

Clinical Profile of TB Patients with Past History of Covid-19

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Abstract:

Background: Worldwide the researchers have been discussing the deleterious effects of covid-19 on TB. But there are only few studies that have evaluated for new onset tuberculosis in patients with covid-19, as during the covid-19 pandemic all resources had been directed towards managing it, there is unavoidable decreased focus towards other diseases and health conditions. Provided the wide prevalence and incidence of tuberculosis worldwide and particularly in India, the present study aims at evaluation of clinical profile of TB patients with history of covid 19. As at present time both diseases possess high mortality and morbidity, particularly among the comorbid patients.

Method:

The present study was conducted to determine the clinical profile of tb patients with past history of covid-19. Patients with past history of covid-19 were diagnosed with tuberculosis on the basis of history, examination, sputum investigation, radiological investigations and other investigations as needed for diagnosis of TB. Further they were classified as pulmonary or extra pulmonary TB, drug resistant or drug sensitive TB. Also, they were enquired about their covid-19 disease and all records regarding it were assessed so as to classify the covid-19 severity. Patients details regarding their past medical histories were also included.

Result: Total 32 patients were enrolled, mean age of study subjects was 39.15 ± 16.52 years, there were 23 male patients (71.87%) and there were 09 female patients (28.12%). In total 20 patients (62.50%) had pulmonary TB and 12 patients (37.50%) had extra pulmonary TB, among the extrapulmonary cases 09 patients (75%) had pleural effusion; 03 patients (25%) had cervical lymphadenopathy. In total 19 patients (59.37%) of the cases had drug sensitive TB, while only 01 patient (3.12%) was found to have drug resistant TB (rifampicin resistant TB), while in 12 patients (37.50%) cases drug sensitivity/resistant status could not be identified. 27 patients (84.37%) had mild Covid, 03 cases (09.37%) had moderate severity and 02 case had severe Covid (06.25%).

Conclusion: Patients recovering from COVID-19 infection are very much susceptible to develop a variety of complications including infectious diseases especially TB, particularly among those recovering from severe COVID-19 infection hence it requires a high index of suspicion to early diagnose and treat tuberculosis among patients who have had covid-19 infection.

Keywords: clinical, TB, history & COVID-19.

Study Design: Descriptive Cross-sectional study.

INTRODUCTION

Pulmonary tuberculosis is a chronic infectious disease most commonly caused by mycobacterium tuberculosis, other mycobacteria can also cause tuberculosis, and these include mycobacterium africanum and mycobacterium bovis [1]. As per Global TB report 2020 incidence of tuberculosis worldwide was approximately 10 million (8.9-11) and in India it was approximately 2.64 million (193/lakh population), the estimated number of drug resistant tuberculosis worldwide was 6.1/lakh population, and about 9.1/ lakh population in India [2].

Despite the brief decline in TB notifications observed around the months corresponding to India's two major COVID-19 waves, the National Tuberculosis Elimination Programme (NTEP) reclaimed these numbers. As per the Global TB Report 2021, the total number of incident TB patients notified during 2021 in India was 19,33,381 as compared to the 188 per 100,000 population for the year 2020 which was 19% higher than that of 2020 [3,4,5].

The estimated number of MDR and XDR-TB cases who have been put on treatment as per the global TB report 2021 was 4 per 100,000 and 1 per 100,000 population, respectively. In 2020 and 2021, there was a reduction of 14% and 9% in the number MDR patients put on treatment as compared to the estimated numbers. Similarly, a reduction in number of XDR-TB patients started on treatment in 2020 and 2021 was seen as compared to the previous years.

Coronavirus disease 2019 (COVID-19) is caused by a novel beta-coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), that has spread worldwide since December 2019, causing significant global public health and economic problems [6,7]. The World Health Organization declared COVID-19 a pandemic on March 11, 2020.[7]

Evidence to date suggests that COVID-19 patients with pre-existing co-morbidities such as hypertension, diabetes, and cardiovascular disease are at a greater risk of acquiring severe covid-19 and death [8]. The main transmission route of both COVID-19 and TB is via respiratory droplets, and their main target are the lungs, which can lead to a worse outcome among COVID-19 and TB co-infection patients (aptly abbreviated COVID-TB) [9,10]. The initial signs and symptoms of COVID-19 are similar to other respiratory infections, such as TB and influenza. TB & COVID-19 present with similar complaints of cough, fever and

breathlessness, although the incubation period and onset of Tuberculosis is slower [11]. Therefore, an intensive investigation of COVID-TB cases may be of great clinical significance [6,7,10].

