

# A Rare Presentation of Covid-19 Infection Causing Bowel Gangrene

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## ABSTRACT

**Introduction:** Coronavirus disease-2019 (COVID-19) caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) has caused global health crisis. Initially considered a respiratory tract pathogen, it can cause multiple organ dysfunction. It has also been described to predispose to venous and arterial thromboembolism; however, limited published data is available regarding mesenteric thrombosis COVID-19. Clinicians should be aware of the life-threatening situation in COVID-19 patients. A novel coronavirus termed as SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) has been the causative agent of a pandemic that originated in Wuhan China in December 2019.

**Case report:** In this we discuss about a case of extensive bowel gangrene probably due to acute mesenteric ischaemia associated with covid 19 infection.

**Conclusion:** Coronavirus disease-2019 (COVID-19) can present with a wide variety of complications during infection. For optimal management of these patients, understanding of various systemic manifestations and complications of SARS-CoV2 is vital. Although in COVID-19 respiratory symptoms predominate, both arterial and venous thrombosis can occur with COVID-19. Arterial thrombosis reported so far include stroke, acute limb ischemia, acute mesenteric ischemia and acute coronary syndrome.

**Keywords:** Gastrointestinal Ischemia, Abdominal Pain, Corona Virus, Resection.

## INTRODUCTION

Acute mesenteric ischaemia is a rare abdominal emergency and is associated with high rates of morbidity and mortality. Prompt diagnosis requires a high index of suspicion and early contrast computed tomography imaging. The exact pathological mechanism leading to the complication of mesenteric ischaemia in COVID-19 is not well understood at present, possibilities include - direct invasion of bowel tissue by the virus, given the expression of angiotensin converting enzyme 2 on enterocytes, the target receptor for SAR-Cov-2 or viral infection of the endothelial cell leading to diffuse endothelial inflammation or increased procoagulant factors like factor VIII, von Willebrand factor, fibrinogen or virus induced cytokine storm leading to coagulation and fibrinolysis activation.<sup>3,4</sup> Treatment of this life-threatening condition includes surgical resection of the necrotic bowel, restoration of blood flow to the ischemic intestine and supportive measure - gastrointestinal decompression, fluid resuscitation, hemodynamic support. Health care providers should have high index of suspicion regarding this life-threatening complication of COVID-19 so that timely intervention can be done.<sup>1,2</sup>

## CASE REPORT

A 34 year old male was brought to the casualty with complaints of acute abdominal pain, distension, vomiting and obstipation for 3 days duration. No history of any previous co- morbidities. Patient was a known alcoholic and smoker. On examination general condition fair, not dyspnoeic or tachypneic. His blood pressure was 120/70 mm/Hg with pulse rate 118/min, abdomen distension present, diffuse tenderness and guarding present, bowel sounds were absent. Blood investigations showed leucocytosis.

Xray abdomen showed multiple air fluid levels. Ultrasound of abdomen showed minimal free fluid abdomen with dilated bowel loops. Contrast enhanced computed tomography showed possibility of small bowel obstruction with strangulation, with left renal infarct in middle and lower pole measuring 5\*7cms. Superior mesenteric artery- normal. Computed tomography of chest showed peripheral ground glass opacities in right upper lobe, possibility of viral pneumonia.

Patient was taken up for emergency laparotomy and intraoperatively around 300 ml toxic fluid drained, multiple interbowel adhesion with interbowel fluid noted. Multiple impending gangrenous patches noted all over the small bowel. About 70cm from DJ flexure 15cm gangrenous segment noted (Fig. 1c). Patchy impending gangrenous segment with congestion seen 40 cm and 50 cm from DJ flexure respectively (Fig. 1b), about 15 cm from IC junction a gangrenous bowel segment of about 75cm noted (Fig. 2e), meckels diverticulum with wide mouth noted at 80 cm from ileocaecal junction (Fig. 2d). Congestion of meckels diverticulum noted. Hence proceeded with resection of gangrenous jejunum around 70 cm from DJ flexure for 20-30 cm and 15 cm from IC junction, the gangrenous segment of bowel with meckels diverticulum resected and proximal double barrel jejunostomy with distal double barrel mucous fistula with laprostomy closure done to observe the remaining impending gangrenous patches. Superior mesenteric artery

