

## Surgery for Ulcerative Colitis – A Comparative Retrospective Study –

Takatoshi SHIMOYAMA<sup>1)</sup>, Hiroshi ISHIKAWA<sup>2)</sup>, Hiroshi NAKAYAMA<sup>3)</sup>, Teruhisa SHIMIZU<sup>2)</sup>, Hiroshi HISANO<sup>1)</sup>, Seiji HONJO<sup>1)</sup>, Satoshi MATSUO<sup>1)</sup>, Hideaki KOMATSU<sup>1)</sup>, Harumi KIDA<sup>1)</sup>, Yoriyoshi SUMIDA<sup>2)</sup>, Seiji MATSUO<sup>2)</sup>, Hiroyuki KUSANO<sup>2)</sup>, Tohru NAKAGOE<sup>2)</sup>, Tishio MIURA<sup>2)</sup>, Hiroyoshi AYABE<sup>2)</sup>, Akio KAWAGUCHI<sup>4)</sup> and Takatoshi UCHIDA<sup>5)</sup>

1) Department of Surgery, National Ureshino Hospital, Ureshinocho Fujitsugun, Saga 843-03, Japan

2) First Department of Surgery, Nagasaki University School of Medicine, 1-7-1 Sakamoto, Nagasaki 852, Japan

3) Department of Surgery, Hokusho Chuo Hospital, Emukaecho Kitamatsuurgun, Nagasaki 859-61, Japan

4) Department of Surgery, Inoue Hospital, 8-9 Takaramachi, Nagasaki 852, Japan

5) Department of Radiology, National Ureshino Hospital, Ureshinocho Fujitsugun, Saga 843-03, Japan

The records of patients with ulcerative colitis (UC) who underwent operation at our hospitals between 1973 and 1995 were reviewed. The clinical course of the disease was the chronic relapsing-remitting type in seven, chronic continuous type in four, acute attack of the relapsing-remitting type in six, and fulminant colitis (toxic megacolon) in two patients. The most common indication for surgery was a condition refractory to conservative therapy. Four patients with massive bleeding, perforation and toxic megacolon underwent emergency operation. The surgical procedures performed were ileoanal anastomosis (IAA) in four, ileoanal canal anastomosis (IACA) in one, ileorectal anastomosis (IRA) in five, proctocolectomy and permanent ileostomy (PCI) in four, and colectomy in five patients. The mortality rate was 5.2%. During follow-up, drug therapy with sulfasalazine (salazosulfapyridine) in colectomy or IRA patients was necessary to control inflammation in the remaining rectal mucosa. One patient with segmental colectomy for severe colitis required removal of the remaining colon 1 year later. Three out of four patients undergoing total proctocolectomy and IAA had a good postoperative course with an average of six bowel movements in 24 hours, but one patient with a long rectal cuff was returned to a PCI because of a cuff abscess. The PCEEA instrument was sufficient to perform IAA and IACA. Carcinoma in the remnant rectum occurred in one patient 20 years after Hartmann's procedure. In conclusion, total proctocolectomy, which has the advantage of removing all diseased mucosa with its potential for inflammation, dysplasia, and carcinoma, may be preferable for extensive long-standing UC.

### Introduction

Ulcerative colitis (UC) is relatively uncommon in Japan although it is not a rare disease in Europe and the United States<sup>1)</sup>. According to the Epidemiology Group of the Research Committee of Inflammatory Bowel Disease in Japan, a total of 10,819 patients diagnosed with UC in 429 hospitals have been registered since 1973<sup>2)</sup>. Patients with

UC are usually treated with medication, and conservative control of UC often obviates the need for surgery. Hiwatashi et al, in their long-term follow-up study of UC in Japan, reported that a total of 114 of the 778 UC patients (14.7%) from eight hospitals required colectomy, and that the cumulative colectomy rate increased rapidly within 2 years after onset<sup>3)</sup>. Surgical indications include cases refractory to conservative management, dysplasia or malignancy, chronic disease, and toxic megacolon or acute exacerbation<sup>4,5)</sup>. The paper reviews our experiences in evaluating the operative procedures and prognosis of UC.

