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Original Research Article

A study of complications of temporary ileostomy in cases of acute abdomen with ileal perforation and obstruction

Chandan Roy Choudhury*, Tshering Doma Bhutia, Bodhisattva Bose

Department of General Surgery, Medical College Hospital, 88 College Street, Kolkata, West Bengal, India

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***Correspondence:**
Dr. Chandan Roy Choudhury,
E-mail: dr_crc3@yahoo.co.in

ABSTRACT

Background: Construction of a gastrointestinal stoma is a frequently performed surgical procedure. Although formation of defunctioning loop ileostomy is usually a straightforward procedure, there is an appreciable complication rate. The purpose of the research was to study the complications, outcome associated with temporary ileostomy and to study the complications related to its closure.
Methods: Institutional based observational study using prospective data collection large ileal perforations covering more than one third of the circumference, or gangrenous change or severe adhesions and old perforations with presence of peritoneal contamination were included in the study. 50 patients were included in the study. Clinical, intra-operative, biochemical parameters with stomal and peristomal complications and tissue histopathology were assessed in the study.
Results: The commonest aetiology for which stoma was performed enteric perforation (44%) whereas perforation was the commonest aetiology for which stoma was performed (64%) apart from gangrene and other aetiologies. The commonest post-operative complication encountered was skin excoriation (64%). Most of the the complications encountered post operatively were statistically significant when correlated with aetiology and duration of presentation.
Conclusions: Although being bothersome, loop ileostomy is still a live saving procedure. Complications of stoma could be managed conservatively with the application of proper user-friendly stoma appliances and it is of paramount importance that ileostomies are properly sited. Before closure of ileostomy it is essential to be careful of operative biopsy report showing non-specific inflammation. Preference of surgeons in the present day to perform ileostomy in emergency setting is increasing.

Keywords: Complications, Ileostomy, Temporary

INTRODUCTION

Construction of a gastrointestinal stoma is a frequently performed surgical procedure. The rationale for a temporary loop ileostomy is to provide defunctioning in cases of potentially dangerous anastomotic complications or perforation peritonitis, with an obvious risk for mortality. Although formation of defunctioning loop ileostomy is usually a straightforward procedure, there is an appreciable complication rate.

Complications related to stoma may occur early or late, intermittently or progressively and may be acute or chronic in nature. It is convenient to prevent complication by means of adequate surgical technique and a better rehabilitation by a multidisciplinary team.

Typhoid and tuberculosis being a frequent cause of an acute ileal perforations, remains a public health problem in our part of world. There are different surgical treatments for typhoid perforation currently in practice. Ileostomy is a life-saving procedure, particularly in those cases where there is fulminant enteritis and peritonitis of long duration.

Despite the major advancement in the field of intestinal surgery, construction of intestinal stoma is still a common and frequently performed procedure. It is mandatory to apply meticulously sound surgical principals. Despite the advances of modern surgery, complication rates for ostomy remain high.[1] The greatest risk of developing complications is within the first five years, but there is a small but continuing risk thereafter.[2] A diagnosis of Crohns disease is associated with higher morbidity after stoma creation.[1-3] Over the long term, reoperations are required in 15 to 20 percent of patients with ileostomies or colostomies.[4-6]

Aims and objectives of this study were to study the complications associated with temporary ileostomy, to study the outcome as a result of temporary ileostomy and to study the complications related to its closure.

METHODS

Present study was carried out in the Department of General Surgery, Medical College and Hospital, Kolkata for a period of two years (January 2016 to December 2017) with a sample size of 50 patients. Study population included patients admitted in surgical emergency with clinical diagnosis of perforation peritonitis and small intestinal obstruction and after their informed risk consent undergoing an exploratory laporotomy thereafter found to be a case of ileal perforations and ileal obstruction requiring construction of temporary ileostomy. Patients fulfilling the following inclusion criteria and who gave their consent was included in the study.

Inclusion criteria

- Large ileal perforations covering more than one third of the circumference,
- Gangrenous change in the segment involved
- Severe adhesions around the perforations and obstruction
- Old perforations with presence of peritoneal contamination.

Exclusion criteria

- All patients unfit for general anesthesia
- Patients of ileal perforations and ileal obstruction not requiring construction of temporary ileostomy
- Post-operative patients who are lost in the follow up before closure of ileostomy
- Patients of ileal perforations and ileal obstruction who required and have undergone temporary ileostomy with co morbid conditions
- Patients didn't give consent to be a part of the study.

Present study was an institutional based observational study using prospective data collection.

