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Salvage surgery is an effective alternative for J-pouch afferent limb stricture treatment

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Background: Restorative proctocolectomy with ileal pouch–anal anastomosis is the surgical treatment of choice for patients requiring surgery for inflammatory bowel disease. A stricture located at the inlet of the afferent limb can lead to small bowel obstruction in a limited number of patients with a pelvic pouch. This paper aims to examine our experience with afferent limb stricture surgical correction when other endoscopic treatment methods have failed to control obstructive symptoms.

Methods: All consecutive eligible patients with ileal pouch–anal anastomosis and afferent limb stricture were identified from our institutional review board–approved database from 1990 to 2021. Patients surgically treated with excision and reimplantation/strictureplasty of afferent limb stricture were included in this study.

Results: Twenty patients met our inclusion criteria. Fifteen (75%) were female, and the overall mean age was 41 ± 10.3 years at afferent limb stricture surgery. The interval from ileal pouch–anal anastomosis formation to surgery for afferent limb stricture was 13.5 ± 6.7 years. Nine (45%) underwent strictureplasty, and 11 (55%) had resection and reimplantation of the afferent limb into the pouch. Before afferent limb stricture surgery, 3 (15%) required a diverting ileostomy for their obstructive symptoms. An additional 12 (60%) had a stoma constructed during afferent limb stricture surgery, and 5 had a strictureplasty and no stoma. Postoperatively, 1 patient (5%) had a leak at the afferent limb stricture repair site. All patients had their ileostomy closed 3.2 (2.99–3.6) months after surgery. Long-term after afferent limb stricture surgery, recurrent small bowel obstruction symptoms recurred in 7 (35%) patients 3.9 (2.6–5.8) years later.

Conclusion: Afferent limb stricture can be treated effectively with salvage surgery. The surgical intervention appears durable and provides an acceptable outcome for their obstructive symptoms.

Introduction

Restorative proctocolectomy with ileal pouch–anal anastomosis (IPAA) is the surgical treatment of choice for patients with medically refractory ulcerative colitis (UC) or UC with dysplasia. Although controversial, IPAA is offered in select experienced centers to patients with isolated Crohn's disease (CD).[1]

A small bowel obstruction (SBO) may develop after the construction of a pelvic pouch. The etiology is varied. In a small subset of patients, strictures can develop in the afferent limb or inlet of the pelvic pouch (ALS). Although limited data are available regarding the management of these pouch strictures, endoscopic therapy has emerged as a nonsurgical therapy.[2–6] Endoscopic dilation of strictures, either by strictureotomy or endoscopic balloon dilation, is safe and effective.[7] However, for some patients, endoscopic techniques are unsuccessful, technically impossible, or do not lead to substantial long-term improvement in the obstructive symptoms.

Historically, the most common surgical treatment for ALS was pouch excision with end ileostomy.[8] Our institution has a large experience in redoing pelvic pouch surgery. Instead of pouch excision, in appropriate patients with ALS, we have performed strictureplasty or excision of the stricture and reimplantation of the afferent limb into the pouch. This paper aimed to describe our surgical experience with strictureplasty or reimplantation of ALS when endoscopic treatment is no longer an option.

Methods

All consecutive eligible patients who underwent IPAA and later developed inlet and/or afferent limb strictures were identified in

