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Comparative Study of Outcome of Early Versus Delayed Closure of Loop Ileostomy in Cases of Enteric Perforation

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ABSTRACT

Background: When patients arrive late in their illness, ileostomy is frequently performed to prevent primary closure in emergency surgical situations such as enteric or tubercular perforations. But there are several morbidities associated with ostomy, which lowers quality of life. Early ostomy closure can reduce related morbidity and let the patient to experience improved quality of life sooner. **Objective:** To compare the outcome of early versus delayed closure of loop ileostomy in cases of typhoid perforation. **Material & Methods:** The study was a randomized controlled trial conducted at Jinnah Hospital's General Surgery Department, Lahore, over six months. 190 patients were enrolled, with 95 in each group. Patients were divided into two groups using a lottery method: early closure (Group A) and delayed closure (Group B). Post-operatively, patients were maintained on antibiotics for 10 days. Data was collected using a pre-designed proforma, and outcomes were recorded according to the operational definition. **Results:** A study of 190 patients, with a mean age of 38.58±5.96 years, found that 44.7 % were male and 65.3% were female in the early closure group, and 55.3 % were male and 34.7% were female in the delayed closure group. Wound infection was 38.3% in the early closure group and 61.7% in the delayed closure group, with no mortality in the early closure group and four in the delayed closure group. **Conclusion:** If patients are carefully chosen, the current study shows the potential benefits of early closure of loop ileostomy and provides a workable substitute for a more traditional delayed method.

INTRODUCTION

Typhoid fever is a major public health issue, primarily occurring in impoverished, overcrowded areas of the developing world. Despite declining incidence rates, the global estimated number of typhoid fever episodes in 2010 was 13.5 million. Most of the disease burden is observed in South and South-East Asia and sub-Saharan Africa, primarily in low-income regions and rural areas (1, 2).

Typhoid intestinal perforation (TIP) is the most serious gastrointestinal complication, reported in 0.8% to 39% of patients, with a significant difference between high-income and low-resource countries (1, 3). Sub-Saharan Africa has a higher propensity to perforation than Asian countries, possibly due to more virulent agents (4). This is likely due to data from referral hospitals, where the ill patients are seen, rather than local disease virulence (5). Patients with delayed loop ileostomy closure were more likely to die (3.45%), have wound infection (26.3%), and have wound dehiscence (1.75%), according to the study (6). Patients with early closure, on the other hand, were more likely to die (6.25%), have wound dehiscence (6.67%), and get infected (3.12%) (7).

An ileostomy is a surgical procedure that involves bringing the ileum lumen through the abdominal wall, creating a temporary or permanent opening. The purpose is to evacuate stool from the body via the ileum, rather than the anus. The output typically consists of loose or porridge-like stool, similar to what passes through the small bowel. The output typically ranges from 200 to 700 ml per day and is typically formed on the right side of the abdomen (8).

There has been much discussion on the best time to close an ileostomy, whether it should be done early (generally within 2–4 weeks) or delayed (usually after 8–12 weeks). It is believed that early closure lowers healthcare expenses, enhances quality of life, and lessens issues associated with stomas. However, delayed closure is a more conventional and often used strategy due to worries about anastomotic healing, intra-abdominal infections, and general surgical hazards. There is still disagreement despite several studies examining the advantages and

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disadvantages of both early and delayed closure, especially in areas with limited resources where patient follow-up may be irregular (9).

Objective

To compare the outcome of early versus delayed closure of loop ileostomy in cases of typhoid perforation.

MATERIALS AND METHODS

The research period took place within the General Surgery Department of Jinnah Hospital in Lahore Pakistan between June 1 and December 1 of 2022. The study included 190 patients who were between 18 to 60 years old with typhoid perforation who needed loop ileostomy closure. Participation in this study required patients without diabetes or anemia and the researchers obtained consent before excluding ambiguous cases and patients who refused to join.

The pre-designed proforma collected data from enrolled patients, after which they received intravenous antibiotic treatment for 10 days following surgery. SPSS v25.0 analyzed the data, which exhibited age, gender, wound infection, and mortality as Mean ± S.D. Frequencies and percentages additionally displayed stratified data according to age, gender, and BMI. The Chi-square test showed significant differences between variables, where the analysis demonstrated results with a p-value set at ≤0.05 to emphasize the need to close ileal perforations properly and on time.

RESULTS

A total of 190 patients (95 in each group) were selected to compare early versus delayed closure of loop ileostomy in typhoid perforation cases. In the early closure group, 47.5% were aged 18–40 years and 54.2% were aged 41–60 years, while in the delayed closure group, 52.5% were aged 18–40 years and 45.8% were aged 41–60 years, with mean ages of 38.58±5.96 and 37.77±5.96 years respectively (p=0.455).

