COVID-19 and radiation induced pneumonitis: Overlapping clinical features of different diseases

To the Editor

SARS-CoV-2 is a novel human coronavirus, first observed at the end of December 2019 in China. In March 2020, with the outbreak of the epidemic, the World Health Organization (WHO) declared the global public health emergency [1]. COVID-19 is the respiratory syndrome associated with SARS-CoV-2. The most serious clinical entity is characterized by severe interstitial pneumonia [2]. Cancer patients are more susceptible to infection due to their lower immunity and therefore might be at increased risk of COVID-19 infection. Furthermore, the prognosis of cancer patients dealing with COVID-19 disease is unpaired as they are usually older with multiple comorbidities. Chinese cancer patients with COVID-19 showed a higher risk of serious events compared with patients without cancer (39% vs 8%, p = 0.0003) [3]. Lung cancer patients may be further at risk as they have a reduced lung function and often suffer from recurrent pulmonary infections.

Radiotherapy is a cornerstone in both definitive or adjuvant treatment of lung malignancies. The clinical picture of radiation induced lung injury (RILI) is radiation pneumonitis (RP) that is relatively common, occurring in 15–40% of patients receiving concurrent chemoradiation (CCRT) for NSCLC [4].

In patients treated with thoracic radiotherapy, discerning RP from COVID-19 disease can be particularly challenging as RP characteristics can mimic SARS-CoV-2 interstitial pneumonia. The most common symptoms are dyspnoea and a dry non-productive cough. High fever (the most common initial symptom of COVID-19) frequently occurs in patients presenting severe lung RP. No laboratory test can definitively identify RP. However, most patients will have a high erythrocyte sedimentation rate (VES) or C-reactive protein and normal procalcitonin. Furthermore, high serum ferritin and D-Dimer are elevated in these patients due to cancer disease [5,6]. In addition, lymphopenia (the most common laboratory finding in patients diagnosed with COVID-19) can be relatively frequent in RP as lymphocytes are known to be more radiosensitive and lymphocyte count reduction has been reported by a median of 67% in NSCLC patients undergoing CCRT [7].

Chest CT is the preferred imaging technique to detect RP. The radiological characteristics of RP are ground-glass opacities (GGO) in the initial phase and patchy areas of consolidation in the peak phase. Furthermore, the thickened pulmonary interstitium and the crazy paving pattern is a common chest CT manifestation of severe RP and COVID-19 (Fig. 1). Linear scarring appearance is typical of later stages, as fibrosis has developed [8,9].

In order to discern between the two clinical entities, some considerations should be made. Firstly, acute symptomatic RP usually occurs within 3 months from the end of radiotherapy. In the Pacific trial in the placebo group, the median time to the onset of RP was 76.5 days [10]. Therefore, an interstitial pneumonia with high fever occurring several months after radiotherapy is unlikely to be radiation induced. Secondly, RP is usually unilateral and the distribution of chest CT abnormalities correspond to radiation treatment fields. It can, therefore, be helpful to correlate CT abnormalities with volumes of treatment and distribution of different doses to lungs. Thirdly, the onset of symptomatic RP is slower than COVID-19 disease, which can show an unfavourable clinical course with the onset of dyspnoea within 5 days and ARDS within 8 days [2].

In conclusion, even if there is still much more to learn about COVID-19 disease, in cancer patients with a history of thoracic radiotherapy treatment and a suspicion of COVID-19 disease, an extra effort should be made to differentiate COVID-19 interstitial disease from RP.

Fig. 1. Patient presenting severe radiation pneumonitis. CT scan shows reticular pattern on 20 Gy irradiated area.
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References


