

# Stapled End-To-Side Ileocolic Anastomosis in Crohn's Disease

## Old Dog, Reliable Tricks? A Retrospective Two-Center Cohort Study

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**Objective:** Analyze our long-term experience with a less-popularized but stalwart approach, the stapled end-to-side ileocolic anastomosis.

**Background:** The choice of technical approach to ileocolic anastomosis after ileocecal resection for Crohn's disease affects surgical outcomes and recurrence. Yet, despite heterogeneous data from different anastomotic configurations, there remains no clear guidance as to the optimal technique.

**Methods:** In a retrospective cohort design, patients undergoing ileocolic anastomosis in the setting of Crohn's disease between 2016 and 2021 at two institutions were identified. Patient characteristics and surgical outcomes in terms of recurrence (surgical, clinical, and endoscopic) were studied.

**Results:** In total, 211 patients were included. Before surgery, 80% were exposed to at least 1 cycle of systemic steroids and 71% had at least 1 biologic agent; 60% exhibited penetrating disease and 38% developed an intra-abdominal abscess. After surgery, one anastomosis leaked (0.5%). Over 2.4 years of follow-up (IQR = 1.3–3.9), surgical recurrence was 0.9%. Two-year overall recurrence-free and endoscopic recurrence-free survivals were 74% and 85% (95% CI = 68–81 and 80–91), respectively. The adjusted hazard ratio of endoscopic recurrence was 3.0 (95% CI = 1.4–6.2) for males and 5.2 (1.2–22) for patients who received systemic steroids before the surgery.

**Conclusion:** The stapled end-to-side anastomosis is an efficient, reliable, and reproducible approach to maintain bowel continuity after ileocecal resection with durable outcomes. Our outcomes demonstrate low rates of disease recurrence and stand favorably in comparison to other more technically complex or protracted anastomotic approaches. This anastomosis is an ideal reconstructive approach after ileocecal resection for Crohn's disease.

**Keywords:** Crohn's disease, ileocolic anastomosis, postoperative recurrence

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The authors will make the study's raw data available to other researchers upon request from the corresponding author.

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## INTRODUCTION

Following ileocecal resection for Crohn's disease (CD), bowel continuity can be restored through various anastomotic configurations using hand-sewn or stapled techniques, with minimally invasive or open approaches. Despite the many possible options for reconstruction (ie, end-to-end, isoperistaltic side-to-side, anti-peristaltic side-to-side, end-to-side, and Kono-S<sup>1</sup>), one single anastomotic type has not yet been considered superior. Re-emerging scientific interest in anastomotic technique and its potential impact on the outcomes of surgical interventions for CD have highlighted the need for a better understanding of the influence morphologic characteristics such as anastomotic distortion, narrowing, and apposition of mesentery exert on surgical outcomes.<sup>2,3</sup>

When choosing a technique for anastomosis after Crohn's resection, many surgeons consider a variety of factors, including ease of creation, risk for anastomotic leak or other complications, cost, operating time factors, and skill requirements. As an example, one of the most widely utilized anastomotic types, the side-to-side ileocolostomy, is technically simple to perform, minimally time-consuming when stapling devices are used, and reproducible; however, it has been shown to have an association with CD recurrence.<sup>4</sup> Commonly employed hand-sewn techniques such as the end-to-end or the antiperistaltic side-to-side anastomosis are more time-consuming than their stapled counterparts and meticulous technique to execute with a reliable outcome. Structurally, they also feature close apposition of the two mesenteric edges of the cut end of the bowel, a characteristic

that may increase susceptibility to Crohn's-related inflammation adjacent to the anastomosis and have an impact on postoperative recurrence.

The more recently-popularized Kono-S anastomosis has been highlighted as a uniquely distinct anastomotic structure.<sup>3</sup> The hallmark of this technique is an exclusion of the bowel mesentery apart from the wall of the bowel involved in the anastomosis, which is thought to prevent distortion and, as a consequence, may reduce recurrence at the mesenteric edge.<sup>5</sup> Similarly, an isoperistaltic side-to-side also prevents mesenteric edge incorporation, but resecting these anastomoses after a recurrence by necessity will sacrifice significantly greater bowel surface area than an end-to-end and end-to-side configuration.

