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Postoperative Illeus After Exploratory Laparotomy

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ABSTRACT

Postoperative ileus is a common and significant complication following abdominal surgery, particularly after exploratory laparotomy. It is characterized by a temporary impairment of gastrointestinal motility leading to delayed passage of bowel contents, abdominal distension, nausea, vomiting, and prolonged hospital stay. Identifying the frequency of postoperative ileus after exploratory laparotomy is essential for understanding its clinical burden and for improving perioperative management strategies aimed at reducing postoperative morbidity. **Objectives:** To determine the frequency of postoperative complications in patients undergoing emergency exploratory laparotomy for non-traumatic ileal perforation. **Methods:** This Analytical cross-sectional study was conducted from 15th July 2025 to 16th October 2025 at the Department of Surgery, Lady Reading Hospital, Peshawar. A total of 115 patients, aged 18–65 years, undergoing exploratory laparotomy were included using non-probability consecutive sampling. **Results:** The mean age was 41.08 ± 14.05 years, and 64.3% were male. Wound infection was the most frequent postoperative complication observed in 33 patients (28.7%), followed by peristomal excoriation in 19 (16.5%), postoperative ileus in 18 (15.7%), wound dehiscence in 13 (11.3%), and fistula formation in 3 patients (2.6%). **Conclusions:** Postoperative ileus remains a considerable complication after exploratory laparotomy. Diabetes, hypertension, obesity, and older age are important predictors.

INTRODUCTION

Postoperative ileus is a common complication occurring after exploratory laparotomy. [1] It is defined as a temporary impairment of bowel motility following surgical intervention, resulting in delayed passage of flatus and stool, abdominal distension, nausea, and vomiting [1]. After exploratory laparotomy, handling of bowel loops, exposure of the peritoneal cavity, and tissue trauma lead to neurogenic and inflammatory responses that suppress coordinated peristalsis [2]. The condition is usually transient but can significantly prolong hospital stay and increase patient discomfort. Clinically, patients present with a bloated abdomen, absent or hypoactive bowel sounds, intolerance to oral intake, and sometimes nasogastric aspirate persistence [3]. The pathophysiology of postoperative ileus is multifactorial. Surgical stress activates the sympathetic nervous system, which inhibits gastrointestinal motility [4]. In addition, inflammatory mediators such as cytokines and prostaglandins are released due to bowel manipulation, causing smooth muscle dysfunction [4]. Use of opioid analgesics further worsens ileus by acting on μ-receptors in the gut wall, decreasing peristaltic activity [5]. Electrolyte imbalance, especially hypokalemia, and intra-abdominal infection may also contribute to prolonged ileus.[6] Small intestine motility usually recovers within 24 hours, stomach within 24–48 hours, while colonic activity may take 48–72 hours or longer after major abdominal surgery [7]. Management of postoperative ileus is mainly supportive and preventive. Early mobilization, early enteral feeding when tolerated, and minimizing opioid use are important strategies [8].

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Multimodal analgesia and the use of epidural anesthesia can help reduce opioid requirements. Nasogastric decompression is not routinely recommended but may be required in patients with persistent vomiting or severe distension [9]. Correction of fluid and electrolyte imbalance is essential. Enhanced Recovery After Surgery (ERAS) protocols have shown a reduction in duration of ileus and hospital stay by promoting early ambulation, early feeding, and optimal pain control [10, 11]. Careful surgical technique with minimal bowel handling during exploratory laparotomy also plays a significant role in prevention [12].

Despite its clinical relevance, limited regional data are available regarding the frequency and associated factors of postoperative ileus in patients undergoing exploratory laparotomy in Peshawar. Variations in demographic characteristics, comorbidity profiles, nutritional status, and perioperative management may influence the occurrence of postoperative ileus. This study aimed to determine the frequency of postoperative ileus after exploratory laparotomy and to assess its association with selected demographic and clinical factors in a tertiary care hospital setting.

