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COVID-19 presenting as intussusception in infants: A case report with literature review

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ARTICLE INFO

Keywords: COVID-19
Intussusception
Mesenteric lymphoid hyperplasia
Infants

ABSTRACT

The novel Corona virus disease 2019 (COVID-19) first presented in Wuhan, China. The virus was able to spread throughout the world, causing a global health crisis. The virus spread widely in Jordan after a wedding party held in northern Jordan. In most cases of COVID-19 infection, respiratory symptoms are predominant. However, in rare cases the disease may present with non-respiratory symptoms. The presentation of COVID-19 as a case of intussusception in children is a strange and rare phenomenon. We present here a case of a two-and-a-half month old male baby who was brought to hospital due to fever, frequent vomiting, dehydration and blood in stool. He was diagnosed as intussusception. The child was tested for corona due to the large societal spread of the virus and because he was near his mother, who was suffering from symptoms similar to corona or seasonal flu (she did not conduct a corona test). Patient was treated without surgery and recovered quickly. The COVID-19 infection was without respiratory symptoms, and there was no need for the child to remain in hospital after treatment of intussusception. The relationship between viruses, mesenteric lymphoid hyperplasia, and intussusception is a confirmed relation. ACE2 is the key receptor required for SARA-COV-2 to enter the host cells. ACE2 has been also found in the brush border of the intestinal mucosa, as well as it is a key inflammatory regulator in the intestine. This may suggest that SARSA-COV-2 could invade the respiratory tract as well as gastrointestinal tract or both. Few case reports documented the presentation of COVID-19 as intussusception in children. In the light of the wide-spread of corona virus, performing COVID-19 tests for children with intussusception can help linking the two entities. Development of gastrointestinal symptoms in COVID-19 positive children should raise concern about the development of intussusception.

1. Introduction

Late 2019, in Wuhan, China, patients who presented with dry cough, decreased or normal white blood cells and fever where diagnosed as “Fever of Unknown Origin with pneumonia” [1]. Soon after that, the causative agent for this “Fever of Unknown Origin with pneumonia” was attributed to the novel severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), i.e. Corona virus disease 2019 (COVID-19) [2]. Corona Virus has strong Human to human transmission and can lead to serious respiratory complications that may cause death [3]. In few months after the detection of the first Wuhan COVID-19 case, the novel virus was able to spread further internationally and became a global concern and emergency [2]. By March 12th, 2020 Jordan had only one confirmed case of COVID-19 [4], but a wedding ceremony in northern Jordan led to the infection of 76 patients [5]. In April 10th, 372 cases were confirmed in Jordan, around quarter of which are related to the above-mentioned wedding ceremony [6]. Disease spread continued to take place in Jordan in spite of the multiple partial and complete lockdowns. Different cities

https://doi.org/10.1016/j.epsc.2021.101779
Received 23 December 2020; Accepted 31 December 2020
Available online 7 January 2021
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revealed evidence of iliocolic intussusception (Target sign). Accordin
gastrointestinal obstruction and decreased gas in the colon. Abdominal ultrasound
oblique projection of the chest was normal. A chest X-ray revealed no patholog
torsion was performed under guidance after insufflation of air at 120 mm
and the patient was discharged from the hospital. The patient was seen for a reg
1. Admission. Transferred from peripheral hospital complaining of vomit
lymphoid hyperplasia was the main reason and key pathophysiology of intus
lymphoid hyperplasia and intussusception [17]. Geographic and environmental factors play important role in intussusception incidence rate. The incidence of intussusception varies among different countries, for example, incidence of intussusception is four times higher in Vietnam than Australia [18]. Viral infections such as respiratory adenovirus [27], rotavirus [28] could be idiopathic [15]. Intussusception is associated with multiple viral infections such as, respiratory adenovirus [27], rota virus [26] and Interestingly, it has been reported previously in a male short-haired Chihuahua infected with canine coronavirus [29] which might suggest a link between the Corona virus and the development of intussusception in animals.

3. Discussion

Most COVID-19 patients present with respiratory symptoms, few of them presents with non-respiratory complaints [10]. The gastrointestinal symptoms of COVID-19 in children are usually limited to abdominal pain, diarrhoea and vomiting [11]. Intussusception is the leading cause of gastrointestinal obstruction in young children [12]. The presentation of COVID-19 as intussusception is only documented in four cases before this case report [10,13–15]. Mesenteric lymphoid hyperplasia seems to be the main reason and key pathophysiology of intussusception in children [16]. There is a very strong causal association between Viruses, Mesenteric lymphoid hyperplasia and intussusception [17]. Geographic and environmental factors play important role in intussusception incidence rate. The incidence of intussusception varies among different countries, for example, incidence of intussusception is four times higher in Vietnam than Australia [18]. Viral infections such as respiratory adenovirus [27], rotavirus [28] could be idiopathic [15]. Intussusception is associated with multiple viral infections such as, respiratory adenovirus [27], rota virus [26] and Interestingly, it has been reported previously in a male short-haired Chihuahua infected with canine coronavirus [29] which might suggest a link between the Corona virus and the development of intussusception in animals.

