Hemoptysis and a Newly Formed Lung Bulla in a Case of Convalescent COVID-19 Pneumonia

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Abstract:
Coronavirus disease 2019 (COVID-19) is a novel infectious disease affecting the general population worldwide. A fever and cough are the common clinical presentations of COVID-19. In most of these patients, computed tomography (CT) shows bilateral peripheral ground-glass opacities. We herein report a case of hemoptysis and lung bulla in the convalescent phase of COVID-19. Based on the clinical observations, alveolar destruction was likely associated with hemoptysis and bulla formation. Therefore, we suggest the follow-up of COVID-19 patients whose clinical parameters indicate alveolar damage, even after their symptoms improve.

Key words: COVID-19 pneumonia, Lung bulla, Hemoptysis

Introduction
Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory coronavirus 2 (SARS-CoV-2), has spread rapidly all over the world in 2020. The common clinical features of COVID-19 include a fever, cough, myalgia, and fatigue (1, 2). Notably, most COVID-19 patients are also diagnosed with pneumonia, including asymptomatic cases (3). During the acute phase, chest computed tomography (CT) in these patients shows bilateral peripheral ground-glass opacities with ill-defined margins that progress to consolidations and fibrosis (4, 5).

We herein report a case of convalescent COVID-19 pneumonia with hemoptysis and subpleural bulla formation on chest CT, rare clinical presentations of COVID-19.

Case Report
A 53-year-old man without a history of smoking presented to our hospital with a 5-day history of a fever, pronounced cough, and diarrhea. Informed consent to publish this information was obtained from the patient.

A physical examination revealed a body temperature of 37.1 °C, blood pressure of 124/76 mmHg, pulse rate of 94 beats per minute, respiratory rate of 24 breaths/minute, and oxygen saturation of 96% in ambient air. Laboratory testing revealed lymphopenia (830/μL), elevated levels of lactate dehydrogenase (LDH) (414 U/L) and C-reactive protein (14.5 mg/dL) and normal levels of D-dimer. Chest CT showed bilateral multifocal peripheral ground-glass opacities with ill-defined margins that progress to consolidations and fibrosis (4, 5).

Ten days after discharge, he presented to our hospital with hemoptysis. Re-examination of the chest CT scan revealed multifocal consolidations and a subpleural bulla in the same region as the ground-glass opacities found on the first CT scan (Fig. 1). We were suspected of being a fluid retention cyst, which probably caused hemoptysis (Fig. 2B). He received hemostatic agent therapy orally, and the hemoptysis gradually disappeared by day 40 from the onset of COVID-19. Subsequent chest CT on day 90 from the onset of COVID-19 showed the recovery and disappearance of the subpleural bulla and consolidations (Fig. 3).

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This case is noteworthy because it demonstrates two useful observations. First, COVID-19 pneumonia can be a cause of lung bulla even without ventilation procedures and a history of pulmonary disease. Second, hemoptysis, which is a rare clinical presentation of COVID-19, can occur in the convalescent phase of COVID-19 pneumonia.

The present case did not require oxygen therapy during hospitalization; however, the elevated levels of LDH, an indicator of exacerbated COVID-19 pneumonia, suggest the existence of alveolar destruction (6). Furthermore, the increased rate of consolidative opacities on CT re-examination of the chest also indicates alveolar damage (7, 8).

Several cases of pneumothorax development have been reported during the course of COVID-19 pneumonia, wherein patients were treated without mechanical ventilation (9-13). According to these case reports, most of the patients who developed pneumothorax did not have a history of pulmonary disease, similar to our case, and their chest CT scans showed bullae or pneumomediastinum formation, which may have led to pneumothorax. The reason for bulla formation in COVID-19 patients is unclear. However, given the clinical course of our case, we strongly believe that pronounced cough and alveolar destruction are potential causes of bulla formation.

Hemoptysis is a rare clinical presentation that occurs in less than 1%-5% of COVID-19 patients on admission (1, 2). In addition to alveolar destruction, pulmonary embolism can cause hemoptysis in COVID-19 patients, given that COVID-19 leads to hypercoagulation (14). However, the D-dimer level was normal in the present case, suggesting that alveolar destruction caused hemoptysis. The prevalence of hemoptysis in the convalescent phase of COVID-19 pneumonia is unknown, but it can occur in any clinical phase until the destructed alveoli have regenerated.

In conclusion, we present a case of hemoptysis and bulla formation, which are rare findings in COVID-19 patients. Our case suggests that alveolar destruction may cause lung bulla and hemoptysis. Pneumothorax caused by bulla formation can develop in COVID-19 patients, even without the use of mechanical ventilation. Importantly, pneumothorax and hemoptysis can occur in the convalescent phase of COVID-19 pneumonia. Therefore, patients with COVID-19 who are susceptible to alveolar destruction should be followed-up even after they reach remission.

The authors state that they have no Conflict of Interest (COI).

References
1. Guan WJ, Ni ZY, Hu Y, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. N Engl J Med 382: 1708-1720, 2020 (in eng).
2. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 395: 497-506, 2020 (in eng).
3. Meng H, Xiong R, He R, et al. CT imaging and clinical course of asymptomatic cases with COVID-19 pneumonia at admission in Wuhan, China. J Infect 81: e33-e39, 2020 (in eng).
4. Shi H, Han X, Jiang N, et al. Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study. Lancet Infect Dis 20: 425-434, 2020 (in eng).
5. Liu D, Zhang W, Pan F, et al. The pulmonary sequelae in discharged patients with COVID-19: a short-term observational study. Respir Res 21: 125, 2020 (in eng).
6. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet 395: 1054-1062, 2020 (in eng).
7. Salehi S, Reddy S, Gholamrezanezhad A. Long-term Pulmonary Consequences of Coronavirus Disease 2019 (COVID-19): What We Know and What to Expect. J Thorac Imaging 35: W87-w89, 2020 (in eng).
8. Salehi S, Abedi A, Balakrishnan S, Gholamrezanezhad A. Coronavirus Disease 2019 (COVID-19): A Systematic Review of Imaging Findings in 919 Patients. AJR Am J Roentgenol 215: 87-93, 2020 (in eng).
9. Yasukawa K, Vamadevan A, Rollins R. Bulla Formation and Tension Pneumothorax in a Patient with COVID-19. Am J Trop Med Hyg 103: 943-944, 2020 (in eng).
10. Janssen ML, van Manen MJG, Cretier SE, Braunstahl GJ. Pneumothorax in patients with prior or current COVID-19 pneumonia. Respir Med Case Rep 31: 101187, 2020 (in eng).
11. Spiro JE, Sisovic S, Ockert B, Böcker W, Siebenbürger G. Secondary tension pneumothorax in a COVID-19 pneumonia patient: a case report. Infection 1-4, 2020 (in eng).
12. Khurram R, Johnson FTF, Naran R, Hare S. Spontaneous tension pneumothorax and acute pulmonary emboli in a patient with COVID-19 infection. BMJ Case Rep 13: 2020 (in eng).
13. Flower L, Carter JL, Rosales Lopez J, Henry AM. Tension pneumothorax in a patient with COVID-19. BMJ Case Rep 13: 2020 (in eng).
14. Casey K, Itten A, Nicolini R, Auten J. COVID-19 pneumonia with hemoptysis: Acute segmental pulmonary emboli associated with novel coronavirus infection. Am J Emerg Med 38: 1544.e1541-1544.e1543, 2020 (in eng).