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A Comparative Study on Mortality and Morbidity Between Early and Late Ileostomy Closure

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ABSTRACT

The ileostomy is a type of stoma created to divert the flow of intestinal content away from a distal anastomosis. It de-functions an anastomosis and limits the clinical impact of an anastomotic leak, which is one of the most feared complications in colorectal surgery. The aim of this study is to review the relevant literature attempting to compare early and late closure of ileostomy in terms of morbidity, mortality, and quality of life. This is an Observational prospective study. It's conducted from March 2020 to September 2021 at Burdwan Medical College and Hospital. About 80 patients were included in this study. We can see 40 out of 80 cases were discharged before 7 days (50%). 24 of them belonged to early group and 16 belonged to late group. Early closure group had 3 patients (7.5%) and late closure group had 8 patients (20%) who were discharged after 2 weeks. CHI-SQUARE TEST shows CHI level of 3.93 which corresponds to p-value of 0.15 which is more than 0.05 so it is not significant. We conclude that, early closure of stoma (5-7weeks) had no adverse effects on functional result. Early closure of stoma presented with lower percentage of major and minor complications among the patients. Length of hospital stay is lower in early closure group according to our study thus decreasing the social and economic burden on the patient. But the current data available could not prove any significant difference between the two groups based on the above aspect except for wound infection which is significantly higher in late group. No sufficient data is still available to draw firm conclusions on the matter.

INTRODUCTION

The ileostomy is a type of stoma created to divert the flow of intestinal content away from a distal anastomosis. It defunctions an anastomosis and limits the clinical impact of an anastomotic leak, which is one of the most feared complications in colorectal surgery. History of STOMAS dates back to 1710 when Littre of Paris made first ventral colostomy for imperforate anus. After World War I mortality rate of 60% due to primary repair of colonic injuries dropped to 30% in World War II due to the introduction of colostomy. Ileostomy gained popularity for ruptured appendix and appendicular abcess[1].

Shock, marked blood loss, significant faecal contamination, associated injuries, time till presentation and multiplicity of injury are widely accepted factors favouring stoma formation than primary repair which leads to significant mortality and morbidity owing to friable tissue that cannot hold a suture.

The number of abdominal stomas made each year is declining in developed countries where indications for faecal diversion include inflammatory bowel disease, familial adenomatosis polyposis, colorectal cancer, non-gastrointestinal obstructing tumors, pelvic sepsis, trauma, diverticulitis, fistula, ischemic bowel disease, radiation enteritis, pseudomembranous enterocolitis, fecal incontinence and paraplegia but in developing countries it is still a common occurring for infective etiologies.

Loop ileostomies are favoured over loop colostomies because they are less bulky, less malodorous, less prone to prolapse and associated with fewer complications upon reversal[2].

A defunctioning loop ileostomy is effective for reducing both the rate of symptomatic anastomotic leakage and the need for a reoperation, as proved by randomized controlled trials (RCTs). A temporary loop ileostomy is preferred to a colostomy by most surgeons because it is easy to construct and close without risk of injury to the colic vascular arcade and there are fewer problems with prolapses. Several individual factors are related to the individual's adaptation to life with a stoma including age, socio-economic profile6, personality and sex. Studies have shown inferior quality of life in patients with a stoma compared with those who underwent similar procedures without stoma formation. Reversal of the temporary stoma resulted in improvement in quality of life whereas knowing that the situation was temporary could interfere with adaptation to living with a temporary ileostomy[3].

Temporary ileostomy reversal is generally associated with a low mortality. However, ostomy reversal may cause complications requiring reoperation and a recently published review found major complications ranging from 0% to 7-9% and minor complications varying from 4-5% to 30%[4].

Reversal of the temporary stoma resulted in an increase in quality of life, whereas knowing that the situation was temporary could interfere with adaptation to living with a temporary ileostomy. Measurements of health-related quality of life are increasingly demanded in the healthcare sectorand are proposed as one suitable test of efficiency of clinical interventions. Studies measuring other parameters following stoma reversal, instead of focusing solely on terms of morbidity and mortality and disregarding patient-centred outcomes, are therefore warranted[4].

MATERIALS AND METHOD

Study Design: Observational prospective study.

Study Place: Burdwan Medical College and Hospital.

