

Temporal Pattern and Frequency of Ileostomy-related Complications: A Prospective Observational Study

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ABSTRACT

Introduction: Ileostomy is frequently performed to divert faecal flow and protect distal bowel anastomoses in both elective and emergency surgical settings. However, postoperative complications remain a significant cause of morbidity and may affect patient recovery.

Aim: To evaluate the frequency and temporal pattern of complications following ileostomy during the first 12 weeks after surgery.

Materials and Methods: This prospective observational study was conducted in the Department of General Surgery, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar, Punjab, India from July 2024 to December 2025. A total of 50 adult patients undergoing elective or emergency ileostomy were enrolled. Demographic, clinical, and laboratory parameters were recorded. Patients were assessed during hospitalisation and followed-up at four, eight, and 12 weeks for the occurrence of stoma-related complications.

Results: The study included 50 patients with a mean age of 45.44 ± 18.31 years; 66% were females. Emergency procedures accounted for 80% (n=40) of surgeries, and a loop ileostomy was performed in 94% (n=47) of cases. The common indications were malignancy (n=24, 48%), bowel obstruction (n=14, 28%), and perforation (n=12, 24%). During hospitalisation, 45 (90%) patients remained free of complications. This proportion decreased to 36% (n=18) at four weeks, then improved to 68% (n=34) at eight weeks and 88% (n=44) at 12 weeks. Skin excoriation was the most common complication at four weeks (n=19, 38%), followed by stomal prolapse (n=5, 10%) and high-output stoma (n=4, 8%). Retraction, parastomal hernia, stenosis, and necrosis were infrequent late complications.

Conclusion: Ileostomy-related complications follow a distinct temporal pattern, with the highest frequency occurring during the first month after surgery.

Keywords: Granuloma formation, Parastomal hernia, Prolapse, Retraction, Stoma

INTRODUCTION

An ileostomy involves exteriorising the small bowel lumen through a surgically fashioned aperture in the abdominal wall, typically on the right side. As a frequently performed life-saving emergency intervention, the intestinal stoma (from the Latin ostium, meaning "opening") serves to divert faecal flow, decompress the bowel, or protect distal anastomoses [1,2].

Stomas are classified by their intended durability: permanent, functional (temporary), or protective. Permanent end ileostomies are indicated when the entire colon and rectum are involved or when co-morbidities contraindicate anastomosis, such as in refractory proctocolitis or familial adenomatous polyposis [3]. Functional end ileostomies allow for delayed restoration of continuity following segmental resection for conditions like toxic colitis or ischaemia. Meanwhile, diverting loop ileostomies are strategically used to protect high-risk pelvic anastomoses, mitigating the septic sequelae of potential leaks [4].

Despite their clinical necessity, ileostomies carry a substantial burden of morbidity, with complication rates ranging from 10% to 70% [5]. Early complications (within 30 days) include ischaemia, mucocutaneous separation, and high-output failure leading to severe fluid and electrolyte imbalances. Late complications (beyond 30 days) encompass parastomal hernias affecting up to 50% of patients long-term prolapse, retraction, and stenosis [6,7].

The present study evaluated the frequency of complications after ileostomy and provided institutional data to optimise perioperative protocols.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of General Surgery, Sri Guru Ram Das Institute of Medical Sciences and Research (SGRDIMS), Amritsar, Punjab, India, from July 2024 to December 2025. The present research study received approval from the Institutional Ethics Committee (SGRD/IEC/2024-298) and the Institutional Research Committee of SGRDIMS, Sri Amritsar.

Inclusion criteria: A total of 50 consecutive adult patients (≥ 18 years) undergoing elective or emergency ileostomy procedures were included after written informed consent was obtained.

Exclusion criteria: Patients with colostomies, urinary stomas, gynaecological stomas, or severe pre-existing psychological disorders were excluded from the study.

