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Management of the Rectal Stump after Subtotal Colectomy Operations for Inflammatory Bowel Disease in the Era of Immunologic Therapy: A Two-Centre Cohort Study

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Keywords
Subtotal colectomy · Rectal stump · Inflammatory bowel disease · Completion proctectomy · Immunobiologic therapy

Abstract

Introduction: Inflammatory bowel disease (IBD) often requires surgical resection, such as subtotal colectomy operations to alleviate symptoms. However, IBD also has an inherently increased risk of colorectal dysplasia and cancer. Despite the well-accepted surveillance guidelines for IBD patients with an intact colon, contemporaneous decision-making models on rectal stump surveillance is sparse. This study looks at the fate of rectal stumps in IBD patients following subtotal colectomy. ***Methods:*** This is a two-centre retrospective observational cohort study. Patients were identified from NHS Grampian and NHS Highland surgical IBD databases. Patients that had subtotal colectomy between January 01, 2010 and December 31, 2017 were included with the follow-up end date on April 1, 2021. Socio-demographics, diagnosis, medical and surgical management data were collected from electronic records. ***Results:*** Of 250 patients who had subtotal colectomy procedures, only one developed a cancer in their rectal stump (0.4%) over a median follow-up of 80 months. A higher than expected 72% of patients had ongoing symptoms from their rectal stumps. Surveillance was varied and inconsistent. However, no surveillance, flexible sigmoidoscopy, or MRI identified dysplastic or neoplastic disease. ***Conclusion:*** Based on our results, we estimate that the prevalence of rectal cancer is lower than previously reported. Surveillance strategy of rectal stump varied as no current guidelines exist and hence is an important area for future study. Given the relatively low frequency of rectal cancer in these patients, and the low level of evidence available in this field, we would propose a registry-based approach to answering this important clinical question.

Introduction

Inflammatory bowel diseases (IBD) are a series of chronic, dysregulated immune conditions that have been increasing in prevalence over the past 2 decades [1].

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These conditions, including Crohn's disease (CD), ulcerative colitis (UC), and indeterminate colitis have varied clinical courses. Their treatments involve complex management strategies including the recent addition of immunobiologics, as well as surgery, and thus require multi-disciplinary specialist input. In addition to the significant morbidity associated with the symptoms from these diseases, IBD patients face an increased risk of colonic dysplasia and cancer [2, 3]. The risk of colorectal cancer in these patients appears to be primarily driven by chronic intestinal inflammation [4].

Despite the recent advancement in medical management, surgery is still required in a substantial cohort of IBD patients, with a lifetime risk of surgery for CD between 50 and 80% and for UC approximately 30% [5]. One of the most common operations for IBD colitis is a subtotal colectomy (STC) procedure, which is defined as removal of the colon from the appendix to sigmoid. This alleviates the symptoms associated with the disease. Furthermore, these operations reduce the risk of colorectal cancer in these patients substantially [6]. However, the rectum is left within the pelvis in STC procedures and therefore there is still risk of inflammation in the stump. This process can lead to the development of dysplasia and cancer, which are often associated with poor prognosis [6].

The fate of the rectal stump is decided mutually by the patient and the responsible surgeon. The management options include completion proctectomy, ileo-anal pouch formation (where appropriate), and rectal stump surveillance. The surveillance option has advantage of avoiding another surgery; however, patients are subject to regular endoscopies which also carry some risks, along with being inconvenient [7]. However, until recently, data on incidence and prevalence of cancer in rectal stump following colectomy were unclear. A meta-analysis on published studies carried out by Derikx et al. [8] in 2015 shows the prevalence and incidence of colorectal cancer after colectomy to be less than 3%. However, with chronic inflammation being the main driving force, it is not known whether the recent introduction of biologics that modify the immune system and inflammatory processes has any impact on the cancer rates. Furthermore, despite the existence of well-accepted colonoscopic surveillance guidelines for patients with IBD with an intact colon, there is little contemporaneous data or decision-making models on surveillance recommendations for rectal stumps following colectomy.

It is not clear how often the surveillance should be done or whether the surveillance has any effect on survival. In this study, we aim to look at the fate of the rectal stump following colectomy in the modern-day management of IBD in two centres in Scotland, the UK.

Methods

Study Design

This is a two-centre retrospective observational cohort study.

