

Evolution of the Remaining Rectum after Colectomy in Patients with Ulcerative Colitis in the Era of Biologic Therapy

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Abstract

Background: The treatment of ulcerative colitis (UC) has evolved significantly with the introduction of biotherapies and advanced endoscopic techniques, reducing the need for surgical intervention. However, surgery remains essential in cases of severe acute colitis, refractory disease, or complications such as toxic megacolon, perforation, or colorectal cancer. **Methods:** We conducted a retrospective analysis of 81 patients who underwent ileorectal anastomosis (IRA) for ulcerative colitis between 2010 and 2023, evaluating surgical outcomes and the long-term evolution of the remaining rectum. Data were collected on disease activity in the rectum, the incidence of rectal cancer, and the need for secondary proctectomy. **Results:** The study included 81 patients who underwent surgery for ulcerative colitis. The median follow-up duration was 6 years. The average age of the patients was 39 years, with a slight male predominance. Among the 81 patients, 57 (70.37%) had a prior diagnosis of ulcerative colitis, while in 24 patients (29.63%) the disease was revealed by a complication that immediately required colectomy. Regarding the extent of the disease, pancolitis was the most common form, found in 47 patients (58.02%). Concerning maintenance treatments administered before surgery in diagnosed patients, 22 patients (38.57%) were on azathioprine, 19 (33.33%) were receiving infliximab, and 16 (28.07%) were treated with mesalazine. The average duration of disease before surgery was 5 years. The surgical indications were mainly dominated by severe acute colitis, representing 61 cases (75.3%). Regarding surgical procedures, 68 patients (83.9%) initially underwent subtotal colectomy with ileostomy and sigmoidostomy, followed by restoration of continuity through ileorectal anastomosis. The average time to restoration of

continuity was 16 months. Additionally, 13 patients (16.04%) directly underwent total colectomy with ileorectal anastomosis. Postoperatively, all patients received local enemas. Subsequently, 49 patients (60.49%) were treated with anti-TNF therapy, 27 (33.33%) with azathioprine, and 5 (6.17%) remained on enemas alone. Endoscopic evaluation of the remaining rectum, performed after surgery and initiation of maintenance therapy, revealed a Mayo score of 0 - 1 in 22 patients (27.16%), a Mayo score of 2 in 13 patients (16.04%), and a Mayo score of 3 in 46 patients (56.79%). Overall assessment of the remaining rectum's evolution showed clinical and endoscopic remission in only 22 patients (27.16%). In contrast, 58 patients (71.60%) developed refractory proctitis, and one case of high-grade dysplasia was diagnosed. Finally, 31 patients (38.27%) required secondary proctectomy. **Conclusion:** The long-term outcomes of the remaining rectum are not always favorable. While some patients achieve clinical and endoscopic remission, a significant proportion develop refractory proctitis, necessitating additional interventions such as secondary proctectomy.

Keywords

Ulcerative Colitis, Ileorectal Anastomosis, Surgical Outcomes, Long-Term Fate of the Remaining Rectum

1. Introduction

Over the past two decades, significant advances have been made in the management of moderate to severe forms of ulcerative colitis, particularly with the introduction of innovative targeted therapies [1] [2]. However, approximately 10–15% of patients still require surgical intervention, usually after the failure of multiple lines of medical treatment [3]. These interventions may be urgent, such as subtotal colectomy, or elective, including options such as total colectomy with ileo-anal anastomosis (IAA) or total colectomy with ileorectal anastomosis (IRA).

Total colectomy with ileorectal anastomosis (IRA) remains widely practiced, especially in young patients, due to its ability to preserve fertility and provide favorable functional outcomes [4]. However, this technique presents challenges, particularly regarding the long-term management of the remaining rectum, which exposes patients to an increased risk of dysplasia and malignant transformation.

The primary objective of this study was to evaluate the long-term evolution of the remaining rectum and to determine whether its preservation is justified in terms of functional and reproductive benefits, while also considering the oncological and inflammatory risks.

