# Comparative Study Between Early and Delayed Closure of Ileostomy After Colorectal Anastomosis

**Abdelsalam Amer Emad[1], Sobhy Rezk Ahmed Teama[1], Mohamed Abdelmoety Abdelkader Aboelnaga[1*]**

[1]Department of General Surgery, Faculty of Medicine - Al-Azhar University

***Corresponding author:** Mohamed Abdelmoety Abdelkader Aboelnaga

Mobile:

Email:

## ABSTRACT

**Background:** Loop ileostomies are generally formed in colorectal surgery to protect low rectal anastomosis in cases of obstructed cancer colon, complicated diverticular disease, strangulated hernias, volvulus, **Aim :** is to compare between the early and delayed closure of ileostomy after colorectal anastomosis as regard of feasibility, bleeding, leakage, incisional hernia, hospital stay and quality of life, **Patients & methods:** This is a comparative prospective cohort research was conducted on 30 adult studied cases with loop ileostomy. studied cases treated with delayed closure of ileostomy following colorectal anastomosis were in group B, while studied cases treated with early closure of ileostomy following colorectal anastomosis were in group A. studied cases were gathered from the Damanhur Medical National Institute & the Department of Surgery at Al-Azhar University Hospitals in Cairo, Egypt, **Results:** There was no statistically significant difference among early & late ileostomy closure as regards comorbidities, complications, and primary outcome. There was a statistically significant difference between early and late ileostomy closure as regards operation data, **Conclusion:** Delayed closure allows more time for healing, reducing anastomotic leak risk and improving surgical safety. The decision should be individualized based on patient-specific factors, including initial surgical risk, recovery progress, and overall health status.

**Keywords:** Ileostomy, colorectal anastomosis, incisional hernia

## INTRODUCTION

An ileostomy is when the lumen of the ileum (small bowel) is brought through the abdominal wall via a surgical opening (created by an operation). This can either be temporary or permanent, an end or a loop.The purpose of an ileostomy is to evacuate stool from the body via the ileum rather than the usual route of the anus.[1]

Building a temporary loop ileostomy is a useful surgical adjuvant in studied cases with high-risk colorectal anastomoses to lower the incidence of symptomatic anastomotic leakage & the need for repeat surgery.[2]

One potentially fatal consequence is a colorectal anastomotic leak. In colorectal surgery, loop ileostomies are typically performed to repair anastomoses or distal enteric illness. One potential solution to lessen the effects of an anastomotic leak is to divert the loop ileostomy.[3]

Diverting ileostomy closure shouldn't be regarded as a minor surgical treatment without complications; for this reason, we also discussed the waiting period before surgery.[4]

The ideal period among the ileostomy's formation & closure is one of the contentious issues.[5] The average waiting period among ileostomy development & closure was six months. studied

cases who received adjuvant chemotherapy following ileostomy construction differed significantly from those who did not.[6]

To enhance the patient's quality of life & avoid potential stomal problems, early stoma closure throughout hospitalization late closure among 6 weeks & 6 months following surgery, & early closure on postoperative days eight & ten with positive outcomes.[7]

An imaging test is typically conducted throughout this pre-closure waiting time to assess the anastomosis's integrity & identify any fistulas or stenosis.[8] The most common complications of post-operative closure of ileostomy: are intestinal obstruction, diarrhea, surgical wound infection, entero cutaneous fistula, and ischemia of the anastomosis. Most of these complications can be resolved in all cases with conservative treatment.[9]

**Aim of this study** : is to compare between the early and delayed closure of ileostomy after colorectal anastomosis as regard of feasibility, bleeding, leakage, incisional hernia, hospital stay and quality of life.

## PATIENTS & METHODS

This comparative prospective cohort research was conducted in 30 adult studied cases with loop ileostomy. studied cases treated with delayed closure of ileostomy following colorectal anastomosis were in group B, while studied cases treated with early closure of ileostomy following colorectal anastomosis were in group A. studied cases were gathered from the Damanhur Medical National Institute & the Department of Surgery at Al-Azhar University Hospitals in Cairo, Egypt.