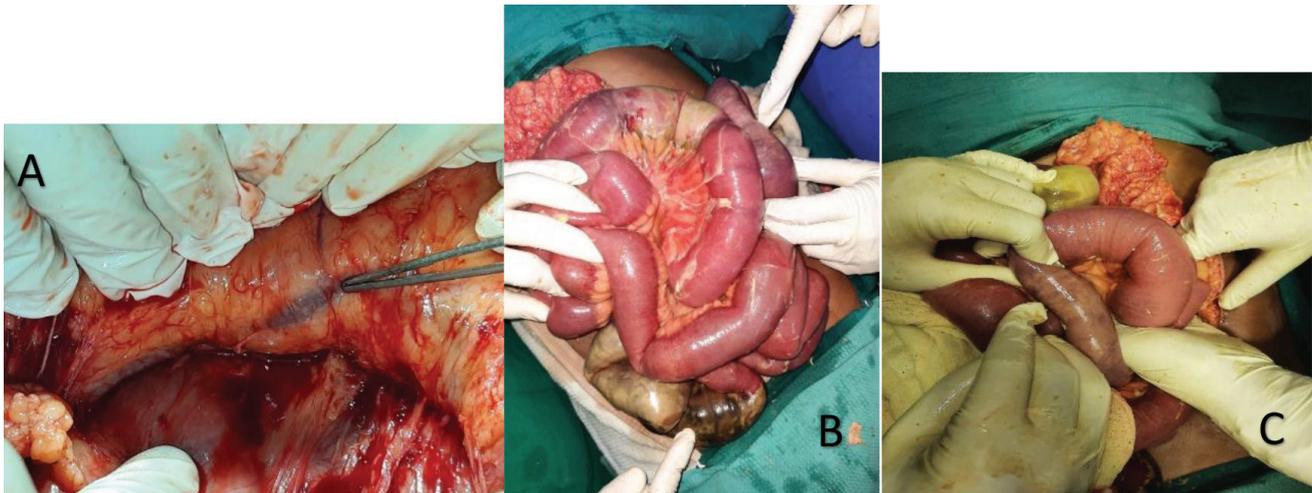
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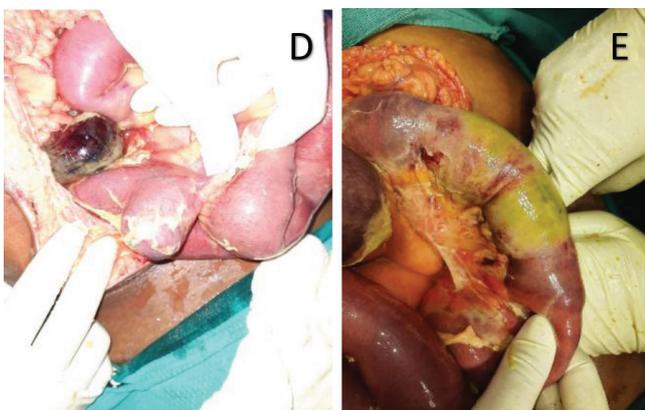
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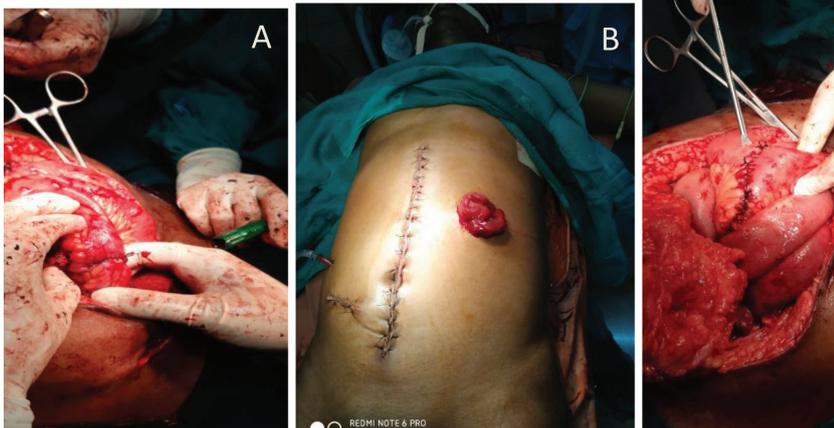
**Figure-1:** Intraoperative pictures showing A) superior mesenteric artery B&C) patchy gangrenous bowel segments



