

Clinical Case: Intestinal Perforation in Patient with SARS-COV-2 Infection

Méndez-de Jesus Ignacio Alberto¹, Trejo-Rosas Saúl², Sanabria-Cordero David¹,
Damián-Flores Sonia¹, Garcia-Roman Maria Teresa Arizbeth¹, Quiroz-Camacho Dulce Mariana³

¹Department of Intensive Care of Infectology Hospital, National Autonomous University of Mexico, Mexican Institute of Social Security National Medical Center La Raza, Mexico City, Mexico

²Department of Pathology of the Specialty Hospital, National Autonomous University of Mexico, Mexican Institute of Social Security National Medical Center La Raza, Mexico City, Mexico

Email address:

ignacio.mendez.300@hotmail.com (Méndez-de Jesus Ignacio Alberto)

To cite this article:

Méndez-de Jesus Ignacio Alberto, Trejo-Rosas Saúl, Sanabria-Cordero David, Damián Flores Sonia, Garcia-Roman Maria Teresa Arizbeth, Quiroz-Camacho Dulce Mariana. Clinical Case: Intestinal perforation in patient with SARS-COV-2 infection. *American Journal of Internal Medicine*. Vol. 11, No. 1, 2023, pp. 1-4. doi: 10.11648/j.ajim.20231101.11

Received: March 29, 2022; **Accepted:** April 14, 2022; **Published:** January 9, 2023

Abstract: As the SARS-COV-2 virus pandemic spreads around the world, new clinical manifestations are being reported. In addition to respiratory manifestations, acute kidney injury, hypercoagulability, pulmonary thromboembolism, and gastrointestinal symptoms have been reported. The Infectology Hospital of the La Raza National Medical Center, in the Intensive Care Unit, has treated 148 patients from November 2020 to November 2021 for severe to critical COVID-19. We present the case of a patient with SARS-COV-2, with intestinal perforation due to vascular congestion at the level of the cecum in a critical COVID-19 patient.

Keywords: COVID-19, SARS-COV-2, ACE2

1. Introduction

In December 2019, a viral pneumonia emerged in the city of Wuhan, located in the Chinese province of Hubei. [1] The causative agent of this disease was later identified as a new coronavirus that has 80% similarity to the respiratory syndrome coronavirus. SARS-COV) detected in 2013. [2] The pathogen of this disease was confirmed by molecular biology methods as a new coronavirus, on January 7, 2020. [3] This respiratory disease spread rapidly to other parts of China, crossing international borders to be spread in different parts of the world for a short period. The disease was later named COVID-19 and the virus that caused it was named SARS-COV-2. On March 11, 2020, the WHO declared the pandemic and COVID-19 emerged as a global health emergency. [4]

Among the most frequent manifestations, respiratory symptoms and fever are reported in most patients who debut with COVID-19. However, there are studies that have shown that extrapulmonary manifestations such as gastrointestinal,

neurological, cardiac and renal are not uncommon. Gastrointestinal symptoms can develop from SARS-COV-2 infection in up to 50% of cases, sometimes even before respiratory symptoms. [5] The virus has been isolated from stool samples and the confirmed mechanism of entry in gastrointestinal cells it is the angiotensin-converting enzyme 2 (ACE-2) receptor. [6] Xiao et al reported abundant expression of the ACE-2 receptor in glandular cells of gastric, duodenal and rectal epithelium by immunofluorescence. [7]

SARS-COV-2 infection causes coagulopathy and hypercoagulability has been shown in critical patients, thrombosis secondary to a state of hypercoagulation can lead to both pulmonary embolism and intestinal ischemia. [8] We report the clinical case of a 57-year-old male patient age who presented intestinal perforation at the cecum level which evolved to septic shock secondary to SARS-COV-2 infection.

