Safety of Urgent Restorative Proctocolectomy with Ileal Pouch-Anal Anastomosis for Fulminant Colitis

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PURPOSE: Subtotal colectomy with ileostomy is the operation of choice for patients with fulminant colitis. Restorative proctocolectomy (RPC) with ileal pouch-anal anastomosis (IPAA) is preferred for patients who undergo elective surgery for ulcerative colitis. We retrospectively evaluated the safety of RPC with IPAA in patients with a moderate form of fulminant colitis. METHODS: A chart review of 737 patients who underwent RPC with IPAA for ulcerative and indeterminate colitis from 1983 through 1992 was performed. Moderate fulminant colitis was defined as acute disease requiring hospitalization and parenteral steroid therapy, but without hypotension (systolic blood pressure, <100 mmHg), tachycardia (>120 beats/min), or megacolon. RESULTS: Twelve patients with moderate fulminant colitis underwent urgent surgery (1.6 percent). They had been treated preoperatively for 5.1 ± 2.3 days with intravenous high-dose steroids, total parenteral nutrition, and antibiotics. These patients had a shorter length of disease (P = 0.01), lower hemoglobin, hematocrit, and albumin (P = 0.001), and higher temperature (P = 0.002) and leukocyte count (P = 0.007) than patients undergoing elective surgery. No early septic complications occurred, although perianal abscess occurred in one patient and pouch-anal fistula in another patient, 13 and 14 months after surgery, respectively. CONCLUSION: In carefully selected, hemodynamically stable patients with fulminant colitis and without megacolon, RPC with IPAA can be safely performed. [Key words: Fulminant colitis; Ileal pouch-anal anastomosis; Surgery]

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In 1951, Crile and Thomas[1] proposed colectomy and ileostomy as the surgical procedure of choice for fulminant (toxic) colitis. The acute toxic or fulminant state, however, has not been uniformly defined.[2–6] Toxic megacolon is defined as a severe variant of fulminant colitis, with total or segmental dilation of the colon,[4] whereas in the more common form of toxic colitis, the patient has tachycardia, has hypotension, and is severely ill but has no colonic dilation. Jalan *et al.*[3] included both clinical presentations under "acute fulminating ulcerative colitis." In fulminant colitis with or without colon dilation, inflammation extends beyond the submucosa and is usually transmural, and morbidity and mortality rates are high.[4–7] Within such a classification we defined a third group of patients with fulminant colitis, those who have ulcerative colitis severe enough to warrant hospitalization with parenteral steroid therapy and intravenous nutrition but who do not have tachycardia, hypotension, or colonic dilation.

Restorative proctocolectomy (RPC) with ileal pouch-anal anastomosis (IPAA) has become the operation of choice for patients who undergo elective surgery for ulcerative colitis (UC) since it was initially described by Parks and Nicholls.[8–10] There is agreement that patients with toxic megacolon or fulminant colitis with hypotension and tachycardia should not have RPC but rather have an initial subtotal colectomy with ileostomy. However, there may be a role for RPC in the third group of fulminant colitis, those with severe symptoms but normal vital signs. To assess the feasibility and safety of RPC with IPAA in this group of patients, we retrospectively evaluated the outcome of surgery.

PATIENTS AND METHODS

Records of all patients undergoing RPC with IPAA (n = 859) were examined from 1983 through 1992. Of these, 737 patients underwent RPC with IPAA for the treatment of UC or indeterminate colitis (IC).

A moderate form of fulminant colitis was defined according to the following criteria: 1) hemodynamically normal (systolic blood pressure more than 100 mmHg, pulse rate less than 120 beats per minute) patients; 2) symptoms included abdominal tenderness, diarrhea, and rectal bleeding; 3) diameter of the

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colon less than 5 cm on plain roentgenogram of the abdomen; and 4) at least three of the six following variables: elevated body temperature (>37°C), white blood cell count over 10,000 cells/mL, albumin of 3 g/dL or less, and total proteins of 6 g/dL or less, hemoglobin of 10 g/dL or less, and hematocrit of 0.30 or less. All patients with fulminant colitis who did not respond to medical treatment with intravenous, high-dose (equivalent to more than 60 mg of prednisone) steroids, total parenteral nutrition, and antibiotics underwent urgent surgery.

