ORIGINAL CONTRIBUTION

Segmental Colectomy in Ulcerative Colitis

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BACKGROUND: Segmental colectomy in ulcerative colitis is performed in select patients who may be at increased risk for postoperative morbidity.

OBJECTIVE: To identify patients with ulcerative colitis who underwent segmental colectomy and assess their postoperative and long-term outcomes.

DESIGN: Retrospective case series.

SETTING: A tertiary care IBD center.

PATIENTS: Patients with ulcerative colitis who underwent surgery between 1995 and 2022.

INTERVENTION: Segmental colectomy.

MAIN OUTCOME MEASURES: Postoperative complications, early and late colitis, metachronous cancer development, completion proctocolectomy-free survival rates, and stoma at follow-up.

RESULTS: Fifty-five patients were included (20 [36.4%] women; age 67.8 (57.4–77.1) years at surgery; BMI 27.7 (24.2–31.1) kg/m^2; median follow-up 37.3 months). Thirty-two patients (58.2%) had ASA score of 3, 48 (87.3%) had at least 1 comorbidity, and 48 (87.3%) had Mayo endoscopic subscores of 0 to 1. Patients underwent right hemicolectomy (n = 28; 50.9%), sigmoidectomy (n = 17; 30.9%), left hemicolectomy (6; 10.9%), low anterior resection (n = 2; 3.6%), or a nonanatomic resection (n = 2; 3.6%) for endoscopically unresectable polyps (n = 21; 38.2%), colorectal cancer (n = 15; 27.3%), symptomatic diverticular disease (n = 13; 23.6%), and stricture (n = 6; 10.9%). Postoperative complications occurred in 16 patients (29.1%; n = 7 [12.7%] Clavien-Dindo class III–V). Early and late postoperative colitis rates were 9.1% and 14.5%, respectively. Metachronous cancer developed in 1 patient. Four patients (7.3%) underwent subsequent completion proctocolectomy with ileostomy. Six patients (10.9%) had a stoma at follow-up. Two- and 5-year completion proctocolectomy-free survival rates were 91% and 88%, respectively.

LIMITATIONS: Retrospective study and small sample size.

CONCLUSIONS: Segmental colectomy in ulcerative colitis is associated with low postoperative complication rates, symptomatic early colitis and late colitis rates, metachronous cancer development, and the need for subsequent completion proctocolectomy. Therefore, it can be safe to consider select patients, such as the elderly with quiescent colitis and other indications, for colectomy. See **Video Abstract**.

COLECTOMÍA SEGMENTARIA EN LA COLITIS ULCEROSA

ANTECEDENTES: La colectomía segmentaria en la colitis ulcerosa se realiza en pacientes seleccionados que pueden tener un mayor riesgo de morbilidad posoperatoria.

OBJETIVO: Identificar pacientes con colitis ulcerosa sometidos a colectomía segmentaria y evaluar sus resultados postoperatorios y a largo plazo.

DISEÑO: Serie de casos retrospectivos.

AMBIENTE: Un centro de atención terciaria para enfermedades inflamatorias intestinales.

PACIENTES: Pacientes con colitis ulcerosa intervenidos quirúrgicamente entre 1995 y 2022.

INTERVENCIÓN(S): Colectomía segmentaria.

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PRINCIPALES MEDIDAS DE RESULTADO: Complicaciones postoperatorias, colitis temprana y tardía, desarrollo de cáncer metacrónico, tasas de supervivencia sin proctocolectomía completa y estoma en el seguimiento.

