

CASE REPORT

Caught Off Guard with COVID-19 Bowel Gangrene: A Case Report

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ABSTRACT

Background: Isolated and predominant gastrointestinal presentation in coronavirus disease 2019 (COVID-19) is reported less often. With evolving evidence that gastrointestinal tract can be a portal of entry, multiplication, primary site of affliction and symptomatic manifestation, and source of infectivity through prolonged fecal shedding of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2), it is essential that isolated gastrointestinal symptoms can also be a mode of presentation of this novel virus and illness.

Case description: The index case is a 10-year-old female child who presented with acute onset abdominal pain. Emergency surgery showed extensive gangrenous small bowel. The small bowel had herniated into a transmesenteric defect near the mid-ileum and was obstructed. Reverse-transcription polymerase chain reaction for SARS-CoV2 sent as preoperative work-up turned positive. The histopathology showed platelet aggregate thrombus in the venules with patent adjacent arterioles.

Conclusion: This is probably the first reported case of COVID-19-related bowel gangrene.

Keywords: Bowel gangrene, COVID-19, Mesenteric hernia, Microvascular thrombosis.

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INTRODUCTION

The ongoing severe acute respiratory syndrome coronavirus 2 (SARS-CoV2)-induced coronavirus disease 2019 (COVID-19) pandemic has predominantly been an acute respiratory illness, even in the pediatric age group across the world.¹ But mounting evidence shows diverse presentation of the disease across various age groups, with cases of predominant gastrointestinal illness being of particular interest.²⁻⁴ Current evidence is in favor of the gastrointestinal tract being an important portal of entry and possible site of persistent source of infection via prolonged fecal shedding, with concurrent gastrointestinal symptoms.⁵⁻⁷ The effect of such gastrointestinal persistence is unknown, as of yet. Here we would like to highlight one such case of reverse-transcription polymerase chain reaction (RT-PCR) proven COVID-19 illness with acute abdomen with extensive bowel gangrene in the absence of any respiratory illness.

CASE DESCRIPTION

The index case was a 10-year-old girl who presented with complaints of nausea and acute pain abdomen. She was afebrile and hemodynamically stable with tenderness in the right iliac fossa. An abdominal X-ray was normal, ultrasonogram showed dilated bowel loops with sluggish peristalsis. She had no premorbid or respiratory illness, had 97% oxygen saturation on room air. Laboratory values showed leukocytosis with neutrophilia, lymphopenia (16,870 per mm³ – 92% neutrophils, 5.9% lymphocytes). SARS-CoV2 nasopharyngeal swab RT-PCR was sent in the background of a COVID-19 afflicted family member and a negative SARS-CoV2 rapid antigen test (ICMR approved). This was positive and concurrent assessment of chest radiograph was suggestive of bilateral basal infiltrates (Fig. 1). D-dimer was high (1,496 ng/mL), fibrinogen was high normal (480 mg/dL), CRP was high (32 mg/dL), but procalcitonin (6 ng/mL) and ferritin (186 ng/mL) were normal.

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Fig. 1: Chest X-ray depicting bilateral basal infiltrates



Fig. 2: Extensive gangrenous small bowel of 60 cm length in the region of the distal jejunum and proximal ileum

Explorative laparotomy done on an emergent basis showed extensive gangrenous small bowel of 60 cm length in the region of the distal jejunum and proximal ileum. The small bowel had herniated into a transmesenteric defect near the mid-ileum and was obstructed (Fig. 2). The gangrenous segment was excised, and an end to end anastomosis done. The colon was normal with no features of malrotation. The child was started on low-dose, low-molecular weight heparin, as the subsequent values of D-dimer (1,060 ng/mL) also remained high postoperatively. The biopsy revealed that the lumen of the venules from the gangrenous segment was partially obliterated by platelet and fibrin thrombi (Fig. 3). Her blood and tissue culture were sterile. Nasopharyngeal swab RT-PCR done on postoperative day 7 was also positive. She needed minimal oxygen postoperatively and gradually recovered without any specific antiviral therapy.