Inclusion Criteria

Patients were identified using previously created database of IBD patients who undergone STC procedures for acute severe colitis within NHS Grampian and NHS Highland [9] in the region of the North of Scotland. All patients were managed in Aberdeen Royal Infirmary, Aberdeen and Raigmore Hospital, Inverness, caring for 580,000 and 350,000 patients, respectively. Patients who had STC between January 01, 2010 and December 31, 2017 were included in this study with the follow-up end date on April 1, 2021 or the date of completion proctectomy. This allowed for a minimum of 3 years of follow-up for each patient.

Exclusion Criteria

STC for conditions other than IBD (such as polyps, tumours, genetic conditions, or infections) was excluded. Additionally, patients who were diagnosed with a malignancy on a background of IBD were excluded. Any IBD case in which a colonic resection did not occur (including small bowel resections) and where the rectum was removed (panproctocolectomy procedures) were not included. The study was limited to adult patients (>16 years old).

Outcome Measures

The primary outcomes were to describe the rates of rectal stump symptoms, proctectomy and pouch formation rates, surveillance frequency, and estimate the incidence of rectal cancer in these patients. We also aim to report the morbidity and mortality rates associated with these primary and secondary procedures, as well as the morbidity associated with the rectal stump remnant.

Data Collection

Cases were identified from the IBD database, which was created using prospective data assessing the inpatient stay, ICD10 codes for diagnosis, and OPCS4 codes for operation, collected by coding department of each hospital. This was then supplemented with data from the electronic patient records (which are prospectively filled out but retrospectively collected). All relevant clinical notes including letters from GP referrals, gastroenterology, IBD nurse specialists, and general surgery were reviewed. Operation notes, anaesthetic records, pathology reports, endoscopy with radiology reports were assessed and the relevant information extracted. The dataset were consistent across the study sites and collected data included demographic information, diagnosis (UC/CD/indeterminate colitis), date of diagnosis, past medical history, medical therapy (prior to STC and topical therapy for rectal stump), rectal stump symptoms, surgical procedures, and rectal stump surveillance. Surveillance data included frequency, findings, and biopsy results. Complications were defined as any deviation from the

Table 1. Demographics of patients included in the study; patients were classified into three groups based on the histopathology following the STC

	UC	%	CD	%	Indeterminate	%	Total
Patients, *n*	183	73.2	56	22.4	11	4.4	250
Males	96	52.5	23	41.1	7	63.6	126
Females	87	47.5	33	58.9	4	36.4	124
Median age at surgery, years (IQR)	42 (29–55)		32.5 (24–48.25)		42 (40–58)		
Steroid use	124	67.8	25	44.6	10	90.9	159
Biologic use	52	28.4	27	48.2	2	18.2	81
Median time diagnosis-surgery, months (IQR)	29 (9, 82)		66.5 (2.25, 136.75)		7 (4, 18)		
Rectal stump	170	92.9	51	91.1	10	90.9	231
Mucous fistula	13	7.1	4	7.1	1	9.1	18
Open STC	106	57.9	41	73.2	9	81.8	156
Laparoscopic STC	77	42.1	15	26.8	2	18.2	94

expected clinical inpatient course and were stratified by Clavien Dindo (severe complications were classified as group 3 or above) [10].

Statistical Analysis

The data obtained were analysed using SPSS v27 (IBM, New York, USA).

Ethical Review

The study was registered as an audit of clinical practice with the clinical effectiveness department of NHS Grampian and NHS Highland and performed in accordance with their instructions.

Results

Two hundred and fifty patients who underwent STC for acute severe colitis during the study period were included. Of these, 183 had a diagnosis of UC, 56 patients had CD and 11 patients were diagnosed with indeterminate IBD. The overall male-female ratio was 126:124 (50.4%:49.6%). The median age of patients at surgery was 42 years for the UC group, 32.5 years for the CD group, and 42 for indeterminate group. Two hundred and eighteen patients required surgery as a retails of failure of medical management, 30 subtotal colectomies were for other reasons other than failure of medical management. These included strictures, toxic megacolon, perforation, severe flare up, bleeding, and ischaemic bowel, and the remaining 2 surgeries were patient choice. A higher proportion of the CD group were on immunobiologic medication before surgery compared to the other two groups (48.2% vs. 28.4% for UC and 18.2% for indeterminate colitis).

