

Emergence of Pulmonary Tuberculosis While Recovering From COVID-19 Pneumonia: A Case Report

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Abstract

COVID-19 can have different presentations; from asymptomatic to multiorgan involvement. This case report is of an elderly gentleman, with known comorbidities of chronic obstructive airway disease and alcoholic liver disease on treatment. He presented with a history of increasing dyspnea and cough for a few days which was present after cold symptoms, and was admitted for the treatment of severe COVID-19 pneumonia. Later, while he was recovering from COVID-19 pneumonia, his respiratory symptoms worsened. After a thorough evaluation, his sputum smear was positive for acid-fast bacilli and also rifampicin sensitive on GeneXpert assay. With timely diagnosis and appropriate treatment, he recovered from both acute conditions and was sent home on the twentieth day of admission.

Categories: Internal Medicine, Infectious Disease, Pulmonology

Keywords: tb: tuberculosis, covid pneumonia, hospital-acquired pneumonia, covid 19, copd (chronic obstructive pulmonary disease)

Introduction

COVID-19 commonly presents with flu-like symptoms but it can have a wide spectrum of presentation; from asymptomatic to multiorgan involvement [1]. Direct COVID-19 infection and cytokine storm are widely accepted mechanisms of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). However, it can be complicated by superadded infection and hyperoxia-induced acute lung injury [2]. Sometimes drug-induced pulmonary toxicity can mimic COVID pneumonia [3]. Tuberculosis is also a global problem, especially in developing countries, as well as in developed countries due to diabetes and increasing cases of HIV [4]. There are few case reports of coexisting tuberculosis and SARS-Cov-2 since its outbreak [5]. The coexistence of two diseases makes the management of the diseases more challenging.

Case Presentation

A 78-year-old, thin-looking gentleman ex-smoker, a resident of Kathmandu, Nepal, with a known case of chronic obstructive pulmonary disease (COPD) and chronic alcoholic liver disease (CLD), presented to the emergency department (ED) with the complaint of shortness of breath and increasing cough for the last six days. This was preceded by a common cold, cough, and fever 10 days back. The fever had subsided after two to three days. Other family members also had similar symptoms of cold and cough prior to that but they had recovered on their own. Furthermore, there was neither a travel history to other countries nor a history of tuberculosis infection. Similarly, he had taken all of his childhood vaccinations including the bacille Calmette-Guérin (BCG) vaccine, and is a farmer by occupation.

On arrival in ED, his blood oxygen saturation (SpO2) was 80% on room air and was maintained at 3 liters per minute (LPM) and his respiratory rate (RR) was 26 breaths/minute. He was afebrile and his blood pressure was also normal. He also had bipedal edema and inspiratory crackles over subscapular areas on chest examination.

On laboratory tests his liver, renal functions, and total leukocyte count (TLC) were normal, hemoglobin (Hb) was 9 g/dl, lymphocytes were 420/mm³, D-dimer was 5.2 mg/L, serum ferritin was 61 ng/ml, and c-reactive protein (CRP) was 28 mg/L. His nasopharyngeal swab RNA test for SARS-CoV2 genes (COVID-PCR) was positive. Initial chest X-ray (CXR) revealed bilateral infiltrates on the mid and lower zones (Figure 1).

