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Outcome of Early Reversal of Intestinal Stoma: A Cross-Sectional Study

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Abstract

Background: Early reversal of temporary intestinal stoma might bring good clinical outcome as like as late reversal in the context of anastomotic leakage, postoperative ileus, sepsis, intraoperative bleeding etc. This may avoid stoma related morbidity & complications. This study was designed to find out the short-term outcomes of early reversal of intestinal stoma within 14 days of index surgery.

Methods: This cross-sectional observational study was conducted at the Department of Colorectal Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. The study duration was 16 months, from March 2021 to June 2022. During this period, a total of 15 patients of either sex who underwent colorectal surgery with employment of intestinal stoma during the study period were included in the study following the inclusion and exclusion criteria. Preoperative checking of anastomotic leakage of index surgery was performed by water soluble rectal contrast imaging prior to selection of cases.

Result: The study included 15 participants with relatively even age and gender distributions. The majority of participants experienced favorable postoperative outcomes, with minimal complications. The anastomotic leak rate was 6.7%, with only one patient experiencing it out of a total of 15. However, a relatively high rate of wound infection (40%) was observed among the participants.

Conclusion: The study demonstrates that early reversal of intestinal stoma in Bangladesh may result in predominantly favorable outcomes in selected patients. However, the high rate of wound infection necessitates further investigation into the causes and implementation of effective preventive measures. Future research with larger and more diverse patient populations is needed to validate and expand upon these findings, contributing to improved surgical care and patient outcomes in Bangladesh and beyond.

Keywords: Early reversal; Intestinal stoma; Rectal cancer; Temporary loop ileostomy; Anastomotic leak

Introduction

Intestinal stomas are created either temporary or permanent fashion for fecal diversion in the management of various gastrointestinal, neurologic or genitourinary condition. Now a days, very low pelvic anastomoses is feasible without having permanent stoma due to higher rates of sphincter-sparing procedures in colorectal surgery [1]. These procedures compel a temporary ileostomy creation for reduction of incidence of any clinical anastomotic leak as well as to mitigate the consequences of leak [2]. Commonly temporary stomas are reversed after 2-3 months but several patient related characteristics

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may influence it and delay in reversal like higher (2 or more) ASA class, advance (stage 3 or 4) cancer, planned for adjuvant chemotherapy [3]. Long term stomas have some complications like parastomal herniation, stoma prolapse, skin excoriation, stomal ischemia, stenosis, retraction etc. Significant morbidity and stoma related complications varies between 21-70% [4]. Complications of stoma closure may delay initiation of chemotherapy. Long term stoma may cause nutritional impairment, need good nursing facilities for stoma care and need extra cost for re-admission & delayed surgery for reversal of intestinal stoma. Moreover, in some patients' temporary stoma can't be possible to reverse at all due to ongoing morbidities [5]. Beside these, advanced age, anastomotic leak, metastatic disease or even adjuvant chemotherapy and its related complications may make diverting stoma a permanent one in about 6-32% patients [6]. So, recently early stoma reversal is a burning issue to avoid those complications. Several studies are going on for assessing the outcome of early stoma reversal. Some studies are going on to include early reversal as a part of ERAS (Enhance recovery surgery) protocol [7]. Even some studies show patients undergoing early stoma closure had fewer soiling than late closure [8]. Early reversal of intestinal stoma trialed in different time in different studies like at 30 days, 21 days, 14 days or even on 8 days. Outcome was very good in most of the studies [9], health related quality of life was also better in early reversal group [10] but wound complication was significantly higher in 8 days. Most of the studies prefer within 14 days considering shortest possible time with almost similar outcome of conventional stoma reversal in 2-3 months and also considering the second surgery for stoma reversal in same hospital admission [11,12]. Research conducted globally demonstrates that early reversal of intestinal stomas yields favorable outcome comparable to conventional stoma reversal procedures [13-15]. Consequently, it is crucial to determine the most effective and safe management strategies for patients with intestinal stomas to minimize complications and improve the overall healthcare outcomes in the country. Despite the global relevance of stoma management, there is a lack of research focusing on the outcomes of early stoma reversal in the context of Bangladesh. A cross-sectional study exploring this topic will contribute to the existing literature and provide valuable insights for healthcare professionals in the country. This study will investigate the potential benefits and risks associated with early stoma reversal, including the rate of postoperative complications in order to check the feasibility and safety of early reversal of temporary intestinal stoma.

