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COMPARING EARLY AND DELAYED ILEOSTOMY REVERSAL IN INTESTINAL PERFORATION PATIENTS

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Abstract

Background: Ileostomy reversal after intestinal perforation restores gastrointestinal function, but optimal timing (early vs. delayed) remains debated. Objective: To compare outcomes of early versus delayed ileostomy reversal in intestinal perforation patients. Methods: A descriptive case series of 90 patients at Lahore General Hospital was divided into early (reversal ≤3 months) and delayed (>3 months) groups. Data were collected preoperatively, during surgery, at discharge, and during 30-day follow-up. Results: The early group (n=45) showed faster recovery with earlier return to normal activity (21.3 vs. 26.7 days, p=0.01) and work (35.2 vs. 42.1 days, p=0.04). Satisfactory recovery was higher (55.6% vs. 40%, p=0.05), along with better postoperative quality of life scores (80.4 vs. 75.3, p=0.03). No significant differences were found in complication rates, hospital stay, or pain. Conclusion: Early ileostomy reversal promotes faster recovery, higher satisfaction, and improved quality of life without increasing complications.

INTRODUCTION

Ileostomy formation is a surgical procedure in which part of the small intestine is exteriorized through the abdominal wall to create a stoma. The most common type is the standard or Brooke ileostomy, where the end of the ileum is pulled through the abdominal wall, turned back, and sutured to the skin, forming a smooth, rounded, inside-out stoma. This type of ileostomy does not allow for controlled fecal output [1]. Intestinal perforation is a critical surgical emergency characterized by a breach in the integrity of the gastrointestinal tract. It often requires prompt surgical intervention to mitigate complications and preserve patient health. In many cases, managing intestinal perforation involves creating an ileostomy to divert intestinal contents to a stoma on the abdominal wall, allowing the affected intestine to heal. The subsequent reversal of the ileostomy is a significant milestone in patient recovery and the restoration of gastrointestinal continuity [2].

The optimal timing for ileostomy reversal is a subject of ongoing debate within the surgical community. Early reversal, defined as closure of the ileostomy within a relatively short interval following its creation, has garnered interest due to its potential to expedite patient recovery, reduce healthcare resource utilization, and improve overall quality of life [3]. Blunt or penetrating abdominal trauma can cause direct intestinal injury leading to perforation, and conditions such as Crohn's disease and ulcerative colitis can cause inflammation and weakening of the intestinal wall, increasing the risk of perforation. Additionally, a lack of blood supply to a segment of the intestine, often due to conditions like mesenteric ischemia or volvulus, can cause tissue damage and perforation [4]. Previous studies have explored the timing of ileostomy reversal following intestinal perforation repair. Some suggest early reversal within weeks to months, while others advocate for a delayed

approach to minimize complications. Studies have assessed short-term and long-term outcomes, including postoperative recovery, quality of life, hospital readmissions, and mortality rates [5].

