Surgical Management of Toxic Dilatation of the Colon in Ulcerative Colitis

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Seventeen patients with ulcerative colitis and toxic dilatation of the colon have been treated in the last decade. After preliminary medical therapy, ileostomy with single or two stage proctocolectomy was done in 16 patients with a single fatality. Turnbull's operation was used in another patient with survival. Followup results from 1 to 10 years are excellent. As a result of this retrospective review of an experience with patients with toxic dilatation of the colon in ulcerative colitis it is believed that the following conclusions are justified: 1) it is imperative that clinicians recognize the syndrome early in its development and be aware of its grave significance. 2) resuscitative treatment should be given on a life-threatening emergency basis and should include parenteral fluids, electrolytes, blood, broad spectrum antibiotics, vitamins, steroids, and nasogastric suction. 3) operation should be carried out urgently after 12-24 hours of resuscitative treatment. The choice of operation lies between ileostomy with (procto) colectomy and Turnbull's procedure.

THE ACUTE, fulminating, deeply penetrating, ulcerative changes in the colonic wall which produce so-called toxic megacolon in patients with inflammatory bowel disease can result in severe hemorrhage, perforations, peritonitis, sepsis and death. When these changes occur in the course of ulcerative colitis, the patient usually presents with acutely rising fever, tachycardia, abdominal pain and distention, bloody diarrhea and the general manifestations of severe toxicity. Roentgenograms of the abdomen show gaseous dilatation of the colon.

Marshak and his associates[8] recognized this catastrophic syndrome in 1950 and named it "toxic megacolon." Adams and other authors[1,9,10,13] suggested that "toxic dilatation" of the colon is a more accurately descriptive term and separates the syndrome from the chronic forms of congenital and acquired megacolon.

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The etiology and pathogenesis of toxic dilatation of the colon are obscure and optimal management remains controversial. In addition to antibiotics and vigorous supportive measures, most physicians initiate treatment with high doses of steroids, while in recent years most surgeons have advocated emergency resection of the colon with ileostomy. Turnbull and his associates,[15] concerned with the high mortality rate of colectomy in toxic megacolon, have recently recommended initial surgical treatment by emergency loop ileostomy and so-called "blow-hole" transverse and/or sigmoid colostomy. The present report records the experience we have had in the last decade in the management of this lethal syndrome in patients with ulcerative colitis.

Clinical Study

Incidence

During the last 10 years, 17 critically ill patients with mucosal ulcerative colitis and toxic dilatation of the colon have been treated at Vanderbilt University Medical Center. Fifteen patients were treated in the 500 bed Vanderbilt University Hospital, one in the affiliated 500 bed Nashville Veterans Administration Hospital and one in the affiliated 250 bed Nashville Metropolitan General Hospital.

During this 10-year period there were 177,314 discharges from the Vanderbilt University Hospital, 78,679 discharges from the Nashville Veterans Administration Hospital and 72,011 discharges from Nashville Metropoli-

TABLE 1. *Summary of Clinical Data in 17 Patients with Toxic Dilatation of Colon*

Patient Age (yr.) Sex	Duration Ulc. colitis	Duration acute episode before entry; Steroid Rx	Duration preoperative medical Rx in our hosp.	Colonic perforation found at operation	Operative Procedure*	Early Complications	Late Complications	Present Status
1. FO, 28F	3 yr.	6 wk. steroids	8 days steroids	none	I & STC AP resection	abd. abscess	chronic perineal sinus	Excellent 10 yr. p.o.
2. JKO, 20F	1 yr.	3 wk. steroids	10 days steroids	none	I & PC	transitory peroneal palsy	none	Excellent 9 yr. p.o.
3. JBW, 50M	2 mo.	2 mo. steroids	19 days steroids	multiple perforations	I & PC	renal failure abd. abscesses Pseudomonas sepsis (died p.o.)	—	Dead
4. AJH, 38F	3 yr.	2 mo. steroids	30 days steroids	single perforation	I & PC	wound abscess	none	Excellent 6 yr. p.o.
5. JKC, 35F	1 yr.	3 wk. steroids	21 days steroids	none	I & PC	Pseudomonas perineal and urinary infections	none	Excellent 5 yr. p.o.
6. JH, 46M	3 yr.	1 mo. steroids	6 days steroids	none	I & PC	none	none	Excellent 5 yr. p.o.
7. JBWm, 65M	3 yr.	6 wk.	6 days (ACTH day of op.)	none	I & PC	none	none	Excellent 5 yr. p.o.
8. HR, 33M	3 yr.	6 wk. steroids	1 day steroids	single perforation	I & PC	thrombophlebitis pelvic abscess	none	Excellent 4 yr. p.o.
9. CMK, 63M	2 yr.	1 mo. steroids	12 hrs. steroids	none	I & PC	none	none	Excellent 3 yr. p.o.
10. JW, 33M	6 yr.	6 wk. steroids	36 hrs. steroids	single perforation	I & STC AP resection	abd. abscess massive rectal bleeding ileal fistula	none	Excellent 3 yr. p.o.
11. AGN, 58F	9 yr.	3 wk.	1 wk.	none	I & PC	urinary infection	stenosis of ileostomy; revision 2 yrs. p.o.	Excellent 3 yr. p.o.
12. KLP, 43F	13 yr.	6 wk. steroids	12 hrs. steroids	multiple perforations	I & TC Suture dehiscence	stress ulcer wound dehiscence	AP resection (3 mo. later) chronic perineal sinus, p.o.	Excellent 2½ yr. p.o.
13. PED, 18M	2 mo.	1 mo.	5 days steroids	none	I & colostomy (Turnbull)	none	none	Good colitis mild 2 yr. p.o.
14. AB, 60F	5 wk.	5 wk.	4 days	single perforation	I & PC	none	none	Excellent 1½ yr. p.o.
15. LN, 52F	1 mo.	1 mo. steroids	48 hrs. steroids	none	I & TC I & D abscesses AP resection	coma multiple abscesses bladder dysfunction	none	Excellent 1 yr. p.o.
16. RW, 52M	17 yr.	3 wk. steroids	24 hrs. steroids	none	I & PC	wound infection partial dehiscence	none	Excellent 1 yr. p.o.
17. RS, 23F	3 yr.	1 mo. (pregnancy 5 mo.) steroids	2 wk. steroids	multiple perforations	delivery stillborn fetus I & TC AP resection	coma massive rectal bleeding	—	Recent discharge; recovery satisfactory