The stapled end-to-side anastomosis (SETS) is a less-utilized technique that employs stapling devices to join the cut end of the small bowel, using a circular stapler, to the antimesenteric luminal side of the colon, thus recreating the configuration of a 'neo-cecum'. It is a safe, reliable, and efficient technique that avoids the technical pitfalls associated with traditional side-to-side and end-to-end anastomoses.<sup>6</sup> In addition, SETS separates small bowel and colonic mesenteries of the anastomotic lumen, a reported benefit of the Kono-S that it suggested to be associated with more favorable recurrence-free periods. It also creates a configuration easily navigable at colonoscopy for surveillance after surgery.

Data on SETS anastomosis is notably lacking in the literature, and thus we report our outcomes after SETS anastomosis for ileocecal resection in CD. We believe that it offers comparable Crohn's-related outcomes to the Kono-S, with the ease, efficiency, and reproducibility of the more traditional techniques.

## MATERIALS AND METHODS

In a retrospective cohort design, patients who underwent SETS anastomosis after ileocecal resection for CD between December 2016 and October 2021 were included from 2 inflammatory bowel disease (IBD) databases; New York University Langone Health, New York, NY and Wake Forest University Baptist Health, Winston-Salem, NC. The study was independently approved by the institutional review boards of the 2 centers (New York University Langone Ethics Committee protocol no: i22-00112). All pertinent demographic and clinical factors including IBD history and perioperative clinical features including steroid and biologics use were identified. Surgical complications, endoscopic, clinical, and surgical recurrence rates were noted.

### Definitions

Endoscopic recurrence was defined as grade 2 or higher of the Rutgeerts scoring system (0: no aphthous ulcers; 1: less than 5 aphthous ulcers; 2: more than 5 aphthous lesions with normal intervening mucosa, skip areas of larger lesions, or lesions confined to ileocolic anastomosis; 3: diffuse aphthous ileitis with diffusely inflamed mucosa; 4: diffuse inflammation with larger ulcers, nodules, and/or narrowing). Grade 1 Rutgeerts lesions were excluded to avoid the potential misinterpretation of aphthous lesions that may instead reflect stapled anastomosis ulceration related to a foreign body reaction as a relation to recurrence. Clinical recurrence was defined by the Harvey Bradshaw Index >4 or when unavailable, the Crohn's Disease Activity Index score >150, or in rare instances via individual opinion and differential diagnosis of a physician. Surgical recurrence was defined as the necessity of reoperation due to recurrent CD during the observation period. Considering the fact that a surgical specimen is the gold standard diagnostic criteria for a recurrence, patients in the face of a surgical recurrence were automatically assigned to a clinical recurrence as well as an endoscopic recurrence. Overall recurrence was defined as

the presence of at least one of these recurrence manifestations, and overall disease-free (recurrence-free) survival was defined as their absence.

'High risk for recurrence' was defined in accordance with the definition put forth by the American Gastroenterology Association.<sup>7</sup> Specifically, 'high risk for recurrence' patients are younger than 30, active smokers, or having had 2 prior surgeries for penetrating disease with or without perianal disease. Patients not assigned to the high-risk group were assigned to the low-risk group for analysis.

### Surgical Technique

Regardless of the access to the abdomen (minimally invasive *vs* open approach), the diseased ileocolic bowel segments were identified and mobilized fully for appropriate visualization and handling. This dissection was carried out in a medial-to-lateral diverging fashion beginning at the ileocolic pedicle. The transection points were determined by identifying the border of grossly normal bowel with diseased bowel, and using a "Pinch" test at the mesenteric border that helps to delineate diseased bowel from healthy bowel mesentery.<sup>8,9</sup> Both colon and ileal margins were then cross-clamped and divided sharply. Mesentery was divided by a vessel sealing device where appropriate, or interlocking suture ligature when mesentery was thickened beyond the safe capacity of the vessel sealing device. A purse string suture of 0-prolene was placed on the ileal end to secure the anvil of a circular stapler in the cut end of the ileum. Next, the circular stapler was introduced through the open end of the colon, followed by an extension of the firing pin through the colon wall to form an antimesenteric circular anastomosis 3–4 cm away from the expected transection line. Once the colon and the small bowel mesenteries were aligned perpendicular to each other and were excluded from each other, the pin and the anvil were mated, and the stapler was fired (Fig. 1). After the circular stapler was disengaged and removed, the anastomosis was checked for patency of the lumen for bleeding. The colotomy was closed using a linear stapler, avoiding crossing staple lines.

