

Is Childhood Intussusception Seasonal? A Single Center Experience

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ABSTRACT

Background: The incidence of intussusception may vary from one season to another and from one country to another. The aim of this study was to evaluate the seasonality of childhood intussusception.

Materials and Methods: This was a retrospective study of infants, aged one year and below, who presented with intussusception (ultrasound confirmed) between January 2016 and December 2020 at the pediatric surgery unit of Enugu State University Teaching Hospital (ESUTH) Enugu, Nigeria.

Results: A total of 378 cases of intussusception in infants were seen during the study period. There were 236 (62.4%) and 142 (37.6%) females. The median age of the patients was 6 months with a range of 3 to 12 months. Abdominal pain was the most common presenting symptom and most of the intussusceptions occurred during the dry season. Majority of the patients had operative treatment and surgical site infection was the most common post-operative complication. The overall outcome was good. However, 34 (9%) infants expired.

Conclusion: Although intussusception can occur at any time of the year, this study has shown that more cases of intussusception are seen during the dry season in our centre. This spans over a period of October to March.

Keywords

Childhood, Dry, Infants, Intussusception, Seasonal, Wet.

Introduction

Intussusception is the invagination of a portion of the intestine into another segment. The portion that invaginates is called intussusceptum while the portion that receives the intussusceptum is the intussuscipiens [1]. Intussusception is a common cause of intestinal obstruction in infants and a frequent cause of pediatric abdominal surgical emergency [2]. Peak age of childhood intussusception has been quoted as 4 to 10 months and its incidence is between 34 and 100 per 100,000 children [3,4]. Intussusception may vary from one season to another and several theories have been proposed on the etiology of intussusception, however, the exact cause of intussusception remain unknown [5].

Some studies have found an association between some viruses/bacteria and intussusception [6]. Intussusception can be diagnosed through ultrasonography, contrast enema or during surgery. Treatment of intussusception can be non-operative or operative. Intussusception is regarded as a medical and surgical emergency and seasonal patterns in developed countries have been reported [7]. In developing country like Nigeria the epidemiological characteristics of intussusception such as the seasonal variations are yet to be assessed in our institution. The aim of this study was to evaluate the seasonality of childhood intussusception. For the purposes of this study, the climate of Nigeria is characterized into 2 seasons: the wet (rainy) and dry season. The wet season is normally from April to October while the dry season is from November to March.

Materials and Methods

This was a retrospective study of infants, aged one year and below, who presented with intussusception (ultrasound confirmed) between January 2016 and December 2020 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. Infants with intussusception who presented primarily to ESUTH and those were referred from peripheral hospital were included into the study. Children older than 1 year of age were excluded from the study. Infants whose features of intussusception could not be confirmed on imaging (ultrasound) and those with pathological lead points 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/km². 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 extracted included the age (in months), gender, time interval between onset of symptoms and presentation to the hospital, presenting symptoms, month and year the patients presented, procedure performed, complications of treatment, duration of hospital stay 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 patients' caregivers was not required due to retrospective nature of the study. 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 intussusception in infants were seen during the study period. There were 236 (62.4%) and 142 (37.6%) females. The median age of the patients was 6 months with a range of 3 to 12 months. The mean time interval between onset of symptoms and presentation to the hospital was 4 days, range of 2 to 10 days. The mean duration of hospitalization was 10 days with a range of 5 to 18 days.

Presenting symptoms (n=378)

The symptoms the patients presented with are shown in Table 1.

Symptoms	Number of patients (%)
Abdominal pain	372 (98.4)
Vomiting	298 (78.8)
Red currant jelly stool	218 (57.7)
Abdominal distension	181 (47.9)
Non-specific symptoms	23 (6.1)
Transanal protrusion	5 (1.3)

Month of the year the patient presented

The month of the year the patient presented is depicted in Table 2.

Table 2: Month/year of presentation and number of patients.

Year/Month of presentation	2016	2017	2018	2019	2020
January	21	19	17	18	22
February	14	18	13	12	11
March	11	9	8	7	9
April	4	5	6	2	1
May	2	1	0	1	2
June	1	0	1	0	0
July	2	1	0	1	1
August	3	2	1	0	0
September	2	3	2	1	0
October	10	9	7	4	8
November	11	10	10	10	11
December	9	8	4	8	10

Procedure performed

Ninety-four (24.9%) patients had successful non-operative treatment (hydrostatic reduction) while 284 (75.1%) patients had operative treatment.

