



CLINICO-EPIDEMIOLOGICAL PROFILE AND OUTCOMES OF PAEDIATRIC INTUSSUSCEPTION IN A TERTIARY CARE CENTRE IN KERALA: A DESCRIPTIVE STUDY.

Paediatrics

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ABSTRACT

Background: Intussusception is a common gastrointestinal emergency in children, characterized by the telescoping of one segment of the intestine into an adjacent segment. It primarily affects children aged 6 months to 3 years. This study aims to analyse the clinical, demographic, and treatment profiles of paediatric intussusception cases at a tertiary care hospital in Kerala. **Materials & Methods:** A descriptive study was conducted at the Department of Pediatrics, Medical Trust Hospital, Kochi, Kerala, including 105 children aged 1 to 72 months diagnosed with intussusception through ultrasonography. Data on demographic characteristics, clinical presentations, diagnostic methods, treatment approaches, outcomes, and hospital stay were collected and analyzed over four years. **Results:** Out of 105 cases, 65.7% were male (Male: Female ratio 1.92:1). The highest incidence was in the 12-24 months age group (29.5%). Common clinical symptoms included abdominal pain (92.4%), vomiting (66.7%), and excessive crying (41.9%). Ileo-colic intussusception accounted for 78.1% of cases. Hydrostatic reduction was successful in 83.8% of patients, with a recurrence rate of 9.5%. The average hospital stay was 3-5 days for 80% of patients. **Conclusion:** Early diagnosis and hydrostatic reduction are crucial for managing paediatric intussusception, minimizing complications and reducing hospital stays. Regular follow-up is necessary to monitor recurrences, particularly in younger children.

KEYWORDS

Intussusception, abdominal pain, ultrasonography, hydrostatic reduction, lead point

INTRODUCTION

Intussusception is the second most common cause of acute abdominal emergencies in children after appendicitis, most frequently affecting children under the age of 3.^{1,2} It occurs when a segment of the intestine telescopes into an adjacent segment, often at the ileo-cecal junction. Intussusception in children is classified into two main types: **primary (idiopathic)**, which constitutes approximately 90% of paediatric cases, and **secondary**, which arises from identifiable pathological lead points such as the appendix, Meckel's diverticulum, intestinal polyps, lymphoma, or solid bowel lesions.^{3,4} Conditions like cystic fibrosis, foreign bodies, intestinal parasites, and inspissated faeces in children may also lead to ileocolic intussusception. If left untreated, intussusception can result in complications including bowel ischemia, perforation, and peritonitis.⁵

Intussusception is categorized by location into four types: **entero-enteric** (limited to the small bowel), **colo-colic** (involving only the large bowel), **ileo-colic** (characterized by the invagination of the terminal ileum into the ascending colon), and **ileo-cecal**.⁶ The ileocecal valve, situated at the junction of the ileum and colon, is a frequent site of invagination because the transition from the narrower ileum to the wider colon forms a natural point of vulnerability. The relative mobility of the ileum, coupled with peristaltic movements, increases the risk of invagination into the colon. In infants, the gastrointestinal tract is still maturing, characterized by immature muscle tone and uncoordinated peristalsis. This developmental immaturity can lead to uncoordinated contractions, increasing susceptibility of the ileo-colic junction to intussusception.

According to World Health Organization (WHO), the incidence of intussusception in developed countries ranges from 0.5 to 4.3 cases per 1,000 live births, while data for developing countries remain scarce.^{7,8} In India, reported incidence rates vary significantly, from 17.7 to 254 cases per 100,000 children.^{9,10} The evaluation and management of abdominal pain are guided by the severity of clinical signs and symptoms. Common symptoms include intermittent abdominal pain, vomiting, abdominal distension, and bloody stools, often described as having a "red currant jelly" appearance. Physical examination may reveal a "sausage-shaped" mass. Behavioral indicators in affected children can include crying and drawing knees to the chest during painful episodes. Ultrasound is the preferred diagnostic tool for pediatric cases, whereas contrast-enhanced computed tomography

(CT) is more commonly used in adults.¹ Many intussusceptions involving the small bowel resolve spontaneously, and hydrostatic reduction involves applying pressure at the apex of the intussusceptum within the colon until complete reduction occurs.¹¹ The higher incidence of intussusception among infants and young children in India is largely attributed to infectious diseases and nutritional factors. This study aims to evaluate the demographic, clinical, and management profiles of pediatric intussusception cases.

