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Surgical management of stomal prolapse – Is there a superior approach to repair?

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ABSTRACT

Background: Stomal prolapse is an uncommon complication related to ostomy creation without comparative studies to suggest an optimal approach. Our aim was to assess long-term recurrence rates following surgical repair, specifically local repair vs. laparotomy.

Methods: We conducted a retrospective review of patients who underwent surgical correction of a prolapsed stoma by dedicated colorectal surgeons. The primary outcome was recurrence. We evaluated perioperative risk factors for long-term recurrence, focusing on the surgical approach.

Results: Over 12 years, 23 patients underwent 37 surgeries (median follow-up 24 months, range 1–126). Repeat operations for recurrence were performed in 43.5% of patients, 80% within one year. Recurrence was similar regardless of the surgical approach; 43.6% local repair vs 42.9% laparotomy ($p = 0.41$). Age, sex, body mass index, smoking status, ASA score, type of stoma, and urgency of repair were not associated with recurrence. Re-recurrence resulting in a third operation, occurred in 50% of patients.

Conclusion: Operative repair of stomal prolapse, regardless of approach, is associated with high recurrence rates. No identifiable factors were associated with recurrence.

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Introduction

Stoma creation is common in surgical practice, with about 150,000 stomas being created in the United States annually.¹ While creation of stomas remains essential for treatment and minimizing surgical complications, they themselves can be associated with significant morbidity. Complications from stomas range from 20 to 70% in reported literature,¹ with stomal prolapse rates between 2 and 26%.² Prolapse is more common with loop colostomies,³ and often involves the distal limb. Risk factors include increasing age,³ bowel obstruction and lack of preoperative site marking.⁴ Stomal prolapse may be intermittent (sliding) or permanent, and can be associated with parastomal hernia, peristomal skin excoriation, bleeding, local discomfort, and difficulty in maintaining an appliance. Rarely, prolapsed stomas can become incarcerated or even necrotic, requiring urgent intervention.

Surgical options for a prolapsed stoma include resection of the prolapsed portion, revision or relocation. Ideally if the stoma is

temporary, reversal should be considered depending on the circumstances. The surgical approach to repair can be broadly classified into two groups – an abdominal approach, often via a midline laparotomy, or a local approach around the stoma site. An abdominal approach releases adhesions, reduces the prolapse and involves fixation of the bowel and/or the mesentery to the abdominal wall. The stoma aperture at the level of the fascia may be narrowed with sutures, and in the setting of a co-existing parastomal hernia, mesh may be used to reinforce the repair. There are reports of similar procedures being performed laparoscopically.^{5,6}

Local procedures involve resection of the prolapsed segment and re-maturation of the stoma, similar to an Altemeier's procedure.⁷ There are also reports of local repair using a technique similar to the Delorme operation.^{8,9} Loop stomas are often converted into end stomas or loop-end stomas. Other reported techniques describe the use of linear staplers^{10–15} or curved staplers.¹⁶ The lack of comparative data and short-term follow up¹⁷ have not made it possible to establish guidelines to help choose an optimal method of repair for stomal prolapse. Our aim, therefore, was to assess our single institution's long-term outcomes following surgery for stoma prolapse. We also analyzed differences in outcomes based on surgical approach as well as the risk factors for recurrence of prolapse.

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Materials and methods

Patient population and study criteria

This was a retrospective cohort study undertaken in the colorectal unit of a single hospital among 7 dedicated colorectal surgeons. All patients who underwent operative repair of a stomal prolapse between January 2005 and December 2016 were identified from an administrative database using the appropriate Current Procedure Terminology (CPT) codes for stoma revision (44312, 44314, 44340, 44345). Electronic medical records of these patients were referenced to verify the subset of patients undergoing stoma revision for prolapse, and these were included in the study. Patients younger than 18 years and pregnant women were excluded.

Clinical demographics including age, sex, body mass index (BMI), smoking status, American Society of Anesthesiologist (ASA) grade, type of stoma, indication for stoma, time to repair of prolapse, type of repair, complications, and recurrence were gathered from the electronic medical records. Follow up was obtained via the electronic medical record, and was limited to stoma closure for temporary stomas, and patient death or last recorded observation for others. The Spectrum Health Institutional Review Board approved the study.

Surgical approach

The surgical approach to repair of the prolapse was surgeon dependent and not standardized. However, two common approaches were employed, either a local repair or an abdominal approach via laparotomy. Local repair involved release of the mucocutaneous junction, dissection into the peritoneal cavity, excision of the redundant bowel and refashioning of the stoma at the same site. If the stoma aperture in the rectus was deemed excessive, then sutures were used to re-approximate the fascial edges. The bowel wall was then sutured to the rectus sheath. No staplers were used to perform local repair.

