

# Emergency surgery in ulcerative colitis

T. A. BOXALL<sup>1</sup>

*From the Department of Surgery, St. Bartholomew's Hospital, London*

**EDITORIAL COMMENT** In reviewing a series of cases of ulcerative colitis which required emergency surgical intervention, the author stresses the lowered mortality which may be obtained if surgery is undertaken before deterioration is advanced. Ileostomy and subtotal colectomy is the operation of choice, and is preferable to conservative measures even in desperately ill patients.

Ulcerative colitis in its milder manifestations may be managed by conservative methods. If these are unsuccessful, or, in the presence of more severe disease, a planned surgical procedure, either subtotal colectomy or proctocolectomy, is the alternative method of treatment. On occasion, however, the rapidity of progression of the disease forces the issue: conservative measures, if any have been instituted, have to be abandoned, and emergency surgery becomes obligatory. The results of such surgery are markedly worse in terms of mortality than interval or definitive procedures (Tables I and II).

One possible method of improving this serious discrepancy between interval and emergency surgery could be an earlier resort to surgery in certain situations. This paper presents an analysis of a group of patients with ulcerative colitis treated by emergency surgery because there was marked clinical deteriora-

tion, in particular, evidence of incipient or actual perforation. In some cases this was a sequel to an acute inflammatory illness; in others it represented a phase of rapid deterioration in an initially more chronic disease process. As Bruce and Cole (1962) remark: 'It must be remembered that on many occasions the patient's condition may deteriorate from day to day, soon reaching the point when operation is associated with a very high mortality rate. The physician in charge must try to prevent this unfortunate circumstance by considering operative therapy early in the disease.'

## MATERIAL

During the period 1950-64 in one surgical unit at St. Bartholomew's Hospital, there were 23 patients (Table III) who received emergency surgical treatment for ulcerative colitis. In the majority of cases this diagnosis was made on the history, physical signs, and sigmoidoscopic examination, and in some by means of a barium enema investigation. In the acute fulminating case where the disease has destroyed the colonic wall in depth, a barium enema can be a dangerous procedure, and is therefore best avoided. Some of the patients also had corroborative evidence of the diagnosis from a rectal biopsy. In every case there was histological verification as the pathological material removed at operation or necropsy supported the diagnosis of ulcerative colitis. In the same period there were in addition a further 61 patients treated by interval surgery. Thus 27% of the series were treated as emergencies.

It is not always possible in making a comparison with other authors to obtain exactly comparable figures, because the emergency cases are taken as a fraction of the total number of ulcerative colitis patients seen and treated medically or surgically. Thus Crile and Thomas (1951) had 31 (5%) acute

TABLE I

RESULTS OF EMERGENCY SURGERY FOR ULCERATIVE COLITIS

<i>Author</i>	<i>No. of Patients</i>	<i>Deaths</i>
Brooke (1956)	13	3 (23%)
Peskin and Davis (1960)	9	2 (22%)
Lennard-Jones and Vivian (1960)	26	8 (31%)
Goligher (1961)	41	12 (29%)
Sampson and Walker (1961)	14	4 (29%)
Hughes (1964)	53	8 (15%)

TABLE II

RESULTS OF INTERVAL SURGERY FOR ULCERATIVE COLITIS

<i>Author</i>	<i>No. of Patients</i>	<i>Deaths</i>
Brooke (1956)	113	8 (7%)
Ripstein (1960)	210	9 (4.3%)
Ewart and Lennard-Jones (1960)	113	5 (4.5%)
Goligher (1961)	104	3 (3%)
Hughes (1964)	115	6 (5%)

<sup>1</sup>Present address: Department of Surgery University of Kentucky, Lexington, Kentucky, U.S.A.