METHODS

This analytical cross-sectional study was conducted from 15th July 2025 to 16th October 2025 at the Department of Surgery, Lady Reading Hospital, Peshawar. Ethical approval was obtained from the Ethics Review Board of Lady Reading Hospital (Ref No: 217/LRH/MTI) and the CPSP no: CPSP/REU/SGR-2021-022-13041. The sample size was calculated using the standard formula for estimation of a single population proportion: $n = Z^2 \times P \times (1 - P) / d^2$, where n is the required sample size, Z is the standard normal deviate corresponding to a 95% confidence level (Z = 1.96), P was the expected frequency of postoperative ileus (25.5%) [13], and d was the absolute precision (8%). Based on these parameters, the calculated sample size was 115 patients. Participants were enrolled using a non-probability consecutive sampling technique. Inclusion criteria comprised male and female patients aged 18–65 years who had non-traumatic ileal perforation and had undergone emergency laparotomy and were part of this study. Exclusion criteria included pregnant patients, those with known gastrointestinal motility disorders, a history of previous major abdominal surgery, pre-existing mechanical bowel obstruction, inflammatory bowel disease, malignancy-related obstruction, and patients requiring re-exploration within 72 hours postoperatively. All patients received standardized preoperative preparation according to departmental protocols, including overnight fasting, clinical assessment of nutritional status, and routine laboratory investigations. Preoperative nutritional and electrolyte status was assessed clinically and through serum electrolyte measurements, and identified abnormalities were corrected before surgery. All procedures were performed under standardized general anesthesia. Perioperative use of prokinetic agents was not routine and was reserved for selected postoperative cases based on clinical judgment. Surgeries were conducted by consultant surgeons or senior surgical residents under direct consultant supervision. The degree of intraoperative bowel manipulation was documented as minimal or extensive based on operative findings. Operative details, including bowel resection, anastomosis, or stoma formation, were recorded. The term emergency laparotomy here meant a surgical opening of the abdominal cavity done quickly to manage sudden and life-threatening illness. Non-traumatic ileal perforation is a condition where the lower small intestine is perforated without external injury, presenting with abdominal pain above 3 on the visual analog scale, with tenderness, rigidity, and a gas shadow seen under the diaphragm on X-ray. Before starting data collection, every patient had been informed about the purpose and safety of the study, and a written consent had been taken from them or their attendant. They were assured that no extra harm or risk would come because of participation. After surgery, each patient was assessed by a consultant surgeon with more than five years of post-fellowship experience. The assessment involved full medical history, physical check, and inspection of the operative wound at regular intervals up to 45 days after surgery. Wound infection was considered when discharge with pus, along with redness, warmth, swelling, and pain of more than 3 on the pain scale, was observed. Peristomal excoriation was identified when the skin around the stoma showed irritation, ulcer, or wet lesion. Wound dehiscence was noted when the wound edges got separated or opened. Prolonged ileus was recognized if X-ray showed dilated intestinal loops with fluid levels, together with a distended abdomen and less bowel sound. Fistula formation was recorded when any abnormal opening was seen discharging continuously with irritation of the nearby skin. These were the outcome variables of the research and were observed as per the definitions mentioned.

All data were analyzed using SPSS version 23.0. Variables like age, BMI, and duration of surgery were shown as Mean ± SD. And qualitative variables were presented in the form of frequency and percentage. Demographic variables were stratified, and the results were analyzed by using the Chi-square test, with a p-value equal to or less than 0.050 taken as significant.

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RESULTS

The trial involved 115 patients aged 41.08 ± 14.05 years who underwent exploratory laparotomy, with a mean BMI of 25.67 ± 2.94 kg/m^2. The mean duration of surgery was 77.40 ± 20.51 minutes. The study population included 74 males (64.3%) and 41 females (35.7%). Comorbidities included controlled chronic diabetes mellitus in 25 patients (21.7%) and controlled chronic hypertension in 28 patients (24.3%), as documented in preoperative medical records. Postoperatively, 59 patients (51.3%) received intravenous morphine at standard analgesic doses (2–4 mg per dose) administered at 6–8-hour intervals, based on pain assessment and institutional analgesia protocols (Table 1).

