



ASSESSMENT OF LUNG FUNCTION IN PREVIOUSLY TREATED CASES OF PULMONARY TUBERCULOSIS: A PROSPECTIVE STUDY

Dr Mukul Saxena¹, Dr Abid Ahsan^{*2}, Dr Ismat Rehana³ and Dr Pooja Chaudhary⁴

¹Associate Professor, Department of TB & Chest Diseases, MRA MC, Ambedkarnagar, UP

²Assistant Professor, Department of Physiology, ASMC, Bahraich, UP

³Assistant Professor, Department of Microbiology, ASMC, Bahraich, UP

⁴Associate Professor, Department of Community Medicine, RD MC, Banda, UP

* Corresponding Author: **Dr Abid Ahsan, Email: abidahsan18@gmail.com**

Place of Study –Mahamaya Rajkiya Allopathic Medical College, Ambedkar Nagar, Uttar Pradesh, India.

ABSTRACT

Objective: To Assess The Lung Function In Previously Treated Pulmonary Tuberculosis Lung Patients

Materials and Methods: This Is A Hospital Based Study Of 115 Patients Attending The Tb And Chest Disease Opd. Chest Xray And Afb For Sputum Was Done In Post Tubercular Patients. Pulmonary Function Was Assessed In Sputum Negative By Spirometry.

Results: Spirometry Results Showed 73.8% Patients With Obstruction, 19.7% With Restriction And 6.6% Patients Were Normal. Among Patients With Obstructive Disease, 20% Were With Moderate Obstruction, 46.7% With Severe Obstruction And 33.3 % Were With Very Severe Obstruction.

Conclusion: Our Study Highlights That Even After Microbiologic Cure Of Pulmonary Tuberculosis, Patients Continue To Have Obstructive Airway Disease. So There Is Utmost Need To Decrease This Burden Through Various Maneuvers.

Keywords: Pulmonary Tuberculosis, Spirometry, Microbiological Cure, Obstructive Air Way Disease, Restrictive Airway Disease

INTRODUCTION:

Pulmonary tuberculosis incidence is quite high in developing nations and nearly 1805670 new cases notified in India in 2020(1). Post tuberculosis pulmonary sequelae are a common problem in patients successfully treated for pulmonary tuberculosis and leads to significant morbidity affecting daily routine life. Chronic obstructive airway disease, asthma and bronchiectasis are known sequelae due to destruction of lung by pulmonary tuberculosis(2)(3)(4)(5)(6)(7). Bronchiectasis has been implicated in the genesis of COPD caused by the destroyed lung due to pulmonary tuberculosis(3)(4)(8). Patients of post tuberculosis pulmonary sequelae have variable pulmonary functions as compared to known patients of COPD and it affects their clinical behavior. This study was conducted to evaluate the pattern of pulmonary function tests in successfully treated and healed case of pulmonary tuberculosis.

Aims and Objectives:

To assess the lung function in patients previously treated for Pulmonary Tuberculosis.

MATERIAL AND METHODS-

Study setting: This study was done in a tertiary care center in Department of Respiratory Medicine and Department of Physiology of Government Medical College in Ambedkar Nagar district of Uttar Pradesh (India).

Study Design: Descriptive Hospital based study.

Sample size: Purposive sample of 115 patients attending the TB and Chest Diseases OPD (June 2021 to January 2022) during the study period.

Duration of the study – 8 months

Inclusion Criteria:

Patients previously treated for Pulmonary Tuberculosis and sputum for AFB negative attending TB and Chest Diseases OPD of Mahamaya Rajkiya Allopathic Medical College who gave informed consent.

Exclusion Criteria:

Patients having active tuberculosis.
Patients admitted with exacerbations and moribund patients.
Patients having contraindications for spirometry.
History of current or previous smoking.
History of occupational exposure.
Diagnosed cases of asthma and COPD.

Methods:

Eligible patients who gave consent were taken up for the study. The baseline characteristics and history was recorded in the proforma. Chest X ray was done for the patients and sputum for AFB testing was done by fluorescent microscopy for all patients. Those patients who were negative for acid fast bacilli on fluorescent microscopy were taken up for spirometry. Spirometry was done by Quark PFT (Cosmed, Rome, Italy) and the results were recorded.

Results:

115 patients participated in the study. 64 patients were male and 51 patients were female. Most of the patients were aged between 21 to 60 years. Age distribution of the patients is shown in Table 1.

Table 1: Age distribution of patients

Age distribution (years)	Number of patients (n= 115)	Percent
11-20	2	1.7
21-30	23	20.0
31-40	14	12.2
41-50	28	24.3
51-60	38	33.0
61-70	8	7.0
71-80	2	1.7
Total	115	100

History:

Shortness of breath was present in 99 patients (86.1%). Cough was present in 97 patients (84.3%). 98 patients had taken complete course of anti-tubercular treatment (ATT) while 17 patients had received incomplete courses of ATT. Last course of ATT was taken less than 10 years back in 79 patients (Table 2). 89 patients had taken a single course of ATT while 26 patients had taken multiple courses of ATT (Table 3).

