

Intestinal Stomas—Current Practice and Challenges: An Institutional Review

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ABSTRACT

Introduction: A stoma is an artificial anastomosis of the gastrointestinal tract to the abdominal skin wall to reroute the stream of feces. Fecal diversion, bowel decompression, and anastomosis protection are common indications for stomas. Relative to other surgical operations, stomas have a high morbidity rate, with rates averaging 40% and ranging 14–79%. The most common early complication was peristomal skin irritation. In contrast, parastomal hernias were the most common late complication.

Methods: This research was performed at King Hamad University Hospital (KHUH) in the Kingdom of Bahrain. Our study included patients who had undergone ileostomies and colostomies. The inclusion criteria included adult patients who are 15 years and older, both emergency and elective cases, and with ASA score of 1–4. The excluded patients were those who had had their stomas performed outside of KHUH and those who were not following up in the hyperbaric department of our hospital. This study was performed using a retrospective study design. The sample size was 98 which included patients with stomas that were following up with the hyperbaric team between January 2018 and February 2021.

Results: We have broken down the indications for stoma formation. The breakdown of all our documented complications are illustrated in the given figure.

Conclusion: Within our institutional study, 63.3% of stoma complications consisted of skin problems. This formed the majority of complications. Establishing a stoma care unit would offer continuous support and care to patients and help them in returning to an optimal quality of life. Additionally, this goal can be met through preoperative and postoperative education regarding surgery and stoma formation. This includes preoperative stoma marking and siting, as well as improved recovery through instruction from knowledgeable stoma care specialists regarding hands-on stoma care.

Finally, patients can be assisted through specialized stoma clinics.

Keywords: Bleeding, Complications of stomas, Electrolyte imbalance, Fistulas, Infection, Parastomal hernias, Stomas.

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INTRODUCTION

A stoma is an artificial anastomosis of the gastrointestinal tract to the abdominal skin wall to reroute the stream of feces.¹ Fecal diversion, bowel decompression, and anastomosis protection are common indications for stomas.² Other indications include obstruction due to benign and malignant tumors, perforation and peritonitis, inflammatory bowel disease, complex fistulas, mesenteric ischemia, and anorectal malformations.³ Temporary stomas can be done in cases of high-risk anastomosis and when the anastomosis is unsafe.⁴

Stomas can be classified according to stoma type (Loop, End, or Double-Barreled), the anatomical site (Colon or Ileum), or the purpose of the stoma (Temporary or permanent).³ Stomas have a high complication rate relative to other surgical procedures, with a rate averaging 40% and ranging from 14 to 79%.^{5,6} Stoma complications are classified as immediate (24 hours), early complications (which occur within 30 days of surgery), and late complications (more than 30 days after surgery), immediately – prolonged ileus and oozing. A 2015 systematic review showed that stomas and their complications affected the quality of life negatively.

Peristomal skin irritation has been observed to be the most common early complication.⁷ In comparison, parastomal hernias were the most common late complication.⁸ Other common complications were prolapse, stomal retraction, vascular compromise, peristomal infection, and early postoperative bowel obstruction.^{9–12}

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Risk factors associated with stoma complications include age, gender, high BMI, use of steroids, immunosuppressants, diabetes mellitus, emergency surgery, old age, ethnic group, gender, malnutrition, bowel distension, and high American society of anesthesiology score.^{4,6,9–13} Furthermore, concomitant chemotherapy and radiotherapy increases the risk of peristomal skin complications.¹² Risk factors pertinent to surgical practice also affect the stoma complication rate. Ileostomies are associated with a better quality of life than colostomies. However, they are associated with a higher ileus and bowel obstruction rate than colostomies.¹² Additionally, preoperative and postoperative education by an

ostomy nurse decreases the risk of complications.¹² Ostomy siting should also be done before the procedure by an ostomy nurse or a colorectal surgeon. It decreases the risk of leakage and dermatitis and improves the patient's ability to adapt to the stoma.¹⁰ Bowel quality could also act as a risk factor, patients with Crohn's disease have a significantly higher risk of stomal necrosis, retraction, and pyoderma gangrenosum.^{14–16} Moreover, intraoperative complications such as bleeding can increase the risk of stoma complications.⁴

