

Spontaneous enteroatmospheric fistula in a patient with COVID-19 disease

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Abstract

Coronavirus 2019 (COVID-19) disease patients present with upper respiratory symptoms; however, these patients may show gastrointestinal symptoms on arrival at the hospital. This finding requires an abdominal physical examination and imaging for 33% of patients. Enteroatmospheric fistulas (EAF) may form a connection between the external environment and the gastrointestinal tract and usually presents various difficulties in controlling the disease without surgical intervention. Its management requires a high level of clinical expertise to control and treat the fistula. In this case report, spontaneous EAF and its management are presented in a 65-year-old morbidly obese female patient who spontaneously had EAF during her hospitalization for COVID-19.

Keywords: COVID-19, Enteroatmospheric fistula, Open abdomen

Introduction

Coronavirus 2019 (COVID-19) disease was first reported in Wuhan in December 2019 and caused the pandemic that is ongoing at present. Although COVID-19 is pathogenic in all age groups, middle and older age groups who suffer with comorbidities have been reported to be at higher risk. The disease, which manifests itself with fever, cough, dyspnea, muscle aches, and weakness, can result in acute respiratory distress syndrome (ARDS), multiple organ failure, and death [1, 2].

This pandemic has also led to some drawbacks in inpatient management when elective surgeries have been cancelled, and a relative increase in emergency and oncologic surgery applications has been observed [2, 3]. Furthermore, an increase in general emergency surgery cases regarding more serious diagnoses, complications, and mortality has been noted [4].

Enteroatmospheric fistulas (EAF) are enteric fistulas that form a connection between the external environment and the gastrointestinal tract, thus forming an open abdomen. EAF management usually presents various difficulties. Many factors make it difficult for spontaneous closure of the fistula tract, so the primary target for the EAF management is to control the fistula in a chronic wound healing environment and operate at the right time for a definitive surgical repair. While various surgical approaches are used, the appropriate approach is specific to the patient's characteristics and is best managed by an experienced surgeon [5]. Our aim in this case report is to reveal the management process of EAF in a COVID 19 patient.

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Informed Consent

The authors stated that the written consent was obtained from the patient presented with images in the study.

Conflict of Interest

No conflict of interest was declared by the authors.

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Case presentation

This case report presents spontaneous EAF and management in a 65-year-old female patient during her hospitalization for the COVID-19 infection. Informed consent was obtained before the admission period. A 65-year-old morbidly obese female patient who had hypertension and type 2 diabetes mellitus (DM) with COVID-19 infection presented in our department after spontaneous intestinal drainage from her anterior abdominal midline incision scar. She was hospitalised 18 days ago by the internal medicine clinic for a COVID-19 infection that manifested as bilateral pulmonary infiltration. Physical examination revealed an enteroatmospheric fistula orifice approximately 2 cm below the umbilicus and 1 cm left of the midline (Figure 1). Skin rashes were remarkable due to chronic irritation by intestinal drainage with biliary content. She was immobile due to her morbid obesity. Her history revealed that she had an open cholecystectomy and incisional hernia repair by an upper midline incision. A recurrent incisional hernia was found on physical examination. While contrast-enhanced abdominal computed tomography (CT) had confirmed the fistula tract (Figure 2), the thorax CT findings were compatible with typical pattern of COVID-19 pneumonia (Figure 3). She tested positive for COVID-19 based on polymerase chain reaction (PCR) and laboratory values with a D-dimer level of 2800 ng/mL, C-reactive protein (CRP) 30 mg/L, and creatinine level of 1.22 mg/dl. Our general surgery clinic took over her clinical follow-up. She had an advanced COVID-19 infection, so our primary therapy aimed to control the fistula during COVID-19 therapy. First, an abdominal vacuum-assisted closure (VAC) device was applied, but it was unsuccessful due to inflammation in the surrounding tissues. Therefore, surgery was planned under COVID precautions. The patient was operated on under sedation. Exploration revealed that the mesh belonging to the old operation and the herniated bowel loops under it were highly adherent and fistulised from this area. Further dissection did not help the surgeons enter the unhealthy abdominal cavity or repair the incisional hernia. The fistulised bowel loop was separated from the hernia sac and surrounding tissues and a temporary stoma through the skin was formed by suturing the lateral borders (Figure 4). Post-operatively, VAC was applied around the temporary stoma to cause fistula maturation. Broad-spectrum antibiotics were started.