2. Case

On September 18, 2021, a 57-year-old male patient was admitted with fever, cough, headache, myalgias and arthralgias of 10 days of evolution, upon admission dyspnea accompanied by a decrease in saturation by pulse oximetry up to 65% in room air, after administration of supplemental oxygen with a 10-liter reservoir mask, saturation improves to 93%. His clinical history denies chronic degenerative diseases, surgeries and drug allergies. Real-time PCR (Polymerase Chain Reaction) of a nasopharyngeal swab was positive for SARS-COV-2, and a chest X-ray showed multiple bilateral ground-glass opacities (Figure 1). On October 1, he presented generalized abdominal pain, predominantly in a colicky setting, accompanied by diarrheal stools, so a simple X-ray of the abdomen was performed while standing (Figure 1). Clostridium difficile infection was ruled out. For acute abdomen data, a simple and contrasted abdominal tomography was performed, reporting a collection adjacent to the cecum and ascending colon, a volume of 288 ml, free fluid in the peritoneal cavity and bilateral pleural effusion with passive atelectasis (Figure 2). Due to the above, he entered the operating room on October 4, finding a plastron in the ascending colon, with two perforations of approximately 1 cm in the cecum, a right hemicolectomy and a Brooke-type ileostomy were performed. At the end of the surgical act, the patient required mechanical ventilation and norepinephrine-type vasopressors at a dose of 0.2 mcg/kg/minute, so he was admitted to the intensive care unit (ICU). During his stay in the ICU, the treatment administered was Piperacillin-Tazobactam, dexamethasone, low molecular weight heparin and sedation with midazolam. Upon admission, the following laboratories are reported: Leukocytes 9.1 103/ μ l, Neutrophils 6,700 103/ μ l, Lymphocytes 1,180 103/ μ l, Hemoglobin 13.8 g/dL, Hematocrit 45.8%, platelets 248 103/ μ l, Creatinine 0.61 mg/dL, Urea 26 mg/dL, Ferritin 1,675 ng/mL, Procalcitonin 2.41 ng/mL, D-dimer 2,196 ng/mL.

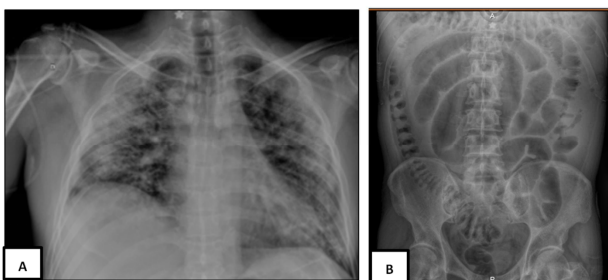


Figure 1. A) Anteroposterior chest X-ray/plain abdominal X-ray in standing position.

- A) Anteroposterior chest X-ray: Shows multiple bilateral ground glass opacities.
 B) Plain abdominal X-ray in standing position: Shows dilation of the large and small intestine.

His clinical picture progressively improved, progressing to withdrawal from mechanical ventilation on October 6 and discharge to the infectious disease department on October 8

to continue his treatment.

The surgical sample is sent to pathology, reporting a segment of the intestine composed of the ileum, cecum, ascending colon and cecal appendix, acute fibrinopurulent peritonitis with mixed panniculitis and vascular congestion with polymorphous inflammatory infiltrate, ileitis and colitis with follicular hyperplasia of the lymphoid tissue, appendix with congestion vascular serosa, negative for neoplastic process or diverticular disease.

Immunohistochemical markers: Reactive pattern of CD3, CD 4, CD 8, CD 79, CD 138. (Figure 3).

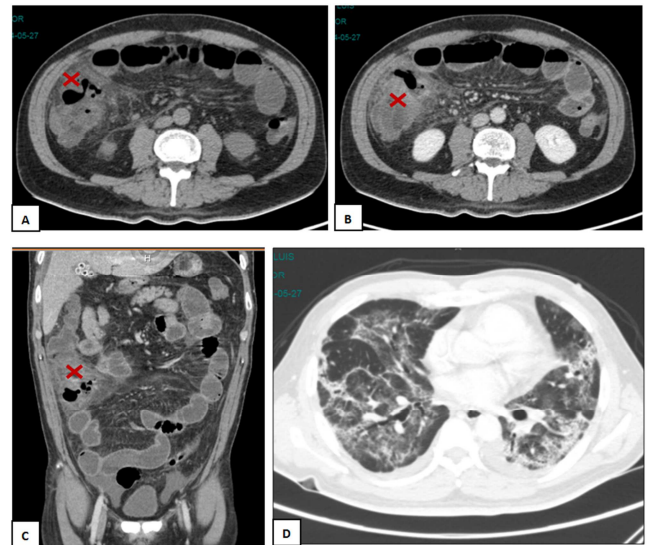


Figure 2. Simple and contrasted thoraco-abdomino-pelvic tomography.

