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**ORIGINAL ARTICLE**

# PATTERNS AND SEASONAL VARIATION OF INTUSSUSCEPTION IN CHILDREN: A RETROSPECTIVE ANALYSIS OF CASES OPERATED IN A TERTIARY HOSPITAL IN ETHIOPIA.

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## ABSTRACT

***Background :****Intussusception is one of the frequent causes of bowel obstruction in infants and toddlers(1). It involves invagination of a portion of intestine into another(2–4). The peak age of occurrence is between the age of 4 and 8 months. The aim of this study is to review the pattern of clinical presentation and seasonal variation of intussusception in our hospital, and to analyze the mode and outcomes of treatment.*

***Patients and Methods:*** *This is a four-year retrospective study of children aged 13 years and below who were admitted and treated for intussusception between January 2011 and December 2014 at the pediatric surgery unit of Tikur Anbesa Specialized Hospital (TAH) in Ethiopia. Information on the patients' demographic characteristics, clinical presentation, and month of occurrence as well as the operative findings and outcome were obtained from the pediatric surgery unit record book, patient charts, and the operating theatre registry.*

***Results:*** *One hundred and thirty six cases of intussusception were admitted to TAH, Addis Ababa over a four year period, of which 130 charts were retrieved and analyzed. Males dominated in the series. Age distribution showed that 59.2% of the cases were ≤one year old, and 77.7 % were ≤two years old. Abdominal pain, vomiting, bloody mucoid diarrhea and a mass palpated abdominally and/or rectally were the most common modes of presentations, with the classic triad of abdominal pain, vomiting and bloody mucoid diarrhea occurring in nearly two third of cases. The highest peak of presentation was in the month of June with 18 (13.9%) cases. The mean duration of symptoms before presentation to our hospital was 5.2 days with a range of 1-21 days. Intraoperatively, it was found that ileocolic intussusception was the most common type. Simple reduction without bowel resection was possible in 70.8% of cases. There were 44(33.9 %) complications, wound site infection being the most common occurring in 20 (15.4 %) cases and there were 6 deaths.*

***Conclusion:*** *Intussusception was more common in the wet season. There was delayed presentation with a higher rate of operative management and bowel resection. The mortality rate has decreased significantly compared with a previous study from this institution.*

***Keywords:*** *Intussusception, seasonal variation, Children, TAH*

## INTRODUCTION

Intussusception is one of the frequent causes of bowel obstruction in infants and toddlers. (1) It involves invagination of a portion of intestine into another. (2–4) The peak age of occurrence is between the ages of 4 and 8 months. (3,5) The vast majority of cases of intussusception do not have a pathologic lead point and are classified as primary or idiopathic and some may have an identifiable lesion that serves as a lead point, drawing the proximal bowel into the distal bowel by peristaltic activity. These anatomic lead points tend to increase in proportion to age, especially after 2 years of age.(6) Intussusception is characterized by a sudden onset of abdominal pain, vomiting , rectal bleeding, and the presence of a palpable abdominal mass.(7) The classic triad of vomiting, abdominal pain and passage of blood per rectum occurs only in a third of cases. (8)

Currently, the diagnosis is usually suspected clinically and confirmed radiologically.(5) The mode of treatment in most developing countries is still surgery despite advancement in the modality of treatment from surgical intervention through non-operative barium enema reduction under fluoroscopy to pneumatic reduction in advanced countries. (6)

## MATERIALS AND METHODS

This is a four-year retrospective study of children aged 13 years and below who were admitted and

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treated for intussusception between January 2011 and December 2014 at the pediatric surgery unit of Tikur Anbesa Specialized Hospital (TAH) in Ethiopia. During this period a total of 9458 patients were admitted to the pediatric ward, out of which 136 were confirmed intussusception cases.

Information on the patients' demographic characteristics, clinical presentation, and month of occurrence as well as the operative findings and outcome were obtained from the pediatric surgery unit record book, patient charts, and the operating theatre registry. Data collected were analyzed using Statistical Package for Social Sciences version 17.

Incomplete recordings in patient charts, especially operation notes, lack of progress notes and lost or incomplete investigations were the limitations faced during this study.