Patients with moderate fulminant colitis who underwent RPC with IPAA were studied. This group was compared with the group of patients who underwent RPC with IPAA for chronic colitis.

Information was obtained regarding patient gender, age at onset of colitis, duration of disease, age at operation, pre-operative physical examination, body temperature, laboratory data, and medications. Data were collected on surgical procedure performed, preoperative and postoperative pathologic diagnosis, perioperative blood transfusions, and length of stay after surgery. Early (within 30 days after surgery) and late complications were recorded.

Data are presented as the median and range when appropriate. Continuous values were compared between the groups using Student's *t*-test. *P* values less than 0.05 were considered significant. Nonparametric continuous values were compared between the groups using Mann-Whitney *U* test. The chi-squared test with a continuity correction for small numbers was used for categoric data. The alpha level was set at 0.05.

RESULTS

There were 737 patients (339 females) with UC (n = 692) or IC (n = 45). Of these, 12 patients (9 females, 3 males) underwent urgent RPC with IPAA for moderate fulminant colitis that had not responded to aggressive medical treatment. A stapled IPAA was used in eight patients and handsewn IPAA in four patients. All patients had a temporary loop ileostomy. Age at diagnosis, length of disease, age at operation, length of hospital stay after surgery, and length of follow-up time for patients undergoing urgent or elective surgery are shown in Table 1.

All 12 patients were hemodynamically normal, with a mean systolic blood pressure of 132 ± 26 mmHg (±SD (standard deviation)) and a mean pulse rate of 104 ± 13 beats per minute (±SD). All had abdominal cramps with abdominal tenderness, a median of nine bowel movements per 24 hours (range, 3–20), urgency, and mild to moderate rectal bleeding. All 12 patients had been treated with intravenous, high-dose steroids (equivalent to 60 mg or more prednisolone per day), total parenteral nutrition and antibiotics (metronidazole or Vancomycin®, Eli Lilly and Co., Indianapolis, IN) for 5.3 ± 2.3 days (mean ± SD). Four patients received sulfasalazine (Azulfidine®, Pharmacia, Inc., Columbus, OH), and two patients received mesalamine (Rowasa®, Solvay Pharmaceuticals, Inc., Marietta GA). Preoperative laboratory data and body temperature for all patients undergoing urgent or elective surgery are shown in Table 2. All 12 patients had perioperative transfusions (350–1,450 mL). Preoperative pathologic diagnosis was UC (n = 11) or indeterminate colitis (n = 1). Postoperative pathologic diagnosis was fulminant pancolitis in all patients.

Within 30 days of surgery, one patient had a mild wound infection, one patient had small bowel obstruction and ventricular tachycardia that were treated conservatively, and a third patient had paroxysmal atrial tachycardia. During a median follow-up time of 35 (range, 3–113) months, one patient died (4 months after surgery) because of myocardial infarction five days after closure of ileostomy and lysis of adhesions because of small bowel obstruction. A perianal ab-

Table 1.
Characteristics of Patients Undergoing Urgent or Elective Surgery for Ulcerative Colitis or Indeterminant Colitis

Characteristic	Urgent (n = 12) Median (Range)	Elective (n = 725) Median (Range)	P Value*
Age at diagnosis (yr)	22 (14–67)	24 (2–71)	0.96
Length of disease (yr)	4 (0.2–15)	8 (0.3–46)	0.01
Age at operation (yr)	26 (14–71)	34 (5–76)	0.25
Hospital stay (days)	9 (6–16)	8 (5–70)	0.48
Follow-up (mo)	26 (3.6–113)	29 (1.5–124)†	0.35

* Mann-Whitney *U* test; alpha = 0.05.
† 690 patients.

