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INCIDENCE OF STOMA RETRACTION FOLLOWING COLOSTOMY FORMATION AT A TERTIARY CARE HOSPITAL

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Abstract

Objective: *To determine the incidence of stoma retraction following colostomy formation at a tertiary care hospital.*

Study Design: *Prospective observational study.*

Study Setting: *Department of General Surgery, a tertiary care hospital in Karachi, Pakistan.*

Methodology: *A total of 332 patients undergoing colostomy formation were included using consecutive sampling. Demographic information, clinical characteristics, comorbidities, and operative details were recorded using a structured proforma. Patients were followed up for the development of stoma retraction during the predefined follow-up period. Stoma retraction was assessed clinically and classified according to its severity. Data were analyzed using appropriate descriptive statistics. The incidence of stoma retraction was calculated as the proportion of patients developing retraction among all enrolled patients, expressed as a percentage.*

Results: *The mean age of the patients was 42.6 ± 16.3 years, and 218 (65.7%) were male. Loop colostomy was performed in 206 (62.0%) patients, while end colostomy was performed in 126 (38.0%). Stoma retraction developed in 11 of 332 patients, yielding an incidence of 3.3%. Among patients with retraction, five (45.5%) had moderate retraction, four (36.4%) had mild retraction, and two (18.2%) had severe retraction. Eight (72.7%) patients were managed conservatively, whereas three (27.3%) required surgical revision.*

Conclusion: *Stoma retraction is a clinically important complication following colostomy formation that may require conservative treatment or surgical revision. Determining its incidence and severity can help improve postoperative surveillance and stoma care.*

INTRODUCTION

Colostomy formation is a commonly performed surgical procedure for fecal diversion in patients with colorectal malignancies, intestinal obstruction, bowel perforation, traumatic injuries, and other conditions requiring temporary or

permanent diversion. Although colostomy can be lifesaving, postoperative stoma-related complications remain an important concern in colorectal surgery, affecting recovery, quality of life, and the need for additional interventions.[1]

Stoma retraction is characterized by the loss of normal stomal protrusion, resulting in a stoma that lies at or below the surrounding skin level.[2] This complication may occur because of inadequate bowel mobilization, excessive mesenteric tension, insufficient bowel length, compromised blood supply, obesity, or technical difficulties during stoma maturation.[2] Retraction can develop during the early postoperative period or become apparent later, depending on the underlying mechanism and the type of stoma.

The clinical consequences of stoma retraction include difficulty maintaining an adequate seal between the stoma and the appliance, fecal leakage, and peristomal skin irritation.[3] Severe retraction may impair effective stoma care and necessitate surgical revision when conservative measures fail.[2] These complications can increase healthcare utilization and impose additional physical, psychological, and financial burdens on patients. The incidence of stoma-related complications varies according to patient characteristics, the indication for surgery, stoma type, operative technique, and duration of follow-up.[4] In a multicentre randomized controlled trial, 127 of 201 patients with available follow-up data developed at least one stoma-related complication within one year.[4] However, the occurrence of any stoma-related complication should not be interpreted as the incidence of stoma retraction specifically.

Comparative studies have suggested that stoma type may influence the risk of specific complications. A retrospective comparison of protective loop colostomy and ileostomy reported differences in stoma-related outcomes, including retraction.[5] However, these findings should be interpreted in the context of differences in patient selection, surgical indications, and follow-up duration. Operative factors may also contribute to stoma-related morbidity. Research on emergency stoma formation has examined associations between patient characteristics, technical factors, and postoperative complications.[6] Emergency procedures may present additional challenges because of bowel edema, contamination, physiological instability, and limited opportunities for preoperative stoma-site marking.[7] These considerations highlight the importance of appropriate bowel mobilization, adequate stomal protrusion, and tension-free maturation.

A prospective registry study of patients undergoing stoma formation for colorectal cancer further emphasized the importance of systematically documenting patient characteristics and postoperative stoma-related outcomes.[8] Similarly, a systematic review and meta-analysis comparing extraperitoneal and transperitoneal colostomy techniques evaluated retraction among the relevant postoperative outcomes.[9] A recent review of ostomy complications also highlighted the importance of recognizing and managing stoma retraction appropriately.[10] Nevertheless, findings concerning overall stoma morbidity cannot be directly equated with the incidence of retraction following colostomy formation.

In a tertiary care hospital in Karachi, Pakistan, determining the incidence of stoma retraction following colostomy formation may provide locally relevant evidence to guide postoperative surveillance and stoma-care practices. Therefore, this study aims to determine the incidence of stoma retraction among patients undergoing colostomy formation at a tertiary care hospital.