Study Population: Patients who will undergo ileostomy closure after emergency or elective ileostomy who attend general surgery department.

Study Period: March 2020 to September 2021.

Sample Size: The number of patients admitted for ileostomy reversal through general surgery department was 104. Considering 10% patients will not provide a valid consent, another 15% patients will be excluded after application of inclusion and exclusion criteria. We expect to include 80 patients over a period of one year.

Inclusion Criteria: Patients in the age group of 18 years to 60 years of both genders who are admitted for ileostomy closure after normal distal cologram study.

Exclusion Criteria:

- Patients with more than one stoma
- Medical causes of delayed laparotomy
- Patients with permanent or end ileostomy, colostomy
- Patients with any bleeding disorders

RESULTS

The following graphs show that in the early closure group, 2 patients were in between 18-30 years [5%] 4 patients were in between 30-40 years [10%] 20 patients were between 40-50 years [50%] and the rest in between 50-60 years (Table 1).

We can see nearly 28 out of 80 cases stoma was made because of bowel perforation of undetermined cause. Out of these 28, stoma of 15 patients were reversed early and 13 were present for late reversal. In patients presenting with disease like CA COLON, TB, IBD etc need more time for follow-up due to variety of

Table 1: Showing Age Distribution of Cases

	Years				
Ileostomy closure	18-30	30-40	40-50	50-60	Total
Early group	2	4	20	14	40
Late group	1	3	18	18	40
Total	3	7	38	32	80

Table 2: Showing Distribution of Cause for Stoma before Reversal

Cause For Stoma Before Reversal	Early Group	Late Group	Total
Acute Obstruction	5	3	8
Blunt Trauma	8	2	10
Penetrating Trauma	4	2	6
CA Colon	2	6	8
Bowel Perforation	15	13	28
Inflammatory Bowel Disease	2	6	8
Tuberculosis	3	7	10
Appendicular Pathology	1	1	2
Total	40	40	80

Table 3: Showing Mortality Distribution Based On the Disease Prior To Stoma Creation

Disease Prior to Stoma Creation	Died After Early Closure	Died After Late Closure	Total
Acute Obstruction	0	0	0
Trauma	0	0	0
CA Colon	1	1	2
Inflammatory Bowel DS	0	1	1
Tuberculosis	0	0	0
Total	1	2	3

Table 4: Hospital Stay Associated With Ileostomy Closure

Closure Type	Less Than 7 Days	7-14 Days	>2 Weeks
Early	24	12	3
Late	16	14	8
Total	40	26	11

reasons so needs more time before stoma can be reversed hence majority of them are placed under late closure group [19 out of 80].patients with stoma made for causes like Trauma, acute obstruction, etc were majorly placed in early closure group (Table 2).

It is seen that patient suffering with carcinoma are more susceptible than others in both groups. All the three deaths were due to post- operative anastomotic leak. After CHI-SQUARE test for statistical significance between both groups we find out CHI is 0.9 whose corresponding p value is more than 0.975 which is more than 0.05 so it is statistically insignificant (Table 3).

From the above values we can see 40 out of 80 cases were discharged before 7 days [50%]. 24 of them belonged to early group and 16 belonged to late group. Early closure group had 3 patients [7.5%] and late closure group had 8 patients [20%] who were discharged after 2 weeks. CHI-SQUARE TEST shows CHI level of 3.93 which corresponds to p-value of 0.15 which is more than 0.05 so it is not significant (Table 4).

DISCUSSION

The discussion is based on the observations and analysis of results from my study of 80 case with respect to timing of ileostomy closure, age, comorbidities and other specific findings and comparing them with other previous studies.

In my study a total of 80 cases of ileostomy stoma were divided into two groups of 40 patients in whom the stoma reversal was done 5-7 weeks after stoma procedure and the other group had 40 patients in whom stoma was reversed after 90 days.

In the early group 22 were male [55%] and 18 [45%] were female. In the late group 26 were male [65%] and 14 were female [35%]. In the early closure group majority of cases [50%] belonged to 40-50 years age group whereas in the late group [90%] cases belonged to 40-60 years age group. In both the groups most common cause for stoma creation is bowel perforation from undetermined cause, 28 [35%] of total. However, cases of trauma, acute obstruction were higher in early group [42%] than in late group [17.5%]. In the late group cases of carcinoma colon, inflammatory bowel disease and tuberculosis were higher compared to early closure.