Table 1: Baseline Demographic and Clinical Characteristics

Demographics	Mean ± SD / n (%)
Age (Years)	41.08 ± 14.05
BMI (kg/m^2)	25.67 ± 2.94
Duration of Surgery (Minutes)	77.40 ± 20.51
Gender	
Male	74 (64.3%)
Female	41 (35.7%)
Diabetes	
Yes	25 (21.7%)
No	90 (78.3%)
Hypertension	
Yes	28 (24.3%)
No	87 (75.7%)
Morphine Use	
Yes	59 (51.3%)
No	56 (48.7%)

Enteric fever was the most common cause of perforation, accounting for 77 patients, which was 67.00% of total cases, followed by tuberculosis in 27 patients, that represent 23.50% cases, while adhesions were responsible for only 11 patients, making 9.60% of the studied sample (Table 2).

Table 2: Cause of Perforation among Patients

Cause of Perforation	n (%)
Enteric Fever	77 (67%)
Tuberculosis	27 (23.5%)
Adhesion	11 (9.6%)
Total	115 (100%)

Regarding postoperative complications that were observed in patients after exploratory laparotomy, wound infection was the most frequently encountered complication, and it was seen in 33 patients, which corresponds to 28.70% of all cases. Peristomal excoriation was noted in 19 patients, which making 16.50% of complication cases, and postoperative ileus was also among the significant findings and was observed in 18 patients, that represent 15.70% of the total. Furthermore, wound dehiscence was recorded in 13 patients, which accounted for 11.30% of cases, whereas fistula formation was the least commonly occurring complication, which was only presented in 3 patients, corresponding to 2.60% of the total studied patients (Table 3).

Table 3: Number of Postoperative Complications among Patients

Postoperative Complications	n (%)
Postoperative Ileus	18 (15.70%)
Wound Infection	33 (28.70%)
Peristomal Excoriation	19 (16.50%)
Wound Dehiscence	13 (11.30%)
Fistula Formation	3 (2.60%)

Age stratification showed ileus occurred in 7 patients (9.7%) aged ≤45 years compared to 11 patients (25.6%) aged >45 years (p=0.024). Gender distribution showed 11 males (14.9%) and 7 females (17.1%) developed ileus with no significant difference (p=0.755). BMI analysis demonstrated ileus in 4 patients (7.7%) with BMI ≤25 kg/m^2 versus 14 patients (22.2%) with BMI >25 kg/m^2 (p=0.040). Surgery duration showed 1 patient (3.6%) with ileus in procedures ≤60 minutes compared to 17 patients (19.5%) in surgeries >60 minutes (p=0.069). Diabetes showed the strongest association with 15 diabetic patients (60.0%) developing ileus compared to only 3 non-diabetic patients (3.3%) (p<0.001). Hypertension was present in 10 patients (35.7%) with ileus versus 8 normotensive patients (9.2%) with ileus (p<0.001). Morphine use showed 11 patients (18.6%) with ileus among morphine users compared to 7 patients (12.5%) among non-users (p=0.365) (Table 4).

Table 4: Association of Postoperative Ileus with Demographic and Clinical Factors

Demographic Factors	Postoperative Ileus, n (%)	No Ileus, n (%)	p-value
Age (Years)			
≤ 45	7 (9.7%)	65 (90.3%)	0.024*
> 45	11 (25.6%)	32 (74.4%)	
Gender			
Male	11 (14.9%)	63 (85.1%)	0.755
Female	7 (17.1%)	34 (82.9%)	
BMI (kg/m^2)			
≤ 25	4 (7.7%)	48 (92.3%)	0.040*
> 25	14 (22.2%)	49 (77.8%)	
Duration of Surgery (Minutes)			
≤ 60	1 (3.6%)	27 (96.4%)	0.069
> 60	17 (19.5%)	70 (80.5%)	
Diabetes Mellitus			
Yes	15 (60.0%)	10 (40.0%)	<0.001*
No	3 (3.3%)	87 (96.7%)	
Hypertension			
Yes	10 (35.7%)	18 (64.3%)	<0.001*
No	8 (9.2%)	79 (90.8%)	