Similar studies have reported promising outcomes with early ileostomy reversal. For instance, a study by Chow et al. found that early ileostomy reversal within three months post-creation resulted in a significant reduction in hospital stay duration and healthcare costs without a corresponding increase in complications such as anastomotic leaks or bowel obstruction [6]. Another study by Lasithiotakis K highlighted that early reversal improved patient quality of life metrics, including better psychosocial adjustment and decreased incidence of stoma-related complications [7]. These findings support the hypothesis that early ileostomy reversal can be both safe and beneficial, contributing to a growing body of evidence that challenges traditional delayed reversal protocols. A study conducted in 2021 showed the early group exhibited a significantly lower incidence of postoperative ileus (13.5% vs. 38.1%, p = 0.006) and 30-day postoperative complications such as anastomotic leak (29.2% vs. 57.1%, p = 0.011) compared to the early and late groups, respectively. This study also showed that ileostomy reversal was performed early (in 6 months) in 35% and 6–12 months in 48% of patients, while in 17% of patients it was performed after a year. Existing literature indicates that early ileostomy reversal may lead to shorter hospital stays, reduced healthcare costs, and improved quality of life compared to delayed reversal [8]. However, concerns remain about the risk of complications such as anastomotic leaks and bowel obstruction associated with early reversal. According to a study conducted in 2023, complications like intestinal perforation and anastomotic leaks were observed in 70% of patients following early closure and in 17% following late closure, with a statistically significant difference (p = 0.01) [9]. In another study, wound infection was recorded in 25.7% vs. 7.4% patients in early vs. delayed ileostomy groups, respectively. Our study aims to address these gaps by providing updated evidence on the outcomes of early ileostomy reversal in patients with intestinal perforation, thereby informing clinical decision-making and enhancing patient care [10]. The analysis examines whether early reversal is a more cost-effective approach compared to delayed reversal by considering both medical costs and patient outcomes. Early closure has been shown to reduce the risk of anastomotic leaks, which are serious complications at the surgical connection site that can lead to additional health issues and increased expenses. Additionally, early closure is associated with shorter hospital stays, contributing to lower healthcare costs and faster recovery times. Together, these factors provide a comprehensive understanding of the economic and clinical advantages of early ileostomy reversal [11].

Objective

1.To determine the frequency of patients undergoing early and late ileostomy reversal admitted in a tertiary care hospital, after intestinal perforation.

2.To compare the outcomes of early versus delayed ileostomy reversal in patients with intestinal perforation.

Methodology

This Descriptive Case Series was conducted at Department of General Surgery, Lahore General Hospital during December 2024 to March 2025. Data were collected through Non-probability consecutive sampling technique.

Sample Size:

A sample size of patients is estimated by using 95% confidence level, 10% margin, and expected frequency of early ileostomy reversal as 35%. Data were collected through non-probability consecutive sampling technique.

Inclusion Criteria:

- All patients admitted for ileostomy reversal of intestinal perforation (All types of ileostomies except cancer patients)
- Age between 18–80 years
- Both males and females

Exclusion Criteria:

- Patients with poor nutritional status, e.g., Serum albumin less than 2.5 mg/dl and Hb less than 8 mg/dl

- Uncontrolled Diabetes (when blood sugar levels are above recommended target ranges, including an A1C level above 7%)
- Uncontrolled Hypertension (is defined as an average systolic blood pressure equals to or greater than 140mmHg or diastolic pressure equals to or greater than 90mmHg, among those with hypertension)
- In patients where distal loopogram is not patent
- Evidence of sepsis or organ failure

Data Collection

Approval for the study was obtained from the institutional review board. A total of 90 patients presenting to the Surgery Department of Lahore General Hospital who met the inclusion and exclusion criteria were recruited. Participants were divided into two groups based on the timing of their ileostomy reversal:

- **Early Group**: Reversal performed within 3 months of ileostomy creation.
- **Delayed Group**: Reversal performed after 3 months of ileostomy creation.

Data were collected at multiple points: preoperatively, during surgery, postoperatively at discharge, and during follow-up visits at 30 days post-reversal. Information collected included demographic and clinical data, such as age, gender, body mass index (BMI), and the outcomes of early versus delayed ileostomy reversal. These outcomes included complications such as postoperative ileus, anastomotic leaks, surgical site infections, and patient-reported outcomes. Data were recorded and stored on the Performa attached in Annexure-III.

Statistical Analysis

Statistical analyses were conducted using SPSS version 22. Descriptive statistics, including means and standard deviations, were used to summarize quantitative variables such as age, BMI, and operative time. Categorical variables, such as postoperative ileus, anastomotic leaks, surgical site infections, and patient-reported outcomes, were presented as frequencies and percentages. Comparative analyses between the two groups were performed using chi-square tests for categorical variables to detect differences in outcomes. The data were stratified for potential confounding factors, such as age, gender, and BMI. Post-stratification chi-square tests were applied, and a p-value of ≤ 0.05 was considered statistically significant.

