

C A S E R E P O R T

Chest computed tomography findings of eight patients with covid-19 diagnosis: case series

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Summary. COVID-19 is an infectious disease caused by the virus named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and declared a pandemic on March 11, 2020, by the world health organization. In Turkey, the first cases began to appear on March 11, 2020. After the cases in China, the appearance of ground glass with or without consolidation in the posterior and periphery of the bilateral lung is determined as the main finding of COVID-19. In this article, we wanted to share the tomography findings of eight patients who were diagnosed with COVID-19 in our emergency department and who had lung involvement. (www.actabiomedica.it)

Keywords: COVID-19, pneumonia, computed tomography

COVID-19 is an infectious disease caused by the virus named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and declared a pandemic on March 11, 2020, by the world health organization. In Turkey, the first cases began to appear on March 11, 2020. The number of patients diagnosed with COVID-19 in our country and all over the world is increasing day by day.

The clinical spectrum of COVID-19 infection is broad. The cases can be seen as asymptomatic, mild upper respiratory disease, mild pneumonia, severe pneumonia, and respiratory failure (1). SARS-CoV-2 infects respiratory epithelial cells as a result of the interaction of the S protein on its own with the cell angiotensin-converting enzyme 2 receptor (1).

In the diagnosis of COVID-19, real-time reverse transcription-polymerase chain reaction (RT-PCR) of viral nucleic acid is accepted as the reference standard test. However, recent studies have addressed the importance of chest computed tomography (CT) examination in COVID-19 patients with false-negative RT-PCR results (2). The sensitivity of computed tomography has been reported to be 98% (2).

In the patient data in China, where the disease was first seen, most patients had bilateral lung involvement. Lung lesions were widely distributed posteriorly, peripherally, and subpleurally. Bilateral widespread ground glass appearance with bilateral consolidation and without consolidation is considered the main finding of COVID-19 (2, 3, 4, 5).

In our country, COVID-19 cases were seen later than in other countries. In this article, we wanted to share the tomography findings of our first patients who were diagnosed with COVID-19 in our emergency department and who had lung involvement.

Case Reports

Case 1

A forty-one-year-old male patient was admitted to the emergency department with complaints of fever, cough, and shortness of breath for five days. The patient had no comorbidity and contact history. RT-PCR test was positive. The laboratory values of

the patient at the time of admission were as follows: White Blood Count (WBC) 10100 μ / L, Lymphocyte 1400 μ / L, C-reactive protein (CRP) 49.66 mg / L and lactate dehydrogenase (LDH) 176 IU / L. In the tomography of the patient; There were extensive areas of diffuse ground-glass opacities (GGO) accompanied by diffuse placement, with both lungs apparent in the subpleural areas (Fig 1). In the treatment, the patient was given hydroxychloroquine (2x400 mg / first day, 2x200 mg / 4 days), azithromycin (2x250 mg/ first day, 1x250 mg / 4 days), oseltamivir (2x75 mg / 5 days). The patient was admitted to the intensive care unit after the oxygen saturations decreased four days later and connected to the ventilator. In intensive care, the patient received treatment with Favipiravir (2x1200 mg / 5 days). The patient was treated in the hospital for 15 days, two days in the intensive care unit, and then discharged.

Case 2

A sixty-four-year-old male patient was admitted to the emergency department with complaints of fever and cough for one day. He had hypertension. The patient's wife was hospitalized with the diagnosis of COVID-19. In the laboratory values of the patient;

WBC was 8600 μ / L, Lymphocyte 1900 μ / L, CRP 65.28 mg / and LDH 416 IU / L. Lung tomography showed diffuse ground-glass densities with diffuse location, more prominent in both lung lower lobes and peripheral areas (Fig 2). In the treatment, the patient was given hydroxychloroquine (2x400 mg / first day, 2x200 mg / 4 days), azithromycin (2x250 mg / first day, 1x250 mg / 4 days), oseltamivir (2x75 mg / 5 days). No additional treatment was given. The patient was discharged seven days later.

Case 3

A fifty-six-year-old male patient had complaints of cough, headache, and myalgia for two days. The patient had no additional diseases. The patient returned from Germany a week ago. The patient had no fever. The patient's laboratory values were as follows: WBC 7900 μ / L, Lymphocyte 600 μ / L, CRP 196 mg / L and LDH 396 IU / L. Tomography showed bilateral peripheral ground-glass opacities and consolidations, more prominent in the upper-lower lobes (Fig 3). Hydroxychloroquine (2x400 mg / first day, 2x200 mg / 4 days), azithromycin (2x250 mg/ first day, 1x250 mg / 4 days), oseltamivir (2x75 mg / 5 days) were given in the treatment. The patient was discharged nine days later.