Figure 1: Spontaneous fistula of the Coronavirus 2019 (COVID 19) patient revealed by physical examination



Figure 2: Fistula tract on abdominal computed tomography (CT)

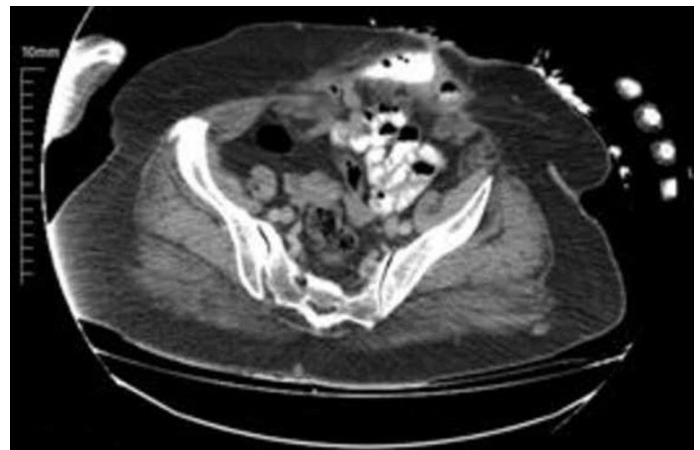


Figure 3: Pulmonary infiltrations due to COVID 19 disease



Figure 4: Fistula tract was matured as temporary stoma after first surgery



Antiviral and supportive treatments were administered during the post-operative period according to the current COVID-19 protocols. The control PCR test was negative. Her pulmonary function improved, which was demonstrated on a follow-up thorax CT. In the intensive care unit (ICU) follow-up, VAC application was found to be ineffective after one week of therapy, so a definitive approach was decided for the patient who was more suitable for definitive surgery. Surgical exploration revealed that the patient had dense adhesions in the entire abdominal cavity due to previous hernia repair with an onlay mesh placement. The fistulised area of 50 cm unhealthy bowel segment that was 200 cm from the Treitz ligament was resected. The proximal and distal small bowel segments were pulled through the skin in the form of a double-barrel ileostomy (Figure 5). The post-operative follow-up showed that the ileostomy was not effective due to stenosis, so the patient's ostomy was revised under sedative anaesthesia. After the stoma revision, her clinical condition improved, and the inflammation in the skin and the septic condition had regressed. After extubation, the patient was transferred to our service. On the second day of the service follow-up, the patient's state of consciousness deteriorated. The patient was intubated electively and taken back to intensive care. The patient died due to a massive pulmonary embolism as revealed by a contrast-enhanced thorax CT.

Figure 5: Double-barrel stoma after definitive surgery



Discussion

Several studies in the literature on enteroatmospheric fistula treatment are available. This case report is the first describing a spontaneous enteroatmospheric fistula and its management in a patient who had complications due to a COVID-19 infection. Due to the current pandemic processes, limited information about the choices and timing of treatment to be applied to this patient group and the difficulties that may be encountered in the management of the perioperative process is available [1–3].

Hospital administrations face increasing difficulties in managing critical resources during the pandemic, such as wards, intensive care units, ventilators, and protective equipment [1–3]. Surgeons must consider local COVID-19 resources. Surgeons must strictly follow two basic procedures: (1) safety and (2) precautions. The first question the surgeon should answer when confronted with a patient with COVID-19 disease is: “Is the patient suitable for non-operative treatment, or can surgical treatment be postponed?” Patient triage is crucial in determining the non-operative or operative approach. If the patient's clinic is not suitable for non-operative follow-up, the golden rule is to work with a minimum number of well-protected healthcare personnel. Close clinical and radiological follow-up at 12 to 24-h

intervals is required in patients selected for a non-operative treatment approach until their condition stabilizes. Surgery is inevitable if the patient's symptoms, such as abdominal pain, fever, and shock, persist or become aggravated [1–3].

