


COVID-19-Associated Ischemic Colitis: A Rare Manifestation of COVID-19 Infection—Case Report and Review

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Abstract

Following the first report of COVID-19 infection in December 2019 as a respiratory illness, it has proven to be a multisystem disease. There are few reported cases of ischemic colitis with COVID-19 infection in the medical literature to date and we have limited understanding of its pathophysiology. We report 2 cases of ischemic colitis as the only manifestation of COVID-19. In addition, we review the current limited literature regarding COVID-19-associated ischemic colitis.

Keywords

COVID-19, coronavirus, gastrointestinal manifestation, ischemic colitis, colonic ischemia

Introduction

In December 2019, the first case of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was reported in Wuhan, China.¹ The infection rapidly spread across the world and was declared a pandemic by the World Health Organization (WHO) on March 11, 2020.² As of July 19, 2021, the Centers for Disease Control and Prevention (CDC) has reported >600 000 deaths due to COVID-19 infection in the United States.³ Patients with COVID-19 infection predominantly have respiratory symptoms, but gastrointestinal (GI) symptoms such as nausea, vomiting, abdominal pain, and diarrhea have been reported in up to 60% of these patients.^{4–12} In this article, we are reporting 2 cases of ischemic colitis as the only manifestation of COVID-19.

Case Description

Case 1

A 62-year-old man with hypertension, well-controlled type 2 diabetes, and gastroesophageal reflux disease presented to the hospital with multiple episodes of hematochezia for 1 day. He was hemodynamically stable and afebrile. He had mild left lower abdominal tenderness. Laboratory data revealed white blood cell count (WBC) 13 300/mm³, hemoglobin 13.2 g/dL, hematocrit 41.2%, and lactic acid 2.1 mmol/L. Stool culture and *Clostridium difficile* polymerase chain reaction (PCR) testing were negative. The SARS-CoV-2 PCR was positive.

Patient did not have any respiratory compromise or hemodynamic instability throughout the hospitalization. Computed tomography (CT) of the abdomen and pelvis with intravenous contrast demonstrated inflammatory changes extending from the rectum to the splenic flexure with patent celiac, superior mesenteric, and inferior mesenteric arteries. Patient underwent flexible sigmoidoscopy that revealed severely edematous, ulcerated, friable mucosa extending 25 cm from the anal verge proximally to the splenic flexure (Figure 1). Colonic biopsies demonstrated small crypts, loss of goblet cells, hyalinization of lamina propria, and mucosal hemorrhage (Figure 2). Based on endoscopic and biopsy findings, he was diagnosed with ischemic colitis. He was given intravenous antibiotics. He was discharged home on day 3 of admission after resolution of leukocytosis and hematochezia.

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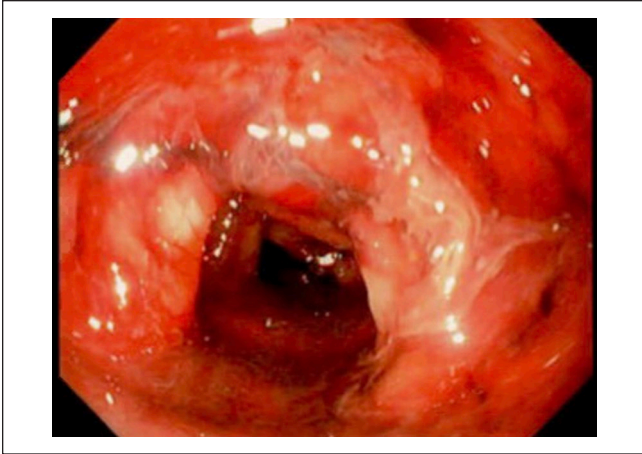


Figure 1. Flexible sigmoidoscopy—severely edematous, friable, ulcerated descending colon.



Figure 3. Flexible sigmoidoscopy—cratered, clean-based, nonbleeding ulcer in the descending colon.

