

Clinico - Radiological and pulmonary function profile of treated pulmonary Tuberculosis patients

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ABSTRACT

Tuberculosis causes most number of deaths due to infections worldwide. Around 9.0 million new cases and 1.5 million deaths registered worldwide of which 360,000 were HIV positive. One fourth of the global TB encumbrance occurs in India, making it the most important public health problem facing this country. It is estimated that out of 9.0 million cases worldwide, 2.3 million cases were reported in India. TB control program of India is on track as far as reduction in the disease burden. There is 42% lessening in humanity since 1990 and 51% lessening in TB pervasiveness as associated to 1990. Further, TB pervasiveness has concentrated from 40 lakhs to 28 lakhs annually from 1990. A total of 9,28,190 smear positive TB cases were diagnosed and 14,10,880 were registered for treatment under RNTCP. It has become a major barrier to our socioeconomic development. Tuberculosis (TB) still remains as the most common communicable disease. It is estimated that 21% of the global TB burden occurs in India. Two in every five Indians are infected with tuberculosis and two persons die every minute because of tuberculosis in India. This study focuses to study the clinico-radiological profile of treated pulmonary tuberculosis patients and to evaluate the risk factors that can influence the treatment outcome in a tertiary care hospital and to evaluate the type of limitation in lung function by spirometry in treated pulmonary tuberculosis patients.



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INTRODUCTION

In this section presents introduction of this research work. HIV infected people are at risk of developing active TB 20 to 40 times more than non-infected

people. [1-3] In 1991, the World Health Assembly (WHA) Decision diagnosed TB as a worldwide public health trouble and advised objectives for country wide tuberculosis programmes, for detecting 70 percent of recent smear-Positive sufferers and curing 85 percentage of such cases by way of the yr 2000 in an try and rejuvenate international TB manage. [4-6] Thereafter, in 1993, the World Health Organisation (WHO) recognized the deadly effect of this disease and declared it a "Global Emergency". The DOTS approach turned into released in 1994, and the Globally recommended method for TB manage due to the fact that then. [7, 8]

Multi-drug resistant tuberculosis (MDR-TB) is an in particular complicated shape of TB characterized by way of resistance to first line pills like

Rifampicin and Isoniazid with or without confrontation to every other anti-tuberculosis pills. [9, 10] Resistance to Rifampicin and Isoniazid, two frontline drugs that shape the spine of the fast-direction treatment, would necessitate using drugs that are more toxic, costly and are administered for a long period the MDR-TB patients that fail treatment have a higher risk of death. [11, 12] Drug resistance is entirely man-made and caused by unpredictable or improper treatment. Its emergence and increase is a growing problem. Drug resistance development is a considerable risk if patients are not properly tested and treated [13, 14]

Majority of the patients who have completed pulmonary TB treatment though having been declared microbiologically cured still continue to have symptoms as a consequence of sequelae of the treatment. [15, 16] Histopathological Findings on account of tuberculosis encompass the construction of caseation granuloma, tissue liquefaction, and hollow space development. When these arise inside the lung, many survivors revel in permanent anatomic adjustments like bronchial and parenchymal structural adjustments, consisting of Broncho vascular distortion, bronchial stenosis, bronchiectasis, emphysematous adjustments, residual cavities and fibrosis all of which has the ability to cause severe lung function abnormalities. Lanee has described the association between tuberculosis and airway involvement more than hundred years back. [17, 18] This parenchymal destruction is said to be because of upregulation of proteases and protease control dysregulation. This post tubercular abnormality has emerged as a separate clinical entity. [19]

In these articles represents fragment 2 of this article simplifies the detail on the related works. In section 3 presents the materials and methods adopted and section 4 presents the particulars of the experimentations and discussions. Finally section 5 accomplishes the paper by allocation our inferences and coming plans.

RELATED WORKS

In this segment represents focuses the related works of this research work. There are many causes for airway diseases. [20] Among which treated pulmonary tuberculosis patients presenting with airway obstruction is very well established. Studies have estimated that around 48.7% to 76% of the patients who have been preserved for pulmonary tuberculosis can present with airway diseases and several studies now being extensively done to prove the association between tuberculosis and airway diseases. [21] Pulmonary tuberculosis

can result in the scarring and fibrosis of the airways, which causes symptoms like difficulty in breathing, wheeze, chest pain, cough and dyspnea on exertion. [22] Many previous studies have shown that these treated pulmonary tuberculosis develop only obstructive defects. However studies that are done recently have shown other pulmonary impairments like mixed or restrictive pattern can also be seen. Patients with these post tubercular airway diseases have impaired quality of life with long-term respiratory complaints and they must be subjected to accurate pulmonary function test to quantify the extent of their impairment. [23] Tuberculosis as a cause of chronic obstructive pulmonary diseases was inducted in GOLD guidelines in 2006. [24] Since then the role pulmonary tuberculosis in the development of chronic obstructive pulmonary disease has been restudied and has been estimated that COPD prevalence has gone up by 3.7 to 5%. [25]

