

PEDIATRICS INTUSSUSCEPTION MANAGING IN BASRAH PROVINCE

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ABSTRACT

Background: Intussusception is one of the most common gastrointestinal emergencies in infants and young children, often requiring immediate diagnosis and intervention to prevent serious complications such as bowel ischemia, necrosis, and perforation. Early recognition and appropriate management are essential for achieving favorable outcomes. This study aimed to evaluate the clinical outcomes, effectiveness of treatment modalities, and recurrence patterns of children diagnosed with intussusception and managed at our institution. Methods: A retrospective study was conducted by reviewing the medical records of pediatric patients treated for intussusception. Data were collected from patient charts, as well as operative records. Variables analyzed included demographic characteristics, treatment approaches, underlying etiologies, recurrence rates, and treatment outcomes. Results: 155 children were diagnosed and treated for intussusception. Non-operative management using ultrasound-guided hydrostatic reduction was successful in 76.8% of cases, thereby avoiding surgical intervention in most patients. Recurrence was observed in 4 cases. Overall outcomes were favorable when prompt diagnosis and treatment were achieved. Conclusion: Most pediatric intussusception cases are idiopathic in origin; however, timely diagnosis and intervention are critical to preventing bowel compromise and other severe complications. Ultrasonography remains the diagnostic modality of choice due to its high accuracy and non-invasive nature. Furthermore, hydrostatic reduction continues to be the preferred first-line treatment, even in patients experiencing recurrent episodes, owing to its high success rate and minimally invasive approach..

Keywords: Intussusception, Hydrostatic reduction, melena, BPR, abdominal pain

INTRODUCTION

Intussusception is among the most frequently encountered abdominal emergencies in pediatric practice and represents a significant cause of intestinal obstruction during infancy and early childhood. The condition occurs when a segment of the intestine telescopes into an adjacent distal segment, leading to bowel obstruction, compromised blood flow, and, if left untreated, bowel ischemia and necrosis. The highest incidence is observed in children younger than two years of age, making early recognition and prompt intervention particularly important in this age group.[1]

The etiology of intussusception is predominantly idiopathic, accounting for more than 90% of cases in the pediatric population.[2] In these patients, no definite anatomical abnormality can be identified as the initiating factor. However, a pathological lead point (PLP) may be present in a minority of cases, particularly among older children. Conditions such as Meckel's diverticulum, intestinal polyps, lymphomas, and other benign or malignant tumors can serve as lead points that precipitate the telescoping of the bowel. The likelihood of identifying a PLP increases in children older than five years of age and in cases involving small-bowel intussusception, where an underlying pathological lesion is more frequently encountered.[3]

Clinically, intussusception typically presents with a characteristic triad of intermittent abdominal pain, vomiting, and rectal bleeding or the passage of "currant jelly" stools [2,3]. However, this classic presentation is not always present, which can make diagnosis challenging. Patients may initially exhibit nonspecific symptoms such as irritability, lethargy, poor feeding, or episodic crying, potentially leading to delays in diagnosis. Consequently, a high index of suspicion is required when evaluating young children presenting with acute abdominal symptoms [4].

Advances in imaging techniques have significantly improved the diagnosis of intussusception [4,5]. Ultrasonography has become the preferred diagnostic modality because of its high sensitivity and specificity, non-invasive nature, lack of radiation exposure, and ability to identify characteristic findings such as the "target" or "doughnut" sign [6]. In addition to ultrasound, plain abdominal radiographs and contrast enema studies may provide valuable diagnostic information in selected cases.[4–8] Early and accurate diagnosis is essential, as delayed treatment may result in bowel ischemia, perforation, peritonitis, and the need for intestinal resection.[9]

The management of intussusception has evolved considerably over recent decades. Non-operative reduction using hydrostatic saline enema, barium enema, or pneumatic (air) enema is currently considered the first-line treatment for uncomplicated cases and has demonstrated high success rates [10]. Nevertheless, approximately 10%–30% of patients ultimately require surgical intervention due to failed non-operative reduction, bowel perforation, hemodynamic instability, signs of peritonitis, or suspicion of an underlying pathological lead point [10–12]. Surgical management may involve

manual reduction of the intussusception or bowel resection when ischemic or nonviable bowel is encountered [11].

