

## Outcome of Restorative Surgery of Fecal Diversion, a Prospective Observational Study of 50 Cases in a Teaching Hospital

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### ABSTRACT

**Background:** An intestinal stoma is a planned opening made in the intestine to divert feces and flatus to the abdominal wall where they can be collected in external appliances. Either colostomy or ileostomy, most of the time acts as the best lifesaving surgical procedure for certain emergencies as well as routine small intestinal and colorectal surgery.

**Objective:** To see the outcome of intestinal stoma closure surgery and the factors that influence the outcome of surgery.

**Study Design:** This is a descriptive type of-cross sectional study. Department of Surgery, Bangabandhu Sheikh Mujib Medical University Hospital (BSMMUH), Dhaka, Bangladesh, which were done over a period of twelve months from April, 2012 to March, 2013.

**Results:** 50 patients with intestinal stoma were admitted in different surgical wards of BSMMUH, Dhaka for intestinal stoma closure surgery. Out of 50 patients 30 patients presented with ileostomy & 20 patients presented with colostomy. After restoration of bowel continuity, in case of ileostomy closure, out of 30 patients 23(77%) patients were recovered uneventfully & 7(23%) patients recovered with some complications. Out of complicated cases, 2(7%) patients developed febrile illness, 2(7%) patients' intestinal obstruction, 1(3.33%) patient developed anastomotic leakage, 1(3.33%) urinary retention & 1(3.33%) patient post-operative ileus. In case of colostomy closure, out of 20 patients 14(70%) patients were recovered uneventfully & 6(30%) recovered with some events; 3(15%) patients developed wound infection, 1(5%) patient post-operative ileus, 1(5%) patient diarrhea & 1(5%) patient febrile illness. Over all Out of 50 patients, post-operative recovery of 37 (74%) patients were uneventful & 13(26%) patients were recovered with complications. 3(6%) patients developed febrile illness, 3(6%) patients wound infection, 2 (4%) patients' adhesive obstruction, 2(4%) patients post-operative ileus, 1(2%) patient developed anastomotic leakage, 1(2%) patient urinary retention & 1(2%) patient developed diarrhoea.

**Conclusion:** Complications of Intestinal stoma reversal surgery is associated with nutritional status of the patients, anaemia, electrolyte imbalance, acquired complications in stoma site, duration of stoma, nature of operation and last of all surgical skill. So Intestinal stoma closure surgery should be performed after adequate nutritional build up, correction of anaemia, correction of electrolyte imbalance, stoma with adequate duration and by a surgeon who is technically skilled and experienced to minimize the incidence of post-operative complication.

**KEYWORDS:** Outcome, Restorative surgery, fecal diversion

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## INTRODUCTION

A stoma is an opening on the body where a connection to an internal hollow organ is brought out. In case of intestine, an intestinal "stoma" is a surgically designed intestinal conduit or opening constructed to divert intestinal content like flatus and faeces to the exterior, where it can be collected in an external appliance named colostomy or ileostomy bag. Stoma reversal surgery is a procedure performed when a patient no longer needs assistance in eliminating waste from the body. During this procedure, a surgeon reinserts the intestine back into the abdominal cavity after closing the stoma. Depending on the purpose for which the diversion has been necessary, an intestinal stoma may be temporary or permanent. Diversion is done for disease of the small and large bowel or traumatic bowel injury. For ileal typhoid ulcer perforation, tubercular ulcer perforation, diverticular perforation, traumatic perforation, volvulus of midgut, sigmoid volvulus and anterior resections, for operative management of high variety of fistula in ano, anal incontinence temporary ileostomy or colostomy created. Permanent ileostomy or colostomy usually done where further restoration of bowel continuity is not possible like APR with permanent end colostomy [1]. The most common stomas are ileostomy or colostomy. In desperately ill patients with advanced obstruction, a caecostomy may be useful. In late cases of obstruction, the caecum may be so distended and ischaemic that rupture of the caecal wall may be anticipated. Caecostomy is only a short term measure to allow a few days for the condition of the patient to improve. Either ileostomy or colostomy, each can be end, loop or double barreled. Temporary or defunctioning stomas are usually fashioned as loop or double barreled. Rarely temporary stoma may be end as when a large segment of terminal ileum close to the ileocaecal valve is resected or in sigmoid volvulus when Hartman's procedure is done. An ileostomy is created by bringing the terminal small bowel through a trephine incision preferably through the rectus muscle and then creating an everted spout of 2-3 cm in length. A colostomy is flush type. An ileostomy is usually situated in RIF, a temporary colostomy may be transverse and sited in the right upper abdomen and colostomy sited in LIF. Though all types of stomas efficiently defunction the distal bowel or permanently act as a stoma for faecal movement, there are several complications stomas like skin excoriation, prolapse, necrosis, stenosis, parastomal hernia, bleeding, fistulation & colostomy diarrhoea. However, loop ileostomies appear to be associated with a lower incidence of complications related to stoma formation & reversal, though they have a high risk of post operative intestinal obstruction after reversal [2]. Though intestinal is a life saving surgery in certain acute as well as chronic abdominal conditions requiring defunctioning of bowel, they have a detrimental effect on patient's personal, social and psychological life. So, reversal of stoma should be done as early as possible. Reversal of stoma can be carried

