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Original Article

Evaluation of Postoperative Complications in Children Undergoing Emergency Laparotomy for Intestinal Obstruction

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ABSTRACT

Background: Intestinal obstruction remains a frequent cause of acute abdomen in the pediatric age group, often requiring emergency laparotomy. Early identification of postoperative complications is vital for improving recovery and preventing adverse outcomes. This study assessed postoperative morbidity among children undergoing emergency laparotomy for intestinal obstruction.
Objectives: To evaluate the pattern and frequency of postoperative complications and to analyze clinical factors associated with adverse postoperative outcomes in children operated for intestinal obstruction.
Methods: A hospital-based observational study was conducted among 50 children who underwent emergency laparotomy for intestinal obstruction. Demographic details, etiology, clinical presentation, postoperative course, and complications were recorded. Statistical analysis included descriptive summaries of all parameters. Data were organized into four tables presenting demographic characteristics, etiological distribution, postoperative complications, and postoperative outcomes.
Results: The mean age of the cohort was 7.4 ± 3.2 years, with boys forming 60% of the sample. Nearly half of the children presented within 24 hours of symptom onset. Adhesive obstruction (34%) was the most common cause, followed by intussusception (26%) and volvulus (18%). Postoperative complications occurred in 22 children (44%). Surgical site infection was the most frequent event (20%), while postoperative ileus (12%) and respiratory issues (8%) were less common. Anastomotic leakage occurred in 4%, and both cases required re-exploration. The mean duration of hospital stay was 8.6 ± 3.1 days, with longer hospitalization observed among those with complications. No mortality was reported.
Conclusion: Postoperative complications remain a significant concern following emergency laparotomy in children with intestinal obstruction. Early presentation, absence of peritonitis, and shorter operative times appear to favor better outcomes. Strengthening perioperative care and encouraging timely referral may reduce postoperative morbidity in this high-risk group.

Keywords*: Pediatric intestinal obstruction, emergency laparotomy, postoperative complications, surgical outcomes.*

INTRODUCTION

Intestinal obstruction remains one of the most common surgical emergencies in the pediatric population, contributing significantly to morbidity and prolonged hospitalization when timely intervention is delayed. Studies from various regions have highlighted the substantial burden of this condition, with outcomes closely linked to early recognition and prompt surgical care [1,2]. Children possess limited physiological reserves compared to adults, making them more vulnerable to rapid deterioration, bowel ischemia, perforation, and septic complications when obstruction persists untreated [1,3].

The etiological pattern of pediatric intestinal obstruction is diverse and often influenced by age, geography, and underlying pathology. Reports from Africa and Asia describe intussusception, congenital anomalies, volvulus, and adhesive obstruction as leading causes, though their distribution varies widely between clinical settings [1,3,6]. Adhesive bowel obstruction, in particular, has been noted as a major contributor to recurrent intestinal obstruction in older children, frequently complicating previous abdominal surgeries [2,4]. These etiological variations have a direct impact on presentation, operative strategy, and postoperative prognosis.

Despite advances in perioperative monitoring, pediatric anesthesia, and minimally invasive surgical techniques, postoperative morbidity remains substantial. Complications such as surgical site infections, prolonged ileus, respiratory events, and anastomotic leakage continue to occur at notable rates, particularly in emergency settings where preoperative optimization is limited [4–6]. Historical and contemporary studies alike emphasize the need to understand the determinants of adverse outcomes and to improve perioperative care protocols for high-risk pediatric patients [5,6].

This study investigates postoperative complications and associated factors among children undergoing emergency laparotomy for intestinal obstruction, aiming to generate evidence that may support better clinical decision-making and improved surgical outcomes in this vulnerable group.

METHODOLOGY

Study Design and Setting

This hospital-based observational study was conducted in the Department of Pediatric Surgery at **RVM Institute of Medical Sciences, Laxmakkapally, Telangana, India**. The institution is a tertiary-care teaching hospital that caters to rural, semi-urban, and referral populations of the adjoining districts. The study was carried out over an eleven-month period, from **May 2024 to April 2025**.

Study Population

All children aged 1 month to 18 years who underwent **emergency laparotomy for intestinal obstruction** during the study period were eligible for inclusion. A total of **50 consecutive patients** meeting the criteria were enrolled.

