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Original Research Article

Nutritional Timing in Pediatric Stoma Reversal: Early Versus Late Feeding Practices

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Abstract: *Early postoperative feeding after pediatric stoma reversal may enhance recovery, but concerns remain regarding its safety and association with postoperative complications.* ***Objective:*** *To determine the effect of early versus late feeding on postoperative complications among pediatric patients undergoing stoma reversal.* ***Methods:*** *This prospective cohort study was conducted in the Department of Pediatric Surgery, Liaquat University of Medical and Health Sciences, from 12 March 2025 to 12th June 2025. A total of 286 pediatric patients undergoing stoma reversal were enrolled and allocated into two groups according to the timing of postoperative oral or enteral feeding. Group E included 143 patients who commenced feeding within 24–48 hours after surgery, while Group L included 143 patients who started feeding after 48 hours. Intraoperative and postoperative outcomes were assessed, including return of bowel sounds, passage of stool, length of hospital stay, and postoperative complications. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The chi-square test or Fisher's exact test was used to compare postoperative complications between groups, with statistical significance set at $p < 0.05$.* ***Results:*** *The overall mean age of the patients was 6.32 ± 3.38 years, and most participants were female. Patients in the early feeding group showed significantly faster postoperative gastrointestinal recovery, with an earlier return of bowel sounds (2.22±1.06 vs 2.55±1.07 days; p=0.011) and earlier passage of bowel (3.11±1.33 vs 3.83±1.21 days; p=0.0005) compared with the late feeding group. Early feeding was also associated with a significantly shorter hospital stay (4.59±1.47 vs 6.55±1.84 days; p=0.0005). The frequency of postoperative complications, including fever, abdominal distension, anastomotic leakage, vomiting, and surgical site infection, did not differ significantly between the two groups.* ***Conclusion:*** *Early initiation of oral or enteral feeding within 24–48 hours after pediatric stoma reversal appears safe and is associated with faster gastrointestinal recovery and shorter hospital stay without increasing postoperative morbidity.*

Keywords: Anastomosis, Surgical; Child; Enteral Nutrition; Intestinal Stomas; Postoperative Complications

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Introduction

Intestinal stomas, such as colostomies or ileostomies, are commonly performed procedures in pediatric patients with conditions like anorectal malformations, Hirschsprung disease, necrotizing enterocolitis, intestinal perforation, intestinal obstruction, or trauma. Following the establishment of these stomas, patients often necessitate gut anastomosis through elective laparotomy to restore bowel continuity once they are stabilized or after definitive surgery has been completed.(1-4) Usually, a child is kept nil by mouth until their bowel movements restart after intestinal anastomosis. It often lasts four to five days, and it is at the surgeon's discretion, with the intention of preventing ileus and facilitating bowel rest while the anastomosis heals (2, 5), because anastomotic leak is often the most worrisome complication for a surgeon. (6) The factors like Bowel manipulation, anesthesia, the inflammatory response to surgery, and perioperative drugs are the potential causes of postoperative ileus. (7) The practice of keeping a child nil by mouth after bowel surgery has recently been challenged because the theories behind it lack scientific support. Nonetheless, children have numerous valid arguments supporting the claim that food consumption begins early in the postoperative phase. (8) Several studies have shown that both pre- and post-operating fasting may also lead to unnecessary starvation, resulting in adverse consequences on patients' outcomes. (9) To prevent these complications the concept of early oral feeding has also been introduced. (10) In some research trials, comparing postoperative fasting to prompt enteral feeding after gastrointestinal resections did not show any obvious edge. However, in Dag et al. study, the early enteral feeding group patients resumed oral feeding on the day after the operation without confirmation of bowel motility, and most of these patients successfully put up with it. (11, 12) As feeding has no further negative effects on the anastomosis site because, even in the absence of oral feeding, around 1.5–2 L of Gastric and pancreatic secretions enter and pass through the intestine. After absorption, a sizable proportion of these secretions flows through the anastomosis site. (8)

Early enteral feeding has been shown to reduce the risk of complications in several adult studies and is advantageous for those undergoing bowel anastomosis and laparotomies, as experimental and clinical data demonstrate that early feeding can accelerate wound healing and boost anastomotic strength. (12) Similar patterns in the adoption of early oral feeding have been observed in the pediatric population as well. But there isn't any conclusive evidence of additional benefits from early feeding, nor are there any clear disadvantages in pediatrics. (6)