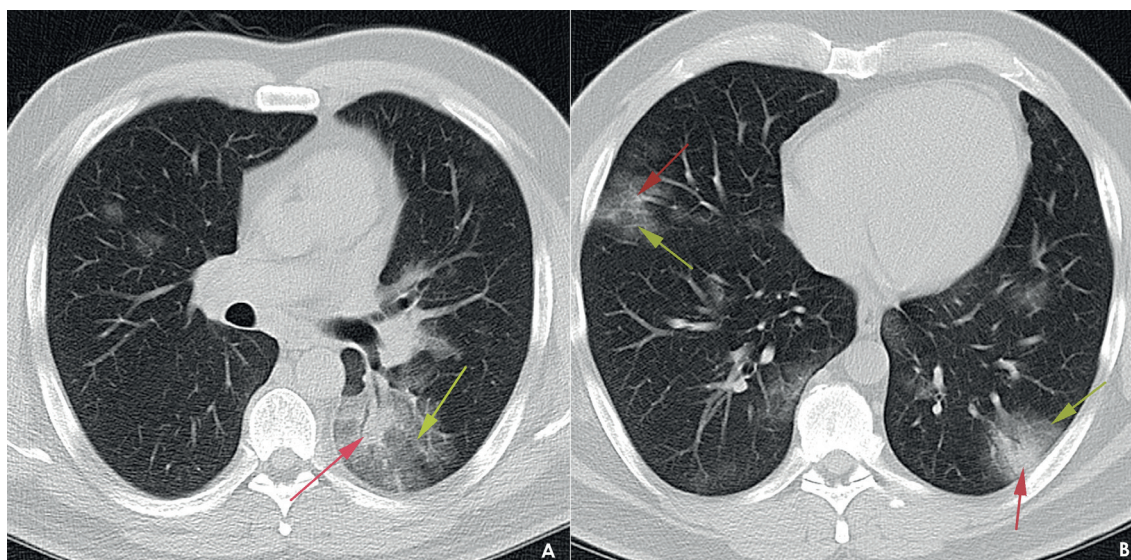


Figure 1. Images of the lungs in a 41-year-old man with a positive RT-PCR show multiple bilateral consolidations (red arrows) with surrounding GGO (yellow arrows).

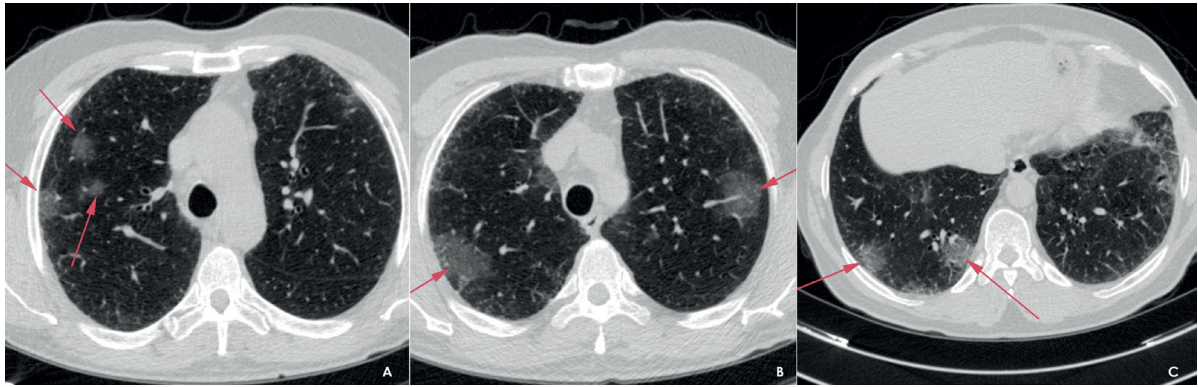


Figure 2. Typical CT imaging features for COVID-19. Unenhanced, thin-section axial (A- C) images of the lungs in a 64-year-old man with a positive RT-PCR show bilateral, multifocal rounded and peripheral GGO.

