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Original Research Article

Chronic airway obstruction in post tubercular fibrosis cases: a serious lung function changes

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ABSTRACT

Background: Tuberculosis (TB) is a major cause of death worldwide. About two thirds of patients develop impaired pulmonary function after completion of pulmonary tuberculosis treatment. But data is lacking to support this assertion. Objective of the study was to determine the frequency of chronic obstructive pulmonary disease (COPD) in post tubercular fibrosis patients in the hospital.
Methods: This is a cross-sectional study which was done at Medinipore Medical College & Hospital in post tubercular fibrosis patients from August 2015 to July 2016. 72 patients who had post tubercular fibrosis were included for spirometry test. Those having a probability of re-activated TB, having history of current or previous smoking or occupational exposure, asthmatics and cases of interstitial lung disease and ischemic heart disease were excluded. Pre- and post-dilator FVC, FEV1 and FEV1/FVC were recorded in each case through simple spirometry.
Results: There were 83.3% (n=72) males. Thirty eight (52.7%) were found to have an obstructive ventilatory defect of different degrees: severe/stage III in 63.1% (n=24), moderate/stage II in 21.5%% (n=8) and mild/stage I in 15.7 % (n=6). Ten (13.8) were found to have a restrictive pattern and 12 (16.6%) revealed a mixed obstructive and restrictive pattern. Only 12 patients (16.6%) had normal lung function. Among the 38 patients with obstruction in spirometry, 24 patients (63.2%) were under weight.
Conclusions: Chronic obstructive pulmonary disease can occur as one of the chronic complications of pulmonary tuberculosis and the obstructive ventilatory defect appears more common especially in patients with low BMI.

Keywords: COPD, Obstructive pulmonary ventilatory defect, Pulmonary function tests, Restrictive ventilatory defect, Tuberculosis

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]

For many persons with tuberculosis, microbiological cure is just the beginning, not the end of their illness.

Post tuberculosis pulmonary impairment has emerged as a distinct clinical entity, which is almost indistinguishable from other forms and hence we review this topic further.[3,4]

METHODS

It was a descriptive study carried out at the Department of Pulmonology, Medinipore Medical College, West Bengal, from August 2015 to July 2016. The inclusion criteria were adults aged 18-65 years, who had a definite past history of pulmonary tuberculosis, had received complete anti-tuberculosis therapy course with chest x-ray suggestive of post tubercular fibrosis.

The patient with 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 were 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. The subjects showing an obstructive ventilatory defect were then classified as mild, moderate and severe according to the GOLD guidelines. Data was entered in Microsoft excel. The data was analysis with different statistical methods.

RESULTS

A total of 92 patients were interviewed. Among them 72 were included as per inclusion and exclusion criteria. The majority of the patients 55.4% were male. Thirty eight (52.7%) were found to have an obstructive ventilatory defect of different degrees: severe/stage III in 63.1% (n=24), moderate/stage II in 21.5%% (n=8) and mild/stage I in 15.7% (n=6).

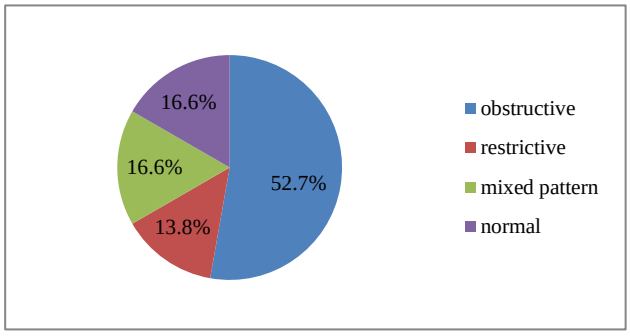

Figure 1: Patterns of pulmonary function impairment.

Ten (13.8) were found to have a restrictive pattern and 12 (16.6%) revealed a mixed obstructive and restrictive pattern. Only 12 patients (16.6%) had normal lung function. Among the 38 patients with obstruction in spirometry, 24 patients (63.2%) were under weight. In those showing irreversible airflow obstruction, 20 (52.7%) had been treated between 10 and 15 years ago, 31.6% (n=12) had been treated in less than 10 years and 15.7% (n=6) had been treated for tuberculosis within 5 years.

