

**EARLY ILEOSTOMY CLOSURE FOLLOWING EMERGENCY BOWEL SURGERY:
A FEASIBLE APPROACH**Nitin Garg¹, Kailash Charokar²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND: Ileostomy is often constructed in emergency surgical conditions like enteric or tubercular perforations when patients present late in the course of illness to preclude primary closure. But the ileostomy carries with it lot of morbidity making the quality of life poor. The early closure of ileostomy can minimize the associated morbidity and help the patient to enjoy better quality of life sooner. **METHODOLOGY:** In this retrospective study, hospital data was collected between November 2010 and October 2013, of the patients whose ileostomy was closed within 3-6 weeks from the time of initial surgery. Demographic, operative and complication data were recorded and reviewed as to the final post-operative outcome. **RESULTS:** Total 22 patients were taken up for ileostomy closure between 3-6 weeks with the mean of 33.6 days. Stoma related complications occurred in 22.7% of patients, skin excoriation being the commonest (13.6%). No difficulty was encountered during stoma closure surgery. Post-op complications occurred in 27.3% of patients, and wound infection was the commonest (18.2%). Other complications were paralytic ileus (9.1%), intestinal obstruction (4.5%), and incisional hernia (4.5%). There was no instance of anastomotic leak, intra-abdominal abscess, entero-cutaneous fistula or mortality. **CONCLUSION:** The present study clearly highlights the potential advantages of early closure of ileostomy without any added morbidity or mortality, and is a feasible alternative to a more conventional delayed approach, provided careful selection of patients is done. This significantly cuts down the convalescence period of the patient and helps him to live a better quality of life much earlier.

KEYWORDS: Ileal perforation, ileostomy, early ileostomy closure, ileostomy closure complications

INTRODUCTION: In the developed countries, ileostomy is mainly constructed as a protective cover for distal colo-rectal or ileo-anal pouch anastomosis.¹⁻³ But in developing countries, it is still often made in emergency surgical setting where infective conditions like enteric or tubercular perforations are common and patients present late in the course of illness to preclude primary closure.^{4,5} As a common practice, it is closed 8-12 weeks later when the patient is presumed to have recovered from the initial illness.^{6,7}

But the ileostomy carries with it lot of morbidity,⁸⁻¹⁰ especially the metabolic disturbances and skin excoriation making the quality of life poor, both physical & social,^{11,12} more so when there are no existing stoma care services at the peripheral level. The early closure of ileostomy can minimize the associated morbidity with it and help the patient to enjoy better quality of life sooner.^{13,14}

In our experience, we have closed several ileostomies, done for emergency abdominal conditions with gross peritonitis, at a period ranging from 3-6 weeks since the time of initial surgery. The aim of the present study is to review our results of early closure of ileostomy, and evaluate the final post-operative outcome.

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PATIENTS & METHODS: This study is retrospective in nature and covers the period between November 2010 to October 2013 at fully equipped surgical centres where same team of surgeons attended the patients. The hospital records were searched for those patients whose ileostomy was closed within 3-6 weeks from the time of initial surgery. The case records were searched for demographic profile, initial operative notes at the time of ileostomy creation, subsequent re-admission for stoma closure and local examination findings, specific pre-operative investigations - Hb%, Sr. albumin levels and distal contrast studies, operative notes of stoma closure, post-operative complications, duration of stay, and follow up visits. All the stoma related complications and any interim admission prior to stoma closure were also noted.

Only those patients were taken up for early stoma closure whose Hb was >10 gm% and Sr. Albumin >3.0 gm%. Even pre-operative blood transfusion was given to raise the Hb upto 10 gm%. The patients having Sr. albumin levels <3.0gm% were not considered for early stoma closure. In addition, distal contrast study was done in all the patients using water soluble contrast to ascertain the distal patency of the intestinal tract. All the patients were operated through the stomal site under general or regional anesthesia. Peri-operative antibiotic prophylaxis was used in all the patients as per standard practice.

RESULTS: Total 22 patients were taken up for stoma closure in the period ranging from 3-6 weeks with the mean of 33.6 days. The age of the patients ranged from 15 to 56 years with the mean of 33 years. There were 15 male patients and 7 female, ratio being 2:1. All the patients belonged to the rural background or far-flung areas with no proper access to optimal stoma related assistance. The indication for stoma formation is given in Table No. 1.

