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A Rare Case of Intussusception in A COVID-19 Positive Patient with Nephrotic Syndrome

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ABSTRACT

Background and Objective: Intussusception is one of the most common causes of intestinal obstruction in children 5 months to 3 years, which is the most common cause of acute abdominal pain and its prevalence increases as a result of viral infection. In this report, were present a case of intussusception in a 17-years-old boy following COVID-19.

Case Report: A 17-year-old adolescent boy with a known case of steroid-dependent nephrotic syndrome from the age of two has been referred to the emergency department with severe abdominal pain and vomiting. On ultrasound, renal mass and free fluids were shown. Ileocecal intussusception was observed and was repaired without any complications.

Conclusion: Based on the results of this study, intussusception should be considered in every patient with nephrotic syndrome with COVID-19 infection.

Keywords: *Intussusception, Nephrotic Syndrome, Meckel Diverticulum, COVID-19.*

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Introduction

Intussusception (IS) is one of the most common causes of bowel obstruction in children between 5 months to 3 years of age. Furthermore, it is the most common cause of acute abdominal pain in children less than 2 years old. Intussusception occurs when a part of gastrointestinal tract is telescoped into distal segment. The cause of IS in majority of cases is unknown (1-3). However, in older children and adolescent, it may be seen with benign or malignant lesions such as mackle's diverticulum, intestinal duplication, lymphoid hyperplasia, intestinal polyps and so on. Clinical suspicion is important to prevent intestinal ischemia, perforation and peritonitis. Intussusception is rarely seen in cases with underlying disease, such as Nephrotic Syndrome (NS). NS is defined by heavy proteinuria (more than 40 mg/m2/hr), generalized edema, hypoalbuminemia, and hyperlipidemia. Abdominal discomfort, pain and peritoneal signs in NS usually result from bowel wall edema or secondary to ascites and spontaneous bacterial peritonitis. In addition, it may be due to the other causes of acute abdominal pain (4-6).

The covid infection is caused by COVID-19 and the first outbreak was reported in Wuhan in China. The main organ affected by COVID-19 infection is respiratory tract. This disease has spread in the world rapidly by respiratory tract droplets and according to WHO (world health organization) report, it is a pandemic disease (3, 7)

In addition to respiratory tract involvement, other organs could be involved and patients may be presented with other signs or symptoms of respiratory tract. Gastrointestinal (GI) tract symptoms in COVID-19 infection may be abdominal pain, nausea, vomiting or diarrhea. Moreover, like other viruses, hypertrophy of the Peyer's patches may be a predisposing factor for IS. However, reports of association between these two diseases are rare. In this report, we present a rare case of NS with COVID-19 infection and IS (3, 7).

Case Report

This study was approved by the ethics committee of Babol University of Medical Sciences with the code IR.MUBABOL.REC.1399.289. A 17-year-old adolescent boy who was a known case of steroid-dependent nephrotic syndrome since he was two years old was referred to emergency department with severe abdominal pain and vomiting. He had history of several hospital admissions for frequent relapses of NS. His last admission was two weeks before with abdominal pain and was treated with high dose of prednisolone 60 mg/m2/day. Considering COVID-19 infection and his weakness, myalgia, loss of appetite, the test of oropharynx multiplexes PCR for COVID-19 infection was done and was reported positive.

He had no family history of COVID-19 infection. He has been vaccinated according to the immunization program and had no history of surgery. He received prednisolone, enalapril and pantoprazole. He was discharged after 3 days. He had abdominal pain with nausea and vomiting. Each periodic abdominal pain took place at intervals of 30-60 minutes and lasted 20-30 minutes. Over time, the episodes become longer and more intense. He had no episodes of rectal bleeding with currant jelly stool. He was pale, dry mucus, afebrile and his blood pressure was 110/80 mmHg, heart rate was 87 beat/min, respiratory rate was 23 times per minute and arterial blood gas was 96%. On abdominal examination, tenderness was detected in the upper right part of the abdomen without feeling a mass. Rectal examination showed normal results. Laboratory test revealed leukocytosis with neutrophil and elevated ESR (erythrocyte sedimentation rate) (Table 1).

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Ultrasonography examination showed pseudo kidney mass and free fluid in abdomen. Broad-spectrum antibiotics were used (Cefotaxime plus Vancomycin). Blood and urine cultures were obtained and he was asymptomatic. After regulation of water and electrolytes, hypernatremia and hypokalemia were corrected. After hemodynamic stabilization by nasogastric tube and intravenous fluid therapy, the barium swallow test was unsuccessful and open surgery under general anesthesia was performed. During the operation, ileocecal IS was seen and was repaired without any complication. Due to the possible cause of Meckel's diverticulum, a diverticulectomy was performed (Figure 1). No respiratory, gastrointestinal, or sepsis symptoms occurred during hospitalization. After three days, his diet began and he was discharged after a week in good condition.