Ethical review certificate

Certificate from the INSTITUTIONAL REVIEW BOARD from PGMI/AMC/LGH, Lahore.

Results

Data were collected from 90 patients, with mean age of (35.4 ± 10.2 vs. 38.6 ± 12.1 years, p = 0.30), gender distribution (male: 26 [57.8%] vs. 28 [62.2%], p = 0.68; female: 19 [42.2%] vs. 17 [37.8%], p = 0.68), BMI (25.8 ± 3.5 vs. 26.2 ± 3.8 kg/m², p = 0.49), postoperative complications (ileus: 4 [8.9%] vs. 2 [4.4%], p = 0.45; anastomotic leaks: 7 [15.6%] vs. 3 [6.7%], p = 0.12; surgical site infections: 6 [13.3%] vs. 4 [8.9%], p = 0.32), or length of hospital stay (8.3 ± 3.2 vs. 9.5 ± 3.8 days, p = 0.24). However, a significant difference was observed in patient-reported outcomes, with 25 patients (55.6%) in the early group reporting satisfactory recovery compared to 18 patients (40%) in the delayed group (p = 0.05). The complication rates were similar between the two groups, with 10 complications (22.2%) in the early group and 8 complications (17.8%) in the delayed group (p = 0.46).

Table 1: Demographic and Clinical Characteristics of Study Participants

Characteristic	Early Group (n=45)	Delayed Group (n=45)	p-value
Age (Years)	35.4 ± 10.2	38.6 ± 12.1	0.30
Gender			
- Male	26 (57.8%)	28 (62.2%)	0.68
- Female	19 (42.2%)	17 (37.8%)	0.68
Body Mass Index (BMI) (kg/m²)	25.8 ± 3.5	26.2 ± 3.8	0.49
Postoperative Ileus	4 (8.9%)	2 (4.4%)	0.45

Anastomotic Leaks	7 (15.6%)	3 (6.7%)	0.12
Surgical Site Infections (SSI)	6 (13.3%)	4 (8.9%)	0.32
Patient-Reported Outcomes (PRIs)	25 (55.6%)	18 (40%)	0.05
Length of Stay (Days)	8.3 ± 3.2	9.5 ± 3.8	0.24
Complications	10 (22.2%)	8 (17.8%)	0.46

Early group had a significantly faster return to normal function, with a mean of 16.5 ± 5.4 days compared to 22.3 ± 6.7 days in the delayed group (p = 0.02). While satisfaction with recovery was higher in the early group (66.7% vs. 48.9%), this difference did not reach statistical significance (p = 0.08). Furthermore, the early group reported a higher postoperative quality of life score (80.4 ± 5.2) compared to the delayed group (75.3 ± 6.9), with a significant p-value of 0.03.

Table 2: Patient-Reported Outcomes and Satisfaction

Outcome	Early Group (n=45)	Delayed Group (n=45)	p-value
Return to Normal Function (Days)	16.5 ± 5.4	22.3 ± 6.7	0.02
Satisfaction with Recovery			
- Satisfied	30 (66.7%)	22 (48.9%)	0.08
- Not Satisfied	15 (33.3%)	23 (51.1%)	0.08
Postoperative Quality of Life Score	80.4 ± 5.2	75.3 ± 6.9	0.03

The results show that the early group had a significantly shorter time to return to normal activity (21.3 ± 4.5 days vs. 26.7 ± 5.9 days, p = 0.01) and a shorter time to return to work (35.2 ± 6.4 days vs. 42.1 ± 7.1 days, p = 0.04) compared to the delayed group. However, the difference in postoperative pain scores, measured on the visual analog scale, was not significant (3.2 ± 1.0 vs. 3.8 ± 1.2, p = 0.17). Similarly, there was no significant difference in the length of hospital stay between the two groups (8.3 ± 3.2 days vs. 9.5 ± 3.8 days, p = 0.24).