DISCUSSION

The COVID-19 has shown a rapidly evolving disease spectrum with predominant presentation as respiratory illness across the world, even in the pediatric age group.¹⁻⁴ Growing evidence now shows that isolated gastrointestinal involvement, with minimal to no respiratory symptoms can also be the presentation.⁴⁻⁶ Since gastrointestinal mucosa also has angiotensin-converting enzyme 2 (ACE2) receptors and these receptors get upgraded during any inflammation, it is possible that the gastrointestinal tract serves as an important portal of entry to the virus with a consequent inflammatory process and clinical symptoms.⁷ ACE2 receptor and transmembrane serine protease 2 (TMPRSS2) found in the esophagus, ileum, and colon are key proteins in the cell entry process of the virus. Coexpression of these two proteins in the same cell facilitates viral entry.⁸ Virus assembly occurs in the cytoplasm of these cells and particles are released into the gastrointestinal tract. Viral multiplication and release are associated with cell breakdown and trigger action by the immune system which may result in direct immune-mediated damage or immune dysfunction-related procoagulant state.⁸ An extension of such inflammatory process could presumptively be extensive loss of vascularity of the bowel and consequent ischemia and gangrene. Documentation of virus presence in the bowel wall by RT-PCR performed on the biopsy samples of the intestine adds credence to this possibility.⁴

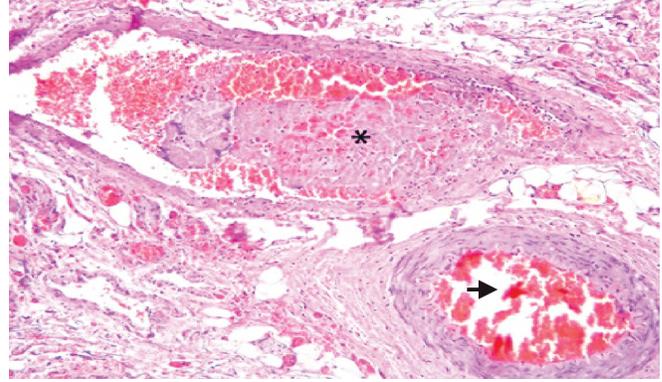


Fig. 3: Intestinal biopsy suggestive of gangrenous segment, partially obliterated by platelet and fibrin thrombi in lumen of venules

In the index patient, gangrene was secondary to strangulation of the bowel in a type of internal hernia classified as a transmesenteric defect. Transmesenteric defects are very rare and cause acute symptoms in less than 0.5% of all intestinal obstructions.^{9,10} The presence of inflammation and thrombosis in the mesenteric vessels secondary to COVID-19 may have primarily caused bowel ischemia and also rendered an innately hypovascular area of the mesentery into a defect leading to strangulation. Another possible explanation could be that the mesenteric defect was congenital with the bowel unobtrusively slipping in and out all these years, but got incarcerated with the onset of COVID-19 or bowel dilatation.

Though gastrointestinal involvement has been well-documented, presentation of COVID-19 with bowel gangrene has not been documented anywhere in the world literature so far, and this case may very well be the one to draw attention to such possibility. A child with such extensive gangrene would have been expected to have fever, more severe pain, vomiting, tachycardia, shock, diffuse abdominal distension with guarding. Dilated bowel loops or features of intestinal obstruction are expected radiologically. This discordance of symptomatology, exam, radiology, and intraoperative findings acquires special significance in the background of COVID-19 positivity. Even though the virus was not demonstrated directly on any biopsy specimen in this case, the fact that in spite of such extensive gangrene, absence of shock, and leukocytosis may very well go against the possibility of a bacterial pathology and with confirmed documentation of RT-PCR for the virus and a suggestive chest radiological picture confirms that this case did have COVID-19 associated bowel involvement. Adding to the uniqueness of the case is the fact that the child never had any documented respiratory symptoms either at presentation or prior.

CONCLUSION

Isolated gastrointestinal COVID-19 is an uncommon entity and bowel gangrene in COVID-19 is unreported so far. This case draws attention to such event and since the literature focusing on COVID-19 is dynamic, the evidence for route of transmission, testing yield, patient outcome, and organ system involvement is just a learning curve and the current case in point may be one such learning opportunity.

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