Parameters to be studied

- Clinical parameters: age, sex of the patient, presenting symptoms, per abdominal findings, X-ray abdomen erect and supine.
- Intra-operative parameters: level of peritoneal contamination, number, site and size of perforations, nature of the lesion causing ileal obstruction, gangrenous changes and presence of adhesions.
- Biochemical parameters: Serum electrolytes, complete hemogram, sugar, urea, creatinine, liver function tests
- Stomal and peristomal complications.
- Tissue histopathology.

Study tools

- Hematological investigations like complete hemogram, sugar, urea, creatinine, blood group, liver function tests, proteins, serum electrolytes
- Radiological investigations like x ray abdomen erect supine.

Data collection proforma, reference literature, statistical analysis software, patient consent form, plan for analysis of data: Data collected throughout the study were assembled in a grand chart and tabulated with tables and pictorial diagrams. It was analyzed using mean, median, standard deviation, percentage calculation and standard statistical analysis like the Pearson chi square test.

RESULTS

Age distribution

Out of those 50 patients,18 (36%) were in the age group of 16-30 years,15 (30%) in the 31-45 years, 14 (28%) in the 46-60 years and only 3 (6%) patients were in the <15 years age group. The mean age was 12.5±19.05.

Sex

Among the 50 patients, 26 (52%) were male and 24 (48%) were female. The sex ratio was 13:12.

Duration of acute symptoms

9 (18%) patients presented within 24-48 hours of their symptoms, 12 (24%) within 24-48 hours and 29 (58%) patients presented after 72 hours of their symptoms.

Presenting signs and symptoms

Abdominal pain was present in all the patients (100%). Fever and peritonism was present in 47 (94%) of the patients, vomiting in 44 (88%), diarrhoea in 11 (22%), constipation in 26 (52%), abdominal distension in 35 (70%) and 32 (64%) patients were in shock at the time of presentation. 6 (12%) patients had history of trauma associated with them.

X-ray findings

On straight X-ray abdomen 26 (52%) patients had multiple air fluid levels which was due to mechanical obstruction or paralytic ileus after perforation peritonitis. 9 (18%) had ground glass appearance suggestive of some kind of peritoneal contamination, 3 (6%) patients had dilated gut and in rest 12 (24%) patients the findings were non-specific

Intra operative findings

On exploring the abdomen, 35 (70%) patients had peritoneal contamination with either pus, faecal matter or blood in cases of trauma or gangrenous gut. 32 (64%) patients had ileal perforation, 20 (40%) patients had gangrenous changes in the small bowel. 26 (52%) had adhesions in the form of interloop, parietal, postoperative band adhesions, 11 (22%) had inflammatory lump in the RIF and 3 (6%) had non-passable stricture in the ileum (Table 1).

Table 1: Intra-operative findings.

Findings	No. of patients	Percentage
Peritoneal contamination	35	70
Ileal perforation	32	64
Gangrenous gut	20	40
Adhesions	26	52
Lump (inflammatory)	11	22
Stricture (non-passable)	3	6

Table 2: Details of perforation.

Number of perforations (N= 32)	No. of patients	Percentage
1	26	52
2	3	6
3	3	6
Site from Ileo-caecal junction(cm)		
15-25	15	30
25-35	12	24
35-45	14	28
Size (mm)		
0-5	23	46
5-10	3	6
10-15	0	0
15-20	6	12

Site of perforations

Out of these 32 patients, 26 (52%) patients had a single perforation and 3 (6%) patients had 2 perforation and another 3 (6%) patients had 3 perforation. 15 (30%) patients had their perforations within 15-25 cm from the ICJ, 12 (24%) within 25-35 cm and 14 (28%) had their perforation within 35-45 cm from the ICJ. Out of the total perforations, 23 (46%) perforations were <5 mm in size, 3 (6%) were 5-10 mm in size and 6 (12%) were 15-20 mm in size (Table 2).

Type of surgery

In 23(46%) of patients, the perforation was exteriorized as a loop ileostomy. In 6 (12%) of patients, who had multiple perforations, the distal one was repaired primarily in 2 layers with interrupted stitches and the segment of the ileum containing the proximal perforation was exteriorized as a loop ileostomy. In 21 (42%) of patients, the gangrenous bowel segment was resected and the two cut ends were exteriorized as an end ileostomy and a mucus fistula (Table 3).

Table 3: Type of surgery performed.

