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Pediatric Covid-19 mesenteric lymphoid hyperplasia associated intussusception: A case report and literature review

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ABSTRACT

A 2 month old, full term, previously healthy male, with known COVID-19 infection 3 weeks prior to arrival presented to the Emergency Department (ED) with complaints of 5–6 episodes of non-bilious and non-bloody emesis. According to the child's parents, the emesis was mostly associated with feeding. His parents endorsed that the patient had one episode of diarrhea that was maroon in color and appeared different than typical stools. Abdominal exam at that time was non distended with no tenderness and no other significant findings. The patient was observed while feeding in the ED and was noted to have some minimal spit up with arching of his back. A presumptive diagnosis of reflux was made, and the patient was discharged home with education on feeding.

The infant was brought back to the ED the following day due to worsening emesis. Additionally, his parents noted more episodes of bloody stools. His abdomen appeared mildly distended with moderate tenderness on abdominal examination. During evaluation, a large "currant jelly" stool was observed (Fig. 1). An abdominal ultrasound was obtained, which demonstrated an ileocolic intussusception with a possible enlarged lymph node as lead point. The patient received an air contrast enema with successful reduction. Repeat ultrasound was obtained which confirmed resolution, and the patient was admitted for overnight observation. The patient tested positive for SARS-CoV-2 using polymerase chain reaction testing. He was discharged the following day after successful advancing of diet, normal serial abdominal exams, and observed normal bowel movements.

1. Case presentation

A 2 month old, full term, previously healthy male, with known COVID-19 infection 3 weeks prior to arrival presented to the Emergency Department (ED) with complaints of 5–6 episodes of non-bilious and non-bloody emesis. According to the child's parents, the emesis was mostly associated with feeding. His parents endorsed that the patient had one episode of diarrhea that was maroon in color and appeared different than typical stools. Abdominal exam at that time was non distended with no tenderness and no other significant findings. The patient was observed while feeding in the ED and was noted to have some minimal spit up with arching of his back. A presumptive diagnosis of reflux was made, and the patient was discharged home with education on feeding.

The infant was brought back to the ED the following day due to

worsening emesis. Additionally, his parents noted more episodes of bloody stools. His abdomen appeared mildly distended with moderate tenderness on abdominal examination. During evaluation, a large "currant jelly" stool was observed (Fig. 1). A screening abdominal xray was done (Fig. 2) followed by an abdominal ultrasound was obtained, which demonstrated an ileocolic intussusception with a possible enlarged lymph node as lead point (Fig. 3). The patient received an air contrast enema with successful reduction (Fig. 4). Repeat ultrasound was obtained which confirmed resolution, and the patient was admitted for overnight observation. The patient tested positive for SARS-CoV-2 using polymerase chain reaction testing. He was discharged the following day after successful advancing of diet, normal serial abdominal exams, and observed normal bowel movements.

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Fig. 1. Image of currant jelly stool observed in the ED.

2. Discussion

Intussusception occurs when there is invagination between a proximal segment of bowel into a more distal segment. It is the most common cause of intestinal obstruction in infancy [1]. Additionally, it is second only to appendicitis as the most common etiology of abdominal emergency in pediatric populations [1]. Intussusception typically occurs in children between the ages of three months and three years, with most

cases in children that are five to nine months of age [1]. The etiology of intussusception is often idiopathic [1,2], however many are thought to be due to a lead point created from enlargement of intestinal lymphoid tissue [2]. As was seen in our case, the most commonly seen location is that of ileocolic intussusception [1,2]. Our hypothesis is that due to recent infection of COVID-19 and known gastrointestinal manifestations of SARS-CoV-2, our patient had subsequent intussusception due to enlargement of mesenteric lymph nodes in the region of the terminal ileum.