## RESULT

A total of 136 cases were admitted and managed during the study period and 130 charts were retrieved for analysis, making the retrieval rate 95.6%. Ninety seven (71.3%) of the cases were males, making the M: F ratio2.94:1. Their age ranged from 1 months to 8 years (Mean=18.4 months and standard deviation= 19.91 months). The most frequent instances occurred in the age group between 3 and 6 months (n=38, 29.2%) with 59.2% of the disease occurring in children below the age of 1 year and 77.7% were below the age of two years. (Figure 1)

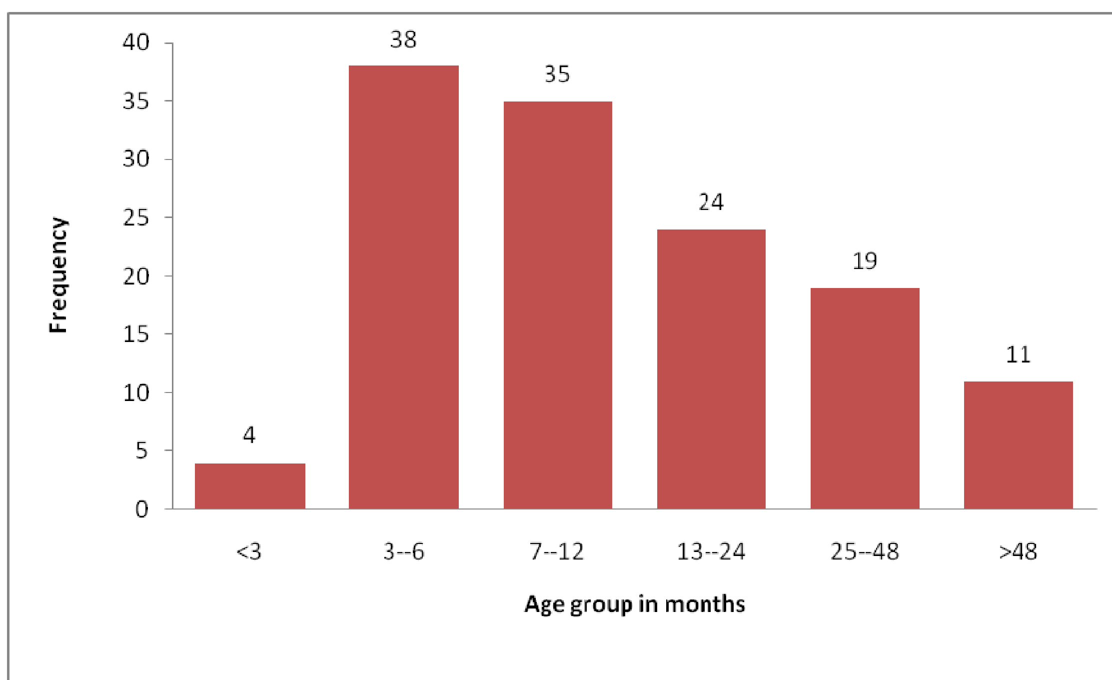


**Figure 1**: Bar graph showing frequency distribution of age of children with intussusception in TAH, July 2015.

Of the 130 operated cases, 42(32.3%) presented between the months of May and July, the highest peak being in the month of June with 18(13.9%) case. There was a second peak in the month of October with 16(12.3%) cases. (Figure 2)

