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Coronavirus Disease 2019 with Comorbid Pulmonary Tuberculosis: A Case Report

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Abstract

Introduction: In December 2019, a new type of pneumonia named coronavirus disease 2019 (COVID-19) was reported in Wuhan, Hubei province, China. The present study aimed to report the case of a patient with COVID-19 and comorbid pulmonary tuberculosis, on which there have been no relevant reports hitherto.

Case Presentation: The case was a 47-year-old female patient with COVID-19 positive pharyngeal swabs. She did not suffer from fever, coughs, or difficulties in breathing. The patient was diagnosed with COVID-19 and pulmonary tuberculosis based on her epidemiological history, routine blood test, imaging findings, and COVID-19 nucleic acid test results. It should be noted that contact and droplet precautions were implemented for this patient. The administrated treatments for her included antiviral, anti-tuberculosis, and liver protection treatments. The patient did not complain about discomfort and her condition was stable.

Conclusion: The COVID-19 and comorbid tuberculosis were suspected; however, epidemiological history, clinical presentation, laboratory tests, and imaging examinations must be combined to make a comprehensive diagnosis. Moreover, prompt quarantine and treatment measures should be implemented as well.

Keywords: Case report, Coronavirus disease 2019, Diagnosis, Pulmonary tuberculosis, Treatment

1. Introduction

Since December 2019, many cases of pneumonia of unknown etiology have been reported in Wuhan, Hubei province, China. With time, similar cases have been reported in other regions of China and in other countries (1, 2). Subsequent studies have shown that this pneumonia of unknown etiology was caused by a novel coronavirus, later named COVID-19 by the World Health Organization. At present, there are no relevant reports on cases of COVID-19 and comorbid pulmonary tuberculosis. In this paper, we report the diagnosis and treatment of a patient with COVID-19 and comorbid pulmonary tuberculosis.

2. Case Presentation

The patient is a 47-year-old woman who was admitted to the Affiliated Luzhou Infectious Disease Hospital of Southwest Medical University on 7 February 2020 for "COVID-19 positive pharyngeal swabs". The patient was a resident of Wuhan, Hubei province, and had moved there 1 month prior to admission. She presented to Gulin People's Hospital for feeling unwell. Routine blood tests and chest computed tomography (CT) were done and a diagnosis of "cavernous pulmonary tuberculosis of the left upper lung" was made following testing. Treatment with oral ethambutol/isoniazid/pyrazinamide/rifampicin was started. The patient was quarantined because she had close contacts with her sister-in-law in Wuhan who had been diagnosed with COVID-19 six days before the patient was admitted. Thereafter, her pharyngeal swab tested positive for COVID-19 nucleic acid and she was admitted for further treatment. Her mental status and sleep quality remained fair, though she had a slightly poor appetite and no significant change in weight. She did not have any change in bowel movements and micturition. The patient mentioned that she had a history of hemoptysis six months prior to this presentation and CT scan of the lung at that time suggested a lung infection; however, anti-tuberculosis treatment was not initiated. She had mentioned a history of asthma but denied smoking and alcohol consumption.

Physical examination on admission showed the following results: temperature; 37.2 ℃, pulse; 79 bpm, respiration; 22 breaths/min, blood pressure; 155/91 mmHg.

She had a thin physique, fair mental status, and no jaundice. Lymph nodes were not palpable, no pharyngeal congestion and swelling were noted, and the tonsils were not enlarged. Percussion of

both lungs was unremarkable, coarse breathing sounds were noted in both lungs on auscultation, rales in both lungs were absent, her voice was unchanged, and heart, abdomen, and nervous system examinations were unremarkable.

After admission, routine blood tests, including C-reactive protein (CRP) measurements, procalcitonin, comprehensive metabolic panel, complete blood counts, and coagulation tests were done (see Table 1 for results). On Day 7 of admission, the patient's stool was positive for COVID-19 nucleic acid. The patient's CT suggests: 1. Infectious lesions at the periphery of the bilateral lower lung lobes (inferior pleural region) with possible superimposed COVID-19 infection; 2. Secondary pulmonary tuberculosis, cavernous lesions, exudates, fibrosis, and calcification at the apicoposterior segment of the left upper lobe and the dorsal segment of the left lower lung lobe (Figure 1).

