



Comparison of early versus delayed closure of ileostomy in a tertiary care hospital

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Abstract

A stoma is an artificial opening made in the bowel to exteriorize the bowel contents. There are two surgical strategies for the closure of a stoma, early and delayed. Early closure of the temporary stoma might reduce both stoma-related complications and patient ailment. Wound complications are common but there are many associated morbidities due to delay in closure. An experiment was done to compare early versus delayed closure of ileostomy in a tertiary care hospital. It was conducted in the Department of Surgery, Lahore General Hospital for Six months i.e. from 21.05.2016 to 20.11.2016 with a Randomized Controlled Trial. Patients were divided into two groups. In group A, patients underwent early closure while in group B, patients underwent delayed closure. Early closure is done within one month of stoma formation whereas delayed closure after 2 months. After discharge, patients were followed-up in OPD for 90 days. Two groups were compared in terms of having complications i.e. anastomotic leakage and wound infections. Anastomotic leak and wound infection were found to be significantly higher in Group-B patients (Delayed closure) as compared to Group-A (Early closure) patients, i.e. anastomotic leak [Group-A: 13.3% vs. Group-B: 32.4%, p -value= 0.001] & wound infection [Group-A: 13.3% vs. Group-B: 36.2%, p -value= 0.000]. The outcome of early closure of ileostomy is more effective than delayed closure in terms of anastomotic leakage and wound infection.

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Introduction

A loop ileostomy is an ileostomy that is constructed surgically in the intestine, usually meant for temporary fecal diversion and is usually closed after some time (Ahmad QA *et al.*, 2010). Reversal of loop ileostomy is a safe procedure having a good outcome in terms of low morbidity, mortality and hospital stay. This reversal of stoma has changed the disease outcome and has led to improved survival in common indications like typhoid, traumatic or tubercular perforation, or if done for fecal diversion protecting distal primary anastomoses as usually done for Crohn's disease or ulcerative colitis (Afridi SS *et al.*, 2013).

Subsequent reversal of the ileostomy restores bowel continuity and improves the patient's overall quality of life. It has been suggested that reversal of loop ileostomy can be performed as an ambulatory procedure with the early discharge of patients (Baraza W *et al.*, 2010). Morbidity after stoma closure, however, is not negligible and the most common complications are postoperative surgical site infections and anastomotic leakage. At present, there is no consensus on the ideal closure technique of the stoma wound to minimize postoperative wound infection and multiple techniques have been proposed (Ahmad M *et al.*, 2013).

One study has found that anastomotic leakage was less with early closure (8 days), i.e. 1% which was significantly less than delayed closure (2 months), i.e. 4% ($P > 0.05$), however, it was also found that wound infection was significantly higher with early closure (19%) as compared to delayed closure (5%), $p < 0.05$ (Alves A *et al.*, 2008). One more study has reported that with early closure (4 weeks), wound infection was present in more cases, i.e. 16.66% as compared to 10.32% with delayed closure (8 weeks), ($p = 0.102$), and anastomotic leakage was seen in 5.76% cases with early and 8.38% cases with delayed closure of ileostomy ($p = 0.368$) (Khan N *et al.*, 2011).

The rationale of this study is to compare early versus delayed closure of ileostomy in patients presenting in

a tertiary care hospital, in terms of complications mainly surgical site infections and anastomotic leakage. In routine practice, it has been noticed that surgeons preferably choose delayed closure of ileostomy, but in literature, it has been observed that there is no difference in early and delayed closure of an ileostomy. As there is no difference between the outcomes of the two procedures than why there would be a delay in ileostomy reversal prolonging the duration of treatment with the need for more logistics. Therefore, we wanted to conduct this study to find which of the two methods is more successful in terms of having fewer complications for the closure of an ileostomy.

Materials and methods

Study Area

Department of Surgery, Lahore General Hospital.

Period

Six months, i.e. 21.05.2016 to 20.11.2016.

Sampling methodology

Sample Size

The sample size of 210 cases; 105 cases in each group is calculated with 80% power of the test, 5% level of significance and taking the expected percentage of anastomotic leakage, i.e. 1% with early ileostomy closure and 8.38% with delayed ileostomy closure.

Study design

Randomized Controlled Trial

Sampling technique

Non-probability, consecutive sampling

Inclusion criteria

Patients age 20 to 60 years from either gender who required the closure of ileostomy presenting after 1 week for follow-up in the outpatient department.

Exclusion criteria

Patients with blood pressure $\geq 160/90$ mmHg, having diabetes mellitus with blood sugar level > 186 mg/dl, having deranged liver function tests ($AST > 40$ IU,

ALT>40IU), deranged renal profile with creatinine >1.2mg/dl, having an active infection or multi-organ failure.

Data collection procedure

After taking permission from the hospital ethical committee, 210 patients, fulfilling the selection criteria were randomly selected from the outpatient department. Informed consent was taken. The predesigned proforma was filled up.

The patients were divided into two groups by using the lottery method. Group A was assigned to patients undergoing early closure whereas group B was assigned to patients undergoing delayed closure. All patients undergoing surgery were given general anesthesia and they were operated by a single surgical team consisting of an associated professor, senior registrar and a postgraduate trainee. Postoperative follow-up was done for 90 days during which patients were advised to report any complications to the surgical team and they were educated about possible complications they may develop. Patients were specially instructed to report if there was a breakdown or leakage at the site of a surgical closure of stoma which would then be confirmed for having

anastomotic leakage by CT scan abdomen. Also, patients were instructed to report any redness around the wound, pus discharge, or elevated temperature locally or generally which would mean to have suspected wound infection which would then be confirmed with a culture of wound discharge for bacterial growth along with confirmation for elevated temperature. All the information was collected on a predesigned proforma.