Despite advances in diagnostic and therapeutic techniques, the management of intussusception remains challenging in certain situations, particularly in recurrent cases and those associated with pathological lead points. Determining the optimal timing for surgical exploration and identifying patients who may benefit from operative intervention continue to be important clinical considerations. Therefore, this study was undertaken to evaluate the clinical outcomes, treatment success rates, recurrence patterns, and overall prognosis of pediatric patients with intussusception managed at our institution. The findings may contribute to a better understanding of disease characteristics and help guide future management strategies.

METHODS

Methods

Study Design and Setting

This retrospective study was conducted at Al-sayab Hospital by reviewed all pediatric patients diagnosed with intussusception between January 2022 and December 2025. The study population consisted of children younger than 12 years of age who were diagnosed with intussusception and managed during the study period. Patients were identified through hospital admission records, radiology databases, operative logs, and discharge summaries.

Inclusion Criteria

- Children aged less than 12 years.
- Ultrasound-confirmed diagnosis of intussusception.
- Patients who underwent either non-operative or operative management at the study institution.
- Complete medical records available for review.

Exclusion Criteria

- Patients older than 12 years.
- Cases with incomplete clinical or radiological documentation.
- Patients referred after definitive treatment elsewhere.
- Cases in which the diagnosis of intussusception could not be confirmed.

Data Collection

Data were collected retrospectively from electronic and paper-based medical records. Information extracted included: Demographic Characteristics (Age at presentation, Sex and residence), Clinical Variables (Abdominal pain, vomiting, BPR, Abdominal distension, Fever, Lethargy, irritability and Palpable mass), Medical History (Previous intussusception, gastrointestinal or respiratory infections,

Previous abdominal surgery and Associate congenital or systemic disorders), and Diagnostic Findings (Ultrasonographic, Plain abdominal x-ray, bowel obstruction and bowel perforation)

Diagnostic Evaluation

All patients underwent abdominal ultrasonography. Diagnosis was established based on characteristic sonographic findings, including the target sign in transverse view and the pseudo-kidney sign in longitudinal view. Additional investigations, such as plain abdominal radiographs, were obtained in selected patients when bowel obstruction, perforation, or alternative diagnoses were suspected.

Treatment Protocol

Following confirmation of diagnosis, management decisions were made according to the patient's clinical condition.

Non-operative Management

Hydrostatic reduction under ultrasound guidance was used as the initial treatment modality in clinically stable patients without evidence of bowel perforation, generalized peritonitis, or severe hemodynamic instability.

The procedure was performed using warm normal saline administered rectally under controlled pressure while monitoring the reduction process in real time using ultrasonography. Successful reduction was defined as complete disappearance of the intussusception and free passage of fluid into the terminal ileum, accompanied by clinical improvement.

Patients were observed after successful reduction and discharged according to institutional protocols once they tolerated oral intake and remained symptom-free.

Operative Management

Surgical intervention was indicated in the following situations:

- Failed hydrostatic reduction
- Signs of bowel perforation
- Generalized peritonitis
- Hemodynamic instability or shock
- Suspected pathological lead point
- Evidence of bowel ischemia or gangrene

The choice between laparotomy and laparoscopy depended on patient condition, surgeon preference, and available resources.

Operative procedures included:

- Manual reduction of intussusception
- Excision of pathological lead points
- Diverticulectomy when Meckel's diverticulum was identified

- Segmental bowel resection for nonviable or irreducible bowel
- Primary intestinal anastomosis following resection

All excised specimens were submitted for histopathological examination to identify underlying pathological causes.

Outcome Measures and Definitions

Successful Reduction

Successful reduction was defined as complete resolution of intussusception by hydrostatic reduction without the need for surgery.

Failed Reduction

Failed reduction was defined as persistence of intussusception despite appropriate attempts at hydrostatic reduction, necessitating surgical intervention.

Non-recurrent Intussusception

Cases successfully treated without any subsequent recurrence during follow-up.

Single Recurrent Intussusception

One recurrence following successful reduction, occurring after the initial episode.