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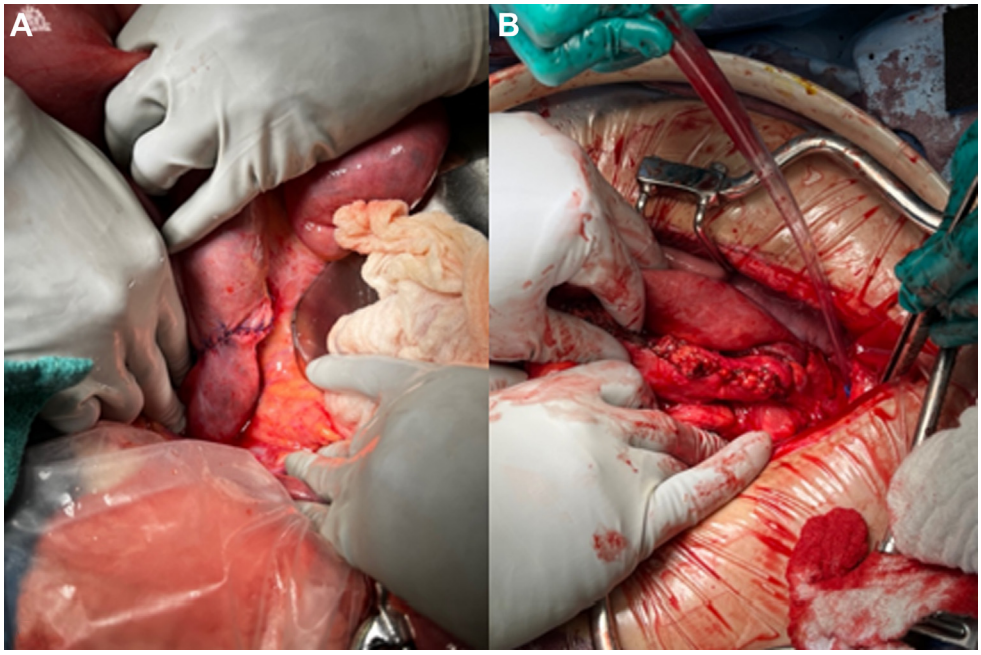

Figure 1. (A) Strictureplasty. (B) Resection and reimplantation.

our pelvic pouch database from 1990 to 2021. Patients treated with either strictureplasty or resection of the afferent limb and reimplantation (Figure 1) into the pouch body were included in this study. Demographic, clinical, and surgical features, management, and outcomes were retrospectively reviewed. The Cleveland Clinic Institutional Review Board approved this study.

Data collection

Demographic and clinical information are as follows: age, sex, ethnicity, height, weight, body mass index, medical and surgical history, and concurrent medications. Current smokers or nonsmokers were obtained from medical records at the start of the procedure. The initial stricture diagnosis was made based on endoscopy or abdominal imaging regardless of symptoms related to the stricture. In the case of an inflammatory stricture, medical treatment was considered the first option. Fibrotic strictures were candidates for endoscopic treatment, whereas the surgical indication was reserved for those patients with failure after 1 or several endoscopic treatments or those in whom endoscopic treatment was not possible due to complete stenosis or high risk of perforation due to the thick fibrotic tissue. Postoperative complications and the need for a new treatment for SBO were collected.

Operative technique

All patients were operated on openly, and ureteric stents were used at the surgeon's discretion. Our Inflammatory Bowel Disease gastroenterology colleagues had evaluated all patients and were not candidates for primary or further endoscopic therapy. After lysis of adhesions, the pelvic pouch inlet was identified. The surgeon assessed the length of the stricture and the surrounding tissue. A strictureplasty (Heineke Mikulicz) was performed if the stricture was short. If the stricture was too long for a strictureplasty, careful excision of the bowel was performed, being mindful of the feeding blood vessels to the distal pouch and staying close to the resected bowel. A hand-sewn reimplantation of the afferent limb into the pouch was usually performed (2 patients had a stapled reimplantation; see results). In nearly all patients, a diverting ileostomy was used preoperatively or at the time of afferent limb surgery. A contrast enema was performed before stoma closure.

Statistical analysis

Descriptive statistics were computed for all variables. Categorical variables were summarized as percentages. Quantitative variables with a normal distribution were summarized as mean ± SD. Quantitative variables with paranormal distribution were summarized in median and IQR.

Results

A total of 20 (0.38%) patients met the inclusion criteria among the 5,264 patients who underwent IPAA from 1990 to 2021. Fifteen were female (75.0%), and the overall mean age was 41 ± 10.3 years. Patient demographic characteristics are detailed in Table I.

