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Study of tuberculosis in post COVID19 patients at tertiary center

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***Abstract*---**Background: Diagnosis of COVID-19 was made before TB because of acute onset of symptoms caused by SARS-CoV-2 in addition to the alarm generated by the COVID-19 pandemic, which determined rapid access to radiological examinations and subsequent discovery of underlying TB. Present study was aimed to study of clinical characteristics of tuberculosis in post covid patients at tertiary hospital Material and Methods: Present study was retrospective study, conducted among patients with history of COVID-19, later started AKT. Results: Based on the study criteria, a total of 32 patients diagnosed as tuberculosis, after COVID-19 infection were included in the present study. Most common age group was 41-50 years (37.5 %), followed by 51-60 years (25 %). Incidence was relatively more in male patients (68.75 %) as compared to female patients (31.25 %). Male to female ratio was 2.2:1. We noted incidence of addiction as smoking (40.63%), alcohol (34.38 %), & tobacco chewing (18.75 %). Other co-morbidities were diabetes (21.88 %), COPD (12.5 %) & positive HIV status (3.13 %). Severity of COVID in patients was mild (34.38 %), moderate (40.63 %) & severe (25 %). CT severity score >12/25 was noted in 43.75%, hospitalisation was required in 75 %, 34.38 % required ICU stay required. 56.25% patients Received iv steroids > 5 days, while 43.75 % patients received iv Remdesivir > 5 days. In present study, respiratory support such as oxygen by nasal prongs/ non-rebreathing mask (37.5 %), non-invasive ventilation (28.13 %) & invasive mechanical ventilation (18.75 %). Conclusion: With an improved understanding of the interrelations and the outcomes,

development of more sophisticated and robust strategy to fight with syndemic of COVID19 & tuberculosis.

***Keywords*---**tuberculosis, COVID-19, chest diseases

Introduction

Tuberculosis (TB) affected 10 million new people in 2017 resulting in 1.6 million deaths globally.[1] A key component to the WHO End TB Strategy[2] (95% reduction in TB deaths by 2035 relative to 2015) is improving the quality of TB care.

India accounts for a quarter of world's tuberculosis burden. The disruptions during the lockdown to control COVID-19 pandemic, has triggered escalation in tuberculosis (Tb) burden which may likely cause a lag in achieving the SDG focused on a tuberculosis free India by 2030.[3] The prevalence of TB among COVID-19 patients has been found to be 0.37 – 4.47% in different studies. There has been an overall decline in TB notification by 26% during January to June 2020 as compared to previous year, due to the COVID-19 pandemic.[4]

Diagnosis of COVID-19 was made before TB because of acute onset of symptoms caused by SARS-CoV-2 in addition to the alarm generated by the COVID-19 pandemic, which determined rapid access to radiological examinations and subsequent discovery of underlying TB.[5] An early diagnosis of both TB and COVID-19 is important in the care of people who are vulnerable to un-favourable outcomes, including death. Older age and certain comorbidities like diabetes mellitus and chronic obstructive pulmonary disease increase the likelihood of severe COVID-19 and the necessity for intensive care and mechanical ventilation.[6] Present study was aimed to study of clinical characteristics of tuberculosis in post covid patients at a tertiary hospital.

Material and Methods

Present study was retrospective, observational study, conducted in department of medicine , at PCMC s PGI & YCMH medical college & hospital,pimpri,pune,India. Study approval was obtained from institutional ethical committee. Patients records started on AKT from July 2020 to January 2022 were analysed, patients with history of COVID-19, later started AKT were considered for study. Confidentiality was strictly observed for all patient details. All cases were confirmed with either sputum CBNAAT or sputum AFB assay were included in present study.

