

Frequency of Morbidity and Mortality after Loop Ileostomy in Patients Presenting With Typhoid Ileal Perforation

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ABSTRACT

INTRODUCTION: Typhoid ileal perforation remains a common acute surgical emergency in our hospital setting.¹

OBJECTIVE: To determine the frequency of morbidity and mortality after loop ileostomy in patients presenting with typhoid ileal perforation

STUDY SETTING: This descriptive case series was conducted at Department of General Surgery, ward 2 JPMC Karachi. A total of 105 patients were included using non-probability consecutive sampling.

METHODOLOGY: This descriptive case series included 105 patients aged 18–60 years with typhoid ileal perforation who underwent loop ileostomy with primary repair. Patients were enrolled through non-probability consecutive sampling and followed for 30 days postoperatively for morbidity and mortality.

RESULTS: A total of 105 patients with mean age 28.4 ± 9.7 years underwent loop ileostomy for typhoid ileal perforation. Male-to-female ratio was 2.9:1. Single perforation was present in 64.8% (n=68) and multiple perforations in 35.2% (n=37). The overall frequency of postoperative morbidity was 48.6% (n=51). Wound infection was the most common complication occurring in 27.6% (n=29) patients. The overall mortality rate was 7.6% (n=8).

CONCLUSION: Loop ileostomy for typhoid ileal perforation is associated with considerable postoperative morbidity and mortality, with higher morbidity observed in patients with multiple perforations.

KEYWORDS: Ileostomy, Enteric Ileal Perforation, Postoperative Complications

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INTRODUCTION:

Typhoid fever is a systemic infection caused by *Salmonella typhi* and remains a major public health problem in developing countries. Despite advances in antibiotics and sanitation, it continues to be endemic in Pakistan due to poor hygiene, contaminated water supply, and overcrowding. The estimated incidence of typhoid fever in Pakistan is 175 per 100,000 population per year, with peak occurrence in children and young adults¹.

Ileal perforation is one of the most serious and life-threatening complications of typhoid fever, occurring in 1-3% of hospitalized typhoid cases². The perforation usually occurs during the third week of illness due to necrosis of Peyer's patches in the terminal ileum. Patients typically present with acute abdomen, peritonitis, septicemia, and hemodynamic instability. If not managed promptly, it carries mortality rates as high as 10-30%³.

The management of typhoid ileal perforation is primarily surgical and includes primary closure, resection and anastomosis, and fecal diversion procedures. The choice of procedure depends on the number of perforations, duration of illness, degree of

peritoneal contamination, and general condition of the patient. Loop ileostomy with primary repair of perforation is a commonly practiced procedure, especially in cases of multiple perforations, unhealthy bowel edges, and gross fecal contamination⁴. The rationale behind loop ileostomy is to divert the fecal stream, reduce intraluminal pressure, and allow healing of the repaired site while avoiding the risks of primary repair leak.

However, this procedure is not without complications. Reported complications include wound infection, high-output stoma, stoma retraction, stoma prolapse, intra-abdominal abscess, burst abdomen, and mortality^{5, 6}.

In Pakistan, typhoid perforation accounts for 70-80% of all cases of non-traumatic ileal perforation⁷. Multiple studies have reported high morbidity and mortality associated with this condition. Butt et al. reported overall morbidity of 52% and mortality of 9.8% after loop ileostomy⁸.

Similarly, Ahmed et al⁹ found wound infection in 29% and mortality in 11.2% of patients. The high complication rate is attributed to delayed presentation, malnutrition, anemia, and poor socio-

economic status. Despite being a common procedure, there is limited local data specifically evaluating the frequency of morbidity and mortality after loop ileostomy in patients with typhoid ileal perforation. Moreover, risk factors such as number of perforations have not been extensively studied in our population. Understanding the frequency and pattern of complications after loop ileostomy is essential to improve surgical outcomes and patient counseling. Identification of high-risk groups, particularly patients with multiple perforations, can help in better perioperative planning and resource allocation.

OBJECTIVE: To determine the frequency of morbidity and mortality after loop ileostomy in patients presenting with typhoid ileal perforation.

