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Original Research

Study of Intussusception: presentation and management strategies in a tertiary care center of southern Rajasthan

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ABSTRACT

Background: Intussusception is a prevalent cause of intestinal obstruction in pediatric patients, requiring rapid identification and intervention to prevent bowel necrosis and potential loss of bowel segments. Non-operative management remains the preferred approach for treating intussusception. This study aimed to assess the presentation and management strategies of intussusception among cases presenting at a tertiary care center of southern Rajasthan.

Materials and Methods: A retrospective study was conducted on cases of intussusception that underwent ultrasound-guided hydrostatic reduction at a tertiary care center of southern Rajasthan. A total of 123 cases were included in the analysis.

Results: The average age of the participants was 15.5 ± 11.6 months, with a notable male predominance. The most frequently reported symptoms were abdominal pain (76.42%), vomiting (65.85%), abdominal distension (44.72%), blood in stools (34.96%), constipation (43.09%), and diarrhea (34.15%). All patients underwent ultrasound-guided hydrostatic reduction, with an overall success rate of 85.37%. The remaining cases required open manual reduction or resection-anastomosis procedures. The average hospital stay was 5.4 ± 2.9 days, and no mortalities were observed.

Conclusion: Intussusception is more common in males, in children < 2 years, and presents with abdominal pain and vomiting. Ultrasound-guided hydrostatic reduction is an effective treatment for intussusception, demonstrating a high success rate and lower morbidity.

Key Words: Intussusception, hydrostatic reduction, abdominal pain, children.

INTRODUCTION

Intussusception is a common cause of acute intestinal obstruction in infants, although it is less frequently observed in older children and adults. This condition involves the telescopic advancement of a proximal intestinal segment into a distal segment, contributing to bowel obstruction, particularly in children. While ileo-ileal or colo-colic variants can occur, the ileo-colic type is the most prevalent [1,2]. Although intussusception typically affects children between 6 months and 3 years of age, it can occur at any age. In most cases, no identifiable cause is found, though in 2–50% of patients, underlying lesions can serve as lead points for the condition. The likelihood of such lesions is greater in older age groups. In a study conducted in India [3-5], intussusception accounted for 16% of all pediatric intestinal blockages. Despite the high incidence of infectious diarrhea in these regions, intussusception remains relatively rare in Asia and Africa for reasons that are yet to be understood [5].

Initial non-operative treatment often involves the use of a barium enema, saline enema, or air insufflation via the rectum. If these methods fail or signs of peritonitis appear, surgical intervention is required. Timely diagnosis and treatment are critical due to the risks of peritonitis, sepsis, and intestinal perforation. Ultrasonography (US) is commonly used for

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diagnosis, with a sensitivity and specificity of approximately 98% [6,7]. Ultrasound is highly reliable for diagnosing intussusception due to its excellent specificity and sensitivity [8,9]. Colour Doppler ultrasound can be particularly useful in detecting vascular changes associated with intussusception and may serve as an indicator of bowel necrosis [10].

Once diagnosed, the primary goal is non-operative reduction, which can be achieved through the use of air, saline, barium, oxygen, water, or water-soluble iodinated contrast under fluoroscopic guidance [11]. The use of air for reduction has been extensively discussed in the literature [12]. In recent years, ultrasound-guided saline reduction has gained significant acceptance as the preferred method for both the evaluation and non-operative management of intussusception in children. Its success rate varies across different institutions, typically around 80% [13]. The reduction process involves both clinical and radiological changes, and the success is measured based on both clinical outcomes and surgical goals. Collaboration between radiologists and physicians enhances the accuracy of diagnosis and improves treatment success. This study aimed to assess the presentation and management strategies of intussusception among cases presenting at a tertiary care center of southern Rajasthan.

MATERIAL AND METHODS

A retrospective study was conducted to evaluate intussusception cases treated in the Department of Surgery at Pacific Medical College & Hospital, Udaipur. The study included a total of 123 patients, both male and female.