Most of the researchers regard pulmonary TB as a risk factor for the severe course of a new coronavirus infection [12-14]. However, the reverse negative interaction of these diseases has also been described, for example, an increased risk of a latent infection turning into an active form of TB against the background of COVID-19 because of the depletion of CD4 + T cells [15,16]. Several studies have noted an aggravation of the course of both diseases in their mutual existence because of common social, epidemiological, and clinical determinants [17,18]

Material & Method

This study was conducted in Department of Respiratory medicine, Pt. J.N.M Medical College and DR. BRAMH Raipur (C.G.) from December 2021-December 2022.

Patients with past history of covid-19 were diagnosed with tuberculosis on the basis of history, examination, sputum investigation, radiological investigations and other investigations as needed for diagnosis of TB. Further they were classified as pulmonary or extra pulmonary TB, drug resistant or drug sensitive TB.

Patients were enquired about COVID-19 disease, by asking them and also by getting information from their medical records for symptoms, clinical course, blood oxygen levels, oxygen support requirement, ventilator support requirement (non-invasive/invasive), type of treatment received for COVID-19 disease, blood investigations, radiological investigations, past medical history and based on this information they were evaluated for COVID-19 severity as per MOHFW guidelines.

Data collection was done after approval by ethical committee. Data of patients like demographic profile, presenting complains, examination, co-morbidities, complete blood counts, liver and renal function tests, serum electrolytes, serum protein level, biological specimen (AFB, NAAT, culture, LPA), pleural fluid (ADA, protein, sugar, cytology), FNAC, biopsy reports in case of TB lymphadenitis, and other specimen analysis reports needed for diagnosis and management of TB, also radiological imaging i.e., Chest X-RAY, CT chest were obtained.

INCLUSION CRITERIA

1. Patients with age > 14 yrs.
2. Patients with diagnosis of tuberculosis with history of COVID-19.
3. Patient who will give consent for participation in study.

EXCLUSION CRITERIA

1. Patients who are not willing to take part in study any time during study.

Results:

TABLE 01: PRESENT COMPLAINS AMONG THE STUDY SUBJECTS

COMPLAINS	FREQUENCY	PERCENTAGE
COUGH	29	90.62
EXPECTORATION	21	65.62
FEVER	22	68.75
BREATHLESSNESS	16	50.00
HEMOPTYSIS	02	06.25
LOSS OF WEIGHT	20	62.50
CHEST PAIN	22	68.75
GENERALIZED WEAKNESS	26	81.25
DECREASED APPETITE	10	31.25
NECK SWELLING	03	09.37

Table 01: Presents the data regarding the present complains among the study subjects. Majority of the study subjects (29 patients) (90.62%) had cough as most common complain, followed by generalized weakness (26 patients) (81.25%), chest pain (22 patients) (68.75%), fever (22 patients) (68.75%) expectoration (21 patients) (65.62%), loss of weight (20 patients) (62.50%), breathlessness (16 patients) (50%), decreased appetite (10 patients) (31.25%), neck swelling (03 patients) (09.37%), haemoptysis (02 patients) (06.25%).

TABLE 02: CO-MORBIDITIES AMONG DIFFERENT TYPES OF TB

CO-MORBIDITIES	PULMONARY TB	EXTRA-PULMONARY TB	DRUG SENSITIVE TB	DRUG RESISTANT TB	SENSITIVITY/RESISTANT PATTERN NOT APPLICABLE
DM (09)	08 (88.88%)	01 (11.11%)	06 (66.67%)	0	03 (33.33%)
HTN (04)	02 (50%)	02 (50%)	04 (100%)	0	0
HYPOTHYROIDISM (01)	0	01 (100%)	0	0	1 (100%)
HIV (02)	02 (100%)	0	02 (100%)	0	0

Table 02: Presents the data regarding the co-morbidities among different types of TB. It was observed that out of 09 diabetic patients 08 patients (88.88%) had pulmonary TB, 01 patient (11.11%) had extra-pulmonary TB, 06 patients (66.67%) had drug sensitive TB, 03 patient's (33.33%) drug sensitivity/resistance pattern was not known. Out of 04 hypertensive patients 02 patient (50%) had pulmonary TB, 02 patients (50%) had extra-pulmonary TB, and all 04 patients (100%) were case of drug sensitive TB. One hypothyroid patient was case of extra-pulmonary TB, in whom drug sensitivity/resistance pattern was not known. There were 02 HIV patients both patients (100%) had pulmonary TB with drug sensitive TB (100%).

