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Postoperative Outcome of Colectomy for Pediatric Patients With Ulcerative Colitis

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Abstract

Background—Few studies have reported on the surgical outcomes of colectomy in pediatric patients with ulcerative colitis (UC).

Patients and Methods—We conducted a retrospective chart review of all pediatric patients diagnosed with UC who underwent colectomy at UCSF between 1980 and 2005 to identify early (within 30 days) and later complications of surgery.

Results—Complete medical records were available for 31 patients [12.4 ± 3.3 (range 6–19) years] with UC who underwent colectomy at UCSF Children's Hospital. Total colectomy with ileal pouch anal anastomosis (IPAA) was performed in 21 of the 31 patients (12 without diverting ileostomy). Five of the 31 patients had an initial colectomy with IPAA and J-pouch performed later; 4 had an initial subtotal colectomy for urgent indications. Only one of 31 had IPAA with S-pouch. The median number of early postoperative complications was 1.0; 4 required additional surgery to treat complications. The most common early complications were small intestinal obstruction in 6 (19%) and wound infection in 4 (13%). Preoperative medications included corticosteroids in 25 (81%), 6-mercaptopurine/azathioprine in 10 (32%), and 5-aminosalicylates in 19 (61%). Medication exposure was not related to postoperative complications. Late complications included pouchitis in 12 (39%), anastomotic, anal, or rectal strictures in 5 (16%), and fistulas in 5 (16%); 1 (3%) was subsequently diagnosed as having Crohn disease.

Conclusions—Postcolectomy morbidity is common among pediatric patients with UC. Preoperative medications were not associated with postoperative complications. Investigations to determine preoperative factors affecting surgical outcomes and long-term satisfaction following this surgery in a large pediatric cohort are needed.

Keywords

adolescents; children; complications; corticosteroids; inflammatory bowel disease; pouchitis; prednisone; surgery

Ulcerative colitis (UC), characterized by mucosal inflammatory infiltrates in the colon resulting in intermittent episodes of abdominal pain, rectal bleeding, and diarrhea, affects both adults and children with similar symptoms in each age group (1). However, children with UC often have more extensive disease and more abdominal pain at diagnosis than adults (2,3).

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Although most children with UC can be successfully managed with medications, some will require surgical interventions (4). This number has not been well described. In 1 prospective study from Denmark, 6% of children diagnosed with UC underwent colectomy within 1 year of diagnosis, increasing to 29% by 20 years from the time of diagnosis (2). Others report a 5-year colectomy rate of 20% to 24% in children (5,6).

The benefits of colectomy do not come without risk. Pouchitis is a common complication, and sepsis, intestinal obstruction, fecal incontinence, and fistulas also occur (7). Women may have decreased fertility after undergoing colectomy (8,9). Few studies have evaluated the surgical outcomes of pediatric patients post-colectomy. Even fewer have investigated possible variables that may affect surgical outcomes, such as preoperative conditions and medical therapy. The primary aims of this study were to describe the types of colectomy performed, determine the percentage of early and late complications following colectomy, and determine whether preoperative treatment with 5-aminosalicylates (5-ASA), immuno-modulators (6-mercaptopurine [6-MP] and azathioprine), or corticosteroids is associated with an increased number of complications in pediatric patients undergoing colectomy.

PATIENTS AND METHODS

All of the pediatric patients (age younger than or equal to 19) who underwent colectomy for UC between 1980 and 2005 at the University of California, San Francisco (UCSF) Children's Hospital Medical Center were identified through databases maintained by the Department of Surgery, the Division of Pediatric Gastroenterology, Hepatology, and Nutrition and the UCSF Health Information Management System (medical records). UC was diagnosed preoperatively by clinical, histological, and/or radiological features, and confirmed by histological examination of the surgically removed colon. All of the medical records were reviewed for demographic data, indication for colectomy (urgent or elective), type of colectomy (1-stage, 2-stage, or 3-stage), operation length, early complications (small bowel obstruction, wound infection, rectal bleeding, ileus, or abscess within 30 days of the operation), and later complications including episodes of pouchitis, diagnosed from clinical symptoms (perianal or abdominal pain and bleeding). Colectomy was defined as urgent if the patient was admitted for UC or failed medical therapy and underwent colectomy during the same admission. Charts were reviewed for preoperative corticosteroid, 6-MP/azathioprine, and 5-ASA dosages and routes of administration. Patients were considered as taking these preoperative medications if they received their last dose within 2 weeks of the operation.

