

## Intussusception: Highlighted Aspects

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**ABSTRACT**

*Intussusception is a clinical disorder characterized by the telescoping of a proximal part of the bowel into its distal part. The point that invaginates into its adjacent part is known as the "Intussusceptum" (also referred to as the lead point), while the distal segment that receives the folding is known as the "Intussusciptien". This is one of the most important causes of acute abdomen in children, particularly infants and toddlers (3 months - 3 years), however it is a rare condition in adults and brings about a variety of symptoms and patterns; be it acute, intermittent, or chronic. This disorder particularly triggers worrisome matters that are deemed target worthy in the clinical setting. One of these matters is managing the possible shock that comes about with the excessive compromise of the mesenteric blood supply, which ends up thickening the intestinal wall leading to fatal complications of ischemia and perforation. Intussusception's diagnostic approach also happens to be its therapeutic approach, which is non-operative reduction (be it air or barium enema). The recurrence risk of Intussusception is one that demands a cautious observation in an in-patient setting, as the reduction management helps in limiting said risk allowing the recurrence to alter between 24 and 48 hours onwards. In recent years, there has been a presentation of this disorder in children who were provided with the Rotavirus vaccine bringing about different post-marketing surveillances to understand the possible risks of developing Intussusception. Along with the general overview on the topic of Intussusception the following highlights will be included: an emphasis on the potential complications of Intussusception, its distinguishing presentation between children and adults, favoring air over liquid enema in reduction management, and Intussusception's increasing risk if/when the Rotavirus vaccine is given.*

**Keywords**

Observation, Patient, Rotavirus Vaccine.

**Introduction**

The general definition of Intussusception is the telescoping of one part or segment of the bowel (proximal part) into its adjacent part or segment (distal part). The part that invaginates forwards is known as the 'Intussusceptum', while the part that receives the protrusion is known as the 'Intussusciptien'.

This condition is one of the most important differentials of Acute Abdomen, particularly in infants, it serves as one of the most common forms of intestinal obstruction, and at the time of the presentation, it can be categorized as a pediatric surgical emergency. Upon diagnostic workup, a 'lead point' is the target of diagnosis. Usually in secondary causes, the most common of which can be an enlarged lymph node in the terminal ileum, the lead point serves as a marker of an underlying cause.

The presentation of Intussusception can typically be seen in

ages ranging from 3 months to 3 years. This age range is more significant in clinical practice than older age groups and adulthood. When classifying the general locations of the intestines in which Intussusception commonly occurs, the most common is the ileocolic junction (particularly the ileocecal junction), the least common after that are the ileoileal and colocolic. Till this day, and beyond the secondary causes, a primary direct cause has not been determined, thus it is almost always idiopathic.

**Clinical Setting**

Describing the clinical features of Intussusception may seem simple, but there is much more to be considered. Within the setting, the affected child could typically present with severe intermittent abdominal pain, which may be accompanied by many other symptoms, ranging from nausea or vomiting, fever, loose stools, lethargy, and in severe cases coma. What would draw further attention to this suspected diagnosis is the appearance of the child; just simply observing the drawing and pulling up of the knees similar to an infantile colic is deemed concerning. Moreover, the specifically described 'red-currant jelly-like stools', is not always

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present in every single case of Intussusception, but it represents an observation of the stool being composed of a mixture of blood, mucus, and sloughed mucosa due to the excessive impaction of both segments on each other.

The management goals in this setting rely on two factors; rehydration and decompression. Rehydrating the patient will help correct the necessary electrolytes lost and IV fluids may also be provided during the reduction procedure along with the initial presentation. Decompression via a naso-gastric tube is helpful in dealing with any cause of obstruction and furthermore encourages intact feeding by any means necessary. In almost a third of cases, surgery will be required to help in manually unfolding the bowel via surgical intervention. In a small percentage of those patients undergoing surgery, resection may be indicated, given certain complications, and it is because of this, pediatric surgeons should always be prepared.

### Diagnosis

The following four standard methods for diagnosis of Intussusception are helpful, in that they serve different ways of aiding a clinician's approach to a suspected diagnosis.

- Abdominal x-ray usually reveals a suspected intestinal obstruction (e.g. free- fluid levels in the right lower quadrant.)
- Ultrasound helps establish the initial diagnosis for Intussusception due to its location, as well as supports observation of the blood flow in the particular region affected.
- The method of GI series examines the entire upper GI until the duodenum, while the lower GI will be further assessed by enema. Serial x-rays are taken throughout for evaluation of adjacent organs.
- Contrast enema is the most specific and most sensitive test for diagnosing Intussusception, and ultimately serves as the therapeutic approach.

### Highlight No. 1

#### Air vs. Barium

Although they are two effective minimally invasive methods of enema, there exist some differences in terms of their manual procedure.

Al-Mubarak et al. labeled air enema to be faster than barium. Barium is not as quick or absorbable wherein the lubricated tube allows it to flow to help coat the inside of the organs. When describing the intra-luminal pressure, Al-Mubarak et al. also declared air enema as having the higher pressure exerted, as opposed to barium having the lower pressure, since it is subjected to a bidirectional flow [1].

Higher rates of reduction have been officially reported with air enema, as opposed to being lower in barium [2]. Fortunately, there is less risk of contamination as well as perforation with air enema. [1]. However, if a patient were to have a pre-existing ulcer or a tear in the abdominal wall, this would allow the barium to leak into the outer peritoneal cavity, and that is why it is contraindicated in cases of peritonitis [3]. The only disadvantage of air enema worth

considering, is that it would be less likely to detect the lead point, be it tumors, stricture, or narrow masses [4].

At the end of the day, it all reflects the variability of the practice, as different protocols continue to exist amongst different physicians. The area of expertise is deemed significant in the overall diagnostic approach.

