

Original Research Article

Clinical Results of One-stage Restorative Proctocolectomy with J-pouch Anal Anastomosis in 300 Ulcerative Colitis Patients

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Abstract

Objectives: Restorative proctocolectomy and ileal pouch anal anastomosis (IPAA), with diverting ileostomy, are established ulcerative colitis (UC) treatments. The routine use of diverting ileostomy is controversial because of the risk of stoma closure and stoma related complications. In our institution, proctocolectomy and IPAA, with mucosectomy and handsewn anastomosis without diversion (one-stage IPAA), were performed for select patients with UC. The present study aimed to evaluate the clinical and functional outcomes of patients undergoing one-stage IPAA.

Methods: Between April 1999 and July 2017, 300 patients underwent one-stage IPAA in our institution. The clinical notes and prognosis were reviewed retrospectively.

Results: Postoperative complications (Clavien-Dindo classification grade \geq III) occurred in 18 patients (6.0%). The most common complication was anastomotic leakage ($n = 9$, 3%). There were 15 patients (5.0%) who required a defunctioning ileostomy. However, 13 patients successfully underwent ileostomy closure and achieved acceptable pouch function. Finally, two patients (0.6%) required pouch excision in this series. The cumulative pouch functional rate was 99.6% / 5 years and 99.2% / 10 years.

Conclusions: One-stage IPAA is a good strategy for carefully selected patients with UC.

Keywords

ulcerative colitis, restorative proctocolectomy, without diverting ileostomy

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Introduction

Restorative proctocolectomy and ileal pouch anal anastomosis (IPAA) with diverting ileostomy is a suitable procedure for treating ulcerative colitis (UC). Patients with UC are at a higher risk for anastomotic leakage due to colon inflammation and the use of medications, including steroids and biological agents[1,2]. Pelvic sepsis is the most severe IPAA complication. Anastomotic leakage is one of the leading causes of pouch failure; therefore, most surgeons establish a temporary loop ileostomy proximal to the ileal pouch. However, some authors have noted that, while ileostomy

prevents some complications, reversal and the ileostomy itself may be sources of morbidities[3,4]. Another surgeon has recommended proctocolectomy and IPAA without diversion as the best strategy because defunctioning ileostomy is not associated with reduced leakage[5].

We performed a one-stage restorative proctocolectomy with mucosectomy and handsewn anastomosis to treat 300 selected patients with UC. This study was designed to assess the long-term outcomes, complications, and hospital stay duration of patients undergoing restorative proctocolectomy with mucosectomy without diverting ileostomy.

Table 1. Patient Background.

Patients Characteristics	
Sex (Male/Female)	160/140
Age at operation (years)	32 (15-69)
Body mass index (kg/m ²)	19.1 (14.1-28.7)
Performance status	0:82, 1:196, 2:20, 3:2
Duration of disease (months)	81 (2-360)
Extent of colitis (Pan-colitis/Left-side/Proctitis)	208/86/4
Severity (Mild/Moderate/Severe)	10/185/15
Preoperative medication	
Total corticosteroids dose (mg)	9000 (0-100000)
Daily corticosteroids dose (mg)	10 (0-60)
Immunomodulator use (%)	67 (22.3)
Tumor necrosis factor inhibitor use (%)	11 (3.6)
Cytapheresis (%)	143 (47.6)
Surgical Indication	
Failed medical treatment (%)	252 (84.0)
Cancer/Dysplasia (%)	39 (13.0)
Bleeding (%)	5 (1.7)
Extra intestinal complication (%)	4 (1.3)

The background information of the patients undergoing one-stage restorative proctocolectomy for UC (n = 300). The data are shown as the median and range.

