



COVID-19 pneumonia: what is the role of imaging in diagnosis?

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TO THE EDITOR:

The current global COVID-19 pandemic is related to an acute respiratory disease caused by a new coronavirus (SARS-CoV-2), which is highly contagious and whose evolution is still little known. Considering the current case definition, based on the diagnosis of pneumonia, more than 100,000 cases of COVID-19 infection have been confirmed worldwide, and the associated mortality rate has fluctuated around 2%.⁽¹⁾ However, recent changes in the diagnostic criteria of the disease have led to an increase in the rate of new cases and, on a daily basis, increasing numbers and challenges have been the subject of intense debate on the topic by the scientific community.

To date, reverse-transcriptase polymerase chain reaction (RT-PCR) remains the gold standard for the definitive diagnosis of COVID-19 infection, despite reports of false-negative results (due to insufficient cellular material or inadequate detection and extraction techniques) in face of positive radiological findings.⁽²⁾ Because currently available laboratory tests might not be widely accessible to a growing infected population, new screening strategies are necessary. In this context, chest X-rays have not been recommended as a first-line imaging modality for the diagnosis of COVID-19 due to its limited sensitivity in the detection of ground-glass opacities and other incipient pulmonary findings of the infection.^(3,4) However, although the use of chest CT as a screening tool has yet to be determined, recent studies have demonstrated a central role of CT in the early detection and management of COVID-19 pulmonary manifestations. It has shown high sensitivity but limited specificity.^(3,5)

To date, most of the cases reported have presented similar tomography findings (Figure 1), with alveolar changes predominating, such as ground-glass opacities, focal consolidations, and mixed opacities (including reversed halo sign), usually with bilateral and multifocal involvement, peripheral distribution, and predominance in the middle, lower, and posterior lung fields.⁽⁶⁻⁸⁾ Septal thickening and reticular changes superimposed on alveolar changes have also been described and reflect concomitant interstitial involvement, especially in patients in advanced stage (8-14 days after the appearance of symptoms).⁽⁹⁾ Incipient lung scarring (fibrotic bands) and pleural effusion have also been more common in the advanced stage of the disease when compared with the early stages, when alveolar changes, especially ground-glass opacities, predominated.⁽⁹⁾

The dissociation between clinical, laboratory, and imaging findings has been demonstrated in some cases. It is estimated that up to 50% of the patients infected with COVID-19 might have normal chest CT scans within the first two days after the onset of the symptoms.⁽⁵⁾ In addition, the existence of patients infected with COVID-19 confirmed by positive RT-PCR and with normal chest CT at admission and during a follow-up period after 2-3 weeks⁽¹⁰⁾ reinforces the current understanding that normal chest CT results should not be considered for the exclusion of the diagnosis, especially in patients with recent onset of the disease.⁽¹¹⁾ Patients with a high degree of clinical suspicion, typical tomographic findings, and negative RT-PCR results have also been found; in such cases, it is recommended that laboratory tests be repeated and contact isolation should be considered.⁽²⁾ Given these possibilities, chest CT findings were excluded from the

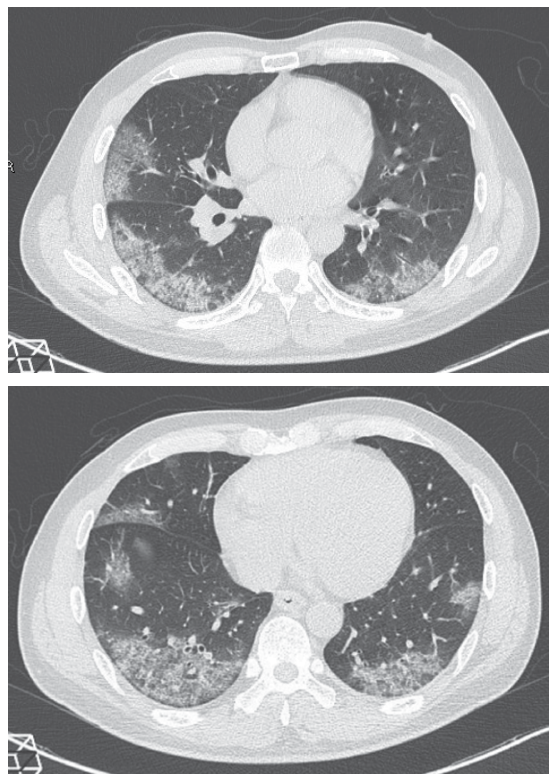


Figure 1. Axial chest HRCT scans showing multifocal and bilateral ground-glass opacities, with peripheral and posterior predominance, which are typical pulmonary findings of COVID-19 infection (confirmed by RT-PCR).

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diagnostic criteria of COVID-19 in the sixth edition of the Coronavirus Pneumonia Diagnosis and Treatment Program guidelines proposed by General Office of China Health Commission.⁽¹²⁾ However, until further ongoing studies on the role of CT in COVID-19 pneumonia are published, an integrated analysis of clinical, laboratory, and radiological aspects should be recommended, aiming at the early diagnosis of the disease.

In conclusion, CT should not be used for COVID-19 screening in asymptomatic patients, but may be considered in hospitalized patients, symptomatic cases, or in specific clinical situations. Tomography findings

of COVID-19 pneumonia are nonspecific and similar to those of other pulmonary infections, and they vary according to the stage of the disease onset. They must be correlated with clinical and laboratory evidence of COVID-19 infection. To date, it is recommended that the final diagnosis of the disease be confirmed by a positive RT-PCR test or genetic sequencing. Clinicians and radiologists should be familiar with the spectrum of COVID-19 involvement and be vigilant to identify and treat the affected patients early. Those patients may have few clinical symptoms, normal findings on chest CT, and even negative laboratory tests at the beginning.

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