



## **Predictors of Postoperative Complications After Ileostomy Closure**

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### **Abstract**

Ileostomy involves exteriorization of ileum on abdominal skin. though ileostomy is frequently a lifesaving procedure it can lead to complications often devastating like necrosis, retraction stenosis, stricture, prolapse, skin infection, dermatitis, and malnutrition etc. outcome varies in patient according to their indication age gender nutritional status ileostomy types , type of procedure , site of stoma. This study was done to study indicators of creating ileostomy, predictors of complications after ileostomy closure and outcomes of ileostomy closure. The study was designed to carry out prospective evaluation of patients undergoing ileostomy for various indications admitted in MBGH Udaipur who were operated as an emergency, excluding children below 12 years and patients operated outside MBGH, Udaipur. Risk factors evaluated were age, nutritional status, time between creation of stoma and closure, type of ileostomy, Complications studied were small bowel obstruction, anastomotic leaks, fistula reoperation and

death. In this study it was seen that were drawn complications were more in elderly patients. Among complications most were surgery related like SSI, intestinal obstruction, faecal fistula, rather than medical like pneumonia and anaemia. Patients with hypoalbuminemia had poor outcome. Patients with double barrel ileostomy had better outcome. Intraoperative drain placement led to better outcome. Patients with ileal perforation and intestinal obstruction had bad prognosis. Outcome after ileostomy closure was good in late closure (>1.5 months) than early closure (<1.5 months). Time taken in surgery had no effect in outcome after ileostomy closure. Patients with associated comorbidities had poor prognosis. Stoma closure should be done in patients after adequate nutritional build up and by surgeon skilled to minimize postoperative complications.

## Keywords

Ileostomy, Ileostomy Closure, Stoma Closure, Post Ileostomy Complications

## Introduction

Ileostomy involves exteriorization of ileum on abdominal skin. Ileum is the only site of absorption of vitamin B12 and bile salts. The enterohepatic circulation of bile salts is critical to maintain bile salt pool and absorption of fats and fat soluble vitamins<sup>1</sup>. Small bowel motility is slower in ileum than in jejunum hence fluid absorption and resulting Na<sup>+</sup> absorption is more in ileum as compared to jejunum<sup>1</sup>. Therefore, ileum is critical in conservation of fluids and electrolytes. Though ileostomy is frequently a lifesaving procedure it can lead to complications, often devastating like necrosis, retraction stenosis, stricture, prolapse, skin infection, dermatitis, and malnutrition etc. Outcome varies in patient according to age, nutritional status, indication, type of ileostomy, stoma site. Present study is to find out predictors of such complications.

## Various Types of Ileostomies are

1. end ileostomy
2. loop ileostomy
3. double barrel ileostomy

Complications after ileostomy can be -

*Early Complications* – within 30 days of surgery like skin complications, stomal necrosis, detachment, abscess formation, retraction, prolapse, fluid and electrolyte imbalance, ileostomy dysfunction, high output etc<sup>2</sup>.

*Late complications* – after 30 days of surgery like fistula, stenosis, parastomal hernia, prolapse, obstruction etc<sup>2</sup>.

Ileostomy closure is usually performed at 3 months after primary operation to allow for wound

healing to occur<sup>3</sup>. During this time edema and induration around the ostomy site also resolves.

*Factors affecting healing of anastomosis* – Blood supply<sup>4</sup>, surgical technique<sup>5</sup>, omental wrapping<sup>6</sup>, nutritional status<sup>7</sup>, mechanical bowel preparation, abdominal drain placement<sup>8</sup>, diabetes, systemic disease.

*Complications of ileostomy closure* – small bowel obstruction<sup>9</sup>, post-operative ileus<sup>10</sup>, wound infection<sup>11</sup>, anastomotic leak<sup>12</sup>, incisional hernia<sup>13</sup>, enterocutaneous fistula<sup>9</sup>.

## Aims & Objectives

To study indicators of creating ileostomy, predictors of complications after ileostomy closure & outcomes after ileostomy closure.

## Method

The study was designed to carry out prospective evaluation of patients undergoing ileostomy for various indications admitted in MBGH Udaipur who were operated as an emergency.

## Exclusion criteria

- children below 12 yrs.
- Patient operated outside MBGH, Udaipur

Risk factors evaluated were age, nutritional status, time between creation of stoma and closure, type of ileostomy.