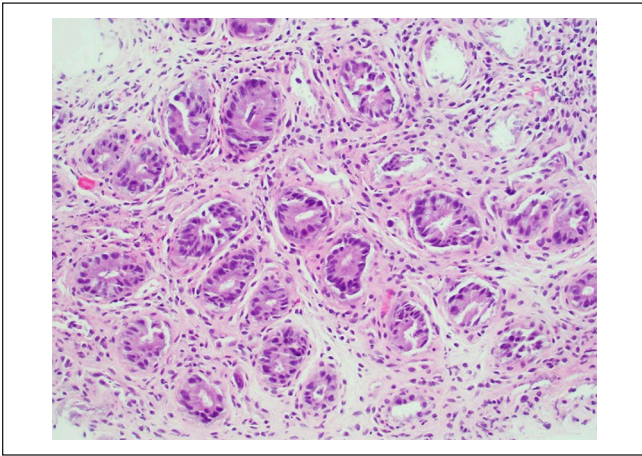


Figure 2. Colonic biopsy—loss of goblet cells and hyalinization of lamina propria.

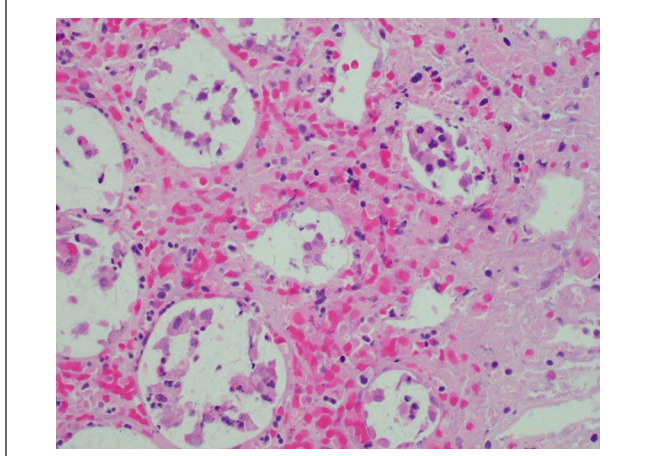


Figure 4. Colonic biopsy—loss of goblet cells, hyalinization of lamina propria and focal hemorrhage.

Case 2

A 66-year-old woman with well-controlled type 2 diabetes and hyperlipidemia presented to the hospital with left lower abdominal pain, intermittent hematochezia, and nonbloody emesis for 2 days. She was diagnosed with asymptomatic COVID-19 infection 3 weeks prior to presentation based on positive SARS-CoV-2 PCR. Patient was afebrile and hemodynamically stable. She had mild left lower abdominal tenderness and examination was otherwise normal. Laboratory data revealed hemoglobin 13.9 g/dL, hematocrit 42.8% and lactic acid 2.4 mmol/L, and negative stool culture, *C difficile* PCR, and SARS-CoV-2 PCR. CT of abdomen and pelvis with intravenous contrast demonstrated inflammatory changes extending from hepatic flexure to sigmoid with patent celiac and mesenteric arteries. Patient underwent flexible sigmoidoscopy and this revealed cratered, clean-based, nonbleeding ulcers with surrounding mucosal erythema, edema, and friable mucosa involving the sigmoid and descending colon (Figure 3). Colonic biopsies demonstrated crypts with

loss of goblet cells, hyalinization of lamina propria, and focal hemorrhage (Figure 4). Based on endoscopic and biopsy findings, patient was diagnosed with ischemic colitis. She was administered antibiotics and managed conservatively. She was discharged home on day 4 of admission, after resolution of hematochezia.

Discussion

With the evolution of the COVID-19 pandemic and growing recognition of various manifestations of the disease, there are an increasing number of reports in the medical literature about the rare and lesser understood extrapulmonary manifestations of the disease. One of the less frequently encountered GI manifestations of COVID-19 infection is ischemic colitis.

We searched the medical literature for reports of COVID-19-associated ischemic colitis and identified 15 patients from 9 publications with COVID-19-associated ischemic colitis and their characteristics are summarized in Table 1.¹³⁻²¹

Table 1. Summary of COVID-19-Associated Ischemic Colitis Cases Reported in the Medical Literature.