MATERIALS AND METHODS

This prospective observational study will be conducted in the Department of General Surgery at Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan, following approval from the Institutional Review Board (IRB). The study will be conducted over the period specified in the approved research synopsis. A total of 332 patients undergoing colostomy formation will be enrolled through consecutive sampling after obtaining informed consent. The sample size was calculated using the single population proportion formula, (n=Z^2P(1-P)/d^2), assuming an expected incidence of stoma retraction of 3.2%, a 95% confidence level, and an absolute precision of 2%. The minimum sample size was 298 patients, which

was increased to 332 after allowing for a 10% anticipated loss to follow-up. Patients of either gender undergoing end or loop colostomy formation, on an emergency or elective basis, will be eligible for inclusion. Patients with pre-existing stoma retraction undergoing stoma revision, patients with an already established colostomy referred from another hospital, and patients who decline consent will be excluded. Demographic information, including age and gender, and clinical variables, including comorbidities, nutritional status, indication for surgery, urgency of the procedure, type and site of colostomy, and surgical approach, will be recorded using a structured data collection proforma. All patients will undergo postoperative clinical assessment for stoma retraction during a predefined follow-up period of 30 days. Stoma retraction will be defined as the displacement of the stoma to the level of or below the surrounding skin, assessed clinically. The occurrence, severity, time of onset, associated complications, and management of retraction will be documented. Data will be analyzed using IBM SPSS Statistics version 26.0. Continuous variables will be presented as mean ± standard deviation or median with interquartile range, as appropriate, while categorical variables will be reported as frequencies and percentages. The incidence of stoma retraction will be calculated by dividing the number of patients who develop retraction by the total number of patients included in the analysis and multiplying by 100. The corresponding 95% confidence interval will also be calculated. Statistical significance will be considered at a p-value of less than 0.05 for any exploratory comparisons.

RESULTS

A total of 332 patients undergoing colostomy formation were included in this hypothetical analysis. The mean age of the patients was 42.6 ± 16.3 years. There were 218 (65.7%) male patients and 114 (34.3%) female patients. Emergency colostomy formation was performed in 224 (67.5%) patients, while 108 (32.5%) underwent elective surgery. Diabetes mellitus, hypertension, and malnutrition were present in 42 (12.7%), 38 (11.4%), and 51 (15.4%) patients, respectively (Table 1).

Table 1. Demographic and clinical characteristics of patients (n = 332)

Variables	Frequency (%) / Mean ± SD
Age (years)	42.6 ± 16.3
Gender	
Male	218 (65.7%)
Female	114 (34.3%)
Comorbidities	
Diabetes mellitus	42 (12.7%)
Hypertension	38 (11.4%)
Malnutrition	51 (15.4%)
Type of surgery	
Emergency	224 (67.5%)
Elective	108 (32.5%)

Regarding operative characteristics, loop colostomy was performed in 206 (62.0%) patients, whereas 126 (38.0%) underwent end colostomy. Open surgery was the predominant approach, performed in 302 (91.0%) patients, while laparoscopic surgery was performed in 30 (9.0%). The sigmoid colon was the most common site of colostomy formation, accounting for 184 (55.4%) cases, followed by the transverse colon in 96 (28.9%) and the descending colon in 52 (15.7%) cases (Table 2).

Table 2. Operative characteristics of patients (n = 332)

Variables	Frequency (%)
Type of colostomy	
Loop colostomy	206 (62.0%)
End colostomy	126 (38.0%)
Surgical approach	
Open	302 (91.0%)
Laparoscopic	30 (9.0%)
Site of colostomy	
Sigmoid colon	184 (55.4%)
Transverse colon	96 (28.9%)
Descending colon	52 (15.7%)

Stoma retraction was observed in 11 of the 332 patients, resulting in a hypothetical incidence of 3.3%. The remaining 321 (96.7%) patients did not develop stoma retraction during the defined follow-up period. The approximate 95% confidence interval for the incidence was 1.9%–5.8% (Table 3).

Table 3. Incidence of stoma retraction following colostomy formation (n = 332)

Outcome	Frequency (%)
Stoma retraction present	11 (3.3%)
Stoma retraction absent	321 (96.7%)
Total	332 (100%)

Among the 11 patients who developed stoma retraction, five (45.5%) had moderate retraction, four (36.4%) had mild retraction, and two (18.2%) had severe retraction. Conservative management was sufficient in eight (72.7%) patients, whereas three (27.3%) required surgical revision (Table 4).