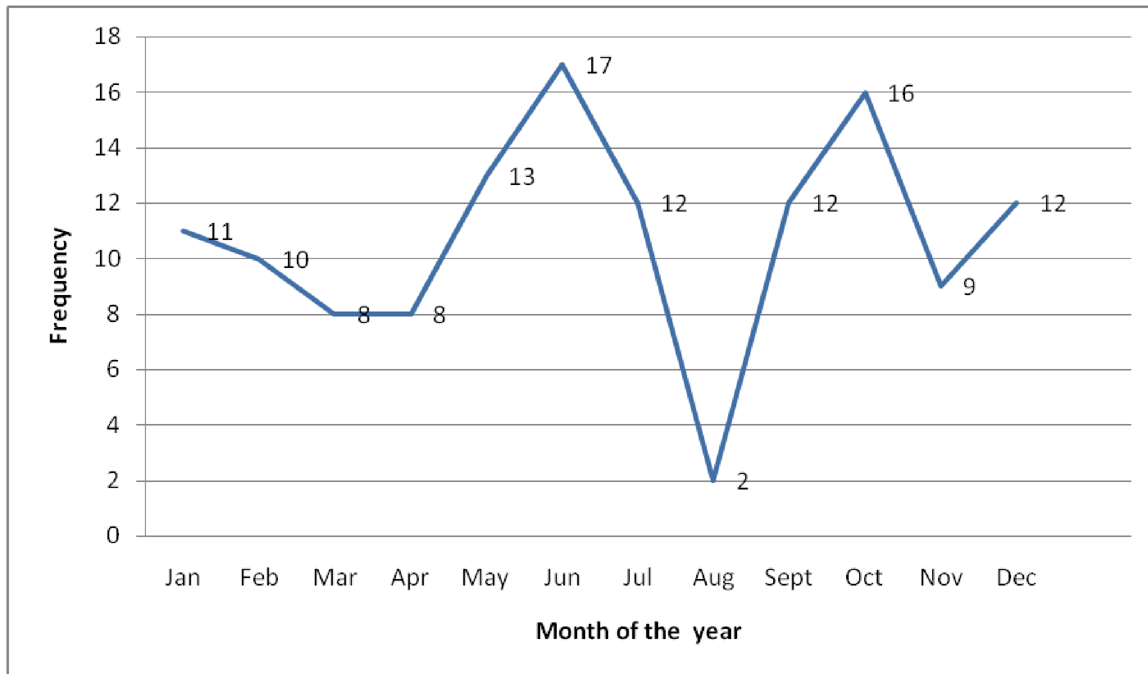


**Figure 2:** Line graph showing the distribution of cases by months of the year in patients with intussusception in TAH, July 2015.

Sixty one (46.9%) of the patients came referred from hospitals out of Addis Ababa, while 59(45.4%) were referred from other health facilities in Addis Ababa. Ten cases came directly to the hospital. The most frequent clinical symptoms were vomiting, abdominal pain and abdominal distention which occurred in all 58(100%) of cases. (Table 1) Four patients came with a complaint of protruding mass per rectum. (Figure 3) Concurrent and antecedent upper respiratory tract infections were reported in 37.7% of the children. One hundred three (79.2%) of the cases had the classic triad of vomiting, abdominal pain and bloody diarrhea.

**Figure 3**: Mass protruding per anus in 23 months old boy in TAH.

**Table 1**: Distribution of patients according to their clinical presentation in TAH, June 2014 .

| Symptom | Frequency | Percentage |
|---|---|---|
| Abdominal distention | 130 | 100 |
| Vomiting | 130 | 100 |
| Bloody stool | 103 | 79.2 |
| Diarrhea | 121 | 93.1 |
| Fever | 73 | 56.2 |
| Abdominal pain | 130 | 100 |
| Mass per rectum | 4 | 3.1 |
| **Signs** | | |
| Dehydration | 100 | 76.9 |
| Abdominal tenderness | 34 | 26.2 |
| Abdominal mass | 91 | 70.0 |
| Palpable mass per-rectum | 45 | 34.6 |

The mean duration of symptoms before presentation to our hospital was 5.2 days with a range of 1-21 days. The majority of children 95(73.0%) presented after 2 days of the onset of symptoms. Only 32 (24.6%) children presented within less than two days of onset of symptoms out of which 6 cases presented within 24 hours of onset of symptoms. The most frequently used diagnostic modality was abdominal ultrasound (84.9%) while in 15.1% of cases diagnosis was made clinically and confirmed during surgery.

Hydrostatic reduction was performed in one patient under ultrasound guidance and was successful. The rest (52) cases were managed surgically. Intraoperatively, it was found that ileocolic intussusception was the most common type. (Figure 4)

Simple reduction without bowel resection was possible in 70.8% of cases while bowel resection was necessary in 29.2% of cases. (Table 2) In all cases there was no grossly obvious lead point identified.