Complications studied were small bowel obstruction, anastomotic leaks, fistula, reoperation and death.

## Observation & Results

### Age & outcome

A total of 50 patients were studied, maximum 20 (40%) patients were in age group of 21 – 40 yrs. Minor & major complication were less in 0 – 20 yrs. group seen in 2 out of 5 (40%) patients, while they were high & almost equal in age group 21 – 40 yrs. in 12 out

of 20 (60%) & among 41 – 60 yrs. group in 11 out of group 61-80 yrs.  
15 (73.33 %) patients. Mortality was seen in 1 case in age

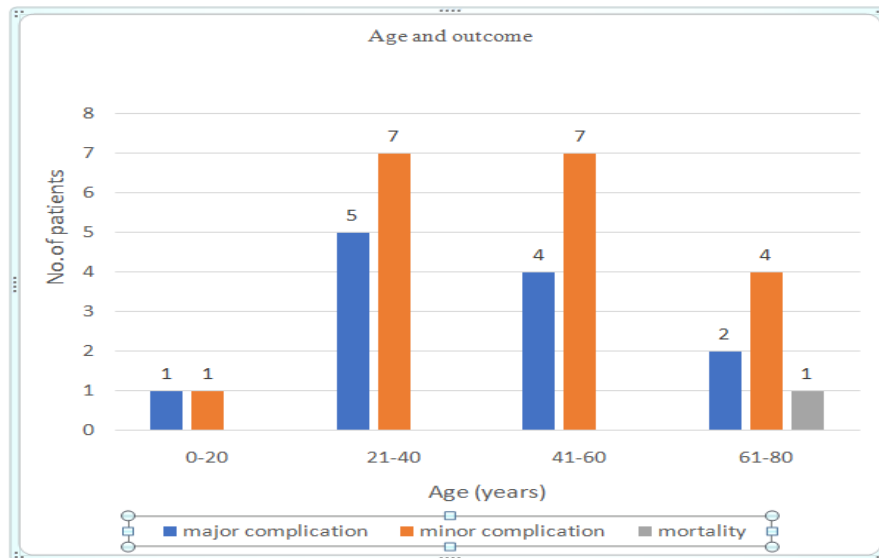


Fig.1

### Serum albumin & its relation to outcome

Serum Albumin level was  $<3.5$ g/dl in 28 (56%) patients, out of them 10 (35.7%) had good prognosis and 18 (64.3%) had bad prognosis. In patients with serum albumin level  $>3.5$  g/dl 15 (68.2%) had good prognosis and 7 (31.8%) had bad prognosis.

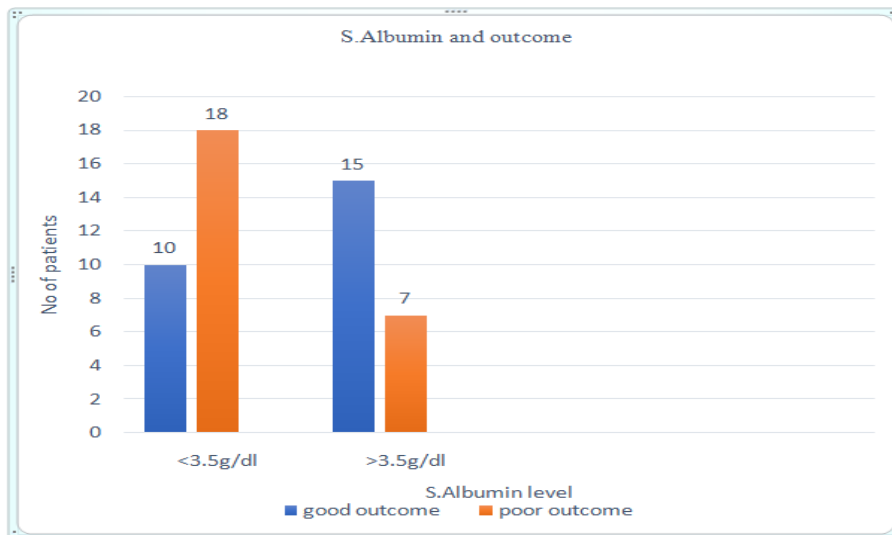


Fig.2

### Type of ileostomy and outcome

Out of 50 patients 24 (48%) had loop ileostomy, 17 (34%) had end ileostomy, 9 (18%) had double barrel ileostomy. Patients with double barrel ileostomy had best prognosis (good prognosis in 66.67%) and end ileostomy had worst prognosis (good prognosis in 35.29%). In patients with loop ileostomy good prognosis in 10 (41.67%) and bad prognosis in 14 (58.33%) patients was seen.