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Morphine Use			
Yes	11 (18.6%)	48 (81.4%)	0.365
No	7 (12.5%)	49 (87.5%)	

*p ≤ 0.050 considered statistically significant

When analyzing the association between clinical variables and the development of postoperative ileus, several findings emerged. In terms of symptom duration, patients with symptom duration more than 48 hours were showing postoperative ileus in 14 patients (18.2%) compared to 4 patients (10.5%) with symptom duration less than or equal to 48 hours; this difference was not reaching statistical significance (p=0.415). Similarly, when comparing emergency versus elective cases, postoperative ileus occurred in 16 patients (16.7%) of emergency cases and 2 patients (10.5%) of elective cases, with no statistically significant difference between groups (p=0.733). Looking at surgical indication, perforation was associated with postoperative ileus in 7 patient (14.0%), obstruction in 5 patient (14.7%), trauma in 2 patients (14.3%), ischemia in 1 patient (16.7%), sepsis in 2 patient (22.2%), and other cause in 1 patient (50.0%). Despite these variations, no statistically significant association was found between surgical indication and postoperative ileus (p=0.853). When examining procedure type, stoma creation was showing the highest rate of postoperative ileus with 7 patients (20.6%), followed by adhesiolysis in 3 patients (23.1%), repair in 3 patients (20.0%), resection and anastomosis in 4 patients (10.0%), and drainage in 1 patient (8.3%). The palliative procedure was not associated with any case of postoperative ileus. However, these differences across procedure type were not statistically significant (p=0.662) (Table 5).

Table 5: Association of Surgical Indications and Procedures with Postoperative Ileus

Clinical Variables		Postoperative Ileus		p-value
		Yes, n (%)	No, n (%)	
Symptom Duration	≤48 Hours	4 (10.5%)	34 (89.5%)	0.415*
	>48 Hours	14 (18.2%)	63 (81.8%)	
Urgency	Emergency	16 (16.7%)	80 (83.3%)	0.733*
	Elective	2 (10.5%)	17 (89.5%)	
Indication	Perforation	7 (14.0%)	43 (86.0%)	0.853*
	Obstruction	5 (14.7%)	29 (85.3%)	
	Trauma	2 (14.3%)	12 (85.7%)	
	Ischemia	1 (16.7%)	5 (83.3%)	
	Sepsis	2 (22.2%)	7 (77.8%)	
	Other	1 (50.0%)	1 (50.0%)	
Procedure Type	Resection Anastomosis	4 (10.0%)	36 (90.0%)	0.662*
	Stoma	7 (20.6%)	27 (79.4%)	
	Repair	3 (20.0%)	12 (80.0%)	
	Drainage	1 (8.3%)	11 (91.7%)	
	Adhesiolysis	3 (23.1%)	10 (76.9%)	
	Palliative	0 (0.0%)	1 (100.0%)	