Very few studies of ostomy closure describe death among their patients. Many of the patients who died after having their stoma closed did not die as a direct consequence of the stoma closure, but because of their primary illness or general weakness.

In a study from 1995, the authors retrospectively investigated long-term survival in patients with colorectal cancer and a temporary stoma. The study showed a shorter survival in patients who had their stoma closed earlier than three months after construction compared with those who had the stoma closed later[6]. Generally, the mortality associated with the closing of temporary ileostomies is low, regardless of closing time. The highest mortality was found in a prospective study from 2005 where the overall mortality associated with the closing of ileostomies was 5%. They reported two deaths, one due to leakage with subsequent peritonitis and the other due to respiratory insufficiency because of lung metastases. Only one of the studies describing closure within two weeks reported deaths. This retrospective study reported a mortality of 3%[7].

From the above studies we can see incidence of anastomotic leak is less in early group. A study by Danielsen *et al*.[8] show no leak in early group compared to one in late closure group. Figueiredo *et al*.[9] show significantly high incidence of anastomotic leak in late group when compared to 1 case in early group. In my study we can see total 8 out of 80 cases showed anastomotic leak [10%] 3 of them are in the early group and 5 are from the late group. The patients who were suffering from COLON CARCINOMA and INFLAMATORY BOWEL DISEASE were seen to be more prone to leak. In early closure group the cases belonged to age group of 40-50 years but in late group leak was noted even in lower age group of 30-40 years. All the cases required re-operation for management.

Though it seems that anastomotic leaks are higher in late closure group calculated p-value shows that this comparison is not significant.

From the following studies we can see that Danielsen *et al*.[8] and figueiredo *et al*.[9] show similar

incidence of post closure obstruction in both groups. A study by Omundsen *et al*.[10] show incidence of post closure obstruction in late group is higher than that of early group.

In my study we see that incidence of post closure obstruction is 4 cases in early group and 8 cases in late group. A total of 12 out of 80 cases showed post closure obstruction due to various causes like electrolyte imbalance or anastomotic stenosis or due to infection [15%]. Most of these cases belonged to the age group of 50-60 years in both groups. In early closure group 3 out of 4 cases and in late group 6 out of 8 developed obstruction during hospital stay.

All the cases were managed conservatively and there were no deaths reported.

Fukudome *et al*.[11] study show 17 % of the cases in which stoma was closed early developed wound site infection. In contrary, the present study shows in early closure 12 out of 40 cases [30%] developed wound infection compared to 16 out of 40 cases [40%] in late closure. p-value of 0.002 confirm that wound infection is significantly higher in late group compared to early group in my study. the most common comorbidity associated with wound site infection is diabetes mellitus. 6 out of total 28 cases with wound infection [21%] 13 out of total 28 cases with wound infection showed no comorbidities. Others include HIV, Hypertension, Tuberculosis which include 9 out of 28 cases.

Menegaux *et al*.[12] Showed that median hospital stay was significantly longer in conventional closure group (36 days) than in early closure group (22 days). In the Nelson et al study, mean hospital stay for early reversal group is 8.4 days as compared to 9.2 days for the late reversal group.

The present study also follows this trend with lower mean hospital stay duration [6.7 days] as compared to 9.02 days of the late reversal group. So, it shows early reversal has comparably low duration of hospital stay. But the p value of our findings suggest that the comparison might not be significant.

From the above data we can see that previous study show higher minor complications in early group rather than late group. In the study by li-ozuner et al minor complications has higher incidence in the late group. Our study also shows similar trend with 35 % cases with minor complication in early group compared to 52% of cases in late group. Minor complications include wound infection, paralytic ileus etc which can be managed conservatively.

CONCLUSION

We conclude that, early closure of stoma [5-7 weeks] had no adverse effects on functional result. Early closure of stoma presented with lower percentage of major and minor complications among the patients. Length of hospital stay is lower in early closure group according to our study thus decreasing the social and economic burden on the patient. But the current data available could not prove any significant difference between the two groups based on the above aspect except for wound infection which is significantly higher in late group. No sufficient data is still available to draw firm conclusions on the matter.

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