The median time between the date of diagnosis and surgery was 2.4 years for the UC group, 5.5 years for the CD group, and 0.6 years for the indeterminate group. In 92% of the patients, the rectal stump was closed and left within the abdomen and 8% of patients had mucous fistula formed. The demographic characteristics of the three groups are shown in Table 1.

Fate of the Rectal Stump

Table 2 shows the fate of the rectal stump in all three groups. Two hundred and thirty-two (92%) of the patients who underwent STC were followed up. Out of the remaining 18 patients, 9 died and 9 patients were lost to follow-up (including 6 who moved out of the region). In the UC group, the median follow-up period was 80.5 months; in the CD group, 87 months; and in indeterminate group, 80 months.

Seventy-two percent of the patients reported symptoms from the rectal stump. These included bloody or mucous rectal discharge, rectal pain, tenesmus, faecal incontinence, and urgency. A total of 137 patients received topical therapy for their symptoms. There was no difference between the groups in the surgical management of rectal stumps. Approximately 62% of the UC group compared to 53% of the CD group and 46% in indeterminate group had surgery ($p = 0.361$). Only one patient had completion proctectomy because of rectal cancer. None of the remaining proctectomy specimens showed any evidence of dysplasia or neoplasia. The median time from first to second surgery was 19.5 months in UC group, 21 months in CD group, and 12 months in indeterminate group (not statistically significantly different).

Table 2. Follow-up and outcomes of the rectal stump following STC

	UC (*N*)	%	CD	%	Indeterminate	%
Total number of patients followed up (*N* = 232)	172	74.1	49	21.1	11	4.7
Median length of follow-up, months (IQR)	80.5 (55, 112.25)		87 (56.5, 124.5)		80 (55, 107)	
Rectal stump symptoms	128	74.4	31	63.3	7	63.6
No symptoms	44	25.6	18	36.7	4	36.3
Topical therapy for stump	105	61.0	26	53.0	6	54.5
No therapy	67	39.0	23	47.0	5	45.5
Second surgery	106	61.6	26	53.1	5	45.5
Patient's choice	57	53.8	7	26.9	3	60
Symptomatic rectal stump	47	44.3	14	53.8	2	40
Stricture/fistula	1	0.9	4	15.4	0	0
Rectal cancer	1	0.9	0	0	0	0
Other	0	0	1	3.8	0	0
Median time from 1st surgery to 2nd surgery, years	19.5 (11.75, 40)		21 (12, 74.5)		12 (9, 43)	
Proctectomy	70	66.0	25	96.2	2	40
IPAA	36	34	1	3.8	3	60
No surgery	66	38.4	23	46.9	6	54.5
Number of sigmoidoscopies						
No sigmoidoscopies	80	46.5	19	38.8	5	45.5
One sigmoidoscopy	61	35.5	17	34.7	4	36.4
Two sigmoidoscopies	24	14.0	9	18.4	2	18.2
Three sigmoidoscopies	4	2.3	3	6.1	0	0
Four sigmoidoscopies	3	1.7	1	2.0	0	0
No surgery and no flexi	19	11.0	7	14.3	2	18.2
Number of MRIs performed	31	18.0	13	26.5	1	9.1
Number of rectal cancers	1	0.6	0	0	0	0

IPAA, ileal pouch anal anastomosis.

Surveillance of Rectal Stumps

In total, there were 189 flexible sigmoidoscopies performed in 128 patients during the study follow-up period. In addition, there were 45 MRI scans performed most commonly due to failure to fully visualise the rectal stump. None of these investigations revealed any rectal cancer or dysplasia.

Complication Rates

Table 3 shows the overall complication rates for STC (1st surgery) and pouch/proctectomy (2nd surgery). One hundred and twelve out of 250 patients (44.8%) experienced complications following STC. Ten patients required ITU admission. Seven of them had an emergency surgery, whereas the other 3 patients had elective surgeries. Four out of those 7 patients who had emergency surgeries died in ITU. Seven patients had complications associated with rectal stump, including blowout, dehiscence, bleeding, and leak. There was no difference between the length of post-operative hospital stay between the groups. Sixty-nine out of 137 patients (50.4%) experienced post-operative complications after the second surgery. Only 1 patient required ITU admission, and no patient died. The most common complication was urinary retention.