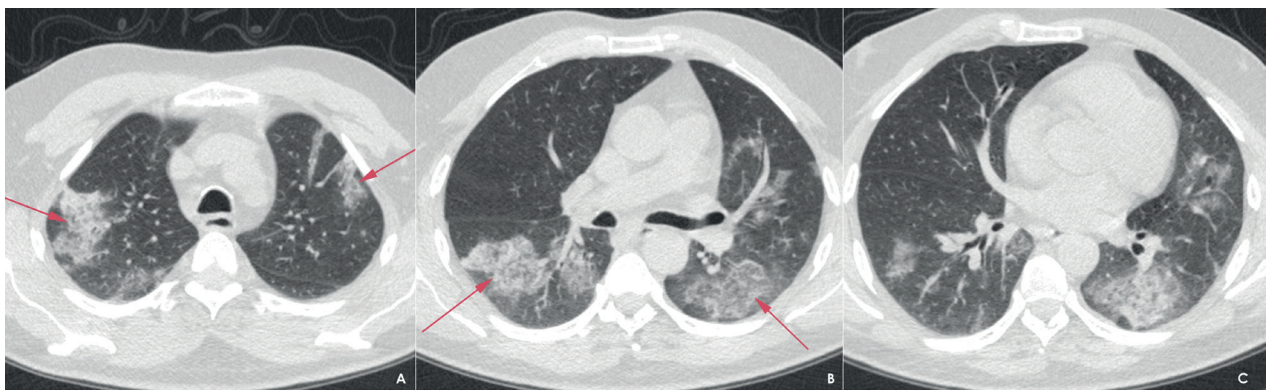


Figure 3. Typical CT imaging features for COVID-19. Unenhanced, thin-section axial images of the lungs in a 56-year-old man with a positive RT-PCR (A-C) show bilateral, multifocal and peripheral GGO (arrows) with superimposed interlobular septal thickening and visible intralobular lines (“crazy-paving”).

Case 4

Fifty-seven-year-old male patient admitted to the emergency department with the complaint of fever, cough, and shortness of breath for four days. The patient applied to another hospital six days ago, and the RT-PCR test was performed there. Hydroxychloroquine and oseltamivir were started because their tomography was compatible with SARS-CoV-2. When the patient was under follow-up at home, when the dyspnea progressed, he applied to our emergency room. He had no comorbidity. The patient’s RT-PCR test was positive. In tomography; In both lung parenchyma, there were areas and consolidations with more common ground-glass density in the upper lobes (Fig 4). The laboratory values of the patient were as

follows; WBC 25.000 μ / TL), Lymphocyte 800 μ / L, CRP 350.71 mg / L, LDH 409 IU / L and Ferritin 669 ng / mL. The patient was hospitalized in the intensive care unit. Favipiravir (2x1600 mg first day, 2x600 mg / 7 days), hydroxychloroquine (2x200 mg / 5 days) and Tocilizumab (1x400 mg / day, one time) were started in the patient, whose oxygen saturation was 92%. Seven days later, the patient was removed from the intensive care unit and transferred to the regular clinic. The patient was discharged on the 14th day of hospitalization.

Case 5

Sixty-four-year-old male patient admitted to the emergency department with the complaint of back

