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Research Article

**AN EVALUATION OF THE CAUSAL FACTORS OF
COMPLICATIONS AFTER ILLEOSTOMY CLOSURE**¹Dr Sheikh Ali Ahmad Ajmal, ²Dr Bushra Khaliq, ³Dr Aamna Arif¹Independent Medical College, Faisalabad., ²Bengbu Medical College, China., ³Sharif Medical and Dental College, Lahore.**Article Received:** October 2020**Accepted:** November 2020**Published:** December 2020**Abstract:****Aims:** To evaluate the causes of complications after illeostomy reversal.**Study design:** An observational study.**Place and duration:** Surgical Unit-II of Nishtar Hospital Multan for one-year duration from June 2019 to June 2020.**Methodology:** The study included 46 consecutive patients who underwent illeostomy reversal within one year. We excluded patients under 12 years of age, patients who were confined within 6 weeks, and patients with additional, unrelated surgical intervention. All patients were followed up at weekly intervals for one month. The main endpoint was the occurrence of surgical complications within 30 days of reversal.**Results:** A series of 46 post-illeostomy closures were analyzed to evaluate factors contributing to morbidity and mortality. There were no deaths, but the complication rate was 10.9% (5 patients), with the most common complications being wound infection (4.35%) and anastomotic leak (4.35%) and paralytic ileus (2.17%). Primary closure of the stoma site, the technique of closure of the anastomotic site, type of stoma, and the surgeon's experience were significant contributing factors.**Conclusion:** We concluded that illeostomy closure has few complications but no mortality. The techniques of closure of the anastomotic site, type of stoma, surgeon's experience, and the technique of skin closure were predictors of complications.**Key words:** illeostomy closure, anastomotic leak**Corresponding author:****Dr. Sheikh Ali Ahmad Ajmal,**

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INTRODUCTION:

In general surgery, stoma formation is a common procedure for both elective and emergency surgery. In the late 1800s, colostomies were used to treat intestinal obstruction. The bowel stoma has been considered a drastic procedure due to its high number of complications. As surgical techniques have improved, the need for a stoma has increased.

An Ileostomy is a life-saving procedure that enables individuals to enjoy the full range of daily life activities. Ileostomies are necessary when the ileum is distant from the stoma or the large intestine is diseased or damaged. An illeostomy may be temporary or permanent, depending on the indication for surgery. A temporary illeostomy is usually removed after a while. Although it lowers the operational risk of the first indication, after its closure it is associated with some morbidity and mortality. Regarding the complications, the presented series show conflicting results. Thus, the incidence rates range from 2.4% to 48.2% after temporary stoma closure.

The most common surgical complications after stoma closure are wound infections, anastomotic leakage, paralytic ileus, small bowel obstruction, and bleeding. Various patient and technique risk factors influencing stoma closure complications.

These complications have an impact on the health of the patient and increase the postoperative hospital stay, as well as increase the costs of hospitalization.

METHODOLOGY:

This study was conducted in the Surgical Unit-II of Nishtar Hospital Multan for one-year duration from June 2019 to June 2020. All subsequent patients undergoing illeostomy closure after 8 weeks of illeostomy construction were enrolled in the study. Patients under 12 years of age, patients undergoing confinement within 6 weeks, and additional non-related surgical intervention were excluded.

Demographic data, indications for temporary illeostomy and operational details were recorded. All patients were subjected to a distal logogram using a barium prior to occlusion. Patients had routine mechanical debridement of the proximal and distal bowel with discontinuation of oral feeding the day before surgery and lavage with oral mannitol solution and lavage of distal loops with saline prior to surgery. All patients received parenteral antibiotics (ceftriaxone and metronidazole) during induction which was continued for 5 days.

All patients consented to laparotomy when required. An elliptical periosteal incision was made and the stoma was mobilized from the surrounding fascial and peritoneal adhesions. After refreshing the margins of the enterotomy, leaving the mesenteric side intact and closing the enterotomy transversely, using a single-layer, hand-sewn externally mucosa, the intermittent technique with delayed absorbable suture material. The muscle gap was closed with proline 0 interrupted sutures. All skin incisions were closed mainly with 2/0 interrupted sutures and an aseptic dressing was applied.

Complications were reported during hospital stay and observed during the monthly weekly follow-up after discharge. Wound infections, anastomotic leakage and paralytic ileus were considered surgical complications.