Data analysis

Data was entered and analyzed by SPSS version 20. Mean and Standard deviation was calculated for age. Frequency and percentage were calculated of gender and post-operative complications, i.e. anastomotic leakage and wound infection. A Chi-square test was applied to compare postoperative complications in both groups. P-value < 0.05 was taken as significant.

Results

The mean age of patients in Group A and Group B was 40.70±11.42 and 41.28±12.43 years, respectively. In Group A there were 52(49.5%) male patients and 53(50.5%) female patients, whereas in Group B there were 47(44.8%) male patients and 58(55.2%) female patients (Table 1).

Table 1. Demographics of patients.

N	Study groups	
	Early closure	Delayed closure
	105	105
Age (years)	40.70±11.42	41.28±12.43
Male	52(49.5%)	47(44.8%)
Female	53(50.5%)	58(55.2%)

Anastomotic leak was found to be significantly higher in Group B patients as compared to Group A patients, i.e. Group-A: 13.3% vs. Group-B: 32.4%, *p*-value = 0.001. Wound infection was significantly higher in Group B patients as compared to Group A patients, i.e. Group A: 13.3% vs. Group B: 36.2%, *p*-value = 0.000 (Table 2).

Discussion

Diverting ileostomy seems to mitigate the consequences of an anastomotic leak from the low

rectal anastomosis. Gastrointestinal continuity is restored after a period of 6–12 weeks but it can be longer if the patient is on adjuvant chemotherapy or due to low priority given to this procedure (Omundsen M *et al.*, 2012).

This exposes up to one-third of the patients to significant morbidity having an impact on the quality of life and considerable economic costs. Earlier reversal of ileostomies a few days after primary anastomosis reduces the length of exposure to stoma-

related morbidity and may improve quality of life, reduce stoma-related costs and still protect the distal anastomosis (Bakx R *et al.*, 2003).

In our study anastomotic leak and wound infection was significantly higher in Group B patients (Delayed closure) as compared to Group A (Early closure) patients, i.e. anastomotic leak [Group A: 13.3% vs. Group B: 32.4%, p-value = 0.001] & wound infection

[Group A: 13.3% vs. Group B: 36.2%, p-value = 0.000]. Among male and female patients anastomotic leak was significantly higher in Group B patients as compared to group A patients, but for wound infection among male patients, it was significantly higher in Group B as compared to that of Group A patients. Among female patients, although wound infection was higher in Group B it was not statistically significant.

Table 2. Comparison of outcome in both groups.

Outcome	Study groups		p-value
	Early closure	Delayed closure	
Anastomotic leak			
Yes	14(13.3%)	34(32.4%)	0.001
No	91(86.7%)	71(67.6%)	
Wound Infection			
Yes	14(13.3%)	38(36.2%)	0.000
No	91(86.7%)	67(63.8%)	

Alves A in 2008 in his study found that anastomotic leakage was less with early closure (8 days), i.e. 1% which was significantly less than delayed closure (2 months), i.e. 4% ($P > 0.05$) which supports the findings in our study. However, it was also found that wound infection was significantly higher with early closure (19%) as compared to delayed closure (5%), $p < 0.05^5$ which is contrary to our study findings.

Khan in 2011 in his study reported that with early closure (4 weeks), wound infection was present in 16.66% cases and 10.32% with delayed closure (8 weeks), ($p = 0.102$) and this finding is not consistent with findings in our study. Although anastomotic leakage was 5.76% with early closure and 8.38% with delayed closure of ileostomy ($p = 0.368$) (Khan N *et al.*, 2011), which is consistent with findings in our study.

Recently in 2016, a local study from CMH Lahore showed that postoperative wound infection developed in 4 patients (13.4%) in the early group and 2 patients (6.7%) in the delayed group (Amna Shahab MAR *et al.*, 2016). Recently in 2016 Konstantinos Lasithiotakis in their study reported that in early

reversal group 2 (16.66%) patients developed an infection while in the delayed reversal group none of the patients developed an infection (Lasithiotakis K *et al.*, 2016). Both the above-mentioned studies support in favor of delayed closure over early closure of stoma in terms of minimal wound infection.

The concept of early closure is becoming more popular as it decreases the burden of management and also offers more incentives for the patients. Early closure is undertaken if the patient is in good general condition without any intra-abdominal sepsis, wound infection and stomal edema (Jordi-Galais P *et al.*, 2003). Both ileostomy and colostomy result in significant quality of life impairment placing a negative impact on patient's psychological, physical, sexual and social welfare (Gooszen H *et al.*, 2002).

A temporary loop ileostomy is often created to minimize the impact of peritoneal sepsis from anastomotic dehiscence after a coloanal or low colorectal anastomosis. Such a stoma is usually closed after 6 to 12 weeks when the intestinal edema is reduced and the peristomal adhesions are dense. This period is three to four times longer than necessary for

assurance of anastomosis healing, which is usually achieved by the second week after surgery (Bakx R *et al.*, 2004). An adhesion barrier membrane, placed around the limbs of a refunctioning loop ileostomy, reduces peristomal adhesion and facilitates early closure at three weeks with minimal complications (Tang C-L *et al.*, 2003).

The early postoperative adhesions tend to be soft, flimsy and avascular which can be swept away with minimal tissue injury. Later in the disease process, the adhesions become dense and adherent and it is quite an ordeal to deal with these adhesions thus increasing the degree of operative difficulty and the risk of injury. Early closure of the temporary stoma might reduce both stoma-related complications and patient ailment. Wound complications are common and there are many associated morbidities due to delay enclosure as seen in our study.

Conclusion

Our study concludes that early closure of ileostomy is more effective than delayed closure both in terms of anastomotic leak and wound infection. With experienced surgeons, early closure can give more suitable results for patients.

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