To the best of our knowledge, this case represents the sixth documented case of intussusception associated with COVID-19 worldwide and only the second in the United States. After review of these reported cases, one death was reported [3]. This mortality was complicated by Multi-inflammatory Systemic Infection in Children (MIS-C) and the patient died due to subsequent multi-organ system failure [3]. The remaining cases, including ours, were likely in the setting of an acute COVID-19 infection with mesenteric lymphadenopathy. Table 1 outlines a full comparison between the six cases. Of note, the patients in this series were all noted to be less than 1 year of age with our patient the youngest known case of COVID-19 associated ileocolic intussusception.

The most commonly used technique for reduction of intussusception is with pneumatic or hydrostatic enema [2]. Reduction can occur under fluoroscopic or ultrasound guidance [2]. Surgical reduction is reserved for complex cases and those that fail the above nonsurgical methods. In the five previous studies, three employed pneumatic reduction, and hydrostatic reduction was used in the remaining two studies.

Besides the aforementioned patient death in Cai et al. [3], all other patients in this series were discharged home without complication following enema reduction and no patients required surgery.

3. Conclusion

Our case report supports previous work regarding a possible association between Sars-CoV-2 infection and intussusception. Pediatricians and other medical providers taking care of children after exposure to the COVID-19 virus should be mindful of this correlation as they are evaluating patients with abdominal pain. Additionally, this growing association between recent Sars-CoV-2 infection and intussusception in children under 1 year of age makes a case for the addition of COVID-19 testing in patients found to have intussusception. Our hope is to further raise awareness of extra-respiratory manifestations of COVID-19 amidst the pandemic to help guide future medical decision making.



Fig. 2. Supine and lateral decubitus views of the abdomen radiographs. a. Supine images, demonstrating multiple and diffuse dilated bowel loops, with paucity of gas in the rectum, concerning for intestinal obstruction. Areas of pneumatosis intestinalis were identified in the right lower quadrant bowel walls (arrows). b. Left lateral decubitus image, showing scattered air-fluid levels. No peritoneal free air.

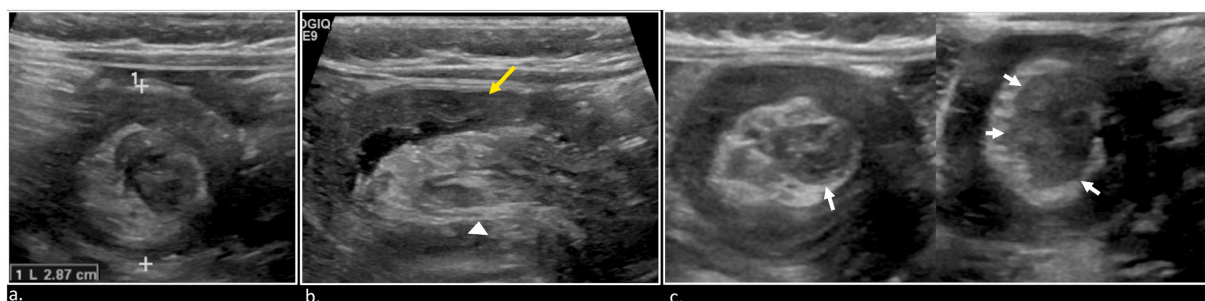


Fig. 3. Abdominal ultrasound. a and b. Axial plane of the right upper quadrant of the abdomen, showing a rounded soft tissue multi-layering appearance structure. It demonstrates a hyperechoic core, representing mesenteric fat, all these findings consistent with a “target sign” for intussusception. The diameter of 2.87 cm favors for an ileocolic type. b. On longitudinal plane, this soft tissue structure has a reniform shape, with central mesenteric echogenic fat (as the sinus renal fat, arrowhead); and the surrounding thickened hypoechoic bowel wall (as the renal cortex, yellow arrow); also known as pseudo kidney sign. c. Axial views, demonstrating prominent lymph nodes within the intussusceptum (white arrow). (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

