Case Series

Intestinal ischemia in the COVID-19 era: case series from peripheral healthcare centre

Neha Dubey¹, Dhawal Sharma²*, Anil Sharma³

¹Department of Radiodiagnosis, Ananta Institute of Medical sciences, Rajsamand, Rajasthan, India
²Department of Surgery, Pacific Medical College and Hospital, Rajasthan, India
³Sharma Hospital, Kankroli, Rajsamand, Rajasthan, India

Received: 29 October 2021
Accepted: 08 December 2021

*Correspondence:
Dr. Dhawal Sharma,
E-mail: dhawalsharma123@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

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. We report 6 cases of COVID-19 positive patients with mesenteric/intestinal ischemia. These patients were examined with variables including demographics, laboratory blood tests including coagulation panels, medical and surgical history, comorbidities, and postoperative follow-up period.

Keywords: Mesenteric ischemia, COVID-19, D-Dimer, Laparotomy

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.

We report 6 cases of COVID-19 positive patients with mesenteric/intestinal ischemia. These patients were examined with variables including demographics, laboratory blood tests including coagulation panels, medical and surgical history, comorbidities, and postoperative follow-up period.

CASE SERIES

This is a retrospective observational study analyzing the clinical characteristics and outcomes of six COVID-19 positive patients. Six patients aged 26-85 presented to our institution from 1st March to 1st May and were diagnosed with COVID-19 pneumonia, subsequently developing mesenteric vascular complications. None of our patients included had any history of thromboembolism nor risk factors that could justify the presentations. We found that 6 patients fulfilled clinical and radiologic criteria for intestinal ischemia (Table 1). All patients presented with gastrointestinal (GI) symptoms. All patient were evaluated with variables including demographics, laboratory blood tests including coagulation panels, medical and surgical history, comorbidities, and postoperative follow-up period.

Among the latter 3, thromboembolic filling defects in the inferior mesenteric artery and superior mesenteric vein were found in 2. Three patients had presented with pneumoperitoneum with perforation peritonitis with ischemia. D-dimer was elevated in all patients. Two of them had comorbidities such as diabetes mellitus and...
hypertension. One of the patient presented with breathlessness with abdominal pain. By the end of the follow-up date (23 Sep, 2021), there were no complications and only 2 deaths.

Table 1: Summarizing clinical characteristics of the COVID-19 patients with AMI.

| Age/sex (years) | Medical history | Medical history | Presenting signs and symptoms | Timing of AMI diagnosis | Imaging findings | Other thrombosis sites | Treatment                                                                 | Outcome            |
|-----------------|-----------------|-----------------|-------------------------------|-------------------------|-----------------|------------------------|----------------------------------------------------------------------------|--------------------|
| 52/m            | No              | Acute abdominal pain | 10 days                      | Dilated distal ileal loops | No              | Laparotomy, resection of gangrenous distal ileal segment and ETE ileoileal anastomosis | Recovered          |
| 26/f            | No              | Abdominal distension, vomiting and fever | 15 days                      | Moderate dilated edematous large bowel with ischemic changes | No              | Laparotomy, resection of gangrenous ascending and transverse colon (Rt Hemicolecotmy) ileo colic anastomosis | Death              |
| 45/f            | No              | Fever, breathlessness, abdominal pain and vomiting | 5 days                       | Pneumoperitoneum with dilated edematous distal bowel loops | No              | Laparotomy, resection of distal gangrenous ileal segment with loop ileostomy | Recovered          |
| 30/m            | No              | Acute abdominal pain, fever | 12 days                      | SMV thrombosis extending upto portal vein and splenic vein with edematous proximal bowel loops | No              | Laparotomy with proximal gangrenous jejunal segmental resection done with jejunoojejunostomy and feeding jejunostomy | Recovered          |
| 37/m            | DM/HTN          | Acute abdominal pain and fever | 7 days                       | IMA thrombosis with pneumoperitoneum and dilated small bowel loops | No              | Laparotomy with total colectomy of patchy gangrenous perforated large bowel with diversion loop ileostomy | Recovered          |
| 85/f            | DM/HTN          | Severe abdominal pain with breathlessness, hypotension | 15 days                      | Dilated stomach, jejunum with pneumatosis intestinalis, air within portal system-SMA thrombosis | No              | Laparotomy with massive small bowel gangrene resection with jejunostomy | Death              |
Dubey N et al. Int J Adv Med. 2022 Jan;9(1):36-39

DISCUSSION

Facing a pandemic emergency is a very hard challenge, beginning with the difficulties of employing accurate diagnostic tools.1

