*Original Research Article*

Outcome Of Early Versus Delayed Loop Ileostomy Closure: A Single Center Experience

ABSTRACT

**Background:** Intestinal stomas are often constructed in emergency abdominal surgeries, when primary repair of bowel carries high risk of anastomotic leakage due to peritoneal contamination or inflamed bowel or in hemodynamically unstable patient, such as typhoid ulcer perforation, trauma (penetrating or blunt), rectal or colonic injury, appendicular perforation etc. During this time stoma carries with it a lot of morbidity making the quality of life poor. That’s why some author suggested early closure of the stoma. Other mentioned early closure is not safe. But there is no established guideline to indicate the optimal timing for reversion.

**Aim:** The aim of the study is to compare the surgical outcomes and complication rates associated with early and delayed loop ileostomy closure

**Methods:**  This was conducted in surgery department of Mymensingh Medical College Hospital, Mymensingh, Bangladesh between January 2021 to June 2022.. A total of 60 patients with loop ileostomy were included in this study in two groups, of them 30 patients in early closure group where reversal was done between 14 days to 28 days and other 30 patients in delayed closure group where reversal was done after 12 weeks. Data were collected from the patients, admitted in different unit of surgery for ileostomy reversion, using a semi structured case record form. Data were analyzed using SPSS (Statistical Package for Social Sciences) software (version 26.0) and findings were presented in the form of tables and graphs with due interpretation. Recorded data finally were analyzed by unpaired t-test and chi-square/fisher exact test and p value <0.05 was considered as a level significance.

**Results:**The mean age was found 39.9±7.17 years and 40.6±6.7 years in early closure group and delayed closure group respectively with male predominance in both groups. Most common indication for ileostomy procedure in both groups was enteric perforation. Stoma related complications significantly higher in delayed closure group (p=0.015). Mean operation time for ileostomy closure was significantly higher in delayed closure group (59.3±9.2 mins vs 72.7±10.4 mins, P <0.001). The postoperative wound infection was higher in early closure group (10.0% vs 6.7%, p=0.640. On the other hand, paralytic ileus and anastomotic leakage were higher in delayed closure group but not statistically significant. Mean hospital stay was significantly higher in delayed closure group compare to early closure group (6.73±1.46 days vs 8.20±2.62 days, p=0.01). Mortality was not found statistically significant in both groups (0% vs 3.3%, p>0.05).

**Conclusion:** The current study demonstrates stoma related complications, mean operation time and length of hospital stay were significantly lower in the early than in the delayed closure group.

Key words: *early, delayed, loop Ileostomy,*

**INTRODUCTION:**

The loop ileostomy is a type of stoma mainly used in colorectal surgery which is constructed to establish a reversible fecal diversion for protection of distal anastomosis. Anastomotic leakage is one of the most serious complication in colorectal surgery. Loop ileostomy decreases clinical consequences of anastomotic leakage.1 Most surgeon’s choice is loop ileostomy because it is easy to construct and close. It is also an emergency life saving procedure in case of enteric ileal perforation, traumatic perforation, necrotizing infection of bowel and so many emergency condition.2

If reversal time of stoma is delayed, then complication rate of stoma increases.3 Improvement of quality of life occurs in case of reversion of ileostomy. Ileostomy reversion is the only solution of stoma related complications. Morbidity and mortality decrease when ileostomy reversion occur within 1 month and even within 10 days.4 Usually ileostomy is reversed two to three months after constructions.4 There is no evidence that this period is necessary for complete healing of the colonic anastomosis. Aanastomotic leakage mostly present on five or seven days after operation. So if there is neither clinical nor radiological signs of anastomotic leakage after one week, it is proven that the colonic anastomosis has already healed. Early closure of temporary stoma decreases both stoma related morbidity and patient discomfort. Reversal of temporary stoma 8-10 days after surgery is feasible though it has higher wound complications.5 Other studies have also found that there is no difference of outcome between early and late stoma closure regarding morbidity and mortality Therefore some authors have recommended that stoma time should be kept to a minimum.6,7 Early ileostomy closure may also reduce postoperative nausea and vomiting.