All patients except 1 had a J-pouch previously performed (1 had an S-pouch). At the time of the initial pouch construction, 19 (90.0%) were believed to have ulcerative colitis (Table I). The time interval from initial pouch formation to problems with ALS was 13.5 ± 6.7 years. The diagnosis had changed to CD in 11 patients (55.0%). Preoperative characteristics are noted in Table II.

Nine (45.0%) patients underwent surgical strictureplasty, and 11 (55.0%) had stricture resection with reimplantation of the afferent limb into the pouch. A diverting ileostomy was performed in 3 (15.0%) patients before the surgical treatment studied here due to SBO symptoms and 12 (60.0%) patients during surgical stricture correction. Operative details are described in Table III.

Strictureplasty leak occurred in 1 patient (5.0%). Ten patients presented with some form of complication; 8 (80.0%) were minor complications (Clavien-Dindo I–II). The median length of hospital stay was 6 (5–9) days. Postoperative complications are detailed in Table IV.

Before stoma closure, 15 patients had a contrast enema performed, and 1 patient with excision and reimplantation had anastomotic narrowing that responded to endoscopic balloon dilation.

Table I
Demographic and clinical characteristics

Factor	Statistics
Age (SD)	41 ± 10.3
Sex	
Female	15 (75.0%)
Male	5(25.0%)
Smoker (at time of stricture surgery)	
Current	3 (15.0%)
Never	17 (85.0%)
Hypertension	3 (15.0%)
Diabetes mellitus	1 (5.0%)
Dyslipidemia	1 (5.0%)
Cardiac disease	1 (5.0%)
Vascular disease	1 (5.0%)
Previous surgery	4 (20.0%)
Diagnosis	
Ulcerative colitis	18 (90.0%)
Unknown	2 (10.0%)
Stages when pouch was constructed	
1	2 (10.0%)
2	10 (50.0%)
3	8 (40.0%)
Configuration of pouch	
J	19 (95.0%)
S	1 (5.0%)

SD, standard deviation.

Table II
Preoperative characteristics

Factor	Statistics
BMI (kg/m^2) (SD)	24.1 ± 3.7
Prealbumin (mg/dL) (SD)	18.9 ± 7.5
Albumin (g/dL) (SD)	3.6 ± 0.8
American Society of Anesthesiologists	
II	10 (50.0%)
III	10 (50.0%)
Steroids	6 (30.0%)
Biologics	5 (25.0%)
Immunotherapy	2 (10.0%)
Diversion prior stricture surgery	3 (15.0%)
Diagnosis changed after pouch surgery to CD	11 (55.0%)
Time until stricture (y) (SD)	13.5 ± 6.7
Endoscopic treatment of the stricture before surgery	10 (50.0%)

BMI, body mass index; *CD*, Crohn disease; *SD*, standard deviation.

All patients had their ileostomy closed 3.2 (2.99–3.6) months after surgical stricture surgery. Long-term follow-up data are described in Table V.

After ALS surgery, recurrent SBO symptoms were noted at 3.9 (2.6–5.8) years in 7 patients (35.0%). In relation to the remaining 13 (65.0%), the evolution was favorable, with the correct pouch function. The details of these 7 patients are described below:

1. One patient presented with a mild inflammatory obstruction 3 months after surgery that was resolved by endoscopic dilation.
2. The rest of the patients all had an initial diagnosis of ulcerative colitis that was later changed to CD:
   a. Two presented with ALS recurrence 4 and 10 years after the index stricture surgery. Both were successfully treated by endoscopic treatment.
   b. One patient presented with a stenosis >10 cm proximal to the pelvic pouch inlet, requiring strictureplasty 4 years after the index stricture surgery and bowel resection 8 years later. He also required endoscopic dilation of the pouch inlet and outlet 6 years after index stricture surgery and subsequent periodic dilations of both areas with satisfactory results.
   c. One patient presented with twisting of the afferent limb 6 years after index stricture surgery. This initially required surgical intervention to relieve and untwist the bowel. Subsequently, the patient later required pouch excision 9 years after index stricture surgery due to refractory CD affecting the pouch.
   d. Two patients presented with ileoanal anastomotic strictures 2 and 0.5 years after the index stricture surgery. Both were initially treated with endoscopic therapy. One of them required pouch excision 12 years after index stricture surgery due to symptoms of CD in his pelvic pouch.