RESULTADOS: Se incluyeron cincuenta y cinco pacientes [20 (36,4%) mujeres; 67,8 (57,4-77,1) años de edad al momento de la cirugía; índice de masa corporal 27,7 (24,2-31,1) kg/m2; mediana de seguimiento 37,3 meses]. La puntuación ASA fue III en 32 (58,2%) pacientes, 48 (87,3%) tenían al menos una comorbilidad y 48 (87,3%) tenían una subpuntuación endoscópica de Mayo de 0-1. Los pacientes fueron sometidos a hemicolectomía derecha (28, 50,9%), sigmoidectomía (17, 30,9%), hemicolectomía izquierda (6, 10,9%), resección anterior baja (2, 3,6%) o resección no anatómica (2, 3,6%) para; pólipos irresecables endoscópicamente (21, 38,2%), cáncer colorrectal (15, 27,3%), enfermedad diverticular sintomática (13, 23,6%) y estenosis (6, 10,9%). Se produjeron complicaciones postoperatorias en 16 (29,1%) pacientes [7 (12,7%) Clavien-Dindo Clase III-V]. Las tasas de colitis posoperatoria temprana y tardía fueron del 9,1% y el 14,5%, respectivamente. Un paciente desarrolló cáncer metacrónico. A 4 (7,3%) pacientes se les realizó posteriormente proctocolectomía completa con ileostomía. Seis (10,9%) pacientes tenían estoma en el seguimiento. Las tasas de supervivencia sin proctocolectomía completa a dos y cinco años fueron del 91% y 88%, respectivamente.

LIMITACIONES: Estudio retrospectivo, tamaño de muestra pequeño.

CONCLUSIONES: La colectomía segmentaria en la colitis ulcerosa se asocia con bajas tasas de complicaciones postoperatorias, tasas de colitis sintomática temprana y tasas de colitis tardía, desarrollo de cáncer metacrónico y la necesidad de una posterior proctocolectomía completa. Por lo tanto, puede ser seguro considerar pacientes seleccionados, como los ancianos con colitis inactiva y otras indicaciones de colectomía. *(Traducción—Dr. Yolanda Colorado)*

KEY WORDS: Postoperative flare; Segmental colectomy; Ulcerative colitis.

Ulcerative colitis (UC) is a chronic inflammatory disease characterized by continuous mucosal inflammation starting from the rectum and extending proximally into the colon.[1] Medical therapy to control symptoms and inflammation is the firstline treatment of UC. Despite advances in medical treatment,[2] 15% to 20% of patients undergo surgical resection because of medically refractory disease, disease-related complications (eg, fulminant colitis, severe bleeding, toxic megacolon), treatment-related side effects, or neoplasia.[3,4]

Restorative total proctocolectomy (TPC) with IPAA is the standard surgical treatment for UC, offering complete removal of the diseased mucosa, effective prevention and treatment of colorectal cancer (CRC), and a preserved anal route for defecation.[1] However, this procedure is associated with several complications, including pouchitis, anastomotic leaks, pelvic sepsis, stricture, and fistula.[5] Other surgical options include TPC with end ileostomy or continent ileostomy, or total abdominal colectomy (TAC) with ileorectal anastomosis.[6]

Segmental colectomy (SC) is typically not offered as surgical treatment in UC given the risk for the development of postoperative colitis or dysplasia/cancer in the remaining colorectum. However, in select patients, such as those with quiescent colitis, those with indications for colectomy independent of UC, and older patients with comorbidities who are often at increased risk for postoperative morbidity and poor function after TPC with or without IPAA, surgeons may consider SC.

Because of this uncommon practice, the literature on the outcomes of SC in patients with UC is limited. Khan et al[7] compared 24 SCs with 35 TPCs for treatment of UC-related CRC. They reported no difference in short- and long-term outcomes other than the need for medical treatment during follow-up, which was higher in the SC group. The largest study so far was published by Frontali et al,[8] who conducted a multicenter study that included 72 patients and was focused on postoperative complications, colitis, and reoperation rates.

Therefore, we aimed to 1) identify patients with UC who underwent SC and 2) report their postoperative and long-term outcomes. We hypothesized that SC can be a safe approach to consider in select patients who may be at increased risk for postoperative morbidity and poor function after TPC with or without IPAA.

MATERIALS AND METHODS

Study Design and Patients

This is a retrospective study from a single tertiary care IBD center. Patients with UC who underwent SC from January 1995 to April 2022 were included. Patients with UC who underwent subtotal colectomy, TAC, or TPC as the first operation were excluded, as were patients with Crohn's disease or indeterminate colitis.

Data Collection

Collected data included patient demographics and preoperative characteristics (eg, age at surgery and IBD diagnosis, sex, BMI, ASA score, comorbidities, past surgical history, smoking status, family history, medication use, disease severity and extent, surgical indications) and intraoperative characteristics (eg, SC type, emergency of surgery, surgical approach, stoma construction,

duration of operation, estimated blood loss, intraoperative complications).