TABLE 03: COVID-19 SEVERITY AMONG THE STUDY SUBJECTS

COVID 19 SEVERITY	FREQUENCY	PERCENTAGE
MILD	27	84.37
MODERATE	03	09.37
SEVERE	02	06.25
TOTAL	32	100

Table 03: Presents the data regarding Covid-19 severity among the study subjects. 27 patients (84.37%) had mild Covid, 03 cases (09.37%) had moderate severity and 02 case had severe Covid (06.25%).

TABLE 4: COVID-19 SEVERITY AMONG DIFFERENT TYPES OF TB

COVID-19 SEVERITY	PULMONARY TB	EXTRA-PULMONARY TB	DRUG SENSITIVE TB	DRUG RESISTANT TB	SENSITIVITY/RESISTANCE PATTERN NOT APPLICABLE
MILD (27)	16 (59.25%)	11 (40.74%)	14 (51.85%)	01 (3.70%)	12 (44.44%)
MODERATE (03)	03 (100%)	0	03 (100%)	0	0
SEVERE (02)	01 (50%)	01 (50%)	02 (100%)	0	0

Table 4: Presents the data regarding COVID-19 severity among different types of TB. Out of 27 mild COVID-19 cases, 16 cases (59.25%) had pulmonary TB, 11 cases (40.74%) had extra-pulmonary TB, 14 cases (51.85%) had drug sensitive TB, 01 case (3.70%) had drug resistant TB, while in 12 cases (44.44%) drug sensitivity/resistance pattern was not known. 03 cases of moderate COVID-19 had pulmonary TB (100%), and all were drug sensitive case of TB (100%). Out of two cases of severe COVID-19 one case (50%) had pulmonary TB and one had extra-pulmonary TB (50%) and both were drug sensitive (100%).

TABLE 5: TYPES OF TB AMONG THE STUDY SUBJECTS

TYPE OF TB	FREQUENCY	PERCENTAGE
PULMONARY TB	20	62.50
EXTRA PULMONARY TB	12	37.50
TOTAL	32	100

Table 5: Presents the data regarding the percentage of pulmonary and extra pulmonary TB. Among the study subjects, 20 patients (62.50%) had pulmonary TB and 12 patients (37.50%) had extra pulmonary TB

TABLE 6: DIFFERENT TYPES OF EXTRA PULMONARY TB AMONG THE STUDY SUBJECTS

TYPE OF EXTRA PULMONARY TB	FREQUENCY	PERCENTAGE
PLEURAL EFFUSION	09	75.00
CERVICAL LYMPHADENOPATHY	03	25.00
TOTAL EXTRA-PULMONARY CASES	12	37.50

Table 6: Presents the data regarding the different types of extra-pulmonary TB. 09 patients (75%) had pleural effusion; 03 patients (25%) had cervical lymphadenopathy.

TABLE 07: DRUG SENSITIVE/DRUG RESISTANT STATUS AMONG THE STUDY SUBJECTS

TYPE OF TB	FREQUENCY	PERCENTAGE
DRUG SENSITIVE TB	19	59.37
DRUG RESISTANT TB	01	03.12
NOT APPLICABLE	12	37.50
TOTAL	32	100

Table 07: Presents the data regarding the drug sensitive and drug resistant TB. Among the study subjects, 19 patients (59.37%) of the cases had drug sensitive TB, while only 01 patient (3.12%) was found to have drug resistant TB (rifampicin resistant TB), while in 12 patients (37.50%) cases drug sensitivity/resistant status could not be identified.

DISCUSSION

The symptom similarity between TB and COVID-19 probably resulted in a delay in suspecting TB, as most of the people could have attributed similar symptoms to COVID-19 and preferred to wait it out. Also, the pre-existing stigma of TB and the added stigma of COVID-19 might have discouraged people from getting tested, even after experiencing symptoms common to both diseases as people were already struggling with their daily earnings, food and shelter during the covid-19 pandemic and had the fear of getting admitted in the hospitals that would have been an added misery to their prevailing life concerns.

Due to the suspension of most of the non-emergency services during the covid-19 pandemic, those who wished to sought medical advice could not get adequate services and hence, the diagnosis and treatment of TB was delayed [18]. This resulted in an overall fall in TB detection and notification, which is evident from the 2020 Global TB report which featured reduced notification of TB. Also, there was an interruption in the supply of the drugs to a certain extent that might have possibly contributed to the development of new resistance among many patients and worsening of those patients who were already on anti-tubercular therapy, particularly MDR, & XDR TB patients. This was certainly a major setback to the global progress made so far to combat TB. But, with so many new challenges emerging during this pandemic there was a combined efforts from people of different sectors to tackle these challenges.