The idea of early enteral feeding (EEN) has gained more attention in abdominal surgery in recent years. Early postoperative enteral nutrition has been demonstrated in most adult clinical trials to reduce postoperative morbidity and mortality, as well as postoperative ileus, and to shorten the duration and length of stay following a variety of surgeries in adults. Early enteral feeding is now a crucial component of "enhanced recovery after surgery" (ERAS) and other fast-track protocols.(13) Delayed feeding puts children and caregivers at risk for malnutrition, prolonged hospital stays, and the need for parenteral nutrition. Following intestinal anastomosis, the most serious complications are anastomosis leakage in 5% to 15 %, peritonitis risk, risk of sepsis and death (14, 15)

The purpose of this study is to assess the effect of early versus delayed feeding in pediatric patients undergoing stoma reversal. Prolonged fasting in children following stoma reversal theory and practice lacks evidence-based scientific support. There is scarce data on it at both the local and international levels. Furthermore, studies also don't support the routine practice of delayed feeding. Our study's primary goal is to assess the time to full feed resumption and the length of hospital stay following stoma reversal between early and delayed feeding. Also, to determine whether early feeding leads to anastomotic leakage complications.

Methodology

This prospective cohort study was conducted in the Department of Pediatric Surgery at Liaquat University of Medical and Health Sciences (LUMHS) from 12th March 2025 to 12th June 2025. Children aged 3 months to 12 years who belonged to American Society of Anesthesiologists (ASA) physical status classes I and II and underwent stoma reversal surgery were enrolled consecutively. Stoma reversal was defined as the restoration of bowel continuity by intestinal anastomosis following either a colostomy or an ileostomy. Children with multiple comorbid conditions, including cardiovascular disease, severe malnutrition defined as weight-for-age below −2 standard deviations, and those diagnosed with Hirschsprung disease, necrotizing enterocolitis, intestinal perforation, trauma, or small bowel atresia were excluded. Written informed consent was obtained from the parents or legal guardians of all participants before enrollment.

The sample size was calculated using the WHO sample size calculation software. The estimation was based on findings from a previous study reporting an anastomotic leakage rate of 15% in the delayed feeding group. Assuming that early feeding would result in a clinically meaningful 60% relative reduction in anastomotic leakage, with 80% power and a 5% significance level, the required sample size was calculated as 143 patients per group, yielding a total sample of 286 children.

Participants were allocated to two groups based on the timing of postoperative feeding initiation. Group E comprised children who started oral or enteral feeding within 24 to 48 hours after stoma reversal, whereas Group L included children in whom feeding was initiated more than 48 hours after surgery. All stoma reversal procedures were performed by senior residents under the supervision of the pediatric surgical team, in accordance with standard institutional protocols.

Baseline demographic and clinical characteristics were recorded for all patients, including age, sex, weight, height, and body mass index (BMI), with BMI calculated as weight in kilograms divided by height in meters squared. Additional preoperative variables included relevant clinical history, findings on physical examination, preoperative hemoglobin and serum albumin levels, and stoma type. All data were entered into a predesigned proforma by the trained researcher and, in her absence, by a designated member of the pediatric surgical team.

The primary and secondary outcome measures included both intraoperative and postoperative variables. Postoperative complications assessed were anastomotic leakage, surgical site infection, vomiting, and abdominal distension. Anastomotic leakage was defined as a disruption at the anastomotic site leading to the escape of intestinal contents into surrounding tissues. Surgical site infection was defined by the presence of redness, swelling, warmth, tenderness, or purulent discharge at the incision site. Abdominal distension was defined as a clinically observable increase in abdominal girth due to gaseous or fluid accumulation, while vomiting was defined as the forceful expulsion of gastric contents. Other postoperative variables included the need for blood transfusion, use of inotropic support, postoperative intensive care unit admission, duration of surgery, and length of hospital stay.

Data were analyzed using SPSS version 23.0 (IBM Corp., Armonk, NY, USA). The distribution of continuous variables was assessed using the Shapiro–Wilk test. Normally distributed variables were summarized as mean ± standard deviation, whereas non-normally distributed variables were reported as median with interquartile range. Categorical variables were presented as frequencies and percentages. Comparisons between the early feeding and delayed feeding groups were performed using the Chi-square test or Fisher's exact test for categorical variables, as appropriate. A p-value of 0.05 or less was considered statistically significant.

Results

A total of 286 pediatric patients undergoing stoma reversal were included in this cohort study. Patients were categorized into two groups based on the timing of initiation of oral or enteral feeding. Group E included 143 patients who started feeding within 24–48 hours postoperatively, while Group L included 143 patients who started feeding after 48 hours. Demographic profile of the patients was not statistically significant between groups. Colostomies were done in 152 cases (53.1%) and ileostomies in 134 cases (46.9%). There was no statistically significant difference in mean hemoglobin, albumin, WBC, or CRP across the groups.