* I & STC: ileostomy and subtotal colectomy
I & TC: ileostomy and total colectomy
I & PC: ileostomy and proctocolectomy
AP resection: abdominoperineal resection of rectum (a second stage operation)

tan General Hospital. Among the total of 328,004 patients discharged from the three hospitals during this decade, the diagnosis of ulcerative colitis was made in 247 individuals.

Each of the 17 patients with toxic dilatation of the colon had the diagnosis of ulcerative colitis confirmed by clinical, radiologic and pathologic criteria. The syndrome was not observed during this decade in any patient with granulomatous colitis or other expressions of Crohn's disease.

Onset of Manifestations of Toxic Dilatation of Colon

There were eight men and nine women in the group with toxic dilatation. Ages ranged from 18 to 65 years and averaged 41 years. Twelve of the patients were 30–60 years old at the onset of the toxic syndrome.

Manifestations of ulcerative colitis had been present in nine patients for one to six years prior to the onset of toxic dilatation. Four patients had had disease from 6 to 17 years. In four others the initial attack of colitis was of the fulminating variety which culminated in the toxic syndrome within one to two months.

In the patients with the longer courses of ulcerative colitis before the development of toxic dilatation, the disease was of the relapsing, remitting type in five and the chronic, continuously active form in eight.

Table 1 summarizes the pertinent clinical data related to the 17 patients in this study. An acute flareup of the manifestations of ulcerative colitis which lasted 3–8 weeks preceded admission to our hospitals in each instance. These acute episodes were characterized by the development of cramping abdominal pain, anorexia, occasionally nausea and vomiting, and exacerbation or onset of bloody diarrhea of increasing severity. Fever, chills, weakness, malaise and prostration were commonly associated.

Initial evaluation of these acute episodes include fluoroscopic examination of the colon by barium enema in five instances within 12 days to 6 weeks of the subsequent clinical and radiologic evidence of toxic dilatation.

Initial treatment of these acute attacks by the patient's physician uniformly included antibiotics and antidiarrheal medication which consisted of opiates and/or anticholingergic drugs. In addition, 13 of the 17 patients were treated with oral steroids, most commonly prednisone. Four also received ACTH infusions and two were given cortisone anemas. The majority of patients were also initially hospitalized in community hospitals where further supportive therapy included intravenous fluids and blood transfusions. Persistence of the acute, severe symptoms and failure of response to treatment prompted referral.

Treatment Used

At the time of admission to our hospitals, increasing severity of abdominal pain with rising fever, tachycardia, increasing bloody diarrhea and abdominal distention were prominent features in most cases. With few exceptions the patients appeared to be critically ill, anemic, dehydrated and showed evidence of recent weight loss. Examination of the abdomen showed abdominal distention of slight to severe degree accompanied by varying degrees of tenderness on palpation in fourteen patients.

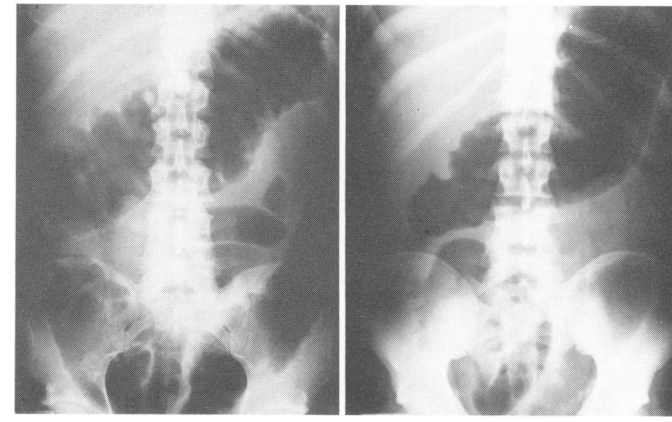

FIG. 1. Roentgenograms of the abdomen on admission in two patients with fulminant ulcerative colitis and toxic dilatation of colon, Patients J. B. W. (left) and P. E. D. (right).