Definitions

Disease severity was classified according to the Mayo endoscopic subscore and disease extent was classified according to the Montreal classification.[9,10] Based on a previous study, early and late postoperative colitis were defined as UC flare requiring medical or surgical therapy within and after 3 months of SC, respectively.[8]

Outcome Measures

The primary outcomes were postoperative complications according to Clavien-Dindo classification,[11] early and late colitis rates, metachronous cancer development, number of patients with stoma at follow-up, and completion proctocolectomy-free survival. The secondary outcomes were postoperative intensive care unit admission, time to return of bowel function and start of diet, length of stay, and postoperative 30-day readmission, reoperation, and mortality rates.

Statistical Analysis

Data are presented as median (interquartile range) and frequency (percent). The Kaplan-Meier method is used to assess the completion of proctocolectomy-free survival. All statistical analyses were performed using JMP Pro 16 (SAS Institute, Cary, NC).

This study was approved by our Institutional Review Board and reported according to the Strengthening the Reporting of Observational Studies in Epidemiology guidelines.[12]

RESULTS

Over a 27-year period, 55 patients met inclusion criteria; during the same period, 4058 IPAAs were performed. The median age at the time of UC diagnosis was 42 (32–60) years and at SC was 67.8 (57.4–77.1) years. Twenty patients (36.4%) were women, with a median BMI of 27.7 (24.2–31.1) kg/m^2. Thirty-two patients (58.2%) had an ASA score of 3 and 48 (87.3%) had at least 1 comorbidity (Table 1).

Preoperatively, 48 patients (87.3%) were under medical treatment for UC (Table 1). This included 5-aminosalicylates in 40 patients (72.7%), systemic corticosteroids in 9 (16.4%), immunomodulators in 7 (12.7%), and biologics in 4 (7.3%). Forty-eight patients (87.3%) had Mayo endoscopic subscores of 0 to 1. Montreal classification for the disease extent was as follows: E1 in 12 (21.8%), E2 in 5 (9.1%), and E3 in 15 (27.3%) patients. Mayo endoscopic subscores were missing in 4 patients (7.3%) and the Montreal classification was missing in 23 patients (41.8%).

TABLE 1. Demographics and disease characteristics

Characteristic	*N = 55*
Age at the time of UC diagnosis, y, median (IQR)	42 (32–60)
Age at the time of surgery, y, median (IQR)	67.8 (57.4–77.1)
Female sex, n (%)	20 (36.4)
BMI, kg/m^2, n (%)	27.7 (24.2–31.1)
ASA score 2 or 3, n (%)	20 (36.4)/32 (58.2)
Comorbidities, n (%)	
Patients with at least 1 comorbidity	48 (87.3)
Hypertension	32 (58.2)
Hyperlipidemia	18 (32.7)
Diabetes	7 (12.7)
Asthma/COPD	8 (14.5)
Coronary artery disease	6 (10.9)
Renal disease	5 (9.1)
Obesity	5 (9.1)
Cancer (other than colorectal)	8 (14.5)
Liver disease	1 (1.8)
Other	20 (36.4)
Prior abdominal surgery, n (%)	28 (50.9)
History of smoking, n (%)	28 (50.9)
Family history of IBD, n (%)	8 (14.5)
Family history of CRC, n (%)	9 (16.4)
Medications, n (%)	
5-aminosalicylates	40 (72.7)
Systemic corticosteroids	9 (16.4)
Immunomodulators	7 (12.7)
Biologics	4 (7.3)
Mayo endoscopic subscore,[a] n (%)	
0: Normal/inactive disease	19 (34.5)
1: Mild disease activity	29 (52.7)
2: Moderate disease activity	3 (5.4)
3: Severe disease activity	0 (0)
Montreal classification: extension of disease,[a] n (%)	
E1: Ulcerative proctitis	12 (21.8)
E2: Left-sided (distal) UC	5 (9.1)
E3: Extensive UC (pancolitis)	15 (27.3)

COPD = chronic obstructive pulmonary disease; CRC = colorectal cancer; IQR = interquartile range; UC = ulcerative colitis.
[a]Data have missing values.