A comparison of postoperative outcomes between groups is shown in Table 2. Patients in Group E experienced a significantly earlier return of bowel sounds (2.22±1.06 vs. 2.55±1.07 days; p=0.011) and earlier passage of bowel (3.11±1.33 vs. 3.83±1.21 days; p=0.0005), indicating more rapid postoperative gastrointestinal recovery (Table 2). Early feeding was also associated with a markedly shorter hospital stay (4.59±1.47 vs. 6.55±1.84 days; p=0.0005), reflecting faster overall recovery (Table 2).

Importantly, the incidence of postoperative complications, such as fever, abdominal distension, anastomotic leakage, vomiting, and surgical site infection, did not differ significantly between the two groups (Figure 1). These findings demonstrate that early initiation of feeding after stoma reversal is both safe and clinically advantageous, promoting faster restoration of bowel function without increasing postoperative morbidity.

Table 1: Demographic and clinical characteristics of patients

Variables	Group E n=143	Group L n=143	P-Value
Age (Years)	6.56±3.56	6.08±3.20	0.243
Weight (kg)	20.77±10.37	21.53±10.92	0.550
Gender			
Female	72(50.3%)	81(56.6%)	0.286
Male	71(49.7%)	62(43.4%)	
Laboratory values			
Hemoglobin (mg/dl)	11.36±1.54	11.35±1.41	0.952
Albumin	4.00±0.59	3.98±0.58	0.826
WBC, (109)	20.14±5.15	19.22±5.75	0.151
CRP (mg/L)	15.92±5.04	16.36±5.50	0.477
Type of Stoma			
Colostomy	77(53.8%)	75(52.4%)	0.813
Ileostomy	66(46.2%)	68(47.6%)	

Table 2: Comparison of outcomes between groups

Outcome	Group E n=143	Group L n=143	P-Value
Duration of surgery (min)	84.10±10.67	84.82±11.53	0.575
Estimated blood loss	89.30±37.47	85.43±85.43	0.386
Return of bowel sound (days)	2.22±1.06	2.55±1.07	0.011*
Passage of bowel (days)	3.11±1.33	3.83±1.21	0.0005*
Length of Hospital Stay	4.59±1.47	6.55±1.84	0.0005*

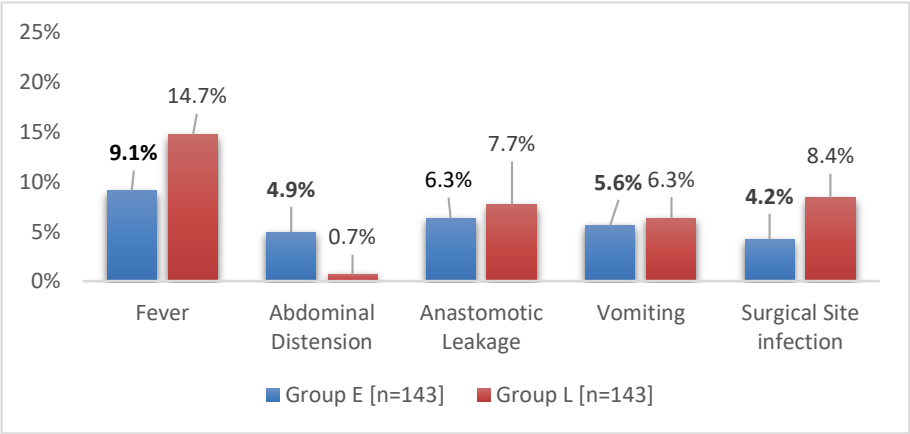

Figure 1: Comparison of complications between groups

Discussion

The present study demonstrated that early postoperative feeding after pediatric stoma reversal was associated with significantly faster gastrointestinal recovery and a shorter hospital stay, without increasing postoperative morbidity. Children who received feeding within 24–48 hours had earlier return of bowel sounds, earlier passage of stool, and a reduced duration of hospitalization compared with those in whom feeding was initiated after 48 hours. Importantly, the rates of abdominal distension, vomiting, anastomotic leakage, surgical site infection, and fever did not differ significantly between the two groups. These findings suggest that early feeding after stoma reversal is both safe and clinically advantageous in pediatric surgical practice.

The safety profile observed in the current study is consistent with the growing body of pediatric evidence supporting early enteral nutrition after gastrointestinal surgery. Previous systematic reviews and meta-analyses have shown that early feeding does not increase the risk of anastomotic leakage, vomiting, abdominal distension, or other major postoperative complications in children undergoing intestinal anastomosis (16,17). More recent literature has further supported the view that early enteral nutrition is well tolerated and may even contribute to lower rates of wound-related complications in pediatric abdominal surgery (18). Individual comparative studies have also reported no significant differences in wound infection or anastomotic failure between early- and delayed-feeding groups (19). Taken together, these findings reinforce the argument that the traditional practice of prolonged postoperative fasting may not be necessary in most children undergoing bowel anastomosis.