MATERIALS & METHODS

This study was conducted in the Department of Pediatrics at Medical Trust Hospital, Kochi, Kerala, India, over a four-year period. The cohort comprised 105 children aged 1 to 72 months who were diagnosed with intussusception via ultrasound. Clinical signs and symptoms included blood in stools, fever, diarrhea, abdominal mass, irritability, intermittent crying, vomiting, abdominal distension, and abdominal pain. The primary treatment included hydrostatic reduction under ultrasound guidance and if hydrostatic reduction could not be achieved, laparotomy was carried out as and when necessary. Data were collected through a comprehensive analysis of medical records, which encompassed diagnostic methods, treatment approaches, immediate outcomes within 48 hours, post-treatment complications, and length of hospital stay (LOS). The data were organized using an Excel spreadsheet, with frequencies reported for categorical variables and means, standard deviations, or medians for continuous variables. Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS version 22.0).

RESULTS

Among the 105 cases of intussusception evaluated, 65.7% (n=69) were male and 34.3% (n=36) were female, resulting in a male-to-female ratio of 1.92:1. Notably, 13.3% (n=14) of the patients reported a history of previous intussusception. The highest incidence was observed in children aged 12-24 months (29.5%, n=31). The most prevalent presenting symptoms included abdominal pain (92.4%), vomiting (66.7%), blood in stool (32.4%), abdominal mass (41.0%), excessive crying (41.9%), distension (39.0%), and tenderness (40%) (**Table 1**).

Of the 105 cases of intussusception included in this study, 80 % presented with the ileo-colic type, while ileo-ileal and ileo-ileocolic types were 8.6% each. The apex of the intussusception was located in the hepatic flexure in 29.5% of cases (**Figure 1**) and in the ascending

colon in 24.7%. (Table 2).

Hydrostatic reduction was the primary treatment method, successfully performed in 83.8% (n=88) of cases. Among these, one case involving a polyp recurred during hospitalization and was subsequently reduced hydrostatically again, followed by endoscopic polypectomy. Surgical intervention (laparotomy) was required in 3.8% (n=4) of cases, while 12.4% (n=13) had spontaneous reduction of intussusception. Of the four cases requiring laparotomy, two were presented 3- 4 days after the onset of symptoms and necessitated bowel resections due to gangrenous bowel resulting from late presentations. One case revealed a lead point caused by a caecal mass (figure 2), which was later confirmed as Hodgkin's lymphoma and resected during laparotomy. The fourth case could not be reduced hydrostatically and was manually reduced via laparotomy; the bowel was viable in this instance, so bowel resection was not required. The overall recurrence rate during hospitalization was 9.5% (n=10). Length of hospital stay (LOS) varied: 80% of patients had a LOS of 3-5 days, while 13.3% had a LOS of less than 3 days and 6.7% exceeded 5 days (Table 3).

Table 1: Baseline Characteristics and Clinical Evaluation of the Infants

Variable	N=105	Percentage (%)
Gender		
Male	69	65.7
Female	36	34.3
Age Groups (months)		
<12 months	29	27.6
12-24 months	31	29.5
25-48 months	26	24.8
>48 months	19	18.1
Clinical Evaluation		
Abdominal Pain	97	92.4
Distension	41	39
Tenderness	42	40
Vomiting	70	66.7
Blood in Stool	34	32.4
Excessive Cry	44	41.9
Abdominal Mass	43	41
Shock	8	7.6
Respiratory distress	4	3.8
Lethargy	12	11.4
Seizure	1	1

Table 2: Diagnostic Features of Infants with Intussusception

Evaluation	N=105	Percentage (%)
Diagnosis		
Ileo-ileal	9	8.6
Ileo-ileocolic	9	8.6
Ileo-colic	84	80
Rectosigmoid	3	2.8
Position of Apex		
Cecum	11	10.5
Ascending Colon	26	24.7
Hepatic Flexure	31	29.5
Transverse Colon	15	14.3
Splenic flexures	1	1
Descending Colon	12	11.5
Ileum	9	8.6

Table 3: Management, Incidence of Recurrence and LOS

Outcome	N=105	Percentage (%)
Management		
Hydrostatic Reduction	88	83.8
Spontaneous Reduction	13	12.4
Surgery (Laparotomy)	4	3.8
Recurrence		
Yes	10	9.5
No	95	90.5
Duration of Hospital Stay		
<3 days	14	13.3
3-5 days	84	80
>5 days	7	6.7



Figure 1: a) Intussusception with apex at Hepatic Flexure, b) after reduction



Figure 2. Intussusception with caecal mass in Non-Hodgkin's lymphoma.