Discussion

With the addition of the immunobiologic medication to IBD care, the need for surgical intervention for patients with IBD is decreasing. However, for a significant proportion of patients, an operative treatment nevertheless remains a mainstay of their clinical management [11–13]. In this study, we have assessed the fate of the rectal stump in IBD patients who have previously had a STC. This is, to our knowledge, the largest review of clinical practice in this subject in the era of immunobiologic medication.

Surveillance of the rectal stump has been perceived to be important due to the inability for patients to report any

Table 3. Complication profile of 1st surgery (STC) and 2nd surgery (proctectomy/pouch formation)

	UC	%	CD	%	Indeterminate	%
Patients that had 1st surgery, *N*	183	73.2	56	22.4	11	4.4
Complications after 1st surgery	83	45.4	25	44.6	4	36.4
ITU admissions	6	3.3	4	7.1	0	0
Clavien Dindo						
I	24	28.9	5	20.0	0	0
II	28	33.7	9	36.0	1	25.0
IIIa	8	9.6	2	8.0	1	25.0
IIIb	16	19.3	6	24.0	2	50.0
IVa	2	2.4	1	4.0	0	0
IVb	3	3.6	0	0	0	0
V	2	2.4	2	8.0	0	0
Length of stay, days	15 (9, 23)		16 (9.5, 23)		17 (9.5, 30.5)	
Patients that had 2nd surgery, *N*	106	61.6	26	53.1	5	45.5
Complications after 2nd surgery	58	54.7	8	30.8	3	60.0
ITU admissions	0	0	1	3.8	0	0
Clavien Dindo						
I	18	31.0	0	0	0	0
II	29	50.0	6	75.0	1	33.3
IIIa	7	12.1	1	12.5	1	33.3
IIIb	4	6.9	1	12.5	1	33.3
Iva	0	0	0	0	0	0
IVb	0	0	0	0	0	0
V	0	0	0	0	0	0
Length of stay, days	8 (6, 11)		6 (5, 9)		9 (5, 19)	

change in bowel habit or distinguish between rectal bleeding from inflammatory causes as opposed to malignancy [7]. The frequency on the optimal rate of surveillance is not readily available. While there are well-established guidelines on colonoscopic surveillance in IBD patients with intact colon published by NICE [14], it is striking that there is no specific guidance for patients with rectal stumps and rectal cuffs [15]. The British Society of Gastroenterology does provide information on surveillance of post-colectomy patients [16]. However, they do not clearly highlight the different surgeries done or the presence or absence of rectal stumps and this guidance was significantly before the increased use of immunobiologic medication, which is likely to reduce rates of malignancy. Our rates of surveillance across this cohort likely reflect variation in clinical practice which may be improved upon by national or international consensus on this subject.

It has been reported in a recent systematic review [6] that many studies recommend luminal screening between 6 months and 2 years for patients with rectal stumps. They also reported that more recent studies are more inclined towards risk stratification of patients dependant on disease duration and activity, history of previous colorectal cancer or dysplasia, and disease-related factors such as primary sclerosing cholangitis. Derikx et al. [6] proposed their own guidelines based on the BSG guidelines along with the available guidance in place for patients with an intact colon. They stratified patients into low-, intermediate-, and high-risk groups. The high-risk group included patients with a history of colorectal cancer, and were advised to undergo yearly screening. The intermediate group included patients with a history of primary sclerosing cholangitis, and were advised to have 2 to 3 yearly screening, whereas the low-risk group were advised for 5 yearly screening [6]. The major advantage of stratifying patients based on risk is reducing the overall number of follow-up endoscopies for patients with rectal stumps given the risk of stump blowout during the procedure [17] and considerations of the compliance with the endoscopic procedures [7, 17, 18].

The local policy is to undertake a rectal stump flexible endoscopic examination 3 yearly unless patients have worsening symptoms or are deemed high risk at which point annual screening is recommended. In our study, the single case of rectal cancer was identified at the time of the STC as an area in the rectum that appeared unusual. As it was below the peritoneal reflection, it was left in situ and investigated, diagnosed, and subsequently treated. A total of 189 flexible sigmoidoscopies and 45 MRI scans were performed and thus not all patients with a rectal stump had been investigated. Of the post-STC surveillance

investigations undertaken, none identified malignancy or dysplasia. Based on these results, it could be considered whether the number of endoscopies and MRIs could be rationalized and whether specific guidance on surveillance taking into account risks of malignancy and risk of endoscopy is needed. Our cohort is considerably too small to be able to definitively recommend such an approach. However, to further understand the rate of malignancy in this patient cohort, national IBD registry could be established. With better understanding of the prevalence and risk factors, specific surveillance guidelines could be created.