Type of Surgery	No. of patients	Percentage of pts
Loop Ileostomy	23	46
Proximal loop ileostomy with distal primary repair	6	12
Resection with end ileostomy and mucous fistula	21	42

Ileostomy complications before closure

There was ischemia in only 1 (2%) patient, transient edema of the stoma in 26 (52%), ileus in 38 (76 %), superficial bleeding in 3 (6%), ileostomy diarrhoea occurred in 26 (52%), muco-cutaneous separation and retraction each occurred in 12 (24%), stomal stenosis occurred in none of the patients.

Peristomal and stomal complications before closure

During the hospital stay and in the follow up period, we observed other complications like skin excoriation which was the most common i.e. in 32 (64%), wound infection in 30 (60%), wound gaping in 15 (30%), incisional hernia in 15 (30%), entercocutaneous fistula in 12 (24%), burst abdomen in 8 (16%), dermatitis in 6 (12%) of our patients. There were 2 mortalities (4%) in the present study.

Aetiology

Out of 50 patients, 22 (44%) had enteric perforation, 18 (36%) had tubercular perforation, 8 (16%) had non-specific causes, 1 patient had an iatrogenic perforation

after a LUCS which was operated outside our institute (Table 4).

Table 4: Histopathological report.

Etiology/HPE	No. of patients	%
Enteric perforation	22	44
Tubercular	18	36
Iatrogenic	1	2
Appendicular abscess	1	2
Non-specific inflammation	8	16

Biochemical parameters

17 (34%) patients had leukocytosis, abnormalities in sodium levels was seen in 25 (50%) of patients. 27 (5 4%) had abnormalities in their serum potassium levels. 15 (30%) of patients had their hemoglobin levels in the range of 6-8 g/dl, 17 (34%) had in the range of 8-10 g/dl and18 (36%) patients ha d in the range of 10-12 g/dl.

Stoma closure

42 patients underwent stoma closure till the end of the study. The average time for closure was 95 days (range 42-186), 100 mins was the average time for loop ileostomy closure (range 90-120), 142 mins was average time for end ileostomy closure (range 105-150 mins), 155 ml was the average blood loss estimated (range = 100-250 ml), 13 days was the average hospital stay after the stoma closure (range = 7-90 day).

Stoma closure related complications

Amongst the 42 patients who underwent closure at the end of the present study, anastomotic leak occurred in 9.09% of patients, 9.09% patients developed enterocutaneous fistula, 4.54% suffered bowel obstruction,60% had wound infection and 36% developed wound dehiscence. However, there was no death in the stoma closure group.

Table 5: Correlation of complications with aetiology.

Complications	Enteric Perforation (N=18)	Tubercular Perforation (N=18)	Non-specific (N=12)	P-value
Ischaemia	1	0	0	0.42
Transient oedema	10	6	9	0.07
Ileus	15	9	12	0.005
Retraction	8	3	0	0.013
Superficial bleeding	0	3	0	0.069
Mucocutaneous separation	0	3	0	0.716
Skin excoriation	11	11	8	0.942
Ileostomy diarrhoea	7	9	9	0.149
Dermatitis	3	3	0	0.319
Wound infection	15	12	1	<0.001
Wound gaping	6	7	1	0.174
Burst abdomen	2	2	3	0.498
Enterocutaneous fistula	2	6	3	0.279
Incisional	2	9	3	0.035
Hernia				
Death	0	1	1	0.499

P values ≤0.05 is considered to be significant and values <0.001 considered to be highly significant

Statistical co-rrelation

When the Pearson chi- square test was applied to check the level of significance we discovered that, skin excoriation occurred in 77.14% of patients who had peritoneal contamination (70%) and the p value was 0.003 which is considered to be statistically significant.

Mucocutaneous separation occurred in 75% of patients who presented >48 hours (p value ≤0.001) which was considered to be statistically significant. Paralytic ileus observed in 83.33% of enteric perforation cases with a p value of 0.005 was considered statistically significant. Ileostomy diarrhea in 47.82% of cases with loop ileostomy was statistically significant (p value = 0.041). Dermatitis in 50% of loop ileostomy patients was statistically significant with a p value of 0.004. Wound gaping which occurred in 45.45% of cases with albumin levels <3 g/dl was statistically significant (p value = 0.035) and in 42.85% of cases with peritoneal

contamination with statistically significant p value = 0.002. Burst abdomen seen in 22.85 % cases with peritoneal contamination (p value = 0.043) and in 66.66% patients with loop ileostomy and 19.04% of end ileostomy patients had p values <0.001 which are considered to be significant.27.27% of patients with albumin levels <3 g/dl had burst abdomen (p value = 0.054).