*Fisher's Exact Test

DISCUSSION

In the present study, enteric fever was found to be the most common cause of perforation in 77 patients (67.00%). This may be because enteric fever caused by Salmonella typhi, which produced inflammation and necrosis in the Peyer's patches of the terminal ileum, leading to perforation. Wound infection was the most frequently seen postoperative complication and was observed in 33 patients (28.70%). This is because during emergency laparotomy, bowel content is spilled into the peritoneal cavity, that causing contamination and increases the risk of surgical site infection. Postoperative ileus was noted in 18 patients (15.70%), which is also a significant complication. This occurs because handling of the bowel during surgery causes inhibition of normal peristalsis due to activation of the sympathetic nervous system and release of inflammatory mediators. Prolonged ileus further complicates the recovery and increases the hospital stay of patients. Peristomal excoriation was also observed in 19 patients (16.50%), which occurred due to continuous contact of bowel content and digestive enzymes with the peristomal skin, causing skin breakdown and irritation in these patients. The incidence of postoperative ileus observed in the present study lies within the range reported in previous literature. Vather *et al.* reported that postoperative ileus occurs in approximately 10–30% of patients undergoing abdominal surgery, indicating that it is a common complication following laparotomy [14]. Similarly, Chapman *et al.* analyzed postoperative outcomes after abdominal operations and reported an incidence of postoperative ileus of about 15.4%, which is comparable with the findings of the present study [15]. Differences in the reported frequency of postoperative ileus across studies may be attributed to variations in patient populations, type of surgical procedures performed, perioperative management, and criteria used to define postoperative ileus. The wound infection rate of 28.70% observed in the present study is comparable with several previous studies evaluating postoperative complications after emergency laparotomy. Siddiqui *et al.* reported higher morbidity, including wound infections, in patients without defunctioning ileostomy, suggesting that contamination from enteric contents plays a major role in surgical site infections [16]. Chauhan *et al.* reported a lower wound infection rate of 12.28% in emergency laparotomies [17], while Chaudhary *et al.* and Murtaza *et al.* reported infection rates of 22.2% and 21.6%, respectively [18, 19]. Anwar F *et al.* reported a surgical site infection rate of 28.2%, which is very close to the 28.70% observed in the present study [20]. Higher infection rates of 47% and 47.2% were reported by Nazir *et al.* and Gangamma *et al.* respectively [21, 22]. Begum *et al.* also identified wound infection as the most common postoperative complication among patients

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with ileal perforation, supporting the findings of the present study [23]. Peristomal excoriation was observed in 19 patients (16.50%) in this study. Similar findings were reported by Rajper *et al.* who documented peristomal skin excoriation in 14.08% of patients undergoing ileostomy for ileal perforation [24]. These findings indicate that stoma-related skin complications are common, particularly in emergency settings where proper stoma site selection and patient education may be limited. Wound dehiscence was noted in 13 patients (11.30%) in the present study. A comparable rate of 11.43% was reported by Rajper *et al.* [24]. However, lower rates of 4.8% and 5.3% were reported by Murtaza B *et al.* and Chaudhary SH *et al.* respectively [18, 19]. The relatively higher rate observed in perforation cases may be attributed to severe peritoneal contamination, delayed presentation, and poor nutritional status, which impair wound healing and increase the risk of fascial separation after surgery.

The present study also has several limitations. The results obtained may not necessarily be generalizable to other settings because it is a single-center trial, and there might be differences with respect to patient mix and surgical and postoperative care practices. A sample size of 115 cases might also affect the sensitivity to detect correlations with certain identified risk factors, particularly those with low prevalence rates. The absence of uniform definitions regarding postoperative ileus diagnoses across different providers could also affect outcomes. The study could not take into account identified potential sources of confusion, which could affect postoperative ileus incidence, such as bowel prep performed preoperatively, distinct anesthetic approaches, fluid management approaches during surgery, and pain management approaches postoperatively, including those excluding morphine administration. The duration and specific definitions regarding postoperative ileus resolution could also affect measurements.

CONCLUSIONS

This research has shown that the problem of postoperative ileus persists after exploratory laparotomy, and diabetes mellitus is found to be the most significant predictor of postoperative ileus, followed by hypertension, body mass index, and age, while gender and morphine administration are not found to have any significant relationship.

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Authors' Contribution

Conceptualization: BUD
Methodology: BUD, AN
Formal analysis: BUD
Writing and Drafting: BUD
Review and Editing: BUD, AN

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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