**Figure-2:** Intraoperative picture showing D) meckels diverticulum E) gangrenous bowel segment

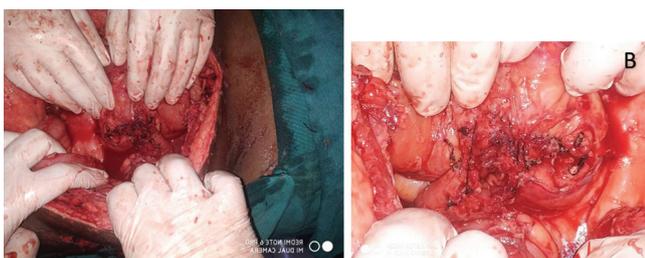
pulsation felt and was found to be normal (Fig.1a). Post operatively patient was started on Inj. Heparin 5000 IU QID, and shifted to ICU for close monitoring. Patient was diagnosed to be covid positive and was started on LAMP regimen on POD1. Histopathology showed haemorrhagic infarction of largest segment of intestine with resected ends showing partial haemorrhagic infarction involving mucosa, haemorrhagic infarction of smaller segment of intestine with both resected ends visible along with diverticula.

On postoperative day two, patient was taken up for relaparotomy and intraoperatively about 50 cm from DJ flexure, gangrenous bowel segment for about 15cm noted (Fig.3a). This segment was 30cm proximal to the previous jejunostomy site. Rest of the bowel was found to be normal



**Figure-3:** Intraoperative pictures showing A) bowel gangrene, B) double barrel jejunostomy, C) Anastomosis of proximal jejunostomy

and the impending gangrenous patches was found to have recovered with IV anticoagulants . Hence proceeded with resection of the gangrenous bowel (Fig.3b) with double barrel jejunostomy followed by anastomosis of the previous two ostomies (jejunojunal and ileoileal anastomosis) (Fig.3c) and closure of abdomen. Postoperatively patient was monitored in an ICU and continued COVID regimen, steroids and higher IV antibiotics, IV fluids and Total Parenteral Nutrition (TPN) started. Enteral feeding was started on POD-3 and the patient was closely monitored in SICU. Despite these measures, the patient's condition remained critical and constant increase in



**Figure-4:** Intraoperative pictures showing anastomotic dehiscence

TC was noted indicating Sepsis.

On postoperative day 9 there was a purulent discharge from wound site and drain. USG abdomen revealed collection in right paracolic and interbowel region of about 400-500cc. In view of possibility anastomotic dehiscence of ileoileal anastomosis patient was taken up for emergency re-exploration. Intraoperatively around 600ml frank pus was drained. Dense adhesions all around and inter loop adhesions noted. Both ileoileal and jejunojunal anastomosis was

found to have completely given away (complete anastomotic dehiscence)(Fig.4).Hence it was proceeded with resection of jejunum from ostomy to anastomotic leak site around 20 cm and double barrel jejunostomy kept. On the ileoileal anastomosis site, distal ileal limb closed and proximal ileum brought out a mucous fistula. Postoperatively patient was under close monitoring and continued IV fluids, higher antibiotics, total parental nutrition and protein supplements but the patient developed dyselectrolymia and severe dehydration despite the fluid and nutritional support, due to high Ostomy output.

Due to massive bowel resection patient also developed features of short bowel syndrome which was added on by high output jejunostomy. Patient was given total parental nutrition and protein supplements to improve the general condition, malnutrition and dehydration. On Postoperative day 39 patient was planned for elective ostomy reversal due to the continued worsening general condition. Hence proceeded with exploratory laparotomy with side to side jejunojejunal and end to side ileoileal anastomosis. Due to persistent hypotension and fall in saturation patient could not be extubated and was under mechanical ventilation. Patient was in close ICU monitoring with inotropic support, antibiotics, blood products, IV fluids and nutritional support. On postoperative day 42 patient developed features of anastomotic leak again and hence planned for re-exploration. But as the patient was in refractory hypotension despite continuous inotropic support and fluid management, surgery was deferred. On postoperative day 43 patient's condition progressively worsened and subsequently developed cardiac arrest despite our best resuscitative efforts.