Patient related details were collected from records, history, past medical history, clinical examination, pre-treatment investigations (complete blood count, urine examination, serum electrolytes, renal function tests, serum TSH, etc.), radiological details were collected.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

Results

Based on the study criteria, a total of 32 patients diagnosed as tuberculosis, after COVID-19 infection were included in the present study. Most common age group was 41-50 years (37.5 %), followed by 51-60 years (25 %). Incidence was relatively more in male patients (68.75 %) as compared to female patients (31.25 %). Male to female ratio was 2.2:1. We noted incidence of addiction as smoking (40.63%), alcohol (34.38 %), & tobacco chewing (18.75 %). Other co-morbidities were diabetes (21.88 %), COPD (12.5 %) & positive HIV status (3.13 %).

Table 1
Sociodemographic characteristics

General characteristics	Number of patients	percentage
Age (years)		
0–30	1	3.13%
31–40	5	15.63%
41–50	12	37.50%
51–60	8	25.00%
61-70	6	18.75%
>70	0	
Mean age	27.43 ± 11.76 years	
Gender		
Male	22	68.75%
Female	10	31.25%
Habits		
Smoking	13	40.63%
Alcohol	11	34.38%
Tobacco Chewing	6	18.75%
Co Morbidities		
Diabetes	7	21.88%
COPD	4	12.50%
Positive HIV Status	1	3.13%
Chronic kidney disease	1	3.13%
On immunosuppression therapy	1	3.13%

Common symptoms while initiating AKT were fever (100 %), cough (100 %), anorexia (75 %), expectoration (71.88 %), weight loss (53.13 %).

Table 2
Symptoms profile

Symptom	No of patients	percentage
Fever	32	100.00%
Cough	32	100.00%

Anorexia	24	75.00%
Expectoration	23	71.88%
Weight loss	17	53.13%
Breathlessness	14	43.75%
Hemoptysis	3	9.38%

In present study, Severity of COVID in patients was mild (34.38 %), moderate (40.63 %) & severe (25 %). CT severity score >12/25 was noted in 43.75%, hospitalisation was required in 75 %, 34.38 % required ICU stay required. 56.25% patients Received iv steroids > 5 days, while 43.75 % patients received iv Remdesivir > 5 days. In present study, respiratory support such as oxygen by nasal prongs/ non-rebreathing mask (37.5 %), non-invasive ventilation (28.13 %) & invasive mechanical ventilation (18.75 %).

Table 3
COVID19 related characteristics

COVID19 related characteristics	Number of patients	percentage
Severity of COVID		
Mild	11	34.38%
Moderate	13	40.63%
Severe	8	25.00%
Other		0.00%
CT severity score >12/25	14	43.75%
Hospitalisation required	24	75.00%
ICU stay required	11	34.38%
Received iv steroids > 5 days	18	56.25%
Received iv Remdesivir > 5 days	14	43.75%
Respiratory support received		
Oxygen by nasal prongs/ non-rebreathing mask	12	37.50%
Non-invasive ventilation	9	28.13%
Invasive mechanical ventilation	6	18.75%

Chest X ray findings showed infiltrates in unilateral upper zone (68.75 %), followed by unilateral lower zone (56.25 %) & unilateral middle zone (50 %). HRCT was done in 13 cases, findings showed consolidation (76.92%) patients, ground glass opacity (76.92 %) & nodules (30.77 %).

Table 4
Radiological findings

Characteristic	Frequency	Percent
Chest X ray findings (n=32)		
Normal	4	12.50%
Unilateral upper zone infiltrates	22	68.75%
Unilateral lower zone infiltrates	18	56.25%
Unilateral middle zone infiltrates	16	50.00%
Bilateral lower zone infiltrates	2	6.25%

Bilateral middle zone infiltrates	2	6.25%
Bilateral upper zone infiltrates	2	6.25%
HRCT FINDINGS (n=13)		
Consolidation	10	76.92%
Ground glass opacity	10	76.92%
Nodule	4	30.77%

Discussion

The view of the WHO, and the specialized scientific press and newspapers is that an important consequence of theCOVID-19 pandemic would be a worsening of the TB epi-demic globally, for a variety of reasons, such as additional pressures on health systems by COVID-19 resulting in weakening of the National TB programme and the potential biological effects of the interaction of the two infections, recalling the concept of 'cursed duet' which in the past was used for TB and HIV.[7,8,9]

