

## Unmasking of miliary tuberculosis in COVID-19: A case report

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### ABSTRACT

Both coronavirus disease-19 (COVID-19) and pulmonary tuberculosis (PTB) are transmitted through the respiratory route and are related to various risk factors. The index case was a 45-year-old female who presented to a tertiary care hospital in North India with complaints of dry cough, loss of weight, and appetite for twenty days followed by fever and dyspnea for five days. RT-PCR for COVID-19 turned out positive. Chest-roentgenogram revealed bilateral homogenous micronodules. She was started on COVID-19 treatment according to the Ministry of Health and Family Welfare guidelines. She was not clinically improved so CECT-thorax was performed which revealed bilateral homogenous millet-shaped micronodular opacities. Mantoux test was twenty-five millimeters in size but sputum analysis for acid-fast bacilli was negative. The patient was started on anti-tubercular-therapy (ATT). The patient got improved clinically and is being followed. This case focuses on the need for prompt diagnosis of PTB in COVID patients for the appropriate management and early recovery.

**Keywords:** Coronavirus disease 19, Mantoux test, Miliary tuberculosis

In November 2019, an unknown organism caused a series of flu-like cases in Wuhan, China, and in no time, it has affected most of the countries of the world [1]. According to a study conducted by Murhekar *et al*, the seroprevalence of coronavirus disease-19 (COVID-19) ranged between 0.62 and 1.03% across the four strata of districts in India [2]. Careful and thorough investigations led to the isolation of the novel coronavirus from the nasal and oropharyngeal swabs collected from the affected population. Both, severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) and *Mycobacterium tuberculosis* (MTB) are transmitted through the respiratory route and are related to risk factors such as advanced age, comorbidities, and immunosuppression. Although miliary tuberculosis is a well-studied disease, its association with COVID-19 is rare and its etiopathogenesis is unclear.

We present a case of miliary tuberculosis in a patient infected with COVID-19. The index case highlights the importance of history taking and consideration of alternate etiologies for the clinical presentations which should be kept in mind especially in a situation of the pandemic. Management of one disease can adversely impact the prognosis of other diseases, if not diagnosed timely.

### CASE REPORT


A 45-year-old female presented to a tertiary care hospital of North India in the month of March 2021 with complaints of dry cough, loss of around 7–8 kg body weight, and appetite for 20 days followed by fever, and dyspnea for 5 days. The patient was a known case of hypertension for 5 years for which, she was on regular treatment. There was no history of HIV, diabetes mellitus, or tuberculosis in the past and no history of tuberculosis contact within the family or vicinity.

On examination, her oxygen saturation was 77% on room air, blood pressure was 140/90 mm Hg on the right arm in the supine position, heart rate was 134 beats/min, temperature was 101°F, and respiratory rate was 32/min with bilateral air entry present in all lung fields. Her body mass index (BMI) on examination was 21.9 kg/m<sup>2</sup>. There was no pallor, icterus, cyanosis, clubbing, lymphadenopathy, or pedal edema.

Her complete hemogram, liver function test, and kidney function test were within normal range. Erythrocyte sedimentation rate (ESR) was 90 mm in the 1<sup>st</sup> h and viral markers for HIV, Hepatitis B, and Hepatitis C was non-reactive. Reverse transcription-polymerase chain reaction (RT-PCR) for SARS-CoV2 came positive and the ratio of partial pressure of oxygen with fractional inspired oxygen (PaO<sub>2</sub>/FiO<sub>2</sub>) was 180. A chest roentgenogram was done which revealed bilaterally distributed micronodules (Fig. 1a).

