

Original Article

# Surgical Outcomes of Crohn's Disease: A Single Institutional Experience in Taiwan

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## Key Words

Crohn's disease;

Operation;

Complication

**Purpose.** Most patients with Crohn's disease require surgery during the course of their illness. In patients suffering from more than 20 years of disease, the cumulative probability of surgery is 78%. We report the surgical outcome of 37 consecutive cases of Crohn's disease undergoing surgical intervention in our institution.

**Patients and Methods.** From January 1985 to May 2008, medical records of patients diagnosed with Crohn's disease and underwent at least one operation were reviewed. The patient characteristics, presentations, operation types, surgical outcomes, and disease courses were analyzed.

**Results.** A total of 37 patients were included for analysis. Ages at first operation ranged from 14 to 80 years old (43.8 on average). The male to female ratio was 26:11. The median follow up period was 99.5 months. Seventy-nine operations were performed (2.14 times for each patient on average). 8 patients experienced 3 or more operations. The time interval between resections ranged from 3 to 125 months (46.4 months on average). Three patients underwent 6 or more operations. One patient died of Crohn's disease.

**Conclusion.** Surgical intervention in Crohn's disease carries high complication risks and recurrence rates. Surgical planning should be more conservative for severe cases.

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Inflammatory bowel diseases, including ulcerative colitis and Crohn's disease (CD), are chronic inflammatory and ulcerative process of the gastrointestinal tract. They are diagnosed by a set of clinical, endoscopic, and histological characteristics.<sup>1</sup> Medical therapy is central to the management of inflammatory bowel disease. CD is characterized by transmural inflammation of the gastrointestinal tract and often leads to fibrosis, obstruction, and perforation, which are not typically seen in ulcerative colitis. CD can involve any part of the alimentary tract from the mouth to the anus but most commonly affects the small intestine and co-

lon. Most patients with chronic CD require surgery some time during the course of their illness. In patients with more than 20 years of disease, the cumulative probability of surgery is 78%.<sup>2</sup> We report the surgical outcome of 37 consecutive cases of CD undergoing surgery in our institution.

## Patients and Methods

From January 1985 to May 2008, medical records of patients diagnosed of CD were retrieved from data-

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base in our institution. The colonoscopic findings, pathological reports, image studies, clinical course records, and operation notes were reviewed. The differential diagnosis of infections, drug induced, radiation induced, tuberculosis, and ischemic enteritis was carefully evaluated. Patients with pathological proof were included. The clinical presentations of patients with borderline pathological reports were carefully re-evaluated. Patients treated without surgical intervention or with an uncertain diagnosis were excluded. The patient characteristics, presentations, operation types, surgical outcomes, and the disease courses were analyzed.

## Results

From January 1985 to March 2008, a total of 37 CD patients were included for analysis. Ages at first operation ranged from 14 to 80 years old (43.8 on average). Age distribution is listed in Table 1 and the highest peak was located between 31 and 50. The male to female ratio was 26:11. The median follow up period was 99.5 months (ranging from 2 to 197 months). Five patients had arthritis at spine or knee. Two patients had gall bladder stones or common bile duct stones. One patient had synchronous colon cancer confirmed in the first operation. Leukemia was diagnosed in one female patient after her second operation. She died of leukemia finally.

The presentation of CD in the first operations is summarized in Table 2. The most commonly occurring symptoms were abdominal pain, bloody stool, and diarrhea. The involved bowel segments were listed in Table 3. A total of 126 admissions were recorded. The average admission for each patient was

**Table 1. Patient ages during first operation**

Age (y/o)	No. of patients
11-20	3
21-30	5
31-40	10
41-50	8
51-60	4
61-70	3
71-80	4
Total	37

**Table 2. Initial disease presentations**

Presentation	No. of patients
Abdominal pain	17 (45.9%)
Bloody stool	11 (29.7%)
Diarrhea	9 (24.3%)
Perianal pain	4 (10.8%)
Abdominal mass	4 (10.8%)
Entero-cutaneous fistula	3 (8.1%)
Surgical complication	2
Fever	2
Bowel perforation	1
Tenesmus	1
Bowel obstruction	1
Intra-abdominal abscess	1
Colon cancer	1

**Table 3. The involved bowel segment in first operation**

Location	No. of patients
Whole colon	7 (18.9%)
Ileum and cecum	11 (29.7%)
Ascending colon	8 (21.6%)
Left colon	6 (16.2%)
Rectum	1 (2.7%)
Peri-anal	4 (10.8%)

3.41. One patient was admitted 17 times in 17 years. 79 operations (Table 4) were performed (2.14 times each patients on average). 8 patients experienced 3 or more operations. Five bowel resection operations, including four right hemicolectomy and one total colectomy, were performed laparoscopically. One patient died of CD after 10 operations.

