

# Gastrointestinal symptoms as an indicator of progression of pulmonary involvement in patients with COVID-19

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European Journal of Medical Case Reports

Volume 5(2):51–54

<https://doi.org/10.24911/ejmcr/173-1598358984>



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## ABSTRACT

**Background:** While the patients with coronavirus disease 2019 typically present with respiratory illness, some patients also report gastrointestinal symptoms such as diarrhea, vomiting, and abdominal pain. In this case study, four different cases with the progression of pulmonary computed tomography (CT) findings following the onset of gastrointestinal symptoms are presented.

**Case presentation:** *Case 1*, A 37-year-old male patient presented with fever, cough, fatigue, muscle and joint pain. On the fifth day of treatment, gastrointestinal symptoms including anorexia, nausea and vomiting were observed. A follow-up chest CT revealed progression in pulmonary involvement. *Case 2*, A 46-year-old male patient presented with fever, shortness of breath, muscle and joint pain. On the fourth day of treatment, gastrointestinal symptoms including anorexia, nausea and vomiting were observed. A follow-up chest CT revealed progression of pulmonary findings in both lungs. *Case 3*, A 50-year-old male presented with no symptoms other than dry cough. On the fourth day of treatment, gastrointestinal symptoms including anorexia, nausea and vomiting were observed. A follow-up chest CT revealed bilateral peripherally ground-glass and consolidation areas. *Case 4*, A 34-year-old female patient presented with fever, cough, fatigue, muscle and joint pain. On the third day of the treatment, gastrointestinal symptoms including anorexia, nausea, vomiting and diarrhea were observed. A follow-up chest CT revealed bilateral progression of pulmonary findings.

**Conclusion:** Many studies reported that patients with gastrointestinal symptoms have a more serious clinical course than patients without these symptoms. No study has yet been presented to the literature in which this clinical situation is supported by radiological findings.

**Keywords:** COVID-19, pulmonary, chest, computed tomography, ground glass.

Received: 02 September 2020

Accepted: 02 January 2021

Type of Article: CASE REPORT

Specialty: Immunology

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## Background

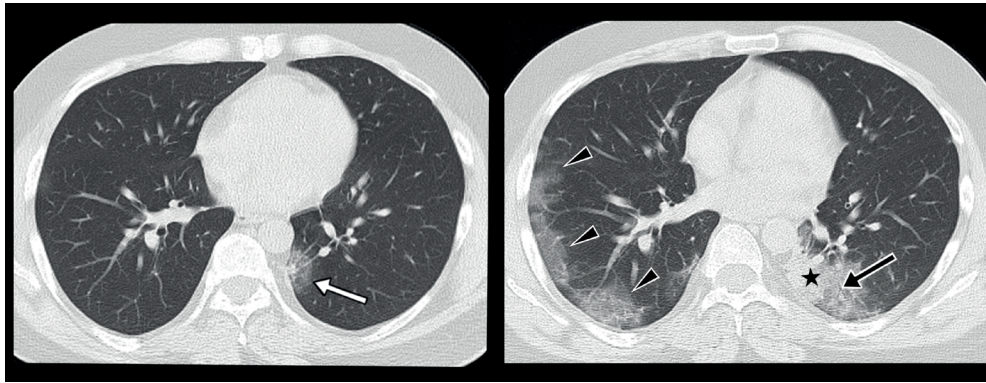
The World Health Organization (WHO) declared the outbreak of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) COVID-19 an international public health emergency and a pandemic on 11 March 2020 [1]. Typical presentations of the disease including fever, cough, myalgia, fatigue and pneumonia are well known [2]. The lungs are the main sites of infection and most patients with COVID-19 present with respiratory symptoms and signs [1]. However, gastrointestinal symptoms such as diarrhea, vomiting and abdominal pain are also encountered in some patients. SARS-CoV-2 interacts with the host angiotensin-converting enzyme 2 (ACE2) receptor. Besides the respiratory system, ACE2 receptors are also expressed in gastrointestinal epithelial cells, suggesting that SARS-CoV-2 can actively infect the gastrointestinal tract and replicate there [3].

In this case study, four different cases with the progression of pulmonary computed tomography (CT) findings following the onset of gastrointestinal symptoms are presented.