out under general anaesthesia by intraperitoneal or extraperitoneal closure. The operation is easier to perform if a period of at least 12 weeks is allowed to elapse between stoma formation & reversal so that there is time for oedema & inflammatory adhesions to settle down [3]. Before bowel closure pre-operative bowel preparation and any distal bowel obstruction or continuing problem at the site of previous surgery should be excluded [4]. Complications that can focus after intestinal stoma closure are anastomotic leakage, adhesive obstruction, fistula, iatrogenic injury, wound infection, post operative ileus and stricture formation on later period. There are several factors that influence outcome of stoma closure surgery like co-morbidity, type and location of the stoma, time interval between stoma formation and closure and surgical skill. The aim of this study is to observe the outcome of intestinal stoma closure surgery and the factors that influence the outcome of surgery.

## MATERIALS & METHODOLOGY

The present study was a cross-sectional study and prospective observational study which was conducted in the Department of Surgery Bangabandhu Sheikh Mujib Medical University Hospital, Dhaka and carried out between the period of April to 2012 and March 2013. The duration of the study was 12 months. A total of 50 (fifty) patients with temporary intestinal stoma were admitted in different surgical wards of BSMMUH for stoma closure surgery. Sampling technique used in this study was purposive sampling.

- **Inclusion criteria:**

Patients with temporary intestinal stoma who were admitted in different surgical wards of BSMMUH for stoma closure surgery and patients of any ages and sex with restoration are included in this study.

- **Exclusion criteria:**

Patients who were admitted with permanent stoma.

The study protocol was approved by Ethics Committee of the Institution. Data will be collected using a structured questionnaire form containing all the variables of interest. The questionnaire will be finalized following pre-testing. All data were checked and edited after collection. Then the data were analyzed with the help of SPSS win 15 software programmed. An analysis plan was developed keeping in view with the objectives of the study. Continuous parameters were expressed as mean $\pm$ SD and categorical parameters as frequency and percentage.

## RESULT

A total of 50 cases of patient with intestinal stoma were studied. The age of patients ranges from 1 to 75 years with average of 38.0 years. Maximum incidence was in the > 50 years age group. Out of 50 cases 32 (64%) were male and rest of 18 (36%) were female. Male to female ratio was 1.8:1. Majority of patients (70%) of this series were from rural areas