SL. No.	Initial Diagnosis	No. of Cases (%)
1	Enteric Ileal perforation	13 (59.1%)
2	Tubercular ileal perforation	04 (18.2%)
3	Traumatic small bowel perforation	01 (4.5%)
4	Necrotizing infections of bowel	02 (9.1%)
5	Perforation of caecum (Infective)	02 (9.1%)

Table 1: The indication for initial stoma formation

Four of these patients were taken up for stoma closure during the same admission, while remaining were re-admitted. No patient required interim admission prior to stoma closure but few stoma related complications were recorded. Timing of closure and stoma complications are given in Table No. 2.

Time period	No. of Cases (%)	Admission	Complications	No. of Cases (%)
3 rd week	2 (9.1%)	Same admission	Electrolyte imbalance	1 (4.5%)
4 th week	4 (18.2%)	Same admission: 2	Partial stomal recession	1 (4.5%)
		Re-admission: 2	-	-
5 th week	4 (18.2%)	Re-admission	Skin excoriation	1 (4.5%)
6 th week	12 (54.5%)	Re-admission	Skin excoriation	2 (9.1%)

Table 2: Time period for stoma closure and associated pre-closure complications

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Five patients required pre-operative blood transfusion to raise the Hb upto 10 gm%. The stoma was mobilized using blunt and sharp dissection and no specific difficulty was encountered as far as mobilization was concerned. In one patient, stoma was very close to ileo-caecal junction and a partial stricture of terminal ileal segment was detected, though pre-op contrast study had revealed no abnormality. In that patient, Right hemicolectomy was safely undertaken through the same site by enlarging the incision (Right transverse). All the anastomosis were done in two layers after freshening the edges, using vicryl or monocryl 3-0 for inner layer and silk 3-0 for sero-muscular layer.

Intra-peritoneal drain was kept in 12 of the patients. A corrugated rubber drain or closed suction drain was used in sub-cutaneous plane in all the patients and wound was primarily closed. Naso-gastric tube was used in all the patients ranging from 1-7 days with the mean of 3 days.

Post-operative recovery was satisfactory in all the patients with no major complications like anastomotic leak or intra-abdominal abscess. Total 8 complications occurred in 6 patients giving a complication rate of 27.3%. Commonest complication recorded was wound infection, present in 4 patients (18.2%). Two patients developed prolonged ileus but subsequently improved on electrolyte correction, naso-gastric aspiration and watchful expectancy. No mortality was recorded. Various complications and their management are summed up in Table No. 3.



Fig. 1: Stomal anastomosis in 2 layers. Final sero-muscular layer.



Fig. 2: Primary skin closure with intra-peritoneal and sub-cutaneous drains

Complication	No. of Cases (%)	Management
Minor wound infection	3 (13.6%)	Drainage, antibiotics All subsequently healed
Major wound infection	1 (4.5%)	Developed wound dehiscence Healed by secondary intention
Prolonged paralytic ileus	2 (9.1%)	Electrolyte correction, naso-gastric aspiration, watchful expectancy
Intra-abdominal abscess	Nil (0%)	-
Anastomotic leaks, Enterocutaneous fistula	Nil (0%)	-
Intestinal Obstruction	1 (4.5%)	Conservative management
Incisional Hernia	1 (4.5%)	Waiting for surgery

Table 3: Complications of stoma closure and their management

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The patients were discharged from the hospital ranging from 7-18 days with the average of 8.8 days from the time of stoma closure. The patients were followed up in general for a period ranging from 1-6 months. One patient required admission 3 weeks later after the discharge due to post-op adhesive obstruction, but was successfully managed on conservative line. One of the patients with major wound infection later on developed incisional hernia at the stoma site and is still waiting for the hernia repair. Recently 14 out of these 22 patients were contacted telephonically and enquired into well-being. None of the patient reported any problem relating to his stoma closure surgery, except the one with incisional hernia. The results are summarized in Table No. 4.