Thirty one large bowel resection and nine small bowel resections were performed in this study. A total of 29 resections were done without protective ileostomy or colostomy. The complications occurred in this subgroup were as follows: 4 leakages (13.8%), 1 early enterocutaneous fistula (3.4%), 1 recto-vesicle fistula (3.4%), and 7 wound infections (24.1%). Eleven patients experienced 2 or more gastrointestinal tract resections. The time intervals between resections range from 3 to 125 months (46.4 months in average). The possibility of re-creating a new enterostomy due to recurrent disease after closure of previous ileostomy was 33.3% (3 of 9 closures). Most operations except five of them were done electively. The reasons of emergent operation were bleeding, bowel obstruction, or perforation.

**Table 4. Types of operations performed**

Type of operations	No. of procedures
Large bowel procedures	31 (39.2%)
Right hemicolectomy	15 (19.0%)
Left hemicolectomy	4 (5.1%)
Total colectomy	9 (11.4%)
Lower anterior resection	1 (1.3%)
Anterior resection	1 (1.3%)
Hartmann's procedure	1 (1.3%)
Stoma operations*	20 (25.3%)
Peri-anal operations	11 (13.9%)
Small bowel resections	9 (11.4%)
Wound debridement	9 (11.4%)
Gastric operations	3 (3.8%)
Excision and anastomosis of fistula	3 (3.8%)
Bypass operation	2 (2.5%)
Extensive resection**	1 (1.3%)
Total***	79

\*Include creation, closure, and revision of stoma

\*\*Left hemicolectomy+gastric wedge resection+splenectomy+distal pancreatectomy

\*\*\*One operation might include several procedures, such as left hemicolectomy+small bowel resection

One patient underwent an extensive visceral resection including left hemicolectomy, partial gastrectomy, splenectomy, and distal pancreatectomy due to extensive disease involving left colon and gastric wall with abscess formation at left upper abdomen. Unfortunately, the whole stomach had to be removed 4 days later because of massive UGI bleeding and pus drained from the operative wound. One patient succumbed to Crohn's disease after 13 years of progressive disease. He received a first operation at 36 and experienced 10 operations including laparoscopic bypass, total colectomy with ileostomy, ileostomy, fistulotomy, colostomy revision, twice ileostomy closure, and 4 wound debridements. Another male patient received 8 operations starting at the age of 58. He received right hemicolectomy with ileostomy, Hartmann's procedure, small bowel resection, ileostomy closure three times, and wound debridement twice within 6 years. An 18 year old boy underwent total colectomy, mucosal proctectomy, ileal pouch-anal anastomosis, and ileostomy due to severe disease. The initial diagnosis of this boy was ulcerative colitis. But the final diagnosis turned to be CD in the following disease course. He was admitted for 11 times in the following years due to peri-anal sepsis, stoma compli-

cations, enterocutaneous fistula, and urolithiasis. Ten years later, he underwent subtotal gastrectomy due to ulcerative mass at pylorus.

## Discussion

Because Crohn's disease occurs anywhere along the alimentary tract from the mouth to the anus and is marked by multiple recurrences, surgical excision is not a curative procedure. Whelan reported in 1985 that up to 90% of patients require at least one operation during their lifetime.<sup>3</sup> And every operation was suggested to be designed as palliative procedure due to the high risk of disease recurrence.<sup>4</sup> The actual percentage of patients of CD undergoing operations in our institution was not accessible due to too many patients that could not be diagnosed definitely with reasonable time intervals of follow up. According to present data, each patient had 2.14 operations on average. Eleven patients (29.73%) underwent 2 or 3 major bowel resections. This result supported the recommendation that surgeons performing operational procedures for patients of CD should keep re-operation in mind after recurrence.

The incidence of CD is equal in men and women. The peak age at onset is between 15 and 25 years of age, with a second, lesser peak between 55 and 65 years.<sup>1</sup> In this series, the mean age of first operation was 43.81 years old and ranged from 14 to 80. The peak incidence occurs between 31 and 50 years old. (Table 1) This observation is reasonable because most patients can be controlled medically years or decades before the disease progressed to a stage where operation is required. We found a male to female ratio of 26:11. This could be a reflection of patient selection bias because, as a hospital of veteran affairs, there exists a male dominancy in our patient population.

CD is marked by one of three major patterns: (1) disease in the ileum and cecum (40% of patients), (2) disease confined to the small intestine (30%), and (3) disease confined to the colon (25%). Much less commonly, CD involves more proximal parts of the gastrointestinal tract—the mouth, tongue, esophagus, stomach, and duodenum.<sup>1</sup> The disease presentation differs according to involved organs. The commonest

clinical manifestations are diarrhea, abdominal pain, weight loss, and relapsing and remitting disease. In our series, the top three presentations were abdominal pain (45.9%), bloody stool (29.7%), and diarrhea (24.3%). Hemorrhage in CD is much less common than in ulcerative colitis<sup>5</sup> but was the second leading symptom in our patients. This might result from the fact that most patients with abdominal pain or diarrhea were treated conservatively, whereas bleeding and hemodynamic instability cause doctors to consider more aggressive management.

