CASE REPORTS

Activating Dormant Strongyloidiasis Secondary to COVID-19 Treatment

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ABSTRACT

The SARS-CoV-2 pandemic has grown into a major global concern with huge efforts to combat the spread. Exaggerated inflammatory response plays a major role in which was the rationale to use corticosteroids as a treatment option. However, multiple studies showed an association between of opportunistic and bacterial infections in patients under corticosteroid therapy. We report a case of a 76-year old patient diagnosed with COVID-19 pneumonia, treated with 10 days Dexamethasone and Remdesivir who presented with abdominal symptoms with eosinophilia. Biopsy and stool studies revealed strongyloides stercoralis larvae. The patient was treated with 2 doses of Ivermectin with significant clinical resolution. Clinician should have high clinical suspicion for Strongloydiasis in patients who have lived or visited *Strongyloides stercoralis* endemic areas and for patients with unexplained eosinophilia. Prompt treatment with Ivermectin is crucial for confirmed cases and should be also implemented empirical in high risk groups, where obtaining a diagnosis is unfeasible.

Key Words: Strongyloides stercoralis, Corticosteroids, Dexamethasone, SARS-CoV-2, Immunosuppression

1. INTRODUCTION

The SARS-CoV-2 pandemic has grown into a major global concern with huge efforts to combat the spread.[1] Exaggerated inflammatory response plays a major role in alveolar destruction that happens with severe coronavirus infection (COVID-19) cases, as shown by many studies.[2] This finding was the reason for using corticosteroids in addition to oxygen supply as a therapy for respiratory failure in critically-ill patients.[3] One randomized clinical trial, the RECOVERY trial, affirmed the survival benefits of using corticosteroids.[4] The study showed evidence that 10-day course of dexamethasone once daily for 10 days reduces 28-day mortality in hospitalized patients with COVID-19 pneumonia on oxygen supply. Another approach to treatment was the use of antiviral therapy. Remdesivir was approved by the Food and Drug Administration (FDA) as it has shown activity against SARS-CoV-2 in vitro.[5] Multiple clinical trials were conducted to assess remdesivir efficacy with variable results.[6]

Upon review of the literature, multiple studies showed increased risk of opportunistic and bacterial infections in patients under corticosteroid therapy.[7] When using immunosuppression with corticosteroids, continuous clinical monitoring is recommended, as secondary infections might arise.[8]

The soil-transmitted nematode Strongyloides stercoralis is the pathogen that causes strongyloidiasis. The global prevalence is estimated to be 30-100 million. The nematode is endemic in tropical and subtropical regions.[9–20]

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Reports of activation or exacerbation of *S. stercoralis* infection in COVID-19 patients treated with either dexamethasone or Remdesivir are few.[10,19,20] Here, we present a case of a 76 year old male with COVID-19 and reactivation of *S. Strongyloides* infection.

2. Case Presentation

The 76-year-old male presented with diffuse abdominal pain as the main symptom. His past medical history included several underlying diseases, like chronic obstructive pulmonary disease (COPD) on home oxygen, chronic kidney disease (CKD), coronary artery disease (CAD), hypertension and a recent COVID-19 infection two weeks prior to admission. The patient localized the abdominal pain mainly in the epigastric area and reported associated anorexia, nausea, vomiting, and diarrhea. Moreover, he noticed a weight loss of 17kg within the last 8 months. There were no reports of hematemesis, melena, hematochezia, fever, sweats, or chills. During his last admission for COVID-19 infection, the patient required no respiratory ventilation support, including invasive or non-invasive. Moreover, he received a 10-day-course of 6 mg Dexamethasone, Remdesivir with a loading dose of 200 mg intravenously and then maintenance dose of 100 mg for 5 days and convalescent plasma. Of note, the patient had a colonoscopy 10 years ago and esophagogastroduodenoscopy 7 years ago, which were both unremarkable. On presentation, the patient's vital signs were notable for oxygen saturation of 97% on ambient air, temperature of 36.7 degrees Celcius, systemic arterial blood pressure of 110/80 mmHg, heart rate of 78 beats/minutes and respiratory rate of 14 breaths/minute. On physical examination, the patient appeared cachectic. He was alert and oriented to person, place, time, and situation. His sclerae were anicteric. Auscultation of the heart showed regular rate and rhythm with no murmurs, and auscultation of the lungs showed equal air entry with no added sounds. Examination of the abdomen revealed normoactive bowel sounds with epigastric tenderness without organomegaly. Neurological examination was non focal. Initial laboratory workup was significant for hyponatremia of 122 mEq/L, leukocytosis with eosinophilia, and urinalysis consistent with urinary tract infection with positive leukocyte esterase and bacteria. Urine studies show high urine sodium, low serum osmolality, and high urine osmolality, consistent with syndrome of inappropriate antidiuretic hormone secretion (SIADH). Computed tomography scan (CT-scan) of the abdomen showed focal colonic wall thickening involving the cecum and right hemicolon. During his hospital stay, and as part of hyponatremia treatment protocol, he was placed on fluid restriction with minimal improvement. He was started on 15 mg tolvaptan orally afterwards, which improved his sodium. Given the inconclusive CT-scan findings, gastroenterologists were consulted for further evaluation. A colonoscopy was attempted but was limited due to poor bowel preparation. Upper endoscopy showed Los Angeles (LA) grade D erosive esophagitis. Biopsies were obtained for pathological examination. The histopathological findings indicated duodenitis with acute inflammation and necrosis, which was suggestive for a parasitic infection. Due to this finding, we received a stool sample for examination which revealed concentrated ova and parasite wet mount of strongyloides stercoralis larvae. The patient was maintained on sucralfate and was given two doses of 0.2 kg Ivermectin orally. Several days after, he reported resolution of nausea, diarrhea and abdominal pain. His appetite improved marginally. The patient was then discharged from hospital with close outpatient follow-up.