Methods

This cross-sectional observational study was conducted at the Department of Colorectal Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. The study duration was 16 months, from March 2021 to June 2022. During this period, a total of 15 patients of either sex who underwent colorectal surgery with employment of intestinal stoma during the study period were included in the study following the inclusion and exclusion criteria. Patients who had undergone index surgery for rectal cancer and had a temporary loop ileostomy were considered eligible for inclusion. However, patients who had an emergency stoma due to necrosis or gangrene, showed evidence of postoperative sepsis, experienced organ failure after the index surgery, displayed radiological signs of primary anastomotic leak before stoma closure, had poor nutritional status (albumin <3 g%), were anemic (Hb <10g%), suffered from severe cardiopulmonary disease, or took immunosuppressive agents were excluded from the study. Informed consent was obtained from each participant prior to the data collection, and ethical approval regarding the study was also obtained from the ethical review committee of the study hospital. Sample size was estimated taking 10% absolute precision and prevalence of anastomotic leak 4% by Nelson et al [13]. After data collection and compilation, statistical analyses of the results were done by using computer based statistical software SPSS version 25. Hypothesis testing was done by using student t-test for quantitative variables and Chi squared (χ 2) test or Fisher's exact test for qualitative variables. Statistical significance was set at $p \leq 0.05$ and confidence interval at 95% level. Blood loss estimation was determined using the "Gauze Visual Analogue" method, whereby a 45X45 cm gauze was observed for supersaturation indicating blood loss exceeding 150 ml when dripping occurred [16]. Anastomotic leak was assessed through either direct wound leakage or confirmed by an ultrasonogram if shows any features of tachycardia, elevated temperature, abdominal pain, tenderness or distension on the 5th podtoperative day.

Results

Table 1 presents the baseline sociodemographic characteristics of the 15 participants included in the study. The age distribution was as follows: 6.67% (n=1) were aged 21-30, 20.00% (n=3) were aged 31-40, 33.33% (n=5) were aged 41-50, 26.67% (n=4) were aged 51-60, and 13.33% (n=2) were aged above 60 years. The mean age of the participants was 47.27±11.59 years, with an age range of 27 to 64 years. The study population consisted of 60.00% (n=9) males and 40.00% (n=6) females. In terms of body mass index (BMI), none of the participants were underweight (BMI ≤18.5). The majority, 60.00% (n=9), had a normal BMI (18.5 – 24.9), and 40.00% (n=6) were classified as obese (BMI ≥25). The mean BMI of the participants was 24.26±2.92, with a range of 18.66 to 27.33.

Md. Talukdar MI, et al., J Surg Res 2023
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Table 2 displays the per-operative & early postoperative characteristics of the 15 participants in the study. The majority of the participants, 93.33% (n=14), underwent operations lasting 90 minutes or less, while only 6.67% (n=1) had operations that exceeded 90 minutes in duration. In terms of blood loss during the procedure, 86.67% (n=13) of the participants experienced a blood loss of 150 mL or less, while 13.33% (n=2) had a blood loss greater than 150 mL. On 5th POD (post-operative day), 93.33% (n=14) of the participants had a temperature below 100°, and only 6.67% (n=1) had a temperature of 100° or higher. Pulse rate per minute was also assessed, with 86.67% (n=13) of the participants having a pulse rate of up to 90 beats per minute, and 13.33% (n=2) having a pulse rate of 91 beats per minute or above. Lastly, wound infection was reported in 40.00% (n=6) of the participants, while 60.00% (n=9) did not experience any infection following the operation.

Table 3 illustrates the distribution of participants with wound infections by the type of infection present (N=6). Among the infected participants, 16.67% (n=1) experienced swelling due to inflammatory edema. The most common type of infection was swelling due to hematoma or seroma, accounting for 50.00% (n=3) of the infected participants. Discharge was reported in 33.33% (n=2) of the participants with wound infections.

Table 1: Baseline sociodemographic characteristics of the participants [N=15]

Variables	n	%
Age		
21-30	1	6.67%
31-40	3	20.00%
41-50	5	33.33%
51-60	4	26.67%
> 60	2	13.33%
Mean±SD	47.27±11.59 years	
Range	27-64	
Gender		
Male	9	60.00%
Female	6	40.00%
BMI		
Underweight (≤18.5)	0	0.00%
Normal (18.5 – 24.9)	9	60.00%
Obese (≥25)	6	40.00%
Mean±SD	24.26±2.92	
Range	18.66 – 27.33	

Table 2: Per-operative & Early postoperative characteristics of the participants [N=15]

Variables	n	%
Duration of operation		
≤ 90 min	14	93.33%
> 90 min	1	6.67%
Amount of blood loss		
≤ 150 mL	13	86.67%
> 150 mL	2	13.33%
Temperature		
<100°	14	93.33%
≥100°	1	6.67%
Pulse per minute		
<91	13	86.67%
≥91	2	13.33%
Wound Infection		
No Infection	9	60.00%
Infection	6	40.00%

Table 3: Distribution of participants by type of infection present [N=6]

Type of Infection	n	%
Swelling due to inflammatory edema	1	16.67%
Swelling due to hematoma/Seroma	3	50.00%
Discharge	2	33.33%

Table 4: Postoperative abdominal findings distribution among the participants [N=15]