TABLE III

## SUMMARY OF CASES

No.	Sex	Age (yr.)	Disease	Distribution	Severity	Steroids	Operation	Result
1	F	50	Remittant	Left-sided	Acute	Yes	Subtotal colectomy	Well
2	F	39	Remittant	Total	Acute	Yes	Subtotal colectomy	Post-operative obstruction, now well
3	F	30	Fulminating	Total	Early peritonitis	No	Subtotal colectomy	Well
4	F	45	Remittant	Left-sided	Acute	No	Subtotal colectomy	Well
5	F	66	Remittant	Left-sided	Pre-perforation	No	Subtotal colectomy	Post-operative obstruction, now well
6	F	51	Remittant	Total	Early peritonitis	No	Ileostomy	Died (inanition)
7	F	33	Fulminating	Total	Pre-perforation	Yes	Subtotal colectomy	Well
8	F	20	Remittant	Total	Acute	No	Ileostomy	Well
9	F	57	Remittant	Total	Acute	Yes	Subtotal colectomy	Well
10	F	59	Remittant	Total	Pre-perforation	Yes	Subtotal colectomy	Septic embolism, now well
11	F	33	Fulminating	Left-sided	Pre-perforation	No	Subtotal colectomy	Post-operative obstruction, now well
12	F	61	Remittant	Total	Early peritonitis	No	Subtotal colectomy	Well
13	F	41	Remittant	Left-sided	Perforation	No	Subtotal colectomy	Died (peritoneal abscess)
14	M	31	Remittant	Total	Pre-perforation	No	Subtotal colectomy	Lung abscess, now well
15	M	20	Fulminating	Total	Early peritonitis	No	Subtotal colectomy	Well
16	M	25	Fulminating	Total	Pre-perforation	No	Subtotal colectomy	Well
17	M	20	Fulminating	Total	Acute	Yes	Subtotal colectomy	Well
18	M	26	Remittant	Left-sided	Perforation	Yes	Subtotal colectomy	Paracolic abscess, now well
19	M	18	Remittant	Total	Acute	Yes	Subtotal colectomy	Well
20	M	42	Fulminating	Total	Perforation	No	Subtotal colectomy	Died (peritonitis)
21	M	56	Remittant	Left-sided	Pre-perforation	No	Subtotal colectomy	Died (septicaemia)
22	M	57	Remittant	Left-sided	Acute	Yes	Subtotal colectomy	Well
23	M	44	Remittant	Left-sided	Acute	Yes	Subtotal colectomy	Abdominal wall abscess, now well

cases out of 675 colitics, although in fact only 16 came to emergency surgery. Again, in the series of Lennard-Jones and Vivian (1960), 32 acute colitics were discovered in 520 cases, and 26 were operated on. But comparison with Ripstein (1953), who had an emergency surgery rate of 33% in 120 surgical cases, or with Goligher (1961), who had 40% emergencies in 104 surgical patients, gives figures comparable with the 27% of the present series.

## COURSE OF THE DISEASE

Of the 23 patients who form the basis of the present analysis, some were already under the out-patient care of the surgical unit concerned, and were subsequently admitted direct to a surgical ward because of a deteriorating condition. Others were under the care of physicians, who sought a surgical opinion because of rapid progression of the disease.

There were two disease patterns evident. First, 16 cases showed a picture of remission and relapse over a period of years, varying from 22 years to 11 months. It is interesting that three patients presented as an emergency surgical problem after having the disease for respectively 19, 20, and 22 years; all were found at operation to have colitis in a pre-perforation stage, and two post-operatively developed septicaemia, one dying as a result of this complication. The second group comprises the remaining seven patients who presented as cases of a rapidly advancing, fulminating type of disease. The length

of history varied from four months to two weeks. The latter, a young man of 25 years of age, at operation had a toxic megacolon with early peritonitis. The pathological specimen showed a colon with incipient perforation at two sites, and the whole was friable and cut like wet blotting paper.

