









Predictive parameters of early postoperative complications in Crohn's disease: Single team experience

Deniz Atasoy¹ , Afag Aghayeva¹ , İsmail Ahmet Bilgin¹ , Yusuf Erzin² , İlknur Erenler Bayraktar¹ , Bilgi Baca¹ , Tayfun Karahasanoğlu¹ , İsmail Hamzaoğlu¹ 

¹Department of General Surgery, Acıbadem Mehmet Ali Aydınlar University School of Medicine, İstanbul, Turkey

²Department of Gastroenterology, İstanbul University Cerrahpaşa School of Medicine, İstanbul, Turkey

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ABSTRACT

Background/Aims: Most of the patients with Crohn's disease (CD) may require at least one surgical procedure over their lifetime. However, these patients tend to have a high incidence of postoperative complications. The aim of this retrospective study was to investigate the predictive parameters of postoperative complications in CD.

Materials and Methods: All consecutive patients with CD between March 2001 and March 2016 who underwent bowel resection were included to this study. Postoperative complications were divided as; major complications including anastomotic leakage, ostomy complications, acute mechanical intestinal obstruction and hemorrhage, and minor complications including wound infection.

Results: A total of 147 patients (74 females, 73 males) with a mean age of 36±11.9 years met the inclusion criteria. Behaviors of CD were stricturing in 90 (62%), fistulizing in 45 (30%) and inflammatory in 12 (8%) patients. Minimally invasive approach was applied in 35% (n=51) of the patients. Twentysix (17%) patients had early (≤30 days) postoperative surgical complications including anastomotic leak (n=10), intra-abdominal bleeding (n=2), complications related to ostomy (n=2), acute mechanical intestinal obstruction (n=1) and wound infection (n=11).

Only fistulizing disease behavior was associated with early postoperative complications (p=0.014).

Conclusion: This study suggests that postoperative complications are still more common in fistulizing CD. Surgical approach did not affect the complication rate. The decision should be individualized according to the prominent risk factors and surgeons' preference.

Keywords: Crohn's disease, complications, postoperative, surgery

INTRODUCTION

Crohn's disease (CD) is a chronic inflammatory bowel disease (IBD), which may present as a simple ulcerous luminal disease or a complicated fistulous, stenosing disease, and it may involve any part of the gastrointestinal tract.

Patients with CD tend to have a high incidence of postoperative complications, including anastomotic leakage, fistulas, bowel obstruction, and wound infection (1). The presence of intraoperative abscesses or fistulas, preoperative hypoalbuminemia, preoperative steroid use, and previous abdominal surgery has been demonstrated to increase the postoperative complication rates in patients with CD (2). However, there are significant differences among tertiary centers to meet the criteria for surgery for patients with CD. In addition, the experience with the use of biologics in the medical treatment of CD for the past 10 years seems to show a tendency

to change the biological behavior of CD and reduce the operation rates (3). Therefore, as a tertiary IBD center that considers the above-mentioned risk factors, our aim in this retrospective 15-year assessment was to examine whether our predetermined attention to preoperative preparation warnings and the use of biologics did change any early postoperative complication rates and profiles.

MATERIALS AND METHODS

Our institution is one of high-volume IBD centers in a highly populated city of İstanbul. We reviewed all the medical records of patients who underwent a surgical resection for CD between March 2001 and March 2016. An institutional approval (Approval number: 2016-12/7) from the local board research and development committee was obtained. The medical data were reviewed from patients' charts.

ORCID IDs of the authors: D.A. 0000-0002-5703-4549; A.A. 0000-0002-5317-8545; İ.A.B. 0000-0002-2073-842X; Y.E. 0000-0002-9460-1469; İ.E.B. 0000-0002-4878-0873; B.B. 0000-0003-1704-2533; T.K. 0000-0001-9700-0450; İ.H. 0000-0002-2131-3298.

Corresponding Author: Bilgi Baca; bilgibaca@hotmail.com

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The patient demographics, smoking status at the time of operation, duration of the disease from the diagnosis, American Society of Anesthesiologists' score, length of the postoperative hospital stay, medications used in the preoperative period, duration and dosage of the corticosteroid therapy, immunosuppressive medications [including azathioprine (AZA) and anti-tumor necrosis factor alpha (anti-TNF α)] use, comorbid diseases, previous abdominal surgical procedures for CD, the type of surgical procedures, and indications for resection (inflammatory, stricturing, or fistulizing) were recorded. The decision to perform surgery was made by the final agreement of different disciplines (gastroenterology, radiology, surgery, and pathology).

Patients were divided into two groups, based on the presence of postoperative complications after surgery.

Patients who were applied steroid therapy until the day of surgery were divided into two groups according to the dosage of corticosteroids (steroid <20 mg and steroid >20 mg). Patients who received immunosuppressive therapies (AZA) within 1 month before surgery, and patients who received anti-TNF α within 8 weeks were classified as "under preoperative medical treatment." Patients who discontinued immunosuppressive therapies at least 1 month before surgery were classified as "not under medical treatment." Previous surgical history was defined as having an intestinal resection because of CD. The surgical approaches were either open, laparoscopic, or robotic. According to the type of surgery, procedures were grouped into three categories: ileocecal resection, small bowel resection, and colectomy. The bowel resections were either one-segment resections or they included more than one segment. The ostomy was created depending on the operative findings (presence of intraabdominal abscesses, multiple fistulas) and patients' medical status.

