A Study on Chronic Obstruction Pulmonary Disease after Successful Treatment of Tuberculosis in Tertiary Care Hospital at, Rajasthan

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ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) and tuberculosis are among the world's first ten most prevalent diseases, the main burden of the latter being in the developing countries, in the form of pulmonary tuberculosis. **Methods:** The study was conducted in pulmonary medicine department of tertiary care hospital in, Rajasthan. Total 50 subjects was included in this study and inclusion criteria were the subjects who had a definite past history of pulmonary tuberculosis, had received complete anti-tuberculosis therapy course and then presented with chronic exceptional dyspnoea with or without cough. Patients meeting the criteria were interviewed after their consent and data were recorded on pre-designed forms as case number, age, gender and timing of the anti-TB treatment. **Results:** In the present study total number of patients were 100, those having a past history of being treated for pulmonary tuberculosis and presenting with chronic obstructive pulmonary disease. Among the 30 were female and 70 were male. In this study 70 (70%) were males. The age in males ranged between 20 and 60 years with a mean of 51.87 years. In females, it ranged between 28 and 55 years with a mean of 40.25 years. Among those 40 (40%) were found to have COPD. **Conclusion:** In conclusion, chronic functional effects of extensive post-tuberculous lung scarring manifested mainly as a COPD like syndrome, which showed same patterns of pulmonary function abnormalities on spirometry.

Keywords: tuberculosis, COPD, Spirometry, infection.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) and tuberculosis are among the world's first ten most prevalent diseases, the main burden of the later being in the developing countries, in the form of pulmonary tuberculosis. In the global burden of disease, COPD and tuberculosis have been ranked as sixth and eighth respectively, in terms of disability and death in low and middle income communities worldwide.[1] However, the impact of pulmonary tuberculosis on the prevalence of COPD has often remained neglected.[2] COPD is an airway inflammatory disease with a high prevalence rate worldwide, ranging from 8.2% in China, 10.9% in Japan, 19.6% in USA, 23.8% in South Africa to 26.1% in Australia,[3-8] It is a major health burden both in developed and developing countries. Pulmonary functional impairment as a complication of tuberculosis manifests in various patterns but mainly as airflow limitation.[9]

Pulmonary Tuberculosis (PTB) is a major cause of death worldwide.[10] The risk factors for TB included age, male gender, low socioeconomic status, malnutrition, substance abuse, silicosis, human immunodeficiency virus infection, malignancy, diabetes, renal disease, celiac disease, gastrectomy, transplant, and receiving corticosteroids and tumour necrosis factor inhibitors.[11-16] In addition, an association between obstructive pulmonary disorders (i.e. chronic obstructive pulmonary disease and asthma) and active TB has been described, mainly due to smoking and corticosteroid use.[16]Inhaled corticosteroids (ICS), along with long-acting β-agonists (LABA), are currently recommended for patients with severe COPD with repeated exacerbations.[3] ICS therapy has been shown to predispose COPD patients to pneumonia in large randomized clinical trials.[17,18]

The empirical evidence suggests that airflow limitation can be present very early after completion of anti-tuberculosis treatment, depending on the degree of anatomical distortion present. The aim of the study was to determine both the prevalence of COPD in PTB subjects recently recorded as cured after anti-tuberculosis treatment using a standardised questionnaire.

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MATERIALS AND METHODS

The study was conducted in Emergency medicine department of National Institute of Medical Science & Research, Jaipur, Rajasthan, India. Total 50 subjects was included in this study and inclusion criteria were the subjects who had a definite past history of pulmonary tuberculosis, had received complete anti-tuberculosis therapy course and then presented with chronic exertional dyspnoea with or

without cough. Only those were included who had radiological evidence of very typical post-TB lesions in the form of scarring, fibrosis, cavitations, emphysema and other destructive lung changes in their latest chest radiographs. It was otherwise difficult to ascertain their past diagnosis by any laboratory records. Presence of any clinical feature leading to a probability of active disease meant exclusion. Other conditions considered for exclusion in this study were history of current or previous smoking, history of occupational exposure, diagnosed cases of asthma and COPD, ischaemic heart disease, interstitial lung disease, bilateral extensive bronchiectasis, severe anemia and renal failure. Those showing more than 12% reversibility in the post-dilator FEV1 were also excluded. Patients meeting the criteria were interviewed after their consent and data were recorded on pre-designed forms as case number, age, gender and timing of the anti-TB treatment. Patients were then called for spirometry on according to convenience without any pre-medication. The technique was explained and actual measurements were done after subjects became familiar with a correct technique. Three attempts were recorded and only considered if the variation between two best reading was less than 5%. Spirometric values were recorded as FVC, FEV1 and FEV1/FVC. Those not meeting the American Thoracic Society Criteria for quality for spirometry and those showing significant post dilator reversibility (more than 12%) were excluded. The subjects showing an obstructive ventilatory defect were then classified as mild, moderate and severe according to the GOLD guidelines.[19] The statistical analysis was done by SPSS software:

RESULTS

In the present study total number of patients was 100, those having a past history of being treated for pulmonary tuberculosis and presenting with chronic obstructive pulmonary disease. Among the 30 were female and 70 were male.