Table 2.
Preoperative Laboratory Data in Patients Undergoing Urgent or Elective Surgery for Ulcerative Colitis or Indeterminant Colitis

Variable	Urgent (n = 12) Mean ± SD	Elective (n = 725) Mean ± SD	P Value
Hemoglobin (g/dL)	10.3 ± 1.9	12.8 ± 1.8	0.001
Hematocrit (%)	31.3 ± 5.3	38.8 ± 4.9	<0.001
Albumin (g/dL)	2.9 ± 0.2	4.2 ± 0.5	<0.001
Total proteins (g/dL)	5.6 ± 0.4	7.0 ± 0.7	<0.001
WBC (cells/mL)	13008 ± 4167	8979 ± 4119	0.007
Temperature (°C)	37.6 ± 0.5	37.0 ± 0.2	0.002

SD = standard deviation; WBC = white blood count.
* Student's *t*-test.

scess developed in one patient with IC, and a pouch-anal fistula occurred in one patient with UC; both were successfully treated surgically, 13 and 14 months after RPC with IPAA, respectively.

Pouch function is good to excellent in all surviving patients. Patients reported an average of six (range, 4–7) bowel movements in 24 hours. Two patients reported minor seepage at night, and three patients (two with concurrent perianal sepsis) had recurrent episodes of pouchitis, 2 to 28 months after surgery. Two patients with mild anal stenosis were successfully treated by recurrent dilation with a pediatric proctoscope.

DISCUSSION

Fulminant colitis is a well-recognized complication of inflammatory bowel disease, especially ulcerative colitis. Because of severity of the illness, frequent need for surgery, and potentially life-threatening complications associated with a high mortality rate, there has been great debate regarding optimal medical treatment and indications and timing of surgical intervention.[6,7] Definitions of fulminant colitis lack uniformity, which makes interpretation of studies from different institutions difficult. Diagnostic criteria of Jalan *et al.*[3] for toxic megacolon included clinical and radiologic evidence of colon dilation, body temperature over 38.6°C, pulse rate over 120 beats per minute, white blood cell count over 10,500/mL, hemoglobin reading less than 60 percent of the normal value, and at least one of the following: dehydration, mental changes, electrolyte disturbance, or hypotension. Fazio,[4] however, considered the patient to be toxic when there was evidence of at least two of the following: tachycardia greater than 100 beats per minute, body temperature over 38.6°C, white blood cell count over 10,500/mL, and hypoalbuminemia less than 3 g/dL. An additional requirement was the presence of abdominal distention in each patient. Megacolon was defined as being present if the colon diameter was at least 5 cm with a disturbed or absent haustral pattern.

In this study we used the clinical criteria of need for hospitalization and parenteral therapy as the prime characteristics of fulminant colitis. Such a definition is more helpful clinically because this is the situation confronting physicians. We then subclassified patients with fulminant colitis into those with (excluded) and without megacolon (diameter more than 5 cm). Patients with fulminant colitis without megacolon can further be divided into those with and without hypotension (less than 100 mmHg) and tachycardia (more than 120 beats per minute). It is this final group that forms the subjects for our study.

High mortality rates with medical and surgical treatment for toxic megacolon[4–6,11] led to earlier surgical intervention in patients with fulminant colitis without colon dilation. However, the philosophy of early surgical intervention, exact criteria of toxicity, experience of the surgical group, referral pattern of patients, and era of the particular series may have influenced outcome, which remained unsatisfactory.[4,12]

Our patients had severe colitis, without colon dilation, episodes of hypotension, or severe tachycardia, and underwent urgent surgery after lack of response to aggressive medical therapy for an average of five days. This approach is in agreement with that of the Oxford group, which showed that improvement should occur within five days of initiating medical treatment or the patient should undergo surgical intervention.[13] Our 12 patients had significantly lower values for hemoglobin, hematocrit, albumin, and total proteins ($P = 0.001$) and significantly higher body temperature and white blood cell count ($P = 0.002$

and 0.007, respectively) compared with patients undergoing elective surgery. These laboratory findings are in accordance with other reports,[5, 6, 11, 12] as is the shorter ($P = 0.01$) duration of preoperative disease.

The decision to perform restorative proctocolectomy in the patients reported was an individual one, made at the time of surgery. Clinical criteria described were the basis for the decision, but intraoperative factors involved included the ease of dissection, the nature of tissues, the degree of inflammation of the lower rectum, and the overall severity of illness of the patient. A patient in whom surgery was difficult, with fragile tissues, with a marked degree of rectal inflammation, or who is unstable under anesthetic is not suitable for restorative proctocolectomy. Each of these factors presents as a range of severity, and the final decision in any particular patient is a summation of all factors viewed by the surgeon's experience.

