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COVID-19 Pulmonary Involvement: Is Really an Interstitial Pneumonia?

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I read the *Academic Radiology* article “Imaging Features of Coronavirus disease 2019 (COVID-19): Evaluation on Thin-Section CT” by Guan C.S. et al. (1) with great interest. The authors reported the typical imaging features of COVID-19 on thin-section CT and also described the short-term follow-up in about two-third of patients. In their series all the patients showed ground-glass opacity (more than half of which were round), whereas nearly 90% of patients showed the crazy-paving pattern; they also reported how consolidations can appear in the center of the ground-glass opacity and can be patchy. The lesions commonly involved the lower lobes of both lungs in a subpleural location.

In Italy we are extensively using chest CT and patients usually display very similar findings described by Guan C.S. et al. However, on the basis of my personal experience, chest CT manifestations may vary, particularly at different stages of the disease as reported by Shi H. et al. (2). Besides, the CT findings noted (ground-glass opacity, consolidation) are not specific for COVID-19 and can be observed with numerous pathogens (for example during an epidemic influenza) and in many noninfectious aetiologies (3). The almost constant presence of ground-glass opacity and the high incidence of the crazy-paving pattern meant that the chest CT features of COVID-19 patients were labeled as “interstitial pneumonia”, at least in the early stages.

Nevertheless, pathological findings underlying these radiological features are not yet clearly defined, particularly the ground-glass opacity and the crazy-paving pattern that are nonspecific radiological signs. Guan C.S. et al. assert that “ground-glass opacities may be due to mild edema of the alveolar septi, hyperplasia of the interstitium, partial filling of airspaces, or a combination of these features. Besides, the crazy-paving pattern may correlate with hyperplasia of

interlobular and intralobular interstitia”. These authors further speculate that these features are very similar to those seen in SARS and MERS-coronavirus infections. Anyhow, information regarding the pathological findings in COVID-19 is very limited, although case reports have been published in recent weeks (4,5). In the case report by Xu Z. et al. (4) samples were obtained from postmortem pulmonary biopsy, and a description of the gross postmortem findings is not given, although multiple ground-glass opacities were described on chest X-ray.

Preliminary unpublished data of autopsies on COVID-19-positive patients in Italy have highlighted the presence of thrombotic formations and also of a thrombofilic vasculitis in the lung, brain, and other organs. On the basis of these preliminary data and on the fact that chest CT findings are non-specific, I've been wondering if “interstitial pneumonia” could be the result of a primary vascular damage and not the very initial cause underlying lung injury. This theory would explain why the lower lobes are more affected where perfusion is prevalent. Obviously, these are my personal observations that will have to be supported by anatomic-radiological correlation on autopsy lung samples. Probably, time will be required to obtain autopsy definitive data and to understand what is the real pathological meaning of ground-glass opacities and of the crazy-paving pattern, early signs of pulmonary involvement. This could be important for identifying the most effective therapy in these patients.

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