Early complications observed within the first 30 days postoperatively were retrieved. The complications were divided as (1) major complications, such as anastomotic leakage, ostomy-related (perforation and bleeding through ileostomy) complications, acute mechanical intestinal obstruction, and intraabdominal hemorrhage; and (2) minor complications such as surgical wound problems.

All interventions were performed by three colorectal surgeons experienced in the IBD surgery.

Table 1. Patient demographics and perioperative outcomes of the patients with and without complications

	Patients without complications (N=121)	Patients with complications (N=26)	p
Gender			
Female	57 (47)	17 (65)	
Male	64 (53)	9 (35)	0.091
Age (year)			
At diagnosis	31 \pm 12.7	34 \pm 14.6	0.539
At operation	36 \pm 11.9	39 \pm 12.8	0.251
Smoking ¹ at the time of operation			
Yes	42 (35)	11 (44)	
No	56 (65)	12 (46)	0.666
ASA class			
I	96 (79)	20 (78)	
II	24 (20)	6 (22)	0.825
Preoperative steroid ² use, n	19 (16)	1 (4)	0.340
AZA ³ use, n	55	11	0.933
anti-TNF α ⁴ , n	10	1	0.084
Albumin ⁵ level <2.5 mg/dL	3	0	1
Previous bowel resection for CD			
Yes	21 (17)	5 (19)	
No	100 (83)	21 (81)	0.772
Disease behavior			
Fistulizing	31 (25)	14 (54)	
Stricturing	78 (64)	12 (46)	0.014
Inflammatory	12 (11)	0 (0)	
Operative approach			
Open	76 (63)	20 (77)	
Laparoscopic	45 (37)	6 (23)	0.170
Surgical procedure			
Ileocecal resection	88 (73)	17 (65)	
Small bowel resection	11 (9)	2 (8)	0.595
Colectomy	22 (18)	7 (27)	

Continuous variables were described as the mean \pm SD, and categorical variables were described as n (%); groups were compared by the Fisher's exact test for categorical variables and the Wilcoxon rank sum test for continuous data

CD: Crohn's disease; ASA: American Society of Anesthesiologists; AZA: azathioprine; anti-TNF α : anti-tumor necrosis factor alpha

¹Smoking habits were obtained from 126 patients

²A history of using a preoperative corticosteroid treatment was obtained from 120 patients; steroid calculations were done according to the yes or no answer, without consideration of the dose

³Preoperative use of AZA was obtained from 123 patients

⁴anti-TNF α use was obtained from 145 patients

⁵A preoperative albumin level was obtained from 55 patients

Statistical analysis

All continuous data were reported as the mean±standard deviation (SD), and they were compared using the Mann-Whitney U test. Categorical variables were reported as frequency (%) and were evaluated with the chi-squared test and Fisher's exact test.

p-values <.05 were considered to be statistically significant. Statistical analyses were performed using the Epi Info™ for Windows v7.2 (Atlanta, GA) software.

RESULTS

A total of 147 patients (74 females, 73 males) with a mean age of 36±11.9 years were included into the study. The mean age at diagnosis was 31±12.7 years. The median time interval between the diagnosis and surgery was 5 (range, 0-29) years. The demographics and perioperative outcomes of the patients with and without complications are shown in Table 1. Strictureing, fistulizing, and inflammatory as the disease type occurred in 90 (62%), 45 (30%), and 12 (8%) patients, respectively. The most commonly affected site was the ileocecal region (n=105, 71.4%).

The 30-day complication rate was 17% (n=26). The major complication rate was 10% (n=15). Minor complications were seen in 11 (7.5%) patients as wound infections. Among 15 major complications, there were 10 anastomotic leaks, two intraabdominal bleedings, one acute mechanical intestinal obstruction, and two complications related to ostomy.

Ostomy-related complications and intraabdominal bleeding required surgical re-intervention. Patients diagnosed with anastomotic leakage underwent a temporary loop ileostomy procedure. Demographics and operative profiles of the 15 patients who demonstrated postoperative major complications are shown in Table 2.

Among the disease behavior types, the fistulizing disease type was statistically significantly associated with early postoperative complications (p=0.014). The inflammatory disease behavior was excluded from the analysis because there were no complications in this disease behavior. Complication rates in the strictureing and fistulizing types were 13% and 31%, respectively.

The mean hospital stay was 8±5.79 (range, 3-33) days [8±5.37 days (range, 3-27 days) for patients without complications and 11±7.29 days (range, 4-33 days) for patients with complications] (p=0.223).

No intraoperative complications and deaths occurred at the early postoperative period.

DISCUSSION

Our study showed that early postoperative complications were more common in patients with fistulizing CD. This could be attributed to the well-known poor anti-TNF α response in this behavior.