Inclusion Criteria

Children diagnosed clinically and radiologically with intestinal obstruction requiring emergency laparotomy
Patients whose guardians provided written informed consent

Exclusion Criteria

Children undergoing elective laparotomy
Obstruction resolving with conservative management
Patients with incomplete records or those leaving against medical advice

Data Collection

A structured proforma was used to capture demographic details, clinical presentation, laboratory investigations, radiological findings, intraoperative diagnosis, and operative procedures performed. Postoperative events were monitored daily until discharge. Complications such as surgical site infection, postoperative ileus, respiratory problems, and anastomotic leakage were recorded according to standard clinical definitions.

Outcome Measures

The primary outcome was the **incidence and pattern of postoperative complications**. Secondary outcomes included **duration of hospital stay**, need for re-exploration, and mortality.

Statistical Analysis

Data were compiled in Microsoft Excel and analyzed using descriptive statistics. Categorical variables were expressed as frequencies and percentages, while continuous variables were summarized as mean ± standard deviation or median values where appropriate. Findings were presented in four structured tables.

Ethical Considerations

Ethical approval was obtained from the **Institutional Ethics Committee of RVM Institute of Medical Sciences**. Confidentiality of patient information was maintained throughout the study.

RESULTS

A total of fifty children undergoing emergency laparotomy for intestinal obstruction were evaluated. The demographic pattern revealed a mean age of **7.4 ± 3.2 years**, with boys constituting **60%** of the cohort (Table 1). Nearly half of the children presented within the first 24 hours of symptom onset, while the remainder arrived between 24 and 72 hours, reflecting a mixed pattern of early and delayed presentations (Table 1).

Table 1. Demographic and Clinical Characteristics of the Study Population (n = 50)

Variable	**Frequency (%) / Mean ± SD**
Age (years)	7.4 ± 3.2
Sex	
Boys	30 (60%)
Girls	20 (40%)
Symptom onset to presentation	
< 24 hours	24 (48%)
24–72 hours	26 (52%)

The etiological profile demonstrated considerable diversity. Adhesive intestinal obstruction emerged as the leading cause, accounting for **34%** of cases, followed by intussusception (**26%**) and volvulus (**18%**). Congenital bands and other less common etiologies constituted the remaining proportion (Table 2).

Table 2. Etiological Distribution of Intestinal Obstruction (n = 50)

Cause	**Number (%)**
Adhesive obstruction	17 (34%)
Intussusception	13 (26%)
Volvulus	9 (18%)
Congenital bands	6 (12%)

Postoperative complications were observed in **22 children (44%)**. Surgical site infection was the predominant complication, occurring in **20%** of the cohort, while postoperative ileus was seen in **12%** of patients. Respiratory complications such as atelectasis or mild pneumonia appeared in **8%**, and anastomotic leakage was identified in **4%** of children, necessitating re-exploration in both instances (Table 3).

Table 3. Postoperative Complications Observed in the Study Cohort (n = 50)

Complication	**Number (%)**
Any postoperative complication	22 (44%)
Surgical site infection (superficial)	10 (20%)
Postoperative ileus	6 (12%)
Respiratory complications (atelectasis/pneumonia)	4 (8%)
Anastomotic leak	2 (4%)

