De Novo Pediatric Ulcerative Colitis Triggered by SARS-CoV-2 Infection: a Tale of 2 Sisters

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Lay Summary
We present a report of 2 sisters who developed acute onset hematochezia concurrently with SARS-CoV-2 infection. One patient recovered completely, whereas the sibling developed chronic symptoms leading to a diagnosis of ulcerative colitis requiring biologic therapy.

Introduction
Coronavirus disease 2019 (COVID-19) has been associated with a wide variety of gastrointestinal symptoms including abdominal pain, vomiting, and diarrhea, which are usually self-limited.1 There are infrequent reports of SARS-CoV-2 triggering new-onset inflammatory bowel disease (IBD) in adults, but none have been reported in children.2-5

Case Report
Two sisters aged 10 (patient A) and 9 years (patient B) who were previously healthy presented together to the emergency department (ED) in August 2021 with acute-onset diarrhea and hematochezia that started 5 days earlier (day 0). They both had low-grade fever and cough for 2 days at onset of symptoms and developed 2 to 3 loose bowel movements daily mixed with bright red blood. Both patients were unimmunized and positive for SARS-CoV-2 infection by polymerase chain reaction testing. The siblings had unremarkable stool studies including bacterial culture, ova and parasite, and Clostridioides difficile antigen and toxin.

Patient A had resolution of hematochezia and diarrhea within 2 weeks. Labs at presentation were remarkable for microcytic anemia with hemoglobin (Hgb) nadir of 7.4 g/dL and mild elevation in C-reactive protein (CRP) to 3.4 mg/L. She was started on oral iron supplements and repeat Hgb at 2 weeks and 2 months was 9.0 and 12.0 g/dL respectively. At follow up, there were no gastrointestinal symptoms and CRP had normalized.

Patient B had a very similar presentation with initial improvement in symptoms within 2 weeks. Oral mesalamine (2.4 g daily) was started at week 10 with plan to gradually taper off prednisone. The patient had repeated relapses as the dose of prednisone was decreased to less than 20 mg daily (Table 1, weeks 16 and 24). Infliximab (8 mg/kg every 6 weeks) was started at week 27. By the end of induction, patient was off prednisone and in clinical and biochemical remission with normalization of fecal calprotectin (Table 1, week 39).

Discussion
COVID-19 has been associated with the development of over 10 distinct autoimmune conditions in both children and adults.6 SARS-CoV-2 virus can enter the gastrointestinal tract by binding to angiotensin-converting enzyme 2 (ACE-2) receptor located on enterocytes. There is emerging evidence that this leads to immune hyperstimulation, redistribution of immune cells, and dysbiosis, similar to that seen in IBD.7 It is not yet fully understood why this occurs in certain patients and not in others, but it is hypothesized to be secondary to genetic susceptibility, defects in immune regulation, and/or presence of other environmental factors.
Our patients did not have any prior gastrointestinal symptoms, and the simultaneous occurrence of hematochezia in the siblings argues against the possibility of pre-existing IBD. The findings from these 2 cases suggest that SARS-CoV-2 infection can trigger an acute intestinal inflammation, which can either self-resolve or evolve into a chronic inflammatory disorder such as ulcerative colitis under unidentified circumstances.

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**Conflicts of Interest**

None to disclose

**References**

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**Table 1.** Laboratory parameters of patient B in relation to clinical events.

| Clinical Event | Week 1 | Week 4 | Week 8 | Week 10 | Week 16 | Week 24 | Week 39 |
|----------------|--------|--------|--------|---------|---------|---------|---------|
| Hemoglobin (g/dL) | 11.8   | 10.3   | 8.2    | 9.1     | 7.2     | 10.9    | 12.8    |
| C-reactive protein (mg/L) | 1.0    | 1.6    | 1.2    | 0.33    | 48.41   | 0.89    | 0.3     |
| Erythrocyte Sedimentation Rate (mm/h) | 28     | 38     | 50     | 19      | 43      | 68      | 16      |
| Albumin (g/dL) | 4.0    | 3.9    | 3.5    | 4.0     | 3.2     | 4.5     | 4.1     |
| Fecal Calprotectin (ug/g) (Ref: <120) | 1401   | 2359   | 1756   | 79      |         |         |         |

**Figure 1.** Endoscopic and histological images from colonoscopy of Patient B. A, Ascending colon: transition zone between inflamed and normal mucosa. B, Transverse colon: mucosa with loss of vascularity, erythema and erosions. C, Descending colon: mucosa with loss of vascularity, erythema, erosions and contact friability. D, Ascending colon biopsy (H&E-20x): active cryptitis, crypt abscess, lamina propria expansion by lymphoplasmacytic inflammation and focal loss of crypts. E, Descending colon biopsy at H&E 10x: active colitis with evidence of chronicity (crypt shortening, irregular size and shape of crypts, crypt branching).
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