DISCUSSION

Intussusception is a common pediatric surgical emergency characterized by a variety of clinical symptoms. This study aimed to analyse the demographic characteristics, clinical presentations, and management strategies of children diagnosed with intussusception at our tertiary care center. Our findings showed a higher prevalence in males, consistent with previous studies. Acute intussusception is more common in children under 2 years, particularly infants aged 4 to 9 months. In our cohort, the highest incidence was observed in children aged 12-24 months (29.5%), followed by those under 12 months (27.6%). These results align with reported peak incidence during the first two years of life.^{13,14} Factors such as rapid growth, anatomical changes, and increased viral infections leading to lymphoid hyperplasia may contribute to this higher prevalence in younger age groups.

In our study, the classic triad of acute intussusception symptoms—abdominal pain, vomiting, and bloody stool—was observed in 20% of cases, which is lower than the findings reported by Güney et al. and Simon et al., who reported incidences of 25% and 28.6% respectively.^{2,15} The most frequently reported symptoms in our cohort included abdominal pain (92.4%), vomiting (66.7%), excessive crying (41.9%), and bloody stools (32.4%), similar to the findings by Simon et al. and Khan et al., who also identified abdominal pain as the predominant symptom.^{15,17}

Most pediatric intussusceptions are primary and classified into six types: ileocolic, ileo-ileocolic, colocolic, ileo-colo-colic, ileo-ileal, and jejuno-jejunum. In our cohort, ileo-colic cases constituted 80 %, consistent with findings from both Indian and global studies that recognize this region as the most common site for intussusception.^{13,16}

Management of intussusception in children involves both non-invasive and surgical options tailored to patient's conditions. First-line non-invasive treatments, such as hydrostatic and pneumatic reductions, are performed under imaging guidance (e.g., ultrasound or fluoroscopy), which allows for real-time monitoring and the safe application of pressure to prevent perforation. In our study, 83.8% of patients were successfully treated with hydrostatic reduction under ultrasound guidance, consistent with findings by John M et al., who reported similar rates for ultrasound-guided hydrostatic reduction.¹³

Spontaneous reduction occurs in about 4-10% of patients; however, we observed a higher rate of 12.4% in our cohort. Recurrence can occur post-treatment, with rates up to 20% for non-operative reductions and 1-3% for surgical interventions. Our study documented a recurrence rate of 9.5%, lower than Bajaj et al.'s report of 10.3%, but higher than Yalcin S et al.'s finding of 2.2%.^{17,19} Notably, Krishna Kumar et al. observed no recurrences within the first 24 hours post-reduction.²⁰

CONCLUSION

Intussusception primarily affects children aged 6 months to 3 years, with the highest incidence noted in the 1- 2 year age group. The hallmark symptoms include abdominal pain (92.4%), vomiting (66.7%), and bloody stools (32.4%), underscoring the necessity for heightened awareness of these clinical features to enable early diagnosis and prompt intervention. Hydrostatic reduction emerged as the primary treatment modality, successfully employed in 83.8% of cases, thereby minimizing the need for surgical interventions and shortening hospital stays. The observed recurrence rate of 9.5% highlights the critical need for ongoing monitoring and follow-up, particularly in children under two years, who are at greater risk for recurrence. Early and accurate diagnosis via ultrasound is essential for timely hydrostatic reduction, which can significantly mitigate complications such as bowel ischemia and perforation. Overall, effective management strategies not only enhance patient outcomes but also contribute to reduced hospitalization duration for affected children, emphasizing the importance of a proactive approach in managing intussusception in the pediatric population.

Conflict Of Interest

None.

Source Of Support

None.

Consent For Publication

Informed consent was obtained from the patients regarding the use of their clinical data. All patient-identifiable data will be kept confidential.

Data Availability Statement

Data shall be available from the corresponding author upon specific request.

Ethical Statement

All procedures performed in this study complied with ethical standards established by the institutional and/or national research committees in accordance with the 1964 Helsinki declaration and its later amendments.

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