

## Risk Factors for Primary Surgery in Crohn's Disease

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### Abstract

Crohn's disease is a chronic inflammatory bowel disease that can affect the entire gastrointestinal tract. We aimed to determine factors that frequently lead to surgery in patients with Crohn's disease. In this retrospective study, 229 patients with established Crohn's disease between 2014 and 2021 were enrolled. Univariate analysis was used to evaluate risk factors associated with surgery. 31% underwent surgery during follow-up. Independent risk factors associated with surgery in Crohn's disease patients were: stricturing disease ( $p < 0.001$ ), penetrating disease ( $p < 0.001$ ), ileal localization ( $p < 0.001$ ), male gender ( $p = 0,004$ ) and smoking habit ( $p = 0.009$ ).

**Conclusion:** For Crohn's disease patients with m factors predictive for surgery early intensive therapy is required.

**Keywords:** Crohn's Disease; Initial Surgery; Risk Factors

### Introduction

Crohn's disease (CD) is a chronic inflammatory bowel disease that can affect any part of the gastro-intestinal tract [1]. The natural history of CD is difficult to predict. In some patients, the disease can be managed satisfactorily by medical therapy, while others develop structural complications and require repeated surgery [2]. This study aimed to assess risk factors for surgery in patients with CD.

### Methods

This was a retrospective descriptive and analytic single center study including all patients with established CD was carried out at tertiary university hospital from 2014 to 2021. Surgical interventions for perianal disease were excluded from the study. Independent risk factors for surgery were analyzed.

### Results

Of all 229 patients with CD, 31% underwent surgery. At the time of diagnosis, age was between 17 and 40 years in 59% patients. The localization of CD was ileal (L1), colonic (L2) and ileocolonic (L3) in respectively 9.6%, 19.2% and 64.6%. The disease phenotype was inflammatory (B1) in 33,6%, structuring (B2) in 39,3% and penetrating (B3) in 27,1%. Anoperineal manifestations were noted in 39,3% of patients.

The median age at surgery was 21.5 years. The median duration from diagnosis to surgery was 38 months. Emergency surgeries were required in 31.9%.

Indication for surgery was fistulas (70.8%), intraabdominal abscesses (18,84%), intestinal stenosis (8,70%) and intestinal perforation (2,90%). The ileocecal resection was the most frequently performed resection (50,70%) (Table 1). Procedures resulting in stoma accounted for (21,60%).

No surgery	158
Small bowel segment resection	22
Ileocecal resection	36
Ileo-hemicolectomy	6
Right hemicolectomy	4
Sigma resection	1
Subtotal colectomy	2

**Table 1:** Primary bowel surgery in the studied population (229 patients).

Risk factors for surgery were diagnosis before the age of 40 years ( $p = 0.008$ ), involvement of the terminal ileum ( $p < 0.001$ ), stricturing disease ( $p < 0.001$ ), penetrating disease ( $p < 0.001$ ), male gender ( $p = 0,004$ ) and smoking habit ( $p = 0.009$ ).

Family history of CD ( $p = 0,24$ ), perianal disease ( $p = 0.57$ ) and the need for systemic steroids ( $p = 0,08$ ) did not influence the risk of surgery significantly.

## Discussion

Crohn's disease (CD) is a chronic inflammatory bowel disease characterized by transmural inflammation that can affect the entire gastrointestinal tract from mouth to anus [1]. Despite the development of medical therapy, surgery represents a cornerstone in the natural course of Crohn's disease. About 75% - 80% of CD patients will require surgical intervention during their lifetime after diagnosis [2]. In a report from Bernell, *et al.* the cumulative incidence of intestinal resection was 44%,61%, and 71%, at 1, 5 and 10 years after diagnosis [1]. Conservative surgical approach to preserve bowel function is necessary to avoid short bowel syndrome. Previous studies have mainly evaluated the predictive factors for postoperative recurrence [1], but risk factors for initial surgery remain poorly studied. We focused on defining potential risk factors for primary bowel resection. The main indications for surgery reported from Olmsted County were obstruction or medical therapy failure in (24%) each, abscess in 10% each, fistulizing disease in 8% of subjects, intestinal cancer in 4% of patients, and severe perianal disease, bleeding or severe pain in 3% [3]. Commonly, CD patients required elective surgery but in some situations the indication is emergent such intestinal perforation, peritonitis, or toxic megacolon [4].

Resection of the diseased segment is the most commonly performed type of surgery [5]. However, other options exist including bypass and strictuoplasty to manage small bowel strictures.

Regarding age of surgery, literature reports are conflicting. In western countries, Young age was associated with increased risk of surgery [5]. The mean age reported was 32 years [5] and 28,7 years [6]. This was consistent with our findings, more than half of patients who required resection were at the age category 17 - 40 years. In contrast, patients who underwent surgery in China were older [2].

Our data revealed that male are at higher risk of surgery. In a population study carried out by Gao., *et al.* including 323 patients with CD from South China male gender is associated with an increased risk for primary surgery [7]. In contrast, a Japanese study reported on 289 patients with CD and found that significantly more women than men underwent surgery [8].

Patients with involvement of the small intestine have been reported to have an increased risk for surgery in several studies. Basilisco, *et al.* demonstrated higher risk of surgery in ileal and ileocolic localization [9], whereas Farmer, *et al.* found that ileocolonic disease is more prone to surgery [10]. Our study showed that the involvement of the terminal ileum constitute a risk factor as in Solberg, *et al.* report of 243 patients newly diagnosed with CD [11].

Strictureing (B2) and penetrating (B3) disease behavior also represent predictive risk factors for primary surgery as demonstrated in a report from Hong Kong [12] and in a large cohort of patients with CD in south mainland China [7].

Prior studies have demonstrated that cigarette smoking is an important environmental factor associated with an increased risk of surgery [13]. A prospective study carried out by Seksik, *et al.* showed the negative impact of tobacco use in a large sample of patients, the surgical rate was significantly higher in the heavy smokers than in the nonsmokers [14].

Although family history of inflammatory bowel disease and perianal disease have been significantly associated with surgery requirement [10,13] in several studies. We were not able to demonstrate this in our cohort

Our study faced some limitations. First it was a single center study. Second, the sample size of our cohort was small. Third medication treatment and their relation to surgery were not studied.

### Conclusion

Surgery is not a cure for Crohn's disease. The objective is to alleviate serious complications and achieve the best possible quality of life.

In our study, almost one-third of patients require surgery at a median of 3 years after onset of diagnosis. Strictureing, penetrating disease and smoking habits are identified as high risks factors predictive of surgery in patients with CD.

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