Variables	n	%
Abdominal Features		
Abdominal pain	0	0.00%
Abdominal tenderness	0	0.00%
Abdominal distension	0	0.00%
Passage of flatus on 5th POD	15	100.00%
Leakage through wound		
No leakage	14	93.33%
Leakage	1	6.67%
Complications		
Anastomotic leakage	1	6.67%
Postoperative ileus	0	0.00%
Sepsis	0	0.00%

Md. Talukdar MI, et al., J Surg Res 2023
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Table 4 presents the postoperative abdominal findings distribution among the 15 participants in the study. Regarding abdominal features, none of the participants reported abdominal pain, abdominal tenderness, or abdominal distension. All participants (100%, n=15) passed flatus on the 5th postoperative day (POD). In terms of leakage through the wound, 93.33% (n=14) of the participants experienced no leakage, while 6.67% (n=1) reported leakage. When considering postoperative complications, anastomotic leakage was observed in 6.67% (n=1) of the participants. No cases of postoperative ileus or sepsis were reported among the participants in this study.

Discusion

In this study, we investigated the outcomes of early reversal of intestinal stoma among 15 participants in Bangladesh. The baseline sociodemographic characteristics of the study population showed a relatively even distribution of age groups and a balanced gender ratio (60% male and 40% female). The majority of participants (60%) had a normal BMI, while 40% were classified as obese. These findings were similar to those of previous studies, that observed a higher young male population among the participants [17,18]. In this study, majority of the patients (60%) had normal BMI and 40% had obesity while none were underweighted. The mean BMI was 24.26±2.92 with range between 18.66 and 27.33kg/m^2. BMI was comparable to the most of the studies conducted. Elsner et al., in their 2021 study found BMI (median, range) to be 25.4 (18.2–33.3) Kg/m^2 [19]. In most of the studies, BMI is an independed risk factor for developing postoperative complications after reversal of stoma. Saito et al (2014) showed in their multivariate analysis, BMI of 24 kg/m^2 was with significantly higher incidences of postoperative complications. Furthermore, patients having BMI < 24 kg/m^2 had less morbidity than patients who remained obese BMI > 24 kg/m^2 (Saito, Y et al., 2014). In this study, Out of 6 obese patients most of them (4) had wound infection. On the contrary, out of 9 normal weighted patients only 2 had wound infection. Though wound infection was more prevalent to obese patients here but there was no significant association on Fisher's Exact test (P=0.13). Estimated blood loss (EBL) was mostly less than 150 ml in most of the studies of early ileostomy reversal such as Wanglin Li and Gokhan Ozuner (2017) found only 33.26 ± 106.93 ml EBL in their early reversal group [21]. Similar results found in this study, where most of the patients' 13 (86.70%) EBL was below 150 ml. Postoperative tachycardia is an important predictor of anastomotic leak. Fukada et al (2019) found a good number of patients who had postoperative tachycardia (≥ 100 bpm), later develop anastomotic leak and the odd ratio is 4.84 with a 95 % CI [0.58~34.59] [22]. In this study, tachycardia was found in only 2(13.30%) patients and one of them developed anastomotic leak. The meta-analysis of Ng et al. (2020) showed similar anastomotic leak in early versus late closure of stoma 4.9% versus 3.7% respectively, (95% CI −0.02 to 0.03), higher wound infection after early closure 18.6% versus 7.1%; (95% CI 0.00–0.19, P = 0.047), similar post-operative ileus (9.4% versus 10.9%), almost equal sepsis (4.3% versus 6.4%) [14]. But dissimilar and disappointing results found in a randomized controlled multicenter trial by Elsner et al (2021) where anastomotic leak was significantly higher (24% vs 0%; p = 0.002) after early closure [19]. But this study was superseded by the Panis et al (2021) where approximately 75% of patients had undergone with early closure with an uneventful postoperative outcome [23]. In this study, anastomotic leak in early closure was found in 6.70% (1 out of a 15) which is quite similar to the other studies. Regarding postoperative findings, none of the participants reported abdominal pain, tenderness, or distension, and all passed flatus on the 5th POD. These results suggest a favorable recovery for the majority of participants. Moreover, 93.33% of the participants did not experience leakage through the wound, and only 6.67% had anastomotic leakage. This low rate of complications is in line with findings from other studies [13].

Limitations of the study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

Conclusion

In conclusion, this study has provided valuable insights into the outcomes of early reversal of intestinal stoma in Bangladesh. The majority of participants experienced favorable postoperative outcomes, with minimal complications and low rates of leakage. However, the relatively high rate of wound infection underscores the need for further investigation into the underlying causes and implementation of effective preventive measures. The findings and analysis of the present study suggest that early reversal of intestinal stoma could be considered as a viable option for selected patients undergoing colorectal anastomosis for low rectal cancer

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Conflict of interest

None declared

Ethical approval

The study was approved by the Institutional Ethics Committee

Md. Talukdar MI, et al., J Surg Res 2023
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