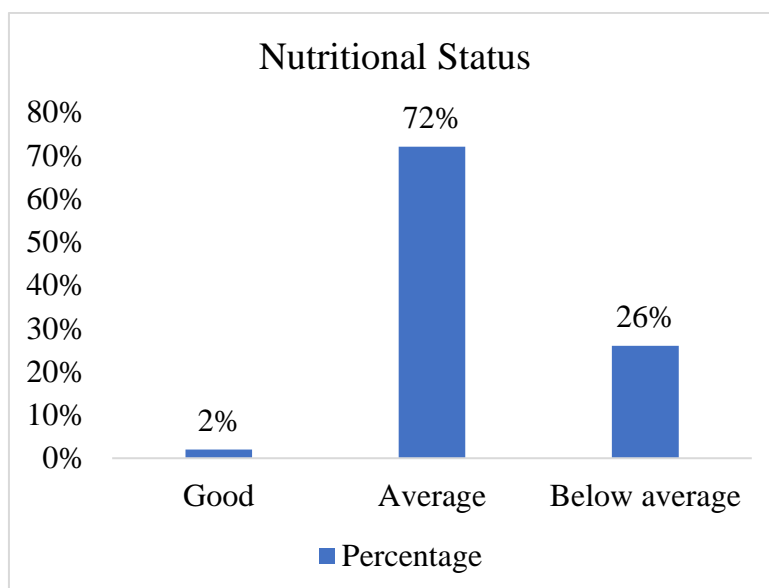
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(Table 1). Among all, 2% patient presented with good nutritional status, 72% patients with average and 26% patients with below average nutritional status (Figure 1). Duration of temporary intestinal stoma ranges from 47 to 182 days with average duration of 96.13 days. Maximum number of stoma were >90 days. 28 (56%) patients presented stoma in right iliac fossa and 11(22%) patients with stoma in left iliac fossa and 11 patients (22%) with other than ileac fossas (Table 2). Majority of the patients (60%) with temporary intestinal stoma were in ileostomy group (Figure 2). Table 3 shows that out of 50 patients with temporary intestinal stoma 29 (58%) patients presented with loop ileostomy, 1(2%) patients with double barrel ileostomy, 13(26%) patients presented with loop colostomy and 7 (14%) patients with end colostomy. In case of ileostomy 12 (40%) patients presented with skin excoriation, 2 (7%) patients with prolapsed intestine, 1 (3%) patients with prolapse and gangrene,

retraction 1(3%) and 14 (47%) patients with no complications. In case of colostomy 2(10%) patient presented with skin excoriation, 1(5%) patient with prolapsed, 1(5%) patient with retraction & 16(80%) patients with no complications (Table 4). Most of patients (92%) operated as elective case except those who presented with complications like prolapse & gangrene and retraction. Reversal procedure of 92% patients done by mid level surgeons (Table 5). In term of ileostomy, 77% patients recovered uneventfully, 7% developed febrile illness and intestinal obstruction, 3.33% developed anastomotic leakage, urinary tract infections and post-operative ileus. Regarding colostomy, 70% recovered uneventfully, 15% developed wound infection, 5% patient post-operative ileus, diarrhea and febrile illness. Over all Out of 50 patients, post-operative recovery of 37 (74%) patients were uneventful & 13(26%) patients were recovered with complications (Table 6).

**Table 1: Distribution of patients according to the demographic characteristics (n=50)**

Variables	n	%
Age Group (Year)		
0-10	13	26
Nov-20	5	10
21-30	5	10
31-40	8	16
41-50	5	10
>50	14	28
Sex		
Male	32	64
Female	18	36
Residence		
Rural	35	70
Urban	15	30

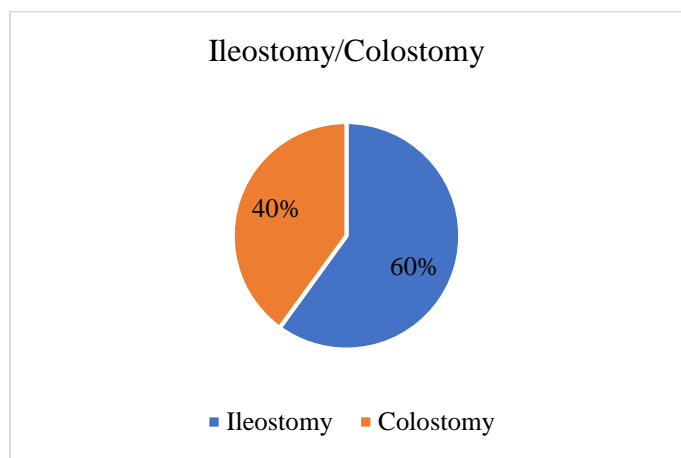


**Figure 1: Nutritional status of patients with intestinal stoma (n=50)**

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**Table 2: Features of temporary intestinal stoma**