Studies have shown that associated risk factors such as smoking, household cooking fuel exposure, subjects having occupation that exposes them to dusts and gases, poor socio economic status, treatment failure or relapse and poor nutritional status play a significant role in the development of post tubercular sequel. [26] This study was undertaken to see the clinico – radiological profile along with the spirometry impairment in treated PTB patients along with an aim to assess risk factors like compliance, default rate, treatment history like number of times ATT has been taken, smoking and occupation that contribute to significant morbidity in the treated PTB patients based on their clinical, radiological and spirometry parameters.

MATERIALS AND METHODS

In this segment represents the materials and methods of this research work. This study was done in the Department of Respiratory Medicine treated pulmonary tuberculosis patients. The diagnosis of post tubercular sequelae was based on the past history of treated pulmonary tuberculosis patients along with clinico – radiological examination, negative sputum examination for acid fast bacilli, and spirometry. This study conducted in the period of February 2014 –August 2015. 104 subjects were analyzed the prospective longitudinal study.

Inclusion Criteria

- Age: 18 - 60 years
- Patients who were previously diagnosed with pulmonary tuberculosis
- Patients with no evidence of active pulmonary tuberculosis bacteriologically, radiologically and

clinically.

Exclusion Criteria

- Age less than 18 and more than 60
- Active haemoptysis
- Pregnancy
- Active Tuberculosis and patients on ATT, MDR TB, XDR TB
- Significant renal and cardiac problems.
- Patients with the history of any pulmonary diseases like BA, COPD, ILD before occurrence of pulmonary tuberculosis
- Patients with respiratory failure
- Immunocompromised states like diabetes and HIV

Patients fulfilling above criteria were encompassed in the study after obtaining consent agreement. All the patients in the study were investigated as follows:

A detailed clinical history including treatment history of Tuberculosis was elicited. Based on the regularity of ATT, patients were categorized as having good compliance if they have taken more than 95% or more of their ATT drugs during their treatment, otherwise regarded as having poor compliance¹³.

After being evaluated as per the Proforma. Patients were reviewed at the end of 3rd month and 6th month. They were assessed clinically with a scoring system at the end of 3rd and 6th month and objectively (Spirometry) at the end of the 6th month. The obtained data was analyzed by relating suitable statistical tests.

Statistical analysis was done in all 104 patients. Information regarding age, gender, chest x-ray findings, spirometry, smoking habits, number of times ATT was taken, compliance to TB treatment and occupation were noted. The results were plotted in Microsoft Office Excel worksheet and were analyzed. Statistics were done using percentage analysis, cross tabulation analysis and chi square test. Statistics was achieved using Statistical Package for Social Sciences (SPSS) version 13.0 for Windows

RESULTS AND DISCUSSIONS

In this segment focuses the results and discussions of this research work. The study was showed at Department of Respiratory Medicine. The data obtained from 104 subjects were analyzed and aggregate data of the study is shown below:Table 1Figure 1

Table 1: Age distribution

Age in years	No. of patients
18 – 20	3
21 – 30	15
31 – 40	20
41 – 50	26
51 – 60	40

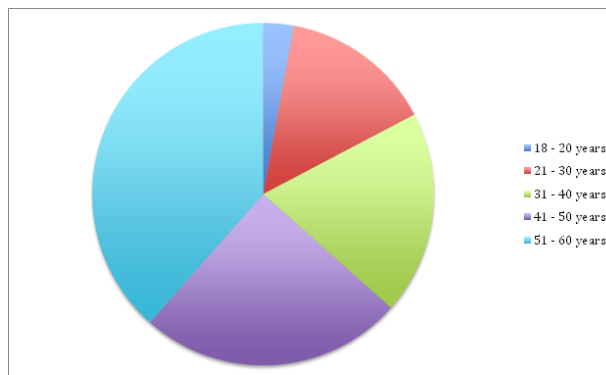


Figure 1: Age distribution

In the present study majority of the patients,40 (39%) presented between the age group 51 to 60. Three were in the age group 18 to 20 (2.8 %). 15 were in the age group 21 to 30. (14%). 20 were in the age group 31 to 40 (19.2 %). 26 (25%) were in the age group 41 to 50.