Table 2: Time at which last course of ATT was taken

Last course of ATT	Number of patients (n= 115)	Percent
<10 years back	79	68.7
>10 years back	36	31.3
Total	115	100

Table 3: Number of courses of ATT taken by the patients

Number of courses of ATT	Number of patients (n=115)	Percent
Single course of ATT	89	77.4
Multiple courses of ATT	26	22.6
Total	115	100

Chest X Ray findings:

Normal chest X ray was found in 12 patients while 103 patients had findings (collapse/ cavity/ fibrosis) in their chest X ray (Table 4). Chest X ray showed evidence of collapse in 59 patients, cavities were present in chest X ray of 22 patients while there was evidence of fibrosis in chest X ray of 102 patients.

Table 4 : Chest X ray findings

Chest X ray finding	Number of patients (n=115)	Percent
Normal Chest X Ray	12	10.4
Single finding in Chest X Ray	37	32.2
Multiple finding in Chest X Ray	66	57.4

Spirometry Result:

Normal spirometry results were found in 8 patients while 83 patients had evidence of obstruction while 24 patients had evidence of restriction in spirometry (Table 5). Among those patients with obstructive defect on spirometry 28 patients had very severe obstruction (FeV1 < 30%), 37 patients had severe obstruction (FeV1 30% - less than 50%) while 18 patients had moderate obstruction (FeV1 50-80%) (Table 6).

Table 5 : Spirometry result

Spirometry result	Number of patients (n=115)	Percent
Normal	8	7.0
Obstruction	83	72.2
Restriction	24	20.9

Table 6 : Severity of obstruction

Severity of obstruction	Number of patients (n=83)	Percent
Moderate obstruction (FeV1 50%-80%)	18	21.7
Severe obstruction (FeV1 30%--<50%)	37	32.2
Very severe obstruction (FeV1 < 30%)	28	24.3

Statistical Analysis: The data was entered and analyzed manually. Appropriate statistical tests were used as applicable. Results were compared to existing data.

Ethical Issues: Informed consent was taken from the subjects. Interview was taken under non-hostile and non-judgmental manner. Health education was provided to each subject. Approval was taken from the institutional ethics committee, MRA Medical College, Ambedkar Nagar.

DISCUSSION:

The total number of patients in our study was 115. Low number of patients has been due to strict exclusion criteria because many of our patients with post tubercular sequelae were smokers who had to be excluded in the study. Average age of our study participants was 45.7 years. This is lower than other studies(9)(10)(11)(3) probably due to more of younger patients attending our hospital. Male to female ratio in present study is 1.25:1, which is comparable to the study of **Inam Baig et al (2010)**(10) and **Ozkaya et al(12)**. Dyspnoea (86.1%) was the most common presentation followed by cough (84.3%) in post tubercular sequelae patients of our study. Similar results have been

found in other studies(9)(11)(3). Most of our patients (68.7%) had taken Anti tubercular drugs within 10 years suggesting early presentation of our subset of patients after receiving ATT. Most of our patients had taken a single course of ATT (77.4%) suggesting that even single episode of TB disease causes changes in lung parenchyma and makes patients symptomatic.

The present study shows that the most of post tubercular sequelae patients were having obstructive pattern (72.2%), about 20.9% had restrictive pattern of disease and remaining 7% had normal spirometry result. Similar results were obtained in previous studies **Inam Baig et al**(10) where obstruction was found in 55.3 percent and **Hassan I et al** where 40.7 percent of patients had obstruction in spirometry. **Agarwal et al**(9) found that 32.4 percent of their COPD patients had history of pulmonary TB thus indicating that tuberculosis may be an etiologic factor in the development of COPD. In present study 89.6% patients had abnormal findings. Out of which patients having single (37%) and multiple (57.4%) findings in CXR. Among 89.6% of abnormal Chest X ray findings, collapse (51.3%), cavities (19.1%) and fibrosis (88.7%). This result is comparable with the result of **Inam Baig et al**(10)and **Bairwa et al**(11) and **Hassan I et al**(3). Post tubercular airflow obstruction was found in 72.2% of patients of which 21.7% were with moderate obstruction, 44.6% were with severe obstruction and 33.7% were with very severe obstruction. So, most of post tubercular sequelae patients were of severe obstruction category. This may be due to more likelihood of presentation in OPD of symptomatic patients. Similar results have been obtained from other studies (10)(11)(13).

CONCLUSION

Tuberculosis associated obstructive airway disease constitutes a substantial burden on health care setups in India. The present study highlights that even after microbiologic cure, patients continue to have obstructive airway disease. Larger studies would be required to find out the burden of this entity and formulate better treatment guidelines for management of post tubercular obstructive airway disease.

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