AIMS AND OBJECTIVES

Stoma complication rates are widely variable in literature.¹⁷ In our study, we determined the ostomy complication rate in Bahrain and describe how risk factors relate to different ostomy complications. This analysis will compare the findings with other highly referenced studies.⁵ Stoma complications are highly variable between studies, a study by Carlson et al.¹⁶ assessed the incidence of stoma-related complications within 1 year and reported a 36% complication rates, 11% of which were peristomal skin complications. Additionally, 88% of the patients had their ostomy appropriately sited preoperatively. However, 37% of emergent cases did not have the stoma location appropriately sited.¹⁶ Our study will also act as a benchmark for future outcomes pertinent to stoma care. Moreover, the study will measure the rates of proven methods to prevent stoma-related complications such as preoperative patient education, follow-up treatment, and ostomy siting.¹⁸

STANDARDS AND METHODS

This research was conducted after ethical approval 21-432 at KHUH in the Kingdom of Bahrain.

Our study was inclusive of patients who had undergone ileostomies and colostomies. The inclusion criteria included adult patients who were 15 years and older, both emergency and elective cases, and with an ASA score of 1–4. Patients who had their stoma performed outside of KHUH as well as patients who were not following up in the hyperbaric department of our hospital were excluded from our study.

This research study was performed using a retrospective study design. Our sample size was known to have 98 patients with stomas. These patients were following up with the hyperbaric team between January 2018 and February 2021.

Electronic medical records of all patients in the inclusion criteria was assessed. Preoperative, intraoperative, postoperative, and follow-up data were collected. For the preoperative period, routine patient level stratification of the risk of developing stoma complications was recorded.

Patient demographics, such as age, gender, weight, medications used, comorbidities, such as hypertension, diabetes, dyslipidemia, ischemic heart disease, and renal failure were collected.

Clinical details like diagnosis and indication of stoma creation (benign or malignant), type of surgery, and presence of preoperative tumor-related complications like anemia or obstruction was also recorded. Whether the patient received preoperative patient family education, stoma site marking, and neoadjuvant concomitant was noted.

For the preoperative period, routine patient level stratification of the risk of developing stoma complications was recorded. This included the patient's age, gender, weight, comorbidities (hypertension, diabetes, dyslipidemia, ischemic heart disease, renal

failure, etc.), and medications used by the patient. The diagnosis and indication of stoma creation, and whether the indication was benign or malignant was indicated in our data. The surgery was performed at KHUH on either an elective or an emergency basis.

Preoperatively, we looked at the presence of the tumor and its related complications, such as anemia or obstruction, stoma site marking, and if the patient received nonadjacent concomitant chemoradiotherapy, as well as patient family education.

For the intraoperative period, the following factors were assessed: American Society of Anesthesiologist (ASA) risk, Stoma type performed (ileostomy vs colostomy), and whether it was temporary or permanent. Additionally, the type of surgery performed, such as right colonic resection, left colonic resection, low/ultralow anterior resection, abdominoperineal resection, total proctocolectomy.

Postoperative period included the duration of stay in the hospital, and whether the patient received chemotherapy, radiotherapy, or any additional surgery. The factors studied after discharge were early versus late complications, and the duration of the stoma when the complication appeared. Furthermore, we kept track of the adherence to follow-ups with the hyperbaric team.

RESULTS

We analyzed 98 stoma cases in this study with various criteria as independent points of comparison by statistical methods (SPSS v 25.0). [Table 1](#) presents the epidemiological data of all patients included in the study. The age of our cohort ranged between 48.25 and 67, with the average age being 60. The cohort was made up of 50 males and 48 females, with the majority being of Bahraini ethnicity (86.7%). The various clinical criteria are displayed in [Table 2](#). The complications were sectioned into early and late complications as evidenced in [Table 3](#).

Table 1: Age, gender, ethnicity, and BMI distribution

Age (Years)	60 (48.25–67)
BMI	27.2 (23.5–31)
Gender	
Male	50 (51.0%)
Female	48 (49.0%)
Ethnicity	
Bahraini	85 (86.7%)
Non-Bahraini	13 (13.3%)

Table 2: The various clinical criteria considered in this study

Comorbidities	
Hypertension	47 (48.0%)
Diabetes	45 (45.9%)
Hyperlipidemia	31 (31.6%)
Smoking history	27 (27.6%)
Ischemic heart disease	9 (9.2%)
ASA score	
1	3 (3.1%)
2	48 (49.0%)
3	37 (37.8%)
4	10 (10.2%)
Previous abdominal surgery	34 (34.7%)

(Contd...)