Study Procedure

Demographic variables, clinical findings, laboratory parameters, operative details, and postoperative complications were recorded using a predesigned proforma.

Postoperative Day 1: Assessment focused on immediate surgical complications, specifically haemorrhage and stoma necrosis.

Postoperative Day 7: Evaluation for early structural issues, including stoma retraction, stenosis, prolapse, and the presence of high-output fistulas.

Follow-up protocol: Patients were monitored via the Outpatient Department (OPD) every 15 days. This surveillance continued for three months or until ileostomy reversal was performed.

Classification of complications: Complications were systematically categorised based on their time of onset according to the classification described by Krishnamurty DM et al., and Tsujinaka S et al., [Table/Fig-1] [2,7].

Early complications (<30 days)	Late complications (>30 days)
Ischaemia or necrosis	Stoma prolapse
Haemorrhage	Retraction
Mucocutaneous separation	Stenosis
Parastomal irritation and rash	Bowel obstruction
Localised abscess	Parastomal hernia
Peristomal pyoderma gangrenosum	Peristomal varices
Contact dermatitis	Stomal fistula
Fluid/electrolyte imbalance (High-output)	Granuloma formation

[Table/Fig-1]: Classification of complication [2,7].

STATISTICAL ANALYSIS

Data were analysed using IBM Statistical Package for the Social Sciences (SPSS) Statistics version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were summarised as mean±standard deviation, while categorical variables were expressed as frequencies and percentages.

RESULTS

The study cohort consisted of 50 patients, with a notable female predominance of 33 (66%) compared with 17 (34%) male patients [Table/Fig-2]. Furthermore, while the majority (70%) were free of systemic co-morbidities, 30% presented with at least one chronic condition.

Variable	Category	n (%)
Gender	Female	33 (66.0)
	Male	17 (34.0)
Age group (years)	≤30	15 (30.0)
	31-40	7 (14.0)
	41-50	8 (16.0)
	51-60	10 (20.0)
	61-70	4 (8.0)
	>70	6 (12.0)
BMI Category	Normal (18.5-22.9 kg/m²)	19 (38.0)
	Overweight (23.0-24.9 kg/m²)	10 (20.0)
	Obesity Class-I (25.0-29.9 kg/m²)	15 (30.0)
	Obesity Class-II (≥30.0 kg/m²)	6 (12.0)
Co-morbidities Hypertension/ Diabetes mellitus	Absent	35 (70.0)
	Present	15 (30.0)

[Table/Fig-2]: Socio-demographic and clinical profile of the study cohort (n=50).

The surgical data revealed that the majority of ileostomies were performed as emergency procedures (80%), with malignancy (48%) being the leading indication, followed by obstruction (28%) and perforation (24%) [Table/Fig-3].

The study population demonstrated mild anaemia with a mean haemoglobin level of 10.44±2.03 g/dL [Table/Fig-4].

The [Table/Fig-5] presents a longitudinal analysis of stoma-related outcomes across four critical time intervals. The data reveals a distinct U-shaped recovery curve: patients were most stable while hospitalised (90% complication-free), faced a significant surge in morbidity during the first month of self-care at home (only 36% complication-free), and showed steady improvement by the 12-week mark (88% complication-free).

DISCUSSION

The present study findings demonstrated a transition from excellent in-hospital outcomes (90% complication-free) to manageable

Parameter	Finding/category	n (%)
Indication	Malignant	24 (48.0)
	Obstruction	14 (28.0)
	Perforation	12 (24.0)
X-ray erect abdomen	Normal	21 (42.0)
	Bowel obstruction	17 (34.0)
	Enteric perforation	12 (24.0)
Physical examination	Moderate nourishment/build*	41 (82.0)
	Pallor (present)	9 (18.0)
	Oedema (present)	3 (6.0)
Nature of surgery	Emergency	40 (80.0)
	Elective	10 (20.0)
Procedure type	Loop ileostomy	47 (94.0)
	End ileostomy	3 (6.0)

[Table/Fig-3]: Preoperative clinical and diagnostic indicators (n=50).