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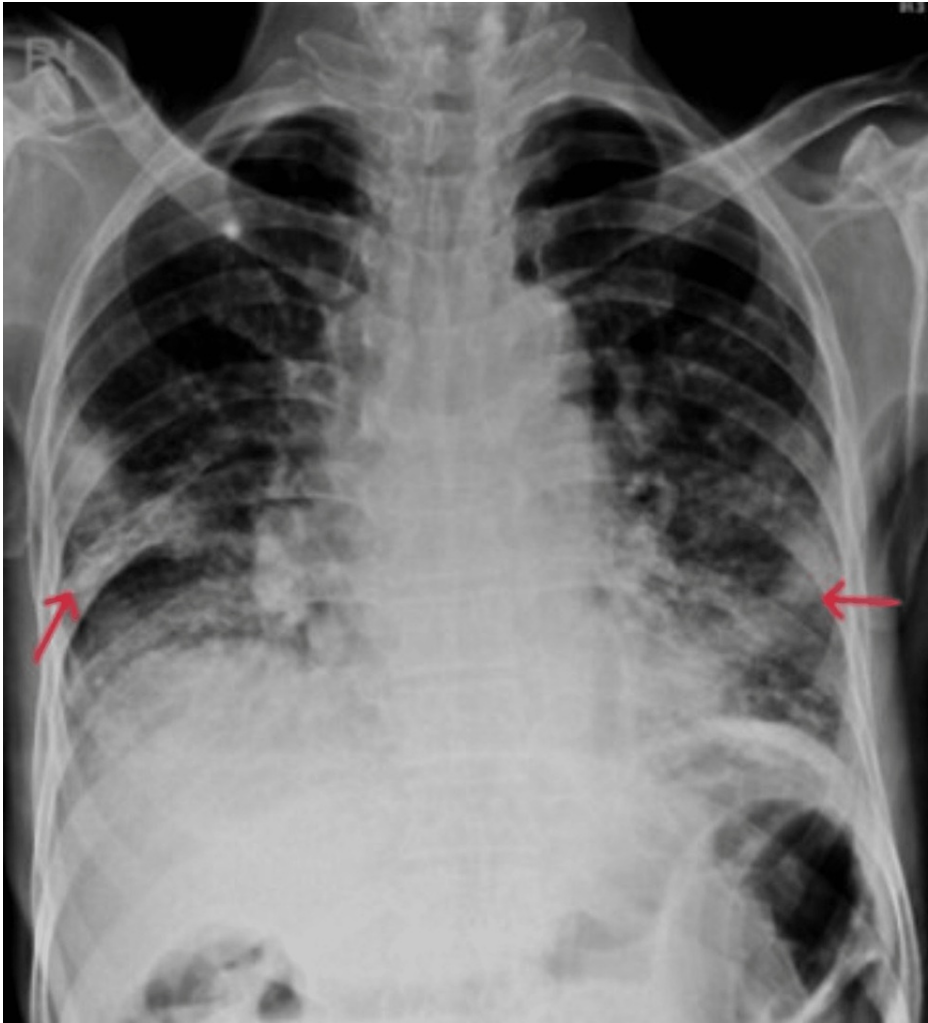


FIGURE 1: Chest X-ray showing bilateral infiltrates.

Similarly, CXR done on the fifth day of admission showed apparent radiological improvement (Figure 2).

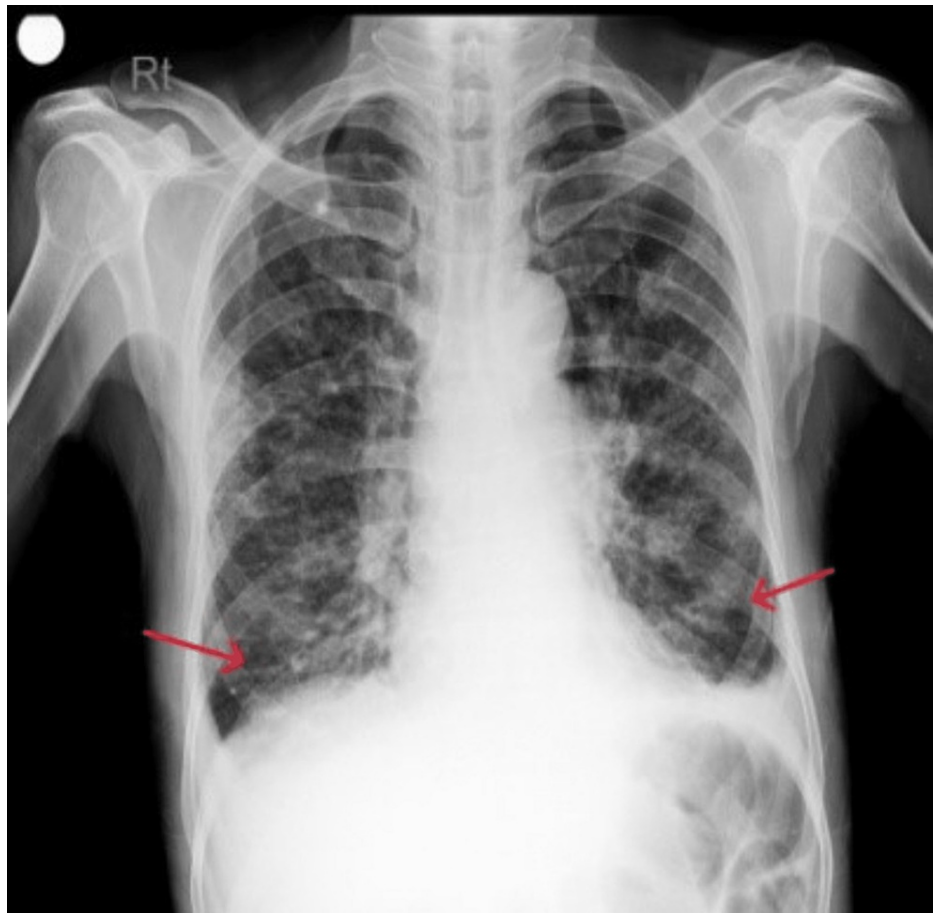


FIGURE 2: Chest X-ray showing a decrease in the bilateral infiltrates.