Table 2: (Contd...)

Pre-op patient education	
Yes	25 (25.5%)
No	72 (73.5%)
Pre-op stoma site marking	
Yes	21 (21.4%)
No	76 (77.6%)
Benign	
Malignant	15 (15.3%)
Anal	65 (66.3%)
Left colon	1 (1.0%)
Rectal	11 (11.2%)
Sigmoid	39 (39.8%)
Synchronous	1 (1.0%)
Transverse	4 (4.1%)
Non-colorectal	1 (1.0%)
Ascites	
Yes	10 (10.2%)
No	15 (15.3%)
Liver failure	
Yes	82 (83.7%)
No	3 (3.1%)
Steroid use	
Yes	94 (95.9%)
No	4 (4.1%)
Neoadjuvant chemotherapy	
Yes	93 (94.9%)
No	4 (4.1%)
Radiotherapy	
Yes	29 (29.6%)
No	64 (65.3%)
Emergency	
Elective	48 (49.0%)
Laparoscopic	49 (50.0%)
Open	47 (48.0%)

Table 3: Early or late complications

Early/late complications	
Early	64 (65.3%)
Late	10 (10.2%)
Early/late	2 (2.04%)
No complications	22 (22.4%)
Total	98

The breakdown of indications for stoma formation is shown in Figure 1. The most common indication was colon cancer, accounting for 55% of all cases. Other specific indications like diversion for wound infection, volvulus, perforation, bowel obstruction, among others are laid out in the figure.

The cohort of stoma cases considered in our study had a total rate of complications of 65.3%. The most common of these were cutaneous complications, stoma retraction, prolapse, and bleeding, accounting for rates of 63.3, 22.4, 16.3, and 16.3%, respectively. The breakdown of all our documented complications is displayed in Figure 2.

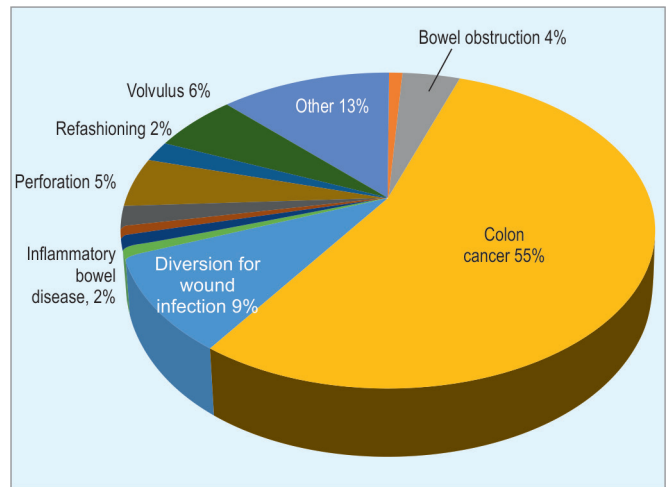


Fig. 1: Breakdown of stoma complications

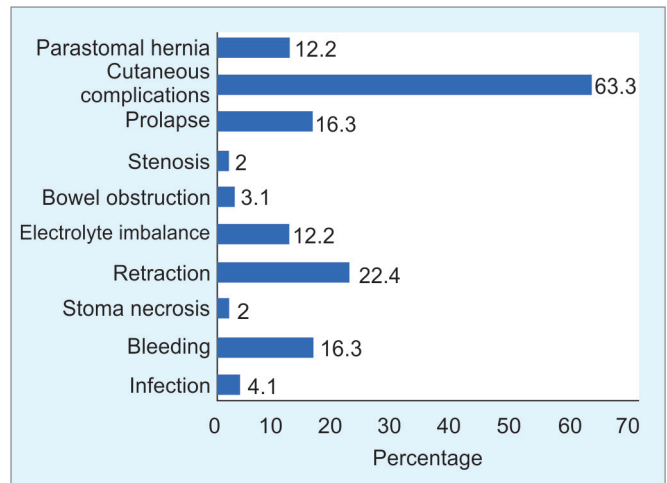


Fig. 2: Rates of complications

DISCUSSION

A systematic review of randomized controlled trials revealed that stoma complication ranges from 2.9 to 81.1%.¹⁹ The 65.3%, with 54 cases out of 98 cases developing complications.