Two patients were comatose and appeared moribund. One patient (KLP) showed exquisite, diffuse abdominal tenderness with distention and resistance which indicated colonic perforation at the time of admission. Sigmoidoscopic examination showed ulcerative proctitis of varying severity compatible with ulcerative colitis in each patient.

On the day of admission roentgenograms of the abdomen were made in all but one patient (RS) who was five months pregnant. X-ray evidence of toxic dilatation of the colon was present in 15 of the 17 patients (Fig. 1). The clinical diagnosis of perforation of the colon was confirmed by x-ray examination of patient KLP (Fig. 2).

Emergent Resuscitation and Emergent Operation

After emergent resuscitative treatment with intravenous fluids, electrolytes, blood, broad spectrum antibiotics and steroids, patient KLP was taken to the operating room twelve hours after admission and submitted to ileostomy and total colectomy. Multiple perforations of the thin walled dilated colon had occurred.

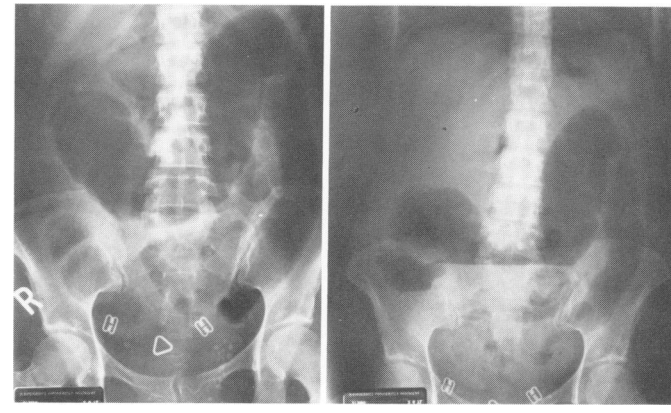

FIG. 2. Roentgenogram of the abdomen (plain, left, and upright, right) on admission in patient (K. L. P.) showing dilated colon and free air beneath diaphragm.

As indicated in Table 1, six of the patients, including patient KLP, were managed by similar emergent resuscitative measures and operation within 12–48 hours after admission to our hospitals with toxic dilatation of the colon. Each of these patients was critically ill and two were considered moribund. Massive rectal bleeding accompanied toxic dilatation in two of this group. Another patient had severe diabetes mellitus. Each of these patients had been treated with steroids prior to admission and received steroids in preparation for operation.

Three of these patients, including patient KLP, were found to have colonic perforations at operation. At operation ileostomy with single stage proctocolectomy was done in three patients and ileostomy with abdominal colectomy (total or subtotal) in the others.

Prolonged Medical Therapy Followed by Operation

In the 11 other patients existence of toxic dilatation was established by clinical and radiologic examination at the time of admission to our hospitals in nine and was not apparent or had not developed in two patients, including the patient RS who was five months pregnant.

In the nine patients with clinical evidence of the toxic syndrome and radiologic confirmation of colonic dilatation, intensive medical therapy was used for periods of 4–21 days. This consisted of rehydration, correction of electrolyte deficits, replacement of blood losses, broad spectrum antibiotics, tranquilizers, nutritional supports, and antidiarrheal medications. Seven of the patients received steroids in full dosage and ACTH infusions. Another patient was treated for one week by parenteral hyperalimentation.

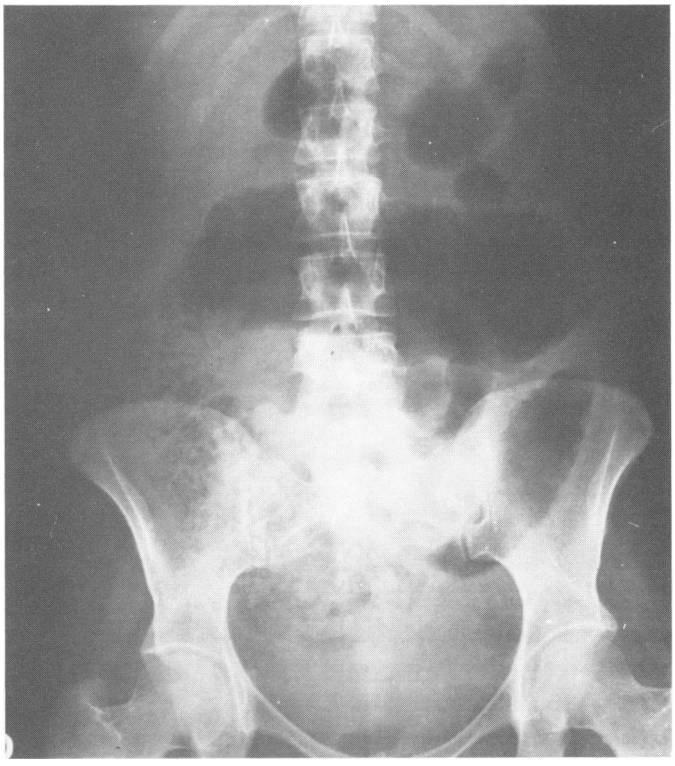

FIG. 3. Roentgenogram of the abdomen in patient A. J. H. during fourth hospital week. Toxic dilatation developed while on continuous intensive medical therapy including steroids and ACTH infusions.

