



Colectomy in pediatric ulcerative colitis: A single center experience of indications, outcomes, and complications



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ABSTRACT

Background/Purpose: There is a paucity of data on outcomes and complications of colectomy for pediatric ulcerative colitis (UC). This study reports the experience of a regional center for 18 years.

Methods: Patients were identified from a prospective database and data obtained by note review. Median height/weight-SDS were calculated preoperatively and postoperatively. Data are expressed as median values (range).

Results: 220 patients with UC (diagnosed <17 years) were identified, and 19 (9%) had undergone colectomy. Age at diagnosis was 11.6 years (1.3–16.5), and 42% of patients were male. Time from diagnosis to surgery was 2.2 years (0.1–13.1). All patients had failed maximal medical therapy. Fifteen patients had urgent scheduled operation, and 4 had emergency procedures, with 2 for (11%) acute-severe colitis (1 *Clostridium difficile* colitis) and 2 for acute-severe colitis with toxic dilatation. All initial procedures were subtotal-colectomy with ileostomy. Nine patients (47%) had early complications (during initial admission), 7 (37%) requiring reoperation. Six (32%) had late complications, with 5 requiring laparotomy. No patients had both early and late complications. Height-SDS was -0.27 before surgery and -0.23 (maximal follow-up). Weight-SDS was 0.32 and 0.05 (maximal follow-up).

Conclusion: Approximately 1/11 children with UC required colectomy during childhood. Half of patients had acute complications, and 1/3 of patients required another operation during their first admission. 1/3 of patients developed late complications.

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The incidence of both Crohn's disease (CD) and of ulcerative colitis (UC) are increasing [1,2] with CD remaining more common than UC in childhood. Pediatric-onset UC is associated with significant morbidity and disease progression is generally agreed to be more severe than adult-onset disease [3]. Surgery for pediatric CD is associated with high morbidity rates, for example 22% early complications in a recent series [4]. Surgical intervention in UC may be curative, but colectomy and ileal pouch-anal anastomosis (IPAA) are associated with significant rates of early and late complications, which occur more frequently following emergency procedures [5–7]. High rates of subsequent adhesive small bowel obstruction and strictures (anorectal and anastomotic) have been described in longer term studies [7,8]. Despite this, surgery remains a crucial tool when maximal medical therapy is unable to control disease and long-term outcomes such as reduced symptoms [9] and patient well-being [10] are generally good. Pouch formation may allow patients to live a relatively normal life without a stoma and high levels of satisfaction are reported after IPAA [11] despite problems

such as pouchitis, frequent stooling and some degree of incontinence being relatively common [8,10].

Perhaps because of the relatively small number of cases performed, there is a paucity of recent single center outcome data for initial subtotal colectomy surgery in pediatric UC, in the context of 2 or 3-stage procedures—subtotal colectomy, IPAA and stoma closure. We aimed to report our single center experience of the results of initial subtotal colectomy (with delayed IPAA) for pediatric ulcerative colitis alongside complications and growth data from this cohort.

1. Methods

The tertiary pediatric gastroenterology/surgery service at Southampton Children's Hospital manages all pediatric inflammatory bowel disease (PIBD) cases from a regional population of more than 650,000 children less than 17 years of age and includes 10 district general hospitals. From previously published Wessex data, an average of 55 new cases of PIBD are seen per year at our center and the number of cases seen per year has increased since the inception of the service [1].

All cases of ulcerative colitis from January 1997 to July 2014 were identified from a prospectively maintained database. Patients with UC who had undergone colectomy before their 17th birthday were identified.

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All patients had been diagnosed using the Porto criteria [12] and treated according to national and international guidelines [13]. The majority of patients were managed with steroids and 5-aminosalicylates derivatives at diagnosis, with subsequent use of additional immunosuppressive agents where appropriate. At University Hospital Southampton, we have previously published data detailing 3 UC patients undergoing colectomy and the outcome at 2 years [14]. These patients have been included in this current study.

The decision to undertake surgery was made by a team of pediatric gastroenterologists, surgeons and radiologists after discussion with patients and parents. Initial surgical intervention was undertaken by both pediatric and adult colorectal surgeons. Subsequent pouch formation and ileostomy reversal was undertaken by adult colorectal surgeons only. In line with many UK centers, the pediatric surgical approach used was a 3-stage procedure (subtotal colectomy, with deferred IPAA, then stoma closure).

Data were collected from case notes and electronic patient records using a standardized proforma from the first surgery to most recent follow-up.

The date of confirmed histological diagnosis, preoperative medical management and details of surgical intervention (including procedure and operative findings) were recorded. Complications were divided into early (occurring within the same admission as the surgery) and late (after discharge from hospital). All further planned and unplanned surgical procedures were documented including IPAA and ileostomy reversal.

Approval was given by the University Hospital Southampton NHS Trust research and development department and the project was registered as service evaluation; ethical board opinion was not required.