The sample size comprised 123 patients, with all eligible cases reported during the study period included in the analysis. Data for the study were collected retrospectively from children treated for intussusception during the specified period. To ensure the accuracy of the sample, inclusion criteria involved diagnosing intussusception through ultrasound and treating the condition with non-operative methods, particularly ultrasound-guided hydrostatic reduction. Exclusion criteria involved patients who underwent primary surgery or had conditions such as peritonitis or intestinal perforation, which are contraindications for hydrostatic reduction.

Before participation in the study, written informed consent was obtained from the parents of all patients. Each case was thoroughly assessed through history taking, clinical examination, and ultrasound imaging to confirm the diagnosis of intussusception. The study aimed to assess the presentation, management strategies, success or failure of reduction, the duration of hospital stay, and any associated mortality. Statistical analysis was performed using SPSS version 20, with descriptive statistics such as frequencies, percentages, means, and standard deviations calculated to summarize the findings.

RESULTS

The majority of cases occurred in children aged 13-24 months (37.4%), followed by the 7-12 months group (34.96%) and ≤6 months (8.94%). In terms of gender distribution, males were more frequently affected (60.16%) compared to females (39.84%) (Table 1).

Table 1: Demographic details of intussusception cases

Parameter	n	%
Age Grouping (months)		
≤ 6	11	8.94
7-12	43	34.96
13-24	46	37.40
24-60	20	16.26
> 60	3	2.44
Gender		
Males	74	60.16
Females	49	39.84

The clinical profile of intussusception cases showed a diverse range of presenting symptoms and signs. Abdominal pain was the most common symptom, observed in 76.42% of cases, followed by vomiting (65.85%), abdominal distension (44.72%), and constipation (43.09%). Other symptoms, including blood in stools (34.96%), diarrhea (34.15%), and the presence of a mass in the abdomen (17.89%), were noted less frequently. A few cases presented with drowsiness or lethargy (2.44%). On ultrasonography (USG) examination, ileo-colic intussusception was the most prevalent finding, identified in 91.06% of cases, while 16.26% showed free fluid (Table 2).

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Table 2: Clinical profile of intussusception cases

Symptom/Sign	n	%
Abdominal Pain	94	76.42
Vomiting	81	65.85
Abdominal Distension	55	44.72
Constipation	53	43.09
Blood in Stools	43	34.96
Diarrhea	42	34.15
Mass in abdomen	22	17.89
Drowsy/Lethargy	3	2.44
USG Findings		
Ileo-Colic Intussusception	112	91.06
Free Fluid	20	16.26

Regarding management strategies, 85.37% of cases with intussusception were successfully treated with ultrasound (USG)-guided hydrostatic reduction (HSR), whereas 14.63% experienced failure of this procedure. Among those who failed HSR, 83.33% underwent resection and anastomosis, while 16.67% received manual reduction. Intraoperative findings were primarily characterized by lymphadenopathy, with enlarged lymph nodes found in 55.56% of cases (Table 3).

Table 3: Management of intussusception cases and Intra-operative findings

Management Strategy	n	%
USG guided HSR		
Successful	105	85.37
Failure	18	14.63
In C/O failure of HSR		
Resection Anastomosis	15	83.33
Manual Reduction	3	16.67
Intra-operative findings		
Lymphadenopathy with many nodes enlarged	10	55.56
Polyps	6	33.33
Lipoma	1	5.56
Lymphoma	1	5.56

The treatment outcomes revealed that the majority of patients had a hospital stay of 5-7 days (52.03%). Remarkably, there were no reported mortalities in the cohort, and all patients were successfully discharged (100%) (Table 4).