The abdominal approach involved a midline laparotomy with reduction of the prolapse without bowel resection. Bowel loops were secured with sutures to the anterior abdominal wall, in an “accordion-like” fashion. Similar to the local approach, the fascial aperture was narrowed using sutures if deemed to be large, or if there was a coexisting parastomal hernia. This repair was reinforced with a mesh if there was an associated parastomal hernia. Resiting of the stoma was performed only if the stoma position was deemed to be suboptimal.

Outcomes and statistical analysis

By selecting the initial cohort among those who underwent surgery for stoma prolapse, we identified only cases where the prolapse was clinically significant warranting repair. Therefore, given that our primary outcome of interest was recurrence of prolapse, we defined this as those with clinically significant prolapse that led to repeat surgical repair. All patients who underwent surgery were followed in the electronic medical record to evaluate for any further surgical procedures. We also evaluated differences in outcome based on surgical approach (local repair vs. laparotomy). Data was analyzed using SPSS software (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). Continuous variables were expressed as mean \pm standard deviation or median (range) and analyzed using the *t*-test. Categorical variables were expressed as percentages and analyzed using the chi-square test or the Fischer’s exact test.

Results

Between January 2005 and December 2016, 23 patients underwent 37 procedures for surgical repair of a prolapsed stoma. 65.2% ($n = 15$) were male, with a mean age of 51.9 (SD 19., Range 19–87) years and a mean BMI of 25.2 (SD 4.5, range 17.6–33.5). The most common indications for the original stoma were malignancy, inflammatory bowel disease and bowel obstruction. Almost half (47.8%) the patients had their original stoma performed as an emergency or urgent procedure. The most common type of stoma prolapse requiring surgery was an end ileostomy (43.5%) followed by loop ileostomy (26.1%). Additional patient demographics are summarized in Table 1.

The most common repair was a local procedure (69.6%, 16 patients), with only 30.4% (7 patients) undergoing a laparotomy. At laparotomy, 4 underwent a reduction of prolapse with fixation, 2 underwent resiting of the stoma and one underwent a fixation followed by mesh placement for an associated parastomal hernia. The median time to repair from first surgery was 6 months (Range 1–74 months). Most stomal prolapses (69.6%, 16/23) were repaired within 12 months of the original surgery, with about a quarter being operated within the first 3 months (26.1%, 6/23) (Fig. 2).

Patients who underwent a local repair were similar in age, sex, BMI and ASA to those who underwent a laparotomy. However, all colostomies (7/7) underwent a local procedure, while only 7/16 ileostomies underwent a local procedure ($p = 0.057$). Also, more inflammatory bowel disease patients underwent laparotomy (4/5) when compared to other disease processes (3/16, colorectal cancer [$n = 8$], bowel obstruction [$n = 8$] or FAP [$n = 3$], $p = 0.046$). The overall mean length of stay was 5.2 days (SD 4.7), with 4.2 days for the local repair group and 7.2 days for the laparotomy group ($p = 0.11$). Complications were noted in 3 patients (one wound infection and 2 prolonged ileus) and were similar between the laparotomy (2/7) and local repair (1/16) groups ($p = 0.21$). Other complications noted during subsequent repairs included one small bowel obstruction and one pneumonia. There were no mortalities.

The median follow-up in our study was 24 months (mean 39, range 1–126). Operative recurrent prolapse occurred in 43.5% (10/23) at a median time of 7.5 months (mean 12.4, range 1–51) from the initial stomal prolapse repair. Most recurrences occurred within

Table 1
Demographic features.

Demographic Feature	All Patients ($n = 23$)
Age	51.9 (SD 19.7) years
Sex	
Male	15 (65.2%)
Female	8 (34.8%)
BMI	25.1 (SD 4.5) kg/m ²
ASA	
1	4 (17.4%)
2	11 (47.8%)
3	8 (34.8%)
Urgent/emergency stoma formation	11/23 (47.8%)
Open approach to stoma formation	19/23 (82.6%)
Indication for stoma	
Colorectal cancer	7 (30.4%)
Small bowel obstruction	4 (17.4%)
Large bowel obstruction	4 (17.4%)
Ulcerative colitis	3 (13.0%)
Familial adenomatous polyposis	3 (13.0%)
Crohn’s disease	
Type of stoma	2 (8.7%)
End ileostomy	10 (43.5%)
Loop ileostomy	6 (26.1%)
End colostomy	5 (21.7%)
Loop colostomy	2 (8.7%)