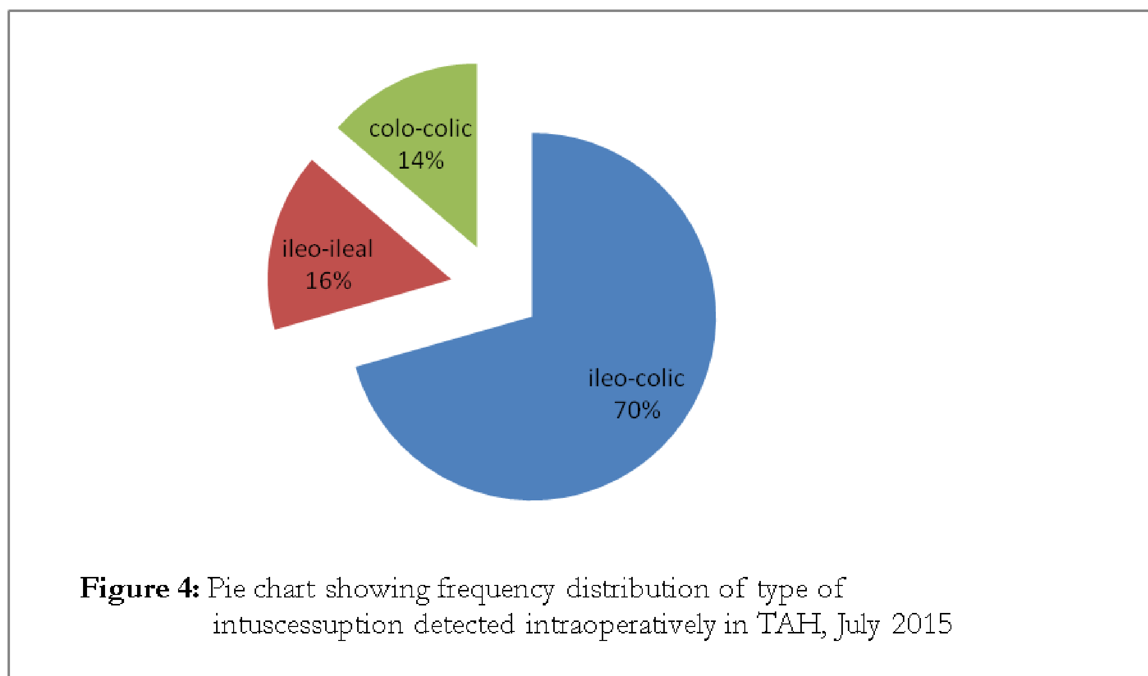


**Figure 4:** Pie chart showing frequency distribution of type of intuscessuption detected intraoperatively in TAH, July 2015

Table 2: Table showing the type of surgery performed in patients with intussusception in TAH, June 2014.

| Type of surgery | Number | Percent |
|---|---|---|
| Simple reduction without bowel injury | 92 | 70.8 |
| Difficult reduction with bowel injury | 3 | 2.3 |
| Difficult/incomplete reduction with bowel resection/gangrenous bowel | 35 | 26.9 |
| Total | 130 | 100 |

There were 44(33.9%) complications, wound site infection being the most common occurring in 20 (15.4%) cases. Anastomotic leak was reported in 2 (1.54%) cases. There were six deaths making the operative mortality rate 4.6%. The mean hospital stay was 9.06 days.

Table 3: Table showing complications in patients with intussusception in TAH, July 2015.

| Type of Complication | Number | Percent |
|---|---|---|
| Surgical site infection | 20 | 15.4 |
| Death | 6 | 4.6 |
| Complete wound dehiscence | 5 | 3.9 |
| Anastomotic leak | 2 | 1.5 |
| Others | 11 | 8.5 |

## DISCUSSION

One hundred and thirty six cases of intussusception were admitted and managed in our hospital over the study period. The majority of the cases are males with M:F ratio of 2.94:1. The mean age of presentation was 18.4 months. About a third (32.3%) of cases came between the moths of May and July, with the highest peak in the month of June. Almost half (46.9%) of the cases came referred from hospitals outside of Addis Ababa. The mean duration of illness before presentation was 5.2 days. All except one case were managed with open surgery out of which 44 cases developed postoperative complications.