Table 1. Laboratory test findings of intussusception in the COVID-19 positive patient with nephrotic syndrome

Investigation	Findings
Hemoglobin	14.8 g/dl
Erythrocyte sedimentation rate	60 mm in first hour
Total white blood cells count	21300 /mc lit
Neutrophils	75%
Lymphocytes	18%
Platelets count	824000/mc lit
Random blood sugar	81 mg/dl
Serum creatinine	0.61 mg/dl
Blood urea nitrogen	13 mg/dl
Alanine aminotransferase	16 U/L
C-reactive protein	3 mg/dl
Sodium	128 mEq/L
Potassium	2.7 mEq/L
Calcium	7.1 mg/dl
Albumin	2.1 g/dl
Total protein	3.5 g/dl
Cholesterol	477 mg/dl
Triglycerides	702 mg/dl
PT	14.4 seconds
PTT	37 seconds
INR	1.2
Urine analysis	protein 3^{+}
COVID-19 PCR nasopharynx	Positive

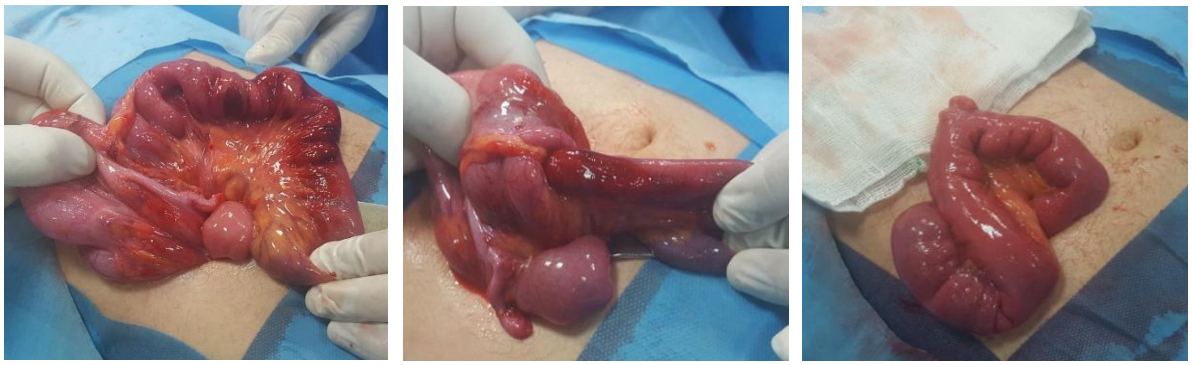

Figure 1. Open reduction of ileocecal intussusception

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Discussion

In this study, a 17-year-old adolescent boy with COVID-19 was reported with intussusception and nephrotic syndrome. The first case of nephrotic syndrome with intussusception was reported in 1975 based on an autopsy (8). In cases of NS with intussusception, Asai et al. (2) noted that most intussusception occurs during generalized edema for 2 weeks or more, which was similar to our patient. Moazzam et al. (3) presented a 4-month-old COVID-19 positive male patient with intussusception which caused abdominal pain, and currant jelly stool who survived. Coinfection and early diagnosis are among the similar reasons.

Cai et al. reported a 10-month-old female with fever, vomiting, currant jelly stool and multiple organ involvement which caused intussusception, who unfortunately died (7). In our study, the patient was discharged despite immunodeficiency and COVID-19 infection. However, early surgery and elimination of the mackle's diverticulum may be effective in improving this disease and also age differences can be effective in recovery.

At the onset of the COVID-19 pandemic, studies have shown that children with mild acute infections may be at risk for secondary inflammatory syndrome (3, 7).

Gastrointestinal manifestations in COVID-19 infection can be presented with nausea vomiting, diarrhea, abdominal pain, dysentery, and etc. So far, three cases of intussusception have been reported in an infant with COVID-19 infection who had no structural abnormalities, which was caused by rectal bleeding, restlessness and fever (3, 7).

To date, intussusception was not found in patients with COVID-19-associated nephrotic syndrome at this age. In the present case, intussusception, Meckel's diverticulum, which has not been presented until this age, was accidentally detected in surgery. Because the patient has not had any problems with several relapsing of NS and has recently developed COVID-19 infection, the association between COVID-19 infection and intussusception is probable.

Possible mechanisms for this condition may be due to intestinal epithelial cells invasion by virus and local reaction. So, mesenteric adenitis can increase the susceptibility of intussusception (1). In addition, an association was reported between adenovirus and intussusception in children after viral infection. Moreover, their stool analysis showed poliovirus, norovirus, parechovirus, and enterovirus (9). The ACE2 receptors for COVID-19 have function and because this protein is involved in the absorption of amino acids at the level of small intestinal enterocytes, and could be a suitable site for the virus (3, 7).

The interesting point of this case report is the occurrence of intussusception at an uncommon age and association with Meckel's diverticulum and nephritic syndrome. This patient was not symptomatic and had no problem before referring. After infection with COVID-19, intussusception occurred. It is certainly not possible to say that COVID-19 infection was the cause, but the concurrence of these three diseases had not been mentioned yet and COVID-19 infection is unknown and more studies with similar demonstrations are needed for conclusion and certainty.

According to this study, intussusception must be considered in any patient with nephritic syndrome and also with COVID-19 infection.

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