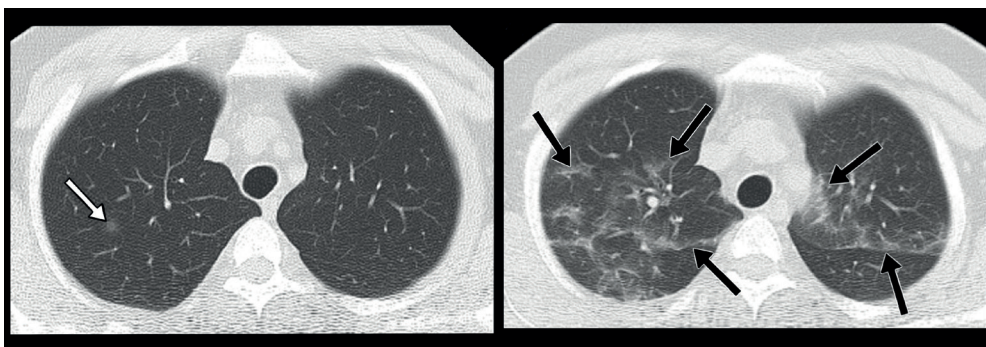
## Case Presentation

### Case 1

A 37-year-old male patient presented with fever, cough, fatigue, muscle and joint pain. CT showed a small nodule with peripheral ground-glass area in the left lung (Figure 1). The real-time polymerase chain reaction (RT-PCR) test was positive for SARS-CoV-2. The patient was treated with oseltamivir, hydroxychloroquine and levofloxacin. On the fifth day of treatment, gastrointestinal symptoms including anorexia, nausea and vomiting were observed. Blood tests revealed an increase in C-reactive protein (CRP), D-dimer level, total white blood cell count and neutrophil count and a decrease in lymphocyte count. A follow-up chest CT revealed progression in pulmonary involvement (Figure 1). Favipiravir was added to the treatment. The symptoms and signs gradually improved and the patient was eventually discharged.



**Figure 1.** A 37-year-old male patient: Initial chest CT demonstrates a small nodule with a peripheral ground-glass density area in the left lung (white arrow); halo sign. Follow-up chest CT demonstrates the progression of the findings including peripheral ground-glass areas in the right lung (arrowheads), consolidation (asterisk) and air bronchogram (black arrow) in the left lung.



**Figure 2.** A 46-year-old male patient. Initial chest CT demonstrates a nodule of ground-glass density in the right lung (white arrow). Follow-up chest CT demonstrates bilateral wide-spread ground-glass densities (black arrows).

### Case 2

A 46-year-old male patient presented with fever, shortness of breath, muscle and joint pain. CT showed a nodule of ground-glass density in the right lung (Figure 2). RT-PCR test was positive for SARS-CoV-2. Treatment with hydroxychloroquine and favipiravir was started. On the fourth day of treatment, gastrointestinal symptoms including anorexia, nausea and vomiting were observed. The blood test revealed an increase in CRP and D-dimer levels. The patient had tachypnea, dyspnea and a decrease in blood oxygen saturation. A follow-up chest CT revealed progression of pulmonary findings in both lungs (Figure 2). The symptoms and signs gradually improved and the patient was eventually discharged.

### Case 3

A 50-year-old male presented with no symptoms other than dry cough. RT-PCR test was positive for SARS-CoV-2. The initial chest CT revealed no pathologies (Figure 3). Treatment with hydroxychloroquine, oseltamivir and levofloxacin was started. On the fourth day of treatment, gastrointestinal symptoms including anorexia, nausea and vomiting were observed. Routine blood tests revealed increased CRP and D-dimer levels. A follow-up

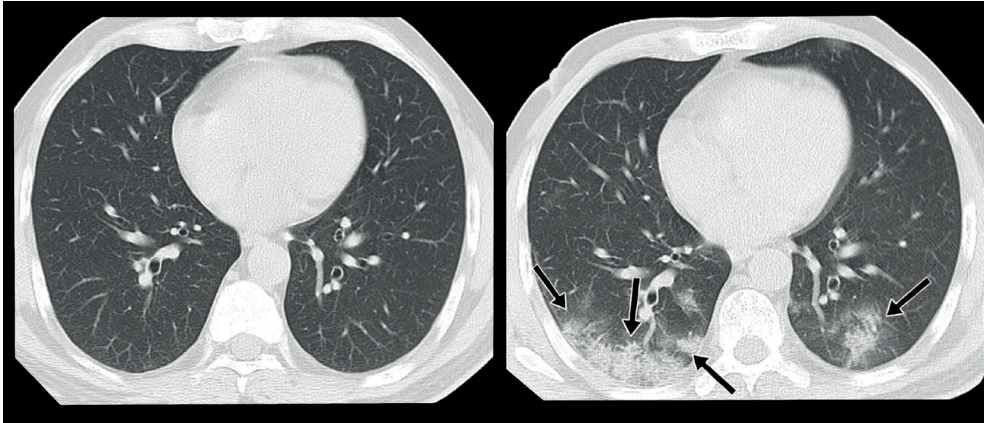
chest CT revealed bilateral peripheral ground-glass opacity and consolidation (Figure 3). Favipiravir was added to the treatment. The symptoms and signs gradually improved and the patient was eventually discharged.