Variables	n	%
Duration of Stoma (days)		
>45	0	0
45-60	2	4
61-75	1	2
76-90	6	12
>90	41	82
Site of stoma		
Right ileac fossa	28	56
Left ileac fossa	11	22
Others area	11	22



**Figure 2: Number of patients with ileostomy/ Colostomy (n=50)**

**Table 3: Types of intestinal stomas in patients with ileostomy and colostomy (n=50)**

Type of intestinal stoma	Number of patients	Percentage
Loop ileostomy	29	58
Double barrel ileostomy	1	2
Loop colostomy	13	26
End colostomy	7	14

**Table 4: Complications in stoma site in patients with intestinal stoma**

Complication	Ileostomy		Colostomy	
	n=30	%	n=20	%
Skin excoriation	12	40	2	10
Prolapse	2	7	1	5
Prolapse and gangrene	1	3	0	0
Retraction	1	3	1	5
No complication	14	47	16	80

**Table 5: Operational features**

Variables	n	%
Nature of operation		
Elective operation	46	92

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Emergency operation	4	4
Level of Surgeon		
Higher level	4	8
Mid level	46	92

**Table 6: Post operative outcomes of intestinal stoma reversal surgery**

Post operative events	Ileostomy n(%)	Colostomy n(%)	Total n(%)
Uneventful	23 (77%)	14 (70%)	37 (74%)
Febrile illness	2 (7%)	1 (5%)	3 (6%)
Anastomotic leakage	1 (3.33%)	0	1 (2%)
Adhesive obstruction	2 (7%)	0	2 (4%)
Wound infection	0	3 (15%)	3 (6%)
Post operative ileus	1 (3.33%)	1 (5%)	2 (4%)
Urinary retention	1 (3.33%)	0	1 (2%)
Diarrhea	0	1 (5%)	1 (2%)

### DISCUSSION

An intestinal stoma is an artificial opening made in small or large intestine to divert intestinal content to the exterior, where it can be collected in an external appliance. It may be temporary or permanent depending on their role. Intestinal stoma is done for diseases of small and large intestines like typhoid ulcer perforation, tubercular ulcer perforation, intestinal obstruction due to bands, small gut volvulus, sigmoid volvulus where resection of gut is unavoidable, to facilitate the operative treatment of a high fistula-in-ano and incontinence or traumatic bowel injury where primary anastomosis of intestine is vulnerable. Most common stomas are ileostomy and colostomy either ends, loop or double barrel. All types of stomas efficiently defunction the distal bowel. Reversal of a stoma usually carried out under general anaesthesia and rarely under spinal anaesthesia by intra or extraperitoneal closure. Before bowel closure preoperative bowel preparation should be ensured and any distal bowel obstruction should be excluded by radiological examination (Distal loopogram, x-ray Barium enema). In spite of these the closure of intestinal stoma is associated with significant morbidity and mortality. Complications that can occur after stoma closure surgery are anastomotic leakage, adhesive obstruction, stricture formation, enterocutaneous fistula, iatrogenic bowel injury, wound infection and postoperative ileus. There are several factors that influence the outcome of stoma closure surgery like co- morbidity or general physical condition of the patient, type and location of the stoma, time interval between stoma formation and closure, surgical skill. So to find out the postoperative events of stoma closure surgery in a tertiary level hospital in Bangladesh, a descriptive study on 50 patients with intestinal stoma carried out at BSMMU Hospital, Dhaka. Fifty patients presenting with intestinal stoma admitted consecutively into surgery units evaluated through proper history taking, thorough clinical examination. Related investigations and finally by