2. Materials and Methods

2.1. Study Type and Period

We conducted a retrospective and descriptive study over a 13-year period, from

2010 to 2023, including 81 patients with ulcerative colitis who were followed in the Gastroenterology Department and underwent total colectomy with rectal preservation in the Visceral Surgery Departments A and B of Hassan II University Hospital in Fez.

2.2. Patients' Selection Criteria

The included patients met the following criteria:

- Age over 18 years;
- A confirmed diagnosis of ulcerative colitis;
- Underwent total colectomy (either urgently or as a planned procedure);
- Availability of a complete medical record containing clinical, biological, endoscopic, and surgical data.

2.3. Patients' Exclusion Criteria

The exclusion criteria are:

- Lack of postoperative follow-up;
- Insufficient data to assess the evolution of the remaining rectum.

2.4. Data Collection

The data were collected from both electronic and paper medical records in the relevant departments. A standardized data collection form was used to gather general patient information, such as age, sex, and medical/surgical history. Preoperative data included the diagnosis of ulcerative colitis, disease duration, disease topography, extra-intestinal manifestations, and preoperative maintenance treatments.

Regarding surgical data, the indication for surgery, the type of surgery performed (total colectomy with ileo-rectal anastomosis or subtotal colectomy with ileostomy), and the time to restore continuity were documented. Postoperative data included the duration of hospitalization, early complications, treatments, as well as the evolution of the remaining rectum, such as any recurrence, refractory proctitis, dysplasia, colorectal cancer, or the need for proctectomy.

In the absence of a consensus definition for refractory proctitis following colectomy with ileorectal anastomosis, we define it as the lack of clinical remission and mucosal healing despite the treatments available in our country, including 5-ASA, immunosuppressants (azathioprine), and anti-TNF α agents (infliximab).

It should be noted that the classical definition of refractory proctitis in ulcerative colitis is based on the absence of remission and clinical improvement after two months of local 5-ASA therapy, possibly combined with oral 5-ASA treatment. This definition serves as a reference for evaluating refractoriness in the post-surgical context.

2.5. Data Analysis

Data processing was performed using SPSS software version 16.0. A descriptive

analysis was conducted to characterize the different variables studied. The results are presented in the form of frequencies, percentages, means, or medians, depending on the nature of the data analyzed.

3. Results

Participant Characteristics:

The study included 81 patients who underwent surgery for ulcerative colitis (UC). The median follow-up period was 6 years (range: 1 - 13 years). The mean age of the patients was 39 years (± 13 years), with a slight male predominance: 45 men (55.6%) and 36 women (44.4%).

Patient histories revealed various medical conditions as shown in **Table 1**. Regarding personal history, 8 patients (9.8%) had diabetes, 12 (14.8%) had hypertension, and 4 (4.9%) had a history of heart disease. One patient (1.2%) had primary sclerosing cholangitis (PSC). Additionally, 4 patients (4.9%) were former smokers. Concerning family history, 3 patients (3.7%) had a family history of inflammatory bowel disease (IBD).

Table 1. The medical history of patients included in the study.

Personal History	
Diabetes	08 patients (9.8%)
Hypertension	12 patients (14.8%)
Heart disease	04 patients (4.9%)
Primary sclerosing cholangitis	01 patients (1.2%)
History of smoking (former smokers, now abstinent)	04 patients (4.9%)
Family History	
Family history of IBD	03 patients (3.7%)

Phenotype and Clinical History of Ulcerative Colitis (UC) before Surgery

Among the 81 patients included in the study, 57 (70.37%) had a prior diagnosis of UC and were receiving medical treatment, while in 24 patients (29.63%) the disease initially presented as a complication requiring colectomy.

The most frequent form was pancolitis (E3 according to the Montreal classification), observed in 47 patients (58.02%), followed by left-sided colitis (E2), found in 34 patients (41.98%).

Additionally, 3 patients (3.7%) were being followed in the Rheumatology Department for ankylosing spondylitis (AS), one patient (1.2%) had a history of anterior uveitis, and another patient (1.2%) was monitored for primary sclerosing cholangitis (PSC).