Gender distribution revealed that 44.7% were males and 65.3% were females in the early closure group, compared to 55.3% males and 34.7% females in the delayed closure group (p=0.020). Wound infection occurred in 38.3% of patients in the early closure group and 61.7% in the delayed closure group (p=0.092). Mortality was recorded as 0 in the early closure group and 4 deaths in the delayed closure group (p=0.121). Data was further stratified based on age, gender, and BMI (Tables 5–10).

Table 1

Description of Age

Age group	Groups		Total	p-value
	Early closure (A)	Delayed closure (B)		
18-40 years	56 (47.5%)	62 (52.5%)	118 (100.0%)	
41-60 years	39 (54.2%)	33 (45.8%)	72 (100.0%)	0.455
Total	95 (50.0%)	95 (50.0%)	190 (100.0%)	

Mean ±SD (early closure group) = 38.58±5.96 years
Mean ±SD (delayed closure group) = 37.77±5.96 years

Table 2

Description of Gender

Gender	Groups		Total	p-value
	Early closure (A)	Delayed closure (B)		
Male	63 (44.7%)	78 (55.3%)	141 (100.0%)	
Female	32 (65.3%)	17 (34.7%)	49 (100.0%)	0.020
Total	95 (50.0%)	95 (50.0%)	190 (100.0%)	

Table 3

Description of Wound Infection

Wound infection	Groups		Total	p value
	Early closure (A)	Delayed closure (B)		
Yes	18 (38.3%)	29 (61.7%)	47 (100.0%)	
No	77 (53.8%)	66 (46.2%)	143 (100.0%)	0.092
Total	95 (50.0%)	95 (50.0%)	190 (100.0%)	

Table 4

Description of Mortality

Mortality	Groups		Total	p-value
	Early closure (A)	Delayed closure (B)		
Yes	0 (0.0%)	4 (100.0%)	4 (100.0%)	
No	95 (51.1%)	91 (48.9%)	186 (100.0%)	0.121
Total	95 (50.0%)	95 (50.0%)	190 (100.0%)	

Table 5

Stratification for Wound Infection in Both Groups Concerning Age using the Chi-Square Test

Age group	Wound infection	Groups		Total	p-value
		Early closure (A)	delayed (B)		
18-40 years	Yes	8 (27.6%)	21 (72.4%)	29 (100.0%)	0.018
	No	48 (53.9%)	41 (46.1%)	89 (100.0%)	
	Total	56 (47.5%)	62 (52.5%)	118 (100.0%)	
41-60 years	Yes	10 (55.6%)	8 (44.4%)	18 (100.0%)	1.000
	No	29 (53.7%)	25 (46.3%)	54 (100.0%)	
	Total	39 (54.2%)	33 (45.8%)	72 (100.0%)	

Table 6

Stratification for Wound Infection in Both Groups Concerning Gender using the Chi-Square Test

Gender	Wound infection	Groups		Total	P-value
		Early closure(A)	delayed (B)		
Male	Yes	12 (37.5%)	20 (62.5%)	32 (100.0%)	0.421
	No	51 (46.8%)	58 (53.2%)	109 (100.0%)	
	Total	63 (44.7%)	78 (55.3%)	141 (100.0%)	
Female	Yes	6 (40.0%)	9 (60.0%)	15 (100.0%)	0.022
	No	26 (76.5%)	8 (23.5%)	34 (100.0%)	
	Total	32 (65.3%)	17 (34.7%)	49 (100.0%)	

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Table 7
Stratification for Wound Infection in Both Groups for BMI Group Using Chi-Square Test

BMI group	Wound infection	Groups		Total	p-value
		Early closure (A)	delayed (B)		
17-25 kg/m2	Yes	3 (30.0%)	7 (70.0%)	10 (100.0%)	
	No	19 (41.3%)	27 (58.7%)	46 (100.0%)	0.724
	Total	22(39.3%)	34 (60.7%)	56 (100.0%)	
>25 kg/m2	Yes	15 (40.5%)	22 (59.5%)	37 (100.0%)	
	No	58 (59.8%)	39 (40.2%)	97 (100.0%)	0.054
	Total	73 (54.5%)	61 (45.5%)	134 (100.0%)	

Table 8
Stratification for Mortality in Both Groups for Age Using the Chi-Square Test

Age group	Morality	Groups		Total	p value
		Early closure (A)	delayed (B)		
18-40 years	Yes	0 (0.0%)	1 (100.0%)	1 (100.0%)	
	No	56 (47.9%)	61 (52.1%)	117 (100.0%)	1.000
	Total	56 (47.5%)	62 (52.5%)	118 (100.0%)	
41-60 years	Yes	0 (0.0 %)	3 (100.0%)	3 (100.0%)	
	No	39 (56.5%)	30 (43.5%)	69 (100.0%)	0.091
	Total	39 (54.2%)	33 (45.8%)	72 (100.0%)	

Table 9
Stratification for Mortality in Both Groups for Gender Using the Chi-Square Test