Among the primary factors that can lead to the development of EAF are anastomotic leakage, serosal injuries, contact with surgical materials used in abdominal closure of dehydrated bowel loops, wound site infections, organ injuries, traumas and ischemia. After the enteroatmospheric fistula is formed, the primary approach in treating this complicated condition is to control the fistula tract. Considering the etiological factor of the fistula and the co-morbid conditions present in the patient, the use of medical and advanced surgical methods should primarily be involved in managing the disease [5, 6].

Bhayane et al. [7] stated that 34% of patients hospitalized for COVID-19 showed gastrointestinal symptoms on arrival, and 33% underwent abdominal imaging. In this study, three of four patients who had signs of bowel ischemia on a CT and underwent a laparotomy, gangrenous changes in the intestines were observed. Necrotic mucosal changes were detected based on pathological examinations. In the other patient, patchy yellow discoloration was detected on the antimesenteric side of the intestines. It has been stated that the potential causes leading to a clinical condition in these patients infected with COVID-19 may be the direct effects of viral infection on the small vessel thrombosis or mesenteric ischemia without occlusion. Angiotensin converting enzyme (ACE) 2 surface expression is most abundant in the lung alveolar epithelium, enterocytes of the small intestine, and vascular endothelium, suggesting that the small bowel and vasculature may be susceptible to COVID-19 infection.

In the case report prepared by Costanzi et al. [8] concerning a patient who developed a colo-vaginal fistula on the 31st post-operative day after a low anterior resection as performed, the authors stated that late bowel ischemia might develop in surgical patients due to a small vessel thrombosis associated with COVID-19. In our patient, it is thought that the mesh used in the previous operation and this ischemic process may be the primary factors in her EAF development [9].

Regulation of nutrition in the general medical management of the disease is essential for clinical progression. The possibility of fluid and intestinal content losses, peritonitis, and body stress response can put patients into a hypercatabolic process. First, a patient's hemodynamic stability should be ensured, electrolyte imbalance should be corrected, and acid-base balance should be provided. Wide spectrum antibiotherapy should be used for the septic process. Total parenteral nutrition (TPN) should be started as soon as possible. The anatomy of EAF, continuous intestinal surface, and length suitable for enteral nutrition should be carefully determined to establish a good nutrition plan. Although the advantages of enteral feeding over TPN are known, it should be considered that it will increase the fistula flow rate [5, 6].

The surgical approach contains difficulties, such as the fistula's sensitivity and surrounding tissues, severe dehydration, a septic process that develops due to intraperitoneal leaks, and intra-abdominal adhesions that restrict intra-operative

manipulation. When EAF develops, hidden fistulas, distal obstructions, foreign bodies, neoplasms, inflammatory bowel diseases, and distal obstructions may lead to the septic process and spontaneously prevent the fistula's closure. Thus, optimal medical and surgical treatment is essential [5, 6, 10–12].

In our case, the patient died although early nutritional therapy had commenced, and infectious precautions were taken for local control of the fistula. Her death was possibly related to COVID-19 infection and its deleterious effect on the patient's clinical condition and her comorbidities. VAC therapy was preferred in literature as in our case [9]. Unfortunately, the patient's clinical condition was not conducive to the continuation of the treatment in this way. Surgical interventions were performed to control the EAF, which were successful but may have contributed to the pro-inflammatory environment that led to the immobilized patient's septic condition and pulmonary embolism.

Conclusion

COVID-19 might present with gastrointestinal symptoms or manifest with complications during the peri-operative period. Surgeons should be aware of the possible deleterious effects of COVID-19 during patient management. During management of the clinical situation of the patient, optimal timing of surgical intervention may be required to avoid the additional burden of COVID-19 disease.

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