

## A rare case report of short bowel anastomosis after acute mesenteric ischaemia in Covid-19 positive patient

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### Abstract

Acute mesenteric ischaemia is one of the serious abdominal surgical emergency, which has got very high morbidity and mortality. During the pandemic of COVID-19, besides respiratory complications, the virus was causing venous and arterial thromboembolism that can lead to acute mesenteric ischaemia in otherwise healthy individuals. Early diagnosis and suitable surgical procedures are the key to the better outcome of this disease. Surgical resection of gangrenous gut, leaving healthy gut is an important step of this operation. Leaving less than 200 cm of small intestine leads to short bowel syndrome which has got its own complication. This case report is on a healthy COVID-19 positive patient who presented with acute mesenteric ischaemia. After surgical resection only 1.5 feet small bowel (60 cm) was left behind and anastomosis was done with healthy transverse colon. He was later managed for complications of small bowel syndrome and was discharged successfully with dietary modifications.

**Keywords:** Acute Mesenteric Ischaemia, COVID-19, Pandemic, Short bowel syndrome.

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### Introduction

Acute Mesenteric Ischaemia (AMI) is defined as a syndrome in which gangrene of the intestine occurs due to inadequate blood supply. AMI can be divided into two types, arterial or venous. Arterial AMI is further divided into occlusive arterial ischaemia (OMAI) or non-occlusive mesenteric ischaemia (NOMI). Venous AMI presents as mesenteric venous thrombosis. Although the survival rates have improved over the past decades for AMI, still the prognosis of AMI is very poor. The average mortality percentage is 71% which may reach up to 90%.<sup>1</sup> Predictors of mortality include older age, hepatic and renal impairment, metabolic acidosis, hypoxia and sepsis. Early diagnosis and proper treatment is the key to success. Treatment options depends on haemodynamic

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stability of the patient as well as etiology of intestinal ischaemia. Generally, non-occlusive AMI is treated medically, while Occlusive AMI is treated surgically. Non-surgical treatment option includes papaverine, low molecular weight heparin, warfarin, broad spectrum antibiotics and use of thrombolytics. Most of the time the diagnosis is made on abdominal exploration. At that time resection of whole gangrenous gut is the ultimate step.<sup>2</sup>

COVID-19 virus was initially considered to cause respiratory complications but lately it was found that this virus also causes arterial and venous thromboembolism. Clinical features of AMI in COVID-19 Positive patients are nausea, generalized abdominal pain and diarrhoea.<sup>3</sup>

In this report, the case of an otherwise healthy patient who came in with AMI with no predisposing factor for AMI is presented. He was later found COVID-19 positive. After exploratory laparotomy only 1.5 feet of small intestine was found healthy and end to end anastomosis of jejunum was done with healthy part of transverse colon. He was later discharged with dietary restriction required for Short Bowel Syndrome.

### Case Report

A 55-years old male, tailor by profession, presented in the emergency department (ER) of EAST surgical ward of MAYO hospital Lahore in March 2021, with chief complaints of sudden onset of abdominal pain for one day. He was an otherwise fit healthy individual but was found to have Diabetes Mellitus on presentation. His past medical and surgical history was insignificant. On examination in the ER, he had pulse of 106 per minute and blood pressure of 110/80 mmHg. Clinically, there was generalized guarding over the whole abdomen on palpation. Percussion notes were tympanic and bowel sounds were negative. Digital rectal examination was normal. Chest X-ray showed multiple opacities in chest and Supine abdominal X-ray showed multiple air fluid levels (Figure-1). Diagnosis of acute intestinal obstruction was made with high suspicion of COVID -19, therefore PCR was sent. Plan for exploratory laparotomy was made under general anaesthesia after taking written and informed consent from the patient.

On opening the abdomen by midline umbilicus saving



**Figure-1:** Abdominal X-ray showing multiple air fluid levels in patient presenting with AMI.

incision, whole of the small gut was found gangrenous and dusky leaving only 1.5 feet of healthy jejunum distal to duodenojejunal junction (Figure-2). The gangrenous segment was extending through ileocolic junction up to hepatic flexure. Superior mesenteric artery was not palpable. Whole of gangrenous segment was resected and multiple small clots were retrieved from small mesenteric vessels. End to end anastomosis was done between



**Figure-2:** Gangrenous whole small intestine except proximal healthy 1.5 feet jejunum.

healthy end of jejunum and transverse colon in single layer extra mucosal fashion. Abdominal drain was placed in the pelvis and abdomen was closed with polypropylene suture No 1 continuous technique. Surgery remained uneventful and patient was extubated successfully.