Failure of satisfactory clinical response to these measures accompanied by increasing size of the gas filled, distended colon prompted surgical intervention in each instance.

At operation, 4–21 days after entry, colonic perforations were found to have occurred in two of these nine patients. In one of these (JBW) massive fecal contamination of peritoneal surfaces occurred from multiple sealed off perforations during the colectomy. Ileostomy and protocolectomy was carried out in seven patients, ileotomy and subtotal colectomy in another individual, and Turnbull's operation of loop ileostomy and transverse colostomy was done in one patient.

In patient RS and AJH toxic dilatation of the colon was apparently not present on admission to the hospital. Radiologic examination of the abdomen was omitted on admission in patient RS who was five months pregnant and gaseous distention of the colon was not present on admission in patient AJH.

Patient RS, who was critically ill on admission, received intensive medical therapy including steroids for fourteen days. She developed abdominal pain and distention on the thirteenth day of treatment with sudden severe exacerbation of pain accompanied by shock and diffuse abdominal tenderness on the fourteenth day. She had felt no fetal movements for three days prior to this catastrophic episode. Diagnoses of toxic megacolon with perforation and fetal death were made. After resuscitation of her shock, labor was induced, a stillborn fetus was delivered and emergent ileostomy and total colectomy was carried out. At operation there were multiple colonic perforations and massive fecal contamination.

Patient AJH had had ulcerative colitis for three years. In the last two years treatment had included oral steroids and cortisone enemas. An acute exacerbation of bloody diarrhea occurred two months before admission and was not responsive to more intensive treatment. On admission to Vanderbilt University Hospital there was no clinical or radiologic evidence of toxic dilatation of the colon. She was febrile, anemic, and had ten to fifteen bloody stools daily. Sigmoidoscopy and barium enema after admission showed characteristics of diffuse ulcerative colitis. Treatment with opiates, prednisone, steroid enemas, azulfadine and ACTH infusions failed to be of benefit. Abdominal pain, distention and tenderness developed during the fourth week of medical therapy and radio-

logic examination showed gaseous distention of transverse colon (Fig. 3). Her condition rapidly deteriorated with rising fever, tachycardia, increasing abdominal pain, distention and colonic dilation. Two days later she was taken to the operating room where the severely inflamed, thin walled colon was found to have a single perforation with a walled-off abscess. Ileostomy and proctocolectomy was carried out with minimal fecal contamination.

Operative Procedure

Table 2 lists the operative procedures used in the seventeen patients with toxic dilatation of the colon. Anesthesia was usually halothane with succinylcholine as a muscle relaxant.

A large caliber Pezzer catheter or balloon tube was placed in the rectum via a proctoscope as an aid to decompressing the unprepared colon in most patients. After opening the abdomen through a long xyphoid to pubis midline incision, the tube was guided by the operator into the sigmoid and intermittent suction facilitated decompression of the dilated colon.

Single stage proctocolectomy which was done in eleven patients was usually carried out as a two team synchronous combined procedure with the patient in dorsal lithotomy position. Great care was taken to avoid injury to the thin-walled friable colon and the colon and rectum were usually removed in continuity. The ileum was divided as close to the ileocecal valve as technically feasible and a matured ileostomy of the Brooke type[3] was most commonly constructed. In two patients the supine position was first used, the colon was resected down to rectum and after completion of the abdominal procedure, the patient was turned on his side (Sims position) and the rectum removed through the perineum.

In most patients the perineal wound was closed in layers and two suction drainage catheters were left in the pelvis and exteriorized lateral to the suture line.

Total or subtotal abdominal colectomy was used in five patients whose condition was so critical that removal of the rectum was deferred. In each of these abdominoperineal resection of the diseased rectum was subsequently carried out as a second stage procedure from two weeks to three months later.

Turnbull's[15] operation of loop ileostomy with "blow-hole" transverse colostomy was carried out in the youngest patient in the group (PED) who had developed toxic dilatation in the first two months of acute fulminating ulcerative colitis.

When gross fecal contamination was present at operation, peritoneal and pelvic lavage with 5 to 10 liters of saline was used with drainage of the abdominal gutters and massive broad spectrum antibiotic coverage was continued in the postoperative period.