Postoperative intraabdominal complication rates for CD are reported to range between 8% and 16% (1,4-7). It was reported that low albumin levels, preoperative steroid use, preoperative abscess, and previous surgery history might be risk factors for postoperative early complications (2). Yamamoto et al. (1) showed that a preoperative low albumin level, steroid use, and the presence of abscesses or fistulas at the time of laparotomy significantly increased the risk of septic complications after surgery in CD.

Benefits of laparoscopic surgery, including decreased pain, better cosmetic results, lower wound complications, shorter hospital stay, and early return of bowel function in the setting of colorectal surgery, could be limited in patients with CD due to a complex nature of the disease. Thickened mesentery, fistulas, and abscess formations may limit the use of laparoscopic surgery in IBD. It is reported that laparoscopic intestinal resection for CD can be performed safely in the majority of affected patients (8). Thus, the postoperative complication rate could be reduced, even in complex cases. Some studies comparing laparoscopy and open surgery in CD reported no significant differences for incidence of intraabdominal abscess and anastomotic leak within the early postoperative period (9,10). In our study, we found that out of 52 patients who had laparoscopic surgery, only 2 of them had anastomotic leaks. Our results were similar with the literature, showing that minimal invasive surgery did not increase the early postoperative complication rates.

A meta-analysis comparing segmental colectomy vs. subtotal/total colectomy with ileorectal anastomosis reported no significant difference in the rates of postoperative adverse events (11). In our study, the most common surgical procedure was ileocolic resection, and there was no statistically significant difference in the incidence of postoperative complications among ileocolic resection, colectomy, and small bowel resections.

Previous reports demonstrated that the presence of abscesses or fistulas at the time of laparotomy significant-

Table 2. Characteristics of the patients with post-operative major complications

Demographics	Disease behavior	Surgical procedure	Complication	Intervention
1- F, 38	Fistulizing	Ileocecal resection	Anastomotic leak	Double-barreled ileocolostomy
2- F, 38	Fistulizing	Total proctocolectomy + end ileostomy	Intraabdominal hemorrhage	Diagnostic laparotomy
3- F, 64	Stricturing	Ileocecal resection	Anastomotic leak	Double-barreled ileocolostomy
4- M, 31	Fistulizing	Ileocecal resection + rectosigmoid resection	Anastomotic leak	Double-barreled ileocolostomy
5- M, 47	Cancer	Right hemicolectomy + ileocolostomy	Ileostomy necrosis	Ileostomy revision
6- F, 53	Fistulizing	Ileocecal resection	Anastomotic leak	Double-barreled ileocolostomy
7- M, 58	Fistulizing	Ileocecal resection	Anastomotic leak	Double-barreled ileocolostomy
8- F, 33	Stricturing	Ileocecal resection + ileocolostomy	Hemorrhage around ostomy	Suture hemostasis
9- F, 37	Stricturing	Right hemicolectomy	Anastomotic leak	Double-barreled ileocolostomy
10- F, 20	Fistulizing	Stoma closure after *Lap RPC + loop ileostomy	Anastomotic leak	Double-barreled ileostomy
11- F, 29	Fistulizing	Stoma closure after *Lap RPC + loop ileostomy	Anastomotic leak	Double-barreled ileostomy
12- M, 29	Stricturing	*RPC+ loop ileostomy	Ileostomy retraction	Ileostomy revision
13- F, 58	Fistulizing	Ileum resection	Anastomotic leak	Double-barreled ileostomy
14- F, 43	Fistulizing	Ileum resection	Anastomotic leak	Double-barreled ileostomy
15- M, 34	Stricturing	Right hemicolectomy + ileocolostomy	Mechanical intestinal obstruction	Adhesiolysis

*Operated on due to ulcerative colitis, however, later diagnosed as Crohn's-like disease
M: male; F: female; RPC: restorative proctocolectomy; Lap: laparoscopic

ly increased the risk of postoperative complication rates (1,7). Our study results were concordant with the literature, showing that the fistulizing type was an independent risk factor for postoperative complications.

There is controversy regarding the overall effects of preoperative anti-TNF α treatment on postoperative complication rates. Although some studies showed no relationship, other studies showed that the anti-TNF α administration was associated with an increased risk of postoperative complications (12-17). Perioperative immunosuppression with corticosteroids, thiopurine, or the combination of both was reported not to alter the surgical complication rates (18). In our study, 20 and 11 patients were still under the steroid and anti-TNF α treatment at the time of surgery, respectively. We also observed that the use of steroid and anti-TNF α treatment until the day before surgery did not affect the postoperative complication rate.

The clinical relapse rate of CD after intestinal resection was reported to be 28% at 5 years (19). After primary re-

section, 39% of recurrent CD patients need re-operation at 10 years (20). The relationship between postoperative complications and the presence of previous operations for CD is controversial. Re-operation for the recurrence of CD was associated with an increased postoperative morbidity and a longer hospital stay than primary resection (21). In our study, 26 patients had a history of previous abdominal operations for CD. Six of them had early postoperative complications, and this was statistically insignificant for postoperative complications.

In conclusion, although the surgical approach and procedure did not affect the complication rate, the decision for surgery should be individualized according to the prominent risk factors and surgeons' preferences.

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