Incisional hernia occurred in 31.03% of patients who presented after 72 hours (p value=0.046) and in 50% cases of tubercular perforation (p value=0.035), and in 42.85% cases of end ileostomy cases (p value ≤ 0.001), all of which are considered to be statistically significant. (Table:5).

DISCUSSION

As per the review of literature, a complication rate of 41% associated with loop ileostomy construction, with 6% of all patients requiring surgical intervention has been reported.[7] Others had a complication rate of 25% related to loop ileostomy construction and all required surgical intervention.[8] Complication rate of 5.7-10.8% have also been reported.[9] There are many factors suggestive to predispose to stoma complications like high body mass index, inflammatory bowel disease, use of steroids, and immunosuppressant drugs, diabetes mellitus, old age ,emergency surgery, surgical technique, and surgeon experience.[10]

A loop ileostomy has an adverse effect on quality of life, which is further enhanced if stoma related complications occur.[11-14] Complication rates of temporary loop ileostomy range between 5-100%.[15] These rates vary due to varying length of follow-up.[16] Age of patient, urgency of surgery, diagnosis at the time of presentation are the factors associated with high level of morbidity and mortality.[17] Complication rates between 20 and 60 percent were also reported, and this wide difference may be related with different time points.[18] Furthermore, stoma related complications improve with time.

Figure 1: A properly fitting stoma bag with stoma adhesives is essential for proper skin care.

Most of the complications in our study group were managed with conservative measures and proper counselling to the patients. Enterostomal therapist were involved in complicated cases who provided patients with specially designed stomal bags with properly adhesives (Figure 1) to take care of complications like retraction and mucocutaneous separation. However, one patient with loop ileostomy required surgical correction for the retraction in which the retracted part was resected and the two ends exteriorized as divided loop ileostomy.

The usual incidence of peristomal skin problem is 10-14% and probable cause may be improper location or construction of stoma and postoperative care or maintenance. It is difficult to maintain a good seal around stoma, previously, it is reported that this can be prevented using appliances consisting of flange or bag designed to fit closely and firmly to the skin around the stoma, with the help of latex mixture, Karaya gum, stoma-adhesive or other pastes.[7] In emergency situation it is important to at least mark the future stoma on the abdominal skin before the incision.

A retrospective study of 1790 patients reported significantly lower incidence of early complications (within 30 days of operation) in patients who were counselled and evaluated by enterostomal therapist and were preoperatively marked for proper stoma site19 Another study reported a six fold decrease in stoma complications when enterstomal therapist were involved in the treatment of stoma patients.[20] However, others showed that the counselling by the enterostomal therapist was not associated with reduction of the complication rates.[17]

In few studies, the link between higher body mass index and retraction, skin excoriation and overflow is found. Two reasons i.e. a thickened fatty mesentery making mobilization more difficult and with a well- developed panniculus in obese patients' traction is exerted on the bowel wall, which may be the main cause for retraction.[21]

Many patients with a loop ileostomy are known to have episodes with excessive fluid loss through the stoma. In some of these patients, the loses over several days can severely derange water and electrolyte balance.[22] During the first few postoperative days, fluid and electrolyte imbalance is the main problem, which needs great care.[7]

This was found in 76% of our patients, needing aggressive fluid and electrolyte management. Stoma stenosis is a rare occurrence with ileostomies and the approximate incidences is 2-10%. The probable causes include poor sighting of stoma, vascular compromise i.e. ischemia and inadequate opening in skin or abdominal wall. There were no cases of stomal stenosis in the present study.

Another complication i.e. a true parastomal hernia which has a peritoneal sac with enlarged fascial defect while the

psuedohernia is the diffuse bulge without enlarged fascial defect, about 90% are true hernias. We didn't encounter this complication in the present study.

Figure 2: A perfect skin is a must before stoma closure.

Most of the peristomal fistula in our patients healed spontaneously with conservative management like wound care, nutritional support and antibiotics. Cases of skin excoriation were managed with application of ointments and paste, and patients were advised to empty the bags when they were 1/3rd filled and closure was done with a healthy skin only (Figure 2). All burst abdomen cases were dressed regularly with moist saline dressings and repaired with tension free suturing technique. All cases of wound gaping were dressed regularly with norm al saline and then secondary suturing was done.

Figure 3: Normal distal loop imaging before closure.

