



POSTOPERATIVE OUTCOMES IN CHILDREN WITH TYPHOID ILEAL PERFORATION: PRIMARY REPAIR VERSUS ILEOSTOMY

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ABSTRACT

Objective

To evaluate and contrast the postoperative outcomes of primary repair versus ileostomy in pediatric patients with typhoid perforation.

Methodology

This comparative study, conducted in pediatric surgery unit, DHQ Teaching Hospital Timergara Lower Dir KPK, Pakistan, in the duration from December 2022 to May 2024, included 70 patients aged 3 to 18 years diagnosed with typhoid perforation. After ethical approval and informed consent from guardians, patients were randomly divided into two groups: Group A (35 patients) underwent primary repair, while Group B (35 patients) received an ileostomy. Preoperative administration of broad-spectrum antibiotics was standard for all patients. Postoperative outcomes, including complications and mortality rates, were documented and analyzed using SPSS version 20.0, with categorical variables compared via the chi-square test to identify the more effective surgical intervention.

Results

This study compared outcomes of primary repair (Group A) versus ileostomy (Group B) in 70 pediatric patients with typhoid ileal perforation. Group A had a mean age of 10.5 years and Group B, 11.8 years, with a slightly higher proportion of males in both groups. Most patients had unsatisfactory socio-economic conditions and rural residency. Symptoms included abdominal pain (91%), pyrexia (87%), abdominal distention (81%), constipation (59%), vomiting (53%), and diarrhea (21%). Local complications were significantly higher in the ileostomy group, with notable differences in wound dehiscence, infection, and skin excoriation. Systemic complications like electrolyte disturbance and weight loss were also more frequent in the ileostomy group. Mortality was higher in the ileostomy group but not statistically significant. Primary repair demonstrated fewer complications and better outcomes, indicating it as the more effective treatment for pediatric typhoid perforation.

Conclusion

Our study favors primary repair over ileostomy for typhoid ileal perforation, showing fewer postoperative complications like wound issues and electrolyte disturbances. While both procedures had similar mortality rates, primary repair appears safer and more effective, especially for patients without significant health complications. This draws attention to the importance of choosing primary repair when managing this condition to improve surgical outcomes and patient recovery.

Keywords: Typhoid, ileal perforation, primary repair, ileostomy.

ARTICLE

Introduction

Typhoid fever, caused by the Gram-negative bacterium *Salmonella typhi*, is a significant infectious disease prevalent in tropical regions and the subcontinent.¹ The disease typically progresses through stages: beginning with fever and chills, advancing to systemic involvement with rash and abdominal discomfort, and culminating in severe complications such as intestinal hemorrhage and perforation, particularly in the third part of the ileum.² Typhoid ileal perforation (TIP) is a major surgical emergency in these regions, contributing to high morbidity and mortality rates, with mortality rates ranging from 5% to 62%, and potentially reaching 80% in cases of delayed treatment.³

The management of TIP poses a critical challenge, with several surgical options available including primary double-layered closure, segmental resection with end-to-end anastomosis, and primary ileostomy.⁴ Despite advances in diagnostic and therapeutic techniques, the optimal surgical intervention remains a subject of debate. Diagnosis is primarily reliant on blood cultures, though stool cultures and serological tests like the Widal reaction are also utilized.⁵

Intestinal perforations have long been recognized as a surgical concern, with evidence of such conditions dating back to ancient civilizations.⁶ The high incidence of enteric fever and tuberculosis in countries like Pakistan and India contributes to the prevalence of ileal perforation peritonitis, a common cause of acute abdomen in these regions. Without prompt treatment, the condition can lead to rapid deterioration and death.⁷⁻⁸

In the context of typhoid fever, nontraumatic ileal perforations can be attributed to a variety of infectious agents, including bacteria (such as *Salmonella* and *Mycobacterium tuberculosis*), viruses (such as cytomegalovirus and HIV), fungi (such as *Histoplasma*), and parasites (such as *Ascaris lumbricoides*, *Enterobius vermicularis*, and *Entamoeba histolytica*). Non-specific ileal perforations, where no specific cause is identified, also contribute to the burden of peritonitis, typically resulting from gram-negative aerobic and anaerobic infections.⁹⁻¹⁰

This study aims to compare the outcomes of primary repair versus ileostomy in pediatric patients with typhoid ileal perforation. By analyzing postoperative morbidity, mortality, and complications associated with each surgical approach, the research seeks to identify the most effective treatment strategy, ultimately contributing to the development of standardized management protocols for this life-threatening condition.

Objective

To evaluate and contrast the postoperative outcomes of primary repair versus ileostomy in pediatric patients with typhoid perforation.