Gastrointestinal symptoms have been described shortly after the SARS CoV-2 outbreak and reported to be self-limiting in the vast majority of patients, but with the possibility of being linked to a high risk of complications. Furthermore, there is growing evidence of a link of COVID-19 to coagulopathy.2,3

Acute mesenteric ischemia 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 AMI in COVID-19 is not well understood at present, possibilities include-direct invasion of bowel tissue by the virus given 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.4-6 Additional explanations for the hypercoagulability may be the presence of high numbers of prothrombotic circulating macrovesicles which are cytoplasmic micro particles stemming from platelets or monocytes and neutrophil extracellular traps (NETs) released from activated neutrophils, constitute a mixture of nucleic DNA, histones and nucleosomes. Treatment of this life-threatening condition includes surgical resection of the necrotic bowel, restoration of blood flow to the ischemic intestine and supportive measure like 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.

GI symptoms have been described in 10% of patients with COVID-19. In most cases these symptoms are mild and self-limiting, even if they seem to increase the risk of complications. We found that GI symptoms at admission could also be the expression of an underlying intestinal ischemia.7

A state of hypercoagulability has been found via D-dimer test in most of the COVID-19 patients admitted to intensive care units.8 Quantitative D-dimer has already been proposed as the best single marker of hypercoagulability in COVID-19 patients, as well as a negative prognostic marker.

CONCLUSION

No final conclusions can be drawn from such a small number of patients due to the ongoing characteristic of the pandemic. However, our experience suggests that a high level of suspicion for intestinal ischemia should be maintained in COVID-19 patients presenting with GI symptoms or with arising abdominal pain because this complication could account for an increase mortality risk. Nevertheless, in this subset, a D-dimer elevation should not only trigger prompt prophylactic use of anticoagulants, but also lead to consider an early abdominal computed tomography scan in patients with suggestive symptoms or biochemical markers of intestinal ischemia. Additional analysis will help to define the role of SARS-CoV-2 in the pathogenesis of such a detrimental manifestation.

Health care providers should have high index of suspicion regarding this life-threatening complication of COVID-19 so that timely intervention can be done.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required
REFERENCES

1. Patel R, Babady E, Theel ES, Storch GA, Pinsky BA, St George K. Report from the American Society for Microbiology COVID-19 International Summit, 23 March 2020: Value of Diagnostic Testing for SARS-CoV-2/COVID-19. mBio. 2020;11(2):26.

2. Jin X, Lian J-S, Hu J-H, Gao J, Zheng L, Zhang Y-M. Epidemiological, clinical and virological characteristics of 74 cases of coronavirus-infected disease 2019 (COVID-19) with gastrointestinal symptoms. Gut. 2020;69(6):1002-9.

3. Guan W-J, Ni Z-Y, Hu Y, Liang W-H, Ou C-Q, He J-X. Clinical Characteristics of Coronavirus Disease 2019 in China. N Engl J Med. 2020;80(6):656-65.

4. Parry AH, Wani AH, Yaseen M. Acute Mesenteric Ischemia in Severe Coronavirus-19 (COVID-19): Possible Mechanisms and Diagnostic Pathway. Acad Radiol. 2020;27(8):11.

5. Varga Z, Flammer AJ, Steiger P, Haberecker M, Andermatt R, Zinkernagel AS. Endothelial cell infection and endotheliitis in COVID-19. Lancet. 2020;395(10234):1417-8.

6. Panigada M, Bottino N, Tagliabue P, Grasselli G, Novembrino C, Chantarangkul V. Hypercoagulability of COVID-19 patients in intensive care unit: A report of thrombo-elasticography findings and other parameters of hemostasis. J Thromb Haemost. 2020;18(7):1738-42.

7. Mao R, Qiu Y, He JS, Tan JY, Li XH, Liang J et al. Manifestations and prognosis of gastrointestinal and liver involvement in patients with COVID-19: a systematic review and meta-analysis. Lancet Gastroenterol Hepatol. 2020;5(7):667-78.

8. Panigada M, Bottino N, Tagliabue P, Grasselli G, Novembrino C, Chantarangkul V et al. Hypercoagulability of COVID-19 patients in intensive care unit: A report of thromboelastography findings and other parameters of hemostasis. J Thromb Haemost. 2020;18(7):1738-42.

9. Thachil J, Tang N, Gando S, Falanga A, Cattaneo M, Levi M et al. ISTH interim guidance on recognition and management of coagulopathy in COVID-19. J Thromb Haemost. 2020;18(5):1023-6.

Cite this article as: Dubey N, Sharma D, Sharma A. Intestinal ischemia in the COVID-19 era: case series from peripheral healthcare centre. Int J Adv Med 2022;9:36-9.