Odds ratios (OR) from univariate logistic regression models and the Fisher exact test were used to determine differences in early postoperative complications (yes/no) by preoperative medication use, demographic factors (age, sex, race/ethnicity), type of colectomy, and indication for colectomy. Statistical analyses were performed using STATA version 9.1 (from StataCorp, College Station, TX). Data are expressed as mean \pm SD. This study was reviewed and approved by the Committee on Human Research at the University of California, San Francisco.

RESULTS

Thirty-one pediatric patients underwent colectomy for UC at the UCSF Children's Hospital Medical Center at the University of California, San Francisco, between 1980 and 2005. One patient had left-sided colitis, and 30 had pancolitis. Sixteen (52%) patients were girls; 22 (70%) were whites, 3 were African American, 3 were Hispanic, and 3 were "other" (Table 1). Mean age at colectomy was 12.4 ± 3.3 years. Mean length of postoperative follow-up was 4.5 ± 4.5 years.

The type of colectomy required was determined by the surgeon, often dependent on the severity of the colitis at the time of the initial surgery. The majority of surgeries (17 [55%]) were performed by 1 surgeon; 5 were done by another surgeon, and the remainder were completed by 7 surgeons (1–2 each).

Eighteen patients had an elective colectomy, whereas 13 had an urgent colectomy. Total colectomy with ileal pouch anal anastomosis (IPAA) with J-pouch was performed in 21 patients (12 without diverting ileostomy); 5 patients had an initial colectomy with IPAA and J-pouch performed later; and 4 patients had an initial subtotal colectomy for urgent indications. Only 1 patient had IPAA with S-pouch. Eight patients had laparoscopic total colectomy, and 6 underwent laparoscopic-assisted colectomy. Data on the length of each J-pouch data were unavailable. In total, 12 had a 1-stage procedure (no ostomy), 14 had a 2-stage (ostomy then takedown), and 5 had 3-stage (all urgent colectomies) procedures with ostomy. The ileoanal anastomosis was hand sewn in 22, stapled in 6, and not specified in 3. A rectal cuff was left in 16 patients, no cuff was left in 12, and in 3 this information was not documented. No trend was found between surgeon or type of procedures and outcomes.

Preoperative medication exposure included 5-ASAs in 19 patients (61.3%), 6-MP/azathioprine in 10 patients (32.3%), and corticosteroids in 25 patients (80.6%). One patient received 3 doses of infliximab, with the last dose given 1 month before colectomy.

Early complications occurred in 17 (55%) patients (Table 2). The median number of early complications per patient was 1.0 (range 0–6). The most common complications were small-intestinal obstruction in 6 patients (19%) and wound infection in 4 patients (13%). Early complications occurred in 3 of the 5 patients who had a 3-stage procedure (with ostomy), 7 of the 14 patients who had a 2-stage procedure (with ostomy), and 7 of the 12 patients who had a 1-stage procedure (without ostomy). Four patients required additional surgery within 30 days postoperatively to treat complications; 2 of these patients developed complete bowel obstruction, 1 had an anastomotic leak resulting in peritonitis, and 1 had a transverse colon perforation.

No significant associations were found between preoperative 5-ASA, 6-MP/azathioprine, or corticosteroid exposure and early postoperative complications (Table 3). Early complications were observed in 11 of the 19 patients taking 5-ASAs compared with 6 of 12 patients not taking 5-ASAs (odds ratio [OR] 1.38, 95% confidence interval [CI] 0.32–5.88; $P = 0.72$), in 7 of 10 patients taking 6-MP/azathioprine compared with 10 of 21 patients not taking 6-MP/azathioprine (OR 2.57, 95% CI 0.52–12.72; $P = 0.28$), and in 15 of 25 patients taking corticosteroids compared with 2 of 6 patients not taking corticosteroids (OR 3.00, 95% CI 0.46–19.59; $P = 0.37$).

No difference was detected in the frequency of early complications among those patients who had an urgent colectomy (8 of 13) versus an elective colectomy (9 of 18) (Table 4) (OR 1.6; 95% CI 0.38–6.82; $P = 0.72$). Age, sex, and type of colectomy also had no significant impact on early complications (data not presented).

Although later complications were not a primary focus of this review, the most common complication more than 30 days post-colectomy was pouchitis, found in 12 (39%) of our patients. Other complications included anastomotic, anal, or rectal strictures responsive to dilation, and small bowel obstruction, fistulas, and colitis in retained colonic mucosa (Table 5). Of the 5 with fistulas, 1 was diagnosed as having Crohn disease by ileal pouch biopsy 4 years after colectomy; the other 4 patients resolved with surgical revision of the pouch. One patient died after subsequent bowel surgery (ostomy takedown) at another institution 4 years after colectomy (due to congenital heart disease that had not been previously diagnosed).