### Statistical Analyses

The data was analyzed using the Statistical Package for Social Sciences 28.0 software for Windows (SPSS; IBM, Armonk, NY). Survival diagrams were created using the R version 4.2.1. The Kolmogorov–Smirnov test was used to determine the normality of continuous variables. Median [interquartile range (IQR)] was used for the presentation of nonparametric distributions. For categorical variables,  $\chi^2$  or Fisher exact test and for continuous variables, Student's t test or Mann–Whitney U test were used depending on the test assumptions. All potential covariates were compared in a bivariate analysis (Kaplan–Meier curves and log-rank tests) for recurrence-free survival time (calculated from the time of the anastomosis creation) and statistically significant ones were taken into a multivariate Cox proportional hazard model to determine the predictors of recurrence. Statistical significance was accepted when  $P < 0.05$ .

## RESULTS

In total, 211 ileocecal resections with SETS anastomoses were included. Median age of patients was 33 years (IQR = 24–48) with 105 male and 106 female patients represented. Median time from diagnosis to the time of surgery was 8 years (IQR = 2–15) and median follow-up after the surgery was 2.4 years (IQR = 1.3–3.9). Of the patients, 16 (7.6%) were active smokers, 31 (15%) were ex-smokers and 164 (78%) were lifelong nonsmokers. Penetrating disease was present in 127 (60%) patients. There was an intra-abdominal abscess in 81 patients (38%). The Montreal classification of disease behavior for

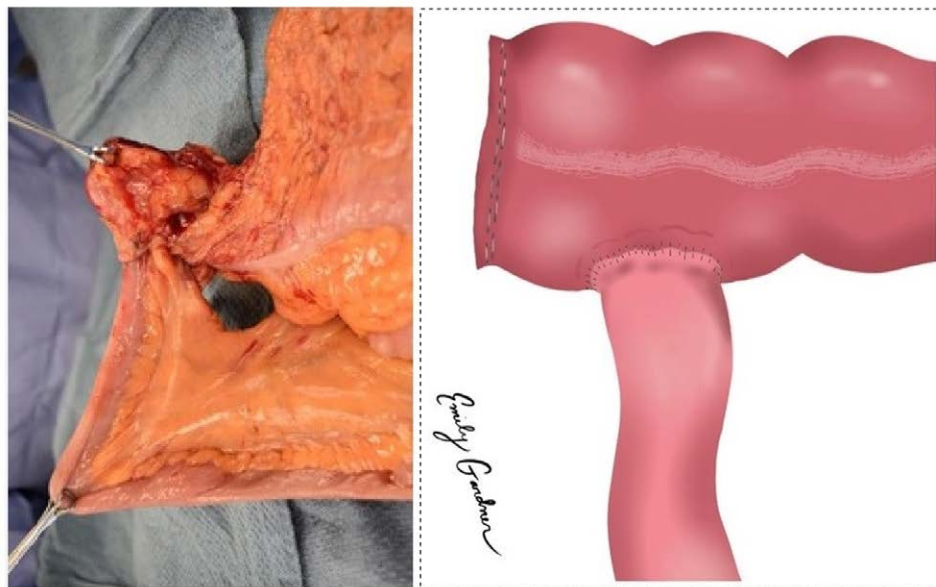


FIGURE 1. Stapled end-to-side ileocolic anastomosis.

Crohn's patients at the time of their ileocecal SETS anastomosis surgery is displayed in Table 1. Regarding concomitant procedures, there were 18 patients who underwent sigmoid resections, 8 individuals who had small bowel resections other than ileocolic resection, 5 cases of small bowel stricturoplasties, 5 instances of perianal fistula interventions, and 2 instances of dilatation for anorectal strictures.

One-hundred-ninety-two ileocecal resections (91%) were elective. The operative approach was laparoscopic in 161 (76%) procedures. Fifty-four patients (26%) had prior bowel resections, 31 (15%) were undergoing redo ileocolic resection, 119 (56%) underwent a diverting loop ileostomy creation after the SETS anastomosis, and 107 procedures (51%) involved enteric fistula takedown. Median time for closure was 3 months (IQR = 3–4). The rate of a history of fistulizing disease behavior was similar among primary and redo-ileocolic resections [98 (54%) vs 17 (55%), respectively;  $P = 0.968$ ]. Table 2 compares the observed anatomical distribution of all the present fistulae at the time of the ileocolic resection procedure between primary and redo ileocolic anastomosis.

Twenty-five patients (12%) with conditions not amenable to medical treatments were steroids and biologic naïve at the time of the surgery; 168 patients (80%) had trialed at least one cycle of systemic steroids before the surgery and 150 patients (71%) had trialed at least one biologic agent; 145 (69%) anti-tumor necrosis factor (TNF), 27 (13%) anti-integrin, and 41 (19%) anti-interleukin 12–23. There were 157 (74%) high-risk patients.

