Early feeding after loop ileostomy reversal: A prospective study

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Abstract: Defunctioning loop ileostomy is an essential procedure in gastrointestinal surgery; however, loop ileostomy reversal (LIR) presents specific complications. Studies have indicated that starting enteral feeding early following stoma closure facilitates the reduction of associated morbidity as well as the psychological and economic burden on patients.

Purpose: To prospectively examine the safety, tolerability, and outcome of early enteral feeding following LIR.

Methods: The study was conducted at a tertiary care hospital over 24 months. A total of 128 patients undergoing LIR were randomly assigned to an early enteral feeding group (Group A) and a conventional feeding group (Group B). Pre-, intra-, and postoperative variables were noted.

Results: Significant differences were observed in the postoperative resolution of ileus and the duration of hospital stay between the groups (p < 0.05).

Conclusion: Early enteral feeding after LIR is safe and sufficiently tolerated. Furthermore, it leads to the early return of bowel functions and thus shortens hospital stay.

KEYWORDS
enteral feeding; ileostomy; ileus; loop ileostomy

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1. Introduction

Defunctioning loop ileostomy is an established method for diverting bowel contents to protect the distal anastomosis and prevent the use of inflamed bowel. Ileostomy is usually reversed at 8–12 weeks. Although considered a minor procedure, loop ileostomy reversal (LIR) is associated with considerable morbidity and mortality.1,2

Patients scheduled for LIR are often malnourished, which, when severe, increases morbidity. Malnutrition is associated with poor healing and other septic complications.3 Stoma closure necessitates an additional post-operative period of starvation, as well as nasogastric drainage to protect repair sites and prevent postoperative nausea and vomiting.

Typically, a course of uncomplicated abdominal surgery entails the stomach being drained by a nasogastric (NG) tube after surgery and the patient not being allowed oral intake until there is evidence that colonic motility has returned (this is usually indicated by flatus and passage of stool).

Earlier feeding without gastric drainage after bowel surgery has been attempted for healthy patients undergoing elective abdominal surgery, and it has been suggested that delaying oral feeding until the resolution of colonic ileus is unnecessary because early feeding is well-tolerated.1–6

Furthermore, various studies have concluded that early feeding is tolerable and beneficial for patients.7,8 However, a bias seems to exist between evidence and practice. Therefore, the present study prospectively examined the safety, tolerability, and outcome of early enteral feeding following LIR.

2. Methods

This was a hospital-based randomized case-control study conducted at the Department of Surgery, Sawai Man Singh Medical College, Jaipur, India, and an associated group of hospitals. All cases of loop ileostomy undergoing LIR over a period of 24 months from October 2011 to October 2013 were included in the study. Patients categorized as American Society of Anesthesiologists (ASA) Grade 3 or higher, patients diagnosed with hemorrhagic tendency because of cirrhosis, immunosuppressed patients, and patients refusing to give informed consent were excluded from the study.

The patients were allocated to either Group A (early enteral feeding group) or Group B (conventional enteral feeding group) by a simple chit box randomization technique. In Group A, the NG tube was not passed and early enteral feeding was started within 24 hours post-operatively, irrespective of return of bowel functions (assessed by presence or absence of bowel sounds). In Group B, the NG tube was passed and enteral feeding was started only after the removal of the NG tube and the return of bowel functions.

The LIR was performed at least 8 weeks after the first operation. Prior to surgery, the continuity of the bowel distal to the ileostomy was confirmed radiologically in all patients; the distal loop was then irrigated to clear the impacted barium and fecaloma. Prophylactic broad-spectrum antibiotics were administered prior to induction of anesthesia. The enteric mucocutaneous junction was taken down and the adhesions between the small bowel and the anterior abdominal wall were freed through sharp dissection. Continuity of the bowel was then restored using continuous absorbable polyfilament suture. Fascial closure and skin closure were performed after returning the bowel into the abdominal cavity.

The duration of surgery was recorded with respect to operative findings and intraoperative complications (serosal tears and bleeding). During the postoperative period, nausea, vomiting, abdominal distension, timing of return bowel sounds, passage of flatus, bowel movements, tolerance of a regular diet, and length of hospitalization were noted in both groups. For the patients in Group A, the NG tube was inserted if two episodes of vomiting of more than 100 mL occurred over 24 hours in the absence of bowel movements. The same discharge criteria were applied for the patients in both groups and included bowel movement and the tolerance of a regular diet for a minimum of 24 hours.

2.1. Statistical analysis

The Chi-square test was used to assess and compare the difference in the proportion of surgical complications. The unpaired t test was used to assess and compare the duration of surgery, mean time of return of bowel sounds, passing of flatus, passage of stools, start of enteral feeding, and length of postoperative stay. A p value < 0.05 was considered significant.

3. Results

A total of 146 patients underwent LIR in the study period. Of these patients, 14 were excluded due to comorbidities meeting the exclusion criteria and four did not give consent to enroll in the study. A total of 128 informed patients were randomly assigned to Groups A and B, with 64 patients in each group.

The groups had comparable age and sex distributions (p > 0.05). Moreover, both groups exhibited a comparable mean duration of surgery. However, the groups differed significantly in terms of the operative findings (p < 0.05): Group A had more flimsy adhesions and Group B had more dense adhesions. Intraoperative complications occurred in 18.7% of the patients in Group A and 20% of those in Group B, indicating no significant difference between the groups (p > 0.05; Table 1).

In Group A, 60 patients (93.75%) tolerated early feeding; no significant difference between the groups was found in the proportion of postoperative complications (p > 0.05). The mean time at which postoperative enteral feeding started was 14.72 hours in Group A, whereas that in Group B was 47.81 hours (p < 0.05). The mean time of postoperative return of bowel sounds, passage of flatus, and passage of stools were significantly reduced in Group A (p < 0.05; Table 2).

