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## The treatment and outcome of a pulmonary sarcomatoid carcinoma patient infected with SARS-CoV-2



To the Editor,

Since December 2019, an outbreak of the pandemic acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection has spread around the world [1–3]. So far, Coronavirus Disease-19 (COVID-19) has threatened nearly 5,000,000 people, and World Health Organization (WHO) has declared it as a public health emergency of international concern. Specifically, cancer patients are more vulnerable to infections because of their poor health status and systemic immunosuppressive states caused by cancer and anticancer treatments [4–8]. And recently, Liang et al. have reported that cancer patients had an increased risk of COVID-19 and a poorer prognosis than those without cancer [9]. Herein, we firstly present a case of a pulmonary sarcomatoid carcinoma patient infected with SARS-CoV-2. The time-line of the clinical history for this patient was shown in Fig. 1.

A 65-year-old man who never smoked was diagnosed with pulmonary sarcomatoid carcinoma and underwent left upper lobectomy and mediastinal node dissection in March 2016. The surgical pathologic stage was stage IIb (pT2bN1M0). Then the patient received four cycles of adjuvant chemotherapy (gemcitabine and cisplatin) until July 2016. After that, imaging evaluation was performed regularly, and no disease progression was found. In addition, he had a medical history of hypertension and type II diabetes.

On January 21, 2020, the patient reported dry cough and asthenia, followed by intermittent fever with a body temperature up to 38°C. These symptoms worsened in the subsequent couple of days, and the patient visited the Emergency Service of Wuhan Hankou Hospital on January 30, 2020. Chest CT scan showed multiple bilateral ground-glass opacities (GGOs) with patchy shadows. He received empiric antibiotic treatment (azithromycin and moxifloxacin) since January 30th, but the symptoms have not been significantly relieved.

Five days later (February 4th), the patient developed dyspnea and shortness of breath, and he was admitted to the respiratory ward of Wuhan Hankou Hospital on February 6, 2020. When he was admitted, he was still tachypnea, and his pulse oxygen saturation (SpO<sub>2</sub>) was only 89 %. Laboratory examinations revealed a decreased lymphocyte count ( $0.8 \times 10^9/L$ ) and ratio (14.5%), and an elevated D-Dimer level ( $> 8.00 \text{ mg/L}$ ). And chest CT scan showed increased bilateral GGOs with crazy-paving pattern. (Fig. 2A). A nasopharyngeal swab specimen was obtained for the real-time reverse transcription-polymerase chain reaction (RT-PCR) test of SARS-CoV-2, and the result was positive on February 8, 2020. The patient was treated with moxifloxacin and oseltamivir and received oxygen therapy (3 L/min), supplemented by traditional Chinese medicine since February 6th. Thereafter, his symptoms gradually relieved with SpO<sub>2</sub> maintained above 95 %, and he did not manifest fever again. The dynamic results of laboratory examinations were shown in Table 1. Follow-up CT was performed once a week, and results showed a gradually improved interstitial pneumonia. (Fig. 2B, C, and D) Repeated RT-PCR tests for SARS-CoV-2 were carried out on February 15th, 18th, and 28th, and all results were negative, indicating a confirmed recovery from COVID-19. Due to the marked improvement in the patient's overall condition, he was discharged on March 4, 2020.

To our best knowledge, this is the first report of a pulmonary sarcomatoid carcinoma patient infected with SARS-CoV-2. Although previous studies revealed that cancer patients might have increased risks of severe infections, worse clinical outcomes and poorer prognosis [4–9], this patient had a good response to antibiotic and antiviral treatments and eventually recovered from COVID-19. However, we should note that this patient had a relative early-stage non-small-cell lung cancer (NSCLC) and underwent radical operation and postoperative chemotherapy. Meanwhile, the time interval between his medical history

