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Childhood intussusception: A prospective study of management trend in a developing country

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ABSTRACT

Background: The management of intussusception has evolved universally from the use of hydrostatic reduction through operative reduction to the use of pneumatic reduction for the acute and uncomplicated cases and surgical reduction for the complicated cases. However, the process of evolution has been very slow in the developing countries, especially sub-Saharan Africa, due to lack of requisite facilities and expertise to manage these patients nonoperatively. This study examined the trends in the management of childhood intussusception in a developing country, compared operative and nonoperative modalities of treatment, and assessed the impact of delayed presentation on the outcome of management. **Patients and Methods:** This was a prospective study of the management of children with intussusception at the University College Hospital, Ibadan, Nigeria. **Results:** Fifty-five consecutive cases of intussusception that presented to the Children Emergency Unit of the University College Hospital between January 2005 and December 2011 were prospectively studied. Details of sex, age of the patients, clinical presentation, duration of symptoms, mode of treatment, and incidence of recurrence were recorded and analyzed. The median age was 7 months. Moreover, the duration of symptoms varied from 1 to 21 days with a mean of 4 days. Twenty-two patients (40%) had attempted hydrostatic reduction; this was successful in 14 patients (63.6%), whereas 8 patients (36.4%) had failed reduction. In all, 41 patients (74.6%) had operative management of intussusceptions; primary operative intervention was carried out in 33 patients (60%) and secondary surgical management in 8 patients (14.5%) with failed hydrostatic reduction. At surgery, manual reduction of intussusception was carried out on 17 patients (30.9%) and resection of devitalized bowel with end to end anastomosis was carried out on the remaining 24 patients (43.6%). The incidence of surgical intervention for intussusception was 74.6%, mortality was 3.6%, and recurrence rate was 3.6%. **Conclusions:** Nonoperative management of intussusception should be adopted in carefully selected cases of intussusception in this subregion as it will help to reduce the financial burden on the parents while surgical management should be reserved for the complicated cases.

Key words: Hydrostatic, intussusception, management, reduction, surgical

INTRODUCTION

Intussusception is the invagination of a segment of bowel into an adjacent segment resulting into an intestinal obstruction. It is the most common acquired cause of intestinal obstruction in children under the age of 2 years.[1-5] The treatment of intussusception has evolved from the use of operative treatment to nonoperative treatment in the developed countries with attendant reduction in the mortality and morbidity of the disease,[6-8] whereas there has been a very slow evolution in the management in the developing countries. Surgical treatment is still routinely employed with a poorer outcome compared to developed countries.[9] This study, therefore, sought to examine the recent trends in the management of childhood intussusception, compare both modalities of treatment of intussusception, and assess the impact of delayed

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presentation on the outcome of both modalities of management.

PATIENTS AND METHODS

A prospective study of all patients admitted and treated for childhood intussusception at the University College Hospital, Ibadan, Nigeria, from January 2005 to December 2011 was carried out. Data about the ages of the patients, sex, clinical presentation, duration of symptoms before presentation, mode of treatment, outcome of treatment, and incidence of recurrence were recorded and analyzed.

RESULTS

A total of 55 patients were managed during this period. The mean age was 13.1 months. A male preponderance was observed (35 boys and 20 girls) with M:F = 1.8:1. The duration of symptoms varied from 1 to 21 days with a median of 2 days. Abdominal ultrasound was used to confirm diagnosis in all the patients.

Hydrostatic reduction of intussusception under ultrasound guidance was performed in 22 patients (40%). Of the patients who had hydrostatic reduction, 8 (14.6%) presented within the first 72 h of onset of symptoms while 5 patients (9.1%) had been having poorly-treated gastroenteritis varying from 5 to 21 days before they were referred to us. The hydrostatic reduction was successful in 14 patients (63.6%), whereas 8 patients (36.4%) had failed reduction. The patients with successful reduction were admitted and observed for 2–23 days with a mean hospital stay of 8 days. The patients with failed hydrostatic reduction of intussusception had surgical intervention to complete the reduction of their intussusception. Of these, 5 patients (9.1%) presented within the first 48 h of onset of symptoms. The duration of hospital stay varies from 6 to 9 days with a mean of 6.6 days.

A total of 41 patients (74.5%) had operative management of intussusception out of which primary operative intervention was done for 33 patients (60%), whereas 8 patients (14.6%) had secondary operative intervention following a failed hydrostatic reduction. Of the patients treated surgically, manual reduction of intussusception was done in 17 patients (30.9%), and 24 patients (43.6%) had bowel resection and anastomosis. Thus, the incidence of surgical intervention for intussusception was 74.6%. There were 2 mortalities (3.6%) due to severe peritonitis and septicemia while 2 patients (3.6%) had recurrence of intussusception after hydrostatic reduction of intussusception.

DISCUSSION

The management of intussusception has evolved from operative management through hydrostatic reduction to pneumatic reduction in the developed countries, unlike in Africa and other developing countries where operative management is still the mainstay of treatment. This probably may explain why majority of the studies on nonoperative management of intussusception have come from the developed countries, where there are facilities for ultrasound guided hydrostatic (saline) reduction and fluoroscopic guided pneumatic or barium enema reduction.[6-8,10,11] The only report from sub-Saharan Africa on ultrasound guided hydrostatic reduction of intussusception being the report by Atalabi *et al.*,[12] who reported their initial experience.