Patients underwent right hemicolectomy (n = 28; 50.9%), sigmoidectomy (n = 17; 30.9%), left hemicolectomy (n = 6; 10.9%), low anterior resection (n = 2; 3.6%), and nonanatomic resection (n = 2; 3.6%) for endoscopically unresectable polyps (±dysplasia; n = 21; 38.2%), cancer (n = 15; 27.3%), diverticulitis/diverticular disease (n = 13; 23.6%), and stricture (n = 6; 10.9%). Surgery was performed electively in 48 patients (87.3%). Perioperative characteristics are reported in Table 2.

Postoperatively, 16 patients (29.1%) experienced complications, of whom 7 (12.7%) had complications of Clavien-Dindo class III to V. The most common complication was ileus (6; 10.9%). The median time to start diet was 2 (1–4) days and return of bowel function was 3 (2–4) days. Of 48 patients with anastomosis, 1 (2.1%) had anastomotic leak. Sepsis occurred in 1 patient (1.8%). The median length of hospital stay was 3 (5–7) days. Postoperative data are listed in Table 3.

TABLE 2. Perioperative characteristics

Characteristic	*N = 55*
Indications for segmental colectomy, n (%)	
Endoscopically unresectable polyp (±dysplasia)	21 (38.2)
Cancer	15 (27.3)
Diverticulitis/diverticular disease	13 (23.6)
Stricture	6 (10.9)
Surgery setting, n (%)	
Elective	48 (87.3)
Emergent	7 (12.7)
Type of segmental colectomy, n (%)	
Right hemicolectomy	28 (50.9)
Sigmoidectomy	17 (30.9)
Left hemicolectomy	6 (10.9)
Low anterior resection	2 (3.6)
Other (nonanatomic/segmental) resection	2 (3.6)
Surgical approach, n (%)	
Laparoscopic	40 (72.7)
Open laparotomy	14 (25.4)
Robotic	1 (1.8)
Reconstruction after resection, n (%)	
Primary anastomosis without a stoma	40 (72.7)
Primary anastomosis with proximal diversion	8 (14.5)
End colostomy without anastomosis	6 (10.9)
End ileostomy without anastomosis	1 (1.8)
Duration of operation, min, median (IQR)	167 (126–213)
Estimated blood loss, mL, median (IQR)	62.5 (25–150)
Intraoperative complications,[a] n (%)	1 (1.8)

IQR = interquartile range.
[a]Intraoperative bleeding.

Five patients (9.1%) experienced early postoperative colitis; all were treated medically and remained under medical treatment at follow-up. Among 46 patients who had >3 months of follow-up, 8 (14.5%) experienced late postoperative colitis, 6 (75%) were treated medically, and 2 (25%) underwent completion proctocolectomy because of medically refractory proctocolitis. Two more patients (3.6%) underwent completion proctocolectomy because of metachronous cancer development (n = 1; 1.8%) and other (n = 1; 1.8%). Thus, a total of 4 patients (7.3%) underwent completion proctocolectomy after a median delay of 21.4 (13.5–25) months of SC (Table 3).

During SC, resection with primary anastomosis was performed in 40 patients (72.7%). A stoma was constructed in 15 (27.2%) patients: 8 (14.5%) diverting loop ileostomy, 6 (10.9%) end colostomy, and 1 (1.8%) end ileostomy. Of those, 11 patients (73.3%) had stoma closure within a median of 3.3 (3.0–4.2) months. Of 40 patients (72.7%) without a stoma, 4 (10%) underwent completion proctocolectomy with ileostomy: 2 (50%) had stoma closure within 1.9 and 6.4 months. Thirty-six patients (65.4%) never had a stoma. At follow-up, 6 patients (10.9%) had a stoma (Fig. 1).

The median follow-up was 37.3 (6.1–69.5) months. Completion proctocolectomy-free survival rates at 2 years was 91% and at 5 years was 88% (Fig. 2).

