

Imaging features of chest computed tomography in patients with 2019 coronavirus disease pneumonia: comparison of our experience and published data

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OBIETTIVI

The chest computed tomography (CT) characteristics of coronavirus disease 2019 (COVID-19) are important for diagnostic and prognostic purposes. The aim of this study was to compare chest CT findings in a review of published studies and our front-line experience of interpreting CT images of COVID-19 pneumonia

MATERIALI E METODI

The CT examinations used three scanners with helical acquisitions in end-inspiration. Dual-energy acquisition on the third-generation dual-source scanner (Somatom Force, Siemens Healthineers, Forchheim) was set at 90/150Sn kV, with modulated mA, a rotation time of 0.25 s, a pitch of 1.05, and a collimation of 2x192x0.6 mm. All of the chest CT examinations were independently evaluated by two radiologists with respectively seven and 20 years of experience in interpreting chest CT images when blinded to clinical or laboratory data. When there was a difference of opinion, a third radiologist with 30 years of experience (AG) was consulted. With the aim of highlighting the contribution and judicious use of CT in the diagnosis of COVID-19 we compare our results with those provides by a systematic review and meta-analysis of the current literature on chest CT imaging findings. After excluding studies which only provided an age range rather than a standard deviation, 25 studies with admissible data were pooled together for analysis of 3,863 patients.

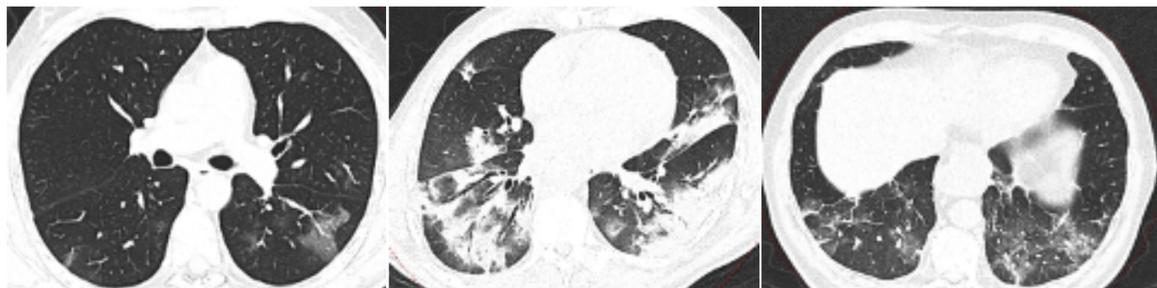


Figura 1.(a) Chest CT scan shows bilateral ground glass opacities (GGOs) in the apical segments of both lower lobes and in the right upper lobe; (b) Chest CT scan shows bilateral large consolidations with air bronchogram in both lower lobes. Less extensive consolidations can be observed in the left upper lobe and in the middle lobe. A solid nodule surrounded by a ground glass halo in the middle lobe can also be observed; (c) Chest CT scan shows thickened pulmonary interstitial structures, with reticular pattern and fibrous stripes in both lower lobes.

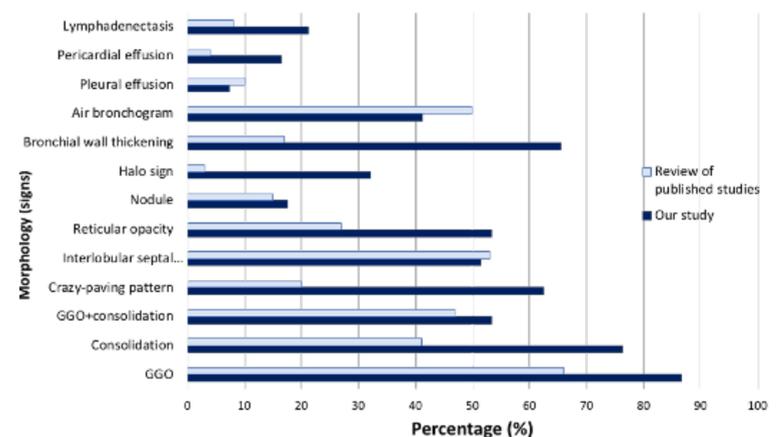


Figura 2. Average percentage of each chest CT manifestation of COVID-19 calculated from published studies compared with our study

RISULTATI

Our study involved 165 COVID-19 patients (131 men [79.4%] and 34 women [20.6%] with a mean age of 61.5±12.5 years). The most frequent symptoms were fever (96.4%), dry cough (51.5%), fatigue (36.9%) and myalgia (26.6%). Sixty-nine percent of the patients had at least one co-morbidity: hypertension was the most frequent (36%), followed by cardiovascular disease (24.5%), pulmonary disease (19%), and diabetes mellitus (17.2%). Nine patients (5.9%) had hypercholesterolemia. The most frequent CT finding was bilateral predominantly subpleural and basilar airspace changes, with more extensive ground-glass opacities (GGO) (Figure 1a) than consolidation (Figure 1b). Like those of a number of recent published studies (Table I), the findings of this study show that CT bilateral distribution of ground glass opacities with or without consolidation in the posterior and peripheral lung is the CT cornerstone of COVID-19, but the preominant findings in later phases include consolidation, reticular pattern (Figure 1c), a 'crazy-paving' pattern, 'reverse halo' sign and vascular dilation sign (Figure 2).

CONCLUSIONI

In conclusion, our comprehensive review of published studies and front-line experience of interpreting CT images of COVID-19 pneumonia confirm the importance of CT in the diagnosis and management of COVID-19 infection.