DISCUSSION

This retrospective study found no association between pre-operative medication use (within 2 weeks of colectomy) and the development of early postoperative complications. The few other studies addressing this question found similar results for 6-MP/azathioprine, but contrasting reports exist for preoperative corticosteroid use. In a primarily adult cohort of patients who underwent colectomy with IPAA, Mahadevan et al (10) showed no association between treatment with 6-MP/azathioprine, cyclosporin, or methotrexate and development of complications, but did show an increase in complication rate among patients taking high-dose steroids (>40 mg/day). Ziv et al (11) found similar results among patients who underwent colectomy and IPAA without protective ileostomy and reported an increased risk of early septic complications with increasing steroid dosage. Additionally, other reports suggest that preoperative treatment with high-dose corticosteroids increases the risk of developing infectious and other complications (12). Given the immunosuppressive effect of steroids, this is not surprising. Our sample size may be too small to detect any of these effects.

More than half of the patients in this study had at least 1 early complication after colectomy. This is higher than previous reports. Alexander et al (13) reported that 21% of pediatric patients who underwent colectomy had at least 1 complication within 31 days, and Fazio et al (14) found that 28% of primarily adult patients had a complication within 30 days. Although our study is limited by the small sample size, our patients had similar types of complications compared with these other studies, with small intestinal obstruction and infectious complications most frequently observed. A significant number of patients developed fistulas as late complications. One patient who developed fistulas was eventually diagnosed as having Crohn disease. However, fistulas can complicate any bowel surgery, and the patients developing fistulas in this report were deemed to have them as a complication of the colectomy rather than undiagnosed Crohn disease, particularly because these eventually resolved with no further medical treatment.

Limitations of this study include a small sample size, making significant statistical analyses difficult, including determination of the effect of the type of surgery performed on the development of complications. Additionally, the 25-year time period allows for some confounding variables such as advances in technology and improvements in medical management including biologic therapies.

Although proctocolectomy offers a cure for patients with UC, the morbidity associated with this operation should be considered, especially in a pediatric population. Even with this morbidity, more long-term studies such as those done by Wewer et al (15) have found high satisfaction among patients undergoing this procedure. As always, the risks and benefits of this operation and the severity and prognosis of the child's disease should provide guidance for proper management, especially in light of the potential complications of chronic immunosuppressive therapies including infections and lymphoma (16). Further investigation on the long-term results of colectomy in pediatric UC in a large cohort of patients is necessary to improve our understanding of associated risk factors for development of complications following colectomy, which will ultimately help risk stratify individual patients and guide medical and surgical management.

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TABLE 1

Patient demographics

	N	Percent
Sex		
Male	15	48
Female	16	52
Race/ethnicity		
Whites	22	70
African American	3	10
Hispanic	3	10
Other	3	10
Age at diagnosis, * y		
0–6	3	10
7–12	14	45
≥13	11	35

* Age at diagnosis not available for 3 patients.

TABLE 2

Early postoperative complications following colectomy

Complication	No. (%) patients with this complication
SBO	6 (19%)
Wound infection	4 (13%)
Rectal bleeding	3 (10%)
Ileus	3 (10%)
Abscess	3 (10%)

SBO = small bowel obstruction.

TABLE 3

Associations between preoperative medication exposure and postoperative complications

	<u>Complications</u>		
	No	Yes	Total
<u>6-MP/azathioprine</u>			
No	11	10	21
Yes	3	7	10
Total	14	17	31
<u>2-tailed Fisher exact test = 0.28.</u>			
<u>5-ASA</u>			
No	6	6	12
Yes	8	11	19
Total	14	17	31
<u>2-tailed Fisher exact test = 0.72.</u>			
<u>Preoperative corticosteroids</u>			
No	4	2	6
Yes	10	15	25
Total	14	17	31
<u>2-tailed Fisher exact = 0.37.</u>			

5-ASA = 5-aminosalicylates; 6-MP = 6-mercaptopurine.

TABLE 4

Association between elective versus urgent colectomy and complications

	<u>Complications</u>		
	No	Yes	Total
No elective colectomy	9	9	18
Elective colectomy	5	8	13
Total	14	17	31

Two-tailed Fisher exact test = 0.72.

TABLE 5

Late complications (>30 days postoperative)

Complication	No. (%) patients with this complication*
Pouchitis	12 (39)
Small bowel obstruction	8 (26)
Fistula	5 (16)
Stricture (anal, rectal, anastomotic)	4 (13)
Rectal mucosal colitis	3 (9)
Perforation (J-pouch, small bowel)	2 (6)
Rectal bleeding	2 (6)
Abscess	2 (6)
Wound infection	1 (3)
Parastomal hernia	1 (3)

* These complications are not exclusive.