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Profile of Children with Non-Gangrenous Intussusception: A Tertiary Hospital Experience

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Research Article

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Abstract

Background: Intussusception is one of the most common causes of intestinal obstruction in children and the bowel may be found gangrenous or non-gangrenous at surgery. The aim of this study was to evaluate children who were operated upon for intussusception and their bowels were found to be viable (non-gangrenous) at surgery.

Materials and Methods: This was a retrospective study of children who were operated upon for intussusception at the pediatric surgery unit of a teaching hospital in Enugu, Nigeria. The study covered a 5-year period. Only infants with intussusception whose intestine were non-gangrenous (viable) at surgery were enrolled into the study.

Results: A total of 175 cases of childhood intussusception were managed during the study period. Out of this number, 123 (70.3%) patients were treated operatively. Among the group of patients treated operatively (123 patients), 39 (31.7%) patients had non-gangrenous bowel and form the basis of this report. The mean age of the patients was 5 months and about two-thirds of the patients were males. Abdominal pain, vomiting and passage of red currant jelly stool were the predominant symptoms the patients presented with no bowel resections were performed because the bowel was non-gangrenous. Wound infection was the most common post-operative complication and 1 (2.6%) patient expired due to aspiration pneumonitis.

Conclusion: Intussusception is a common surgical condition in children and the bowel may not be gangrenous at surgery. However, only about one-third of our patients had viable (non-gangrenous) bowel at surgery. This low number of patients with non-gangrenous bowel may be due to the late presentation of the patients

Keywords: Children; Experience; Intussusception; Non-Gangrene; Single Surgeon.

Introduction

The invagination of a segment of the intestine into another segment is termed intussusception. The segment that invaginates is called intussusceptum and the segment that receives the invaginating segment is termed intussuscipiens. Intussusception is a regular cause of intestinal obstruction in children particularly in infants and is a pediatric abdominal surgical emergency [1,2]. Globally, 1-4 per 2000 children is the published incidence of intussusception and most often, the etiology of intussusception in children is idiopathic [3]. Several types of intussusception have been described with the ileocolic type being the most common [3]. There are several symptoms of intussusception. These may include abdominal pain, passage of red currant jelly stool and vomiting which are the classical symptoms of intussusception [4]. Howbeit, this triad is not present in all the patients [5]. The symptoms may vary widely. Marsicovetere et al. documented that the clinical presentation of intussusception is variable [6]. It is important to note that some patients with intussusception may not have any symptoms [7]. Normally, there is a balance between the longitudinal and radial smooth muscle forces of the intestine. However, when there is an imbalance in the forces, this causes a segment of the intestine to invaginates into another segment [8]. As the bowel invaginates, it carries along with it its blood supply. The blood vessels are compressed leading to impaired blood supply to the invaginated bowel and subsequent cut-off of blood supply. Ultimately, this may lead to gangrene of the intestine as a result of little or no blood supply. A large number of our patients with childhood intussusception undergo intestinal resection, hence the need to study children who never had any intestinal resection.

The aim of this study was to evaluate children who were operated upon for intussusception and their bowels were found to be viable (non-gangrenous) at surgery. The focus on non-gangrenous intussusception is because our clinical experience shows that there are fewer non-gangrenous intussusceptions possibly due to delayed presentations.

Materials and Methods

This was a retrospective study of children who were managed for intussusception at the pediatric surgery of Enugu State University Teaching Hospital (ESUTH), Enugu, Nigeria. The study covered a 5-year period, from January 2016 to December 2020. Only infants with intussusception whose bowel were viable (non-gangrenous) at surgery were enrolled into the study. Patients who have had surgery or any form of intervention for intussusception (for example, hydrostatic or pneumatic reduction) at a peripheral hospital before referral to ESUTH for further treatment were recruited into study. Patients who were older than 15 years and those with gangrenous intussusception were excluded from the study. ESUTH is a teaching hospital located in Enugu, Southeastern Nigeria. The teaching hospital serves the people of Enugu State and the neighboring states. Information was retrieved from the patients' medical records. The information extracted included the age, gender, presenting symptom, symptom duration prior to presentation, interval between presentation and surgical intervention, finding at surgery, definitive surgical procedure performed, complications of treatment, duration of hospitalization and treatment outcome. Diagnosis of intussusception was made based on the findings on clinical evaluation and radiological reports. For the purposes of this study, the patients were followed up for 12 months. Informed consent was not obtained from the patients' caregivers due to retrospective nature of the study and the identities of the patients were not disclosed. However, a retrospective consent was obtained from the caregivers through phone calls. Data entry and analysis were performed on Statistical Package for Social Science (SPSS) version 21 (manufactured by IBM Corporation Chicago Illinois). Percentages, mean, and range were the forms of data expression.

Results

Patients' Demographics

A total of 175 cases of childhood intussusception were managed during the study period. Out of this number, 52 (29.7%) patients were treated non-operatively by hydrostatic reduction. The rest, 123 (70.3%) patients were treated operatively. Among the group of patients treated operatively (123 patients), 84 (68.3%) had gangrenous bowel, whereas 39 (31.7%) had non-gangrenous bowel and form the basis of this report. All the intussusceptions were idiopathic.