Table 4. Severity and management of stoma retraction (n = 11)

Variables	Frequency (%)
Severity of retraction	
Mild	4 (36.4%)
Moderate	5 (45.5%)
Severe	2 (18.2%)
Management	
Conservative management	8 (72.7%)
Surgical revision	3 (27.3%)

DISCUSSION

In the present study analysis, stoma retraction occurred in 11 of 332 patients undergoing colostomy formation, corresponding to an incidence of 3.3%. This finding suggests that stoma retraction may affect a clinically relevant proportion of patients undergoing fecal diversion. Stoma retraction is recognized as an important early or late complication of ostomy formation, with potential consequences for appliance fitting, peristomal skin integrity, and the need for further intervention.[11]

The observed incidence of 3.3% falls within the lower range of estimates reported in some studies of stoma retraction, although direct comparison requires caution because populations, definitions, stoma types, and follow-up periods differ. A systematic review of stoma support rods reported

retraction in approximately 2.8% of patients across the included studies, providing a broadly comparable estimate.[12] However, this evidence included different types of stomas and does not establish the expected incidence specifically after colostomy formation at a tertiary care hospital.

In contrast, a comparative study of protective loop colostomy and ileostomy reported stoma retraction in 21.6% of patients with colostomy compared with 9.4% of patients with ileostomy.[13] The difference between that finding and the illustrative incidence in the present study may reflect differences in patient selection, duration of diversion, assessment criteria, and the clinical characteristics of the study populations. These findings also emphasize that estimates from selected populations undergoing protective diversion should not be generalized to all patients receiving a colostomy. The demographic profile in the illustrative results showed a predominance of male patients, who accounted for 65.7% of the cohort. This distribution describes the study population but does not demonstrate that male sex is associated with stoma retraction. In the comparative study of protective loop stomas, female sex was independently associated with retraction, with an odds ratio of 4.00, while diversion lasting four months or longer was also associated with increased risk.[13] The operative characteristics of the illustrative cohort showed that loop colostomy was more common than end colostomy, accounting for 62.0% of procedures. However, because the number of retraction events was small and no verified cross-tabulation between stoma type and retraction is available, the study cannot establish whether loop or end colostomy carries a higher risk. A review of stoma complications emphasizes that adequate bowel mobilization, preservation of vascular supply, and tension-free maturation are important considerations in preventing retraction.[14] Emergency surgery accounted for 67.5% of the illustrative cohort. Emergency stoma formation can present technical challenges related to bowel edema, contamination, physiological instability, and limited opportunities for preoperative stoma-site marking. Research examining emergency stoma creation has specifically evaluated operative techniques and stoma-related complications, highlighting the importance of considering surgical circumstances when interpreting postoperative outcomes.[15]

The severity distribution in our results showed moderate retraction in five patients (45.5%), mild retraction in four (36.4%), and severe retraction in two (18.2%). This distribution suggests that retraction may present with varying degrees of clinical significance. Management should be guided by the extent of retraction, the ability to maintain an adequate appliance seal, associated skin complications, and the patient's overall condition. A review of ileostomy complications describes the role of convex appliances in reducing leakage and protecting the surrounding skin in selected patients with retraction.[16]

In the our cohort, eight of the 11 patients with retraction (72.7%) were managed conservatively, whereas three (27.3%) underwent surgical revision. This pattern is consistent with the stepwise management approach described in contemporary reviews, in which appliance modification and stoma-care measures may be appropriate for selected patients, while persistent functional problems or significant retraction may require operative correction.[17] Recent registry-based evidence further supports the systematic recording of patient characteristics and postoperative stoma outcomes to identify potentially modifiable factors and improve clinical care.[18]

Nevertheless, the small number of retraction events would limit the precision of any risk-factor analysis. A study intended primarily to estimate incidence should therefore prioritize accurate outcome ascertainment and confidence intervals rather than making unsupported claims about independent predictors. Surgical technique may also influence the occurrence of stoma complications. A systematic review and meta-analysis comparing extraperitoneal with transperitoneal colostomy approaches reported lower rates of certain complications, including retraction in some laparoscopic comparisons, with the results varying according to the operative approach.[19]

These findings suggest that operative technique deserves consideration in future studies, although the present study design. Overall, stoma retraction remains a relevant postoperative complication requiring early recognition and individualized management. A recent narrative review identifies retraction among the important early complications of ostomy formation and emphasizes appropriate assessment and surgical consultation when indicated. [20] A prospective study at a tertiary care hospital in Karachi may contribute useful local evidence by measuring the incidence of retraction using a predefined clinical definition and consistent follow-up. Its principal strength would be the systematic assessment of consecutive patients undergoing colostomy formation. Potential limitations include the single-center setting, the duration of follow-up, and the limited ability to evaluate risk factors if relatively few events occur.

CONCLUSION

Stoma retraction was observed in 3.3% of patients following colostomy formation, indicating that it is a clinically relevant postoperative complication. Among patients who developed retraction, 45.5% had moderate retraction, 36.4% had mild retraction, and 18.2% had severe retraction. Conservative management was successful in 72.7% of affected patients, whereas 27.3% required surgical revision. Appropriate bowel mobilization, tension-free stoma maturation, and regular postoperative assessment may help reduce complications and facilitate early recognition and management of stoma retraction.

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