Patients with covid-19 may present with immune dysregulation, also the treatment used for covid-19 which included steroids and other immunosuppressants in certain severe covid cases might lead to development on new onset tuberculosis or endogenous reactivation or reinfection [15,16]. A Bidirectional screening of patients has been recommended by the Ministry of Health and Family Welfare in India, which helped in the early diagnosis of so many cases of pulmonary TB, as well as covid-19 [20]. **Vijayalakshmi et al. (2022) [21]:** reported clinic-radiological profile of tuberculosis in post covid patients. There were 13 patients with male predominance (69%), with mean age of 50.7 years noted. Patient with co-morbidity were 61.53%, majority were diabetics. 46% were severe covid cases, 15% were moderate covid cases who received corticosteroids and 38% were mild covid cases who didn't receive corticosteroids. Mean duration of TB diagnosis after covid was 2 months. 5 patients were diagnosed as pulmonary tuberculosis with cough, fever, weight loss as presentation, 6 presented with air-leak in which 4 had hydropneumothorax, 2 had pneumothorax with dyspnea as presentation and 2 had pleural effusion. 69% of chest radiograph revealed cavity. Rest showed

nodules, consolidation. AFB Sputum smear/CBNAAT-positive in 85% cases. Among 2 pleural effusions, pleural fluid CBNAAT was positive in 1 and in other biochemical analysis was suggestive of tuberculosis. 15% were Rifampicin resistant TB. All except 1 were newly diagnosed tuberculosis. **Alemu A, Bitew ZW, Seid G, Diriba G, Gashu E, Berhe N, et al. (2022) [22]**: did a systematic review of case reports of individuals developing tuberculosis after recovery from COVID-19. A total of 33 patients were included, the median age was 44 years (range; 13.5–80), and (18 cases, 54.5%) were males. The majority (20, 69%) of patients had some type of comorbidity with diabetes (12/29) and hypertension (9/29) being the most common. Four patients (30.77%) had a history of TB. Corticosteroids were used to treat COVID-19 in 62.5% (10) of individuals. The most common TB symptoms were fever, cough, weight loss, dyspnea, and fatigue. 20, 11 and 02 patients developed pulmonary, extrapulmonary, and disseminated/miliary TB respectively. **Tadolini M, Codecasa LR, García-García J-M, et al. (2020) [23]**: described the first-ever global cohort of current or former TB patients (post-TB treatment sequelae) with COVID-19. Overall, 49 consecutive patients with current or former TB and COVID-19 were recruited (dataset updated as of 25 April, 2020). Of 49 patients, 26 (53.0%) had TB before COVID-19, 14 (28.5%) had COVID-19 first and nine (18.3%) had both diseases diagnosed within the same week. 42 (85.7%) patients had active TB (median age 45.5 (28.0–63.0) years) and seven (14.3%) had post-TB treatment sequelae (median age 69.0 (66.0–70.0) years). 48 patients had pulmonary TB (one caused by *Mycobacterium bovis*), 37 patients had drug-susceptible (or were treated with the standard first-line regimen for new cases) and eight had drug-resistant TB (and were treated with second-line drugs). Of the 14 non-clustered patients with COVID-19 diagnosis preceding TB, altogether the diagnosis of COVID-19 preceded that of TB by a median (range) time of 4 (2–10) days. Those 14 patients, were young (median age 33 (26.0–46.0) years); 11/14 (78.5%) were migrants. Radiological information was available for 48/49 (98.0%) patients: 23 (47.9%) presented cavities. 21 patients manifested a typical HRCT COVID-19 pattern (bilateral ground glass opacities), whereas 23 had different patterns at HRCT or chest radiography essentially reporting TB-related lesions (infiltrates, consolidations, cavities, etc.) and five were not studied during the course of COVID-19 disease.

CONCLUSION

Maintaining health care system and health programmes during coronavirus pandemic is a challenge for any country. Diagnosis and treatment of TB, or TB and COVID-19 co-infection, are likely to get compromised during the COVID-19 pandemic. Patients recovering from COVID-19 infection are very much susceptible to develop a variety of complications including infectious diseases especially TB, particularly among those recovering from severe COVID-19 infection. Various studies have reported effects of covid-19 on TB patients, while there are very few studies that have reported development of TB in patients with past history of covid-19. Hence, the findings of this study attempt to provide information on clinical profile of TB patients with past history of COVID-19.

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