In both remittant and fulminating groups there were some patients with total colitis, and some with predominantly left-sided colitis (invariably including the rectum) and only minimal changes in the right colon. Although the left-sided colitic has a more localized disease it is evident that this can well be of such severity as to warrant an emergency operation. Of this series there were nine patients with the disease mainly distal to the hepatic flexure, and at operation two had already perforated and three more were on the point of doing so. Two patients in this group died, one of post-operative septicaemia and the other of multiple intraperitoneal abscesses followed by pulmonary embolism. In this left-sided colitis group, the caecum and ascending colon commonly showed some granular changes or early ulceration only, but it was grossly dilated in several patients (Fig. 1).

Four patients in the series had distant complications. One had arthritis, one uveitis, one pyoderma, and another had erythema nodosum. A fifth patient was 16 weeks pregnant when she presented for surgery as an emergency with fulminating ulcerative colitis and the features of toxic megacolon. After recovering from the operation, she had a spon-

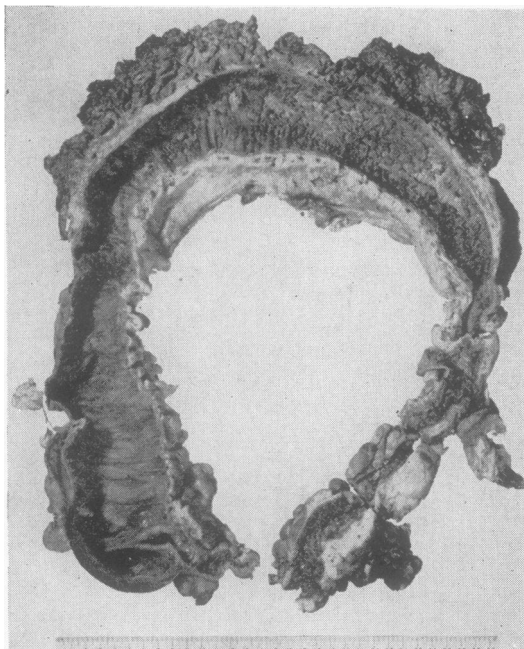


FIG. 1. *Acute ulcerative colitis with changes most marked distal to the hepatic flexure. The caecum and ascending colon show some ulceration and marked dilatation.*

taneous delivery at 25 weeks of a live foetus, which died after four hours.

#### INDICATIONS FOR SURGERY

The most important indications for surgery in this series were clinical in character. Brooke (1956) suggested as criteria for recognizing a fulminating episode of colitis the following: severe toxæmia, pyrexia to 103-104°F., lethargy verging on coma, and serious electrolyte imbalance.

A deterioration is seen in the general condition of the patient who is gravely ill, and in particular has a rising pulse, often of the order of 120 to 130 a minute, and high fever, accompanied by signs in the abdomen. The patient complains of increasing abdominal discomfort from distension, and along the line of the colon is found to have tenderness; in particular rebound tenderness is especially significant because it denotes peritoneal irritation. The abdominal distension may well fill out the normal epigastric hollow below the xiphisternum. The characteristics of bowel sounds vary with colonic dilatation or perforation. Free fluid may well be detected in the abdomen.

Along with these physical signs, certain investigations may prove useful. In particular, a plain radio-

graph of the abdomen will confirm the large bowel dilatation, and if necessary serial films will indicate the progress of this particular feature. A white blood count is frequently raised and electrolyte disturbance is such that the serum sodium, chloride and potassium levels are low, as is the value for serum protein in some cases.

Systemic steroid therapy had been given to 10 of these patients: in seven of them for a limited period of days or weeks, immediately preceding the emergency operation. Steroids had very little effect upon the course of the disease. Although some patients who received steroid drugs were subjectively improved for a temporary period, there was no case in which the abdominal signs were so masked as to make the diagnosis of incipient or actual perforation impossible.

The tendency has been in all these cases to undertake an emergency operation in the presence of the earliest signs of a serious intra-abdominal complication as a matter of planned policy before allowing the patient to deteriorate too badly. The success of this 'early emergency surgery' policy is indicated by the results in terms of mortality (four deaths in 23 cases, or 17%).