The mean duration of the postoperative hospital stay was also significantly shorter in Group A (p < 0.05; Table 2).
Although outside the scope of the study, no anastomotic leak and major wound infections were observed in any patient in either group at postoperative Day 14 at the outpatient department follow up.

### 4. Discussion

Postoperative nutritional status is a major factor in clinical outcomes as malnutrition predisposes to increased incidence of infection and prolonged hospital stays. This is particularly critical in patients undergoing gastrointestinal surgical procedures. Experimental data derived from both animals and humans suggest that enteral nutrition is associated with an improvement in wound healing. Radiological and electrophysiological studies have shown that following laparotomy, the small bowel is typically least affected and can maintain organized peristaltic contraction throughout the perioperative period. The stomach typically regains a normal emptying pattern in 24 hours and the colon regains motility last, usually in 48–72 hours.

Early enteral nutrition after major abdominal surgery was found to reduce infectious complications. It may have a positive impact on the psychological state of a patient and may facilitate recovery.

This study evaluated the impact of early feeding on primary outcome parameters such as tolerance of early feeding, resolution of ileus, bowel movement, surgery-related immediate postoperative complications, and duration of hospital stay in patients undergoing LIR.

#### 4.1. Tolerance of early feeding

We observed that in the early feeding group, 93.75% of the patients tolerated gradual dietary advancement and accepted a meal at a mean of 14.72 hours, considerably earlier than the resolution of colonic ileus. The incidence of postoperative nausea and vomiting was comparable in both groups. Various studies comparing the tolerance of early feeding in elective colorectal and major gastrointestinal surgery have reported similar results, finding no significant difference in the rates of nausea, vomiting, and NG tube reinsertion between the two groups (Table 3). Bufo et al. reported that a longer operative time and increased intraoperative blood loss may indicate a more difficult procedure and identify patients unable to tolerate early feeding. The rates of nausea, vomiting, and need for NG tube reinsertion appear to be dependent on the nature of surgery and anesthesia, operative time, and intraoperative findings.

In our study, although the nature of the surgery and the operative time were comparable, a significant difference was observed in the intraoperative findings, namely that Group B had more dense adhesions. However, because the surgeon was not blinded for the study, this could be a consequence of operator-dependent bias.

#### 4.2. Resolution of ileus

Livingston and Passaro defined ileus as the functional inhibition of propulsive bowel activity, irrespective of pathologic mechanism. Intraoperative bowel manipulation, anesthetic agents, perioperative use of narcotics, postoperative sympathetic overactivity, and electrolyte imbalance contribute to ileus. No standard definition of the length of time that an ileus lasts has been established, and authors variously select tolerance of a diet, passage of flatus, or passage of stool as their criterion for the recovery of bowel function. However, the data for the time of return of each of these bowel functions are based on multiple, small series of patients. A reasonable definition of the duration of an ileus is the time from surgery to the passage of flatus or stool, accompanied by oral diet tolerance as a subjective assessment thereof. We found that in Group A, the resolution of ileus as evidenced by the appearance of bowel sounds, passage of flatus, and passage of stool occurred at a mean of 23 hours, 33 hours, and 47 hours, respectively; by contrast, it was significantly delayed in Group B. The difference was found to be statistically significant (Table 2).

By contrast, various studies comparing early enteral feeding with conventional feeding in major intraabdominal surgery have concluded that ileus persisted for a long time.
Early feeding after loop ileostomy reversal

Comparison with other studies.

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<th>Conventional feeding (TF)</th>
<th>p</th>
<th>EF TF</th>
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<td>&gt;0.05</td>
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<tr>
<td>Length of hospital stay (d)</td>
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<td>23.2</td>
<td>&gt;0.05</td>
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Data are presented as %, unless otherwise indicated.

EF = early enteral feeding; TF = conventional feeding.

in both groups and that early feeding did not shorten the ileus duration significantly. Differences were attributed to bowel manipulation and a longer operative time rather than to the time of feeding (Table 3).

However, because the operating time and bowel handling in our study were similar in both groups, we argue that early feeding does have an impact on ileus resolution ($p < 0.05$).

### 4.3. Length of hospital stay

The mean time of discharge for the patients in Group A was 3 days (range, 3–4 days), which was significantly shorter than that for those in Group B. LIR has potential as an ambulatory procedure. Kalady et al demonstrated that discharge within 23 hours is possible after general or regional anesthesia in a cohort of 28 carefully selected patients. They argued that if patients tolerate early feeding after LIR, then it is not necessary for them to remain in hospital until bowel function is restored. Various studies comparing the application of early feeding with conventional feeding in abdominal surgery have identified no significant difference in the length of hospital stay (Table 3).

Nonetheless, our findings are of value in a country with a low bed-to-patient ratio. Although our study did not consider this factor, early feeding, if tolerated, reduces the cost of treatment by ~25%.

Studies have suggested that the early resumption of oral feeding has a positive impact on the psychological state of patients. Patients who are orally fed exhibit a feeling of well-being and this may have a vital role in recovery. Thus, considerable evidence supports early postoperative enteral feeding.

The limitations of the present study are the lack of follow-up data on wound infection and the nonblinding of the surgeon regarding the group allocation.

### 5. Conclusion

The study demonstrates that commencing oral feeding in selected patients following LIR as early as 12 hours postoperatively is safe. Early feeding following LIR is sufficiently tolerated and may lead to the early resolution of postoperative ileus. Implementation of the early enteral feeding protocol may be beneficial in terms of the quality as well as cost efficacy of treatment. Hence, awareness and acceptance of this policy by caregivers are recommended.

### References