Definitions:

1. Wound infection was defined according to the Centers for Disease Control and Prevention criteria. Under this definition, superficial infection occurs within 30 days after surgery and affects only the skin or subcutaneous tissue.
2. Anastomotic leakage was considered when there were symptoms of generalized peritonitis, intestinal fistula, or radiographic leakage.
3. paralytic ileus was defined as the inability to tolerate orally ingest the drug for a minimum of 5 days after surgery, with the need for nasogastric decompression and the absence of intestinal sounds.

Several risk factors related to the operation have been noted. As a result, there were complications with the operation within 30 days. Data was analyzed using SPSS version 18.0. A p value below 0.05 was considered statistically significant.

RESULTS:

46 patients participated in the study. All patients underwent emergency surgery. The age range of these patients was 14-80 years, the mean age was 42.8 years and SD 1.6. 28 patients (61%) are male and 18 patients (39%) are female. The most common indication for illeostomy 15 was externalization of the major ileal perforation (32.6%). This was followed by abdominal tuberculosis 11 (23.9%), penetrating abdominal trauma 7 (15.2%), intestinal gangrene 7 (15.2%), blunt abdominal trauma 2 (04.35), colonic obstruction 2 (04.3%), post-laparotomy 1 (02.2%), ileal perforation post-abortion 1 (02.2%). The ileum was introduced as a loop in most patients, followed by a double-barrel illeostomy, ileo-colostomy, and terminal illeostomy with a distant mucosa needle. (Table 1)

Table 1: Types of Ileostomy

| Type of stoma | No. of patients |
|--|-----------------|
| Loop ileostomy | 29 (63.0%) |
| Double barrel ileostomy | 14 (30.4%) |
| Ileocolostomy | 02 (04.3%) |
| End ileostomy with distant mucus fistula | 01 (02.2%) |

The median interval between stoma construction and stoma closure was 14 weeks (range 7-35, mean 15 ± 6.8). Forty-two (42) closures were made by an elliptical incision around the ileostomy, while four (4) required a laparotomy. All anastomoses were made using a single-layer technique with a rupture outside the mucosa, with the use of delayed absorbable suture material. The loops were inverted by transverse closure after reshaping the edges, while in the remaining cases the short segment of the intestine was removed and an end-to-end anastomosis was performed. The median duration of the operation was 60 minutes (range 45-120 minutes). Intraperitoneal drains were placed at the discretion of the operating surgeon. In 19 cases (41.3%), wave drains were used in the wounds. 18 stoma closures (39.1%) were

supervised directly, and 28 stoma closures (60.9%) were performed by consultants. The mean stay after surgery was 6 days. (Median 5, range 4-15, SD ± 2.21 days) There was no operative mortality.

Complications related to the operation occurred in five patients (10.9%). The most common complications were wound infection and anastomotic leak. Leakage occurred in 2 patients (4.35%), 1 of which required relaparotomy. The second had a low-output fistula that responded to conservative treatment. Wound infection was found in 2 (4.35%) patients who were treated with simple drainage and oral antibiotics depending on culture and sensitivity. Paralytic Ileus occurred in 1 patient (2.17%) treated conservatively Table 2.

Table 2: Patient related risk factors for complications after ileostomy closure

| Risk factors | With Complications (n=5) | Without complications (n=41) | p-value |
|-----------------------------------|--------------------------|------------------------------|---------|
| Age in years (median) | 49(15-80) | 38 (14-65) | 0.12 |
| Gender | | | |
| Male | 03(40%) | 31(75.6%) | 0.128 |
| Female | 02(60%) | 10(24.4%) | |
| Type of stoma | | | 0.079 |
| Loop ileostomy | 01(20%) | 28(68.3%) | |
| Double barrel ileostomy | 02(40%) | 10(24.4%) | |
| Ileocolostomy | 01(20%) | 02(4.9%) | |
| End colostomy | 01(20%) | 01(2.4%) | |
| Reason for ileostomy | | | 0.421 |
| Typhoid perforation | 01(20%) | 15(36.6%) | |
| Abdominal tuberculosis | 01(20%) | 10(24.4%) | |
| Penetrating abdominal trauma | 00(0%) | 07(17.1%) | |
| Bowel gangrene | 02(40%) | 05(12.2%) | |
| Blunt abdominal trauma | 01(20%) | 01(2.4%) | |
| Large bowel obstruction | 00(0%) | 02(4.8%) | |
| Post-laparotomy Ileal perforation | 00(0%) | 01(2.4%) | |
| Post-abortion ileal perforation | 00(0%) | 01(2.4%) | |

