

## Intussusception in Older Children: A Single Center Experience

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### Abstract

**Background:** Intussusception in older children may be less common than intussusception in infants. However, it is a significant cause of bowel obstruction across all age groups. The aim of this study was to evaluate our experience with regards to older children (5 years and above) who were managed for intussusception in a single tertiary center in a developing country.

**Materials and Methods:** This was a retrospective study of children, aged 5 year and above, who presented with intussusception (ultrasound confirmed) over a 5-year period at the pediatric surgery unit of a teaching hospital in Enugu, Nigeria. The information analyzed included the patients' age (in years), gender, time interval between onset of symptoms and presentation to the hospital, presenting symptoms, operative procedure performed, complications of treatment and outcome of treatment.

**Results:** A total of 378 cases of childhood intussusception were seen during the study period. Out of this number, 18 (4.8%) patients were older than 5 years of age. There was male predominance. Abdominal pain was the most common and consistent symptom in all the patients and majority of the patients had bowel resection (right hemicolectomy with ileotransverse anastomosis). One-fifth of the patient had pathologic lead point (PLP). Wound infection was the most common post-operative complication and one patient expired due to overwhelming sepsis.

**Conclusion:** Although intussusception is more common in infants; its occurrence in older children is not uncommon and may be associated with PLP. Non-operative treatment is often ineffective and operative treatment is always required.

**Keywords:** Intussusception, Older Children, Single Center, Pathologic Lead Point.

### Introduction

The invagination of a portion of the intestine into another segment is defined as intussusception. Intussusceptum is the portion that invaginates while the portion that receives the intussusceptum is the intussusciens [1]. Intussusception is a common cause of pediatric abdominal surgical emergency as it causes intestinal obstruction in children [2]. The peak age of occurrence of childhood intussusception has been referenced as 4 to 10 months and its published incidence is between 34 and 100 per 100,000 children [3, 4]. Some researchers have reported intussusception as occurring in infants and children aged 3 months and 3 years [5]. The etiology of intussusception in children is mostly idiopathic. However, intussusception in older children as in adults may have pathologic lead point (PLP). Intussusception can occur at any age and pathologic lead points can as well be found at any age. The clinical presentation of intussusception may include abdominal pain, vomiting, and passage of red currant jelly stool. Older children with intussusception may present with atypical features and a high index of suspicion, on the part of the clinician, is required to make a diagnosis. Ultrasound is the investigation of choice for the diagnosis of intussusception because of its high

sensitivity and specificity. Management of intussusception could be non-operative or operative. Although intussusception is considered a disease of infancy, however, occurrence in older children is a relatively frequent clinical event. The aim of this study was to evaluate our experience with regard to older children who were managed for intussusception in a single tertiary center in a developing country. All the intussusceptions were ultrasound confirmed. For the purposes of this study, older children refer to those who are 5 years of age and older.

### Materials and Methods

This was a retrospective study of children, aged 5 years and above, who presented with intussusception (ultrasound confirmed) between January 2017 and December 2021 at the pediatric surgery unit of Enugu State University Teaching Hospital (ESUTH) Enugu, Nigeria. Diagnosis of intussusception was made based on clinical and imaging results. Children with intussusception who presented primarily to ESUTH and those who were referred from the peripheral hospital were included in the study. Children younger than 5 years of age were excluded from the study. Infants whose features of intussusception could not be

confirmed on imaging (ultrasound) were also excluded from the study. ESUTH is a tertiary hospital located in Enugu, South East Nigeria. The hospital serves the whole of Enugu State, which according to the 2016 estimates of the National Population Commission and Nigerian National Bureau of Statistics, has a population of about 4 million people and a population density of 616.0/km<sup>2</sup>. The hospital also receives referrals from its neighboring states. Information was extracted from the case notes, operation notes, operation register, and admission-discharge records. The information analyzed included the age (in years), gender, the time interval between onset of symptoms and presentation to the hospital, presenting symptoms, an operative procedure performed, complications of treatment, and outcome of treatment. The follow-up period was 6 months. Ethical approval was obtained from the ethics and research committee of ESUTH and informed consent from the patient's caregivers was not required due to the retrospective nature of the study and the identities of the patients were not revealed. Statistical Package for Social Science (SPSS) version 21 (manufactured by IBM Corporation Chicago Illinois) was used for data entry and analysis. Data were expressed as percentages, mean, and range.