**Inclusion criteria:** Age between 18 - 70 years, patients with loop ileostomy as a protective stoma after colorectal anastomosis, radiological evidence of no anastomotic leakage or fistulas, and general conditions and laboratory investigation are good.

**Exclusion criteria:** Patients with advanced cancer colon need palliative treatment for permanent colostomy and declined informed consent.

**Methods:**

**All studied cases were subjected to** Full history taking, Clinical examination

**Intervention**

Thirty to sixty minutes before stoma closure, intravenous antibiotic prophylaxis was provided. Peristomal skin excision, everted ileum mobilisation, & brief segmental resection of afferent & efferent stomal limbs were all carried out under general anaesthesia before reconnection. Depending on the surgeon's preference, end-to-end anastomosis was carried out using either a double-layer running suture (PDS II (polydioxanone) Suture 5-0, Johnson & Johnson Medical Limited, Livingston, United Kingdom) or a side-to-side stapler (PROXIMATE Linear Cutter 75mm, ETHICON Endo-Surgery (Europe) GmbH Johnson & Johnson Company, Norderstedt, Germany). For every patient, the meso's tiny opening was sealed. Non absorbable monofilm sutures 3-0 or 4-0 in interrupted vertical back stitch technique were used to close the skin over a subcutaneous drain, while an absorbable running suture (PDS II loop, strength 2, Johnson & Johnson Medical Limited) was used to close the fascia.

**Ethical considerations:**

The Faculty of Medicine at Al Azhar University granted official clearance. The Ethics Committee has given its approval to the project. All studied cases were informed about the research's purpose & methodology before giving their informed permission. Both the service offered, and the research procedures had no negative effects on the participants. Individual data has been securely stored by the lead investigators as private information. Participants were not required to pay any additional fees, & the investigators paid for all associated expenses.

**Early stoma closure:** This group included patients who had stoma closure performed 14–28 days after index surgery.
**late stoma closure:** This group included patients whose temporary stomas were closed between eight & twelve weeks in accordance with our hospital's unit procedure.
Significant blood loss & conversion to midline laparotomy were among the intraoperative problems noted in both groups. Blood loss throughout stoma closure was classified as "significant" if it exceeded 150mL & as "not significant" if it was less than or equal to 150mL. The length of the procedure was measured from the beginning of the skin incision to the end of the skin closure. The Clavien-Dindo classification system was used to stratify the complications.

**Postoperative care and follow-up**

Postoperative treatment was carried out. Following surgery, studied cases start oral fluids , usually on the 3rd postoperative day, the nasogastric tube was withdrawn. Most studied cases start resumed their regular soft diets five to seven days after surgery. As per standard procedure, intravenous antibiotics were administered for five days following surgery, tolerance to a normal diet, vomiting, abdominal distension, & signs of anastomotic leak were all observed in the studied cases. post operative complications early and delayed.Early complications such as fever,bleeding,leakage, wound infection, deep vein thrombosis, pneumonia, surgical wound infection, intra-abdominal collection, & anastomotic leak . Late complications such as incisional hernia as a result of wound failure & other stoma-related issues as well as . The frequency of complications in each group was used to compute the overall complication rate based on these characteristics. Following stoma closure surgery, studied cases were contacted for follow-up at four weeks & three months.

## RESULTS

The mean age of the studied cases was 59.33 (±9.33 SD) with a range (of 45-74), among the studied cases there were 10 (33.3%) females and 20 (66.7%) males, among the studied cases there were 1 (3.3%) single, 24 (80%) married and 5 (16.7%) widow as shown in

**Table 1**.

**Table 1:** Distribution of patients according to demographic data

| | **Subjects (n = 100)** | |
|---|---|---|
| **Age** | | |
| Range. | 18– 70 | |
| Mean ± SD. | 59.33 ± 9.33 | |
| **Sex** | No. | % |
| Female | 10 | 33.3 |
| Male | 20 | 66.7 |

Data are presented as frequency (%) unless otherwise mentioned, SD: **Standard deviation**

There was no statistically significant difference among early & late ileostomy closure as regards comorbidities as shown in **Table** .