Height, weight and BMI were recorded for each patient from before surgery and at maximal follow-up after surgery. These were converted to standard deviation scores (SDS/Z-scores) using the UK 1990 growth standards (<http://www.phsim.man.ac.uk/SDSCalculator/SDSCalculator.aspx> last accessed May 2015). Measurements from before and after surgery were compared using the Mann–Whitney U test. Fisher's exact test was used to compare complication rates. A *P* value of <0.05 was considered significant. Data are reported as median (range).

2. Results

Two hundred twenty children with histologically confirmed UC were identified from the database over the study period, 19 (9%) of these underwent colectomy at <17 years of age. One of these had a colectomy performed at another center; this patient was excluded from subsequent analysis. Nine children at maximum follow-up had transitioned into adult care and surgical procedures and complications posttransition are included.

Median age at diagnosis of those who underwent surgery was 11.6 (1.3–16.5) years. Median time from diagnosis to first surgery was 2.2 (0.1–13.1) years. Median age at initial surgery was 14.4 (7.7–16.6) years. Median total follow-up time was 6 (0.6–14.8) years.

The 1 year colectomy rate (patients undergoing colectomy aged <17 years, within 1 year of diagnosis) was 3% (7/220). The 5 year colectomy rate (patients undergoing colectomy aged <17 years, within 5 years of diagnosis) was 7% (15/220).

2.1. Preoperative medical management

All children had been treated with steroids between diagnosis and first surgery, 14/19 (73.4%) had been on a thiopurine (e.g., azathioprine or 6-mercaptopurine) prior to surgery. Three had received anti-TNF α therapy [Infliximab, Janssen Biotech Inc. Horsham, PA (*n* = 2) and Adalimumab, Abbvie Inc. North Chicago, IL (*n* = 1)].

Four children (21%) had preoperative total parental nutrition (PN). Four (21%) had preoperative nasogastric tube feeding [Modulen IBD,

Nestle, Vevey, Vaud, Switzerland) or EO28 (Nutricia, Danone Place, Schiphol, the Netherlands)].

Preoperative albumin was available for 16/19 patients. Median albumin was 24 (12–42), 10 children had low albumin for their age (normal range for median age at surgery 35–50 g/dl) at the time of surgery. There was no statistical association between low albumin and increased risk of postoperative complications (*P* = 0.12).

2.2. Indications and type of surgery

All children had failure of medical management, defined as ongoing severe symptoms despite maximal medical therapy (steroids, thiopurine, anti-TNF α). Some had surgery prior to the introduction of biological therapy in pediatric UC.

Fifteen (79%) children underwent urgent scheduled procedures and 4 (21%) required emergency intervention. Two children had surgery for acute colitis with toxic dilatation, and two were caused by acute severe colitis (1 of these had severe *Clostridium difficile* colitis).

19 children underwent subtotal colectomy with end-ileostomy, of which 3 had mucous fistula formation rather than rectal stump closure. One had gastrostomy placement prior to colectomy as a separate procedure. 16 (80%) were open procedures. Four colectomies were started laparoscopically, one required an additional Pfannenstiel incision to close the rectal stump which leaked intraoperatively after endoscopic stapling. The decision to operate open or laparoscopically was made by the operating surgeon, but our current preference is to perform all colectomies laparoscopically.

Histological assessment was consistent with UC in all cases. Median length of stay for the initial surgery was 15 (5–58) days.

2.3. Complications of colectomy

2.3.1. Early complications

A total of 13 complications occurred in 9/19 (47%) children (Table 1). Seven (37%) with early complications had another unplanned surgical procedure during the same admission as a direct result of the complication. Five (71%) underwent relaparotomy (rectal stump leak *n* = 1, small bowel perforation *n* = 1 and small bowel obstruction *n* = 3), two (29%) had wound exploration, washout and reclosure for dehiscence.

Two children developed postoperative seizures and required admission to intensive care. In one child this was caused by a venous sinus thrombosis and the patient was discharged on warfarin. The other was known to have epilepsy prior to surgery and was on long term anticonvulsant therapy.

2.3.2. Late complications

Six (32%) children had adhesive small bowel obstruction. Of these, five required laparotomy at a median of 5.1 (0.1–8.7) years after initial surgery. No patients who underwent laparoscopic

Table 1
Early complications of colectomy surgery.

Complication	Number of patients (% of total patients)	Further details
Rectal stump leak	1 (5%)	Required laparotomy
Small bowel perforation	1 (5%)	Ileal perforation 9 days postcolectomy
Small bowel obstruction	3 (16%)	1 volvulus, 1 ileostomy-related stricture, 1 internal hernia,
Wound dehiscence	3 (16%)	2 required return to theatre
Intraabdominal abscess	2 (10%)	Both treated conservatively
Seizures	2 (10%)	1 secondary to postoperative venous sinus thrombosis
Pneumonia	1 (5%)	

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