Regarding maintenance treatments administered before surgery in patients with a prior UC diagnosis, 22 patients (38.57%) were on azathioprine, 19 (33.33%) were receiving infliximab, and 16 (28.07%) were treated with mesalazine.

The mean disease duration before surgery in patients previously diagnosed with

UC was 5 years, ranging from 3 months to 17 years.

Preoperative Clinical and Paraclinical Data

The reasons for consultation in our series were as follows: 88.88% of patients presented with mucous-bloody diarrhea, 51.85% reported abdominal pain, 16.04% had rectal syndrome, and 7.40% experienced asthenia, weight loss, or general discomfort.

Clinical examination revealed that the majority of patients, 68 (83.95%), were tachycardic on admission, and 23 (28.39%) had fever. Abdominal examination showed diffuse tenderness in 63 patients (77.77%) and abdominal guarding in 8 patients (9.87%).

Biological evaluation (See **Table 2**) revealed hypochromic microcytic anemia in 71 patients (87.65%), with a mean hemoglobin level of 9.6 g/dL, and leukocytosis in 62 patients (76.54%), with a mean white blood cell count of 10,000 cells/mm³. Hypoalbuminemia was found in 43 patients (53.08%) with a mean albumin level of 30 g/L, while elevated C-reactive protein (CRP) levels were observed in 68 patients (83.95%).

Parasitological stool examination, performed in 61 patients (75.30%), revealed cystic forms of *Entamoeba histolytica* in 37 patients (45.67%) and trophozoite forms in 11 patients (13.58%), while results were normal in 13 patients (16.04%). Stool cultures, performed in 61 patients (75.30%), were negative in all cases. Finally, testing for *Clostridioides difficile* toxins A and B, conducted in 59 patients (72.83%), was positive in 3 patients (3.7%).

Table 2. Biological abnormalities in our series.

Biological Assessment	Number of patients	Percentage (%)
Hypochromic microcytic anemia	71	87.65%
Hyperleukocytosis	62	76.54%
Elevated CRP	68	83.95%
Hypoalbuminemia	43	53.08%
Cystic forms of <i>Entamoeba histolytica</i>	37	45.67%
Trophozoite forms of <i>Entamoeba histolytica</i>	11	13.58%
Positive <i>Clostridioides difficile</i> toxins A and B	3	3.7%

All patients followed for ulcerative colitis (UC) had undergone at least one total colonoscopy during their follow-up prior to surgery. Here, we present the results of endoscopies performed immediately before surgery, which partly guided the surgical interventions.

Lower endoscopy was systematically performed in 61 patients (75.3%) admitted for severe acute colitis. This examination revealed rectosigmoiditis without signs of endoscopic severity in 29 patients (35.8%), characterized by erythematous rectosigmoid mucosa with superficial ulcerations. In contrast, rectosigmoiditis with

endoscopic signs of severity was observed in 32 patients (39.5%), including deep ulcerations in 18 patients (22.2%) and exposure of the muscularis propria in 14 patients (17.3%).

Additionally, 20 patients (24.69%) underwent scheduled, non-emergency surgery. Prior to surgery, all underwent total colonoscopy, which revealed pancolitis with a Mayo score of 3 in 14 patients (17.28%) and a Mayo score of 2 in 5 patients (6.17%). One patient (1.23%) showed slightly erythematous colonic mucosa scattered with pseudopolyps, including a large ulcerated polyp approximately 12 mm in size.

In our series, 72 patients (88.88%) underwent abdominopelvic CT scans, which revealed several abnormalities. Symmetrical and regular bowel wall thickening, associated with submucosal edema and hyperemia, was observed extending from the rectum to the left colon in 6 cases (7.40%) and involving the entire colon in 59 cases (72.83%). Colonic dilation greater than 6 cm was identified in 3 cases (3.70%). Additionally, pneumoperitoneum accompanied by a colonic wall defect, suggestive of perforation, was detected in 4 cases (4.93%).

Surgical Treatment

All patients in our study underwent surgery (See **Table 3**). Among them, 68 patients (83.95%) required emergency surgery, while 13 patients (16.04%) underwent scheduled interventions.

