

# Complications of Protective Ileostomy in Emergency Surgery- A Study of 50 Cases

HR ROY<sup>a</sup>, MA BASUNIA<sup>b</sup>, MA QUAYUM<sup>c</sup>

## Summary:

*The temporary proximal loop or end ileostomy is considered suitable to protect a distal anastomosis following surgery for gangrene or perforation of terminal ileum with faecal peritonitis and colorectal surgery. This technique is, however, associated with failure, complications and even mortality. The aim of this study was to quantify retrospectively the morbidity associated with an ileostomy and its subsequent closure. Fifty patients with a temporary ileostomy, created between July 2007 and December 2009 were retrospectively analyzed from a review of patient records. All operations of ileostomy closure were done after a median period of 106 days (interquartile range: 69–174 days). Stoma related morbidity occurred in 26(52%) patients. After ileostomy closure, 21 major*

*complications were seen in 10(20%) patients and 28 minor complications occurred in 17(34%) patients. Sixteen (32%) patients had neither stoma-related morbidity or peri- or postoperative complications after stoma closure. Protective proximal ileostomy was found to be associated with a high morbidity. This raises the question of the mode of identifying the specific patients with an ileal perforation/gangrene or low anastomosis who should be provided an ileostomy for protection, set against the potential complications of the formation and closure of the ileostomy.*

*Indexing words- Protective ileostomy, loop ileostomy, faecal diversion, low anterior resection, ileal perforation, ileal or ileocaecal gangrene.*

*(J Bangladesh Coll Phys Surg 2011; 29: 196-200)*

## Introduction:

A temporary stoma is often created to protect a low colorectal, colo- or ileo-anal anastomosis<sup>1</sup>. It is also done in ileal perforation with advanced (faecal) peritonitis and ileal/ileocaecal gangrene when the site is closure to ileocaecal valve. A loop ileostomy is considered the preferred method for faecal diversion<sup>2</sup> and its main purpose is the attenuation or even prevention of anastomotic leakage. Though end ileostomy is also considered in some cases of late maltreated patients of perforation or gangrene in the

terminal ileum. Gastrointestinal continuity is usually restored after a period of 6 weeks to 3 months. However, during this restoration period, stoma-related morbidity occurred in up to 30% of patients, resulting in increasing cost and difficulty for the patient<sup>3-5</sup>. A loop/end ileostomy has an adverse effect on the quality of life, which is further aggravated if stoma-related complications occurred<sup>3,6</sup>. Early closure of loop ileostomies is feasible and seems to be safe for majority of the patients<sup>7</sup> while delayed closure may further increase the risk for morbidity<sup>8</sup>. The standard operative technique of ileostomy closure includes mobilization of the stoma and anastomosis of the two limbs most commonly by a hand-sewn technique after resection of the ileostomy<sup>9</sup>. Following closure, complications rates of up to 20% have been reported<sup>10</sup>. The aim of this study was to evaluate the morbidity associated with loop/end ileostomy creation and closure retrospectively in Rangpur Medical College Hospital (RpmCH), Rangpur.

- Dr. Hriday Ranjan Roy, Junior Consultant (Surgery), Rangpur Medical College Hospital
- Dr. Moksed Ali Basunia, Associate Professor of Surgery, Rangpur Medical College
- Dr. M.A. Quayum, Associate Professor of Surgery, Rangpur Medical College,

**Address of Correspondence:** Dr. Hriday Ranjan Roy (Main Author), Consultant, Surgery, House no-18, Road no-4, Shaymoli Lane, Dhap, Rangpur, Mobile: 0088-01712-841244, Email= hriday.roy@gmail.com

**Received:** 26 May 2010

**Accepted:** 20 September 2011

**Materials and Methods:**

Between July 2007 and December 2009, a consecutive series of patients undergoing creation and subsequent closure of a loop/end ileostomy in the surgical department of the Rangpur Medical College Hospital (RpmCH) were included in this study. Patients' case records were assessed retrospectively for demographics, primary diagnosis, operative indication for loop/end ileostomy, its duration, stoma-related morbidity, length of hospital stay during ileostomy closure, postoperative morbidity and mortality during a 60 days follow up period. The Hartman's procedures for sigmoid volvulus with gangrene or death following primary surgery were excluded from the study. As the RpmCH is a teaching hospital, procedures were performed by surgical residents/consultants under direct supervision of an associate professor.

*Statistical analysis*

Statistical analysis was performed using the SPSS software package. Medians and interquartile ranges were depicted when appropriate. The chi-square test, students' t-test or Fisher's exact test were applied when appropriate for group comparisons.