Out of 104 patients, 61 patients (59%) had occupation, which has the potency to cause lung diseases based on the various published studies and 43 (41%) had occupation, which does not have the potential to cause any lung diseases. 59% of the subjects has occupations like construction labour, carpenter, chemical industrial worker, cooking, farming, flower vender, painting, pen ink manufacturer, welding, petroleum bunk employer and teacher. 41% of the subjects were domestic help, house wife, business people and students. Majority of the patients in our study were farmer(15%) and cook (13%) by occupation.

In India, mostly due to better quotes of treatment noncompliance, the variety of disappointments producing multi resistance to pills is about 12% of treatment consequences activating a first-rate public fitness trouble. There are variations within the disease of maximum TB sequelae. Some authors concluded that TB causes obstructive pattern while others concluded that both restrictive and mixed can also be seen.

Menon et al. described that despite adequate ATT and early clinical response in newly diagnosed pulmonary tuberculosis patients, large percentage of

these patients have residual radiological changes which can cause severe pulmonary impairment. They also stated that in subjects with severe inflammatory response, because of severe response to foreign organism there is more self tissue destruction.

Several studies have stated that in cases with initial sputum positivity there are more residual lesion than those with initial sputum negativity probably because of very high bacterial load which can cause significant residual lesions.

Al-Hajjaj et al stated that compliance to ATT also plays a huge role in residual lesions. Patients with good ATT compliance had very less lesions compared to those who had poor compliance to ATT therapy. This study also stated that in subjects with severe radiological lesions during their initial diagnosis, extending their treatment time might reduce post treatment sequelae. Similarly, in our study we noticed that, in subjects with poor compliance to ATT treatment had more radiological lesions compared to patients with good compliance.

Many studies have stated that there is an association between smoking, biomass fuel exposure and occupational lung toxins and patients developing post tubercular pulmonary impairment. Similarly, in our study we observed that more than 61% of the patients were smokers and 59% of them had occupation, which exposes them to harmful dusts and smokes.

Pasipanodya et al finished in fitness technological know-how Centre, University of North Texas states that maximum of the sufferers with dealt with pulmonary tuberculosis confirmed a restrictive pattern on spirometry. However in our look at the majority of the patients had obstructive pattern. Pulmonary impairment became more commonplace in cigarette smokers. They concluded that pulmonary impairment contributes important, formerly unmeasured burdens of tuberculosis in microbiologically cured patients that may consist of continual damage and extra humanity and microbiological cure is the start, no longer the quit, of their infection.

In our observe, there was a male predominance than lady with a ratio of 2.1: 1 and most sufferers had been between 51 to sixty years age organization and all of the patlents had been symptomatic which include cough, sputum and breathlessness due to pulmonary tuberculosis sequelae and showed decrease in pulmonary function. We also discovered correlation between defaulters, sufferers with poor compliance to ATT, occupational exposures and full-size lung involvement radiologically.

Hayett et al said that during patients with extensive tuberculosis lesions causes restrictive kind of pulmonary impairment. However in our look at we found that even in topics with minimum radiological adjustments can have restrictive sample.

Respiratory impairment arises from numerous anatomical capabilities. Destruction to bronchi because of considerable fibrosis or endobronchial stricture can motive airflow obstruction. Greater lung extent loss appears to stem from parenchymal damage and succeeding fibrotic manner. Our examine established the lifestyles of considerable practical boundaries in patients with squeal of pulmonary tuberculosis [25].

The gift study demonstrates a great growth in practical trouble in sufferers with pulmonary tuberculosis sequelae. Fluctuations in lung characteristic and huge residual lesions are not shared answers in patients with tuberculosis who are recognized early and whose treatment is suitable and uneventful. Delays inside the identity of cases of pulmonary TB are due to insufficient evaluation of indicative respiration misery or suspension in searching for medical consideration. Smoking and occupational experience history was a big forecaster of pulmonary feature worsening. In patients with extensive residual lesion we observed a significant correlation with pulmonary function impairment. Patients who had very poor compliance to ATT and who were defaulters had severe residual lesions causing severe pulmonary impairment.

CONCLUSION

Finally this work concludes that,

1. The most communal spirometer pattern observed in preserved pulmonary tuberculosis patients was obstructive
2. Smoking, higher default rate, poor compliance and occupation exposure to dust, smoke, chemicals and gases were associated with advanced radiological disease and poor clinical score in this study
3. Hence, prompt and early effort must be made to increase the compliance and to prevent default. Health education regarding smoking, occupational exposure and other risk factors for TB must be stressed in RNTCP programme and all efforts should be made to follow up treated patients to assess and manage respiratory impairment

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest for this study.

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