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Case Report

Acute Appendicitis and Multisystemic Inflammatory Syndrome due to COVID-19: a Case Report and Literature Review

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ABSTRACT

The prevalence of gastrointestinal symptoms of COVID-19 is variable with different types of presentations. Some of them many present with manifestations mimicking surgical emergencies. Yet, the pathophysiology of acute abdomen in the context of COVID-19 remains unclear. We present a case of a previously healthy child who presented with acute appendicitis with multisystemic inflammatory syndrome. We also highlight the necessity of considering the gastrointestinal symptoms of COVID-19 infection in pediatric patients in order to avoid misdiagnosis and further complications.

Introduction

Fever, dry cough, myalgia, tiredness, dyspnea, and anorexia are common symptoms of COVID-19 infection. However, a large number of individuals also reported gastrointestinal symptoms (1) . Gastrointestinal manifestations were the main elements in the clinical picture of about 92% of patients with multisystemic inflammatory syndrome (MIS) associated with COVID-19(2). Acute abdomen remains a rare presentation of COVID-19 but its association with the disease prognosis is still undetermined (1). In children with MIS, it is very often difficult to distinguish surgical etiologies of acute abdomen from nonsurgical etiologies and the use imaging tools remain necessary to guide further management (3). Blumfield et al. reported various abdominal imaging findings in COVID-19 patients, especially in pediatric patients with multisystem inflammatory and including ascites, bowel wall thickening, echogenic kidneys, hepatomegaly, splenomegaly, gallbladder wall thickening, bladder wall thickening, and mesenteric lymphadenopathy (4). We present the case of a 10 years child with no history of previous disease who developed acute appendicitis in the context of COVID-19 associated MIS.

Observation

A 10-year-old fully immunized male presented fever associated with chills, mild periumbilical abdominal pain radiating to the right

iliac fossa, myalgia and arthralgia. He we exposed to COVID-19 five weeks earlier. He was started in the clinic on antibiotics, Dexamethasone, and ibuprofen. When he arrived to our department, he had mild microcytic anemia, mild thrombocytopenia, lymphopenia and increased CRP Ferritin and D-dimer. He had negative COVID antigen test and PCR and positive Covid IgG antibody. Abdominal Ultrasound and CT scan showed multiple enlarged matted mesenteric lymph nodes clustered at the right iliac fossa associated with mild free fluid mainly in the right iliac fossa. Appendectomy was performed. Post-operatively, the patient was conscious and stable. Histology showed reactive lymph node and mild serositis in the resected appendix. Two days after the intervention, he became unstable with low oxygen saturation, tachycardia, tachypnea, dizziness, hypotension, lower limb edema, and myalgia and he was admitted to ICU. Chest X rays revealed bilateral infiltrates mainly on the right side, with left pleural effusion. The patient was treated with O2 nasal canula, antibiotics, methyl prednisone, aspirin, LMWH, and IVIG. The treatment was followed by resolution of the symptoms. He was afebrile with no significant findings upon systemic examination. Further, the patient developed sudden pain in his left leg, associated with tenderness, swelling, with no redness. The Doppler showed soft tissue edema. ECG showed signs of carditis and chest imaging revealed pleural effusion. The treatment by antibiotics and corticoids was continued. His status was improved and he was discharged on Prednisolone, Cefdinir, and Esomeprazol, figure 1.

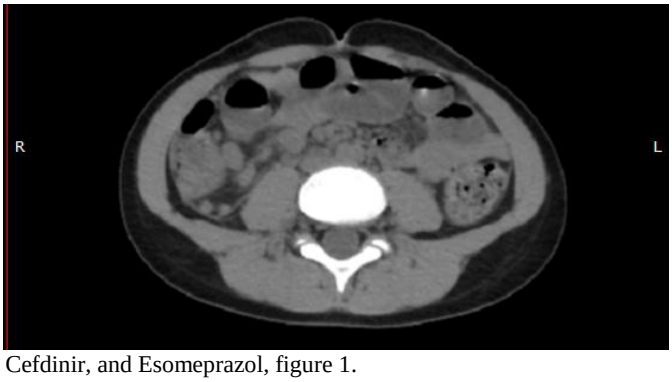

Figure (1): CT scan showing multiple enlarged matted mesenteric lymph nodes clustered at the right iliac fossa.

Discussion

The prevalence of gastrointestinal involvement of COVID-19 in pediatric patients varies is between 0 and 88% with a wide range of symptoms including vomiting, and abdominal pain, vomiting, diarrhea… Some atypical manifestations mimicking surgical emergencies may be also present, especially in the context of MIS(5). Various abdominal imaging findings have been reported in COVID-19 patients, especially in pediatric patients with MIS including ascites, bowel wall thickening, echogenic kidneys, hepatomegaly, splenomegaly, gallbladder wall thickening, bladder wall thickening, and mesenteric lymphadenopathy (4, 6).

Also, when the digestive symptoms are major, like in our case, MIS may be confused with other gastrointestinal diseases (7). Therefore, the diagnosis of MIS should be considered patients with a history of recent exposure to SARS-CoV-2 even in the absence of respiratory signs especially if inflammatory markers are high(6). The severity of abdominal pain may sometimes make it difficult to distinguish between surgical emergencies such as acute appendicitis and other conditions (3). In a recent report, acute abdomen was found in in 30.9% of MIS patients with gastrointestinal manifestations. Yet, the final diagnosis was not surgical in 76.4% of the cases. These non-surgical diagnoses included ileocolitis, mesenteric lymphadenitis; paralytic ileus, and ascites. Urgent laparotomy was found to be unnecessary in about 50% of the children while real emergencies including obstructive ileus and appendicitis were found in a small percentage of the patients(8). The management of these manifestations may led to a big dilemma since delaying acute abdomen treatment can have a serious impact on the prognosis while undergoing unnecessary surgical interventions in children with MIS may worsen the course of the infection and lead to high morbidity and mortality rates(2). The pathophysiology of appendicitis in the context of MIS is unclear. ACE2 which is the receptor of the SARS-CoV-2 virus is highly expressed in host enterocytes. Appendicitis may be caused by the inflammation caused by the viral invasion, by the resulted lymphoid hyperplasia or by the inflammation the appendicular artery (9). Moreover, the virus can interact with this receptor and infect gastrointestinal tract cells and lead to an excessive immunological response in these cells with the infiltration of host lymphocytes and plasma cells. This infiltration can induce interstitial edema and lead to the damage of the gut-blood barrier, causing a multisystem dysfunction because of the release of microbial metabolites, endotoxins and viral particles into the general circulation (5, 10).

Conclusion

We highlight the necessity of considering the gastrointestinal symptoms of the MIS caused by COVID-19 infection. Also, more deep studies should be done to identify the category of pediatric patients with COVID19 who should undergo urgent surgery for acute abdomen in order to avoid misdiagnosis and unnecessary interventions.

Ethical statement

A written consent signed by the parents was obtained to state their permission to publish the text and any images.

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Conflicts of interest

The authors declare no conflicts of interest.

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