Among the 12 patients, no mortality or significant septic complications were observed within 30 days after operation. That high-dose steroids in our patients did not produce toxic megacolon or perforation of the colon supports other reports,[4–6, 12–14] that the role of steroids in producing such complications has not been proven. Our results with urgent RPC and IPAA are similar to the results we have achieved in patients undergoing elective surgery.[10] A literature search revealed no reports on these types of patients with moderately severe forms of colitis who underwent urgent RPC and IPAA. Thus, this study provides information not previously available concerning surgery for patients with fulminant colitis. For hemodynamically unstable patients with fulminant colitis, with or without megacolon, our operation of choice is emergency subtotal colectomy and ileostomy with pouch construction at a later stage, excluding desperately ill patients in whom the Turnbull's "blow-hole" procedure is done (Fig. 1).[4]

Our study may be criticized in that it is retrospective and the number of patients undergoing urgent operation is small. Furthermore, although preoperative and postoperative diagnosis of UC showed essential concordance (11 of 12 patients), risks of performing restorative proctocolectomy for Crohn's disease is higher than in elective cases. However, the study group of patients had, at least by outcomes analysis, been reasonably well selected in this regard. Thus, in a tertiary care center experienced in inflammatory bowel disease, this risk may be minimized.

The surgical standard for most patients with severe (fulminant, toxic, acute) colitis remains abdominal colectomy and ileostomy.[15] Within that group, however, is a further group that might be termed moderate fulminant colitis, characterized by absence of tachycardia and hypotension, in whom restorative proctocolectomy, IPAA, and temporary ileostomy may safely be performed as initial surgical therapy.

CONCLUSION

This study involves a very select and small subset of our patients with severe colitis, who underwent restorative proctocolectomy with ileal pouch-anal anastomosis for inflammatory bowel disease with favorable results.

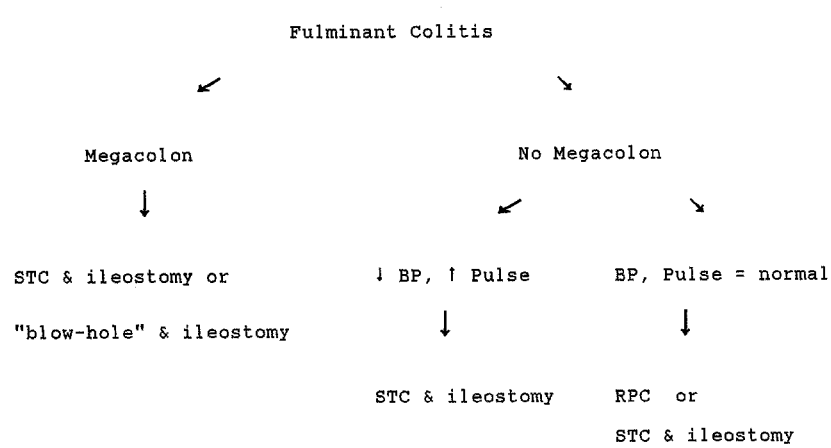

Figure 1. Algorithm of surgical treatment for fulminant colitis. STC = subtotal colectomy, BP = blood pressure, RPC = restorative proctocolectomy.

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Invited Editorial

To the Editor—The surgeons at the Cleveland Clinic, with their vast experience in handling a large number of patients with ulcerative colitis, have reported their data on a retrospective review of the safety of urgent restorative proctocolectomy with ileal pouch-anal anastomosis for fulminant colitis. These 12 cases represented 1.6 percent of the Clinic's total experience in restorative proctocolectomy. Even in the best of hands, morbidity was high, and one patient died following ileostomy closure. Missing from this paper is functional outcome data in this small series, as well as lack of comparison with the group with the three-stage procedure for fulminant colitis. Any surgeon who performs this operation must always bear in mind the importance of intraoperative judgment, and a conservative decision will more often bring forth a favorable outcome in these gravely ill individuals. Only under very unusual circumstances should urgent restorative proctocolectomy be considered, as evidenced by how infrequently it has been attempted at the Cleveland Clinic.

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