We have divided our complications into two categories: Early vs Late. Early complications include infection, bleeding, stoma necrosis, retraction, electrolyte imbalance, bowel obstruction, cutaneous complications, and stenosis. Late complications included prolapse, parastomal hernia, bowel obstruction, and retraction. Additionally, each complication was divided based on the elective vs emergency procedure. However, our study found no difference between the rate of complications based on emergency vs elective procedures for all complications.

Overall, in our study, the lowest complication rate was seen in stoma necrosis (2.0%), with a higher rate seen with ileostomy (2.6%) as opposed to colostomy (1.7%). On the other hand, the highest complication rate was seen in cutaneous complications (63.3%), with a higher rate seen with ileostomies (79.5%) as opposed to colostomy (53.4%).

Other common complications included retractions (22.4%), bleeding (16.3%), prolapse (16.3%), and electrolyte imbalance (12.4%).

Early Complications

Cutaneous Complications

Our incidence of cutaneous complications is 63.3%. It has been reported that the most common early complication was skin irritation.^{5,19} It has additionally been reported globally, that there are approximately 73% of patients with a stoma facing cutaneous complications. Our study has revealed that preoperative education had no impact on cutaneous and other complications ($p > 0.05$). This is not in line with other literature, such as a study done in Saudi Arabia that showed performing a stoma care educational program before discharge has decreased cutaneous complications over the duration of 6 weeks.¹³ Another study done in Sweden had 11% cutaneous complications and had ongoing stomal education throughout follow-ups.¹⁶

Electrolyte Imbalances

According to studies, 16% of patients with stomas experience electrolyte imbalance.¹⁷

Our investigation revealed that 12.4% of our patients had electrolyte imbalance, demonstrating that our findings were consistent with previous studies. However, in our study, ileostomies made up the bulk of cases 23.1%, whereas colostomies made up 5.2%.

Retraction

Incidence of retraction varies from 2.9 to 5.4% (6), in our study (22.4%), falling higher than the usual incidence. This could be due to multiple reasons, including the fact that this complication is mostly common in patients with high body mass index. In our study's BMI of the patients ranged from 23.5 to 31, with a mean of 27.2. This could well indicate that the reason behind a higher number of retractions than the standard is due to the high BMI in Bahrain.²⁰ There was no difference between elective (22.4%) and emergency procedures (22.9%).

Infection

The rate of infections and abscesses in the review is between 2 and 14.8%. Our study looked only at the rate of infection, which was 4.1%, which is well within the standard and on the lower end.⁵ This was equally seen in colostomy and ileostomy as well as in elective and emergency procedures.⁵

Stoma Necrosis

According to a review article, the incidence of necrosis is between 1.6 and 11%. Our overall stoma necrosis rate (2.1%), with more of them occurring with ileostomy (2.6%) as opposed to colostomy (1.7%). Interestingly, there was no stoma necrosis occurring in any of our elective patients and two cases were seen in our emergency patients.¹⁷

Late Complications

Parastomal Hernia

The incidence of parastomal hernia ranges between 3 and 50% due to many factors, such as definition of the complication, different population of patients, follow-up durations, and so on. It was shown that the incidence of this complication increases with the number of years.¹⁷ Our study showed a complication rate 12.2% which lies on the lower end.

Prolapse

In contrast to the review, our study's incidence rate of stomas was greater than average at 23.1% for ileostomies and 12.1% for

colostomies. The incidence rate of stomas in ileostomies ranged between 2 and 3% and 2–10%, respectively.

The reason for this could be explained by some of the risk factors for stoma prolapse, such as advanced age and obesity. As discussed in retraction of early complications, Bahrain has a higher BMI index in comparison to other countries. Additionally, the mean age of the patients in our study was 60.^{17,21}

Stenosis

The incidence of stoma stenosis in our research is 2.1%, with 1.7% among colostomy and 2.6% among ileostomy cases, whereas a rate of 2–15% has been reported in other studies. Our study shows that we are at the lower end and well within standards.^{14,22,23}

CONCLUSION

Within our institutional study, 63.3% of stoma complications were composed of skin problems. This formed the majority of complications. Designing a stoma care unit would offer continuous support and care to the patients and aid them and their families in getting back to the best quality of life. This goal will be achieved through preoperative and postoperative education with regards to surgery and stoma formation. This consists of preoperative stoma marking and siting, as well as improved recovery through guidance from well-informed stoma care specialists regarding hands-on stoma care. Lastly, patients and caregivers will be assisted through specialized stoma clinics.

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