Original Article

Early Closure of Loop Ileostomies in Typhoid Perforation

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ABSTRACT

Objective: To determine the outcome (morbidity and mortality after surgery) of early ileostomy closure after typhoid perforation.

Study Design: Descriptive, Cross Sectional Study

Place and Duration of Study: This study was conducted at the Department of General Surgery, Liaquat University Hospital Hyderabad/Jamshoro from February 2022 till January 2023.

Materials and Methods: 100 consenting patients meeting the eligibility criteria underwent elective early ileostomy reversal (<6 weeks of ileostomy). Details were noted regarding the imaging procedure done for stoma assessment and operative notes (duration of surgery, adverse events, blood loss etc.). Patients were followed up postoperatively till discharge and at 7th day, 14th day, 21st day and then at 6 weeks for evaluation of the outcomes.

Results: The mean age of the patients was 35 ± 5.75 years. Parastomal hernia occurred in 4 (4%) patients, wound infection was present in 20 (20%) patients, anastomotic leakage was seen in 7 (7%) patients, skin excoriation occurred in 4 (4%) patients, prolonged hospital stays occurred in 26 (26%) patients and mortality occurred in 1 (1%) patients.

Conclusion: Early reversal of ileostomy after typhoid perforation was associated with lesser rates of anastomotic leakage, skin excoriation and mortality but with higher rates of wound infection and prolonged hospital stay.

Key Words: Typhoid perforation, ileostomy, reversal

INTRODUCTION

Typhoid fever, once regarded as the commonest cause of fever worldwide, has witnessed a downward trajectory in most developed parts of the world, however, it is still a major public health concern in the developing world owing to poor sanitation, untreated sewage and sub-par water treatment facilities; leading to much morbidity and mortality[1]. With the introduction and widespread distribution of numerous drug-resistant strains of the bacterium in different Asian nations, the situation has recently gotten worse. Case fatality rates associated with the transmission of these pathogens are getting close to those recorded in the pre-antimicrobial therapy era[2]. As a result, Asia has the highest morbidity rate, with 93% of all episodes occurring there. The third highest incidence rate of any location is thought to be in

Southeast Asia, where there are 110 cases per 100,000 people[3]. Despite the dearth of population-based data from Pakistan, numerous hospital-based studies from various regions of the nation have consistently revealed a relatively high frequency of typhoid fever[4]. One of the most frequent side effects of typhoid fever is intestinal perforation. It is the second most frequent reason for ileal perforations and is responsible for roughly 23% of all perforations that have been recorded in developing countries[5]. Traditionally, the third week is when the perforation happens. The majority of patients have longitudinal ulcers on the antimesenteric boundary within 45 cm of the ileocecal valve, which causes infection of Peyer's patches in 85% of cases, leading to solitary disease. A patient with a serious condition who has a perforation is frequently not diagnosed with it until it has developed into a full-blown case of suppurative bacterial peritonitis due to intestinal bacterial leaking brought on by a super-infection. As a result, the situation is a common surgical emergency[6]. The typical course of treatment is a risky resuscitation laparotomy after the diagnosis of subsequent peritonitis brought on by hollow viscus perforation. Depending on the degree of peritonitis and the patient's overall health, the ileal perforation is either largely closed, the intestine is resected and anastomosed, or a diverting stoma is made[7]. The small intestine's distal end and the abdominal wall are externally connected through surgery called an ileostomy, which is routinely performed[8]. Due to the early initiation of enteral

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feeding and nutritional accumulation, ileostomy as a therapeutic option has a lower death rate, although it is frequently accompanied by both general and local problems[9]. Poor sitting, parastomal hernia, prolapse, retraction, ischemia/necrosis, peristomal dermatologic issues, mucocutaneous separation, and pyoderma gangrenosum are some of the typical stoma consequences[10]. These complications are more pronounced if stoma is left for a long period of time. This is substantiated by recent research that claims early closure of loop Ileostomy, to be safer, with low morbidity and minimal mortality and reduced the chances of stoma related complications[11]. However, if at least 12 weeks pass between the formation of the sta and its reversal, the procedure will be simpler to carry out since edema and inflammatory adhesions will have had time to subside[12]. In addition to that, although early closure reduces ileostomy complications, it significantly increases the post-closure wound infection rate, adding to the already high hospital readmissions rate and healthcare burden[13]. There is currently a lot of interest in the early reversing of intestinal stomas, and several recent studies have supported the innovative idea of doing so four weeks after the stoma was first created[14]. Some reviews also promote closing of temporary stoma as early as within 2 weeks[15].