Beyond safety, our findings indicate that early feeding offers measurable benefits in postoperative recovery. Children in the early-feeding group experienced more rapid restoration of bowel activity, as reflected by earlier bowel sounds and bowel movements, along with a significantly shorter hospital stay. These results are consistent with earlier pediatric and adult studies showing that early oral or enteral feeding accelerates recovery of gut function, shortens the time to full feeds, and reduces the length of hospitalization without compromising anastomotic integrity (20-22). A previous pediatric study on ileostomy closure similarly demonstrated an earlier return of bowel function and shorter hospitalization among children who started feeds early after surgery (20). Therefore, the present study adds further evidence, specifically in the setting of pediatric stoma reversal, that early feeding may improve functional recovery while maintaining postoperative safety.

The relevance of these findings is particularly notable in resource-constrained settings. In many low- and middle-income countries, prolonged hospitalization places a substantial burden on families and health systems. Studies from comparable settings have shown that early postoperative feeding may reduce hospital stay and postoperative infectious morbidity, thereby improving bed turnover and lowering overall treatment burden (23,24). Our findings align with these reports and support the feasibility of adopting early feeding protocols in routine pediatric surgical care, especially where access to prolonged postoperative support and parenteral nutritional strategies may be limited.

The biologic rationale for early postoperative feeding also supports the clinical findings of the present study. Early enteral nutrition helps preserve intestinal mucosal integrity, stimulate enterocyte function, maintain villous architecture, and reduce bacterial translocation (25,26). In contrast, prolonged fasting may contribute to mucosal atrophy, increased intestinal permeability, and delayed recovery of bowel motility. Early luminal nutrition also promotes gastrointestinal hormonal and neural stimulation, which may enhance peristalsis and reduce postoperative ileus (27). In addition, some studies suggest that early feeding may attenuate postoperative inflammatory responses and support immune function, which could partly explain the absence of increased infectious complications in early-fed patients (17,28). These physiologic mechanisms are consistent with our observation of earlier bowel recovery and comparable complication rates between the two groups.

From a clinical perspective, the present findings support the incorporation of early postoperative feeding into standardized perioperative care pathways for pediatric stoma reversal. Enhanced recovery protocols increasingly emphasize early enteral nutrition to reduce practice variation and improve postoperative outcomes (29,30). The current study suggests that, in appropriately selected children, feeding can be initiated within 24–48 hours without increasing surgical risk. This also has practical implications for counseling caregivers, as parents can be reassured that early feeding is generally well tolerated and may contribute to earlier

recovery and discharge (31). Nevertheless, individualized clinical judgment remains necessary, particularly in children with poor nutritional reserve, tenuous intraoperative bowel condition, or other factors that may justify slower advancement of feeds.

The present study has several strengths. It included a relatively large cohort of pediatric patients undergoing stoma reversal and compared clinically relevant outcomes between clearly defined feeding groups. Baseline demographic and laboratory characteristics were comparable, which strengthens the internal validity of the findings. In addition, the study evaluated both postoperative complications and functional recovery indicators, thereby providing a more comprehensive assessment of the impact of feeding timing. These strengths improve the clinical applicability of the results and support their relevance to everyday pediatric surgical practice.

Despite these strengths, some limitations should be acknowledged. First, the study was conducted at a single center, which may limit the generalizability of the findings to other institutions with different patient profiles, perioperative practices, or surgical expertise. Second, although the groups were defined according to the timing of feeding initiation, the composition, volume, and advancement schedule of feeds were not described in detail, which may influence tolerance and recovery. Third, the exact duration of postoperative follow-up for the detection of complications was not clearly specified, and this may have led to underrecognition of delayed events such as anastomotic leakage. Fourth, although major comorbidities were excluded and baseline albumin and hemoglobin were recorded, a more detailed nutritional assessment would have strengthened the interpretation of feeding tolerance and postoperative recovery. Finally, patient-centered outcomes such as pain, comfort, parental satisfaction, and formal cost analysis were not evaluated.

Conclusion

In conclusion, your study demonstrates that starting oral or enteral feeding within 24 to 48 hours after pediatric stoma reversal is safe and beneficial, promoting faster gastrointestinal recovery and shorter hospital stays without increased morbidity. This supports the idea that extended postoperative fasting may be harmful and unnecessary. Your findings, along with existing research, advocate for early feeding regimens in pediatric stoma reversals, especially when minimizing hospital stays and optimizing resources are priorities. Future studies should build on this work with larger multicenter trials, long-term follow-ups, cost analysis, and patient-centered outcomes.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (LUMHS/IRB/589/25)

Consent for publication

Approved

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Conflict of interest

The authors declared no conflict of interest.

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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the study's integrity.

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