*Moderate nourishment/build: Clinically assessed as an average body habitus with adequate nutritional status, without obvious signs of malnutrition, cachexia, severe obesity, or muscle wasting.

Laboratory parameter	Mean±SD	Range (Min-Max)
Haemoglobin (g/dL)	10.44±2.03	7.00-16.40
Total leucocyte count (cells/μL)	10,161.00±5,386.54	1,900-22,600
Serum albumin (g/dL)	3.63±0.72	1.83-5.63
Serum creatinine (mg/dL)	1.00±0.47	0.42-3.20
Serum sodium (mmol/L)	134.19±4.25	130-146.0
Serum potassium (mmol/L)	4.84±1.23	2.49-7.50

[Table/Fig-4]: Preoperative hematological and biochemical profile of study participants (n=50).

Complication	In-hospital	4 weeks	8 weeks	12 weeks
No complication	45 (90%)	18 (36%)	34 (68%)	44 (88%)
Skin excoriation	1	19	8	0
Prolapse	0	5	3	0
High output/diarrhoea	3	4	0	0
Haemorrhage	0	3	0	0
Parastomal hernia	0	1	2	1
Retraction	0	0	2	3
Stenosis	0	0	1	1
Mucocutaneous separation	1	0	0	0
Necrosis	0	0	0	1

[Table/Fig-5]: Temporal progression of ileostomy complications (early to 12 weeks).

outpatient morbidity that peaked at four weeks and steadily declines toward the three-month reversal mark.

The cohort’s mean age of 45.44±18.31 years marks a distinct departure from the Western literature [8], where stoma patients are typically older (often >60 years) due to the predominance of colorectal malignancies. Instead, the present study data aligns with Pal N et al., who noted a peak incidence in the 21-30 years age group (23.52%) driven by trauma and perforations [9]. Interestingly, the present study observed a 66% female predominance, contrasting sharply with the male-dominated series of Pal N et al., (83.52%) and Karki OB (59%) [9,10]. The observed female predominance may reflect regional variations in disease spectrum and referral patterns.

Emergency procedures dominated in the present study (80%), a trend consistent with Karki OB, (82.9%) and Veena A et al., (68%) [10,11]. The frequency of loop ileostomy in the present study (94%) was considerably higher than that reported by Pal N et al., (31.8%) and Veena A et al., (44%), reflecting a greater reliance on temporary faecal diversion in our patient population [9,11].

In the study by Rajkumar R et al., 85% of patients developed stoma-related complications, with peristomal skin excoriation being the most common complication (80%) [12].

In the present study, the most striking finding was the sharp decline in the complication-free rate at four weeks. This period represents the hazard zone for new ostomates. In the present study, the in-hospital complication-free rate was 90%, whereas Rajkumar R et al. reported an overall complication rate of 85%, indicating a substantially higher burden of postoperative complications in their cohort [12,13].

This temporal association corroborates the findings of Labgaa I et al., who noted that metabolic and nutritional deficits primarily drive early postoperative complications rather than late-onset sequelae [14]. Appropriate appliance fitting, patient education, and regular follow-up are essential to minimise peristomal skin complications and improve quality of life.

Limitation(s)

The present study had certain limitations. It was a single-centre study with a relatively small sample size and a follow-up period of 12 weeks. Some late complications, such as parastomal hernia, may require longer surveillance to accurately estimate. Furthermore, the observational design limits causal inference regarding predictors of complications.

CONCLUSION(S)

The present study demonstrated that ileostomy-related complications follow a distinct temporal pattern, with the highest frequency observed during the first four weeks after surgery. These findings emphasise the importance of careful postoperative surveillance, nutritional assessment, and structured stoma-care education during the early recovery period. Early identification and management of complications may improve patient outcomes and reduce ileostomy-related morbidity.

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