### Patients and Materials

Of the 32 patients with ulcerative colitis (UC) followed in our surgical department in the period between 1973 and 1995, we retrospectively studied the 19 patients who had received surgical treatment. There were nine men and ten women. The mean age at operation was 34.1 years, with a range of 15 to 60 years. The diagnostic criteria provided by the Investigation and Research Committee for Ulcerative Colitis (organized by the Japanese Ministry of Health and Welfare in 1973) were used<sup>6)</sup>. Diagnosis of UC was histologically confirmed in all patients.

### Clinical Features

The clinical course of the disease is shown in Table 1. The duration of symptoms of UC prior to the operation was from 3 months to 15 years. The disease involved the left side of the colon and rectum in six, and total colon in 11 patients. Grossly, the resected specimen was the pseudo-polyposis type in 11, atrophic type in 6 and toxic megacolon in 2 cases. Indications for surgical treatment in the 19 patients are summarized in Table 2. Refractory disease including unsuccessful drug treatment was the most common indication for surgery in patients with UC.

**Table 1.** Clinical Course of Ulcerative Colitis

Type of clinical course	No. of patients	Duration of symptom (Mean)
Chronic relapsing-remitting	7	4Y3M
Chronic continuous	4	6Y7M
Acute attack of relapsing-remitting	6	5Y8M
Acute fulminant (Toxic megacolon)	2	3M
Total	19	5Y2M

Y : year, M : month

Emergency operations were carried out in four patients with massive bleeding, perforation and toxic megacolon. The patients were allocated to groups according to the surgical procedure, and the postoperative results in each group were evaluated.

## Results

### Surgical Procedures

The Surgical procedures performed in the 19 patients are listed in Table 3. The main surgical procedure in our hospitals changed from colectomy in the 1970s to ileorectal anastomosis (IRA) in the 1980s. Although IRA remained the main surgical procedure in the 1980s, new techniques of restorative proctocolectomy, namely, ileoanal anastomosis (IAA) and ileoanal canal anastomosis (IACA) were introduced. In the 1990s, restorative operations were predominant, and IRA was performed in only one patient.

Colectomy of the diseased segment was performed in five patients with mild or moderate colitis in the previous series. Three patients with the left colon type of the disease underwent left hemicolectomy. The other two patients with mild proctitis had subtotal colectomy and cecal-rectum anastomosis. Of the nine patients undergoing total colectomy, four had end-ileostomy for potentially fatal complications: fulminant colitis, toxic megacolon, and severe attacks of colitis. The other five patients underwent ileorectal anastomosis (IRA) for mild or moderate inflammation of the rectum.

Four patients have undergone abdominal colectomy, proximal proctectomy, endorectal mucosectomy, and endorectal ileal pull-through anastomosis (IAA) with defunctioning ileostomy. At ileoanal anastomosis, two patients had construction of a J-shaped ileal pouch, and the other two had no reservoir. In one patient, the PCEEA instrument was used to perform ileal J-pouch-anal anastomosis (Fig. 1). Double-stapled ileal pouch-anal anastomosis (IACA) (preserving the anal transition zone) was performed in one patient with the total colon type with mild proctitis (Fig. 2). This anastomosis was completed with a 28-mm circular stapler and was found to lie 2.5 cm above the dentate line without a diverting ileostomy.

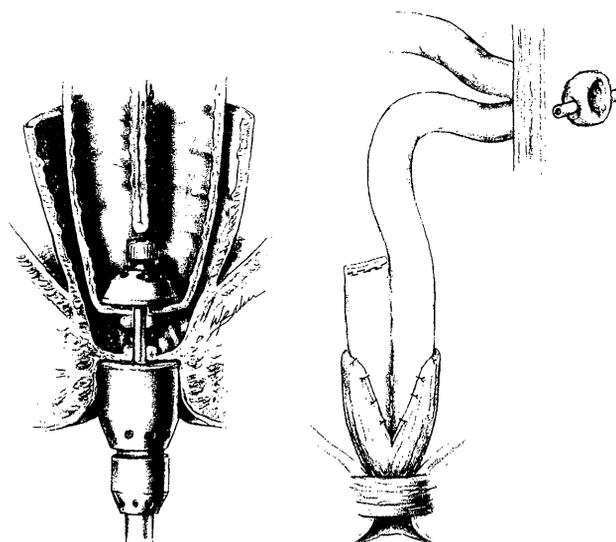
**Table 2.** Indication for Surgery in Ulcerative Colitis