The most common indication for ileostomy in our study was ileal peforation which was detected in 44% of cases. 36% had tuberculosis as the cause, in 24% cases the histopathological report came as non-specific inflammation. Out of these non-specific cases, 8 % cases had widal positivity and history of trauma was present in 12% of cases. Unlike the West, typhoid is still a common cause of ileal perforation in our country, 23 followed by tuberculosis accounting for 16.6%, being common diseases of India.

Amongst the study group, 42 patients underwent stoma closure. Preoperative distal cologram was done in all these patients to evaluate the status of distal gut and to rule out any kind of distal obstruction (Figure 3). The average time interval of closure since the stoma construction was 95 days and the time range varied from 42 days to 186 days. The patients taking anti tubercular drugs were taken up for closure after the full completion of their treatment, which was approximately 180 days.

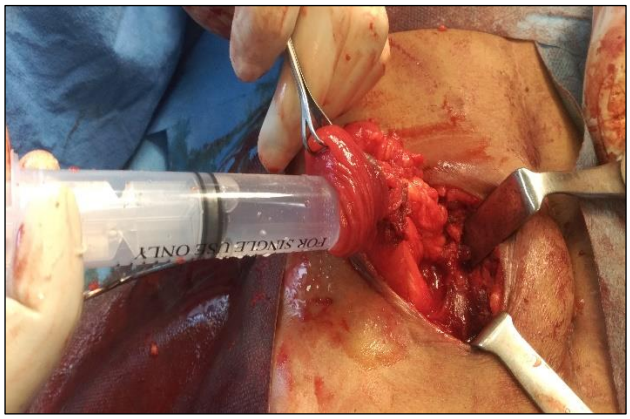

Figure 4: Saline injection test to detect inadvertent perforations during loop mobilization for closure.

After stomal closure, 2 (9.09%) patients each developed an anastomotic leak and an enterocutaneous fistula. As per literature review, the anastomotic leak rate is 0-7%.[24-26] To diagnose inadvertent perforation during dissection to release the loops for closure we designed a saline infusion test for it (Figure 4). These complications were managed conservatively and was not associated with any mortality. However, in one of these patients surgical intervention was undertaken after the failure of conservative management. A midline laporotomy was done to resect the fistulous segment and primary anastomosis with a rectus muscle flap to reinforce the anastomosis was done. Similar procedures have been done by by many other surgeons in the past elsewhere.[27]

Histopathological report of the resected fistulous segment came as a non-specific chronic inflammation and patients underwent a course of anti-inflammatory drugs mesalazine before closure attempt again and it didn't recur again. A biopsy report of non-specific inflammation should alert the surgeon regarding Crohn's disease or tuberculosis and evaluation is necessary in these situations prior to stoma closure. 4.54% patient developed intestinal obstruction, wound infection was the commonest complication (90%) as compared to 41.6%.[28]

1.3% where skin incision left open versus 2.8%, 3% and 14.2% in those who had primary closure of the skin incision.[23,29,26]

It is essential in cases of tuberculosis to look for disease activity before closure of stoma even after completion of anti-tubercular therapy due to emerging drug resistant strain worldwide. Persistent disease activity might give rise to leak in anastomosis following stoma closure.

Reported overall complication rate of ileostomy closure ranges from 10 to 17% and may reach upto 30% when performed for diversion of ileoanal pouches.[25,30] Several factors have been associated with increased risk of postoperative complications developing after stoma closure such as the time interval between primary surgery and closure, the use of bowel preparation, antibiotic prophylaxis and technical strategies like stapled and handsewn techniques.

The interval between primary surgery and closure has been considered a possible risk factor for complication development. Possible explanation for this association includes complete recovery of the patients after the initial procedure usually a major operation, which may take upto 2-3 months.[31] Also longer intervals may avoid the period of hypervascularization of adhesions which progressively become less firm. Finally, longer time interval leads to increased vascularization and decreased edema of stoma border. On the other hand, poor patient acceptance and compliance with ileostomy associated with cost burden of stoma care are arguments favoring early stoma closure as opposed to late closure.[31]

CONCLUSION

- Typhoid perforation is the commonest indication for temporary loop ileostomy
- There is an increasing trend of performing stoma nowadays in emergency situations although being bothersome, ileostomy is still a live saving procedure
- It is of paramount importance that ileostomies are properly sited
- Before closure of ileostomy it is essential to be careful of operative biopsy report showing non-specific inflammation, which might indicate Crohns disease or tuberculosis and might lead to anastomotic leak post closure if left untreated
- In tubercular infection complete treatment of tuberculosis with diease activity in remission is a must before stoma closure.

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