TABLE 3. Postoperative outcomes

Outcome	*N = 55*
Postop ICU admission, n (%)	3 (5.5)
Return of bowel function, d, median (IQR)	3 (2–4)
Start of diet, d, median (IQR)	2 (1–4)
Length of hospital stay, d, median (IQR)	3 (5–7)
Postop 30-d complications, n (%)	16 (29.1)
Superficial SSI	2 (3.6)
Organ/space SSI	2 (3.6)
Anastomotic leak	1 (1.8)
Sepsis	1 (1.8)
Bleeding requiring transfusion	3 (5.4)
Ileus	6 (10.9)
Small-bowel obstruction	3 (5.4)
Urinary tract infection	0 (0)
Urinary retention	0 (0)
Deep venous thrombosis	0 (0)
Other	2 (3.6)
Clavien-Dindo classification of postoperative complications, n (%)	
Grade I	1 (1.8)
Grade II	8 (14.5)
Grade IIIa	2 (3.6)
Grade IIIb	3 (5.4)
Grade Iva	0 (0)
Grade IVb	1 (1.8)
Grade V	1 (1.8)
Postoperative 30-d readmission, n (%)	3 (5.4)
Postoperative 30-d reoperation, n (%)	3 (5.4)
Postoperative 30-d mortality, n (%)	1 (1.8)
Early postoperative colitis, n (%)	5 (9.1)
Late postoperative colitis,[a] n (%)	8 (14.5)
Subsequent completion proctocolectomy,[b] n (%)	4 (7.3)
Reasons for subsequent completion proctocolectomy, n (%)	
Cancer recurrence	1 (1.6)
Medically refractory flares	2 (3.3)
Other[c]	1 (1.6)

ICU = intensive care unit; IQR = interquartile range; SSI = surgical site infection.
[a]Among 48 patients who had a >3-mo follow-up.
[b]After a median delay of 21.4 (13.5–25) mo after segmental colectomy.
[c]This patient requested to undergo total colectomy after 6 mo of segmental colectomy because of being diagnosed with cancer on the pathology of the initial surgery.

Results of the Neoplasia Subgroup

Of 36 patients (59%), 27 underwent right hemicolectomy (75%), 3 left hemicolectomy (8.3%), 2 sigmoidectomy (5.6%), 2 low anterior resection (5.6%), and 2 nonanatomic resection (5.6%) because of endoscopically unresectable polyps (±dysplasia; 21; 58.3%) and cancer (15; 41.7%). The median ages at the time of UC diagnosis was 40 (29–60) years and at surgery was 70.5 (58.6–79.1) years.

Before surgery, 33 patients (91.7%) were receiving medical treatment, including 5-aminosalicylates in 28 (77.8%), systemic corticosteroids in 5 (13.9%), immunomodulators in 5 (13.9%), and biologics in 3 (8.3%). Thirty-two patients (88.9%) had a Mayo endoscopic subscore of 0 to 1. Montreal classification for disease extent was as follows: E1 in 3 (8.3%), E2 in 4 (11.1%), and E3 in 14 patients