**Results:**

Fifty patients were included in this study. The median age at the time of ileostomy closure was 46 years (interquartile range: 29–66 years). Twenty seven male patients and 23 female patients were admitted into this study. Most patients had an ileal perforation near ileocaecal valve with severe faecal peritonitis [(19) 38%], or gangrene of the terminal ileum or ileocaecal region [10 (20%)], or volvulus of the sigmoid colon with gangrene in 7(14%) patients and rectal carcinoma in the middle or upper third in 8(16%) patients. Others are colon trauma 2 (4%) and carcinoma colon with obstruction 4 (8%) (Table-1).

Morbidity following primary surgery- Forty eight stoma-related complications (major and minor) was seen in 26 (52%) patients during the time period in which the ileostomy was present (Table 2). Complications are dermatitis in 21 (42%) (Fig-1), bleeding from stoma in 7 (14%), parastomal infection in 4 (8%), high stoma output in 3 (6%), retraction in 6 (12%), parastomal hernia in 3 (6%) and stomal stricture 2 (4%) patients. Following primary surgery, four (8%) of 26 patients developed an anastomotic complication despite the

**Table-I**

<i>Patient characteristics, indication for surgery and procedure. Values are numbers and percentage within parenthesis.</i>	
Variable	Diverting ileostomy (n=50) (%)
<b>Gender</b>	
Male	27 (54%)
Female	23 (46%)
<b>Age—median (interquartile range)</b>	
years	46 (29-59)
<b>Indications for surgery</b>	
Terminal ileal perforation	19 (38%)
Gangrene	10 (20%)
Sigmoid volvulus with gangrene	7 (14%)
Rectal carcinoma	8 (16%)
Others	6 (12%)
<b>Procedures Performed</b>	
Wedge Resection and anastomosis	19 (38%)
Resection and end ileostomy	10 (20%)
Low anterior resection	8 (16%)
Right hemicolectomy	3 (6%)
Transverse colectomy	1 (2%)

**Table-II**

<i>Ileostomy-related complications before closure (n=26).</i>	
Complications	Number (%)
Dermatitis	21 (42%)
Bleeding from stoma	7 (14%)
Parastomal infection	4 (8%)
High stoma output	3 (6%)
Enterocutaneous fistula	2 (4%)
Retraction	6 (12%)
Parastomal hernia	3 (6%)
Stomal stricture	2 (4%)
<b>Total</b>	<b>48</b>

Values are number percentage within parenthesis. Same patient may had more than one complications.



This patient had severe dermatitis.

**Fig-1:** After closure of ileostomy and repair of parastomal hernia.

protective ileostomy. In one patient, a definitive colostomy was carried out for faecal peritonitis. In the other three patients (two with purulent peritonitis and one with a presacral abscess), a definitive colostomy was avoided, in one case by a pull-through procedure and in the other two by drainage of the local peritonitis and irrigation of the cavity.

Late major complications after primary surgery (within 2 months after primary surgery) were as follows: anastomotic leakage in 5 (10%), enterocutaneous fistula in 6 (12%), bowel obstruction in 2 (4%) and wound dehiscence in 8 (16%) (Fig-2). Minor complications developed at that interval were: wound infection in 10 (20%) (Fig-3), pneumonia in 8 (16%), infection elsewhere in 4 (8%) and others in 6 (12%) patients (Table- 4).

#### *Morbidity of closure*

The median interval between primary surgery and ileostomy closure was 106 days (interquartile range: 69–174 days). Most closures [29 (58%)] were performed using a circumstomal incision but in 21 (42%) a midline incision was necessary because of the inability to



**Fig-2:** Wound dehiscence after ileostomy



**Fig-3:** Dermatitis and wound infection after ileostomy closure.

mobilize the ileostomy limbs for a safe anastomosis or to correct an additional lesion including parastomal hernia (three), enterocutaneous fistula (two), and small bowel stenosis (two). The median operation time was 65 min (interquartile range: 55–80 min) and the median

hospital stay was 8 days (interquartile range: 5–10 days). Patients who developed a complication had a significantly longer hospital stay than those without complications (10 vs 7 days,  $P = 0.001$ ) (Table 3). Overall, 49 postoperative complications (same patient may have had more than one complications) occurred in 27 patients (54%) during a 2-month period. These included 21 major complications in 10 (20%) patients and 28 minor complications in 17 (34%) patients. Other complications are shown in Table 4. No statistical difference in morbidity was found between patients having a long or short interval to ileostomy closure (cut-off value 100 days). There was no statistical difference among major complications in patients having a midline incision or circumstomal incision (5% vs 13%,  $P = 0.459$ ) but the incidence of minor complications were significantly greater after a midline incision.