TABLE 2. *Toxic Dilatation of Colon: Operative Procedure*

Ileostomy and Proctocolectomy	11
Ileostomy and Colectomy (AP Resection Rectum at Second Stage)	5
Ileostomy and Transverse Colostomy	1

TABLE 3. *Toxic Dilatation of Colon: Colonic Perforation Found at Operation*

Single	4
Multiple	3
None	10

Pathologic Findings

As indicated in Table 3, gross colonic perforation was found at operation in seven of the seventeen patients. Examination of the sixteen gross specimens of colon and rectum showed each colon to be dilated and thin walled with maximal dilatation in transverse colon in most specimens (Fig. 4). Serosal surfaces were hyperemic. Several specimens had dark, diffuse and mottled areas in the dilated segments suggestive of infarction (Fig. 5). The perforations observed at operation were confirmed and when the specimens were opened, they were found to be at areas of deeply penetrating ulcerations. All specimens showed diffuse ulcerations of large areas of the mucosa. Some ulcers were punctate whereas others coalesced and occupied a wide area. Pseudopolyp formation and mucosal undermining and bridging were prominent features in most specimens. Most specimens showed the grossly severe ulcerative and inflammatory changes to involve the rectum and the entire colon diffusely while few had less severe to minimal disease in the cecum. A few specimens showed minimal gross disease in the rectum and cecum (Fig. 6). There was no ileal involvement grossly except in one specimen where the distal three inches showed serosal and mucosal hyperemia and edema characteristic of "backwash" ileitis.

Microscopic examination of sections from each colon and of the biopsy of transverse colon in the patient who had Turnbull's operation showed changes characteristic of ulcerative colitis. There were no granulomas seen in any specimen. The areas of ulceration were completely denuded of mucosa with replacement by vascular granulation tissue, heavily infiltrated with inflammatory elements. The inner and outer muscle layers in all specimens were involved in the inflammatory process. In some areas the muscularis was completely replaced by vascular granulation tissue. Degeneration and necrosis of muscle fibers were widely observed.

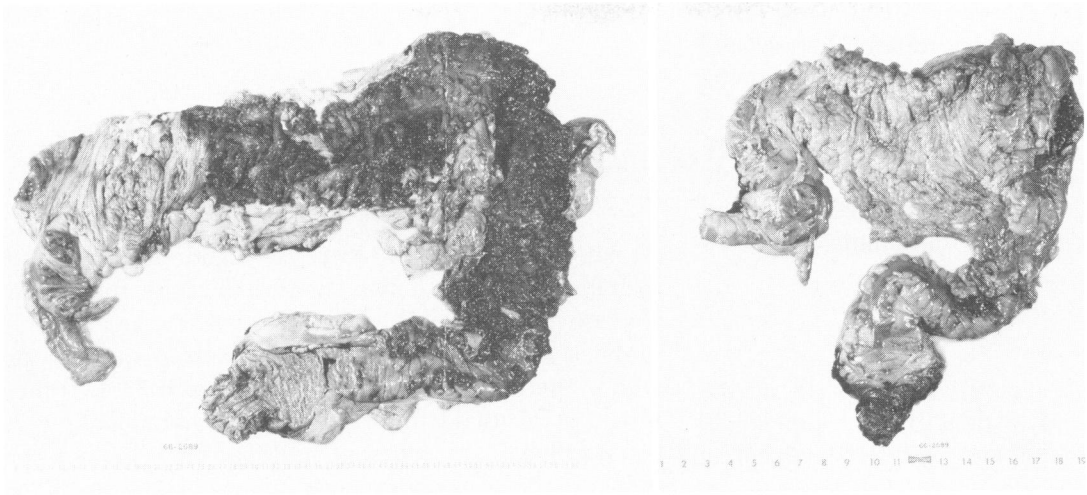

FIG. 4. Gross specimen of colon and rectum in patient J. B. W. who had toxic dilatation and multiple colonic perforations.

Results

The early results of combined medical and surgical treatment are summarized in Table 4. One patient died (JBW). This man had acute fulminating disease culminating in toxic dilatation on admission to Vanderbilt University Hospital. He was treated medically with antibiotics, parenteral fluids and steroids for nineteen days before operation. At operation there were multiple sealed off perforations of the colon (Fig. 4) and proctocolectomy was done in a massively contaminated field. Despite vigorous postoperative supportive therapy, he died two weeks after operation in uremia with multiple abscesses, peritonitis and Pseudomonas septicemia.

All other patients survived operation with varying degrees of difficulty in the recovery period.

Four patients made totally uneventful recoveries with primary healing of wounds and no complications whatsoever. Two others made equally smooth recoveries except for a mild urinary infection in one and transitory peroneal palsy in the other.

The ten other surviving patients had a variety of complications which delayed recovery. The non-fatal complications are listed in Table 5.

Problems with infection and wound healing were the most frequently encountered complications.

Bleeding from the retained rectal segment of persistent and significant degree occurred in the first few weeks after abdominal colectomy in three of the five patients who were so treated and necessitated urgent second stage resection of the rectum. One of these and

