



## The Fate of the Rectal Stump Following Subtotal Colectomy for Acute Colitis

Porter DJ\*, Lucocq J and Muthukumarasamy G

Department of Emergency and Colorectal Surgery, Ninewells Hospital and Medical School, Dundee, Scotland

### Abstract

**Objective:** Acute severe colitis requires surgery in approximately thirty percent of cases. Subtotal colectomy with end ileostomy is the standard procedure with the laparoscopic approach offering distinct advantages. Controversy surrounds the optimal short and long-term management of the distal rectal stump. This study reviews the clinical outcomes and the fate of the rectal stump in patients who have had a subtotal colectomy for acute colitis.

**Methods:** Analysis of prospective data of patients who had an emergency subtotal colectomy for severe acute colitis over a ten-year period in a tertiary referral centre.

**Results:** Sixty-six patients had a subtotal colectomy in Ninewells Hospital from January 2010 until September 2019. The average age of the patients at the time of surgery was 40.5 years. 54% of patients were female and 56% were male. Subtotal colectomy was performed for fulminant colitis in 40% of patients, for failure of medical therapy during an acute episode of severe colitis in 56%, and for colonic strictures in the remaining 4% of patients.

Complications included peritonitis, with return to theatre in 9% of patients; wound infection in 6%, pneumonia in 2%, ileus in 15%, conversion to open in 2%, and stoma - related problems in 6% of patients. In 98% percent of patients the rectal stump was closed at the level of the recto-sigmoid junction and in 2% the rectal stump was left open and brought to the skin as a mucous fistula. 73% percent of patients opted for no further surgery, but 27% percent of patients underwent a completion proctectomy, and this was most commonly performed because of bleeding from the rectal stump. The median follow-up of patients within this study was 6.25 years and during this time three of the eighteen patients (17%) who had a completion proctectomy underwent an Ileo-Pouch Anal Anastomosis (IPAA).

**Conclusion:** Subtotal colectomy with closed rectal intra-peritoneal stump and end ileostomy is the procedure of choice in severe acute colitis refractory to maximal medical therapy or fulminant colitis. Given the patient dissatisfaction and morbidity associated with mucous fistula, we believe that this procedure should be abandoned. We suggest that pelvic dissection should not be performed at the time of the emergency subtotal colectomy given the risk of morbidity and to reduce difficulty for future pelvic dissection should a proctectomy or IPAA be performed.

**Keywords:** Acute colitis; Ulcerative colitis; Colectomy; Rectal stump; Ileo-pouch anal anastomosis; Proctectomy

### Introduction

Acute colitis is common, with approximately 2500 to 3000 admissions annually in the United Kingdom [1,2], of which approximately 68% are defined as acute severe colitis [2] according to the Truelove and Witt's criteria [3]. Around 1/3 of patients with Ulcerative Colitis (UC) will require surgery within 13 years of initial diagnosis, a figure that has remained largely unchanged over the past 40 years [4], and 15% of patients present with an acute exacerbation requiring hospital admission and intensive medical therapy [5]. Despite recent advances in the agents used in the medical management of UC and the availability of biological therapy which has modified the management of acute severe colitis [6-8], 30% of patients will require an emergency colectomy for fulminant colitis, toxic megacolon, life-threatening hemorrhage, or failure to respond to maximal medical therapy [8]. A subset of patients with UC will also require elective or expedited surgery for intractable or chronic inflammatory bowel disease that is refractory to medical therapy or for dysplasia or carcinoma within the colon [9]. A variety of surgical procedures may be offered in the elective or expedited setting, whereas in the emergency management of acute severe UC

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**\*Correspondence:**

Porter DJ, Department of Emergency and Colorectal Surgery, Ninewells Hospital and Medical School, Dundee, Scotland,  
E-mail: dporter@tcd.ie