METHODOLOGY

This descriptive case series was conducted in the Department of General Surgery, Surgical Ward 2, Jinnah Postgraduate Medical Centre (JPMC), Karachi, after approval from the institutional Ethical Review Committee. The study was conducted from February 21, 2026, to August 21, 2026. A total of 105 patients were enrolled through non-probability consecutive sampling. Written informed consent was obtained from all participants before enrolment.

Demographic data, duration of symptoms, number of perforations, and postoperative complications were recorded on a structured proforma.

Inclusion Criteria

Patients aged 18–60 years of either sex with typhoid ileal perforation diagnosed on the basis of clinical, radiological, and operative findings were included in the study. All included patients underwent loop ileostomy with primary repair of the perforation. Typhoid etiology was established by a positive Widal titre $\geq 1:160$, positive blood culture for *Salmonella* Typhi, or operative findings consistent with typhoid ileal ulcers.

Patients were monitored during their hospital stay and followed for 30 days postoperatively for the development of postoperative complications and mortality. The entire assessment was performed under the supervision of a consultant surgeon with at least five years of experience.

Exclusion Criteria

Patients with ileal perforation secondary to trauma, tuberculosis, malignancy, or other non-typhoidal causes; patients who underwent primary closure without diversion or end ileostomy; patients with diabetes mellitus, chronic kidney disease, chronic liver disease, immunocompromised states, or steroid use; and patients presenting more than 7 days after the onset of symptoms with septic shock were excluded from the study.

Data were analyzed using SPSS version 26. Categorical variables were presented as frequencies and percentages, whereas quantitative variables were expressed as mean $\pm$ standard deviation. The chi-square test was used to assess associations between categorical variables. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 105 patients with mean age 28.4 ± 9.7 years underwent loop ileostomy for typhoid ileal perforation. Male-to-female ratio was 2.9:1. Single perforation was present in 64.8% (n=68) and multiple perforations in 35.2% (n=37). The overall frequency of postoperative morbidity was 48.6% (n=51). Wound infection was the most common complication occurring in 27.6% (n=29) patients. Other complications included high-output stoma 12.4%, intra-abdominal abscess 9.5%, stoma-related complications 11.4%, burst abdomen 4.8%, and primary repair leak 2.9%. The overall mortality rate was 7.6% (n=8).

The primary cause of death was septicemia and multi-organ failure. On stratification, patients with multiple perforations had significantly higher overall morbidity 73.0% as compared to 35.3% in single perforation group, $p < 0.001$. Specifically, wound infection 40.5% vs 20.6%, $p = 0.028$ and high-output stoma 21.6% vs 7.4%, $p = 0.038$ were significantly more common with multiple perforations. Mortality was also higher in multiple perforation group 13.5% vs 4.4%, but was not statistically significant, $p = 0.112$. Patients who developed complications had significantly longer hospital stay 16.8 ± 5.1 days vs 8.4 ± 2.7 days, $p < 0.001$.

Table 1: Demographic and Clinical Characteristics

Variable	n = 105
Age (years) Mean $\pm$ SD	28.4 $\pm$ 9.7
Gender	
Male	78 (74.3%)
Female	27 (25.7%)
Number of Perforations	
Single	68 (64.8%)
Multiple	37 (35.2%)
Mean Duration of Symptoms (days)	4.8 $\pm$ 2.1

Table 2: Overall Frequency of Postoperative Morbidity and Mortality

Outcome	Frequency n (%)
Total Morbidity	51 (48.6%)
Total Mortality	8 (7.6%)
Mean Hospital Stay (days)	12.5 $\pm$ 4.3

Table 3: Type and Frequency of Postoperative Complications

Complication	n = 105
Wound Infection	29 (27.6%)
High Output Stoma >500ml/day	13 (12.4%)
Intra-abdominal Abscess	10 (9.5%)
Stoma Retraction	7 (6.7%)
Stoma Prolapse	5 (4.8%)
Burst Abdomen	5 (4.8%)
Primary repair leakage	3 (2.9%)

