



Spontaneous Reduction of Intussusception in Infants: Is the Glass Half Empty or Half Full?

Chukwubuike Kevin Emeka^{1*}; Eze Thaddeus Chikaodili²; Onah Livinus Nnanyereugo³

¹Pediatric Surgery Unit, Department of Surgery, Enugu State University Teaching Hospital, Enugu, Nigeria.

²General Surgery Unit, Department of Surgery, Enugu State University Teaching Hospital, Enugu, Nigeria.

³Department of Obstetrics and Gynaecology, Enugu State University Teaching Hospital, Enugu, Nigeria.

*Corresponding Author(s): Chukwubuike Kevin

Emeka

Department of Surgery, Enugu State University

Teaching Hospital, Enugu, Nigeria.

Email: chukwubuikeonline@yahoo.com

Received: Jan 13, 2022

Accepted: Feb 18, 2022

Published Online: Feb 22, 2022

Journal: Annals of Pediatrics

Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

Copyright: © Emeka CK (2022). *This Article is distributed under the terms of Creative Commons Attribution 4.0 International License*

Keywords: Infants; Intussusception; Spontaneous reduction; Ultrasound confirmed.

Abstract

Background: Intussusception is not an uncommon abdominal surgical emergency in children. However, spontaneous reduction of intussusception is possible, though uncommon.

Materials and methods: This was a retrospective study of the characteristics of infants who had spontaneous reduction of intussusception at a tertiary hospital in Enugu, Nigeria. The study covered a 5-year period. Diagnosis of intussusception was made and confirmed based on clinical features and imaging (ultrasound) findings respectively.

Results: A total of 383 cases of intussusception in infants were confirmed during the study period. Out of this number, 12 infants had spontaneous reduction. These gave a spontaneous reduction rate of 3.1% and form the basis of this report. The mean age of the patients was 6 months and there was male predominance. Abdominal pain was the most common symptom and the patients had abdominal ultrasound scan. Majority of the patients had normal serum electrolyte values. Two-thirds of the spontaneous reduction occurred preoperatively while one-third of the reductions were noticed intra-op. No definitive operative procedure was performed because the intussusception had resolved spontaneously. Conclusion: Spontaneous reduction of intussusception is an uncommon event that may occur without stimulation. This study has shown that about 3 in 100 cases of intussusception in infants may reduce spontaneously. However, it must be emphasized that all efforts should be geared towards non-operative or operative treatment of intussusception, as spontaneous reduction is not an option of treatment.



Introduction

Intussusception is the telescoping or invagination of a portion of the intestine into an adjacent segment [1]. The portion that receives the intussusceptum is the intussusciens. It is one of the most common causes of intestinal obstruction in children especially in infants and a common cause of pediatric abdominal surgical emergency [2]. One to four per 2000 children is the reported incidence of intussusception globally. In most cases, intussusception in children is known to be idiopathic and is usually ileocolic [2]. The symptoms of intussusception may include abdominal pain, passage of red currant jelly stool and vomiting. Ultrasound is the investigation of choice for the diagnosis of intussusception because of its high specificity and sensitivity of nearly 100% [1]. There are a certain underreported percentage of children who present with clinical and radiological evidence of intussusception but have no evidence of intussusception when they undergo further evaluation [4]. There are also a small proportion of children who are found not to have intussusception on the operating table after clinical and radiological diagnosis of intussusception. The term spontaneous reduction has been used to describe the above scenarios. Several series on pediatric intussusception have reported on this phenomenon of spontaneous resolution and the documented rates of spontaneous reduction ranges from 0.3% to 14% [4-6].

The aim of this study was to determine the rate of spontaneous reduction of intussusception in children who presented with clinical and radiological features of intussusception.

Materials and methods

This was a retrospective study of the characteristics of infants who had spontaneous resolution of intussusception at the pediatric surgery unit of Enugu State University Teaching Hospital (ESUTH) Enugu, Nigeria. This study covered a period of 5 years, January 2015 to December 2019. Diagnosis of intussusception was made and confirmed based on clinical features and imaging (ultrasound) findings respectively. Infants who presented to our facility and infants who were referred from peripheral hospitals, with radiologically confirmed intussusception, were included in the study. Patients older than one year of age and those without ultrasound diagnosis of intussusception were 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/km². The hospital also receives referrals from its neighboring states. Information was extracted from the case notes and admission-discharge records. The information extracted included the age, gender, clinical features, interval between onset of symptoms and presentation to the hospital, method of diagnosis, definitive treatment and duration of hospital stay.