MATERIALS AND METHODS

This Descriptive, Cross Sectional Study was carried out at the Department of General Surgery, Liaquat University Hospital Hyderabad/Jamshoro from February 2022 till January 2023. Data was collected through Non-Probability Consecutive Sampling. A total of 100 cases were studied, by keeping a 5% margin of error, Confidence level: 95%, Response Rate: 50%.

Inclusion Criteria: Consenting patients (diagnosed surgically treated for ileal perforation via ileostomy) aged 25 to 45 years without comorbidity with normal blood CP and serum albumin and scheduled for an early ileostomy closure <6 weeks at the study setting were included into the study after taking written informed consent.

Exclusion Criteria: Non-consenting patients or patients that were malnourished, immuno-compromised or aged. And Older than 45 years were excluded from the study.

Data Collection: Data was collected for a period of six weeks and each patient was followed up postoperatively till discharge and at 7th day, 14th day, 21st day and then at 6 weeks for evaluation of the outcomes. The primary source of data was collected in person from the patient and attendant initially on admission after informed consent followed by brief history, observation and assessment of patient during the intraoperative and postoperative period at above mentioned schedule with proper documentation of each variable at successive sessions.

Procedure Technique: All 100 consenting patients meeting the eligibility criteria were made to undergo early ileostomy reversal (<6 weeks of ileostomy). All of the reversal procedures were completed on the elective list. After performing a preoperative distal loopogram to determine the distal patency, the loop ileostomy was reversed within six weeks using the conventional method of closure. After receiving informed consent, a consultant surgeon operated on each case while under general anesthesia. The night before surgery, a clear liquid diet was made available to all patients. Before the induction of anesthesia, prophylactic antibiotics (injection cefuroxime 1.5gm I/V and metronidazole 500 mg I/V) were given. Before the procedure began, an adrenaline solution was administered around the stoma to stop the bleeding and make the dissection easier. Just outside the stoma, an elliptical incision was created, and dissection was continued until the peritoneal cavity was reached and opened. All adhesions were freed after entering the peritoneal cavity under close observation using blunt and sharp dissection. Following the mobilization of the loop and freshening of the ileostomy borders, the stoma was transversely closed with Vicryl 2/0 using a single interrupted extramucosal layer method. The luminal patency and the contents of the gut were squeezed with the thumb and index finger to check for a gross visible leak. Returning the bowel to the peritoneal cavity, it was positioned next to the wound. After establishing hemostasis, the abdominal wall was completely closed with polypropylene 1. Plastic 2/0 was used to seal the skin. Up until the return of bowel sounds and the passage of flatus, the patient was maintained off of oral intake. Data was recorded onto a pre-structured questionnaire, containing inquiries pertaining to basic biodata, sociodemographic details, surgical outcomes (morbidity and mortality). Details were also noted regarding the imaging procedure done for stoma assessment and operative notes (duration of surgery, adverse events, blood loss etc.). Patients were followed up postoperatively till discharge and at 7th day, 14th day, 21st day and then at 6 weeks for evaluation of the outcomes.

Statistical Analysis: The statistical data was evaluated via SPSS version 21. Patients were evaluated for the outcome such as morbidity and mortality after the surgery. Qualitative data such as gender, parastomal hernia, wound infection, anastomotic leakage, skin excoriation, mortality and prolonged hospital stay was expressed as number and percentage (No & %).

