

A Rare Case Report: A covid-19 Positive Patient having Imaging Features of Miliary Tuberculosis and Novel Corona Virus Disease 2019 (Covid-19)

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A B S T R A C T

Introduction: Covid -19 is a newly emerged disease which spreads globally since 2019. The World Health Organization (WHO) used the term 2019 novel coronavirus that affects the lower respiratory tract of patients with pneumonia in Wuhan, China. It may cause various symptoms such as pneumonia, fever, breathing difficulty and lung infection. Coinfection of Coronavirus with Miliary tuberculosis (TB) has not been previously reported. Hence, here we are presenting a case of a patient who had imaging findings of miliary tuberculosis with novel corona virus disease.

Case report: A 34 years old male patient presented with complain of shortness of breath and cough with expectoration associated with low grade fever since 4 months. Chest X-rays showed diffuse multinodular infiltration consistent with miliary TB. Multiple areas of inhomogeneous radio opacities were also found. On HRCT thorax, multiple tiny Miliary nodules giving "tree in bud" appearance in both lung fields were seen. Patchy ground glass opacity with interlobular septal thickening giving crazy paving appearance was also seen. Also Patient was suspected for COVID-19 infection due to symptoms like cough and shortness of breath, hence a nasopharyngeal swab collected which was positive for COVID-19. Sputum AFB examination was also positive for pulmonary tuberculosis.

Conclusion: If SARS-CoV-2 infects dormant TB populations, it may cause severe impact in global health and economics by causing both COVID19 and dormant TB reactivation. Thus, there is an urgent need to study the association of both to avoid a later global TB pandemic.

Keywords: Covid -19, Miliary TB, Coinfection, Chest HRCT

INTRODUCTION

The World Health Organization (WHO) used the term 2019 novel coronavirus to refer to a coronavirus that affected the lower respiratory tract of patients with pneumonia in Wuhan, China in December 2019. The WHO has declared the official term of the 2019 novel coronavirus is coronavirus disease (COVID-19) and the present mention term for the virus is severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).¹

A cluster of patients with pneumonia of unknown origin was reported to be associated to the local Huanan South China Seafood Market in Wuhan, Hubei Province, China, in December 2019. The WHO has reported that the emergence of the coronavirus crisis is linked to the Huanan South China Seafood Marketplace, although no clear animal affiliation has been established.²

The coronavirus belongs to a family of viruses that may cause various symptoms such as pneumonia, fever, breathing

difficulty and lung infection.¹ In the long term, post-pandemic, the SARS-CoV-2 might activate dormant bacterial infections. Tuberculosis, as per previous history, is one of the crucial bacterial infections influenced by viral catastrophes.³

Tuberculosis (TB) remains one of the most significant causes of mortality from infectious diseases and faces daunting obstacles to global health at the economic, academic and political stage. The latest figures from the World Health Organization (WHO) reveals that 8.8 million cases of TB were reported in 2010. Miliary TB is a probably lethal type of TB that arises from major lymphohematogenous transmission of *Mycobacterium tuberculosis* bacilli.⁴

The name "miliary" was introduced in 1700 by John Jacobus Manget, who likened the appearance of the concerned lung with its surface enclosed with solid tiny white nodules to few millet seeds.⁵

Miliary TB can occur as a consequence of persistent acute infection or by reactivation of the residual focus with

eventual spread. The phrase miliary TB was traditionally a pathological and then a radiographic description; it is even now used quite generally (albeit incorrectly) by others to describe all types of acute, widely distributed TB, whether or not the disease exhibits a classical radiographic or pathological nodular presentation typical of hematogenous spread.⁴

Tuberculosis can be categorized as pulmonary or extrapulmonary through the disease site; the miliary disease has been defined as both an extrapulmonary and a pulmonary TB. The epidemiology of Miliary TB has been influenced by the introduction of chemotherapy for the management of malignancy, the application of biologic medications, the HIV crisis and immigration trends.⁴