Alves and colleagues found that wound complications rate was 18% in early group and 5% in delayed group.8 In this study they also found that anastomotic leak rate was 6% in early group while 5% in delayed group .According to another study, average number of complications were significantly lower in early group. Based on other studies, the temporary stoma closure within 2 weeks reduces in morbidity and mortality and decreases the complication rate.9.10

Loop ileostomy reversion is frequently performed in different unit of Surgery of Mymensingh Medical College Hospital. This study was conducted to compare the results of two different time of ileostomy reversion that was early and delayed ileostomy reversion to see the early postoperative outcome in terms of post-operative complications, hospital stay and mortality rates.

**Materials and method:**

The prospective comparative study was conducted in the Department of Surgery, Mymensingh Medical College & Hospital, Mymensingh, Bangladesh from January 2021 to June 2022. A total number of 60 patients were included in the study. 30 cases were included in early closure group (Group A) and another 30 in delayed closure group (Group B).

**Inclusion criteria:**

* Patients of both sexes.
* Patients age group was 18 years and above.
* Patients with loop ileostomy after emergency and elective intestinal surgery.

**Exclusion criteria:**

* Permanent or end ileostomy.
* Any radiological sign of primary anastomotic leak on water soluble contrast examination before stoma closure.

Demographic variables including sex, age and comorbidities were identified after proper history taking and clinical examination. Etiology of creation of stoma , Pre-closure and post closure complications , operation time and duration of hospital stay were analyzed.

All patients who were primarily operated and ended up with temporary loop ileostomy were admitted for ileostomy reversion and considered for this comparative study on the basis of inclusion and exclusion criteria. Preoperative evaluation by detail history and clinical evaluation then relevant investigations were done to confirm the fitness for reversion and fitness for anaesthesia. We had done distal loopogram to see any radiological sign of primary anastomotic leak and patency of distal colon. In this study, early reversion of stoma was done between 14 days and 28 days following index surgery and delayed reversion was done after 12 weeks of primary surgery. All the stoma was closed by hand sewn anastomosis. Patients were observed up to 30 days in the post-operative period for any complications.

All the data were analyzed bySPSS 26.0 (Statistical Package for Social Sciences). Categorical data were reported as numbers and percentage (%) and quantitative data were expressed as mean and standard deviation. A p value > 0.05 was considered statistically significant.

**Results:**

The study was conducted on 60 patients with loop ileostomy admitted in different surgical units of Mymensingh Medical College & Hospital according to inclusion and exclusion criteria. Thirty cases were included in early closure group (Group A) and another 30 in delayed closure group (Group B).The mean age was 39.9±7.17 years in group A and 40.6±6.7 years in group B which was not statistically significant. No significant difference was also noted in sex distribution between two groups ( p>0.05).

**Table-1 shows age distribution of the study population**

|  |  |  |
| --- | --- | --- |
| **Age group (years)** | **Group A**  **(n=30)** | **Group B**  **(n=30)** |
| 20-29 | 2(6.7%) | 3(10.0%) |
| 30-39 | 16(53.3%) | 13(43.3%) |
| 40-49 | 8(26.7%) | 11(36.7%) |
| 50-60 | 4(13.3%) | 3(10.0%) |
| Total  Mean±SD | 30(100.0%)  39.9±7.17 | 30(100.0%)  40.6±6.7 |

**Table-2: Sex distribution of the study patients in two groups (N=60)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Gender** | **Group A**  **(n=30)** | **Group B p-value**  **(n=30)** |  |
| Male | 18(60.0%) | 16(53.3%) 0.876 |  |
| Female | 12(40.0%) | 14(46.7%) 0.602 |
| Total | 30(100.0%) | 30(100.0%) |  |

Most common indication for ileostomy creation in both the groups was ileal perforation which was 16(53.3%) in early closure group and 18(60.0%) in delayed closure group followed by traumatic perforation. Other indications were defunctioning ileostomy and appendicular perforation. Ileostomy related complications significantly higher in delayed closure group (p=0.015). Only 4(13.3%) patients developed skin excoriation in early closure group. In delayed closure group pre-closure complications were prolapse 4(13.3%), skin excoriation 10(33.3%), stomal retraction 1(3.3%). Mean operating time was significantly higher in delayed closure group compare to early closure group (59.3±9.2mins vs. 72.7±10.4, p<0.001).