Complications of treatment

Twenty-nine (7.7%) patients had surgical site infection, incisional hernia occurred in 19 (5.0%) patients and 11 (2.9%) patients had abnormal wound healing (keloid and hypertrophied scar).

Outcome of treatment

Three hundred and forty-four (91%) patients achieved full recovery and were discharged home. However, 34 (9%) infants expired. The causes of mortality include overwhelming sepsis, acute kidney injury and electrolyte imbalance.

Discussion

Intussusception was first mentioned in 1674 by Barbette of Amsterdam. However, John Hunter in 1789 described intussusception in details. In 1871, Jonathan Hutchison operated on a child that had intussusception [8,9]. Some reports have documented the seasonality of intussusception in children while others believe that there is no seasonality [10,11].

In the present study, there is male predominance. Other series on intussusception also reported male predominance [12,13]. However, Obiora et al. reported female predominance in children with transanal protrusion of intussusception [14]. The reason for the gender difference is not known. The median age of our patients was 6 months. This finding is consistent with the report of other studies conducted in sub-Saharan Africa [13,15]. Howbeit, Chukwubuike reported a median age of 8 months [16]. These studies are all in agreement with the quoted peak age range of intussusception in children of 4 months to 10 months [3]. The idiopathic nature of infant intussusception may explain this age range. It is worthy to note that intussusception can occur at any age and intussusception with pathological lead point can also occur in children [17]. Furthermore, intussusceptions have also been reported in preterm neonates [18]. Delayed presentation of the patients was evident in the 4 day lag period between time of onset of symptoms and

time of presentation to the hospital. This late presentation may be due to lack of parental awareness and financial constraints. The mean duration of hospitalization following the treatment of intussusception was dependent on the modality of treatment. For instance, infants who had hydrostatic reduction were discharged earlier than children that had operative treatment.

Abdominal pain was the most common and consistent symptom in the patients with intussusception. Other published reports on intussusception also documented abdominal pain as the most common symptom of intussusception [12,19]. A series from Vietnam reported that 100% of their patients with intussusception had abdominal pain [20]. However, there are reports of painless intussusception in children [21]. A painless intussusception is defined as intussusception in which the child does not have colicky abdominal pain, does not cry and does not show any outward appearance of discomfort with the intussusception [22]. It is noteworthy to state that there was delayed presentation in children with painless intussusception, hydrostatic reduction was less effective and operative treatment is often performed [22]. There could be transanal protrusion of intussusception in children with long mesentery and lack of colonic apposition [23,24].

Over the 5-year study period in the current series, majority of the intussusceptions were seen during the dry season, in the months of November, December, January, February and March. This finding is in agreement with the report of other researchers [25,26]. Cameiro et al. documented those shortages of water and higher incidence of gastroenteritis (with the associated bowel hypermotility) during the dry season may explain the higher incidence of intussusception [25]. Howbeit, Gadisa et al. in their study reported that intussusception was more common during the wet season [10]. No reason was opined for the higher incidence of intussusception during wet seasons. In developed countries, intussusception occurs more often in the fall and winter season [7].

Majority of the patients had operative treatment for the intussusception. Late presentation with associated marked abdominal distension may explain the high number of patients that had operative treatment. The operative treatment involved manual reduction of the intussusception or bowel resection and anastomosis when the intussusception is irreducible, gangrenous or perforated. Other studies on intussusception also reported the higher number of patients treated operatively [27].

Surgical site infection was the most common post-operative complication recorded. Ogundoyin et al. and Chalya et al. also reported surgical site infection as the most frequent complication following operative treatment for intussusception [13,27].

The general outcome in the management of infants was good. However, mortality may result from sepsis. Ameh et al. also reported the effect of sepsis on the outcome of children treated for intussusception by laparotomy [29].

Conclusion

Although intussusception can occur at any time of the year, this study has shown that more cases of intussusception are seen during the dry season in our centre. This spans over a period of October to March.

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