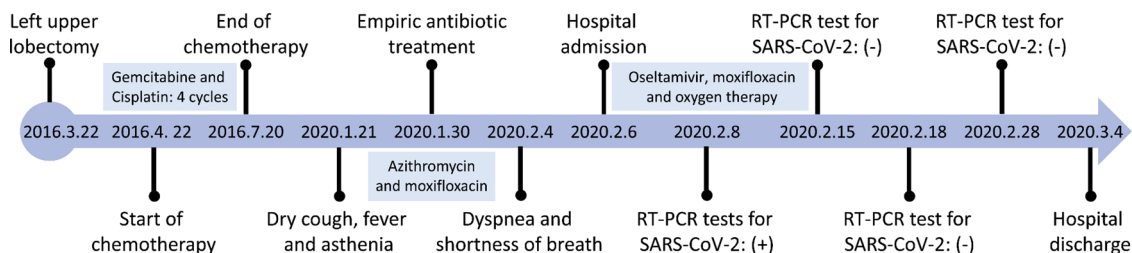
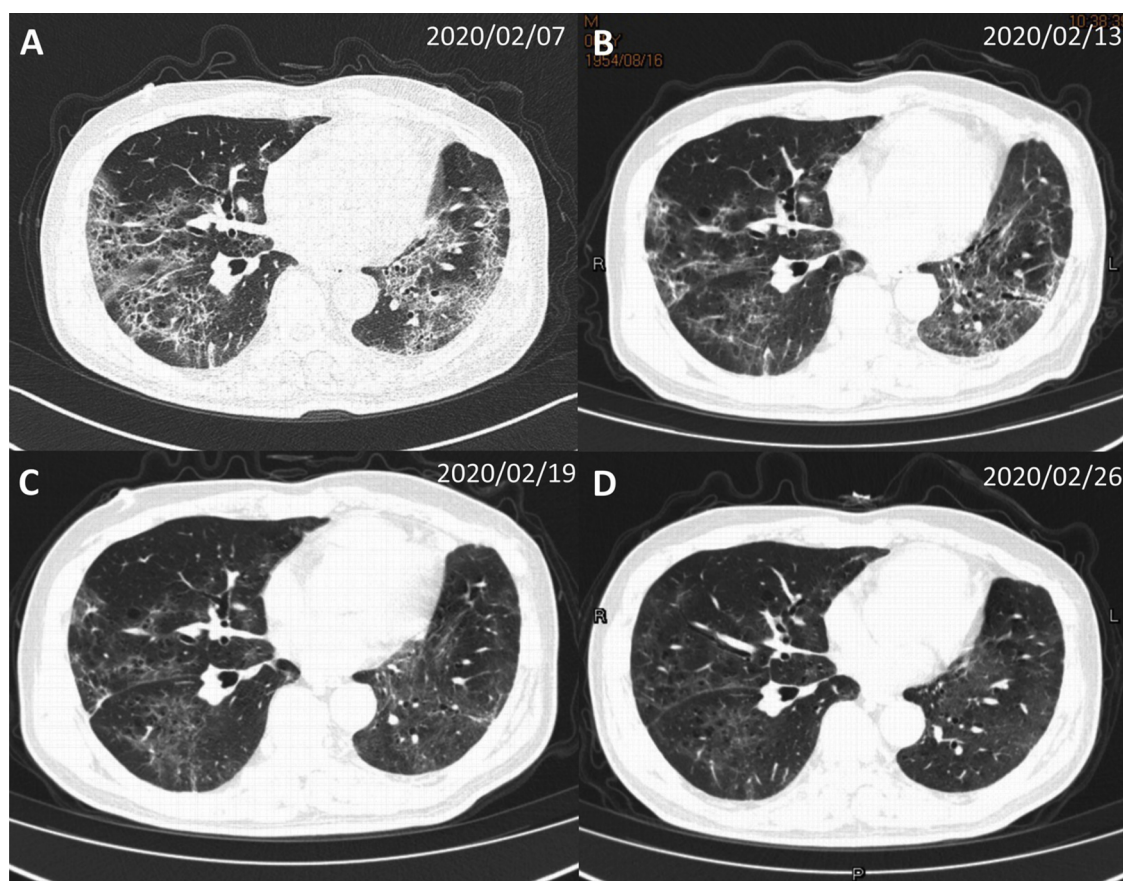


Fig. 1. Time line of clinical history for a pulmonary sarcomatoid carcinoma patient infected with SARS-CoV-2.



**Fig. 2.** Chest computed tomography scans for a pulmonary sarcomatoid carcinoma patient infected with SARS-CoV-2. Typical COVID-19 feature, such as multiple bilateral ground-glass opacities (GGOs) and crazy-paving pattern can be seen.

**Table 1**

Laboratory examination results of a pulmonary sarcomatoid carcinoma patient infected with SARS-CoV-2.

	Feb 07	Feb 14	Feb 19	Feb 27	Reference range
White blood cell count, $\times 10^9/L$	5.2	5.5	4.0	4.5	3.5–9.5
Lymphocytes, $\times 10^9/L$	0.8	1.0	0.8	1.0	1.1–3.2
Lymphocyte ratios, %	14.50	18.90	19.30	21.00	20–50
Neutrophils, $\times 10^9/L$	3.9	3.8	2.5	2.8	1.8–6.3
Neutrophil ratios, %	75.80	68.30	62.00	61.60	40–75
C-reactive protein, mg/L	–	8.530	4.030	2.520	0–5
D-Dimer, mg/L	> 8.00	7.07	2.96	2.17	0–0.5
Albumin, g/L	29.1	32.3	31.4	38.8	34–54

of pulmonary sarcomatoid carcinoma and that of COVID-19 is too long, so we have no idea whether the treatment of cancer, such as immunosuppressive chemotherapy, are associated with the risk of SARS-CoV-2 infection.

Additionally, chest CT images of this patient showed a typically reported COVID-19 feature, such as GGOs and crazy-paving pattern. To be mentioned, typical radiological changes in the pulmonary tissue were reported before the definite diagnosis of COVID-19, suggesting the importance of early imaging examination and evaluation. And it is reported that early identification of lung tissue changes could improve the

prognosis of patients with SARS-CoV-2 infections [10]. However, since different patients might have completely different radiographic changes in lung tissue, the findings of chest CT scans must be combined with clinical symptoms and laboratory examination results of patients. Furthermore, the approach of multidisciplinary discussion between clinicians and radiologists is more conducive to making accurate diagnosis and best individualized therapeutic decision.

#### Declaration of Competing Interest

The authors declare that they have no conflicts of interest.

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