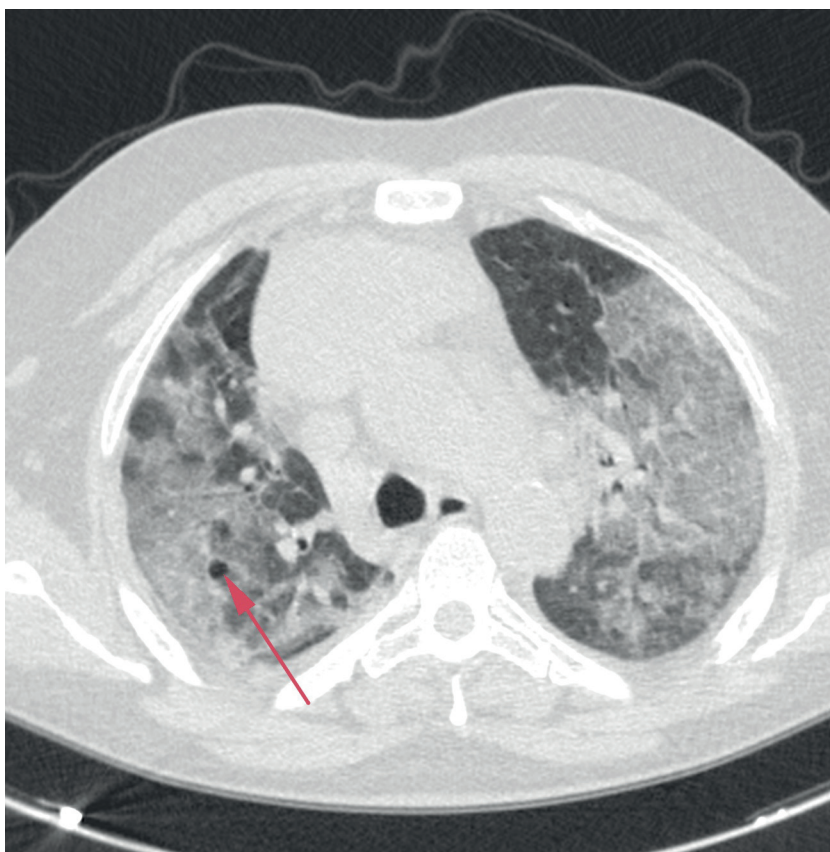


Figure 4. A 56-year-old male COVID-19 patient. CT scan shows a patchy GGO with an air bubble sign (red arrow) in the posterior segment of the upper right lobe.

pain for five days. The patient had no fever and cough complaints. A kidney was removed due to malignancy. He had contact with tourists from abroad. Tomography findings: The bilateral lower lobes have more prominent peripheral ground-glass opacities and consolidations (Fig 5). The laboratory values of the patient were as follows; WBC $4.500 \mu / \text{TL}$, Lymphocyte $700 \mu / \text{L}$, CRP $38.9 \text{ mg} / \text{L}$, and LDH $225 \text{ IU} / \text{L}$. The patient had a fever on the second day of hospitalization. The COVID-19 PCR test was positive. The patient was given hydroxychloroquine ($2 \times 400 \text{ mg} / \text{first day}, 2 \times 200 \text{ mg} / 4 \text{ days}$), azithromycin ($2 \times 250 \text{ mg} / \text{first day}, 1 \times 250 \text{ mg} / 4 \text{ days}$), oseltamivir ($2 \times 75 \text{ mg} / 5 \text{ days}$). On the seventh day of hospitalization, the patient was started on favipiravir ($2 \times 1600 \text{ mg} / \text{first day}, 2 \times 600 \text{ mg} / 4 \text{ days}$) and vitamin C ($1 \times 1 \text{ g}$). The patient was discharged from the hospital 14 days later.

Case 6

Sixty-five-year-old male patient admitted with the complaint of cough, shortness of breath, and weakness for six days. The patient came from Mecca a week ago. There is no history of chronic disease. The patient had no fever. The patient's WBC ($10.4 \times 10^3 \mu / \text{L}$), CRP ($261 \text{ mg} / \text{L}$) and LDH ($301 \text{ IU} / \text{L}$) levels were high. The lymphocyte value was $600 \mu / \text{L}$. In the patient's lung tomography; there were consolidations, and paving stone views bilaterally in the lower lobes with peripheral ground-glass opacities (Fig 6). RT-PCR test was positive. Hydroxychloroquine ($2 \times 400 \text{ mg} / \text{first day dose}, 2 \times 200 \text{ mg} / 4 \text{ days}$), azithromycin ($2 \times 250 \text{ mg} / \text{first day}, 1 \times 250 \text{ mg} / 4 \text{ days}$), oseltamivir ($2 \times 75 \text{ mg} / 5 \text{ days}$) were given in the treatment. On the third day of his admission, Tocilizumab ($1 \times 400 \text{ mg} /$

