

Bowel Perforation in COVID-19 Patient Treated With DexamethasoneCastro G^{1*}, Ryan M¹ and Franz M¹¹Department of medicine, AMSA UCF College of Medicine, USA***Corresponding author:**

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1. Abstract

The treatment and management for COVID-19 continues to evolve as we have gained more experience with infected patients over the past year of this pandemic. The goal of the medical team is to optimize the care and balance the risk and benefits of each intervention and treatment. Currently, guidelines include starting dexamethasone therapy for patients requiring supplemental oxygen or mechanical ventilation. However, each treatment and intervention comes with risks. Here, we discuss the case of a 76-year old male who presented to the ED with dyspnea and cough after being diagnosed with COVID-19 three days prior. The patient was admitted for COVID pneumonia and was treated with dexamethasone, remdesivir, and convalescent plasma. The patient then received Acetyl Salicylic Acid (ASA) and Lovenox due to elevated D-dimer. On hospital day 11, the patient developed acute-onset, vague, lower abdominal pain without peritoneal signs or diffuse tenderness on palpation. Abdominal X-ray (KUB) noted pneumoperitoneum and positive Rigler's sign. Chest X-ray (CXR) days prior revealed an 8 cm descending colon. The patient underwent an emergent, exploratory laparotomy with total colectomy and end ostomy due to cecal and sigmoid bowel perforation of unknown etiology following 11 days of treatment with dexamethasone and remdesivir. This case documents an incident of bowel perforation with minimal abdominal symptoms or physical exam findings following an 11-day course of glucocorticoid therapy in a COVID-19 positive patient.

2. Introduction

As the number of COVID-19 positive cases rise, current treatments require frequent revision with essential attention to balancing the potential risks of these interventions. The current literature continues to focus on respiratory symptomology and acute

respiratory complications; however, a proportion of patients may present with concurrent gastrointestinal symptoms or may suffer GI events as adverse effects of treatment. Gastrointestinal perforation is commonly associated with diverticulosis, diverticulitis, neoplasms, iatrogenic causes, and adverse drug effects [1]. Glucocorticoid steroids have had a long history of delaying positive physical exam findings and have been shown to increase the risk of bowel perforation [2]. It is also essential to note the potential for SARS-CoV-2 to have its own role in the development of gastrointestinal symptoms with additional exacerbation by the current recommended treatment guidelines. The Recovery Collaborative Group has theorized direct insult to colonic cells by the virus. The virus receptor, Angiotensin Converting Enzyme (ACE)-2, has been found in the glandular cells of the rectal and other GI epithelia [3]. Here, we report a patient with several risk factors including a prior history of polyps, as well as glucocorticoid use and NSAID therapy as treatment for COVID-19 infection. This report aims to add to the existing literature for optimizing COVID-19 treatment while balancing the risks of interventions and potential complications.

3. Case

A 76-year-old man presented with dyspnea and prior diagnosis of COVID-19 for 3 days' duration. The patient was symptomatic 10 days before confirmatory COVID-19 testing with complaints of weight loss, cough, and new-onset dyspnea. He denied abdominal pain, nausea, vomiting, melena, hematochezia, or diarrhea. The patient also denied classic signs such as loss of sense of smell or taste, headache, and sore throat. Additionally, no lower extremity swelling, pain, or hemoptysis was noted. Chest CT depicted ground-glass opacities, with no pulmonary embolus present. Sputum samples were collected on admission. The patient received the

final diagnosis of COVID pneumonia.

The patient's past medical history included chronic hepatitis C, hyperlipidemia, colonic polyp, tobacco dependence, alcohol dependence, chronic lower back pain with disc disorder and degeneration, shoulder pain, arthropathy, and hypercholesterolemia. Family history was noncontributory. His allergies included Rosuvastatin and Simvastatin. Surgical history included left total knee replacement, resection of distal right clavicle, and cataract extraction.

The patient quit smoking six months prior to presentation. He denied alcohol and illicit drug use. He was single, lived alone, and worked as a police officer. Vitals on presentation included Temperature: 98.2F, HR: 75, RR 18, BP 140/82, Weight: 202.3 lbs. BMI: 28.3. His initial arterial blood gas demonstrated hypoxemia (pO₂: 81) on 8L nasal cannula, pH and bicarbonate with slight elevation, and pCO₂ within normal limits. D-dimer elevation of greater than 3,000 prompted prophylactic fractionated heparin therapy. The patient required 10-12 liters of oxygen via nasal cannula to maintain an O₂ saturation greater than 92%. Intravenous Solu-Medrol 125 mg was initiated with transition to IV dexamethasone 6 mg every 24 hours.

3.1. Continued Clinical Course

On hospital day 11, the patient complained of new-onset abdominal distension with lower abdominal pain. He reported normal bowel movements at this time. Chest X-ray showed significant free air in the abdomen underlying the diaphragm bilaterally with dilated loops of bowel. Additional findings included patchy opacifications throughout the lung fields bilaterally consistent with COVID pneumonia.