Gender	Morality	Groups		Total	p value
		Early closure (A)	delayed (B)		
Male	Yes	0 (0.0%)	4 (100.0%)	4 (100.0%)	
	No	63 (46.0%)	74 (54.0%)	137 (100.0%)	0.128
	Total	63 (44.7%)	78 (55.3%)	141 (100.0%)	
Female	Yes	-	-	-	
	No	32 (65.3%)	17 (34.7%)	49 (100.0%)	-
	Total	32 (65.3%)	17 (34.7%)	49 (100.0%)	

Table 10
Stratification for Mortality in Both Groups for BMI Group Using the Chi-Square Test

BMI group	Morality	Groups		Total	p-value
		Early closure (A)	delayed (B)		
17-25 kg/m2	Yes	0 (0.0%)	1 (100.0%)	1 (100.0%)	
	No	22 (40.0%)	33 (60.0%)	55 (100.0%)	1.000
	Total	22 (39.3%)	34 (60.7%)	56 (100.0%)	
>25 kg/m2	Yes	0 (0.0%)	3 (100.0%)	3 (100.0%)	
	No	73 (55.7 %)	58 (44.3%)	131 (100.0%)	0.092
	Total	73 (54.5%)	61 (45.5%)	134 (100.0%)	

DISCUSSION

Iliostomy is primarily used in developed countries for distal colorectal or ileoanal pouch anastomosis protection. However, in developing countries, it is often used in emergency surgical settings due to infectious conditions or late illness presentation. Stoma creation can cause patients to experience altered body image, daily routines, lifestyle changes, and sexuality changes (10). Individual factors like age, socio-economic status, personality, and sex influence a person's adaptation to life with a stoma. Studies show patients with stomas have an inferior quality of life compared to those without stoma formation. Reversing a temporary stoma improves quality of life, but understanding the situation can interfere with adaptation. The time for reversal is crucial, and researchers aim to investigate morbidity, mortality, health, economic implications, and patient-reported outcomes related to reversing a temporary ileostomy (11).

The study compared the outcomes of early and delayed closure of loop ileostomy in typhoid perforation cases. Out of 190 patients, 47.5% were aged 18-40, 54.2% were aged 41-60, and 52.5% were aged 18-40. The mean age of the early closure group was 38.58±5.96 years, while the delayed closure group had a mean age of 37.77±5.96 years. The majority of patients were male, with a higher percentage of females in the early closure group. The wound infection rate was 38.3% in the early closure group, and mortality rates were 0 in the early closure group and 4 in the delayed closure group.

In the present study, we compared the outcomes of early versus delayed closure of loop ileostomy in patients with typhoid perforation. A total of 190 patients were enrolled, with 95 patients in each group. In the early closure group, 47.5% (n=56) were aged between 18 and 40 years, while 54.2% (n=39) were between 41 and 60 years. In the delayed closure group, 52.5% (n=62) were aged 18–40 years, and 45.8% (n=33) were aged 41–60 years. The mean age was 38.58±5.96 years in the early closure group and 37.77±5.96 years in the delayed closure group (p=0.455). Regarding gender distribution, in the early closure group, 44.7% (n=63) were male and 65.3% (n=32) were female, while in the delayed closure group, 55.3% (n=78) were male and 34.7% (n=17) were female (p=0.020). Wound infection rates were 38.3% (n=18) in the early closure group compared to 61.7% (n=29) in the delayed closure group (p=0.092). Mortality was recorded as 0 cases in the early closure group and 4 cases in the delayed closure group (p=0.121).

Many studies on early ostomy closure have been published in the West recently, although the patient profiles in India and the West differ significantly. Ileostomy is mostly used in industrialized nations as a protective covering for ileo-anal pouch anastomosis or distal colo-rectal anastomosis (12). However, in underdeveloped nations, where infectious diseases like tubercular or enteric perforations are prevalent and patients arrive late in their illness to avoid primary closure, it is still frequently performed in emergency surgical settings (10).

Early ostomy closure is feasible for patients with uneven recovery, lower wound complications, and small bowel obstruction, despite higher wound rates and morbidity rates.

The study found that ileostomy-related complications occurred in 39.4% of patients, with skin-related issues being the most common. In cases of enteric perforation, complications included peristomal skin excoriation,

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weight loss, retraction, fluid imbalance, and prolapse (10).

Park et al.'s randomized study on the EASY trial found no significant difference in quality of life between early and late closure groups, with all aspects improving over time. However, the study did not identify predictor factors affecting quality of life (13).

CONCLUSION

The results of early versus delayed loop ileostomy closure in typhoid perforation cases are compared in the current study. As long as patients are carefully chosen, the current study amply illustrates the potential benefits of early closure of loop ileostomy and is a workable substitute for a more traditional delayed method.

The study suggests that early ileostomy closure can reduce complications, improve patient outcomes, and shorten recovery time. It recommends future clinical protocols include clear patient selection criteria and large-scale, randomized studies to optimize safety and success.

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