Only one of the 232 followed up patients (0.4%) in our cohort developed rectal stump cancer within the time frame of the study. This appears to demonstrate that the cancer rate in such patients is lower than previously perceived. However, we acknowledge that this might be a type two error due to the relatively low study size and follow-up time frame. In addition, more malignancies may be identified over time in subsequent investigations for this comparatively young patient cohort. Our finding agrees with systematic review by Derikx et al. [8] from 2015 which found the prevalence of incidence to be less than the previously quoted rate of 3%. However, there is still limited knowledge regarding the magnitude of risk in this patient cohort.

We also observed that 72% of the patients reported symptoms of proctitis from their rectal stump. Previous reports describe that, while nearly all patients will develop a degree of inflammation on endoscopy, fewer than 50% will be symptomatic [19–22]. Such differences in rates of symptomatic rectal stumps may be as a result of definitions or thresholds in severity of symptoms. However, our findings are important when counselling patients about what to expect post-STC procedures. Over 50% of patient cohort in all three groups had subsequent surgery involving their rectum. The majority of patients had their second procedures as a consequence of their ongoing symptoms that interfere with their quality of life or the patient's choice due to noncompliance with the long-term follow-up. We also demonstrate that IBD surgery has a high rate of morbidity associated with such operations.

The non-surgical management options for the rectal stump symptoms and inflammation include the use of short-chain fatty acids, topical 5-ASAs, and topical glucocorticoids given via enema [23]. More experimental methods of management include fibre irrigation [24], endoscopic dextrose spray [25], leukocytapheresis [26], and faecal transplantation [27]. However, the evidence for each of these methods is based on limited studies and case reports. If severe proctitis in a diverted rectum was refractory to 5ASA and topical steroids, consideration could be given to the addition of immunomodulators or biologics. However, the efficacy of medical management is highly variable, and a proportion of patients will progress to requiring surgical input [23]. In our study, 137 patients had non-surgical management of proctitis in the form of topical steroid enemas and biologics; however, many of these patients then proceeded to a surgical intervention. 97 patients had completion proctectomy, whereas 40 patients had ileal pouch anal anastomosis. It has been reported that patients who choose not to undergo reconstruction with ileal pouch anal anastomosis, about 7–14% of them will eventually require completion proctectomy either due to ongoing inflammation of rectal stump or development of dysplasia or cancer [28–30]. Our practice appears to differ from these other reports.

This study has several strengths and limitations. The retrospective nature of the study weakens the analysis and relatively small numbers of patients may mean there is a type 2 error. Strengths include involvement of two different centres and low number of patients lost to follow-up.

Conclusion

In the largest study of rectal stump management in IBD in the era of immunobiologics, we estimate the prevalence of rectal cancer to be lower than previously reported. We also speculate that rectal stump surveillance remains unclear and is an important area for future study. Given the relatively low frequency of rectal cancer in these patients, and the low level of evidence available in this field, we would propose a registry-based approach to answering this important clinical question.

Statement of Ethics

This study was assessed using the Medical Research Council's "Is my study research?" online tool (http://www.hra-decisiontools.org.uk/research/result7.html) and was deemed to be a clinical audit of current practice and not research. It was therefore registered with the clinical effectiveness departments of NHS Grampian and NHS Highland and performed in accordance with their instructions. Ethical approval is not required for this study in accordance with local or national guidelines. Patient consent was not required in accordance with local or national guidelines.

Conflict of Interest Statement

The authors declared that there is no conflict of interest.

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Author Contributions

Dominika Boldovjakova and Islam El-Abbassy: design of the work, data collection, data analysis and interpretation, and drafting and revision of the article; Inari Alarcon, Mamoun El-Saify, Juen Hao Chan, and Morag Harley: data collection and revision of the article; Craig Parnaby and Angus Watson: design of the work, data analysis and interpretation, and revision of the article; and George Ramsay: design of the work, data analysis and interpretation, and drafting and revision of the article.

Data Availability Statement

All data generated or analysed during this study are included in this article. Further enquiries can be directed to the corresponding author.

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