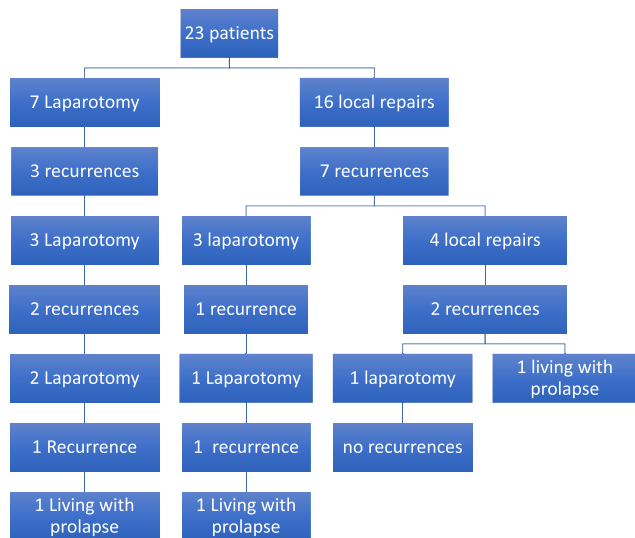


Fig. 1. Flow of patients.

surgical repair. This included 4 redo local repairs and 6 laparotomies (3 in the previous laparotomy group and 3 in the previous local repair group) (Fig. 1). Re-recurrence was seen in 5 patients (50%). Four of 5 underwent a third repair of the stoma prolapse (all laparotomy), with 2 having a further recurrence (50%). After multiple repairs, attempt to correct the prolapse was abandoned in 3 patients (13%). The re-recurrence rates are summarized in Table 3.

Discussion and conclusions

There is little published literature on outcomes after operative repair for stoma prolapse. Most of the published data includes case reports and small case series with less than 10 patients.^{5,6,8,10–12,15–17} These largely describe short-term results of modifications in techniques of repair. Text books and articles on stoma complications mention abdominal and local approach to repair,^{1,4,18} but are seldom clear on the details, indications, merits and complications of each procedure. There are no studies comparing various approaches and long-term recurrence rates of each type of repair are not known. Our study provides the largest published series of operative repairs for stomal prolapse and tries to elucidate an optimal approach for this difficult problem.

Unfortunately, our results have shown that recurrence following surgical repair of stoma prolapse is high, with nearly half the patients undergoing repeat operative repair for recurrence. Recurrence rates were not influenced by identifiable pre-operative factors, including age, sex, BMI, urgency of repair or the approach to repair (abdominal vs. local). Most of the recurrences occurred within a year of repair, with recurrence rates dropping to minimal after that (Fig. 2). Rates of recurrence after redo repair also were high (50%). It should be noted however that a high number of operative repairs were done for prolapses created in the emergent setting. This highlights the importance of preoperative counseling and marking by an enterostomal therapy nurse to reduce stoma related problems.

one year of repair (8/10,80%) (Fig. 3). There were a similar number of recurrences in the local repair group (median follow-up 23 months) compared to the laparotomy group (median follow-up 55 months, n = 7 (43.6%) vs. n = 3 (42.9%), p = 0.41). None of the studied risk factors for recurrence of prolapse were significantly different between groups, although those who recurred were 14 years younger than those who did not (p = 0.09, Table 2). There was no difference between recurrence rates for ileostomies (4/9) and colostomies (4/7) in the local repair group (p = 1.0). A total of 4 patients underwent ileostomy closure after first repair of the prolapse. The follow-up was terminated when the stoma was reversed. All patients with a recurrence of prolapse underwent repeat