The patient's physical exam included: lower abdominal tenderness with distension and no visible deformity. No signs of peritonitis included guarding or rigidity were present. The patient spoke in short sentences with accessory muscle use noted. Vitals were Temperature: 97.7 F, HR: 76-94, RR 18-40, SBP 101-123, DBP 64-82 and pulse oximetry 84-100 ON 40L FI0₂: 70% with nasal cannula.

The patient's laboratory data demonstrated a WBC of 17.8, 90% neutrophils and prothrombin time of 14.7. Preoperative imaging including abdominal X-ray noted free air under the hemi diaphragm with multiple dilated loops of bowel and double wall sign present.

The patient proceeded to an emergent exploratory laparotomy with increased risk of prolonged respiratory failure, MI, stroke, VTE/PE, anastomotic leak, wound infection, and a calculated overall 65% mortality rate.

Intraoperatively, tense pneumoperitoneum was identified. The abdomen revealed an inflammatory response in the right lower quadrant. The cecum was perforated with early abscess formation and serosal surface inflammation. The transverse and proximal colon showed an area of transmucosal and transmural ischemia. Addi-

tionally, sigmoid colon was inflamed, contracted, and perforated. Intraoperatively, the distal colon appeared obstructed possibly due to a perforated diverticulum with stricture and contraction resulting in cecal perforation. Due to the extensive colonic injury, the decision was made to perform an abdominal colectomy with end ileostomy.

Due to severe COVID pneumonia, the patient returned to the Medical Intensive Care Unit (a dedicated COVID unit) for primary post-operative care. After 24 hours of mild hemodynamic instability responsive to fluid and pressor support, he recovered. He was successfully weaned off ventilation and extubated. The patient did not have further complications post-operatively and has a functional ostomy.

4. Discussion

As the numbers of COVID -19 cases rise and hospitals adopt standardized protocols for treatment, increasing incidences of adverse events are observed. The primary symptomology of COVID-19 positive patients includes respiratory symptoms and complications such as acute respiratory failure and pneumonia. Patients continue to be treated with supplemental oxygen, steroids, remdesivir and mechanical ventilation to mitigate complications.

Currently, patients requiring invasive mechanical ventilation or oxygen alone often receive dexamethasone treatment³. Dexamethasone is administered at a dose of 6 mg daily for 10 days or up until discharge. This recommendation results from studies finding lower 28-day mortality among patients given dexamethasone in addition to mechanical ventilation or oxygen [3]. However, with this benefit, there is associated risks. Glucocorticoid steroid use has been shown to have multiple and common adverse effects that include immune suppression, diabetes, reduced wound healing, adrenal suppression, tissue atrophy, hypertension, peptic ulcers, and GI bleeding [5]. Several studies have also shown that prolonged steroid use can lead to delayed symptom presentation of bowel perforation or other GI complications such as peritonitis and abdominal pain [3,5]. Patients taking steroids are at an increased risk of gastrointestinal perforation with increased morbidity and mortality rate due to the delayed symptom presentation likely resulting from steroid-induced inflammatory suppression [8]. A relationship between gastrointestinal symptoms and COVID-19 has also been described in several case reports and studies [6,7]. These symptoms include nausea, vomiting and diarrhea resulting from the SARS-CoV-2 utilizing Angiotensin-Converting Enzyme (ACE) 2 as a viral receptor in gastrointestinal cells. The ACE2 messenger RNA is used as a viral transporter in the gastrointestinal system [2]. Specifically, receptor expression has been noted along the lining of the gastric, duodenal, and rectal epithelia which supports the entry of SARS-CoV-2.2 Additionally, bowel perforation has been reported in several patients with COVID-19 infection.

This patient presented with vague, abdominal pain without guard-

ing or rebound during hospital management of acute COVID-19 pneumonia. In the case of this patient, the combination of symptom suppression, gastrointestinal mucosal insult due to COVID-19, glucocorticoid therapy and history of colonic polyps could have precipitated the dual cecal and sigmoid bowel perforation.

This case demonstrates the need to consider gastrointestinal involvement of COVID-19 infection and a potential link to bowel perforation, GI bleed, and more common GI symptoms such as nausea, vomiting, and diarrhea. This patient, despite recovering well, was left with a permanent ostomy. To best optimize patient care, all factors must be considered to avoid adverse events, such as bowel perforation. In addition, special attention should be taken to evaluate abdominal complications. Due to the increasing use of systemic steroid treatment and the ongoing discoveries regarding the novel SARS-CoV-2 virus, indications for monitoring patients should be continuously assessed. The risks of currently established treatments should be considered when managing patients in the hospital setting in order to raise clinical suspicion for GI involvement in COVID-19 patients.

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