RESULTS

A total of 100 patients were enrolled. The mean age of the patients was 35 ± 5.75 years, the mean duration of symptoms was 18 ± 3.08 days, the mean duration of hospital stay was 8 ± 3.53 days and the mean BMI was 26.3 ± 4.29 (Table 1). There were 76 (76%) males and 24 (24%) females (Figure-I), anastomotic leakage was

seen in 7 (7%) patients (Figure-I), skin excoriation occurred in 4 (4%) patients (Figure-II). Prolonged hospital stay was seen in 7 (7%) patients of young age and 19 (19%) patients of early middle age (p=0.581) and mortality occurred in 0 (0%) patients of young age and 1 (1%) patients of early middle age (p=0.583) (Table 2). With respect to gender, it was revealed that parastomal hernia occurred in 2 (2%) male patients and 2 (2%) female patients (p=0.214), wound infection occurred in 11 (11%) males and 9 (9%) female patients (p=0.014), anastomotic leakage occurred in 6 (6%) male patients and 1 (1%) female patient (p=0.533), skin excoriation occurred in 3 (3%) male patients and 1 (1%) female patient (p=0.962), prolonged hospital stay was seen in 17 (17%) male patients and 9 (9%) female patients (p=0.141) and mortality occurred in 0 (0%) male and 1 (1%) female (p=0.074) (Table 3).

Table No.1: Mean Of Quantitative Variables (n=100)

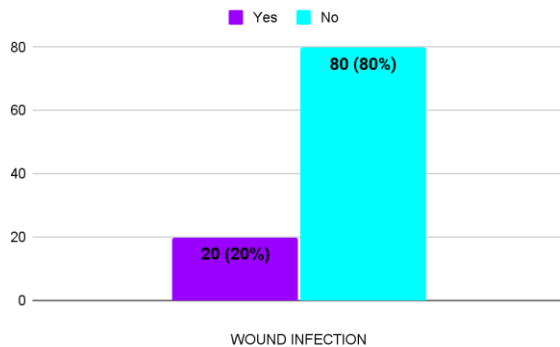| Variable	Mean±Standard Deviation
Age (in years)	35±5.75
Duration of symptoms (in days)	18±3.08
Duration of hospital stay (in days)	8±3.53
BMI (in Kg/m²)	26.3±4.29

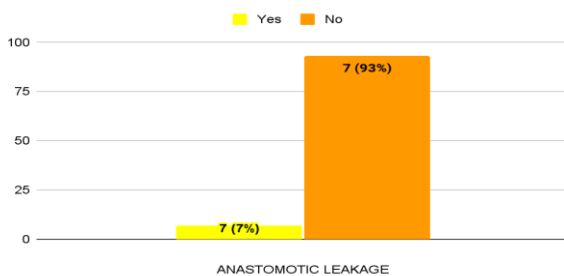**Figure No.I: Frequency of Wound Infection in Patients**

Figure No.2: Frequency of Anastomotic Leakage

Skin excoriation occurred in 4 (4%) patients with short duration of symptoms and 0 (0%) patients with long duration of symptoms (p=0.307), prolonged hospital stay was sees in 20 (20%) patients with short duration of symptoms and 6 (6%) patients with long duration of symptoms (p=0.648) and mortality occurred in 1 (1%) patient with short duration of symptoms and 0 (0%) patient with long duration of symptoms (p=0.615) (Table 4). Patient who was obese (p=0.984), skin excoriation occurred in 3 (3%) patients who had normal BMI and in 1 (1%) patient who was overweight (p=0.454), prolonged hospital duration was seen in 12 (12%) patients who were overweight, 10 (10%) patients who were overweight and in 4 (4%) patients who were obese (p=0.966) and mortality occurred in 1 (1%) patients who had a normal BMI (p=0.553) (Table 5).

Table No.2: Stratification of outcomes with respect to age (n=100)

Outcome		Age Group		P Value
		Young age (25 to 30 years) n=23	Early middle age (31 to 45 years) n=77	
Parastomal hernia	Yes	0 (0%)	4 (4%)	0.265
	No	23 (23%)	73 (73%)	
Wound infection	Yes	2 (2%)	18 (18%)	0.122
	No	21 (21%)	59 (59%)	
Anastomotic leakage	Yes	3 (3%)	4 (4%)	0.195
	No	20 (20%)	73 (73%)	
Skin excoriation	Yes	0 (0%)	4 (4%)	0.265
	No	23 (23%)	73 (73%)	
Prolonged hospital stay	Yes	7 (7%)	19 (19%)	0.581
	No	16 (16%)	58 (58%)	
Mortality	Yes	0 (0%)	1 (1%)	0.583
	No	23 (23%)	76 (76%)	