- A) Simple abdominal tomography (cross section)
 B) Contrast abdominal tomography (cross section)
 C) Contrast abdominal tomography (Coronal slice)
 D) Contrast chest tomography (cross section)
 Thoraco-abdomino-pelvic tomography: *Reports collection adjacent to the cecum and ascending colon, volume of 288 ml, free fluid in the peritoneal cavity and bilateral pleural effusion with passive atelectasis.

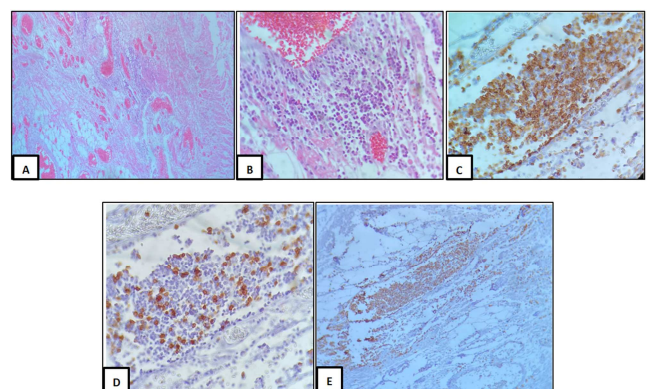


Figure 3. Histopathology.

- A) Adipose tissue with congestive vessels and mixed inflammatory infiltrate.
 B) Tissue with 40x approach, inflammatory infiltrate composed of plasma cells and lymphocytes is found.
 Immunohistochemical markers
 C) CD-4 reactive pattern
 D) CD-8 reactive pattern
 E) CD-3 reactive pattern

3. Discussion

Among the most frequent manifestations in patients who debut with COVID-19 are respiratory symptoms and fever. However, there are studies that have shown that extrapulmonary manifestations such as gastrointestinal, neurological, cardiac and renal are not uncommon. Intestinal complications in seriously ill patients hospitalized for SARS-COV-2 represent an incidence of 1.1% with a relative risk of death of 4.97%. [9]

As evidence from the literature accumulates, it has become clear that various gastrointestinal symptoms may also be observed. The study by Zhang J et al. report that gastrointestinal manifestations in COVID-19 occurred in 50% of cases, including symptoms such as nausea (17.3%), diarrhea (12.9%), anorexia (12.2%), abdominal pain (5.8%), belching (5%), and emesis (5%). [10] There is a hypothesis that the virus may upregulate the expression of ACE-2 receptors (angiotensin II converting enzyme), which allows a greater penetration of the virus to the digestive cells. There is the intestine-lung axis, which by modifying and altering the composition of the microbiota, interacts with the immune system of the intestinal mucosa, favoring an increase in the production of cytokines, with endotheliopathy, characterized by overexpression of coagulation factors, vascular congestion, stasis, local hypoxia and greater inflammatory infiltrate with great recruitment of CD4, CD8, neutrophils and Th2 cells with greater IgE production, which favors the process of injury at the pulmonary and gastrointestinal levels. [11-13]

All of these mechanisms can promote mesenteric thrombosis, which can contribute to intestinal ischemia and subsequent shock. Spontaneous perforations appear to occur predominantly in the cecum or proximal jejunum. There are reports where there is an irregular yellowish color change in the intestinal serosa of ischemic lesions, different from the usual purple or black color of the necrotic intestine. [14, 15]

4. Conclusion

In the case described here, an acute overdilatation of the entire colon was observed, without mechanical distal obstruction. Although the pathophysiology of this event is unknown, the histopathological report describes the serosa as having a smooth and shiny grayish-brown appearance, except for the perforated portion that corresponds to the cecum and ascending colon, where it changes to a granular texture with yellowish plaques. The meso-colon without perforation, but also with a yellowish appearance with reddish-brown areas with a hemorrhagic appearance.

Among the main limitations of our report is not being able to count on the immunofluorescence study showing the expression of ACE-2, as a binding site for SARS-COV-2, which is usually abundantly expressed in the glandular cells of the gastric, duodenal and rectal epithelia., we do not have the detection of SARS-COV-2 RNA at the cellular level or the intracellular staining of the viral nucleocapsid protein, nor is there a way to know the patient's viral load at hospital admission.