Indication	No. of patients
Relapsing-remitting	5
Refractory to medical treatment	8
Massive bleeding	2(1)
Perforation	1(1)
Toxicity	2(2)
Other	1
Total	19(4)

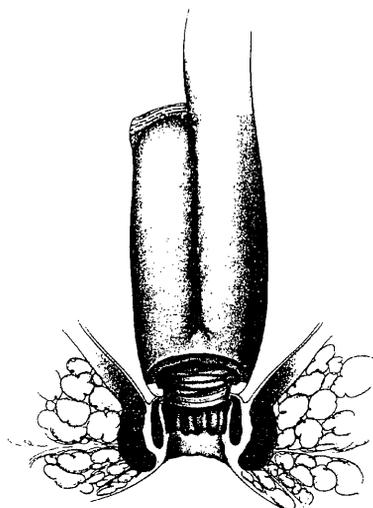
( ) : emergency

**Table 3.** Surgical Procedures of Ulcerative Colitis.

	No. of patients
Colectomy	
Left hemicolectomy	3
Subtotal colectomy	2
Total colectomy	
Permanent ileostomy	4
Ileorectal anastomosis(IRA)	5
Proctocolectomy	
Ileoanal anastomosis(IAA)	4
Ileoanal canal anastomosis(IACA)	1
Total	19



**Fig. 1.** Auto Suture instruments used in an ileal J pouch anal anastomosis. Introduce the EEA instrument into the anus and advance the center rod (left). A proximal diverting loop ileostomy is performed (right).



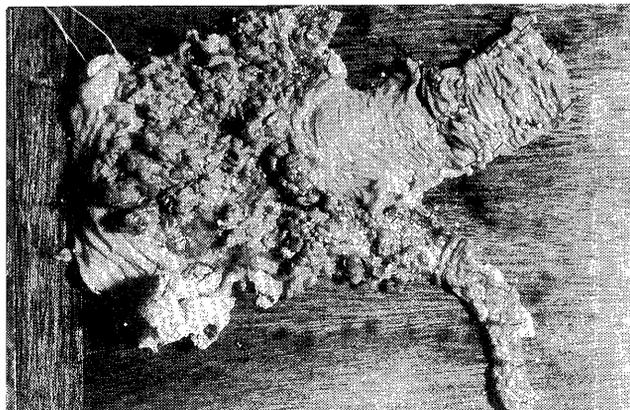
**Fig. 2.** Stapled ileal pouch-anal canal anastomosis (IACA) 1-2 cm above the dentate line.

#### *Morbidity and Mortality*

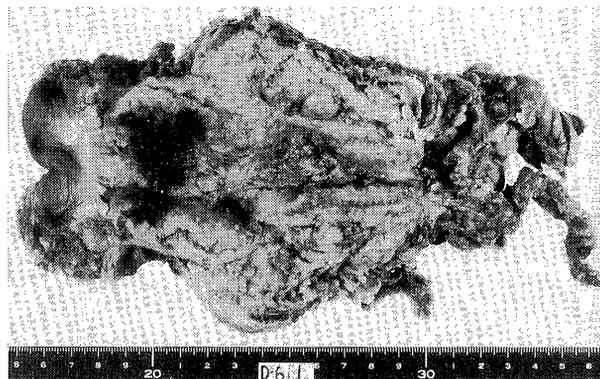
The most common postoperative complication was wound infection (six patients, 31.5%). Among the four IAA patients, an abscess of the cuff occurred in a female patient. Despite attempts at drainage by laparotomy, she was returned to a permanent ileostomy (PIC) with removal of the loop segment 38 days after the initial operation. A 60-year-old man with perforation of toxic megacolon died of pelvic sepsis 3 months after total colectomy and end-ileostomy. The operative mortality rate of all patients was thus 5.2%.