Emergency surgery in this series was indicated in all cases showing signs of perforation, present or imminent, with one exception. This was a young man of 18 years of age whose disease worsened acutely and he experienced repeated large bowel haemorrhages. In spite of a transfusion of 8 pints of blood, bleeding persisted, and an emergency subtotal colectomy and ileostomy was done. The patient had total colitis, with a thickened colonic wall and a granular polypoid mucosa. The rectum was also diseased, but the bleeding did not persist after operation and he made a satisfactory recovery.

#### SURGICAL PROCEDURE AND ITS RESULTS

Before operation was possible, electrolyte and fluid disturbances were corrected. In some patients such was the acuteness of their deterioration that no bowel-sterilizing agent was given. In others, anticipating that deterioration was imminent, and also as a specific treatment, phthalyl-sulphathiazole was given in the pre-operative period. When 24 hours' notice was possible, a quick preparation by oral neomycin was given: 0.5 g. hourly for four hours, followed by 0.5 g. every four hours for the remainder of the 24-hour period. As an alternative, streptomycin was occasionally used, by injection or by mouth.

Of 23 patients, only two had an emergency ileostomy. One of these was for a patient who was rapidly deteriorating after an illness of 11 years, and

at operation was found to have peritonitis: she died a week later. The second ileostomy case improved after this operation was done and had a subtotal colectomy six weeks later. The rectum was removed subsequently, and the patient is now (12 years after) alive and well. The remaining group of 21 patients all had a subtotal colectomy and ileostomy as the emergency procedure of choice.

The sequels to operation in both groups are shown in Table IV.

TABLE IV  
RESULTS OF SURGERY

<i>Operation</i>	<i>Sequel</i>
Ileostomy only (2)	One case proceeded to subtotal colectomy and excision of the rectum One died nine days after operation
Subtotal colectomy and ileostomy (21)	11 had an uncomplicated recovery 7 had post-operative complications but survived 3 died in the convalescent period

Of the 11 straightforward subtotal colectomy cases, 10 subsequently had the rectum removed, and one more patient is awaiting this procedure. There were seven patients whose recovery was interrupted by complications: three had intestinal obstruction, one had multiple septic emboli, necessitating a below-knee amputation of the left leg, another had a paracolic abscess, another had an aspiration abscess in the right lung requiring surgery, and the last patient had an abscess of the abdominal wall. These seven patients are now alive and well; five of them have had the rectum removed, one has had an ileorectal anastomosis, and one is awaiting excision of the rectum.

Of the three deaths, these were all related to intraperitoneal sepsis: two had perforations and the third had peritonitis. The causes of death were staphylococcal septicaemia complicated by peripheral circulatory failure, multiple intraperitoneal abscesses, and peritonitis respectively.

Appropriate corticoid cover was given for patients who had received systemic steroids as part of the previous treatment. Of the 10 patients who had received steroid therapy, none died, seven made an uncomplicated recovery, and three had septic complications (septic embolism, paracolic abscess, and abdominal wall abscess).

#### DISCUSSION

It was Ferguson and Stevens (1948) who affirmed that no patient with ulcerative colitis was too ill to be operated on but rather could well be too ill not to be operated on. It is also true as a corollary to this statement that more patients die as a result of the

disease than as a result of surgery for the disease. As Peskin and Davis (1960) and others have pointed out, even extensive operations are well tolerated, provided that most of the diseased colon is eradicated. This is a greatly changed attitude to past ideas of conservative management of the acutely ill patient, with ileostomy reserved for desperate cases as a last resort.