## Results

### Patients' Demographics

A total of 378 cases of childhood intussusception were seen during the study period. Out of this number, 18 (4.8%) patients were older than 5 years of age and form the basis of this report. The rest of the 360 (95.2%) patients were younger than 5 years of age. Twelve (66.7%) patients were males and 6 (33.3%) were females. The mean time interval between onset of symptoms and presentation to the hospital was 5 days with a range of 2 to 9 days. It took an average of 12 hours from presentation to intervention, range 6 hours to 48 hours.

### Presenting Symptoms (n=18)

Abdominal pain was recorded in 18 (100%) patients, bilious vomiting occurred in 15 (83.3%) patients, the passage of red currant jelly stool in 14 (77.8%), and abdominal distension in 9 (50%) patients.

### Intra-operative finding and procedure performed (n = 18)

At surgery, intussusception was confirmed in all the patients. Three (16.7%) patients had pathologic lead points (PLP) while there was no PLP in 15 (83.3%) patients. All the PLP were Meckel's diverticulum, one is shown in [Figure 1].



**Figure 1:** Meckel's diverticulum that caused intussusception in a 6-year-old.

The procedures carried out on the patients are shown in Table 1. None of the patients had non-operative treatment.

**Table 1: Procedures Performed**

Procedure performed	Number of patients (%)
RHC with ILT	17 (94.4%)
Manual reduction	1 (5.6%)

RHC=Right hemicolectomy, ILT=Ileotransverse anastomosis

### Complications of Treatment

Surgical site infection occurred in 4 (22.2%) patients, 1 (5.6%) patient each had an anastomotic leak and stitch sinus.

### Treatment Outcome

Seventeen (94.4%) children achieved good recovery and were discharged home. One (5.6%) patient who had an anastomotic leak expired due to overwhelming sepsis.

### Discussion

Historically, John Hunter described a classic case of what he called "introsusception". The first recording of intussusception was in 1674 by Paul Barbette of Amsterdam [6]. Intussusception is considered a disease in infants and toddlers [7]. However, intussusception can occur at any age including in neonates and adults. The older age of the child is associated with the increased occurrence of PLP; the presence of a PLP is more likely in older children (8). One study from Aleppo, Syria documented that intussusception is an uncommon condition in children older than 2 years of age [9].

In the index study, more males were affected. This male predominance is consistent with the report of other series on childhood

intussusception [10, 11]. With advancing age, gender difference in children with intussusception becomes marked; especially in patients older than 4 years [12]. Late presentation of the patients is manifest in the delayed arrival in the hospital, after a mean period of 5 days. This delayed presentation of children with intussusception in low-income countries was also reported by a study from Tanzania [13]. Atypical presentation of intussusception in older children may explain this delayed presentation. Park et al documented the changes in clinical characteristics of intussusception in children with intussusception [14]. Poverty and a low level of awareness on the part of the parents also influence the time of presentation to the hospital. The 12 hours time interval before surgical intervention was the time required for patients' resuscitation, investigation, and optimization. Most of the patients presented with anemia, and fluid and electrolyte derangements.

Abdominal pain was the most common presenting symptom in the patients. Other series on intussusception also published abdominal pain as the most common symptom of intussusception [14, 15]. Khasawneh et al found vomiting as the most common symptom of pediatric intussusception [11]. The classical triad of abdominal pain, abdominal mass and passage of red currant jelly per rectum are found in childhood intussusception [16]. This triad occurs in various combinations but in no particular sequence. It is worthy to state that intussusception without abdominal pains can also occur in children [17].

Non-operative treatment of intussusception was ineffective in the current series. All the patients had operative treatment. Non-operative treatment (hydrostatic reduction) was attempted in 9 (50%) patients but it was unsuccessful. The presence of PLP and the delayed presentation may have affected the outcome of hydrostatic reduction. Hence, there was the need for operative treatment of the intussusception. Older children are more likely to undergo operative treatment than infants with intussusception. However, it is pertinent to state that not all intussusceptions in older children have PLP. Most of the intussusceptions in older children are still idiopathic. But children older than 5 years of age are much more likely to have a pathologic lead point and early surgical intervention is should be considered [18]. Meckel's diverticulum was the PLP recorded in the current study. Meckel's diverticulum is the most common congenital malformation of the gastrointestinal tract and occurs due to persistence of the vitello-intestinal duct [19]. Other researchers have also reported childhood intussusception resulting from Meckel's diverticulum [20, 21]. Most Meckel's diverticulum are asymptomatic, however, it is the inversion of the Meckel's diverticulum that makes it a lead point for intussusception. Intussusception within the lumen of the Meckel's diverticulum has also been reported [22]. Even in neonates and adults, Meckel's diverticulum is a consistent cause of bowel obstruction secondary to intussusception [23, 24]. Other pathologic lead point that may cause intussusception in children may include pathologic appendix, calcified fecolith, polyp, adenoma, mucocele, submucosal hematoma, carcinoid tumor, lymphoma and foreign bodies [25].