#### *Postoperative Course*

The postoperative outcomes of the 18 patients were followed-up for 2.5 to 23 years, with a mean of 12.6 years. Drug therapy with sulfasalazine (SASP) was necessary in all colectomy patients for control of the inflammatory process in the remaining colorectal mucosa. However, subsequent operations were performed in one patient. This patient, a 29-year-old man, with left hemicolectomy developed severe colitis associated with marked inflammatory polyps in the retained right colon requiring removal of the total colectomy and ileostomy 1 year later (Fig. 3). However, he required a third operation with the removal of the remaining rectum, because severe proctitis also occurred 1 year after the second operation. Two out of four IAA patients eventually had ileostomy closure 8 to 12 months after the first operation. Anal function in IAA and IACA patients was rather good. There were no episodes of pouchitis despite mild anal canal inflammation 2 to 8 years after surgery. Patients reported an average of six (range, 4-7) bowel movements in 24 hours. The other patient refused ileostomy closure.



**Fig. 3.** Resected specimen showing the remarkable inflammatory polyps in the remaining cecum.



**Fig. 4.** Resected specimen of a patient with carcinoma in the remnant rectum.

Carcinoma in the retained rectum was found in a 67 year-old woman 20 years and 6 months after an operation consisting of left hemicolectomy and standard colostomy with Hartmann's pouch (Fig. 4). She died of widespread cancer 8 months after an abdominoperineal rectal resection (Miles' procedure).

#### **Discussion**

Although there are numerous surgical options for the treatment of UC, most of the patients in our previous series underwent colectomy of the diseased segment because UC is a benign disease in young patients. The postoperative course after this procedure seems to be rather good for mild or moderate colitis, but patients with fulminant colitis had acute relapsing inflammation in the remaining colon requiring reoperation. Segmentectomy of the diseased colon, should not be performed in patients with refractory colitis due to long-term, high-dose steroid therapy. Fulminant or unremitting colitis in our four patients was effectively managed by total colectomy and standard ileostomy. However, controversy exists regarding optimal management of the remnant rectal segment after

total colectomy because of the high incidence of pelvic sepsis and the greater degree of persistent mucus discharge or bleeding from the retained diseased bowel<sup>7,9</sup>. Karch et al. evaluated subtotal colectomy, intraperitoneal Hartmann's closure of the rectum, and Brooke ileostomy in a series of 114 patients, and they concluded that this procedure was the preferred modality in patients with intractable IBD colitis<sup>9</sup>.

Of the sphincter-saving operations, total colectomy and ileorectal anastomosis (IRA) was the first procedure utilized for patients with UC, and was preferred since it was a safe operation and since it did not have the disadvantage of a permanent ileostomy. The anastomosis is performed either at the level of the sacral promontory or 1-2 cm above or below the pelvic reflexion. This procedure has been reported to have low mortality and leakage rates of less than 2% in each large series. It also has advantages in relation to IAA and IACA, namely good postoperative bowel and anal functions and it can be performed as a single operative procedure<sup>7,10,11</sup>. However, recurrent rectal disease has been shown to be the most common cause of failure after IRA. Many IRA patients need postoperative local administration of corticosteroids for the control of inflammation in the remaining rectal mucosa. In our series, minor leakage occurred in one case, and the inflammatory process of the retained rectum was well controlled by local medications. Recently, the double stapling technique for ileorectal anastomosis is commonly used, resulting in a low incidence of leakage and pelvic sepsis.

Total proctocolectomy has the advantage of removing all diseased mucosa with its potential for inflammation, dysplasia, and carcinoma. Restorative proctocolectomy with an ileoanal anastomosis (IAA) has gained wide acceptance in the surgical treatment of patients with UC<sup>5,12</sup>. Modifications of this procedure have been made in each series since the original description of total proctocolectomy, endorectal mucosectomy, handsewn IAA, and diverting ileostomy<sup>13-16</sup>. Since 1990, we have used the stapled technique for IAA, with preservation of the anal transitional zone 1-2 cm above the dentate line<sup>17</sup>.