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the policy of early subtotal colectomy and end ileostomy has been widely advocated, and this has in resulted in a marked reduction in morbidity and mortality [10]. It is prudent to avoid pelvic dissection in the acute setting to reduce the morbidity of the procedure and to facilitate later proctectomy or restorative IPAA. Early colectomy with preservation of the rectal stump has been further supported by the poor results achieved in other studies, in which attempts were made to perform more definitive surgery in the acute setting, including restorative IPAA [11]. Following successful emergency subtotal colectomy and ileostomy in severe colitis, a major cause of patient morbidity and mortality is complications arising from the retained rectal stump. Alternative approaches to surgical management of the rectal stump have continued to stimulate debate. Several surgical options have been described, including the closed rectal stump within the pelvis or abdomen [12], the subcutaneous placement of a closed rectal remnant within the abdominal wound [13] or formation of a sigmoid mucous fistula [14]. It is the practice in this centre to perform a laparoscopic or open subtotal colectomy with a closed rectal intra-peritoneal stump at the level of the recto-sigmoid junction above the peritoneal reflection with a rectal catheter left in the rectal stump. Some of these patients will subsequently undergo a proctectomy with or without an IPAA and some patients will have no further surgery. Decision making for the long-term management of the retained rectum is multifactorial and requires the surgeon to consider the patient's medical comorbidities, extent of symptoms from the rectal stump, and the cancer risk against the morbidity of another major operation, including pelvic dissection. The objective of this study was to assess the long-term fate of the retained rectum in patients who had undergone a subtotal colectomy and end ileostomy for ulcerative colitis over a 10 year period from 2010 to 2019.

## Methods

Consecutive patients who underwent subtotal colectomy for a pre-operative diagnosis of UC, Crohns' colitis or indeterminate colitis from January 2010 until September 2019 at Ninewells Hospital and Medical School, Dundee, were identified from a prospectively maintained database. Hospital records, operative and pathology reports, and follow-up outpatient clinic records were retrospectively reviewed. Recorded variables included number of patients, age at surgery, patient sex, urgency of surgery (emergency <24 h, expedited <4 weeks or elective >12 weeks), smoking status of patients at time of surgery, indication for surgery, pre-operative diagnosis, pre-operative medications, 30-day morbidity and mortality, histopathology result, status of rectal stump (open, closed within wound or within peritoneal cavity), presence/absence of rectal stump symptoms, participation in rectal surveillance, pathology in rectal stump, numbers of patients who had proctectomy, time to proctectomy, reason for proctectomy, morbidity from proctectomy, number of patients who had an IPAA, and the total duration of follow-up. Cases were excluded from the sample population if they had incomplete data, unresolved by the use of alternative sources of inpatient information or if they had missing inpatient case notes. This study received Caldicott Guardian Approval from the Department of Public Health, division of population health sciences, patient consent was therefore not required.

## Results

Sixty-six patients underwent subtotal colectomy in the 10 year period from January 2010 until September 2019 (mean age, 40.5 years; range, 14 to 73; M:F: 1:3, 29% smokers). 5 of these patients underwent a primary ileorectal anastomosis at the time of subtotal

**Table 1:** Patient Demographics.

Number of patients	66
Mean age (range), years	40.5 (14-73)
M:F	01:01.3
Smokers (%)	19 (29)

**Table 2:** Pre-operative medications.

Medication	Number of patients (%)
Corticosteroids	49 (74)
Azathioprine	18 (27)
Aminosalicylates	12 (18)
Biologics	9 (14)
Methotrexate	3 (5)
No immunosuppressant	3 (5)

