In reply

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We have read the letter from Drs. Scialpi, Piscioli, Improta, Carpinì, and Manciolì, regarding our previously published article titled “Ultra-high-resolution computed tomography (UHR-CT) can demonstrate alveolar collapse in novel coronavirus (COVID-19) pneumonia” [1]. We appreciate your interest in our article and for sending us this letter.

In the letter, Dr. Scialpi et al. said that our title was not appropriate and that the lung lesions of SARS-CoV-2 infection are not simple pneumonia, but diffuse alveolar damage (DAD). They also mentioned that the term “alveolar collapse” is not suitable, and suggested “atelectasis” instead, which is a more conventional word used for lung volume loss.

To address these concerns, first: in our study, we observed smaller secondary pulmonary lobules in a crazy paving appearance in infected lungs compared to those in unaffected lungs, alongside consolidation associated with bronchiectasis and deviation of the fissure on UHR-CT. We believe that this volume loss with the distortion of peripheral lung structures cannot be explained by simple pneumonia. These findings indicate severe lung injury observed in acute respiratory distress syndrome (ARDS)—a speculation mentioned in our article. Second, in the Fleischner Society: Glossary of Terms for Thoracic Imaging, “collapse” is synonymous with “atelectasis” and the two are often used interchangeably. Alveolar collapse is frequently used in describing ARDS. We have some clinical cases of acute respiratory failure, for example, anti-MDA5 antibody-positive interstitial lung

disease showing rapidly progressive lung volume loss in CT scans and typical features of DAD with alveolar collapse in surgical biopsies [2]. We want to emphasize that the lesions in COVID-19 are severe, as suggested by UHR-CT findings. Therefore, we intentionally used the term “alveolar collapse”, although some authors may disagree with its use.

“Pneumonia” is used not only for infectious diseases, but also non-infectious diseases like acute interstitial pneumonia, which is a representative disease showing diffuse alveolar damage. The term “pneumonia” is used in certain COVID-19 articles, especially in discussions regarding its differential diagnosis [3]. Currently, the pulmonary lesions of COVID-19 are heterogeneous with two primary types (Types L and type H) that correspond to early- and late-stage lung damage [4]. Type L is observed in the early phase, showing hypoxemia, but maintained pulmonary compliance, while Type H is a progressive, critical state, similar to ARDS with DAD. Dr. Pfeifer et al. postulated that the loss of hypoxic vasoconstriction (the Euler-Liljestrand mechanism) and an increase in shunt volume are correlated [4]. Many clinicians consider COVID-19 as a systemic disorder due to the cytokine storm, endothelitis, and cardiovascular complications as key threats. We hope that the imaging diagnosis of COVID-19 will be established in the near future, to distinguish these subtypes.

In closing, we agree with Dr. Scialpi et al. that the pulmonary lesions in COVID-19 are indeed diffuse alveolar damage in severe cases. Thank you again for the important suggestions.

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