Case study

Superior Mesenteric Artery Thrombosis in Covid-19 Patient

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ABSTRACT

Covid-19 infection increases risk of thrombosis both arterial and venous systems. Many organs of arterial thrombosis were reported. We reported a case of superior mesentericy~~y~~ artery thrombosis in a ~~the~~ Covid-19 pneumonia patient who presented with abdominal pain and leukocytosis. The patient required exploratory laparotomy, bowel resection and superior mesenteric artery thromboembolectomy. In p~~P~~ostoperative period, the patient ~~was~~ continuedous ~~ous~~ anticoagulationnt ~~nt~~ for long term treatment.

Keywords: COVID-19; Superior mesenteric artery thrombosis; Anticoagulation; Thromboembolectomy

1. INTRODUCTION

COVID-19 disease causing from SARS-CoV-2 virus infection usually effects the respiratory system. The COVID-19 patients increase risk of thrombosis especially in critically ill patients. Thrombotic events involve both arterial and venous systems (1). There are many reports demonstrating deep vein thrombosis and pulmonary embolism (2). The reports about arterial thrombosis are less. The literatures about arterial thrombosis included stroke, acute limb ischemia, and acute coronary syndrome (1). The superior mesenteric artery (SMA) thrombosis ~~also~~ has also been reported in only a small number and almost all the reports were case reports (3-6).

We reported a case of SMA thrombosis with bowel gangrene in a COVID-19 pneumonia patient presenting with severe abdominal pain and requiring exploratory laparotomy, bowel resection and SMA thromboembolectomy. The patient agreed to publish her case by completing the consent form of the Institutional Review Board.

2. CASE REPORT

A 72-year-old female with Covid-19 has admitted for pneumonia treatment for 10 days. Her regimen of treatment included oral Favipiravir and intravenous dexamethasone. Two days before, she developed mild abdominal ~~abdominal~~ pain and her symptom was progress in severity. Clinical abdomen showed soft and generalized tender. Laboratory showed leukocytosis as white blood cell count 44,450 mm3 (44.45 × 109 per L) with neutrophils count 93.7%. Contrast enhanced CT was performed and demonstrated low density thrombosis of SMA after middle colic branch along to distal segment of SMA (Fig 1. it would be wise to place an arrow to indicate the lesions). No enhancing contrast in distal ileum and caecum was showed suspecting gangrenous segment. Minimal free fluid intraabdomen and

no free air were detected. The patient was started intravenous unfractionated heparin in bolus dose then continuous infusion. The patient was transferred from community hospital. After the patient arrived our Covid intensive care unit, reassessment for the patient was done and abdominal sign was generalized tender and guarding. The patient underwent emergency exploratory laparotomy. Intraoperative finding were 50 centimeters of distal ileum and caecum and ascending colon gangrene. Proximal SMA was diminished pulse and absent pulse of distal SMA. Distal ileum resection and right hemicolectomy was performed. After resection of gangrenous segment of small bowel and colon, surgical SMA thromboembolectomy was done via anterior approach at base of transverse mesocolon. Thrombosis in SMA was detected then SMA thromboembolectomy was performed with embolectomy balloon catheter 3 Fr both proximal and distal segment. Good inflow and back bleeding were detected then arteriotomy closure with prolene 6-0 interrupted fashion. Temporary closure abdomen with vacuum dressing was done. Anastomosis was not performed. The second operation was planned in next 2 days. Postoperative period, the patient was continuously perfused intravenous heparinization and improved in abdominal pain. The leukocytosis decreased to 14,210 mm3 (14.21 × 109 per L) with neutrophils count 86.3%. Two day after operative, patient underwent re-exploratory laparotomy. Intraoperative findings showed no further gangrene of small bowel and large bowel then End-to-side anastomosis between ileum and transverse colon was performed. Primary abdominal closure was performed. Patient was started oral diet in postoperative day 3. The patient was continuous anticoagulant by vitamin K antagonist and discharged after 8 days of surgery. We planned to keep INR 1.5-2.5 time at least 3-6 months after surgery.

Fig 1. Thrombus in mid superior mesenteric arteryit would be wise to place an arrow to indicate the lesions

Fig 2. The resection part of distal ileum and caecum and ascending colon necrosis

3. DISCUSSION

Thrombotic events in COVID-19 patients have been reported. Incidence of venous thromboembolism is high and requires for prophylaxis especially in critically ill cases. Arterial thrombosis was also reported with acute limb ischemia, ischemia stroke and myocardial infarction in the majority of the cases. SMA thrombosis has been reported in only a small

number and most reports are case reports. The most frequently presenting symptom was abdominal pain(3). Other symptoms were nausea, diarrhea, and abdominal distension(7). Some reports demonstrated that patients presented with deterioration of conscious level. Laboratory investigations showed metabolic acidosis and increasing of lactate level(5). Contrast enhanced CT is the investigation of choice for diagnosis (8, 9). In some cases, SMA thrombosis can occur concurrently with splanchnic vein thrombosis or other arterial thrombosis such as cerebrovascular vessel and coronary arteries (8-10). Because SMA thrombosis is life-threatening condition, prompt management is required and effect outcomes of treatment. High index of suspicion is needed because of no specific signs and symptoms or laboratory. SMA thrombosis can occur in hospitalization and posthospitalization periods(6).

The pathogenesis for thrombosis in the covid-19 patient is not well understood. Many possible mechanisms were proposed such as inflammation induced hypercoagulable state consisting of endothelium injury, activation of the coagulation cascade and inhibit fibrinolysis(11, 12).

The goal of treatment is rapidly restoring blood flow to the intestines. The initial treatments are anticoagulant and broad-spectrum antibiotic. However, management relies on clinical examinations and findings on CT scan. In cases of peritonitis on physical examination or small bowel ischemia on CT scan, the patients required laparotomy with small bowel resection and surgical SMA thromboembolectomy(8, 10). Endovascular treatments such as endovascular thrombectomy and catheter-directed thrombolysis were reported and mostly followed by laparotomy due to worsening abdominal symptoms. Conservative treatment with anticoagulant may be successful in case of bowel hypoperfusion and was a treatment option for moribund cases(8). In our case, the patient had peritonitis and CT scan showed bowel necrosis so laparotomy was necessary. The resection of non-viable distal ileum and right side colon then surgical SMA thromboembolectomy were performed. The patient was planned for a secondary operation due to unreliable zone of bowel. On the second operation, no further bowel ischemia was detected so End-to-side anastomosis was done without complication. Anticoagulant for long term treatment after restoration of blood flow is not consensus regarding both drug of choices and duration for treatment(13, 14). It still requires further study.

4. CONCLUSION

SMA thrombosis is a rare complication in covid-19 patients. Diagnosis is challenging due to there being no specific symptoms. CT scan is an investigation of choice. The treatment is restoring blood flow to intestine and resection of necrotic area with anticoagulation therapy.

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CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal.

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