Intussusception: A Case Study and Review of Literature

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Abstract:

Intussusception is one of the most common abdominal medical emergencies in children under 3 years of age. It is characterized by the invagination of one segment of bowel into the lumen of another segment. The classic triad of symptoms consists of vomiting, abdominal pain, and bloody diarrhea. Although classic, this triad is observed in less than half of all cases at initial presentation. This case exhibits the frequent circumstance when the classic triad of symptoms does not occur. The patient exhibited progressively severe abdominal pain and one episode of vomiting shortly before presentation at the emergency room, but did not present with any history of bloody diarrhea. Due to a high degree of suspicion and suggestive osteopathic clinical findings, the diagnosis was considered and confirmed with abdominal US. Treated with barium pneumatic enema was initiated within 2 hours of presentation, which resulted in successful reduction of the effected segment. Delayed diagnosis of intussusception is associated with poorer patient outcomes; hence clinicians must be vigilant and maintain a high index of suspicion, even when they do not portray the classic triad of symptoms.
Introduction:

Intussusception is a disease process in which a segment of bowel invaginates into the lumen of another segment of bowel causing a telescoping lesion. It most often involves the terminal ileum and cecum, but may occur anywhere within the small or large bowel. It is one of the most common abdominal emergencies for children less than 3 years of age, with a variable incidence of 0.33 to 2.4 per 1000 live births.\(^1\) Most cases occur under 12 months of age, with over 90% of cases observed within the first 3 years of life.\(^2,3\) Boys are more likely to be affected than girls.\(^1\)

The most common cause of intussusception remains idiopathic. However, any pathological process that provides a lead point within the lumen of the bowel can cause intussusception. A lead point can be defined as any projection or lesion within the lumen of the bowel\(^1\), which can be affected by peristalsis. Most commonly, lead points are formed by lymphoid hypertrophy (Peyer’s patches), which is why certain pathogens, including adenovirus, have been implicated as possible causes.\(^4\) Other possible lead points consist of Meckel’s diverticulum, duplication cysts, polyps, and lymphoma.\(^5\)

The previous rotavirus vaccine RRV-TV (RotaShield\(^\circledast\)) was withdrawn from the market in 1999 due to the increased risk of intussusception within 5-7 days of vaccine administration. This increased risk accounted for approximately 1 excess case of intussusception for every 10,000 to 12,000 vaccinated infants. The reason for the increased risk is largely unknown, but is thought to be associated with infants who were likely to have developed intussusception with any enteric infection.\(^5\) A 2011 Cochrane review\(^6\) showed newer rotavirus vaccinations RV1 and RV5 reported no significant increased risk of intussusception; however a recent retrospective study from New England Journal of Medicine\(^7\) has suggested that the first dose of RV5 attributes a 1.5 in 100,000 increased occurrence of intussusception in the first 21 days after vaccine administration.

The classical presentation of intussusception includes a triad of findings including: vomiting, abdominal pain, and bloody “currant jelly” stools.\(^8,9\) This classic triad has been identified to occur in less than half of initial clinical encounters.\(^1\) Diagnostic delay is associated with poorer patient outcomes.\(^1,8\) Therefore, clinicians should maintain a high degree of suspicion when presented with a clinical case that may resemble intussusception, regardless of whether the patient displays the classic triad of symptoms.

Case Presentation:

Our patient is a 3-year-old male that presented on October 31\(^\text{st}\) with mild intermittent abdominal pain. Painful episodes lasted no more than 2-5 minutes, with almost complete absence of abdominal pain between episodes. Painful episodes would occur about every 30 minutes. Abdominal pain progressively worsened throughout the day until it became severe. At this point, the child would double over in pain with each episode. The father, an osteopathic medical student, was able to give a history that also included his own examination of the patient. He reported that he had examined the patient 4 hours after onset and found a palpable hard 3 cm sausage shaped mass in the right lower quadrant of the abdomen, bowel sounds were present, and a chapman point located at the right 10\(^\text{th}\) rib. The patient
experienced one episode of nonbloody, nonbilious emesis 3 hours later, which prompted the visit to the emergency room.

The patient had no major medical problems or past surgeries at the time of presentation. The patient was currently taking no medication and had no known medication allergies. The patient was up to date with all of his vaccinations and received all his vaccinations at their recommended ages. Patient’s father reports that until today, the child did not appear sick.