postoperative findings after stoma closure surgery. The Objective of this study is to find out the outcome of stoma closure surgery, to find out the factors that influence the outcome of stoma closure surgery and to assess the present status of stoma closure surgery. In BSMMUH, the patients admitted for closure of stoma were previously operated for colorectal carcinoma and most of the patients were more than fifty years of age. Another significant number of patients in this study came from paediatric wards who were presented with stoma due to anorectal malformation. So, the age distribution of the patients in this series is slightly differ from the observation made by other authors [5,6]. The age of this series ranges from 1-75 years, with an average of 32.83 years. The male to female ratio of our study was 1.8:1 which is almost similar to the observations made by other researcher [7,8]. According to our study, 1 (2%) patient presented with good nutritional status, 36 (72%) patients with average and 13 (26%) patients with below average nutritional status. In this study BMI of the patients considered as a parameter for nutritional status. So majority of patients with intestinal stoma present with average nutritional status. Average and below average nutritional status is due to lack of adequate food and maintenance of nutrition. Our study showed that duration of temporary intestinal stoma ranges from 47 to 182 days with average duration of 96.13 days. Maximum number of stoma duration were >90 days. The mean interval for reversal of intestinal stomas were 90 days, a figure which is similar to studies by Senapati et and Toole 'O et al [9, 10]. 28 (56%) patients presented with ileostomy situated in right iliac fossa and 11 (22%) patients with colostomy situated in left iliac fossa and 11 (22%) in other areas which is similar to observations made by other authors [11]. The most common type of temporary intestinal stoma was loop ileostomy, followed by loop colostomy, end colostomy, and double barrel ileostomy. That is most of the de-functioning intestinal stomas are ileostomy, unless large gut is involved and

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primary anastomosis between ends of large gut is possible. Among all ileostomy cases, 12 (40%) patients presented with skin excoriation, 2 (7%) patients with prolapsed intestine, 1 (3%) patients with prolapse and gangrene, retraction 1(3%) and 14(47%) patients with no complications. In case of colostomy 2(10%) patient presented with skin excoriation, 1(5%) patient with retraction, 1(5%) patients with Prolapsed & 16(80%) patients with no complications. Robertson et al reported intestinal stoma related complications rate between 10 and 70%, complications are amongst in ileostomy patients [12]. Duchesne CJ et al reported 25% ileostomy complications which included prolapsed in 22% cases and skin excoriation in 17% cases [13]. Park JJ also reported skin excoriation in 12% and prolapse in 2% cases as common complications [14]. That is in this study stoma related complications are similar to other studies of different authors. Most of the patients underwent elective operation in our study. Patients who presented with acute emergency & complications like intestinal prolapse & gangrene underwent emergency operation. 46 (92%) operations were done by mid level surgeons. In this study in post operative period 13 (26%) patients developed complications and 37 (74%) patients recovered uneventfully. Senapati et al in a series of 310 patients and Macklin et al in a series of 55 patients reported a complication rate of 22.4% and 10% respectively [9,10]. Herwig Pokorny et al analyzed 533 patients with stoma closure between 1993 and 2001 [15]. In their study the overall stoma closure-related surgical complications rate was 20% (107 patients). A Bekele et al analyzed 87 patients out of which 17 (19.5%) patients developed complications. An overall complication rate of 17% following stoma closure was cited in several studies, with rates from 0% up to 42% [16-19]. In this study complication rate is similar to other studies of different authors. Anastomotic leakage occurred in 1(2%) patients who underwent intestinal stoma reversal surgery in this study. Herwig pokorny et al reported out of 533 patients 29 (5%) patients develop anastomotic leakage [15]. Syed A A et al reported 1-2% anastomotic leakage [20]. The patient who developed anastomotic leakage in this study were operated by mid level surgeons. The operations were done as emergency operation for prolapse & gangrene. In this case patients were anaemic, nutritional status was below average & patient was in carcinoma rectum. Anastomotic leakage may be due decreased immunity, completed six cycle chemotherapy or may be due to anaemia and poor nutritional status of the patients or may be due to surgical skill done by mid level surgeons. In the current study 2 (4%) patients developed adhesive obstruction. Syed A A et al found 2.4% patients developed adhesive obstruction in his study who underwent intestinal stoma reversal surgery [20]. A Bekele et al reported 1.2% patients presented with adhesive obstruction in his study. In this study the complication adhesive obstruction was a bit high in comparison to other studies. Out of two patients who developed adhesive obstruction one