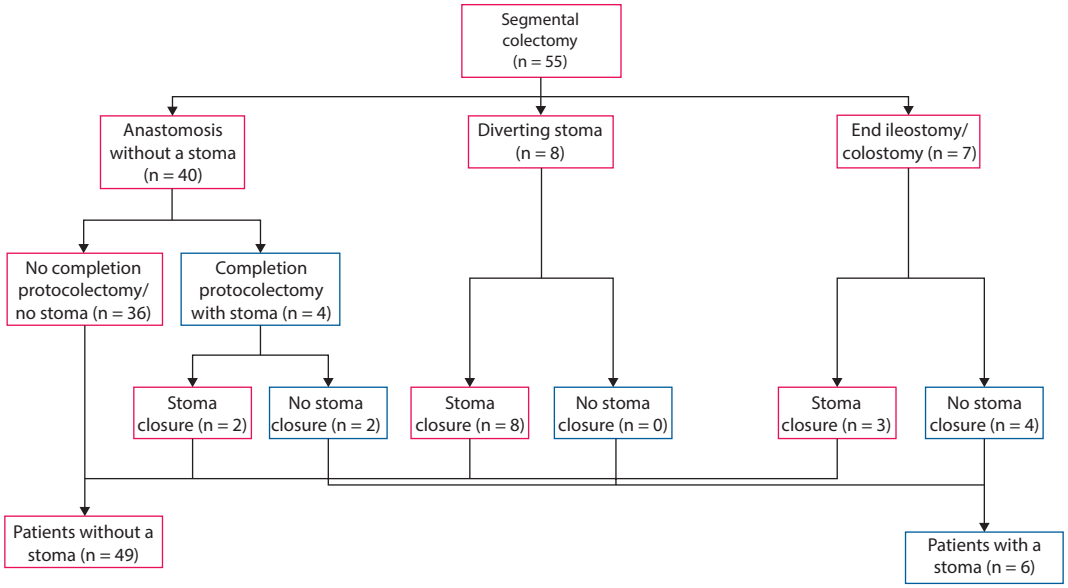

FIGURE 1. Flow chart showing the number of patients with stoma construction and reversal.

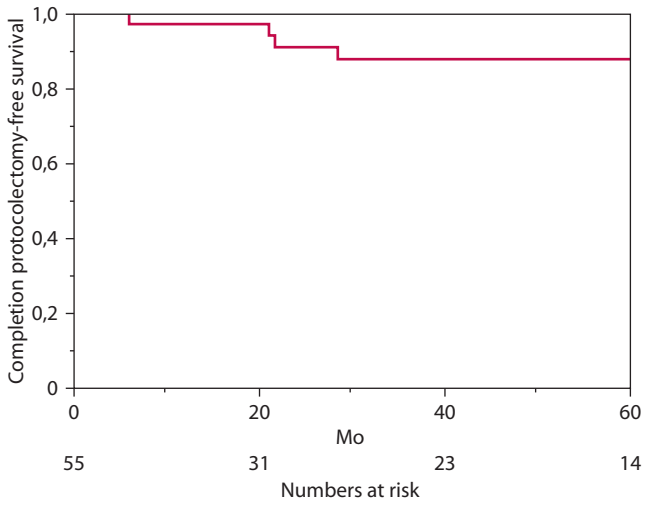

FIGURE 2. Kaplan-Meier graph for completion proctocolectomy-free survival.

(38.9%). Mayo endoscopic subscore and Montreal classification were missing in 2 patients (5.6%). Demographics are detailed in Supplemental Table 1 at http://links.lww.com/DCR/C338 and perioperative characteristics of this subgroup are detailed in Supplemental Table 2 at http://links.lww.com/DCR/C339.

Pathology revealed the following: adenocarcinoma (n = 17; 45.9%), adenoma (±dysplasia; n = 14; 37.8%), mucinous carcinoma (n = 3; 8.1%), signet-ring cell carcinoma (n = 1; 2.7%), GI stromal tumor (n = 1; 2.7%), and no malignancy (n = 1; 2.7%). One patient had 2 primary cancers: 1 mucinous neoplasm of the appendix and 1 adenocarcinoma of the ascending colon (see Supplemental Table 3 at http://links.lww.com/DCR/C340).

Postoperatively, 6 patients (16.7%) had complications of Clavien-Dindo class III to V. Three patients (8.3%) experienced early colitis. Among 29 patients who had >3 months of follow-up, 10 (34.5%) experienced late colitis; 8 (80%) were treated medically. All 4 patients (11.1%) underwent subsequent completion proctocolectomy in this subgroup (see Supplemental Table 4 at http://links.lww.com/DCR/C341).

Within a median follow-up of 35.6 (6.8–47.8) months, 1 (2.8%) patient had metachronous cancer development and thus underwent completion proctocolectomy.

Resection with primary anastomosis was performed in 28 (77.8%) patients. Stoma construction was performed in 8 patients (22.2%): 4 (11.1%) diverting loop ileostomy, 3 (8.3%) end colostomy, and 1 (2.8%) end ileostomy. Of those patients, 4 (50%) had stoma closure within a median of 2.7 (2.3–3.6) months. Of 28 patients (77.8%) without a stoma, 4 (14.3%) underwent completion proctocolectomy: 2 (50%) had stoma closure within 1.9 and 6.4 months. In this subgroup, 6 patients (16.7%) had a stoma at the follow-up (see Supplemental Fig. 1 at http://links.lww.com/DCR/C342).

The completion proctocolectomy-free survival rate for this subgroup was 85.7% at 2 years and 80.4% at 5 years (see Supplemental Fig. 2 at http://links.lww.com/DCR/C343).