In a study of 507 patient with 35 years follow up, patients with terminal ileum and cecal or right colonic disease have the most common anatomic distribution encountered in practice, accounting for approximately 40% of patients undergoing surgery.<sup>6</sup> In a total of 31 colonic procedures, we performed 15 (48.4%) right hemicolectomies for ileo-cecal or ascending colon disease. This percentage is comparable to other reports. Wolff concluded in 2001 that preservation of bowel length with the goal of maintaining normal function is paramount in patients with Crohn's disease.<sup>7</sup> We performed 8 (21.6%) total colectomies in these 37 patients. No matter how conservative a surgeon might be, a significant proportion of patients will lose their colon due to CD. Braveman and colleagues reviewed 32 patients undergoing ileal pouch-anal anastomosis (IPAA). They identified complications in 93%, including fistula (63%), pouchitis (50%), and anal stricture (38%), resulting in diversion or pouch excision in 29% of patients.<sup>8</sup> In the only patient undergoing IPAA in our study, the patient experienced a complicated course. He had a peri-anal debridement three times due to anastomosis leakage.

Approximately 50% to 60% of all CD patients with perianal disease experience at least one perianal abscess<sup>9</sup>, with up to 60% having a recurrent abscess within 2 years.<sup>10</sup> Because the disease process presents with extensive recurring inflammation, perianal fistulas are often deep, eroding through the sphincter muscle and are associated with extensive scarring. We performed 9 fistulectomies and 2 drainage procedures for peri-anal abscess in 7 patients. All of these patients had more than one operation because of complications with CD or recurrent fistula. This observation might indicate that patients with CD undergoing

peri-anal operations had more complicated disease patterns and carried an increased risk of bowel resection.

We performed 4 laparoscopic right hemicolectomies and one laparoscopic total colectomy with ileorectal anastomosis. These patients recovered smoothly without peri-operative complications. Eshuis reported in 2008 that surgical recurrence and quality of life after laparoscopic-assisted and open ileocolic resection for Crohn's disease were comparable.<sup>11</sup> Our limited experience supports this statement.

Bednarz analyzed the surgical outcomes of 52 consecutive patients of CD.<sup>12</sup> Thirty-six patients experienced a smooth postoperative recovery. And the most frequent complication was wound infection. The complication rate of surgery for CD is difficult to analysis because of the wide range of surgical procedures. However, 24.1% wound infection rate and 13.8% leakage rate in bowel resections without protective stoma were reported in our series. And this is much higher than other types of abdominal surgery. Three patients (8.1%) in this series experienced six or more operations. One of them died of CD due to malnutrition, septic complications, and hemodynamic collapse. These three patients shared the same tendency for refractory disease recurrence and surgical complications. The disease-related mortality rate was inaccessible because some of the patients lost follow up during their disease course. In our limited experience, patients underwent multiple surgery had higher mortality rate. Anastomotic leakage, wound infection, enterocutaneous fistula, stoma complications, or recurrent symptoms often led to another bowel resection. In our experience, such patients should be treated with a different surgical policy. We suggest that in treating patients with a high recurrence rate, closure of ileostomy should be delayed and intestinal anastomosis should be replaced by stoma creation if feasible.

## Conclusion

Surgical intervention of Crohn's disease carries a high complication and recurrence rate. Surgical planning should be more conservative for severe cases.

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原 著

## 客隆氏症的手術結果：台灣單一機構的經驗

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**目的** 多數的客隆氏症患者在病程中會遇到手術的需要，20 年以上的病患需要手術的累積機會是百分之七十八，本文報告 37 位在本院接受手術的客隆氏症患者的手術結果。

**方法** 從 1985 年一月到 2008 年五月，收集被診斷客隆氏症並且接受手術的病患加以統計，紀錄其特徵、表現、術式、手術結果、與病程。

**結果** 37 個病例被收案分析，他們接受第一次手術時的年齡在 14 到 80 歲之間 (平均 43.8 歲)，男女比例是 26：11，追蹤中位數時間是 99.5 個月，總共進行了 79 次手術 (平均每人 2.14 次)，8 位病人接受三次以上的手術，兩次切除手術之間的時間差從 3 到 125 個月不等 (平均 46.4 個月)，一位病人死於客隆氏症，3 位病人接受 6 次以上的手術。

**結論** 客隆氏症的手術有高併發症及復發機率，重症病人的手術應該偏向保守。

**關鍵詞** 客隆氏症、手術、併發症。