



## Case Report

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# Mesenteric Ischemia in a Case of COVID-19



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## ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is now a global threat. Various papers have addressed the pulmonary symptoms of this viral disease. Also, thrombotic complications have been highly prevalent among COVID-19 patients. Reports on rare presentations of COVID-19 can help fast diagnosis and management. In this study, a COVID-19 patient is presented who developed mesenteric ischemia.

## Introduction

The coronavirus disease 2019 (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is now a global threat. Various papers have addressed the pulmonary symptoms of this viral disease, which help better identify the pathogenesis of this virus [1, 2]. It seems that the Angiotensin-Converting Enzyme 2 (ACE2) receptor is involved in the entrance of the virus into the cell. Re-

garding the presence of ACE2 receptors on the alveolar epithelial cells, enterocytes of the small intestine, and vascular endothelium, these cells and organs are prone to this virus [3, 4].

Abdominal imaging in COVID-19 hospitalized patients mainly showed cholestasis and intestine wall abnormalities. Patients who underwent laparotomy often had ischemia, which can be due to thrombosis in small vessels [5]. Moreover, thrombotic complications, such as pulmonary embolism, deep vein thrombosis, ischemic stroke, cardiac infarction, and arterial embolisms

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Table 1. Lab Data

<b>WBC (white blood cell)</b>	<b>13900</b>	<b>/<math>\mu</math>L</b>
RBC (red blood cell)	4.79	/ $\mu$ L
Hb (hemoglobin)	13	mg/dl
HCT (hematocrit)	40	%
MCV (mean corpuscular volume)	83.51	fl
MCH (mean corpuscular hemoglobin)	27.14	Pg
MCHC (mean corpuscular hemoglobin concentration)	32.5	%
PLT (platelet)	477000	/ $\mu$ L
Neut (neutrophils)	93	%
Lymph (lymphocytes)	3	%
ESR (erythrocyte sedimentation rate)	91	mm/hr
CRP (C-reactive protein)	1+	titer



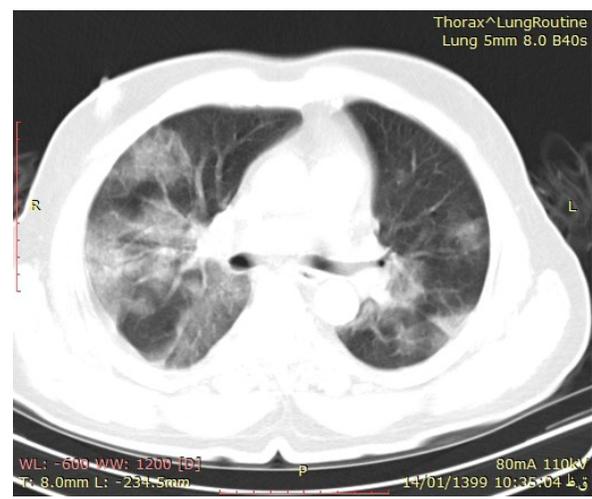
have been highly prevalent among COVID-19 patients [6]. Despite the extensive attention to the abdominal symptoms of this disease [5], reports on rare abdominal symptoms of COVID-19 can help fast diagnosis and management of these patients. In this study, a COVID-19 patient is presented who had mesenteric ischemia.

### Case Presentation

The presented patient is a 54-year-old man referring to the hospital complaining of shortness of breath, cough,

and history of fever, and chills which had got worsen during the past 10 days. Initial examinations showed the O<sub>2</sub> saturation of 84%, lymphopenia, and increased Erythrocyte Sedimentation Rate (ESR) and C-reactive Protein (CRP) (Table 1). He was suspected to have COVID-19; hence, chest CT (Figure 1) and Polymerase Chain Reaction (PCR) were performed and confirmed the diagnosis of COVID-19.

Regarding his proper condition, he was treated with hydroxychloroquine. After improvement of the symptoms, he was discharged from the hospital with the re-



**Figure 1.** Axial non-contrast chest CT scan with lung window

Demonstrates bilateral, multifocal, and predominantly peripheral ground-glass opacity with interlobular septal thickening (crazy paving), which involved more than 75% of lung parenchyma. Also, vascular dilatation is noted. These findings are typical for COVID-19 infection (Computerized Oncology Radiation and Data System [CORADS 5]).