Methodology

This comparative study was carried out in pediatric surgery unit, DHQ Teaching Hospital Timergara Lower Dir KPK, Pakistan, in the duration from December 2022 to May 2024. A total of 70 patients diagnosed with typhoid perforation were included in the study. Ethical board of the said institute approved the study. Detailed demographic information including age, sex, and body mass index was recorded after obtaining informed written consent from the patients' guardians. Patients under the age of 3 and those whose guardians did not provide written consent were excluded from the study.

The selected patients, aged between 3 and 18 years, were randomly assigned into two equal groups. Group A, comprising 35 patients, underwent primary repair of the typhoid perforation, while Group B, also comprising 35 patients, received an ileostomy. Prior to the emergency surgical intervention, all patients were administered broad-spectrum antibiotics.

Postoperative outcomes, including the incidence of complications and mortality rates, were meticulously documented and compared between the two groups. Statistical analysis was conducted using SPSS version 20.0. Frequencies and percentages were calculated for categorical variables, and

the chi-square test was applied to compare the outcomes between the two surgical methods. This methodological approach aimed to determine the more effective surgical intervention for pediatric patients with typhoid ileal perforation.

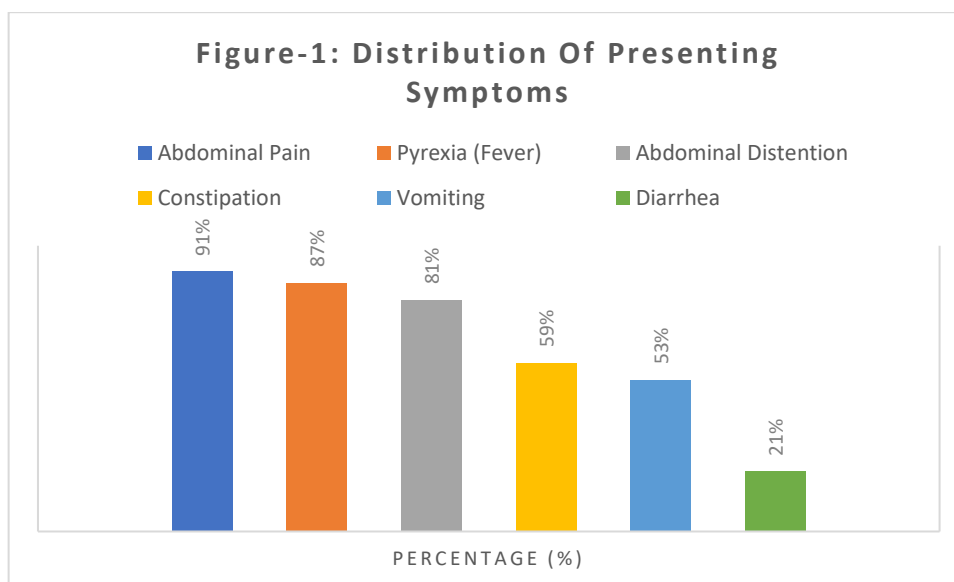
Results

In this comparative study involving 70 patients with typhoid ileal perforation, Group A underwent primary repair while Group B received ileostomy. The mean age was 10.5±6.8 years for Group A and 11.8±8.2 years for Group B. Both groups had a slightly higher proportion of males (57% in Group A and 63% in Group B) compared to females (43% in Group A and 37% in Group B). Socio-economic conditions were categorized as unsatisfactory for 63% of Group A and 69% of Group B, with the remaining having satisfactory conditions. Residence was predominantly rural for 54% of Group A and 57% of Group B, with the remainder residing in urban areas (Table-1).

Table-1: Demographics of both the treatment groups

Variable		Group A (Primary Repair) (n=35)	Group B (Ileostomy) (n=35)
Mean Age (years)		10.5 ± 6.8	11.8 ± 8.2
Gender	Male	20 (57%)	22 (63%)
	Female	15 (43%)	13 (37%)
Socio-Economic Condition	Unsatisfactory	22 (63%)	24 (69%)
	Satisfactory	13 (37%)	11 (31%)
Place of Residence	Rural	19 (54%)	20 (57%)
	Urban	16 (46%)	15 (43%)

In a cohort of 70 patients, several symptoms were observed. Abdominal pain was the most prevalent, affecting 64 patients (91%), followed closely by pyrexia (fever) which was reported in 61 patients (87%). Abdominal distention was noted in 57 patients (81%), while constipation affected 41 patients (59%). Vomiting was present in 37 patients (53%), and diarrhea was the least common symptom, observed in 15 patients (21%), which are depicted in figure-1 below.



