DOI: 10.7860/IJARS/2021/46139:2589

Radiology Section

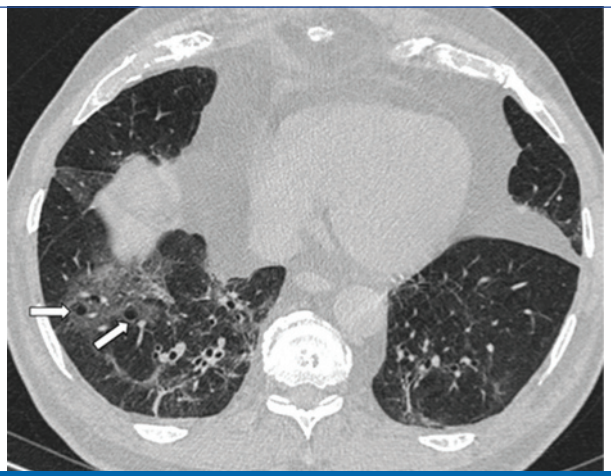
COVID-19 Disease: Bubble in Lung

PUNEET RAJ GOYAL[1], AMANDEEP GOYAL[2]

Keywords: Air bubble sign, High resolution computed tomography chest, Vacuolar sign

High Resolution Computed Tomography (HRCT) chest examination of patients with Coronavirus Disease 2019 (COVID- 19) pneumonia shows myriad of patterns and various signs. This radiology-based article focuses on one of the relatively less commonly encountered signs known as air bubble or vacuolar sign, presence of which signifies advanced-phase disease.

A 73-year-old man presented in emergency department with recent onset of high grade fever, cough, shortness of breath and myalgia. He had no other relevant medical history. On examination, pulse rate was 92/min, respiratory rate was 26/min and initial blood oxygen saturation was 87% on room air. He was evaluated with HRCT of chest [Table/Fig-1]. Chest CT scan showed peripheral patchy areas of ground glass attenuation with crazy paving, subpleural curvilinear bands and fibrotic stripes in both lower lobes. Two small rounded air containing structures were seen within the ground glass attenuation area in right lower lobe (arrows in [Table/Fig-1]). This rounded air containing space is called 'air bubble sign' or 'vacuolar sign'. These typical findings were suggestive of COVID-19 pneumonia which was confirmed later on by virological tests. Patient was admitted to the COVID-19 ward and with resolution of symptoms, he was discharged after 10 days.



[Table/Fig-1]: HRCT scan showing multiple patchy areas of ground glass haze, crazy paving pattern, fibrotic stripes and reticulations. Two small rounded air attenuation spaces within the area of ground glass haze (arrows) in right lower lobe known as air bubble or vacuolar sign were seen.

COVID-19 pandemic is a global health emergency. HRCT chest is increasingly being used as rapid and reliable tool to triage patients suspected of COVID-19 presenting in emergency department. Typical early phase HRCT findings include predominantly peripheral areas of ground glass haze with or without consolidation, crazy paving pattern and less reticulations. In advanced or later phase of disease reticular pattern, fibrotic stripes, subpleural curvilinear bands, pleural thickening and bronchial dilatation are common [1,2]. In addition to vascular dilation and pleural retraction signs, advanced phase disease is also characterised by increasing frequency of air bubble or vacuolar sign [1]. This sign refers to small rounded air attenuation or vacuole like transparent space of <5 mm within the region of ground glass attenuation or consolidation [1]. It may be caused by an incompletely filled alveolar cluster or focal resorption process in the exudative lung parenchyma, or pathological dilation of a physiological space, or cross section of the bronchiolectasis [2]. This suggests that in advanced stages of disease increasing involvement of lung parenchyma is accompanied by reparative changes. Shi H et al., in their study called this rounded air space as cystic change and Kong W and Agarwal P referred to it as cavity [3,4]. Zhou S et al., termed it as vacuolar sign [1]. However, Ye Z et al., argued that it is more appropriate to call these small bubble-like air-containing spaces as air bubble sign [2].

To conclude, CT findings for patients with COVID-19 pneumonia show diverse patterns and presence of certain findings like air bubble or vacuolar sign indicates relatively advanced phase of the disease.

REFERENCES

[1] Zhou S, Wang Y, Zhu T, Xia L. CT features of coronavirus disease 2019 (COVID-19) pneumonia in 62 patients in Wuhan, China. Am J Roentgenol. 2020;214:1287-94.

[2] Ye Z, Zhang Y, Wang Y, Huang Zi, Song B. Chest CT manifestations of new coronavirus disease 2019 (COVID-19): A pictorial review. Eur Radiol. 2020;30:4381-89.

[3] Shi H, Han X, Jiang N, Cao Y, Alwalid O, Gu J, et al. Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: A descriptive study. Lancet Infect Dis. 2020;20:425-34.

[4] Kong W, Agarwal P. Chest imaging appearance of COVID-19 infection. Radiology: Cardiothoracic Imaging. 2020;2(1):1-22. https://doi.org/10.1148/ryct.2020200028

PARTICULARS OF CONTRIBUTORS:
1. Consultant, Department of Radiodiagnosis, Amar Hospital, Patiala, Punjab, India.
2. Consultant, Department of Radiodiagnosis, Max Superspeciality Hospital, Saket, New Delhi, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Puneet Raj Goyal,
183-A Sewak Colony, Patiala, Punjab, India.
E-mail: docpuneetgoyal@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Aug 01, 2020
- Manual Googling: Sep 04, 2020
- iThenticate Software: Oct 21, 2020 (17%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Jul 30, 2020**
Date of Peer Review: **Aug 26, 2020**
Date of Acceptance: **Sep 14, 2020**
Date of Publishing: **Jan 01, 2021**