Table 3: Operation technique related risk factors for complications after ileostomy closure.

| Risk factors | With complications n=5 | Without complications n=41 |
|---|------------------------|----------------------------|
| Median Interval(weeks) from construction to closure | 14 (10-21) | 14 (7-35) |
| Type of anastomosis | | |
| End to end closure | 03 | 06 |
| Enterotomy closure | 02 | 35 |
| Surgical approach | | |
| Relaparotomy | 02 | 02 |
| Closure at ileostomy site | 03 | 39 |
| Surgeons experience | | |
| Supervised trainee | 03 | 15 |
| Consultant. | 02 | 26 |
| Drains | | |
| Used | 03 | 15 |
| Not used | 02 | 26 |
| Duration of surgery in min | | |
| Median (range) | 60(45-120) | 60(45-90) |

DISCUSSION:

Temporary small bowel stoma is a common surgical procedure in both elective and emergency situations to protect the distal anastomosis or to avoid intraperitoneal anastomosis if the surroundings are hostile. It is generally recommended that you close your temporary stoma within 9-12 weeks. However, some patients do not tolerate a temporary stoma because of a poor fit of the pouch, which leads to premonitions of the surrounding skin, dehydration, electrolyte imbalances and nutritional deficiencies, so you may opt for an early closure. Closing the ileostomy may be associated with mortality and morbidity. The presented series showed conflicting results on morbidity and mortality rates. But the overall complication rate after an ileostomy is closed ranges between 2.4% -48.2%. Various factors are responsible for complications after an ileostomy is closed. Such as skin closure techniques and anastomotic sites, surgeon's experience, type of stoma, and the interval between primary surgery and closure. In our study, surgical complications requiring reoperation that could be treated conservatively were considered morbid. Wound infection is a common complication after stoma closure. It ranges from 1.3% -14.2% depending on the skin closing technique. Various techniques have been used to close the skin wound. The rate of infections associated with wound closure by secondary intention is low, but it causes a very unsightly scar and prolongs hospital stay. Primary shutdown is usually associated with a high

infection rate. However, when broad-spectrum antibiotics are used along with primary closure, it gives good results in terms of the cosmetic infection rate and hospital stay. Delayed primary wound closure also has a low infection rate at the wound site. Lee JR *et al*; observed a low infection rate when the string technique was used instead of linear closure.

A catastrophic complication of intestinal anastomosis is an anastomotic leak leading to peritonitis, which is associated with high morbidity and mortality. The percentage of complications with leakage of 5-8% at the anastomotic site has been documented. It was observed that the time interval from onset to closure had a significant impact on the complication rate ($p < 0.0001$). Anastomotic leakage was small in those who underwent closure after 90 days than in those who were less than 30 days old. Surgeon's experience is another factor influencing the complication rate of stoma reversal. A slight anastomotic leakage was observed in the hands of experienced surgeons. The closure of the stoma can be retroperitoneal or intraperitoneal through the same site. Retroperitoneal closure was performed to minimize intraperitoneal contamination following anastomotic breakdown. But it was associated with high intestinal fistula and incisional hernia formation and was reserved for special cases. Those who underwent relaparotomy and anastomotic closure had a higher complication rate than those whose closure was restricted to the stoma site. Various techniques of anastomotic closure have

been used to control complications of the anastomotic line. It has been observed that the closure of the loop is associated with fewer complications at the suture line than with split stomas. This is most likely because there is less need to dissect the mesentery in the closure of the loop than in split stomas. However, according to S.A Garcia-Botello et al. There are no statistically significant differences in the incidence of occlusion techniques ($p = 0.892$). Paralytic ileus and small intestine obstruction are other complications seen after stoma inversion. The reported incidence varies across series from 4% to 16.6%. Paralytic Ileus is most likely caused by electrolyte imbalance and small intestine obstruction as a result of postoperative adhesions. They both usually respond well to conservative treatment, and surgery is rarely indicated.

CONCLUSION:

Ileostomy reversal is not free from complications. However, it was concluded that anastomotic closure techniques, stoma type, surgeon's experience, and skin closure technique were predictors of complications. Loop closure, enterotomy using the extra-mucosal technique gives better results than end-to-end resection and anastomosis. The risk of wound infection and dehiscence is low for delayed primary skin closure than for primary skin closure.

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