About one-fifth of our patients had a PLP. This finding is compa-

table to the report of one study from Saga, Japan which reported that in approximately 25 percent of cases of intussusception in older children, there is an underlying disease that causes development of a pathologic lead point for the intussusception [26]. However, in infants and younger children, the incidence of intussusception is less. The incidence of intussusception caused by PLP increase with age from about 5 percent in the first year to 44 percent within the first 5 years of life and 60 percent in children above 5 years [27].

The definitive surgical procedure performed was right hemicolectomy with ileotransverse anastomosis. The indications for this procedure were irreducible intussusception, gangrenous intussusception and/or presence of PLP. Late presentation with associated complications such as non-viable bowel may have influenced the high number of bowel resections.

Surgical site infection was the most common postoperative complication in the studied patients. The incidence of surgical site infection recorded in the present study is consistent with the report of Millano et al [28]. The high number of bowel resections performed in the patients may explain the wound infections.

The single patient (5.6%) who could not make it had severe sepsis which could not be controlled by antibiotics. The patient succumbed to systemic decompensation and multiple organ dysfunctions.

## Conclusion

Although intussusception is more common in infants; it's occurrence in older children is not uncommon and may be associated with PLP. Clinical presentation in older children may be atypical, necessitating late presentation. Non-operative treatment is often ineffective and operative treatment is always required.

## References

1. Cera, S. M. (2008). Intestinal intussusception. *Clinics in colon and rectal surgery*, 21(02), 106-113.
2. Madan, A. J., Haider, F., & Alhindi, S. (2021). Profile and outcome of pediatric intussusception: a 5-year experience in a tertiary care center. *Annals of Pediatric Surgery*, 17(1), 1-6.
3. Jiang, J., Jiang, B., Parashar, U., Nguyen, T., Bines, J., & Patel, M. M. (2013). Childhood intussusception: a literature review. *PloS one*, 8(7), e68482.
4. Buttery, J. P., Danchin, M. H., Lee, K. J., Carlin, J. B., McIntyre, P. B., Elliott, E. J., ... & PAEDS/APSU Study Group. (2011). Intussusception following rotavirus vaccine administration: post-marketing surveillance in the National Immunization Program in Australia. *Vaccine*, 29(16), 3061-3066.
5. Yehouenou Tessi, R. T., El Haddad, S., Oze, K. R., Mohamed Traore, W. Y., Dinga Ekadza, J. A., Allali, N., & Chat, L. (2021). A child's acute intestinal intussusception and literature review. *Global Pediatric Health*, 8, 2333794X2111059110.
6. Davis, C. F., McCabe, A. J., & Raine, P. A. M. (2003). The ins and outs of intussusception: history and manage-