DISCUSSION

In this study, we evaluated the postoperative and long-term outcomes of patients with UC who underwent SC because of various indications. Results of our study showed that in select patients with UC, such as elderly

patients with comorbidities and quiescent disease, SC is associated with an acceptably low postoperative complication, early colitis, metachronous cancer development, and subsequent completion proctocolectomy rates. Therefore, it can be considered as a safe approach in select patients for whom the standard, more radical surgical approach has a high risk of postoperative morbidity. Eight patients (14.5%) developed late postoperative colitis, 6 of whom (75%) were successfully treated with medical therapy. The completion proctocolectomy-free survival rate at 2 years was 91% and at 5 years was 88%. Moreover, 36 patients (65.4%) never had a stoma, whereas the number of patients with a stoma at the follow-up was 6 (10.9%).

According to the American Society of Colon and Rectal Surgeons and the European Crohn's and Colitis Organization guidelines, restorative proctocolectomy with IPAA is the standard surgical treatment of UC.[13,14] However, this procedure can be associated with a 66% morbidity rate.[5] Morbidities include pelvic sepsis, acute and chronic leaks, pouchitis, anastomotic stricture, and pouch-related perineal fistulas.[5,15–17] Despite the high risk of complications, the majority (more than 90%) of patients report a good-to-excellent quality of life and that they would undergo the procedure again or recommend it to a friend or family.[5] However, this group typically consists of young and otherwise healthy patients who are fit for major surgery.[4]

In UC, surgery can be required for older patients because of various indications. Furthermore, these patients may have several comorbidities and quiescent chronic UC with no or minimal disease activity. Even in this group, the recommendation is to perform restorative proctocolectomy with IPAA or TPC with end ileostomy, as long-term outcomes in older patients are acceptable.[18,19] However, there remains a concern for higher postoperative morbidity and mortality, suboptimal function, and reduced quality of life after TPC/IPAA surgery with increasing age, which has led some surgeons to perform SC.[20,21]

Between 1995 and 2022, 55 patients with UC underwent SC at our institution and were included in this study. During the same period, 4058 patients underwent TPC with IPAA. The median age at the time of surgery was 67.8 years, with 87.3% of our patients having at least 1 comorbidity. Most patients (87.3%) had a Mayo endoscopic subscore of 0 to 1 at the time of surgery. Previously, a multicenter study by Frontali et al[8] included 72 patients. In this study, the mean age at the time of UC diagnosis was 46 (±18) years and at SC was 57 (±17) years. Fifty percent of patients had no or mild disease activity, and 31% of patients were not receiving medical treatment before surgery. Another study published by Khan et al[7] showed significant differences in patient demographics between SC and TPC groups: patients undergoing SC were significantly older at the time of UC diagnosis and diagnosis with CRC. They had more comorbidities, milder disease activity, and reduced extent of disease. Thus, SC in UC is rarely performed, and patients with UC undergoing SC constitute a very specific group.

The most common indication for surgery in UC is chronic, medically refractory disease.[22] Other indications include acute fulminant colitis, colorectal neoplasia, and failure to thrive in pediatric patients.[1,22] In addition, patients with UC may require surgical treatment for diverticulitis. In our study, 23.6% of our patients underwent SC because of concomitant diverticulitis. Similarly, in a study by Frontali et al,[8] 23.6% of patients with UC underwent surgery for diverticulitis. Because segmental colitis associated with diverticulosis (SCAD) might be mistaken for UC, it is important to verify the diagnosis.[23] Although both conditions exhibit similar clinical manifestations, SCAD is typically confined to the sigmoid colon, and the histology shows nonspecific mucosal inflammation.[23] UC affects younger individuals, involves the rectum, and has a higher risk of complications. To differentiate between the 2, we need a combination of demographic, clinical, endoscopic, histologic, and radiologic features, as well as an accurate location assessment.[24] In our cohort, among 13 patients who underwent SC because of diverticular disease, 8 had proctitis and 1 had left colitis. Three patients had positive family history for IBD. Histology showed "chronic active colitis with background diverticular disease" in the majority of patients. All patients were diagnosed with IBD before they underwent surgery. In fact, 9 of them were under medical treatment by the time of surgery. These features make us believe that these patients had diverticular disease in the setting of UC. However, because of the retrospective nature of the study and the difficulty of diagnosing between these 2 entities, it is not possible to be 100% sure about the underlying diagnosis.