Methods

Patients

From April 1999 through July 2017, 300 patients with UC who underwent one-stage IPAA were included in this study. Within the same period, 1409 cases met the preoperative criteria for one-stage IPAA (excluding Crohn's disease and fulminant colitis). The rate of one-stage IPAA was 21.2% (300/1409) because most patients wished to receive two-stage surgery after the informed consent process or did not meet the intraoperative conditions. All patients underwent open abdominal surgery. The clinical notes and prognoses were reviewed retrospectively. Table 1 summarizes the patients' background information.

Ethical considerations

The Institutional Review Board of the Hyogo College of Medicine (No.202004-437) approved all study protocols. Each participating patient provided informed consent for participation in the clinical trial.

Selection of patients for one-stage procedure

The decision to omit ileostomy was based on operative and preoperative considerations. Patients were selected for one-stage IPAA if they had been diagnosed previously with UC with no fistulas (excluding those with Crohn's disease). Additionally, patients with fulminant colitis, including toxic

megacolon, were considered unsuitable for the one-stage procedure because of the high rate of postoperative complications in this population. Also, if tension was applied to the anastomotic part during surgery, then the ileostomy was performed. If these conditions were achieved, a loop ileostomy was not performed[6].

Operative techniques

We have already described our surgical techniques[7]. The patient underwent the procedure in the Lloyd-Davies position, and two separate teams performed the abdominal and perineal portions of the procedure. Mucosal dissection began circumferentially from the dentate line using harmonic scalpels (Johnson & Johnson Medical, Ethicon Endo-Surgery, Tokyo, Japan) to preserve the internal sphincter muscle fibers; 2-3 cm from the dentate line, the levator muscle and rectal wall were resected gradually. The dissected rectum was pushed upward into the abdominal cavity with clean gauze pads. An abdominal proctocolectomy was performed from the cecum in the usual manner. A 15 cm ileal J-pouch was created from the terminal 30 cm of the ileum. The pouch was stapled proximally and distally with 3-row staplers inserted at the mid-portion of the J-pouch. The septum at the pouch's apex was transected with a linear stapler to prevent apical pouch bridge syndrome[8]. After cleaning the pelvic floor with 4 liters of physiological saline, the pouch was delivered into the rectal muscular cuff.

The perineal operator determined which portion of the

Table 2. Surgical Parameters (n = 300).

	n = 300
Operation time (min)	200 (136-570)
Blood loss (ml)	195 (10-1190)
Transfusion	5
Postoperative hospital stay (days)	22 (12-84)
Re-operation	18

The data are shown as the median and range.

pouch apex came to the dentate line most easily. That portion of the pouch apex was opened with an electrical scalpel. The IPAA was handsewn with 24 stitches using 3-0 absorbable sutures. After the surgeons completed anastomosis, the pouch was decompressed transanally with a 28-French transanal catheter. Table 2 summarizes the surgical details.

Postoperative management

Broad-spectrum antibiotics were continued for 24 hours postoperatively.

An anesthesiologist removed nasogastric decompression in the operating room. The patient began progressive feeding when bowel function returned.

On the third day postoperatively, the medical staff removed the urinary catheter after detaching the epidural catheter. The transanal catheter was removed on the eighth to tenth day postoperatively after performing contrast pouchography and checking for leakage.

Definitions

Patients had a functional pouch if their anastomotic leakage healed during the follow-up period, and they could undergo stoma closure. Patients with pouch failure, assigned to the nonfunctional group, were defined as those who required pouch removal or repeat ileostomy for several reasons, including pelvic sepsis and pouchitis. At the time of the final confirmation, the cases without ileal pouch resection were called the functional pouch group, and the ratio was the functional pouch rate. Even if a stoma was constructed, a pouch with a subsequently closed stoma was considered a functional pouch. Early postoperative complications were defined as those occurring within 30 days after surgery and classified as Clavien-Dindo grade III or higher[9,10].

Statistical analysis

Data were collected retrospectively onto a dedicated database from a review of the medical and nursing notes. The grouped data are expressed as the median and range. The cumulative incidences of nonfunctional pouches were estimated using the Kaplan-Meier method. JMP ver. 12 (SAS Institute, Inc., Cary, North Carolina, USA) was used to perform the analyses.