The most significant complication of IAA is pelvic and perianal sepsis, in which the morbidity rate ranged from 5% to 24% in the large series<sup>4,5,7</sup>. In our series, anastomotic leaks occurred in a patient in whom a long rectal muscle cuff was used. Fonkalsrud et al. noted in the Mayo Clinic series that the length of rectal muscle retained above the ileoanal anastomosis need not be longer than 4-5 cm, because long rectal muscle segments have caused compression of the ileal reservoir and, in some instances, produced acute angulation of the ileum or reservoir, or both, contributing to the development of a partial outlet obstruction with stasis and reservoir inflammation<sup>15</sup>.

According to the large series, functional results and quality of life improved with time and stabilized approximately 1 year after surgery so that patients resumed

normal work, social, and sexual activities<sup>14,18</sup>. Bowel frequency ranged from 1.7 to 8.7 stools, with a mean of 4.5 per day<sup>19</sup>. On the other hand, double-stapled ileoanal canal anastomosis (IACA) seems to be associated with fewer complications and better postoperative sphincter function than handsewn IAA because it involves less anal manipulation<sup>20</sup>.

The criteria for the selection of these surgical procedures are still controversial. Patients with UC may undergo surgery either as an emergency or an elective procedure. According to a survey of ten institutes in Japan<sup>12</sup>, restorative proctocolectomy accounted for 81.8% of the surgical procedures performed in patients with UC (250 out of 305 patients) in the last 5 years (1989-1993); IAA in 63% and IACA in 33% of these patients. The IACA group consisted of older patients with less severe disease than the IAA group, and IAA was more frequently performed during reconstructive phase surgery after emergency operation. In general, IRA is indicated for patients receiving high-dose prednisolone, for those who need a quick return to social activity, and for those with poor anal function. IACA is indicated for those patients with good anal function assessed preoperatively<sup>5,11,12</sup>. However, these two procedures entailed a potential risk of recurrence of the disease in the remaining anal canal mucosa. Although there are several surgical options for the treatment of UC, each one has a role and should be discussed with the patient<sup>5</sup>.

It is well known that patients with long-standing UC have a high risk of developing colorectal cancers and the neoplastic changes in the mucosa known as dysplasia<sup>21</sup>. This complication occurs in 3-5% of all cases of UC, which is five to ten times greater than the incidence of carcinoma of the colon in the general population<sup>22</sup>. On the other hand, the incidence of colorectal carcinomas which arise from the remnant colon and rectum after surgery are 3.0-3.7% after ileorectal anastomosis<sup>23</sup>. Kurtz et al, in reviewing 58 cases of carcinoma developing in a remnant rectum (36 in ileorectal anastomosis, 23 in an excluded rectal stump) which were collected from the literature, suggested that rectum-sparing operations did not appear to decrease the incidence of malignant transformation in UC<sup>24</sup>. Total proctocolectomy which has the advantage of removing all diseased mucosa with its potential for inflammation, dysplasia, and carcinoma may be recommended for cases extensive long-standing UC.

## References

- 1) Morita T, Toki S, Hirohashi T et al: Incidence and prevalence of inflammatory bowel disease in Japan: National epidemiological survey during the year 1991. *J Gastroenterol* 30: 1-4, 1995.
- 2) Kitahora T, Utsunomiya T, Yokita A et al: Epidemiological study of ulcerative colitis in Japan: incidence and familial occurrence. *J Gastroenterol* 30: 5-8, 1995.
- 3) Hiwatashi N, Yao T, Watanabe H et al: Long-term follow-up study