Variable	Result
Demographic profile	Age: 15-56 years, Mean: 33 years Male: Female – 2:1 Residence: Rural areas (22)
Stoma related complications	Electrolyte imbalance (1) Skin excoriation (3) Partial stoma recession (1)
Interval between ileostomy creation & closure	3-6 weeks Mean: 33.6 days
Pre-op investigations	Hb% > 10 gm% Sr. Albumin > 3.0 gm% Distal contrast studies: normal in all
Intra-op complications including conversion to full laparotomy or abandoning the procedure	One patient required Rt hemicolectomy but managed through the same incision
Post-op complications	Wound infection (4) Paralytic ileus (2) Post-op adhesive obstruction(1) Incisional hernia (1)
Anastomotic leaks Entero-cutaneous fistula Intra-abdominal abscess	NIL
Mortality	NIL
Hospital stay	7-18 days Mean: 8.8 days

Table 4: The summary of results

DISCUSSION: Intestinal stomas are often created in emergency abdominal situations when primary repair of bowel carries high risk of failure due to gross peritoneal contamination or severely inflamed bowel as can occur in enteric and tubercular perforations.^{4,5}

Conventionally, they are taken up for closure 8-12 weeks later from the time of initial surgery. But the optimal time of closure is in debate now, with recent few studies favoring early closure, as

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early as 10 days.¹⁵ These studies are predominantly from the western world describing the early closure of loop ileostomy in cases of colorectal anastomosis for rectal carcinoma,^{16,17} though there is paucity of data concerning timing of stoma closure that was made in emergency.¹⁸⁻²⁰

We applied the same principle and went ahead with early closure of temporary ileostomy that was done in emergency situation.

The timing of early closure as defined by us is 3-6 weeks post initial surgery. 12 out of 22 cases (54.5%) were done in the 6th week, while 2 cases (9.1%) were done in the 3rd week. The earliest closure was done at 18th day and mean duration of closure was 33.6 days. There is a study by Nadim et al in 2010,²¹ prospectively comparing the early closure of temporary ileostomy at 4 weeks to delayed closure at 8 weeks where the stoma was formed mostly for emergency abdominal conditions as in our study. In another study by Samiullah et al in 2010²² which evaluated the results of early closure of ileostomy following emergency abdominal surgery, the mean duration of closure was 23.5 days. There is a study by Struijs et al in 2012 which also recommends the early closure (median 39 days) in children with NEC.²³ Our study concur with these studies on early closure of temporary stomas, and with favorable outcome as discussed below.

In present study, all the patients belonged to rural background and none of them had excess to trained stoma care personnel at their place. Even for a simple change of stoma device they had to come to our centre. This had lot of financial burden and take away useful working hours of the accompanying person. In addition we have seen variable degree of skin excoriation which only gets worse with time. This causes lot of physical problem and anguish to the patient, as well the social detachment. There are possibility of other complications like electrolyte disturbances, recession of stoma, parastomal herniations, prolapse of bowel, fecal impaction, etc. which often require frequent admissions and add to morbidity and cost of treatment.⁸⁻¹⁰

We observed overall stoma related complication rate of 22.7%, though none of the complication was serious in nature or required any operative intervention. Skin excoriation was seen only from 5th week onwards and was present totally in 13.6% of patients. Still it was mild, when compared to severe excoriation that is often seen with delayed closure of stomas at 8-12 weeks.

In a prospective audit of complications of loop ileostomy construction and take down, García-Botello et al²⁴ described ileostomy related complications in 39.4% patients. The most common were skin related - dermatitis (12.6%) and erythema (7.1%) put together. In another study where ileostomy was done for enteric perforation,⁵ ileostomy related complications occurred in 63.33% of patients. Peristomal skin excoriation (33.33%) was the most common complication followed by weight loss (13.33%), retraction (13.33%), fluid and electrolyte imbalance (10%), and prolapse (3.33%).

In fact these were the very factors, in particular lack of proper stoma care services which motivated us to consider early stoma closure, so that stoma related complications could be minimized.



Fig. 3: The loop ileostomy at the end of 5th week (minimal skin excoriation)



Fig. 4: The loop ileostomy at the end of 10th week (excessive skin excoriation)

The selection of the cases for early closure was done based on adequate nutritional level of the patient and patients with unfavorable parameters were given more time to improve their nutritional status. We kept Hb% and Sr. Albumin levels of 10.0 gm% and 3.0 gm% respectively as cut-off, before considering the patient for stoma closure. In 5 patients we even gave pre-operative blood transfusion to increase Hb levels. Iancu et al in 2008²⁵ have mentioned hypoproteinemia and anemia as independent predictive factors for anastomotic leakage in a very large case series of 993 cases.

Moreover the distal patency was confirmed by contrast study, and patients with distal obstruction or leak were turned down for early closure. Though in one of our case it missed out the partial stricture - probably the thin catheter was negotiated beyond the stricture before instilling the contrast. The routine use of distal contrast study is debatable and Khair et al in 2006²⁶ have doubted its routine use without clinical suspicion of distal leak. But still we have the protocol of using it routinely, though we are not recommending for or against it based on this study.