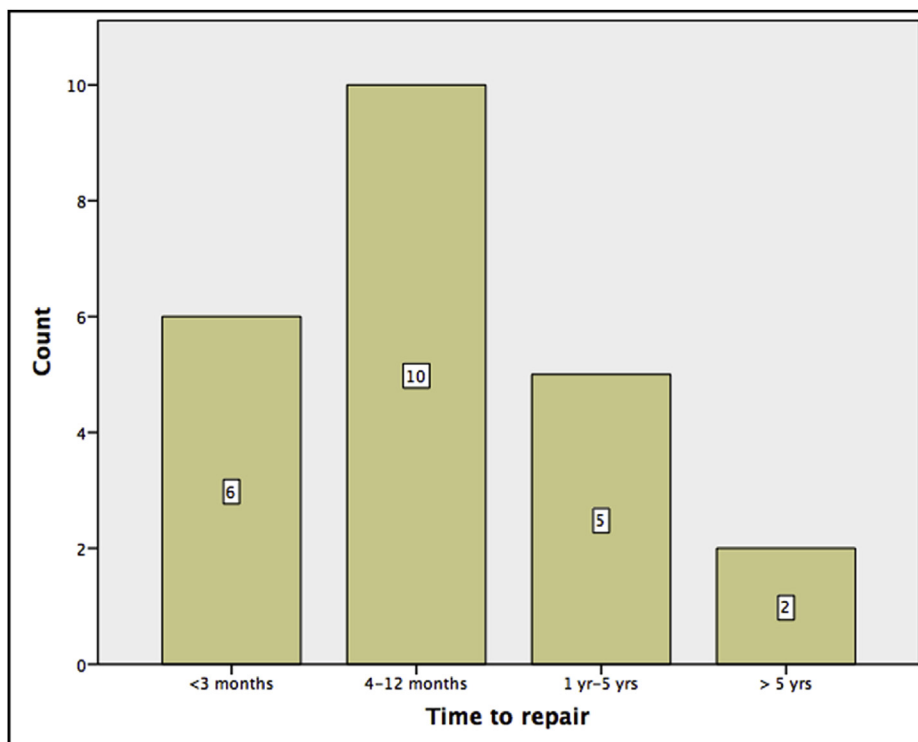


Fig. 2. Time to repair of stomal prolapse from initial stoma creation.

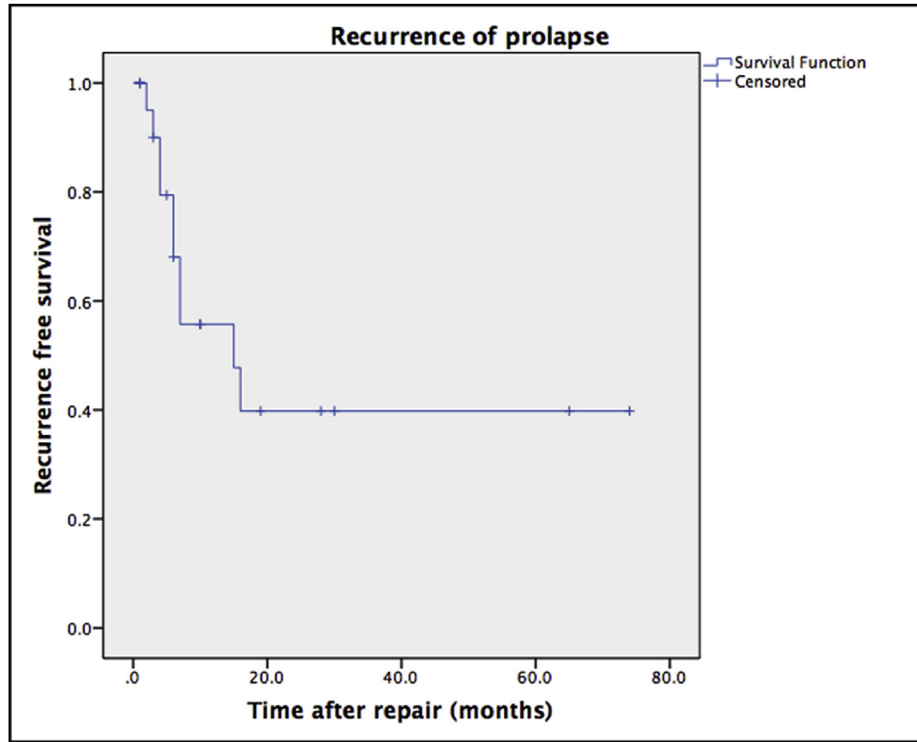


Fig. 3. Recurrence rates for stomal prolapse with time.

There is little guidance in literature on the benefits of one approach over the other. While there are many studies on techniques of local repair (mostly using staplers),^{7–17,19} there are relatively few on open abdominal approaches, instead highlighting on a laparoscopic approaches.^{5,6} We have not demonstrated any difference in recurrence based on approach, although the laparotomy group had a trend towards lower recurrence rates. Although we did not use staplers on our local repairs, we do not suppose this form of local, resectional surgery differs greatly from a non-stapler approach. Likewise, we did not implement a laparoscopic

approach for any cases with the supposition that perhaps the etiology of the prolapse involved the lack of intraabdominal adhesions.

Choice of approach depends on many factors such as primary indication of stoma, need for concomitant procedures, fitness of the patient, ASA score, need for resiting of stoma, number of previous laparotomies, expertise of the surgeon, etc. For those wishing to avoid a laparotomy due to age, significant co-morbidities or a hostile abdomen, a local procedure may be a less riskier option. Those with a local procedure had a significantly shorter hospital

Table 2
Risk factors for recurrence of stomal prolapse.