Multiple Recurrent Intussusception

Two or more recurrent episodes occurring after either hydrostatic reduction or surgical treatment.

Follow-up

Patients were followed through outpatient clinic visits and hospital records. Follow-up information was reviewed to identify recurrent episodes, late complications, and the need for additional interventions.

Statistical Analysis

Data were entered into a computerized database and analyzed using the Statistical Package for Social Sciences (SPSS) software version 24 (IBM Corp., Armonk, NY, USA). Categorical variables were summarized as frequencies and percentages, whereas continuous variables were expressed as means \pm SD or medians with ranges, depending on data distribution.

Ethical Considerations

Ethical approval was obtained from the institutional ethics committee of Al-sayab Hospital before commencement of the study. Patient confidentiality was strictly maintained throughout the research process. Personal identifiers were removed from all study records, and data were analyzed anonymously. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

RESULTS

Demographics

A total of 155 children with intussusception were managed. There were 97 males and 58 females (male-to-female ratio =1.67:1). The mean age at presentation was 20 months, with ages ranging from 6 months to 13 years. The majority of patients were younger than one year of age, accounting for 85 cases. Age between 1 and 3 years recorded in 40 cases, while 30 patients were older than 5 years. (Figures 1 and 2)

Age distribution of children with intussusception

Distribution of 155 children according to age group.



Figure 1. Age distribution of children with intussusception.

Sex distribution of children with intussusception

Male and female distribution among 155 children.



Figure 2. Sex distribution.

Clinical Presentation

Intermittent colicky abdominal pain was the most common presenting symptom, reported in all patients. Vomiting was the second most frequent symptom and occurred in 140(90.3%) cases. Malena and BPR was observed in 31.6% of patients. A palpable abdominal mass was identified in only 49 patients, while abdominal distension was present in 15 cases. (Figure 3)

Clinical presentation of children with intussusception

Frequency of presenting symptoms among 155 children with intussusception.

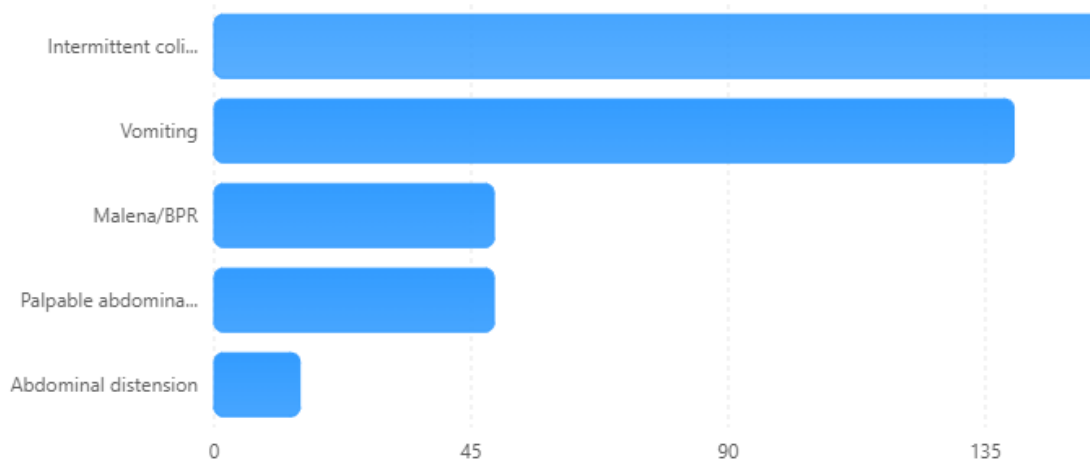


Figure 3. Clinical presentation of children with intussusception.

Non-operative Management

Hydrostatic reduction was employed as the primary treatment modality in all suitable patients. Successful reduction was achieved in 119 of 155 patients, yielding an overall success rate of 76.8%. The remaining 36 patients (23.2%) experienced failed hydrostatic reduction and subsequently required operative intervention. (Figure 4)

Outcome of hydrostatic reduction in children with intussusception

Treatment outcome among 155 children with intussusception.