The argument against ileostomy alone is that the diseased colon is left behind, and not only does absorption of its toxic contents continue, but also the disease process may well progress to perforation. Crile and Thomas (1951) remark that the causes of death after medical management or ileostomy alone are similar, and that peritonitis is the commonest. Their own results are a graphic illustration of the dangers inherent in a simple ileostomy as the initial procedure. In their series of 31 cases, 15 were treated medically and 11 died. Of 16 treated surgically by ileostomy alone, there were 10 deaths. A further seven additional cases were then treated with subtotal colectomy and ileostomy, and only one died, a patient who was moribund at the time of operation. In the series of Lennard-Jones and Vivian (1960), of 26 acute colitics treated by surgery, only four had an ileostomy alone but all survived. This they explain, however, by the fact that the colon was already healing at the time the ileostomy was established. Of the remainder, 21 patients had a subtotal colectomy and ileostomy and seven died. Goligher (1961) also experienced a high mortality rate with this operation. He had seven deaths in 17 cases. This is explained, however, by the fact that he used this operation for his worst cases and the more extensive proctocolectomy as his standard operation of choice. He treated a further 24 patients in this way, and had five deaths, an improved result that is clearly related more to the nature of the disease in these patients than to the choice of operation. Subtotal colectomy and ileostomy is more generally accepted as the procedure when emergency surgery for ulcerative colitis is needed (Ripstein, 1954; Diethelm and Nickel, 1963; Hughes, 1964).

It may be difficult to compare the results of different series, and even to compare different operations may be misleading. As Goligher (1961) points out, there may be a wide interpretation of how severely ill a patient is, and under what circumstances an emergency operation is being contemplated. This may well explain the great discrepancy between the results of Ripstein (1953) who had two deaths out of 43 cases of acute colitis (5% mortality), and those of Lennard-Jones and Vivian (1960), with eight deaths in 26 cases of colitis coming to surgery (31% mortality).

The most serious objection to ileostomy alone,

and the commonest cause of death whichever operation is done, is the development of a colonic perforation and then peritonitis. It is because of the serious consequences of perforation that, even though the operation of ileostomy alone has virtually been abandoned, the results of emergency surgery for ulcerative colitis still carry such a high mortality (Table I). It varies from 15% to 31%. It is clearly vital to employ a policy of early surgery and if possible to act before the development of the feature that carries with it the high mortality rate. If results are to be improved, surgery must come sooner. This accounted for the better results obtained by Gallagher, Goulston, Wyndham, and Morrow (1962), who had two deaths in their series of 23 patients. The absence of perforation in their series encouraged them to adhere to this policy of early surgery.

In the present series, where a readiness to resort early to emergency surgery was also manifest, it is interesting to discover that perforation was anticipated, but had not actually occurred, in nearly half of the patients (11 of 23). These patients either showed evidence of an early peritonitis or such gross thinning of the colonic wall as to make perforation certain within hours. In nine patients, although the disease was severe, and causing grave illness, perforation did not appear to be an immediate prospect. Of the remaining three, perforation had already occurred. It is significant that of this small group, two died, and the third recovered, because the perforation became walled off and formed a paracolic abscess, so preventing the development of a generalized peritonitis.

Turnbull (1965) is of the opinion that the patient with a walled-off perforation is a not uncommon occurrence. He feels that these cases are made worse by the surgeon's manipulation of the walled-off area, so in them he advocates a lesser procedure: a loop or end ileostomy with exclusion, together with a right upper quadrant colostomy, and some months later, the colon is removed under safer conditions.

Perforation is the development most to be feared in acute ulcerative colitis. Surgery must anticipate this, and be used before it occurs. It is clearly vital to recognize the pre-perforation state. Many authors have stressed that colonic dilatation may well be the pre-perforation stage (Peskin and Davis, 1960; Sampson and Walker, 1961), but this is not an infallible rule. As Lennard-Jones and Vivian (1960) have described, half their acute colitics had only moderate or no dilatation at all. The phenomenon of colonic dilatation has aroused considerable interest and comment as to its aetiology. Some suggest that it is caused by hypokalaemia (Cohn, Copit and Turner, 1956), or the destruction of the autonomic nerve plexuses in the bowel wall (Bockus, Roth,

Buchman, and Kalsner, 1958), or smooth muscle toxic destruction (Walker and Curtis, 1965), although as Gallagher *et al.* (1962) have pointed out, and in the present series this is confirmed, often the dilatation of the colon is most evident in areas that are not so grossly diseased, as in the right-sided colonic dilatation where there is advanced disease principally on the left side.