Table 3. Early Postoperative Complications (Clavien-Dindo grade \geq III, n = 18).

	n	%
Leakage (ileoanal anastomosis)	9	3.0
Leakage (pouch)	4	1.3
Bowel obstruction	2	0.7
Pelvic bleeding	2	0.7
Pelvic abscess	1	0.3

In total, 15 patients (5%) required a de-functioning ileostomy after the operation.

Results

Early postoperative complications

Table 3 presents the early postoperative complications (Clavien-Dindo grade \geq III). Eighteen patients (6%) developed postoperative complications; the common complications were pouch leakage (9, 3%) and anastomotic leakage (1.3%).

Fifteen patients required a defunctioning ileostomy after the operation. However, 13 patients successfully underwent ileostomy closure and achieved acceptable pouch function. Finally, two patients in this series required pouch excision with conversion to eternal ileostomy due to anastomotic leakage and a change in the diagnosis to a CD.

Postoperative long-term outcomes

At our hospital, 182 patients were followed, and 118 patients were followed at other hospitals. We also confirmed the pouch functional rate for cases under observation at other hospitals. The cases without a stoma at the time of final confirmation were considered part of the functional pouch group. The cumulative five-year pouch functional rate was 99.6%, and the cumulative 10-year pouch functional rate was 99.2% (Figure 1).

Tao patients underwent pouch resection; in one case, the patient's diagnosis changed from UC to CD. In the other case, repeated refractory fistulas occurred at the anastomotic site.

Discussion

UC patients have a high risk of anastomotic leakage due to the inflammatory state of the colon, the use of steroids and biological agents, and malnutrition[1,2]. In fact, some studies have claimed that IPAA without diversion increases the incidence of septic complications[9-11]. Pelvic sepsis leads to pouch function failure because of anastomotic fibrosis, decreased pouch compliance, dysmotility, and impaired pelvic floor activity. For that reason, preventing leakage is extremely important in one-stage IPAA for UC patients.

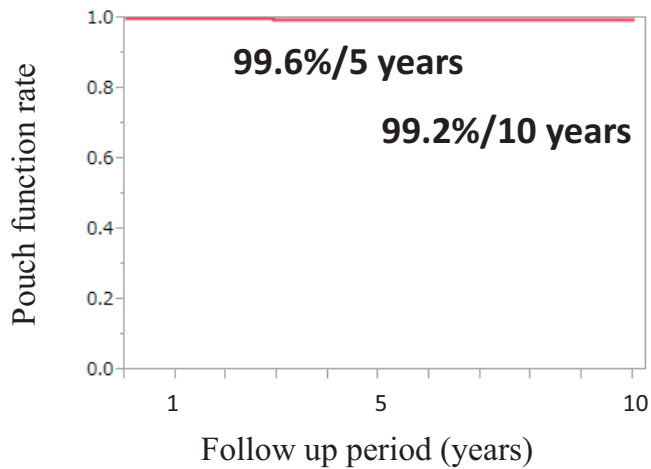


Figure 1. Cumulative Pouch Functional Rate.

The cumulative five-year pouch functional rate was 99.6%, and the cumulative 10-year pouch functional rate was 99.2%.

Therefore, we performed one-stage IPAA for select cases that satisfied preoperative and intraoperative conditions.

Preoperatively, we excluded patients with acute colitis, including toxic megacolon and UC with fistulas (excluding those with Crohn's disease) because postoperative complications occur at a high rate in this population.

The important term at the time of operation is tension-free anastomosis. To achieve affordable anastomosis, we mobilized the small bowel mesentery to the duodenum and carefully opened a mesenteric window to maintain blood flow. Then, we confirmed that the pouch tip reached 2 cm from the pubic symphysis. Especially in cases of obese men, the narrow pelvic cavity and thick mesentery prevent tension-free anastomosis. If they did not satisfy the preoperative and intraoperative conditions, the pouch was established covering the stoma. The procedure was decided at the time of operation; therefore, sufficient preoperative explanation is necessary for all patients.

