Korean Journal of Radiology

KJR

Check for updates

Computed Tomographic Findings in COVID-19

Beuy Joob, MD[1], Viroj Wiwanitkit, MD[2, 3]

[1]Sanitation 1 Medical Academic Center, Bangkok, Thailand;
[2]Department of Community Medicine, Dr DY Patil, Pune, India;
[3]Department of Tropical Medicine, Hainan Medical University, Haikou, China

Dear Editor,

We read the publication on "Novel Coronavirus Pneumonia Outbreak in 2019: Computed Tomographic Findings in Two Cases" with great interest (1). Lin et al. (1) described "chest computed tomography findings of multiple regions of patchy consolidation and ground-glass opacities in both lungs" and mentioned that "these findings were characteristically located along the bronchial bundle or subpleural lungs." We would like to share ideas and observations from other countries where coronavirus disease 2019 (COVID-19) is also endemic. The computed tomography (CT) findings of COVID-19 are variable. In our setting, some patients have no initial abnormal lung findings and can be misdiagnosed with other common diseases. A recent publication showed that the detection rate of disease is 98% (2). Also, there are different clinical findings in different stages of the disease (3). Use of CT imaging might be useful for assessing the severity of COVID-19, but disease confirmation is still based on molecular diagnosis of the pathogen.

ORCID iD

Beuy Joob
  https://orcid.org/0000-0002-5281-0369

REFERENCES

1. Lin X, Gong Z, Xiao Z, Xiong J, Fan B, Liu J. Novel coronavirus pneumonia outbreak in 2019: computed tomographic findings in two cases. *Korean J Radiol* 2020;21:365-368
2. Fang Y, Zhang H, Xie J, Lin M, Ying L, Pang P, et al. Sensitivity of chest CT for COVID-19: comparison to RT-PCR. *Radiology* 2020 Feb 19 [Epub]. https://doi.org/10.1148/radiol.2020200432
3. Pan F, Ye T, Sun P, Gui S, Liang B, Li L, et al. Time course of lung changes on chest CT during recovery from 2019 novel coronavirus (COVID-19) pneumonia. *Radiology* 2020 Feb 13 [Epub]. https://doi.org/10.1148/radiol.2020200370

Letter to the Editor

Response

Xiaoqi Lin, MD[1]*, Pinggui Lei, MD[2]*, Bing Fan, MD[1]

[1]Department of Radiology, Jiangxi Provincial People's Hospital, Nanchang, China; [2]Department of Radiology, The Affiliated Hospital of Guizhou Medical University, Guiyang, China

To the Editor,

Thank you for your comments regarding our online article on computed tomography (CT) findings in two cases of coronavirus disease 2019 (COVID-19), which caused an outbreak in China (1). Recent studies documented that human-to-human transmission of the novel coronavirus 2019 (2019-nCoV) is the epidemiologic characteristic of COVID-19 (2, 3). As of February 25, 2020, the World Health Organization (WHO) reported 80239 confirmed cases globally, and 2700 deaths in 34 countries, including China, Korea, Japan, the United States of America, Canada, Italy, and Iran (4). In short, 2019-nCoV has spread worldwide.

Fever and cough are the most frequent initial symptoms of COVID-19 and may facilitate the diagnosis of infection with 2019-nCoV (5). Regarding the CT characteristics, we agree that the features of 2019-nCoV infection detected by imaging modality are diverse. Ground-glass opacity (GGO), pulmonary consolidation, pulmonary nodules, and diffuse GGO with thickened interlobular septa were observed in patients with COVID-19 pneumonia. However, pleural effusion and thoracic lymphadenopathy were uncommon. The characteristics of the opacities were also variable and included linear and rounded morphology, "crazy-paving" pattern, and the "reverse halo" sign (6). Among these CT findings, GGO and consolidations were always observed at different stages of COVID-19 development (5).