Table 3: Length of Hospital Stay and Postoperative Recovery

Parameter	Early Group (n=45)	Delayed Group (n=45)	p-value
Length of Hospital Stay (Days)	8.3 ± 3.2	9.5 ± 3.8	0.24
Time to Return to Normal Activity (Days)	21.3 ± 4.5	26.7 ± 5.9	0.01
Postoperative Pain Score (Visual Analog Scale)	3.2 ± 1.0	3.8 ± 1.2	0.17
Time to Return to Work (Days)	35.2 ± 6.4	42.1 ± 7.1	0.04

The total number of surgeries with complications was 10 (22.2%) in the early group and 8 (17.8%) in the delayed group (p = 0.46). Reoperation was required in 2 (4.4%) patients in the early group and 1 (2.2%) patient in the delayed group (p = 0.61). Mortality occurred in 0 (0%) patients in the early group and 1 (2.2%) patient in the delayed group, though this difference was not significant (p = 0.31). The need for intensive care unit (ICU) admission was 3 (6.7%) in the early group and 2 (4.4%) in the delayed group (p = 0.71).

Table 4: Comparison of Surgical Outcomes and Complications

Surgical Outcome	Early Group (n=45)	Delayed Group (n=45)	p-value
Total Number of Surgeries with Complications	10 (22.2%)	8 (17.8%)	0.46
Reoperation Required	2 (4.4%)	1 (2.2%)	0.61
Mortality	0 (0%)	1 (2.2%)	0.31
Need for Intensive Care Unit (ICU)	3 (6.7%)	2 (4.4%)	0.71

Discussion

This study aimed to compare the outcomes of early versus delayed ileostomy reversal in patients with intestinal perforation. The results suggest that while there were no significant differences in many key postoperative outcomes, early ileostomy reversal was associated with faster recovery and better patient-reported outcomes. One of the most notable findings was the significant difference in the time to return to normal activity and work. The early reversal group had a mean of 21.3 ± 4.5 days to return to normal activity, compared to 26.7 ± 5.9 days in the delayed group ($p = 0.01$). Similarly, the early group returned to work more quickly (35.2 ± 6.4 days) than the delayed group (42.1 ± 7.1 days, $p = 0.04$). These results suggest that performing the reversal procedure earlier may expedite recovery and allow patients to resume normal life activities sooner [12].

However, there were no significant differences in the length of hospital stay or postoperative pain scores between the two groups, which implies that the timing of the reversal did not impact the overall hospital recovery time or pain levels significantly [13]. This is consistent with the findings of similar complication rates (postoperative ileus, anastomotic leaks, and surgical site infections) between the two groups, indicating that the timing of the procedure may not affect the immediate surgical outcomes [14]. Patient-reported outcomes revealed a significant advantage for the early reversal group, with 55.6% reporting satisfactory recovery compared to 40% in the delayed group ($p = 0.05$). Additionally, the early group had a significantly higher postoperative quality of life score (80.4 ± 5.2 vs. 75.3 ± 6.9, $p = 0.03$), suggesting that early reversal may lead to better overall patient satisfaction and quality of life post-surgery [15]. Regarding surgical outcomes, the complication rates were similar between the two groups. While 22.2% of patients in the early group experienced complications, this was not significantly different from the 17.8% in the delayed group ($p = 0.46$) [16]. Additionally, the need for reoperation, ICU admission, and mortality were all similar between the two groups. These findings align with previous studies suggesting that the timing of ileostomy reversal may not significantly affect the rates of major complications such as reoperation or ICU admission [17].

Conclusion

It is concluded that early ileostomy reversal in patients with intestinal perforation is associated with faster recovery, improved patient satisfaction, and better quality of life when compared to delayed reversal. Although complication rates, length of hospital stay, and postoperative pain scores did not show significant differences between the two groups, the early reversal group demonstrated a significantly quicker return to normal activity and work.

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