**Fig-1 Stoma related complications between two groups**

**Table-3: Distribution of indications for ileostomy creation in two groups (N=60)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indications** | **Group A**  **(n=30)** | **Group B** **p-value**  **(n=30)** |  |
| Enteric perforation | 16(53.3%) | 18(60.0%) 0.546 |  |
| Traumatic perforation | 9(30.0%) | 7(23.3%) 0.332 |
| Defunctioning ileostomy | 3(10.0%) | 2(6.7%) 0.213 |
| Appendicular perforation | 2(6.7%) | 3(10.0%) 0.452 |
| Total | 30(100.0%) | 30(100.0%) |  |

Among the complications wound infection, prolong paralytic ileus, anastomotic leakage and enterocutaneous fistula were most common. Wound infection and prolong paralytic ileus were found in both groups but anastomotic leakage and enterocutaneous fistula were found only in delayed group. There was only one mortality in Group B. Two (6.7%)) patients of group-B required re-laparotomy.

The mean hospital stay for patients in Group A was 6.73±1.46 days and in Group B was 8.20±2.62 and the difference was statistically significant (p<0.001).

**Discussion:**

Loop ileostomy is a lifesaving procedure in the emergency situation as well as in case of routine surgery to mitigate the consequences of anastomotic leak which is a potentially life threatening complication. The query on which time frame is ideal for optimal closure has been recently debated. The timing of early closure as defined in present study is between 14 to 28 days of post initial surgery, which is comparable to study conducted by Rafiq et al .11

The most common age group in our study was 30-39 years with 29(48.33%) patients belonging to this age group. Among them 16(53.3%) and 13(43.3%) patients belonged to early closure and delayed closure group respectively. No significant difference was found in age and sex distribution between two groups (P>0.05). Similar results were reported in a study by Nelson et al. where majority of the patients were in age group 31-40 years with male predominance.12 Most common cause of stoma formation in this study was for emergency laparotomy for enteric perforation which was found 16(53.3%) in early closure group and 18(60%) in delayed closure group. Kumar et al. reported the most common cause of stoma formation was enteric perforation (61.7%) followed by koch’s abdomen and trauma each accounting for 12.76% cases.13

Stoma related complications were found higher in delayed closure group. Among them skin excoriation and stomal prolapse were most common complications which coincides with previous studies.13,14 Post-operative complications like anastomotic leakage and enterocutaneous fistula were more common in group-B. In delayed closure group, 2(6.25%) patients developed anastomotic leak but no anastomotic leakage was observed in early group. Similar results were also observed in other studies where delayed closure had more anastomotic leakage.14,15

Mean operating time was significantly higher in delayed closure group compare to early closure group (p<0.001). We found intraoperative adhesions higher in delayed closure group resulting prolong operation time. In accordance with Jat et al. operative time was marginally high in delayed closure (mean 78 min) compared to early closure group (mean 76.12 min).That study also found intraoperative adhesions were significantly higher in delayed ileostomy closure group (38.33%).16

Hospital stay was significantly shorter in early closure group in contrast to delayed reversal group and p value <0.01.Similar results were also shown by Menegaux et al. and Shaikh et al.17,18

2 (6.7%) patients in delayed closure group underwent relaparotomy due to anastomotic leakage and the result was not found statistically significant (p =0.472). In this study, 1(3.3%) patient was died during relaparotomy due to delayed reversal with complication of general anaesthesia. No significant difference of mortality between two groups (p>0.05).

The current study had some limitations. It was a single center study with a small sample size. Besides the study was conducted for a short period of time. Further large scale multicenter study is required to obtain a better result regarding early stoma closure.

**Conclusion:** Early closure of the stoma has no adverse effect on functional results or quality of life rather than it can avoid stoma related complications. Early closure of a temporary stoma can be done in selected cases between 4 weeks with favourable outcome. The current study demonstrates stoma related complication, mean operating time and length of hospital stay were significantly lower in the early than in the delayed closure group.

**CONSENT:**

Patient’s informed written consent was taken to publish her case for academic purpose.

**ETHICAL APPROVAL:**

As per international standards or university standards written ethical approval has been collected from Institutional ethical committee and preserved by the authors.