The main indications for emergency surgery included severe acute colitis refractory to first- and second-line medical treatments in 61 cases (75.3%), colonic perforation in 4 cases (4.93%), and toxic megacolon in 3 cases (3.7%). Scheduled surgery was performed in 13 patients, primarily for UC resistant to medical treatment in 9 cases (11.11%) and for high-grade colonic dysplasia in 4 cases (4.93%).

Table 3. Indications for surgery.

Surgery Type	Indication	Number of Cases	Percentage (%)
Emergency Surgery (N = 68)	Severe acute colitis refractory to medical treatment	61	75.30%
Emergency Surgery (N = 68)	Colonic perforation	4	4.93%
Emergency Surgery (N = 68)	Toxic megacolon	3	3.70%
Scheduled Surgery (N = 13)	Ulcerative colitis resistant to medical treatment	9	11.11%
Scheduled Surgery (N = 13)	High-grade colonic dysplasia	4	4.93%

Regarding the surgical interventions, 68 patients (83.95%) initially underwent subtotal colectomy with ileostomy and sigmoidostomy, followed at a later stage by restoration of digestive continuity through ileorectal anastomosis. In contrast, 13 patients (16.04%) underwent direct total colectomy with ileorectal anastomosis.

The mean length of postoperative hospitalization was 12 ± 4 days. Postoperative recovery was uncomplicated in 73 cases (90.12%). However, 8 patients (9.87%) experienced complications after surgery. These included abdominal wall infection in 5 patients (6.17%), successfully managed with antibiotics and local care; hemorrhagic shock due to postoperative digestive bleeding in 1 patient (1.23%), managed with blood transfusion, resuscitation measures, and enemas; and pulmonary embolism in 1 patient (1.23%), which required appropriate medical intervention.

The mean time to restoration of digestive continuity in patients who underwent colectomy with a double stoma (ileostomy and sigmoidostomy) was 16 months (range: 5 - 48 months). It is important to note that 12 patients (14.81%) had not yet undergone this procedure. The main reason for this delay was the need to wait for healing of the rectal mucosa before proceeding with restoration of continuity. Among patients who underwent restoration, 35 (43.20%) had a Mayo score of 0 - 1 before the procedure, while 21 patients (25.92%) had a score of 2 at the time of restoration.

Postoperative Medical Treatment

Postoperatively, all patients initially received local treatment with enemas containing 5-ASA or corticosteroids. However, therapeutic escalation was necessary for the majority of patients. Specifically, 49 patients (60.49%) were treated with anti-TNF agents, 27 patients (33.33%) received azathioprine, and 5 patients (6.17%) continued on exclusive local treatment with enemas.

The median time to initiation of postoperative treatment was 27 days (range: 14 - 140 days).

Evolution and Outcome of the Remaining Rectum

After surgery and the initiation of maintenance therapy, clinical evaluation revealed remission in 38 patients (46.9%). Endoscopic evaluation of the remaining rectum, performed at least six months after surgery and the start of maintenance therapy, showed a Mayo score of 0 - 1 in 22 patients (27.16%), a score of 2 in 13 patients (16.04%), and a score of 3 in 46 patients (56.79%). Additionally, one patient developed stenosis of the ileorectal anastomosis and underwent endoscopic dilation.

Outcome of the Remaining Rectum After Ileorectal Anastomosis

Despite postoperative medical management, several complications were observed in our series (See **Table 4**). Refractory proctitis was the most frequent complication, occurring in 58 patients (71.6%), of whom 30 required secondary proctectomy. One patient underwent surgery for high-grade dysplasia.

Table 4. Outcome of the remaining rectum after ileorectal anastomosis.

Evolution	Number of patients	Percentage (%)
Refractory proctitis	58	71.60%
High-grade dysplasia	1	1.2%
Recourse to secondary proctectomy	31	38.27%

Continued

Decision to delay proctectomy to preserve fertility (in young female patients)	3	3.7%
Proctectomy required but could not be performed due to social constraints	1	1.2%

In three young female patients, proctectomy was postponed to preserve fertility until completion of family planning. Additionally, one patient required proctectomy but was unable to undergo the procedure due to specific social constraints.