Since its first description, its clinical presentation has changed dramatically. Diagnosis of miliary TB is a daunting task that can horrify even the most trained health professionals. There are non-specific physiological signs, and chest X-rays do not often demonstrate traditional miliary alterations. Atypical symptoms such as Enigmatic Miliary TB and Acute Respiratory distress Syndrome frequently contribute to delayed diagnosis.⁴

Here we are presenting a case of a patient who had imaging findings of miliary tuberculosis with novel corona virus disease (COVID-19)

CASE REPORT

A 34 years old male patient presented at AMC MET Medical College & Sheth L.G. General hospital with complain of shortness of breath and cough with expectoration associated with low grade fever since 4 months to department of respiratory medicine and referred to department of radiodiagnosis, AMC MET Medical college & Sheth L.G. General hospital, Ahmedabad for HRCT Scan of thorax.

As per history given by him, he also had complaint of decreased appetite and weight loss. There was no past history of tuberculosis or any other chronic respiratory or other medical illness. Patient did not have any significant occupational exposure or smoking history. No contact history of Covid 19 or mycobacterium tuberculosis positive patient. As a first line investigation, chest x ray was done. Chest X-rays showed diffuse multinodular infiltration consistent with miliary TB. Multiple areas of inhomogeneous radio opacities were also found, suggestive of consolidation. So, as a further plan of investigation HRCT Scan of thorax was performed and serial images were obtained in 3D (Sagittal, coronal and axial) planes using 16 slice CT scanner of 0.5 mm slice thickness.

On HRCT thorax, multiple tiny miliary nodules giving “tree in bud” appearance in both lung fields were seen, same as most common finding seen in Miliary tuberculosis patient. (Figure 1) There were also small nodular opacities of varying size in both upper lobes.

There was patchy consolidation in superior lingular segment of left upper lobe and superior basal segment of both the lower lobes. (Figure 2) Ground glass opacity with inter and intralobular septal thickening, suggestive of crazy paving pattern were also found in lingular segment of left upper lobe, medial segment of right middle lobe and both lower

lobes predominantly in superior basal and posterior basal segments. (Figure 3) Multiple lymph nodes were also found in mediastinum- in pretracheal, paratracheal, subcarinal, precarinal, both hilar regions and also in both supraclavicular regions, some of them show soft calcification-which favours tuberculosis infection. (figure 4). There was no pleural effusion.

Few enlarged lymph nodes were also found in para aortic and peripancreatic regions, few of them were showing foci of calcification.

Though consolidation can occur in tuberculosis patient because of ground glass opacities (GGO) with inter and intralobular septal thickening giving crazy paving pattern found in both lower lobes predominantly in superior basal and posterior basal segments and due to current pandemic of COVID-19, COVID-19 pneumonia was suspected coexisting with miliary tuberculosis.

Also Patient was suspected for COVID-19 infection due to symptoms like cough and shortness of breath, hence further investigations were done.

A nasopharyngeal swab collected upon presentation was positive for COVID-19. Sputum AFB examination was also done and report was positive for pulmonary tuberculosis. Till that time patient was given all symptomatic treatment

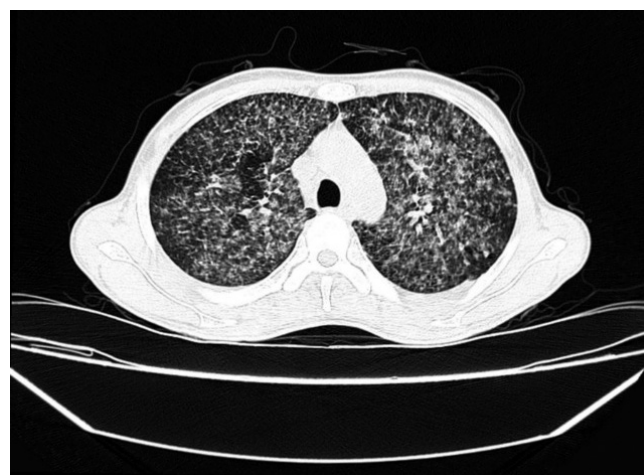


Figure-1: Multiple tiny nodular opacity giving “Tree in bud” appearance in both lung fields