Patient number	Publication	Age/sex	Preexisting diseases	GI symptoms	Vasopressor requirement	Intravascular thrombi	Diagnostic tests	Treatment	Outcome
1	Lakshmanan and Toubia	72/Male	Multiple comorbidities (details NA)	Diffuse abdominal pain, rectal bleeding	No	NA	CT: thickening of descending and sigmoid colon, mid ascending colon, pneumatosis without portal venous gas	Medical	NA
2	Singh et al	82/Female	HTN, DM	Abdominal distension, tenderness	No	CT angiogram: no evidence of atherosclerosis; pathology: microvascular thrombosis	CT: PI of ascending colon and cecum; intraoperative findings: gangrenous ascending colon, marked distension from cecum to rectosigmoid junction	Surgical ileostomy	Alive
3	Almeida et al	76/Male	HTN	Rectal bleeding	NA	No	Endoscopy: erythema, edema and fragile mucosa; CT: signs of colonic ischemia such as wall thickening, absence of wall enhancement, mesenteric stranding of sigmoid	Medical	Death
4	Almeida et al	68/Male	HTN, DM, dyslipidemia	Abdominal distension, paralytic ileus, signs of peritoneal irritation	NA	No	CT: cecal perforation, pneumatosis of left colon; intraoperative findings: fecaloid peritonitis, gangrenous perforation of cecum, diffuse ischemia of colon	Surgical ileostomy and peritoneal lavage	Death
5	Almeida et al	56/Male	HTN, DM, COPD, dyslipidemia, obesity	Abdominal distension, tenderness, guarding	NA	No	CT: small bowel distension, colonic pneumatosis, pneumoperitoneum	Medical	Death
6	Norsa et al	85/Male	NA	Lower GI bleeding	NA	NA	CT and endoscopy: ischemic colitis	NA	Alive
7	Norsa et al	71/Female	NA	Loss of appetite, vomiting, lower GI bleeding	NA	NA	Endoscopy: ischemic colitis	NA	Alive
8	Norsa et al	69/Male	NA	Diarrhea, fever, dyspnea	NA	NA	CT: ischemic colitis (right colon)	NA	Death
9	Norsa et al	63/Male	NA	GI symptom not specified	NA	NA	CT: right and transverse colon ischemia, splenic infarcts	NA	Death
10	Norsa et al	83/Female	NA	Dyspnea, abdominal pain	NA	NA	CT: small bowel and colon ischemia	NA	Death
11	Chan et al	73/Male	HTN, ESRD	Bloody diarrhea	No	NA	CT: mucosal hyperenhancement with mass-like thickening of distal sigmoid colon and regional air within mesenteric vessels concerning for ischemic colitis	Medical	Death
12	González Lázaro et al	53/Male	DM, hypercholesterolemia	Abdominal pain, vomiting	NA	NA	CT: mucosal hyperenhancement of ascending colon concerning for ischemic colitis	Surgical resection of 148 cm of small bowel and 32 cm of right colon and end ileostomy	Alive
13	Paul et al	66/Male	None	Diarrhea, melena	Yes	NA	Endoscopy: multiple ulcerations of sigmoid colon	Medical	Alive
14	Kinjo et al	45/Male	None	Hematochezia	NA	No	CT: thickening of descending colon, engorgement of mesenteric vessels	Medical	Alive
15	Varshney et al	50/Female	HTN, hospitalization for COVID-19 pneumonia 2 weeks prior to current hospitalization	Abdominal pain, constipation	Yes	CT: larger sized arteries were patent with no apparent atherosclerotic disease; pathology: thickened intima with compromised lumen	CT: grossly distended distal segment of descending and sigmoid colon, imperceptible posterior wall of sigmoid possibly due to ruptured diverticulum; intraoperative finding: gangrenous sigmoid, ischemic descending colon with multiple perforations	Surgical drainage of collection, left colectomy, transverse colectomy, and rectal stump closure (Hartmann procedure)	Death
16	Case 1	62/Male	HTN, DM, GERD	Hematochezia	No	No	CT: inflammatory changes extending from rectum to splenic flexure	Medical	Alive
17	Case 2	66/Female	DM, hyperlipidemia	Left lower quadrant pain, hematochezia, nonbloody emesis	No	No	CT: inflammatory changes extending from hepatic flexure to sigmoid	Medical	Alive

Abbreviations: GI, gastrointestinal; NA, not available; CT, computed tomography; HTN, hypertension; DM, diabetes; PI, pneumatosis intestinalis; COPD, chronic obstructive pulmonary disease; ESRD, end-stage renal disease; GERD, gastroesophageal reflux disease.

