: 4 cases (10%)
4. Cystic bronchiectasis: 3 cases (7.5%)
5. Central bronchiectasis: 1 case (2.5%).

Secondary bacterial infections in our study included staphylococcal, klebsiella and pseudomonas species. This study of Post-tubercular bronchiectasis has associated COPD in 34% of patients. Two patients in our study showed active tuberculosis in the bronchial washings.

BRONCHIECTASIS IN COPD PATIENTS

In our own study 40 patients of COPD were analysed with clinical, chest x-ray, CT scan, serum C-reactive protein and albumin levels and microbiological study by sputum microscopy for culture and sensitivity and gram stain. Mean age of the patients was 59±7. Bronchiectasis was present in 30 patients (75%). Patients with bronchiectasis had significantly more exacerbations, severe airway obstruction, higher CRP levels and low albumin levels. Our study showed an elevated prevalence of bronchiectasis in patients with COPD and was associated with severe airway obstruction, exacerbations, inflammation, malnutrition and mortality in Indian patients.

III. Discussion

The number of indoor patients with bronchiectasis is increasing in last few years. The main causes of bronchiectasis were pulmonary TB, bacterial infection and pertussis. The peak age range of post-TB bronchiectasis is 35-45 years. Patients with post-TB bronchiectasis are more prone to have haemoptysis but less sputum. The chest radiography of patients with post-TB bronchiectasis has upper lobes involvement of lung. Post-TB bronchiectasis patients have marked different clinical features and prognosis, compared with non-TB bronchiectasis. Tuberculosis of the bronchi and bronchioles can cause destruction of the airways. An association between chronic obstructive pulmonary disease (COPD) and tuberculosis (TB) has been described, mainly due to smoking and corticosteroid use. The World Health Organization estimated that there were 10.4 million new cases of TB in 2018. The risk factors for TB included low socioeconomic status, malnutrition, silicosis, and immunocompromised status i.e. HIV infection, malignancy, diabetes. Association between chronic obstructive pulmonary disease and active TB has been described, mainly due to smoking and corticosteroid use. Keeping a high suspicion and regularly monitoring for the development of pulmonary TB in COPD patients are necessary, especially for those receiving higher doses of oral corticosteroids and other COPD medications. Although ICS therapy has been shown to predispose COPD patients to pneumonia in large randomized clinical trials, it does not increase the risk of TB in real world practice. The study done by Lee et al showed that COPD patients were more likely to develop pulmonary TB than non-COPD subjects under a wide variety of diagnostic scenarios for COPD. COPD patients are at risk of serious bacterial infections including tuberculosis. In the executive summary of the 2006 update of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines, the role of tuberculosis in the development of chronic airways obstruction has been recognized.

Previous studies had also revealed that an obstructive pattern of pulmonary functional impairment following treated pulmonary tuberculosis was more common. Post-tubercular impairment can manifest as reversible or irreversible obstructive airway disease, mixed defect or as pure restrictive defects.

Immunological mechanisms have been postulated as a cause of Posttubercular asthma. Cavitation, extensive fibrosis, bulla formation and bronchiectasis implicated in the genesis of COPD caused by the destroyed lung due to pulmonary tuberculosis. In detail with further studies and a better understanding of the pathophysiology of airflow limitation may point the way to therapeutic strategies for control of symptoms in these patients. It remains unclear whether there is a similarity in the pathology of COPD and TB but clinically we see a post tubercular disease which is more or less similar to COPD.

Patients with a medical history of tuberculosis were more likely to present airflow obstruction than those without such a diagnosis. It is also increasingly recognised that opportunist mycobacteria are associated with localised or widespread bronchiectasis. Bronchiectasis, like other forms of lung damage, makes patients prone to picking up environmental mycobacterial species and bronchial damage may occur as a result of opportunist mycobacterial infection. Airway diseases, bronchiectasis and bronchial asthma present with similar symptoms. The differentiation between asthma, chronic obstructive pulmonary disease and bronchiectasis in the early stage of disease is extremely important for the proper management. In our study of post tubercular bronchiectasis was seen in 55% of patient.

IV. Conclusion

Tuberculosis can cause bronchiectasis and restrictive and obstructive airway disease. Smoking is an aetiological factor for both Tuberculosis and COPD. Bronchiectasis patients have more susceptible to bacterial infections including *Mycobacterium tuberculosis*. Bronchiectasis is associated with airway disease and COPD patients have high prevalence of Bronchiectasis. Tuberculosis, Bronchiectasis and COPD is a deadly triad responsible for increase in indoor patients, increased morbidity and mortality.

The problem becomes much complicated in the event of coexistent Diabetes mellitus, HIV disease and immunocompromised individual. High degree of awareness on the part of the physician, early treatment of Tuberculosis with proper drugs, implementation of RNTCP programme, prevention of smoking and explanation of the hazards of smoking at a nearly age by means of awareness programmes can decrease this problem of the country.

References

- [1]. Athanazio R. Airway disease: Similarities and differences between asthma, COPD and bronchiectasis. *Clinics (Sao Paulo)* 2012;67:1335-43.
- [2]. Baig IM, Saeed W, Khalil KF. Post-tuberculous chronic obstructive pulmonary disease. *J Coll Physicians Surg Pak* 2010;20:542-4.
- [3]. Global Initiative for Chronic Obstructive Lung Disease. Disease: Comorbidities. Global Strategy for the Diagnosis Management and Prevention of Chronic Obstructive Pulmonary Disease. Ch. 6. 2015. p. 49.
- [4]. Havlir DV, Getahun H, Sanne I, Nunn P. Opportunities and challenges for HIV care in overlapping HIV and TB epidemics. *JAMA* 2008;300:423-30.
- [5]. Hnizdo E, Singh T, Churchyard G. Chronic pulmonary function impairment caused by initial and recurrent pulmonary tuberculosis following treatment. *Thorax* 2000;55:32-8.
- [6]. Lee CH, Lee HC, Shu CC, Lim CS, Wang JY, Le LN, et al. Risk factors for pulmonary tuberculosis in chronic obstructive pulmonary disease in Taiwan: A nationwide cohort study. *BMC Infect Dis* 2013;13:194.
- [7]. Lee JH, Chang JH. Lung function in patients with chronic airflow obstruction due to tuberculous destroyed lung. *Respir Med* 2003;97:1237-42.
- [8]. Menezes AM, Hallal PC, Perez-Padilla R, Jardim JR, Muiño A, Lopez MV, et al. Tuberculosis and airflow obstruction: Evidence from the PLATINO study in Latin America. *Eur Respir J* 2007;30:1180-5.
- [9]. Pauwels RA, Buist AS, Calverley PM, Jenkins CR, Hurd SS; GOLD Scientific Committee. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. NHLBI/WHO global initiative for chronic obstructive lung disease (GOLD) workshop summary. *Am J Respir Crit Care Med* 2001;163:1256-76.
- [10]. Verma SK, Kumar S, Narayan KV, Sodhi R. Post tubercular obstructive airway impairment. *Indian J Allergy Asthma Immunol* 2009;23:95-9.
- [11]. Xu JF, Ji XB, Li HB, Lu HW, Fei K, Fan LH, et al. Bronchiectasis caused by pulmonary tuberculosis: The epidemiology, clinical presentations and the differences from non-tuberculosis-caused bronchiectasis. *Eur Respir J* 2013;42:279.
- [12]. World Health Organization: Global Tuberculosis Report. In Book Global Tuberculosis Report. City: World Health Organization; 2016.

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