**Table 2:** Comparing among the early & late ileostomy closure according to comorbidities

| | **Subjects** | | | | $\chi^2$ | **p** |
|---|---|---|---|---|---|---|
| | **Early (n = 13)** | | **Late (n = 17)** | | | |
| **Comorbidities** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Hypertension | 3 | 23.1 | 2 | 11.8 | 0.679 | 0.410 |
| Ischemic heart disease | 2 | 15.4 | 2 | 11.8 | 0.084 | 0.773 |
| COPD | 2 | 15.4 | 3 | 17.6 | 0.027 | 0.869 |
| Renal Disease | 1 | 7.7 | 1 | 5.9 | 0.039 | 0.844 |
| Smoker | 2 | 15.4 | 5 | 29.4 | 0.810 | 0.368 |

Data are presented as frequency (%) unless otherwise mentioned, SD: **Standard Deviation**

The mean ileostomy duration of the early group was 1.92 (±0.28 SD) with range (1-2) weeks, the mean ileostomy duration of the late group was 9.53 (±1.07 SD) with a range (8-11) weeks as shown in **Table 3**.

**Table 3:** Comparing among early & late ileostomy closure according to ileostomy duration

| | **Subjects** | | **Test of Sig.** | **p** |
|---|---|---|---|---|
| | **Early (n = 13)** | **Late (n = 17)** | | |
| **Ileostomy duration (weeks)** | | | | |
| Range. | 1 – 2 | 8 – 11 | t= 24.958 | <0.001* |
| Mean ± SD. | 1.92 ± 0.28 | 9.53 ± 1.07 | | |

Data are presented as frequency (%) unless otherwise mentioned, SD: **Standard Deviation**

There was a statistically significant difference among early & late ileostomy closure as regards operation data as shown in **Table** .

**Table 4:** Comparing among the early & late ileostomy closure according to operation data

| | **Subjects** | | **Test of Sig.** | **p** |
|---|---|---|---|---|
| | **Early (n = 13)** | **Late (n = 17)** | | |
| **Duration (min)** | | | | |
| Operative time. | 45 – 81 | 64 – 111 | t= | <0.001* |

| | | | | |
|---|---|---|---|---|
| Mean ± SD. | 62.46 ± 11.82 | 89.53 ± 13.7 | 5.683 | |
| **Bleeding (mL)** | | | | |
| Intra operative bleeding. | 10 – 50 | 20 – 80 | t= 2.874 | 0.008* |
| Mean ± SD. | 33.08 ± 13.16 | 51.76 ± 20.38 | | |

Data are presented as frequency (%) unless otherwise mentioned, SD: **Standard Deviation**

There was no statistically significant difference among early & late ileostomy closure as regards primary outcome as shown in **Table** .

**Table 5:** Comparing the early & late ileostomy closure according to primary outcome

| | **Subjects** | | **Test of Sig.** | **p** |
|---|---|---|---|---|
| | **Early (n = 13)** | **Late (n = 17)** | | |
| **Time to first gas passing (days)** | | | | |
| Range. | 0 – 3 | 0 – 3 | t= 0.029 | 0.977 |
| Mean ± SD. | 1.54 ± 0.97 | 1.53 ± 0.72 | | |
| **Hospital Stay (days)** | | | | |
| Range. | 3 – 8 | 2 – 9 | t= 0.667 | 0.510 |
| Mean ± SD. | 5.08 ± 1.5 | 5.59 ± 2.43 | | |

Data are presented as frequency (%) unless otherwise mentioned, SD: **Standard Deviation**

There was no statistically significant difference among early & late ileostomy closure as regards complications as shown in

**Table** .

**Table 6:** Comparing among the early & late ileostomy closure according to complications

| | **Subjects** | | | | $\chi^2$ | **p** |
|---|---|---|---|---|---|---|
| | **Early (n = 13)** | | **Late (n = 17)** | | | |
| **Complications** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Ileus | 2 | 15.4 | 3 | 17.6 | 0.027 | 0.869 |
| SSI | 2 | 15.4 | 1 | 5.9 | 0.739 | 0.390 |
| UTI | 1 | 7.7 | 1 | 5.9 | 0.039 | 0.844 |
| Atelectasis | 1 | 7.7 | 1 | 5.9 | 0.039 | 0.844 |
| Thromboembolic event | 0 | 0 | 1 | 5.9 | 0.791 | 0.374 |
| Incisional hernia | 1 | 7.7 | 0 | 0 | 1.353 | 0.245 |

