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Intussusception and SARS-CoV-2 infection

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ABSTRACT

We present 2 cases in the same city, of coexistence of intussusception and SARS-CoV-2 infection. The first in an 8 month old male in August 2020 and the second in a 7 month old female in October 2020; both resolved by surgical technique. Although it is known that some intussusception cases can present concomitantly with viral infections, the fact that they appear in the same context as COVID-19 has only been reported as of late; these 2 new cases are added to the 6 reported so far. In the future, it will be analyzed whether this coexistence is the result of an association between the 2 diseases.

1. Introduction

Intussusception or intestinal invagination occurs when a segment of the intestine (the intususceptum) is telescopically introduced into an adjacent segment (intussuscipiens) [1]. It is the most common cause of intestinal obstruction in infants [2]. Surgical reduction is performed urgently in order to avoid the development of ischemia, necrosis, perforation and peritonitis. More than 80% of cases correspond to ileocolic intussusception. Most are idiopathic, caused by lymphoid hyperplasia which acts as an invaginating point in the small intestine; the remaining 6% are explained by lesions such as: Meckel’s diverticulum, Henoch-Schönlein purpura, intestinal duplication cyst, polyp or lymphoma [1]; in other series it has been reported that up to 30% have a history of previous viral infection [3].

Some enteric infections have been related to intussusception, possibly due to the proliferation of lymphoid tissue in response to the microorganism, some examples are: Yersinia enterocolitica, Staphylococcus aureus, Clostridium difficile, Salmonella typhimurium and Escherichia coli O157: H7; and viruses such as adenovirus, cytomegalovirus, Epstein-Barr virus, herpes virus 6 [4], rotavirus, poliovirus, enterovirus, parechovirus, and norovirus [3].

2. Case 1

An 8 month old male patient, treated at the City Children’s Hospital, in August 2020, presenting with a feverish feeling starting 2 days prior to admission and managed with Acetaminophen, 8 non-biliary episodes of vomiting the day before, and no respiratory symptoms. At the hospital, he had 2 stools with currant jelly appearance. No significant pathological history. Feeding: breast milk and formula, and solid diet started 2 months prior.

On examination: Well-nourished, irritable, pale, without respiratory distress, his abdomen was soft and not distended, normal peristalsis, grimace upon palpation, no presence of masses, and capillary refill of 4 seconds. Rectal examination: stool with mucus and blood. Due to the pandemic situation, and the presence of fever, an RT-PCR test for SARS-CoV-2 was obtained with a positive result.

Laboratory tests including complete blood count within normal limits, Globular Sedimentation Rate: 17mm/hour, Protein C Reactive 18.6 mg/L and normal coagulation tests. An ultrasound was obtained confirming intussusception. Surgical reduction with manual reduction was performed; Ileo-colic invaginated portion without tension. There were no complications during the procedure.

During recovery, he presented normocytic normochromic anemia with a decrease in hemoglobin to 7.5 g/dL from 12.0 g/dL at admission, normal ferritin and D-Dimer at 7650 ng/ml. He received prophylactic anticoagulation with enoxaparin. General diet was resumed on the 3rd postoperative day due to secondary ileus, with adequate tolerance and finally he discharged on the 12th day of hospital stay.

3. Case 2

A 7 month old female infant, consulted at The University Hospital, presenting with Intermittent crying of over 36 hours, associated with 2 stools with currant jelly appearance. Upon admission, a fever of 38 °C and non-biliary vomiting. Relevant background: Initiation of solid diet 1