There was only 1 anastomotic failure (leak) at the SETS anastomosis (0.5%) and no postoperative mortality. Five patients (2.4%) needed reoperation within 30 days: 1 stoma retraction, 1 bleeding from mesentery, 1 surgical site infection, 1 anastomotic failure at an accompanying colorectal anastomosis, and 1 failure at the SETS anastomosis (mentioned above). To prevent recurrence after ileocecal resection, prophylactic biologics were given to 150 (71%) patients; 108 (51%) of whom started the prophylaxis within 6 months of the ileocecal resection surgery and 62 (29%) started within 8 weeks. Prophylactic strategies with respect to the degree of resection and risk groups for recurrence are shown in Table 3. Surgical recurrence was noted in 2 patients (0.9%); 1 (1.9%) and 1 (0.6%), respectively for low- and high-risk groups ( $P = 0.447$ ). Two-year overall recurrence-free survival and endoscopic recurrence-free survival

were 74% and 85% (95% CI = 68–81 and 80–91), respectively. Two-year surgical recurrence-free survival was 99.4% (95% CI = 98.4–100.0). A multivariate Cox proportional hazard regression for endoscopic recurrence revealed that sex and history of systemic steroid use before surgery were significant predictors. Males (HR = 3.0, 95% CI = 1.4–6.2,  $P = 0.004$ ) and patients who received systemic steroids before the surgery (HR = 5.2, 95% CI = 1.2–22,  $P = 0.025$ ) had a higher risk for endoscopic recurrence.

All types of recurrence-free survivals with respect to the risk status of the patients are presented in Figure 2. In the second year, overall recurrence-free survival rates were 71% (95% CI = 63–79) and 85% (95% CI = 74–97), respectively, for high- and low-risk groups ( $P = 0.16$ ). In the same year, endoscopic

**TABLE 1.**  
Demographics and Categorical Patterns of Disease Behavior in Crohn's Patients

Variable	All
Age, median (IQR)	33 (24–48)
Sex	
Female	106 (50)
BMI, median (IQR)	22 (20–26)
Pattern of Crohn's disease	
Interim behavior, n (%)	83 (39)
Montreal B1	3 (3.6)
Montreal B2	27 (33)
Montreal B3	53 (64)
Montreal P	2 (2.4)
B1p	0 (0)
B2p	1 (1.2)
B3p	1 (1.2)
Definitive behavior, n (%)	128 (61)
Montreal B1	6 (4.7)
Montreal B2	48 (38)
Montreal B3	74 (58)
Montreal P	12 (9.4)
B1p	1 (0.8)
B2p	2 (1.6)
B3p	9 (7.0)

After 5 years have elapsed from the diagnosis, disease behaviors are no longer considered as "interim" but they are called "definitive". IQR, interquartile range.



**TABLE 2.**  
**Organ Site-Specific Involvements of Fistulizing Disease in Primary and Redo-ileocolic Resection Procedures, n (%)**

Fistula Site	Overall	Primary	Redo	P
Entero-enteric	49 (23)	43 (24)	6 (19)	0.581
Entero-colic	65 (31)	60 (33)	5 (16)	0.060
Entero-vesicular	15 (7.1)	14 (7.8)	1 (3.2)	0.703
Enterocutaneous	12 (5.7)	8 (4.4)	4 (13)	0.081
Other	23 (11)	17 (9.4)	6 (19)	0.102

Statistical significance was defined as  $P < 0.05$ .

disease-free survival rates were 83% (95% CI = 77–90) and 93% (95% CI = 85–100) ( $P = 0.43$ ), clinical recurrence-free survival rates were 73% (95% CI = 66–81) and 85% (95% CI = 74–97) ( $P = 0.19$ ) and surgical recurrence-free survival rates were 100% (95% CI = 100–100) and 97.5% (95% CI = 92.8–100.0) ( $P = 0.38$ ), respectively, for high- and low-risk groups.

Two-year overall recurrence-free survival of high-risk patients was 75% (95% CI = 62–89) and 69% (95% CI = 60–80), respectively, for early prophylactic takers and nontakers ( $P = 0.43$ ). Their same-year endoscopic recurrence-free survival rates were 85% (95% CI = 74–97) and 82% (95% CI = 74–90), respectively ( $P = 0.19$ ).

