

Short-term Outcome of Early Closure of Diverting Loop Ileostomy in Patients with Emergency Benign Colo-rectal Pathologies

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Introduction: A temporary loop ileostomy is constructed mainly to avoid complications of anastomotic leak after colonic anastomosis.

Aim of work: To investigate the short-term outcome of early closure of loop ileostomy in cases diverted for emergency benign indications after distal colectomies and primary anastomosis.

Patients and methods: The present prospective randomized controlled study included 62 patients presented with non-malignant distal gastrointestinal emergencies including obstruction, and destructive trauma who were randomly allocated into two groups.

Group A included 31 patients: who underwent early revision for the simple loop ileostomy 3 weeks after the primary intervention.

Group B included 31 patients who underwent early revision for the simple loop ileostomy 3 months after the primary intervention.

Follow-up was planned for a month for any evolving complications including wound complications (Midline and stoma site), unexplained abdominal pain (Suspicious for anastomotic leakage), ileus, unexplained fever, and oral intake intolerance.

Results: The mean age was 36.4 ± 5.3 and 37.2 ± 4.7 years for groups A and B respectively. The main cause of the primary intervention was sigmoid injuries followed by rectal injuries in both groups. There was a statistically significant higher rate of post-reversal ileus in Group B ($p=0.001^*$). The incidence of stomal complications including peristomal infections, mucosal sloughing, stoma retraction, and parastomal hernias were higher in Group B.

Conclusion: Within carefully tailored selection criteria, patients with diverting loop ileostomy protecting a distal colonic anastomosis after colonic resection for emergency non-malignant indications can have their ileostomies reversed early.

Key words: Loop ileostomy, early reversal, stoma complications.

Introduction

Typically, a temporary loop ileostomy is done as a "cover" for a coloanal or distal at-risk colorectal anastomosis.¹ In certain cases of intestinal obstruction, it is even a "life-saving" surgery. Nevertheless, it is linked to several complications.² Skin complications are the most common one ranging from mild skin irritation up to ulceration and necrosis.³ Dehydration is a common cause of readmission in those patients.⁴ It is important not to undervalue the psychological effects and disrupted psychosocial life.⁵ The rate of stoma-related complications varies between 10 and 52%.⁶ It is estimated that 85–90% of patients who have loop ileostomies do not require their stoma; that is, they experience more complications than advantages.⁷

Therefore, numerous publications recommended early closure of loop ileostomies in certain patients.⁷

In patients with rectal and distal colon cancers, the concept was aggressively opposed and rejected due to safety concerns and numerous trials were prematurely stopped.^{8,9} The concept of early closure of loop ileostomies in patients with benign diseases is still under investigation especially after emergency situations.¹⁰

The present study aimed at thorough light on the feasibility of early loop ileostomy closure in patients having their ileostomies for emergency benign indications following distal colonic resection like left, sigmoid or rectal resection and primary anastomosis recording the short-term outcome after stoma reversal as well as the morbidities sustained during the interval between stoma creation and take-down.

Patients and method

Study design

The present study was conducted following the code of ethics of Helsinki Declarations where informed written consent was obtained from all included patients. The current prospective randomized controlled study included 62 patients presented with non-malignant distal gastrointestinal emergencies including obstruction, and destructive trauma (Trauma affecting more than 50% of the bowel circumference) whether penetrating, blunt, or iatrogenic. Also, patients with inflammatory lesions within the left colon requiring resection, anastomosis, and simple loop diversion were included. Malignant distal gastrointestinal emergencies were excluded. Patients with collagen disease and those on steroid or immunosuppressive

medications as well as patients with ASA scores ≥ 3 were also excluded. Patients requiring multiple segmental resections were also, excluded

Eligible patients were recruited throughout the period from January 2022 till January 2025

Eligible patients in the current study were randomly allocated into two groups

Group A included 31 patients who underwent early revision for the simple loop ileostomy 3 weeks after the primary intervention

Group B included 31 patients who underwent early revision for the simple loop ileostomy 3 months after the primary intervention

Randomization was done by an independent investigator using specific software (Random Allocation Software 1.0, 2011).

Procedure

For all included patients, abdominal exploration was done and the patients were assessed intraoperatively for the pathological cause of the surgical emergencies.

Colonic resection was done followed by primary anastomosis using endo GIA staplers (Linear or circular according to the level of the lesion). This was followed by the construction of proximal loop ileostomy.