The mean age of the patients was 5 months, range of 3 to 48 months. There were 27 (69.2%) males and 12 (30.8%) females. The median duration of symptoms prior to presentation to the hospital was 3 days (range: 1-7 days) and the mean duration from presentation to surgery was 2 days (range: 1 – 4 days). The mean duration of hospital stay was 9 days (6-15 days).

Presenting Symptoms (n=39)

The presenting symptoms of the patients are shown in Table 1.

Finding at surgery (n=39)

These 39 patients had non-gangrenous intestine. The portions of the bowel involved in the intussusception included the terminal ileum and ascending colon 26 (66.7%), parts of the transverse colon 11 (28.2%) and part of the descending colon 2 (5.1%). The non-gangrenous intestines were milked out and found to be viable. The cecum was not noticed to be mobile.

Table 1: Presenting symptoms (n=39).

Presenting symptoms Number of patients	(%)
Abdominal pain	39 (100)
Bilious vomiting	28 (71.8)
Passage of red currant jelly stool	26 (66.7)
Abdominal distension	12 (30.8)

Definitive Surgical Procedure Performed

Manual reduction of the intussusception was carried out in all the patients. There was no need for intestinal resection since the intestines were not gangrenous.

Complications of Treatment

Wound infection occurred in 11 (28.2%) patients, incisional hernia 3 (7.7%) patients and stitch abscess in 2 (5.1%).

Treatment Outcome

All the patients survived the intussusception except one. The one (2.6%) patient who expired had aspiration pneumonitis despite being on nasogastric tube. There was no recurrent case of intussusception in any of the patients during the follow up period.

Discussion

Intussusception is the most common cause of childhood intestinal obstruction in Nigeria [9]. Prompt diagnosis and treatment of intussusception is considered key to successful management of intussusception. Delays in presentation and treatment may result in gangrenous bowel and the extensive operative treatment that is involved in intestinal resection and anastomosis. In other words, early presentation of children with intussusception may only require non-operative treatment such as hydrostatic or pneumatic reduction or manual reduction; this is because of the non-gangrenous state of the intestine in early presenters.

In the present study, about one-third of the patients were treated non-operatively, while more than two-thirds were treated operatively. This predominant operative treatment could be due to the late presentation of the patients and the high number of patients with gangrenous bowels. Ekenze et al. also reported that surgical management was performed routinely in cases of intussusception in developing countries [10]. Overall, only about one-third of the patients had non-gangrenous bowel at surgery. Delayed presentation of the patient may account for the low number of patients with viable bowel observed at surgery. The longer the duration of the intussusception, the higher the chances of intestinal gangrene occurring. The mean age of our patients was 5 months. This age is comparable to the age reported by other series on childhood intussusception [5, 11]. The age of weaning of the infants from breast milk and the introduction of formula meals may explain this peak age of intussusception. However, it is pertinent to note that intussusception can occur at any age even in adults. More males were affected in the current series.

This male predominance is consistent with the report of other studies on childhood intussusception [3,6]. However, Obiora et al reported female predominance with regard to children with intussusception [12]. The reason for the gender difference is not known. In low-income country like Nigeria, patients do not present early to the hospital. This is evidenced by the mean interval of 72 hours before presentation to the hospital. Paucity of parental awareness and poverty may account for the late presentation to the hospital. Resuscitation, correction of electrolyte imbalance and optimization of the children were necessary before the patients were taken to theatre for surgery. This accounted for the 48 hours interval between presentation and surgery. The duration of patients' hospitalization may be related to the state of the patient before surgery, extent of surgery performed and nature of the post-operative course. For instance, patients who presented in shock and those that had post-operative wound complications stay longer in the hospital.

The presenting symptoms of intussusception may vary from one patient to another. Abdominal pain is a consistent symptom in these children with intussusception. Children manifest abdominal pain by drawing their knees towards their chest. The abdominal pain is of sudden onset and is colicky. However, painless intussusception can also occur in children [13]. Other symptoms such as vomiting, passage of red currant jelly stool, constipation can occur but in no particular sequence. The classic symptoms of intussusception include abdominal pain, passage of red currant stool and abdominal mass. This triad is present in less than a quarter of children [5].

All the intussusceptions in our patients were ileocolic. Other researchers have also reported ileocolic intussusception as the most common type of intussusception [6, 14]. Manual reduction of the intussusception was effective in the reduction of the intussusception. Following the manual reduction, the intestines were found to be viable. Those with non-viable intestines were not considered in the present study.

Surgical site infection was the most frequent complication recorded in the index study. This is despite the administration of prophylactic antibiotics. A study from Tanzania also reported surgical site as the most frequent complication following operative treatment for intussusception [5]. An infection rate of 26% following laparotomy for intussusception has been reported [15]. The emergency nature of the surgery for intussusception and the environment may explain the high wound infection rate.

Survival rate of children treated for intussusception in our centre is high. Generally, the outcome of intussusception is good if the children were well resuscitated and optimized before the surgery. Prompt treatment also has a positive impact on the outcome of children treated for intussusception.

Conclusion

Intussusception is a common surgical condition in children and the bowel may not be gangrenous at surgery. However, only about one-third of our patients had viable (non-gangrenous) bowel at surgery. This small number of patients with non-gangrenous bowel may be due to the late presentation of the patients. The future in the assessment of these patients with intussusception lies in the use of 3D technology to anatomy evaluation, as currently used in cardiac pathologies [16].

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