The postoperative outcomes of this comparative analysis are discussed in Table-2. Local complications were notably higher in the ileostomy group, with wound dehiscence (30.00% vs. 4.00%, p<0.001), wound infection (65.00% vs. 22.00%, p=0.002), and skin excoriation (50.00% vs. none) being significantly more frequent. Additionally, systemic complications such as electrolyte disturbance (35.00% vs. 8.00%, p=0.008) and weight loss (55.00% vs. 8.00%, p<0.001) were markedly higher in the ileostomy group. Although not statistically significant, higher incidences of incisional hernia, obstruction, burst abdomen, ileostomy prolapse, pulmonary infection, septicemia,

and shock were also noted in the ileostomy group. Mortality rates were higher in the ileostomy group (12.50% vs. 4.50%), though this difference was not statistically significant ($p=0.370$). These findings suggest that primary repair is associated with fewer complications and better overall outcomes compared to ileostomy in the treatment of typhoid perforation in pediatric patients.

Table-2: Postoperative outcomes in both treatment groups

Outcomes	Group A (Primary Repair)	Group B (Ileostomy)	p-value	
Local Complications	Wound Dehiscence	2 (4.00%)	6 (30.00%)	<0.001
	Wound Infection	11 (22.00%)	13 (65.00%)	0.002
	Incisional Hernia	3 (6.00%)	3 (15.00%)	0.340
	Obstruction	2 (4.00%)	3 (15.00%)	0.145
	Burst Abdomen	4 (8.00%)	4 (20.00%)	0.240
	Primary Repair Leak	3 (6.00%)	-	-
	Ileostomy Prolapse	-	3 (15.00%)	-
Systemic Complications	Skin Excoriation	-	10 (50.00%)	-
	Electrolyte disturbance	4 (8.00%)	7 (35.00%)	0.008
	LRTI (Pulmonary Infection)	5 (10.00%)	5 (25.00%)	0.165
	Septicemia	3 (6.00%)	3 (15.00%)	0.570
	Weight Loss	4 (8.00%)	11 (55.00%)	<0.001
Death	Shock	2 (4.00%)	2 (10.00%)	0.505
		2 (4.50%)	4 (12.50%)	0.370

Discussion

In this study comparing primary repair and ileostomy for typhoid ileal perforation, our findings highlight significant differences in postoperative outcomes between the two surgical approaches. We observed that patients undergoing ileostomy had notably higher rates of wound dehiscence (30.00%) and wound infection (65.00%) compared to those who underwent primary repair (wound dehiscence 4.00%, wound infection 22.00%), with both differences proving statistically significant ($p < 0.001$ for wound dehiscence and $p = 0.002$ for wound infection). Additionally, electrolyte disturbance was more frequently encountered in the ileostomy group (35.00%) compared to the primary repair group (8.00%, $p = 0.008$). These findings align with previous studies by Mittal et al. and Mishra et al., which similarly reported higher morbidity associated with ileostomy compared to primary repair, despite comparable mortality rates between the two groups.¹¹⁻¹²

Our study highlights the clinical implications of these surgical choices in managing typhoid ileal perforation. The preference for primary repair, supported by studies such as Babu et al., stems from its association with lower rates of postoperative complications and shorter hospital stays compared to ileostomy. This aligns with the recommendation that primary repair should be considered especially in patients without significant comorbidities, as advocated by Babu et al. In contrast, studies highlighting the challenges of managing complications post-ileostomy, including the need for urgent interventions in cases of intestinal leakage, underscore the complexities associated with this approach.¹³

While our findings demonstrate clear advantages for primary repair in terms of morbidity outcomes, the mortality rates did not exhibit significant differences between the groups in our study (4.50% vs. 12.50%, $p = 0.370$). This is consistent with the broader literature suggesting that while primary repair may offer advantages in reducing surgical complications, it does not necessarily confer a survival benefit over ileostomy in the context of typhoid ileal perforation.¹⁴⁻¹⁵

This study, therefore, supports the notion that primary repair is associated with fewer postoperative complications and should be considered as the preferred surgical approach in appropriately selected patients. Future research could explore factors influencing the choice of surgical intervention, such as patient demographics, clinical presentation, and institutional capabilities, to refine treatment strategies and improve outcomes for patients with typhoid ileal perforation.

Conclusion

In conclusion, our study favors primary repair over ileostomy for typhoid ileal perforation, showing fewer postoperative complications like wound issues and electrolyte disturbances. While both procedures had similar mortality rates, primary repair appears safer and more effective, especially for patients without significant health complications. This draw attention to the importance of choosing primary repair when managing this condition to improve surgical outcomes and patient recovery.

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