## DISCUSSION

COVID-19 manifestations are mostly respiratory with related complications ranging from mild non-pneumonic illnesses to respiratory failure.<sup>6</sup> However, several extra pulmonary presentations, including gastrointestinal (GI) symptoms, such as anorexia, diarrhoea, vomiting, nausea, abdominal pain, and GI bleeding have been recently reported in COVID-19 patients.<sup>7</sup> Due to the prominence of the pulmonary presentations, extra pulmonary manifestations can be easily missed and overlooked, resulting in a delayed diagnosis of COVID-19 in patients with primary GI manifestations.<sup>10</sup> Severe GI complications have been observed in critically ill patients with a higher frequency.<sup>7</sup>

GI ischemia is an uncommon medical condition and results from any aetiology that leads to bowel hypo perfusion. Recent studies suggest that the possible coagulopathy or vasculopathy caused by COVID-19 may increase the risk of thromboembolic events and associated ischemia.<sup>8,9</sup> Most of the published reports, however, include extremity venous thrombosis and pulmonary embolism.<sup>9,11</sup> Thromboembolic events in the GI system, including mesenteric ischemia, are specifically important, because they constitute a potentially fatal clinical emergency with a high rate of mortality.

Among the common presenting symptoms of the disease, GI-related complaints are seen in up to 38% of patients, among

which diarrhoea, nausea/vomiting and abdominal pain are the most common complaints. The imaging characteristics of the patients presenting with GI dominant manifestations include distended fluid-filled bowel loops with post-contrast enhancement and surrounding fat stranding/mesenteric inflammation.<sup>12</sup> However, more severe cases of bowel wall necrosis leading to surgical resection have also been reported. Reports of the GI complications following COVID-19 are evolving. The most clinically significant imaging findings reported are pneumatosis intestinalis and portal venous gas, the two alarming signs of bowel ischemia. Although fluid-filled dilated loops have been frequently reported, this finding is associated with diarrhoea, a common but nonspecific manifestation of the COVID-19 and other viral infections.

In recent studies, it has been suggested that all hospitalized COVID-19 patients should undergo routine coagulation profile monitoring and thromboembolism prophylaxis. Contrast-enhanced abdominopelvic CT scan has a pivotal role in the early diagnosis of ischemic bowel disease. It should be considered in any cases of COVID-19 with prominent GI signs and symptoms, especially those admitted in ICU. This modality allows to detect associated vascular findings and identifying those patients who may benefit from percutaneous endovascular thrombectomy as well.<sup>14</sup>

Limited data is available addressing GI ischemia in the setting of COVID-19. Also, the exact underlying pathologic mechanism is not clear. Different pathophysiological mechanisms, such as inflammation, vasculopathy, immobilization, endothelial dysfunction, and hypercoagulable state have been considered to explain GI ischemia in COVID-19 patients. However, it is still unclear whether arterial thromboembolic events are direct complications of COVID-19 or simply a coincident. Considering the high mortality rate of GI ischemia, clinicians are encouraged to have a very high clinical suspicion index and low threshold for cross-sectional imaging and clinical screening of GI symptoms in the era of COVID-19 due to the possible risk of GI ischemia progression and its related complications that may require emergent surgical intervention.

## CONCLUSION

Macro vascular arterial/venous thrombosis can be depicted in almost half of COVID-19 patients with bowel ischemia. Overall mortality in COVID-19 patients with GI ischemia and radiologically evident mesenteric ischemia was 38% and 40%, retrospectively. Although many attributing factors are considered in the pathogenesis of bowel ischemia, factors such as hypercoagulable state, non-occlusive mesenteric ischemia, and micro vascular thrombosis constitute the underlying pathology in the majority of COVID-19 patients with GI ischemic presentation.

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