Table 1. Laboratory test results

	Reference value	First day of admission	Fourth day of admission	Seventh day of admission	Tenth day of admission
Blood routine test					
WBC ($\times10^9$ L^{-1})	3.5-9.5	9.09	7.42	4.79	6.87
NEU ($\times10^9$ L^{-1})	2-7	6.77	5.02	2.95	5.19
NEU-R (%)	50-70	74.5	67.6	61.6	75.6
LYM ($\times10^9$ L^{-1})	0.8-4	1.58	1.74	1.33	1.11
LYM-R (%)	20-40	17.4	23.5	27.8	16.2
HGB (g/L)	115-150	121	116	105	113
PLT ($\times10^9$ L^{-1})	100-300	184	165	169	187
CRP (mg/L)	0-10	0.9	27.2	17.61	10
ESR (mm/hour)	0-21	ND	ND	15.35	ND
PCT (μg/L)	<0.5	<0.5	0.64	<0.5	ND
Biochemical test					
ALT (U/L)	7-10	9.1	90.9	39.8	21.5
AST (U/L)	15-35	16.4	131.5	22.4	15.8
TP (g/L)	65-85	72.2	65.1	62.1	68.5
ALB (g/L)	40-55	44.3	39	37.1	40.5
TBIL (μmol/L)	5.1-28	19.5	9.5	6.39	6.71
LDH (U/L)	120-250	122	128	115.3	114.9
α-hydroxybutyric acid (U/L)	72-182	101.3	94.2	95.6	97.2
CK-MB (U/L)	50-310	55	31.1	45	43.7
Blood coagulation test					
PT (s)	10-16	13.3	12.4	13	ND
FDP-C (mg/L)	0-5	2.95	1.59	1.73	ND
FBG-C (mg/L)	2-4	4.36	3.23	3.28	ND
D-Dimer (mg/L)	0-0.5	0.57	0.21	0.07	ND

WBC: White blood cell, NEU: Neutrophil, NEU-R: Neutrophil rate, LYM: Lymphocyte, LYM-R: Lymphocyte rate, HGB: Hemoglobin, PLT: Platelet, CRP: C-reactive protein, ESR: Erythrocyte sedimentation rate, PCT: Procalcitonin, ALT: Alanine aminotransferase, AST: Aspartate aminotransferase, TP: Total protein, ALB: Albumin, TBIL: Total bilirubin, LDH:Lactate dehydrogenase, CK-MB: Creatine kinase-MB, PT: Prothrombin time, FDP-C: Fibrinogen degradation product-C, FBG-C: Fibrinogen-C, ND: Nodata

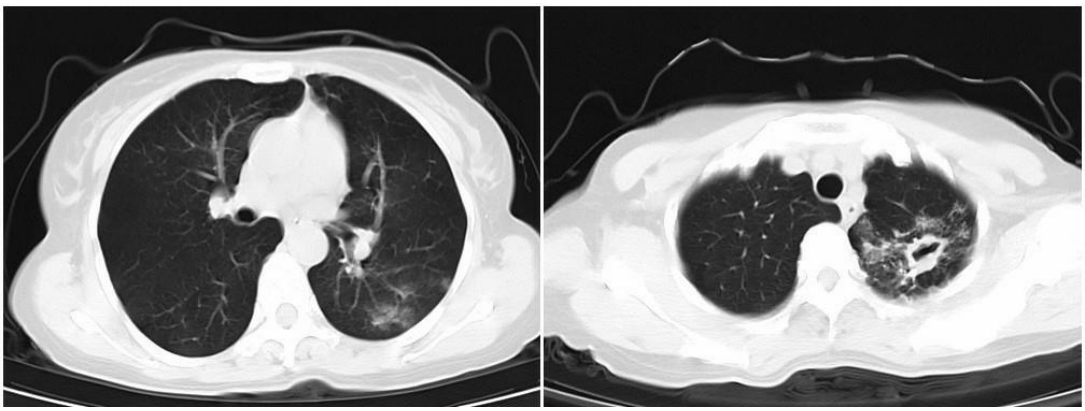

Figure 1. CT images
1. Infectious lesions at the periphery of the bilateral lower lung lobes (inferior pleural region) with possible superimposed COVID-19 infection.
2. Secondary pulmonary tuberculosis, cavernous lesions, exudates, fibrosis, and calcification at the apicoposterior segment of the left upper lobe and the dorsal segment of the left lower lung lobe.