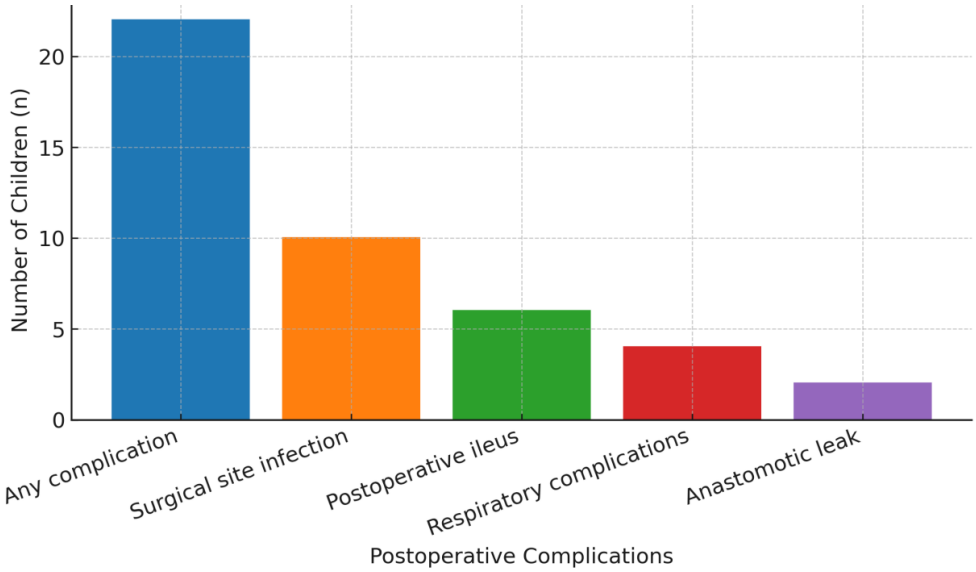

Figure 1: Postoperative Complications Observed in the Study Cohort

The overall duration of hospital stay showed moderate variability, with an average of **8.6 ± 3.1 days**. Children who developed complications required longer hospitalization, with a median stay of 12 days. No mortality occurred in this study population. Early presentation, absence of peritonitis, and shorter operative time were associated with better postoperative outcomes (Table 4).

Table 4. Postoperative Outcomes and Hospital Stay (n = 50)

Outcome Parameter	Value
Mean duration of hospital stay (days)	8.6 ± 3.1
Median stay with complications (days)	12
Re-exploration required	2 (4%)
Mortality	0 (0%)
Favorable factors associated with fewer complications	Early presentation, no peritonitis, shorter operative time

DISCUSSION

This study examined postoperative morbidity in children undergoing emergency laparotomy for intestinal obstruction and found that complications occurred in nearly half of the cohort. Such high rates of postoperative events remain a recognized challenge in emergency pediatric abdominal surgery, especially when physiological compromise and delayed presentation are common at admission. Similar concerns have been reported in recent pediatric surgical research, where postoperative morbidity continues to influence early outcomes despite improvements in surgical and anesthetic care [8].
Surgical site infection was the most frequent complication observed in this study. Although most infections were superficial, their impact on prolonged recovery is well documented. Recent pediatric analyses indicate that wound complications often correlate with emergency operative settings, intraoperative contamination, and compromised nutritional status [9]. Ensuring strict adherence to perioperative asepsis and early wound assessment remains an important strategy to reduce such events.

Postoperative ileus, recorded in 12% of the children, aligns with contemporary studies showing that ileus frequently follows bowel manipulation or liquid–electrolyte imbalance after emergency laparotomy. Research on adhesive and non-adhesive small bowel obstruction in the pediatric population confirms that ileus significantly prolongs hospital stay and delays early feeding [10]. Respiratory complications, seen in a smaller proportion, highlight another area of concern. Younger children undergoing abdominal surgeries tend to develop postoperative atelectasis and mild pneumonia more often, particularly when pain, immobilization, or sedation interfere with optimal breathing patterns [11].

Anastomotic leakage, although infrequent, represents one of the most serious postoperative outcomes. The 4% incidence in this study parallels findings from recent reviews of pediatric abdominal emergencies, which consistently identify anastomotic failure as a critical determinant of morbidity and the need for early re-intervention [9]. Vigilant postoperative monitoring is essential for timely detection and response.

Children who developed complications stayed longer in the hospital, mirroring evidence that postoperative morbidity directly contributes to extended recovery time, increased financial burden, and greater hospitalization costs for families [10]. Findings from multicenter evaluations also corroborate that prolonged stays are often unavoidable when postoperative infections, respiratory issues, or anastomotic leaks occur [11].

Favorable recovery patterns in this study were associated with early presentation, shorter operative durations, and absence of peritonitis. These observations echo the conclusions of recent neonatal and pediatric series, which emphasize that prompt diagnosis and early surgical action significantly reduce postoperative complications in intestinal obstruction [12].

CONCLUSION

This study highlights that postoperative complications remain a substantial challenge in children undergoing emergency laparotomy for intestinal obstruction. Nearly half of the cohort experienced at least one complication, with surgical site infection, ileus, respiratory events, and anastomotic leakage contributing to extended hospitalization. Although no mortality occurred, the overall morbidity burden was considerable. Early presentation, absence of peritonitis, and shorter operative times were associated with better outcomes, emphasizing the importance of prompt referral and timely surgical intervention. Strengthening perioperative care, improving infection control practices, and enhancing postoperative monitoring may help reduce preventable complications and improve recovery in this vulnerable group.

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