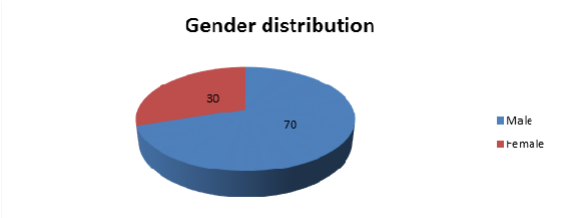

Figure 1: I showing gender distribution of patients

In this study 70 (70%) were males. The age in males ranged between 20 and 60 years with a mean of 51.87 years. In females, it ranged between 28 and 55 years with a mean of 40.25 years. Among those 40 (40%) were found to have COPD.

Table 1: I Lung function results including pulse oximetry

Variable	COPD (n=30) mean ± SD	No COPD (n=70) mean ±SD	P value
FVC PBD	l 3.21 ± 0.6	2.63 ± 0.5	0.83
FEV_1 PBD	12.18 ± 0.8	2.22 ±0.6	0.001
FEV_1% PBD	58.50 ± 10.1	82.4 ±6.9	0.0001
PBD change in FEV_1, %	7.10 ± 5.3	9.4± 9.8	0.49
FEV_1% PBD (LLN)	76.2 ± 2.6	78.7 ± 4.13	0.001
Pulse oximetry, %	96.8 ± 2.0	95.1 ± 2.30	0.12

SD-standard deviation; PBD-post-bronchodilator; FVC-forced vital capacity; FEV_1-forced expiratory volume in 1 s; LLN-lower limit of normal.

DISCUSSION

This study found that 40% of treated pulmonary tuberculosis patients presenting with COPD, had an obstructive ventilatory defect. Previous studies had also revealed that an obstructive pattern of pulmonary functional impairment following treated pulmonary tuberculosis was more common.[20-22] PLATINO study, a recent large study, found that FEV1 is reduced compared to FVC in most cases.[23] However, another previous study had found after 15 years' follow-up of 40 patients that there was a higher yearly decline in FVC compared to FEV1.[24] A recent literature review confirmed a positive association between TB and COPD, with odds ratios ranging between 1.37 and 2.94; this association is independent of smoking history.[2] The literature reports that smoking becomes an important factor in the development of COPD in patients with a history of ≥10 pack years.[25] Our patients with COPD smoked significantly more than those without COPD; however, the history of smoking among both groups was moderate and cannot alone explain the degree of obstruction observed. The effect of smoking and TB sequellae was undoubtedly additive in the development of COPD in this group of patients.

In a previous report on COPD prevalence in 12 Asia-Pacific countries and regions,[26] smoking and air pollution, rather than biomass fuel, were the most important risk factors of COPD in Taiwan. Men were more likely to have the two kinds of exposure than women. Results of sensitivity analysis in the present study that included females only reveals that even in this predominantly nonsmoking population, previous TB and delay in anti-TB treatment are still independent risk factors for COPD. Though the sensitivity analysis cannot dissect the influences of these confounding factors, the current findings suggest that TB maybe a risk factor of COPD itself or a surrogate of inhalation of toxic substances and low socioeconomic status.

The prevalence of COPD may be underestimated, especially in the control subjects, because pulmonary function tests are less frequently

prescribed in control subjects. However, in addition to spirometry, TB patients have more prescriptions of antitussives and COPD-specific medication than control subjects after the initial study date, suggesting that respiratory symptoms, a key feature of COPD, are more common during post-TB follow-up. Furthermore, the possibility of undiagnosed COPD prior to the initial study date may also still exist, despite an observation period of three years. Thus, the impact of TB increases as follow-up duration increased. PTB is one of the factors for the development of COPD, patients with CAO due to PTB are usually not treated according to COPD guidelines. Although there seems to be an increased risk of PTB relapse with chronic use of inhaled steroids,[27] these patients could potentially benefit from treatment using only long-acting bronchodilators.

CONCLUSION

In conclusion, Chronic functional effects of extensive post-tuberculous lung scarring manifested mainly as a COPD like syndrome, which showed same patterns of pulmonary function abnormalities on spirometry. Pulmonary tuberculosis is an independent and long-lasting risk factor for developing COPD. Any delay in initiating anti-TB treatment remains a serious issue and increases the risk of COPD. In order to control TB epidemics and reduce COPD burden, early diagnosis of pulmonary TB and prompt initiation of appropriate anti-TB treatment is imperative. Further studies on the post-treatment course of pulmonary TB are needed to optimize follow-up care and early intervention for COPD.

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