### Case 4

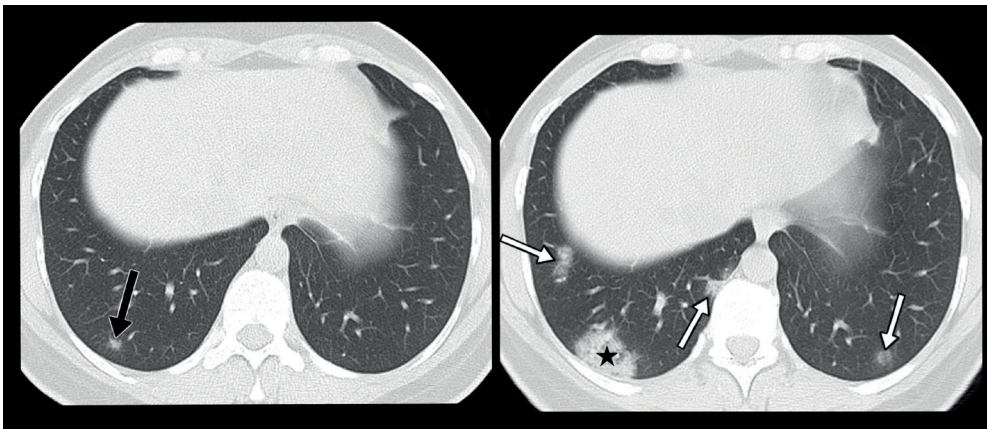
A 34-year-old female patient presented with fever, cough, fatigue, muscle and joint pain. RT-PCR test was positive for SARS-CoV-2. Initial chest CT showed a ground-glass density nodule in the right lung (Figure 4). Treatment with hydroxychloroquine, oseltamivir and levofloxacin was started. On the third day of the treatment, gastrointestinal symptoms including anorexia, nausea, vomiting and diarrhea were observed. A follow-up chest CT revealed bilateral progression of pulmonary findings (Figure 4). Favipiravir was added to the treatment. The symptoms and signs gradually improved and the patient was eventually discharged.

### Discussion

In some COVID-19 patients, it has been reported that gastrointestinal symptoms such as diarrhea, vomiting and abdominal pain can be observed during the course of the disease, typically following respiratory symptoms [3]. On the other hand, in some other patients, gastrointestinal



**Figure 3.** A 50-year-old male patient. Initial chest CT shows no disease findings. Follow-up chest CT demonstrates bilateral peripheral ground-glass densities and consolidations (black arrows).



**Figure 4.** A 34-year-old female patient. Initial chest CT demonstrates a small nodule of ground-glass density (black arrow) in the right lung. Follow-up chest CT demonstrates bilateral areas of ground-glass density (white arrows) and an area of pulmonary consolidation (asterisk) in the right lung.

symptoms may start 1 to 2 days earlier than symptoms such as fever and shortness of breath [2].

In a study conducted on 204 COVID-19 patients, gastrointestinal findings were identified and it was emphasized that patients with gastrointestinal symptoms had a worse prognosis [4]. In a different study, the frequency of serious and critical disease in patients with gastrointestinal symptoms was higher than those without these symptoms. Fatigue, headache, shortness of breath, acute respiratory distress syndrome, liver damage, and shock were more frequently encountered in patients with gastrointestinal findings [5]. Similarly, in a different study in which collected analyses of many different studies were conducted, a more serious disease spectrum was observed in patients with abdominal pain, nausea and vomiting [6].

In our case study, we observed a progression in the pulmonary CT findings after the onset of the gastrointestinal symptoms. The emergence of gastrointestinal symptoms may be related to the degree of viral replication in the gut in the course of the disease, and it can be assumed to be associated with increased disease severity due to high viral load and viremia. Digestive system symptoms may be underestimated in clinical practice by clinicians and this may affect

diagnostic accuracy. Therefore, keeping in mind gastrointestinal symptoms is extremely important both in the diagnosis of the disease, in determining the treatment modalities, and in controlling the viral spread and pandemic.

To the best of authors' knowledge, a correlation between a progression of pulmonary CT findings and the onset of gastrointestinal symptoms is not documented in the literature. We believe that in patients with new-onset of gastrointestinal symptoms, a follow-up CT scan is needed because of the possible progression of pulmonary involvement of the disease. In these patients, treatment can be modified accordingly. Gastrointestinal findings can be used as clinical predictors of the disease and included in future risk classification algorithms. Detection of some gastrointestinal findings in COVID-19 can be valuable in predicting the course of the disease.

#### What is new?

Many studies reported that patients with gastrointestinal symptoms have a more serious clinical course than patients without these symptoms. No study has yet been presented to the literature in which this clinical situation is supported by radiological findings.

**Funding**

None.

**Conflict of interests**

The authors declare that there is no conflict of interest regarding the publication of this Case Report.

**Consent for publication**

Written informed consent was taken from the patients.

**Ethical approval**

Ethical approval is not required at our institution for publishing an anonymous case report.

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