

Does Prolongation of Time Between Intussusception Diagnosis and Therapeutic Enema Result In Increased Patient Morbidity: a Retrospective Review

Introduction

- Ileocolic intussusception has an incidence of 26-38 cases per 100,000 live births for those aged 1-3 years old
- Treated emergently to avoid potential complications including:
 - Bowel obstruction
 - Bowel ischemia
 - Bowel perforation
- Standard of care is therapeutic enema by pediatric radiologist with surgical reduction if necessary
- Delayed treatment by enema secondary to lack of personnel or equipment necessitates for transport
- Purpose: determine if there is increased patient morbidity with prolonged time between diagnosis and treatment of intussusception

Methods

- Retrospective evaluation of pediatric patients treated for intussusception at Florida Hospital for Children (referral center for 12 hospitals) over 11 years
- Chart reviewed for:
 - Time of presentation
 - Onset of symptoms
 - Time of radiologic diagnosis
 - Time of therapeutic enema
 - Success of enema reduction
 - Surgical outcomes (if applicable)
- Need for surgical outcome was considered increased morbidity
- Exclusion criteria of ileoileal intussusception
- Additionally, imaging was reviewed for concerning signs including free fluid or trapped fluid

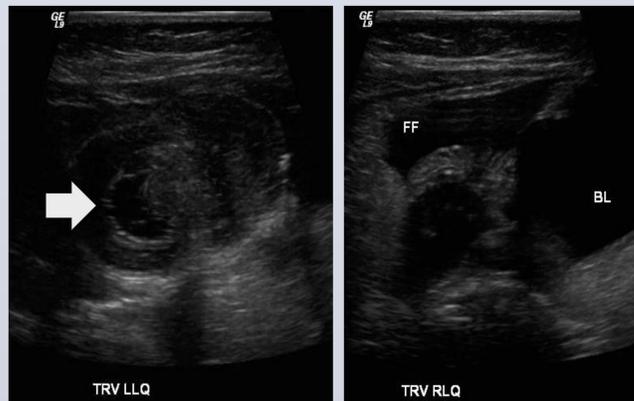


Fig. 1. Ultrasound images demonstrating concerning signs on intussusception such as trapped fluid (arrow) and free fluid (FF). These findings on ultrasound indicated a higher risk of unsuccessful reduction of intussusception by therapeutic enema.

Results

- 147 cases presentations of intussusception
 - 128 cases with subsequent attempts at therapeutic enema reduction
 - 19 cases resolved spontaneously
 - Defined as cases with repeat ultrasound demonstrating no ileocolic intussusception or cases with subsequent enema without evidence of intussusception at the time of enema
- 128 cases of therapeutic enema were divided into groups based on time from diagnosis to enema:
 - Within 3 hours of radiologic diagnosis = 95 cases
 - From 3 to 6 hours from radiologic diagnosis = 28 cases
 - At 6 or more hours from radiology diagnosis = 5 cases
- A total of 30 cases required surgical resection
- Chi square test of independence demonstrated no statistically significant difference in rate of surgical reduction between the three time frames of treatment with P value of 0.660
- All four patients who required bowel resection for ischemia had attempted enema reduction within 3 hours
 - For each of these patients, parents reported symptoms of 24 hours or longer

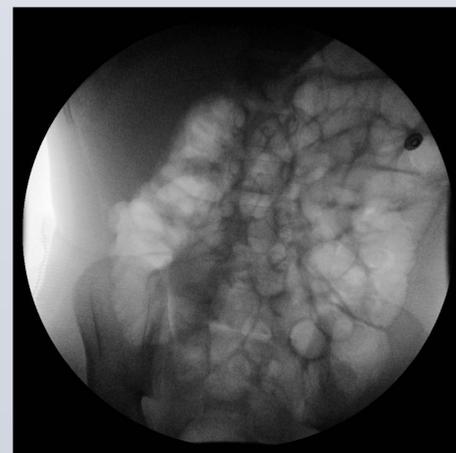


Fig. 2. Ileocolic intussusception on ultrasound without concerning features. Fluoroscopic spot film demonstrates successful therapeutic air enema with reflux of air into the small bowel.

Time (diagnosis to enema)	First enema success	Second enema success	Surgery	Bowel Resection
0-3 hours	67% (64/95)	9.5% (9/95)	23% (22/95)	4% (4/95)
3-6 hours	68% (19/28)	11% (3/28)	21.5% (6/28)	0%
>6 hours	60% (3/5)	0%	40% (2/5)	0%

Fig. 3. Table comparing percentages of cases with successful first and second (if necessary) therapeutic enema reductions of ileocolic intussusception. The percentage of cases requiring surgical reduction and therefore incurring additional patient morbidity is not statistically significant (p value=0.660). Note that four cases with attempts at reduction occurring within three hours incurred additional morbidity of bowel resection secondary to ischemia.

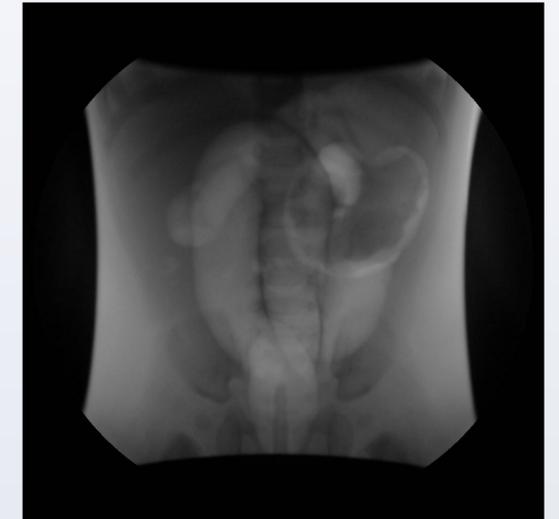


Fig. 4. Fluoroscopic spot film demonstrates unsuccessful therapeutic air enema. This patient ultimately underwent surgical reduction.

Discussion

- No statistically significant difference in morbidity (need for surgical reduction) with prolonged time between diagnosis and treatment
- No evidence of increased ischemic bowel in patients with prolonged time between diagnosis and treatment
- Primary limitation is small study size
 - Particularly in the group of patients with enema attempts at 6 or more hours from time of diagnosis
- Both cases with concerning ultrasound findings such as trapped or free fluid were unsuccessful at attempted enema reduction

References

- Jiang J, Jiang B, Parashar U, Nguyen T, Bines J, et al. (2013) Childhood Intussusception: A Literature Review. *PLoS ONE* 8(7): e68482. doi:10.1371/journal.pone.0068482
- Bratton SL, Haberkern CM, Waldhausen JH, Sawin RS, Allison JW. Intussusception: hospital size and risk of surgery. *Pediatrics* 2001; 107:299-303
- Navarro OM, Daneman A, Chae A. Intussusception: the use of delayed, repeated reduction attempts and the management of intussusceptions due to pathologic lead points in pediatric patients. *AJR* 2004; 182:1169-1176
- Parashar UD, Holman RC, Cummings KC, et al. Trends in intussusception-associated hospitalizations and deaths among US infants. *Pediatrics* 2000; 106:1413-1421
- Daneman A, Navarro O. Intussusception part 1: a review of diagnostic approaches. *Pediatr Radiol* 2003; 33:79-85
- Buettcher M, Baer G, Bonhoeffer J, Schaad UB, Heining U. Three-year surveillance of intussusception in children in Switzerland. *Pediatrics*. 2007; 120: 473-80