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Original Article

Evaluation of the Causal Factors of Complications Following Ileostomy Closure

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ABSTRACT

Objective: To estimate the causative factors of complications in ileostomy reversal. This study was conducted at the Department of Surgery Khairpur Medical College Khairpur Mirs from January 2021 to December 2021. **Methods:** This analysis comprised 52 patients selected consecutively who underwent ileostomy reversal within one year. The study excluded patients under 12 years of age. All patients were followed weekly for three months. The main measure of outcome was the occurrence of surgical complications within 30 days of resolution. **Results:** 52 total patients of ileostomy closures were analyzed to evaluate features contributory to mortality and morbidity. There was no death in this study, but the complication ratio was 15.4% (8 patients), the most common complications were leakage of anastomosis 4 (7.7%), infection of wound 2 (3.8%) and intestinal obstruction 2 (3.8%). The anastomotic site closure technique, primary stoma closure, surgeon's experience and stoma type were important contributing factors. **Conclusions:** We determined that ileostomy closure is related with several problems but not cause any death. The techniques of closure of the anastomotic site, the surgeon's experience, the type of stoma and the technique of closure of skin were forecasters of complications.

INTRODUCTION

From Creating a stoma is a common procedure in both emergency and elective surgery in general surgery. Colostomy was introduced in the 1800s for treatment of intestinal obstruction [1,2]. Intestinal stomas were considered demanding procedures due to the high complication rate [3,4]. With the advancement of surgical techniques, the need for a stoma has increased [5]. An Ileostomy is a life-saving technique that allows people to adore a wide variety of daily goings-on [6,7]. Ileostomies are compulsory when the stoma or the ileum distal from the large intestine is damaged or diseased. An ileostomy can be permanent or temporary, contingent on the indications for surgical procedure [8]. A temporary ileostomy is generally removed after sometime [9,10]. Although the first indication reduces the risk of surgery, it is associated with some morbidity and mortality after confinement. Regarding complications, the testified studies display contradictory outcomes [11]. Thus, incidence ratio after temporary stoma closure ranges from 2.4% to 48.2%. After stoma closure, the most common surgical complications are wound infection, anastomotic leakage, paralytic ileus, bleeding, and small bowel obstruction [12]. Various patient and procedure related risk factors persuading stoma closure complications. These complications affect the patient's health and increase the postoperative hospital stay and hospitalization costs.

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METHODS

52 subsequent patients whose ileostomy was closed after eight weeks of ileostomy were enrolled in the analysis. The study excluded patients under 12 years of age, patients who were closed within 6 weeks, and patients who had undergone additional unrelated surgery. The temporary ileostomy indications, demographics of patients and surgery particulars were recorded. A distal barium loopogram was accomplished in all subjects before closure. Oral feeding was discontinued the day before surgery, and routine bowel preparation of the distal and proximal parts of the intestine, lavage with an orally administered mannitol solution prior to surgery, and lavage of the distal parts with saline were performed. For 5 days, all patients were given parenteral antibiotics (ceftriaxone and metronidazole). All patients were required to provide their informed permission to a laparotomy. The stoma was mobilized from the adjacent peritoneal and fascial adhesions using an elliptical circumstomal incision. After freshening the enterotomy margins and splitting the mesenteric side integral and the transversely closed enterotomy, a delayed absorption suture was employed with a hand stitched extra-mucosal in interrupted single layer method. Interrupted prolene 0 stitches were used to close the muscle gap. All skin wounds were closed with 2/0 interrupted prolene, and a sterile dressing was used as needed. Complications were evaluated during the hospital stay and in weekly surveillance for three months after release. Surgical complications included anastomotic leaking, paralytic ileus, and wound infections. Several risks associated with the surgery have been identified. As a consequence, after 30 days, there were no difficulties associated to the procedure. SPSS version 20 was used to analyze the data. Statistical significance was defined as a p value of less than 0.05.

RESULTS

52 total patients of ileostomy closures were analyzed to evaluate features contributory to mortality and morbidity. All patients experienced emergency surgery. 17-83 years was the patients age range with the 43.2 years mean age, and 1.7 S.D. 33 (63.5%) subjects were males and 19 (36.5%) were females. The most communal indication for an ileostomy was exteriorization of the ileal perforation of typhoid fever 16 (30.8%). Subsequently penetrating abdominal trauma 9 (17.3%), abdominal tuberculosis 13 (25%), blunt abdominal trauma 3 (5.8%), intestinal gangrene 4 (7.7%), post-laparotomy 2 (3.8%), large bowel obstruction 4 (7.7%), ileal perforation post-abortion 1 (1.9%). In the majority of patients, the ileum was introduced as loop, followed by an illeo-colostomy, double-barrel ileostomy and an end ileostomy with a distant mucous fistula. (Table 1)

Type of stoma	
Double barrel ileostomyy	15(28.8%)
Loop ileostomy	31(59.6%)
Ileocolostomy	3(5.8%)
End ileostomy with distant mucus fistula	2(3.8%)

Table 1: Types of Ileostomies

The median period from stoma insertion to closure was 15 weeks (range 8-37, mean 14± 7.1). An elliptical peri-ileostomy incision was used for 46 closures, with six necessitating laparotomies. All anastomoses were made in a hand sewn extra-mucosal in interrupted single layer technique was used with a delayed absorption suture. The loops were reversed by transverse closing after reshaping the edges, while in other cases a short segment of the intestine was excised and an end-to-end anastomosis was performed. The mean operative duration was 55 minutes (range 47-125 mints).