One of the hesitations to perform SC in patients with UC is the risk of colitis development in the remnant colorectum. Frontali et al[8] reported a 7% early and 42% late postoperative colitis rate after SC. Our early postoperative colitis rate was 9.1%, which was confirmatory of the very low risk. They further evaluated the risk factors for early postoperative colitis and reported that increased disease activity is associated with higher risk. Temporary stoma was another risk factor, likely because of the fact that surgeons tend to create more temporary stomas in patients with severe diseases. The late postoperative colitis rate in our study was lower (n = 8; 14.5%), with the majority (n = 6; 75%) being treated medically. This difference can be explained by variations in the medical management of UC as well as patient-related factors. For example, in our cohort, 1 patient experienced late colitis because of a lack of adherence to prescribed medical therapy. Nonetheless, only 4 patients (7.3%) underwent completion proctocolectomy during follow-up. Previously, the need for completion

colectomy/proctocolectomy has been reported to be more than 20%.[8,25–27] This difference may be explained by differences in indications to perform SC.[25–27] In addition, 87.3% of our cohort had no or minimal disease activity before surgery, which can explain the low postoperative colitis and completion proctocolectomy rates.

Another concern about SC in UC is the risk of metachronous CRC development in the remnant colorectum.[7] In 2005, Lindberg et al[25] reported outcomes of 4 patients with UC who underwent surgery for CRC: 1 died because of metachronous CRC. Khan et al[7] compared 24 SCs with 35 TPCs in UC. At a median follow-up of 7 years, no metachronous CRC development was observed in any group, and there was no statistically significant difference in distant recurrence rates (4% in SC vs 5.9% in TPC, $p = 0.75$). In our study, 21 patients had cancer in the pathology: 1 developed metachronous CRC. Although the results of our study were in line with those of Khan et al,[7] supporting the low risk for cancer recurrence after SC, our cancer recurrence rate was lower than those reported in other studies,[8,25] which varying sample sizes may explain. In addition, our median age at the time of surgery was 67.8 (57.4–77.1) years, which might have contributed to a lower cancer recurrence rate as it was older than other studies.[8,25]

After TPC with IPAA in UC, stoma-related complications range from 43% to 49%, with high stoma output and peristomal skin irritation being the most common.[27–30] In our cohort, 36 patients (65.4%) never had a stoma; hence, they avoided potential stoma-related complications. Fifteen patients (27.3%) had stoma during SC, which was similar to previous studies.[8,25] Six patients (10.9%) had stoma at the follow-up, which was not reported before.[8,25,26,31] This finding can be explained by the relatively older age of our cohort, as it was shown previously that stoma reversal rate decreases with increased age.[32]

We acknowledge the limitations of our study. This is a single-center retrospective study, potentially limiting its generalizability. Because of the rarity of this approach, we had a small sample size of 55 patients. Not all patients in this cohort had typical indications for surgery (eg, diverticulitis), or some typical indications for TAC/TPC were not included in this study (eg, medically refractory UC). As we emphasized earlier, this cohort included a very specific patient population. Including patients undergoing surgery for diverticulitis/diverticular disease might have introduced bias into our study because of the difficulty of making a differential diagnosis between UC and SCAD. In addition, 7 patients (12.7%) did not require medical treatment at the time of surgery, which may lead to questioning of diagnosis in these patients.

Nevertheless, in this study, we focused on a very specific group of patients for whom a nonstandard surgical approach was followed. Although we had a small sample size, this is one of the largest studies published so far. We included all patients with UC who underwent SC and reported short- and long-term outcomes such as postoperative complication rate, early and late colitis rates, metachronous cancer development, and completion proctocolectomy-free survival rates, which provided us with a more comprehensive information. Furthermore, we reported the number of patients with stoma at the follow-up, which was not reported before.

CONCLUSION

In select patients with UC, such as older patients with comorbidities and quiescent disease, SC can be considered as the surgical approach, given that it is associated with low rates of postoperative complications, early or late colitis, metachronous cancer development, and the need for subsequent completion proctectomy.

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