During surgery for stoma closure we didn't encounter any difficulty in dissection and mobilization of bowel from the parities or peritoneum. Sufficient space was created by lysing intra-peritoneal adhesions so that bowel can be safely repositioned inside the peritoneal cavity. No intra-operative bowel perforations occurred, neither conversion to full laparotomy. In fact in one of our patient we had to do a Right hemicolectomy for intra-operatively detected terminal ileal stricture at the site of original perforation, and it was managed by enlarging the same incision without resorting to a full mid-line laparotomy.

12 of our cases were done in the 6th week when inflammation due to initial peritonitis had almost settled. Four of these cases were of tubercular enteritis and we waited till they have got at least a month of ATT. Otherwise also in rest of the 10 cases done earlier, we didn't have much difficulty as far as adhesions are concerned. Struijs et al²³ studied in particular, the adhesion formation in early and late closure groups in NEC and found no significant difference between the two groups.

The complication rate in our study was 27.3% and commonest complication recorded was wound infection (18.2%, n = 4) as in most of the studies. Out of these 3 were minor and 1 major. This is comparable to study by Nadim et al²¹ reporting 16.66% wound infection rate in early closure group, and lower than 24.5% as reported by Samiullah et al.²² Overall also this figure is in line with the data in various studies which put the wound infection rate between 0% and 18%.²⁷

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We closed all wounds primarily and used either corrugated rubber drain or closed suction drain in the subcutaneous plane because of the dead cavity and potential for infection. One of the studies has mentioned a lower wound infection rate with a circumferential subcuticular wound approximation.²⁸ We do not have any familiarity with this technique. We did encounter one case (4.5%) of incisional hernia following major wound infection for which the reported incidence is 1% to 12%.²⁷

Other complication like paralytic ileus (9.1%) did not alter the final outcome of the patients, except slightly longer duration of stay. One of our patients was re-admitted after stoma closure with features of intestinal obstruction (4.5%) but was managed successfully on conservative line. Reported incidence of intestinal obstruction after stoma closure surgery is 0% to 15%.²⁷

Most importantly, we did not encounter any intra-abdominal abscesses, anastomotic leaks, entero-cutaneous fistulas, or mortality figures. This is in contrast to a recorded leak rate of 4.5% and mortality of 2.2% by Samiullah et al²² and, 5.76% leak rate plus mortality of 1.2% by Nadim Khan et al²¹ in evaluating the early closure of temporary loop stoma. Even literature suggests an anastomotic leak rate following closure of ileostomy, whether early or late, in the range of 0% to 8%.²⁷

In the audit of García-Botello SA et al,²⁴ closure was associated with a complication rate of 33.1% and a mortality rate of 0.9%. Wound infection occurred in 18.3% and small bowel obstruction in 4.6%. Anastomotic leak requiring re-anastomosis occurred in 2.8% and entero-cutaneous fistula treated conservatively in 5.5%. In another study, done by S Mittal et al⁵ where ileostomy was constructed for enteric perforation, the average duration of ileostomy closure was 3.6 months. In that study ileostomy closure related complications occurred in 23.33% of patients. It included wound infection in 20%, anastomotic leak in 6.67%, intra-abdominal collection in 6.67%, wound dehiscence in 13.33% and re-operation in 6.67%.

Thus we can say that the results of our study are comparable to results of other studies on early closure of stoma as well as to the studies where closure was delayed or even better as far as anastomotic leak and mortality rates are concerned. The stringent adherence to surgical principles, meticulous tissue mobilization and careful selection of patients perhaps all together can lead to favorable outcome in stoma closure, even if done earlier.

The limitations of this study are a small set of patients and not being a comparative & prospective study. But then, the present study still highlights the potential advantages of early closure of ileostomy without any added morbidity or mortality.

CONCLUSION: Our study shows that early ileostomy closure is a feasible alternative to a more conventional delayed approach, provided careful selection of patients is done. This significantly cuts down the convalescence period of the patient who is recovering from a major surgical abdominal catastrophe and helps him to live a better quality of life much earlier. Perhaps larger controlled studies can be undertaken to evaluate this hypothesis and it would be a useful exercise, considering large number of ileostomies being constructed as part of emergency abdominal surgical practice, especially in the developing world.

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