Among the 15 patients, the outcome of 1 patient was not reported,¹³ 8 patients died, and 6 patients survived the illness. Among the survivors, 2 patients were managed medically^{19,20} and 4 patients required surgical management. We excluded 4 patients with ischemic enteritis,^{16,20,22} 2 patients with incidentally found pneumatosis intestinalis,^{23,24} and cross-sectional studies published by Vanella et al and Bhayana et al on mucosal damage (6 patients with left-sided and 3 patients with diffuse ischemic colitis) and abdominal imaging findings in COVID-19 patients, respectively, due to limited availability of patient information (age, sex, preexisting condition[s], GI symptom[s], vasopressor requirement, presence of intravascular thrombus, treatment, and outcomes).^{25,26}

Both cases 1 and 2 reported by us do not have any risk factors for intestinal ischemia but had clinical features consistent with ischemic colitis. Neither of the 2 patients had hemodynamic instability or imaging evidence of intravascular thrombosis. Case 1 had positive COVID-19 PCR during the admission, whereas case 2 had recent asymptomatic COVID-19 infection preceding the admission for ischemic colitis. There is no definitive proof of causation; however, given the diagnosis of ischemic colitis during/recent infection with COVID-19, we diagnosed both patients with COVID-19-associated ischemic colitis.

Human-to-human transmission of COVID-19 infection is mainly through respiratory droplets. The hallmark of COVID-19 infection is severe respiratory illness; however, other organs, including GI tract, are also affected. Angiotensin-converting enzyme 2 (ACE2) receptor that plays a key role in the viral entry is expressed in the gastric, duodenal, and rectal epithelia.²⁷ The most common GI symptoms are diarrhea (34%), nausea (27%), vomiting (16%), and abdominal pain (11%).²⁸ In a retrospective study conducted by Laszkowska et al, patients with GI symptoms had an indolent course with lower rates of intubation and death.²⁹

In patients with COVID-19, coagulopathy is suspected to be related to the high inflammatory state and is associated with increased mortality and morbidity.^{30,31} Most common thromboembolic complications are pulmonary embolism, deep vein thrombosis, and, rarely, mesenteric ischemia. Acute mesenteric ischemia is associated with very high morbidity and mortality. Following prompt diagnosis, patients with mesenteric ischemia should be treated with fluid resuscitation and surgical resection of necrotic bowel with restoration of blood flow to the ischemic intestine.^{14,15}

The reduced blood flow state in colonic ischemia (CI) is insufficient to maintain cellular metabolic function.³² The CI is the cause of 9% to 24% of all hospitalizations for acute lower GI bleeding.³³⁻³⁵ There is higher incidence of CI after age 49 and has a female predilection.^{36,37} CI results from alterations in the systemic circulation or from anatomic or functional changes in the mesenteric vasculature.³² Typical clinical presentation is sudden onset abdominal pain, urge to defecate, and rectal bleeding within 24 hours.³⁷ These symptoms resolve in 2 to 3 days and colon usually heals in 1 to 2 weeks.³² Left colon

is most commonly affected and includes the watershed areas—splenic flexure and sigmoid colon. Early colonoscopy (less than 48 hours) with minimum insufflation is recommended in suspected cases to confirm the diagnosis.³⁸⁻⁴⁰

The pathophysiological mechanism in COVID-19 resulting in ischemic colitis is poorly understood. None of the patients with COVID-19 ischemic colitis had mesenteric arterial occlusion detectable in imaging, but 2 patients had microthrombi in pathology specimen.^{14,21} Patients with severe COVID-19 infection have nonocclusive CI due to intense vasoconstriction and decreased mesenteric blood flow secondary to hemodynamic compromise and use of inotropic agents.¹⁴

In cases 1 and 2, there was no hemodynamic instability or radiographic evidence of thrombosis. We suspect that our patients developed ischemic colitis, most likely due to SARS-CoV-2-induced endotheliitis or direct bowel damage due to expression of ACE-2. Given the limited information available on COVID-19-associated ischemic colitis, further research is needed to better understand this condition.

Author Contributions

Each author contributed substantially to the work, worked on the drafting of the manuscript, and was involved in its final approval.

Declaration of Conflicting Interests

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Ethics Approval

Our institution does not require ethical approval for reporting individual cases or case series.

Informed Consent

Verbal informed consent was obtained from the patients for their anonymized information to be published in this article.

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