- ment over the past fifty years. *Journal of pediatric surgery*, 38(7), 60-64.
7. Hassan, A., Zain, M., & Ghazaly, Y. (2019). Primary neonatal ileoileal intussusception. *Journal of pediatric surgery case reports*, 41, 18-20.
  8. Wong, C. W., Jin, S., Chen, J., Tam, P. K., & Wong, K. K. (2016). Predictors for bowel resection and the presence of a pathological lead point for operated childhood intussusception: a multi-center study. *Journal of Pediatric Surgery*, 51(12), 1998-2000.
  9. Sankari Tarabishi, A., Aljarad, Z., Shebli, B., Masri, A. H., Anadani, R., Shabouk, M. B., & Trissi, M. (2020). A rare case of bowel intussusception due to adenocarcinomatous polyp in a 14 year-old child: case report. *BMC surgery*, 20(1), 1-5.
  10. Xuan, N. T., Son, N. H., & Thien, H. H. (2020). Treatment outcome of acute intussusception in children under two years of age: a prospective cohort study. *Cureus*, 12(4).
  11. Khasawneh, R., El-Heis, M., Al-Omari, M., Al-Qaralleh, M. A., rahman Al-Manasra, A., Alqudah, A. A., & Awad, S. (2021). The radiological characteristics of childhood intussusception including unusual features and rare pathological lead points. *Heliyon*, 7(6), e07231.
  12. Parashar, U. D., Holman, R. C., Cummings, K. C., Staggs, N. W., Curns, A. T., Zimmerman, C. M., ... & Glass, R. I. (2000). Trends in intussusception-associated hospitalizations and deaths among US infants. *Pediatrics*, 106(6), 1413-1421.
  13. Chalya, P. L., Kayange, N. M., & Chandika, A. B. (2014). Childhood intussusceptions at a tertiary care hospital in northwestern Tanzania: a diagnostic and therapeutic challenge in resource-limited setting. *Italian journal of pediatrics*, 40(1), 1-8.
  14. Park, I. K., & Cho, M. J. (2021). Clinical Characteristics According to Age and Duration of Symptoms to Be Considered for Rapid Diagnosis of Pediatric Intussusception. *Frontiers in Pediatrics*, 9, 651297.
  15. Chukwubuike, K. E., Anijunsi, P. L., & Eze, T. C. (2022). Is Childhood Intussusception Seasonal? A Single Center Experience. *Int J Family Med Healthcare*, 1(1), 1-4.
  16. Yilma, Y., Akmel, M., & Workicho, A. (2018). A three-year study on childhood intussusception in Jimma University Medical Center. *Medical Practice and Reviews*, 9(1), 1-7.
  17. Emeka, C. K. (2022). Painless Intussusception in Children: Is it a Recognized Clinical Entity?. *EC Gastroenterology and Digestive System*, 9, 06-10.
  18. Banapour, P., Sydorak, R. M., & Shaul, D. (2015). Surgical approach to intussusception in older children: influence of lead points. *Journal of Pediatric Surgery*, 50(4), 647-650.
  19. Sagar, J., Kumar, V., & Shah, D. (2006). Meckel's diverticulum: a systematic review. *Journal of the Royal Society of Medicine*, 99(10), 501-505.
  20. Barry III, W. E., Rosenberg, D. M., Warren, M., & Kim, E. S. (2017). Small bowel intussusception secondary to inverted Meckel's diverticulum. *Journal of pediatric surgery case reports*, 25, 49-51.
  21. Morrison, J., & Jeanmonod, R. (2011). Intussusception Secondary to a Meckel's Diverticulum in an Adolescent. *Case reports in emergency medicine*, 2011.
  22. Kassir, R., Debs, T., Boutet, C., Baccot, S., Abboud, K., Dubois, J., ... & Tiffet, O. (2015). Intussusception of the Meckel's diverticulum within its own lumen: unknown complication. *International Journal of Surgery Case Reports*, 10, 111-114.
  23. Oukhouya, M. A., Andaloussi, S., Abdellaoui, H., Tazi, M., Mahmoudi, A., Elmadi, A., ... & Bouabdallah, Y. (2018). Meckel's diverticulum causing intestinal obstruction in the newborn. *Pan African Medical Journal*, 31(1).
  24. Muneeb, A., Nguyen, N. N., Iqbal, F., & Bhargava, P. (2022). Meckel's diverticulum leading to ileo-ileal intussusception. *Radiology Case Reports*, 17(5), 1579-1582.
  25. Joshi, S. B., Harish, E., Kinhal, V., Kola, S. K., & Sundeeep, V. K. (2015). Intussusception in children with a pathological appendix acting as a "Lead Point"-a series of 3 cases. *Journal of Clinical and Diagnostic Research: JCDR*, 9(7), PD03.
  26. Kakiuchi, T., Esaki, M., Nakayama, A., Ichinose, F., & Matsuo, M. (2020). Cecal Intussusception Diagnosed by Total Colonoscopy in a Child: A Case Report. *Frontiers in Pediatrics*, 8, 438.
  27. Tiwari, C., Shah, H., Sandlas, G., & Bothra, J. (2020). Paediatric intussusception: a clinical scoring system to predict the risk of operative intervention. *Journal of Mother and Child*, 24(1), 19-23.
  28. Milano L. Prognostic factors for surgical site infection, Event and length of hospitalization for children with intussusception. *J Pediatr Neonatal Care*. 2016; 5(7): 00209.

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