Endoscopic recurrence-free survivals with respect to sex and history of systemic steroids are presented in Figure 3. In the second year, endoscopic recurrence-free survival rates were 76% (95% CI = 67–86) and 95% (95% CI = 91–100), respectively, for males and females ( $P = 0.011$ ). Same rates were 83% (95% CI = 77–89) and 97% (95% CI = 91–100), respectively, for patients who had received systemic steroids before and those who had not ( $P = 0.038$ ).

Two-year endoscopic recurrence-free survival rates were 88% (95% CI = 79–98) and 84% (95% CI = 77–91), respectively, for early prophylactic takers and nontakers ( $P = 0.19$ ). Same rates were 84% (95% CI = 79–91) and 91% (95% CI = 79–100), respectively, for patients who underwent primary and redo ileocolic anastomosis ( $P = 0.40$ ).

## DISCUSSION

Early studies on ileocolic anastomotic types demonstrated that the proposed stapled approaches outperformed the conventional hand-sewn end-to-end ileocolic anastomosis for CD<sup>10,11</sup> or achieved at least comparable perianastomotic recurrence rates with favorable postoperative outcomes.<sup>12</sup> In our study, we show that the SETS anastomosis is a reliable and reproducible stapled option for the configuration of ileocolic anastomosis that affords even high-risk patients a comparable 2-year endoscopic

recurrence rate of 15% and surgical recurrence rate of 0.6%. We believe that this approach allows for a perpendicular orientation of the 2 bowel segments, provides mechanical stability with offsetting of the mesenteries that may be associated with improved outcomes, and is a safe and efficient stapled approach after ileocecal resection for CD.

Stapled ileocolic anastomoses, in general, and including non-IBD populations, are associated with an anastomotic leak rate of 2.5%.<sup>13</sup> In our study, despite our high-risk IBD population, failure of SETS anastomosis and leakage was present in only 1 out of 211 patients (0.5%). Other complications necessitating reoperation in 4 patients (1.9%) were most likely to be unrelated to the technique used for the ileocolic anastomosis. Our findings contribute substantial and compelling data to the narrative that this technique offers characteristics that contribute to improved outcomes, such as avoiding inadvertent luminal narrowing during creation (as seen with end-to-end) and preventing crossing staple lines (noted with antiperistaltic side-to-side ileocolic anastomoses).<sup>14,15</sup>

No published clinical trial has compared end-to-side anastomosis to other configurations in the setting of surgical management of CD. McLeod et al<sup>16</sup> compared the end-to-ends to the side-to-sides and reported an endoscopic recurrence rate of 42.5% in the end-to-end group and 37.9% in the side-to-side group ( $P = 0.55$ ) after about 1 year of follow-up; anastomotic leak rate was 7% in both groups ( $P = 0.86$ ). A multicenter study by Celentano et al<sup>1</sup> sought to elucidate the influence of the direction of peristalsis over the side-to-side ileocolic anastomosis and reported a 2.3% (4/175) leak rate for isoperistaltic side-to-side and 4.4% (9/205) rate for antiperistaltic side-to-side configurations following ileocecal resection for CD.<sup>1</sup>

It has been proposed that CD is in part a result of inadequately regulated responses to intestinal microbiota<sup>17,18</sup> and one consistent observation across bowel segments involved by CD is that mucosal ulceration is largely confined to the mesenteric pole of the intestine.<sup>19</sup> One explanatory theory is that the mesenteric pole is the side where oxygen and nutrient-rich blood are supplied to the bowel wall and that this may contribute in a way to microbiota-driven ulceration. Assessing the association between anastomotic compromise and altered microbiota would be difficult without examining the composition of the gut microbiome. However, the presence of a microbiota-driven mechanism could be considered given the low rate of anastomotic failure in our SETS anastomoses, where the mesenteric poles of the bowel lumen were kept away from each other. We believe a similar theory can also be considered in the context of disease recurrence. The 18-month endoscopic recurrence (Rutgeerts score  $\geq 2$ ) has been reported as 67% for stapled antiperistaltic side-to-side anastomosis compared to the novel stapled configurations such as Kono-S, which shows a comparative rate of 25%.<sup>20</sup> In previous reports, SETS was associated with a

**TABLE 3.**  
**Prophylactic Strategies for Crohn's After Primary and Redo Ileocolic Resections With Stapled End-to-side Anastomosis, n (%)**