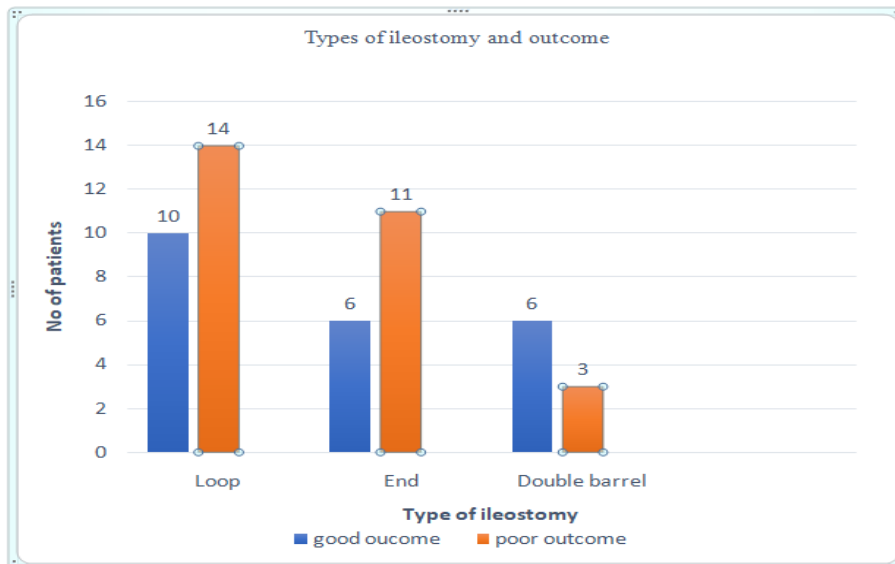


Fig.3

### Effect of drain placement

In this study drain was placed in 44% (i.e.,22 out of 50) patients, out of these10(45.45%) patients had no complications, rest patients had complications but out of 28 patients in whom drain was not placed good outcome was seen in 9(32.14%) patients while 19(65.86%) patients developed complications.

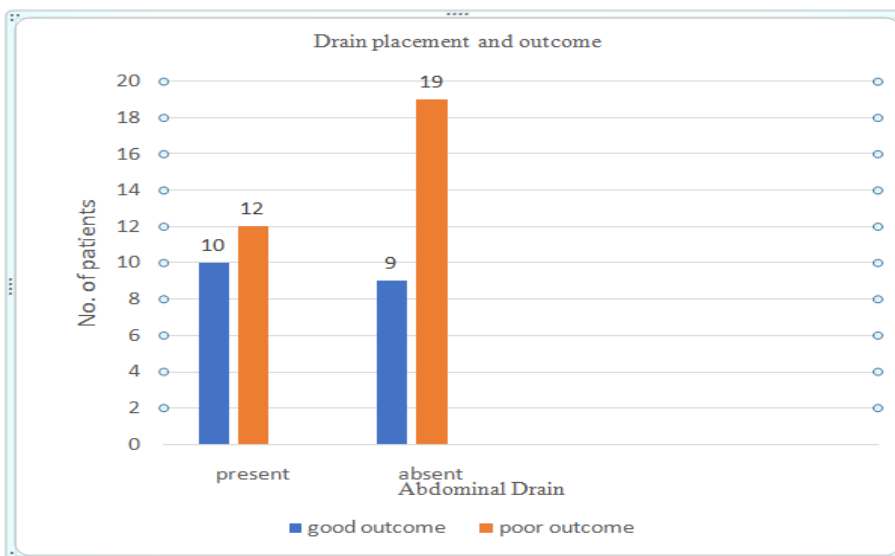


Fig.4

### Effect of indication of ileostomy on outcome

The most common indication was ileal perforation 25(50%), others were obstruction 19(38%), malignancy 3(6%) ulcerative colitis 2(4%) caecal perforation 1(2%). More complications were seen in patients of perforation and obstruction. Among 25 patients with ileal perforation complications were seen in 16(64%) patients while complications were seen in 12 (63%) patients with intestinal obstruction.