3. Discussion

Upon literature review, reports of strongyloidiasis exacerbation within patients with a COVID-19 infection are scarce[19,20] However, based on clinical experience with the use of steroids to treat other diseases, exacerbation of S. stercoralis manifestations can may occur.[11] Different therapeutic approaches have been developed for the treatment of the COVID-19 infection, with ongoing debate regarding their efficacy. The findings of the RECOVERY trial have been encouraging.[4] However, the applicability of the results is limited in certain settings, especially in low-income, African countries.[12] One of the concerns raised by the authors was the risk of reactivating or worsening dormant infections like tuberculosis or strongyloidiasis.

Strongyloidiasis is caused by infection by the helminth strongyloides stercoralis. The filariform larvae usually reside in soil or other sources contaminated by human feces and enter the body through the skin. The larvae migrate to the lungs where they travel up the tracheobronchial tree and get swallowed. It matures in the intestine and deposits eggs into the mucosa. Rhabditiform larvae hatch and are excreted in the stool to restart the life cycle. Rhabditiform larvae may also become filariform larvae and travel to the lungs for autoinfection. Adult worms may live up to 5 years without causing symptoms.[9]

Strongyloidiasis may present with a spectrum of symptoms, ranging from mild to severe.[9] In patients with an underlying immunosuppression, disseminated infection may occur with a high mortality rate (up to 70%–100%).[13] The disseminated state is severe and can result in colonization of body areas with parasities, which they normally do not reach. These include organs like the liver, heart, brain and the urinary tract.[14] Given these high fatality rates, high clinical

suspicion should be implemented to screen patients with high risk for reactivation, and to pursue empiric treatment if diagnostic tools are unavailable.[15] The case presented here did not raise any suspicion for increased risk of strongyloidiasis; this suggests that the diagnosis was possibly associated with the use of high-dose corticosteroids used to treat the COVID-19 pneumonia. Fortunately, the patient did not develop a disseminated infection which can be probably attributed to early detection and timely treatment.

The risk of disseminated infections has been gaining recognition. A recently published paper proposed a dedicated strategy for epidemiological risk stratification to prevent disseminated Strongyloides infection for COVID-19 patients on high-dose steroids therapy.[16] Based on this strategy, a presumptive ivermectin treatment can be offered to patients at high risk who initiate or are candidates for steroids in both outpatient and inpatient settings.

The efficacy of single dose Ivermectin has been well-established for patients with confirmed uncomplicated infection.[17] A longer course of treatment can be offered for patients with disseminated infections.[18] The patient in our case was treated with two doses of Ivermectin due to the underlying immunosuppression with corticosteroids therapy.

4. Conclusions

We report a case of confirmed strongyloidiasis in a COVID-19 patient treated with high-dose steroids. High clinical suspicion should be implemented especially for patients who have lived or visited endemic areas. Moreover, it is recommended to consider strongyloidiasis in patients with unexplained eosinophilia. Prompt treatment with Ivermectin should be considered for confirmed cases or for high risk cases where obtaining a diagnosis is unfeasible.

Conflicts of Interest Disclosure

The authors have declared no conflicts of interest.

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