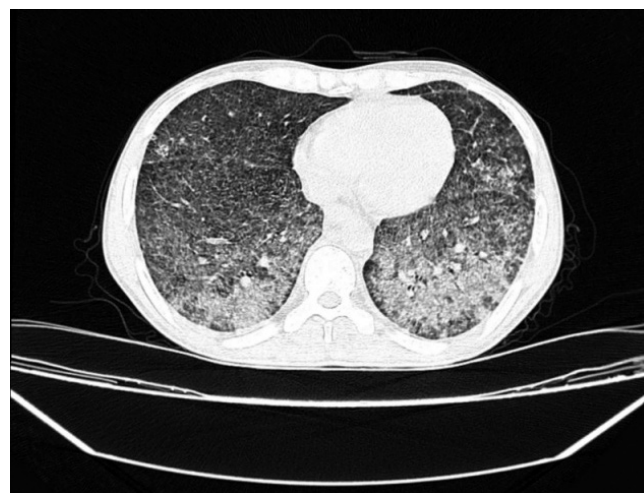


Figure-2: Patchy consolidation in both lower lobes

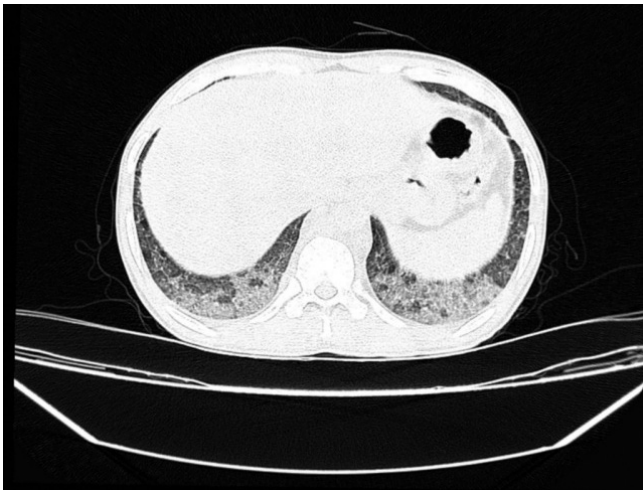


Figure-3: GGO with inter and intralobular septal thickening giving crazy paving appearance in both lower lobes

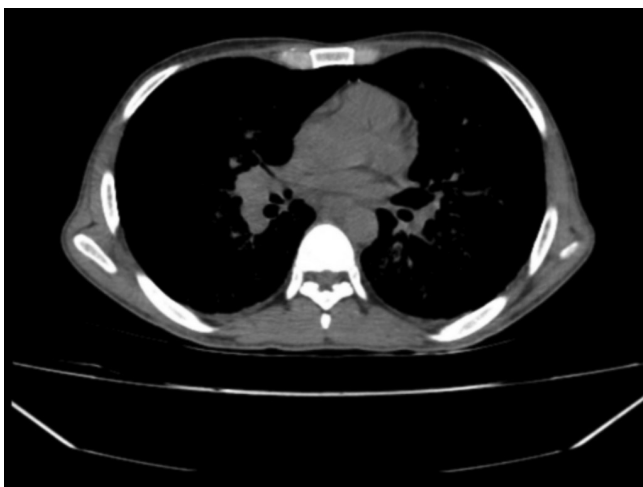


Figure-4: Few enlarged lymph nodes found in paraaortic regions

and antibiotics were started considering infective etiology, in isolation ward due to suspected covid-19.

Patient was admitted in isolation ward of hospital following the positive reports. All symptomatic and antibiotic treatment was started. AKT was initiated. After 2 days, patient had respiratory distress and other respiratory complications and patient was shifted to ICU and was put on ventilator. Patient was given all life supporting treatment like ionotropes, iv fluids and other higher antibiotics. After 2 days patient died due to respiratory complications.