**Table 3:** Operative data.

Primary procedure	Number of patients (%)
sSubtotal colectomy	61 (92)
Primary ileorectal anastomosis at the time of subtotal colectomy	5 (8)
<b>Surgical approach</b>	
Laparoscopic	42 (64)
Open	22 (33)
laparoscopic converted to open	2 (3)
<b>NCEPOD classification of primary procedure</b>	
Elective	29 (44)
Expedited (<4 weeks)	21 (32)
Emergency (<24 hours)	16 (24)

colectomy, leaving 61 patients who underwent a subtotal colectomy and end ileostomy during the study period (Table 1). Pre-operatively 74% of patients were taking corticosteroids, 18% aminosalicylates, 27% azathioprine, 5% methotrexate, 14% were taking biologics, and 5% of patients were taking no immunosuppressant medication at the time of surgery. 29% of patients were current smokers at the time of surgery (Table 2). In 24 patients the subtotal colectomy was performed laparoscopically and in 42 patients the procedure was performed by open surgery. 44% of subtotal colectomies were performed as an elective procedure, 32% were performed as an expedited procedure, and 24% were performed as an emergency procedure (Table 3). The indications for subtotal colectomy were fulminant colitis in 40% of patients, failure of medical therapy during an acute episode of severe colitis in 56%, and colonic strictures with proximal serosal tears in the remaining 4% of patients. 30 day mortality was zero, 30 day morbidity included peritonitis, with return to theatre in 9% of patients; wound infection in 6%, pneumonia in 2%, ileus in 15%, conversion to open in 2%, and stoma - related problems in 6% of patients (Table 4).

Histopathological analysis of the subtotal colectomy specimen demonstrated UC, Crohns' colitis and indeterminate colitis in 62%, 29%, and 9% of patients respectively. In 98% of patients the rectal stump was closed at the level of the recto-sigmoid junction above the peritoneal reflection with a rectal catheter left in the rectal stump, and in 2% the rectal stump was left open and brought to the skin as a mucous fistula. 73% of patients opted for no further surgery and kept their rectal stump but 27% underwent a completion proctectomy. All of the patients who maintained their rectal stump

**Table 4:** 30 day morbidity.

Complication	Number of patients (%)
Ileus	10 (15)
Peritonitis + return to theatre	6 (9)
Stoma-related morbidity	4 (6)
Wound infection	4 (6)
Pneumonia	1 (2)

are undergoing endoscopic surveillance and only one patient has developed a malignancy in the rectal stump, this occurred sixteen months following the subtotal colectomy, and the patient underwent surgical excision of the rectal stump. In those patients who underwent a completion proctectomy, this was most commonly performed due to bleeding (56%), however it was also performed for pain (4%), and mucus discharge per rectum (40%). When a proctectomy was performed, the median time between the subtotal colectomy and proctectomy was 1.66 years. A not insignificant morbidity was noted following proctectomy, this included erectile dysfunction in 6% of cases, urinary difficulties (dysuria, nocturia, urinary frequency) in 6%, peri-anal pain in a further 6% and poor wound healing in 22% of cases. The median follow-up of patients within this study was 6.25 years and during this time 3 of the 18 patients (17%) who had a completion proctectomy underwent an Ileo-Pouch Anal Anastomosis (IPAA). The reason for the IPAA in all 3 patients was patient preference. Complications following the IPAA included per rectal bleeding in one patient and a superficial wound infection in 1 patient.

## Discussion

This study reports a series of patients who were treated with subtotal colectomy and ileostomy for severe acute colitis over a 10 year period in a tertiary referral centre. We believe that the data presented in this paper supports the evidence that subtotal colectomy with closed rectal intra-peritoneal stump and end ileostomy is the procedure of choice in severe acute colitis refractory to maximal medical therapy or fulminant colitis, and it remains a choice in the elective setting [15]. The patient population investigated in this study reflects previous demographic findings for patients presenting with severe acute colitis [16]. We found no relationship between age, gender, smoking status, pre-operative medication or indication for colectomy (toxic megacolon, fulminant colitis or failed medical management of severe acute colitis) and the development of post-operative complications. Larger studies may however be required to accurately demonstrate more subtle relationships from any potential pre-operative risk factors to those outcomes that were measured. Early colectomy and ileostomy is the recommended treatment for fulminant or complicated severe acute colitis [17] and the safety of this procedure has been demonstrated in numerous studies [1,5,8]. There is however a wide variability in practice regarding the management of the rectal stump during and following subtotal colectomy. Intra-operatively the rectal remnant can be left open and brought to the skin as a mucous fistula, closed and brought to the under-surface of the laparotomy wound, or closed and left within the pelvis with a rectal drain in situ for 48 h to 72 h post-operatively [18]. This study demonstrates that the practice of the surgeons within our unit is similar to those in other units with 98% of rectal stumps being closed at the recto-sigmoid junction, above the peritoneal reflection. This is to avoid disturbance of the pararectal planes and avoids disruption of the pelvic nerves and reduces difficulty for future pelvic