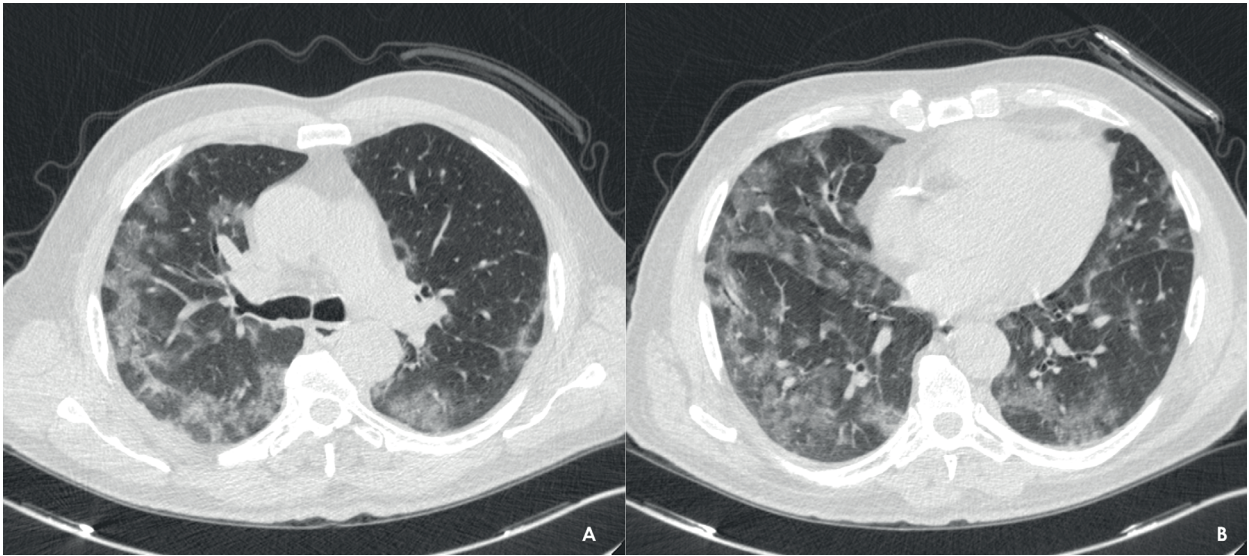


Figure 5. Unenhanced axial images showing patchy GGO with nonrounded morphology and no specific distribution, in a case of COVID-19 pneumonia (A, B)

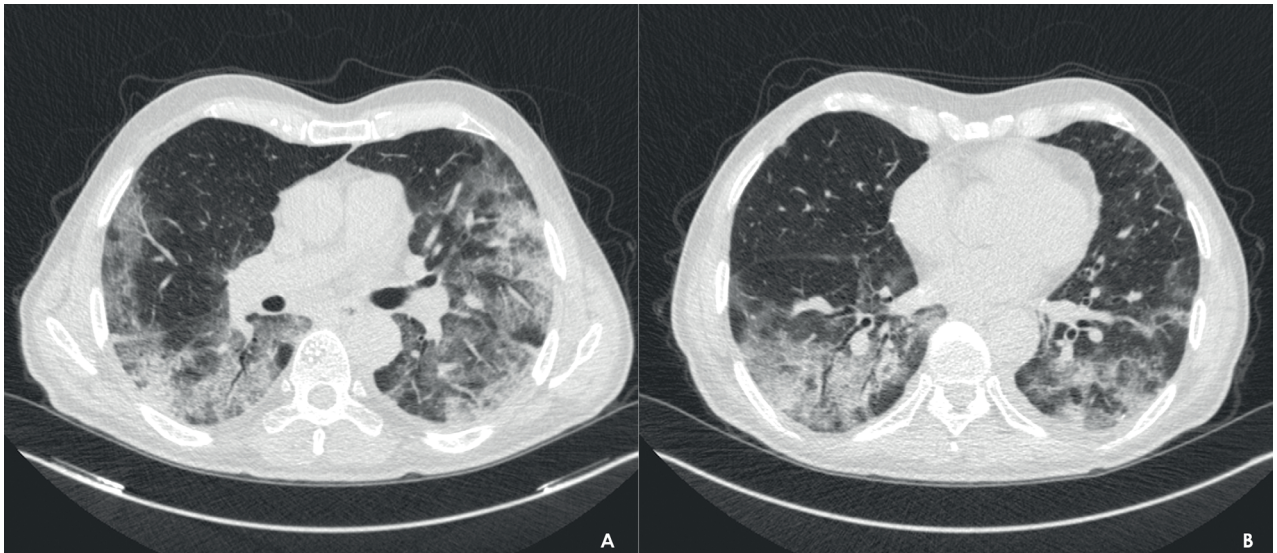


Figure 6. Unenhanced, thin-section axial (A- B) images of the lungs in a 65-year-old man with a positive RT-PCR show bilateral, posterior, peripheral GGO and consolidation. Air bronchograms are noticeable in the left lung.

day, one time) was given when ferritin level increased (1745 ng / mL), and Favipiravir (2x1600 mg / first day, 2x600 mg / 4 days) was given when hypoxia developed. On the fourth day of hospitalization, D-dimer level (58.28 mg / L) increased, and Enoxaparin was given to the patient. The patient was discharged 11 days later.