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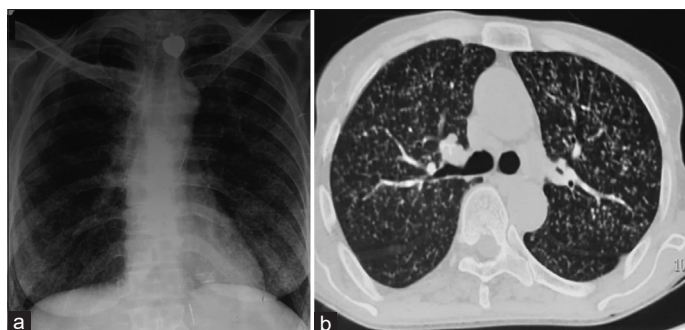
According to the Clinical Management Protocol for COVID-19 by the Ministry of Health and Family Welfare [3], she was categorized in the severe category of COVID-19 and managed according to the guidelines with remdesivir, dexamethasone, and low molecular weight heparin. After starting the treatment, there was an improvement in dyspnea, however, cough and fever persisted.

A review of this index case was done and PTB was put in as an alternative diagnosis. After induction with 3% saline, sputum was sent for acid-fast bacilli along with Gene-Xpert for Tuberculosis. These tests were negative for tuberculosis. A Contrast-Enhanced Computed Tomography scan (CECT) of the thorax was performed which revealed multiple homogenously distributed centrilobular millet shaped micronodular opacities of size 2mm in bilateral lung fields (Fig. 1b). Tuberculin skin test (TST) was performed using intradermal injection of one-tenth of a milliliter (ml) of purified protein derivative (PPD) tuberculin and revealed a significantly positive wheel which was twenty-five millimeter in size.

After a detailed clinical-radiological evaluation, the patient was started on antitubercular therapy (ATT) according to the National Tuberculosis Elimination Program, and COVID-19 specific treatment was stopped. After clinical improvement and a negative RT-PCR, she was discharged from the hospital. After completion of the intensive phase of ATT, the patient was followed up clinically and radiologically. She was clinically improved and her chest roentgenogram showed remarked improvement (Fig. 2). She was switched to a continuous phase of ATT and is currently being followed up.

## DISCUSSION

Tuberculosis is one of the leading causes of morbidity and mortality, especially in developing countries like India. In this case report, the chest roentgenogram did not have the typical features of coronavirus disease, i.e., ground-glass opacities, consolidation, and interstitial changes in the peripheral regions, thus making us think of either an alternative diagnosis or another pathology in association with COVID-19. Clinicians ought to bear in mind the possible co-infections associated



**Figure 1:** Chest radiography before starting of anti tubercular treatment. (a) Posteroanterior view of chest roentgenogram showing bilateral homogenously distributed micronodules; (b) Contrast enhanced computed tomography Scan Thorax showing multiple homogenously distributed centrilobular millet shaped micronodular opacities of size 2 mm in bilateral lung fields

with *Mycobacterium tuberculosis* among patients with atypical radiographic features of COVID-19 [4]. One of the main reasons for the increased risk of developing COVID-19 in patients with the current or past history of TB is the damage caused by Tubercular bacilli on the lungs and reduction in the local immunity there which increases the body's susceptibility to airborne pathogens [5].

A retrospective study by Liu *et al.* [6] was conducted to seek out the association between lymphocyte counts and severe COVID-19. They found that CD4+T and CD8+T lymphocytes were significantly decreased in patients with COVID-19. CD4+T cells, a vital immune defense against mycobacterium might have unmasked underlying miliary tuberculosis in our case. In a brief report of Low *et al.* [7] out of the 236 probable SARS cases in Singapore who presented with persistent respiratory symptoms and/or worsening chest radiographic findings, two were found to be co-infected with SARS-CoV-2 and *Mycobacterium tuberculosis*. In this study, it was concluded that infection with SARS-coronavirus causes a brief suppression of cellular immunity making the patients susceptible to reactivation of TB. Similarly, in our case report, the patient probably having latent tuberculosis, developed active pulmonary TB due to suppression of immunity, especially a decrease in CD4+T cells.