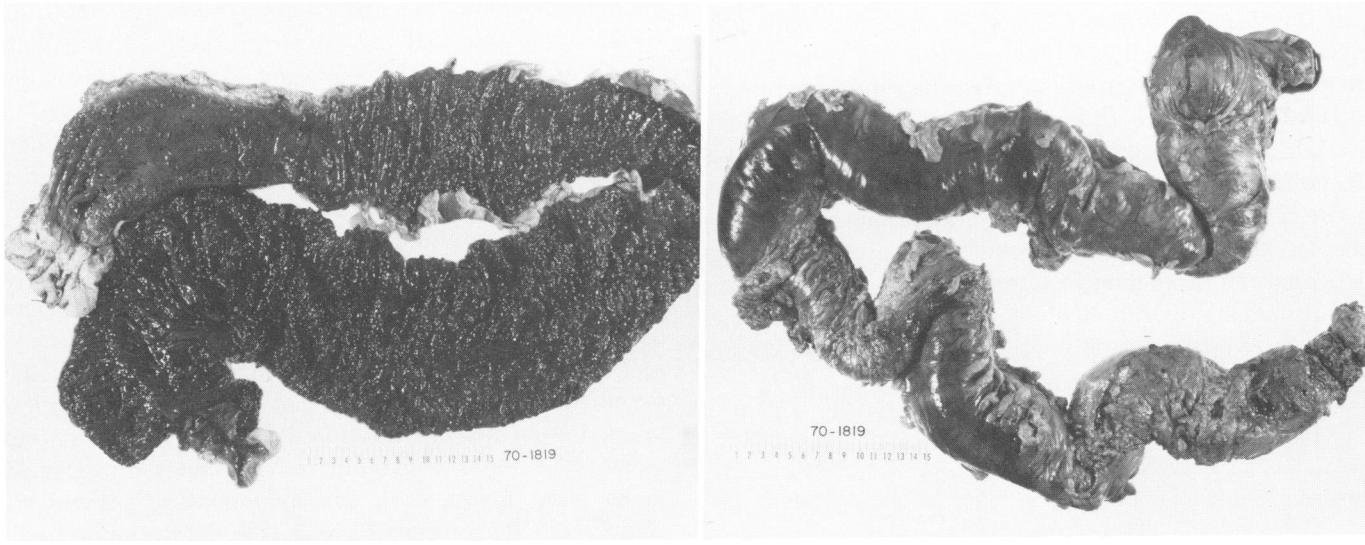

FIG. 5. Photograph of gross specimen of colon and rectum in patient C. M. K. with toxic dilatation showing diffuse necrosis and infarction of colonic wall.

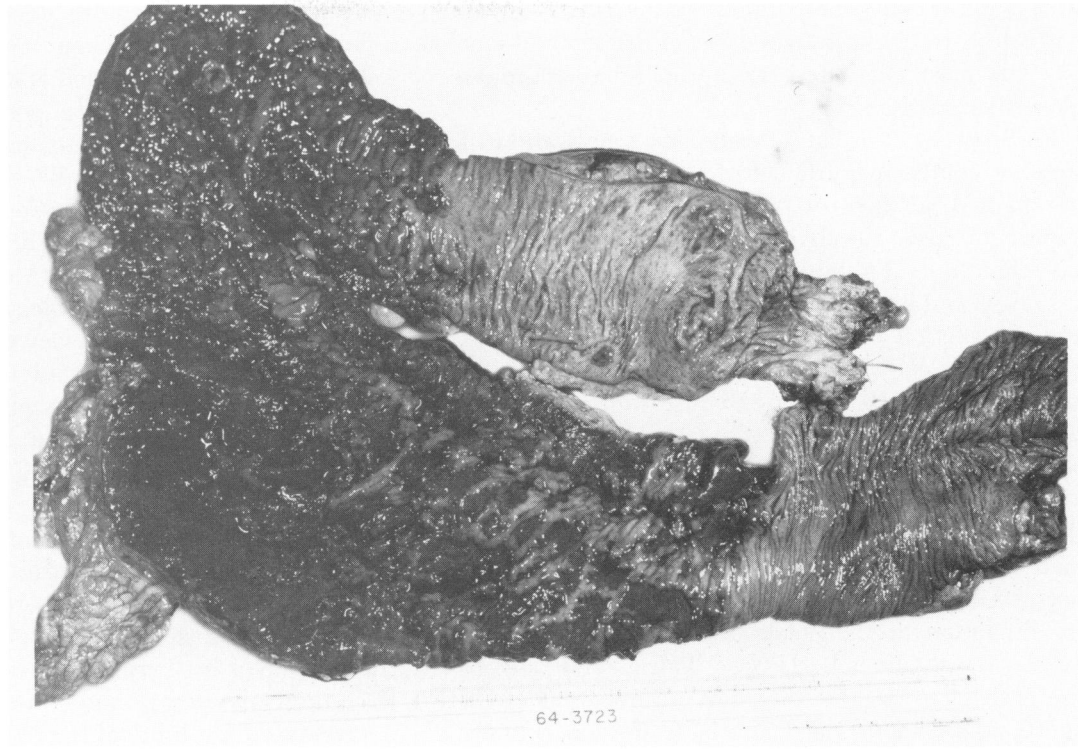

FIG. 6. Photograph of gross specimen of colon and rectum in patient J. K. O. with toxic dilatation and severe ulcerative necrosis of colon with minimal gross disease in cecum and rectum.

one other patient with subtotal colectomy also had multi-loculated pelvic abscesses which were drained at the time of removal of the rectal segment.

Two patients had a poorly explained post-anesthetic coma which required several days of respiratory support. Gastric bleeding which occurred in one patient from stress ulcers fortunately responded to non-operative treatment. Treatment of thrombophlebitis with heparin in patient HR resulted in a pelvic hematoma which subsequently became infected and required open perineal drainage and slowed recovery. In another patient a brachial stretch injury sustained during operation was transitory with full recovery.

