



Case Report

Association Tuberculosis/COVID-19. An announced Tragedy

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MRS, 32, male, homeless, resident in Cracolândia (by derivation of crack, crack + land = land of crack, a popular denomination for a region in the centre of the city of São Paulo with intense drug trafficking and prostitution), illicit drug user, smoker, alcoholic, in an open system on probation, with no family bonds despite having three children. The individual was admitted to the Nestor Goulart Reis Hospital in Américo Brasiliense, SP, Brazil, a State Health Secretary reference centre, to treat multi/extensively resistant tuberculosis, on April 6, 2020, upon diagnosis with bacterial pneumonia and pulmonary tuberculosis (TB). An outpatient rapid molecular sputum test (RMT) performed on March 20, 2020 revealed positivity for M. tuberculosis with rifampicin resistance (R). The therapy established at the time was Capreomycin (CM), Ethambutol (E), Levofloxacin (Lvx), Pyrazinamide (P), and Terizidone (Tzd).

After hospitalization, his general condition progressively decreased, with fever, dry cough, dyspnea, tachycardia, anorexia, myalgia, leucocytosis with left-shift deviation, lymphopenia, and hypoxemia. A reverse-transcriptase polymerase chain reaction (RT-PCR) on April 9, 2020 was positive for SARS-CoV-2.

The patient was referred to an Intensive Care Unit (ICU), where he developed viral bronchopneumonia, bacterial pneumonia, septic shock with pulmonary focus, and respiratory and renal failure.

He required orotracheal intubation, tracheostomy, and mechanical ventilation in the prone position. Anti-tuberculosis and antimicrobial therapy was maintained, and the patient remained in the ICU for 21 days. The RT-PCR that was performed on May 5, 2020 was also positive. After discharge from the ICU, the patient

remains hospitalized and receives tuberculosis treatment. The COVID-19 serology test performed on July 12, 2020 was negative.

TB is the largest cause of death due to a single infectious agent, accounting for 1.5 million deaths in 2018 and approximately 4,000 deaths per day [1]. Similar to SARS-CoV-2, TB undergoes direct airborne transmission and is considered a social disease. Its incidence increases or decreases according to socioeconomic and/or social protection measures [2].

Risk factors such as older age, malnutrition, diabetes, agglomeration, social vulnerability, and signs and symptoms such as cough, fever, asthenia, and myalgia are common to both pathologies and may confound and/or delay the diagnosis of COVID/TB co-infections, thus increasing virus and/or bacillus dissemination [3].

The patient was an alcoholic, smoker, and illicit drug user with low socioeconomic level, which are risk factors for tuberculosis [4]. The population living in “Cracolândia” has an increased risk of transmission and spread of viral respiratory infections, including SARS-CoV-2, due to the lack of respiratory and hand hygiene, disrespect for physical distance, impossibility of socially isolating and quarantining infected people and individuals in contact, and not using protective masks and other individual protection equipment [5,6].

The patient had risk factors for both infections, besides structural pulmonary parenchyma involvement (Figure 1), which may explain the viral infection severity, progression to Severe Acute Respiratory Syndrome, and need for mechanical ventilation [7].

The possible relationship between COVID-19 and tuberculosis is not well established. A study that evaluated 49 patients with COVID19/TB co-infection showed that the viral infection may occur before, simultaneously, or after TB diagnosis [8] (Figure 1).



Figure 1: Chest X-Ray. A) Admission. B) 95 days after.

A Chinese observational study that evaluated 86 patients showed that active or latent TB was the most prevalent comorbidity (36%) when compared with diabetes (25%), hypertension (22%), coronary disease (8%), and COPD (5%). Moreover, patients with severe/critical co-infections were significantly more frequent than those with mild/moderate conditions (78%/ 22%). The authors suggest the need for consistent studies that evaluate whether TB is a risk factor for COVID-19 and the possibility of a causal relationship [9].

In developing countries, a substantial part of the population lives in poor housing conditions, without access to social protection and adequate food, which makes social isolation difficult. These facts tend to increase COVID-19/TB co-infection. Recent studies evaluated the possible consequences of interrupting health services due to the Covid-19 pandemic [2,6,10]. For patients with TB, adequate treatment may be affected, including the treatment of patients who require multidrug resistant therapy due to delayed diagnosis and treatment. Furthermore, the interrupted production and transportation of drugs and supplies, reduced nutritional and mental support, limited access to health services, and reduced management of adverse reactions to drugs and comorbidities have also occurred during the COVID-19 pandemic [2]. The facts described above may increase the risk of TB deaths for several years, considering that delayed diagnosis and treatment increases transmission and consequently the number of patients. Projections estimate an increase of up to 20% in TB deaths over the next five years, compared to a scenario without the COVID-19 pandemic [10]. Analyses conducted by the Stop TB Partnership

in collaboration with the Imperial College, Avenir Health, Johns Hopkins University, and USAID, globally estimate that a three-month extended confinement and ten-month extended restoration could lead to 6.3 million new TB cases between the years 2020 and 2025 and an additional 1.4 million TB deaths over the same period [11].

In addition, a recent United Nations study estimates that the economic and social consequences of the COVID-19 pandemic have the potential to increase the number of people living in poverty by one-half to one billion, most of whom live in Africa and South and Central America [2].

Brazil is the ninth largest economy in the world, with a gross domestic product of 1.87 trillion dollars. Meanwhile, 20% of the population remains in poverty. It is estimated that 12 million people live agglomerated in communities (shanty towns) without basic sanitation [12]. This combination of factors may facilitate COVID-19/TB co-infection and increase the number of TB cases and deaths.

In summary, health services, including those that diagnose and treat TB and lung diseases, may receive patients with COVID-19, many of whom have not been previously diagnosed. The consequences of co-infection are remain unexplored. Patients will need close follow-up to assess possible late respiratory and systemic repercussions. Furthermore, effective public power and health system actions will be necessary for the most vulnerable populations to avoid cases as serious as the one presented here.

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