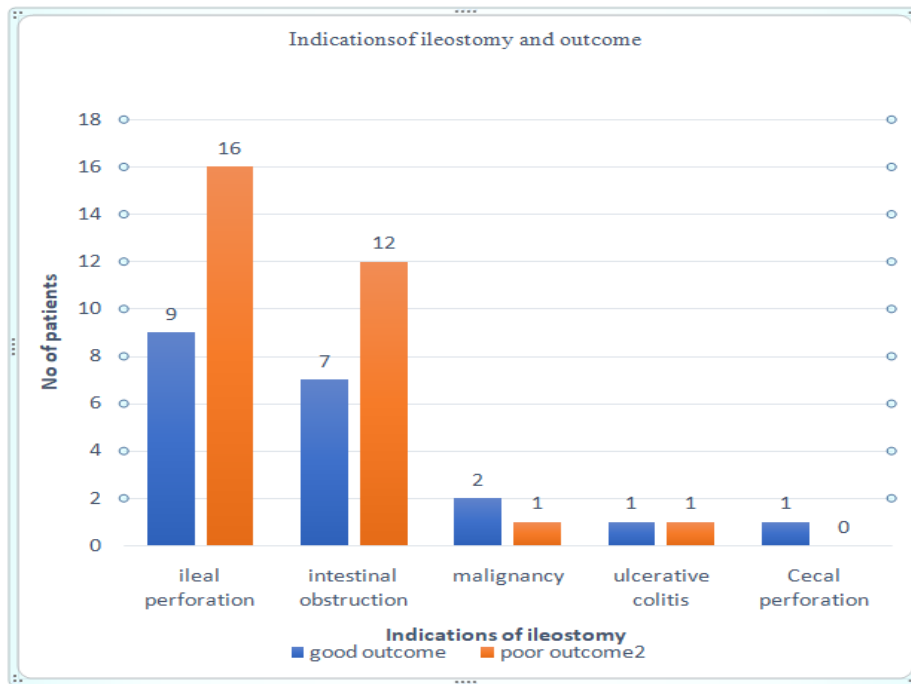


Fig.5

**Duration of ileostomy before closure & outcome**

Outcome was good in patients undergoing late closure (55%) than those with early closure (30%). Complications were recorded in 64% patients (32 out of 50). Of these surgical site infections was the most common post-operative complication present in 40% cases (20 out of 50) patients. 9 out of 50 (18%) patients developed intestinal obstruction and 2 (4%) had enterocutaneous fistula. Mortality was 2% in our study and cause was septicaemic shock.