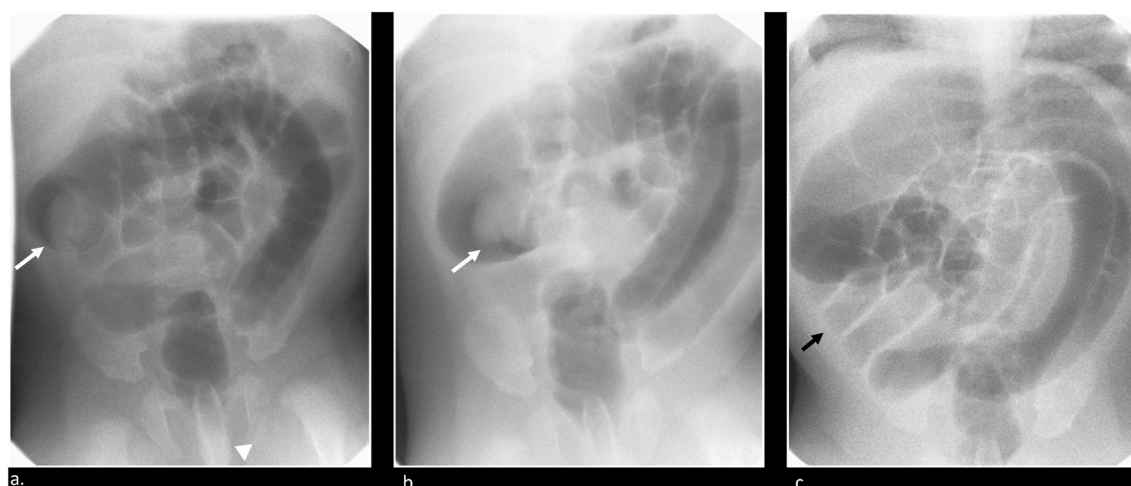


Fig. 4. Therapeutic air enema. a. Air was introduced very gently in the colon through a rectal tube (arrowhead). A rounded soft tissue structure was seen in the colonic hepatic flexure, consistent with the intussusceptum (white arrow). b. The intussusceptum was pushed back into the expected terminal ileum area. c. The intussusception was completely reduced, as the soft tissue density was not longer identified, and the air refluxes to the distal small bowel in the right lower quadrant (black arrow).

Table 1
Summary of Covid19-related cases of Intussusception.

	Hartman et al.	Athamnah et al. [4]	Cai et al. [3]	Moazzam et al. [5]	Bazuaye-Ekwuyasi et al. [6]	Martínez-Castaño et al. [7]
Age (in months)	2	2.5	10	5	9	6
Sex	Male	Male	Female	Male	Male	Male
Presenting Symptom	Abdominal tenderness, emesis, currant jelly stool	Abdominal tenderness, bilious emesis, currant jelly stool	Restless, vomiting, currant jelly stool	Episodic abdominal pain, inconsolable, currant jelly stool	Fussy, cough, congestion, vomiting, episodic abdominal pain, bloody stool	Abdominal pain, emesis, currant jelly stool
Fever (°C)	None	38.5	38.6	None	38.2	None
Suspected COVID-19 Illness Onset	Known COVID-19 illness 3 weeks prior to presentation	Flu-like illness 10 days prior to presentation	No known COVID-19 exposure, tested positive on 9th day of hospital admission	Symptoms of upper respiratory tract infection 1 week prior to presentation	Active symptoms of an upper respiratory tract infection and family members with similar symptoms	Contact with a relative with respiratory infection 12 days prior to presentation
Location of Intussusception	Ileocolic	Ileocolic	Not specified	Ileocecal	Ileocolic	Ileocolic
Type of Reduction	Pneumatic	Pneumatic	Pneumatic and subsequently surgical	Pneumatic	Hydrostatic	Hydrostatic
Outcome	Recovered	Recovered	Died	Recovered	Recovered	Recovered
Geographic Location	USA	Jordan	China	Pakistan	USA	Not specified

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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