### Recurrence

In distinguishing the effective methods of enema, the topic of recurrence is highly correlated, as modern day clinical evidence has revealed low rates of recurrence of Intussusception after an effective enema reduction procedure.

As Gray et al. have reviewed in their systematic review, as per the American Academy of Pediatrics (AAP); there is an overall recurrence of 12.7% when using contrast enema and 7.5% with the ultrasound-guided approach. 24 hours later, a recurrence of 3.9% in both methods will be substantially noticed, and finally at 48 hours, one may be on alert as there is a recurrence of 5.4% and 6.6% in contrast enema and ultrasound-guided enema, respectively. Furthermore, fluoroscopic-guided enema exhibits in a similar numerical pattern; an overall 8.5% recurrence, a 2.2% recurrence at 24 hours, and a 2.7% recurrence at 48 hours. Their conclusive recommendation was that, according to multiple studies, outpatient management after successful reduction helps demonstrate high success rates with repeat enema without any delayed complications [5].

### Highlight No. 2

#### Adult vs. Child Presentation

Adult Intussusception, according to Huang BY et al. & Napora TE et al. is poorly characterized in today's literature [6,7]. Marinis A. et al. estimated that Intussusception accounts for 1% to 5% of all cases of bowel obstruction in adults [8]. A variety of symptoms could exist in an adult presentation, such as mild constipation or vomiting, but it is quite difficult to establish the diagnosis, the reason being most adult cases are almost always due to an underlying cause. Therefore, it could be considered a secondary Intussusception without much confirmation.

Some familiar associations with adult Intussusception include cystic fibrosis, celiac disease, and inflammatory bowel disease, just to name a few [7]. However, some pathological lead points such as tumors or polyps can also be detected upon diagnosis, and this helps support the idea highlighted by van Dijk et al. in their case report, which explains that since there is a high risk of associated malignancies in adults, surgical intervention serves as the first choice of therapy. Contrasting to children, where most cases are idiopathic and benign, and the therapy of choice is non-operative reduction [9]. Even though it is not as common a differential in adults it is still a differential nonetheless.

### Highlight No. 3

#### Complications

Why is Intussusception such a concern to most clinicians?

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Through diagnostic approaches and continuous observations, physicians tend to forget what they are trying to prevent more than just simply treating the condition or reducing the pain. One need not underestimate how fundamental the mesenteric blood supply is. This anatomical stream is cared a lot for, and when it comes to matters of shock or ischemia, venous obstruction and bowel wall edema are real predicaments that can cause necrosis of intestinal tissue furthermore leading to the ultimate hazard of gangrene.

If left untreated, internal bleeding could follow Intussusception leading to a severe abdominal infection, such as peritonitis, which could further lead to a tear in the wall or perforation [9]. Nevertheless, the uncomplicated cases of Intussusception that do not reduce well with enema will undergo open reduction, while intestinal resection can be reserved for cases complicated by necrosis and perforation.

#### **Highlight No. 4 Rotavirus**

It is well known that Rotavirus currently serves as the most common cause of infantile gastroenteritis globally. Methods of vaccination against this virus have been available, but not with an overall easily confirmed submission. For almost 20 years, the dilemma behind this vaccine serving as a risk factor for Intussusception continues to be discussed further.

This all began on August 31st, 1998, where the first vaccine for Rotavirus had just been approved by the FDA, and it was called RotaShield. Before its availability, it had undergone a pre-licensure trial which reported five cases of Intussusception among 10,054 infants who had received the vaccine [10]. Later on, this risk was found to be 30-folds after receiving the first dose, and the VAERS (Vaccine Adverse Events Reporting Systems) reported 15 cases which were thoroughly evaluated leading to a temporary suspension by the CDC, prompting the ACIP (Advisory Committee on Immunization Practices) to withdraw it officially from the market in October, 1999 [10,11].

By the turn of the century, several large clinical trials involving more than 70,000 children were conducted to assess two new vaccines, RotaTeq and Rotarix [11]. As per the CDC, in early 2007, 3.6 million doses of RotaTeq had been distributed, out of which 35 cases had been reported for Intussusception, 17 of those cases were reported in the first three weeks (or 21 days) post-immunization, 11 of those cases developed within the first week (or 7 days) after the vaccine was provided [12]. In total, 28 cases represented a potential complication.

According to the WHO's report, in 2009, post-license trials revealed an increased risk with the Rotarix vaccine, whereby active cases represented a 4-6 fold increase in risk, which was lower than that of RotaShield previously. Ere go, the risks and benefits were weighed against each other, and their analysis predicted the prevention of 49,500 deaths from the Rotavirus potentially causing 300 excess deaths from Intussusception. Furthermore, both vaccines were used in accordance with proper age restrictions and showed a good

safety record (6-folds risk within the first week). The conclusion of this report emphasized on how this small risk of Intussusception was far outweighed by the many benefits of the vaccine [11].

It could be agreed by many health professionals, that it is up to the physician to explain this increased risk and inform the parents of the signs. Parents should further monitor their infants, especially after the initial dose within the first week. If there are recurrent cases, caution will be advised.

Nevertheless, the WHO continues to strengthen its immunization programs all over the world, and suggestively recommends an ongoing active surveillance of the Rotavirus vaccines in developing countries [11].

#### **Conclusion**

Given the differences between air enema and barium enema, selecting one of either method will rely on existing clinical experience amongst different physicians.

Intussusception in adults, despite being rare, requires meticulous investigation to rule out any existing pathology, as it is almost always due to an underlying cause.

The significant complications of Intussusception should always be considered when intervening early on.

The Rotavirus deems evaluation of its effectiveness and observation for signs and symptoms of Intussusception after its initial administration (preferably, within the first week).

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