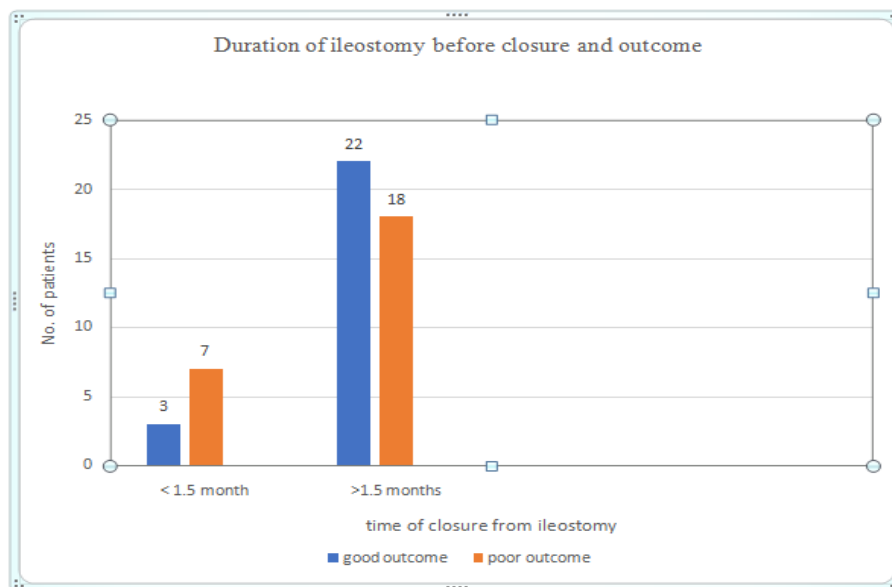


Fig.6

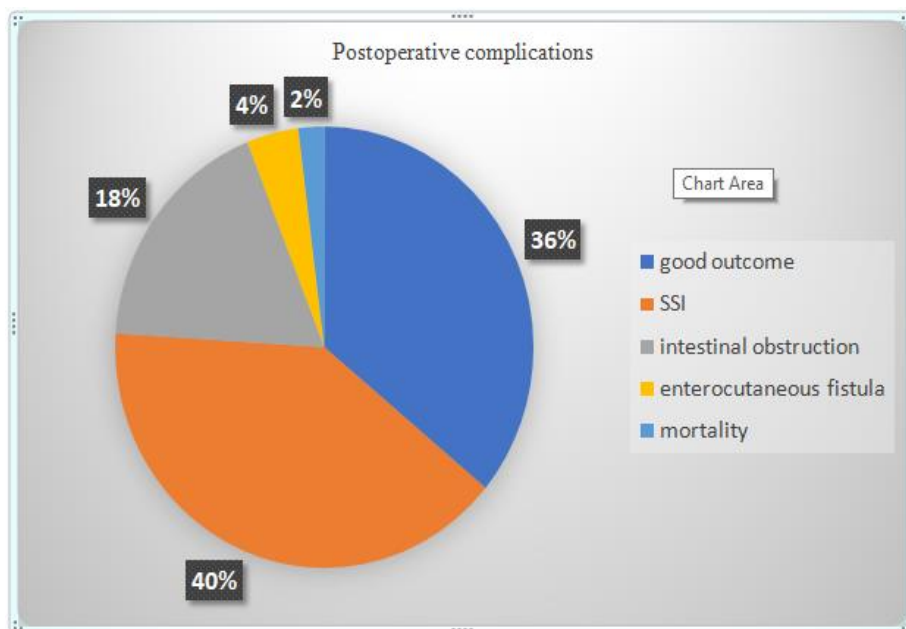


Fig.7

**Effect of adhesions on post-operative intestinal obstruction**

Intestinal obstruction was seen in 33.33% (10 out of 30) patients with adhesions while it was seen in 35% (7 out of 20) patients without adhesions. Hence in our study intraoperative adhesions did not significantly affect postoperative intestinal obstruction.

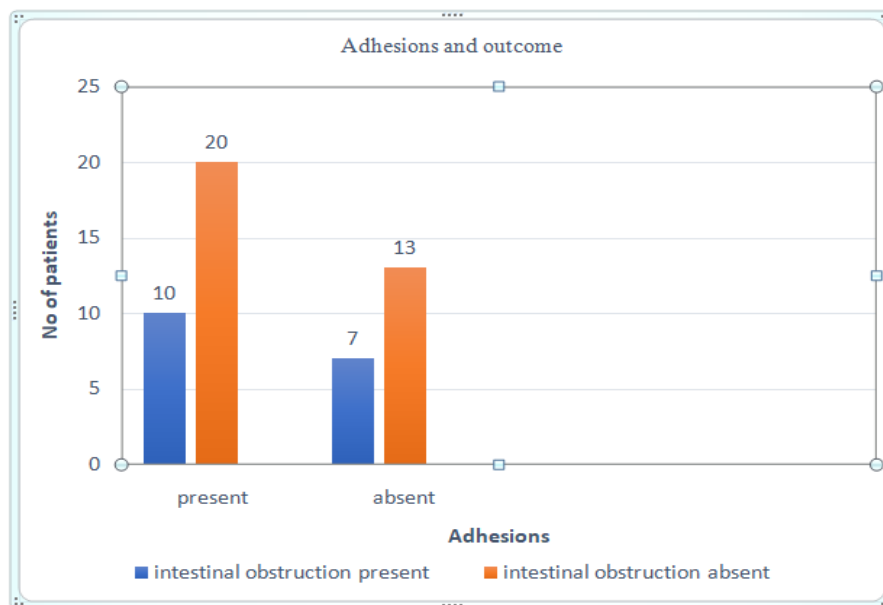


Fig.8

**Effect of duration of surgery on outcome**

Duration of surgery varied from 50 to 120 minutes. In most patients' surgery was done in 90 to 120 minutes. Duration of surgery did not have any effect on outcome.