Case 7

A forty-six-year-old male patient admitted to the emergency room with a complaint of cough and fever for three days. The patient has uncontrolled diabetes mellitus. RT-PCR test was positive. He works

as a security guard in the hospital. Laboratory values of the patient at admission were as follows: WBC $9.400 \mu / L$, Lymphocyte $1700 \mu / L$, CRP $135.97 \text{ mg} / L$, LDH $302 \text{ IU} / L$. In the CT; in both lung parenchyma, there are patchy areas, and peripheral ground-glass opacities in the upper and lower lobes (Fig 7). The patient was started on hydroxychloroquine ($2 \times 400 \text{ mg} / \text{first day}$, $2 \times 200 \text{ mg} / 4 \text{ days}$), azithromycin ($2 \times 250 \text{ mg} / \text{first day}$, $1 \times 250 \text{ mg} / 4 \text{ days}$), oseltamivir ($2 \times 75 \text{ mg} / 5 \text{ days}$). On the fifth day of hospitalization, Favipiravir was started when hypoxia appeared, and on the sixth day, Tocilizumab was started when Ferritin level increased to $2205 \text{ ng} / \text{mL}$. The patient was discharged after 17 days when the RT-PCR test became negative.

Case 8

Fifty-year-old male patient admitted to the emergency department with the complaint of cough and shortness of breath for five days. The patient had no fever, comorbidity, and a history of contact. Laboratory values of the patient at admission were as follows:

WBC $5800 \mu / L$, Lymphocyte $1500 \mu / L$, CRP $5.84 \text{ mg} / L$, LDH $306 \text{ IU} / L$. CT scan showed bilateral peripheral ground-glass opacities, paving stone views, areas with reverse halo sign appearance, and consolidations especially in lower lobes (Fig 8). In the treatment, hydroxychloroquine ($2 \times 400 \text{ mg} / \text{first day}$, $2 \times 200 \text{ mg} / 4 \text{ days}$), azithromycin ($2 \times 250 \text{ mg} / \text{first day}$, $1 \times 250 \text{ mg} / 4 \text{ days}$), oseltamivir ($2 \times 75 \text{ mg} / 5 \text{ days}$) were given. RT-PCR test was positive. The patient was discharged five days later.

Discussion

In the patient data in China, where the disease was first seen, most patients had bilateral lung involvement. Zhou et al. reported that 191 patients had consolidation in 59%, ground-glass opacity in 71%, and bilateral infiltration in 75% (1).

Heshoui et al. reported that the dominant lesion was ground-glass opacity with indeterminate margins, air bronchograms, smooth or irregular interlobular or septal thickening, and thickening of the adjacent pleura (3).