**DISCALIMER (ARTIFICIAL INTELLEGENCE):**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

**COMPETING INTERESTS DISCLAIMER:**

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

**References:**

1. Abdalla, S. and Scarpinata, R. Early and late closure of loop ileostomies: a retrospective comparative outcomes analysis. Ostomy Wound Management.2020; 64(12):30-35.
2. Cheng, Z., Dong, S., Bi, D., Wang, Y., Dai, Y. and Zhang, X. Early versus late preventive ileostomy closure following colorectal surgery: systematic review and meta-analysis with trial sequential analysis of randomized controlled trials. Diseases of the Colon & Rectum.2021; 64(1):128-137.
3. Danielsen, A.K., Park, J., Jansen, J.E., Bock, D., Skullman, S., Wedin, A., Marinez, A.C., Haglind, E., Angenete, E. and Rosenberg, J. Early closure of a temporary ileostomy in patients with rectal cancer. Annals of surgery, 2019;265(2):284-290.
4. Fukudome, I., Maeda, H., Okamoto, K., Kuroiwa, H., Yamaguchi, S., Fujisawa, K., Shiga, M., Dabanaka, K., Kobayashi, M., Namikawa, T. and Hanazaki, K. The safety of early versus late ileostomy reversal after low anterior rectal resection: a retrospective study in 47 patients. Patient Safety in Surgery.2021; 15(1):1-6.
5. Li, W. and Ozuner, G. Does the timing of loop ileostomy closure affect outcome: A case-matched study. International Journal of Surgery.2018: 43;52-55.
6. Wang, L., Chen, X., Liao, C., Wu, Q., Luo, H., Yi, F., Wei, Y. and Zhang, W. Early versus late closure of temporary ileostomy after rectal cancer surgery: a meta-analysis. Surgery Today.2021;51(4):463-471.
7. Yetişir, F., Şarer, A., Acar, H.Z. and Çiftciler, E. The reversal of stoma following open abdomen management. Indian Journal of Surgery.2016;78(3):182-186.
8. Alves, A., Panis, Y., Lelong, B., Dousset, B., Benoist, S. and Vicaut, E. Randomized clinical trial of early versus delayed temporary stoma closure after proctectomy. Journal of British Surgery.2020;95(6):693-698.
9. Huang, X., Wang, C., Huang, Z., Zhou, H., Li, H., Shi, F., Du, L., Ke, X., Zheng, B., Zhang, S. and Che, X. Meta-analysis of early versus late closure of a temporary ileostomy after proctectomy. Oncotarget,2019; 9(1):1027-1037.
10. Aljorfi, A.A. and Alkhamis, A.H. A systematic review of early versus late closure of loop ileostomy. Surgery Research and Practice.2020;6(2):1-8.
11. Rafiq, A., Ghaffar, A., Mahmood, S., Kareemullah, M., Shamsuddin, Khan, S.U., Qasim, M. and Bhatti, A. Comparison of early versus delayed closure of ileostomy in a tertiary care hospital. International Journal of Biosciences.2020; 17(6):70-75.
12. Nelson, T., Pranavi, A.R., Sureshkumar, S., Sreenath, G.S. and Kate, V. Early versus conventional stoma closure following bowel surgery: a randomized controlled trial. Saudi journal of gastroenterology: official journal of the Saudi Gastroenterology Association.2020; 24(1):52-58.
13. Kumar, R.S., Prakash, O., Aftab, A., Rajesh, K. and Preeti, U. Comparative study of early and delayed loop ileostomy and colostomy closure. International Journal of Current Research.2016; 8(09):38158-38160.
14. P.K. Garg, A. Goel, S. Sharma, N. Chishi, M.K. Gaur.Protective diversion stoma in low anterior resection for rectal cancer: a meta-analysis of randomized controlled trials.Vis Med.2019;35:156-160
15. I. Vogel, N. Reeves, P.J. Tanis, et al.Impact of a defunctioning ileostomy and time to stoma closure on bowel function after low anterior resection for rectal cancer: a systematic review and meta-analysis.Tech Coloproctol, 2021;25(7): 751-760
16. Jat, D.C., Kumar, A. and Gupta, M.K. Case Study on comparative study between early and delayed ileostomy closure. Journal of Dental and Medical Sciences.2020; 19(5):25-29.
17. Menegaux, F., Jordi-Galais, P., Turrin, N. and Chigot, J.P. Closure of small bowel stomas on postoperative day 10. European Journal of Surgery.2022;168(12):713-715.
18. Shaikh, S., Laghari, Z.H., Laghari, Q.A., Abro, S. and Dal, N.A. Early or delayed reversal of temporary ileostomy after typhoid perforation: A comparative study at tertiary care hospital. Journal of Liaquat University of Medical & Health Sciences. 2020;19(02):78-81.