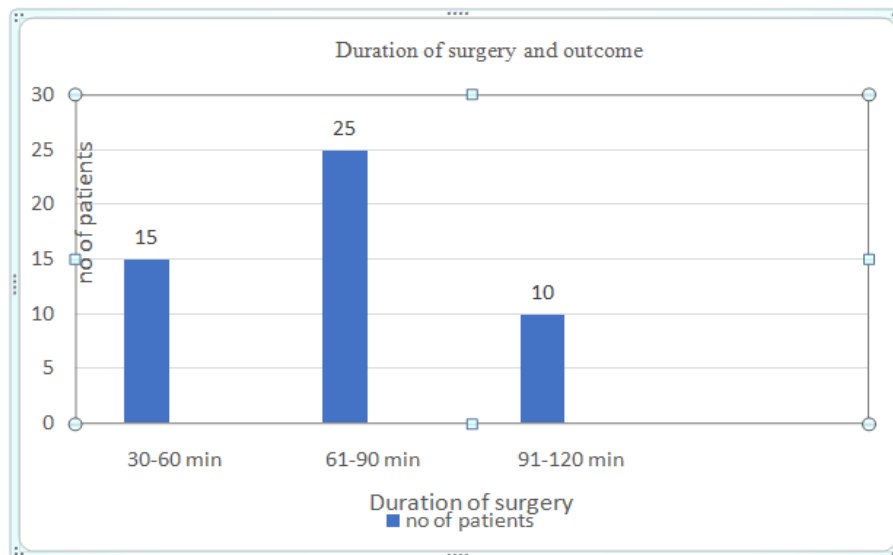


Fig.9

### Discussion

Our study included 50 patients out of which maximum were in age group 21-40 years followed by 41-60 yrs. Ileostomy closure was done at less than 1.5 months in 20% patients and after 1.5 months in 80% patients. Complication rate was 70% in patients with early closure, while it was 45% in patients with late closure. While in a study by Nitin Garg complication rate was 27.3% in patients with early closure<sup>14</sup>. Wound infection was the commonest complication in 40% patients while in Nitin Garg it was 18.2%<sup>14</sup>. 64% patients developed complications in our study which was much higher than quoted in literature. The mortality rate was 2% which is within reported range. Most of the data regarding complications following ileostomy closure comes from research in USA, Spain, Turkey, Europe reflecting morbidity was 3-30% and mortality was 0.4 %<sup>12,15</sup>. A recent study reported complication rate 9.3 % and mortality 0.6 %<sup>16</sup>. Indications of ileostomy mostly included ileal perforation and intestinal obstruction. Complications developed in 64% patients with ileal perforation and 63% patients with intestinal obstruction. This may be the probable cause for such high overall complication

rate. In present study intestinal obstruction occurred in 18% patients and is reported as 0-15% in literature<sup>16</sup>. Anastomotic leak rate in present study was 0% while in literature it was reported to vary between 0-8%<sup>9</sup>. In another study it was reported to be as high as 12%<sup>17</sup>. Enterocutaneous fistula rate in present study was 4% in accordance to reported range of 0.5-7%. Incisional hernia was not seen in any case and it falls below reported range of 1-12%<sup>9,18</sup>. This could be due to proper wound closure, lack of dead space, good hemostasis and use of abdominal binder. Surgical site infections were seen in 40% cases higher than that reported in literature 18.3%<sup>9</sup>. In conclusion the complication rate observed in this study is high as compared to those recorded in literature because majority of these studies were conducted in western centres but population in our study comes from rural south Rajasthan living in deprived conditions, with poor nutritional status, with little access to healthcare facilities.

### Conclusion

Post ileostomy closure complications increased with age of patient, highest being in age group 41 – 60 yrs. Patients with hypoalbuminemia had poor outcome as

compared to patients with albumin in normal range. Patients with double barrel ileostomy had better outcome as compared to patients with end or loop ileostomy had poor outcome. Intraoperative drain placement led to better outcome. Among indications, patients with ileal perforation and intestinal obstruction had bad prognosis as compared to ulcerative colitis, cecal perforation and malignancy. Although patients with adhesions took more time in ileostomy closure but outcome was similar to patients without adhesions. Among complications most were surgery related like SSI, intestinal obstruction, faecal fistula, rather than medical like pneumonia and anaemia. Outcome after ileostomy closure was good in late closure (>1.5 months) than early closure (<1.5 months). Time taken in surgery had no effect in outcome after ileostomy closure. Patients with associated comorbidities had poor prognosis. Mortality is very less (2%) in patients undergoing ileostomy closure. Stoma closure should be done in patients after adequate nutritional build up and by surgeon skilled to minimize postoperative complications.

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