**Table-III**

<i>Ileostomy closure, peri-operative data (n=50).</i>	
Time to closure (days), median (interquartile range)	106(69-80)
Operating time (minutes), median (interquartile range)	65 (55–80)
Blood loss (ml), median (interquartile range)	150 (50–250)
Hospital stay (days), median (interquartile range)	8 (5–10)

**Table-IV**

<i>Complications within 2 months of ileostomy closure (n=27).</i>	
Complications	Total (%)
<b>Major</b>	
Anastomotic leakage	5 (10%)
Enterocutaneous fistula	6 (12%)
Bowel obstruction	2 (4%)
Wound dehiscence	8 (16%)
<b>Minor</b>	
Wound infection	10 (20%)
Pneumonia	8 (16%)
Infection elsewhere	4 (8%)
Others	6 (12%)
<b>Total</b>	<b>49</b>

Values are number percentage within parenthesis. Same patient may have had more than one complications.

**Discussion:**

Creation and subsequent closure of a loop ileostomy is a commonly performed procedure with a high risk of morbidity and even mortality<sup>3–8,10</sup>. In this study, creation of ileostomy resulted in morbidity in 52% of patients and closure led to complications in 54% patients. Major and minor complications in 20% and 34% of patients. Remarkably, only 32% of patients in this series avoided any complication. The results of this study show a complication rate following ileostomy closure higher than that reported in the literature<sup>3–8,10</sup>. This may in part be because of the fact that RpmCH is a tertiary referral centre treating many difficult cases including patients with multiple previous abdominal operations. This could also explain the relatively high percentage of laparotomy needed for ileostomy closure where the small bowel limbs could not be mobilized adequately for a safe anastomosis because of adhesions. Laparotomy was found to be related to a higher incidence of minor complications in this series. The reported incidence of leakage of a distal colorectal anastomosis ranges between 1% and 24%<sup>11, 12</sup>. The main purpose of a temporary loop ileostomy is to prevent leakage or to mitigate its effects once established<sup>13–15</sup>. This beneficial effect should be set against the morbidity associated with creation and closure of a loop ileostomy, which is reported to be approximately 30%<sup>10,16</sup>. This raises the question as to when a low anastomosis should be protected by an ileostomy. The randomized trial carried out by Matthiessen et al.<sup>17</sup> of no faecal diversion vs faecal diversion following low anterior resection reported significantly less anastomotic leakage in the group with faecal diversion. However, the trial included a very heterogeneous group of anastomotic leakage and did not attempt to determine which specific patients would benefit from faecal diversion. Furthermore, no data regarding stoma-related morbidity were given. Thus, guidelines for when an ileostomy should be used are lacking. Remzi et al.<sup>18</sup> compared proctocolectomy with or without protective faecal diversion in a study of over 2000 patients and found no differences in septic complications, quality of life or functional results. The high morbidity of the ileostomy and its closure make a question whether frequent use of ileostomy is at all justified or not. Ileostomy is definitely protective and beneficial only in highly selective patients. Otherwise, it should be avoided as far as possible to avoid the high rate of complications of ileostomy and its closure. It also may influence the timing of adjuvant chemotherapy in carcinoma colon or rectum. Little is known of the effect of chemotherapy on complications of loop



ileostomy closure. Thalheimer et al.<sup>21</sup> found that the rate of minor complications was twice as high in patients receiving postoperative adjuvant therapy compared with those not having any such therapy. The ideal timing of loop/end ileostomy closure has been estimated to be between 8 and 12 weeks following the primary surgery<sup>10, 22</sup>. In 2003, Bakx et al.<sup>7</sup> concluded that ileostomy closure is feasible without increased morbidity within the initial hospital admission for primary surgery. In the present series, the median interval to ileostomy closure was in line with the published literature but despite this there was a high morbidity following closure. The question of which specific patients have a defunctioning ileostomy following surgery of ileal perforation or gangrene or colorectal carcinoma remains unanswered.

### Conclusion:

Protective loop ileostomy was found to be associated with a high morbidity. This raises the question of the mode of identifying the specific patients who should be provided an ileostomy for protection, set against the potential complications of the formation and closure of the ileostomy.

### Author Contributions

1. Dr. Hriday Ranjan Roy: Study conception and design, data collection, operative surgeon and preparation of manuscript.
2. Dr. M. A. Basunia: Operating surgeon and revision & improvement of manuscript.
3. Dr. M.A. Quayum: Operating surgeon and revision & improvement of manuscript.