Colonic dilatation is associated with the physical signs of a rising pulse rate and rebound tenderness. Both these signs are also present in incipient perforation, and to a greater extent in the patient who has peritonitis. These two signs are thus of particular value when a decision has to be made as to the wisdom and necessity of resorting to emergency surgery in acute colitis.

#### SUMMARY

Against a background of similar series, which illustrate the high risks associated with emergency surgery in acute ulcerative colitis, a series of 23 patients submitted to early operation is presented. In particular the course of the disease, indications for surgery, the type of procedure used, and the results obtained are stated. Discussion includes the findings of other authors, and the case for an earlier resort to surgery in this particular manifestation of ulcerative colitis is argued from the premise that the feature most to be feared is perforation of the diseased bowel.

I wish to acknowledge with gratitude the permission of Sir C. Naunton Morgan to allow me to study these patients under his care, and also for his help and criticism in the preparation of this paper. My thanks are also due to the Department of Medical Illustration, St. Bartholomew's Hospital.

#### REFERENCES

- Bockus, H. L., Roth, J. L. A., Buchman, E., and Kalsner, M. (1958). Ulcerative colitis. In *Modern Trends in Gastro-enterology*, edited by F. Avery Jones. (2nd Series), pp. 296-314. Butterworth, London.
- Brooke, B. N. (1956). Outcome of surgery for ulcerative colitis. *Lancet*, 2, 532-536.
- Bruce, D., and Cole, W. H. (1962). Complications of ulcerative colitis. *Ann. Surg.*, 155, 768-781.
- Cohn, E. M., Copit, P., and Tumen, H. J. (1956). Ulcerative colitis with hypopotassemia. *Gastroenterology*, 30, 950-957.
- Crile, G., Jr., and Thomas, C. Y., Jr. (1951). The treatment of acute toxic ulcerative colitis by ileostomy and simultaneous colectomy. *Ibid.*, 19, 58-68.
- Diethelm, A. G., and Nickel, W. F., Jr. (1963). Primary resection of the colon for ulcerative colitis. *Surg. Gynec. Obstet.*, 117, 438-442.
- Ewart, W. B., and Lennard-Jones, J. E. (1960). Corticosteroids in pre-operative medical management of ulcerative colitis. Do they affect surgical success? *Lancet*, 2, 60-64.
- Ferguson, L. K., and Stevens, L. W. (1948). The surgery of complications of ulcerative colitis. *Gastroenterology*, 11, 640-645.
- Gallagher, N. D., Goulston, S. J. M., Wyndham, N., and Morrow, A. W. (1962). The management of fulminant ulcerative colitis. *Gut*, 3, 306-311.

- Goligher, J. C. (1961). Surgical treatment of ulcerative colitis. *Brit. med. J.*, 1, 151-154.
- Hughes, E. S. R. (1964). Surgery in ulcerative colitis. *Med. J. Aust.*, 1, 743-748.
- Lennard-Jones, J. E., and Vivian, A. B. (1960). Fulminating ulcerative colitis. Recent experience in management. *Brit. med. J.*, 2, 96-102.
- Peskin, G. W., and Davis, A. V. O. (1960). Acute fulminating ulcerative colitis with colonic distension. *Surg. Gynec. Obstet.*, 110, 269-276.
- Ripstein, C. B. (1953). Primary resection of the colon in acute ulcerative colitis. *J. Amer. med. Ass.*, 152, 1093-1095.
- (1954). Perforation of the colon in ulcerative colitis. *Ann. Surg.*, 140, 872-874.
- (1960). The role of surgery in the management of ulcerative colitis. *Amer. J. Surg.*, 99, 152-153.
- Sampson, P. A., and Walker, F. C. (1961). Dilatation of the colon in ulcerative colitis. *Brit. med. J.*, 2, 1119-1123.
- Turnbull, R. B. (1965). Personal communication.
- Walker, F. C., and Curtis, G. T. (1965). Irreversible changes of ulcerative colitis. *Brit. med. J.*, 1, 414-416.