TB service providers across many high TB burden contexts have faced difficulties in service provision, due to lack of appropriate equipment and capacity, restrictions to movement (affecting health care workers, commodities and stock) and reallocation of resources.[10] Meanwhile, individual TB patients have struggled to access TB services, either through fear of SARS-CoV-2 infection, fear of stigma, restrictions to movement, reduced health facility opening hours or reductions in the ability to pay for care or transport.[11]

COVID-19 is a highly contagious acute viral disease, whereas TB is a chronic bacterial disease. Both COVID-19 and TB affects the respiratory system, primarily the lungs, and have similar symptoms such as cough, fever and breathing difficulty, although the severity and duration of the symptoms are varied.[12] Up to 78% of patients with COVID-19 may be asymptomatic and recover spontaneously.[13,14]

A higher number of deaths have occurred in adults aged over 60 years, in particular men.[15] Similarly, gender differences in TB burden have been reported worldwide, with men more likely to be affected by TB than women.[16] Patients with underlying chronic diseases such as hypertension, diabetes, lung cancer and chronic obstructive pulmonary disease are at a higher risk of COVID-19-related death and hospital admission, as well as poor outcomes for TB.[17,18]

Song WM et al.[19], conducted a meta-analysis, 36 studies were included. Of 89 COVID-TB patients, 19 (23.46%) died, and 72 (80.90%) were male. The median age of non-survivors (53.95 ± 19.78 years) was greater than that of survivors (37.76 ± 15.54 years) ($p < 0.001$). Non-survivors were more likely to have hypertension (47.06 vs. 17.95%) or symptoms of dyspnea (72.73% vs. 30%) or bilateral lesions (73.68 vs. 47.14%), infiltrates (57.89 vs. 24.29%), tree in bud (10.53% vs. 0%), or a higher leucocyte count than survivors ($p < 0.05$). In terms of treatment, 88.52% received anti-TB therapy, 50.82% received antibiotics, 22.95%received antiviral therapy, 26.23% received hydroxychloroquine, and 11.48% received corticosteroids. The pooled ORs of death or severe disease in the

COVID-TB group and the non-TB group were 2.21 (95% CI: 1.80, 2.70) and 2.77 (95% CI: 1.33, 5.74) (P < 0.01), respectively.

Decreased mobility and increased COVID-19 related hospital admissions per 100,000 population were correlated with an increased difference between reported TB cases and those expected. These variables may be surrogate measures for disruption in TB diagnostic services or, alternatively, the impact of mask use and decreased mobility on transmission dynamics.[20]

National TB Elimination Programme (NTEP) announced a Rapid Response Plan, which includes bi-directional TB-Covid-19 screening, intensified case finding, replacement of sputum smears with rapid molecular testing, home-based sample collection and delivery of TB medicines, and modification of the DOTS approach to include digital adherence technologies, call centers and family members to provide treatment support.[21]

Still certain conditions are yet to scientifically clear, such as[22]

1. COVID-19 can occur before, simultaneously or after the diagnosis of TB; role of COVID-19 in boosting the development of active TB is yet to be established;

2. The role of TB sequelae in COVID-19 evolution is also unclear, potentially being a risk factor for worsening out-comes;

3. Further studies are needed to enable analysis of inter-actions and determinants of outcomes in patients with both diseases.

Ensuring adequate treatment for known TB patients, through provision of additional medicine and digital treatment support, appears to be more amenable to physical distancing than TB diagnosis, which typically requires direct contact between individuals.

Conclusion

TB and COVID-19 are infectious diseases that share many similarities in their pathogenesis. With an improved understanding of the interrelations and the outcomes, development of more sophisticated and robust strategy to fight with syndemic of COVID19 & tuberculosis.

Conflict of Interest: None to declare

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