Strategy	Overall	Primary	Redo	P	High Risk	Low Risk	P
Prophylactic biologic							
Anti-TNF	96 (46)	86 (48)	10 (32)	0.109	75 (48)	21 (39)	0.258
Infliximab	46 (22)	41 (23)	5 (16)	0.408	37 (24)	9 (17)	0.289
Adalimumab	50 (24)	44 (24)	6 (19)	0.538	39 (25)	11 (20)	0.505
Certolizumab pegol	5 (2.4)	4 (2.2)	1 (3.2)	0.552	3 (1.9)	2 (3.7)	0.604
Anti-integrin	8 (3.8)	8 (4.4)	0 (0)	0.607	5 (3.2)	3 (5.6)	0.425
Anti-interleukin 12-23	45 (21)	33 (18)	12 (39)	0.011*	37 (24)	8 (15)	0.176
None	61 (29)	52 (29)	9 (29)	0.987	40 (26)	21 (39)	0.061
Timing of prophylaxis							
Within 8 weeks	62 (29)	53 (29)	9 (29)	0.963	51 (32)	11 (20)	0.092
Within 6 months	108 (51)	90 (50)	18 (58)	0.407	92 (59)	16 (30)	<0.001*
After 6 months	41 (19)	37 (21)	4 (13)	0.461	25 (16)	16 (30)	0.028*

\* $P < 0.05$ .

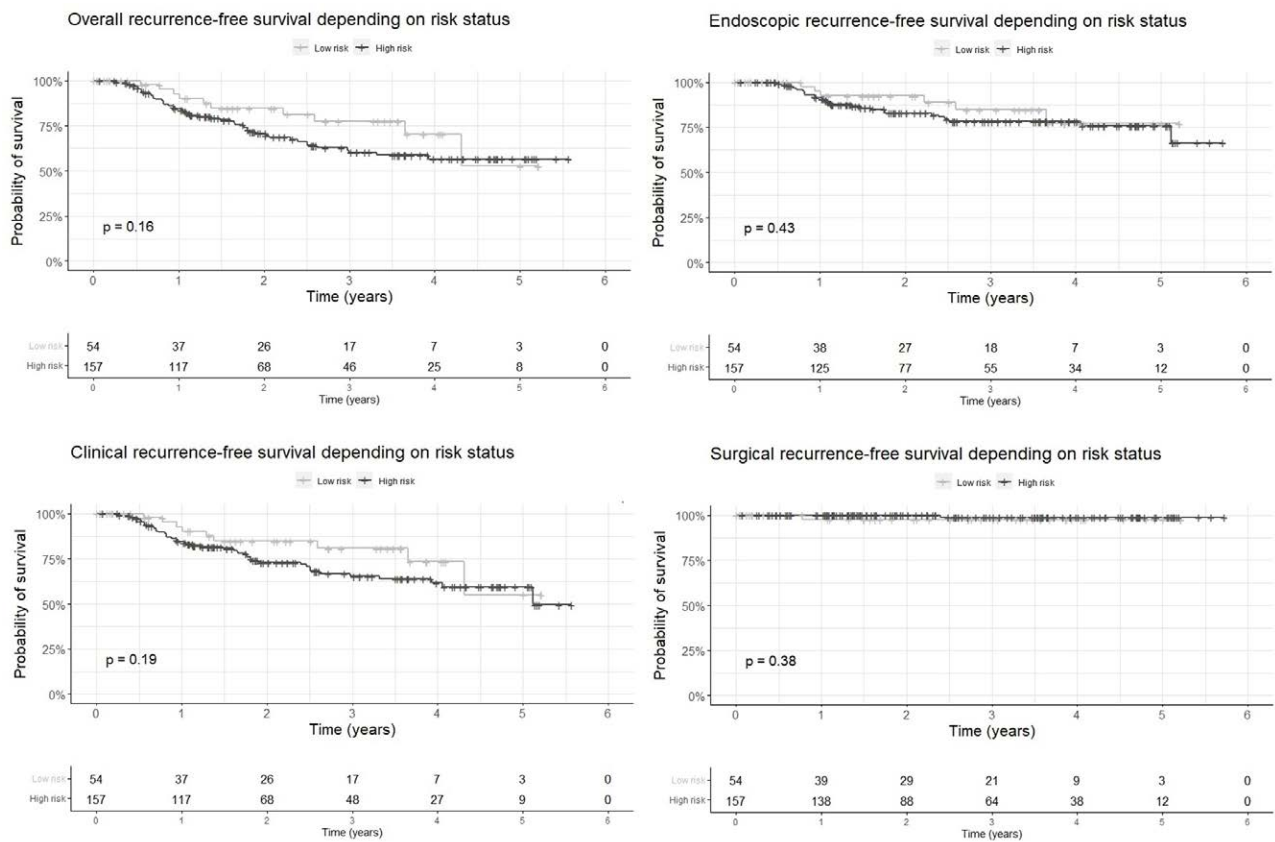


FIGURE 2. All types of recurrence-free survivals with respect to the risk status of the patients.