High-resolution computed tomography (HRCT) of the chest done on the day of presentation showed multifocal consolidative lesions in bilateral lungs with air-bronchograms, right upper lobe bulla, and moderate ascites (Figure 3).

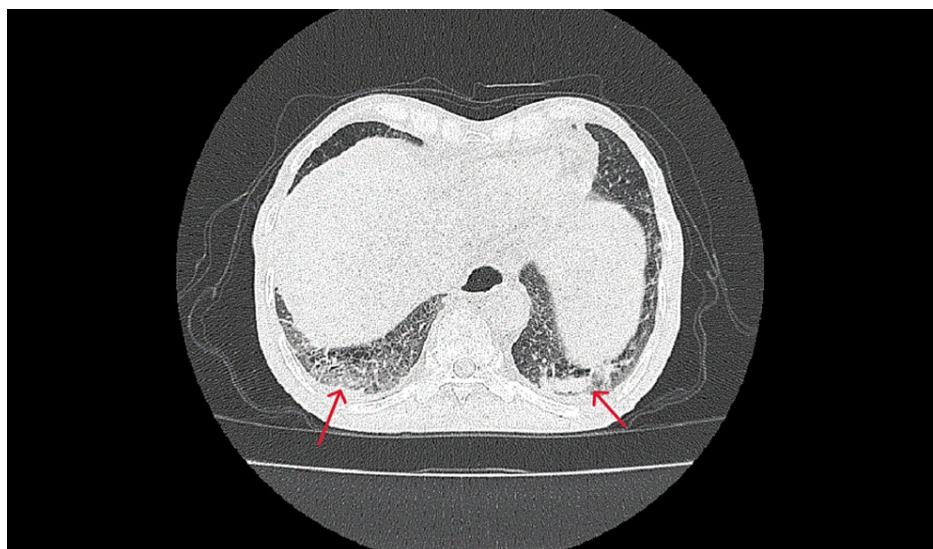


FIGURE 3: High-resolution computed tomography of the chest revealing bilateral multiple peripheral and some central consolidative lesions on bilateral lungs and emphysematous changes.

He was admitted with a diagnosis of COVID-19 pneumonia and managed with dexamethasone, ivermectin, low molecular weight heparin, and other supportive treatments for COPD, CLD, and ascites [6]. There was no growth on blood and sputum culture and sputum Ziehl-Neelsen (ZN) staining was negative for mycobacteria. He improved gradually and after the ninth day of admission repeat COVID-PCR was negative, so he was shifted to the general ward on 1 LPM oxygen supplementation.

Gradually from the tenth day of admission, his dyspnoea, cough, and sputum production increased. Oxygen requirements had also increased. CXR on the following day showed increased infiltrates on bilateral lung fields, and his SpO₂ was 88% at 10 LPM via a non-rebreather mask (Figure 4).



FIGURE 4: Chest X-ray showing significantly increased infiltrates, more over the left middle zone.

With a provisional diagnosis of hospital-acquired pneumonia (HAP), sputum gram stain and culture, fungal stain, fungus culture, and sputum ZN stain were repeated, and GeneXpert for *Mycobacterium tuberculosis* and resistance to rifampicin (MTB/RIF) assay was also conducted. Broad-spectrum antibiotics were started. He was immediately shifted to the intensive care unit (ICU) and maintained on continuous positive airway pressure (CPAP) and oxygen via a non-breather mask alternatively. His sputum ZN stain showed 3+ acid-fast bacillus (AFB) on consecutive samples; first-line antitubercular therapy (consisting of isoniazid, rifampicin, pyrazinamide, and ethambutol) was started immediately. Later GeneXpert MTB/RIF assay also detected mycobacterial tuberculosis which was rifampicin sensitive as well. He improved gradually with the above treatment and was shifted to the general ward at 2 LPM oxygen via nasal cannula after five days of ICU stay.

Discussion

SARS-CoV2 is a new strain of coronavirus and many of its effect on our body and immune system is not yet completely known [7]. If a patient is worsening, apart from disease progression, the possibility of superadded infection or reactivation of various infections like tuberculosis or pneumocystis pneumonia should also be considered [8].