Previous studies have shown that the lobe involvement was most frequently distributed along the bronchovascular bundles or subpleural regions in the bilateral lungs (6-8), which is consistent with the CT findings in the two cases that we reported. However, not all of the patients with COVID-19 had abnormal CT features. A recent study has shown that 98% (50/51) of patients had abnormal chest CT characteristics, and one patient (1/51, 2%) had normal results on chest

CT (9). Even though COVID-19 can be confirmed by the detection of the nucleic acid of the virus, CT examination—as the imaging modality—has an important role in detecting abnormalities in the pulmonary parenchyma in patients with suspected COVID-19 pneumonia. Therefore, the combination of repeated swab tests and CT examinations can be helpful for diagnosing individuals with high clinical suspicion of 2019-nCoV infection but negative in the real-time reverse transcriptase-polymerase chain reaction (rRT-PCR) screening (9). CT images and the detection of nucleic acid can mutually complement each other in the diagnosis of COVID-19.

In conclusion, COVID-19 pneumonia is a human-to-human transmitted disease, and fever and cough may be its initial symptoms. The 2019-nCoV has certain specific signs on CT imaging. However, not all cases display abnormal chest CT results, and the detection of the nucleic acid of the virus is the best way to diagnose patients with suspected COVID-19. Therefore, clinical history, manifestations, and the rRT-PCR amplification of the viral DNA from a sputum sample can be considered to represent the comprehensive analysis necessary to diagnose COVID-19 infection.

ORCID iDs
Bing Fan
    https://orcid.org/0000-0003-4439-6150
Xiaoqi Lin
    https://orcid.org/0000-0002-0760-3950
Pinggui Lei
    https://orcid.org/0000-0001-7610-0292

REFERENCES

1. Lin X, Gong Z, Xiao Z, Xiong J, Fan B, Liu J. Novel coronavirus pneumonia outbreak in 2019: computed tomographic findings in two cases. *Korean J Radiol* 2020;21:365-368
2. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 2020 Jan 29 [Epub]. https://doi.org/10.1056/NEJMoa2001316
3. Phan LT, Nguyen TV, Luong QC, Nguyen TV, Nguyen HT, Le HQ, et al. Importation and human-to-human transmission of a novel coronavirus in Vietnam. *N Engl J Med* 2020;382:872-874
4. World Health Organization. Coronavirus disease 2019 (COVID-19) situation report–36. Available at: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200225-sitrep-36-covid-19.pdf?sfvrsn=2791b4e0_2, 2020-02-25. Accessed February 25, 2020
5. Pan F, Ye T, Sun P, Gui S, Liang B, Li L, et al. Time course of lung changes on chest CT during recovery From 2019 novel

*These authors contributed equally to this work.
Corresponding author: Bing Fan, MD, Department of Radiology, Jiangxi Provincial People's Hospital, Aiguo Road No. 92, Donghu, Nanchang 330006, China.
• Tel: (86) 19917922166 • Fax: (86) 0791-86892076
• E-mail: 26171381@qq.com

coronavirus (COVID-19) pneumonia. *Radiology* 2020 Feb 13 [Epub]. https://doi.org/10.1148/radiol.2020200370

6. Bernheim A, Mei X, Huang M, Yang Y, Fayad ZA, Zhang N, et al. Chest CT findings in coronavirus disease-19 (COVID-19): relationship to duration of infection. *Radiology* 2020 Feb 20 [Epub]. https://doi.org/10.1148/radiol.2020200463

7. Liu P, Tan XZ. 2019 novel coronavirus (2019-nCoV) pneumonia. *Radiology* 2020 Feb 4 [Epub]. https://doi.org/10.1148/radiol.2020200257

8. Chung M, Bernheim A, Mei X, Zhang N, Huang M, Zeng X, et al. CT imaging features of 2019 novel coronavirus (2019-nCoV). *Radiology* 2020 Feb 4 [Epub]. https://doi.org/10.1148/radiol.2020200230

9. Fang Y, Zhang H, Xie J, Lin M, Ying L, Pang P, et al. Sensitivity of chest CT for COVID-19: comparison to RT-PCR. *Radiology* 2020 Feb 19 [Epub]. https://doi.org/10.1148/radiol.2020200432