Discussion

This retrospective study reports on a cohort of patients with ALS treated by performing either strictureplasty or resection of the afferent limb and reimplantation into the pouch body. Our findings demonstrate that both techniques are feasible and safe with acceptable long-term outcomes, suggesting that salvage surgery should be considered for appropriate patients.

ALS is uncommon after IPAA surgery for UC. Although the possible etiologies are unknown, certain risk factors may contribute to its development. These include surgery-associated ischemia, use of nonsteroidal anti-inflammatory drugs, undiagnosed CD, and twisting of the pre-pouch ileum.[9–11] In our series, more than half of the patients (11, 55.0%) had their diagnosis changed to CD at the time of ALS presentation, and nearly all of them presented with new symptoms of SBO after the index stricture surgery (studied here) when followed long-term.

Other authors have studied ALS. Our patients had symptoms 13.5 ± 6.7 years after pelvic pouch construction. Sellers et al[12] reported SBO symptoms 13.6 years after pouch construction, and O'Brien et al[13] 13 years after pouch construction. This reflects the slow development of ALS. Strictures can be categorized as inflammatory, fibrotic, or a combination of both. Medical therapy is preferred for inflammatory strictures, but fibrotic strictures are more challenging, usually requiring endoscopic and/or surgical treatment.[10,13,14]

Endoscopic balloon dilatation (EBD) in treating Inflammatory Bowel Disease-related strictures has been extensively studied. A meta-analysis of 13 studies with 1,163 CD patients undergoing EBD showed immediate technical success in 89% of patients and a surgery-free rate in 67% with a median follow-up of 15 to 70 months.[15] However, there are limited data on EBD in afferent limb strictures. In a recent study of 200 patients from our institution, Lan et al evaluated EBD and endoscopic strictureotomy in treating pouch inlet or afferent limb strictures. Symptom improvement was recorded in 27 (18.4%) of patients. Nine patients (5.6%) had pouch failure, and 42 (21.0%) underwent subsequent surgery. They found the duration of retreatment was 0.4 (0.3–0.9) years.[7] Systematic reviews and meta-analyses report that the rate of subsequent surgical intervention after EBD ranged from 18 to 75%.[5,15–20] Patients treated with endoscopic strictureotomy were found to have better results, with 15.3% to 33.5% needing subsequent surgery. Endoscopic therapy can also have complications, with reported excessive bleeding rates of approximately 3.3% to 8.8% per procedure and perforation rates of 0.4% to 1.1% per procedure.[21,22]

Our findings suggest that pouch salvage surgery could be considered a valid alternative for patients with strictures that are not or no longer amenable to endoscopic treatments. There are limited data on salvage surgery in the treatment of pouch stricture. One study reported on 8 patients operated on for J-pouch inlet obstructions. At a mean follow-up of 36.5 months, all patients retained their pouches. One patient had recurrent obstructive symptoms, and 4 of the 5 patients with inlet strictures were diagnosed with CD based on pathologic examination.[12]

Table III
Operative characteristics during afferent limb stricture surgery

Approach	Open	n = 20
Surgery for treatment	Strictureplasty	9 (45.0%)
	Resection + anastomosis	11 (55.0%)
Anastomosis type	Stapled	2 (18.2%)
	Hand-sewn	9 (81.8%)
Specimen size (SD)		10.59 ± 6.20
Total diverted at stricture surgery conclusion		12 (60.0%)
Complications		2 (10.0%)
Transfusion		3 (15.0%)
Estimated blood loss (mL) (Med, IQR)		125 (50–325)
Other procedure		13 (65%)
Type other procedure		
	Anal procedure (seton/dilatation)	2
	Close loop ileostomy	1
	Additional strictureplasty	3
	Repair internal hernia	1
	Gynecologic procedure	5
	Take down enteroenteric fistula	1
Drain		9 (45.0%)
Length of surgery (min) (Med, IQR)	269 (212.25–334)	

IQR, interquartile range; *SD*, standard deviation.