Our patient didn't have a history of tuberculosis or contact with a tuberculosis patient in the past and his sputum smear was negative for AFB at the time of presentation. Furthermore, he had taken the BCG vaccine and didn't have any travel history. Later during the course of the hospital stay, due to his worsening clinical condition in spite of earlier improvement, ZN stain was repeated and GeneXpert MTB/RIF was also done along with various infectious workups [9]. The clinical scenario of this particular patient suggests initial COVID-19 infection, which impairs the immune system and may have led to the emergence of tuberculosis [10]. Another possible mechanism of the development of tuberculosis is the use of systemic steroids, which suppress the immune response and may lead to the reactivation of latent infection or a new infection itself [11].

Conclusions

COVID-19 infection is a multisystem disease. It can take severe form in some infected patients. Superadded infection or reactivation of infectious disease like tuberculosis can also worsen the condition. Thus, clinicians need to maintain a high index of suspicion for pulmonary tuberculosis in such situation, which cannot be explained otherwise.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

- Huang C, Wang Y, Li X, et al.: Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020, 395:497-506. [10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5)
- Spagnolo P, Balestro E, Aliberti S, et al.: Pulmonary fibrosis secondary to COVID-19: a call to arms? . *Lancet Respir Med*. 2020, 8:750-2. [10.1016/S2213-2600\(20\)30222-8](https://doi.org/10.1016/S2213-2600(20)30222-8)
- Duzgun SA, Durhan G, Demirkazik FB, Akpinar MG, Ariyurek OM: COVID-19 pneumonia: the great radiological mimicker. *Insights Imaging*. 2020, 11:118. [10.1186/s13244-020-00933-z](https://doi.org/10.1186/s13244-020-00933-z)
- Goldhaber-Fiebert JD, Jeon CY, Cohen T, Murray MB: Diabetes mellitus and tuberculosis in countries with high tuberculosis burdens: individual risks and social determinants. *Int J Epidemiol*. 2011, 40:417-28. [10.1093/ije/dyq238](https://doi.org/10.1093/ije/dyq238)
- Daneshvar P, Hajikhani B, Sameni F, et al.: COVID-19 and tuberculosis coinfection: an overview of case reports/case series and meta-analysis of prevalence studies. *Heliyon*. 2023, 9:e13637. [10.1016/j.heliyon.2023.e13637](https://doi.org/10.1016/j.heliyon.2023.e13637)
- Bryant A, Lawrie TA, Fordham EJ: Ivermectin for prevention and treatment of COVID-19 infection: a systematic review, meta-analysis, and trial sequential analysis to inform clinical guidelines. *American Journal of Therapeutics*, 28, E434-E460, July 2021. *Am J Ther*. 2021, 28:e573-6. [10.1097/MJT.0000000000001442](https://doi.org/10.1097/MJT.0000000000001442)
- Mohandas S, Jagannathan P, Henrich TJ, et al.: Immune mechanisms underlying COVID-19 pathology and post-acute sequelae of SARS-CoV-2 infection (PASC). *Elife*. 2023, 12:1-19. [10.7554/eLife.86014](https://doi.org/10.7554/eLife.86014)
- Bhat P, Noval M, Doub JB, Heil E: Concurrent COVID-19 and *Pneumocystis jirovecii* pneumonia in a severely immunocompromised 25-year-old patient. *Int J Infect Dis*. 2020, 99:119-21. [10.1016/j.ijid.2020.07.061](https://doi.org/10.1016/j.ijid.2020.07.061)
- Kabir S, Parash MT, Emran NA, Hossain AB, Shimmi SC: Diagnostic challenges and Gene-Xpert utility in detecting *Mycobacterium tuberculosis* among suspected cases of pulmonary tuberculosis. *PLoS One*. 2021, 16:e0251858. [10.1371/journal.pone.0251858](https://doi.org/10.1371/journal.pone.0251858)
- Chowdhury MA, Hossain N, Kashem MA, Shahid MA, Alam A: Immune response in COVID-19: a review . *J Infect Public Health*. 2020, 13:1619-29. [10.1016/j.jiph.2020.07.001](https://doi.org/10.1016/j.jiph.2020.07.001)
- Sahn SA, Lakshminarayan S: Tuberculosis after corticosteroid therapy. *Br J Dis Chest*. 1976, 70:195-205. [10.1016/0007-0971\(76\)90029-2](https://doi.org/10.1016/0007-0971(76)90029-2)