### References:

1. Rolandelli RH, Roslyn JJ (2001) Colon and rectum. In: Sabiston Textbook of Surgery, editor Townsend CM, pp. 929–73. WB Saunders, Philadelphia, PA.
2. Fash S, Hulten L. Loop ileostomy: a superior diverting stoma in colorectal surgery. *World J Surg* 1984; 8: 401–7.
3. Phang PT, Hain JM, Perez-Ramirez JJ, Madoff RD, Gemlo BT. Techniques and complications of ileostomy takedown. *Am J Surg* 1999; 177: 463–6.
4. Adang EM, Engel GL, Rutten FF, Geerdes BP, Baeten CG. Cost-effectiveness of dynamic graciloplasty in patients with fecal incontinence. *Dis Colon Rectum* 1998; 41: 725–34.
5. Wong KS, Remzi FH, Gorgun E, Arrigain S, Church JM, Preen M, Fazio VW. Loop ileostomy closure after restorative proctocolectomy: outcome in 1,504 patients. *Dis Colon Rectum* 2005; 48: 243–50.
6. Gooszen AW, Geelkerken RH, Hermans J, Lagaay MB, Gooszen HG. Quality of life with a temporary stoma: ileostomy vs. colostomy. *Dis Colon Rectum* 2000; 43: 650–5

7. Bakx R, Busch ORC, Geldere van D, Bemelman WA, Slors JFM, Lanschot JJB. Feasibility of early closure of loop ileostomies. *Dis Colon Rectum* 2003; 46: 1680–4.
8. Khoo RE, Cohen MM, Chapman GM. Loop ileostomy for temporary fecal diversion. *Am J Surg* 1994; 167: 519–22.
9. Kaidar-Person O, Person B, Wexner SD. Complications of construction and closure of temporary loop ileostomy. *J Am Coll Surg* 2005; 201: 759–73.
10. Bakx R, Busch OR, Bemelman WA, Veldink GJ, Slors JF, Van Lanschot JJ. Morbidity of temporary loop ileostomies. *Dig Surg* 2004; 21: 277–81.
11. Bokey EL, Chapuis PH, Fung C, Hughes WJ, Koorey SG, Brewer D, Newland RC. Postoperative morbidity and mortality following resection of the colon and rectum for cancer. *Dis Colon Rectum* 1995; 38: 480–6.
12. Tuson JR, Everett WG. A retrospective study of colostomies, leaks and strictures after colorectal anastomosis. *Int J Colorectal Dis* 1990; 5: 44–8.
13. Gastinger I, Marusch F, Steinert R, Wolff S, Koeckerling F, Lippert H; Working Group Colon D Rectum Carcinoma. Protective defunctioning stoma in low anterior resection for rectal carcinoma. *Br J Surg* 2005; 92: 1137–42.
14. Bax TW, McNevin MS. The Value of diverting loop ileostomy on the high-risk colon and rectal anastomosis. *Am J Surg* 2007; 193: 585–8.
15. Poon RT, Chu KW, Ho JW, Chan CW, Law WL, Wong J. Prospective evaluation of selective defunctioning stoma for low anterior resection with total mesorectal excision. *World J Surg* 1999; 23: 463–7.
16. Shellito PC. Complications of abdominal stoma surgery. *Dis Colon Rectum* 1998; 41: 1562–72.
17. Matthiessen P, Hallböök O, Rutegaard J, Simert G, Sjö Dahl R. Defunctioning stoma reduces symptomatic leakage after low anterior resection of the rectum for cancer: a randomized multicenter trial. *Ann Surg* 2007; 246: 207–14.
18. Remzi FH, Fazio VW, Gorgun E, Ooi BS, Hammel J, Preen M, Church JM, Madbouly K, Lavery IC. The outcome after restorative proctocolectomy with or without defunctioning ileostomy. *Dis Colon Rectum* 2006; 49: 470–7.
19. Ikeuchi H, Nakano H, Uchino M, Nakamura M, Noda M, Yanagi H, Yamamura T. Safety of one-stage restorative proctocolectomy for ulcerative colitis. *Dis Colon Rectum* 2005; 48: 1550–5.
20. Ikeuchi H, Shoji Y, Kusunoki M, Yanagi H, Nod M, Yamamura T. Clinical results after restorative proctocolectomy without ileostomy for ulcerative colitis. *Int J Colorectal Dis* 2004; 19: 234–8.
21. Thalheimer A, Bueter M, Kortuem M, Thiede A, Meyer D. Morbidity of temporary loop ileostomy in patients with colorectal cancer. *Dis Colon Rectum* 2006; 49: 1011–7.
22. Perez RO, Habr-Gama A, Seid VE, Proscurshim I, Sousa AH Jr, Kiss DR, Linhares M, Sapucahy M, Gama-Rodrigues J. Loop ileostomy morbidity: timing of closure matters. *Dis Colon Rectum* 2006; 49: 1539–45.