



## Research Article

# Outcomes of Surgery in Crohn's Disease: A Single-Center Experience

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### Abstract

**Objectives:** Crohn's disease (CD) is a chronic inflammatory condition that affects the entire gastrointestinal tract. Surgery is not curative and first-line treatment modality for patients with CD, but 75% of the patients require surgery. There are mainly four surgical options with different outcomes and recurrence rates. We aimed to investigate the postoperative results of different surgical interventions used to treat CD and their association with treatment modalities.

**Methods:** A retrospective study was performed through the analysis of patients treated with surgery involving bowel resection. A total of 76 patients were included and classified into four groups according to the type of surgery they underwent: segmental colectomy, total colectomy, segmental small intestinal resection or stricturoplasty, and ileocecal resection.

**Results:** 76 patients underwent a bowel resection for complicated CD. There was no significant difference in the rates of morbidity and mortality among the four surgical procedure groups. Regarding hospital stay and ICU stay, there was a statistically significant difference ( $p=0.03$ ) among the groups, especially in the Total proctocolectomy (TPC) TPC group. There was no statistically significant difference in the mortality and morbidity rates between the surgery groups. Likewise, we did not find any statistical difference between laparoscopy and open resection or emergency and scheduled surgery.

**Conclusion:** We found that patients who undergo TPC for Crohn's colitis exhibit a significantly longer length of hospital stay than those who undergo other surgical procedures, but there was no statistical significant difference in mortality and morbidity among the groups.

**Keywords:** Crohn disease, outcome, surgery, type

Crohn's disease (CD) is a chronic inflammatory condition that can affect the entire gastrointestinal tract, from the mouth to the anus, and the most commonly affected parts are the terminal ileum and cecum (55%). The incidence of CD is between 5 and 10 per 100.000 population in the Western countries and it is increasing in developing countries and Asia as well.<sup>[1,2]</sup> Although surgery is not curative and first-line treatment modality for CD, approximately 75% of patients require surgery with an aim to minimize the impact of the disease. Besides that, approximately 40%–50% of patients undergoing surgery are likely to need further operations within 10–15 years.<sup>[3]</sup>

The resection of the terminal ileum and cecum is the most widespread treatment modality in these cases, and it is performed both for advanced disease and acute disease non-responder to medical therapy. Total proctocolectomy (TPC), segmental small intestine resection (SIR), and subtotal colectomy (SC) are the other options with different outcomes and recurrence rates.<sup>[4]</sup> The decision regarding which surgery to perform depends upon the extent and site of disease, the presence of perianal disease, the patient's age and lifestyle, and the willingness of a patient to accept a stoma.<sup>[5]</sup>

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**Submitted Date:** January 09, 2018 **Accepted Date:** January 26, 2018 **Available Online Date:** May 03, 2018

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Laparoscopic surgery has gained a rightful popularity over the years via several advantages that have to be considered when planning and selecting the preferable approach for patients. Some reports claimed that laparoscopic surgery is superior to open surgery with lower morbidity and mortality rates, faster recovery of intestinal motility, and lower postoperative admission times.<sup>[6]</sup> Nevertheless, laparoscopic surgery in CD has been more limited in use because the inflammation encountered in CD is often multifocal with a thickened mesentery and makes a minimally invasive approach challenging.<sup>[2,7]</sup> We aimed to investigate postoperative results of different surgical interventions used to treat CD and its relation with treatment modalities.

## Methods

A retrospective study was performed through the analysis of patients treated with surgery involving bowel resection by open or laparoscopic way for CD at the Turkey Advanced Specialty Education and Research Hospital, Ankara, from January 2013 to December 2016. Data on patients were collected from the hospital database and analyzed using frequencies and percentages. Patients' admission diagnoses and the admission modality (emergency or elective) were analyzed as well. Exclusion criteria for this current study included a history of previous bowel surgery such as bowel resection or strictureplasty, previous history of malignancies, and indeterminate colitis. A total of 96 patients underwent intestinal resection for pathologically confirmed CD during the study period, and a total of 76 patients were included in our present analyses. The following variables were retrospectively collected from the medical records of these patients: demographics, preoperative disease characteristics, operative indications, the operative approach (open vs. laparoscopy), operative findings (stricture, fistula or abscess), postoperative morbidity, the reoperation rate, follow-up duration in the intensive care unit and in hospital separately, and postoperative complications.

The study was exempted from the signed informed consent form requirement because it was a case-control medical record review. Since our study was in the category of non-interventional clinical research with its retrospective structure, ethics committee approval was needed.

## Patient Classification

The 76 enrolled patients were classified by the type of surgery into the following four groups: patients who had undergone a single segmental colectomy or multiple SC group (n=27), patients who had received a total colectomy or total proctocolectomy (TPC group, n=7), patients who had undergone segmental small intestinal resection or stricturoplasty (SIR group, n=9), and patients who had un-

dergone ileocecal resection (IR group, n=33). Laparoscopic intestinal resection was performed for six patients with different resection types. Surgical recurrence was defined as a need of operation on any section of the intestine for the pathologically approved CD.

## Statistical Analysis

Data for patient groups were compared using the Spearman's rho test for bivariate correlations and the Kruskal-Wallis test for continuous variables. Statistical significance was defined as  $p < 0.05$ , and all analyses were performed using SPSS software version 20 (SPSS Inc, Chicago, IL). SPSS version 20.0 for Windows (SPSS Inc., Chicago, IL, USA).