The time needed for patients to have their ileostomy functioning was recorded. That was the time when the patient would start an oral diet gradually. The stoma and peristomal area, beside the midline incision, were examined daily for any developing complication including peristomal dermatitis, wound infection, dehiscence, stoma retraction, and stoma viability. Full lab investigations were done every other day (CBC, Na, K, albumin). A pelviabdominal ultrasound was done on day 5 for intraabdominal collection and a distal loopogram after 2 weeks postoperative to assess anastomosis healing.

Stoma reversal

Under general anesthesia, local dissection of the stoma was done, followed by bowel continuity using hand-sewn sutures using 3/0 polyglactin sutures. The abdominal wall defect was closed in layers using polygalactin sutures for subcutaneous tissue and proline 2/0 sutures for the skin.

Following the stoma reversal, an Enhanced recovery after surgery (ERAS) track was applied including adequate perioperative hydration, early oral feeding as tolerated by the patient, and judicious use of drains and catheters. patients were discharged when tolerating a regular diet, vitally stable with normal labs on postoperative day 4.

The difference between both groups was the time of reversal either 3 weeks or 3 months after the 1ry intervention.

Follow-up and outcomes

Follow-up was planned for a month for any evolving complications regarding the main as well as the second operation of restoring bowel continuity including wound complications (Midline and stoma site), unexplained abdominal pain (Buspicious for anastomotic leakage), ileus, unexplained fever, and oral intake intolerance.

The primary research outcome was a feasible and safe reversal of simple loop ileostomy with minimal postoperative complications.

The 2ry outcome was decreased overall hospital stay and cost together with the decrease of stoma-related complications.

Sample size

The G *power 3.1 program (Universities, Dusseldorf, Germany) was utilized to estimate the sample size with an effect size of 0.9 and 95% power depending on the primary outcome which was the incidence of postoperative complications such as leak. For each group, 31 patients were recruited.

Statistical analysis

Student's "t" test was used for statistical analysis of quantitative parameters that were described by mean and SD. The chi-square test was used for qualitative characteristics that were represented as frequency percentages. The Statistical Package for the Social Sciences, or SPSS-20, version 21 was employed. Significant probability values were defined as those below 0.05.

Results

The present study included 62 patients who were allocated into two groups with a mean age of 36.4 ± 5.3 and 37.2 ± 4.7 years for groups A and B respectively. There was no statistically significant difference between both groups regarding the preoperative comorbidities (**Table 1**).

Table 1 showed that the main cause of the primary intervention was sigmoid injuries followed by rectal injuries in both groups among them penetrating trauma was the main cause.

Table two shows that there was a statistically significant higher rate of post-reversal ileus in Group B ($p=0.001^*$). The incidence of stomal complications including peristomal infections, mucosal sloughing, stoma retraction, and parastomal hernias were higher in Group B. one patient in each group presented with leakage and abdominal collection following reversal of the stoma. Other post operative complications were showed in **Table 2**.

Table 1: Sociodemographic data and comorbidities and causes of diversion

Variant		Group A n=31 Early reversal of ileostomy	Group B n=31 Conventional rever- sal of ileostomy	P value
Age	Mean±SD	36.4±5.3	37.2±4.7	0.62
Sex	N (%)			
Females		11 (35.5 %)	9 (29 %)	0.081
Males		20 (64.5 %)	22 (71 %)	
BMI		27.8± 3.2	27.1±4.1	0.14
Comorbidities				
Smoking	N (%)	16 (51.6 %)	18 (58.1 %)	0.084
DM	N (%)	4 (12.9 %)	5 (16.1 %)	0.076
HTN	N (%)	3 (9.7 %)	3 (9.7 %)	1.00
Asthmatic	N (%)	3 (9.7 %)	4 (12.9 %)	0.072
IHD	N (%)	2 (6.5 %)	2 (6.5 %)	1.00
Causes of diversion				
Rectal injuries	N (%)			
Penetrating trauma		3 (9.7 %)	2 (6.5 %)	0.054
Endoscopic		2 (6.5 %)	2 (6.5 %)	1.00
Foreign body		1 (3.25%)	2 (6.5 %)	0.051
Sigmoid injuries	N (%)			
Penetrating trauma		12 (38.7%)	14(45.2%)	0.12
Endoscopic		2 (6.5 %)	3 (9.7 %)	.054
Diverticular disease	N (%)	3 (9.7 %)	2 (6.5 %)	0.054
Volvulus sigmoid	N (%)	4 (12.9 %)	3 (9.7 %)	0.072
Iatrogenic injury (Intraoperative)	N (%)	4 (12.9 %)	3 (9.7 %)	0.072