dissection should a proctectomy or IPAA be performed [10]. The intra-peritoneal stump not only avoids the morbidity associated with subcutaneous placed rectal stumps [19] but also stoma management complications [10], and potential subsequent wound infection [10] issues associated with the creation of a mucous fistula. Given these potential complications, some centers have abandoned the mucous fistula technique due to the difficulties associated with discharge from the fistula and because improved results and lower morbidity have been demonstrated with the intra-peritoneal stump [9]. In the study presented in this paper only 2% of patients had a mucous fistula due to the patient dissatisfaction associated with this technique, and because of the improved outcomes demonstrated from the closed intra-peritoneal rectal stump. In all cases of intra-peritoneal rectal stump closure during subtotal colectomy in our centre a rectal catheter was left in situ in the immediate post-operative period. The rectal catheter has been utilized as a means of reducing the intraluminal stump pressure, reducing but not eradicating the risk of rectal stump dehiscence [20]. Following subtotal colectomy there is also variation in the long-term management of the rectal stump. The St. Mark's experience published in 1994 described the fate of the rectal stump after emergency subtotal colectomy and ileostomy in severe acute colitis [21]. In this series 59% of patients underwent restorative proctectomy, 18% had ileorectal anastomosis and 23% had proctectomy [21]. In our study 73% of patients retained their rectal stump following subtotal colectomy, whilst 27% underwent a completion proctectomy. In those patients who underwent completion proctectomy, the most common indication for this was bleeding, followed by mucus discharge per rectum, and anal pain. One patient underwent proctectomy 16 months following subtotal colectomy for surveillance detected rectal cancer. Despite the evidence suggesting that restorative proctectomy is now the most common definitive operation for UC patients [15], only 3 patients in our study underwent an IPAA during the median follow-up of 6.25 years, with minor post-operative complications. An additional 5 patients underwent subtotal colectomy and primary ileo-rectal anastomosis, with no reported post-operative complications. Although an ileo-rectal anastomosis can have acceptable functional results [15], it has the disadvantage of leaving rectal mucosa behind with the potential for further symptoms and development of rectal cancer at a later stage. Rectal cancer has been reported to develop in the long-term residual rectal stump in 3% of patients who have previously undergone colectomy for UC [22]. The operative management of the rectal stump at colectomy should therefore reliably allow for future definitive surgery, either IPAA or proctectomy, and to be amenable to long-term surveillance of the retained rectum [10].

## Conclusion

This study supports the evidence that subtotal colectomy with closed rectal intra-peritoneal stump and end ileostomy is the procedure of choice in severe acute colitis refractory to maximal medical therapy or fulminant colitis. Given the patient dissatisfaction and morbidity associated with mucous fistula, we believe that this procedure should be abandoned, and that the closed rectal intra-peritoneal stump should be protected from dehiscence by the placement of a rectal cancer in the early post-operative period. We suggest that pelvic dissection should not be performed at the time of the emergency subtotal colectomy given the risk of morbidity and to avoid disturbance of the pararectal planes to reduce difficulty for future pelvic dissection should a proctectomy or IPAA be performed. The results of this study support previous evidence that the intra-

peritoneal rectal stump is associated with low rates of pelvic sepsis. Due to long-term problems associated with a retained rectal stump, the actuarial risk of neoplasia, and good social and sexual function after IPAA, patients with histology proven UC should be advised to consider second-stage reconstructive surgery after emergency colectomy.

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