Risk elements	(n=8) with complic-ations	Without complications (n=44)	p-value
Years of age (median)	50(17-83)	39 (15-68)	0.10
Gender			
Male	05(62.5%)	33(75%)	0.13
Female	03(37.5%)	11(25%)	
Stoma classification			
Ileostomy loop	02(25%)	30(68.2%)	0.080
Ileostomy with two barrels	03(37.5%)	11(25%)	
Ileo-colostomy	02(25%)	01(2.3%)	
colostomy removal	01(12.5%)	02(4.5%)	
Reason for ileostomy			
Perforation after Typhoid fever	02(25%)	14(31.8%)	0.430
Abdominal TB	02(25%)	11(25%)	
Penetrating trauma to abdomen	01(12.5%)	06(13.6%)	
Gastrointestinal gangrene	01(12.5%)	07(15.9%)	
Abdominal blunt trauma	02(25%)	02(4.5%)	
Obstruction of the large intestine	00(0%)	01(2.3%)	
Post-laparotomy Perforation of ileum	00(0%)	02(4.5%)	
Ileal perforation after abortion	00(0%)	01(2.3%)	

Table 2: Complications following ileostomy closure are linked to patient risk factors

The intraperitoneal drainage was maintained according to the operating surgeon's decision. Corrugated drainage was used in 20 (38.5%) patients. Stoma closure 21 procedures (40.4%) were performed under direct supervision, while 31 (59.6%) closures were accomplished by surgeons. Seven days was the mean stay postoperatively (median 4, range 4-16, SD ± 2.30 days). There was no death in this study, but the complication ratio was 15.4% (8 patients), the most common complications were leakage of anastomosis

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4(7.7%), infection of wound 2 (3.8%) and intestinal obstruction 2 (3.8%). The anastomotic site closure technique, primary stoma closure, surgeon expertise, and stoma type all played a role. Intestinal obstruction developed in 1 patient (2.3%) treated conservatively.

Risk elements	n=8) with complications	n=44 Without complications
Median Interval(weeks) from construction to closure	10 (9-20)	15 (8-37)
Anastomosis Types		
Complete closure	04	06
Close the enterotomy	03	39
Surgical method	01	05
Closure of the ileostomy site relaparotomy	02	44
Surgeon's experience		
Supervised trainee	05	16
Consultant	04	29
Drains		
Used	05	15
Not used	03	29
Duration of surgery in min		
Median (range)	55(47-125)	52(43-85)

Table 3: Complications after ileostomy closure are linked to the operation method

DISCUSSION

Temporary small bowel stoma creation is a common operating technique in both emergency and elective situations to preserve distal anastomosis or to evade intraperitoneal anastomosis in a hospital environment [10,11]. It is usually suggested to close temporary stoma within 10 to 12 weeks. However, some patients do not tolerate a transient stoma due to poor pouch location, result in dehydration, surrounding skin erosion, nutritional deficiencies and electrolyte imbalance, so prompt closure might be an option [12,13]. Closing an ileostomy may be related with morbidity and mortality. The conveyed studies showed contradictory outcomes in terms of morbidity and mortality. However, the overall complication rate for ileostomy closure ranges from 2.4% to 48.2%. A variety of factors have been thought to be responsible for complications following an ileostomy closure. Such as skin closure techniques and anastomotic sites, surgeon's experience, time amid initial surgery and closure and type of stoma [14]. In current study, the medical condition was considered to be a surgical complication that required repeated intervention and could be treated conservatively. The infection in the wound is a communal impediment after closure of stoma. Depending on the technique of skin closing, it ranges from 1.3-14.2%. Various procedures have been cast-off to close the skin wound. Secondary wound closure has a low infection rate but leaves a very unsightly scar and extends stay in hospital [15,16]. Prompt closure is frequently related with a high ratio of infection. However, when broad-spectrum antibiotics are given in conjunction with primary debridement, they give virtuous outcomes in terms of hospital stay and cosmesis. When the purse string approach was employed instead of linear closure, Lee JR et al, found a low risk of infection. An anastomotic leak leading to peritonitis, which is related with increased mortality and morbidity, is a severe barrier to gut anastomosis [17,18]. The frequency of complications has been documented with 5-8% leakage at the anastomotic site. The time from onset to closure was found to have important impact on the rate of complications ($p < 0.0001$) [19,20]. The leakage of the anastomosis was smaller in those closed after 3months than in those closed at intervals shorter than one-month. The experience of surgeon is additional factor that modifies the rate of complication in stoma reversal. Low leakage at anastomosis site was observed in the hands of skilled specialists [21,22]. From the same location, the stoma can be closed retroperitoneally or intraperitoneally. After anastomotic leakage, retroperitoneal closure was performed to reduce intraperitoneal contamination. However, it has been associated with high-form enterocutaneous fistulas and incision hernias and was reserved for special cases [23]. Other complications observed after stoma reversal are paralytic ileus and small bowel obstruction. The reported incidence varies between 4-16.6% across series. Paralytic ileus is probably caused by electrolyte imbalance and small intestine obstruction due to postoperative adhesions. Both respond well to cautious management in general, and operation is rarely defined.

CONCLUSION

It is not feasible to reverse an ileostomy without problems. However, it has been discovered that anastomotic site closure techniques, stoma type, surgeon expertise, and skin closure technique are all predictive of problems. Retrograde enterotomy, resection, and end-to-end anastomosis all have worse results than loop closures. When compared to primary skin closures, the risk of infection and wound dehiscence is reduced with delayed primary skin closures.

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