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Table 1

| Case | Age | Gender | Symptoms | Initial Labs | Treatment | Type of intussusception | Outcome | Remarks |
|------|-----|--------|----------|-------------|-----------|-------------------------|---------|---------|
| Cai et al., Wuhan, China [10]| 10 months | Female | Initial symptoms 1 month prior and rhinopharyngitis 1 week before. | | | | | |
| Rajalakshmi et al., Chennai, India [6]| 8 months | Male | Symptomatic before SARS-CoV-2 positive test, then symptoms, then SARS-CoV-2 positive test 2 days before | Anemia | Hydrostatic enema |Ileocecal | Recovered | |
| Moazzam et al., Karachi, Pakistan [3]| 4 months | Male | Intussusception initially SARS-CoV-2 positive test, then symptoms, then SARS-CoV-2 positive test 2 days before | Leukocytosis | Hydrostatic enema |Ileocolic | Recovered | None |
| Martínez-Castaño et al., Spain [11]| 6 months | Male | Intussusception initially SARS-CoV-2 positive test, then symptoms, then SARS-CoV-2 positive test 1 day before | Anemia | Hydrostatic enema |Ileocolic | Recovered | None |
| Makrinioti et al., Saltillo, Mexico [7]| 10 months | Female | Intussusception initially SARS-CoV-2 positive test, then symptoms, then SARS-CoV-2 positive test 1 day before | Anemia | Hydrostatic enema |Ileocolic | Recovered | None |
| Mercado et al., Mexico City [8]| 9 months | Male | Intussusception initially SARS-CoV-2 positive test, then symptoms, then SARS-CoV-2 positive test 2 months before | Anemia | Hydrostatic enema |Ileocolic | Recovered | None |

4. Discussion

Since the declaration of a COVID-19 pandemic caused by SARS-CoV-2 virus in March 2020, the priority targets for case identification have been focused on adults with respiratory manifestations. Testing rates in the pediatric population are much lower compared to adults and elderly people globally. This situation can generate an underestimation of pediatric cases [3].

COVID-19 in children, specifically infants, has an asymptomatic or mild presentation. Gastrointestinal symptoms have been more frequent in pediatric age compared to adults, and include nausea, vomiting, diarrhea, and abdominal pain [2]. To date, available studies show that approximately 10% of pediatric patients present these symptoms and they have been associated with greater severity of the disease [5].

SARS-CoV-2 binds to Angiotensin II Converting Enzyme to enter cells of lung tissue and gastrointestinal tract, especially the small intestine and colon [6]. This protein, identified in immunohistochemical studies in enterocytes, acts as a co-receptor for the absorption of nutrients, for example amino acids from food [5]. The pathophysiology of the infection involves production of cytokines and release of chemokines responsible for acute intestinal inflammation. The presence of viral nucleocapsid has been demonstrated in rectal swab samples, even after clearance of the virus in the upper respiratory tract, which corroborates with intestinal compromise [6].

Although the pathogenesis of intussusception related to the SARS-CoV-2 is not fully understood, it can be inferred that it involves alteration in peristaltic intestinal movement that allows intussusception [7]. Diagnostic imaging studies have identified data of ileocolitis and mesenteric lymphadenitis in adult tomography [8]; in pediatrics, there are 2 studies that report thickening of the wall of the small intestine and colon [9], which may be consistent with local inflammation.

Analyzing the clinical and surgical characteristics of the cases (Table 1), we found that the age of presentation, the affected segment and the predominance in males were maintained, like most cases of intussusception. Half of the cases presented respiratory symptoms between 1 and 2 weeks before the appearance of the intussusception diagnosis. 3 of 8 patients remained afebrile throughout the evolution. Half of cases were associated with anemia in the initial laboratories. As is known, the management of choice for intussusception is pneumatic or hydrostatic reduction guided by ultrasound or fluoroscopy; however, in the 2 cases that we present, the resolution was surgical due to the lack of 24-h service of this equipment.

The mortality rate in intussusception is reported to be less than 1% [7]; it’s striking that in this group of cases, 1 of 8 has died, this patient was the first reported and was associated with Multisystemic Inflammatory Syndrome caused by COVID-19.
5. Conclusion

With the contribution of more cases of both diseases, future research will attempt to understand if intussusception is part of the gastrointestinal symptoms of SARS-CoV-2 infection or if it is an associated complication. In our city, which serves a population of 936,107 people (2016, National Institute of Statistics and Geography - of Mexico) we identified 2 cases in children in less than 1 month, so infection by this new coronavirus should be considered from now on in patients presenting with intussusception during pandemic time.

Patient consent

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

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Declaration of competing interest

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