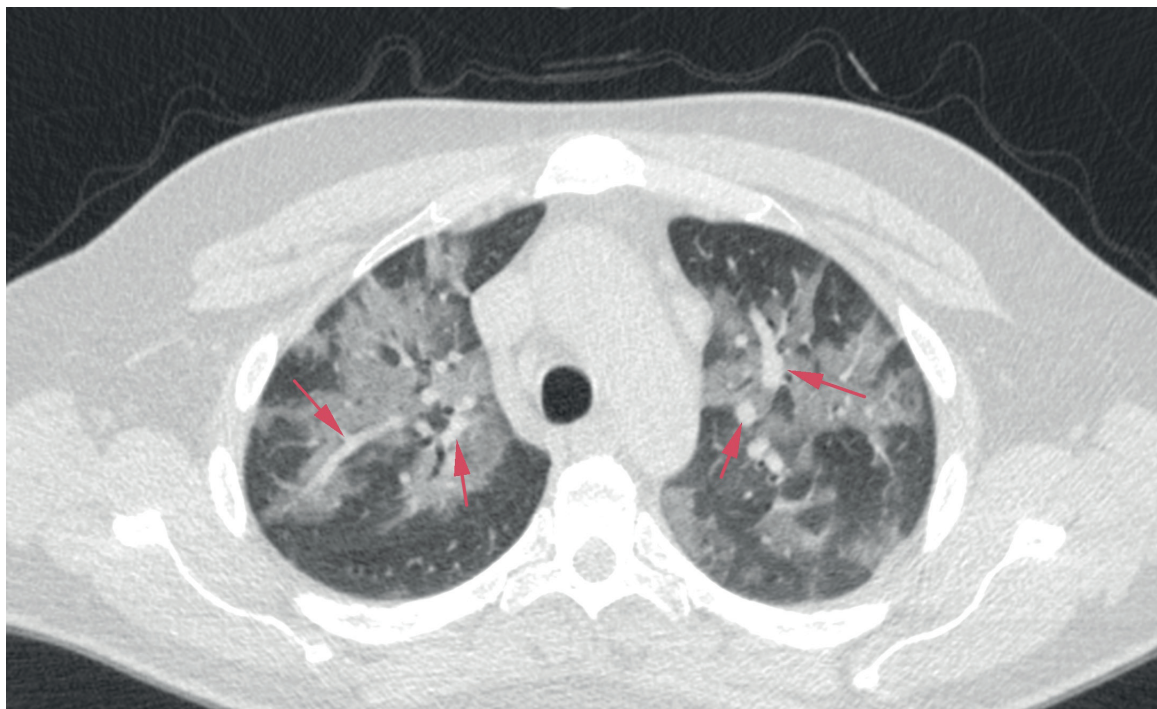


Figure 7. CT scan shows large areas of GGO in the right and left upper lobe with multiple small vascular enlargement (red arrows).

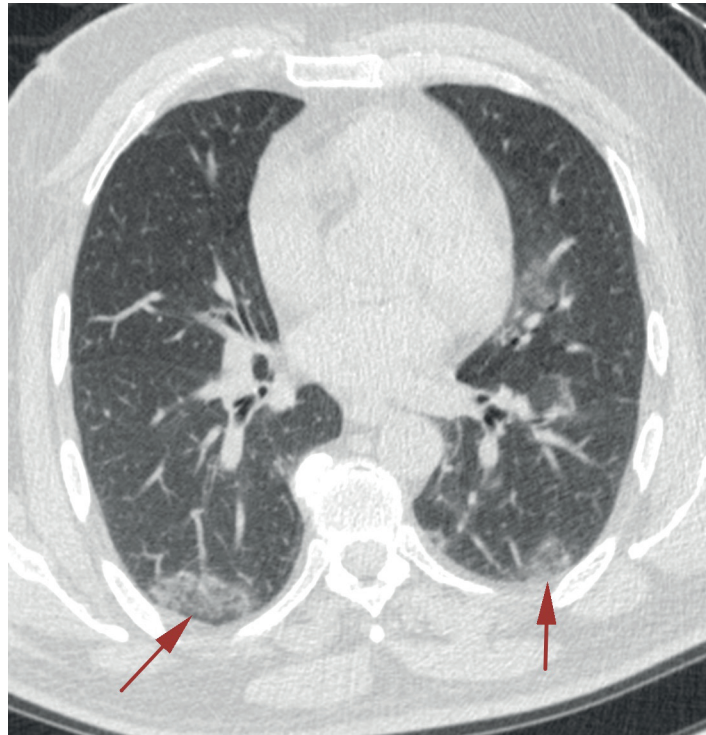


Figure 8. Image of the lungs in a 50-year-old man with a positive RT-PCR show bilateral a reversed halo sign (red arrows) in the superior segment of the right and left lower lobe.

In a study conducted in Korea, COVID-19 pneumonia generally manifested as pure ground-glass opacity to mixed ground-glass opacity and consolidative lesions in the bilateral peripheral posterior lungs (4). The shape of the injuries is typically ill-defined and patched or nodular. Irregular-confluent lesions are primarily distributed throughout the pleura, while nodular lesions are mostly distributed along with the bronchovascular bundles (4).

The study of Xu et al. showed bilateral, multifocal ground-glass opacities, with peripheral distribution in patients with SARS-CoV-2 pneumonia. More than half of the patients had multilobar involvement, and lesions were more common in the lower lobes (6).

Bilateral diffuse multifocal ground-glass opacities and consolidations were observed as typical tomography findings in our cases. Reticular pattern, air bronchogram, vascular enlargement, pleural thickening, crazy paving pattern, air bubble sign, halo sign were the other tomographic findings that we detected in our cases. Our findings are consistent with previous

studies and may be helpful in the early detection of SARS-CoV-2 pneumonia.

Conclusion

As a result, the appearance of ground glass with or without consolidation in the posterior and periphery of the bilateral lung is likely the main finding of COVID-19. RT-PCR results may delay and could be false negative so CT seems to be helpful in the early diagnosis.

Conflict of Interest

Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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