Upon arrival to the emergency room the patient’s vitals were a temperature of 37, blood pressure of 93/48, heart rate of 74, respiratory rate of 24, and 100% O2 saturation on room air. The patient was alert and in apparent pain at presentation. The abdomen was soft, non-tender, non-distended, with bowel sounds present in all 4 quadrants. The medical student’s findings of the abdominal mass and the chapman’s point were confirmed.

Bedside abdominal US revealed a telescoping lesion in the transverse colon consistent with intussusception (Figure 1). Reduction enema was performed using air under manometry (Figure 2). There was significant edema of the ileocecal junction that produced resistance to retrograde insufflation of air into the terminal ileum. The air enema was repeated 3 times with successful reduction on the final attempt.

The patient was admitted to the hospital for close observation. He was started on a clear liquid diet, which was slowly advanced as tolerated over the course of 24 hours. Once tolerating a normal diet and displaying an active and rambunctious attitude; he was discharged with follow up instructions to report to his primary care physician.

Discussion:

Treatment for intussusception can be implemented once confirmed with radiologic studies. The current treatment involves either hydrostatic (contrast, usually barium) or pneumatic enema. After successful reduction of the involved segment, the patient should be briefly observed for reoccurrence. Reoccurrence risk within the 24 hours following successful reduction, ranges from 2.2-3.9%, regardless of enema type.\(^5\) This supports an outpatient management approach to successful reductions. Although reoccurrence risk is equal among both types of enemas, pneumatic reduction appears to be more successful at reducing the effected segment. Pneumatic enema reduction also avoids possible complications such as electrolyte disturbances and peritoneal contamination. Consequently, pneumatic enema should be the preferred method of reduction.\(^3\)

Failure of enema reduction is based on many factors, including absence of a pathologic lead point, skill of the clinician, and length of time the child is symptomatic prior to presentation.\(^3\) In those cases that are unsuccessful with pneumatic or hydrostatic enema treatments, surgical intervention is warranted. Surgical intervention is also immediately indicated when the patient becomes unstable or perforation leading to peritonitis is suspected.
An osteopathic approach to patients with a gastrointestinal complaint requires appropriate knowledge of Chapman’s points, and proper palpation skills. Although treatment with pneumatic enema must be pursued in uncomplicated cases of intussusception, OMT may help patients to have an accelerated recovery time. Although studies involving the typical age group for most cases of intussusception are lacking, the autonomic nervous system has been shown\textsuperscript{11} to be influenced in adult patients with cervical myofascial release. This vagal response must be explored further for its possible influence on the gut and whether or not this helps patients return to normal bowel function after successful reduction. Indirect myofascial techniques have also been suggested to benefit neonates with gastrointestinal symptoms and accelerate recovery time.\textsuperscript{12}

In this case the patient did not present with the classic triad of symptoms as he did not have a history of bloody diarrhea. Keene observation and the use of osteopathic findings facilitated the rapid diagnosis and a prompt trip to the emergency room. This helped to avoid poorer outcomes associated with delayed diagnosis. Physicians should maintain a high degree of suspicion and consider the diagnosis even in the absence of the classic triad which is only present less than half of the time. An osteopathic physician has additional palpatory skills to facilitate a rapid diagnosis and may implement appropriate techniques to promote an accelerated recovery of patients with intussusception.

Abbreviations:

US: ultrasound; RRV-TV: rhesus rotavirus reassortant tetravalent vaccine; RV1: monovalent human rotavirus vaccine (Rotarix®); RV5: pentavalent bovine-human reassortant rotavirus vaccine (RotaTeq®); O2: oxygen; RUQ: right upper quadrant; OMT: osteopathic manipulative treatment

Author’s Contributions:

Philip Call conceived the idea of the case presentation. Tracy Middleton coordinated the project and edited the final edition. Both PC and TM read and approved the final edition.

Acknowledgements/Disclosures:

We would like to thank Banner Thunderbird Hospital for providing the medical records necessary, including the imaging studies used in this case presentation.
References


Figure 1. Abdominal ultrasound of patient’s right upper quadrant is presented. The image displays the telescoping lesion with a segment of bowel within the lumen of another segment.
Figure 2. Pneumatic enema reveals the lesion in the right upper quadrant. Image on the left displays the site of intussusception during the pneumatic enema. Image on the right reveals the resolution of the lesion after the 3rd and successful attempt.