patient was taking anti-TB medication for intestinal tuberculosis for 3 months. Other patients with intestinal tuberculosis, who underwent intestinal stoma reversal after completion of anti-TB medication recovered uneventfully after stoma reversal surgery. So ongoing anti-TB medication in intestinal tuberculosis may provoke adhesive obstruction, in stoma reversal surgery. Another patient who developed the same complication, his previous diagnosis was double barrel ileostomy in situ for small gut volvulus due to bands & adhesion. She had previous history of appendectomy. So bands & adhesion due to post operative procedure may be another contributory factor in case of post intestinal stoma reversal adhesive obstruction. We observed that 2 (4%) patients developed post-operative ileus after intestinal stoma reversal surgery. In case of ileostomy 1(3%) patient & in colostomy 1(5%) patient developed the complication. Herwig Pokorny et al found in their study out of 533 patients 21 (4%) patients suffered from post operative ileus following intestinal stoma reversal surgery [15]. The figure is similar to current study. Out of two patients with post operative ileus, one presented with huge intestinal prolapse, reduction of which failed after several attempts. Then laparotomy was done. After hot mopping, prolapsed part reduced and impending gangrene revived and then anastomosis was done. The patient was old, nutritional status was average and there was no electrolyte imbalance. So post operative ileus may be due to over handling of gut. Another patient developed ileus after ileostomy closure with double barrel ileostomy. Her primary diagnosis was acute intestinal obstruction due to a band from the umbilicus to DJ flexure, operation was done outside the BSMMU. The patient was paediatric (age 10 years), poor, anaemic, nutritional status was below average and developed electrolyte imbalance in post operative period. So general physical condition and electrolyte imbalance may be the factors for developing post operative ileus in this patient. In this study out of 50 patients 3 (6%) patients presented with wound infection after intestinal stoma reversal surgery. Syed A A et al reported out of 79 patients, 8 (9.8%) patients developed wound infection after intestinal stoma closure surgery [20]. The rate of wound infection of current study is nearly similar to the rate of other studies of different authors in case of intestinal stoma reversal surgery. Two patients who developed wound infection post operatively, intestinal stoma was associated with surrounding skin excoriation. In this study another ten patients with intestinal stoma & skin excoriation did not develop wound infection after stoma reversal surgery. So skin excoriation may be a cause of wound infection. Two patients out of three were end colostomy (Hartmann's procedure) due to carcinoma colon, with below average nutritional status & anaemia. In case of ileostomy 1(3%) patients & in case of colostomy 2(40%) patients developed wound infection. Wound infection rate is high in colostomy than ileostomy closure surgery, which may be due to contamination from large gut content. So general

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physical condition, complication on stoma site & content of gut may be the factors for wound infection in this study who underwent intestinal stoma reversal surgery.

### LIMITATIONS OF THE STUDY

Every hospital-based study has some limitations and the present study undertaken is no exception to this fact. The limitations of the present study are mentioned. Therefore, the results of the present study may not be representative of the whole of the country or the world at large. The number of patients included in the present study was less in comparison to other studies. Because the trial was short, it was difficult to remark on complications and mortality.

### CONCLUSION

Most of the patients recovered uneventfully after intestinal stoma reversal surgery. Complication rate was a bit higher after colostomy closure than ileostomy. Outcome of stoma reversal surgery influenced by nutritional status of the patients, anaemia, electrolyte imbalance, complications in stoma site, duration of stoma and surgical skill. Intestinal stoma closure surgery should be performed after adequate nutritional build up, correction of anaemia, correction of electrolyte imbalance, stoma with adequate duration and by a surgeon who is technically skilled and experienced to minimize the incidence of post-operative complication.

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### CONFLICT OF INTEREST:

None declared.

### ETHICAL APPROVAL:

The study was approved by the Institutional Ethics Committee.

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