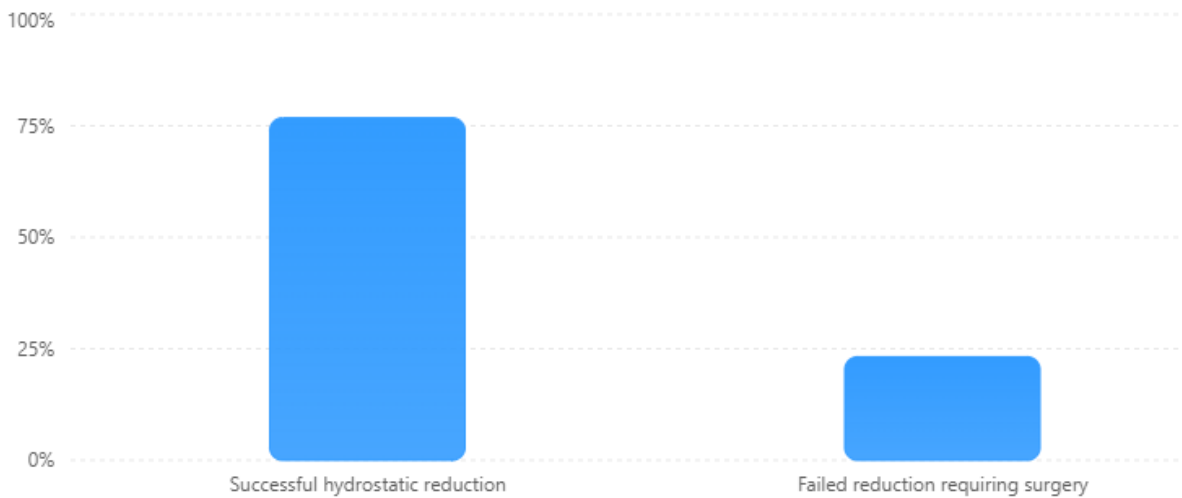


Figure 4. Outcome of hydrostatic reduction in children with intussusception

Surgical Management

Surgical treatment was required in 36 patients. Among surgically managed patients, Figure (5):

- 25 patients underwent open laparotomy with manual reduction of the intussusception.
- Two patients underwent successful laparoscopic reduction.
- Two patients were found to have spontaneous reduction at the time of surgical exploration.
- Seven patients required bowel resection and primary anastomosis because of irreducible intussusception, bowel compromise, or associated pathological lesions.

Types of surgical management in children with intussusception

Distribution of surgical procedures among 36 surgically managed patients.



Figure 5. Types of surgical management in children with intussusception.

RECURRENCE

Recurrent intussusception was documented in 4 patients, resulting in an overall recurrence rate of 2.6%. One patient experienced recurrence within 2 days. The age at first recurrence ranged from 6 months to 5 years. Three patients experienced only a single recurrence. Two patients were successfully managed by repeat hydrostatic reduction, whereas one required surgery. One patient experienced five separate episodes of intussusception, the surgery was required because of failed reduction.

(Table 1)

Table 1. Characteristics of Recurrent Intussusception

No. of Recurrences	No.	Hydrostatic Reduction	Surgery
1 recurrence	3	2	1
5 recurrences	1	-	1

DISCUSSION

Intussusception remains one of the most common causes of acute intestinal obstruction and surgical emergencies in infancy and early childhood [13]. Prompt diagnosis and timely intervention are essential to prevent bowel ischemia, perforation, and other serious complications [14,15]. Our findings support the effectiveness of ultrasonography for diagnosis and ultrasound-guided hydrostatic

reduction as the primary treatment modality in most patients. Consistent with previous reports, intussusception predominantly affected younger children in our cohort. More than 80% of patients were younger than two years of age, with the highest incidence occurring during infancy. This age distribution is in agreement with several published studies that have identified infancy and early childhood as the peak period for the development of intussusception [13–18]. The age-related pattern may be explained by developmental changes in intestinal lymphoid tissue and increased susceptibility to bowel telescoping during early childhood.

A male predominance was observed in the present study. Similar findings have been consistently reported in the literature, where males constitute approximately 60–75% of pediatric intussusception cases [19–22].