36% combined endoscopic or radiologic recurrence at 3 years,<sup>21</sup> and in the present study, our endoscopic recurrence for SETS at 3 years was 20%.

Critics of the Kono-S technique cite its involved nature, need for lengthier time to construct, and its cost of stapling devices coupled with increased operating time and skillset to perform a hand-sewn anastomosis.<sup>4,22</sup> Furthermore, what appears to be the technique's strengths, by thinking outside the box, may very well be its weakness. First, the mesenteric edges of the colon and small bowel stumps in the Kono-S still substantially contact each other in a head-to-head fashion adjacent to the supporting column framing the Kono-S anastomosis. Second, it forms a very complex unit that cannot be dismantled easily to spare extra bowel length when surgical recurrence involves only one side of the complex. The isoperistaltic side-to-side structure prevents mesenteric edge incorporation to the anastomosis, but the central component of the pathophysiology, the mesentery, is now oriented in 2 layers side-by-side overlapping the mesenteries of the colon and the small bowel stumps, making this complex difficult to dismantle to preserve bowel length if resection is needed.

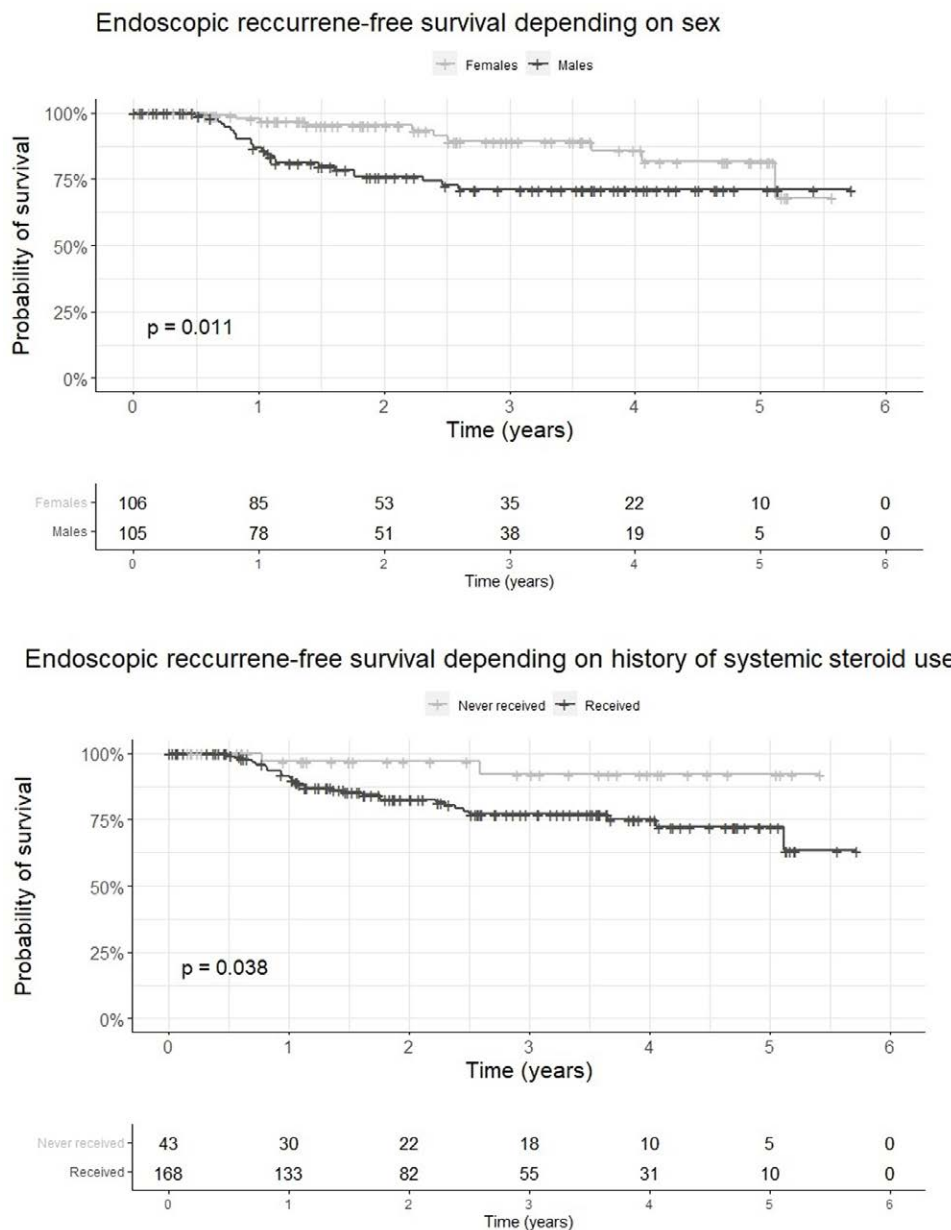
Throughout our analysis, we pursued the risk stratification previously recommended by the American Gastroenterology Association for disease recurrence.<sup>7</sup> Although not statistically significant, patients with a high risk (age <30, active smoking, ≥2 prior surgeries for penetrating disease) had a shorter overall recurrence-free survival after ileocecal resection. Their combined endoscopic, clinical, or surgical recurrence rate was 29% at 2 years and 40% at 3 years.