However, we can demonstrate a positive PCR and that the patient did present elevated ferritin at 1675 ng/dl, D-dimer 2,196 ng/mL, in the histopathological study he reported vascular congestion with predominantly lymphocyte inflammatory infiltrate, in the immunohistochemical markers he reported a pattern reactive CD-3, CD-4, CD-8, CD-138, CD-79a, therefore it is a strong marker of severity and progression of SARS-COV-2 disease.

Since it is a new disease whose clinical manifestations are also extrapulmonary, we are discovering possible atypical expressions of the infection and its complications. This reported case highlights the need to be attentive to gastrointestinal symptoms in positive COVID-19 patients for early diagnosis and prevention of complications.

References

- [1] Lu H, Stratton CW, Tang YW. Outbreak of pneumonia of unknown etiology in Wuhan China: the mystery and the miracle. *J Med Virol*. 2020; 92 (4): 401-2.
- [2] Cui J, Li F, Shi ZL. Origin and evolution of pathogenic coronaviruses. *Nat Rev Microbiol*. 2019; 17: 181-92.
- [3] De Nardi, P., Parolini, DC, Ripa, M., Racca, S. y Rosati, R. (2020). Perforación intestinal en un paciente con COVID-19: reporte de caso. *Revista internacional de enfermedad colorrectal*, 35 (9), 1797-1800.
- [4] Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020; 395 (10223): 497-506.
- [5] L. Pan, M. Mu, P. Yang, et al. Características clínicas de pacientes con COVID-19 con síntomas digestivos en Hubei, China. *Am J Gastroenterol*, 115 (2020), págs. 766-773.
- [6] K. Kotfis, K. Skonieczna-Żydecka. COVID-19: síntomas gastrointestinales y posibles fuentes de transmisión del SARS-CoV-2. *Anaesthesiol Intensive Ther*, 52 (2020), pp. 171-172.
- [7] F. Xiao, M. Tang, X. Zheng, et al. Evidencia de infección gastrointestinal por SARS-CoV-2. *Gastroenterología*, 158 (2020), pp. 1831-1833.
- [8] M. Panigada, N. Bottino, P. Tagliabue, et al. Hypercoagulability of COVID-19 patients in Intensive Care Unit. A report of thromboelastography findings and other parameters of hemostasis. *J Thromb Haemost*, 18 (2020), pp. 1738-1742.
- [9] Zhang J, Dong X, Cao Y, Yuan Y, Yang Y, Yan Y, et al. Clinical characteristics of 140 patients infected with SARS-CoV-2 in Wuhan, China. *Allergy*. 2020; 75 (7): 1730-41.
- [10] Ren B, Yan F, Deng Z, Zhang S, Xiao L, Wu M, et al. Extremely High Incidence of Lower Extremity Deep Venous Thrombosis in 48 Patients with Severe COVID-19 in Wuhan. *Circulation*. 2020; 142: 181-3.
- [11] Spiezia L, Boscolo A, Poletto F. COVID-19-Related Severe Hypercoagulability in Patients Admitted to the Intensive Care Unit for Acute Respiratory Failure. *Thromb Haemost*. 2020; 120 (6): 998-1000.

- [12] Tay MZ, Poh CM, Rénia L, MacAry PA, Ng LFP. The trinity of COVID-19: immunity, inflammation and intervention. *Nat Rev Immunol.* 2020; 1-12.
- [13] Zhang Y, Cao W, Xiao M, Li YJ, Yang Y, Zhao J, et al. Clinical and coagulation characteristics of 7 patients with critical COVID-2019 pneumonia and acro-ischemia. *Zhonghua Xue Ye Xue Za Zhi.* 2020; 41 (0): E006.
- [14] Nahas SC, Meira-Júnior JD, Sobrado LF, Sorbello M, Segatelli V, Abdala E, Ribeiro-Júnior U, Ceconello I. Intestinal perforation caused by COVID-19. *Arq Bras Cir Dig.* 2020 Nov 20; 33 (2): e1515. doi: 10.1590/0102-672020190001e1515. PMID: 33237160; PMCID: PMC7682143.
- [15] Fan BE, Chang CCR, Teo CHY, Yap ES. COVID-19 Coagulopathy with Superior Mesenteric Vein Thrombosis Complicated by an Ischaemic Bowel. *Hamostaseologie.* 2020 Dec; 40 (5): 592-593. doi: 10.1055/a-1232-7446. Epub 2020 Sep 7. PMID: 32894875.