The clinical manifestations observed in our patients were largely consistent with the classical presentation of intussusception. Intermittent colicky abdominal pain was the most frequent symptom, followed by vomiting and BPR. These findings correspond with those reported by Khan et al., who documented abdominal pain in approximately 78% of affected children, and other studies that identified vomiting and BPR as common presenting symptoms [23,24].

Interestingly, a palpable abdominal mass was detected in 49 cases, while abdominal distension was present in merely 15 cases. These figures are lower than those reported in some previous studies. Such variations may reflect differences in the timing of presentation, clinical assessment, and the widespread use of US, which facilitates earlier diagnosis before the development of advanced physical findings. Consequently, reliance solely on clinical examination may result in delayed diagnosis, emphasizing the importance of imaging in suspected cases.

Hydrostatic reduction under guidance was used as the initial treatment approach in clinically stable patients. Successful reduction was achieved in 76.8% of cases, which is comparable to the success rates reported in the literature, typically ranging between 80% and 95%.[20]

Despite the effectiveness of non-operative management, approximately 36 of our patients required surgical intervention following failed hydrostatic reduction or because of clinical indications such as suspected bowel compromise. A proportion comparable to previously published reports indicating that 10–30% of cases ultimately require operative management.[10–12] Delayed presentation, prolonged symptoms, bowel edema, and the presence of pathological lead points are among the factors known to increase the likelihood of surgical intervention.[25]

Open laparotomy was the most commonly employed procedure, while laparoscopic reduction was performed in a smaller proportion of patients. Several studies have demonstrated the safety and effectiveness of laparoscopic management in selected patients, although conversion to open surgery may be required in complex cases.[26]

Recurrence remains an important aspect of intussusception management [27]. In our study, recurrent intussusception occurred in 4 patients. These findings are comparable to recurrence rates reported in previous studies [26-28] and support the recommendation that recurrent episodes should initially be managed with repeat hydrostatic reduction whenever clinically appropriate.

The optimal management of recurrent intussusception remains controversial. Current literature does not provide a universal consensus regarding the number of recurrent episodes that should prompt operative intervention. Some authors advocate repeated hydrostatic or pneumatic reduction whenever feasible, whereas others recommend surgical exploration after multiple recurrences because of the increased possibility of an underlying pathological lead point. Wei-Lun et al. reported that the risk of further recurrence increases significantly after the third episode and suggested consideration of surgical intervention at that stage. Their reported postoperative recurrence rate was only 1.7%.[29]

The present study has several limitations. First, its retrospective design may have resulted in incomplete documentation of some clinical variables and follow-up data. Second, the study was conducted at a single institution, which may limit the generalizability of the findings to other populations. Third, long-term follow-up was not available for all patients, potentially leading to underestimation of recurrence rates. Despite these limitations, the study provides valuable insight into the epidemiological characteristics, management strategies, and outcomes of pediatric intussusception over an extended study period.

CONCLUSION

Intussusception remains one of the most common abdominal emergencies in childhood and requires prompt recognition and timely intervention to prevent serious complications such as bowel ischemia, perforation, and intestinal necrosis. Although the condition classically presents with intermittent abdominal pain, vomiting, and rectal bleeding, clinical manifestations may be variable, necessitating a high degree of clinical suspicion. Ultrasound-guided hydrostatic reduction was highly effective and should remain the first-line treatment for uncomplicated intussusception, including most recurrent episodes. Surgical intervention remains necessary in cases of failed reduction, bowel perforation, peritonitis, intestinal ischemia, or when a pathological lead point is suspected. Early diagnosis, appropriate patient selection, and timely management are essential for achieving favorable outcomes and minimizing morbidity in children with intussusception.

Authors' contributions

1; Conceptualization; Data Curation; Investigations; Methods; Project administration; Resources; Software; Validation; Visualization; Writing – original draft and Writing – review & editing

2; Conceptualization; Data Curation; Methods; Project administration; Resources; Software; Writing – original draft and Writing – review & editing

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None.

Conflicts of interest

The authors declare no conflict of interest regarding this article.

Ethical approval

The Medical Ethical Committee of The Department of Medical Oncology, Baghdad Oncology Teaching Hospital, Baghdad Medical City Complex approved this study (no.015 on 12/2/2020).

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