Table 2: Postoperative complications and ICU admission

Variant		Group A n=31 Early reversal of ileostomy	Group B n=31 Conventional reversal of ileostomy	P value
Initial ICU admission	N (%)	2 (6.5 %)	2 (6.5 %)	1.00
Postoperative complications				
Stomal Gangrene (Mucosal sloughing)	N (%)	2 (6.5 %)	2 (6.5 %)	1.00
Peristomal infection	N (%)	3 (9.7 %)	12 (38.7%)	0.001*
Mucocutaneous separation	N (%)	0 (6.5 %)	8 (25.8 %)	0.001*
Stomal retraction	N (%)	1 (3.25%)	6 (19.4% %)	0.001*
Ileus after reversal	N (%)	3 (9.7 %)	6 (19.4% %)	0.015*
Leakage after reversal	N (%)	1 (3.25%)	1 (3.25%)	1.00
Abdominal collection after reversal	N (%)	1 (3.25%)	1 (3.25%)	1.00
Secondary wound infection	N (%)	4 (12.9 %)	3 (9.7 %)	0.072
Parastomal hernias	N (%)	0 (0 %)	4 (12.9 %)	0.001*

Discussion

Fecal diversion is a common procedure in coloproctology to prevent potential leakage in distal colonic anastomosis.¹¹ It has a variety of reasons, both benign and malignant. In situations of distal colonic (Beyond mid-transverse colon) resection anastomosis surgeries, a loop ileostomy is a frequent surgery for fecal diversion. It is safer and has less postoperative complications than transverse loop colostomy.^{2,4,12}

Due to a lack of specialized study, there is still a debate in the literature regarding the best time to reverse a loop ileostomy, particularly in situations where the indications for diversion are benign. Reversal of loop ileostomies usually occurs between weeks 6 and 12.¹³ In some trials, it reached 1-2 months and longer time in other studies. In others, it reached 2 and 5 months.^{2,5}

The negative effects of loop ileostomies on patients' lives are directly correlated with the length of diversion.^{5,14} Among other stoma-related issues, a prolonged stoma would lead to wound infection, skin excoriation, parastomal hernias, and dehydration.¹⁵ Reversing such stomas as soon as possible would prevent those consequences.^{5,15}

The argument over the advantages of such diversion is another subject on which early ileostomy reversal was promoted.⁷ Many surgeons subsequently recommended early loop ileostomy reversal within the first 14 days after diversion.⁵

Given that the anastomosis's tensile strength increases quickly from day 5 to day 7 and that the anastomosis is safe at this point.¹⁶ The optimal timing for early reversal is suggested to be two weeks after distal anastomosis.⁷ Two weeks following distal anastomosis is recommended due to the thick postoperative adhesions that begin to form two weeks to six weeks after laparotomy.¹⁷

In the present study, there was significantly higher peristomal infection reported in Group B when compared with Group A matching the results of Nelson et al.¹⁰ This result may be due to the shorter time elapsed before stoma reversal in Group A making less time of contact with ileal secretions that cause severe irritation and maceration of the skin.

In the present research, no case of parastomal hernia was detected in Group A as well as the reported cases of mucocutaneous separation and stoma retraction was lower in the same group when compared with those in Group B and this is assumed to be due to the fact that the prolonged time for the presence of stoma makes the patient liable for more stoma related complications.

Paralytic ileus after stoma reversal was less common in Group A matching the results of Guidolin et al.¹⁸

Many reasons can explain these findings including dense adhesions present after long time following the initial surgery requiring extensive Adhesiolysis. The resulting diversion colitis in the for prolonged diversion may have a role.¹⁹ All those consequences are time dependent.¹⁸⁻²¹

Based on the results attained, we strongly recommend early reversal of diverting ileostomies provided the indication of diversion is protection of distal anastomosis following resection for a benign cause as soon as the main insult is controlled. It is to state that similar recommendations were reached by Aldardeer et al⁶ who recommending stoma reversal within the same admission for selected cases.

Conclusion

Within a carefully tailored selection criteria, patients with diverting loop ileostomy protecting a distal colonic anastomosis after colonic resection for emergency non-malignant indications can have their ileostomies reversed early.

Limitation

Lack of well designed randomized controlled previous trials to compare with.

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