Risk Factor		Recurrence rate	P value
Age	Recurrence	44 yrs.	0.09
	No recurrence	58 yrs.	
BMI	Recurrence	26.2	0.21
	No recurrence	23.8	
Sex	Male	5/15 (33.3%)	0.22
	Female	5/8 (62.5%)	
Smoking	Smokers	4/8 (50%)	0.69
	Non-smokers	6/15 (40%)	
ASA	1	2/4(50%)	0.90
	2	5/11 (45.5%)	
	3	3/8 (37.5%)	
Type of stoma	ileostomy	6/16 (37.5%)	0.65
	colostomy	4/7 (57.1%)	
	Loop	3/8 (37.5%)	
	End	7/15 (46.7%)	
Approach	Laparotomy	3/8 (37.5%)	0.67
	Local repair	8/15 (53.3%)	
Urgency	Elective	4/12 (33.35)	0.41
	Emergency	6/11 (54.5%)	
Indication for surgery	Colorectal cancer	2/7 (28.6%)	0.69
	Bowel obstruction	4/8 (50%)	
	Inflammatory bowel disease	2/5 (40%)	
	FAP	2/3 (66.7%)	

Table 3
Stoma prolapse rates after multiple repairs.

	Local Repair	Laparotomy	Overall
After primary prolapse surgery	7/16 (43.6%)	3/7 (42.9%)	10/23 (43.5%)
After first recurrence	2/4 (50%)	3/6 (50%)	5/10 (50%)
After second recurrence	No local repairs performed	2/4 (50%)	2/4 (50%)

stay than those with a laparotomy. This procedure may even be carried out under local anesthesia⁷ in some cases. For patients needing resiting of their stoma, or fit patients with a friendly abdomen, laparotomy may be considered. A laparoscopic approach may be pursued based on the expertise of the surgeon and the risk of adhesions from previous surgeries. A co-existing parastomal hernia may also favor a laparotomy or a laparoscopic approach.²⁰

The use of staplers for local repair depends on surgeon expertise and familiarity with the procedure. There are various methods to apply staplers described in literature, some of which close off the distal limb, and some of which don't. Familiarity with the procedure and sound understanding of the anatomy and physiology of the resultant stoma are required before considering any of these procedures.

A limitation of this study is the lack of standardization of surgical approaches within the cohort of abdominal approaches. Given its retrospective nature we are also unable to make clear comparison between approaches. For example, one potential bias of this cohort was to undergo local therapy as a first line for repair (70%) which was made individually by each surgeon after discussion with the patient. While it is reasonable to undertake a less invasive procedure first off, it skews comparison between the abdominal and local repair cohorts. Unfortunately, given the rarity of such a vexing problem it will be difficult to prospectively compare different approaches. It may therefore be incumbent on larger case series such as this to aid with future decision-making.

Although the study spans over 12 years, the number of patients is still small, which makes statistical analysis and interpretation of results difficult. We also do not have data regarding those who chose not to undergo a surgical approach for prolapse. Non-operative management with lifestyle modification, weight loss, and consultation with enterostomal therapy nurses remains a first line treatment for prolapse and may be employed even for larger prolapses. We also defined recurrent prolapse to be that only those cases that were clinically significant as to warrant surgical repair as judged by the patient and the operating surgeon. Given these factors, it is highly probable that true recurrence rates of prolapse are even higher than the 43% reported in this series.

To conclude, recurrence of stomal prolapse after operative correction remains high. Both abdominal and local procedures can be used to treat stomal prolapse, and although the choice needs to be individualized to each patient, a superior approach cannot be recommended at the present time. Novel approaches, pooled series and long-term follow-up are needed to formulate an improved evidence based algorithm for treatment of stoma prolapse.

Ethical Approval

This study was approved by the Institutional review board. For this type of study formal consent is not required.

Contributions (via CRediT)

a. R. Mittal – Data curation, formal analysis, investigation, methodology, resources, software, validation, writing – original draft, writing – reviewing and editing.

b. T. Jalouta – Data curation, formal analysis, investigation, resources, software, visualization, writing – original draft.

c. M. Luchtefeld – Conceptualization, project administration, supervision, validation, writing – reviewing and editing.

d. J. Ogilvie – Conceptualization, formal analysis, investigation, methodology, project administration, supervision, validation, writing – reviewing and editing.

Declaration of competing interest

The authors declare that they have no conflict of interest.

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