A diagnosis of COVID-19 was made following the COVID-19 diagnosis and treatment protocol (interim 5th revised edition) combined with the patient's epidemiological history, routine blood test, imaging findings, and COVID-19 nucleic acid test results. In the patient's hometown, there was a high incidence of tuberculosis. The patient had a history of hemoptysis six months ago. But the patient had no obvious respiratory symptoms at present. Her imaging test showed secondary pulmonary tuberculosis. The patient was clinically diagnosed as pulmonary tuberculosis. After admission, contact and droplet precautions were implemented. Lopinavir/ritonavir (400 mg/100 mg), twice daily, was orally administered as antiviral treatment. On Day 2 of admission, the patient experienced multiple episodes of vomiting, with accompanying dizziness, fatigue, and subxiphoid distension and discomfort. These symptoms were attributed to lopinavir/ritonavir use. In addition, rifampicin and lopinavir/ritonavir have antagonistic effects; therefore, the antiviral drug was switched to 0.2 g umifenovir, twice daily, orally. 0.3 g isoniazid, 0.45 g rifampicin, 0.75 g ethambutol hydrochloride, and 0.4 g moxifloxacin hydrochloride, one time a day, orally, were given as anti-tuberculosis treatment. On Day 4 of admission, liver dysfunction was noted, and anti-tuberculosis drugs were discontinued. Intravenous polyene phosphati-dylcholine at a dose of 465 mg and 1.2 g reduced glutathione were administered, one time a day, for liver protection. Pharyngeal swabs and stool testing for COVID-19 nucleic acid had be done after 14 days of treatment, the test results were negative. The patient has been discharged. The patient has not complained of discomfort, and her condition is stable.

3. Discussion

COVID-19 spreads via droplets and contact. A study found that elderly males with comorbidity are more susceptible to COVID-19 (3). After infection, the virus undergoes a 1–14 days (mostly 3–7 days) incubation period before causing noticeable clinical symptoms. The symptoms of COVID-19 are mainly fever, fatigue, and dry cough. Symptoms in some patients are milder and may present only as low-grade fever and fatigue, without pneumonia. On the other hand, some patients may present with more severe symptoms such as dyspnea, hypoxemia, or even rapidly progressing to acute respiratory distress syndrome (ARDS), septic shock, refractory metabolic acidosis, and coagulation disorders (3).

At the early stage of the disease, routine blood tests show normal or decreased white blood cell and lymphocyte counts. Elevated liver enzymes, lactate dehydrogenase (LDH), creatine kinase, and myoglobin are seen in metabolic panels. Elevated troponin can be seen in some critically ill patients while others will have elevated CRP and erythrocyte sedimentation with normal procalcitonin levels. In severe cases, elevated D-dimer levels and progressive decline in peripheral blood lymphocyte counts could be seen. With regards to imaging, ground-glass opacities in both lungs, mostly below the pleura and sometimes accompanied with an air bronchogram sign, interlobular septal thickening, and pleural thickening, with limited cases of pleural effusion or enlarged lymph nodes have been reported (4). However, these laboratory and imaging test results are not specific, particularly in the presence of other comorbid lung diseases, which may interfere with the diagnosis of COVID-19. Therefore, it is especially important to carry out COVID-19 nucleic acid testing on sputum, pharyngeal swab, or lower respiratory tract secretions of suspected patients (5).

Currently, the treatment of COVID-19 is isolating the patient and maintaining oxygen, water, electrolyte, and homeostasis. Lopinavir/ritonavir, umifenovir, and other anti-COVID-19 drugs can be used for treatment (6). There are also reports of ganciclovir and oseltamivir being used for treatment (1). Currently, some drugs are still at the R&D phase (7, 8). Short-term steroids can be used for treating patients with significant dyspnea and rapid progression on chest imaging. When necessary, non-invasive or invasive mechanical ventilation should be administered.

In this case report, our patient left Wuhan where she was noted to have had close contacts with a patient diagnosed with COVID-19. Therefore, she had a corresponding epidemiological history. Her imaging test showed infectious lesions at the periphery of the bilateral lower lung lobes (inferior pleural region), corresponding to image findings of COVID-19. At the same time, secondary pulmonary tuberculosis, cavernous lesions, exudates, fibrosis, and calcifications were observed at the left upper lobe apicoposterior segment and the dorsal segment of the left lower lung lobe, suggesting possible pulmonary tuberculosis. This image presentation was indicative of lesions caused by tuberculosis COVID-19. In clinical practice, the latter tends to be covered by tuberculosis lesions. However, COVID-19 lesions occur at the lateral side of the lower lung. Therefore, it is important to distinguish between the two in clinical practice. Although the patient had COVID-19 and comorbid tuberculosis, her respiratory symptoms were atypical and she did not show apparent dyspnea and fever. After admission, her condition remained stable. However, more importantly, the patient tested

positive for COVID-19 nucleic acid upon pharyngeal swab and stool tests. A study reported that the viral load in sputum samples is higher than in pharyngeal swabs (9). Therefore, multiple pharyngeal swabs, in addition to sputum and stool nucleic acid tests can further improve the sensitivity of nucleic acid testing.

In summary, when COVID-19 and comorbid tuberculosis is suspected, epidemiological history, clinical presentation, laboratory tests, and imaging examinations must be combined to make a comprehensive diagnosis and prompt quarantine and treatment measures should be implemented.

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