The diagnosis of intussusception was exclusively by abdominal ultrasound in this study as we believe that abdominal ultrasound would not only confirm the diagnosis, it would also reveal the lead points when present and evidence of bowel perforation while the patients are spared of any irradiation.[13] Before the year 2005, all our patients had an operative intervention to treat intussusception with high morbidity although mortality was low.

Various studies[1,5,9,14-18] have reported the time of presentation as one of the contributing factors to the high rate of surgical intervention. We observed that a delay in presentation was probably responsible for the high rate of operative treatment among the patients. These children were often taken to health centers and other peripheral hospitals where they were treated for gastroenteritis and rectal prolapse, and when their clinical states deteriorate, they are then referred to the pediatric surgery center for specialist management. This is similar to what Bode[15] reported in his own series where these patients were largely misdiagnosed and given wrong treatment before referral. This view was also shared by Kuremu[18] in his own study; he believed that primary health care personnel in the peripheral hospitals and health centers might not have had sufficient expertise to handle challenging occasional presentations and may not be able to distinguish these with the more common gastroenteritis that they see on a daily basis. Another reason is the fact that most parents would rather seek for medical care, where it is cheapest not minding the level of expertise of the doctor taking care of their children because they lack sufficient funds to seek for specialist care, especially since effective health insurance is not widely available in most parts of Africa and parents have to pay out of pocket to care

for their children. On the average, 42 patients (76.4%) presented more than 24 h after the onset of symptoms. This agrees with reports from this subregion[1,9,15] but differs from that of Winstanley *et al*.[19] who reported that 60% of their patients were seen within the first 24 h.

The cost of operative management of intussusception in our center is about USD530; this is by far beyond the reach of many of our patients, majority of who live on less than USD1 a day. This, however, made us apply the nonoperative management of intussusception using hydrostatic reduction under ultrasound guidance. This modality of management only costs about USD125 in our center, and it is used to confirm the diagnosis and treat at the same cost.

For the patients that did not have evidence of perforation of the intestine and peritonitis at presentation, the hydrostatic reduction under ultrasound guidance was used for them with a great reduction in the financial burden to their parents in a resource-poor setting like ours. This modality of management of intussusception was first adopted in the treatment of intussusception from January 2005, and it was the only nonoperative modality available in our center as a fluoroscope was not available for pneumatic or barium enema reduction. Okuyama *et al*.[10] reported that the success of nonoperative management of intussusception decreases with increasing duration of symptoms; we observed that a larger proportion of the patients who presented late had surgical management although significant proportion who presented beyond 48 h after the onset of presentation had a successful reduction. It has been suggested that the patients who had successful reduction beyond 48 h probably had insufficient fat in their mesentery, which will not cause constriction of vascular supply at the neck of intussusception or a slow process of invagination of the bowel as a result of electrolyte imbalance, which will then prevent complete vascular obstruction and enable the intestine to survive prolonged ischemia.[3]

In this study, there was no morbidity or mortality following hydrostatic reduction of intussusception and the recurrence rate was 3.6%. Many authors have shown that nonoperative management has demonstrated a high rate of success in the management of intussusceptions;[20-22] however, a high percentage of patients undergoing surgical intervention for intussusceptions is constantly being reported.[1,23] Centers that do not have facilities for the nonoperative management are known to have a higher rate of use of surgery to treat all patients presenting with intussusception.[22,24] This was the case in our center before the year 2005. However, surgical interventions are also high in centers that do not have immediate access to specialist pediatric surgery facilities.[1,15,25] The incidence of surgical intervention for intussusceptions at specialist pediatric surgery centers (with hydrostatic or pneumatic reduction facilities) ranges from 4.5% to 14.5%.[5] The fact that over 75% of our patients presented late may explain the high rate of surgical intervention, in this study, despite the availability of facilities for hydrostatic reduction of intussusception in our center.

It has been reported that there is no association between delay in presentation and the type of operative procedure used to treat the intussusception.[3] Of the patients who had operative management, severe generalized peritonitis was observed as the cause of high rate of resection of the bowel and the duration of symptoms did not have any significant effect on the type of operative intervention offered to them [Table 1]. Overall, morbidity was higher in these patients although reported mortality from different reviews ranged from 0% to 3.4%;[4] mortality in this series was 3.6%. This is a marked improvement from the previously reported mortality from this center that puts the mortality at 8%.[16] Surgical site infection and wound dehiscence were the most common postoperative complications; these were more commonly observed in patients that had a resection of gangrenous bowel and end to end anastomosis.

CONCLUSION

Although hydrostatic reduction of intussusception has demonstrated a high rate of success in this study, higher rate of surgical intervention has also been observed with a significant proportion requiring resection for bowel

Table 1: The relationship of duration of symptoms to the treatment options

Duration of symptoms	Nonoperative management	Percentage	Manual reduction	Percentage	Bowel resection and anastomosis	Percentage
<1 day	6	10.9	4	7.3	2	3.6
1-2 days	5	9.1	6	10.9	2	3.6
3-5 days	7	12.7	5	9.1	12	21.8
>5 days	4	7.3	2	3.6	8	14.6
Total	22	40.0	17	30.9	24	43.6

complications. Thus, pediatric surgeons are encouraged to adopt nonoperative management of intussusception in carefully selected cases while surgical intervention should be reserved for the patients who are acutely ill and have suspected peritonitis. It is believed that the nonoperative management will also go a long way to reducing the financial burden of specialist care in a resource-poor setting like ours and this should be encouraged. The time of presentation is not related to the type of operative procedure used in the treatment of intussusception.

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Conflicts of interest

There are no conflicts of interest.

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