DISCUSSION

The COVID-19 caused by SARS-COV2, has created a global pandemic associated with substantial mortality and morbidity. Notably, a significant number of infected individuals have recovered. However, evidence for a possible host defence or anti-viral mechanism against the virus has not yet been identified.³

The presentation of this patient is of particular interest due to the coinfection with covid-19 and pulmonary TB. There are no such clinical correlation has been found before.

In the current case, it can be explained as patient initially had pulmonary TB as he had prolonged symptoms, and he

subsequently infected by Covid-19 infection.

The following criteria have been proposed for the diagnosis of miliary TB:

- (1) Clinical presentation constant with the diagnosis of TB – like pyrexia with evening rise of temperature, night sweats, anorexia, and weight loss of greater than 6 weeks in length – responding to antituberculosis management
- (2) Typical miliary pattern on chest radiograph
- (3) Bilateral, dispersed reticulonodular lung lesions on the background of miliary shadows, which can be shown either by chest radiography or HRCT scan; and
- (4) Microbiological or Histopathological confirmation of TB.

Presentation of a patient with fever of several weeks' duration, anorexia, weight loss, lassitude, and cough is frequent. Episodes of every day morning high temperature spikes are reported to be characteristic of miliary TB.⁴ Skin involvement in the form of erythematous macules and papules has also been described. Signs of hepatic involvement may be evident in the form of icterus and hepatosplenomegaly.⁵

A conventional miliary pattern on the chest radiograph represents the abstract of densities of tubercles that are rightly aligned, while curvilinear densities and reticulonodular pattern arise from imperfectly aligned tubercles.⁶ In our study we found similar findings- multiple tiny nodules in both lung fields.

On a thin-section CT, a mixture of both sharply and poorly defined 1–4 mm nodules were seen in a diffuse, random distribution often associated with intra- and interlobular septal thickening. The interlobular septal thickening or intralobular fine network that is apparent on HRCT scans in miliary TB seems to be triggered by the existence of tubercles in the interlobular septa and alveolar walls, Centrilobular nodules and branching linear structures with a “tree-in-bud” appearance may be evident.⁷

In our patient ground glass opacity with inter and intralobular septal thickening- crazy paving pattern was noted in lingular segment of left upper lobe, medial segment of right middle lobe and both lower lobes, predominantly in superior basal and posterior basal segments. Patchy consolidation was seen in superior lingular segment of left upper lobe and superior basal segments of both lower lobes.

According to study by Li and Xia, Ground-glass opacities (GGOs) and integration with or without vascular expansion, interlobular septal thickening, and air bronchogram signs are typical CT characteristics of COVID-19. The “reversed halo” sign and pulmonary nodules with a halo sign are uncommon CT features of COVID-19.⁸

The other study done in relation to our case report was about coinfection with MERS-CoV and pulmonary TB. Coinfection of MERS-CoV patients with influenza A, parainfluenza, herpes simplex, Streptococcus pneumoniae, herpes simplex virus type 1, and rhinovirus RNA 14 have previously been reported. Coinfection with M. tuberculosis is of particular importance as the diagnosis of TB might be overlooked and shadowed by concern about MERS-CoV infection, as occurred during the SARS outbreak.⁹

In the case report by Sarah Alfaraj et al., they presented 2 cases with both MERS-CoV and pulmonary TB. The 2

patients were diagnosed with pulmonary TB and had positive MERS-CoV as it may happen that both MERS-CoV and TB cause immune suppression and augment the infection of each other.¹⁰

These studies shows the correlation between COVID-19 and other respiratory infection. So, it is utmost important to evaluate every COVID-19 positive patients for other nosocomial infection.

CONCLUSION

There can be coinfection of miliary tuberculosis and COVID-19 in a patient, so one should keep it in mind during diagnosis. Due to suppressed immunity latent or subclinical tuberculosis can manifest as clinical symptoms or can be flare up of already diagnosed disease. Strikingly, one quarter of the world population is already infected with dormant tuberculosis (TB). If SARS-CoV-2 infects these dormant TB populations, it may cause severe impact in global health and economics by causing both COVID19 and dormant TB reactivation. Thus, there is an urgent need to study the association of COVID19 with dormant TB reactivation to avoid a later global TB pandemic.

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