Results

Patients' demographics

A total of 383 cases of intussusception in infants were confirmed during the study period. Out of this number, 12 infants had spontaneous resolution. This gave a resolution rate of 3.1% and forms the basis of this report. There were 7 (58.3%) males and 5 (41.7%) females. Details of the patients' demographics are shown in Table 1.

Table 1: Demographic features of the patients (n=12).

Demographic features	Value
Mean age	6 months (3-12)
Gender	Male 7 (58.3%) Female 5 (41.7%)
Mean interval between symptom and presentation	2 days (1-3)

Clinical features

The clinical features of the patients are depicted in Table 2.

Table 2: Clinical features.

Clinical features	Number of patients (%)
Abdominal pain	11 (91.7)
Passage of red currant jelly stool	10 (83.3)
Palpable abdominal mass	9 (75.0)
Vomiting	8 (66.7)
Constipation	5 (41.7)
Abdominal distension	1 (8.3)

Method of diagnosis (Imaging)

All the patients had abdominal ultrasound. None of the patients had abdominal computed tomography (CT) scan or Magnetic Resonance Imaging (MRI).

Laboratory results

All the patients had a hemoglobin level of more than 10 grams per deciliter. Eleven (91.7%) patients had normal serum electrolyte whereas 1 (8.3%) patient had deranged serum electrolyte (hypokalemia) that needed correction.

Method of treatment

Among the 12 patients that had spontaneous reduction, 9 (75%) patients had their spontaneous resolution of intussusception, preoperatively (in the ward). Three (25%) patients were noticed to have resolved intussusception in theatre, intra-op.

Definitive operative procedure performed

No definitive operative procedure was performed because the intussusception had resolved spontaneously.

Duration of hospital stay

The mean duration of hospital stay was 3 days and 7 days for the patients whose intussusception was noticed to have resolved preoperative and intra-operative respectively.

Discussion

Intussusception was first recorded by Paul Barbette of Amsterdam in 1674. In 1742, Cornelius Velse operated in a patient with intussusception successfully. John Hunter outlined a classic case of what he called "introsusception" [7]. Spontaneous reduction of childhood intussusception has been described by some authors as atypical intussusception [8]. Other series on intussusception have also reported spontaneous reduction of intussusception [9,10]. In the present study, there was male predominance. This is consistent with the report of other series on spontaneous reduction of intussusception [4,8]. The exact reason for this male predominance is not known but may be

explained by the higher incidence of intussusception in males [11]. The mean age of our patients was 6 months. A meta-analysis on intussusception conducted in Atlanta, Georgia also reported the mean age of 6 months for children with intussusception [12]. However, it is worthy of note to state that intussusception can occur at any age. Our choice of infants in the present study arose from the fact that most intussusceptions in infants are idiopathic. Older children with intussusception may have pathological lead point. Majority of the patients who had spontaneous reduction of their intussusception presented to the hospital within 48 hours of onset of symptoms. Early presentation is important in infants with intussusception because gangrenous bowel is unlikely to reduce spontaneously. In early presenters, some of the intussusception may be transient and resolve spontaneously [13].

Abdominal pain was the most common symptom in the patients. One study from Lebanon also reported abdominal pain as the most common symptom [9]. However, other authors reported vomiting as the most common symptom [13,14]. There is no particular sequence of symptoms in children with intussusception. The triad of abdominal pain, palpable abdominal mass and vomiting may not be present in every patient. The predominant symptom in infants with intussusception may depend on the time of presentation.

All the patients had an abdominal ultrasound scan, which confirmed the intussusception. The pseudokidney and target signs that confirm intussusception on ultrasound were positive in all the patients. Patients whose intussusception could not be confirmed by scan had to be excluded. Ultrasound is the investigation of choice for the diagnosis of intussusception because ultrasound has no exposure to radiation; it's readily available and has high specificity and sensitivity of nearly 100% [1]. Ultrasound for monitoring (post reduction) is also important to confirm the successful spontaneous reduction of the intussusception. CT scan and MRI were not done due to cost and non-availability. Again, the risk of exposure to radiations when using CT scan is an important consideration in children.

Almost all the patients had normal serum electrolyte values. This may have facilitated the spontaneous reduction since bowel activity would expel the intussusceptum from the intussusciens. Electrolyte derangement would cause ileus.