- of ulcerative colitis in Japan. *J Gastroenterol* 30: 13-16, 1995.
- 4) Fazio VW, Ziv Y, Church JM et al: Ileal pouch-anal anastomoses complications and function in 1005 patients. *Ann Surg* 222: 120-127, 1995.
  - 5) Binderow SR and Wexner SD: Current surgical therapy for mucosal ulcerative colitis. *Dis Colon Rectum* 37: 610-524, 1994.
  - 6) Investigation and Research Committee for Ulcerative Colitis. Diagnostic criteria of ulcerative colitis (in Japanese). *Jpn Med J* 2673: 31-34, 1975.
  - 7) Sasaki I and Funayama Y: Recent advance in surgical treatment for inflammatory bowel disease. *Jpn J Gastroenterol* 92: 1715-1723, 1995.
  - 8) Moss GS and Deddie N: Fate of rectal stump in ulcerative colitis. *Arch Surg* 91: 967-970, 1965.
  - 9) Karch LA, Bauer JJ, Gorfine SR and Gelemt IM: Subtotal colectomy with Hartmann's pouch for inflammatory bowel disease. *Dis Colon Rectum* 38: 635-639, 1995.
  - 10) Steller C, Larvol L, Girault T et al: Is ileorectal anastomosis still a valid therapeutic alternative in the surgical treatment of hemorrhagic rectocolitis? Analysis of the functional, endoscopic and histologic result of 74 cases (in French with English abstract). *Gastroenterol Clin Biol* 17: 175-180, 1993.
  - 11) Saito Y, Sawada T, Tsuno N et al: Total colectomy and ileorectal anastomosis in ulcerative colitis. *J Gastroenterol* 30: 131-134, 1995.
  - 12) Utsunomiya J, Yamamura T, Kusunoki M et al: Ileoanal anastomosis and ileoanal canal anastomosis in Japan: comparative retrospective study. *J Gastroenterol* 30: 128-130, 1995.
  - 13) Parks AG and Nicholis RJ: Proctocolectomy without ileostomy for ulcerative colitis. *Br Med J* 2: 85-88, 1978.
  - 14) Johnston D, Holdsworth PJ, Nusmyth DG et al: Preservation of the entire anal canal in conservative proctocolectomy for ulcerative colitis: a pilot study comparing end-to-end ileoanal anastomosis without mucosal resection with mucosal proctectomy and edo-anal anastomosis. *Br J Surg* 74: 940-944, 1987.
  - 15) Cohen Z, McLeod RS, Stephan W et al: Continuing evolution of the pelvic pouch procedure. *Ann Surg* 216: 506-511, 1992.
  - 16) Fonkalsrud EW: Update on clinical experience with different surgical techniques of the endorectal pull-through operation for colitis and polyposis. *Surg Gynecol Obstet* 165: 309-316, 1987.
  - 17) United States Surgical Corporation, Auto Suture Company: Ileal "J" Pouch. Stapling techniques, general surgery with auto suture instruments. 3rd ed. p202-205, 1988.
  - 18) Pemberton JH, Phillips SF, Ready RR et al: Quality of life after Brooke ileostomy and ileal pouch-anal anastomosis: comparison of performance status. *Ann Surg* 209: 620-628, 1989.
  - 19) Newton CR and Baker WN: Comparison of bowel function after ileorectal anastomosis for ulcerative colitis and colonic polyposis. *Gut* 16: 785-791, 1975.
  - 20) McIntyre PB, Pemberton JH, Beart Jr RW et al: Double-stapled vs handsewn ileal pouch-anal anastomosis in patients with chronic ulcerative colitis. *Dis Colon Rectum* 37: 430-433, 1994.
  - 21) Cook MG and Goligher JG: Carcinoma and epithelial dysplasia complicating ulcerative colitis. *Gastroenterol* 68: 1127, 1975.
  - 22) Edwards FC and Truelove SC: The course and prognosis of ulcerative colitis. Part IV. Carcinoma of the colon. *Gut* 5: 15-22, 1964.
  - 23) Oakley JR, Levry IC, Fazio VW et al: The fate of the rectal stump after subtotal colectomy for ulcerative colitis. *Dis Colon Rectum* 6: 394-396, 1985.
  - 24) Kurtz LM, Flint GW, Platt N and Wise L: Carcinoma in the retained rectum after colectomy for ulcerative colitis. *Dis Colon Rectum* 23: 346-350, 1980.