Patient was monitored in COVID-19 isolated intensive care unit on heparin infusion and oral sips were allowed on 5th post-operative day and solid food on 7th post-operative day. COVID-19 PCR was positive and he was sent to the chest medicine department on 8th post-operative day with strict dietary restrictions. He was vaccinated for COVID-19 after one month and was followed for one month by both surgical and chest medicine department. He often complained of diarrhoea for which dietary restrictions were advised.

## Discussion

AMI is a rare but life-threatening abdominal emergency with high morbidity and mortality rates. Besides many other predisposing factors leading to AMI, the cases of AMI are also on the rise during COVID-19 pandemic. The exact pathological mechanism of development of AMI in COVID-19 positive and otherwise healthy patients is still unknown. It has been proposed by Parmar et al, that the direct invasion of bowel tissue by the virus giving expression of angiotensin converting enzyme 2 on enterocytes, is the main cause of arterial and venous thromboembolism in healthy patients.<sup>4</sup> Another hypothesis proposed by Parry AH et al, stated that the target receptor of SAR-Cov-2 or viral infection of the endothelial cell leading to diffuse endothelial inflammation of increased procoagulant factors like factor VIII. The virus also induces cytokine storm leading to coagulation and fibrinolysis activation<sup>5</sup>. Other hypothesis proposed by Sehhat et al, showed that the virus caused hypercoagulability due to presence of high number of prothrombotic circulating macrovesicles which are cytoplasmic microparticles stemming from platelets or monocytes and neutrophils extracellular traps (NETs) released by activated neutrophils.<sup>6</sup>

According to the World Society of Emergency Surgery there is no level 1 evidence to guide the evaluation and treatment of suspected AMI. The published literature only contains institutional reviews, case series and personal recommendations.<sup>7</sup> The goal of surgical intervention for AMI includes re-establishment of blood supply to ischaemic bowel, resection of all non-viable regions and preservation of all viable bowel. The healthy bowel may then be exteriorized as stoma or end to end anastomosis can be done to avoid high out stoma complications but with increased risk of anastomosis leakage. Some old school of surgeons considered AMI untreatable and they

carry the approach of just opening and closing of abdomen without any intervention once AMI is found, to prevent the patient from additional trauma of resection.

According to Kanasaki et al, superior mesenteric artery is involved in majority of the cases which leads to ischaemia of all small bowel and up to mid of transverse colon.<sup>8</sup> The average length of small bowel is 600 cm and if less than 200 cm gut remains, patient will be at risk of developing small bowel syndrome (SBS). SBS is clinically defined as malabsorption, diarrhoea, steatorrhoea, fluid and electrolyte imbalance and malnutrition. According to Luther et al, management of SBS requires patience, persistence and attention to details. Treatment includes giving total parenteral nutrition, intestinal transplantation and lifelong dietary restrictions including less fluid intake and small frequent solid meals rather than large meals three time a day.<sup>9</sup>

Role of surgery in SBS is controversial. According to Fan Bejar et al, the restoration of continuity of the small bowel to the large bowel after resection of gangrenous small bowel is the single most effective operation to make the patient independent of parenteral support and stoma related complications.<sup>10</sup> Nontransplant surgical procedures which included autologous gastrointestinal reconstruction are also devised to maximize the function of existing intestine. Dietary modifications like good hydration, enteral or parenteral nutrition, vitamins and minerals support and small frequent meals in patients with short bowel helps to improve the quality of life.

## Conclusion

During the COVID pandemic, high suspicion should be kept in mind while dealing with patients presenting with abdominal pain for AMI. Resection of diseased segment of

bowel and anastomosis is better treatment option to avoid high output stoma in cases of AMI. Small gut less than 60 cm can be managed by dietary restrictions and patient can lead a quality life.

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