Early introduction of biological therapy (within 8 weeks) is a conditional recommendation for high-risk patients because clinical trials have not yet shown its effectiveness over endoscopy-guided management.<sup>7,23</sup> Similarly, compared to endoscopy-guided treatment, early prophylaxis did not significantly benefit our high-risk patients, although their overall

recurrence rate was slightly increased (31% vs 26% at 2 years) when they did not receive any sort of early pharmacological prophylaxis after the surgery. The most commonly selected prophylactic agent after a primary ileocecal resection was an anti-TNF [86 of (67%) 128 regimens]. After a redo ileocecal resection, the most common agent selected was anti-interleukin 12–23 [12 (55%) of 22 regimens]. We certainly acknowledge that anti-TNFs are the most commonly effective agents to prevent postoperative recurrence in CD,<sup>24</sup> and anti-interleukin 12–23 may be used as first- or second-line therapy as a reliable option, especially in specific patient groups such as the elderly and patients with extraintestinal manifestations.<sup>25</sup>

Our study demonstrates that the male sex and receiving systemic steroids before the operation were the only independent risk factors for an earlier endoscopic recurrence. An increased risk for an earlier postoperative recurrence in men with CD has been previously reported,<sup>26</sup> although this is not a consistent observation throughout the recent literature, and the opposite gender pattern has also been demonstrated.<sup>26–28</sup> Gut microbiome influenced by sex hormones may provide one plausible mechanism through which inflammation impairs healthy immunologic responses in CD. As of today, the magnitude of the contribution of gender/sex hormones to the gut microbiota and this possible effect on IBDs is not clearly understood, but a causal relationship among these factors is being investigated through large research initiatives.<sup>29</sup> Our data also showed that preoperative systemic steroid is an independent risk factor for an earlier endoscopic recurrence. This observation is consistent with the concept of disease recurrence being strongly associated with the initial extent of the inflammatory process.<sup>28</sup>

Our 2-center retrospective study exhibits some limitations that should be noted. Although we investigated a large cohort over a long period, statistical power was limited for parameter estimates on data with rare events. Demographics of the patients



**FIGURE 3.** Endoscopic recurrence-free survivals with respect to sex and history of systemic steroids.

in our institutions show the high complexity of our patients over the last 6 years, possibly reflecting a selection bias toward the inclusion of cases with more extensive disease involvement. There is no control group in our study, and the extent of mesenteric resection is not measured, but our findings highlight the important concept of mesenteric exclusion that is achieved by the offsetting mesenteric apposition exhibited by the SETS anastomosis. Together, complimented with the avoidance of overlapping staple lines, these features may play a critical role in the favorable outcomes of low recurrence and surgical complication rates. Diversion rates up to 56% could also be a factor underlying low septic complication rates, but likely also reflects severe disease or high complexity in the patient cohort. In and of itself, this should not impact the very low recurrence rates seen in the group. Further insights on how best to improve recurrence outcomes could be gained with a better understanding of the pathophysiology of CD and the subsequent role of the gut microbiota.

To conclude the stapled end-to-side, or SETS, anastomosis provides a ‘best of both worlds’ for the surgical treatment of ileocolic CD—desirable results of low long-term recurrence

rates coupled with a reproducible, durable, and technically achievable surgical technique. This configuration likely demonstrates many of the putative advantages of recently investigated novel techniques for ileocolic anastomosis but in a more straightforward and efficient fashion. Our study supports it as a feasible and safe anastomosis, likely due to its stable perpendicular orientation with unique offsetting of the mesenteries, which should be strongly considered as an optimal technique.

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