## Results

A total of 76 patients underwent bowel resection for complicated CD between January 2013 and December 2016. The average age of patients was 38.03 (SD, 9.9) years. There were 33 females and 43 males. Patients presented to the gastrointestinal surgery department with complaints such as acute abdomen, bowel obstruction, abdominal pain, and so on. The majority of the patients were transferred from the gastroenterology department and the ratio of the emergent surgical cases to the non-emergent ones was 14.5%. Patients' mode ASA score was 2. Surgical procedure types and descriptive statistics are summarized in Table 1 and Table 2. As shown in Table 1, IR (n=33) and SC (n=27) were the main surgical procedure types. Laparoscopic surgery was not the preferred method, and emergency surgery was needed only in 14% of patients (Table 1).

**Table 1.** Surgical procedure types and main complications

	Frequency (n)	Percent (%)
Laparoscopic surgery	6	7.9
Emergent surgery	11	14.5
Ileocecal resection	33	43.4
Subtotal colectomy	27	35.5
Segmental small bowel resection	7	9.2
Total proctocolectomy/colectomy	9	11.8
Mortality	2	2.6
Anastomosis complications	12	15.8

**Table 2.** Descriptive statistics of the patients'

	Min.	Max.	Mean	Std. Deviation
Age	20	59	38.03	9.96
Postoperative hospital stay (days)	1	62	10.54	9.56
Length of stay in ICU(days)	1	45	3.68	5.94

The average hospital stay after surgery was 10.54 days (SD, 9.5), and the average stay in ICU was 3.68 days (SD, 5.9) (Table 2). Anastomosis complications were the major morbidity in this study and its rate was 15.8%, whereas the mortality rate was 2.6 (n=2 occurred on postoperative 45<sup>th</sup> day and 36<sup>th</sup> day). In none of the cases, reintervention was required, and other small complications such as incisional surgical site infection or minimal fat necrosis (n=8) were overcome by bedside interventions (Table 1).

There was no significant difference in the rates of morbidity and mortality among the four surgical procedure groups. Regarding hospital stay and ICU stay, there was a statistically significant difference among the groups ( $p < 0.05$ ). The mean rank, which was determined by kruskal Wallis test, was higher in the TPC group comparing to the other surgical procedures. It shows that statistical difference among the groups was significant especially in the TPC group. There was significant difference between IR and non-IR only in terms of hospital stay. Laparoscopic surgery or emergency surgery as a variable factor did not show a statistically significant difference. For other parameters involving outcomes, no statistical significant difference was found.

## Discussion

Inflammation can extend entirely through the intestinal wall, and most patients (>70 %) with CD will eventually develop stricturing or perforating complications that require surgery as a part of the therapeutic management of the disease.<sup>[4]</sup> Intestinal obstruction is the most frequent indication of surgical treatment, and the obstructed tract often comprises the cecum and terminal ileum; in these cases, IR is required. CD may be helped by surgery, but it cannot be cured by surgery. The primary goals of surgery are to reduce serious complications, provide the best possible quality of life, and maintain as much bowel movement as possible.<sup>[8]</sup>

During the present study period, 76 patients with CD treated at our institution underwent various types of surgery that were classified into four groups defined above. In our study, the mean age of patients requiring surgery was 38, similar to that of Bernell et al.,<sup>[10]</sup> which showed that the median age of the first surgical resection in CD is in the third decade. Patients with CD are at increased risk of developing postoperative complications such as anastomosis leakage, ranging between 10% and 25% according to the published studies, and the anastomosis complications rate in our study was 15.8%, similar to findings in the literature.<sup>[2]</sup>

Depending upon the surgical strategy, we found that post-

operative hospital stay and ICU stay remarkably changed, especially in the TPC group. Although the extent of colonic disease and complications affected the choice of surgical treatment, our present findings suggest that TPC was the most related one with length of stay.

In this study, we did not find any relation between morbidity and mortality and surgery type or laparoscopic intervention, unlike available literature favoring laparoscopic surgery.<sup>[11]</sup>

However, our present study had several notable limitations such as having only a 4-year follow-up period and the small number of cases. Thus, surgical recurrence rate could not be assessed; a comprehensive prospective study is required. As in most single-institution retrospective observational cohort studies, potential biases for both patient referral and selection existed. Additionally, our study design lacked random experimental allocation to the groups and four groups were compared for morbidity, mortality, and hospital and ICU stay. Although the formation of permanent stoma is an important consideration for young, socially, and physically active patients, we could not collect data on the quality of life or psychological acceptance of permanent stoma because of the retrospective design of our study.

## Conclusion

We found that patients who undergo TPC for Crohn's colitis exhibit a significantly longer length of hospital stay than those who undergo other surgical procedures, but there was no statistical significant difference in mortality and morbidity among the groups. Likewise, we did not find any statistical difference among morbidity rate and hospital stay and ICU stay between laparoscopy and open resection or emergency and scheduled surgery.

## Disclosures

**Ethics Committee Approval:** An extra formal consent other than the patients had given prior to hospitalization was not required for the current study because it was a case-control medical record review. Since our study was in the category of non-interventional clinical research with its retrospective structure, no ethics committee approval was applied.

This study adhered to the principles in accordance with the Helsinki declaration of 1975, as revised in 2008.

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

**Authorship contributions:** Concept – I.M.; Design – I.M.; Supervision – S.T.; Materials – S.Y.; Data collection &/or processing – S.B., I.M.; Analysis and/or interpretation – I.M., D.K.; Literature search – I.M., S.Y.; Writing – I.M., S.T.; Critical review – I.M., E.B.B.

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