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

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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 intussuscipiens. 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.

**Clinical features**

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

**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.

**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 “intrussusception” [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 intussus-
ception [12]. However, it is worthy of note to state that intus-
susception 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 pre-
sentation 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 pa-
tients. One study from Lebanon also reported abdominal pain 
as the most common symptom [9]. However, other authors re-
ported vomiting as the most common symptom [13,14]. There is 
no particular sequence of symptoms in children with intus-
susception. 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 de-
pend 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 inves-
tigation 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]. Ul-
trasound for monitoring (post reduction) is also important to 
confirm the successful spontaneous reduction of the intussus-
ception. 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 val-
ues. This may have facilitated the spontaneous reduction since 
bowel activity would expel the intussusceptum from the intus-
susciptens. Electrolyte derangement would cause ileus.

Two-thirds of the patients had their spontaneous reduction of 
intussusception observed preoperatively while being resus-
cititated. 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 reduc-
tion 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 obvi-
ous. Longer time is required for full recovery from surgery. No 
definitive operative treatment was performed because the in-
tussusception reduced spontaneous which were confirmed ei-
ther 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 re-
duce 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.

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