Postoperative anal function is also a significant problem. IPAA with mucosectomy was difficult to perform in the first session without covering stoma because of the damage to the internal anal sphincter. The early problem occurred frequently after one-stage IPAA. Anal pain and soiling are important complications that make it difficult for patients to be eligible for one-stage IPAA. Therefore, we administered loperamide hydrochloride and zinc oxide ointment mixed with dimethyl isopropylazulene ointment. We previously reported that the anal pain disappeared approximately two months after surgery[12], but these issues are directly linked to the quality of life and are obstacles for patients to make decisions. For that reason, stapled IPAA can be performed in the first session because this procedure does not hurt the internal anal sphincter and provides good postoperative anal function. In recent years, improvements in mucosal resec-

tion, using harmonic scalpels, have made it possible to minimize the damage for anal function. Due to various problems, IPAA has been performed as a multistage surgery. However, the disadvantage of this procedure is the risk of a stoma related complication at the time of closure. In particular, stoma outlet obstruction occurs in 13~27% of cases[7,13,14]. In addition, Mennigen[15] claimed that the overall morbidity rate of ileostomy closure was 16.5%. The overall morbidity rate of ileostomy reversal reduces the benefit of temporary fecal diversion.

The cumulative five-year pouch functional rate was 99.6%, and the cumulative 10-year pouch functional rate was 99.2%. The pouch failure rate was 0.8% / 10 years. A previous report from Udo[16] indicated that the cumulative pouch failure rate reached 3.5% / 2.2 years, which is higher than our result in this report. The difference may be caused by patients with suspected indeterminate colitis (IDC) or CD. Many surgeons have reported that a significant pouch failure risk factor is a change in the diagnosis from UC to CD or IDC[17-19]. In Japan, there is a consensus that IPAA is contraindicated if CD or another inflammatory bowel disease (IBD, excluding UC) is suspected[20]. We excluded such patients from this study; therefore, the smaller number of patients with unclassified diagnoses might have led to a lower rate of pouch failure.

Recently the incidence of colitis-associated colorectal cancer has been increasing, and it is often associated with cancer and dysplasia in the anal canal mucosa. In these cases, IPAA with mucosal resection is recommended over IACA with anal canal mucosa[21]. Bratsis reported a case of adenocarcinoma in the anal canal after ileal pouch-anal canal anastomosis using a double-stapling technique[22]. We have had similar case experiences[23]. Most cases of colitis-associated colorectal cancer are early stage. These patients often have chronic inflammation of the intestinal tract, and their general condition is relatively good because there are few severe cases of UC. Therefore, it is considered to be a good indication of one-stage IPAA. In this study, 13% of the surgical indications in this study were cancer or dysplasia. In the future, if the number of cancer and dysplasia cases increases, there is a possibility that the one-stage IPAA will increase.

Conclusion

One-stage IPAA with mucosectomy is an excellent procedure for patients who have achieved these three points: (1) elimination of Crohn's disease, (2) elimination of the fulminant type of colitis, including TMC, and (3) easy access of the ileal pouch to the anastomosis site. To the best of our knowledge, this study involves the largest series of patients undergoing restorative proctocolectomy and IPAA with mucosectomy and without ileostomy.

Conflicts of Interest

There are no conflicts of interest.

Author Contributions

Conception and design: H Ikeuchi, R Kuwahara

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Final approval of the article: R Kuwahara, M Uchino, H Ikeuchi, T Bando, H Sasaki, Y Goto, Y Horio, T Minagawa

Approval by Institutional Review Board (IRB)

All study protocols were approved by the Institutional Review Board of the Hyogo College of Medicine (No. 202004-437).

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