There is another possible hypothesis that supports the coinfection of *Mycobacterium tuberculosis* and SARS-CoV-2. During latent TB infection, the persistence of mycobacteria induces a chronic pro-inflammatory response within the lung parenchyma, which is important to maintain the structural integrity of granuloma [8]. TNF and INF- $\gamma$  are the main cytokines that contribute to the containment of the bacillus, and they conjointly play a key role in the pro-inflammatory immunomodulation of the response against SARS-CoV-2 [9].

Low socioeconomic status and overcrowded living conditions are risk factors for TB. Similar working and living conditions have served as a catalyst for the rapid transmission of SARS-Cov2. A study conducted in Singapore [10] revealed that the inadequately ventilated and overcrowded migrant employee dormitories resulted in the residents being more prone to infectious diseases such as varicella, tuberculosis, coronavirus. In our case,



**Figure 2:** Posteroanterior view of chest roentgenogram after intensive phase of anti tubercular treatment

the patient being from low socioeconomic strata and living in overcrowded and poorly ventilated conditions was predisposed to communicable infections.

The patient, an immunocompromised person had underlying miliary tuberculosis for which she was symptomatic for a long period of time, however, due to her low socioeconomic status, lack of literacy, and lack of healthcare facilities in the peripheries, she could not get adequate treatment on time. Untreated tuberculosis along with her working and living conditions led to her being infected with SARS-CoV2.

## CONCLUSION

Improving screening processes, living conditions, and literacy, and implementing routine vaccination strategies may prevent future communicable disease outbreaks. Since coronavirus is a novel infection, not much is known regarding its association with tuberculosis. This case focuses on the need for prompt diagnosis of TB in COVID patients for the appropriate management and early recovery.

## REFERENCES

1. Pneumonia of Unknown Cause-China. (n.d.). Available from: <https://www.who.int/emergencies/disease-outbreak-news/item/2020-DON229>. [Last accessed on 2021 Sep 02].
2. Murhekar MV, Bhatnagar T, Selvaraju S, Rade K, Saravanakumar V,

Thangaraj JW, *et al*. Prevalence of SARS-CoV-2 infection in India: Findings from the national serosurvey, May-June 2020. *Indian J Med Res* 2020;152:48-60.

3. Ministry of Health and Family Welfare. Available from: <https://www.mohfw.gov.in/pdf/UpdatedClinicalManagementProtocolforCOVID19dated03072020.pdf>. [Last accessed on 2021 May 18].
4. Shi H, Han X, Jiang N, Cao Y, Alwalid O, Gu J, *et al*. Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: A descriptive study. *Lancet Infect Dis* 2020;20:425-34.
5. Tadolini M, Codecasa LR, García-García JM, Blanc FX, Borisov S, Alffenaar JW, *et al*. Active tuberculosis, sequelae and COVID-19 co-infection: First cohort of 49 cases. *Eur Respir J* 2020;56:1-6.
6. Liu Z, Long W, Tu M, Chen S, Huang Y, Wang S, *et al*. Lymphocyte subset (CD4+, CD8+) counts reflect the severity of infection and predict the clinical outcomes in patients with COVID-19. *J Infect* 2020;81:318-56.
7. Low JG, Lee CC, Leo YS, Low JG, Lee CC, Leo YS. Severe acute respiratory syndrome and pulmonary tuberculosis. *Clin Infect Dis* 2004;38:e123-5.
8. Mack U, Migliori GB, Sester M, Rieder HL, Ehlers S, Goletti D. LTBI: Latent tuberculosis infection or lasting immune responses to *M. tuberculosis*? A TBNET consensus statement. *Eur Respir J* 2009;33:956-73.
9. Wang W, Ye L, Ye L, Li B, Gao B, Zeng Y. Up-regulation of IL-6 and TNF-induced by SARS-coronavirus spike protein in murine macrophages via NF- B pathway. *Virus Res* 2007;128:1-8.
10. Tham S, Lim W, Lee C, Loh J, Premkumar A, Yan B, *et al*. Four patients with COVID-19 and tuberculosis, Singapore, April-May 2020. *Emerg Infect Dis* 2020;26:2763-5.

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