4. Discussion

The treatment of ulcerative colitis has seen significant improvements with the advent of biotherapies and interventional endoscopy, reducing the need for surgery. However, surgery is still necessary in cases of severe acute colitis, especially when the condition is refractory to medical treatments or complicated by toxic megacolon, colonic perforation, or massive bleeding. Severe acute colitis is the first manifestation of the disease in one-third of cases [5], and about 25% of UC patients experience at least one episode during their disease course, with a 1% mortality rate and 30% requiring colectomy during the initial hospitalization [6] [7].

Refractory UC, defined as corticosteroid-dependent or symptomatic despite optimal treatment, requires elective surgery [8]. The decision to proceed with surgery depends on symptom evaluation, the likelihood of improvement with further treatment, and the risks of surgery, including postoperative complications and long-term sequelae.

UC patients have a significantly higher risk of colorectal cancer (CRC), 2 to 3 times greater than the general population. This risk increases in patients with pancolitis or prolonged disease, with 2%, 8%, and 18% risks of CRC at 10, 20, and 30 years, respectively [9] [10]. Regular screenings, such as high-definition colonoscopy and chromoendoscopy, are recommended after 8 years of disease progression [11].

Total or subtotal colectomy with terminal ileostomy is typically the first-line emergency procedure for severe or complicated cases. Total proctocolectomy with ileal pouch-anal anastomosis (TPC-IPAA) is the standard surgical approach for UC, as it removes the diseased mucosa and restores digestive continuity to minimize functional sequelae [3]. This procedure may be performed in one, two, or three stages, depending on the patient's situation. IPAA is contraindicated in cases of poor sphincter function or suspected Crohn's disease, with preoperative evaluation necessary, especially for patients over 70 [3].

For some patients, total colectomy with ileorectal anastomosis (TC-IRA) may be an option if the rectum is minimally affected, though it requires ongoing medical treatment and endoscopic surveillance for potential neoplasia. A French study found a failure rate of 27% at 10 years and 40% at 20 years for TC-IRA, with most

failures due to refractory proctitis or rectal cancer [12].

For those not candidates for continuity restoration, total proctocolectomy with permanent terminal ileostomy is the alternative. While the morbidity rate is about 30%, complications related to stomas tend to be less severe than those associated with TPC-IPAA [3] [13].

Patients with IRA often need anti-inflammatory treatment, with 60-91% using topical 5-ASA for its anti-inflammatory and potential cancer-preventive effects [14]. However, the use of immunomodulators and biologics remains underexplored.

In our study, the long-term outcomes of patients undergoing IRA, either immediately after total colectomy or following subtotal colectomy, showed that this approach's benefit-to-risk ratio needs careful evaluation.

Long-term risks include complications such as delayed healing, dysplasia, or cancer, leading to potential secondary proctectomy. Regular surveillance is necessary, as the incidence of rectal cancer after IRA ranges from 0 to 8%, depending on the follow-up period [15]. Studies show that IRA and IPAA yield similar functional outcomes, though IRA may present more urgency and dietary restrictions, while IPAA often results in more nighttime leakage and daytime bowel movements [16].

A GETAID study reported a 40% failure rate of IRA at 20 years, with a cumulative risk of rectal cancer of 7.2% over the same period [17]. Preoperative treatment with immunotherapy and anti-TNF was significantly associated with IRA failure, whereas performing an IRA in the context of severe acute colitis appeared to be a protective factor against postoperative complications [17].

In our study, however, the main indications for surgery also involved emergency situations: severe acute colitis refractory to first- and second-line medical treatments in 61 cases (75.3%), colonic perforation in 4 cases (4.93%), and toxic megacolon in 3 cases (3.7%). Contrary to the GETAID findings, the severity of preoperative inflammation in our cohort appears to be a potential risk factor for postoperative complications. Further analytical studies would be necessary to confirm this observation.