SARA-COV-2 could invoke the respiratory tract as well as gastrointestinal tract or both, but it is not clear which one take place first. This suggestion aligned with the finding of Xu et al. [24] who reported that 8 out of 10 children tested positive for SARA-COV-2 test were tested positive for a rectal swabs, and it also support the proposed faecal-oral transmission as a possible rout to spread the infection which has been discussed in multiple reviews [20,21,25,26]. Perhaps considering stool and rectal swabs together with oropharyngeal swabs in the future paediatric cases with GIT symptoms would help to get a better explanation about faecal-oral transmission of SARA-COV-2. Also rectal swabs and oropharyngeal swabs for SARA-COV-2 in intussusception patients will help confirming the relation between SARA-COV-2 and intussusception.

The mechanism behind the development of the intussusception in paediatric with SARA-COV-2 is not fully understood, and generally, it could be idiopathic [15]. Intussusception is associated with multiple viral infections such as, respiratory adenovirus [27], rota virus [26] and Interestingly, it has been reported previously in a male short-haired Chihuahua infected with canine coronavirus [29] which might suggest a link between the Corona virus and the development of intussusception in animals.

SARA-COV-2 could be presented with sever inflammatory condition known as cytokines storm, which is mainly originated from respiratory tract, but the exclusive presence of gastrointestinal symptoms with the absence of respiratory symptoms in several positively tested adults [30] and children [13,31] might suggest that the cytokines storm could be originated from the Gastro intestinal tract (GIT) causing GIT symptoms and complications including intussusception, where a significant association was found between acute intussusception in paediatric and

After intussusception reduction, patient improved dramatically, there was no need for further treatment of COVID-19; Patient was discharged the next day after reduction and parents were advised to follow isolation protocols and return back for regular clinic visit or in case new symptoms develop.

2. Case presentation

A 10-week-old male infant, normal vaginal delivery after full term pregnancy (39 weeks), with no history of Neonate intensive care unit admission. Transferred from peripheral hospital complaining of vomiting, abdominal distension. Upon arrival the baby was looking ill, febrile 38.5 °C, poor feeding, heart rate was 130 beats per minute with an oxygen saturation of 97%, and the baby had a recurrent attack of bouts of crampy abdominal pain.

Signs of dehydration were noted upon physical examination. Ear, nose, throat examination showed unremarkable changes. Similarly, chest examination showed good air entry with no significant finding. Abdominal examination showed diffuse central tenderness along with bilious discharge from the Naso-Gastric tube NGT. Rectal exam showed jelly like material mixed with soft stool. Importantly, the mother reported that she had a flu-like symptoms 10 days ago. However, she is symptoms free as her symptoms subsided 3 days ago. Complete blood count, Chest X-Ray and abdominal X ray beside abdominal ultrasound revealed evidence of ileocolic intussusception (Target sign) . Accordingly, PCR was requested together with I.V fluid and antibiotics (Cef-tazidime 35 mg/Kg and metronidazole 15 mg/Kg). Non-surgical (Pneumatic) reduction of intussuscepted bowel (ileocolic intussusception) was performed under guidance after insufflation of air at 120 mm Hg for 2 minutes as recommended for the treatment of stable intussusception patients [9]. Free flow of air was observed in the large and small intestine, representing a successful reduction of intussusception. Fig. 1. Four hours later the COVID-19 PCR test was reported as positive.

Fig. 1. Abdominal X-ray showing normal gas distribution after pneumatic reduction.
The development of symptoms related to the gastrointestinal system, such as vomiting, constipation, blood in the stool, or abdominal distension in children with COVID-19 should lead doctors to suspect intussusception as a possible cause of these symptoms.

**Patient consent**

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

**Ethical approval**

Case report need no ethical approvals.

**Funding**

No funding or grant support.

**Authorship**

All authors attest that they meet the current ICMJE criteria for Authorship.

**Author contribution**

Mohammad N. Athamnah, MD: First author and project manager.

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Wafa Shatnawi MD: Literature review.

Marwa Elmughrabi MD: Literature Review.

Hussein S O Al Azzam: Manuscript editing and proofreading.

**Research registration Unique Identifying number (UIN)**

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**Guarantor**

Mohammad Naser Athamnah, MD.

**Declaration of competing interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.
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