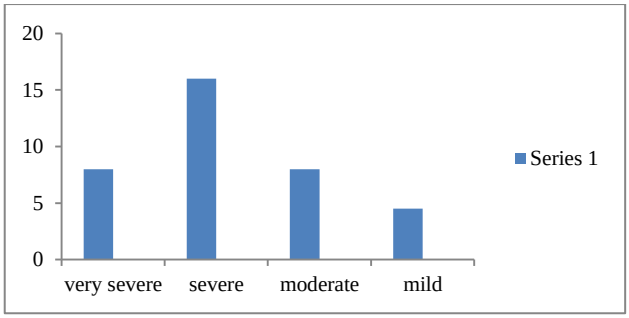

Figure 2: Severity of obstruction (N=38).

Table 1: Depicts the interval of treatment completion and dyspnea development.

Interval of treatment completion and dyspnea development	No. of cases	Percentage
Less than 5 years	06	15.7
5-10 years	12	31.6
More than 10 years	20	52.7

Among the 38 patient who showed obstructive pattern, 52.7 % of them developed dyspnea more than 10 years after completion of treatment.

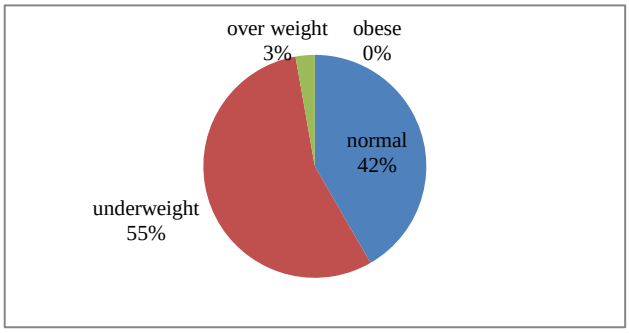

Figure 3: Pie diagram of patients as per B.M.I

55% of total patients in present study were under weight and among the 38 patients who showed obstructive in spirometry, 63.2% (n=24) were low B.M.I.

DISCUSSION

Present study found that 52.7% of treated pulmonary tuberculosis patients 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.[5-7] PLATINO study, a recent large study, found that FEV1 is reduced compared to FVC in most case.[8] An inverse relationship between FEV1 and the extent of the disease on the original chest radiograph in treated pulmonary TB has been documented. Both Pulmonary tuberculosis and obstructive airway disease especially bronchial asthma do not reach peak of activity at the same time due to different immunological mechanisms. The Thl

and Th2 subgroups of lymphocytes regulate development of tuberculosis and bronchial asthma, respectively and their levels are not enhanced simultaneously. Studies support this hypothesis by demonstrating an increased proportion of Th-2 lymphocytes in the peripheral blood and airway of patients with asthmatic disorders.[9,10]

After antitubercular treatment, the enhanced levels of Th- 1 come down and a proportion of patients develop Th-2 mediated airway obstruction which on aggravation emerges as bronchial asthma.[11,12] In present study restrictive defect is seen in 13.8% cases. Some studies found restrictive lung disease as most common followed by obstructive defect.[9,13]

Another study found that after 15 years follow up of patients there was a higher decline in FVC than FEV1.[14] Post tubercular pulmonary impairment emerges as distinct entity in various pattern but mainly as airflow limitation and previous Tuberculosis is considered as risk factor for COPD.[15-18] Further research required to understand the mechanism of development of obstructive defect in pulmonary tuberculosis.

CONCLUSION

Pulmonary tuberculosis causes significant impairment of lung function of all three types but mainly as obstructive abnormality due to lung destruction and inflammation. So early diagnosis and treatment of Tuberculosis decreases the post tuberculosis impairment. As post Tubercular fibrosis is considered a risk factor for COPD, we can reduce the prevalence of COPD by controlling tuberculosis.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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