Many other studies have also examined the risks associated with the remaining rectum after colectomy with ileorectal anastomosis, as shown in **Table 5**. The main findings of these studies are summarized in the table below:

Table 5. Main findings of studies on the remaining rectum after colectomy with ileorectal anastomosis.

Series	Periods	Number	Mortality	Refractory proctitis	Rectal cancer	Need for proctectomy
Farnell [18]	1961-1973	63	3.2%	33.3%	0%	24%
Binder [19]	1953-1974	29	-	67.3%	-	72.4%
Baker [20]	1952-1976	374	2.7%		5.9%	11%
Backer [21]	1951-1979	59	0%	20.3%	5.1%	22.0%

Continued

Johnson [22]	1950-1981	286	8.7%	38.1%	3.8%	-
Oakley [23]	1960-1982	288	4.2%	41%	3.1%	55%
Hawley [24]	1953-1984	125	0.8%	15.2%	4%	28%
Leijonmarck [25]	1955-1984	51	4%	45.1%	0%	57%
Khubchandani [26]	1959-1986	53	-	18.9%	5.7%	12%
Pastore [27]	1974-1990	48	0%	54%	2%	17%
Our series	2010-2023	81	0%	54.23%	1.2% cases of high-grade dysplasia	27.16%

These studies highlight an overall failure rate of ileorectal anastomosis (IRA), ranging from 20% to 40% in the long term. This failure rate is influenced by various factors, including the type of management before and after the procedure, as well as patient selection. Additionally, the cumulative risk of rectal cancer after IRA is a major concern, ranging from 2% to 7% depending on the duration of follow-up. This incidence underscores the importance of close and regular post-operative surveillance to detect any early malignant transformation in the remaining rectum. Refractory proctitis, frequently observed after IRA, is also a key factor in long-term outcomes. It is a common cause of failure and often leads to secondary interventions such as proctectomy.

A systematic review conducted by Mohammed Al-Rashedy *et al.*, published in the *Arab Journal of Gastroenterology* in 2023, aimed to evaluate the short- and long-term outcomes of ileorectal anastomosis (IRA) in patients with ulcerative colitis (UC). The parameters analyzed included anastomotic leak rates, IRA failure (defined as conversion to an ileal pouch-anal anastomosis [IPAA] or an end stoma), the risk of dysplasia or cancer in the rectal remnant, and postoperative quality of life.

This review showed that IRA after subtotal colectomy for UC is associated with a relatively high failure rate, with 18.4% of patients requiring conversion either to IPAA or to an end stoma [28].

A study conducted by C. Thibault *et al.* on the outcomes of ileorectal anastomosis in Crohn's disease in the era of biologic therapies reported that the rate of abdominoperineal resection at the end of follow-up was similar to that observed in the literature prior to the advent of biologics [29].

To date, no studies have specifically evaluated this rate in patients with ulcerative colitis. Furthermore, there is a lack of studies and recommendations regarding the postoperative management of UC.

All of these data emphasize that IRA may be considered in carefully selected patients if three criteria are met [4]:

- Salvageable rectum (low inflammation, absence of microrectum).
- Ulcerative colitis with less than 10 years of evolution.
- No dysplasia or cancer.

A thorough preoperative assessment is essential and should include complete colonoscopy, rectoscopy, and imaging studies (rectography, abdominopelvic CT scan with sagittal reconstruction).

IRA may also represent a relevant alternative in certain specific situations [3]:

- Uncertainty regarding a diagnosis of Crohn's disease.
- Impaired sphincter function, particularly in patients over 70 years of age.
- Young women wishing to preserve fertility for potential pregnancy.

5. Conclusions

The results of our study, together with data from the literature, indicate that the long-term outcome of the remaining rectum after ileorectal anastomosis is associated with significant complications, particularly refractory proctitis and an increased risk of rectal cancer. These complications often necessitate secondary proctectomy, thereby diminishing the initial benefits of this approach.

Although ileorectal anastomosis may be considered a temporary or selective option in specific cases, careful and regular postoperative monitoring remains essential given the high risk of complications.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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