Table IV
Postoperative in-hospital data and 30 days follow-up

Variable	Results
Complications	
No	10 (50.0%)
Yes	10 (50.0%)
Clavien-Dindo	
I	1 (10.0%)
II	7 (70.0%)
III	2 (20.0%)
Intraabdominal abscess	2
Acute urinary retention	1
Urinary tract infection	2
Ileus	4
Hemorrhage	3
Transfusion	2
Wound infection	2
Leak	1 (5.0%)
Reoperation	1 (5.0%)
Length of stay (d) (Med, IQR)	6 (5–9)
Hospital readmission (medical problem)	1 (5.0%)

IQR, interquartile range.

Table V
Long-term follow-up

Variable	Results
GGE	
Prior ileostomy closure	
Yes	15 (75.0%)
Not applicable	5 (25.0%)
GGE results	
No leak or stricture	14 (93.3%)
Stricture	1 (6.7%)
Stricture treatment prior ileostomy closure	
Endoscopic dilation	1 (5.0%)
Not applicable	19 (95.0%)
Ileostomy closure	15 (75.0%)
Ileostomy closure time (mo) (Med, IQR)	3.2 (2.99–3.6)
SBO after ileostomy closure or surgery	7 (35%)
SBO after surgery time (y) (Med, IQR)	3.9 (2.6–5.8)
Stricture treatment after ileostomy closure	
Endoscopic dilation	5 (71.4%)
Surgical	2 (28.6%)
Follow-up time (mo) (Med, IQR)	28.8 (4.6–114.4)

GGE, gastrografin enema; *IRQ*, interquartile range; *SBO*, small bowel obstruction.

Few studies have compared endoscopy to surgical intervention. In a previous study conducted at our institution, 16 (9.6%) patients who underwent surgical strictureplasty were compared to 151 (90.4%) patients who underwent endoscopic balloon dilation for strictures located at various locations in a pelvic pouch. After a mean follow-up of 4.1 ± 2.6 years, pouch stricture recurred in 92 patients (55.1%), and 21 (12.6%) patients developed pouch failure. The time interval between the procedure and pouch stricture recurrence or pouch failure was longer in the surgical strictureplasty group versus the endoscopic dilation group (2.5 [IQR = 1.0–3.9] years vs 0.4 [IQR = 0.2–1.2] years, $P < .001$).[23]

Study Limitations

There are several limitations to this study. It is a retrospective study with a small sample size. Although the data were not captured prospectively, some were part of our prospective pelvic pouch database. Patients with ALS may have limited options besides a permanent stoma, so the surgical techniques described can provide useful information regarding options in this subset of pelvic pouch patients. Whether the surgical techniques are generalizable is unknown because the surgeons operating on these patients are skilled in redoing pelvic pouch surgery and practice at a tertiary referral center with a long history of performing operations for ulcerative colitis.

In conclusion, salvage surgery could effectively treat afferent limb pouch strictures in cases where endoscopic treatment is ineffective or impossible. Both strictureplasty or resection of the afferent limb and reimplantation into the pouch body are effective, safe, and feasible techniques with an acceptable complication rate in experienced hands and referral centers. The surgical intervention appears to provide a longer time interval between treatment and recurrence of SBO symptoms than other treatments previously described in the literature.

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Conflict of interest/Disclosure

The authors have no conflicts of interests or disclosures to report.

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