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in pursuit of the scientific evidence. *Chest*. 2020;158(5):1885-1895.

2. Tekcan Şanlı DE, Yıldırım D. A new imaging sign in COVID-19 pneumonia: vascular changes and their correlation with clinical severity of the disease. *Diagn Interv Radiol*. 2021;27(2):172-180.
3. Moores L, Tritschler T, Brosnahan S, et al. Prevention, diagnosis, and treatment of VTE in patients with coronavirus disease 2019: CHEST Guideline and Expert Panel report. *Chest*. 2020;158(3):1143-1163.
4. Hauguel-Moreau M, Hajjam ME, De Baynast Q, et al. Occurrence of pulmonary embolism related to COVID-19 [published online ahead of print October 6, 2020]. *J Thromb Thrombolysis*. <https://doi.org/10.1007/s11239-020-02292-4>.
5. Wells P. Hypercoagulability in COVID-19. *Journal of the South African Heart Association*. 2020;17(3):266-274.

Response



To the Editor:

We thank Rotzinger and Qanadli for the interest in our article on the chest CT imaging signature of coronavirus disease 2019 (COVID-19) infection.¹ In our article, we reported a pooled prevalence of vascular thickening of 72.9% (95% CI, 64.4% to 81.4%) in patients with COVID-19.¹ At the time our article was published, there was a lack of scientific data that correlated chest CT imaging to postmortem pathologic findings in this disease. Recently, Henkel et al² published a series of 14 patients who died of COVID-19, in whom a morphologic comparison of antemortem chest CT scans with postmortem gross findings and histopathologic findings was performed. Five of 14 patients in their study also underwent contrast-enhanced CT imaging.² Both vascular thickening (vascular enlargement/vascular congestion) and pulmonary arterial enlargement (related to the corresponding bronchus) were present in 12 of 14 patients (86%) on chest CT imaging.² Based on their histopathologic correlation and previous autopsy studies,^{3,4} Henkel et al² speculated that the observation of enlarged pulmonary arteries might be related to an increase of parenchymal and predominantly intravascular pressure, due to severe COVID-19 pulmonary microangiopathy that affected the alveolar capillary network. The high incidence of microthrombosis was also thought to be suggestive of a possible underestimation of the vascular alterations associated with COVID-19 with the use of imaging, especially on unenhanced scans.² Henkel et al² concluded that both severe acute lung injury and vascular complications contribute to fatal outcomes. These considerations largely resonate with the excellent remarks by Rotzinger and Qanadli.¹ Nevertheless, the scientific evidence on the pathophysiologic condition and clinical relevance of vascular changes on chest CT imaging in COVID-19, besides frank pulmonary

embolism, is still limited, and the interpretation of this limited evidence remains somewhat speculative. Further studies are warranted to understand the nature of vascular abnormalities seen on chest CT scans and how this can help to improve patient management and outcome.

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References

1. Adams HJA, Kwee TC, Yakar D, Hope MD, Kwee RM. Chest CT imaging signature of coronavirus disease 2019 infection: in pursuit of the scientific evidence. *Chest*. 2020;158(5):1885-1895.
2. Henkel M, Weikert T, Marston K, et al. Lethal COVID-19: radiological-pathological correlation of the lungs. *Radiol Cardiothorac Imaging*. 2020;2(6):e200406.
3. Wichmann D, Sperhake JP, Lütgehetmann M, et al. Autopsy findings and venous thromboembolism in patients with COVID-19: a prospective cohort study. *Ann Intern Med*. 2020;173(4):268-277.
4. Ackermann M, Verleden SE, Kuehnel M, et al. Pulmonary vascular endothelialitis, thrombosis, and angiogenesis in Covid-19. *N Engl J Med*. 2020;383(2):120-128.

Corticosteroid Plus Tocilizumab in COVID-19



When Two Is Better Than One

To the Editor:

We compliment the retrospective study by Narain et al¹ in *CHEST* (March 2021) that analyzed and compared the risk of death with different immunotherapies in patients with coronavirus disease 2019 (COVID-19). The findings of the study had some implications for the use of immunotherapy in this patient population. Specifically, the study found that the use of corticosteroids reduced the risk of death (hazard ratio [HR], 0.66; 95% CI, 0.57-0.76), but no survival advantage was observed with the use of tocilizumab, an IL-6 receptor monoclonal antibody (HR, 0.79; 95% CI,