Two-thirds of the patients had their spontaneous reduction of intussusception observed preoperatively while being resuscitated. No drug was administered preceding the resolution of the intussusception; it was spontaneous. However, some researchers have suggested the use of ketamine, midazolam, atropine and glycerin that may assist in successful hydrostatic reduction [15]. None of these agents were administered to our patients. One-third of the resolution of the intussusception was noticed intra-op. Sedation and smooth muscle relaxant given during general anesthesia might also play a role in the reduction process.

The duration of hospitalization was dependent on the time of spontaneous reduction: Infants whose intussusception was noticed to have happened intra-operatively stayed longer than those with pre-operative reduction. The reason for this is obvious. Longer time is required for full recovery from surgery. No definitive operative treatment was performed because the intussusception reduced spontaneously which were confirmed either by ultrasound or intra-operatively.

Conclusion

Spontaneous reduction of intussusception is an uncommon event that may occur without stimulation. This study has shown that about 3 in 100 cases of intussusception in infants may reduce spontaneously. However, it must be emphasized that all efforts should be geared towards non-operative or operative treatment of intussusception, as spontaneous reduction is not an option of treatment.

References

1. Mensah Y, Glover AH, Etwire V, Appeadu-Mensah W, Twum M. Ultrasound Guided Hydrostatic Reduction of Intussusception in Children at Korle Bu Teaching Hospital: An Initial Experience. *Ghana Medical Journal*. 2011; 45: 128-131.
2. Chukwubuike K. Intussusception in Children treated on the basis of clinical features: A prospective observational study from Enugu State, Nigeria. *Medical Journal of Zambia*. 2020; 47: 223-230.
3. Jo S, Lim I, Chae S, Yun S, Lee N, et al. Characteristics of intussusception among children in Korea: a national epidemiological study. *BMC Pediatrics*, 2019; 19: 211.
4. Roben EC, Horowitz R. Rate of spontaneous resolution of idiopathic ileocolic intussusception. *Academic Journal of Pediatrics & Neonatology*. 2018; 7: 18-23.
5. Navarro O, Daneman A. Intussusception. Part 3: Diagnosis and Management of Those with an Identifiable or Predisposing Cause and Those That Reduce Spontaneously. *Pediatric Radiology*. 2004; 34: 305-312.
6. Shekherdimian S, Lee SL, Sydorak RM, Applebaum H. Contrast enema for pediatric intussusception: is reflux into the terminal ileum necessary for complete reduction? *J Pediatr Surg*. 2009; 44: 247-249.
7. Davis CF, McCabe AJ, Raine PAM. The ins and outs of intussusception: history and management over the past fifty years. *J Pediatr Surg*. 2003; 38: 60-64.
8. Kornecki A, Daneman A, Navarro O, Connolly B, Manson D, et al. Spontaneous reduction of intussusception: Clinical spectrum, management and outcome. *Pediatr Radiol*. 2000; 30: 58-63.
9. Marsicovetere P, Ivatury SJ, White B, Holubar SD. Intestinal Intussusception: Etiology, Diagnosis, and Treatment. *Clinical Colon Rectal Surgery*. 2017; 30: 30-39.
10. Myat TW, Thin Aung NN, Thu HM, Aye A, Win NN, et al. Epidemiology of intussusception among children less than 2 years: findings of baseline surveillance before rotavirus vaccine introduction in Myanmar. *Heliyon*. 2021; 7: e06601.
11. Chen SC, Wang JD, Hsu HY, Leong MM, Tok TS, et al. Epidemiology of childhood intussusception and determinants of recurrence and operation: analysis of national health insurance data between 1998 and 2007 in Taiwan. *Pediatr Neonatol*. 2010; 51: 285-291.
12. Jiang J, Jiang B, Parashar U, Nguyen T, Bines J, et al. Childhood intussusception: A literature review. *Plos One*. 2013; 8: e68482.
13. Das MK, Arora NK, Gupta B, Sharan A, Kameswari K, et al. Intussusception in children aged under two years in India. Retrospective surveillance at nineteen tertiary care hospitals. *Vaccine*. 2020; 38: 6849-6857.
14. Xuan NT, Son HN, Thien HH. Treatment outcome of acute intussusception in children under two years of age. A prospective cohort study. *Cureus*. 2020; 12: e7729.

15. Woo JW, Kim SC. Sedative reduction method for children with intussusception. *Medicine (Baltimore)*. 2020; 99: e18956.