All patients were successfully weaned off steroids within the first few weeks after operation.

Late results of treatment in the sixteen survivors are summarized in Table 6. After recovery from the removal of the diseased colon and rectum, there was a rapid return to good health with good adjustment to ileostomy and impressive weight gain in fourteen patients. Rehabilitation in this group over the last one to ten years has been excellent. The only late complications have been the persistence of a chronic perineal sinus requiring subsequent operative excision in two patients and stenosis of the ileostomy requiring stomal revision in one other.

One patient (RS) who survived perforation of the toxic megacolon with removal of the colon and rectum in two stages has made a satisfactory recovery and has only recently been discharged from the hospital.

The single patient (PED) treated by Turnbull's[15] operation has made an excellent adjustment to ileostomy and an impressive recovery from the toxic dilatation syndrome. His colitis has been in remission during the two years since operation and proctocolectomy has not yet been carried out.

Comment

Since Marshak's[8] original description in 1950, toxic megacolon or, preferably, toxic dilatation of the colon has been recognized by clinicians as the most hazardous complication of ulcerative colitis. While it may occur much less frequently in granulomatous colitis and, as Rip-

TABLE 4. *Toxic Dilatation of Colon: Early Results*

Deaths	1
Survivors	16
Survival Rate	94%

TABLE 5. *Toxic Dilatation of Colon: Non-fatal Postoperative Complications*

Abdominal Abscess	5	Coma	2
Wound Abscess	4	Stress Ulcer	1
Urinary Infection	3	Thrombophlebitis	1
Rectal Bleeding	3	Bladder Dyskinesia	1
Wound Dehiscence	2	Brachial Palsy	1
Perineal Infection	2	Peroneal Pasly	1

stein[11] and others have pointed out, in pseudo-membranous colitis, rarely in ischemic bowel disease and amebiasis, it is most characteristic of the fulminant phase of ulcerative colitis.

Fortunately, it is an uncommon complication of ulcerative colitis. According to Spiro[14] it may develop in one to two per cent of patients with this disease. It is apparently more closely related to the severity of the disease than to its duration.

Bockus and his associates[2] first suggested that paralysis and destruction of the myenteric plexus might be the cause of the colonic paralysis and dilatation. McInerney and coworkers[7] have reported distortion and edema of the nerve cells, but others have failed to show consistent changes in the neural mechanism.

Lumb, Protheroe and Ramsay[5] in 1955 emphasized the importance of penetration of the ulcerative inflammatory process into the muscular coats of the colon with necrosis and destruction of muscle fibers as the basis for dilatation of the colon in severe ulcerative colitis. Similar observations by Hickey, Tidrick and Layton[4] led the authors to suggest the term "fulminating ulcerative colitis with colonic wall necrosis" as more accurately descriptive of the condition. Spiro[14] sums up current evidence in stating that "direct inflammatory infiltration of the muscular coats is probably the most important factor in the genesis of acute toxic dilatation and is no doubt the most important factor in subsequent perforation of the colon."

The specific etiology of toxic dilatation remains unknown just as does the etiology of ulcerative colitis. Smith, Law and their coworkers[13] have stressed the possible roles of barium enema, hypokalemia, opiates and anticholinergic drugs in the genesis of toxic dilatation by distending the wall of the ulcerated colon and further impairing its peristaltic activity. While the role of these factors remains uncertain it seems wise to correct hypokalemia and avoid barium enemas and anticholinergic drugs in the acute fulminating phase of ulcerative colitis.

The clinical syndrome of acute toxic dilatation in ulcerative colitis has been well described and when accompanied by radiologic evidence of the characteristic gaseous distention of a dilated, thin walled ulcerated colon (Figs. 1, 2) the diagnosis needs no further confirmation. Most clinicians now recognize that toxic dilatation is potentially lethal and, as Ripstein[11] has said, "is but a step away from perforation of the colon."

The proper course of treatment of toxic dilatation remains controversial. Spiro[14] sums up recent collective experience by stating that about 25 per cent of such patients treated medically will die and 25 to 40 per cent of those who do not respond to medical therapy and who must undergo emergency colectomy will also die.

Adams[1] has recently reviewed the experience with 16 patients at the University of Rochester Medical Center and found that all patients operated on within 5 days after the onset of toxic dilatation survived while three postoperative deaths occurred in patients whose colons perforated during 6 or more days of medical therapy. He summarized evidence from his own study and those of McElwain *et al.*[6] and Turnbull and his coauthors[15] indicating that the great majority of patients who have survived the toxic dilatation syndrome by medical therapy alone or by Turnbull's procedure have subsequently required ileostomy and proctocolectomy. Hence, he questions the validity of the concept that prolonged medical therapy of toxic dilatation is justifiable in the hope that the patient will be spared an ileostomy.

The results of prolonged medical therapy in our series indicate an icreased incidence of perforation of the colon when operation was delayed. Furthermore, serious deterioration in the patient's condition had occurred when operation was finally resorted to in every instance of prolonged delay.