**Figure 2.** Topogram (A) and Axial (B and C) contrast-enhanced abdominopelvic CT scan



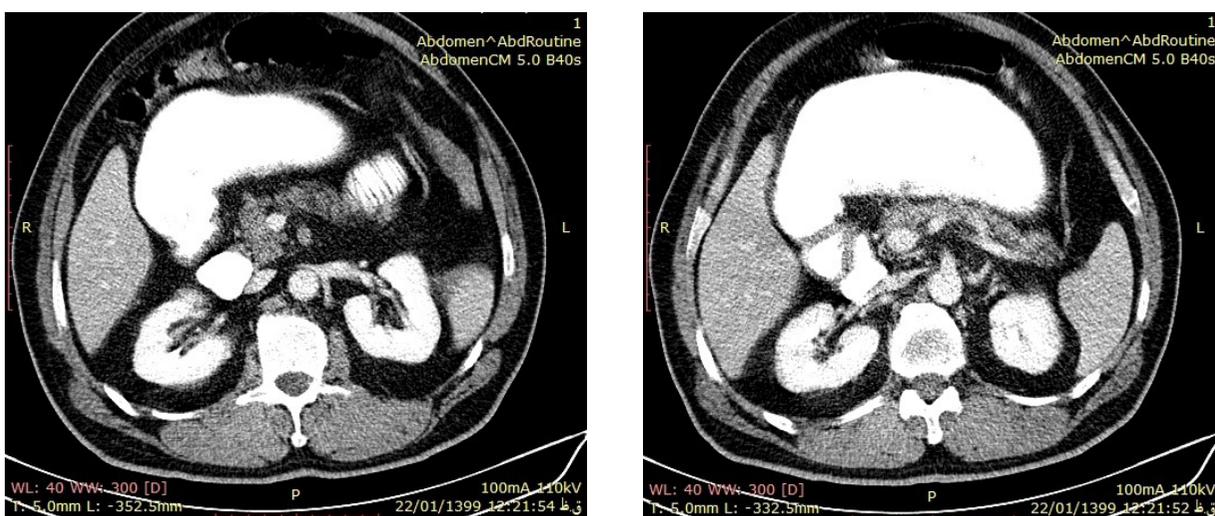
They show dilated hypotonic proximal small bowel loops compatible with low-grade partial obstruction; affected loops display diminished contrast enhancement. No apparent cause of obstruction is identified.

quired recommendations. Two days later, he was again referred to the hospital with periumbilical abdominal pain, nausea and vomiting, and constipation. Physical examinations indicated periumbilical tenderness and abdominal distension. During the rectal examination, fecal materials were touched, regarding the abdominal pain and suspicion of the obstruction, the patient underwent an abdominopelvic CT scan with and without contrast agent (Figures 2 and 3). CT scan results indicated partial low-grade obstruction along with Superior Mesenteric Artery (SMA) thrombosis. Upon mesenteric ischemia diagnosis, the patient underwent small intestine laparotomy and resection along with end-to-end anastomosis of the small intestine (intestinal ischemia and intestinal gangrene, about 270-cm resection, started from 120-cm distance from the Treitz ligament and ending at a 35-cm distance from the ileocecal

valve). The patient was also investigated by second-look, which showed no significant point.

### Discussion

Abdominal symptoms and digestive complications as well as increased liver enzymes have been frequently reported among COVID-19 patients [7]. However, the imaging symptoms of these patients have been less addressed. Abdominal imaging has been conducted in most the hospitalized cases. Right Upper Quadrant (RUQ) ultrasonography often have shown cholestasis, which is probably in severe cases. CT findings also have presented intestinal pneumatosis and gas in the intestine, which can be the symptoms of ischemia. Similar to our presented case, laparotomy and pathology also



**Figure 3.** Axial contrast-enhanced abdominopelvic CT scan



(A) at Superior Mesenteric Artery (SMA), and (B) after separation of its first branch

It illustrates that the origin of SMA appear normal and after separation of inferior pancreaticoduodenal artery SMA lacks contrast enhancement. The distal thrombosed segment of SMA is dilated and is as large as the adjacent Superior Mesenteric Vein (SMV).

confirmed ischemia, which can be in the case of small vessel thrombosis [5].

Activation of coagulation pathways in the immune response will result in the over-production of inflammatory cytokines and multi-organ damages [8]. The disturbed coagulant-anticoagulant balance will also increase by micro thrombosis. In some studies, prophylactic heparin was recommended for hospitalized COVID-19 patients to prevent thromboembolism [8-10].

Further studies are required to elucidate the effective factors in the emergence of abdominal symptoms, especially intestine ischemia and coagulopathy in COVID-19 patients. By evaluating the coagulation tests during the hospitalization, before discharging, the ischemic and thrombotic complications can be prevented, which need deeper investigations.

## Ethical Considerations

### Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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### Conflict of interest

The authors declared no conflict of interest.

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