In a similar study done 21 years ago only 66 cases were operated in the same institution in 10 years. (9) In this review 130 cases were seen in only four years. The apparent increase in incidence from previous study done in the same institution could be due to the accessibility and utilization of ultrasound as diagnostic mode, and/or increased heath service accessibility. The male predominance in this study coincides with similar study done in this institution in 1993 (9) and others from Nigeria & Tanzania.(3,5,6,10) The majority of the cases presented during infancy with a median age of 7 months and a peak age group of incidence of 3-6 months. This has a similar pattern with a similar study done in this institution(9) and studies from other parts of the world. (7,11,12)

Reports indicate that intussusception has seasonal variation, with higher incidence during dry seasons. (6,7) We observed higher incidence in the months of May-July, which is the beginning of the Ethiopian rainy season with a second peak in the month of October which is the end of the rainy season. This variation could be due to higher incidence of upper respiratory tract infection in children during these seasons, as evidenced by 62% of preceding upper respiratory track infections (URTI) in cases operated during this season as compared to 37.7% in total.

The classical clinical features of vomiting, abdominal pain, passage of bloody mucoid stool, were the predominant findings in our study, occurring in 79.23 % of cases, and this is in line with reports from available literature from Africa. (8,13,14) This is much higher when compared with western data where only a third of cases have the classic triad. (1) This could be due the delayed presentation.

Most of the patients in this study presented late to the hospital as in the previous report and studies carried out in other centers(3,5,6,9,10,15,16)with a mean duration of 5.2 days between the onset of disease and commencement of treatment. Only six patients presented within 24 hours. Delay may be due to the distance patients had to travel to arrive at the hospital, the relative similarity of the symptoms with non-surgical diseases, misdiagnosis and delayed referral. The medical officers in most peripheral centers often manage most children with intussusception for dysentery, gastro-enteritis, and sometimes rectal prolapse before referral.

In this study, all except one of our patients were treated by open surgery. This high rate of operative treatment is due to the fact that most patients presented to the hospital very late and obvious signs of

dehydration, sepsis and peritonitis were present, which are contraindications to hydrostatic reduction. Lack of 24 hour radiologic service may also be responsible. Ileo-colic intussusception was the most common variety observed. This agrees with the pattern reported previously.(1–3,9)

The spectrum of post-operative complications observed is similar to other reports, (5,15,17) and occurred following intestinal gangrene and consequent bowel resection caused by delayed presentation.

Thirty eight (29.2%) of the cases had intestinal resection with primary anastomosis. This percentage was similar to reports from other African countries (5,6,10,15), but higher than western countries(1). The high rate of bowel resection in our study is as a result of inability to reduce the apex of edematous intussusceptum, and bowel gangrene.

In this study, we recorded a mortality rate of 4.62%. This figure is lower than the previous report of 27% and 24%(9,18) from our Centre and 54% from Gondar, Ethiopia (16). In Nigeria, mortality ranges between 6.2% and 25%,(4,6,11,12) while in other parts of Africa, it ranges between 6.2% and 35.1%. (3,6,10,17,19) In this study, infants constituted 80% of the mortality and all of them undergone bowel resection. This is primarily due to the delayed presentation and inability of infants to stand the stress of sepsis and surgery.

***Conclusion and Recommendation:*** This study has shown that intussusception is a common disease. There was a delay in presentation to hospital. Even though most patients came late, image guided hydrostatic reduction should be provided for those who come early. In our case there were 6 patients who came within 24 hours and only one case of hydrostatic reduction. There should also be well staffed radiology service during emergency hours for non-operative management.

There was high rate of bowel resection and complication rate. Health professionals need to have high index of suspicion for this condition in children with the aforementioned symptoms, especially in children with concurrent or antecedent URTI. This will avoid delayed presentation and the associated complications.

Even though there is significant improvement in the mortality from the previous study, still there much to be done to reduce further.

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