Table 4: Treatment outcomes among intussusception cases

Outcome	n	%
Hospital stay (Days)		
≤ 4	53	43.09
5-7	64	52.03
> 7	6	4.88
Surgical outcome		
Mortality	0	0.00
Successful Discharge	123	100.00

DISCUSSION

The study revealed that the mean age of the participants was 15.5 months, with a distinct male predominance, indicating that male infants may have a higher susceptibility to intussusception within this age group. The most frequently reported clinical symptom was stomach discomfort, followed by vomiting, abdominal distension, blood in stools, constipation, and diarrhoea. These findings are consistent with the typical clinical presentation of paediatric intussusception as reported in earlier literature. In this study, ultrasound-guided hydrostatic reduction (USGHR) was utilized as the primary intervention for all cases, achieving a success rate of 85.37%. For patients where hydrostatic reduction was unsuccessful, surgical interventions such as open

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manual reduction or resection anastomosis were performed. The average hospital stay was 5.4 days, and notably, no fatalities were recorded, highlighting the safety profile of this management approach. These outcomes align with the findings of Nayak D. et al. [14], who demonstrated that USGHR is a simple, safe, and effective method for managing paediatric intussusception. Furthermore, Demirel BD et al. [15] corroborated these results by showing that USG-guided hydrostatic reduction is an effective treatment modality for both primary and recurrent ileo-colic intussusception in children.

In a related study by Ahmed MM et al. [16], it was observed that intussusception predominantly occurred in children aged 6 to 24 months, with ileo-colic intussusception being the most common anatomical variant. The average time to presentation in their study was 17.1 hours, and hydrostatic reduction was successful on the first attempt in 90% of cases. This underscores the importance of early diagnosis and timely intervention in improving treatment outcomes. Similarly, Chukwubuike KE et al. [17] reported that hydrostatic reduction was successful in 65% of their cases, further emphasizing its utility as a non-invasive treatment option. The simplicity and high success rates of hydrostatic reduction make it a preferred initial approach in paediatric patients presenting with intussusception.

Eraki ME et al. [18] conducted a comparative study evaluating the effectiveness of ultrasound-guided hydrostatic reduction versus surgical treatment. Their findings revealed that hydrostatic reduction was successful in 30 cases without any associated mortality, while 70 cases required open surgical intervention. This study also identified various etiological factors, including Meckel's diverticula and polyps, as underlying causes of intussusception. Krishnakumar et al. [19] further supported the effectiveness of hydrostatic reduction, reporting a 96% success rate with no recurrences or complications observed within 24 hours post-procedure. Such high success rates highlight the robustness of hydrostatic reduction as a first-line treatment.

A study by Batos TA et al. [20] reported a 100% success rate for hydrostatic reduction in 31 patients; however, 3 cases experienced recurrence within 48 hours of the procedure. This finding highlights the need for close post-reduction monitoring to detect and address any potential recurrences. Avci V et al. [21] identified several factors influencing the success of hydrostatic reduction, such as the length of the invaginated bowel segment and the number of reduction attempts. These factors could serve as critical predictors of treatment outcomes and may guide the decision-making process for clinicians.

Xie X et al. [22] conducted a comparative analysis of hydrostatic and pneumatic reduction techniques, concluding that hydrostatic reduction had a higher success rate (96.8%) compared to pneumatic methods. This finding reinforces the preference for hydrostatic reduction in centres where adequate ultrasound guidance and expertise are available. Similarly, Edison DT et al. [23] evaluated the effectiveness of USGHR in 88 children, reporting an 85.2% success rate, a mean hospital stay of 5.3 days, and no recorded fatalities. These outcomes further validate the safety and efficacy of USGHR, establishing it as a reliable and minimally invasive treatment option for paediatric intussusception with low morbidity and no associated mortality.

Collectively, these studies underline the significance of USGHR as a cornerstone in the management of paediatric intussusception. While the technique demonstrates high efficacy and safety, early diagnosis and timely intervention remain critical for optimizing outcomes. The ability to achieve high success rates with minimal complications highlights the importance of promoting the availability of ultrasound-guided hydrostatic reduction in healthcare facilities, particularly in resource-limited settings.

CONCLUSION

Intussusception predominantly affects male children under the age of two and commonly presents with symptoms such as abdominal pain and vomiting. Ultrasound-guided hydrostatic reduction (HSR) is a highly effective treatment option, offering a high success rate with minimal morbidity. This approach is both safe and efficient for managing intussusception. However, it is crucial to exclude peritonitis and bowel ischemia through thorough clinical and radiological evaluation before proceeding with HSR. In cases where bowel ischemia is suspected, Doppler ultrasound can provide valuable additional diagnostic information.

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