Data are presented as frequency (%) unless otherwise mentioned, SD: **Standard Deviation**

## DISCUSSION

Loop ileostomies are generally formed in colorectal surgery to protect low rectal anastomosis in cases of obstructed cancer colon, complicated diverticular disease, strangulated hernias, volvulus.[1]

**Bananzade et al.**[10] reported that the baseline demographic & clinical features of the 2 study groups did not differ significantly. Compared to patients who underwent late ileostomy closure, those who underwent early closure experienced significantly less intraoperative bleeding ($p<0.001$) & a significantly shorter operation length ($p<0.001$).

**Bananzade et al.**[10] reported that even after controlling confounders, smoking considerably raised the likelihood of postoperative complications after ileostomy closure. Complications following ileostomy closure were not observed to be substantially correlated with other variables. Remarkably, early closure (less than two weeks) was not linked to a higher incidence of problems either.

There was no statistically significant difference among early & late ileostomy closure as regards comorbidities.

In this study comorbidities such as hypertension,ischemic heart disease,renal disease and smoker. There was no statistically significant difference among early & late ileostomy closure as regards comorbidities.

**Flynn et al.**[11] reported that individuals with heart failure, ischaemic heart disease, COPD, & atrial fibrillation were more likely to experience high-grade problems. Pre-existing atrial fibrillation ($p <0.01$) & COPD ($p = 0.029$) were found to be independently linked to a higher likelihood of high-grade consequences using multivariate analysis.

The mean ileostomy duration of the early group was 1.92 (±0.28 SD) with a range (of 1-2) weeks, the mean ileostomy duration of the late group was 9.53 (±1.07 SD) with a range (8-11) week. There was a statistically significant difference among early & late ileostomy closure as regards operation data.

In this study there was a statistically significant difference among early & late ileostomy closure as regards operation data.

**Sauri et al.**[12] reported that the late group experienced considerably more blood loss and surgery duration ($p = 0.001$ for each). Adhesion, which is typically observed to be more fibrous with

longer intervals among ileostomy construction & reversal, may have caused this. Tougher adhesions require more dissection, which takes longer & ends up in more blood loss.
In this study there was no statistically significant difference among early & late ileostomy closure as regards intra operative bleeding.
**Nakamura et al.**[13] reported that compared to late closure (>two months), early (<two weeks) ileostomy closure is linked to a similar rate of complications & adverse outcomes. Additionally, the data showed that early closure is linked to less intraoperative bleeding & a shorter operation duration. There was no correlation between early closure and higher overall complication rates. There was no statistically significant difference among early & late ileostomy closure as regards complications. There was no statistically significant difference among early & late ileostomy closure as regards the primary outcome.
In this study there was no statistically significant difference among early & late ileostomy closure as regards the primary outcome.
**Bananzade et al.**[10] reported that the time to 1st soft food was considerably shorter for those having a late ileostomy closure (p¼0.036). Regarding the length of hospital stay & the time before the 1st gas passage, there was no discernible difference among the 2 study groups.
In this study there was no statistically significant difference among early & late ileostomy closure as regards hospital stay.
**Abdalla et al.**[14] reported that the length of hospital stay (7.94 vs. 7.97 days, respectively; P =.588) & rates of closure-related complications (20.9percent vs. 18.6 percent, respectively; P =.637) did not differ statistically among the early & late groups.There was no statistically significant difference among early & late ileostomy closure as regards demographics.
The mean age of the studied cases was 59.33 (±9.33 SD) with a range (45-74), among the studied cases there were 10 (33.3%) females and 20 (66.7%) males,
In this study there was no statistically significant difference among early & late ileostomy closure as regards demographics.

## CONCLUSION

Delayed closure allows more time for healing, reducing anastomotic leak risk and improving surgical safety. The decision should be individualized based on patient-specific factors, including initial surgical risk, recovery progress, and overall health status. To confirm these results & investigate the long-term impacts of both closure techniques, more investigation is required.

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