Table No.3: Stratification of Outcomes with Respect to Gender

Outcome		Gender		P Value
		Male n=76	Female n=24	
Parastomal hernia	Yes	2 (2%)	2 (2%)	0.214
	No	74 (74%)	22 (22%)	
Wound infection	Yes	11 (11%)	9 (9%)	0.014
	No	65 (65%)	15 (15%)	
Anastomotic leakage	Yes	6 (6%)	1 (1%)	0.533
	No	70 (70%)	23 (23%)	
Skin excoriation	Yes	3 (3%)	1 (1%)	0.962
	No	73 (73%)	23 (23%)	
Prolonged hospital stay	Yes	17 (17%)	9 (9%)	0.141
	No	59 (59%)	15 (15%)	
Mortality	Yes	0 (0%)	1 (1%)	0.074
	No	76 (76%)	23 (23%)	

Table No.4: Stratification of outcomes with respect to duration of symptoms

Outcome		Duration of Symptoms		P Value
		Short duration (≤21 days) n=80	Long duration (>21 days) n=20	
Parastomal hernia	Yes	2 (2%)	2 (2%)	0.126
	No	78 (78%)	18 (18%)	
Wound infection	Yes	17 (17%)	3 (3%)	0.532
	No	63 (63%)	17 (17%)	
Anastomotic leakage	Yes	7 (7%)	0 (0%)	0.170
	No	73 (73%)	20 (20%)	
Skin excoriation	Yes	4 (4%)	0 (0%)	0.307
	No	76 (76%)	20 (20%)	
Prolonged hospital stay	Yes	20 (20%)	6 (6%)	0.648
	No	60 (60%)	14 (14%)	
Mortality	Yes	1 (1%)	0 (0%)	0.615
	No	79 (79%)	20 (20%)	

Table No.5: Stratification of outcomes with respect to BMI

Outcome		Body Mass Index			P Value
		Normal BMI (20 to 25 K/m^2) (n=46)	Over-weight (25.1 to 30 Kg/m^2) (n=40)	Obese (>30 Kg/m^2) (n=14)	
Parastomal hernia	Yes	1	2	1	0.649
	No	45	38	13	
Wound infection	Yes	11	6	3	0.582
	No	35	34	11	
Anastomotic leakage	Yes	3	3	1	0.984
	No	43	37	13	
Skin excoriation	Yes	3	1	0	0.454
	No	43	39	14	
Prolonged hospital stay	Yes	12	10	4	0.966
	No	34	30	10	
Mortality	Yes	1	0	0	0.553
	No	45	40	14	

DISCUSSION

The current study revealed that in the patients who underwent early reversal of ileostomy, the commonest morbidity encountered was prolonged hospital stay in 26% and wound infection i.e. in 20% of the patients, followed by anastomotic leakage in 7%, parastomal hernia in 4%, skin excoriation in 4% and mortality occurred only in 1% of the patients. Majority of the patients were of early middle age (77%), were predominantly male (76%), had shorter duration of symptoms (80%) and had a normal BMI (46%). In terms of effect modifiers, only significant association was seen between gender and wound infection, whereas no other effect modifier had any statistically significant association with the outcomes. In our study wound infection occurred in 20% of the patients who underwent early reversal of ileostomy. Mehbooh *et al.*

in a study conducted in Karachi revealed that wound infection occurred in 13% patients who underwent ileostomy closure[16]. Garg and Charoker assessed complications related to ileostomy which was closed within a time frame of 3 to 6 weeks following the initial surgery and found that postoperatively, complications were seen in 27.3% individuals and the commonest complication seen was infection of wound i.e. 18.2%[17]. Gopal *et al.* revealed that the frequency of wound infection in the early ileostomy reversal group was 12.5%[18].

CONCLUSION

The current study concluded that early reversal of ileostomy after typhoid perforation was associated with lesser rates of anastomotic leakage, skin excoriation and mortality but with higher rates of wound infection and prolonged hospital stay. However, there is still need to have a comparison with delayed reversal of ileostomy in order to confirm if there is any significant difference between the outcomes of both.

Author's Contribution:

Concept & Design of Study:	Sheraz Malik
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Data Analysis:	Aisha Masroor Bhatti, Maria Zeb, Saba Gul
Revisiting Critically:	Sheraz Malik, Amir Iqbal Memon
Final Approval of version:	Sheraz Malik

Conflict of Interest: The study has no conflict of interest to declare by any author.

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