It has been our experience[12] in surgical treatment of ulcerative colitis that the operative procedure of choice is ileostomy and single stage proctocolectomy. We have used this as the ideal objective in dealing with this series of patients with toxic dilatation of the colon.

Turnbull and coworkers[15] have reported highly successful results in early surgical treatment of toxic dilatation by loop ileostomy and transverse and/or sigmoid "side" colostomies. They had one death in 42 patients with this treatment which they consider as a temporizing procedure to get the patient through the toxic phase, clean out the colon and hopefully render the patient a better risk for planned colectomy.

TABLE 6. *Toxic Dilatation of Colon: Late Results*

Operation	Patients	Result	Followup Period
Ileostomy, Colon and Rectum Resected	14	Excellent	1 to 10 Yr.
	1	Satisfactory	Recent Discharge
Ileostomy, Colostomy Colon and Rectum *in situ*	1	Good	2 Yr.

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Discussion

Dr. William H. ReMine (Rochester, Minnesota): As I read over the manuscript, I was impressed with the fact that there was such a terribly long interval between the onset of the acute episode and the time that these patients arrived at a suitable place for treatment.

I was also impressed with the long period of treatment during the chronic phase, up to 17 years. This is part of the problem we are all confronted with: How to get physicians who are handling the primary treatment of these patients to refer them to an institution where they can be adequately treated.

The use of steroids creates a difficult problem because it masks a lot of the acute symptoms that come with perforation and abscess formation, and in addition the patients develop a euphoria which is very misleading. When asked how they feel: They feel great, and they act like they feel great, until suddenly they collapse because of the overwhelming sepsis that has developed.

This is something to always keep in mind in any patient being followed while on steroid therapy.

Now, to get to some of the technicalities of the operation. One often hears the expression "an adequate incision." We now have a situation where a "more-than-adequate incision"should be made, since it is necessary to have plenty of exposure so that it is not necessary to put tension on the bowel until it is properly mobilized.

My approach has been to pack the abdomen off as soon as we enter the abdomen through a more-than-adequate incision; packing off all the areas where you might develop pooling of soilage.

Recently, we have been using a long rectal tube, about a #35 French. This is started before the operation by putting it just in the rectum, and after the abdomen is opened, the tube is passed up as far upward as possible by having someone push it up under the drapes. It can then be guided by hand into adequate position, so that decompression of the soggy bowel can be accomplished.

The use of intra-abdominal antibiotics was not mentioned in the manuscript. Dr. Scott talked about postoperative antibiotics, and certainly adequate use of these is to be encouraged. I think this is one instance where we might think very seriously about using them after careful lavage, which they use, with large, copious quantities of sterile water and sterile saline to lavage out the abdomen in the presence of contamination, but also to use intra-abdominal antibiotics.

Now, anesthesiologists don't usually encourage this, but I think, with judicious use, it can be used quite adequately and helpfully. The only complication I have had with this lately is that the endotracheal tube has to remain in place a bit longer during the immediate postoperative period, but other than this the patients that I have seen have gotten along very well.

The use of the transverse colostomy decompressive maneuver has been discussed.

We have not had much experience with this because, on the whole, if you use proper care with the decompressive tube from below, I think you can avoid having to produce a colostomy that has to be taken down at a future date. I certainly wouldn't refuse to use it, if it were necessary, however, and I think this is something that you have to determine at the time.

Dr. William C. McGarity (Atlanta): It has been our tendency in the last few years to operate much earlier on patients with toxic megacolon, and I feel this has cut down considerably on the mortality and the morbidity. Unfortunately, our friends, the gastroenterologists, tend to attempt to save the patient an ileostomy, or an operation, and by the time the consultation is asked for, many of these patients have an impending perforation, or a free perforation.

We also feel that the treatment of choice is to remove the entire diseased colon. The operative procedure is ultimately dictated by the operative findings. If there are no contraindications, the procedure of choice is to do an ileostomy and a single-stage proctocolectomy. However, if there is any added risk, we do not hesitate to do the total abdominal colectomy, and leave the rectum and rectosigmoid in place, and remove it at a later date. Of course, if the patient is bleeding, then one must remove the entire colon. We have not had any late bleeding, as Dr. Scott reported, from the rectal segment.

I feel that in the patient with an impending perforation, a more conservative approach should be taken. As most of us know, the impending perforation usually occurs in the area of the splenic flexure or in the left colon. In many of these patients we have tended to do what we refer to as a near hemicolectomy. The right colon and right transverse colon are resected, and the left transverse colon is brought out as a vent for decompression of the left colon. We have found that this is a helpful procedure in many of these cases.

However, if the patient has an impending perforation in the transverse colon or the right colon, I certainly think this is the place for the Turnbull procedure. A loop ileostomy and a transverse colostomy is done. In the patients where we have carried out this procedure, we have not found it necessary to do the sigmoid colostomy. If a long rectal tube is inserted prior to laparotomy the distal colon can be decompressed at the time of operation.

Dr. Douglas H. Riddell (Nashville): In the last few years we have had occasion to operate on six patients such as Dr. Scott has presented. In four of these patients a one-stage coloproctectomy was done while two required a two-stage procedure.