Table 4: Stratification of Complications with Number of Perforations

Complication	Single n=68	Multiple n=37	Total n=105	p-value
Wound Infection	14 (20.6%)	15 (40.5%)	29 (27.6%)	0.028
High Output Stoma	5 (7.4%)	8 (21.6%)	13 (12.4%)	0.038
Any Complication	24 (35.3%)	27 (73.0%)	51 (48.6%)	<0.001
Mortality	3 (4.4%)	5 (13.5%)	8 (7.6%)	0.112

DISCUSSION

Typhoid ileal perforation is a life-threatening complication of enteric fever and remains a major surgical emergency in developing countries including Pakistan. Loop ileostomy with primary repair is frequently performed in patients with multiple perforations, gross contamination, and hemodynamic instability. However, it is associated with significant morbidity and mortality. This study was conducted to evaluate the frequency of postoperative morbidity and mortality after loop ileostomy in patients presenting with typhoid ileal perforation. In the present study of 105 patients, the mean age was 28.4 ± 9.7 years with male predominance 74.3%.

This is consistent with Butt et al.⁸ and Khan et al.¹⁰ who reported that young adult males are most commonly affected. The observed male predominance is consistent with findings reported in previous studies. The overall frequency of morbidity was 48.6% and mortality was 7.6%. This morbidity rate is comparable to Ahmed et al.⁹ who reported 52.3% and Rasool et al.¹¹ who reported 46.8% morbidity after diversion ileostomy for typhoid perforation. Our mortality rate is slightly lower than that reported in some previous series, which may reflect improvements in early resuscitation, antibiotic therapy, and critical care.

Wound infection was the most common complication occurring in 27.6% of patients. This is similar to 29% reported by Sakhare et al.¹⁴ and 31% by Naveed et al.¹⁵ The high rate can be attributed to fecal contamination, malnutrition, anemia, and delayed presentation which are common in our population. High-output stoma >500ml/day was seen in 12.4% patients. This is within the range of 10-18% reported in literature.⁶ High-output stoma leads to dehydration, electrolyte disturbances, and prolonged hospital stay. Intra-abdominal abscess occurred in 9.5% and stoma related complications including retraction and prolapse in 11.4%. Burst abdomen (4.8%) and primary repair leakage (2.9%) were comparatively less frequent complications. Our findings are in agreement with Talpur et al.⁷ who

reported similar complication profile after loop ileostomy.

On stratification with number of perforations, multiple perforations were present in 35.2% of patients. Patients with multiple perforations had significantly higher overall morbidity 73.0% vs 35.3%, $p < 0.001$. Wound infection 40.5% vs 20.6%, $p = 0.028$ and high-output stoma 21.6% vs 7.4%, $p = 0.038$ were significantly more common in this group. Mortality was also higher 13.5% vs 4.4% but did not reach statistical significance, $p = 0.112$. This is consistent with Butt et al.⁸ and Qamar et al.¹⁶ who reported that multiple perforations are associated with increased septic load, prolonged operative time, and greater tissue trauma, all of which contribute to higher complication rates. Multiple perforations may reflect more advanced disease and have been associated with increased postoperative complications. The mean hospital stay was 12.5 ± 4.3 days and was significantly longer in patients with complications 16.8 ± 5.1 days vs 8.4 ± 2.7 days, $p < 0.001$.

This increases the financial burden on patients and hospital resources. Strengths of this study include a focused evaluation of loop ileostomy outcomes and stratification by number of perforations.

Limitations:

The limitations of this study include its single-center design, absence of a comparison group undergoing primary repair without diversion, and a relatively short 30-day follow-up period.

CONCLUSION:

Loop ileostomy for typhoid ileal perforation is associated with considerable postoperative morbidity and mortality. Multiple perforations were significantly associated with increased postoperative morbidity. Early diagnosis, timely surgical intervention, appropriate resuscitation, and meticulous postoperative and stoma care may help improve outcomes.

Authors' Contributions

Dr. Syedal Khan Kasi and Dr. Shabina Jaffar conceived and designed the study and were involved in data collection. Dr. Rahab, Dr. Haider, Dr. Beena, and Dr. Danish contributed to data analysis and manuscript preparation. Dr. Shabina Jaffar and Dr. Danish critically reviewed and revised the manuscript. All authors reviewed and approved the final manuscript.

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